PROMOTING URBAN VITALITY TO OVERCOME URBAN FAILURES IN KOCHI CITY (SOUTHWEST INDIA)

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THESIS REPORT

(2021- 2022)

"PROMOTING URBAN VITALITY TO OVERCOME URBAN FAILURES IN KOCHI CITY (SOUTHWEST INDIA)"

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Master of Science Program in Architecture for the Sustainability Design

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"One cannot make architecture without studying the condition of life in the city"

- Aldo Rossi"

Abstract

The world, especially Asia and Sub-Saharan Africa, is experiencing a massive wave of urbanization. Despite this, it is mostly taking place in the absence of urban planning, with even those municipalities that seek to do so frequently failing to effectively implement them or care for the needs of the majority. As a result, cities are congested, filthy, environmentally unfriendly, and disorganized, jeopardizing citizens' health and happiness. We do, however, have a chance to change that. Over the next 20 years, the world will build as much as has ever been built in terms of sustainable urban development and accompanying infrastructure. Many cities in both rich and poor countries have previously demonstrated how to create cities that are vital, active, sustainable, inclusive, livable, and beautiful.

In short, the intriguing subject to be investigated is how to promote urban life in Indian cities while overcoming urban failures. This report is part of a graduation project at Politecnico di Torino. The main purpose of this paper is to find urban and architectural responses that promote the well-being of inorganic elements, living organisms, and humans that make up the ecosystem. Our spaces have the power to either hurt us or keep us safe.

In this paper, we are here to identify and understand the problems faced by the people in the city, taking into consideration the population growth and increasing demand for transformation facilities and existing resources. The city could be more planned and made liveable by focusing on the master planning process, urban vitality, and urban sociology. This report, as the final version of this graduation project, aims to show the entire scope of the research, including the thesis plan, theoretical framework, thematic development, contextual analysis, site visit, design process, and design evaluation. As the project's final iteration, this report marks the project's completion and, ideally, the first step towards developing cities that transcend their urban shortcomings.

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1 Thesis Plan

Arc de Triomphe, Paris, France

Public spaces in Western Contexts

Public spaces in Non-Western Contexts

India Gate, New Delhi, India

Figure 1: Public spaces in western context (above). [Source: Arc de Triomphe, Paris, France]
Figure 2: Public spaces in non-western context (below). [Source: : India Gate, New Delhi, India]

1.1 Study Motivation

"Architecture is a small piece if this human equation, but for those of us who practice it, we believe in its potential to make a difference, to enlighten and to enrich the human experience, to penetrate the barriers of misunderstanding and provide a beautiful context for life's drama."

---------- *Frank Gehry* ----------

Future Master Planning?

More than half of the world's population already lives in cities, and the "urban transition" that began in the early 1900s will be completed in less than a century. The emerging countries, which are currently in transition, have a larger population than the industrialized countries, which have been transformed for two or three decades. Today, less developed countries account for two-thirds of all city dwellers. While the enormous boom in urbanization in the twenty-first century may be largely predicted, numerous local territorial representations are required, particularly in larger cities that are receiving a lot of attention. The Indian subcontinent is an excellent case study for projecting the evolution of urban population using past city trajectories in relation to the system to which they belong because it is still less urbanized and has a long-standing and relatively trustworthy statistical monitoring system (Swerts et.al, 2014). Despite this, India now has one out of every ten city people in the globe. The urban population of India is already massive. With 38 percent of India's population living in continually built-up communities with more than 10,000 inhabitants, the agglomeration process makes it possibly even bigger (Denis & Marius, 2011). This raises concerns regarding the future expansion of Indian cities, particularly its huge metropolises, in the face of potentially rapid urbanization in the next decades.

Several UN agency sources provide urban population projections for all nations and a few significant cities (UN, 2012). Although they use a logistic curve model to predict the evolution of total urban population, they have been criticized for overestimating urban growth because they are based on linear inter-census growth rates and ignore the major trend in the manifestation of W. Zelinsky's "urban transition" (Bocquier, 2004). (1973). Demographic approaches such as cohort-component, trend extrapolation, and structural models are mostly used in the more advanced population projection methods designed for national and local systems (Smith et al., 2002). Davis' prediction of India's urbanization level in the year 2000 (Davis, 1962) was based on the classic hypothesis of urban transition with a direct reference to the pattern in the United States.

Future Cities for People?

"Architects can't force people to connect, it can only plan the crossing points, remove barriers and make the meeting places useful and attractive"

---------- *Denise Scott Brown* ---------

The second question is: where do I want to focus my efforts in this master planning process? People's perspective on cities is key to comprehending them. The focus of current studies on developing 'cities for people' is on existing cities, which encompasses rehabilitation, observation of existing users, adjusting of the existing system, and so on. Back to the beginning, movements such as Jane Jacobs' renowned conflicts with Robert Moses, Christopher Alexander, William H. Whyte, Edward T. Hall, and Jan Gehl came from places with existing urban fabric, often opposing the redevelopment movement. When these processes are applied to today's urban scenario, especially Asia's booming cities, a fascinating question emerges: "How do we construct cities for people out of existing urban fabric?" Cities work in a similar way to living beings. Their economic and social infrastructure must be in good working order for them to thrive. Through the use of spatial planning tools, there are numerous options for accomplishing this. We're rethinking, redesigning, and re-establishing the very purpose and strategy to planning Kochi, India, in this topic. It is vital to keep in mind the process of a living city in order to ensure that the actions taken are self-reinforcing. The premise that articulating good design on places mixed with the social component of "people come where people are" is a very good approach of addressing this subject could be the greatest example. However, as we will see in the following sections, quantity is not everything, as evidenced by the following characteristics: compact, direct and logical routes, modest space dimension; and a clear hierarchy where decisions made about spaces are the most important. The author Jan Gehl illustrates that increasing density does not lead to more active cities, but rather the contrary, as seen in Manhattan, New York, and even Sydney's downtown.

"Live in a city space has a significant impact on how we perceive the space. A lifeless street is like an empty theatre: something must be wrong with the production since there is no audience."

"Don't ask what the city can do for your building, but what your building can do for the city."

"What it takes to become a good architect? To be a good architect you have to love people, because architecture is an applied art and deals with the frameworks for people's lives"

Design Process	Development Process
Management Process	Space in use

Masterplanning Process

WESTERN

Definition of Urban Vitality

INDIAN

Definition of Urban Vitality

Figure 3: Western definition of urban vitality (Left) [Source:Strøget-Streets&Transportation]

Figure 4: Asian definition of urban vitality (below) [Source:Charminar-Street view]

1.2 Problem Field

Urban Population

"Understanding the demographic changes that are likely to unfold over the coming years, as well as the challenges and opportunities that they present for achieving sustainable development, is key to the design and implementation of the new development agenda," said Wu Hongbo, UN Under-Secretary-General for Economic and Social Affairs.

India's urban population outnumbers that of other highly urbanized countries and areas throughout the world. In a few decades, half of the country will be 'urbanized,' signaling a turning point in the country's economic transition. By 2036, urbanization is predicted to account for 73 percent of overall population growth (MoHFW, 2019).

Cities currently house 54 percent of the world's population, with that number expected to climb to 66 percent by 2050. (UN, 2014). India, China, and Nigeria, according to the UN DESA's Population Division's 2014 assessment of World Urbanization Prospects, will see the most urbanization increase. Between the years 2014 and 2050, these three countries are expected to contribute for 37% of global urban population growth. India is expected to add 404 million urban residents by 2050(UN, 2014). From 746 million in 1950 to 3.9 billion in 2014, the worldwide urban population rose at a rapid pace. Despite having a lower rate of urbanization than the rest of the globe, Asia is home to 53 percent of the global urban population. Many studies and agendas in the subject of urban development have been raised in response to this forecast. In the context of Asian cities, the focus is more on extended metropolitan regions, peri-urban regions, decolonization, and urban slums, also known as informal settlements. Living conditions in informal settlements are generally poor, and many urban population growths are allocated in these informal settlements around the inner city. However, since informal settlements account for up to 30% of total urban population (UN-Habitat, 2004) and 43% in developing countries (UN-Habitat, 2001), the rest must be accommodated in other urban areas, such as suburban and new towns in the peri-urban zones.

Lack of planning and economic growth

"Managing urban areas has become one of the most important development challenges of the 21st century. Our success or failure in building sustainable cities will be a major factor in the success of the post-2015 UN development agenda," said John Wilmoth, Director of UN DESA's Population Division.

Some studies that have been done about the planning and design of urban cities in Asia focuses on stakeholder dynamic

Growth rates and Percentage of Urban agglomerations by size class

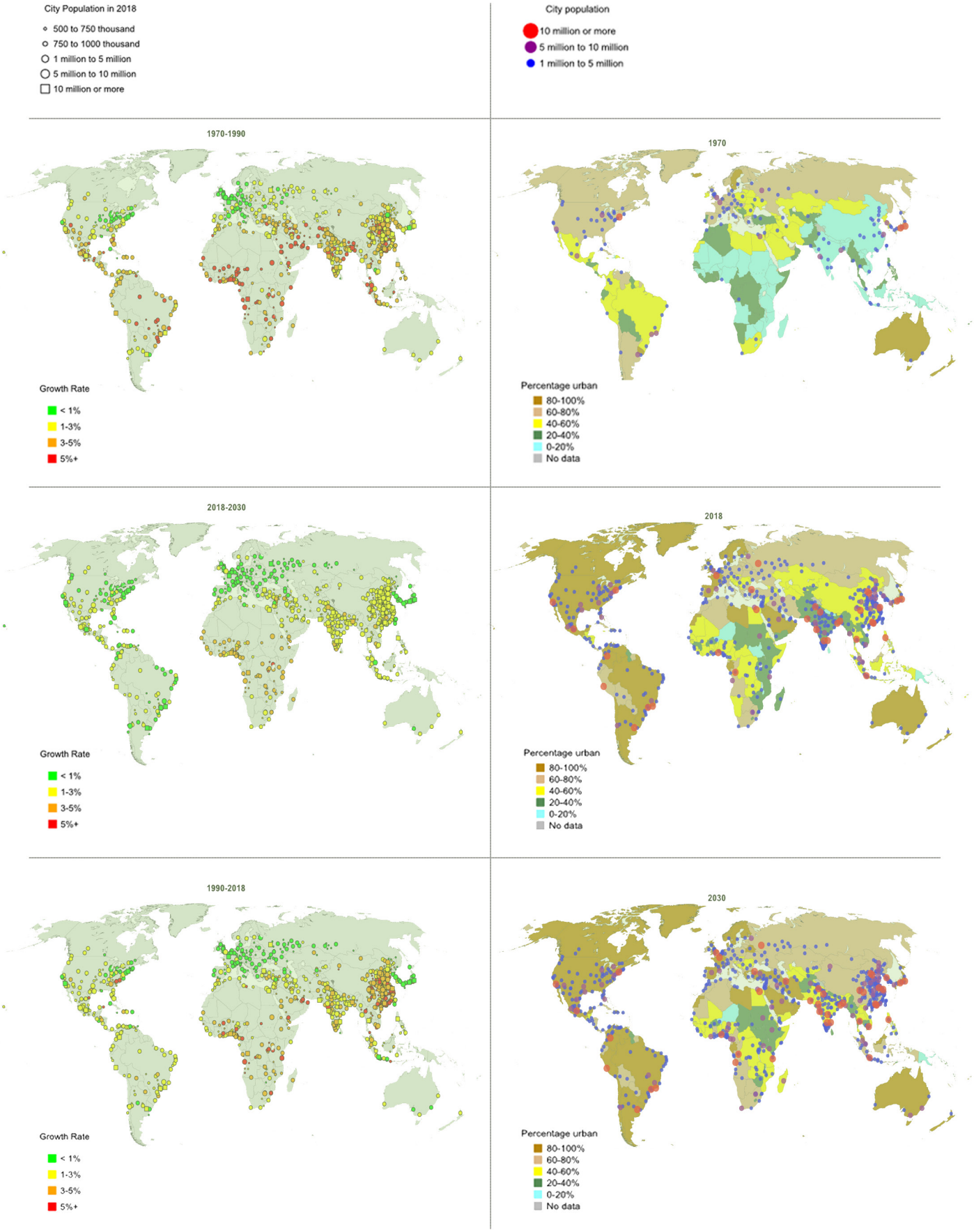


Figure 5: Growth rates and Percentage of Urban agglomerations
[Source: (United Nations, Department of Economic and Social Affairs, and Population Division, 2019)]

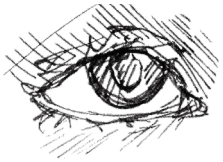
and developed theme and implementation process dynamic between planned and unplanned cities similarities with capitalist first world city and urban vitality. The latter study cited "the difficulty of making a town into a socially, culturally, and economically balanced city" as a common problem of many recent (Cities of Tomorrow, 2011) towns. Aside from urban vitality, the master planning process is a common issue in this Asian city. According to their research, the issue is not with the spatial design form (masterplan, urban design, and architecture), but with the implementation process and the implemented result. Over the years, cities have expanded and become burdened by the stresses and strains of unplanned urbanization, the brunt of which is faced by the poor and the marginalised, the biodiversity and the economy. In fact, Covid-19 revealed the dire need for planning and management of our cities, with an emphasis on the health of citizens (World Cities Report, 2020). Lack of serviced land, traffic congestion, pressure on basic infrastructure, high air pollution, urban flooding, water scarcity, and droughts are not simply a reflection of infrastructural deficiencies in cities. These issues indicate a deep and substantial lack of adequate master planning and urban sociology.

Massive capacities for problem-solving, creativity, and ideation are required to address present and future difficulties in the development and management of cities, towns, and their infrastructure. Urbanization, which is frequently a major driver of economic expansion, is intrinsically tied to development.. As India approaches the tipping point of shifting from a predominantly rural to an urban culture, the focus must be on securing the best economic growth possibilities for all parts of the population. It is concerning that, despite significant investment, our cities continue to face numerous efficiency and sustainability difficulties (Reforms in Urban Planning capacity in India, 2021).

India's future depends on urbanization. Our cities take up only 3% of the country's land area, but they account for 60% of the nation's GDP. India is rapidly advancing toward being half-urban in a few decades. This would open up significant economic development and global competitiveness potential. Efforts must be focused on ensuring the nation's readiness to manage such a major urban shift and saving our cities from the ravages of uncontrolled urbanization and unregulated construction. The government has put in a lot of work in the urban sector over the last few years (RUPCI, 2021).

Unplanned urbanization has the potential to be disastrous. In short, the product, i.e., the spatial aspect of urban vitality, and the method, i.e., the master planning process, are the two most significant components in constructing dynamic cities.

1.3 Problem Definition



Spatial and Functional Aspects of Urban Vitality

Urban vitality is a key indicator of a city's attractiveness and competitiveness, as well as its ability to support long-term growth. Urban vitality, as a new source of urban competitiveness, aids a city in gaining comparative advantages, resulting in long-term economic growth and regional innovation (Barton H, 2009). People's pleasure with all aspects of urban life is central to the concept of urban vitality (Lynch K, 1984). It is difficult to capture the extensive meanings of urban vitality in specific measures (Front Public Health, 2021). Many academics have attempted to assess urban vitality from various perspectives. (Yue et al, 2019) they used the elements of the built environment, human activities, and human–environment interaction to determine urban vitality. Urban space was subdivided into economy, culture, and society, and urban vitality was classified as economic, cultural, and social vitality (Pugalis. L, 2009). Many researchers define and quantify urban vitality in terms of various features (Numerous spatial scales (e.g., jiedao units, community neighbourhoods, and street blocks), and multiple temporal horizons are considered (Jacobs.J, 1961 and Gehl.J, 1971) conceptual framework (e.g., night-time, twilight, and early morning).

Master Planning Process

The master planning process, as well as the implementation process and results, is a common concern in Asian cities. As a result, a well-established model must be used to analyze this master planning process. To have this paradigm, city master planning must be viewed as a sub-field of the designated urban design field. A master plan can take a variety of forms, but it is essentially a dynamic long-term planning document that establishes the foundation for future development. It aids in the creation of new ideas. If you're aiming to redevelop a downtown area, for example, you'll need a 10-year to 15-year plan to keep growth consistent over time. (Washburn. A, n.d.) The end result of urban design and master planning may vary depending on the era, but the process remains consistent. It's a kaleidoscope, with maddeningly complex patterns emerging from the collision of three opaque forces: politics, finance, and design. When a city's growth pattern becomes a threat to its well-being, compliance becomes counterproductive, and urban design must face its own shortcomings.

1.4 Context Introduction

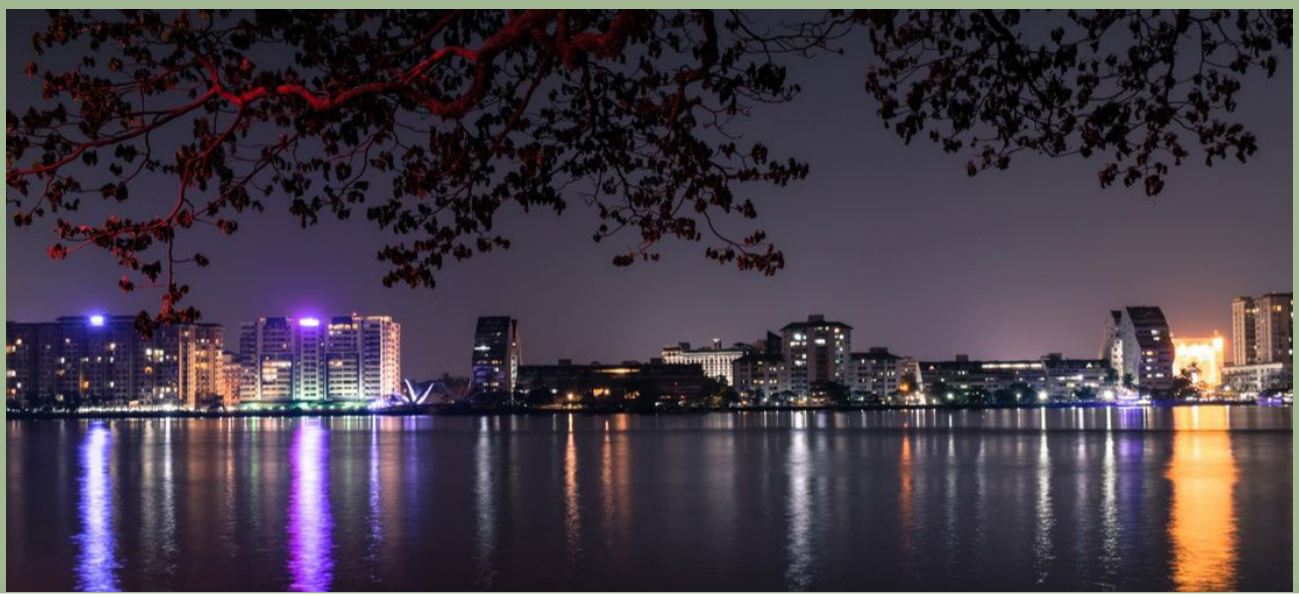
1.4.1 Why Southwest India?

By 2050, India's urban population will account for 14% of the global urban population. In fewer than thirty years, half of India's people will be forced to live in cities, resulting in massive changes in the environment, economic structure, and social life (Swerts et al, 2014, p. 43-52). To anticipate India's urban future, we assumed that all individual urban agglomerations' secular and present growth trajectories would be primary drivers of future urbanization trends. We show that India's city system follows a dispersed growth model, and that its hierarchical distribution is constantly changing (Swerts et al, 2014, p. 43-52).

We show here that the city of Kochi's location has an impact on its growth trajectory. Kochi, often known as the "Queen of the Arabian Sea," has long been the center of Indian spice commerce (KMC, 2018). It is located on the southwest coast of India at 9°58'N 76°13'E. The Cochin Stock Exchange, the Indian Navy's Southern Naval Command, and state headquarters are all located in Kerala's commercial metropolis. Kochi has a well-connected mode of transportation network. Kochi has the second highest population density statistic, with 6340 people per square kilometer, with a population of 601574 as of 2011 (Walkability Study, 2017).

Map 1: Context Location Maps.

[Source: drawing by the authors based on GADM Maps and Data]



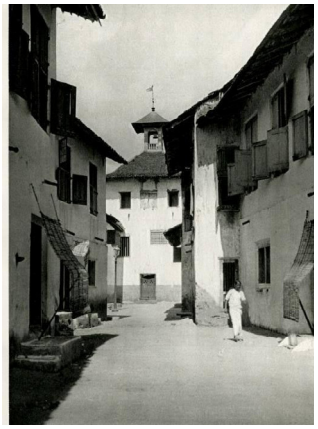
1.4.2 About Kochi City

Introduction

Queen of the Arabian Sea: Kochi, originally Cochin city, is a major port on the Arabian Sea's Malabar Coast, located in Kerala's west-central region (KTDC, 2017). Kochi is the name of a former princely kingdom as well as a group of islands and settlements. Trikkakara, Eloor, Kalamassery, and Trippunithura are all part of the urban agglomeration. The city is governed by the Kochi Municipal Corporation, which was established in 1967, and the Greater Cochin Development Authority (GCDA) and the Goshree Islands Development Authority are the statutory bodies in charge of the city's development (GIDA).

History

Muziris, a port north of Kochi (usually identified with Kodungallur in the Thrissur district), was the center of the Indian spice trade for many years and was known since antiquity to Arabs, Yavanese (Greeks and Romans), Jews, Syrians, and Chinese. (History of Ernakulam, 2007). After the huge flood of the Periyar River in 1341 destroyed the port of Muziris in Kodungallur (Cranganore), Kochi grew in importance as a commerce center (History of Kochi Rajas, 2009). The first documented references to Kochi may be found in texts written by Chinese adventurer Ma Huan during his voyage to Kochi as part of Admiral Zheng He's treasure fleet in



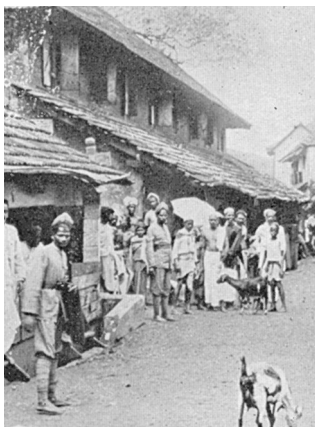


Figure 6: Night view image of marine drive, Kochi city.
Figure 7: Historical images of Kochi City. [Source: Memories of Broadway]

the 15th century (Ma Huan, 1970). Kochi is also mentioned in the chronicles of Niccol Da Conti, an Italian adventurer who visited Kochi in 1440. In the early Middle Ages, the monarch of Perumpadappu (near Ponnani) retreated to Kodungallur after the Zamorin of Calicut conquered the Ponnani area following the Tirunavaya War. S. Menon, 2007) They afterwards relocated to Kochi and founded the Kingdom of Cochin.

Culture

Kochi's culture has been enriched throughout millennia by numerous waves of migration. The Malabar Yehuden - and now increasingly known as Cochin Jews - who figured prominently in Kochi's business and economic strata and owned several Synagogues across the city once had a large Jewish community that played an important role in the city's business and economic circles (The Jews, Israel and India, 2006). (The Jews, Israel and India, 2006). Kochi is also the state's business and financial hub, and it is gradually establishing itself as one of India's commercial cities. For a long time, Syriac Orthodoxy was Kochi's only Christian tradition. However, when the Portuguese arrived in the 16th century, Roman Catholicism became the dominant religion.

Figure 8: Photos showing culture and festivals of Kochi
[Source: Cultural Kochi - Lonely Planet]

Architecture

At various times throughout history, three colonial empires had occupied the area for centuries (Historical Building of Fort Kochi, n.d.). They all left their imprints on Fort Kochi's geography and culture, as well as important contributions to its art and architecture. The historic structures are the most visible manifestations of the colonial influence (HBFK, N.D.). Many of them have been kept, despite the fact that some are ruins. Kochi has grown alongside the canals, and the architectural style has changed with the seasons. Kochi and Kerala are known for their slant-roofed vernacular structures.

Climate

Kochi's climate is tropical monsoon and has low seasonal temperature changes and medium to high humidity due to its proximity to the equator and coastal location. Annual temperatures range from 23 to 31 degrees Celsius, with a high of 36.5 degrees Celsius and a low of 16.3 degrees Celsius (ETRIS, 2016). Kochi is positioned on the windward side of the Western Ghats, the southwest monsoon produces significant rains from June to September. Because Kochi is on the leeward side of the northeast monsoon, it receives lighter (but still significant) rains from October to December. The annual rainfall is 3,014.8 mm (118.69 in), with an average of 124 wet days per year (CCT, 2015).

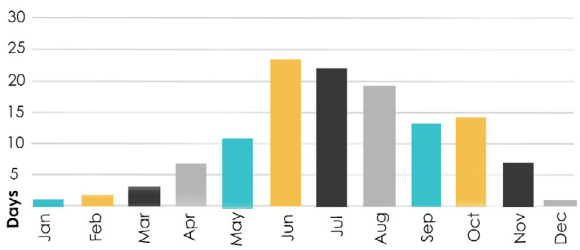


Chart 1: Average rainfall in Kochi (mm)
[Source: by author based on India Meteorological Department]

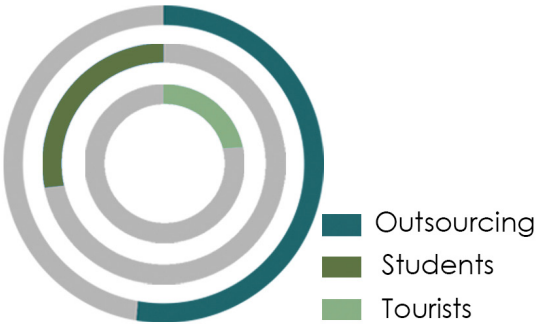
Figure 9: Different style architecture in kochi (Above)
Figure 10: Monsoon in Kochi (Below)

Demography

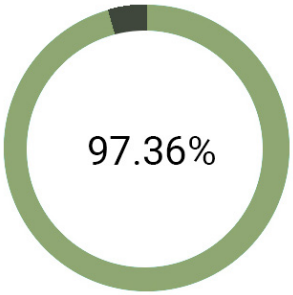
Total Population: 633, 553

Male: 312, 358 Female: 321, 195 Total Households: 122, 084

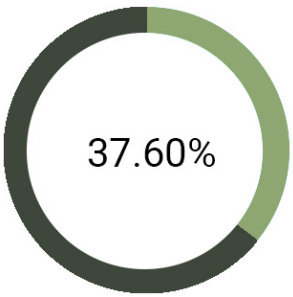
Floating Population



Literacy Rate



Total Workers



Age Group

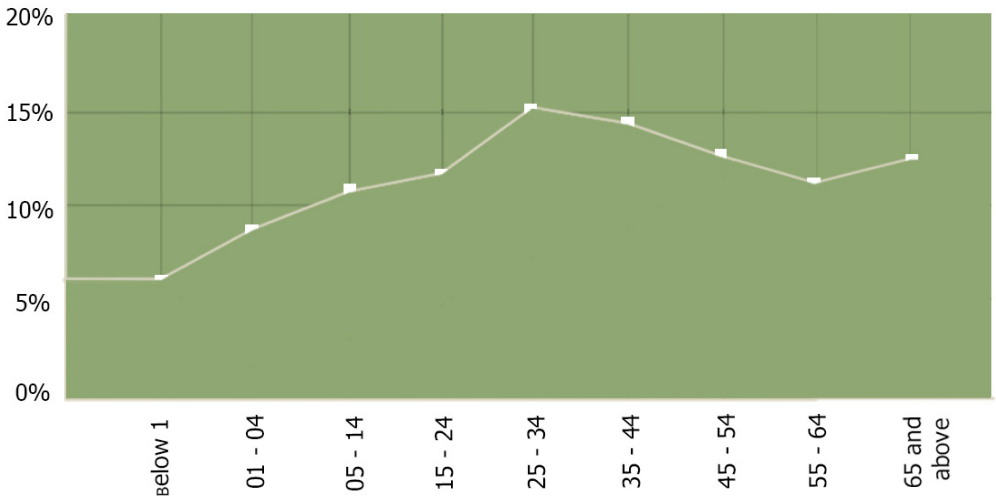


Chart 2: Demographic datas of Kochi [Source: Kochi City Population Census 2011-2022 | Kerala]

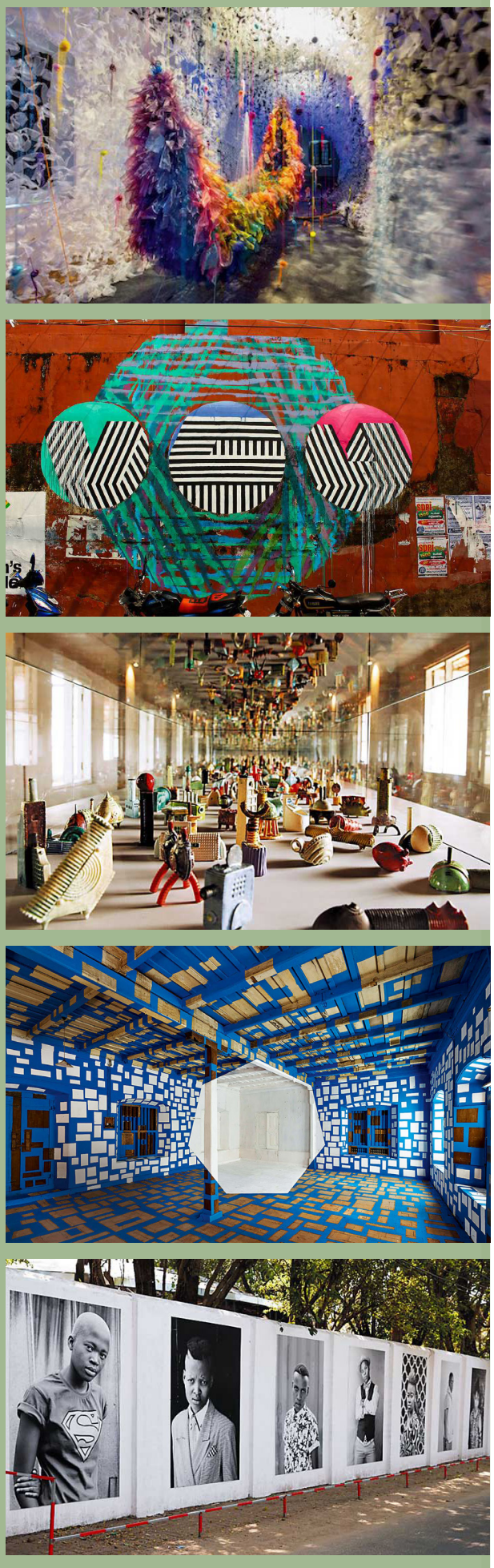


Figure 11: Kochi muziris biennale art and installations
[Source: Kochi-Muziris Biennale 2020]

Kochi Biennale

The Kochi-Muzitis Biennale (KMB) is India's first biennale of contemporary art. The first two editions: KMB 2014 and KMB 2016 - began on the same day and lasted 108 days. It was thematically focused on freedom of expression and social activism Kochi in 2012, historical currents (14th to 17th) centuries the maritime explorations in 2014, forms and approaches to art practice, with artistic expression by including poets, musicians, and performance artists from different cultural and artistic traditions in 2016. In essence, over three editions, the idea of community and social engagement was carefully integrated into the curation. It is a first attempt to capture the rise of Kochi as a creative city and a story of progress through cultural influences, a place where art can thrive. The overlap of people and events, the focal points of censorship, and the settings point to the crucial importance of the political, cultural, literary, scientific, and philosophical climate necessary for ideas to flourish and develop (KMB, 2018).

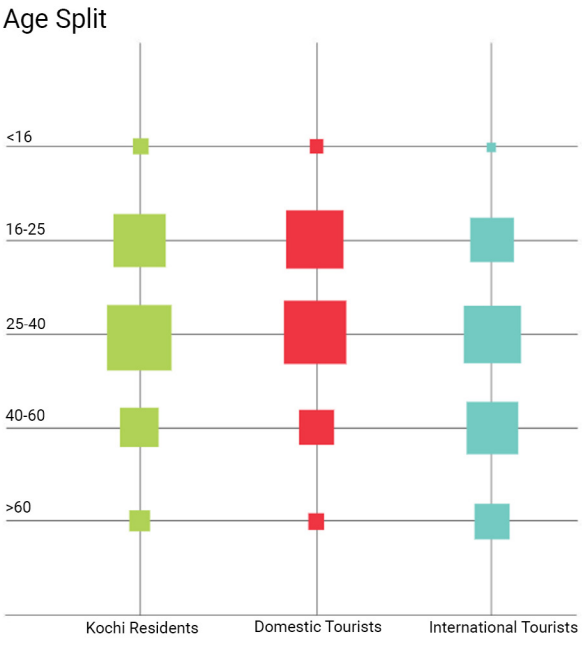


Chart 3: Kochi biennale visitors age split
[Source: Kochi- Muziris Biennale | Impact Assessment Study]

1.4.3 Urbanization in Kochi (Ernakulam District)

Kochi's urbanity is inextricably tied to its reputation as a global trading hub, which provides its modern underpinnings by bringing in new ideas, technologies, and human resources from both domestic and international sources. (EKC, 2020) Ernakulam became the state's most urbanized district as a result. Its urban population (2,119,724) and the percentage of urban to total district population (68.07%) qualify it for national urban policy frameworks, which is one of the numerous reasons why it is a part of the country's flagship Smart Cities Mission.

Kochi is inextricably linked to Kerala's vast waterways. The region is an urban system with strong connections in terms of trans- port and trade at the global, regional, and local levels. Its people are always on the move, and migration to global capitals brings income, talents, and resources back to the country. It's crucial to recognize its urbanity. Its diverse biological landscape reflects a long history of active participation in commercial activities and trade routes, combined with an old sense of global cosmopolitanism (EKC, 2020).

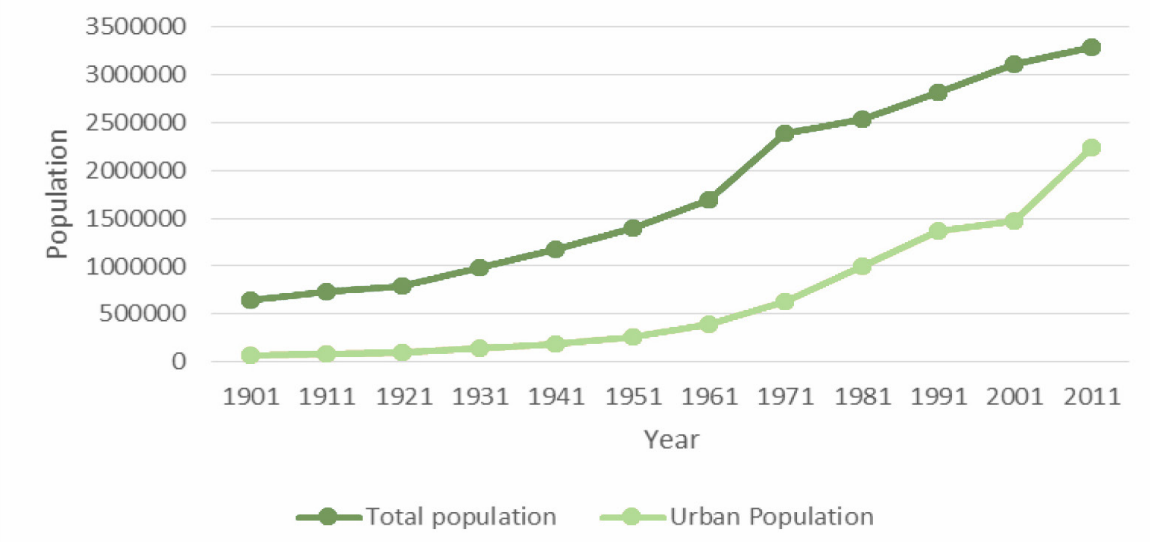
The old municipal areas of Fort Kochi, Mattancherry, Ernakulam, and a few towns adjacent to Ernakulam are now merged into the Corporation of Kochi. The city's boundaries were primarily increased along road traffic corridors as a result of population expansion. Today, the Kochi water metro is making up for decades of neglecting the city's historical river and back-water-based mobility (EKC, 2020). This marginalization resulted in primarily unplanned urban development, putting a strain on nearby panchayats due to increased construction activity and a continuing lack of civic infrastructure. The 2030 Sustainable Development Goals were adopted by all UN member states in 2015. (SDGs). These goals should be considered an overall guideline for approaching this urban design in Kochi, in addition to the city's existing growth strategy. The fundamental theory was that an approach to integrated urban development could only be conceivable and successful if it focused on the various functions of the city and factored in its specific socio-cultural, economic, and ecological features (EKC, 2020).

The City Vision

"An economically productive, effective and egalitarian metropolis which will provide to all sections of society the desired level of services and attract worldwide attention as a preferred destination for Health care, services" - City Development Plan, Kochi

"The Vision is 'to transform Kochi into an inclusive, vibrant city of opportunities with efficient urban services sustainable growth and ease of living" - Cochin Smart City Mission Limited's Vision.

Process of Urbanisation in Ernakulam District



Degree of Urbanisation in Ernakulam, 1901- 2011

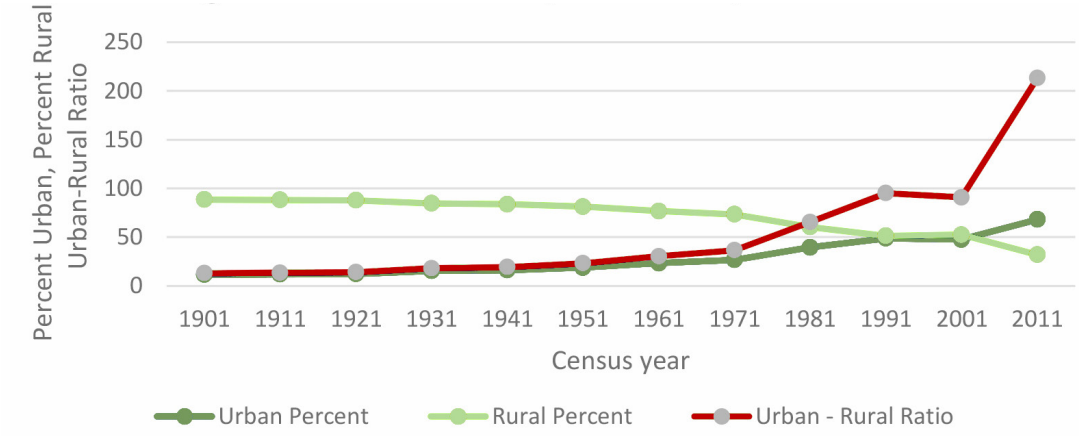


Table: Degree of Urbanisation in Ernakulam, 1901- 2011

Year	Urban Percent	Rural Percent	Urban - Rural Ratio
1901	11.48	88.52	12.97
1911	11.88	88.12	13.48
1921	12.22	87.78	13.92
1931	15.32	84.68	18.09
1941	16.19	83.81	19.32
1951	18.79	81.21	23.14
1961	23.27	76.73	30.33
1971	26.69	73.31	36.41
1981	39.56	60.44	65.45
1991	48.74	51.26	95.08
2001	47.56	52.44	90.69
2011	68.07	31.93	213.19

Table 1: Indicators and description of Place-Shaping process
[Source: Kochi- Muziris Biennale | Impact Assessment Study]

Chart 4: Process of Urbanisation in Ernakulam
Chart 5: Degree of Urbanisation in Ernakulam, 1901- 2011

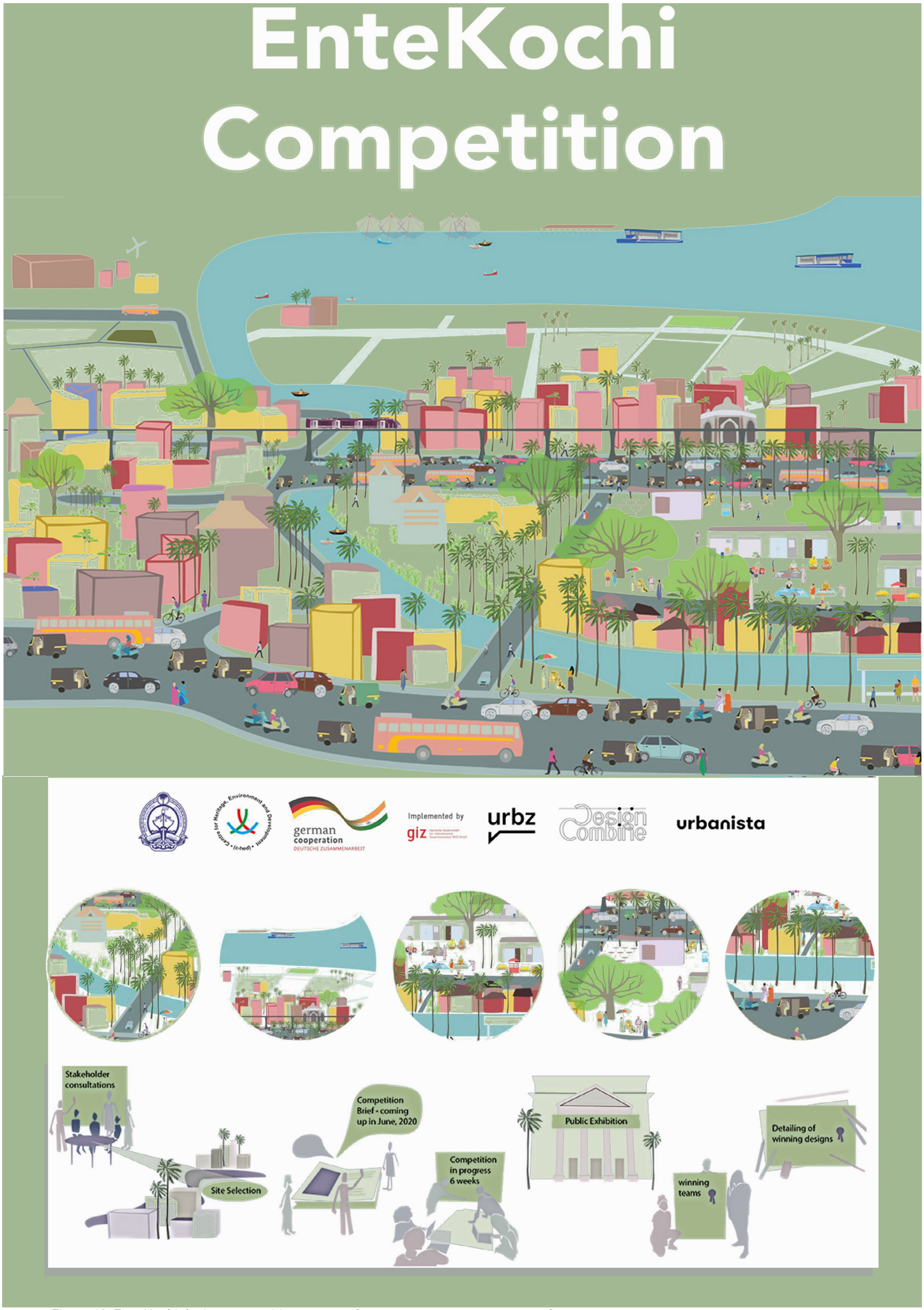


Figure 12: Ente Kochi design competition poster [Source: Entekochi Competition]

1.4.4 EnteKochi Competition Overview

The Kochi Municipal Corporation (KMC) and the GIZ (German Agency for International Cooperation) jointly invite all creative minds in urbanism, architecture, landscape design, as well as environmental and social scientific professionals, are invited to participate in the EnteKochi-Competition, the next phase of EnteKochi (My Kochi).

The (EnteKochi-Competition, 2019) is a national level Urban Design Competition (UDC) that aims to jointly 'design the future city' of Kochi. It is envisaged to plan and then facilitate the implementation of an integrated civic project that is of key relevance for the sustainable development of Kochi.

The initiative was set up as an urban-lab to encourage people to think about and discuss the city together. It is acceptable to make mistakes and to consider and develop ideas "outside the box" in this setting. Everyone has the ability to address issues, explore alternate possibilities, and push current limitations in order to make Kochi the finest city it can be. EnteKochi functioned as the essential spark that is now generating a powerful momentum in the form of participatory planning in Kochi. It has shown, as an exemplary process, how inputs from different sources and user-groups can be integrated and lay the foundation for a better future city (EKC, 2019)

Figure 13: Activities showing EnteKochi Competition phase 1. [Source: Entekochi Competition]

THE HINDU

Stress laid on flood mitigation efforts near Mullassery canal

Safe public spaces, walkways among solutions proposed at urban design competition

ABHINAYA HARIGOVIND
KOCHI

Flood mitigation measures, accessible and safe public spaces and pedestrian-friendly walkways are all part of solutions suggested for the area around the 1.3-km-long Mullassery canal as part of an urban design competition. It had invited entries in an attempt to troubleshoot the environmental, infrastructural and social challenges that the area presents, without displacing people in the vicinity.

As part of EnteKochi, an urban design competition was organised by the Kochi Corporation in association with GIZ (German Agency for International Cooperation) under the Sustainable Urban Development - Smart Cities project (SUD-SC).

A nine-member jury of urban designers, researchers, academic experts, and architects recently selected three winning entries out of 117 submitted by teams from across the country. To ensure resilience to climate change, the winning entries focus on solutions such as multifunctional urban spaces and floodable landscapes, where water can be allowed to expand along the banks during high levels of rainfall, and when the water recedes, those areas can be used for purposes like sports. Softening of canal edges and removing its concrete banks to replace them with green patches that allow water to percolate was also suggested, besides integrating the KSRTC bus station well with the surrounding areas to be turned into an accessible, safe and gender-sensitive space. Turning the canal edge into a walkway with a bike path that could connect the bus station, boat jetty, and the nearest metro station, streamlining informal vending spaces, restoration of the Jewish cemetery in the area, creating safe well-lit public spaces and an amphitheatre in the vicinity of the Indira Priyadarshini Park were proposed by the winning entries.

Waiting for revival: A file photo of the Mullassery canal in Kochi. Softening of the canal edges and removing its concrete banks to replace them with green patches were among the suggestions made at the competition.

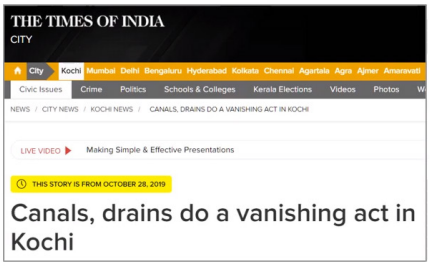
For K.T. Ravindran, Delhi-based urban designer, chairman of the Architectural Heritage Advisory Committee of INTACH and head of the jury, the methodology proposed by the winning entries looks at the locality and people's needs with as much importance as the environment.

Georg Jahnsen, an urban planner and project manager for SUD-SC, who was part of the jury, said the ideas would require a few months to be further detailed before they could be implemented. While implementation and procuring funds will be the Kochi Corporation's mandate, GIZ and the supporting planning agencies Urbanista (Germany), Urbz (Mumbai), and Design Combine (Kochi) offered technical expertise with the competition and fine-tuning of solutions. The solutions, in their implementation, will take into consideration the consent of the people living and working in the area and will not cause any displacement, Mr. Jahnsen said.

The winning entries, once detailed, will have to be presented before the corporation council for its approval, besides consulting all other stakeholders, including people in the vicinity of the canal, said Rajan Chedambath, director, Centre for Heritage, Environment and Development (C-HED).

"Some roads passing by the canal are fairly narrow and to what extent work in the area might be possible without affecting transport is not clear. Improving the living standards of residents and renovating the bus station will be essential to make the project meaningful," said K.V.P. Krishnakumar, councillor representing the area.

However, the city also faces issues like...


THE TIMES OF INDIA
CITY

Canals, drains do a vanishing act in Kochi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Kochi in deep waters yet again

With memories of last year's flood yet to fade away, Kochiites had to face another deluge on Monday morning with heavy rain pounding the city.

Published: 22nd October 2019 07:06 AM | Last Updated: 22nd October 2019 07:06 AM


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Kerala staring at ecological disaster as 3,176 tonnes of waste dumped everyday

Environmentalist C R Neelakandan said solid waste management in the state is pathetic.

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WATER

Groundwater quality declines in Ernakulum due to coastal erosion: study

A study by JNU researchers shows that shoreline changes between 1971 and 2007 affected groundwater quality in we 27 sites


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Home › Cities › Kochi

An unsafe city for women

It seems that the high-decibel campaigns to bring down a women have not yielded results as there was a double-fold crimes against women in Kochi.

Published: 18th February 2019 01:10 AM | Last Updated: 18th Februar

By Arun M
Express News Service

KOCHI: It seems that the high-decibel campaigns to brin atrocities against women have not yielded results as the

Figure 14: The hindu news report on Mullaserry canal(Above) [Source:Entekochi Competition]
Figure 15: News reports on different issue of Kochi(Below) [Source: Kochi Indian News, Culture, Politics | TNIE]

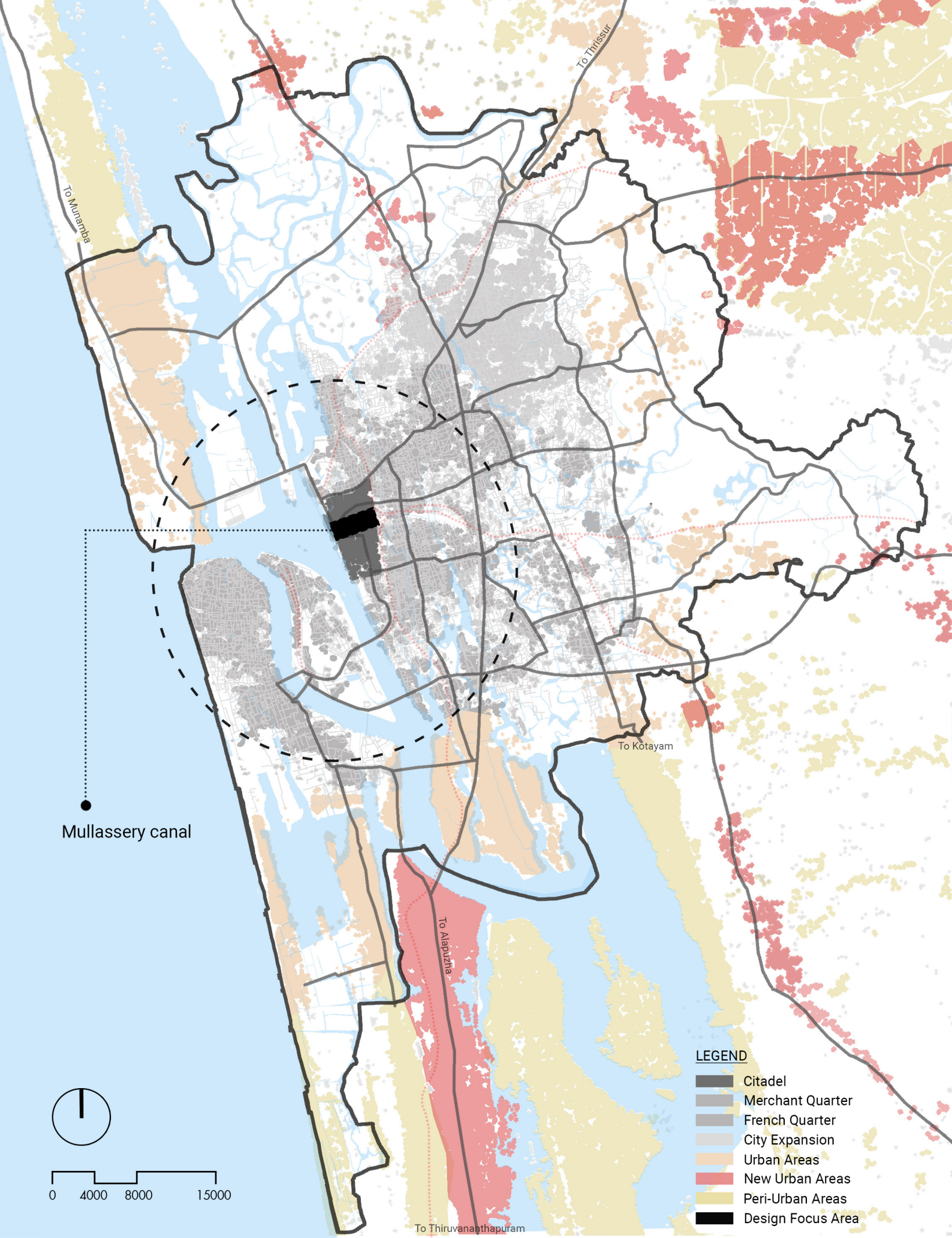
1.4.5 Regional Context of Kochi

Kochi is located on India's southwest coast at 9°58'N 76°13'E and has a corporation limit area. The **Kochi Municipal Corporation** is the municipal corporation in charge of a portion of Kochi, India (also known as Cochin). The Corporation manages 94.88 km2 of Kochi city, which has a population of 677,381. It is the state's most densely populated city corporation. The city has grown significantly beyond the corporation limits established in 1967 over the years, though the official city limits have yet to be increased (KCDP, 2016).

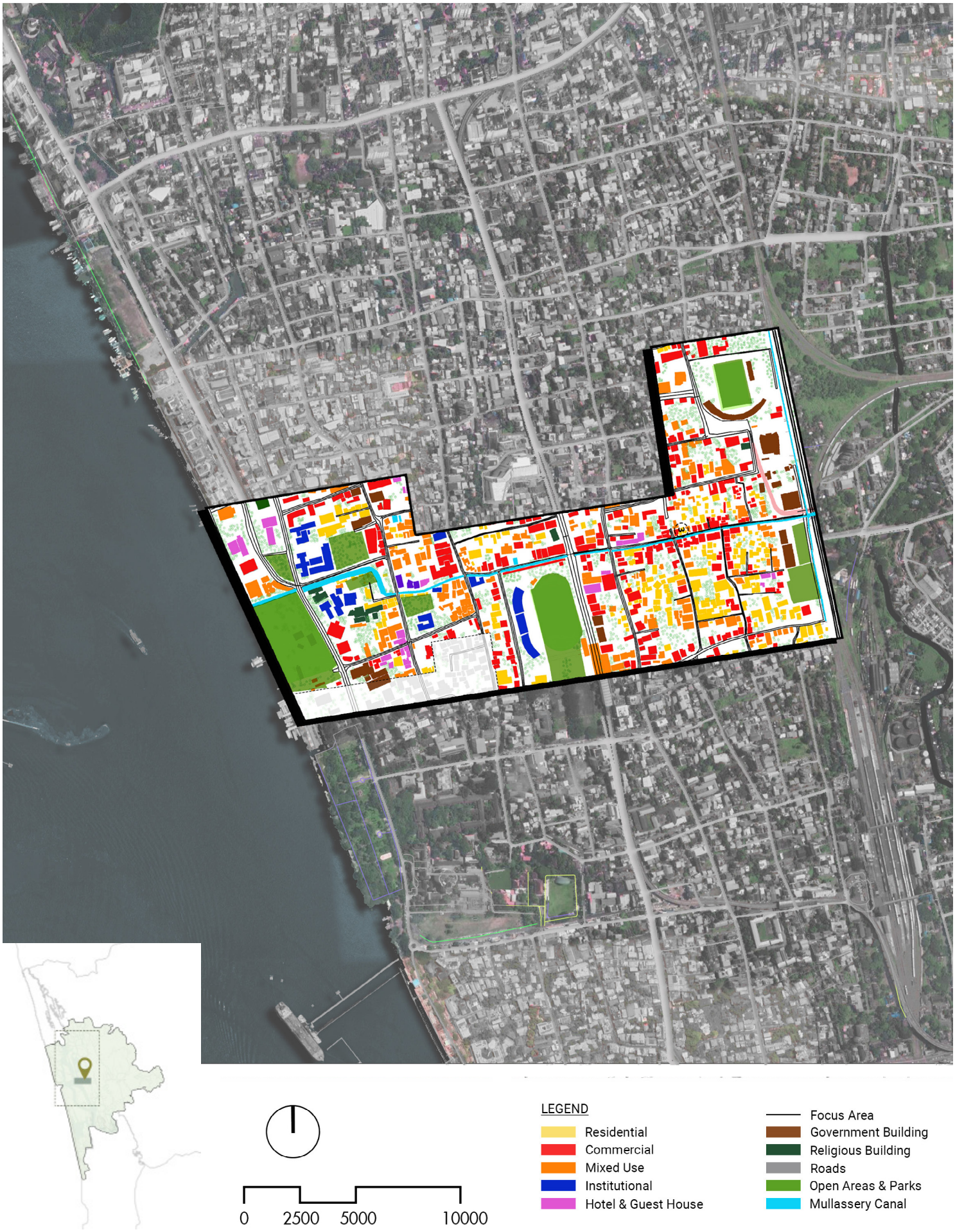
The city straddles the backwaters, taking in the northern tip of a peninsula, several islands, and a portion of the mainland. The Laccadive Sea is to the west, and the rest of the mainland is urbanized to the east. Kochi is mostly at sea level, with a 48-kilometer coastline (Cochin (A Monograph), 2010).

Kochi's current metropolitan boundaries include the mainland Ernakulam, Fort Kochi, and the northeastern suburbs of Edapally, Kalamassery, Aluva, and Kakkanad. Tripunithura to the southeast, and a smattering of islands in Vembanad Lake. Within the Kochi metropolitan limits, the state government and the GCDA intend to include Mala and Kodungallur in the Thrissur district, Angamaly, Perumbavoor, Piravom, and Kolenchery in the Ernakulam district, Thalayolaparambu and Vaikom in Kottayam, and Cherthala in the Alappuzha district. The newly formed metropolis would be overseen by a new authority known as the Kochi Metropolitan **Regional Development Authority** (Kochi Forward for Metro Status, 2015). However, according to The Hindu (Indian Newspaper), the state government has yet to take any concrete steps in this regard.

The central city, three municipal towns (Aluva, Perumbavur, and Paravur), and three townships (Thrikkakara – Kalamassery, Ambalamugal, and Eloor) were considered as locations for the urban population. The urban periphery zone was supposed to limit Cochin's horizontal urban expansion and protect the ring towns' autonomy. Roads (bypass to Central City, radial links to Thrikkakara and Ambalamugal, and improvement of existing system), commercial centers, and housing were among the proposed. The **Cochin Town Planning** Trust was established in 1963 to carry out the interim plans' recommendations. The trust started a variety of neighborhood improvement projects. This was the city's first systematic effort to guide its planned growth. The Municipal Corporation of Kochi created a CDP in 2006, which was authorized by the **MoUD and MoHUPA.** The CDP's goal is to create a city development framework for Kochi and its environs.



Map 2: Regional Context of Kochi.
[Source: by author based on Kerala Sustainable Urban Development Project]

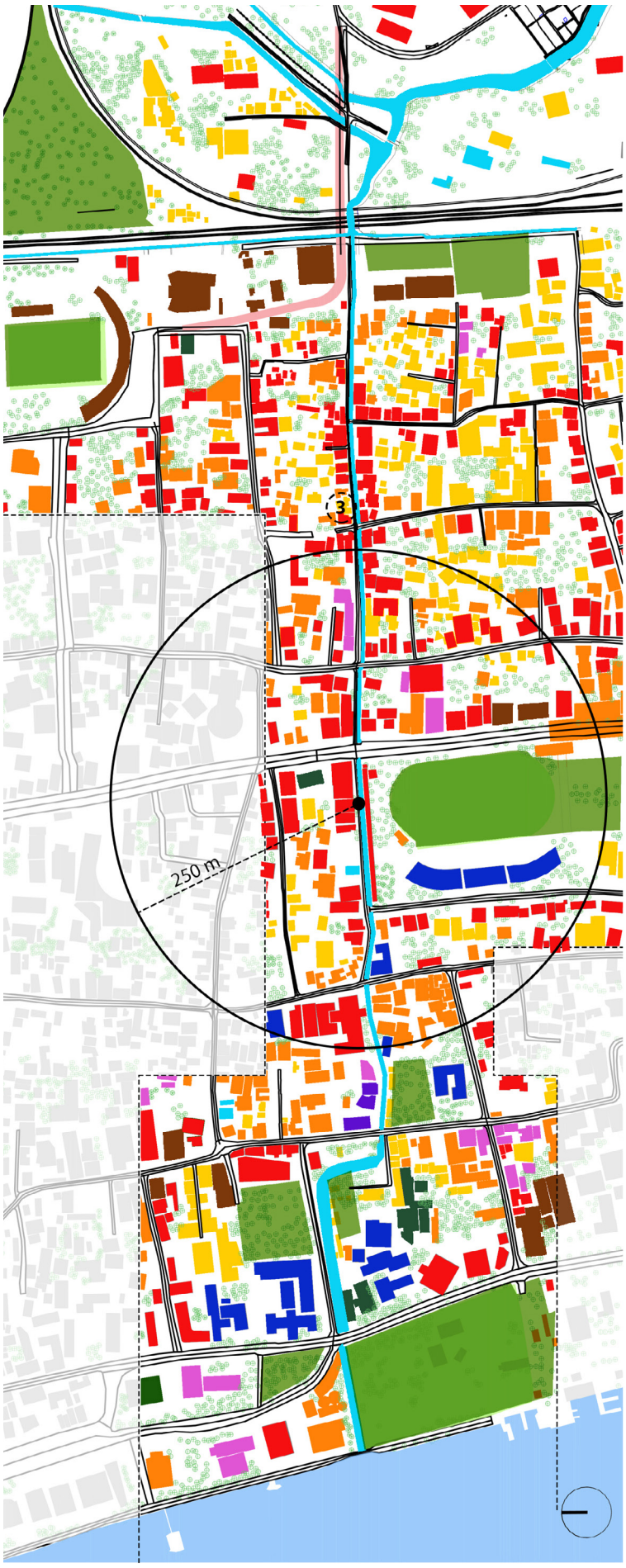


Map 3: Masterplan context of Focus Area.

