[RE]SHAPING URBAN ENVIRONMENTS IN CHENNAI CITY

Urban transformation through an integrated densification process to facilitate liveable environments



P5 REPORT

Kavya Suresh | 4831004



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To note:

North points to the top in all drawings, unless otherwise mentioned.

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COLOPHON

MSc. Graduation thesis P5 report
MSc 4, Urbanism track
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Course : AR3U100 Graduation LAB Urban transformation and sustainability

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Delft, Netherlands

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To my mentors, Claudiu Forgaci and Dominic Stead, I express my gratitude for supporting me through this project with insightful discussions, constructive feedback and a lot of inspiration., without which this project would not have been possible.

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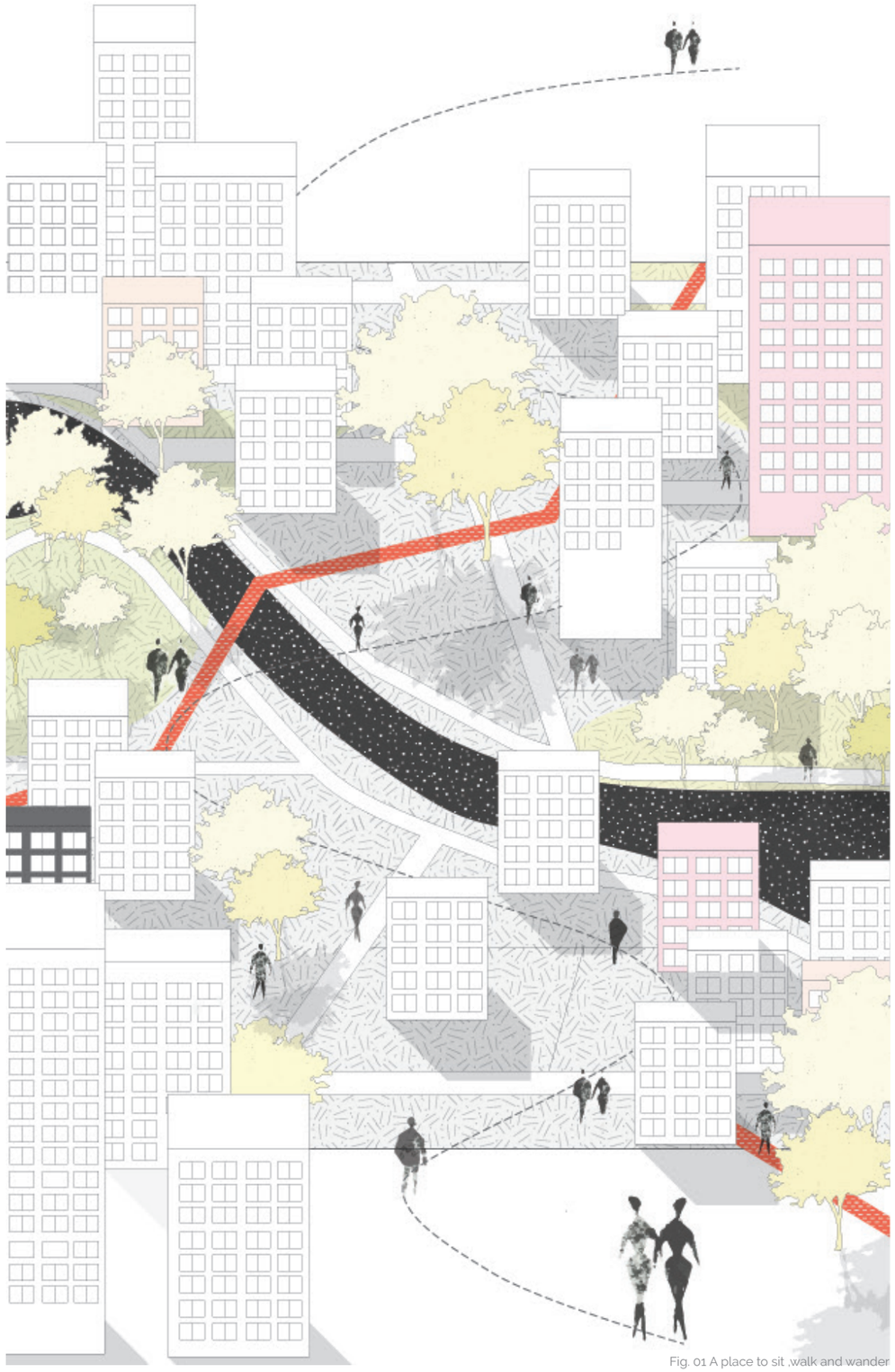