[Source: by author based on google earth maps and ente kochi competition brief

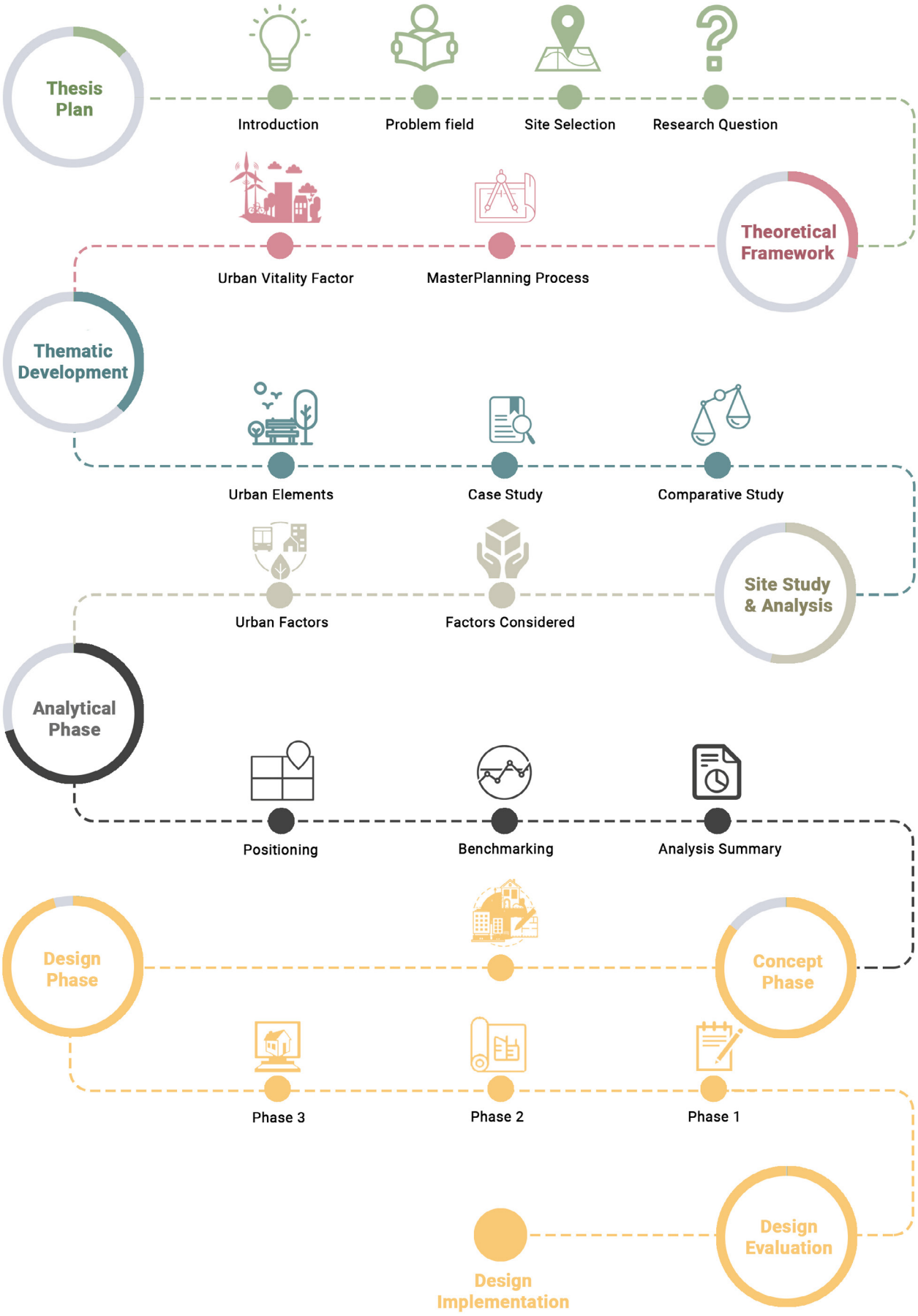
1.4.6 Focus Area

The focus area for the thesis is the Mullassery Canal Precinct in down town Ernakulam, which is part of the Central Business District (CBD) of Kochi. With the emergence of various modes of personal and public transportation, as well as a road-centric development, the canal appears to have been built upon by neighbouring plots over time, as its function for effective transportation faded into the past. While the canal is 1.3 kilometers long, concrete slabs cover more than half of it, which are used for on-street parking and specific vending zones (EKC, 2020). As we travel east to west along the canal, the land use pattern changes. . It is bordered by the city's most prestigious educational institutions, historical attractions, major commercial avenues, street markets, warehouses, and both official and informal housing. The canal is bordered by the low-rise, high-density urbanization that reshaped Kochi in the 1980s (EKC, 2020).



Map 4: Focus Area Map Possibly Zoom-in .
[Source: By Authors-Datas from entekochi-competition]

1.5 Methodology



1.6 Study Relevance

Academic Relevance: Understanding of a study process

This graduation project will expand the study about urban growth to the growth in municipal area setting as city extensions, particularly in Indian context. In relation to urban design process, as mentioned by Carmona (2014), study about urban design process, especially thorough study about its processes is still lacking. IThis graduation project will widen the conventional concept of urban vitality in the European setting to urban vitality in the Indian context, particularly in terms of the spatial design aspect. Furthermore, this urban vitality aspect will be investigated not only on the design process of Kochi city master planning, but also in the development process, management process, and space in use. Approach on investigating throughout the whole master planning process tackle the common issues of implementation process and products of Kochi city in India.

Factual Relevance: Understanding the existing City Conditions

According to the govenmental facts and figures, India struggles with a number of significant barriers that continue to hamper the development of urban infrastructure: complex leadership structures, land valuation challenges, capability gaps, and funding shortfalls are all part of urban challenge that is effectively holding India back from a new round of dramatic economic growth. Apart from the complex societal issues on a larger scale, there are basic needs like satisfactory housing and development. Kochi city must address the current issues of poor infrastructure and social life, resulting in a decline in people's quality of life. This project will be useful in improving the quality of urbanization and creating a pleasant atmosphere.

Societal Relevance: Understanding of social benefits

In terms of society, culture and traditions, India stands with the strong ethics and identity. It is incorrect to develop a city without considering the city's identity. Raising the urban development standards, comparing Indian scenario with other cities over the world is not a wise action. Every city has its own history, culture and identity there is no doubt that we need to nurture, pre serve and renew the urban fabric with changing times. Indian cities have their own societal background and level of willingness to absorb the change. In terms of technological change, we can't force urban development. Designing or planning Kochi city with its own urban fabric and historical background, current culture, and fitting future predictions/ changes would be the smatness here.

2 Problem Statement & Research Questions

2.1 Problem Statement

"The main problem that Kochi Municipal Corporation is dealing with is that much of the modern city has grown outside of the official city limits, which were last defined in 1967. As a result, the extended urban agglomeration grew much faster than any other Indian city, depleting the corporation's resources. As a major industry and thriving modern port-city, Kochi required much stronger leadership and plans, which have yet to materialize. The city grew in an unplanned manner, with no masterplan in place, causing additional problems. The Kochi Corporation failed to coordinate multiple agencies performing various projects because most of the town-planning agencies, including as transportation, power, and water distribution, were administered by the Kerala Government. Apart from that, the **Greater Cochin Development Authority** received a large portion of the city's infrastructure development funds, which frequently results in administrative squabbles and execution challenges."

For this graduation project, we are here to develop a master plan along with urban vitality to contribute to socio-cultural development and a friendly environment for the people, We choose our focusing area Mullassery canal road which already has a proposal of development by the EnteKochi Competition Team as mentioned before and not only but also it is the central business district of Kochi City. This development of the master plan model can be taken as a step for the development of other urban centers of Kochi which are not vitally active and sustainable.

In terms of urban design, the two most important components in creating a dynamic city are the product, which is the spatial aspect of urban vitality, and the process, which is the masterplanning process. These two issues are two sides of the same coin, and they must be thoroughly resolved in order for the Mullaserry site in central business district of Kochi city to be considered significant. The impact of physical features of space on the liveliness of public life is described as the product spatial aspects of urban vitality. The masterplanning process is defined as an amalgamation of the context, stakeholder power relationships, and place-shaping activities.

Mullassery, an outlier among Kochi's unplanned centers, is in the midst of creating its most dense urban sector — the heart of the city, which must be the most vital. The major goal of this graduation project is to figure out how to build a vital central area that promotes urban life throughout the masterplanning process, not just during the design phase.

2.2 Research Questions

Many questions started to assist the research, and also to develop the proposition and strategies to answer the beneficial issues. From all the various questions, the research question has been refined into a more detailed and particular emphasis. Focusing on our thesis context area, Mullassery canal (Kochi City) where we are developing urban spaces to attract people through a master plan. Here are the main research questions that answer the aim, scope, and design outcome of the thesis project which helps to start with.

"It is difficult to design a space that will not attract people.
What is remarkable is how often this has been accomplised."

---------- *William H. Wryte* ----------

Main Research Questions	Sub-Research Questions
Aim How to develop a master plan by promoting urban vitality	1. What are the constitutes for the spatial aspects of urban vitality in master planning?
Scope Public placemaking to respond to the people needs throughout the process of focus area (Mullassery canal) master	2. What is the current status of the master planning process for the focus area (Mullassery canal)?
Context Kochi City, India Focus Area (Mullassery canal)	3. How do city centers work in Kochi?
Design Outcome with Urban Design?	4. What role does urban design play in the revitalization of cities and the master planning process?

2.3 Method & Approach

Many questions started to assist the research, and also to develop the proposition and strategies to answer the beneficial issues. From all the various questions, the research question has been refined into a more detailed and particular emphasis. Focusing on our thesis context area, Mullassery canal (Kochi City) where we are developing urban spaces to attract people through a master plan. Here are the main research questions that answer the aim, scope, and design outcome of the thesis project which helps to start with.

How might urban design help to promote urban vitality throughout the master planning process in Kochi's Mullassery canal area which is the central business district of Kochi City, Southwest India?

How can urban design relate to urban vitality and the master-planning process?

Method	Theoretical Approach
Design Principles Literature, Comparative, Interview	Spatial Aspect of Urban Vitality
Process Analysis Literature, Thematic Framework	Master Planning Process Carmona (2014)
Context Analysis Focua Area (Mullassery Canal)	Survey Tool Gehl Institute
Positioning & Visioning Comparative, Masterplan Analysis, Site Visit	
Design Research Scenario-based design, Design through Scale, Evidence and Observation based design	

2.4 Expected Outcome

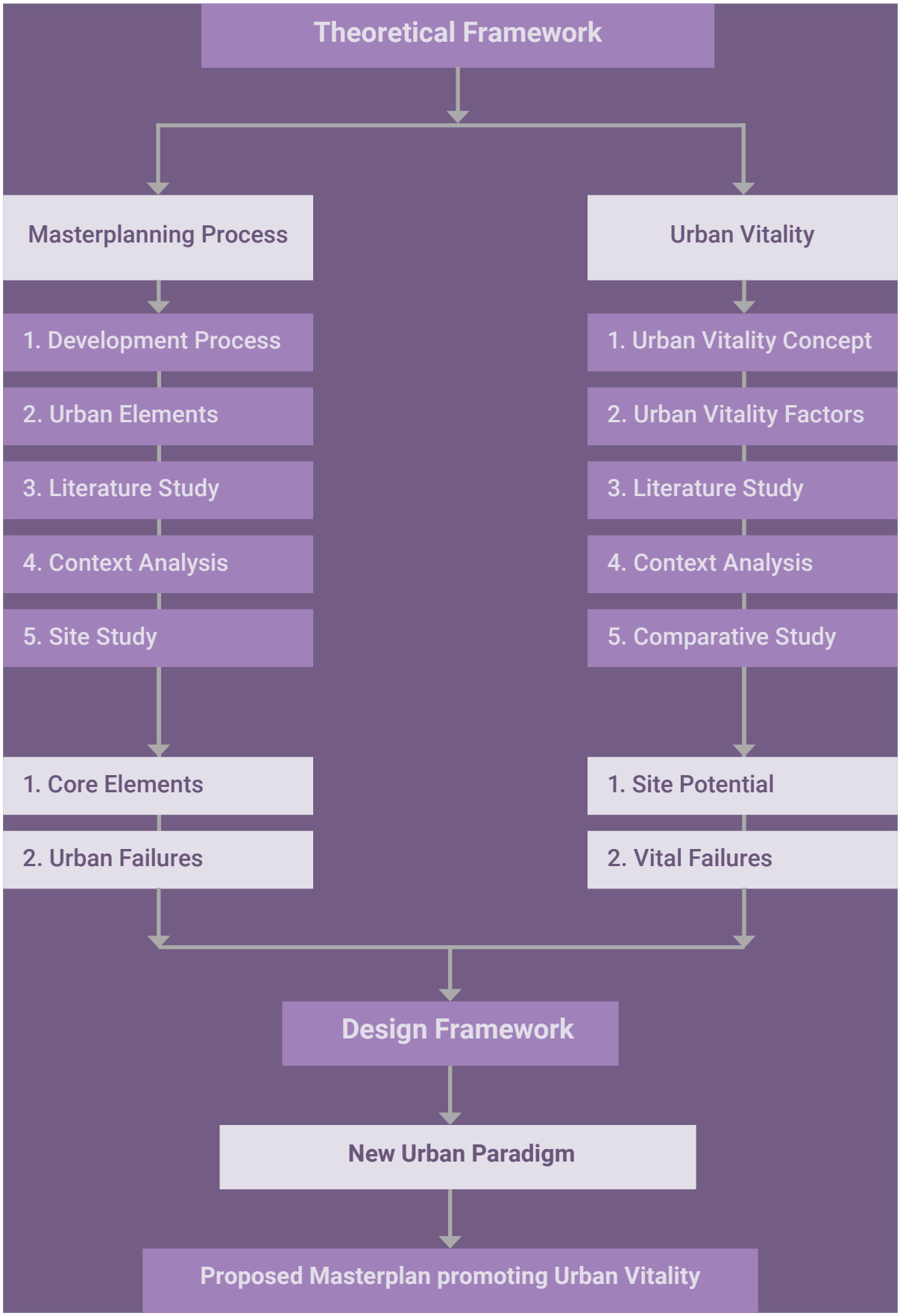


Table 2: Expected Outcome [Source: By the authors]

The research technique has three primary sections to answer the research questions, as detailed on the previous sheet (Table 2).

- The first section will concentrate on the masterplanning process' theoretical approach. This will be accomplished by a process analysis, literature review, and a Mullassery canal case study (Kochi city). This section will primarily take the form of a theory paper and will result in a design goal: a key component of the four ongoing place-shaping processes.

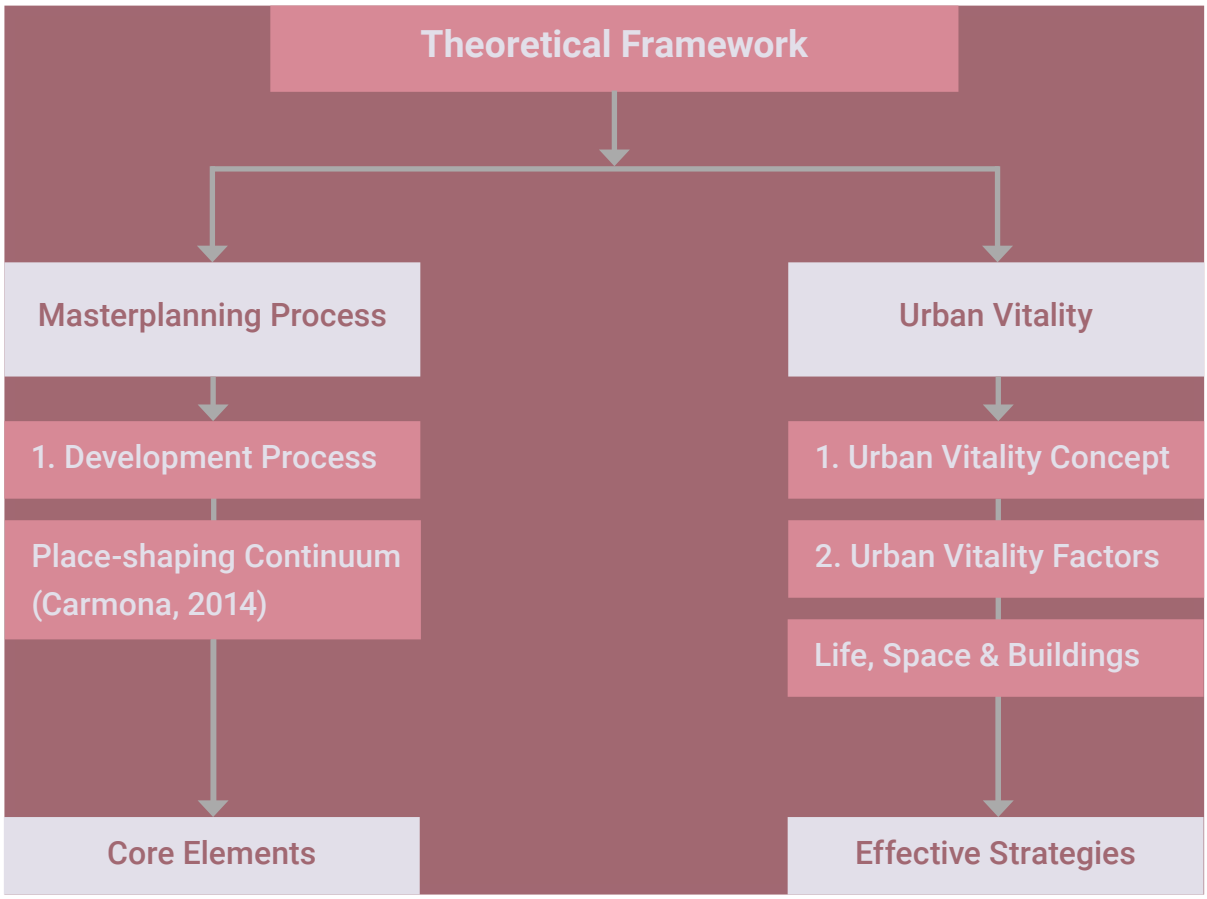
- The second section will concentrate on the theoretical approach to urban vitality's spatial features. The second portion will examine urban vitality concepts through interviews, literature reviews, and a comparison of how urban vitality is applied in practice. This section will examine the elements that influence urban vitality. A design framework will be developed based on the first two components.

- These two sections will concentrate on the project's spatial strategy in order to comprehend how the essential city core of the Mullassery canal region should function. The city center will be positioned, benchmarked, and the existing site conditions will be assessed as part of this spatial approach. This part will generate the potentials for the site, which will be developed into a site-specific design brief.

- This design brief, in conjunction with the design framework from the theoretical approach, serves as a guiding and evaluating tool for the graduation project's conclusion. The project's research by design approach will be the emphasis of the third segment, which will finally answer the research questions.

3 Theoretical Framework

3.1 Introduction



A deep study of the theoretical framework is divided into four categories in this sub chapter. The first section is a study of the place-shaping masterplanning process adapted from Carmona, 2014. The second is a definition of urban vitality and its principles, which aids in characterizing the factors of urban vitality in order to understand more about the people, places, and programs that are being produced and expanded over time.

The Life, Space, and Buildings paradigm aids in understanding the relationship between masterplanning and urban vibrancy. It also goes through what's needed to link and categorize the concepts with what happened in practice.

3.2 Master Planning Process

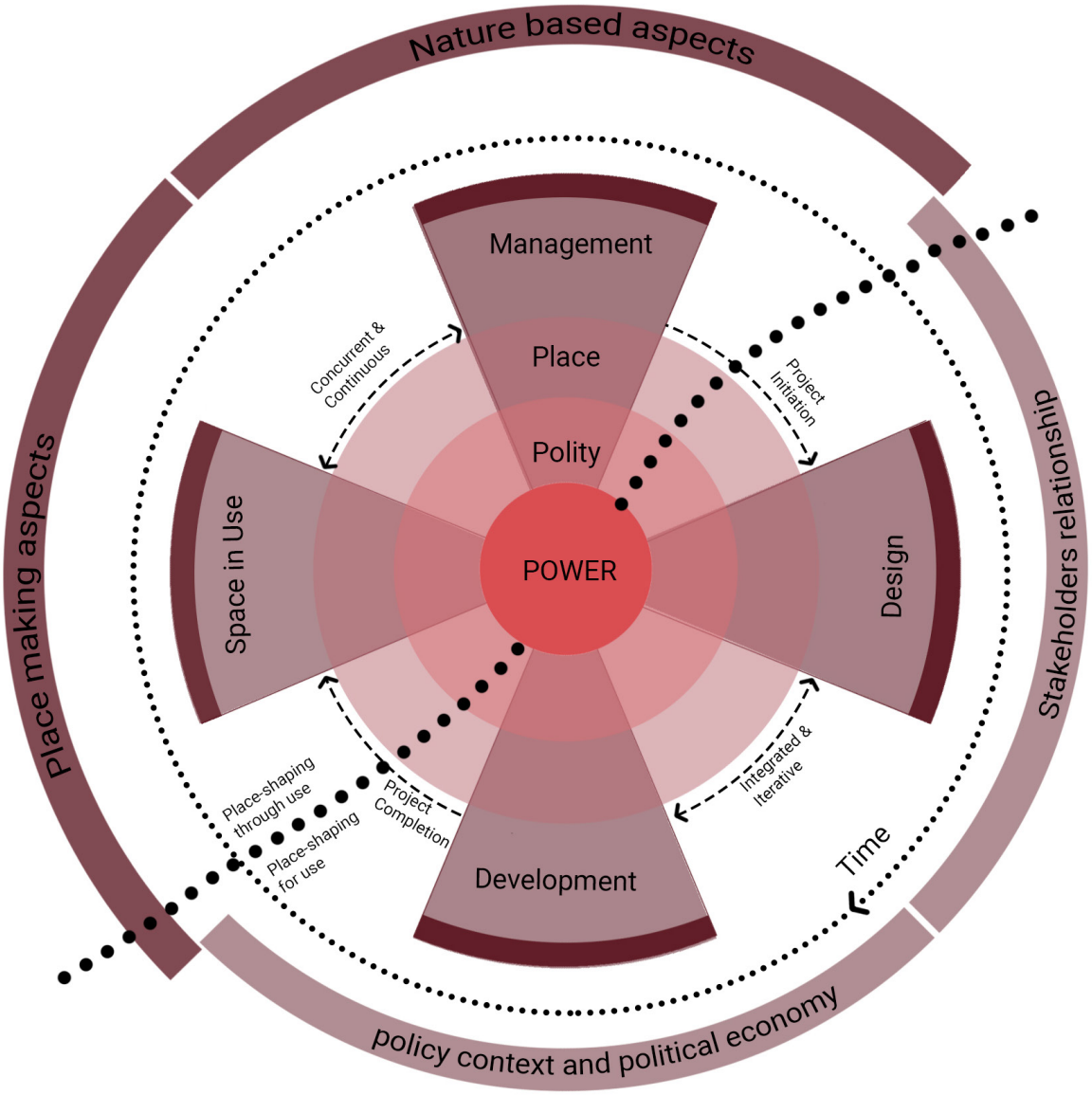
"I feel however, that we architects have a special duty and mission... (to contribute) to the socio-cultural development of architecture and urban planning."

---------- *Kenzo Tange* ----------

Place-shaping is not a new concept. Making places for people has been a major goal in urban planning over the past two decades. Contemporary urban design focuses on how to create successful places that serve diversity and activity; in particular, it focuses on how to create well-designed physical milieus that support the functions and activities that take place within them (Carmona, 2010). Understanding the design and development process of any built environment intervention is critical to developing a holistic approach to urban design research and practice. The place-shaping process describes the various operation acts that determine how community places are created, used, and by whom, as well as how and why they are managed (Carmona, 2014).

The urban design process is described in literature as a design spiral, a cyclical and iterative process in which ideas are enhanced over time through a succession of creative leaps or conceptual shifts (Zeisel, 1984). In most cases, urban design processes are examined, refined, adjusted, enhanced, and re-evaluated in light of the original goals and new inputs. As a result of this iterative approach, additional design development proposals and policies are examined in light of the original and developed objectives. As a result, urban planning is a continual process of trial, error, and development or change (Carmona, 2010). J. T. Lang, 2005).

On a larger scale, there are two types of urban design processes: uninformed design, in which the process is never planned in its totality, and knowing design, in which the various problems are purposefully developed and defined through design proposals, development plans, and policies. Briefing, design, implementation, and post-implementation review are the four main stages involved in the latter (Carmona, 2010). According to the literature, most general models of the urban design process offer a reasonable step-by-step technique that progresses from perceptions of a problem through post-implementation evaluation of a completed work. Because of the iterative nature of the urban design process, urban design studies portray it as a place-shaping continuum over time, as seen in Figure 17.



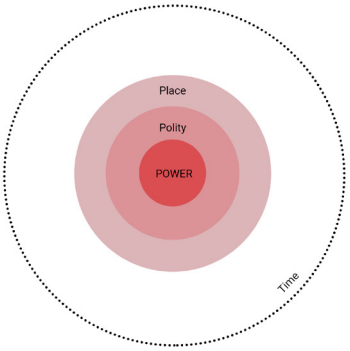
Place-shaping Continuum
(adapted from Carmona, 2014)

Linear Place-shaping

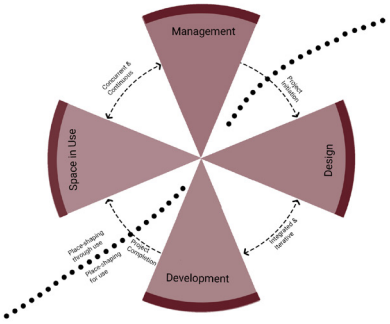
Figure 16: Place-shaping Continuum and Linear Place-shaping
[Source: By Author adapted from Carmona 2014]

Carmona's Place-Shaping Continuum Urban Design Process Model

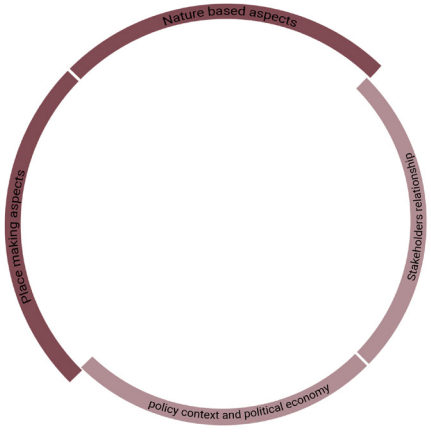
This theory (Carmona, 2014) of the urban design process is summarized in Figure 17, in which urban design is represented as an integrated place-shaping continuum through time, incorporating, first, two key contextual factors: the history and traditions of place, which continue to exert an intangible influence on projects from one generation to the next in a variety of ways; and the contemporary polity, the policy context. Second, these contexts have an impact on four active place-shaping processes: (1) design and (2) development, which shape the physical public realm for use; (3) space in use; and (4) management, which shapes the social public realm through usage. (Figure 17-bottom) In contrast to linear place-shaping processes, these four dynamic place-shaping processes spread urban design processes based on placemaking elements, natural aspects, policy content, political economy, and stakeholder relationships (Figure 17-top). Each comprises a complex mix of ambitions and actions that, when combined, determine the outcomes of public space. Finally, a set of power relationships between stakeholders acts as a lens, focusing urban design processes in various directions and in various and inconsistent ways, and significantly shaping the character of outcomes in the process.



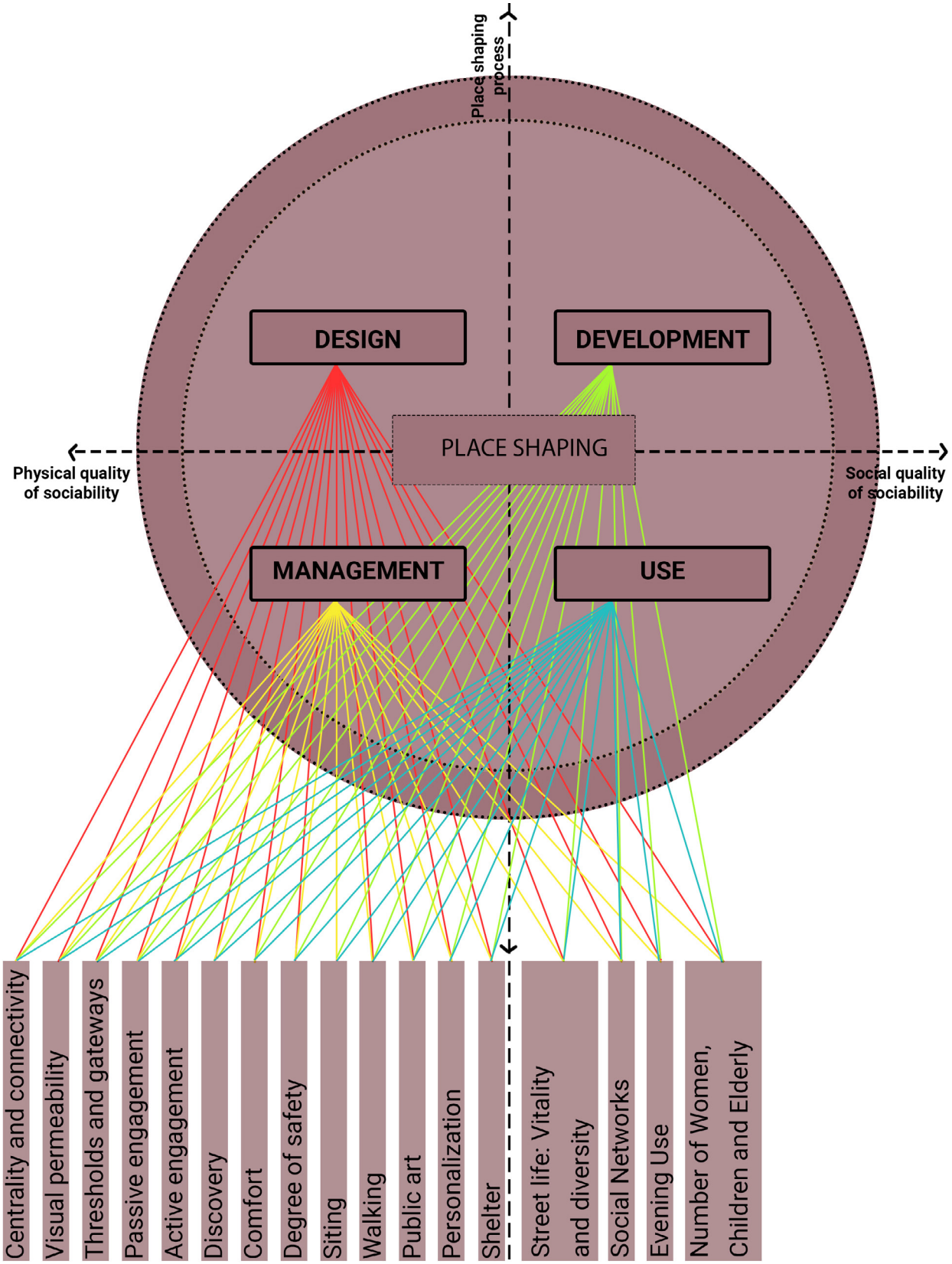
Contextual Factors and Power Relationship



4 Active Place-shaping Processes



Factors based on Place-shaping Processes

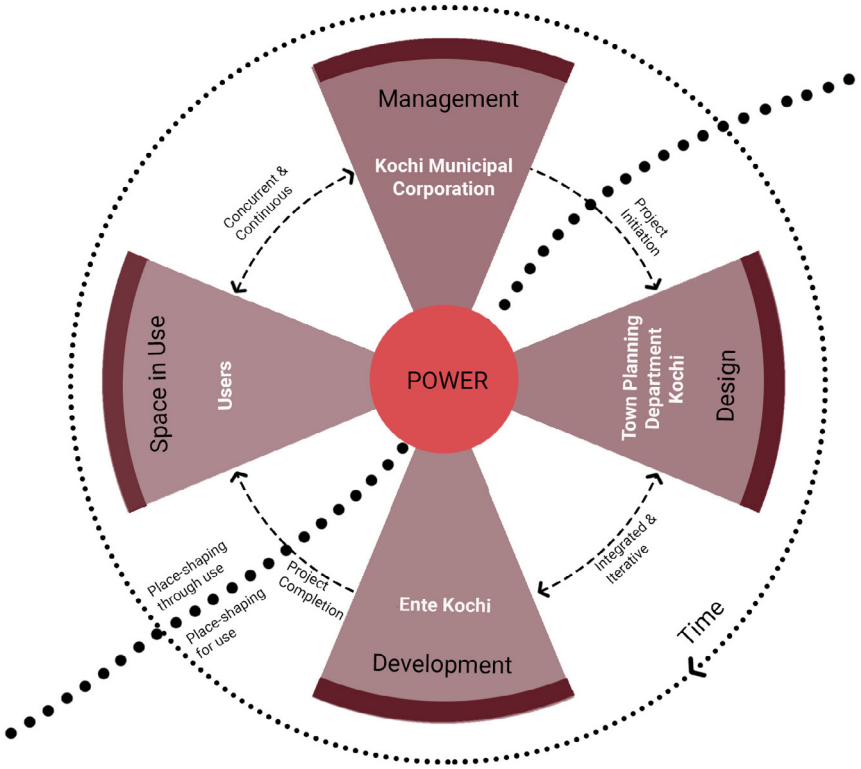


Theoretical Model of Place-shaping of sociable public spaces

Figure 17: Theoretical Model of Place-shaping of sociable public spaces
[Source: By Author adapted from Carmona 2014]

Place shaping process	Indicators of place-shaping process	Description of place-shaping process	Place shaping process	Indicators of place-shaping process	Description of place-shaping process
Design	Creative Design	Injecting creativity in design	Use	Activities	Creating activities
	Making trade-offs	Creating a balance coordination between assigned authorities during design process		Associations	Introducing level of services that meet users' needs
	Innovating (or not)	Creating innovation in uses of the space		Amenities	
	Creating value	Creating maximum benefit of space usage		Adaptation	Considering adaptation with new uses in the space
	Shaping constraints	The influence of the regulatory shaping constraints on the space overall outcomes		Appropriation	Considering appropriateness for different uses and users in the space
Development	Lead and coordinate	Creating a good coordination between the various stakeholders during the development process	Management	Everyday stewardship	Operating appropriate management system for different events in the space
	Negotiating consents	Reconciling between the various actors of development		Curating place	
	Marshalling resources	Creating a good coordination of funding sources to serve the market conditions that related to user's needs		Controlling spaces	Operating appropriate control and observation system in the space
	Injecting quality	Injecting quality during various development process		Redevelop/ Revitalize	Redeveloping/ revitalizing the operation management system
	Garnering support	Involving community participation			

Indicators and Descriptors of Place-shaping Process



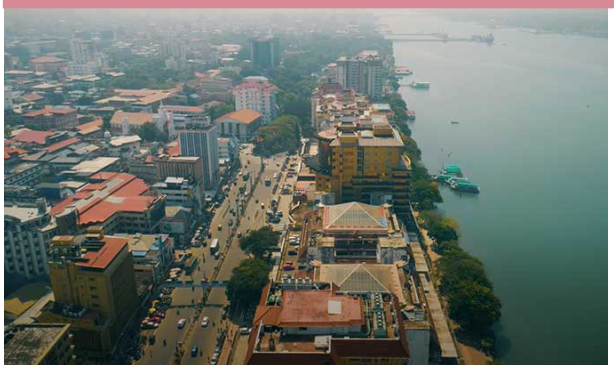
Place-shaping Continuum in Mullassery Canal Area
(adapted from Carmona, 2014)

Figure 18: Place-shaping Continuum in Mullassery Canal Area

Table 3: Indicators and description of Place-Shaping process

[Source: By Author adapted from Carmona 2014]

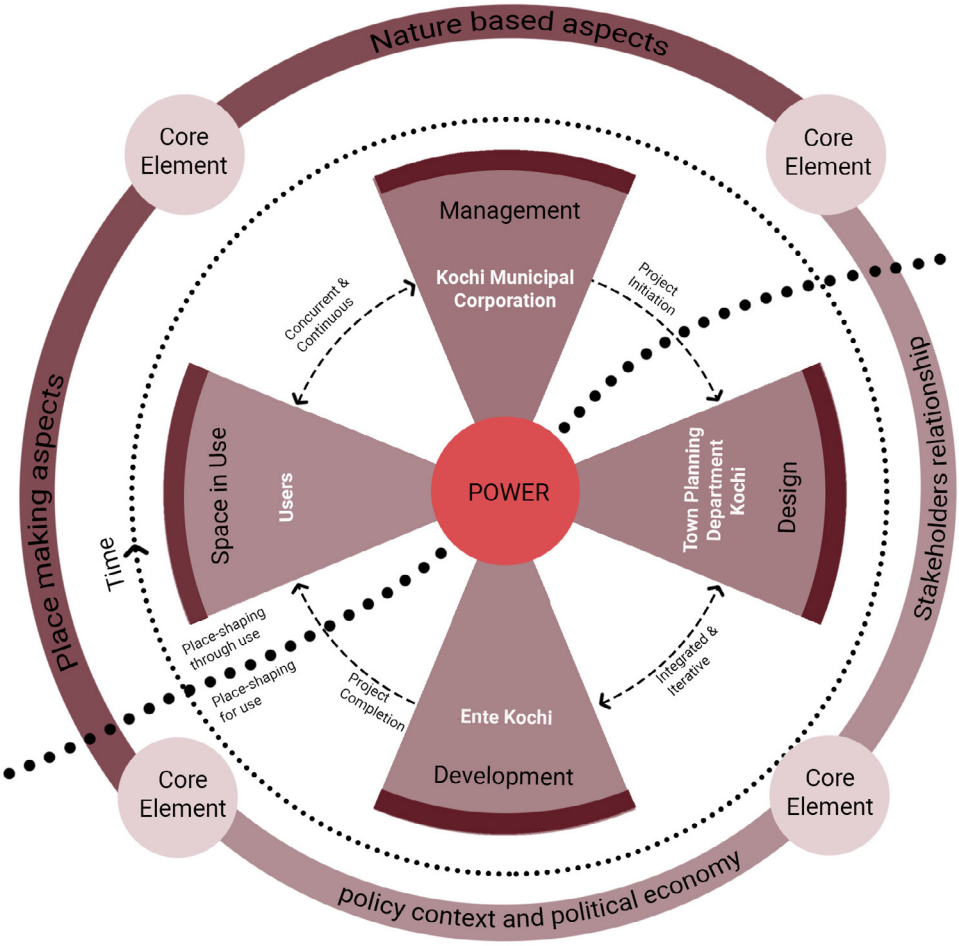
Kochi, a historic and commercial city in Kerala's southwest and a well-known tourist attraction, is still working on its own masterplan. The fact that there is no efficient design plan to concentrate people into better organized urban centers is one of the most typical failures of Indian cities.



The Four-Active Place-Shaping Processes in Mullassery Canal Area Masterplanning

To begin, the Town Planning Department of Kochi is in charge of the design process in the Mullassery Canal Area and whole of Kochi City. The civic authority first attempted to design a master plan for Kochi in 2002, a city that had grown by leaps and bounds. In 2010, the Town Planning Department drew out a plan for the Greater Kochi area, but it was never completed. In terms of Carmona's place-shaping continuum, master planning is consciously using design as a tool to consciously influence Kochi's future. The two agendas indicated earlier, defining a vision and creating values, are continually present in the Mullaserry canal masterplanning process, which has been regularly revised since 2019. From a 'commercial and tourism urban area and sustainable living,' the goal evolved over time. Second, (EKC, 2020) the development process in Mullassery canal is initiated by EnteKochi to 'design the future city' of Kochi. To achieve this, new kinds of collaboration and knowledge co-creation in urban environments are being pursued. It places Kochi Municipal Corporation (KMC) and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) in the context of SUD-SC, a multi-stakeholder participatory planning process that encouraged creativity, innovation, and public awareness about concerns of sustainable urban development. Design is unknowingly employed as a tool to consciously shape the destiny of places in this method. Because one of the developers is also the operator, long-term investment and space management are addressed concurrently with the development phase, resulting in a close relationship between the two processes. Finally, during the site study and analysis, the space in use is observed.

Figure 19: Kochi city aerial view
[Source: streets-of-india, 2018]



Place-shaping Continuum in Mullassery Canal Area
(adapted from Carmona, 2014)

The Need for a Core Element

Using Carmona's paradigm, which distinguishes between knowing and unknowing place shaping, as well as place making and natural aspects, helps to comprehend the dynamic among stakeholders (Figure 21). This distinction is useful when combined with knowledge of the power dynamics among stakeholders, such as the power hierarchy between the master planner, developer, manager, and user. Aside from the advantages, the model has a drawback based on an underappreciated component of urban structure (as Ellis (2014) also points out). Although Carmona (2014) established the concept in the setting of public places in London in his study, the connection between the process and the form is not entirely evident. The question is whether the form of the urban space has an impact on the urban design process, and if so, how so and how significant is the impact. As a result, more research is needed to identify a fundamental factor that connects all of the current place-making processes (design, development, management, and space in use). This aspect will be looked into further as part of the larger research process.

Figure 20: Place-shaping Continuum in Mullassery Canal Area
[Source: By Author adapted from Carmona 2014]

3.3 Urban Vitality Definition

In cities, both urban vitality and social cohesion bring various benefits. Positive determinants of urban vitality are the association between built environment qualities and neighborhood social cohesion. Green space is linked to a lower level of urban vitality, but public transportation accessibility is linked to a higher level of social cohesion.

Built Environment and Urban Vitality

Jane Jacobs claimed in her famous book "The Death and Life of Great American Cities" (1961) that social interactions are the lifeblood of a thriving metropolis. To enhance social and economic vitality, planners should be sensitive to the intricacies of human lives within the city, rather than constructing cities following a set of theoretical concepts. Many academics feel that successful places are dependent on street activity and the social interactions it fosters, such as Jacobs (1961) and others (Buchanan, 1988, Gehl, 2011, Maas, 1984). As a result, urban design includes not just the physical infrastructure but also the myriad social activities and events that occur within these places (Montgomery, 1998). Well-designed public spaces promote a wide range of casual social encounters, and it is these seemingly unimportant interactions that make up a flourishing city's social fabric. Both street accessibility and building density are required for urban vitality, according to Jacobs' design theory (1961). Maas (1984) proposed in his thesis that neighborhood vitality consists of social, geographical, economic, and experiential elements. In terms of street life, he defines urban vitality as the synergy of relatively dense urban places that give a variety of economic and 'gratuitous' options, as well as a dense and diversified populace. As a result, the amount and diversity of amenities, such as stores, cafes, and restaurants, are critical components in drawing a population that uses the area consistently throughout the day.

Low-density areas without appropriate amenities may lack the footfall needed to create the continuity of people's presence and the incidental social interactions that make a place lively. In accordance with (Jacobs, 1961, and Maas, 1984), we consider density to be a prerequisite for vitality rather than a component of the vitality metric itself. While denser communities are more likely to be crucial, not all dense neighborhoods are.

Empirical research has shown some support for Jacob's design theory at the residential neighborhood level (Sung & Lee, 2015), factors in the built environment that can be seen to operationalize Jacobs' conditions for urban vitality are linked to pedestrian activity and other indicators of vibrancy in urban areas ((Delclòs-Alió et al., 2019, Lu et al., 2019, Sung et al., 2013, Sung and Lee, 2015, Wu et al., 2018, Xia et al., 2020, Zumelzu and Barrientos-Trinanes, 2019). Walking activity is consistently higher in dense, mixed-use neighborhoods near the city center with good public transportation (Durand et al.,

2011, Sallis et al., 2016). With the same built environment variables being associated with urban vitality. Researchers also looked into the effects of policies and actions targeted at boosting urban vitality. Pedestrianization, reduced traffic, reduced automobile parking, and the provision of cycling lanes, according to Gehl, can all help to boost urban vitality (Gehl, 2013). These solutions will assist in reclaiming public areas and streets for people rather than cars (Pere, 2017).

According to Carmona (2014), temporary usage; the presence of local amenities; components such as fountains, public art, and public furniture; the presence of grass to sit on; and microclimate are some of the factors that influence the level of use of public space. Smaller-scale community-led initiatives can help boost urban vibrancy and a sense of community at the local level. (Anderson, Ruggeri, Steemers, & Huppert, 2017).

Urban Vitality and Social Cohesion

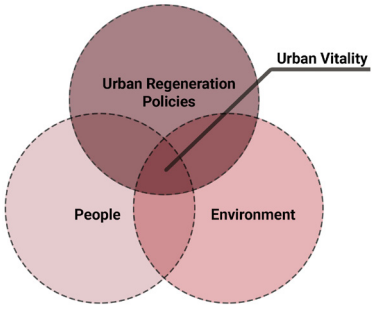
One of Jane Jacobs' central points is that more active neighborhoods, i.e. those with higher levels of urban vitality, encourage casual social connection, and it is these seemingly unimportant interactions that can foster a sense of local community and social cohesion (Jacobs, 1961). While many of Jacobs' ideas on vitality have been supported by empirical research (Delcls-Alió et al., 2019, Lu et al., 2019, Sung et al., 2013, Sung and Lee, 2015, Wu et al., 2018, Zumelzu and Barrientos-Trinanes, 2019), the suggestion that urban vitality helps improve social cohesion has yet to be adequately investigated.

It's possible that urban vitality and social cohesion in neighborhoods are at odds. Denser urban regions have a higher level of urban vitality (Durand et al., 2011, Lu et al., 2019, Sung and Lee, 2015). Because high urban density reduces distances, larger overall social networks, more frequent overall social engagement, and better support from close connections can be acquired. (Mouratidis, 2018). However, these connections may not be with people from the same neighborhood, and frequent encounters may not always indicate significant community ties (cf. Granovetter, 1973). Denser communities may have more impersonal interactions with a wider range of connections, resulting in lesser social cohesion. As a result, while busy locations may promote overall social interaction, they may be less socially cohesive at the local level. This is consistent with research from urban sociology, which claims that while urbanity promotes liveliness, it also promotes impersonal social ties and, as a result, reduced social cohesion. "Proximity does not equate with meaningful interaction," Valentine discovered, because meaningful social contacts in cities necessitate that urban politics address issues of inequality and diversity (Valentine, 2008).

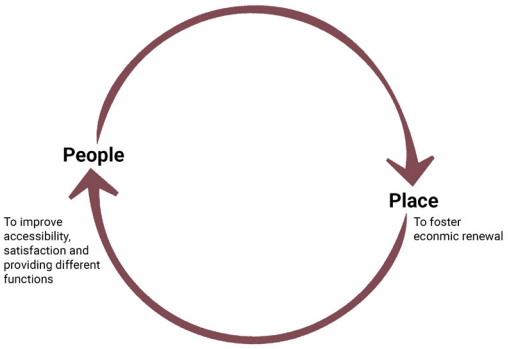
Urban Vitality Concept

The concept of urban vitality revolves around people's satisfaction with all aspects of urban life. It's impossible to quantify the broad implications of urban vitality in concrete terms. Many academics have attempted to assess urban vitality from various perspectives(RTVUS, n.d.). Nonetheless, they all used the elements of the built environment, human activities, and human–environment interaction to determine urban vitality. Vitality is a "performance" feature of urban design that has the ability to reflect the interrelationship between forms of places while also supporting human capacities, biological necessities, and functions (RTVUS, n.d.).

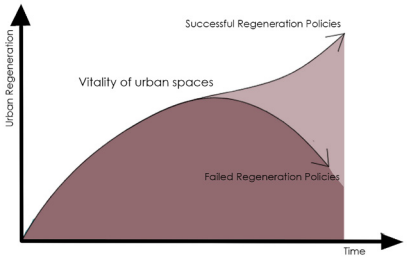
The assessment of indicators and goals for urban vitality reveals that they are all working toward the same goal of improving the quality of urban environments through social, economic, and environmental variables. "Place" and "people" can identify the intricacies of urban development in both approaches: On the one hand, the "Place" focuses on urban regeneration and aims to start and or support economic revitalization through property development and commercial growth. On the other side, the "People" focus on urban regeneration by providing options for avoiding multiple deprivation through the provision of functions for people from various social classes. Fulfilling all of people's needs and boosting the functioning of places in order to meet people's needs for their everyday activities will result in successful urban regeneration and vibrancy (RTVUS, n.d.).



The Common Point where Urban Vitality Emerges



Two Effective Stratergies for Urban Vitality

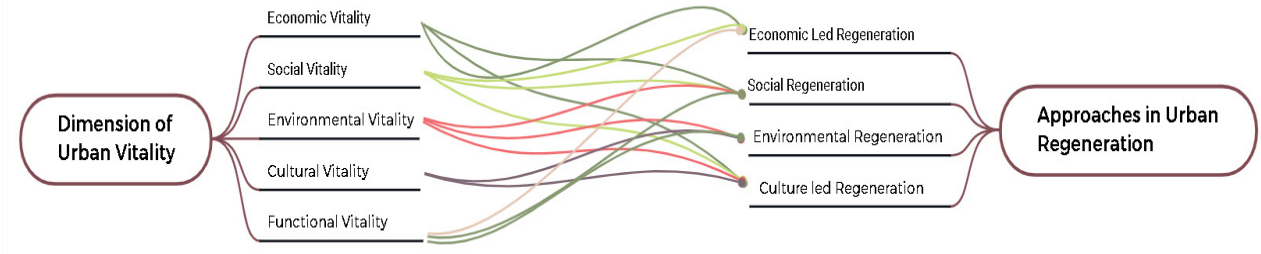


Urban Regeneration Policies

Figure 21: Point where urban vitality emerges
Figure 22: Two effective strategies for urban vitality
Figure 23: Urban regeneration policies graph
[Source: By Author adapted from Regeneration as a Tool]

Dimensions of Urban Vitality	Factors leading to a successful Urban regeneration
Cultural Vitality	• Includes respect and appreciation of the city and its traditions. • Handicrafts, artefacts, and symbols.
Functional Vitality	• Economic design • Functional design.
Social Vitality	• Making vibrant society. • Developing community spirit. • Developing opportunities for involvement of wide range of lifestyles.
Environmental Vitality	• Environmental survival. • Legibility, sense of place, safety, and adaptability. • Connectivity and linkage.
Economic Vitality	• Agglomeration of commercial enterprises. • Market freedom, urban consumption.

Five dimensions of urban vitality and leading factors in successful urban regeneration



The Interrelation between approaches in Urban Regeneration and Dimensions of Urban Vitality

Table 4: Leading factors in successful urban regeneration
Chart 6: Urban regeneration and dimensions of urban vitality
[Source: By Author adapted from Regeneration as a Tool]

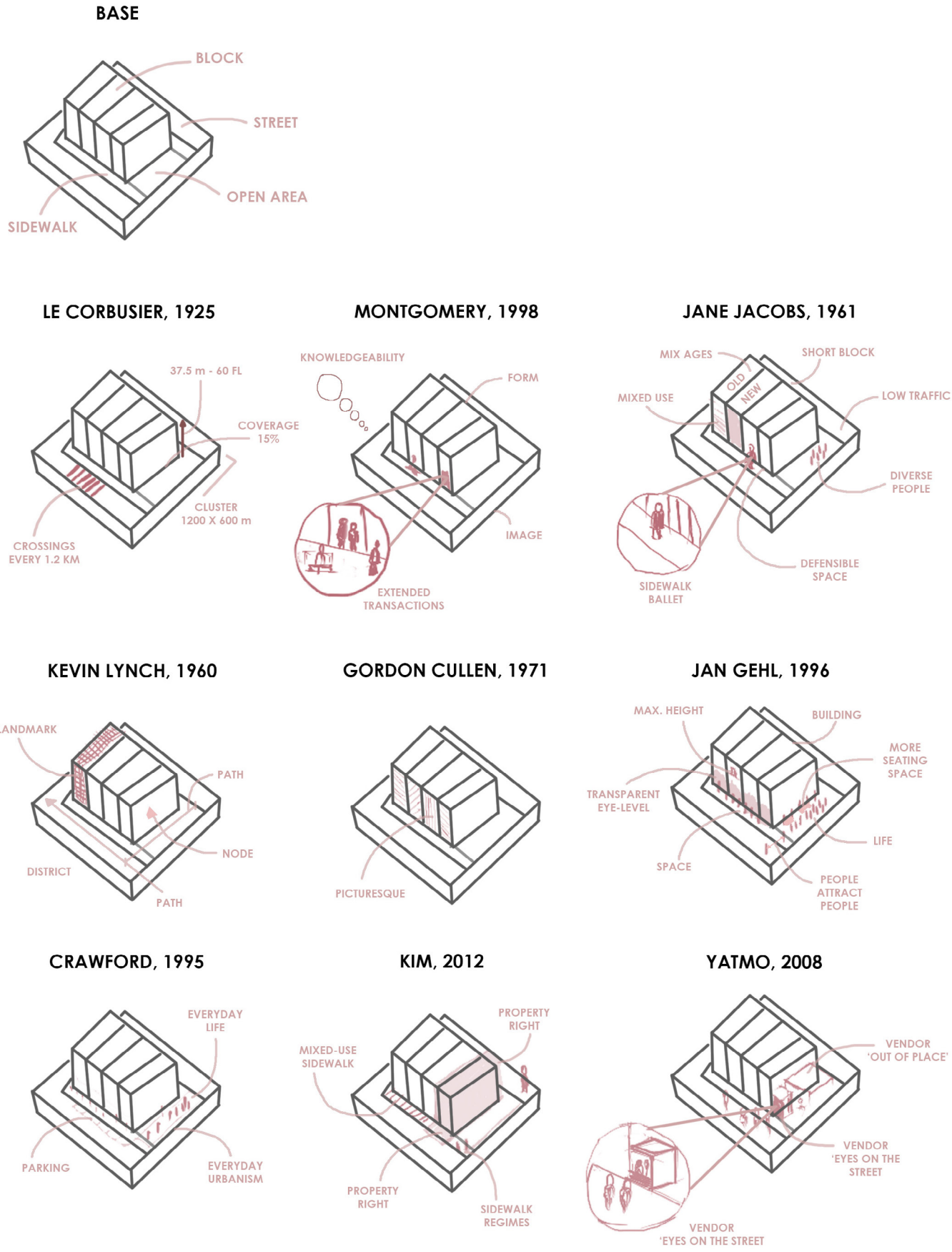


Figure 24: Illustration of each researcher using the same base
[Source: drawings by the authors based on reports]

3.4 Urban Vitality Factors

"Streets and their sidewalks, the main public spaces of a city, are its most vital organs."
---------- Jane Jacobs----------

"First life, then spaces, then buildings - the other way around never works."
---------- Jan Gehl----------

Each notion from each researcher is illustrated using the same base (Figure 25, top-left) in order to systematically study the definition of urban life via diverse lenses – from West to East: The terms "block," "street," "sidewalk," and "open space" are all used interchangeably. The thoughts are 'forced' to be compared by conducting this exercise. Despite the fact that this experiment has significant restrictions, the following points can be drawn from it:

- Le Corbusier (1925) has some very explicit guidelines on how to promote his idea of urban vitality/urbanity, with figures like optimal building coverage of 15% and pedestrian crossings every 1.2 km, which is such precise figures than other researchers.
- Mainstream researchers such as Montgomery (1998), Jacobs (1961), Lynch (1960), Cullen (1971), and Gehl (1996) emphasize on intangible components such as activities, people, image, and uses rather than the urban form (Figure 25, first-second row). Instead of specific guides, Gehl (2013) presented certain observation principles for understanding public space and public life.
- On the other hand, researchers such as Crawford (1995), Kim (2012), and Yatmo (2008) concentrate on everyday activities and the 'unplanned' urban form, such as property rights, sidewalk regimes, street vendors, and parking lot interaction (Figure 25, last row).
- In conclusion, the balance between exact guidance, as provided by Corbusier (1925), intangible aspects, as proposed by mainstream scholars, and the unplanned, as advocated by other scholars, needs to be further investigated, particularly in regard to the design of urban form.

As elaborated and illustrated, the diverse definitions of urban vitality from various scholars and contexts prompted this graduation project to take a stand in creating its concept of urban vitality, using the Indian context as a starting point (people, place, program). Referring to Montgomery's (1998) definition '...the extent to which a place feels alive or lively', the keyword is in the term 'lively'. This term is arguably related closely to the local culture in this case of Kochi and Mullasery canal. Lively in Kochi means for its own traditional, art and cultural activites like sidewalk eating with low seating, or the presence of market seller, or the market itself, or the presence of a water bodies (as Kochi is known for its canals).

Criteria	Quality Description
High mixture of uses	The landuse encourages mix activities and uses not mono-functional activities and uses.
Effective coverage to the users	Service zones that are adequate for all public uses and facilities.
Informal economic activities is encouraged to happen	Adequate space for informal activity to take place.
Clear position as a satellite self-sufficient	Clear position in compare to order competitor and align with market demands.
High Integration and High connectivity values, High integration value, High Choice Value	Legible: Determining how simple it is for someone in a local position to grasp the global structure. Integrated: Indicates how well-connected (or central) a street is to the rest of the network. Accessible: Indicates how significant a roadway is as a network through-road.
Subtle transition strategy during transition between phases	It was created with the goal of promoting a sense of completion.
High population density	Located in a location with a sufficient critical mass.
High social diversity	Age, origin, education level, occupation, income level, and cultural background are all diverse.
High amount of cultural events	The amount of cultural events and celebration that takes place throughout the year.

As seen in the table above, people, place, and program are progressively developed and enlarged. Each factor is further defined by a set of principles. For example, place factor is expanded to clear regional position; mixed-used and functional overlap land use; high density of people; and so on. Each concept is developed in light of the three parts of the master planning process: dominant process, power relationships, and context. Each principle's quality definition, criteria, spatial need, case study, and source are all detailed. This elaboration is necessary in order to connect and categorize the principles with what transpired in practice.

Table 5: People, Place and Program chart [Source: By Author adapted from Regeneration as a Tool]

3.5 Life, Space and Buildings

Jan Gehl, (2006, Chapter 7) Even on a broader scale, where one is not concerned with just a single street but rather entire cities, towns, and neighborhoods, street life is a greatly sought-after and necessary characteristic in a city. In this context, debates about the atmosphere and attributes of the built environment should pay far more attention to the life and energy of the'spaces between.'

The objective in city politics, planning principles, and construction plans is for cities and neighborhoods, both new and old, to be alive, attractive, and safe. Because of the tough conditions for developing city life in most modern, large cities, the goal of building entire cities bursting with street life is an unrealistic and certainly impossible task Jan Gehl, (2006, Chapter 7).

However, in all cities, whether new or old, small or large, congested or vast, there is sufficient possibility to develop pleasant pedestrian areas as well as lovely squares and plazas that are enticing places to meet, linger, and stay. It's difficult to argue against the desire for cities to become inviting places—places that encourage foot and bicycle traffic and invite people to use pedestrian-friendly paths and plazas in key areas.

Life, Spaces, and Buildings in that order, please. It has long been standard practice in the establishment of new neighbourhoods to prioritize the buildings themselves, followed by public life, if possible Jan Gehl, (2006, Chapter 7). The focus was on the structures themselves, with public spaces being whatever was left over in between, and life being at most a half-hearted afterthought. The effect is awful, empty neighborhoods all over the place.

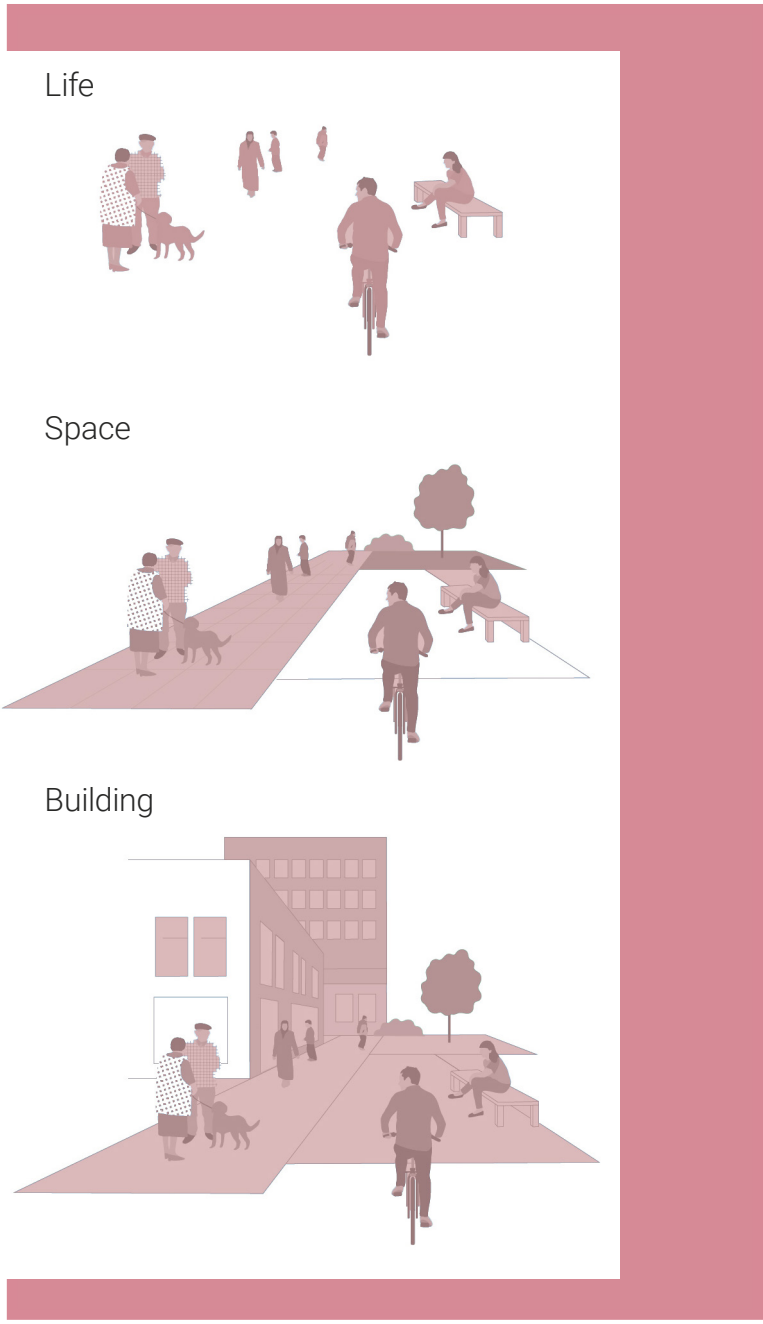


Figure 25: Focus on creating cities for people [Source: Gehl — Making Cities for People]

All activities that rely on the presence of people in public settings are referred to as social activities Jan Gehl, (2006, Chapter 7). Children at play, greetings and chats, communal activities of many kinds, and, eventually, passive connections, or simply seeing and hearing other people, are all examples of social activities. Different types of social activities take place in a variety of settings, including homes, private outdoor areas, gardens, and balconies, public buildings, workplaces, and so on; however, only those activities that take place in publicly accessible spaces are explored in this context.

Figure 26: Activities that rely on the presence of people in public settings
[Source: Gehl — Making Cities for People]

4 Thematic Development

4.1 Introduction

An 'Urban Element' is a theoretical concept that incorporates many parts of linked theoretical principles. Elements are common features of good city form that can range in scale from a pavement texture to a building entry, shop front, pocket park, plaza and street, or neighborhood and precinct, evoking Alexander, Ishikawa, and Silverstein's 'Pattern Language' (1977). Urban design features are critical in characterizing a location so that people can quickly comprehend the options it provides. This topic examines and defines five urban design aspects, namely pathways, edges, districts, nodes, and landmarks, which pertain to physical form. This paper examines the relationship and quality of these characteristics in evaluating responses to urban environment in people-place connections. This research examines urban aspects through an inventory of the layout design, observations, and characteristics, as well as a community response evaluation. This research provided instances of how urban development using high-quality urban design features was able to create connections between people and places.

The following are the urban elements catalogue case studies that have been compiled. The findings of this study revealed that all aspects of urban design play a part in making cities more functional, energetic, and appealing to residents.

4.2 Urban Elements

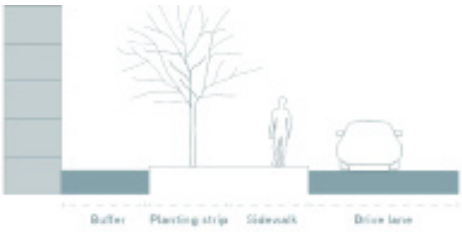
The link between setback and walkability is explored. If there is no building setback, walkability may or may not improve. Varying building types require different setbacks to facilitate walkability, in addition to the proper pedestrian walkway and shade.	Building Setback for Walkability 
The city should feature a network of comfortable-scale pedestrian lanes and thoroughfares to allow for intimate street activity. The city's streets are frequently what give it its personality and fuel urban life.	Lane City (Section) 
Despite the fact that research reveals that public plazas are vital social and communal gathering areas, it is not uncommon to find underutilized, ill-defined, or undesirable sites referred to be plazas or squares (Alexander, 1977).	Active Plazas 
Wide streets can also be beneficial to pedestrians recommend utilizing a 1:1 height-to-width enclosure ratio when building roadways. Planting on the street helps to define different 'components' of the roadway and breaks down the scale of a large street.	1: 1 + Street 
By reclaiming the driving lanes along existing streets for pedestrian-related amenities, such as trees for shade, broader side-walks with seats, and outdoor refreshment spots, more street space may now be given up to walkers (ORAs).	Active Pedestrian Streets 

Table 6: Urban elements - 1 [Source: Von Richthofen Aurel (2018). Urban Elements]

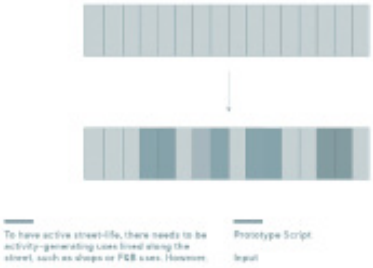
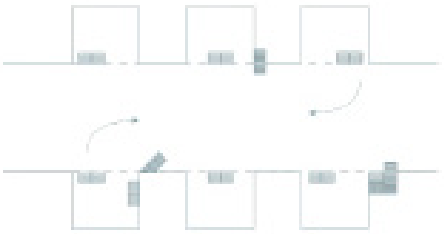
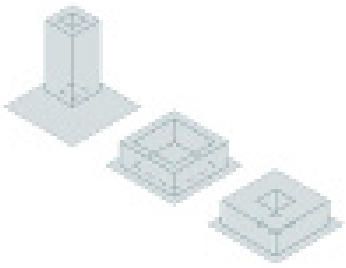
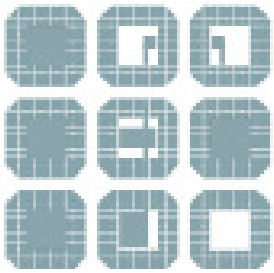
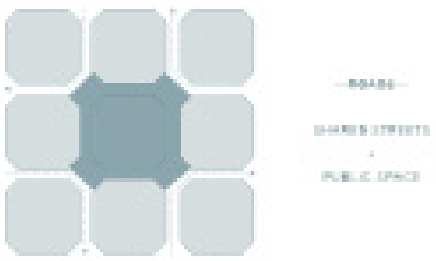
To create a lively street life, there must be activity-generating uses along the street. A street with only one type of use, on the other hand, would be boring and unappealing. Different sorts of programs should be available for different types of interaction.	Multi- Prog Street 
Buildings beside pedestrian lanes should have many entrances that access straight to street level to encourage chance interactions between building users and passers-by along the lane, this will ensure that single-user developments have many street entrances.	Entranceways 
Low-rise structures contribute to a liveable city by creating a more pedestrian-friendly atmosphere that can inspire better community living. The goal is to achieve a balance for both inhabitants and pedestrians by examining the link between the inside and the outside.	Inside- Outside 
Following the iceberg city concept, the freed area above ground is given priority to the ground datum, allowing people to use the ground space for breathing room, escape, and connectedness once more, especially for big properties (>1ha).	Seal Holes in Podium 
When several minor land lots inside the same urban block redevelop, there is an opportunity to amalgamate and consolidate vehicle entrances. This allows public events to take place on particular frontages without having to share them with automobile traffic.	Car-Lite Superillas 

Table 7: Urban elements - 2 [Source: Von Richthofen Aurel (2018). Urban Elements]

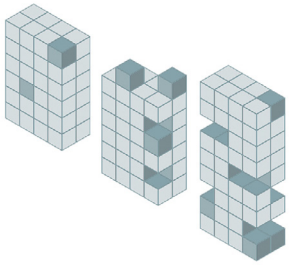
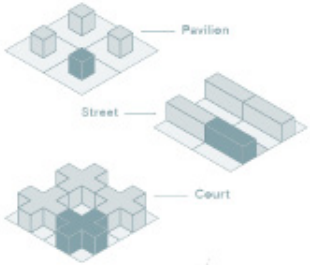
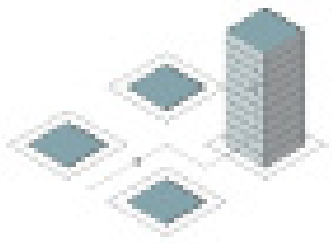
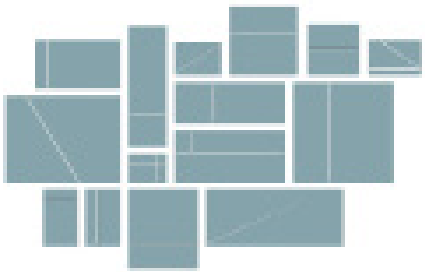
High density guarantees that a city is sufficiently compact to encourage an organic evolution into a self-sustaining metropolis, and it is complimented by other variables such as smart technologies and mixed-use planning.	Multi- Prog Street 
Sky-rise vegetation is crucial in a dense tropical metropolis like Singapore to provide urban respite and contribute to a sustainable built environment modelled using a script that determines the maximum possible green replacement by replacing displaced units.	Jenga City 
It might be argued that archetypes of the pavilion, street, and court can be distilled from historic, modern, and even future architecture typologies. By expanding the pavilion along an axis, the street typology develops on two sides, the court is formed.	Building Typology Redux 
What if the city's population is proportional to the average walking time between a residence/office unit and a significant transportation node, such as an MRT station? by proposing to manage walking time to the MRT station/Bus interchange, reliance on public transportation may increase.	Urban Accessibility 
Pedestrian life is an integral component of city life, and it is critical that walkability design is incorporated into the city's urban form, resulting in long, circular walking routes to destinations.	Lane City (Plan) 

Table 8: Urban elements - 3 [Source: Von Richthofen, Aurel (2018). Urban Elements]

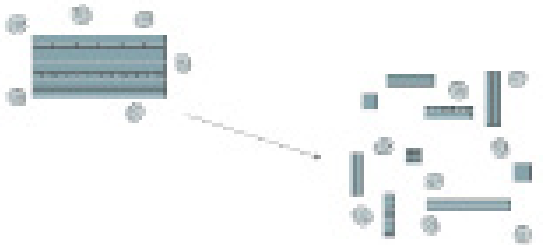
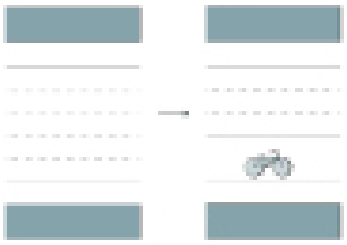
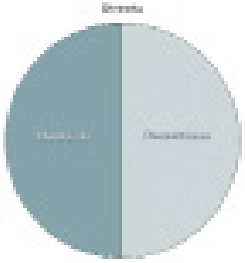
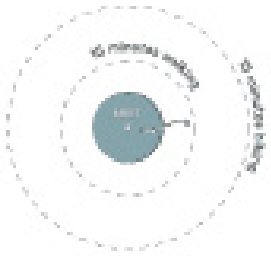
Rem Koolhaas offered a theoretical concept/ patent proposal to either reduce density and building footprint so that activities can infiltrate, or to com-pact and condense uses into a high-intensity mega center for activities.	Synergistic Users & Urban Space in CBD 
With greater road space available, more area may be dedicated to active transportation, including more extensive options for cycling and bicycle parking (particularly with the trend of shared bikes).	AV Streets 
Because the street is broader, there is a wider carriageway and a sense of 'openness,' which encourages speeding in these places.	Multi- Model Streets 
How far can you walk in 15 minutes on an MRT ride and at your current walking speed? Is it possible to find all you need and wish to see within the 15-minute travel time? You can plan Transport Oriented Development along the transit route using the specified infrastructure network.	Max Reach by Public Transport 
The tropical environment has an impact on architectural structures due to various weather components such as sun, rain, and wind. As a result, a tree canopy can only provide adequate shelter if its size is proportional to the range of fluctuation of these meteorological factors.	Climate Canopy 

Table 9: Urban elements - 4 [Source: Von Richthofen Aurel (2018). Urban Elements]

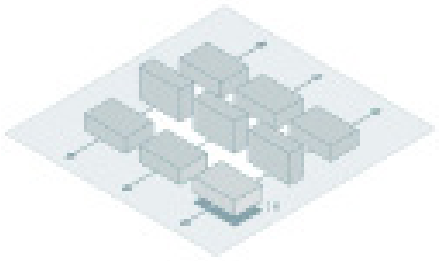
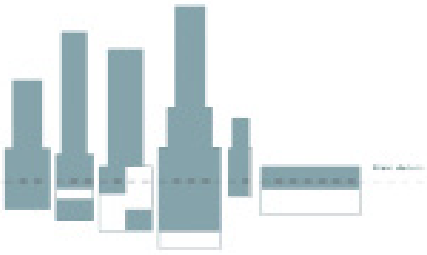
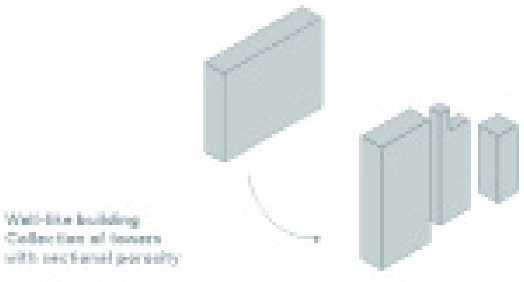
It is critical to have open space near to pedestrian flow to allow for social and recreational activities. The amount of the open space should be proportional to the number of users. It could be on a large scale, such as a neighborhood, or on a smaller scale, such as giving pocket open spaces.	Large Public Spaces 
Relationship between the depth of the building and the height of the ground floor voids. This idea investigates how the depth of a building's voids can be precisely related to the depth of the building, addressing solar comfort and ventilation at street level.	Sectional Porosity to Enhance Urban Environment 
Our crossroads may be made more pedestrian-friendly and safer by using curb design. We can accomplish a number of positive results for pedestrians by lowering the turning radius of the intersection corners of a traffic junction.	Curb(side) Matters 
Our perception of the skyline above ground often shapes our perception of urban congestion. As a result, burying more city mass frees up above-ground area for greenery, open spaces, and liveable spaces	Iceberg City 
Porosity between buildings dependent on the height-to-width ratio of the buildings can be used to prevent wall-like facades. As cities become denser and more constructions are built taller and closer together, some buildings generate a wall-like effect that degrades the beauty of urban form.	Avoid Wall-Like Facades 

Table 10: Urban elements - 5 [Source: Von Richthofen Aurel (2018). Urban Elements]

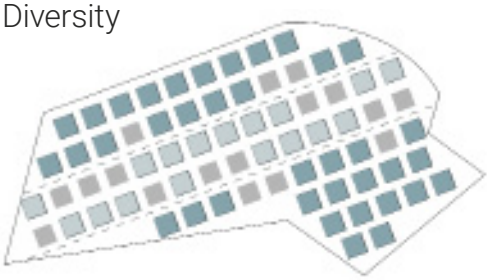
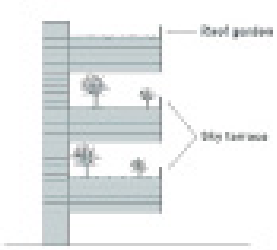
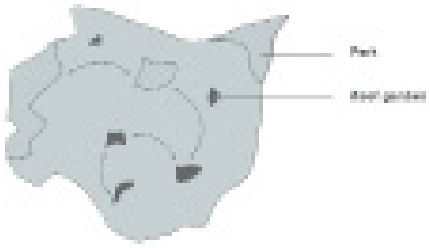
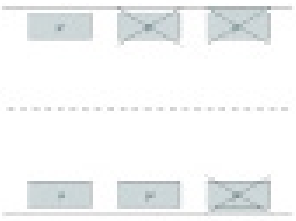
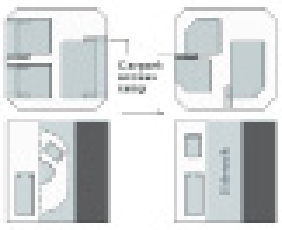
It is critical to provide activity-generating uses along a pedestrian spine and near key public places in order to create a lively and compelling pedestrian experience. The extent of the retail usage can also be determined by the function of public spaces.	Function, Urban Activity & Building Diversity 
Both on a precinct and development level, public places might be huge or intimate. Public spaces are encouraged to be multi-level inside a development, and can take the shape of landscaped areas on the first floor, sky terraces on the intermediate floors, or roof gardens.	Multi-Level Public Spaces 
Roof gardens can function as connectors between pocket parks, community parks, regional parks, and nature reserves. This provides for a high level of connectivity and circuitry, as well as a wide range of species and long-term durability also serve as buffer for natural and human landscapes.	Rooftop Ecology 
At least four modes of mobility are seen on every boulevard, avenue, and street: strolling, cycling, catching the bus, and driving. The percentage of space dedicated to pedestrians is around 50%, and it can be adjusted to the local conditions of the urban fabric.	The Travel Adaptor 
Sidewalks are vital locations for people to interact with the city. A continuous sidewalk creates a more pedestrian-friendly environment and allows for a more active street life. To do so, the walkways will need to be cleared of pedestrian and traffic conflicts.	Continous Sidewalk 

Table 11: Urban elements - 6 [Source: Von Richthofen Aurel (2018). Urban Elements]

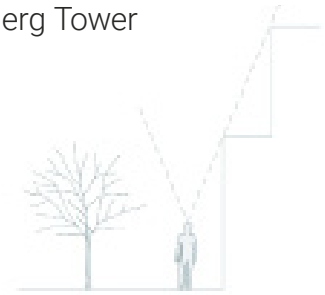
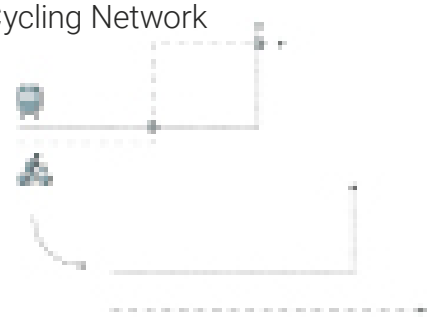
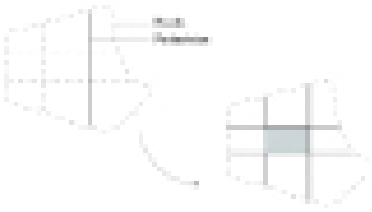
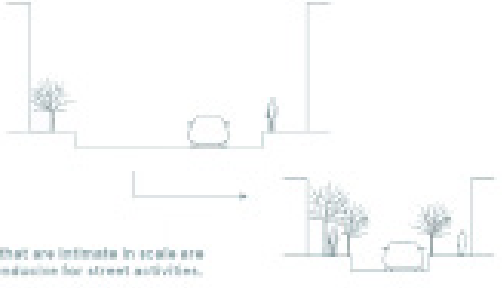
Sidewalks are important places for individuals to interact with their surroundings. A continuous sidewalk encourages pedestrian activity and offers a more pedestrian-friendly environment. The walkways will need to be cleansed of pedestrian and traffic problems.	Pedesrrian-Friendly Waterfront Developments 
This is true of a building's edge or a massing that includes trees. According to this study, any section of a building taller than 22 meters should be set back beyond the sky view cone to retain a comfortable view of openness.	Iceberg Tower 
The bike lane should ideally be completely isolated from the bus stop. If the networks cannot be separated, bike pathways can be built on alternate streets from bus corridors, or cycling lanes can be installed on the opposite side of a one-way street.	Cycling Network 
Superblocks allow for the creation of 'breathing streets.' A superblock is made up of nine existing grid blocks that are 400 meters long. By changing the road hierarchy to roads outside the periphery of the superblocks, over 60% of the street is freed up and traffic is reduced by 21%.	Breathing Streets 
With a street width to building height ratio of 1:1 to 1:1.5, and a height of roughly 20 meters, streets that are suitable to street activities are "intimate" in scale. Wider streets provide the city a distinct structure and give automobiles a feeling of direction, but they can be overwhelming for pedestrians. Cental landscape spine solve this.	Urban Edge-Enclosure 

Table 12: Urban elements - 7 [Source: Von Richthofen Aurel (2018). Urban Elements]

4.3 Core Elements of the Project

Focus Area: Kochi is the western coast's economic hub and a fast rising coastal city. The study focuses on the growth trends in Kochi Corporation's region as well as the Mullaserry Canal's surroundings. The Urban Design focuses on the Mullassery Canal Precinct in downtown Ernakulam, which is part of Kochi's Central Business District (CBD).

Informal Settlements: Kochi's canals are encircled on all sides by housing complexes. The relationship between these settlements and the canals is fragile at the moment. In a healthy symbiotic relationship with the canal ecology, redevelop in-situ or refit low-income informal communities (EKC, 2020). To re-invent the integration of street vendors and informal commercial zones into the core urban fabric in order to clear encroachments from the canal and repair it holistically (EKC, 2020).

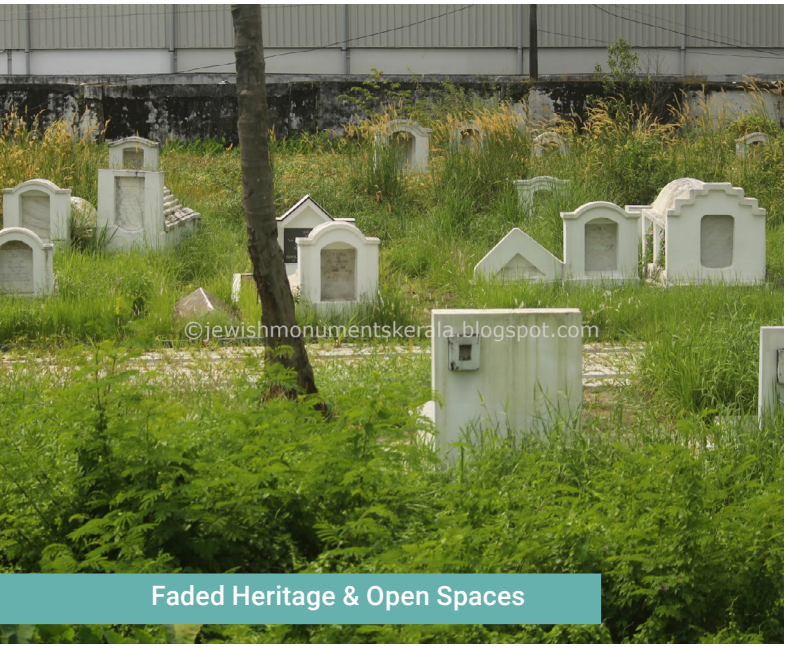
Polluted Waterways: The organic matter in the canals has increased due to illegal waste dumping and direct discharge of untreated home wastewater, causing eutrophic conditions in the water bodies. Furthermore, discharging wastewater turns the canal into an open sewage channel, causing health problems and negatively impacting the quality of life in the surrounding neighborhoods (EKC, 2020).


Aerial View of Kochi City


Informal Settlements


Polluted Waterways

Figure 27: Metro line-Kochi(Aerial view) [Source: Kochi Metro - Kochi Metro Rail Ltd]
Figure 28: Informal settlements near mullaserry canal
Figure 29: Mullaserry canal [Source: Design Brief | Entekochi Competition]



Faded Heritage & Open Spaces


Excess Garbage


Unsafe Streets

Faded Heritage Sites and Open Areas: Due to its location in the heart of the CBD, the UDC site offers numerous options for cutting-edge public placemaking concepts that are both inclusive and sustainable. (EKC, 2020) The city's faded heritage locations and open spaces must be reclaimed by its citizens in a healthy, sustainable, and inclusive manner so that the city's vibrant heart can be revived.

Excess Garbage: The need for managing residential waste disposal – both liquid and solid waste, managing special accumulated waste produced after festivities or events, disposing of construction rubble, commercial waste and effluents, as well as others, such as medical, sanitary, or electronic waste – all operate at different levels (EKC, 2020).

Unsafe Streets: Three important transit zones run across the area. Because of the density and narrowness of connecting highways, the issues faced in the dense urbanization of the city are the imagination of an economic model that has lost connection with the waterways and could not fully adapt to a road-based mobility system. (EKC, 2020) Despite the fact that the zone is traversed by three major transit nodes, it remains poorly connected, unwalkable, and visually hazardous, especially for women and vulnerable groups. This is particularly true in the area behind and around the KSRTC bus station, which the police have designated as a law and order sensitive area (EKC, 2020) .

Figure 30: Jewish cemetery [Source: jewish monuments kerala]
Figure 31: KMC garbage collection ground [Source: Design Brief | Entekochi Competition]
Figure 32: MG road (Night) [Source: Kochi's MG Road needs creative solutions to save business | Kochi - Times of India,]

4.4 Choice of Case Studies

Masterplanning in future cities of India

Project: **Amaravati Masterplan**
Location: Andhra Pradesh, India
Architect: Foster + Partners
Year: 2017

Sustainable City Planning Strategies

Project: **Sustainable Amsterdam**
Location: Amsterdam, Netherlands
Year: 2017

Vital Place Shaping

Project: **Canal Corridor, King's Cross**
Location: London, UK
Architect: Townshend Landscape Architects
Year: 2017

Riverfront Regeneration, Adaptive Reuse

Project: **Minhang Riverfront Regeneration**
Location: Shanghai, China
Architect: SPARK
Year: 2021

4.5 Case Study 1 - Masterplan Amaravati, India

"We are delighted to be working with the chief minister and the government of Andhra Pradesh to help them realize their vision of the People's Capital and inspiring vision for the governmental complex at Amaravati. The design combines decades of research into sustainable cities with the most cutting-edge technologies now being produced in India. -Norman Foster, Founder and Executive chairman of Foster + Partners"

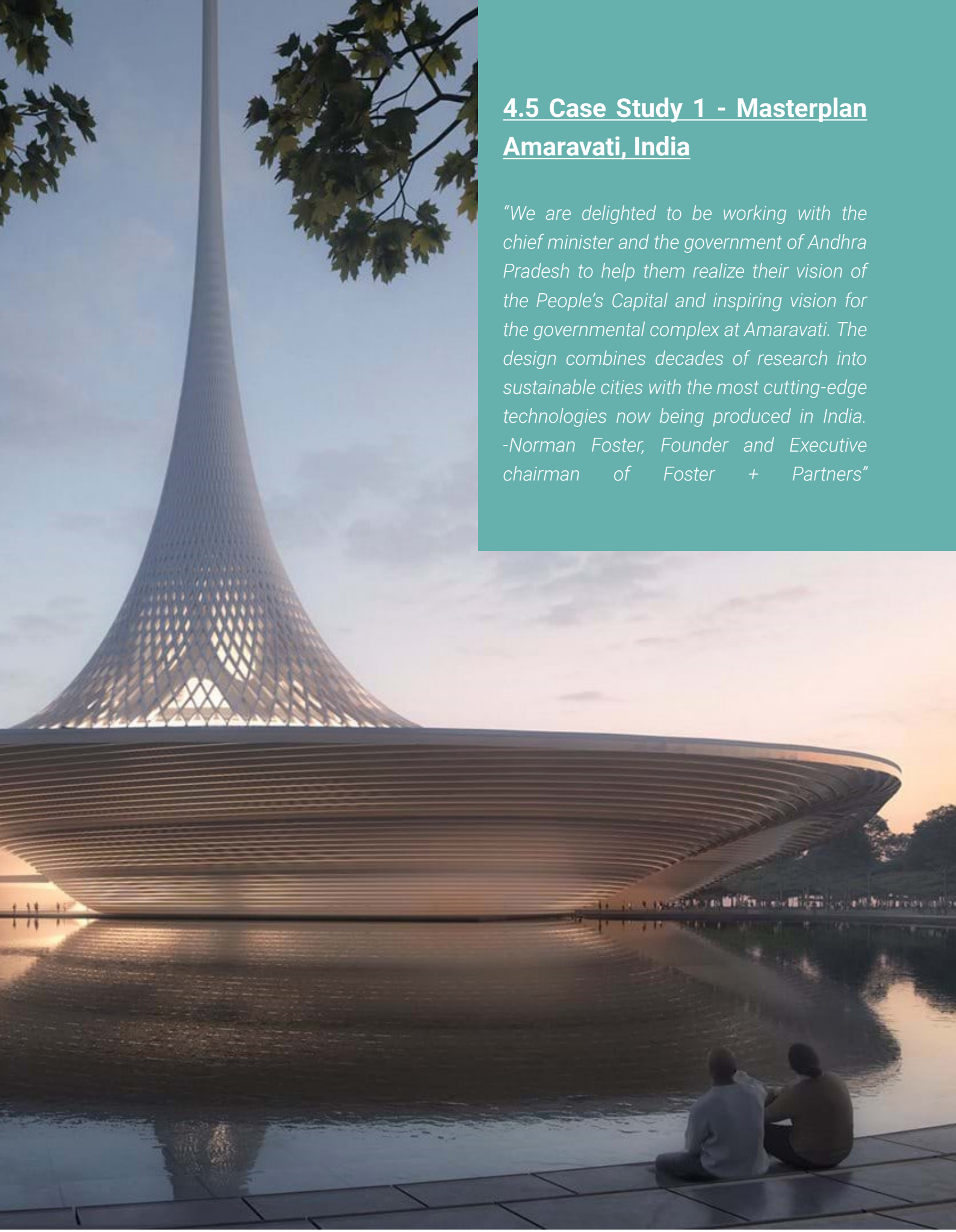


Figure 33: Legislative building, Amaravati
[Source: Fosterandpartners-Amaravati-masterplan]

Project: Amaravati Masterplan
Location: Andhra Pradesh, India
Architect: Foster + Partners
Year: 2017

After the state boundaries between Andhra Pradesh and the new state Telangana were redrawn, Amaravati was established as the new administrative capital of the Indian state of Andhra Pradesh. The masterplan for the new government complex, which will be the focal point of the 217-square-kilometer metropolis, was created by (Foster + Partners, 2017). The project entails the construction of two significant structures: the legislature assembly and the high court complex, as well as other secretariat buildings that house state administrative departments.

The new metropolis, which will be one of the most sustainable in the world, will be built on the banks of the River Krishna and will benefit from an ample supply of fresh water. The government complex is located in the city's center and measures 5.5 kilometers by 1 kilometer. It is defined by a strong urban grid that shapes the city. A clearly defined green spine spans the length of the project, forming the cornerstone of the masterplan's environmental policy, with at least 60% of the land filled by vegetation or water, inspired by Lutyens' New Delhi and New York's Central Park (Foster + Partners, 2017). The city was built to the highest sustainability standards, using the most cutting-edge technology currently being developed in India, such as photovoltaics. Electric vehicles, water taxis, and dedicated bike lanes, as well as shaded avenues and squares that allow people to meander around the city, are all part of the mobility strategy. (Foster + Partners, 2017) Traveling south from the river's shore, there is a mixed-use quarter built around 13 urban plazas, each representing one of Andhra Pradesh's 13 state districts. The legislative

Figure 34: Masterplan, Amaravati [Source: Fosterandpartners-Amaravati-masterplan]

assembly building, a democratic and cultural emblem for the people of Andhra Pradesh, is located in the heart of the green spine. The legislative assembly building is framed by the secretariat and cultural buildings and situated within a vast freshwater lake. Administrative offices are in the northwest, with the assembly chamber and council hall in the southwest and northeast corners, respectively. The center is supposed to be a void, similar to a courtyard, in keeping with Vaastu ideas. It is a public gathering venue for the people and their elected officials for the majority of the year (Foster + Partners, 2017).

A spiral slope leads to the cultural museum and viewing gallery, where visitors may see democracy in action. A 250-metre-high conical roof with a wide overhanging canopy provides shade while allowing cooling winds to travel through the structure. The high court complex's tiered roof design, which is inspired by India's medieval stupas, is offset from the main axis. The large overhangs on the roof give shade while also allowing the structure to breathe naturally. The structure's layout is inspired by the ancient temple design, with alternating concentric layers of chambers and circulation spaces (Foster + Partners, 2017).

The administrative offices and lesser courts, which are most accessible to the public, are on the building's outer boundaries, while the Chief Justice's court and private chambers are on the inside. The building has a courtyard and a roof garden, that allows the greenery to penetrate the interior spaces (Foster + Partners, 2017).

Figure 35: Masterplan and other building conceptual designs, Amaravati [Source: Fosterandpartners-Amaravati-masterplan]

4.6 Case Study 2 - Sustainable Amsterdam, Netherlands

"The complexity of urban development means it is no longer possible to make do with blueprint planning; 'certainties' that stem from them have long been lacking in credibility. The Amsterdam structural vision must seduce and convince with a coherent narrative, a story in which the social benefit of spatial interventions is explained and justified in terms that are as clear as crystal."

The city's bold goal of reducing GHG emissions by 75% by 2040 compared to 1990 levels and eventually phase out fossil fuels is admirable. If it works, Amsterdam's emissions will be 15% lower than the European Union's aim of a 60% decrease in emissions by 2040 (ICLEI, 2017). Municipal authorities consider the city's 2040 GHG reduction objective as a stepping stone toward the city's even more ambitious 2050 goal of decreasing GHGs by 80 to 90%. City leaders have long acknowledged that meeting the 2050 target will be a prolonged process that will necessitate wide multi-sector collaboration, as well as patience and tenacity. Together with the city: The municipal executive wishes to accelerate the city's sustainability, but it can't do so on its own. This speed necessitates a shift in mindset as well as efficient collaboration with Amsterdam residents, businesses, social organizations, and academia. There is no single factor that can make a significant difference. As a result, we rely on the federal government to enact necessary legislation and provide adequate funding. We can only move forward in the right direction and gain enough traction if we all work together. can help with the energy transition and the transition to a circular economy.

Figure 36: Bicycle parking-Amsterdam [Source: Amsterdam photos]

Reaching for sustainability: a panoramic vision

The city of Amsterdam's sustainability vision combines economic, social, and environmental goals. As a result, as Amsterdam prepares to phase out fossil fuels and user in a clean-energy future, the city anticipates a wide range of co-benefits rather than unintended costs as a result of the transition. The same efforts that Amsterdam must take to reduce and eventually eliminate fossil fuels would enhance air quality, reduce traffic congestion, improve building comfort, increase worker productivity, and save citizens money (ICLEI, 2017)

The city's sustainability objective is broad, aiming to improve public space management as well as the efficient use of energy, water, and material resources. The city collaborates with Amsterdam's industry, supply-chain managers, real estate developers, and bus and taxi firms using an integrated systems approach. It has also established a nearly €50 million revolving Sustainability Fund, in addition to the city's existing €40 million Climate and Energy Fund (ICLEI, 2017).

The new fund is open to organizations in need of low-interest financing for sustainable energy projects or garbage reuse and recovery operations. Sustainable Amsterdam, Between 2013 and 2020, the city's energy and environmental strategy aims to increase per-person renewable energy output by 20% while reducing overall per-person energy use by 20%.

A fossil-free energy future

By 2020, the city plans to boost its installed wind power capacity by 18 MW, a 27 percent increase over current levels. By that time, the city hopes to have improved its air quality by cutting soot emissions by 30% and nitrogen dioxide levels by 35%. If implemented successfully, the city's energy efficiency and renewable energy policies will lower the cost and quantity of energy used per person, as well as carbon dioxide emissions per person. The leaders of Amsterdam are drawn to a vision of Amsterdam as a clean, successful, and sustainable city, while avoiding the air and water pollution and price volatility that comes with fossil fuel dependency (ICLEI, 2017).

Renewable energy, on the other hand, produces virtually no pollution and has a more predictable price. Furthermore, the cost of renewable energy has been consistently decreasing for decades, and it is already at or below the cost of new fossil fuel power in many locations. The Netherlands, like much of the European Union, has been draining down its once-abundant natural gas reserves for some time and will have to start importing natural gas by 2025. Amsterdam's authorities believe that its sustainability measures will serve as a buffer against a future era of scarcity and higher pricing for fossil fuels. Amsterdam's leaders also expect that investments in modern, efficient, and clean energy systems will ultimately pay for themselves. They see renewable energy as a "win–win"

that will render the city more pleasant and healthier in the near-term, while ensuring that future energy supplies stay affordable and reliable in the long-term (ICLEI, 2017).

Waste-to-energy

Today, solid waste from Amsterdam is burned in an incinerator with strict environmental controls to generate heat and electricity for the city. The heat is supplied to residential and industrial consumers after the power is fed into the grid. Despite the fact that the heating plant burns municipal garbage, the city hopes to increase the percentage of solid waste that is separated from 19 percent in 2013 to 65 percent in 2020 (ICLEI, 2017).

The city plans to raise the number of residences linked to district heating from 62,000 to 102,000 between 2013 and 2020, as well as grant a €8 million subsidy to one of the city's public housing corporations to adapt 1,000 units to a zero-net-energy standard. The city believes that by implementing this scheme, other building owners will follow suit. Modern, energy-efficient buildings are generally more comfortable for inhabitants and attract higher prices than older, inefficient units, according to planners. Property values will be higher in a clean, well-managed city with energy-efficient buildings and good public transportation than in a city where public infrastructure has been allowed to deteriorate and fossil fuel industries' dominance has remained unchallenged, assuming all other factors are equal (ICLEI, 2017).

Electric transport

Amsterdam's leaders acknowledge that clean air is critical to the city's long-term viability, sustainability, and appeal to people and businesses. To minimize air pollution, they are boosting demand for electric vehicles (EVs) by increasing the number of public EV charging stations from 1,000 in 2013 to 4,000 by 2018, ensuring that EVs have plenty of charging alternatives. Taxi drivers can also use rapid chargers (ICLEI, 2017).

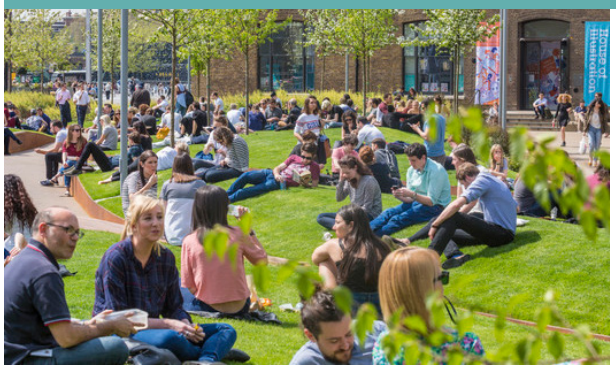
Vehicle owners who purchase an electric car in Amsterdam today will receive a public charging station in front of their home, and the city aims to provide EV drivers other benefits, such as the ability to carry products to merchants during hours when deliveries are otherwise banned. Despite the fact that the city's taxi and bus firms were initially resistant to the city's climate and energy policy, the city was able to get their cooperation. For example, in 2015, it secured a deal with its municipal bus business to transition to all-electric bus service by 2025. Furthermore, by 2025, the hundreds of mostly diesel boats now used for tours through the city's historic canals must be converted to electric, and the city is researching how to make its municipal ferries cleaner. The city also reached an agreement with taxi companies: by 2025, all taxis in the city must be electric, and in the meantime, electric taxis will be given preferential treatment at certain city taxi stands, meaning they will have to wait less for their fares, making the switch to electricity more profitable (ICLEI, 2017).

Challenges and looking forward

The city had hoped to raise its solar producing capacity to 25 MW by 2016, but it is currently only at 16 MW, representing a 78 percent increase over 2013. On the other hand, city officials are committed to reaching Amsterdam's climate and environmental goals (ICLEI, 2017).

Amsterdam is one of the world's most technologically advanced, politically progressive, and socially integrated cities. As a result, the challenges it has encountered in achieving long-term viability should serve as a cautionary story. Cities that are less well-governed, more contentious, and fast industrializing, with rapidly rising GHG emissions, confront even bigger challenges on their way to long-term sustainability. However, as Amsterdam's experience demonstrates, the benefits of successful cities are well worth the effort, and the world is a better place as a result (ICLEI, 2017).

Figure 37: Cityscape-Amsterdam [Source: Amsterdam photos]



4.7 Case Study 3 - Canal Corridor, King's Cross, London, UK

Project: Public Space, Park
Location: London, UK
Architect: Townshend Landscape Architects
Year: 2017

The Canal Corridor connects the Maiden Lane Bridge at York Way to the east and the railway bridge accessing St Pancras Station to the west, continuing along the northern side of the Regent's Canal through the historic centre of the King's Cross Development (Townshend, 2017). The corridor was designed as part of a site-wide masterplan to connect the King's Cross Development to the canal through a series of active public spaces, breaking through the boundary wall to reconnect the canal with its surrounding neighbourhoods and bringing in the diverse communities of the area. The King's Cross masterplan is a 67-acre brownfield property in central London that is being developed. The Canal Corridor is divided into two levels: a towpath level alongside the canal and a higher level, about 3 metres above, separated by a retaining wall that runs the length of the site, an impenetrable built-form barrier of walls, generally blank building and structural facades, all of which face away from the Regents Canal.

The Canal Corridor concept has created active areas and paths that improve the site's linkages and accessibility, and it will grow into a thriving, vibrant neighborhood that is integrated into the larger city. Each location has been created to be accessible to people of all abilities. The ground floors in Gas Holder Park were created to slope down to the towpath level, allowing for step-free access.

Figure 38: People using King's cross public space [Source: Canal Corridor, King's Cross Landscape | ArchDaily]

towpath level, allowing for step-free access. The gasholder structures and the canal towpath are linked by sinuous routes that flow past planting and lawn areas, with seating intervals (Townshend, 2017).

A sloping route leads to the new Somers Town Bridge on the east side, with the canal wall rising parallel to the path(Townshend, 2017). The Viaduct, a linear garden with pocket spaces formed out of the plants and seating opportunities above the historic Wharf Road Arches, connects Gas Holder Park and the Viaduct. The passage co ntinues eastward, alongside the Fish and Coal buildings, into Granary Square, where the Ghat Steps were installed into the canal wall, allowing views and providing a link to the canal towpath.

The canal wall was moved back on the eastern side of Granary Square, and a sloped entrance was built, issuing from the towpath to the north of the Lighterman building, where steps and a lift to the towpath were also built. Wharf Road Gardens, on the top level, has meandering paths between lawns with raised borders for seating and sections of edge that are flush to give inclusive access onto the lawns, complementing Gas Holder Park. The spaces have been combined to create a new linear public open space in London using complementary materials and harmonious characters (Townshend, 2017).

Figure 39: Landscape King's cross public space [Source: Canal Corridor, King's Cross Landscape | ArchDaily]

4.8 Case Study 4 - Minhang Riverfront Regeneration, Shanghai, China.

Project: Public Space, Park, Adaptive Reuse
Location: Shanghai, China
Architect: SPARK
Year: 2021

SPARK is pleased to announce the completion of the first phase of a much broader regeneration master plan for Shanghai's Minhang district's public space is the Minhang Riverfront Regeneration. The Minhang Riverfront is a large-scale urban renewal project. It was a rotting, overgrown riverbank bordered by low-grade industrial buildings with vestiges of pathways, industrial and antiquated utilities, all signs of the district's long history of transformation and neglect. SPARK's urban park, which was developed around an open space armature around which older developments were rebuilt, is today a thriving mix of commercial, technological, and institutional activities. The SPARK proposal creates a 750-meter-long recreational area that meets the government's and community's goals for a sense of place, improved pedestrian connectivity, and a more sustainable living environment.

In SPARK's design concept, a single cell Diatom was used as a repeating component. Diatoms are single-celled algae that naturally clean water in a variety of beautiful patterns. The Diatom shape has been abstracted into two and three-dimensional objects that

Figure 40: Minhang riverfront development aerial view [Source: Minhang Riverfront Regeneration / SPARK Architects]

animate the river embankment and tell the story of ecosystem and river regeneration. Three pedestrian bridges connect the residential, educational, and corporate sectors, and the riverside is built with continuous green ribbons of walking, jogging, and bicycle paths. The habitat was built by layering four distinct zones that improve vistas and allow for the first time access to the river. The linear zones take on an abstracted riparian form and accommodate creative pockets of activity with lawns, cafés, a sports park, and an event plaza.

SPARK developed a unique navigation and furnishing strategy that contributes to the new environment's storytelling and accessibility. "The Minhang project demonstrates how urban open space can play an important role in civic revitalization and social sustainability," said SPARK Partner Stephen Pimbley. It has instilled civic pride in the district and established a local benchmark for the quality of life of future residents."

"We were really excited about the project's potential goals to our imagination," said Lim Wenhui, Partner at SPARK, "to bring new life to the riverfront and provide a safe, attractive environment that invites residents, students, visitors, and business people discover the forgotten riverfront and celebrate its rebirth."

Figure 41:Minhang riverfront development design concepts
[Source: Minhang Riverfront Regeneration / SPARK Architects]

4.9 Case Studies Summary

Case Study 1: Amaravati Masterplan

Design Elements: An axial strip promenade runs north and south of the city, with 60 percent of the space dedicated to greenery or water, sustainable transportation, well-defined walking & cycling paths, & well-shaded streets & squares.

Case Study 2: Sustainable Amsterdam

Design Elements: Waste-to-energy and electric transportation are two initiatives aimed at bettering public space management and the efficient use of natural & material resources.

Case Study 3: Canal Corridor, Kings's Cross

Design Elements: Interlocking spaces, active and passive recreation, active places and routes that increase the site's links, and a lively, vibrant community that is accessible to individuals of all abilities.

Case Study 4: Minhang Riverfront Regeneration

Design Elements: Vibrant mixeduse neighbourhood, single cell Diatom as recurring motif, green ribbons, a furniture strategy that contributes to the storytelling and accessibility.

CHAPTER II.

5 Site Characteristics

5.1 About Mullassery Canal

5.2 Factors to be Considered

5.1 About Mullassery Canal

The Mullassery canal in Ernakulam, Kochi and its immediate surroundings is a manmade canal centrally located on the mainland portion of Kochi (EKC, 2020). The Mullassery canal was established for inland mobility in the past, connecting Kochi's backwaters to the Perandoor Canal in the east. The Kerala State Regional Transport Corporation (KSRTC) bus terminus, located on the eastern end, provides intra-city and inter-city public transit. Waterfront reclamation in the past has resulted in Marine Drive, a linear public recreational avenue juxtaposed with housing towers and commercial buildings at the juncture where the canal meets the backwaters (EKC,2020).

With the emergence of various modes of personal and public transportation, as well as a road-centric development, the canal appears to have been based on nearby plots as its function for effective transportation faded into the past. While the canal is 1.3 kilometers long, concrete slabs cover more than half of it, which are used for on-street parking and specific vending zones. (2020, EKC) As we travel east to west along the canal, the land use pattern changes. It is bordered by the city's most prestigious educational institutions, historic buildings, major commercial streets, street markets, warehouses, and both official and informal housing. The canal is bordered by low-rise, high-density development from the 1980s, which completely changed Kochi's skyline.

Map 5: Existing Landmarks & Functions.
[Source: by author based on entekochi-competition]

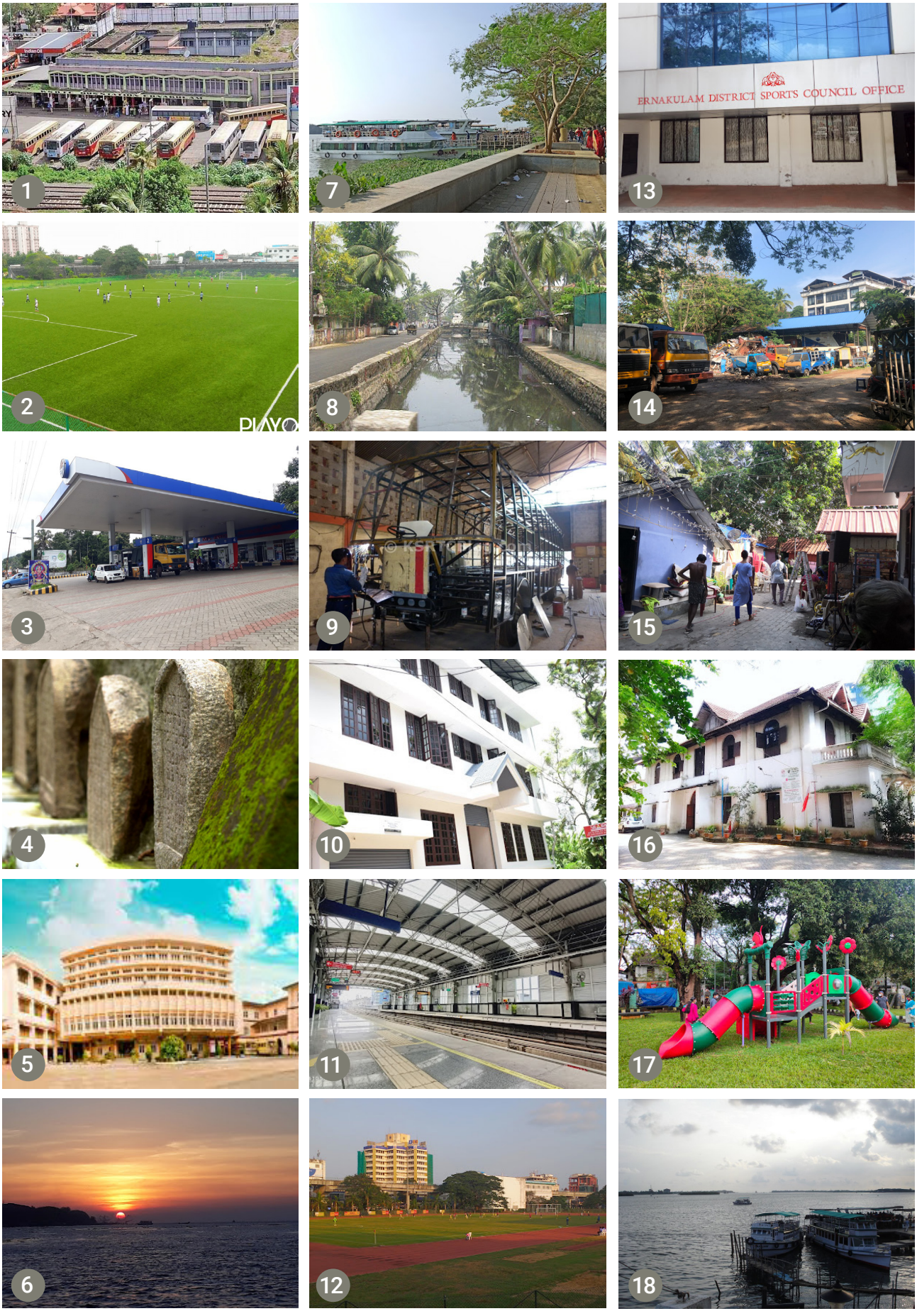


Figure 42: Focus Area (Mullassery Canal) Landmarks

5.2 Factors to be Considered

5.2.1 Flood Mitagation

Waterlogging is highly dangerous in Ernakulam's downtown zone. Mainland Kochi was developed on rice paddy farms in the past. The majority of it is in the Low-Elevation Coastal Zone, and a portion of it is below sea level. The Mullassery canal's eastern terminus is located in one of the city's low-lying neighborhoods (EKC, 2020). Furthermore, the city is prone to flooding due to a combination of manmade factors and climate change-related cloudbursts and rainfall patterns.

Flooding in cities is a recurring problem that interrupts people's lives and costs a lot of money and time. Adapting to climate change will be an integral aspect in developing flood control strategies. Because current urban initiatives have failed to respect the city's natural water system, certain portions of the land are prone to flooding (EKC, 2020). Because the canal has been substantially built over, it is clogged at various spots.

The canal's flood plains have been encroached upon, like in the case of the current KSRTC intra-state bus stop, resulting in massive flooding after heavy rains. The canal's preservation and renewal must also demonstrate ecological awareness by being integrated into the city's current infrastructure architecture in a way that minimizes flooding and produces a healthy ecology around the water bodies (EKC, 2020).

Figure 43: Mullaserry canal [Source: Design Brief | Entekochi Competition]

5.2.2 Re-thinking Waste Management Systems

The need for managing residential waste disposal, both liquid and solid waste, managing special accumulated waste produced after festivals or events, disposing of construction rubble, commercial waste, and effluents, as well as others, such as medical, sanitary, or electronic waste, operates at various levels. Domestic drains are connected to a network of canals and stormwater drains for waste disposal. Due to the dumping of various types of debris, the flow of water in the canal is disrupted or hindered, necessitating more regular dredging and desilting of the canal (EKC, 2020).

The organic matter in the canals has increased due to illegal waste dumping and direct discharge of untreated home wastewater, causing the water bodies to become eutrophic. Furthermore, discharging wastewater turns the canal into an open sewage channel, causing health problems and negatively impacting the quality of life in the surrounding neighborhoods (EKC, 2020).

5.2.3 Improving Mobility & Walkability

Because of the density and narrowness of connecting highways, the issues faced in the dense urbanization of the city are the imagination of an economic model that has lost connection with the waterways and could not fully adapt to a road-based mobility system. Throughout the day, major parts of the city remain congested. This, combined with the lack of an integrated transportation infrastructure with innovative last-mile connectivity options, has created a fragmented and isolated metropolis. Improving walkability and other non-motorized modes of transportation are also key steps in reducing the impact of climate change caused by emissions from motorized vehicles (EKC, 2020).

There is a shortage of healthy, barrier-free, and safe walking linkages in the area, particularly for users from the numerous institutions that essentially line the zone. Women who frequent the area also report a sense of being unsafe and isolated, which makes them fear going out after sunset. As a result, there are empty, gender-neutral streets and struggling businesses with minimal foot traffic. The lack of public spaces prevents citizens from being active and inclusive, adding to the city's perception of decline (EKC, 2020).

Despite the fact that the zone is crossed by three major transit nodes, it is nonetheless poorly connected, unwalkable, and obviously hazardous, especially for women and vulnerable groups (EKC, 2020). This is particularly true in the area behind and around the KSRTC bus station, which the police have designated as a law and order sensitive area.

Figure 44: Site-Barren land
Figure 45: Site-Open space
[Source: Design Brief | Entekochi Competition]

5.2.4 Integration of sustainable Low-In -Come Housing

Kochi's canals are encircled on all sides by housing complexes. At the moment, the relationship between these neighborhoods and the canals is tense. Untreated sewage and solid waste dumped into canals serve as breeding grounds for water-borne diseases, putting local residents' health at risk. Low-income neighborhoods are also the most vulnerable during the city's flash floods, which cause health and property losses as well as challenges in everyday life, pushing residents to abandon these bodies of water (EKC, 2020).

5.2.5 An Ecological Approach

The site is part of a broader estuarine environment and is located in an ecologically vulnerable coastal area. It's critical to address the canal's fresh and saline water management systems, which can help the city adapt to climate change. The canal's eastern terminus is a wide open region that may be a remnant of the city's marshes. A huge urban biological network includes marshes, forests, and parks. The landscape's potential biological functions, as well as its unique flora and fauna, can be utilized to provide long-term resistance to climate change and floods, as well as contribute to local livelihoods and improve neighborhood quality of life. The ecological factor is also linked to neighborhood quality of life, which has a direct impact on public health (EKC, 2020).

Figure 46: Site-KSRTC parking lot and overbridge
Figure 47: Site-informal street

5.2.6 Public Place Making

Because it is located in the center of the CBD, the UDC site provides numerous opportunity for cutting-edge public placemaking concepts that are both inclusive and sustainable (EKC, 2020). Through innovative urban planning, many of the fallow locations highlighted on the maps can be made accessible from the Canal, resulting in a continuous and integrated spatial expression. It could be an opportunity to re-imagine how a bus stop in the city center can be integrated holistically into urban placemaking activities, resulting in an environmentally sustainable and citizen-friendly public space. Overall, these placemaking initiatives may improve foot traffic in these regions, which will help to support and supplement the CBD's deteriorating economic activity. The city's open spaces must be reclaimed by its citizens in a healthy, sustainable, and inclusive manner so that the city's dynamic heart can be restored (EKC, 2020).

5.2.7 Socio-Economic Sensitivity

Kochi's urbanism address the demands of the poorest and most marginalized. Informal settlements and street vendors are the lifeblood of Ernakulam's city center, and any reimagining of the city's urbanism must include an in-situ response to this group of users, who are nearly always left out of urban design, and planning visions. Roadside vendors require creative placemaking to accommodate them in the heart of those spaces, while informal housing settlements require improved service infrastructure and integration with the city's public spaces (EKC, 2020).

Figure 48: Site-Maharajas ground
Figure 49: Site-Informal road
[Source: Design Brief | Entekochi Competition]

Figure 50: Site-Informal settlements
Figure 51: Site-Mullaserry canal

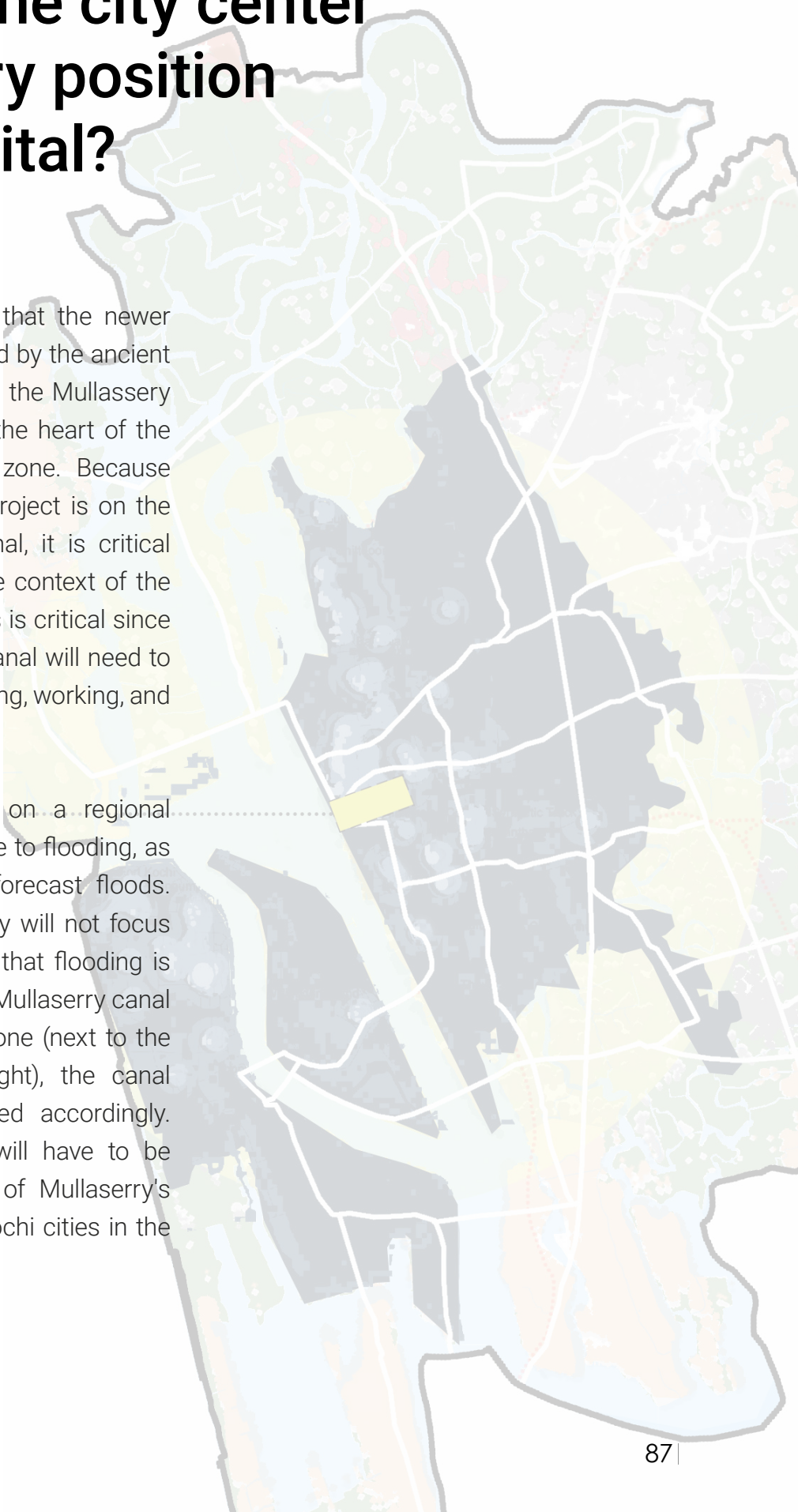
6 Context Analysis

6.1 Introduction

The starting points for the next steps are defined using the two theory frameworks of urban vitality and masterplanning process. It has to do with the component of urban vitality: accessible street. This point was chosen for its ability to connect the other aspects of urban vitality. The idea is that the first step in designing a vital area city center is to understand how Kochi city centers operate. Presumably, the center of the Focus area (Mullassery canal zone) is also at one of Kochi's most accessible locations, thus the starting point of the accessible street factor. Following that, in this sub chapter, based on urban aspects, a study of the current state of the focal region is carried out, from which the urban failures are reported.

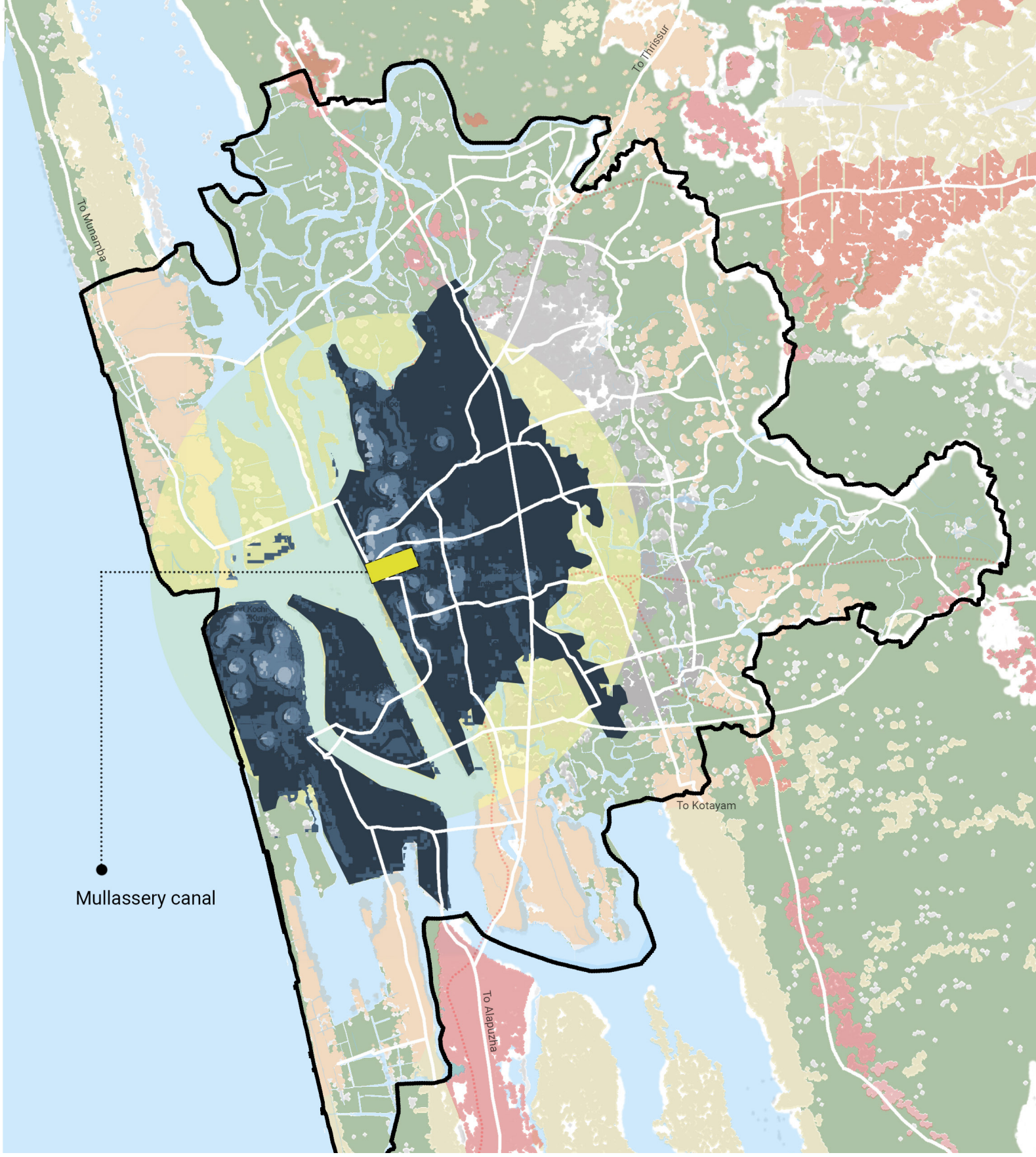
6.2 Positioning

How might the city center of Mullassery position itself to be vital?