Fig. 01 A place to sit ,walk and wander

PERSONAL MANIFESTO

Chennai is a historical seaside city on the southern coast of India, steeped in rich culture and diverse landscapes. Mismanaged growth has led to a situation of congestion, lack of public space and forgotten ecological networks in the city. These issues, over time, have amounted to a living environment that is negligent of the pedestrian, and lacks many opportunities for social interactions, opportunities to walk, sit or just wander in the city. The motivation for this project comes from being one of the many people who lives in this city, observing it both as “home” and more recently, with a critical eye. This project aims to find potentials in the ever changing and densifying city, to facilitate these spatial qualities and create liveable and vibrant environments for those who inhabit it.

01 PROBLEM DEFINITION



Chapter overview:

This chapter gives an overview of Chennai city, pertaining to the larger problem field. The problem tackled is explained in detail, ending with potential directions for the research process.

Chapter contents:

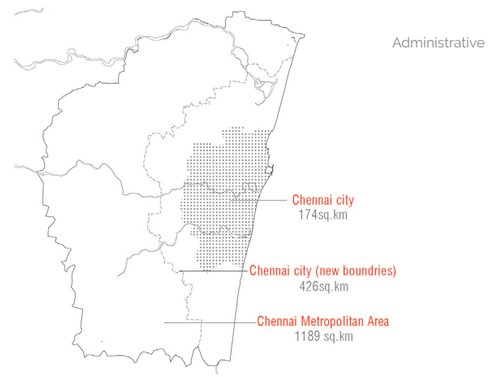
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1.8 Need for an integrated approach
1.9 Conclusion

1.1 PROBLEM FIELD

CONTEXT

Indian cities have undergone extensive urbanisation ever since the postcolonial economic reform of the nineties. Chennai, an Indian coastal city, has experienced significant transformation in its urban fabric during its 400-year journey from a port outpost in the British colony, to its current role as one of the largest urban agglomerations and globalisation hotspot in India. (Dowall & Monkkonen, 2007) The city is situated in the river basin of three rivers, Adyar, Cooum and Kosasthalaiyar.