Kochi is built in such a way that the newer parts of the city are surrounded by the ancient (Figure 29). Our main region is the Mullassery Canal, which is positioned in the heart of the city's business development zone. Because the focus of this graduation project is on the city center of Mullassery Canal, it is critical to situate the center within the context of the surrounding town regions. This is critical since the city center of Mullaserry canal will need to draw people from Kochi (for living, working, and pleasure).

Apart from this focal point on a regional scale, the Kochi region is prone to flooding, as evidenced by historical and forecast floods. Despite the fact that this study will not focus on climate resilience, the fact that flooding is and will be a concern, and the Mullaserry canal region is located in a buffer zone (next to the backwaters, Figure 29-top right), the canal was required to be positioned accordingly. This climate resilience idea will have to be incorporated into the design of Mullaserry's city center, as well as other Kochi cities in the future.centers.



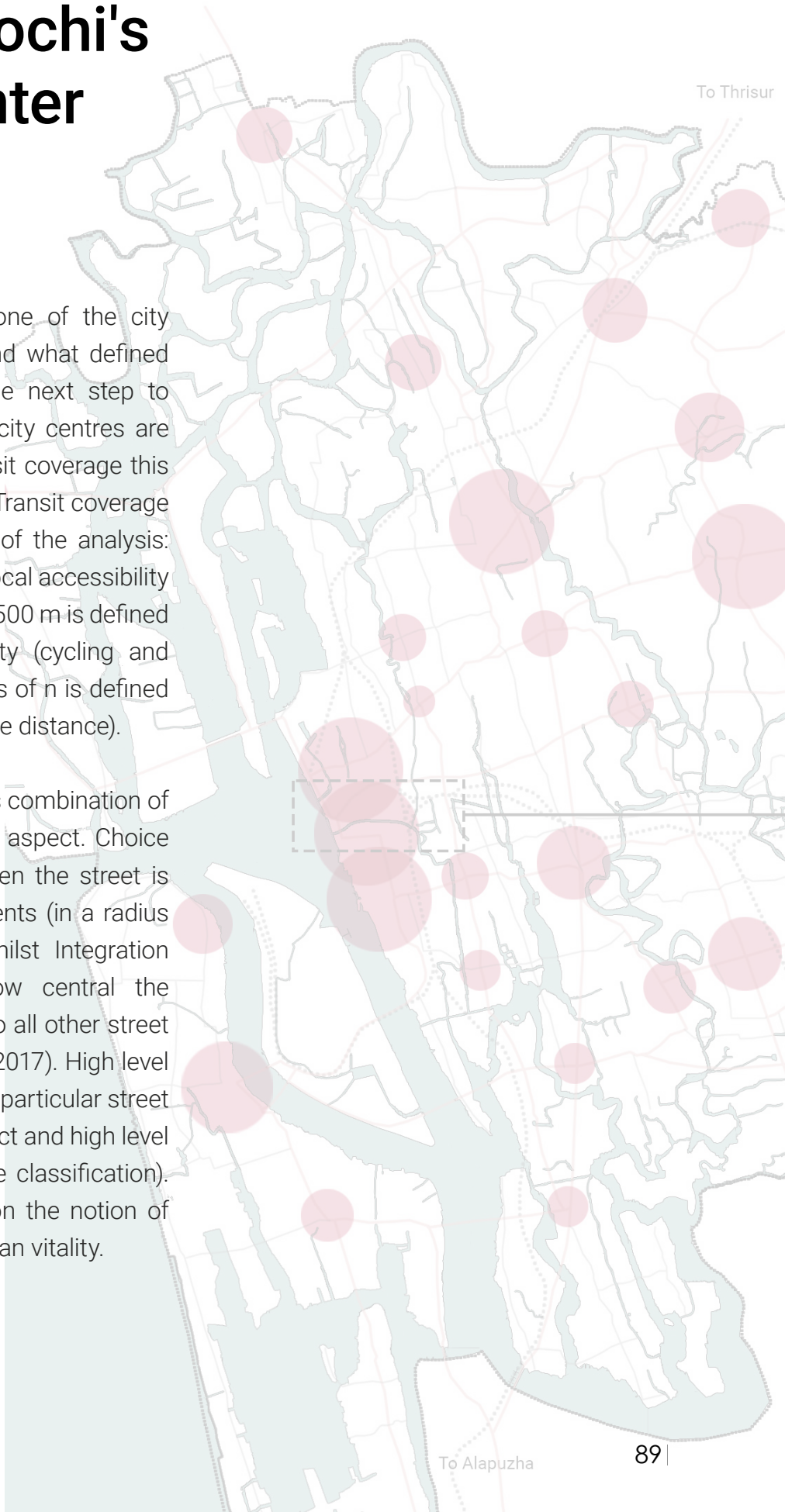
Map 6: Kochi city structure and flooding risk .
[Source: drawing by the authors based on Urban_flood_vulnerability_zoning_of_Cochin_City_Southwest_coast_of_India_using_remote_sensing_and_GIS]

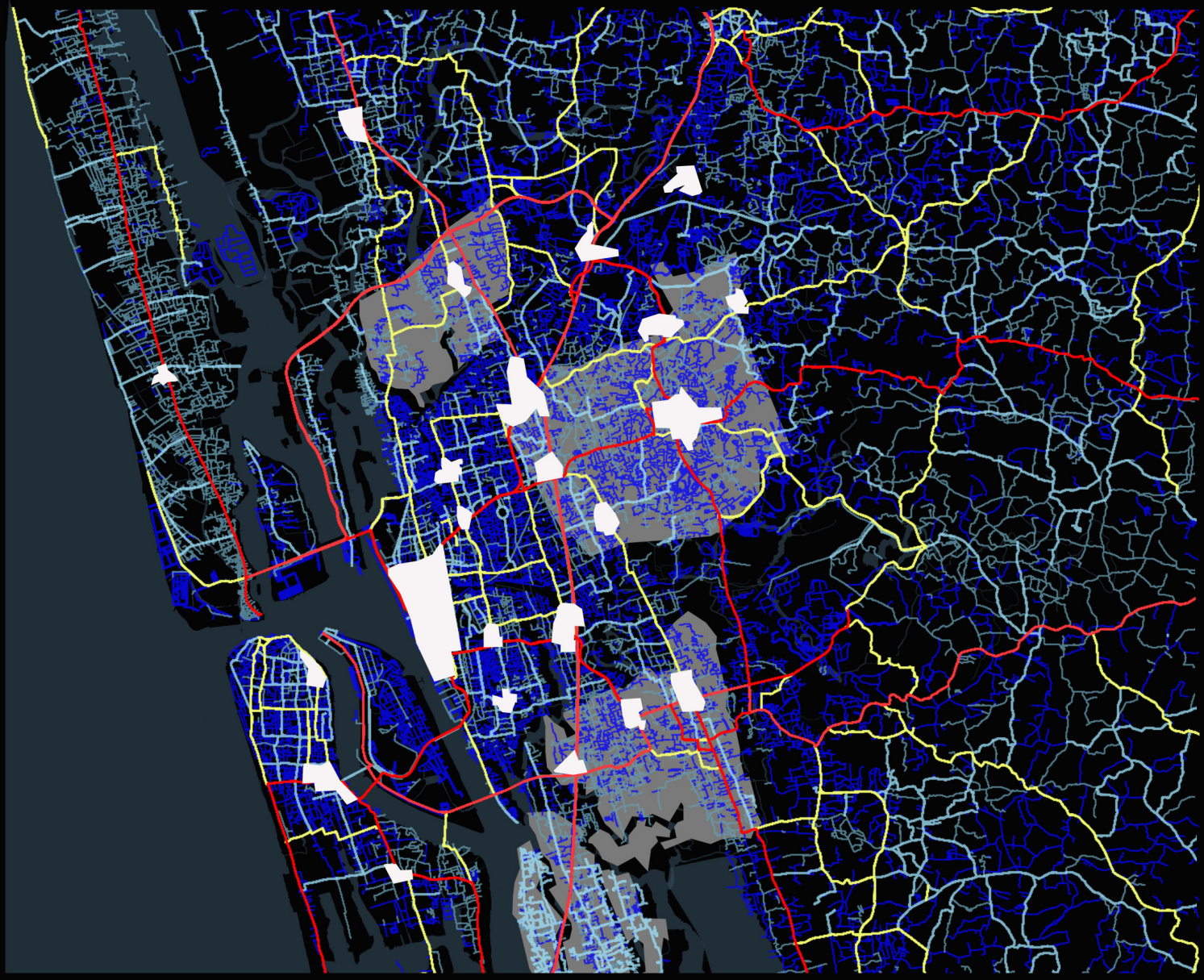
6.3 Benchmarking

How does Kochi's vital city center function?

Mullassery canal region as one of the city centres of Kochi to understand what defined urban vitality in Kochi is. The next step to do is to analyse where such city centres are located and what kind of transit coverage this city centres are accessible to. Transit coverage will be defined as the radius of the analysis: radius of 800 m is defined as local accessibility (walkable distance); radius of 1500 m is defined as neighbourhood accessibility (cycling and motorbike distance); and radius of n is defined as global accessibility (driveable distance).

Accessibility itself is defined as combination of Choice aspect and Integration aspect. Choice (closeness) aspect is how often the street is passed to reach all the segments (in a radius of n) in a road structure whilst Integration (betweenness) aspect is how central the particular street is in relation to all other street (in a radius of n) (Javadi et al, 2017). High level of accessibility means that the particular street has a high level of Choice aspect and high level of Integration aspect (bivariate classification). This analysis needed based on the notion of how accessibility relates to urban vitality.

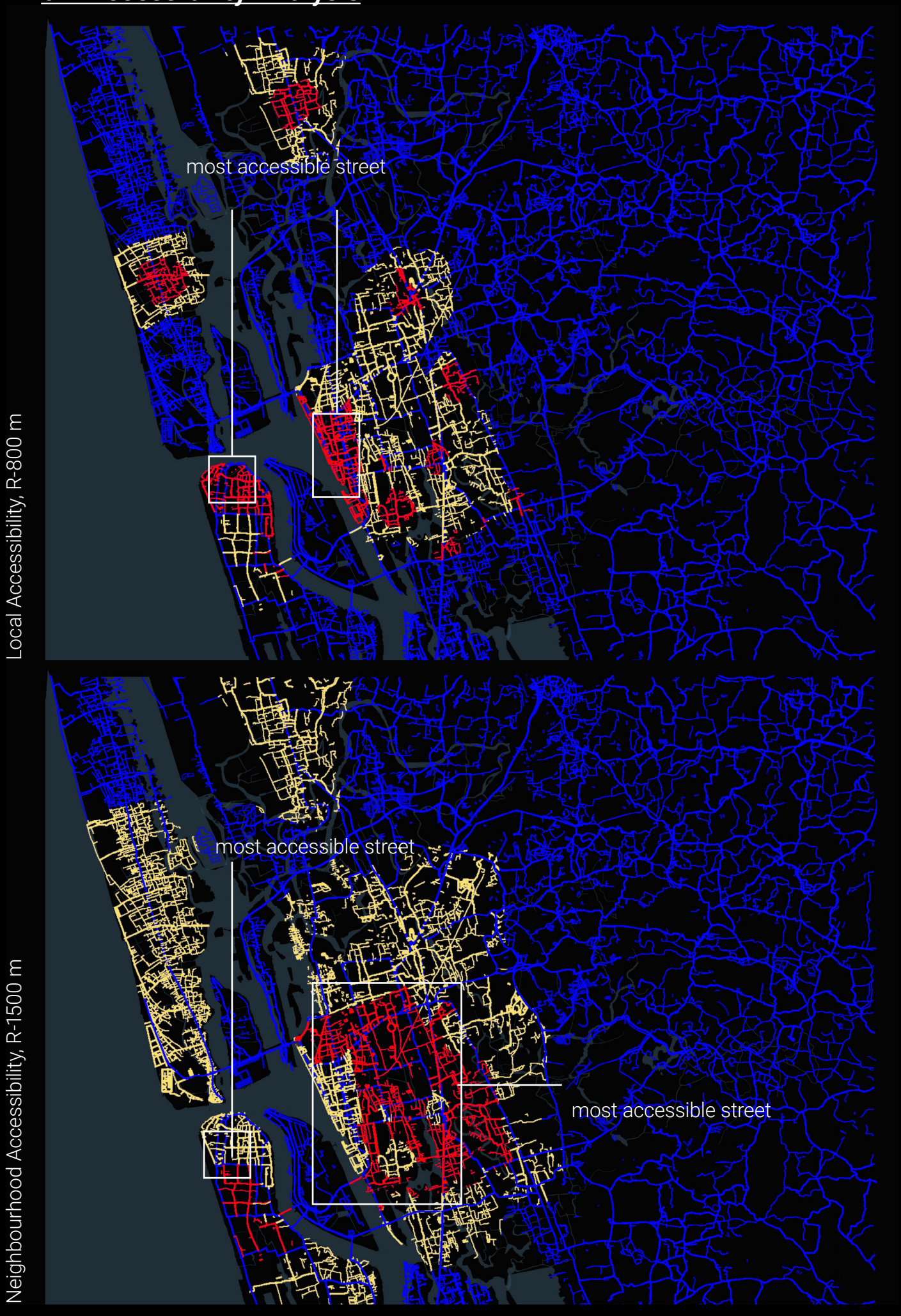


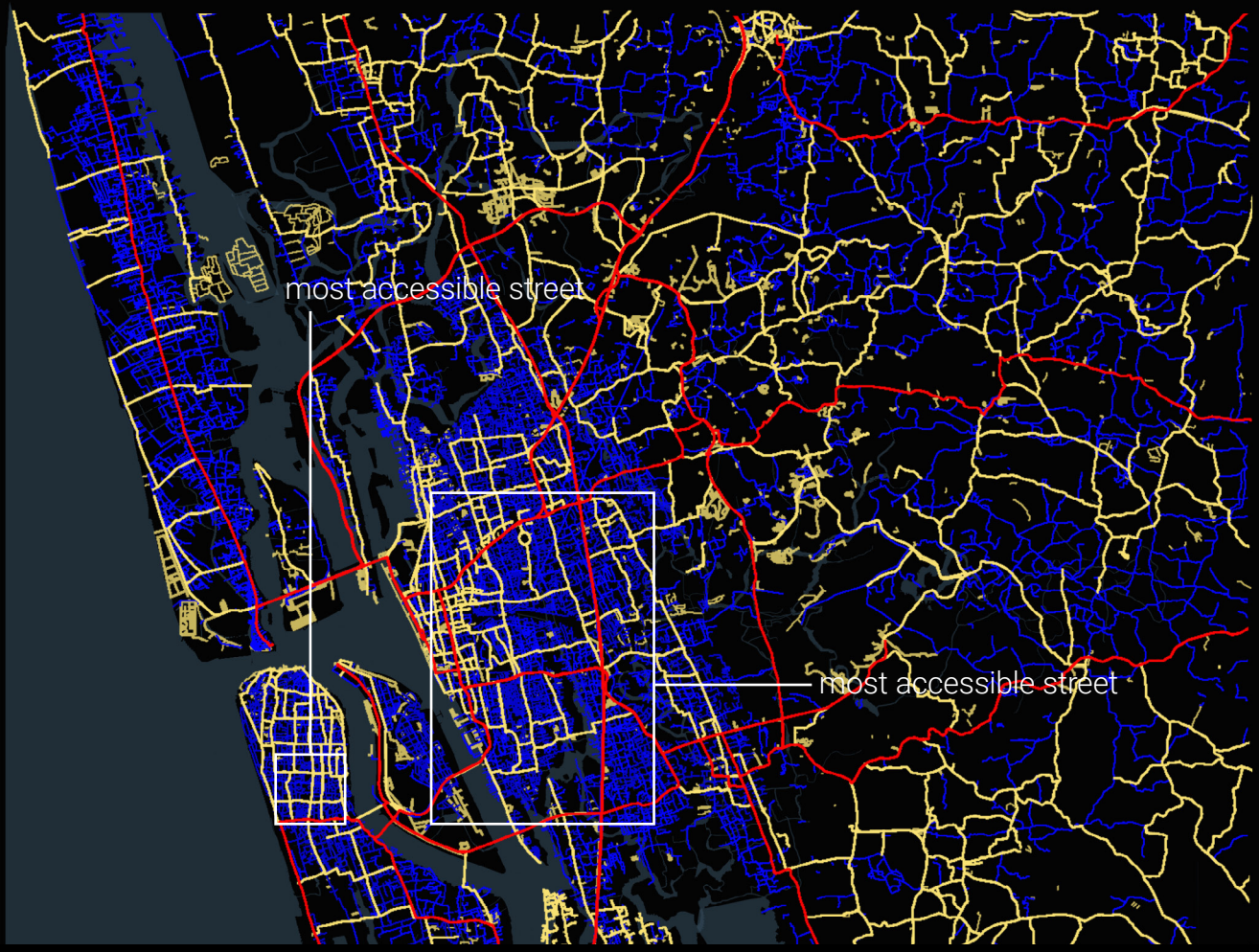


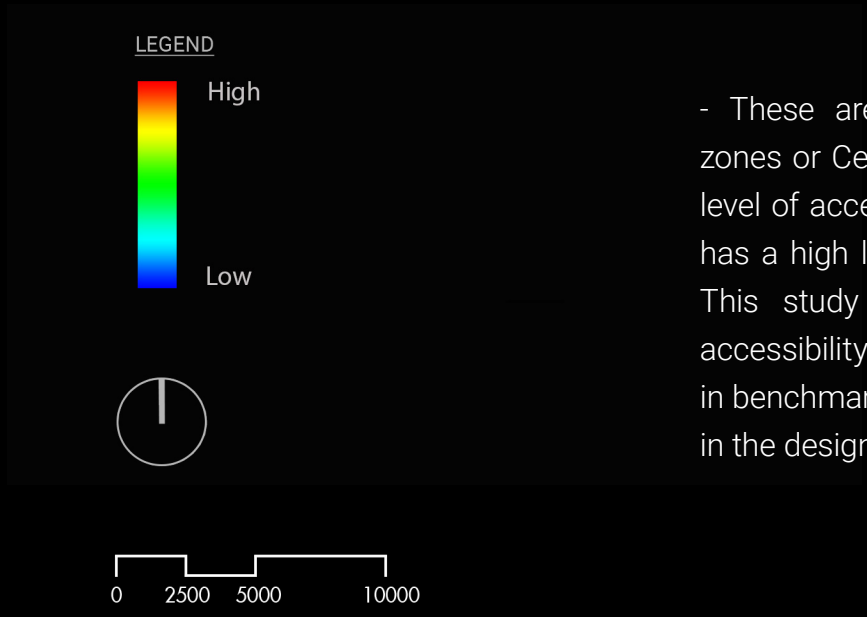
- Learning about Kochi's current city centers, accessibility, and development patterns, to study how they run and provide a diverse range of activities and how are connected. This step is being made on purpose to embrace the locality and learn more about its positive and negative aspects to improve or make it more vital and occurring.

Map 7: Kochi city centers and mobility analysis [Source: by author based on QGIS]

6.4 Accessibility Analysis





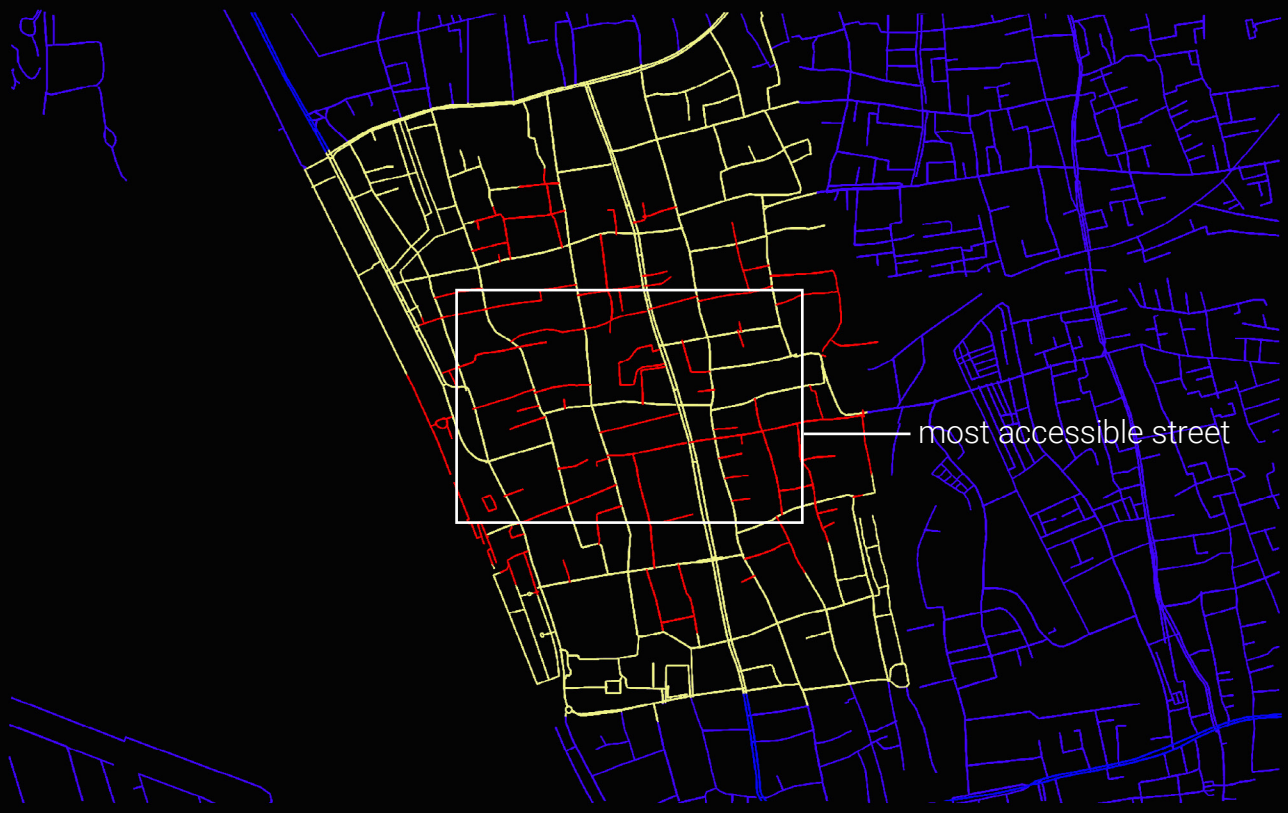


- These are the city's most accessible zones or Central Business districts. A high level of accessibility indicates that a street has a high level of choice and integration. This study aids in understanding how accessibility relates to urban life, as well as in benchmarking new functions and tactics in the design.

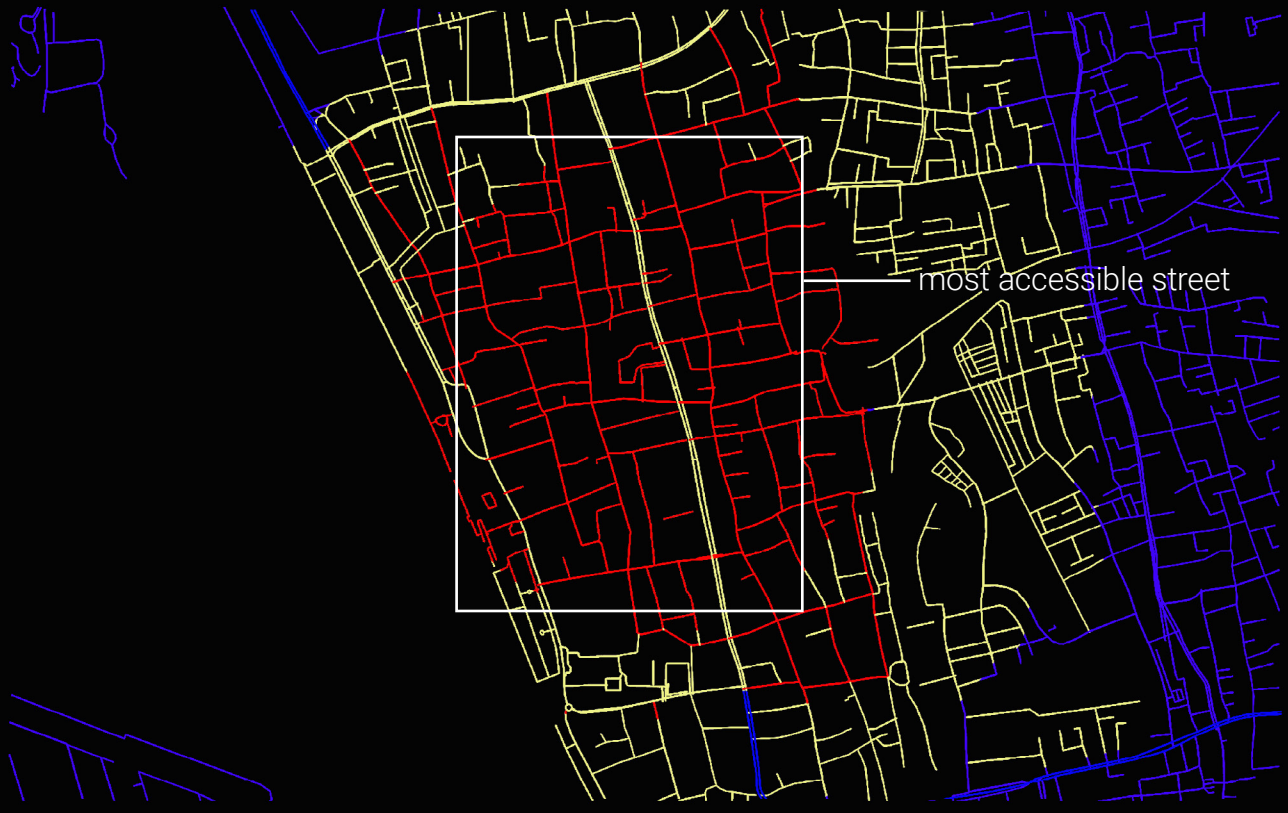
Map 8: Kochi city center accessibility analysis [Source: by author based on QGIS]

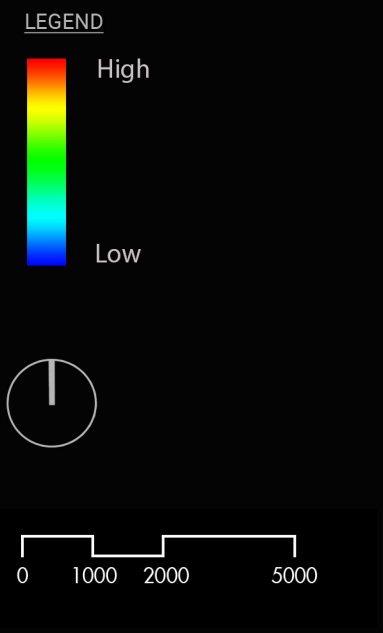
6.4.1 Focus Area Accessibility

Local Accessibility, R-800 m



Neighbourhood Accessibility, R-1500 m





- The following is an analysis of the most accessible zones in the focus area of Mullaserry Canal Region and its Surroundings. A high degree of accessibility indicates that a street has a high level of Choice and Integration. In a zoom-in setting, this research aids in understanding how accessibility is related to urban vibrancy.

Map 9: Focus area accessibility analysis [Source: by author based on QGIS]

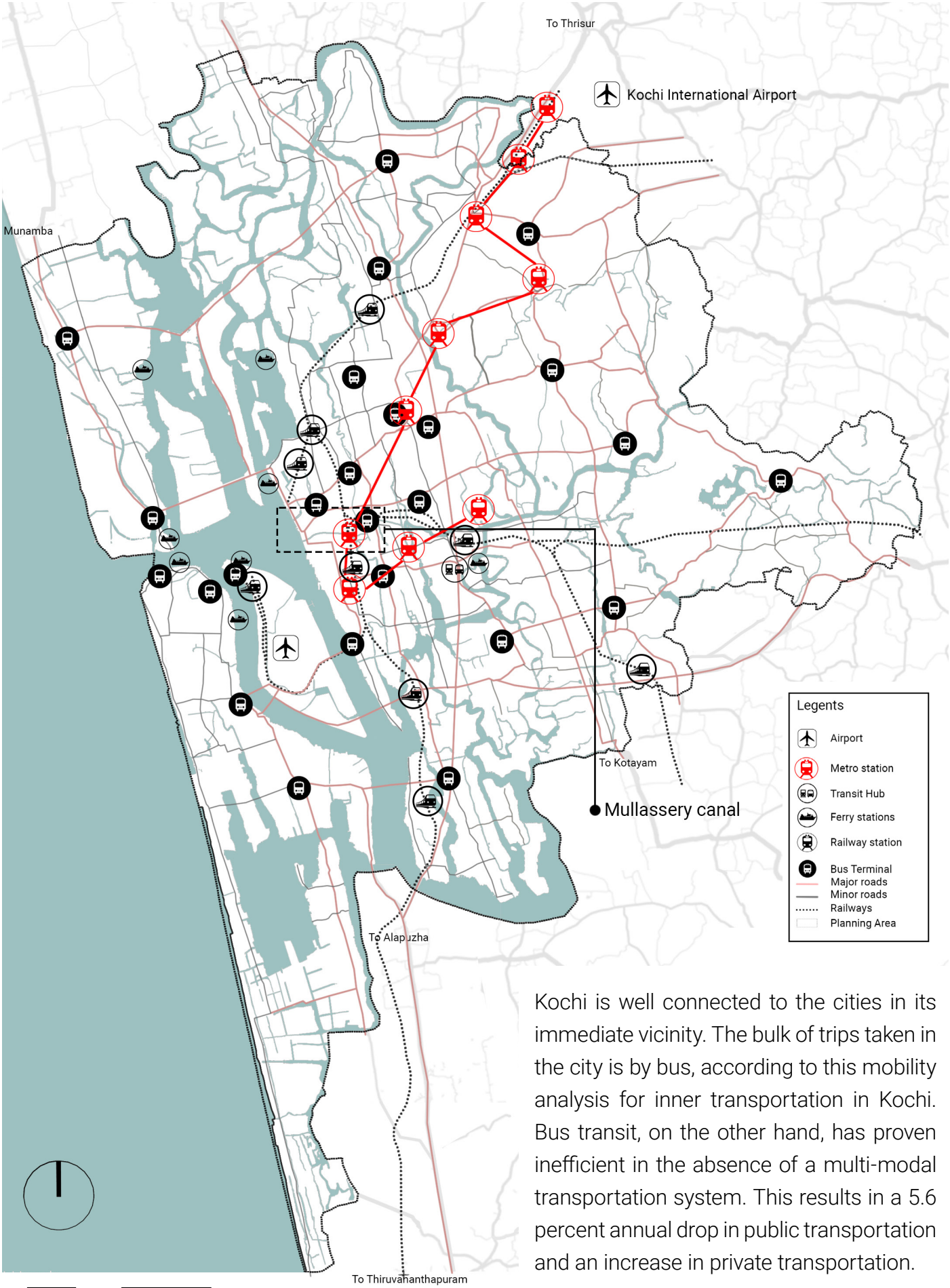
6.4.2 Assessment

- According to the accessibility analysis, the Park Ave Rd, LT. Unniyattil Rd, A.k Sheshadri rd, the Mullaseey Canal Road, and the KSRTC rd, which connects people from the bus station to the marine drive, have the highest accessibility in the local transit coverage (R=800 m). This metric is important for getting an initial impression of the place in terms of urban life (which principles are visible) and comparing it to other areas. This region's typology ensures mixed-use buildings, high density, and a diverse range of people's activities inside the area. Because of the existence of institutions, business activity, and tourist attractions in this area, people began to gather. Finally, on the tiny streets in front of the shop building, informal economic activity took place. The place's vitality is based on all of these elements.

- According to the accessibility analysis, the center part of the focal area, which surrounds the mullassery canal and contains local accessible area, has the highest accessibility in the neighborhood transit coverage (R=1500 m). The informal economy is not as active as the local accessible area, but it does exist, for example, in the form of street parking. The place's vibrancy is most noticeable in the narrower street (mainly North-South). On-site observation will be used to conduct a more thorough inquiry.

- According to the accessibility analysis, the Mahtma Gandhi Road, which is an old highway that covers a total distance of 4.5 kilometers, has the highest accessibility in the worldwide transit coverage (R=n) (north-south). It is regarded as the city's lifestyle district, with a significant concentration of commercial activity, educational institutions, hospitals, and government buildings. The towering tower assures a high population density in the neighborhood, especially given the combination of office and residential towers. As Kochi's CBD, the defining premise of this area is a clear regional position and market-driven economic activities.

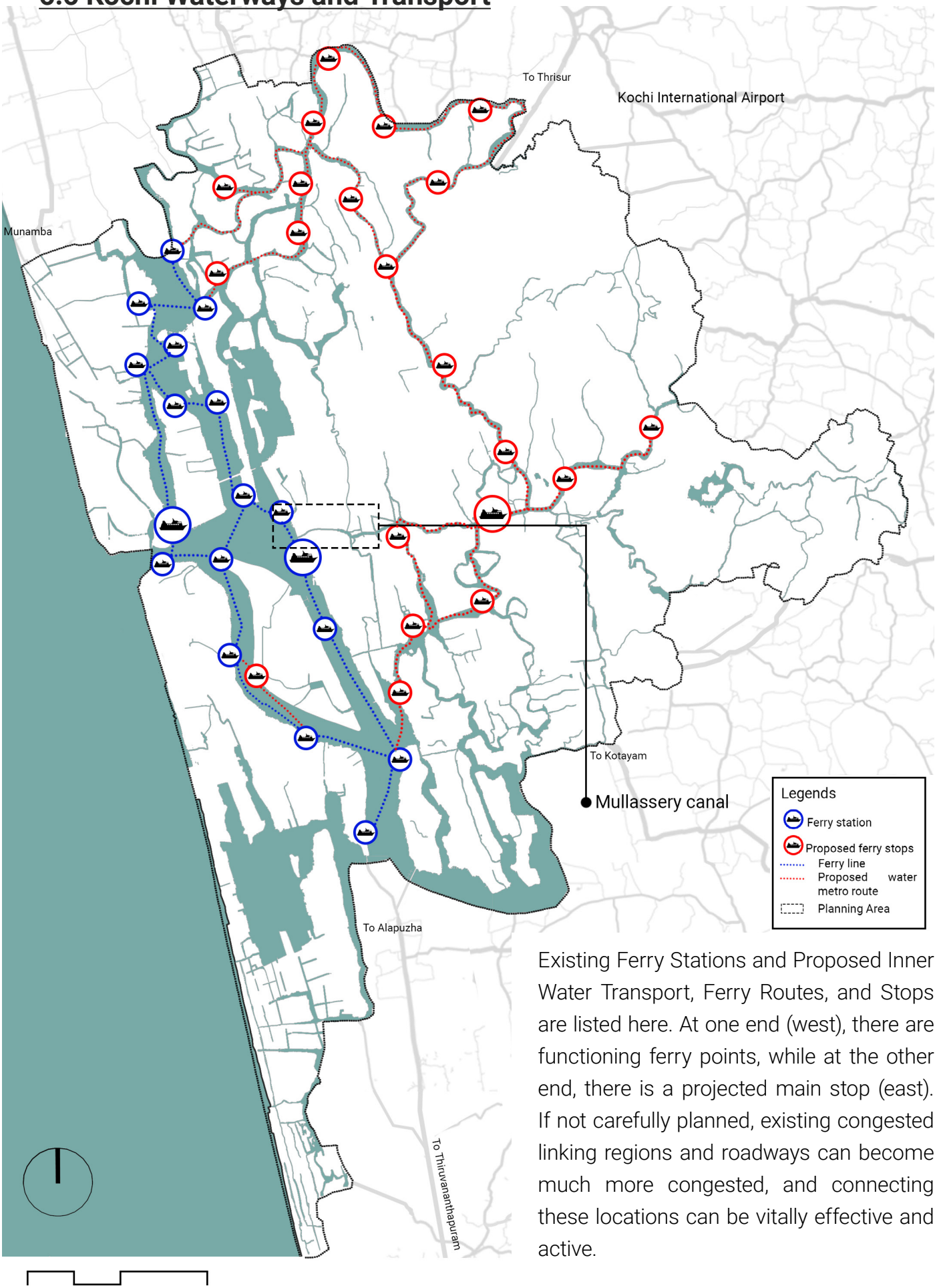
6.5 Kochi Mobility Analysis



Kochi is well connected to the cities in its immediate vicinity. The bulk of trips taken in the city is by bus, according to this mobility analysis for inner transportation in Kochi. Bus transit, on the other hand, has proven inefficient in the absence of a multi-modal transportation system. This results in a 5.6 percent annual drop in public transportation and an increase in private transportation.

Map 10: Kochi city mobility transport
[Source: by author based on http://www.codatu.org/wp-content/uploads/Transportmobility-scenario-in-Kochi-by-KMRL1.pdf]

6.6 Kochi Waterways and Transport

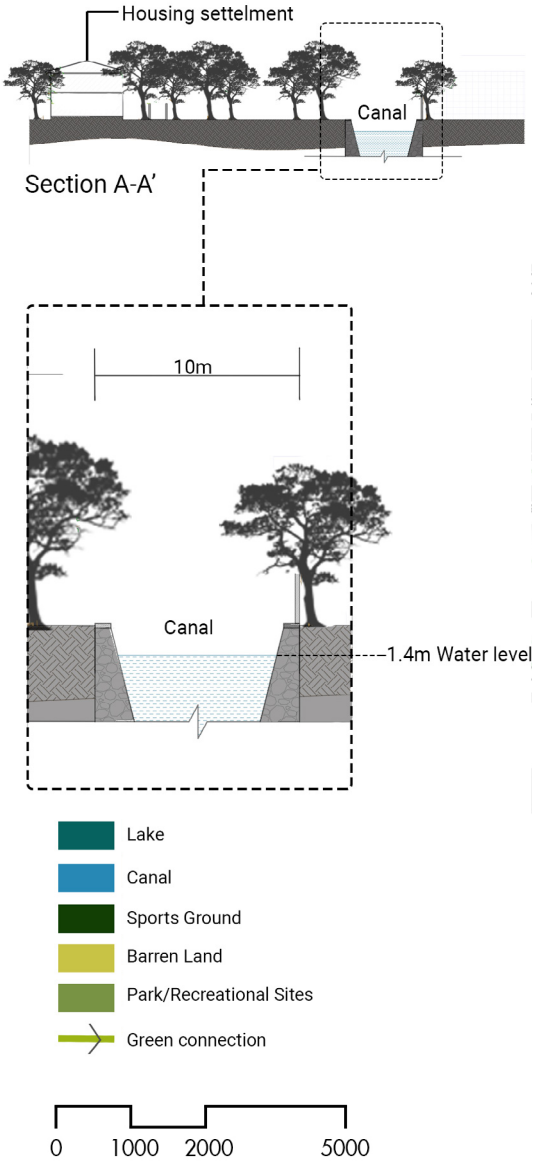


Existing Ferry Stations and Proposed Inner Water Transport, Ferry Routes, and Stops are listed here. At one end (west), there are functioning ferry points, while at the other end, there is a projected main stop (east). If not carefully planned, existing congested linking regions and roadways can become much more congested, and connecting these locations can be vitally effective and active.

Map 11: Kochi city mobility transport
[Source: drawing by the authors based on https://icrier.org/pdf/Working_Paper_359.pdf]

6.7 Green Areas and Waterbodies

The Mullaserry canal's path, as well as its connections to the backwaters and open spaces, are depicted in the diagram below. As can be seen, the open space ratio in this area, as well as the entire Kochi city, is quite low. Parks and recreational sites are scarce, and the majority of those that do exist are either inactive or poorly managed. The canals are likewise treated in the same way, whether they are used or not. Several canals are even home to unofficial buildings, some of which go unreported.



Map 12: Focus Area green spaces and water bodies
[Source: drawing by the authors based on QGIS]

6.8 Mobility Analysis

This map depicts the modes of transportation available in the current site situation. Private vehicles have a higher percentage in the Mullassery canal area than public transportation, cycling, and walking combined. Because cars take precedence over bicycles, the percentage of people who cycle is extremely low. There are no cycle paths in the research region, and 75% of the roads lack sufficient road markings and signage. Footpaths are found on a small percentage of roads. Another issue that has to be addressed is the abundance of on-street parking.

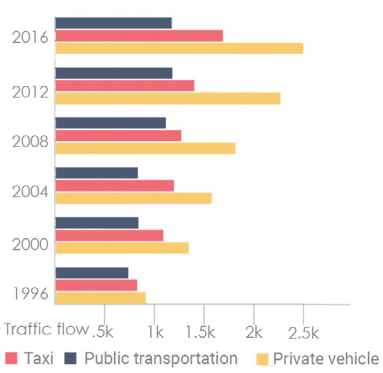
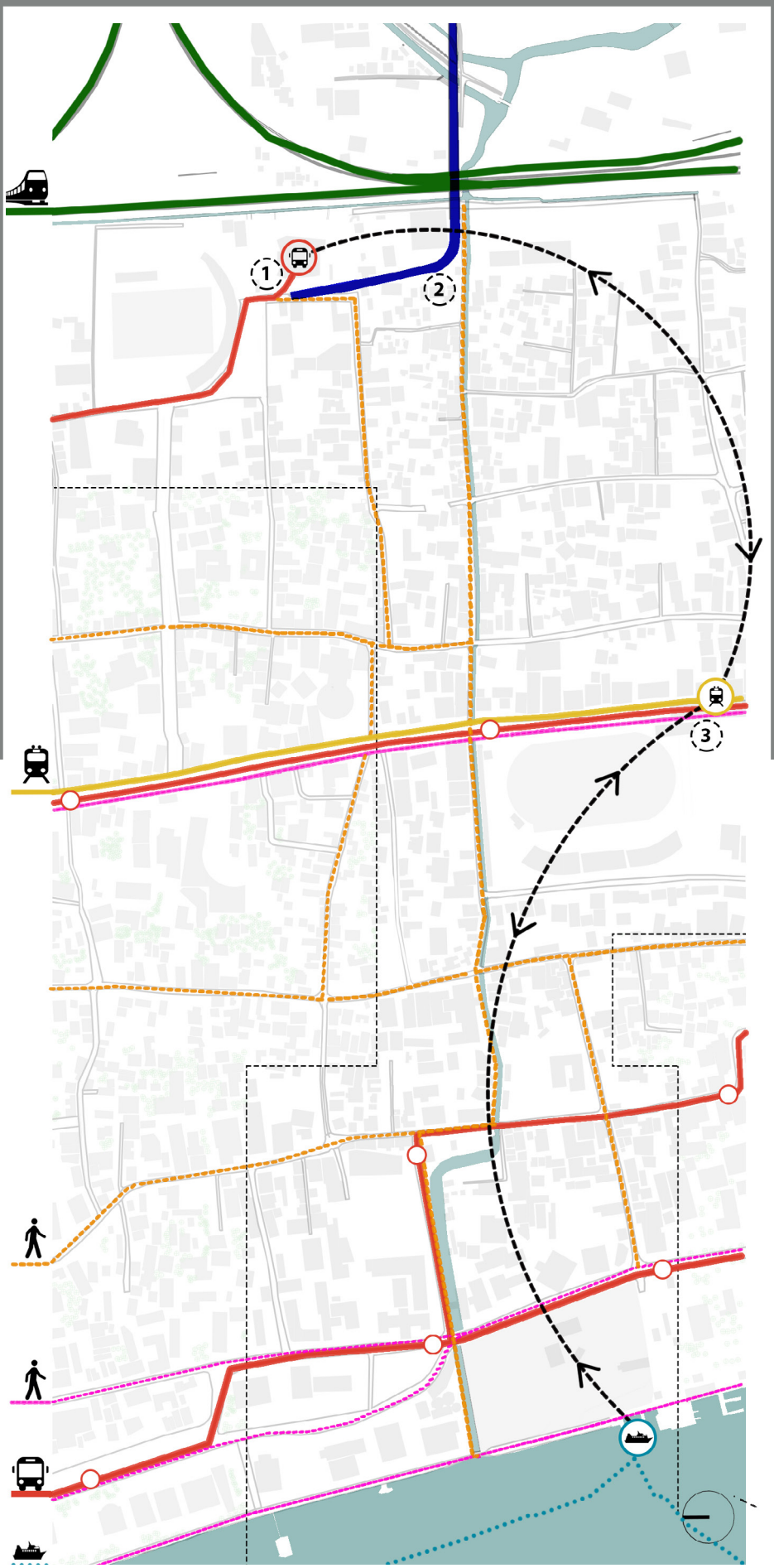


Chart 7: Rise in Number of vehicles
[Source: Registered Vehicles: Kochi | Economic Indicators]



Map 13: Focus Area mobility transport analysis
[Source: drawing by the authors based on QGIS]

6.9 Nodes Analysis

As described in the previous chapter, MG Road junction which is a major business thoroughfare that connects to the marine drive via the Mullassery Canal is the major node, following to this is the Park avenue junction. As can be observed, these nodes have a significant amount of traffic and congestion (Map 15). Points indicating social gatherings are common on commercial streets, paths, and storefronts, causing traffic congestion and disrupting free walkers.

Vehicle Flow

Social gathering

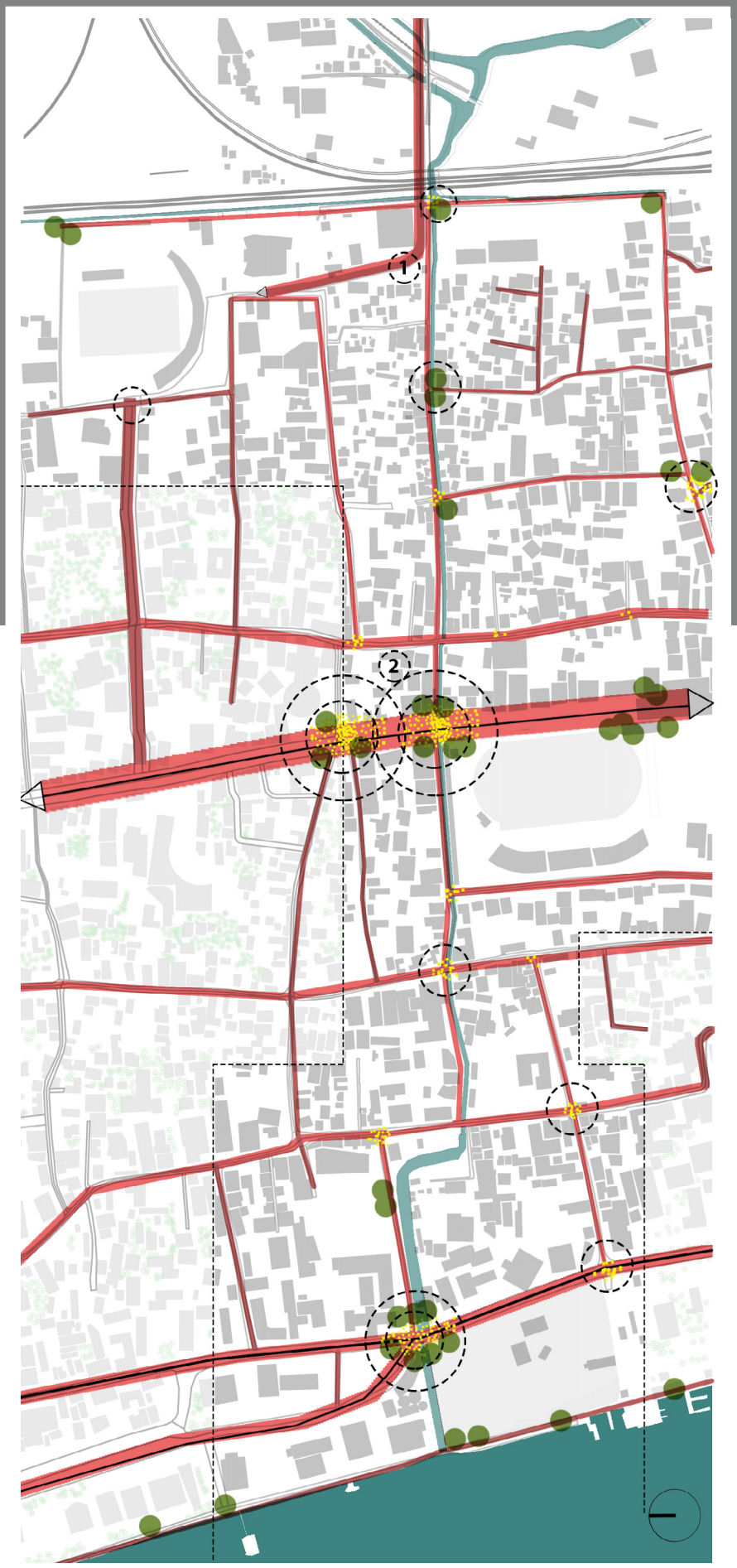
Traffic

Nodes

Main Nodes

0 1000 2000 5000

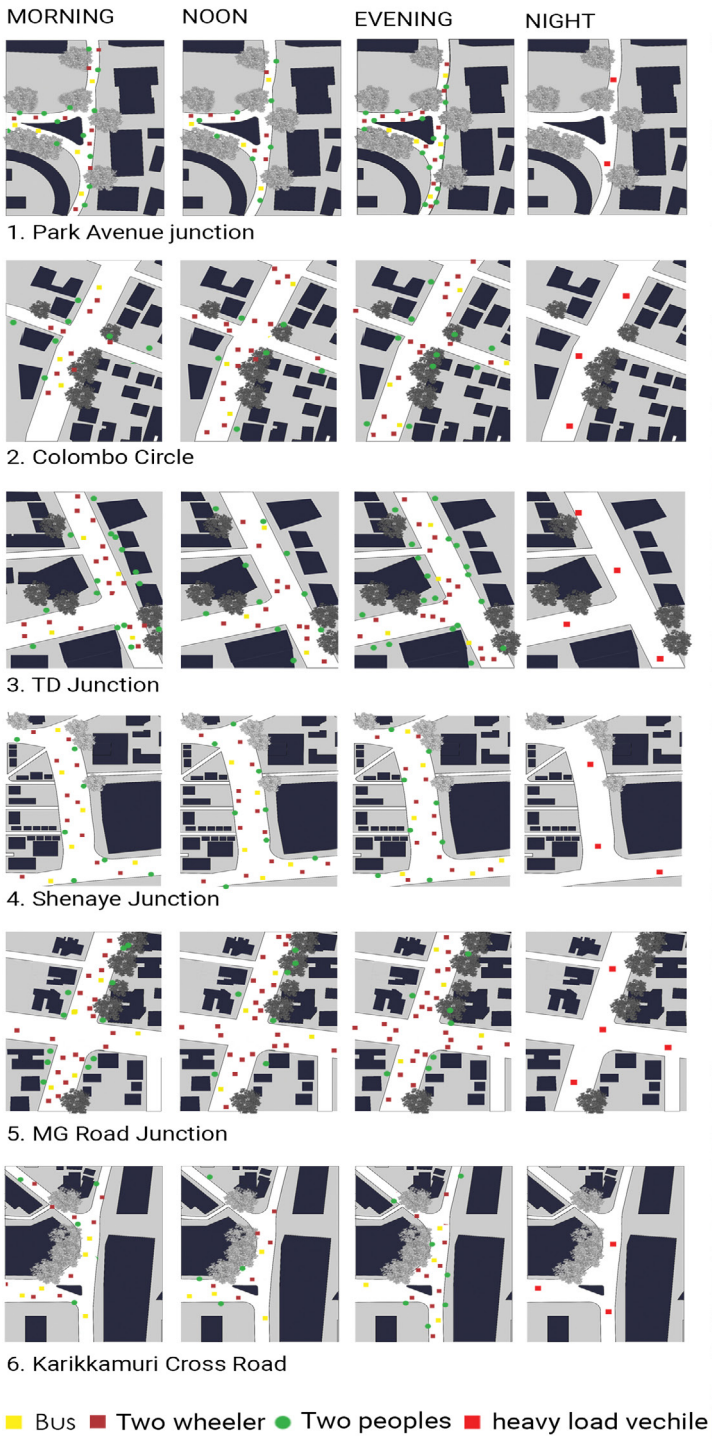
Figure 52: Site Images
[Source: Design Brief | Entekochi Competition]

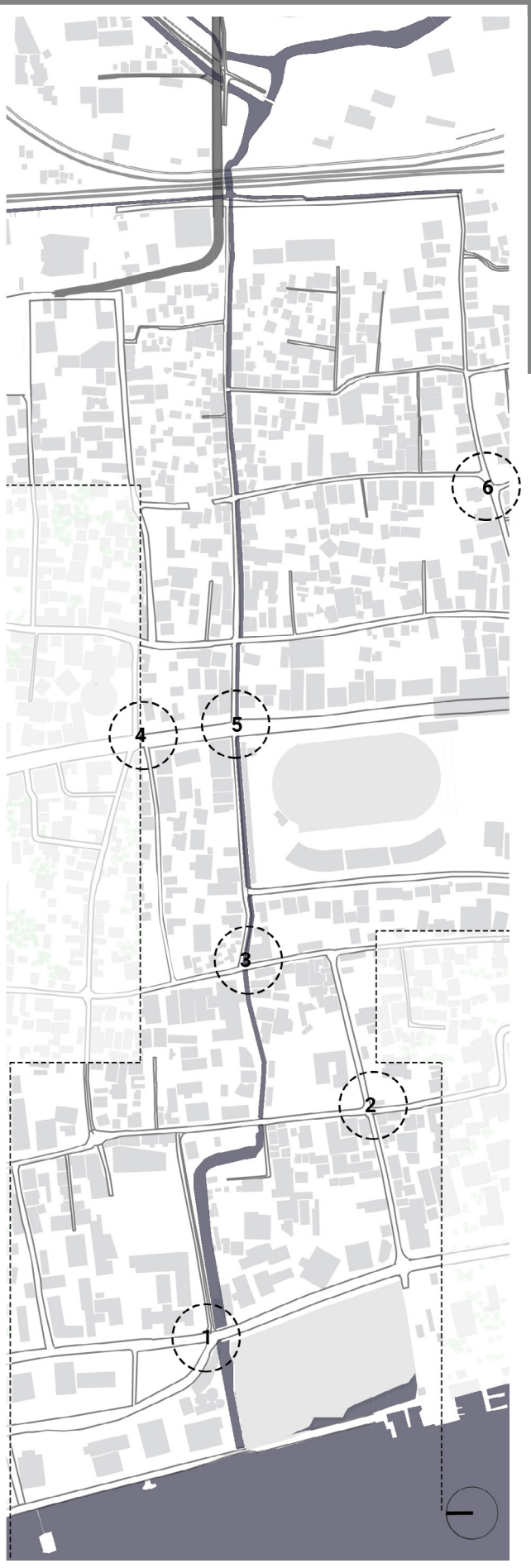


Map 14: Focus Area node analysis
[Source: drawing by the authors]

6.10 Traffic Analysis

The traffic flow in the nodes at the focus area is depicted in the diagram below. The survey is conducted at four different times during the day at these intersections (Park avenue junction, colombo circle, TD junction, Shenaye junction, MG road junction and Karikkamuri cross road). This investigation is focused on how people move and what method of transportation they choose.





Map 15: Focus Area traffic analysis [Source: drawing by the authors based on QGIS]

6.11 Urban Failures

1. Informal Housing Settlements on Canal:
- Redevelop in-situ or refit low-income informal communities in a healthy symbiotic connection with the canal ecology. Several waterways in Kochi city are either lined along their sides or covered with informal dwelling complexes, according to the survey. Currently, there isn't always a good link between these neighborhood communities and the canals.

2. Informal Street Vendors covered Canal Stretch:
- To reinvent the integration of street vendors and informal commercial zones into the main core to free the canal from encroachments and restore the zone holistically, urban fabric will be used.

3. Pollution:
- Vehicle exhaust fumes and power plant emissions are the primary sources of air pollution in this area, as is generally the case. Air and travel-related pollution caused by urban mobility must be addressed in light of the seasonal variations in air pollution in Kochi.

4. Improper Waste segregation ground near Canal:
- One of the key difficulties at this location is improper garbage dumping near the canal, and incorrect maintenance of this dumping surrounding the canal region is a major urban failure that must be managed and segregated.

5. Sewage disposal to the canal and non-functional WTP:
- Using appropriate waste and water management strategies, traditional and/or creative practices, and an emphasis on socio-ecological restoration and rejuvenation to solve sewage in the canal.

6. Damaged and Unsafe Footpaths:
- Pedestrian linkages that connect many public transportation nodes around the canal precinct should be made easier. This pedestrian network can be viewed as a component of a wider urban design project. A basic necessity for the city center is walkable, barrier-free, and well-connected transit nodes refreshed by revitalized public spaces and activities that welcome inhabitants to enjoy a walk and 'hang out.'

7. Public Place Making:
- The canal should be open to the public in order to generate a continuous and integrated spatial expression. Placemaking should address best practices that urge residents to take precautions 24 hours a day, seven days a week, especially for women, sexual and gender minorities, children, and the elderly, as well as ensuring accessibility for those with impairments. Waterfront development and waterlogging mitigation measures can potentially intersect with novel, simple, and gradually implementable public uses along the canal.

1 Informal Housing settlement on canal

(Padikathukulam Settlements along the canal)

(Padikathukulam Settlements along the canal)

2 Informal vendors covered canal stretch

Vending zone over the covered canal stretch (on the left)

Vending zone over the covered canal stretch

3 Pollution

Canal - flow obstructed by Railway tracks and pollution

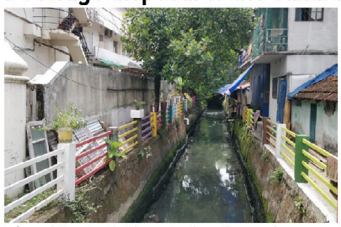
Polluted water of the canal

4 Waste segrigation ground near the canal

Municipal Waste Segregation Ground

Municipal Waste Segregation Ground

5 Sewage disposal to the canal and non functional WTP



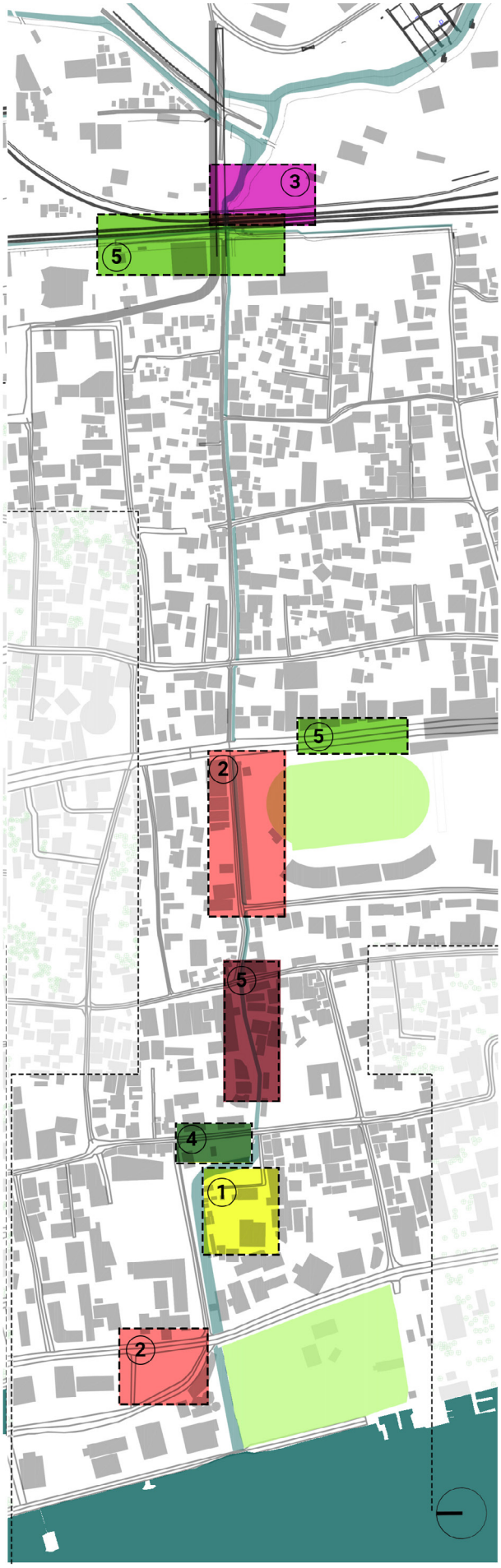
Informal Housing Settlements along the canal

Water treatment system over the canal

5 Damaged Footpaths

Current situation of pedestrian paths

Damaged road



0 1000 2000 5000

Figure 53: Site-Urban failures
[Source: Design Brief | Entekochi Competition]

Map 16: Showing Urban Failures in Mullassery Canal.
[Source: drawing by the authors]

7 Site Visit

7.1 Introduction

The site analysis is divided into two categories: quantitative and qualitative. The quantitative analysis comprises Gehl's observation tools, interviews, and online voting, while the qualitative analysis includes site images. Both the quantitative and qualitative analysis are in reference to the Gehl observational tools and the urban vitality and masterplanning process framework.

These technologies were chosen in accordance to the project's central goal, which is to create a masterplan with a vital urban setting. Gehl Institute is the company that makes the tools. The concept is to employ the observation tools in on-site observations to look into how the urban vitality principles are used in the Mullassery canal region and its environs. Finally, how they are intertwined with masterplanning procedures. Online interviews with residents of local communities, their neighborhoods, and visitors were conducted, and the results are included in the following sheets for your convenience.

The qualitative analysis of key activities based on site photographs is the next step in defining the area's characteristics. Following the analysis of urban elements, the next step is to investigate the activities that take place within it. Analyzing how elements create activity or how individuals treat elements resulted in a variety of activities. These analyses are crucial in the development of new urban paradigms and design initiatives.

7.2 Quantitative Analysis

7.2.1 Gehl's Observation Tools

Following the context analysis, on-site observations are used to clarify the study. The Gehl Institute's observation tools are used for the on-site observations here (Figure 51). The observation tools were chosen because they are a direct interpretation of the instruments that Jan Gehl himself used to analyze public life in a specific location.
Furthermore, Gehl Institute encourages urbanists to use their tools so that the tools can be improved depending on the experiences of each user. People moving count, participant survey, and twelve urban quality criteria were the three techniques employed in this project's on-site observation (Figure 55).

A good city is like a good party- people stay longer than really necessary, because they are enjoying themselves,

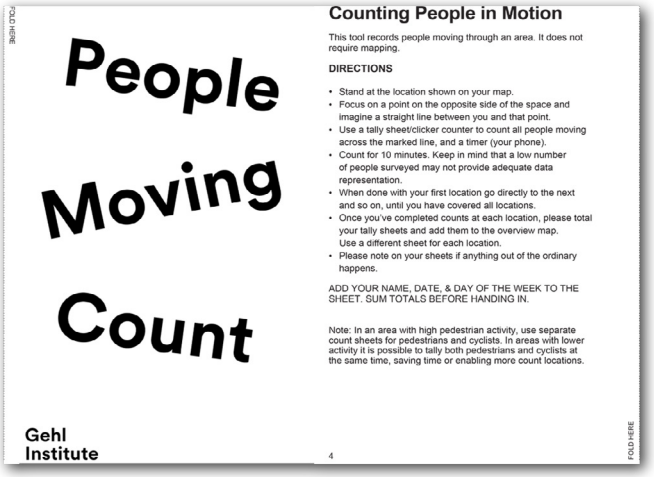
----------*Jan Gehl*----------

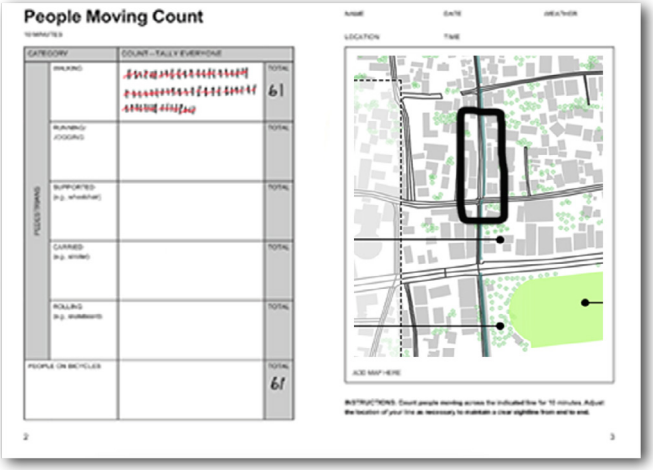
The first tool is **People Moving Count**, and it counts how many people move through a location and how they move. This data allows us to see how busy a location is at different times of the day and how accessible it is by different means of transportation. We can also see which sector of the street/block is active with this tool.

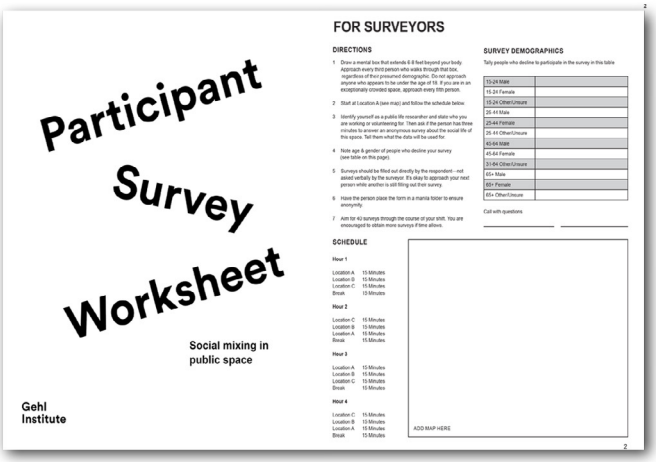
The second tool is a **Participant Survey**. It is an important tool for getting input from people who spend time in or pass through a public space. It assists us in determining who is in the space and what their perspectives are on the space.

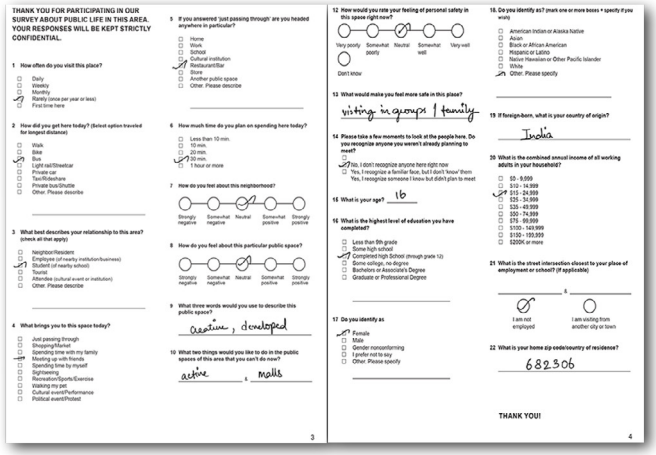
The final tool is **Twelve Quality Criteria,** which is used to study how people interact with public areas. It's specifically used to assess if certain aspects of a public space are safe, comfortable, and entertaining for those who spend time there. This tool is intended to quantitatively compare the attributes of the observed spaces.

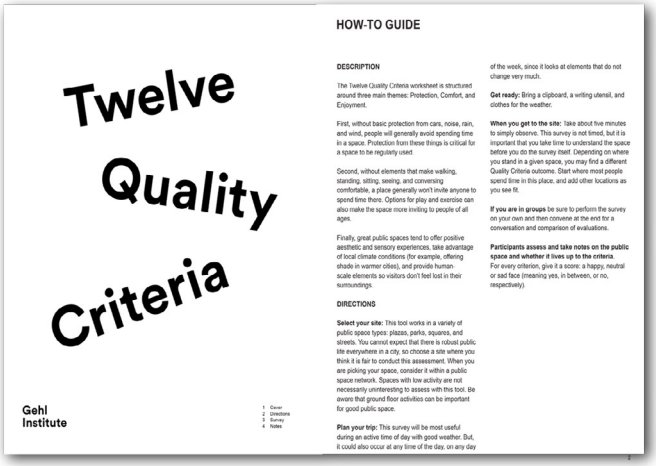
For this observation, scholars from the local Architecture Company (Root bridge enterprises Pvt. Ltd) are assisting in doing the observation and providing local information about the space for this project. This is especially true for the third tool (the twelve quality standards), as the tools were designed for European/American contexts that may differ from the Indian one.











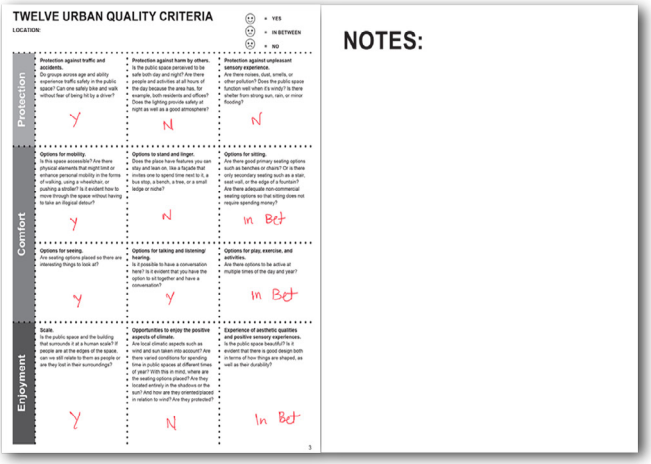
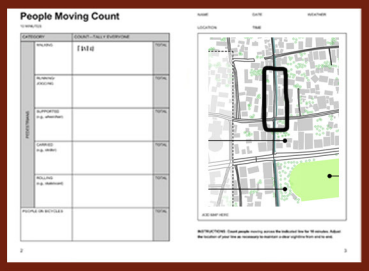


Figure 54: Tools: Gehl Institute [Source: Gehl — Making Cities for People]

PEOPLE MOVING COUNT



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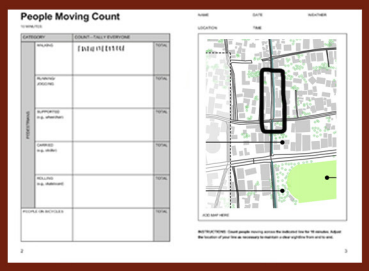

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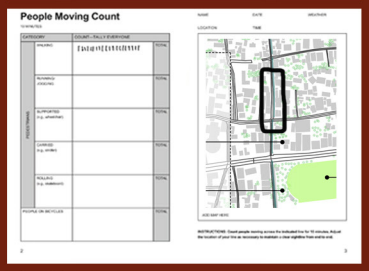

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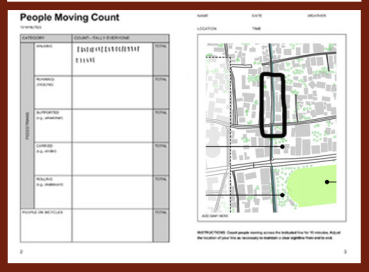

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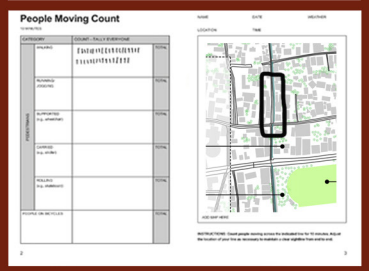

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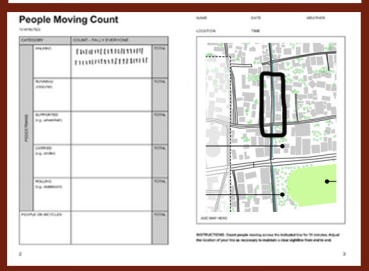

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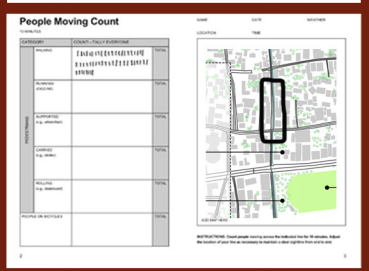

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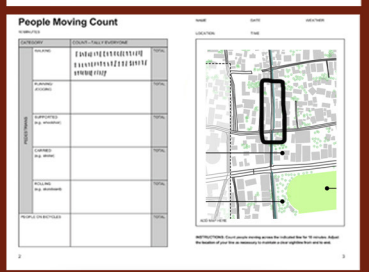
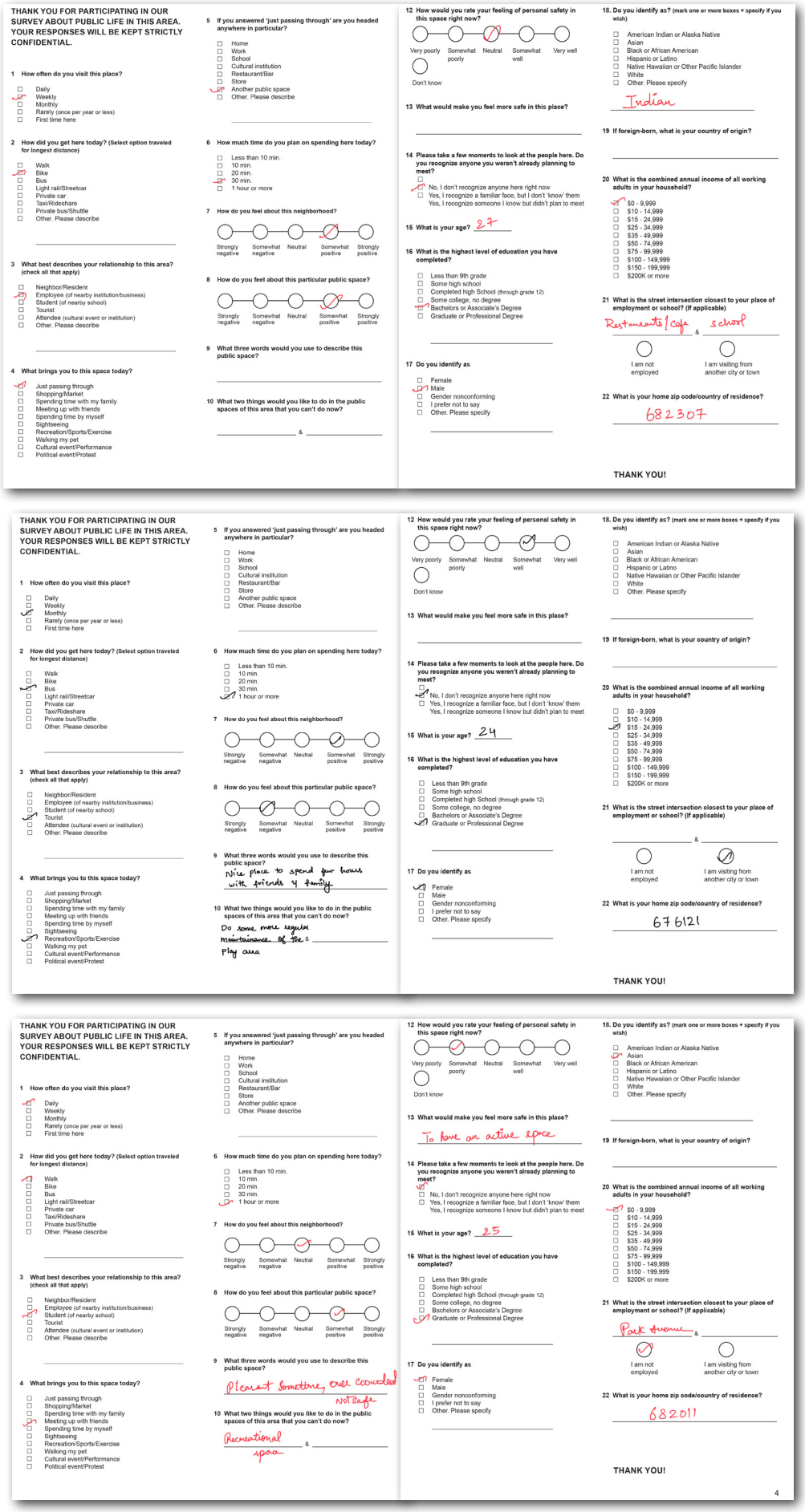


09:16

Figure 55: People moving count survey [Source: by Author based on Gehl's tool]

PARTICIPANT SURVEY



THANK YOU FOR PARTICIPATING IN OUR SURVEY ABOUT PUBLIC LIFE IN THIS AREA. YOUR RESPONSES WILL BE KEPT STRICTLY CONFIDENTIAL.

1 How often do you visit this place?
☐ Daily
☑ Weekly
☐ Monthly
☐ Rarely (once per year or less)
☐ First time here

2 How did you get here today? (Select option traveled for longest distance)
☐ Walk
☑ Bike
☐ Bus
☐ Light rail/Streetcar
☐ Private car
☐ Taxi/Rideshare
☐ Private bus/Shuttle
☐ Other. Please describe

3 What best describes your relationship to this area? (check all that apply)
☐ Neighbor/Resident
☑ Employee (of nearby institution/business)
☐ Student (of nearby school)
☐ Tourist
☐ Attendee (cultural event or institution)
☐ Other. Please describe

4 What brings you to this space today?
☑ Just passing through
☐ Shopping/Market
☐ Spending time with my family
☐ Meeting up with friends
☐ Spending time by myself
☐ Sightseeing
☐ Recreation/Sports/Exercise
☐ Walking my pet
☐ Cultural event/Performance
☐ Political event/Protest

5 If you answered 'just passing through' are you headed anywhere in particular?
☐ Home
☐ Work
☐ School
☐ Cultural institution
☐ Restaurant/Bar
☐ Store
☑ Another public space
☐ Other. Please describe

6 How much time do you plan on spending here today?
☐ Less than 10 min.
☐ 10 min.
☐ 20 min.
☑ 30 min.
☐ 1 hour or more

7 How do you feel about this neighborhood?
Strongly negative | Somewhat negative | Neutral | ✓ Somewhat positive | Strongly positive

8 How do you feel about this particular public space?
Strongly negative | Somewhat negative | Neutral | ✓ Somewhat positive | Strongly positive

9 What three words would you use to describe this public space?

10 What two things would you like to do in the public spaces of this area that you can't do now?
&

12 How would you rate your feeling of personal safety in this space right now?
Very poorly | Somewhat poorly | Neutral | Somewhat well | ✓ Very well
☐ Don't know

13 What would make you feel more safe in this place?

14 Please take a few moments to look at the people here. Do you recognize anyone you weren't already planning to meet?
☑ No, I don't recognize anyone here right now
☐ Yes, I recognize a familiar face, but I don't 'know' them
☐ Yes, I recognize someone I know but didn't plan to meet

15 What is your age? 27

16 What is the highest level of education you have completed?
☐ Less than 9th grade
☐ Some high school
☐ Completed high School (through grade 12)
☐ Some college, no degree
☑ Bachelors or Associate's Degree
☐ Graduate or Professional Degree

17 Do you identify as
☐ Female
☑ Male
☐ Gender nonconforming
☐ I prefer not to say
☐ Other. Please specify

18. Do you identify as? (mark one or more boxes + specify if you wish)
☐ American Indian or Alaska Native
☐ Asian
☐ Black or African American
☐ Hispanic or Latino
☐ Native Hawaiian or Other Pacific Islander
☐ White
☐ Other. Please specify
Indian

19 If foreign-born, what is your country of origin?

20 What is the combined annual income of all working adults in your household?
☑ $0 - 9,999
☐ $10 - 14,999
☐ $15 - 24,999
☐ $25 - 34,999
☐ $35 - 49,999
☐ $50 - 74,999
☐ $75 - 99,999
☐ $100 - 149,999
☐ $150 - 199,999
☐ $200K or more

21 What is the street intersection closest to your place of employment or school? (If applicable)
Restaurants / Cafe & school
☐ I am not employed
☐ I am visiting from another city or town

22 What is your home zip code/country of residence?
682307

THANK YOU!

THANK YOU FOR PARTICIPATING IN OUR SURVEY ABOUT PUBLIC LIFE IN THIS AREA. YOUR RESPONSES WILL BE KEPT STRICTLY CONFIDENTIAL.

1 How often do you visit this place?
☐ Daily
☐ Weekly
☑ Monthly
☐ Rarely (once per year or less)
☐ First time here

2 How did you get here today? (Select option traveled for longest distance)
☐ Walk
☐ Bike
☑ Bus
☐ Light rail/Streetcar
☐ Private car
☐ Taxi/Rideshare
☐ Private bus/Shuttle
☐ Other. Please describe

3 What best describes your relationship to this area? (check all that apply)
☐ Neighbor/Resident
☐ Employee (of nearby institution/business)
☐ Student (of nearby school)
☑ Tourist
☐ Attendee (cultural event or institution)
☐ Other. Please describe

4 What brings you to this space today?
☐ Just passing through
☐ Shopping/Market
☐ Spending time with my family
☐ Meeting up with friends
☐ Spending time by myself
☐ Sightseeing
☑ Recreation/Sports/Exercise
☐ Walking my pet
☐ Cultural event/Performance
☐ Political event/Protest

5 If you answered 'just passing through' are you headed anywhere in particular?
☐ Home
☐ Work
☐ School
☐ Cultural institution
☐ Restaurant/Bar
☐ Store
☐ Another public space
☐ Other. Please describe

6 How much time do you plan on spending here today?
☐ Less than 10 min.
☐ 10 min.
☐ 20 min.
☐ 30 min.
☑ 1 hour or more

7 How do you feel about this neighborhood?
Strongly negative | Somewhat negative | Neutral | ✓ Somewhat positive | Strongly positive

8 How do you feel about this particular public space?
Strongly negative | Somewhat negative | Neutral | Somewhat positive | Strongly positive

9 What three words would you use to describe this public space?
Nice place to spend few hours with friends & family

10 What two things would you like to do in the public spaces of this area that you can't do now?
Do some more regular maintainance of the & Play area

12 How would you rate your feeling of personal safety in this space right now?
Very poorly | Somewhat poorly | Neutral | ✓ Somewhat well | Very well
☐ Don't know

13 What would make you feel more safe in this place?

14 Please take a few moments to look at the people here. Do you recognize anyone you weren't already planning to meet?
☑ No, I don't recognize anyone here right now
☐ Yes, I recognize a familiar face, but I don't 'know' them
☐ Yes, I recognize someone I know but didn't plan to meet

15 What is your age? 24

16 What is the highest level of education you have completed?
☐ Less than 9th grade
☐ Some high school
☐ Completed high School (through grade 12)
☐ Some college, no degree
☐ Bachelors or Associate's Degree
☑ Graduate or Professional Degree

17 Do you identify as
☑ Female
☐ Male
☐ Gender nonconforming
☐ I prefer not to say
☐ Other. Please specify

18. Do you identify as? (mark one or more boxes + specify if you wish)
☐ American Indian or Alaska Native
☐ Asian
☐ Black or African American
☐ Hispanic or Latino
☐ Native Hawaiian or Other Pacific Islander
☐ White
☐ Other. Please specify

19 If foreign-born, what is your country of origin?

20 What is the combined annual income of all working adults in your household?
☐ $0 - 9,999
☑ $10 - 14,999
☐ $15 - 24,999
☐ $25 - 34,999
☐ $35 - 49,999
☐ $50 - 74,999
☐ $75 - 99,999
☐ $100 - 149,999
☐ $150 - 199,999
☐ $200K or more

21 What is the street intersection closest to your place of employment or school? (If applicable)
&
☐ I am not employed
☑ I am visiting from another city or town

22 What is your home zip code/country of residence?
67 6121

THANK YOU!

THANK YOU FOR PARTICIPATING IN OUR SURVEY ABOUT PUBLIC LIFE IN THIS AREA. YOUR RESPONSES WILL BE KEPT STRICTLY CONFIDENTIAL.

1 How often do you visit this place?
☑ Daily
☐ Weekly
☐ Monthly
☐ Rarely (once per year or less)
☐ First time here

2 How did you get here today? (Select option traveled for longest distance)
☑ Walk
☐ Bike
☐ Bus
☐ Light rail/Streetcar
☐ Private car
☐ Taxi/Rideshare
☐ Private bus/Shuttle
☐ Other. Please describe

3 What best describes your relationship to this area? (check all that apply)
☐ Neighbor/Resident
☐ Employee (of nearby institution/business)
☑ Student (of nearby school)
☐ Tourist
☐ Attendee (cultural event or institution)
☐ Other. Please describe

4 What brings you to this space today?
☐ Just passing through
☐ Shopping/Market
☑ Spending time with my family
☐ Meeting up with friends
☐ Spending time by myself
☐ Sightseeing
☐ Recreation/Sports/Exercise
☐ Walking my pet
☐ Cultural event/Performance
☐ Political event/Protest

5 If you answered 'just passing through' are you headed anywhere in particular?
☐ Home
☐ Work
☐ School
☐ Cultural institution
☐ Restaurant/Bar
☐ Store
☐ Another public space
☐ Other. Please describe

6 How much time do you plan on spending here today?
☐ Less than 10 min.
☐ 10 min.
☐ 20 min.
☐ 30 min.
☑ 1 hour or more

7 How do you feel about this neighborhood?
Strongly negative | Somewhat negative | ✓ Neutral | Somewhat positive | Strongly positive

8 How do you feel about this particular public space?
Strongly negative | Somewhat negative | Neutral | ✓ Somewhat positive | Strongly positive

9 What three words would you use to describe this public space?
Pleasant Sometimes over crowded Not Safe

10 What two things would you like to do in the public spaces of this area that you can't do now?
Recreational space &

12 How would you rate your feeling of personal safety in this space right now?
Very poorly | ✓ Somewhat poorly | Neutral | Somewhat well | Very well
☐ Don't know

13 What would make you feel more safe in this place?
To have an active space

14 Please take a few moments to look at the people here. Do you recognize anyone you weren't already planning to meet?
☑ No, I don't recognize anyone here right now
☐ Yes, I recognize a familiar face, but I don't 'know' them
☐ Yes, I recognize someone I know but didn't plan to meet

15 What is your age? 25

16 What is the highest level of education you have completed?
☐ Less than 9th grade
☐ Some high school
☐ Completed high School (through grade 12)
☐ Some college, no degree
☐ Bachelors or Associate's Degree
☑ Graduate or Professional Degree

17 Do you identify as
☑ Female
☐ Male
☐ Gender nonconforming
☐ I prefer not to say
☐ Other. Please specify

18. Do you identify as? (mark one or more boxes + specify if you wish)
☐ American Indian or Alaska Native
☑ Asian
☐ Black or African American
☐ Hispanic or Latino
☐ Native Hawaiian or Other Pacific Islander
☐ White
☐ Other. Please specify

19 If foreign-born, what is your country of origin?

20 What is the combined annual income of all working adults in your household?
☑ $0 - 9,999
☐ $10 - 14,999
☐ $15 - 24,999
☐ $25 - 34,999
☐ $35 - 49,999
☐ $50 - 74,999
☐ $75 - 99,999
☐ $100 - 149,999
☐ $150 - 199,999
☐ $200K or more

21 What is the street intersection closest to your place of employment or school? (If applicable)
Park Avenue &
☑ I am not employed
☐ I am visiting from another city or town

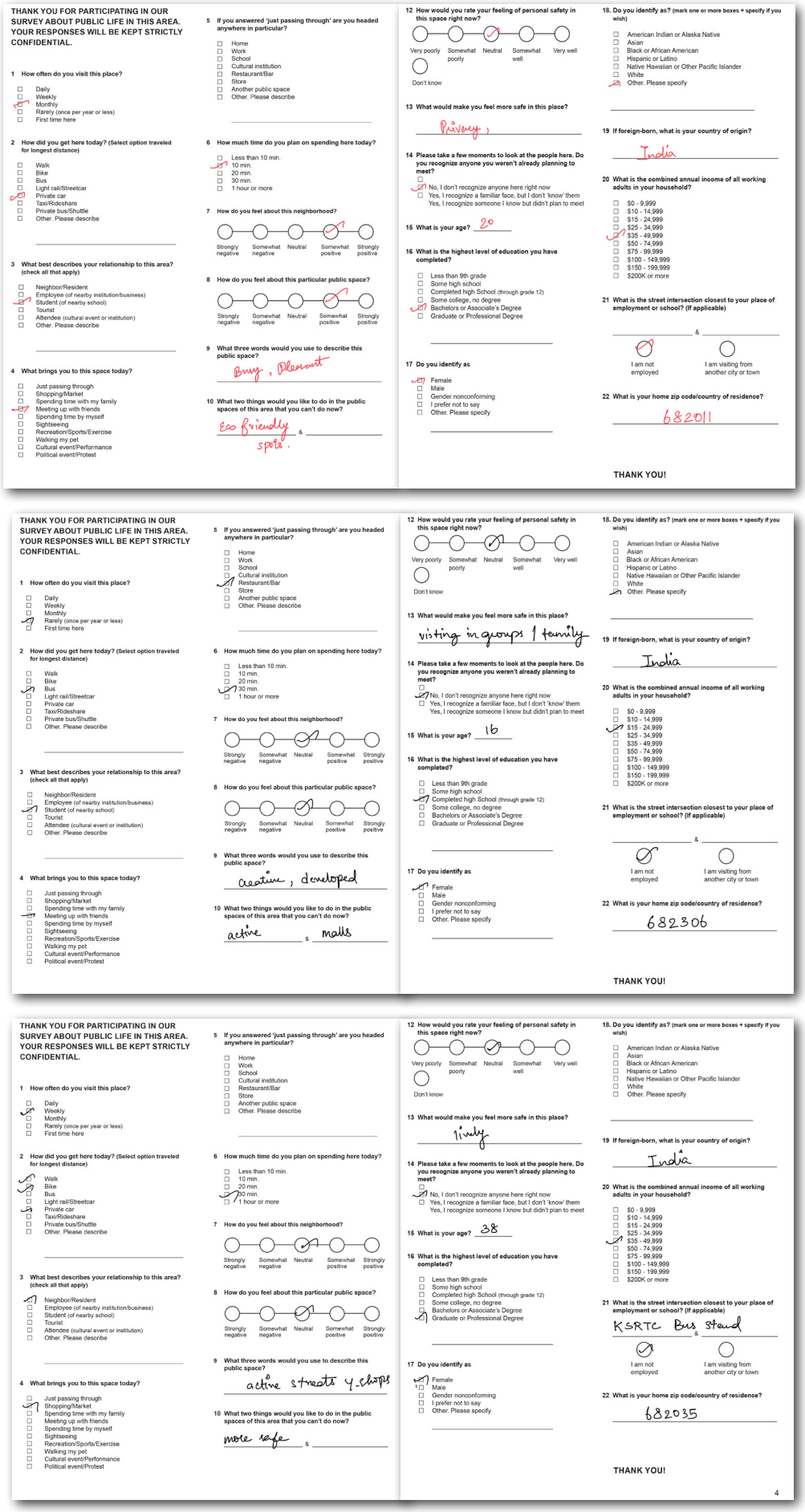
22 What is your home zip code/country of residence?
682011

THANK YOU!

4

Figure 56: Participant survey worksheets 1
[Source: by Author based on Gehl's tool]

PARTICIPANT SURVEY



THANK YOU FOR PARTICIPATING IN OUR SURVEY ABOUT PUBLIC LIFE IN THIS AREA. YOUR RESPONSES WILL BE KEPT STRICTLY CONFIDENTIAL.

1 How often do you visit this place?
- ☐ Daily
- ☐ Weekly
- ☑ Monthly
- ☐ Rarely (once per year or less)
- ☐ First time here

2 How did you get here today? (Select option traveled for longest distance)
- ☐ Walk
- ☐ Bike
- ☐ Bus
- ☐ Light rail/Streetcar
- ☑ Private car
- ☐ Taxi/Rideshare
- ☐ Private bus/Shuttle
- ☐ Other. Please describe

3 What best describes your relationship to this area? (check all that apply)
- ☐ Neighbor/Resident
- ☐ Employee (of nearby institution/business)
- ☑ Student (of nearby school)
- ☐ Tourist
- ☐ Attendee (cultural event or institution)
- ☐ Other. Please describe

4 What brings you to this space today?
- ☐ Just passing through
- ☐ Shopping/Market
- ☐ Spending time with my family
- ☑ Meeting up with friends
- ☐ Spending time by myself
- ☐ Sightseeing
- ☐ Recreation/Sports/Exercise
- ☐ Walking my pet
- ☐ Cultural event/Performance
- ☐ Political event/Protest

5 If you answered 'just passing through' are you headed anywhere in particular?
- ☐ Home
- ☐ Work
- ☐ School
- ☐ Cultural institution
- ☐ Restaurant/Bar
- ☐ Store
- ☐ Another public space
- ☐ Other. Please describe

6 How much time do you plan on spending here today?
- ☑ Less than 10 min.
- ☐ 10 min.
- ☐ 20 min.
- ☐ 30 min.
- ☐ 1 hour or more

7 How do you feel about this neighborhood?

Strongly negative — Somewhat negative — Neutral — Somewhat positive — Strongly positive (☑ Somewhat positive)

8 How do you feel about this particular public space?

Strongly negative — Somewhat negative — Neutral — Somewhat positive — Strongly positive (☑ Somewhat positive)

9 What three words would you use to describe this public space?

Busy, Pleasant

10 What two things would you like to do in the public spaces of this area that you can't do now?

Eco Friendly & sports.

12 How would you rate your feeling of personal safety in this space right now?

Very poorly — Somewhat poorly — Neutral — Somewhat well — Very well (☑ Somewhat well); ☐ Don't know

13 What would make you feel more safe in this place?

Privacy.

14 Please take a few moments to look at the people here. Do you recognize anyone you weren't already planning to meet?
- ☐
- ☑ No, I don't recognize anyone here right now
- ☐ Yes, I recognize a familiar face, but I don't 'know' them
- ☐ Yes, I recognize someone I know but didn't plan to meet

15 What is your age? 20

16 What is the highest level of education you have completed?
- ☐ Less than 9th grade
- ☐ Some high school
- ☐ Completed high School (through grade 12)
- ☐ Some college, no degree
- ☑ Bachelors or Associate's Degree
- ☐ Graduate or Professional Degree

17 Do you identify as
- ☑ Female
- ☐ Male
- ☐ Gender nonconforming
- ☐ I prefer not to say
- ☐ Other. Please specify

18. Do you identify as? (mark one or more boxes + specify if you wish)
- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Black or African American
- ☐ Hispanic or Latino
- ☐ Native Hawaiian or Other Pacific Islander
- ☐ White
- ☑ Other. Please specify

19 If foreign-born, what is your country of origin?

India

20 What is the combined annual income of all working adults in your household?
- ☐ $0 - 9,999
- ☐ $10 - 14,999
- ☐ $15 - 24,999
- ☐ $25 - 34,999
- ☑ $35 - 49,999
- ☐ $50 - 74,999
- ☐ $75 - 99,999
- ☐ $100 - 149,999
- ☐ $150 - 199,999
- ☐ $200K or more

21 What is the street intersection closest to your place of employment or school? (If applicable)

&

☑ I am not employed ☐ I am visiting from another city or town

22 What is your home zip code/country of residence?

682011

THANK YOU!

THANK YOU FOR PARTICIPATING IN OUR SURVEY ABOUT PUBLIC LIFE IN THIS AREA. YOUR RESPONSES WILL BE KEPT STRICTLY CONFIDENTIAL.

1 How often do you visit this place?
- ☐ Daily
- ☐ Weekly
- ☐ Monthly
- ☑ Rarely (once per year or less)
- ☐ First time here

2 How did you get here today? (Select option traveled for longest distance)
- ☐ Walk
- ☐ Bike
- ☑ Bus
- ☐ Light rail/Streetcar
- ☐ Private car
- ☐ Taxi/Rideshare
- ☐ Private bus/Shuttle
- ☐ Other. Please describe

3 What best describes your relationship to this area? (check all that apply)
- ☐ Neighbor/Resident
- ☐ Employee (of nearby institution/business)
- ☑ Student (of nearby school)
- ☐ Tourist
- ☐ Attendee (cultural event or institution)
- ☐ Other. Please describe

4 What brings you to this space today?
- ☐ Just passing through
- ☐ Shopping/Market
- ☐ Spending time with my family
- ☑ Meeting up with friends
- ☐ Spending time by myself
- ☐ Sightseeing
- ☐ Recreation/Sports/Exercise
- ☐ Walking my pet
- ☐ Cultural event/Performance
- ☐ Political event/Protest

5 If you answered 'just passing through' are you headed anywhere in particular?
- ☐ Home
- ☐ Work
- ☐ School
- ☐ Cultural institution
- ☑ Restaurant/Bar
- ☐ Store
- ☐ Another public space
- ☐ Other. Please describe

6 How much time do you plan on spending here today?
- ☐ Less than 10 min.
- ☐ 10 min.
- ☑ 20 min.
- ☑ 30 min.
- ☐ 1 hour or more

7 How do you feel about this neighborhood?

Strongly negative — Somewhat negative — Neutral — Somewhat positive — Strongly positive (☑ Neutral)

8 How do you feel about this particular public space?

Strongly negative — Somewhat negative — Neutral — Somewhat positive — Strongly positive (☑ Neutral)

9 What three words would you use to describe this public space?

creative, developed

10 What two things would you like to do in the public spaces of this area that you can't do now?

active & malls

12 How would you rate your feeling of personal safety in this space right now?

Very poorly — Somewhat poorly — Neutral — Somewhat well — Very well (☑ Neutral); ☐ Don't know

13 What would make you feel more safe in this place?

visiting in groups / family

14 Please take a few moments to look at the people here. Do you recognize anyone you weren't already planning to meet?
- ☐
- ☑ No, I don't recognize anyone here right now
- ☐ Yes, I recognize a familiar face, but I don't 'know' them
- ☐ Yes, I recognize someone I know but didn't plan to meet

15 What is your age? 16

16 What is the highest level of education you have completed?
- ☐ Less than 9th grade
- ☐ Some high school
- ☑ Completed high School (through grade 12)
- ☐ Some college, no degree
- ☐ Bachelors or Associate's Degree
- ☐ Graduate or Professional Degree

17 Do you identify as
- ☑ Female
- ☐ Male
- ☐ Gender nonconforming
- ☐ I prefer not to say
- ☐ Other. Please specify

18. Do you identify as? (mark one or more boxes + specify if you wish)
- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Black or African American
- ☐ Hispanic or Latino
- ☐ Native Hawaiian or Other Pacific Islander
- ☐ White
- ☑ Other. Please specify

19 If foreign-born, what is your country of origin?

India

20 What is the combined annual income of all working adults in your household?
- ☐ $0 - 9,999
- ☐ $10 - 14,999
- ☑ $15 - 24,999
- ☐ $25 - 34,999
- ☐ $35 - 49,999
- ☐ $50 - 74,999
- ☐ $75 - 99,999
- ☐ $100 - 149,999
- ☐ $150 - 199,999
- ☐ $200K or more

21 What is the street intersection closest to your place of employment or school? (If applicable)

&

☑ I am not employed ☐ I am visiting from another city or town

22 What is your home zip code/country of residence?

682306

THANK YOU!

THANK YOU FOR PARTICIPATING IN OUR SURVEY ABOUT PUBLIC LIFE IN THIS AREA. YOUR RESPONSES WILL BE KEPT STRICTLY CONFIDENTIAL.

1 How often do you visit this place?
- ☑ Daily
- ☐ Weekly
- ☐ Monthly
- ☐ Rarely (once per year or less)
- ☐ First time here

2 How did you get here today? (Select option traveled for longest distance)
- ☑ Walk
- ☑ Bike
- ☐ Bus
- ☐ Light rail/Streetcar
- ☑ Private car
- ☐ Taxi/Rideshare
- ☐ Private bus/Shuttle
- ☐ Other. Please describe

3 What best describes your relationship to this area? (check all that apply)
- ☑ Neighbor/Resident
- ☐ Employee (of nearby institution/business)
- ☐ Student (of nearby school)
- ☐ Tourist
- ☐ Attendee (cultural event or institution)
- ☐ Other. Please describe

4 What brings you to this space today?
- ☐ Just passing through
- ☑ Shopping/Market
- ☐ Spending time with my family
- ☐ Meeting up with friends
- ☐ Spending time by myself
- ☐ Sightseeing
- ☐ Recreation/Sports/Exercise
- ☐ Walking my pet
- ☐ Cultural event/Performance
- ☐ Political event/Protest

5 If you answered 'just passing through' are you headed anywhere in particular?
- ☐ Home
- ☐ Work
- ☑ School
- ☐ Cultural institution
- ☐ Restaurant/Bar
- ☐ Store
- ☐ Another public space
- ☐ Other. Please describe

6 How much time do you plan on spending here today?
- ☐ Less than 10 min.
- ☐ 10 min.
- ☐ 20 min.
- ☑ 30 min.
- ☐ 1 hour or more

7 How do you feel about this neighborhood?

Strongly negative — Somewhat negative — Neutral — Somewhat positive — Strongly positive (☑ Somewhat positive)

8 How do you feel about this particular public space?

Strongly negative — Somewhat negative — Neutral — Somewhat positive — Strongly positive (☑ Somewhat positive)

9 What three words would you use to describe this public space?

active streets & shops

10 What two things would you like to do in the public spaces of this area that you can't do now?

more safe &

12 How would you rate your feeling of personal safety in this space right now?

Very poorly — Somewhat poorly — Neutral — Somewhat well — Very well (☑ Somewhat well); ☐ Don't know

13 What would make you feel more safe in this place?

lively

14 Please take a few moments to look at the people here. Do you recognize anyone you weren't already planning to meet?
- ☐
- ☑ No, I don't recognize anyone here right now
- ☐ Yes, I recognize a familiar face, but I don't 'know' them
- ☐ Yes, I recognize someone I know but didn't plan to meet

15 What is your age? 38

16 What is the highest level of education you have completed?
- ☐ Less than 9th grade
- ☐ Some high school
- ☐ Completed high School (through grade 12)
- ☐ Some college, no degree
- ☐ Bachelors or Associate's Degree
- ☑ Graduate or Professional Degree

17 Do you identify as
- ☑ Female
- ☐ Male
- ☐ Gender nonconforming
- ☐ I prefer not to say
- ☐ Other. Please specify

18. Do you identify as? (mark one or more boxes + specify if you wish)
- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Black or African American
- ☐ Hispanic or Latino
- ☐ Native Hawaiian or Other Pacific Islander
- ☐ White
- ☐ Other. Please specify

19 If foreign-born, what is your country of origin?

India

20 What is the combined annual income of all working adults in your household?
- ☐ $0 - 9,999
- ☐ $10 - 14,999
- ☐ $15 - 24,999
- ☐ $25 - 34,999
- ☑ $35 - 49,999
- ☐ $50 - 74,999
- ☐ $75 - 99,999
- ☐ $100 - 149,999
- ☐ $150 - 199,999
- ☐ $200K or more

21 What is the street intersection closest to your place of employment or school? (If applicable)

KSRTC Bus stand &

☑ I am not employed ☐ I am visiting from another city or town

22 What is your home zip code/country of residence?

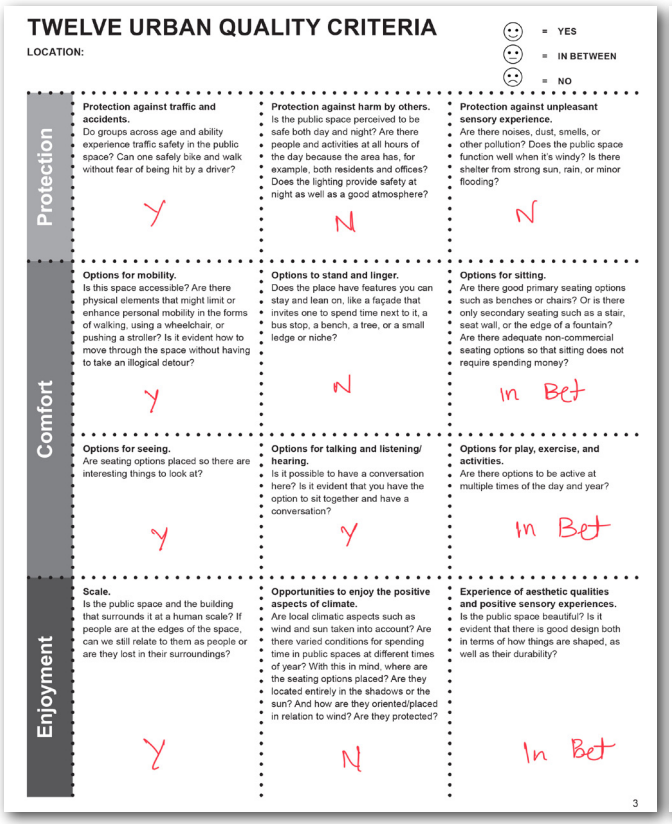
682035

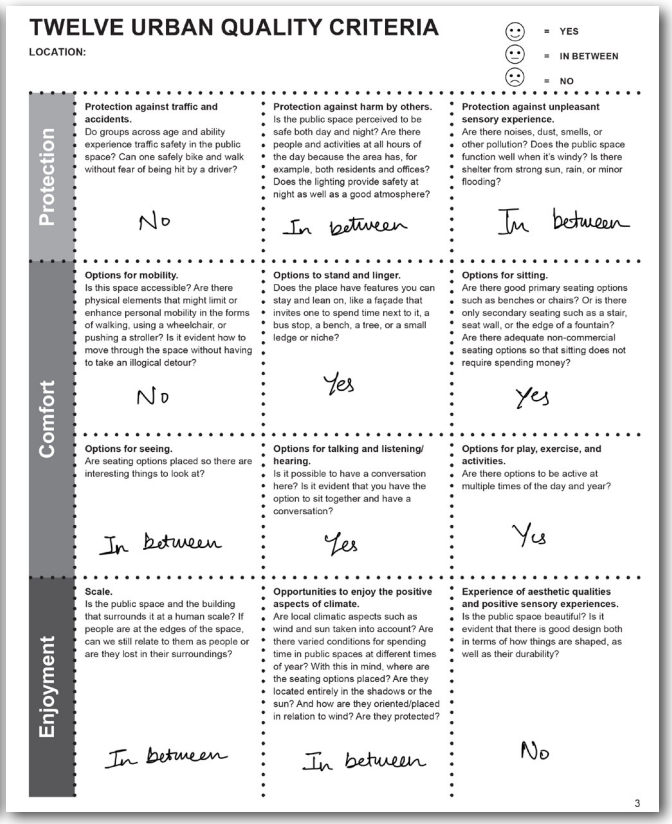
THANK YOU!

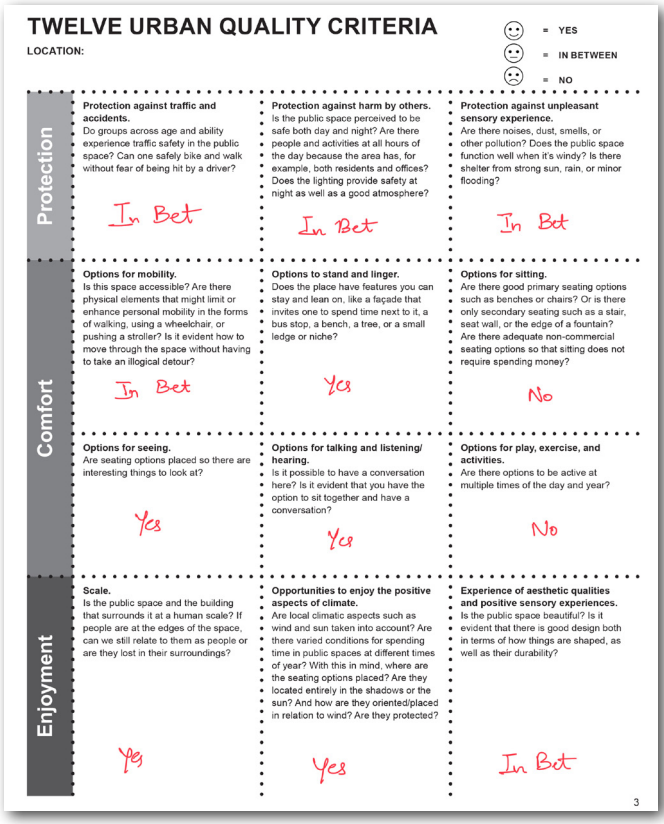
4

Figure 57: Participant survey worksheet 2 [Source: by Author based on Gehl's tool]

TWELVE URBAN QUALITY CRITERIA







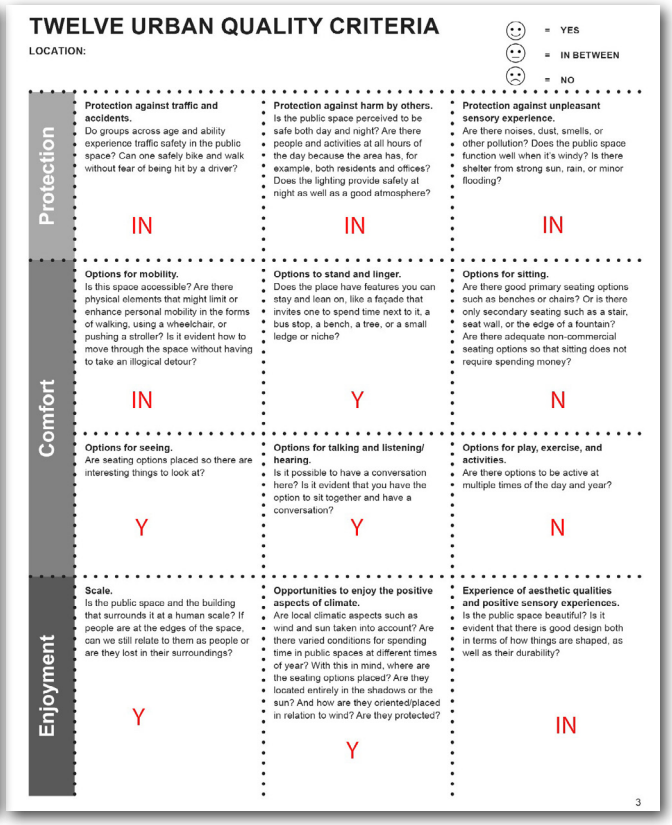
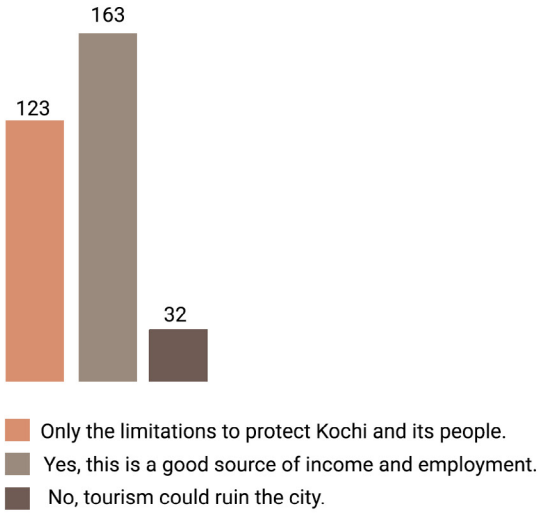


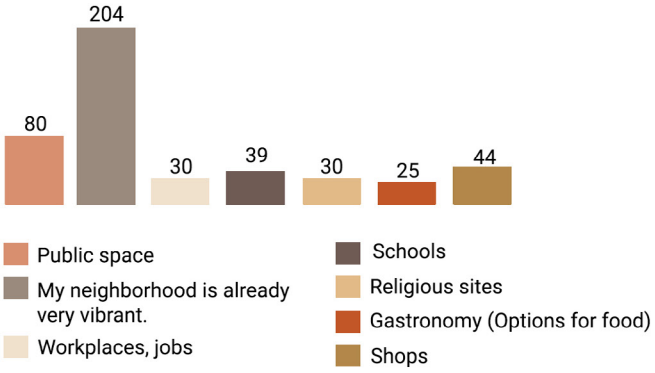
Figure 58: Twelve Urban Quality Criteria [Source: by Author based on Gehl's tool]

7.2.2 Interviews and Online Votings

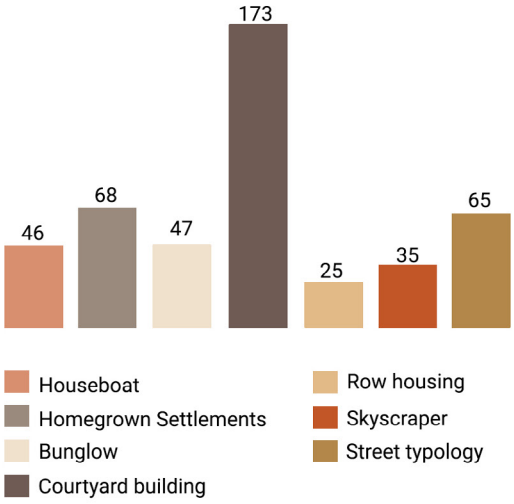
1.Should future Kochi make efforts to attract more tourists?



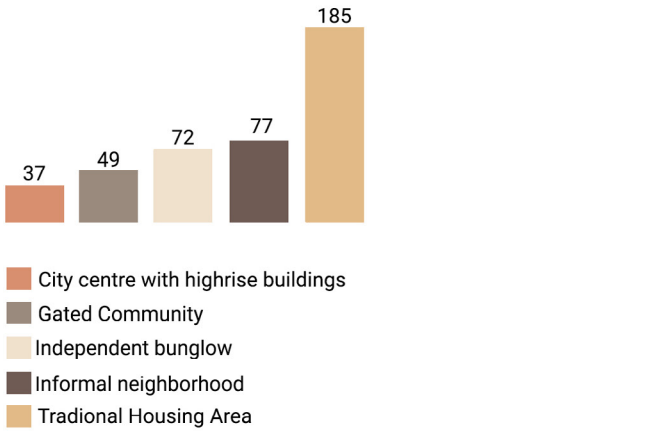
2.What is missing in your neighbourhood for it to be vibrant?



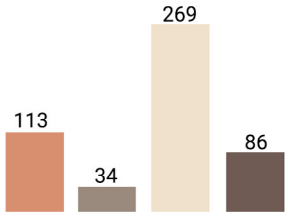
3.In what type of housing would you like to live in future Kochi?

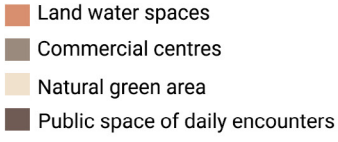


4.In what kind of neighborhood do you live?

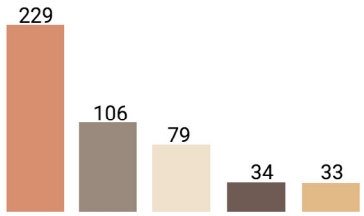


5.Which kind of public space should be part of a future kochi?





6.Have you been aware of climate change? If so, in what context?



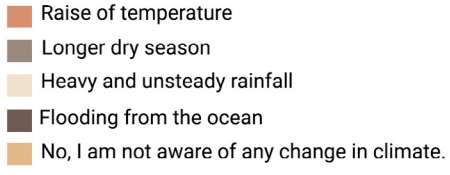
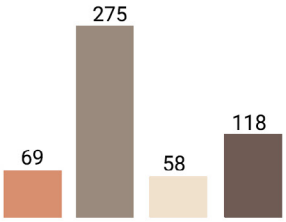


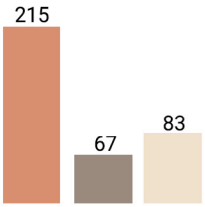
Chart 8: Site Survey and interviews - 1 [Source: Ente Kochi Report]

7.What actions are most important to reduce the effects of flooding through monsoon and bad weather in the future?



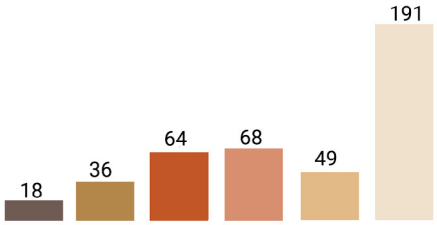
- Waterfront development to prevent the sea level from reaching the city?
- Change cananls and drainage systems, to drain off water more efficiently
- Development of emergency plans, sections and zones.
- Increase pre-monsoon and post monsoon safety inspections.

8.Are you aware of where your wastewater goes?



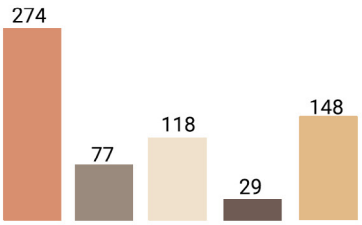
- Yes, it goes to the ocean/canals.
- Yes, it will be treated and cleaned the right way.
- No, I have no idea.

9.How is waste disposal working in your neighborhood?



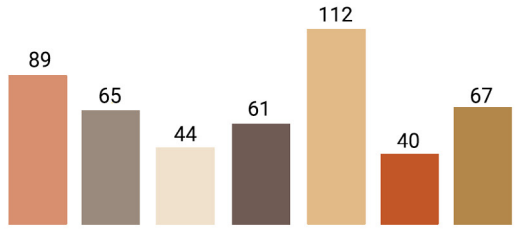
- 6 (Great)
- 5
- 4
- 3
- 2
- 1 (Poor)

10.What could the city of Kochi and its people do to reduce the pollution of the coastline in the future?



- Proper waste management
- Proper liquid waste management
- Recycling plastic
- Deposit system on plasic bottles
- Ban plastic bags, cups and other things that I could be made out of other material.

11.To adress the most relevant topics and generate useful results, My Kochi foucuses on 7 urban challenges. (prioritize the urban challanges according to the most importance they habe for you)



- Public commongrounds & environment (creating spaces for interaction and recreation)
- Local economy and labour space Crueling future structures for sustainable income)
- Neighborhood and houses (providing quality and safe housing in a vibrant environment)
- The Kochi identity (maintaining and respecting the cultural identity)
- Basic services and welfare (creating reliable structures and basic services for all)
- The coastal climate challenge (preparing Kochi and its people for floods and severe weather conditions)
- The mobility factor (Providing easy and accessible transport)

Chart 9: Site Survey and interviews - 2 [Source: Ente Kochi Report]

Online Votes

	QUESTION	ANSWER	NUMBERS
1	Which forms of waste management could help to keep the neighbourhoods clean?	A pickup at my home	2
		A recycling place to bring dry waste	4
		A collective space to bring all the garbage	4
2	Which traditional sites and elements define the cultural identity of Kochi and should therefore be protected?	Arts and Crafts	8
		Language	6
		Native Communities	7
		Natural and ecological features	7
		Local traditions and rituals	5
		Religious spaces	2
		Spiritual foundations	4
		Historical sites	5
		Canals, coastline, back waters	7
3	Which mode of transport do you use most frequently?	Bike	3
		Motorbike	4
		Car	3
		Taxi	1
		Bus	3
		Auto Rickshaw	1
		Metro	1
		Walking	2
4	Which kind of public spaces should be part of future Kochi?	Land-water spaces	1
		Natural green areas	2
		Commercial Centres	2
		Public space for daily encounters	1
		Others	1
5	Which actions are most important to reduce the effects of flooding through monsoon and bad weather in the future?	Waterfront development to prevent the sea level from reaching the city	1
		Change canals and drainage systems, to drain off the water more effectively	6
		Devpt of emergency plans, stations & zones	4
		Increase pre- and post-monsoon safety inspections	2
6	What is missing in your neighbourhood, for it to be vibrant?	My neighbourhood is already very vibrant	3
		Shops	5
		Schools	1
		Public Space	5
		Gastronomy	1
		Workplaces and jobs	4
7	What could the city of Kochi and its people do to reduce the pollution of coastline in the future?	Proper waste management	3
		Proper liquid waste management	4
		Recycling plastic	1
8	Throughout Kochi, there are many canals and waterways. What has to be done to use them as public spaces in the future?	They have to be accessible by the public	1
		They have to be cleaned and prevented from being used as garbage dumps.	2
9	Should historical sites and buildings in Kochi be protected?	Yes, existing hitorical sites and buildings should be protected from destruction	13
		No, existing hitorical sites and buildings no longer play any decisive role	7
		Future developments should involve traditional construction methods and styles	8
		New buildings should follow a modern design	5
10	Should future Kochi make efforts to attract more tourists?	Only with limitations to protect Kochi and its people	4
		Yes, this is a good source of income and employment	2

Table 13: Online survey and Interviews - 1 [Source: Ente Kochi Report]

11	In what type of housing would you like to live in future Kochi?	Homegrown settlements	1
		Houseboat	2
		Skyscraper	2
		Bungalow	1
		Courtyard building	2
		Street typology(mixed-use houses)	2
12	In what sector do you work?	Fishing industry	3
		Trade and service	3
		Production and logistics	4
		Government	4
		Tourism	4
		Building and construction industry	2
		Port and harbour industry	2
		Navy	3
13	In what kind of neighbourhood do you live?	Gated community - fenced complex	2
		City centre - high rise buildings	2
		Informal neighbourhood	1
		Traditional housing area	3
		Independent bungalow - residential area	2
14	If you could build your public space, what would be you primary objective?	Commercial offers: markets, shops, etc.	2
		Cultural possibilities: museums, libraries, cinemas, etc.	4
		Public services: toilets, ghats, etc.	1
		Green spaces: grass, trees, plants, playgrounds, seating facilities, etc.	3
		No cars, motorbikes, etc.	3
		Tourist attractions	2
15	How far is your work from home?	I work from home	2
		Very close - I can walk	3
		I have a short commute (less than 30 mins)	1
		I have a long commute (above 30 mins)	1
16	Have you been aware of climate change? If so, in what context?	Heavy and unsteady rainfall	8
		Flooding from the ocean	5
		Longer dry season	6
		No, I'm not aware of any change in climate	1
		Rise of temperature	5
17	Do you feel safe when travelling through Kochi?	Always	2
		Usually, but it depends on where I am and which mode of transport I am using	4
		Rarely, only in certain parts of the city	1
18	Do you feel a lack of space to meet people publicly in your neighbourhood?	Yes	5
		No	5
19	Below is a list of basic services. Please mark the ones you do not have access to.	Clean water	1
		Electricity	1
		Sanitation	1
		Education	2
		Medical treatment	1
		Security	1
20	Are you aware of where your wastewater goes?	Yes, it goes to the oceans/canals	4
		No, I have no idea	3
21	The whole Kochi area is pretty scattered. I wish there were more connections between the different parts of the city	Yes, the city is much divided, and I wish the different parts of Kochi would be more connected	3
		No, the city is already well connected	2
22	Where do you meet people in Kochi?	On the street	6
		At the beach/coastline	1
		In a specific locality (cafe, restaurant, etc)	2
		In parks	4
		At home	4

Table 14: Online survey and Interviews - 2 [Source: Ente Kochi Report]

7.3 Qualitative Analysis

- (Left) This photo depicts the state of the marine drive pedestrian line. This is the site's lone pedestrian route. This walkway, however, should be connected to the other new ones in a defined manner. From north to south, this lengthy stretch of walking and cycling path stretches. Benches are positioned at regular intervals for relaxation and to take in the scenery. This pathway is shaded by trees and is frequently used by locals. The official and informal urban fabric are both investigated.

– (Right) This photograph depicts the intersection of Park Avenue and Shanmugham Road. Apart from Urban textiles, there are a number of informal stores along the road's edge.

- (Left) The intersection of Park Avenue and Shanmugham Road is depicted in this photograph. It is noted that there is an undefined pedestrian crossing and a motorbike crossing. Informally parked vehicles can be spotted on the sides of the road. The walkway isn't clearly defined.

– (Right) The Lt.Unniyattil Karunakaran ln road, which connects Marine Drive and Mg Road, is depicted in this shot. Because of the educational buildings, this road is generally crowded and congested. It is observed that there is no pedestrian line or crossing.

- (Left) This photograph displays solid garbage dumping in the target area by residents, street vendors, and municipal waste collectors, which has not been properly divided and processed. This could produce problems for the residents of the neighborhood, as well as the canal, the institution, and the surrounding area.

– (Right) This snapshot portrays the Ak Shesadri Road, which has a shophouse building typology. This image is analyzed with vehicles parked on the road in an unofficial manner, posing a hazard to walkers. There is no clear distinction between pedestrian and vehicular movement.

- This snapshot depicts the fashion street, a shopping lane that connects Mg Road and Marine Drive. It is located near to Maharajas College Ground. In this shot, you can see undefined pathways and shops occupying the canal. Despite the fact that it is a business street, the lively and safe atmosphere is much missed.

- (Left) The overbridge near the KSRTC bus terminal, which is one end of the target region, is depicted in this shot. On the next plot, it is seen that the unoccupied area is utilized by informal parking by private automobiles and Ksrtc bus parking. Because there is no connection under the bridge, this space appears dormant and dangerous for persons strolling from Mullasserry canal road to ascend the overbridge.
- (Right) This image depicts the MG Road, which is a high-traffic commercial thoroughfare. Pedestrians and unofficial parking spaces were found to be damaged in this study. Street vendor seating can be observed here, which acts as a barrier for pedestrians.

- (Left) This image depicts a street business where people congregate and socialize. These stores obstruct the pedestrian path and cause traffic congestion.
- (Right) This photograph depicts the MG Road, which is a high-traffic business thoroughfare. Pedestrians and unofficial parking spaces were found to be damaged in this study. This route has both public and private vehicle access. The metro train connection is located above the road. According to interviews, traveling in this pedestrian area late at night is dangerous, especially for women.

Figure 59: Photographic Analysis
[Source: by the authors]

7.4 Site Visit Summary

1. Gehl's Institute Tool: Quantitative Analysis

People Moving Count: According to observations made on commercial road, the total number of individuals counted in 10 minutes is more than 50. This is the count because of the epidemic; otherwise, it is frequently greater than the survey result. The pedestrians are noted to be partially occupied by street vendors or shophouses. Shopkeepers and employees are constantly carrying storage from one shop to the next. These activities appeared to be a stumbling block for the walkers. Some individuals prefer to wait or rest beneath the shade of the trees.

Participant Survey Tool: This technique was used to interview six persons who then shared their experiences on the site. To summarize, the previously mentioned common points show that neighborhoods are typically favourably characterized, while public areas in this region are largely inactive and indifferent. The interviewee's overall impression is that public areas are congested, unsafe at night, particularly for women, a pleasant location to spend time in groups, and that recreational spaces are lacking.

Twelve Urban Quality Criteria: With this tool, it can be seen that the total protection criteria is somewhere in the middle, where comfort and enjoyment are both yes. However, just six interviewees have spotted it, and it has yet to be noticed.

2. Interviews and Online Voting

The data for this analysis came from the EnteKochi Competition. According to the results of this survey, public spaces and sustainable living are in great demand. People ranked waste management treatment and maintenance as the most important. Individuals's requirements include proper waste management, creating areas for interaction and enjoyment, and providing excellent, safe housing and a lively environment, and most importantly basic essentials and basic services for low-income people.

3. Photographic Analysis: Qualitative Analysis

This is used to examine street activities at various points and from various perspectives. Analyzed are people of varied genders and ages. Failures in the Vitality of Urban Fabrics are plainly visible and recorded. Vendors on the streets, for example, occupy canals and pedestrian walkways. Barriers and conjestion for pedestrians on busy roadways, undefined pedestrian paths, parking and crossing, informal settlements, incorrect trash management, and a lack of safety and critical activities are all examples.

In summary, these agenda thoughts will be used to inform the design of Mullasserry canal area regeneration.

CHAPTER III.

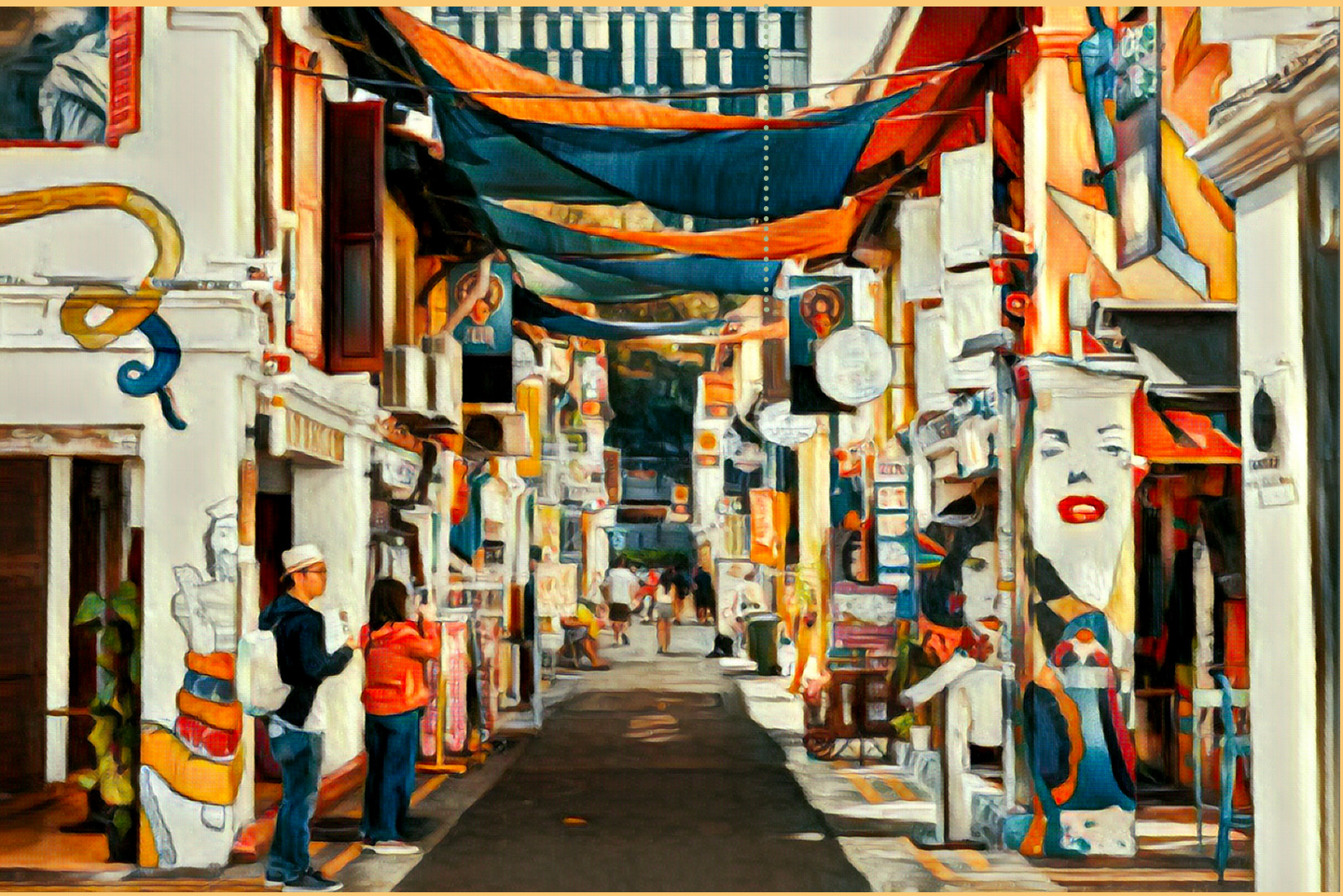
8 Design

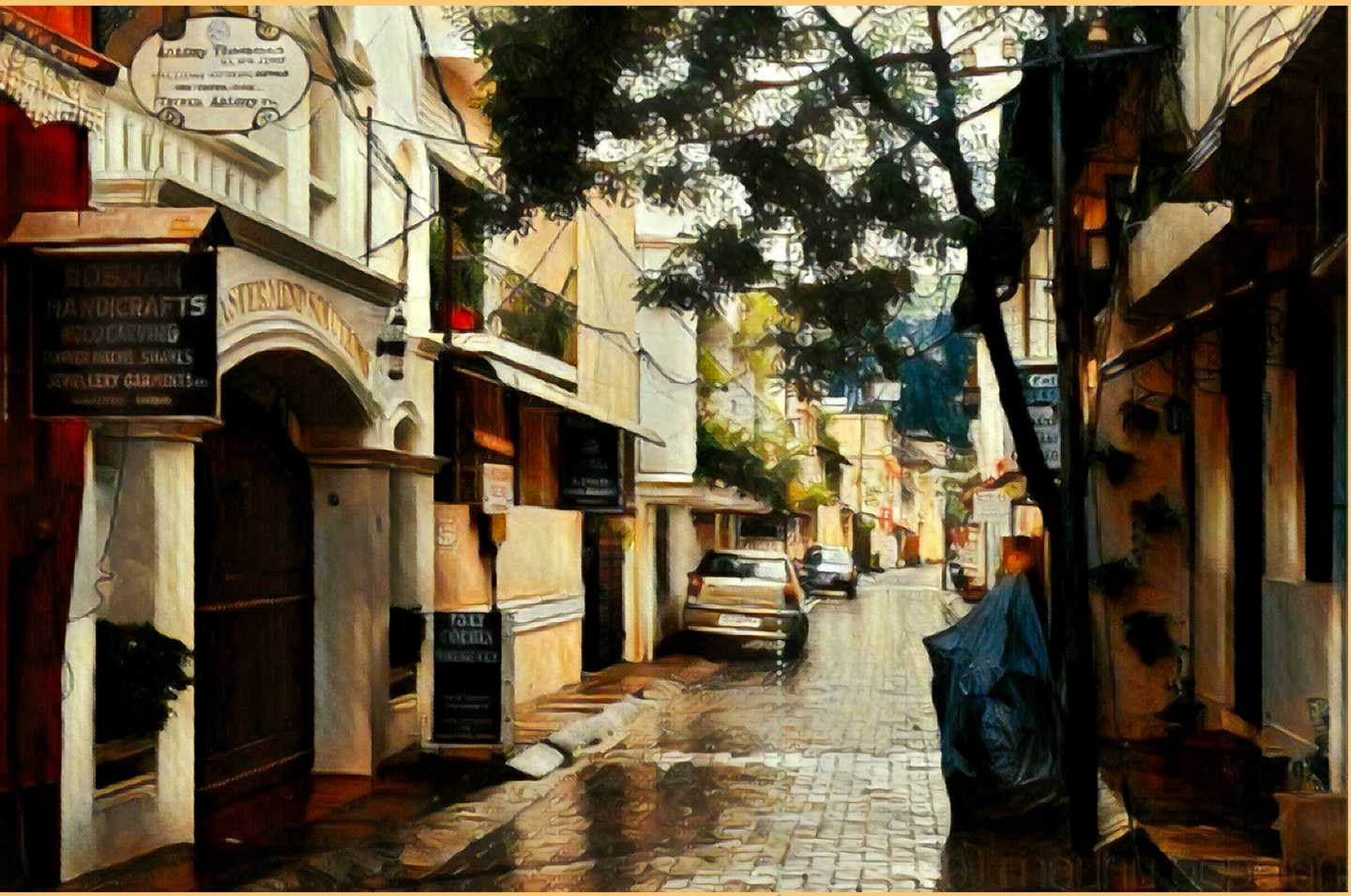
VISIONG

To - Well defined Vital Spaces

To Recondition - Undefined Public Spaces

To - Streets that are both lively and safe





To Resape - Inactive and Lifeless streets

Figure 60: Visioning [Source: (haji lane)

IMAGINE

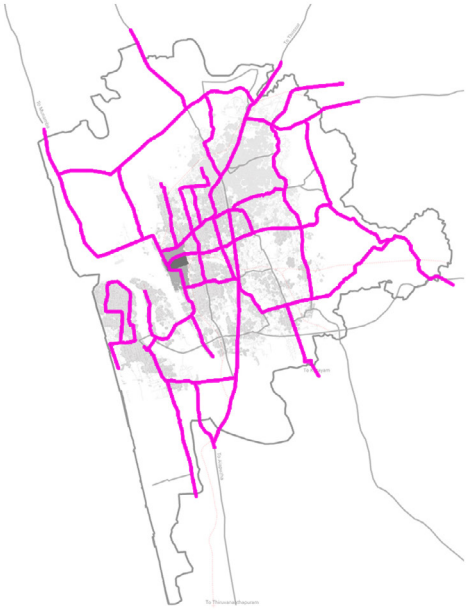
Streetscape that Adapt Climate Change - Shading from extereme heat and sunken roads which can act as water containers.

Water Tanks as a Communal Spaces - Reuse of Existing Condition

Figure 61: Imagining
[Source: By the Authors]

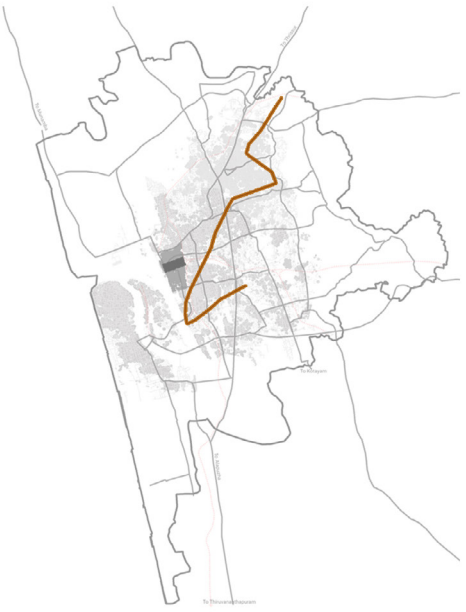
8.2 Positioning

The accessibility of modes of transportation by car or private vehicles aids in the analysis of the choice aspect.



Displaying public transportation, particularly buses that connect various points throughout Kochi City.

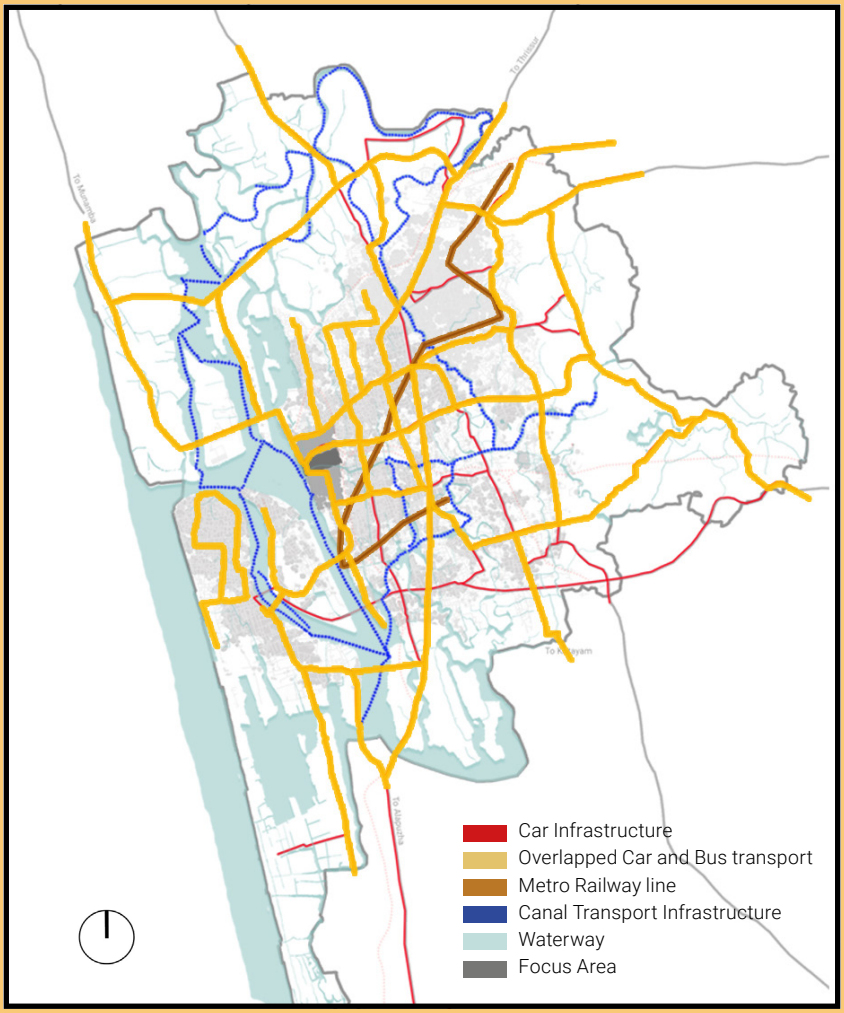
The proposed waterway transportation infrastructure is shown below.



Metro railway lines, which are easily accessible from the focus area, play an important role.

Car Infrastructure
Bus Infrastructure
Metro Railway line
Canal Transport Infrastructure
Waterway
Focus Area

Map 17: Different types of mobility infrastructure Analysis
[Source: drawing by the authors]



Combined Approach

Based on a road and public transportation accessibility analysis in the Choice aspect (which path is used more frequently to access all other paths). The Focus Area is situated along the main lines, which are intersected by highly accessible automotive and public transportation infrastructure paths. These circumstances place the Mullassery canal region in a unique situation, as it has both car and public transportation facilities.

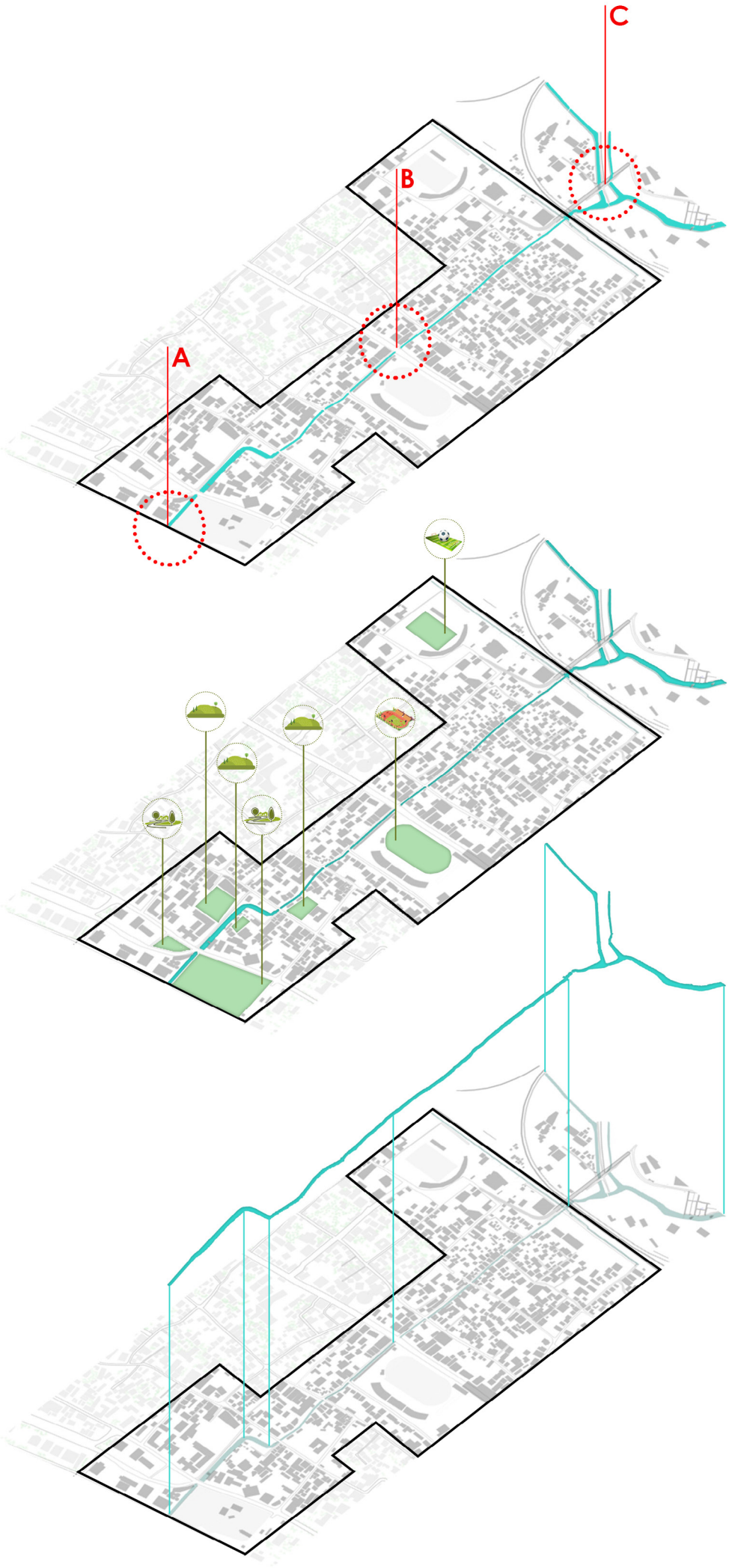
Map 18: Combined Map of different mobility infrastructure [Source: drawing by the authors]

8.3 Design Approach

1. Design approach starts with connecting three main focus points, starts from point A which is marine drive, through point B MG road and ends at point C KSRTC bus stand.

2.Analysing the existing greenspaces which are active but not as much effective to the surroundings.

3. Analysing the existing natural element at site in order to protect and use them in a defined and proper manner.

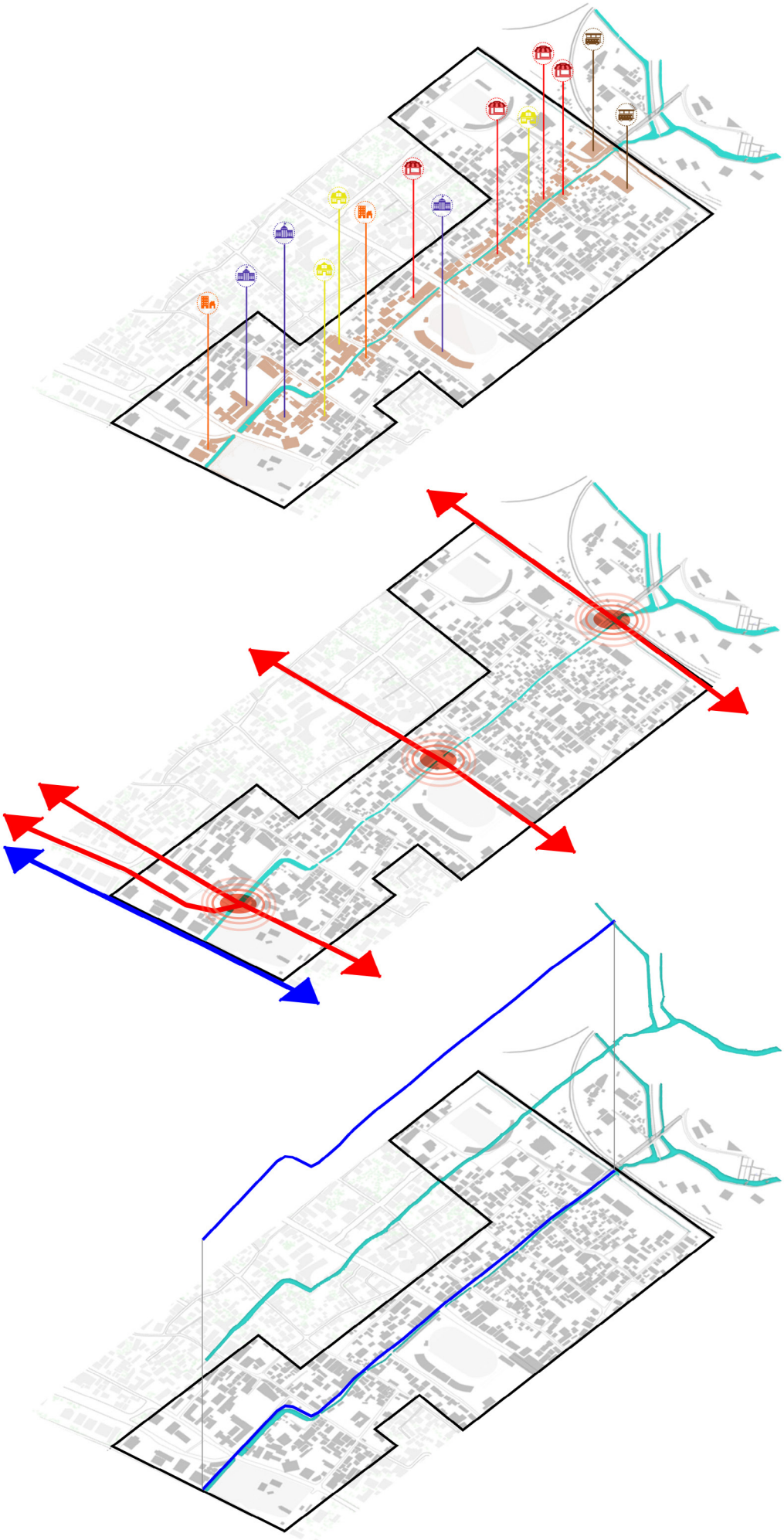


Map 19: Design Approach 1 [Source: drawing by the authors]

4. Existing building structures and its typology are analysed for the better implementation design in the site. This mainly includes, Residential, commercial, institutional and mixed use functions along the sides of the canal.

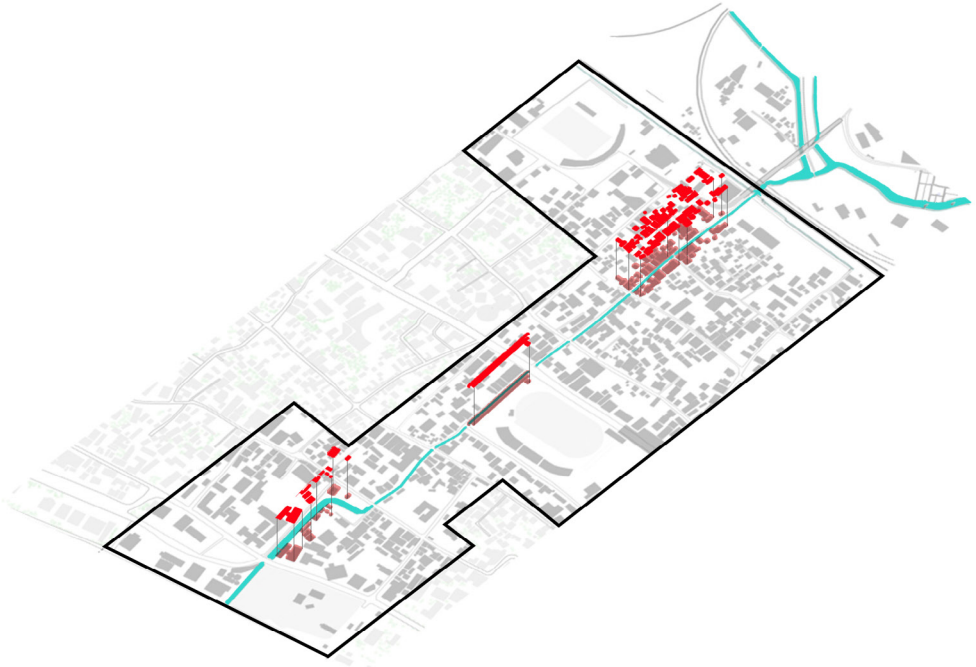
5. Busy main roads and highly in traffic itensity is analysed with the existing pedestrian line along the marine drive. The nodes crossing the canal are highlighted to take care of in the design.

6. Using the form of the the existing natural element or canal, the three points are connected together to extract the basic network along the canal as the main pedestrian and cycling connection .

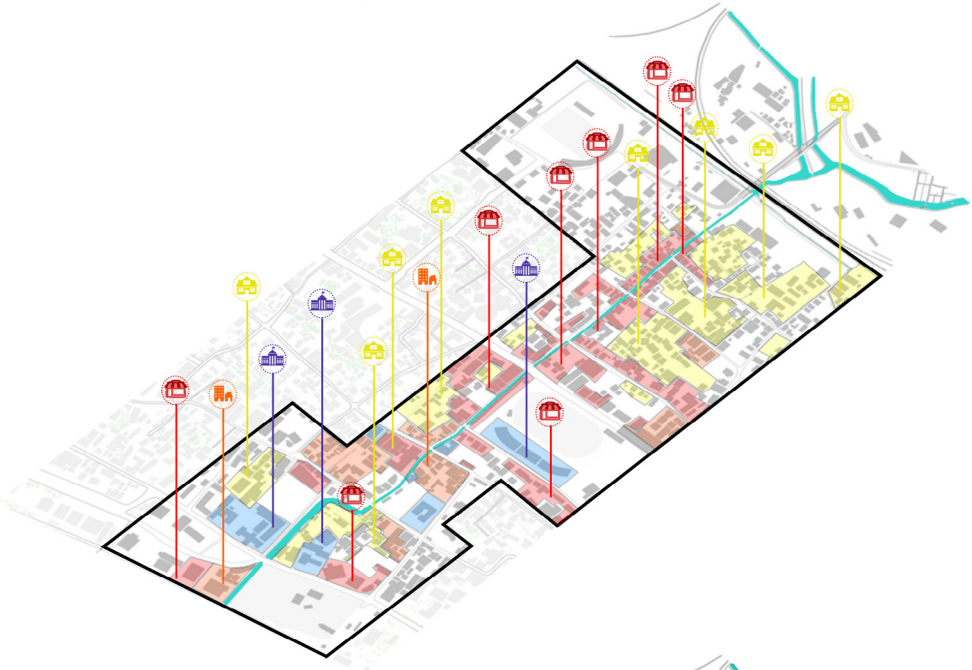


Map 20: Design Approach 2 [Source: drawing by the authors]

7. Informal settlements over the canal and unplanned commercial buildings are marked to be demolished and planned with new typology structure in coporating the existing functions in a better way.



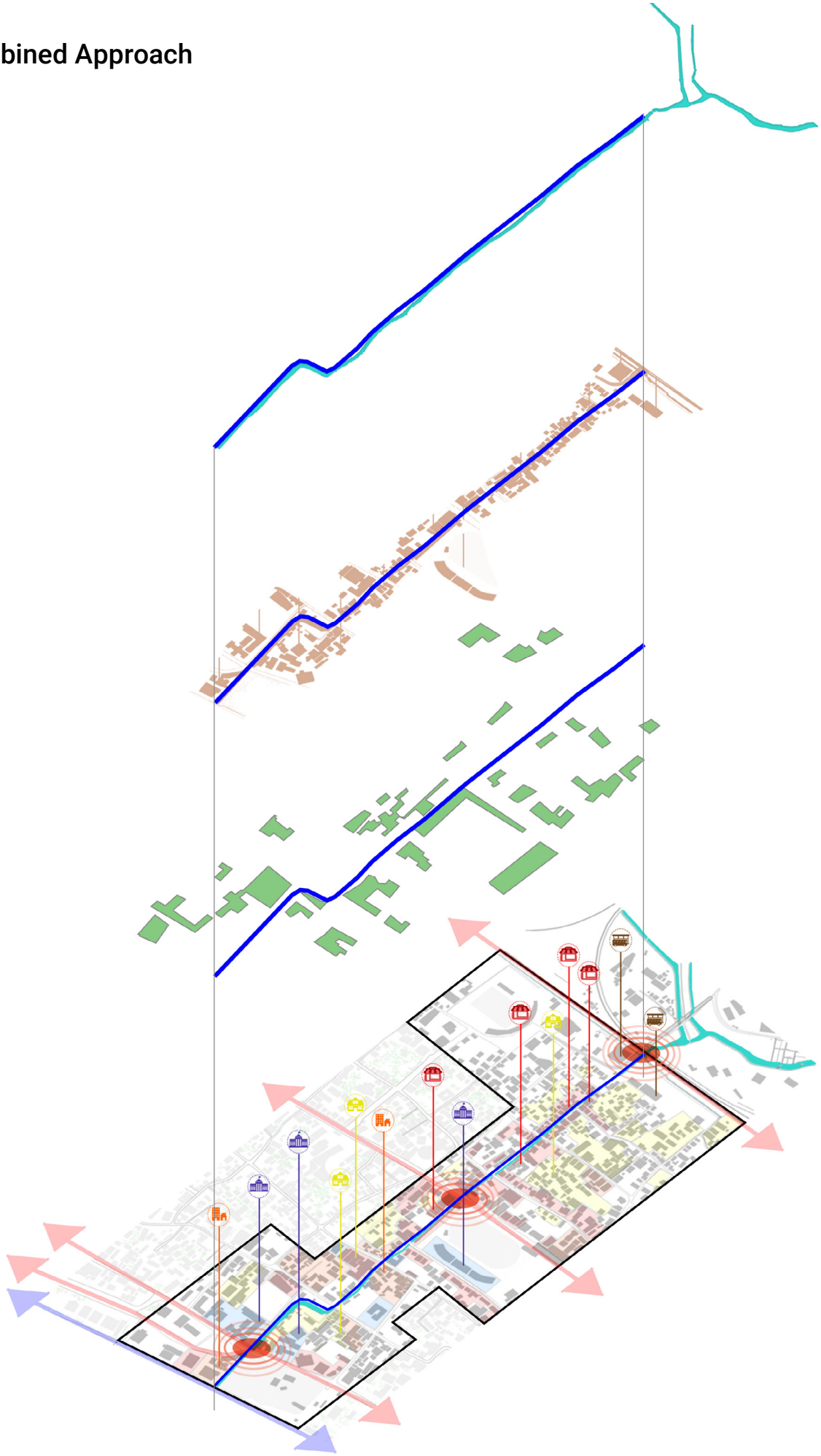
8. Considering the surrounding environment and settlement pattern for better understanding and development for the future.



9. Identifying the dead or barren spots and define them with proper public space functions based on the surrounding Settlement.

Map 21: Design Approach 3 [Source: drawing by the authors]

Combined Approach



Map 22: Combined Approach [Source: drawing by the authors]

8.4 Masterplan Context

KOCHI'S ENVIRONMENTAL ISSUES

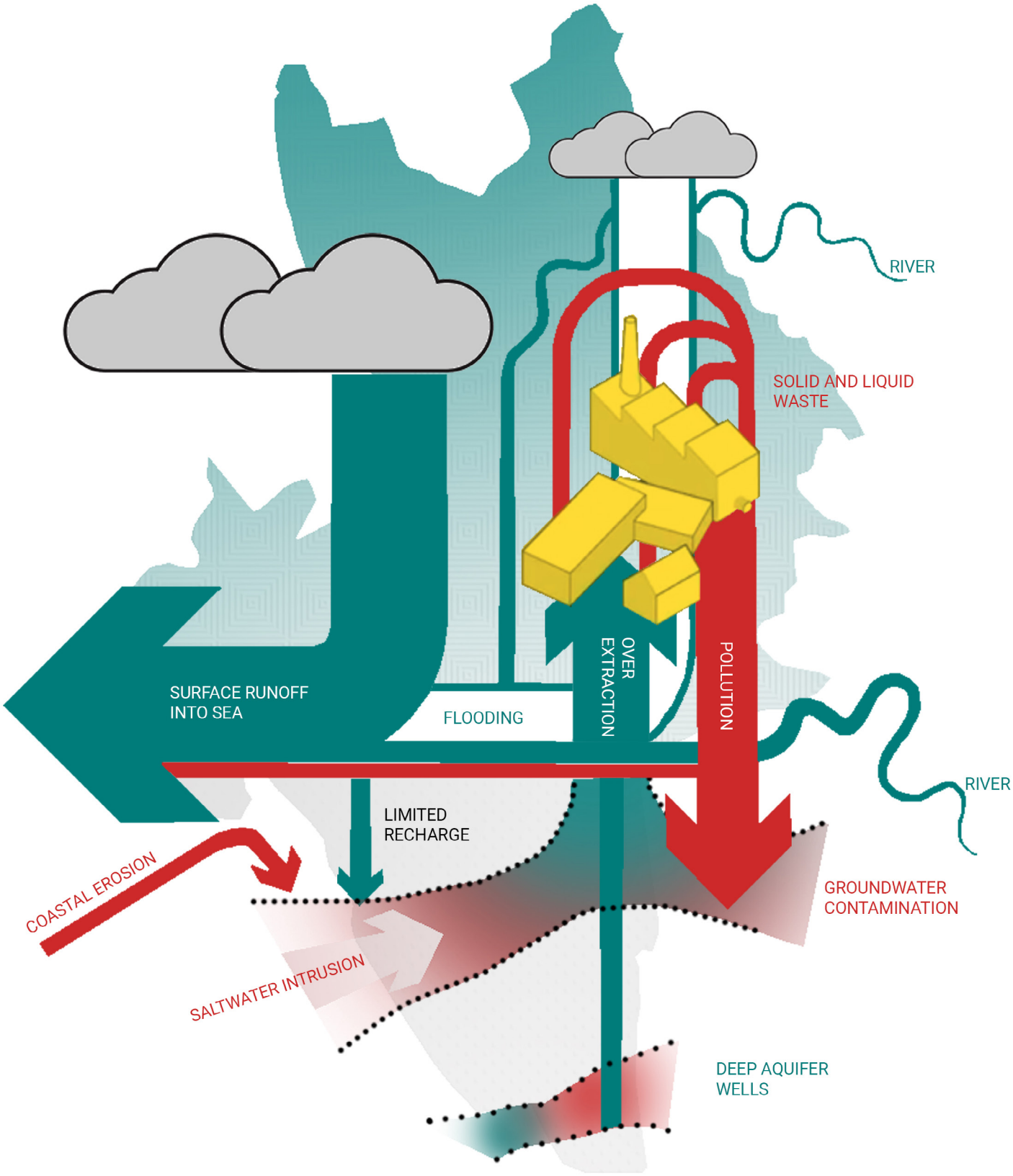


Figure 62: Environmental issues of Kochi graphic representation

HOW DO WE CREATE A DYNAMIC, SAFE, AND RESILIENT CITY WITH THE PEOPLE OF KOCHI FOR **THE PEOPLE OF TOMORROW?**

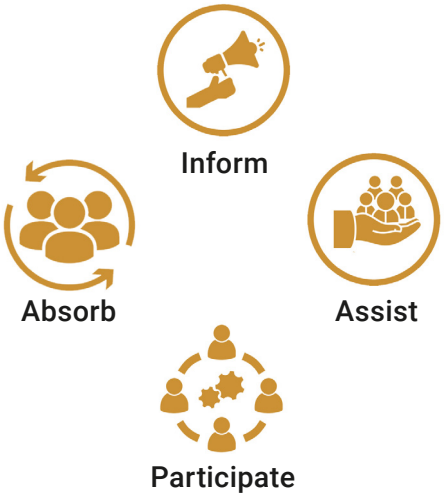
UPLIFT

REGENERATE

COLLABORATE

8.3 Design Concept

UPLIFT refers by promoting the establishment of social networks, residents may contribute in improving their surroundings and creating inclusive communities. **UPLIFT** toolkit, we looked for methods to engage communities to fight the canal's problems in its current state.

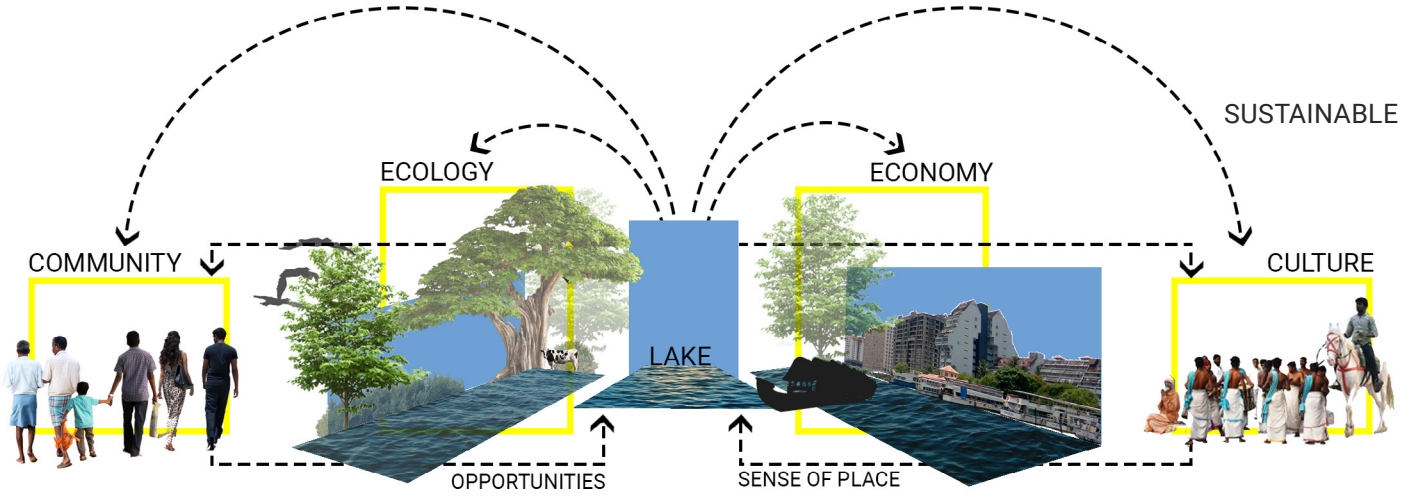


REGENERATE refers to the ecology through nature based solution. NBS initiatives that employ the landscape to repair links between urban green space, monsoons, water bodies, and the aquifer are cataloged in regenerate. Surgical procedures such as parklets, infrastructural measures such as daylighting and channel bed restoration, and strategic initiatives such as opening public areas to a natural edge are all part of the **REGENERATE** framework.

COLLABORATE is a term that refers to the process of rebuilding public spaces and mobility systems in order to improve transit, revived areas, and safe spaces. The **COLLABORATE** tool builds a network of pedestrian-friendly main streets, local streets, and open spaces, including the Mullassery bike route.

UPLIFT + **REGENERATE** + **COLLABORATE**

the community to create inclusive neighbourhoods | **the ecology through nature based solution** | **the public realm and mobility system**



Approach

To support a growing population, there is an increasing demand for 'growth' and 'development.' Economic progress comes at the expense of natural resources, but uncontrolled usage of natural resources would cause us considerably more harm. Traditional culture and community systems included lakes and canals to preserve their holiness in a folk sense. On the other side, modern development has cut us off from these systems. This design's strategy is a long-term, sustainable economic model that considers the region's ecosystem while also fostering a sense of community and cultural identity around the natural resource.

Economy vs Ecology

Achieving a balance between economic growth and environmental conservation is the goal. Ecologically sustainable development models have combined sustainable agriculture and livestock. Green infrastructure improves the quality of life in a city and, as a result, the property value. Increasing the FSI in the immediate vicinity can significantly lessen land pressure. Because the site is close to a ferry terminal, bus terminal, metro station, and major train station, paratransit can aid in the long-term sustainability of these communities.

Figure 63: Concept representation [Source: By Author]

UPLIFT the community to create inclusive neighbourhoods + **REGENERATE** the ecology through nature based solution + **COLLABORATE** the public realm and mobility system

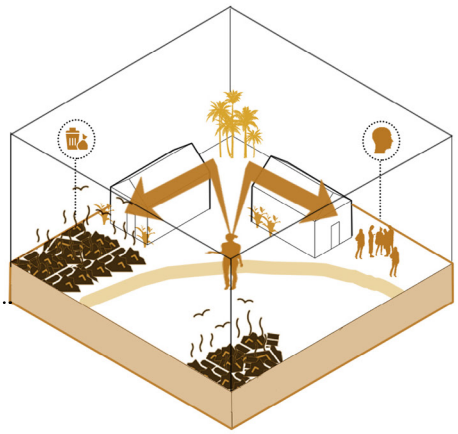
The Mullassery Canal serves as a vital natural link between the marshes at the Perandoor Canal's mouth and the Marine Drive coastline. Existing streets become green infrastructure, and open areas become multipurpose, floodable landscapes. We suggest a green street and open space network that slows runoff and recharges aquifers. We value Kochi's distinctive burial grounds as natural resources and work to protect them as community assets. Residents can use community groves to manage and monitor natural resources including trees, stormwater, and groundwater in a more sustainable way. Green ties connecting community orchards are weaved into organic neighborhoods and informal settlements to boost residents' health and well-being.

The canal's bank will be transformed into a continuous walking and bike path between the KSRTC bus stop, the Mahatma Gandhi Metro station, and the ferry connection to Fort Kochi. This cycling route connects to a projected waterfront trail that connects Subhash Bose Park and the Mangalavanam Bird Sanctuary along Marine Drive. The region is a suitable site for Kochi's bike share program pilot because of these links. Last-mile connectivity to important transit hubs and secure access to new, dynamic open areas are ensured by the collective strategies. A set of cultural and tourism trails that restore historic places like the Jewish Cemetery and connect them to proposed public spaces add to the network's activation. Littering along the canal, we believe, is symptomatic of a number of urban challenges. Using the We suggest design ideas and locations that enable different groups to develop their social links and networks and generate a larger sense of community in order to foster trust and social capital among varied stakeholders. The community-driven tool major goal is to educate and involve all stakeholders, collaborate with them to develop community-driven solutions, and give critical assistance in the form of money, facilitation, and capacity building. To achieve long-term systemic change, each of these four initiatives targets three levels: the household, the neighborhood, and the city.

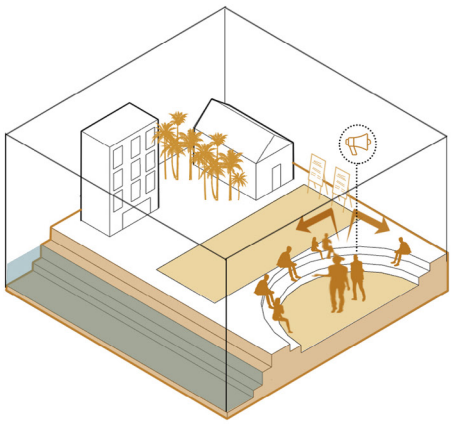
Multiple systems can be integrated into site-specific interventions using these approach. We show examples of how the **REGENERATE + COLLABORATE + UPLIFT** paradigm may be used to successfully reinforce each other and create many benefits. A public plaza with retail space, bike-share facilities, public restrooms, pavilions, and green streets is located at the M.G. Road intersection. A biogas-fueled community center surrounded by facilities for workers to use "waste as a resource" will become a showcase for mainstream circular economy waste management techniques at the KMC garbage collection center.

UPLIFT

Inform

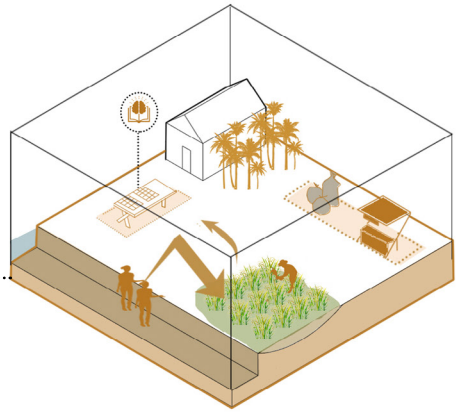


Building awareness

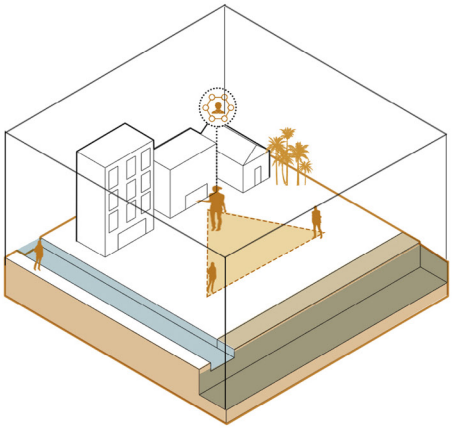


Creating community & systemic awareness

Absorb

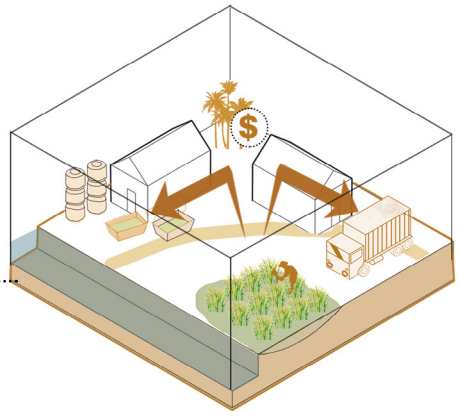


Community Intiatives & building local knowledge

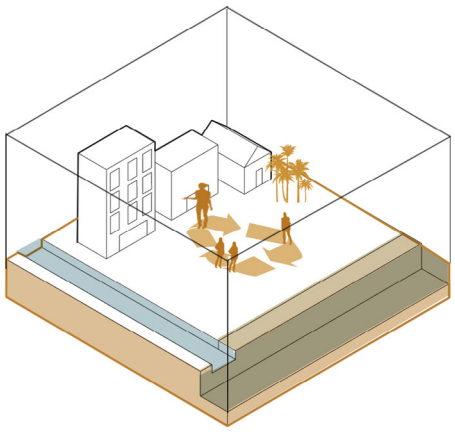


Participatory governance/ align community stakeholders

Participate

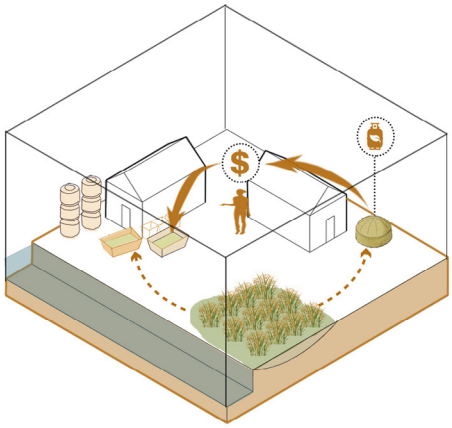


Catalysing lifestyle change

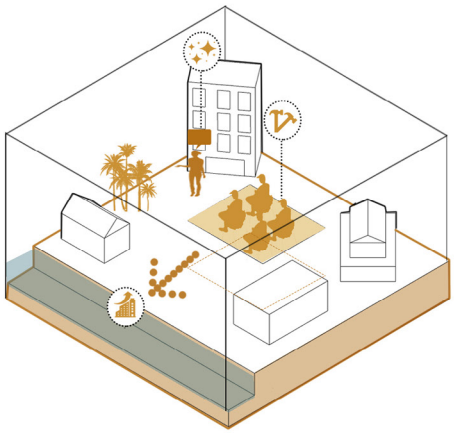


Community stewardship & knowledge exchange

Assist



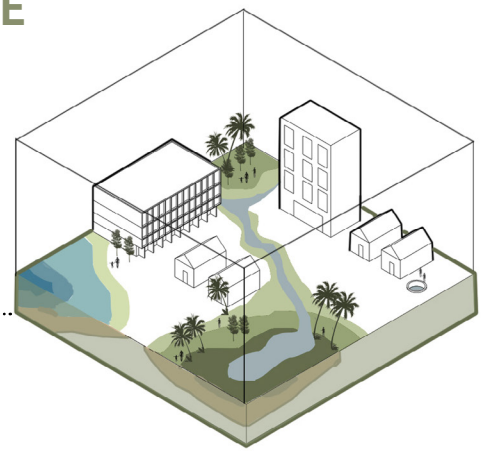
Waste as resource



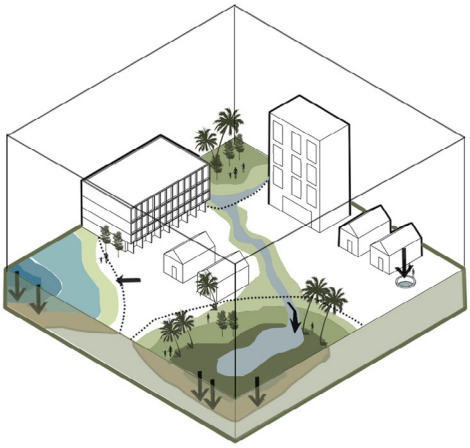
Capacity building

REGENERATE

Protect

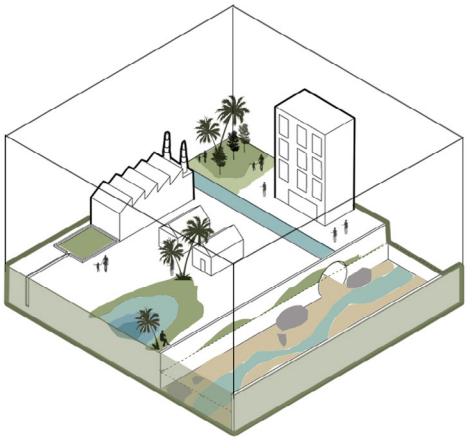


Urban forest and tree mapping

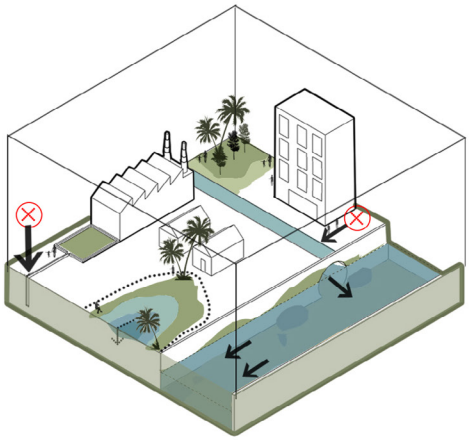


Monitoring Water bodies & Aquifer mapping

Restore

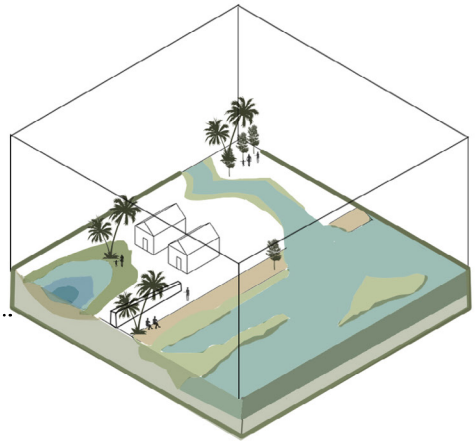


Soils/ Degraded forests

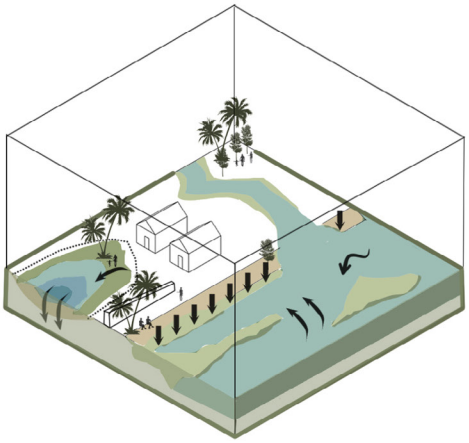


Polluted/ Depleted aquifers

Increase

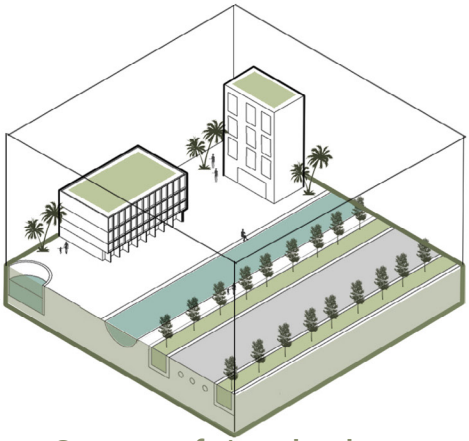


Parks/ Gardens

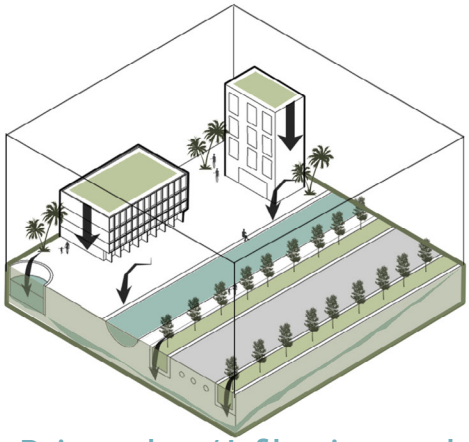


Coastal edge against erosion & aquifers against intrusion

Build



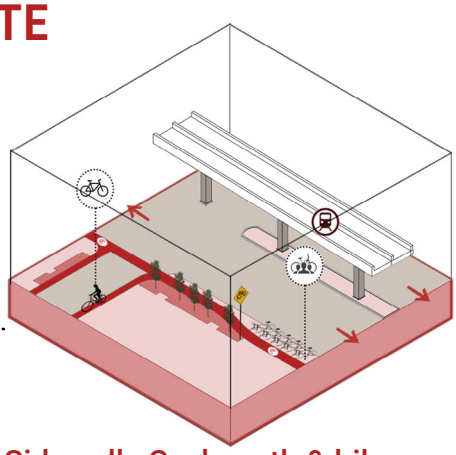
Green roofs/ wetlands development



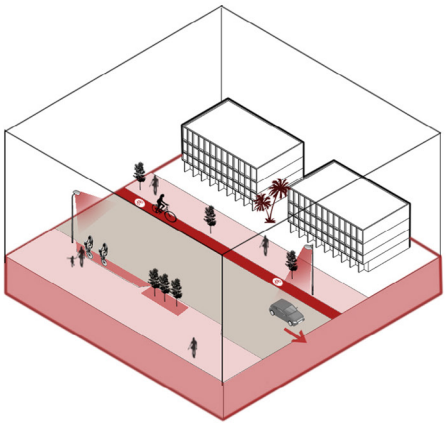
Rain gardens/ Infiltration ponds

COLLABORATE

Access

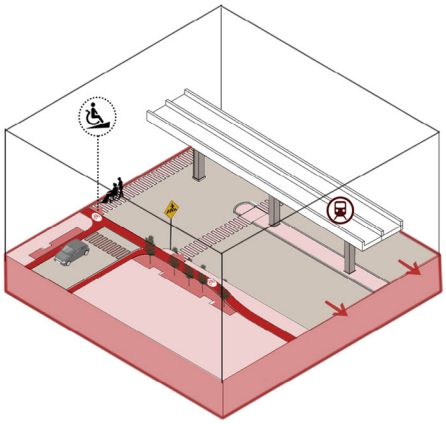


Sidewalk, Cycle path & bike sharing

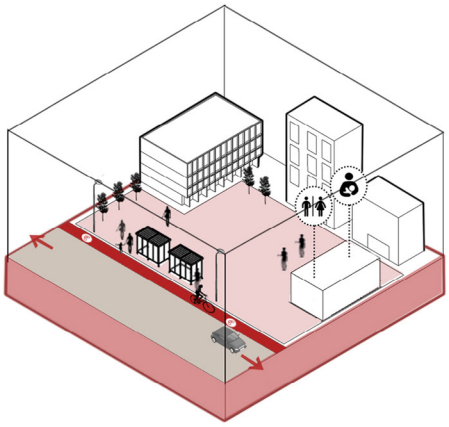


Street light, limited speed & street hawkers

Involve

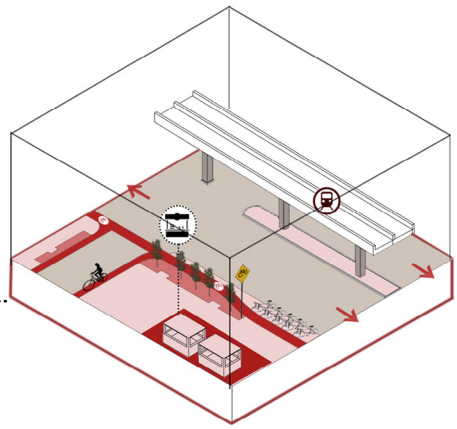


Pedestrian crossing, slope for wheel chair/ trolley.

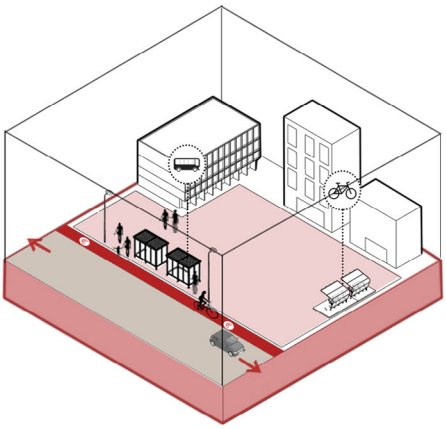


Toilets & Feeding area

Initiate

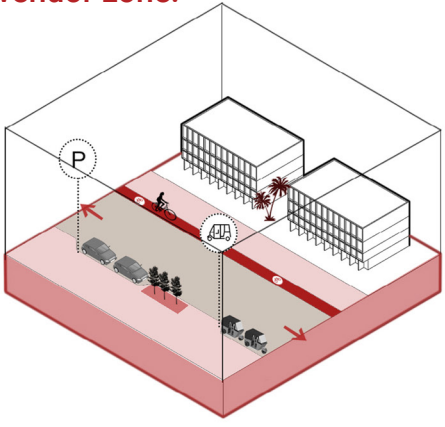


Street shops, book kiosk, vendor zone.

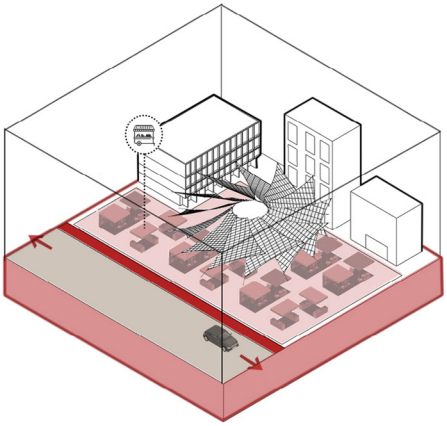


Bus stop, cycle parking

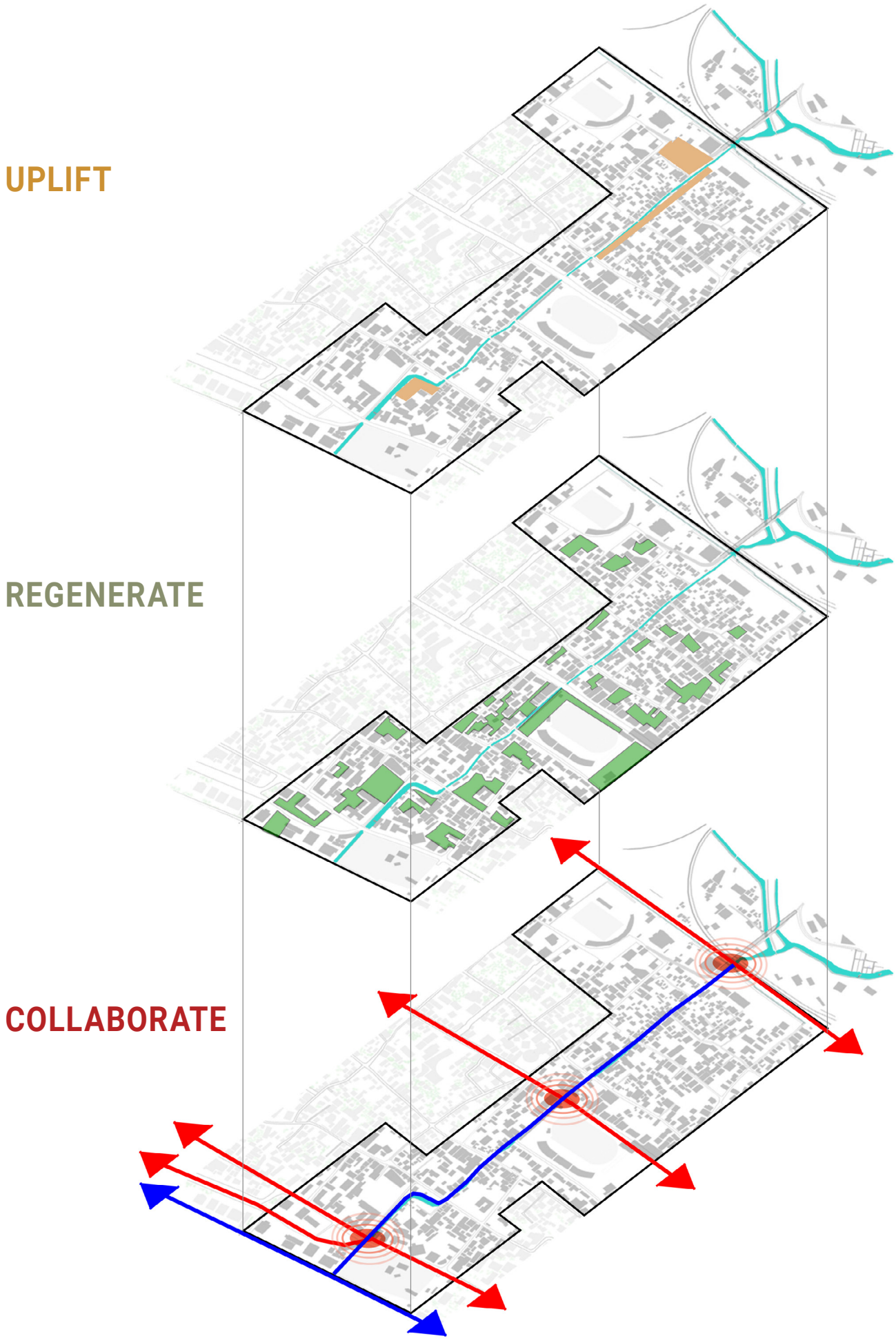
Create



Parking and Auto stand



Community Open Market



Map 23: Concept Implementation Zones [Source: drawing by the authors]

BUILDING A CIRCULAR RESOURCE PARADIGM

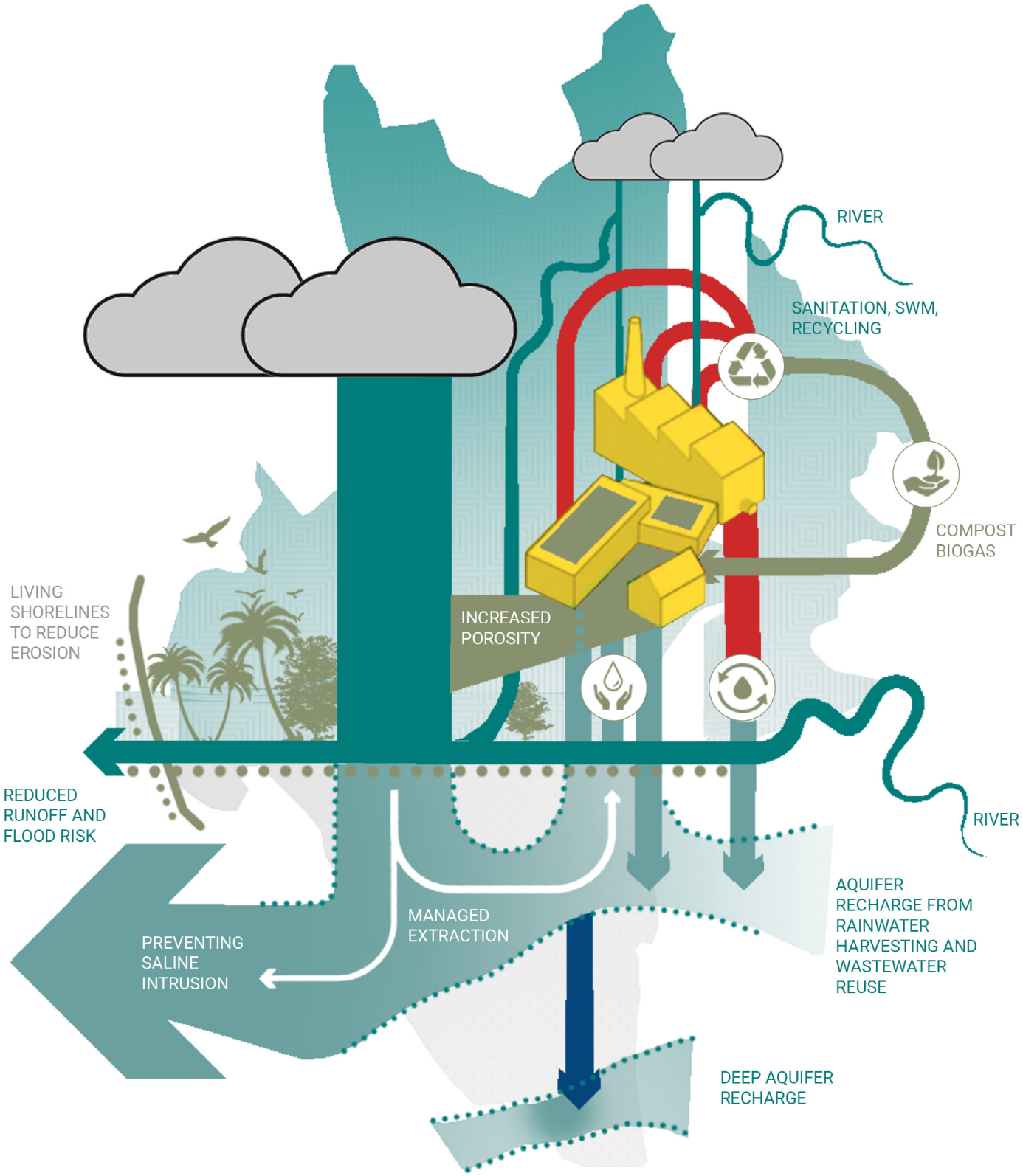
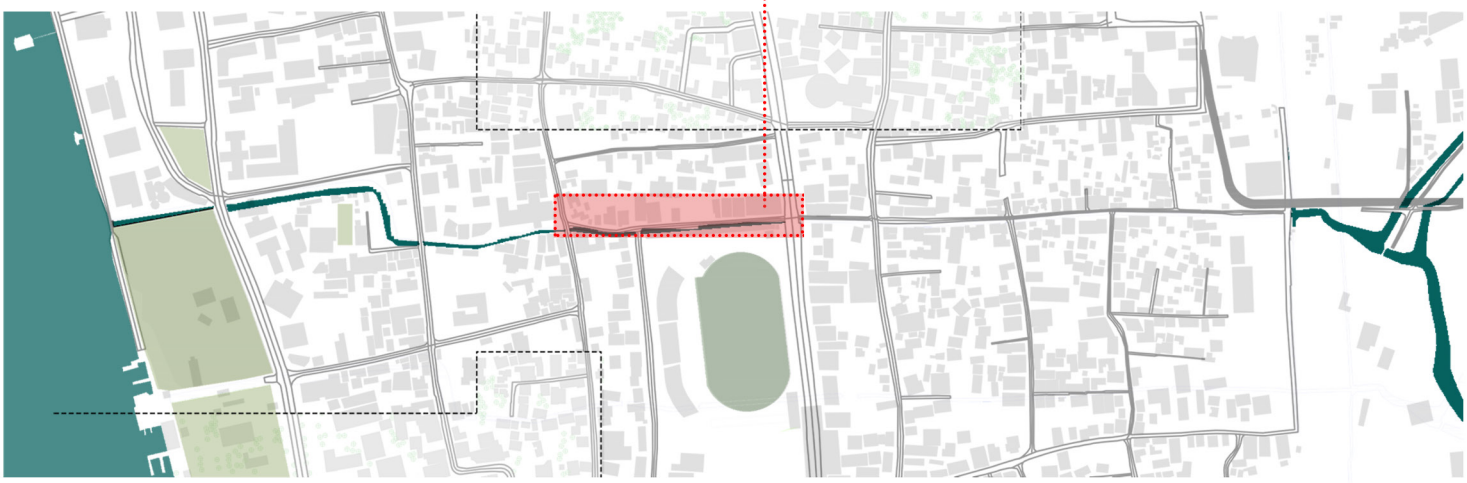


Figure 64: Building a circular resource pardadigm graphical representation [Source: By the Authors]

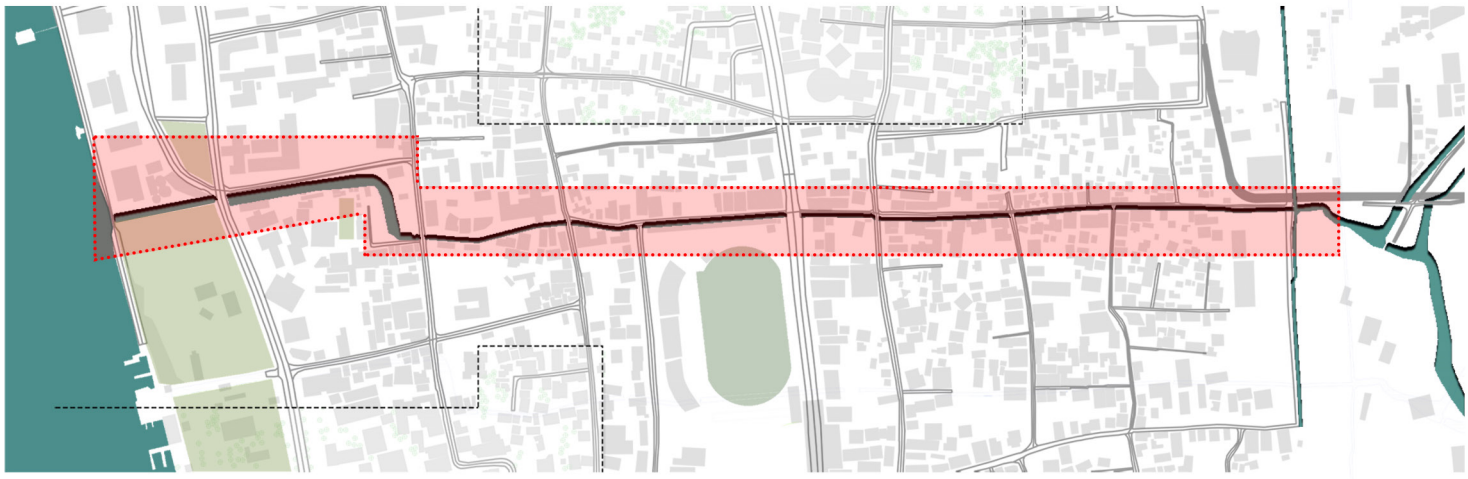
8.4 Design Phase 1

PHASE 1- CONSOLIDATING EDGES OF THE CANAL

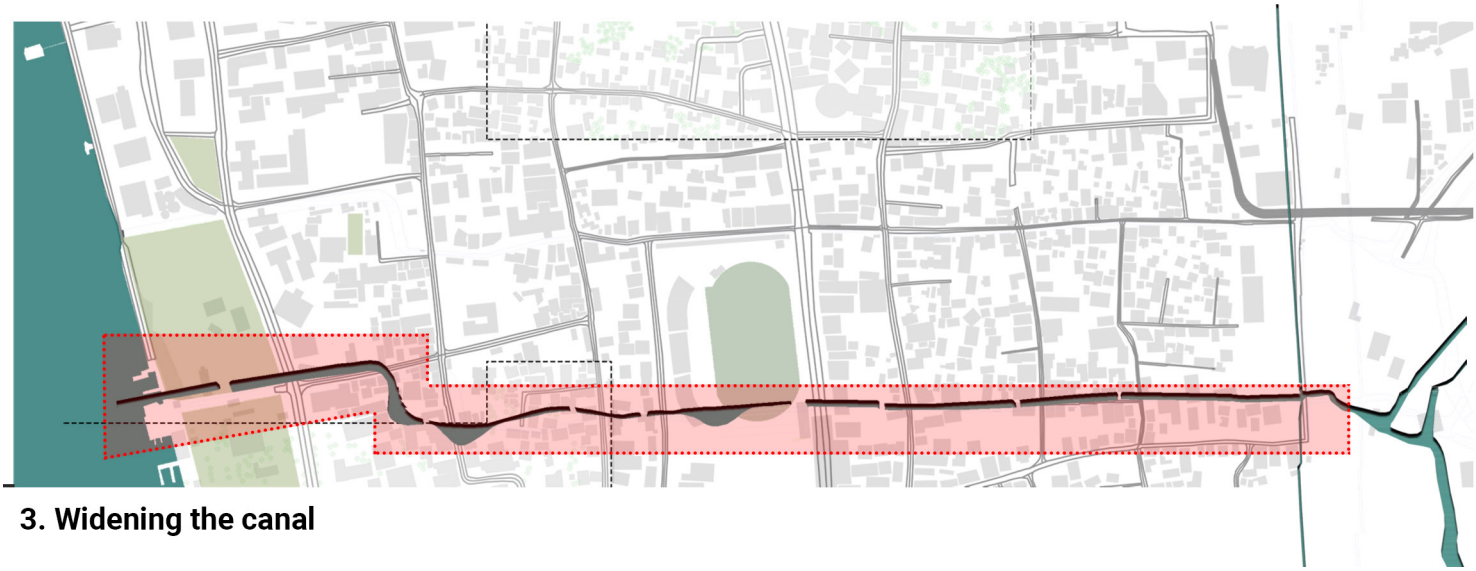
Informal Housing Settlements and Illegal Intervension above Mullassery canal.



1. Existing Situation of Mullaserry canal



2. Canal Retrieving its Original Form

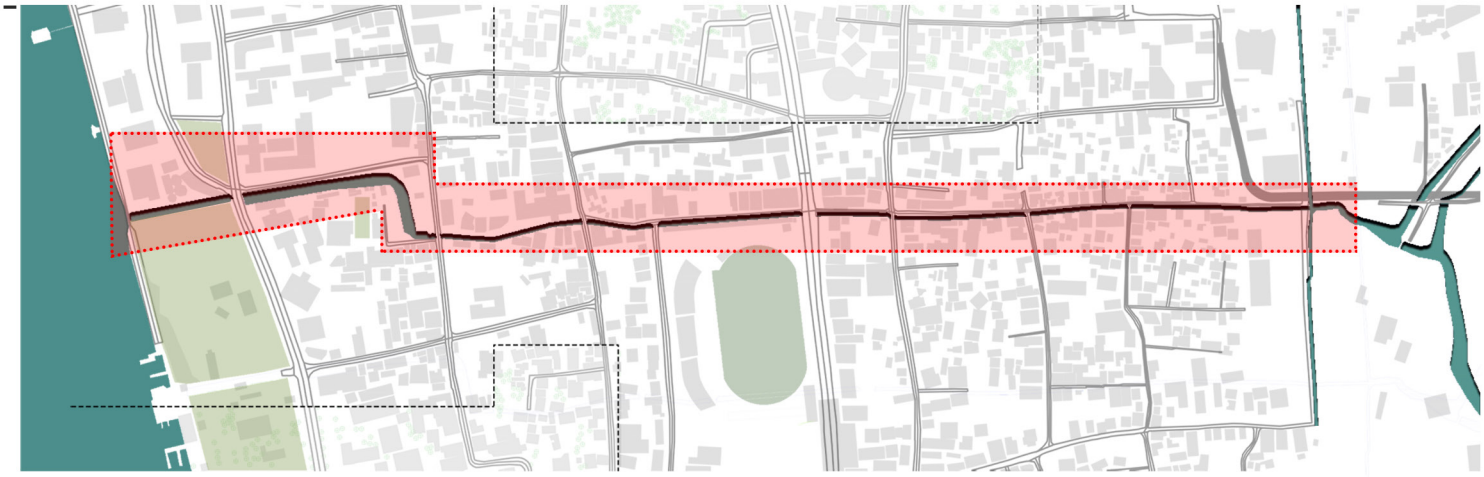


3. Widening the canal

Map 24: Map showing Design Phases - 1 [Source: drawing by the authors]

8.5 Design Phase 2

PHASE 2- REVITALIZING AND CONNECTING THE OPEN SPACES



1. Canal with Widened edges

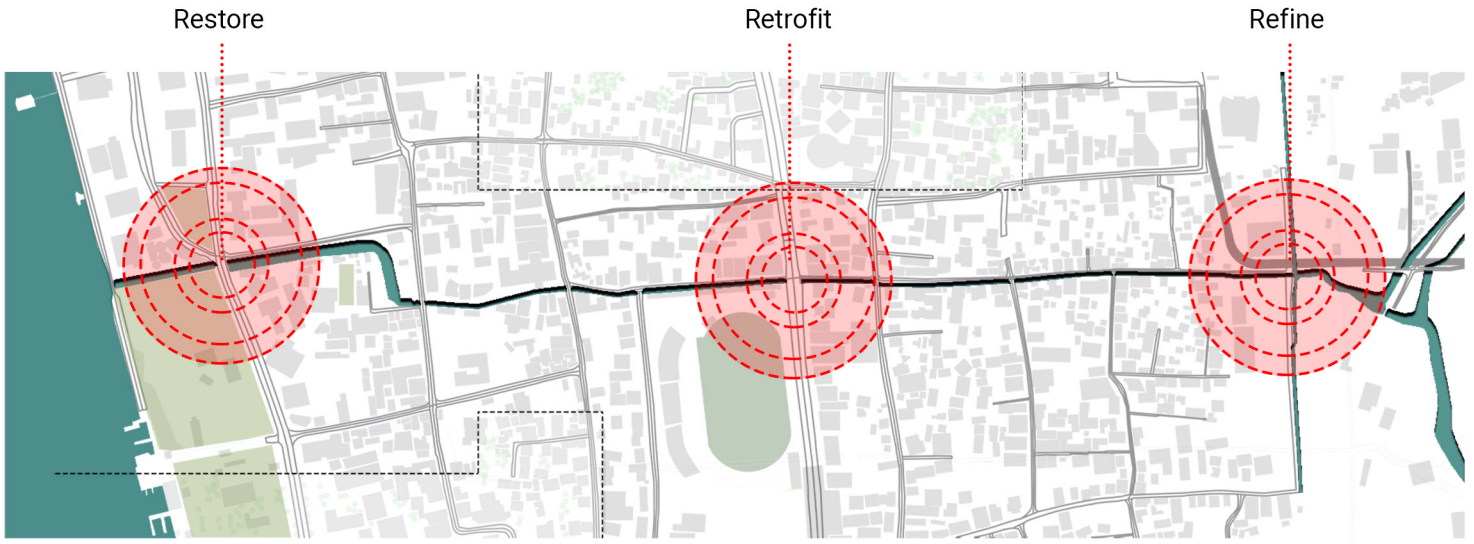
2. Finding Pocket spaces for Community Gardens and Parks

3. Integrating Public Spaces

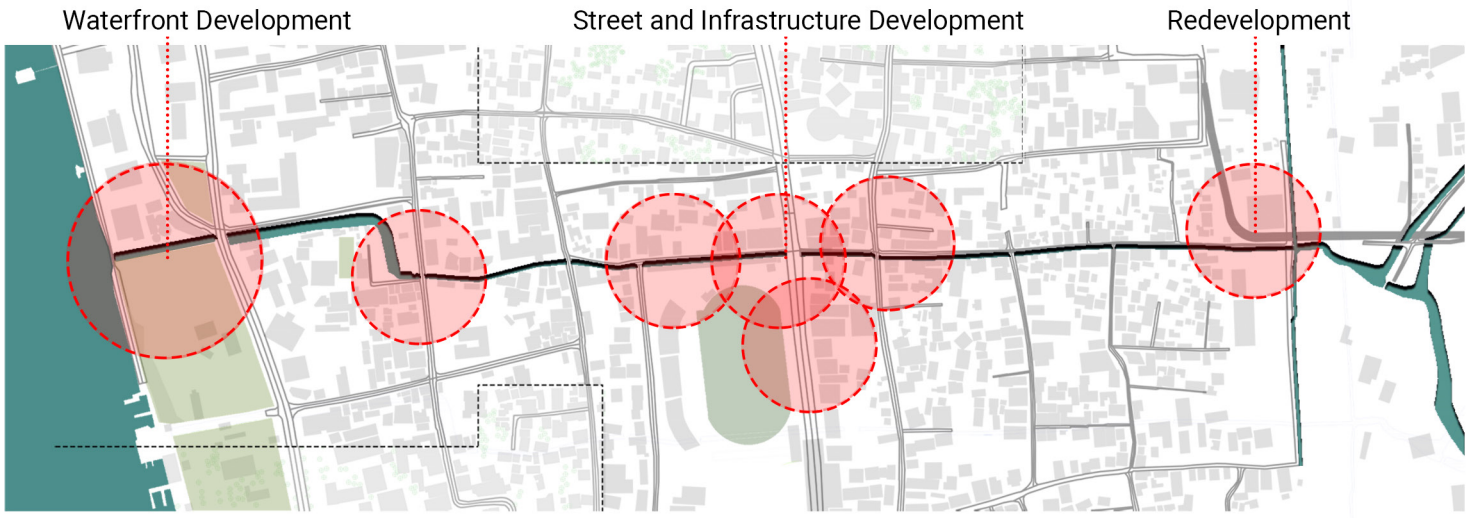
Map 25: Map showing Design Phases - 2 [Source: drawing by the authors]

8.6 Design Phase 3

PHASE 3 - ECONOMIC AND CULTURAL DEVELOPMENT



1. Identifying Opportunities and its Challenges



2. Design Concept and Zoning

3. Design Implementation

Map 26: Map showing Design Phases - 3 [Source: drawing by the authors]

8.7 Master Plan

Map 27: Proposed Master Plan [Source: drawing by the authors]

AXONOMETRIC SITE VIEW 1

Figure 65: Axonometric Site view 1 [Source: By the Authors]

AXONOMETRIC SITE VIEW 2

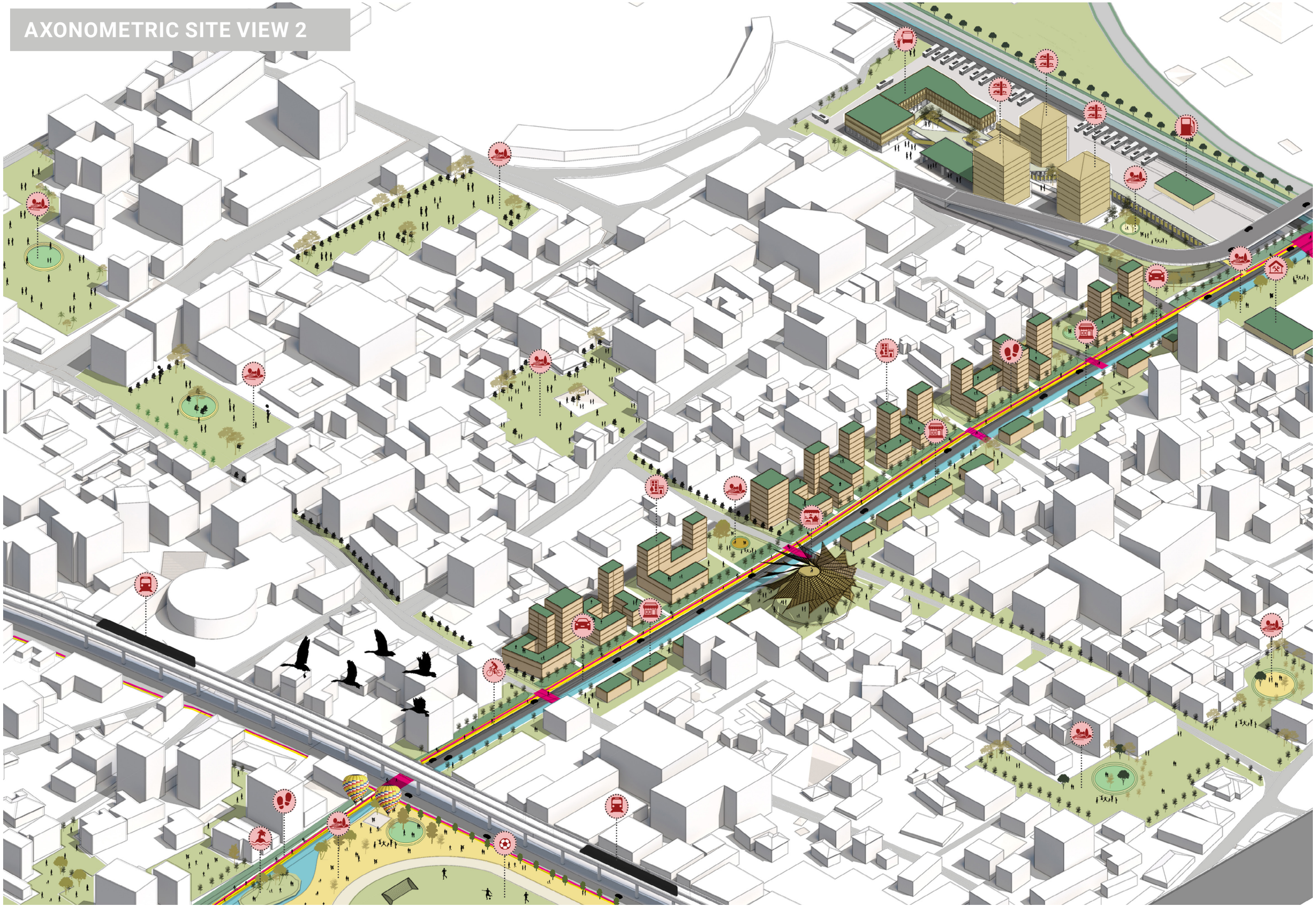


Figure 66: Axonometric Site view 2 [Source: By the Authors]

SCENE RENDER 1 - MARINE DRIVE

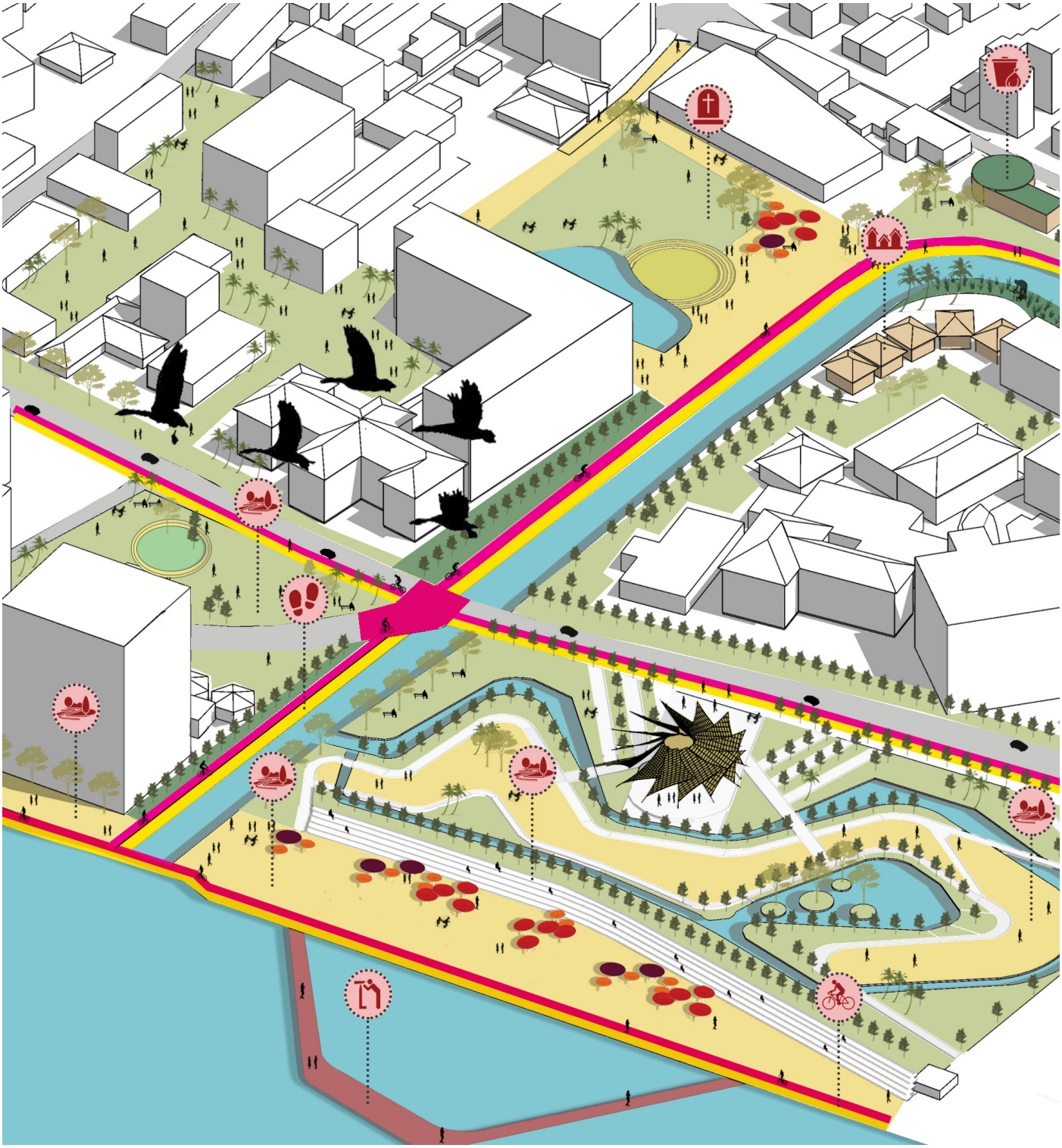
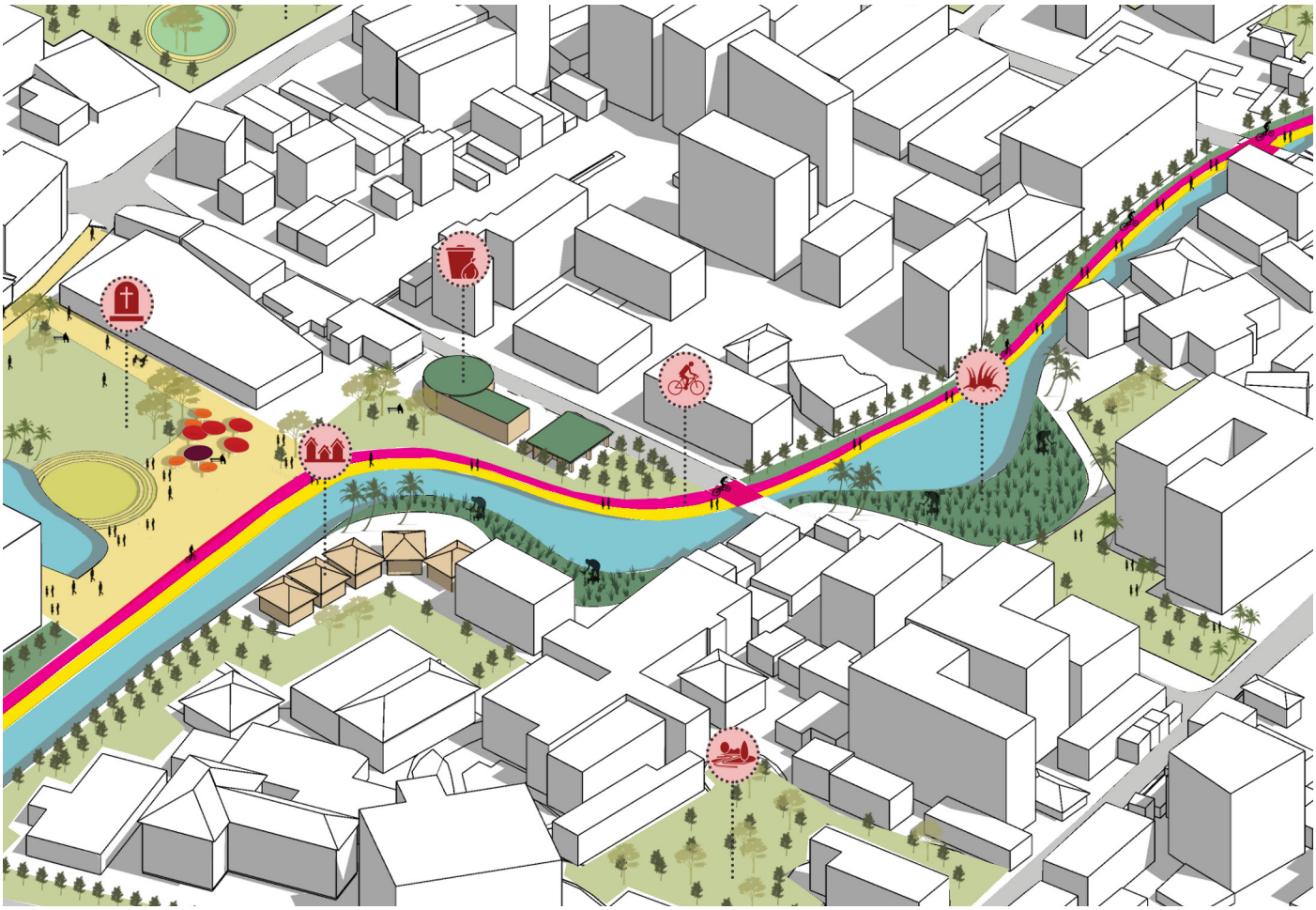


Figure 67 : Scene Render 1 [Source: By the Authors]

SCENE RENDER 2 - COMMUNITY DEVELOPMENT & FARMING



SCENE RENDER 3 - ACTIVE PUBLIC PIAZZA & ISLAND PARK

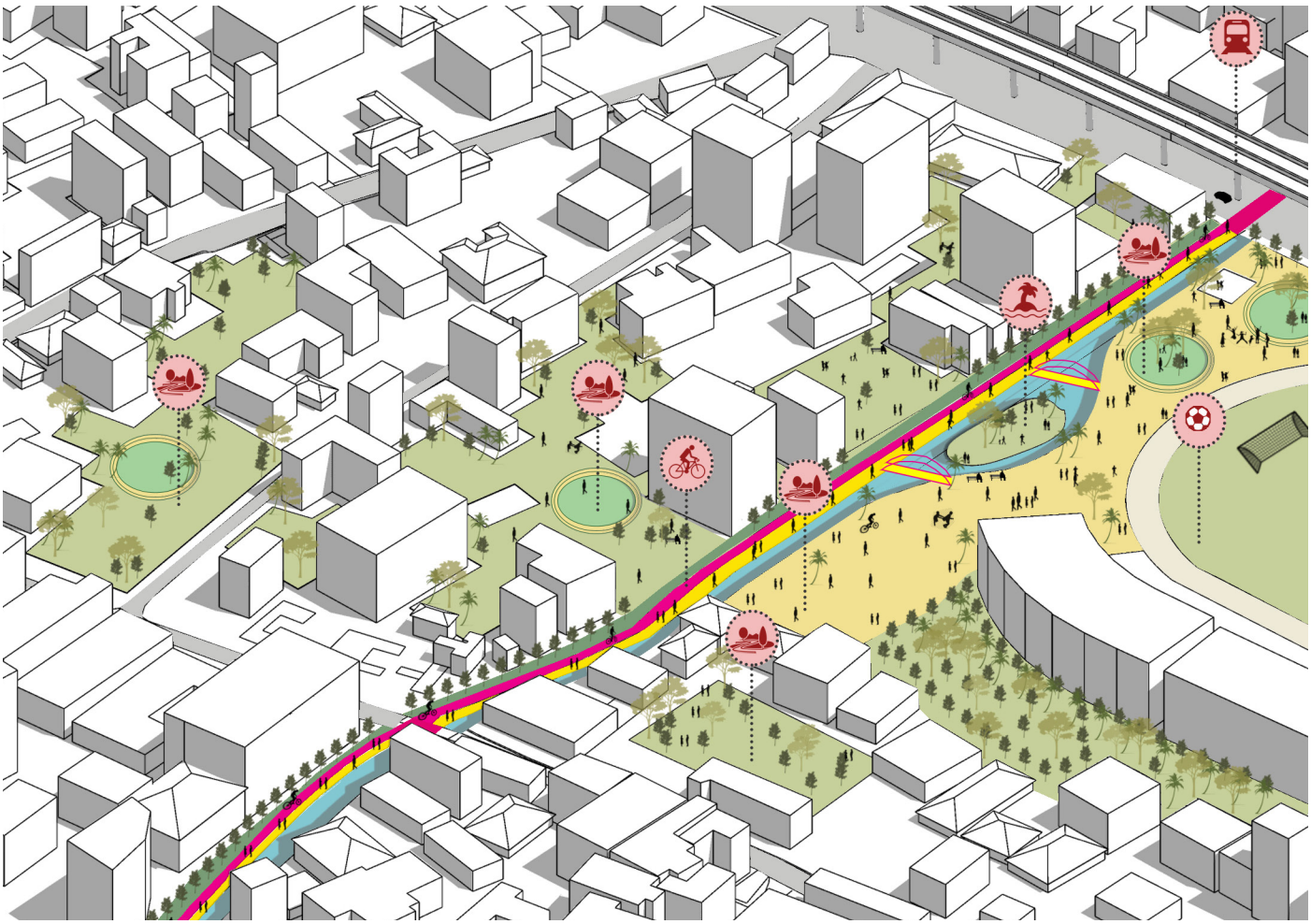


Figure 68 : Scene Render 2 and 3 [Source: By the Authors]

SCENE RENDER 4 - PROPOSED MIXED-USE, COMMERCIAL & KSRTC BUILDING

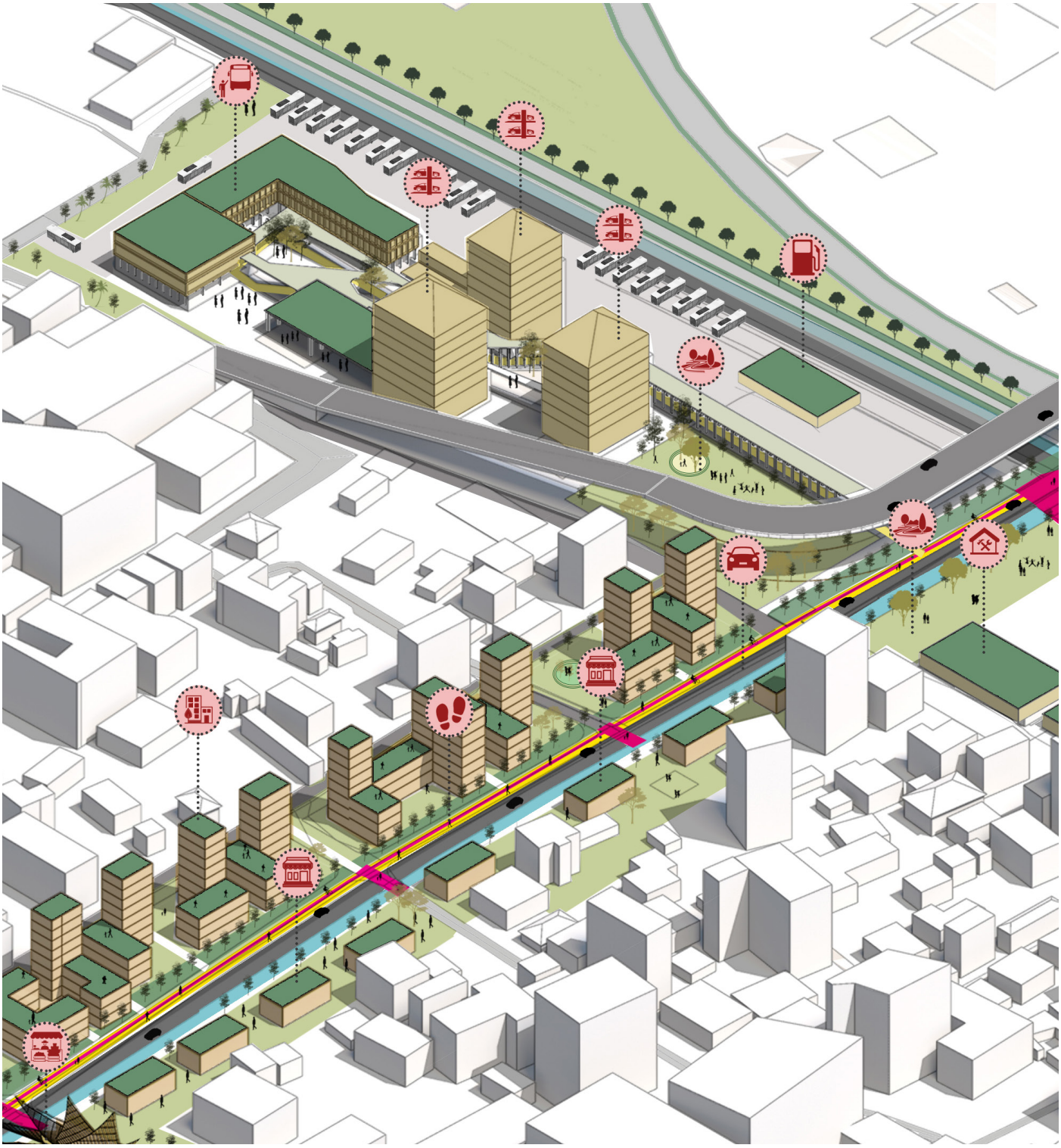
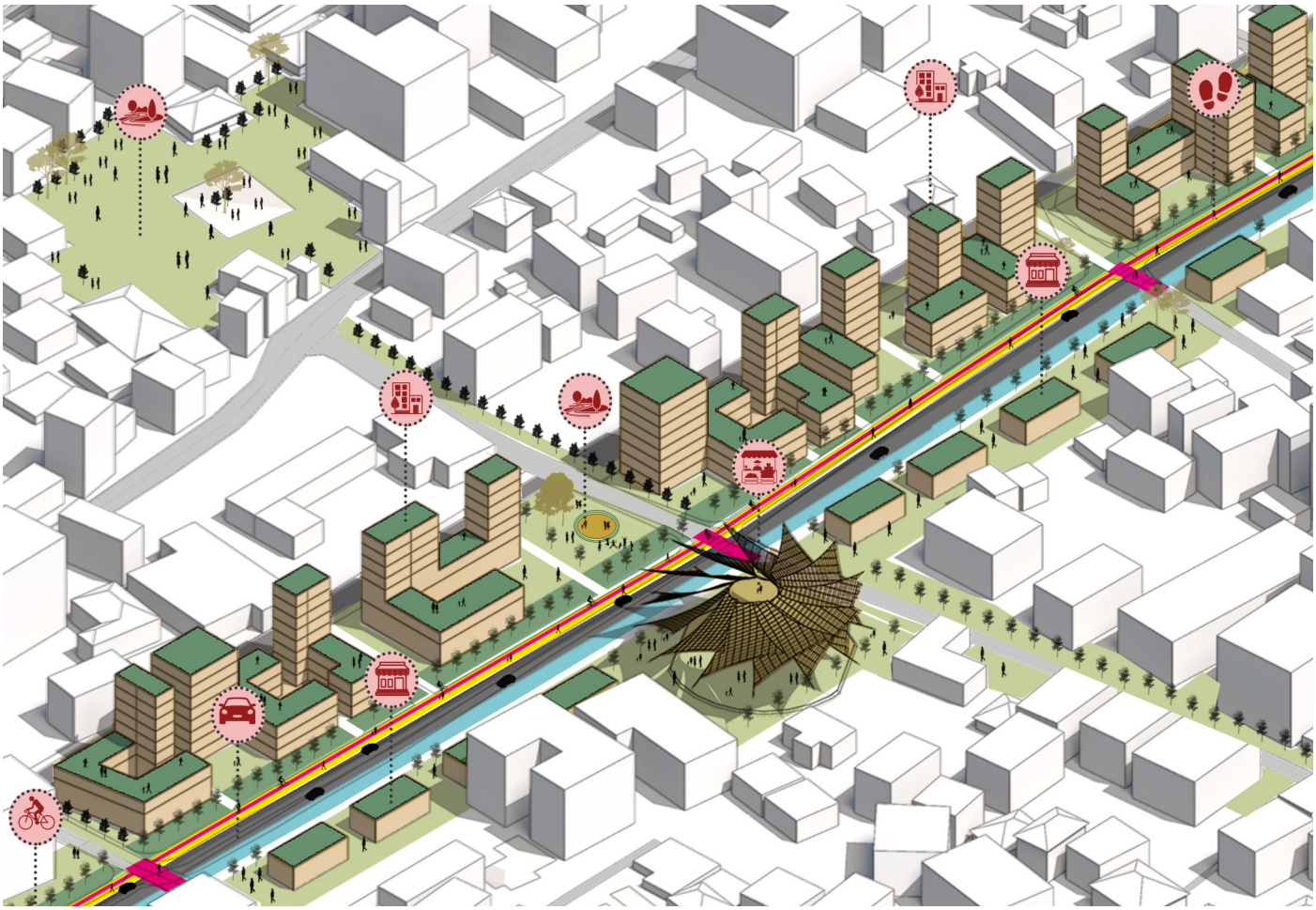


Figure 69 : Scene Render 4 [Source: By the Authors]

SCENE RENDER 5 - PROPOSED MIXED-USE, COMMERCIAL & OPEN MARKET



SCENE RENDER 6 - ACTIVE PUBLIC PIAZZA

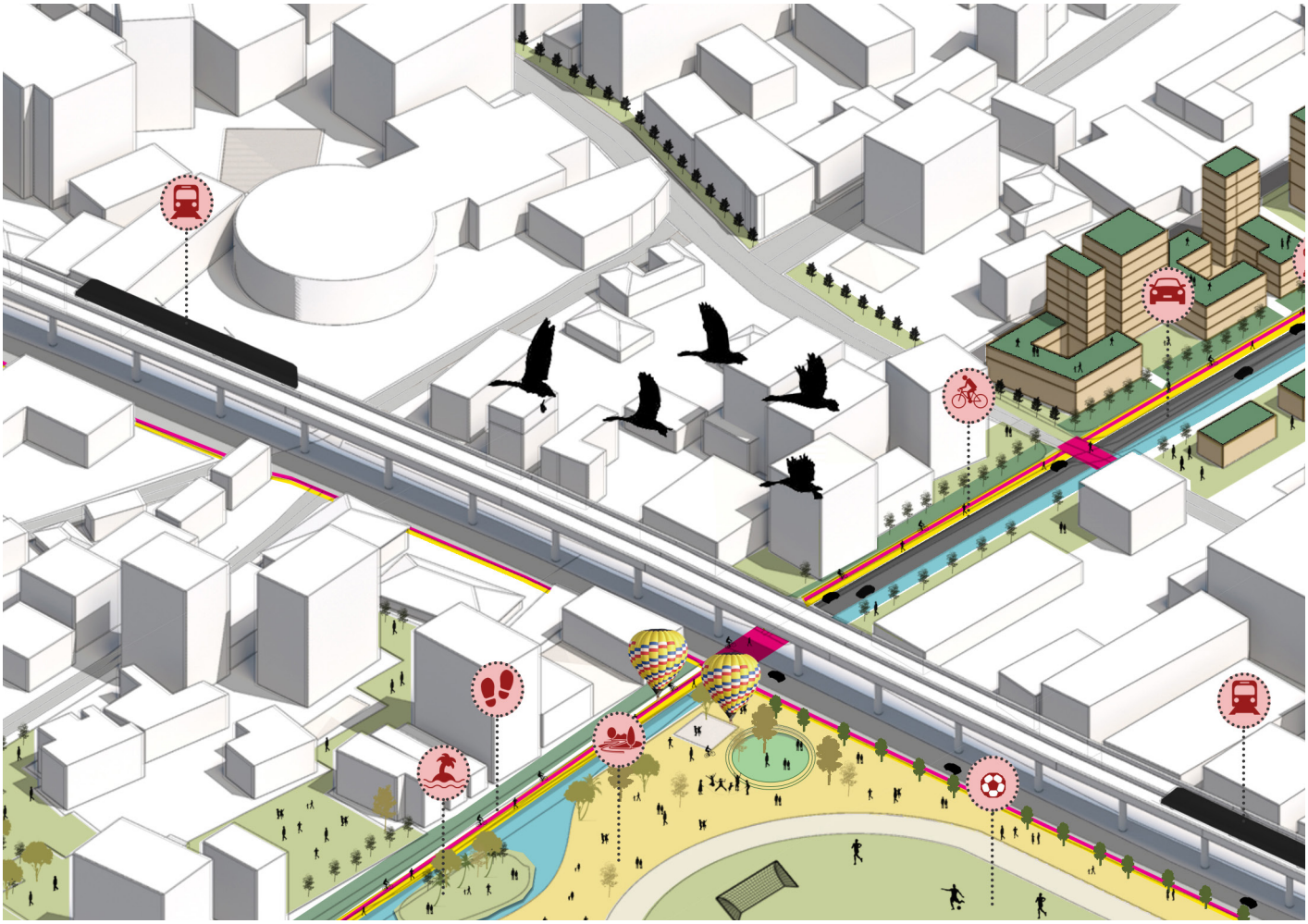


Figure 70 : Scene Render 5 and 6 [Source: By the Authors]

Proposed Mixed-Use Development

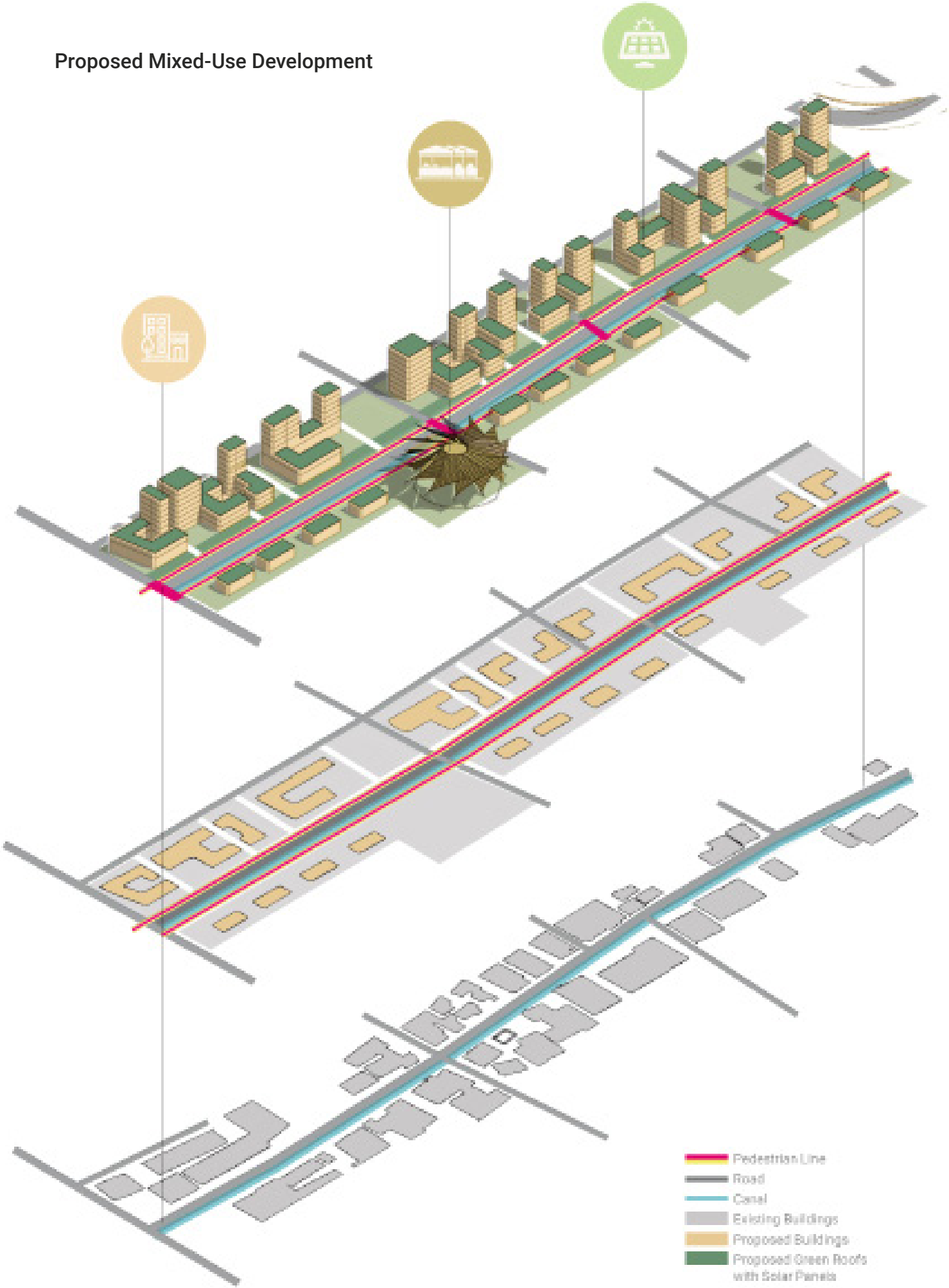
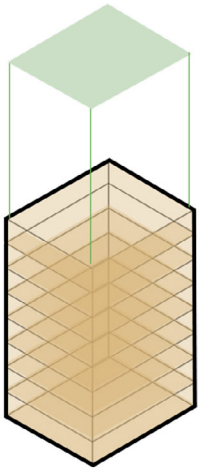
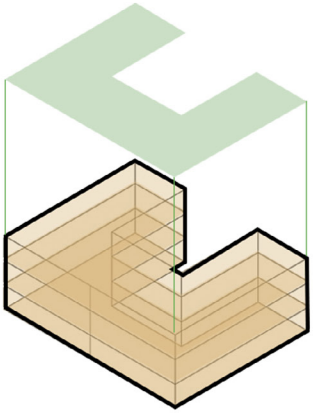


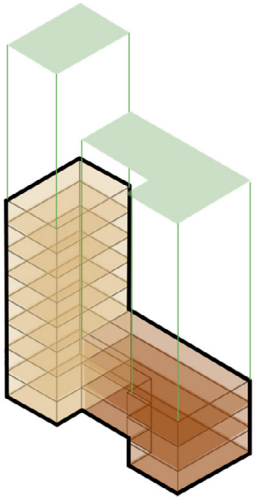
Figure 71 : Proposed Mixed-use development [Source: By the Authors]



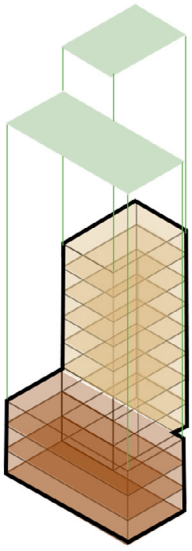
First, the mixed-use concept is exhibited at the block level, where one kind is combined with parking and office spaces on the ground floor.



The second form, which is typically found in store houses, can be created by separating the uses of the ground floor, higher levels, and roof.



The third one combines ground-floor commercial establishments and upper-floor office buildings with leisure spaces and cafes that open to green terraces.



With mixed use of shops, residences, and towers with commercial activity, this type is similar to the second and third.

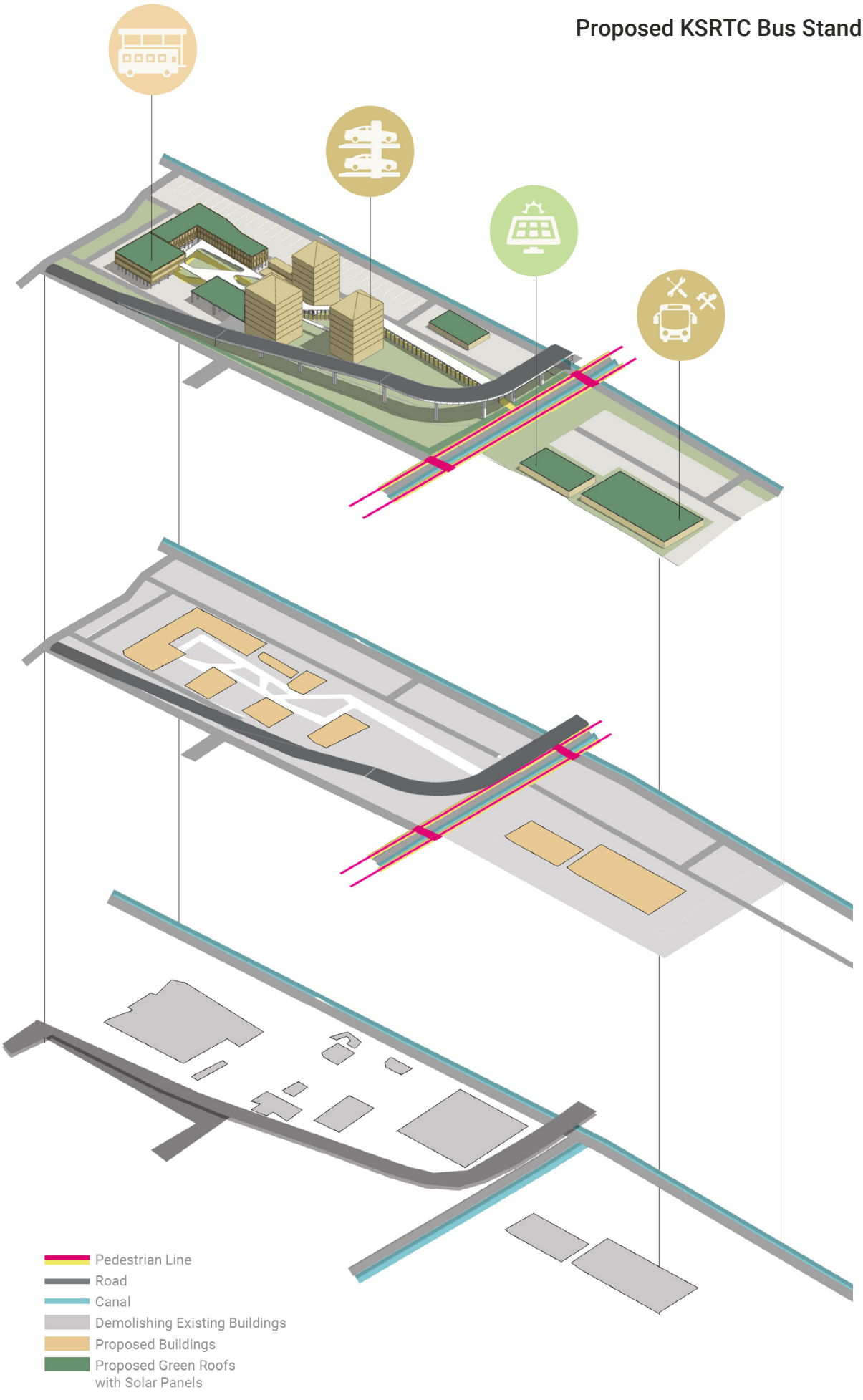
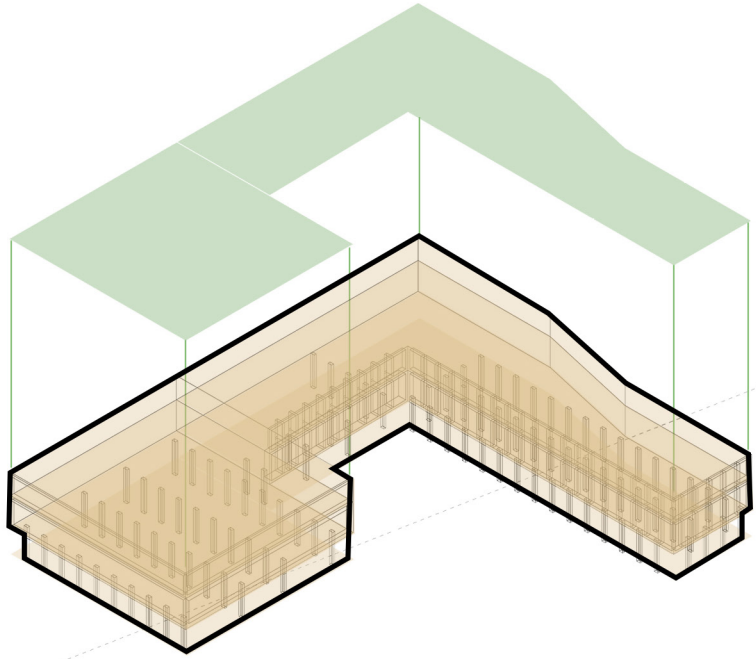
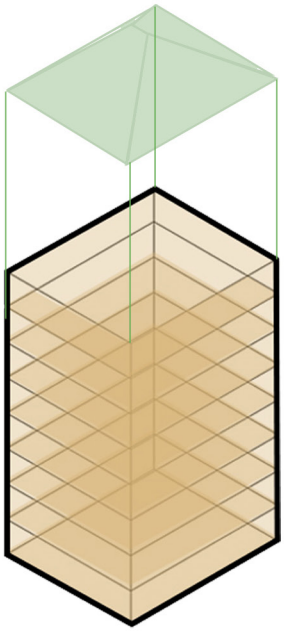


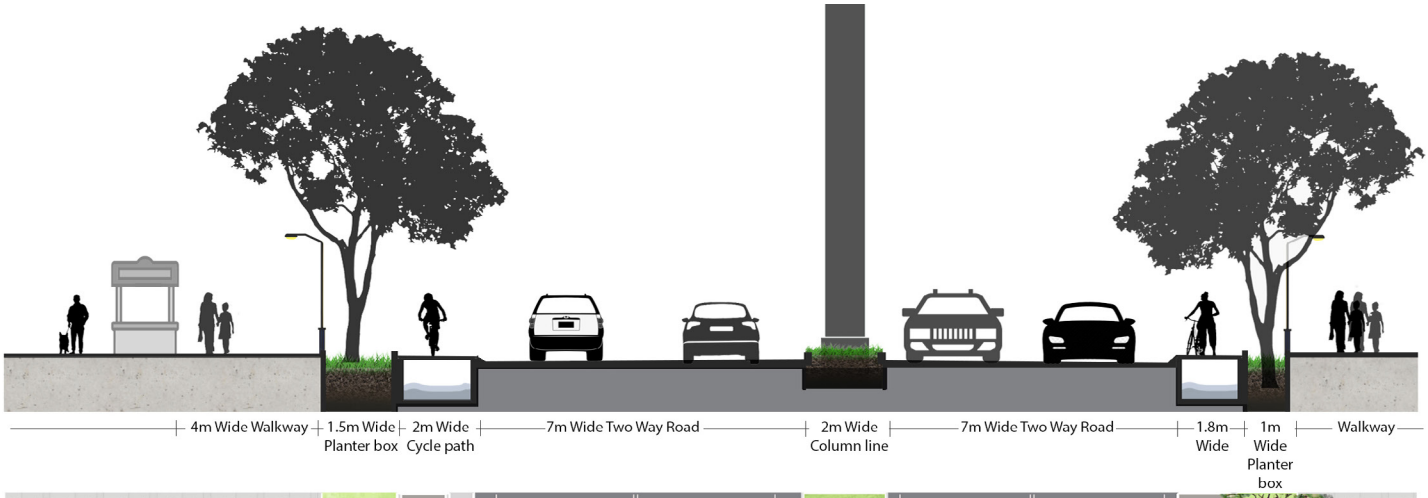
Figure 72 : Proposed KSRTC Building [Source: By the Authors]

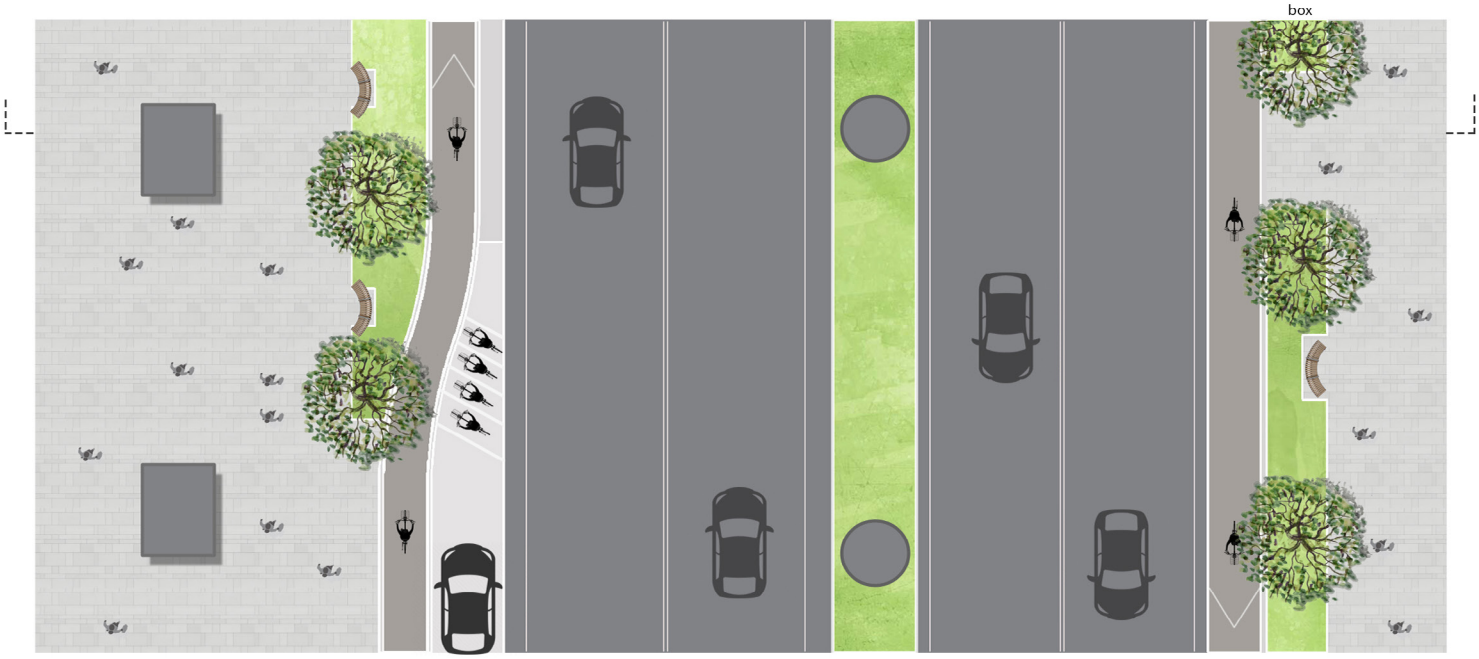


Renovating KSRTC Bus Stand with stilt bus parking and administration office building on other levels introducing green roof with solar panels.

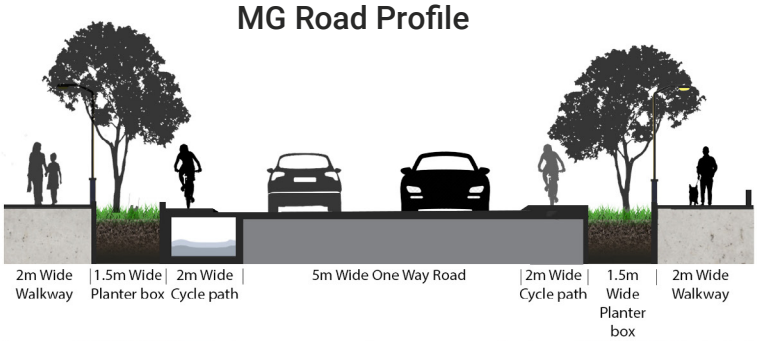


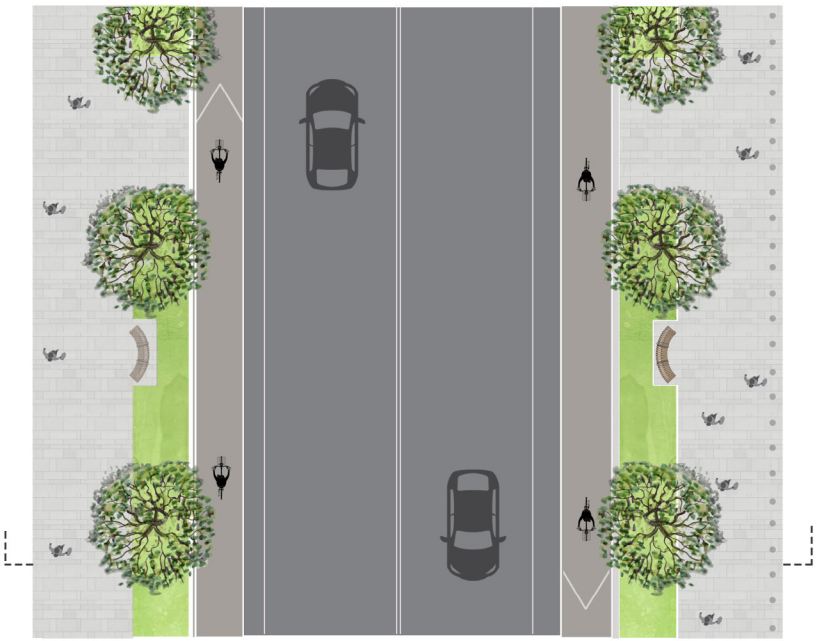
Proposing vertcal public parking structures next to the KSRTC stand to support the neighbourhood and moving people.





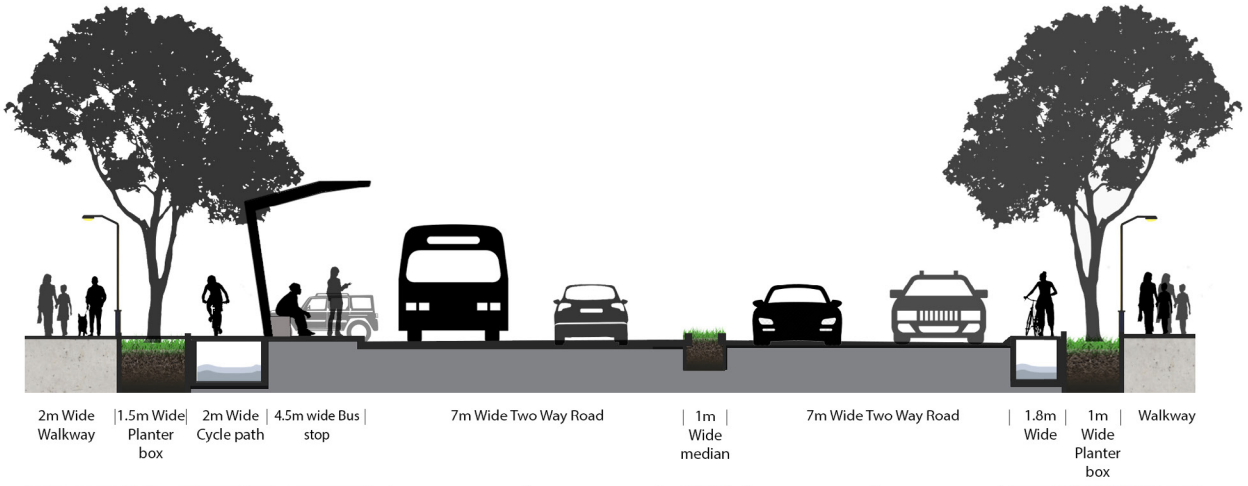
MG Road Profile

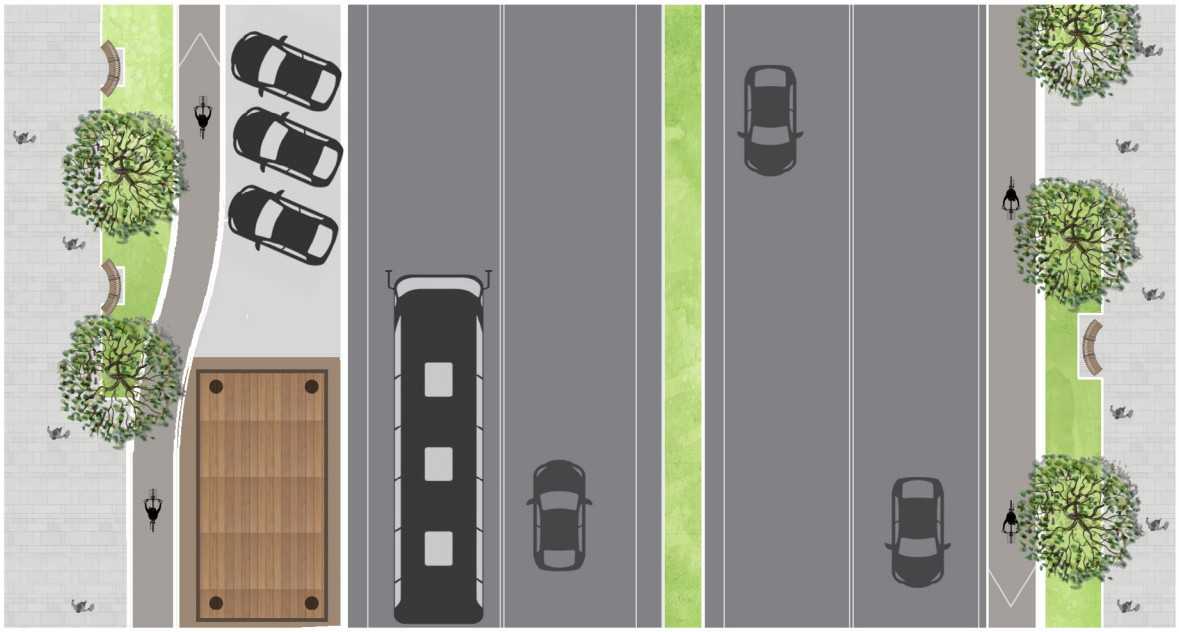




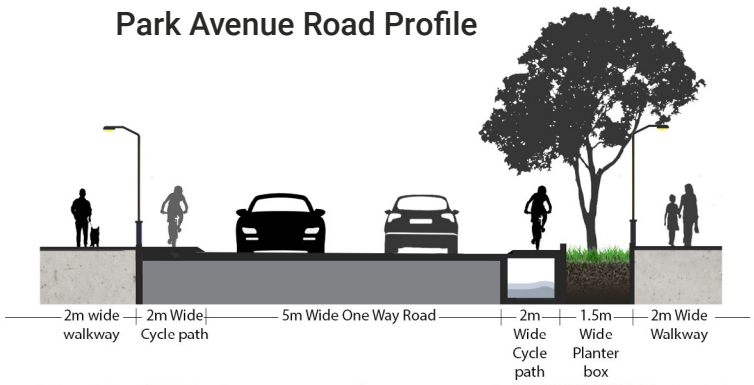
Mullaserry Canal Road Profile

0 20 50 150





Park Avenue Road Profile



Market Road Profile

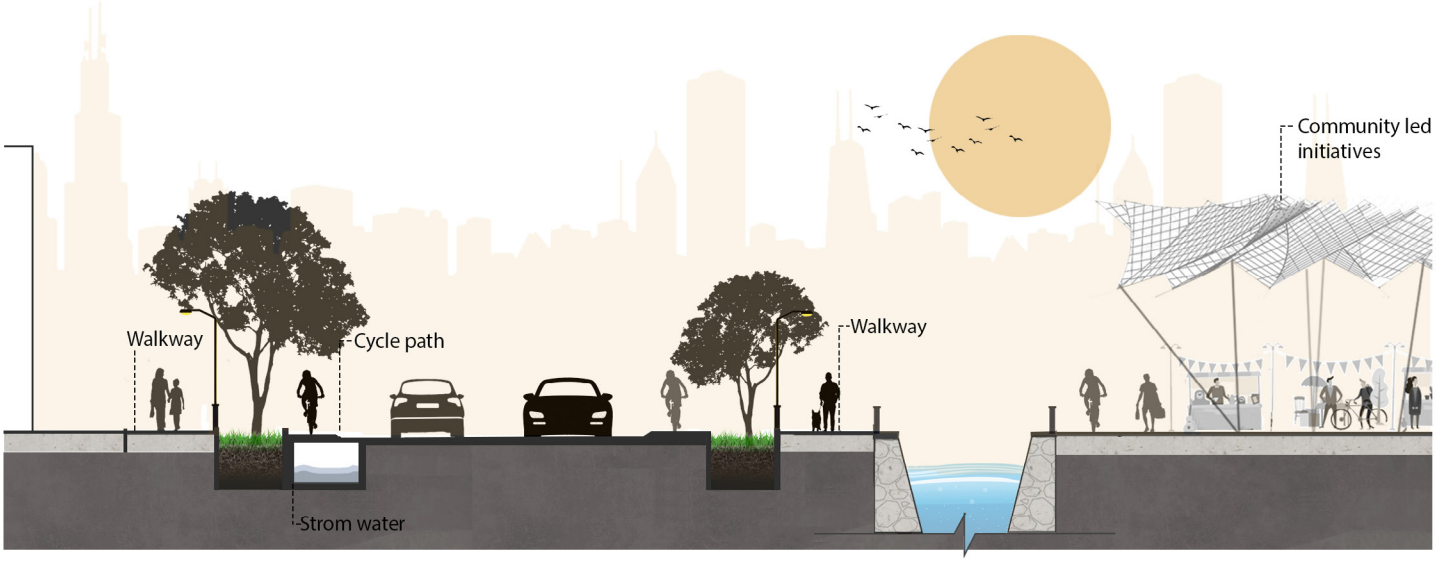
0 20 50 150

Key Plan

0 20 50 150

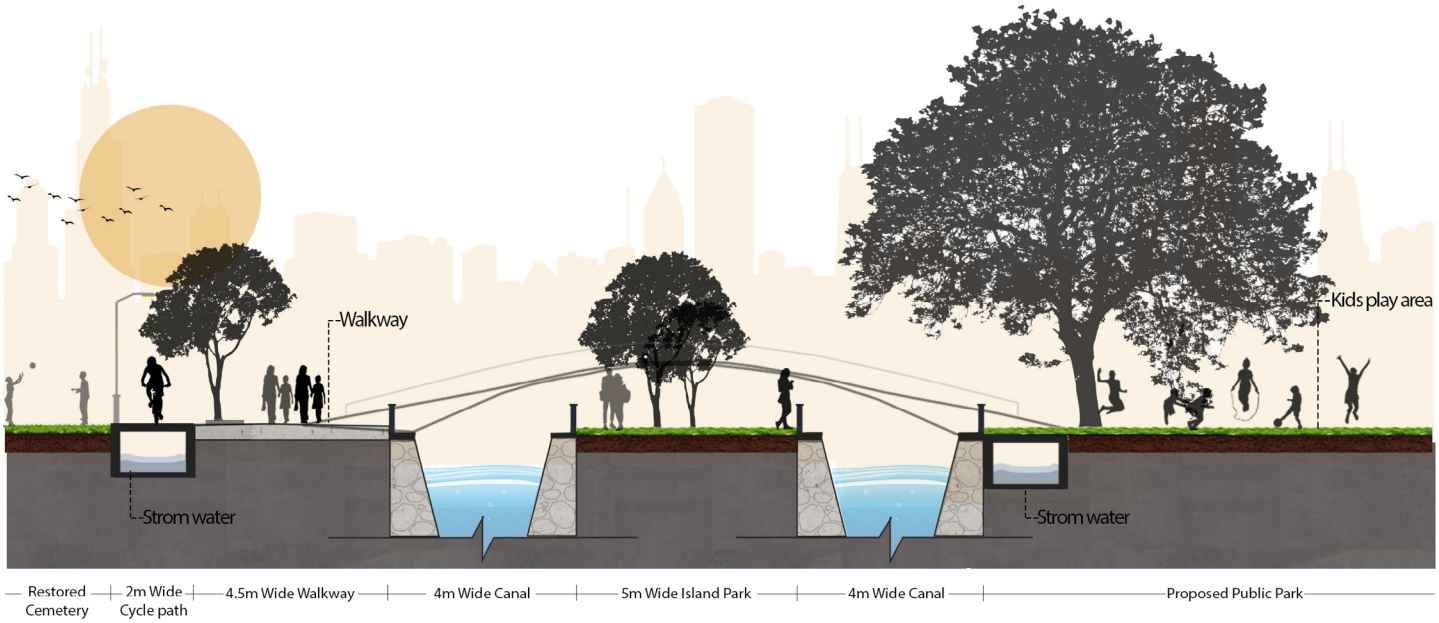
4m Wide Walkway | 1.5m Wide Planter box | 2m Wide Cycle path | 7m Wide Two Way Road | 2m Wide Column line | 7m Wide Two Way Road | 1.8m Wide | 1m Wide Planter box | Walkway

Section A

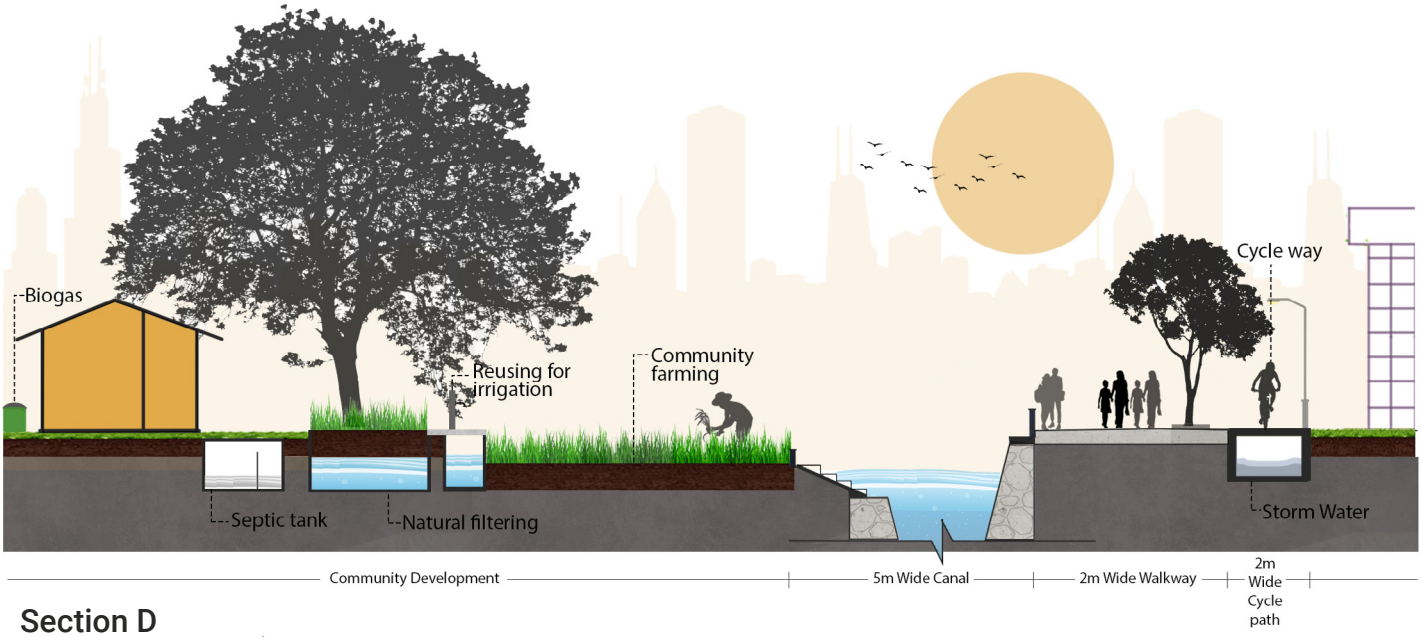


Mixed-use buliding | 2m Wide Walkway | 1.5m Wide Planter box | 2m Wide Cycle path | 5m Wide One Way Road | 1.5m Wide Planter box | 2m Wide Walkway | 5m Wide Canal | Open Market

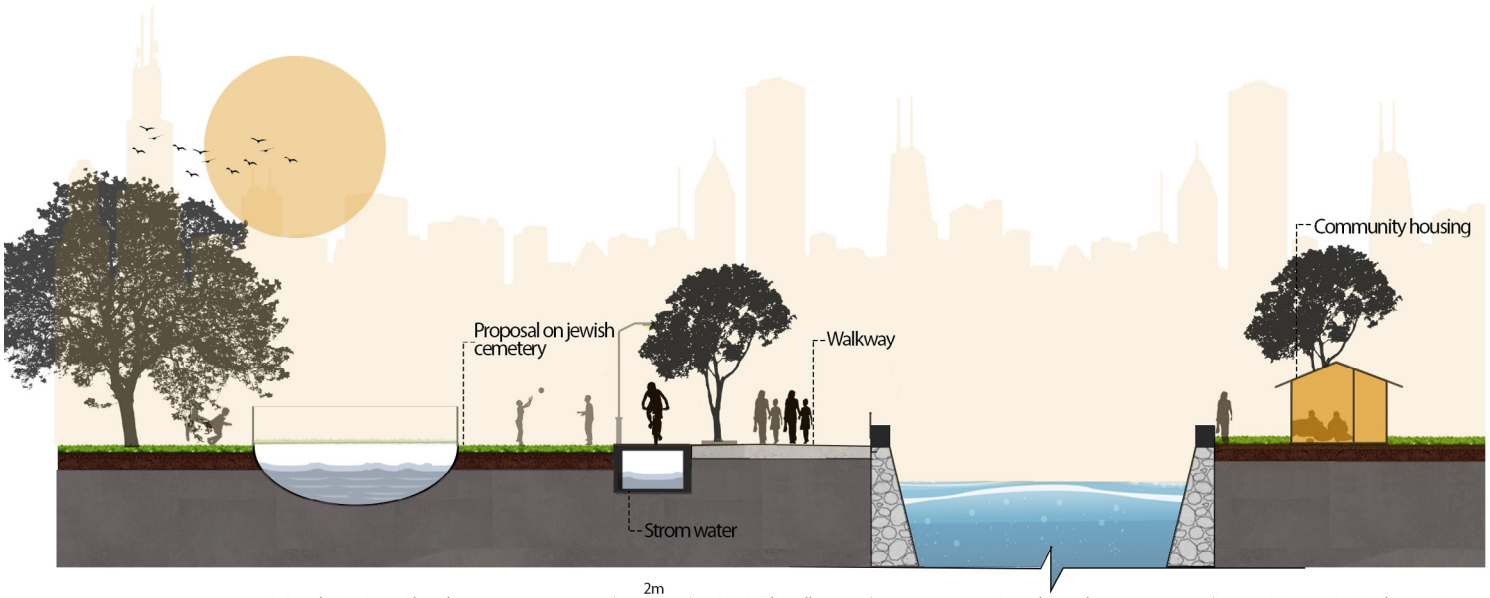
Section B



Section C



Section D

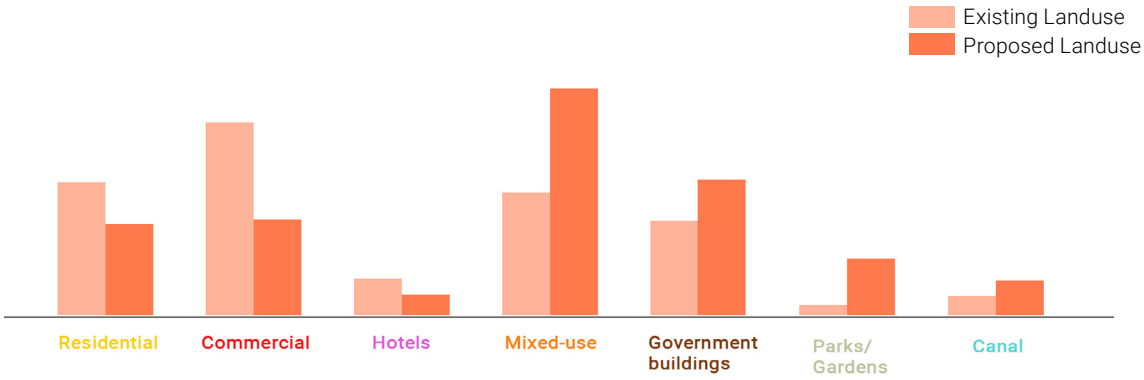


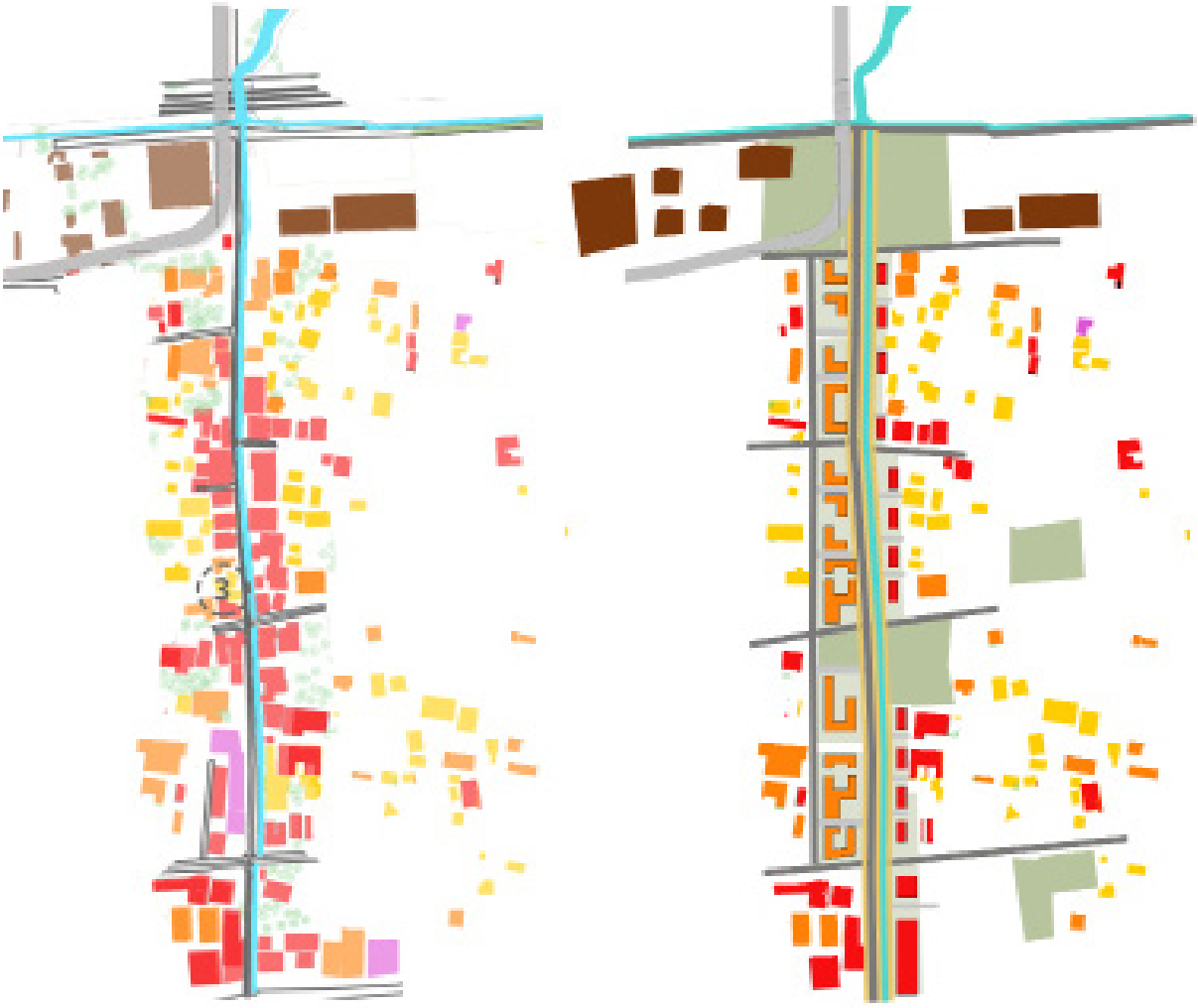
Section E

0 20 50 150

9 DESIGN EVALUATION

9.1 Landuse Comparison





Existing Landuse

Proposed Landuse

The existing structures are more clustered, but the proposed design will mix the uses for each block. The biggest changes in terms of quantity of land use are the extension of the road reserve land use to become pedestrian friendly routes. Roads that are hospitable to pedestrians are retained in line with the general concept.

Map 28: Existing Landuse Comparison(Left) Map 29: Proposed Landuse Comparison(Right)
Chart 10: Landuse Comparison [Source: By Authors-Datas from QGIS]

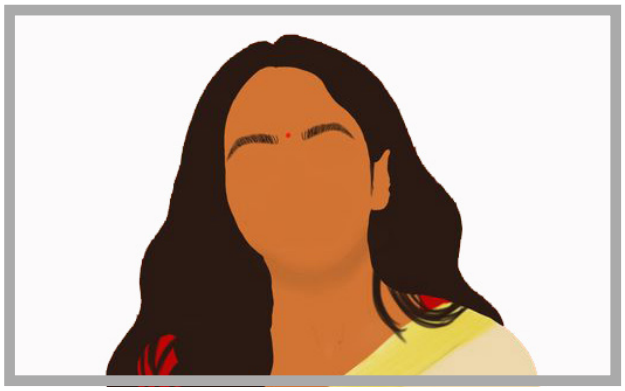
9.2 People

Persona 1

Occupation : Student
Condition : St. Teresa's College
Need : Recreational Space
More hangout places
Walking friendly streets
Safe roads especially during night time.

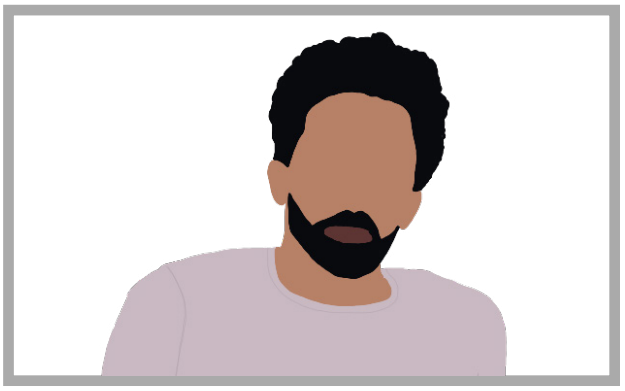
Persona 2

Occupation : Office Worker
Condition : Neighbourhood IT Company
Need : Maintainence of public parks Better and active atmosphere with green spaces for daily walk
Walkers friendly and safe streets



Persona 3

Occupation : Housewife
Condition : Resident
Need : Low-cost housing
Income Opportunities
Affordable everyday need nearby, Recreation places for a evening walk and during weekends.



Persona 4

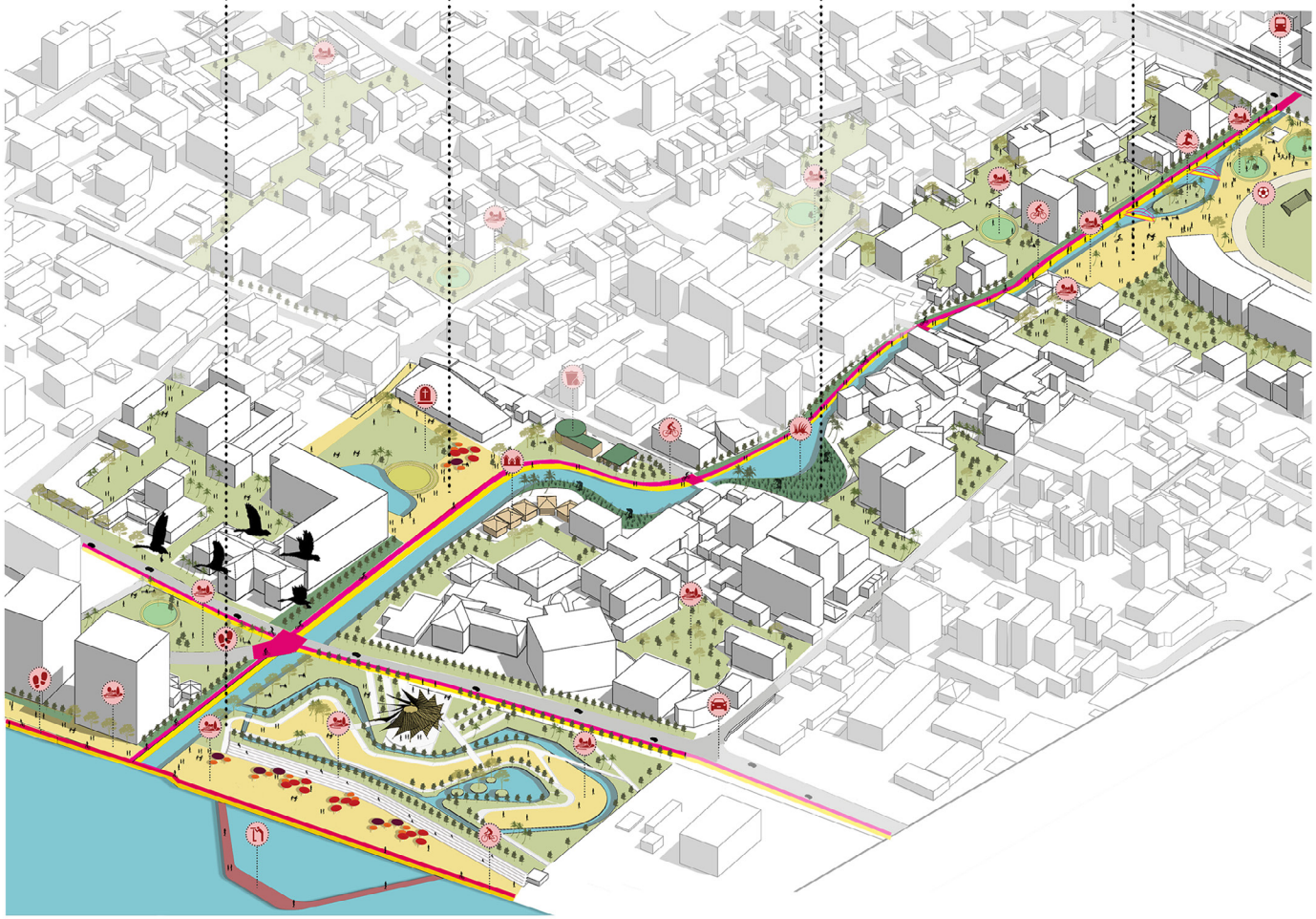
Occupation : Business
Condition : Neighbourhood Resident
Need : Hangout places for daily visit
Safe and easy access to the parks and gardens
Walking friendly streets
Affordable day-day needs

Business Man

Office Worker

Student

Housewife



9.3 Masterplanning Process

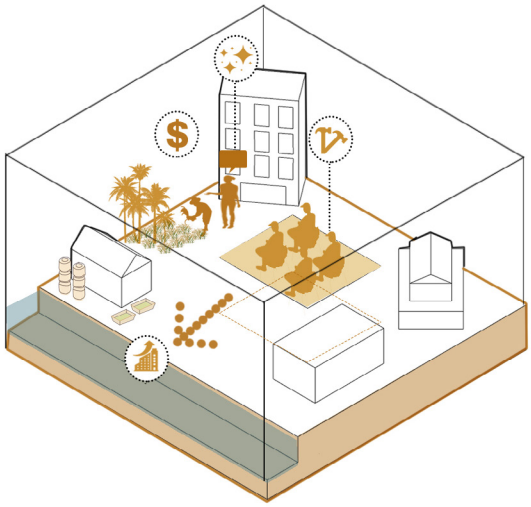
Carmona's Place-shaping Continuum

The masterplanning procedures, which encompass design, development, administration, and space in use, are the ultimate stage of the design evaluation. As previously stated, one of the goals of this project is to build design in process and process in design, as defined by Carmona (2016). Based on the proposed design, a set of design governance is proposed.

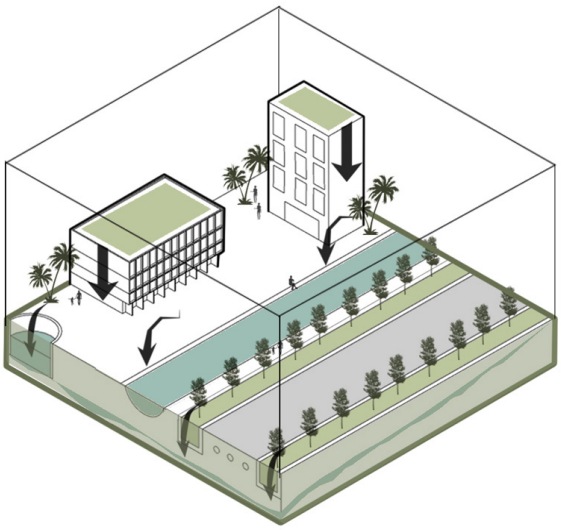
Design Process

The proposed design governance for the design process is mainly concerned with the overall design approach, i.e. the analysis-observation-concepts. The analysis in this case is a mobility analysis of street accessibility. The statement relates to the Gehl Institute's approach to understanding public life, which was used in this study to better understand Kochi's public life. Finally, there's the Uplift+Regenerate+Collaborate notion. The design might be objective, interactive, or subjective using these three techniques.

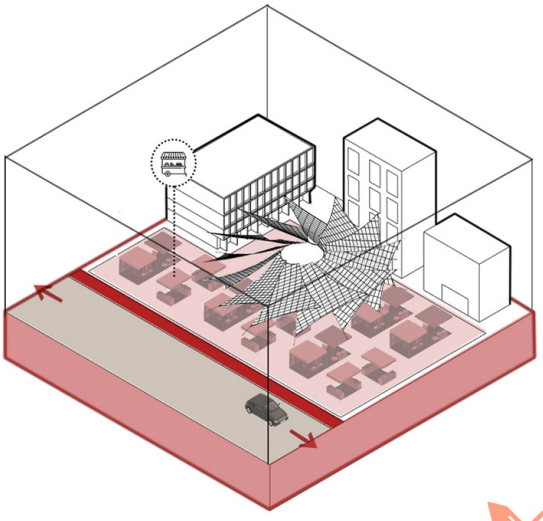
UPLIFT



REGENERATE



COLLABORATE



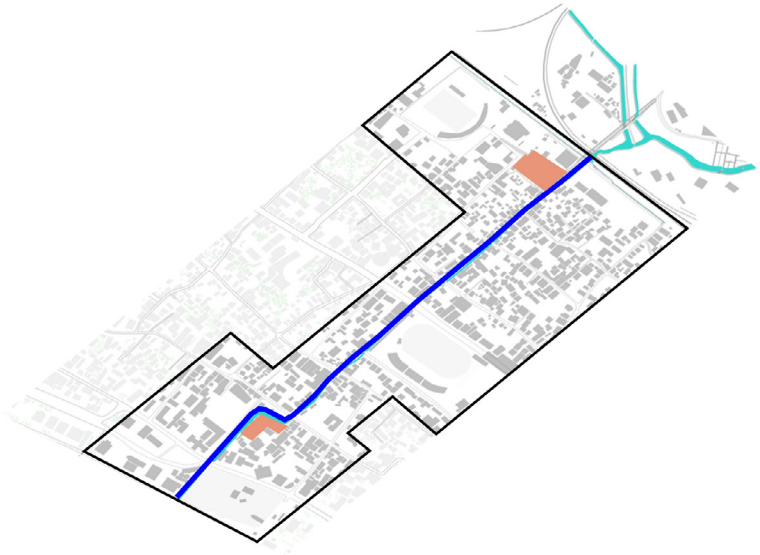
Development Process

In compared to the design process, the suggested design governance is quite practical for the development process. The goal is to suggest and make explicit the most important design decision for stakeholders to consider during the development process. Connection to sustainable accessibility, Canal regeneration, and community development are the three design decisions.

To begin, ensuring long-term accessibility or connectivity in the site and area, as well as its surrounding neighborhoods, is a critical step in ensuring the CBD's vitality. The projected connection increased the likelihood of people using the main roads lining the canal's western and eastern sides, boosting the area's vibrancy.

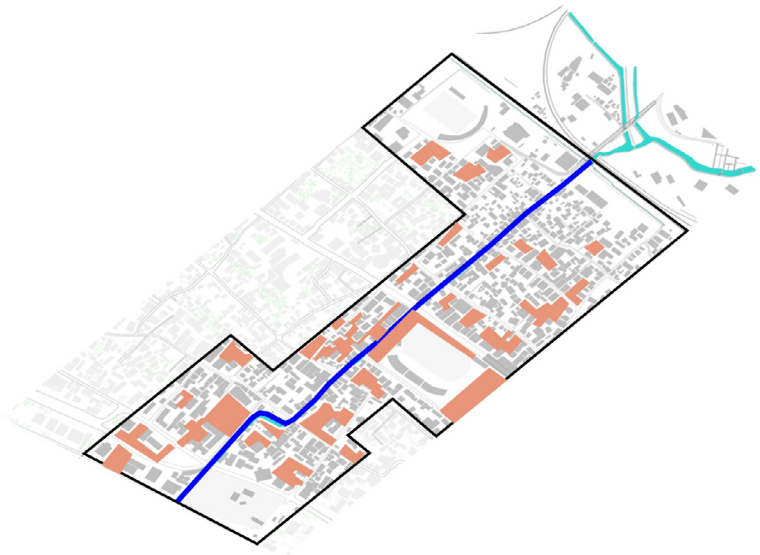
Second, by widening, cleaning, and creating the canal's own environment for the existence of an East-West connection within the city center, the canal's connectivity to other city centers was greatly improved. The liveliness of the area can be maximized by having these linear roads close to the canal as the core and meeting the city center.

Third, the residents of Mullassery Canal are in desperate need of social and community development. Given the natural aspects of canals and green spaces, as well as the heavily traveled road crossing, a considerably more diverse social composition is required.



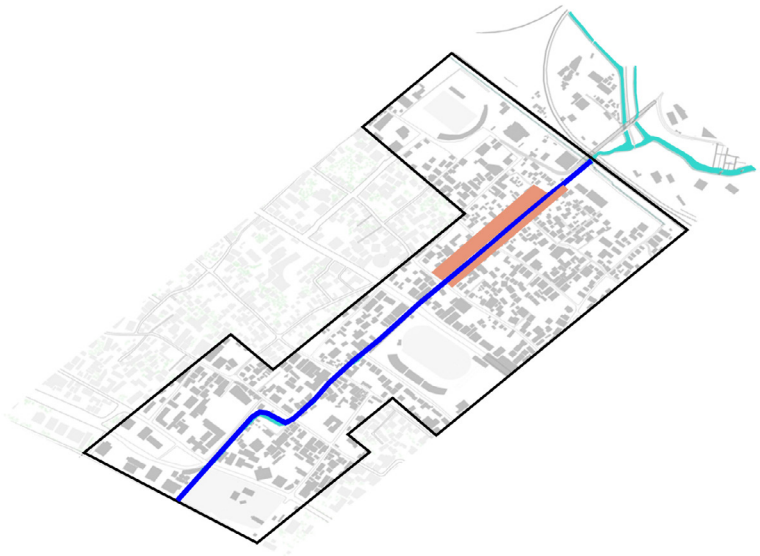
Urban Vitality Place People	Concept Community Development Existing Low-income Settlement
Design	
Development	
Management	
Space in Use	

Design 1 - Community Development



Urban Vitality Place People	Concept Mullassery Canal & Surroundings Mullassery canal road settlements
Design	
Development	
Management	
Space in Use	

Design 2 - Open and Public spaces



Urban Vitality Place People	Concept Mullassery Canal Road Low-income Settlements
Design	
Development	
Management	
Space in Use	

Design 3 - Mixed-use & Commercial Buildings

Map 30: Development Process

Chart 11: Development Process [Source: By Authors]

Management Process

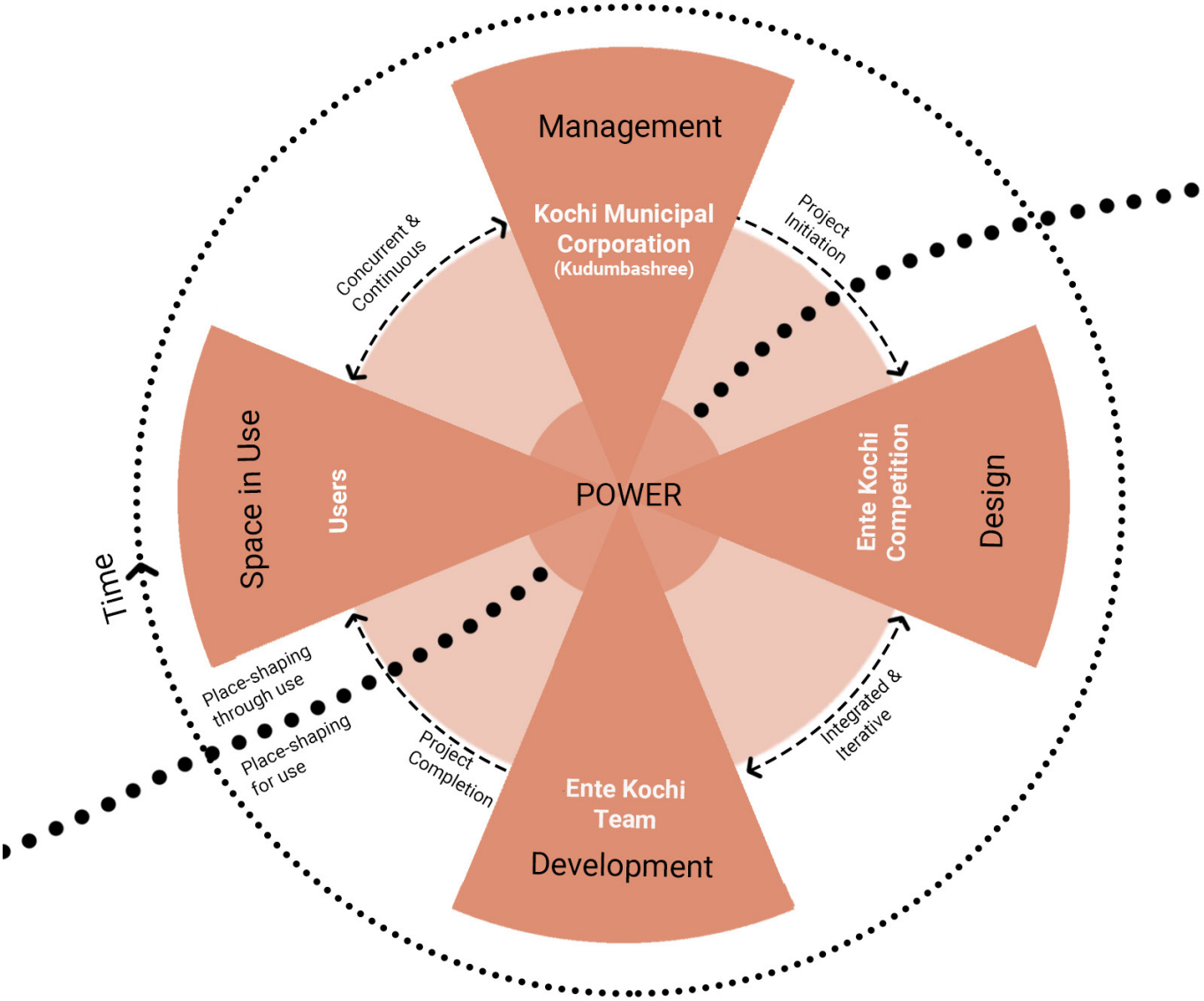
The design governance is related to the functioning of the location, such as public uses, private events, and informality, in the management process. The first is related to a series of planned public areas and public usage in the marine drive region. The functionality of these venues, particularly in respect to their openness (available to whom, when, and where) and privacy (degree of publicness), is critical to their vitality.

The second is related to private events that are expected to be held in defined places, such as the mixed-use concept. The third proposal is for a commercial building with an open market in between the commercial structures, creating a pocket space. While no specific program is planned for the space, the operator/manager of the location is encouraged to propose appropriate events, such as a night market, festival, or small concert.

Third, the network's activation is aided by a series of cultural and tourism trails that repair historic sites such as the Jewish Cemetery and connect them to projected public areas. Littering along the canal, in our opinion, is indicative of a lot of urban issues. Finally, the main purpose of the Community Driven Tool is to educate and engage all stakeholders, collaborate with them to generate community-driven solutions, and provide vital support in the form of money, facilitation, and capacity building.

Aside from design governance, a management scheme for the management process is proposed. This is particularly in line with the results of the stakeholder engagement during the site visit. The fundamental link concerns the distribution of power held by the EnteKochi team as a developer, as well as how management control is included into the design and development processes.

This relationship, in turn, allots the community stewardship (Kudumbashree), led by the manager function (Kochi Municipal Corporation), which is mostly in terms of maintenance, whereas the manager's position in the city center will be more complex. For example, in respect to the projected mixed-use development, where everything is being guided directly by the developer in the current phase, the manager should be in responsible for the future city center.


Management
Kochi Municipal Corporation
(Kudumbashree)
Concurrent & Continuous
Project Initiation
Space in Use
Users
POWER
Ente Kochi Competition
Design
Time
Place-shaping through use
Place-shaping for use
Project Completion
Integrated & Iterative
Ente Kochi Team
Development

Space in Use

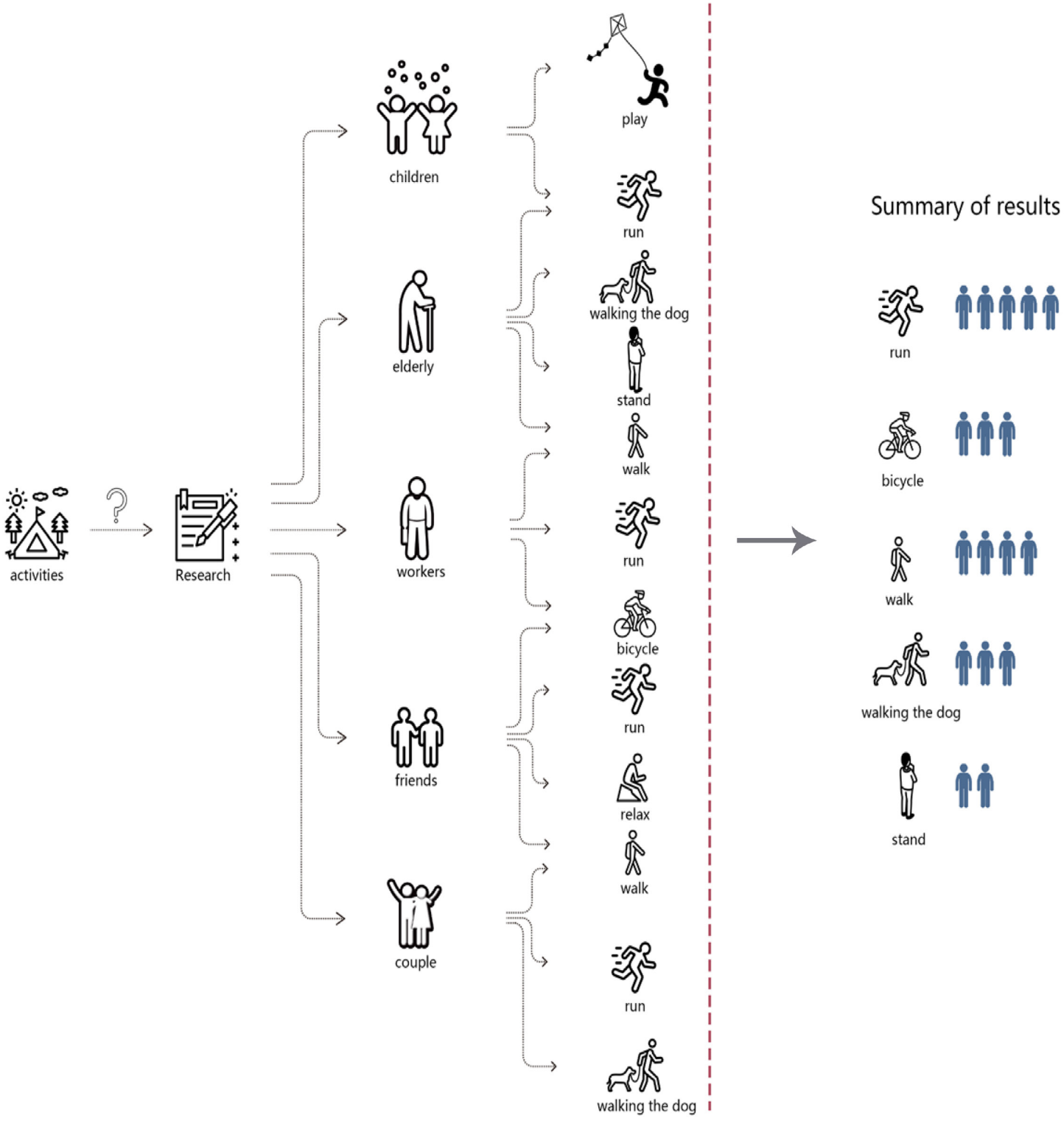
The design governance for the space in use process is primarily concerned with the lifestyle that future residents of Kochi city centre should expect, such as cycling focused transit, community development, mixed-use development, and new sustainable living.

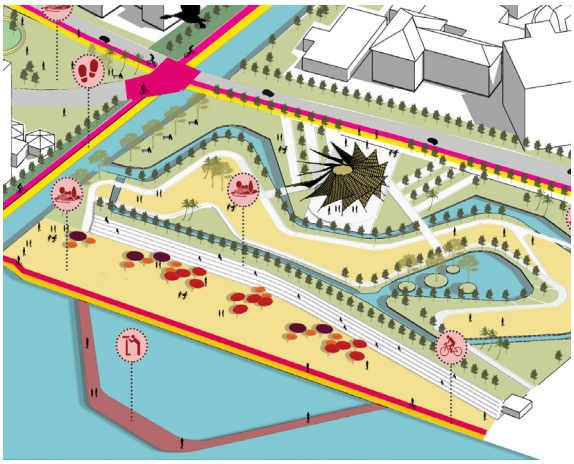
First, between the KSRTC bus stop, the Mahatma Gandhi Metro station, and the ferry connection to Fort Kochi, the canal's bank will be transformed into a continuous walking and biking trail. This one has to do with the bike infrastructure that has been included in the planned plan. This cycling culture is advocated not only for its positive effects on health and the environment, but also to highlight the process of adopting riding culture in the city. As a result, the objective is to resurrect this culture with the help of a well-designed bike and pedestrian infrastructure.

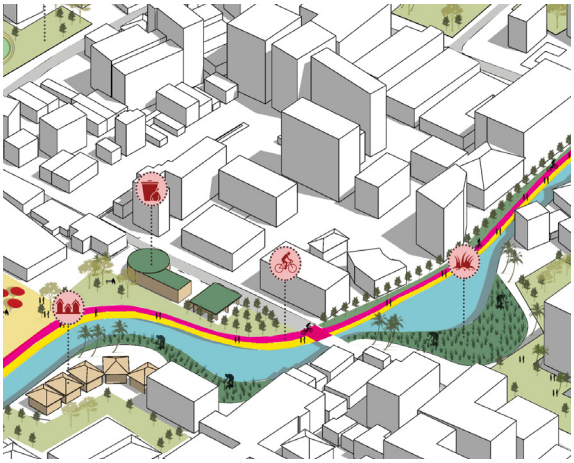
Second, community development is a community-driven instrument with the primary purpose of educating and involving all stakeholders, collaborating with them to produce community-driven solutions, and providing vital financial, facilitation, and capacity-building help.

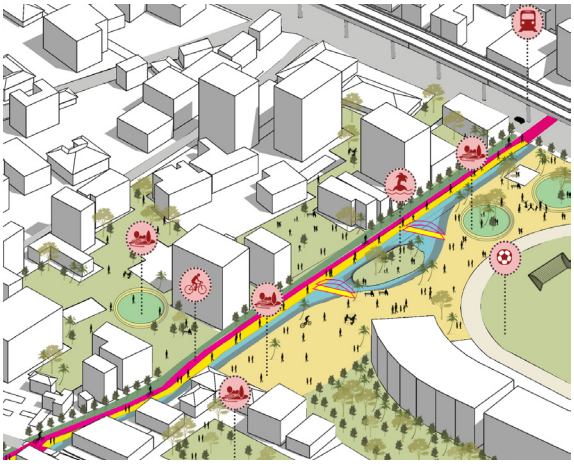
Third, as mentioned in prior issues, a mixed-use development proposal. Finally, this proposal advocated that people of Mullassery Canal and its environs take the lead in demonstrating that a city may remain vitally engaged in a well-defined and organized manner.

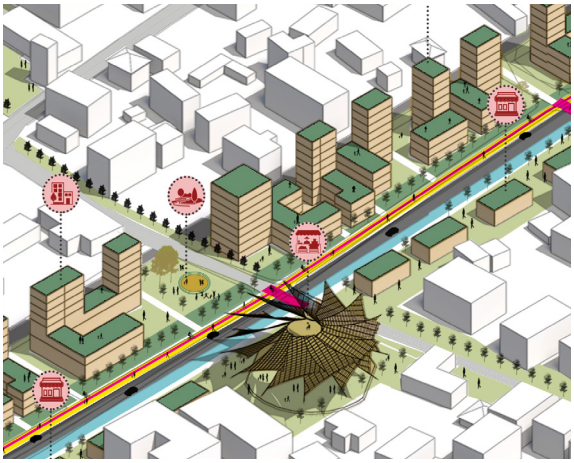
Pedestrian Activities











10 Thesis Conclusion

10.1 Thesis Conclusion

10.1 Thesis Conclusion

Aspect 1: The relationship between the thesis topic, academics studio, and Urban planning/ Masterplanning

Part of this thesis project was inspired by the Urban Design Studio. This thesis project, enlarged the study of urban expansion to masterplanning development in the Indian context, with an emphasis on the southwest region. We believed that this problem is important to investigate, particularly because of our personal experience dealing with this topic in the professional sector and a desire to learn more about how Indian cities masterplanning should be done optimally or academically. We also noticed that, at least in our experience, the urban planning/masterplanning method is largely lacking in the Indian context.

As a result, this degree topic on masterplanning in Kochi (Southwest India) has been chosen. Apart from master planning, the theme of urban vitality was also studied in my graduation research, particularly in regard to Gehl's (2013) cities for people approach. Since the beginning of the course, we have attempted to analyze this topic through my initiatives. As a result, being able to finally research this topic and combine it with the study of Indian cities was a tremendously beneficial and profitable experience for us. Furthermore, the studio's mindset toward an open-ended approach was beneficial in tailoring our project to my needs and hobbies.

Aspect 2: The research method and approach in relation to the thesis topic methodical line of inquiry

Kochi City (CBD area Mullassery Canal) masterplanning and urban vitality are the two issues of my graduation project. These two themes, based on my experience with this assignment, required a significantly different research strategy and approach. Building density, footprint, landuse, accessibility, and other factors in Indian city masterplanning necessitated a more case-study research method (as evidenced by India's masterplanning failures) and a more prescriptive design approach (e.g., building density, footprint, landuse, accessibility, and so on). The urban vitality theme, on the other hand, necessitated a more on-site observational study method (to truly see what was going on on the ground) and a more non-prescriptive design approach (e.g., program, informality, movement, etc.). As a result, our graduation project's ability to mix the two conflicting issues was a contribution to the enrichment of urban design. This project was possible to integrate numerous approaches across various stages and scales of the project thanks to the studio's method variety. For instance, in this project, the spatial analysis method was combined with on-site observation and sociological approach through interviews and the use of Gehl Institute tools (see: https://gehlpeople.com/tools/how-to-use-the-public-life-tools/).

The findings of this investigation were then used as the basis for the design. Furthermore, using the assigned analysis method, the designs are self-evaluated. In conclusion, all of these methods assisted me in enriching the design part of the project, which is the emphasis of my thesis.

Aspect 3: The relationship between the thesis project and the wider social aspects, professional and theoretical framework

One of the goals of this thesis project is to bridge the gap between the academic world of science and the social and professional world of work. For starters, this initiative has contributed to the corpus of knowledge in the field of Kochi city research. Various connections with Kochi professionals have had a big impact on this endeavor. With the application of Carmona's (2014) Place-Shaping Continuum model to analyze the Kochi city masterplanning process, we have also provided the idea that this research has brought a fresh perspective to the Kochi study.

This initiative has tapped into the domain of Kochi Municipal Corporation by establishing the 'EnteKochi' competition in collaboration with German cooperation Multi-stakeholder participatory planning and public awareness activities in Kochi in order to achieve active sustainable urban development. i.e., the designer, the programmer, and the project manager. This project has seen the Kochi masterplanning area from a more integrated perspective – not just from the designer's point of view – with the addition of the two non-designer aspects. Overall, the deliberate decision to tackle the three realms for this project has made it more integrative.

Aspect 4: The ethical challenges and ethical difficulties that arose throughout the research

The ethical concerns that we encountered during the project's development are primarily related to the objective viewpoint that we as academics must take. This problem arose while examining the current state of city planning in Kochi, as the city has yet to build a solid masterplan, despite the fact that Kochi is one of the state's metropolitian cities. The most difficult component is coming up with a fresh masterplan that is both energetic and vibrant. In terms of practical application, this project has been extremely beneficial in shaping our own expertise in the areas of masterplanning and urban vitality.

Apart from my own knowledge, our research has demonstrated several valuable ideas that will be relevant in the field of urban design and masterplanning through our thesis instructors Prof. Mario Artuso and Prof. Crivello Silvia, as well as our direct interactions with the locals in the city.

11 Appendix

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