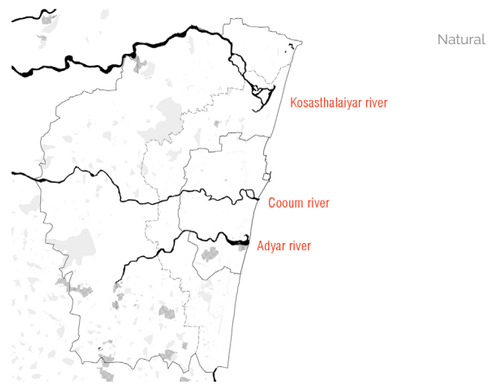
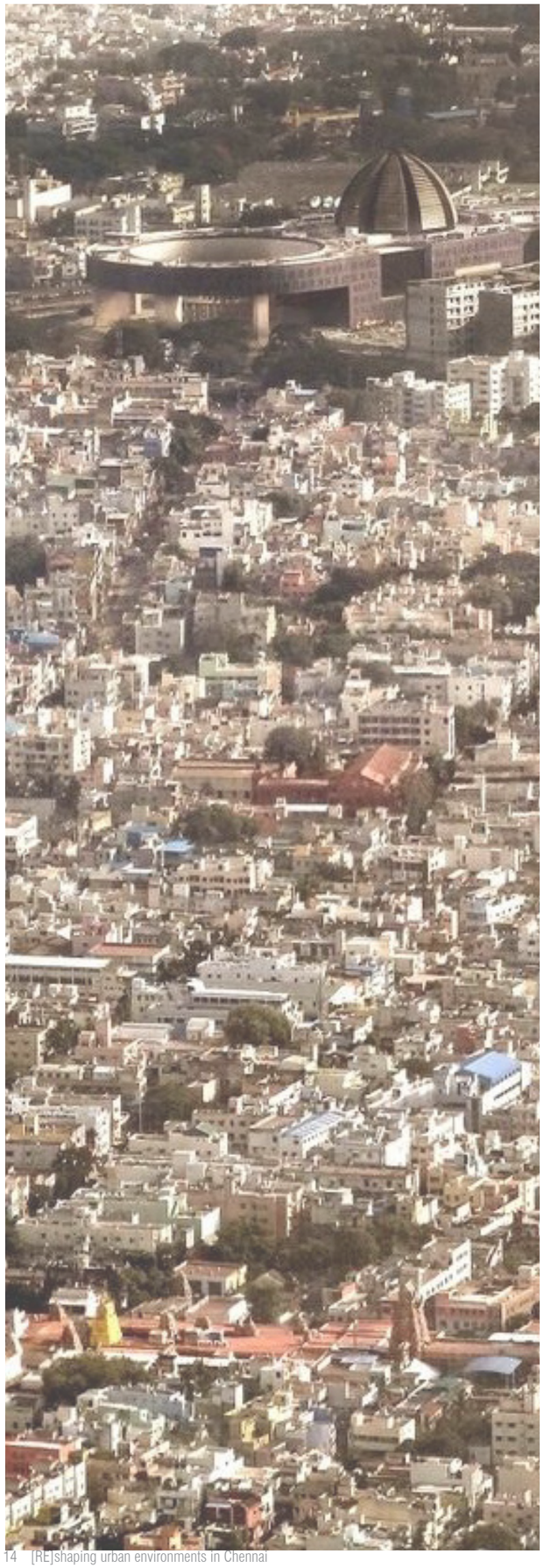
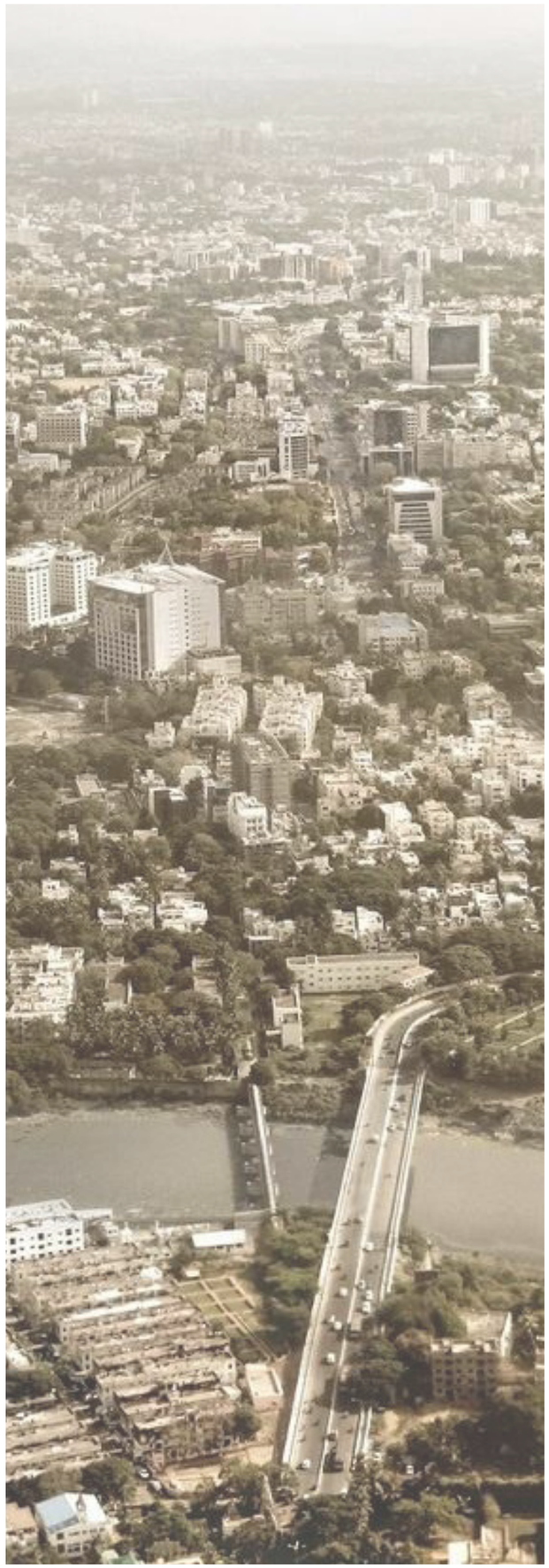


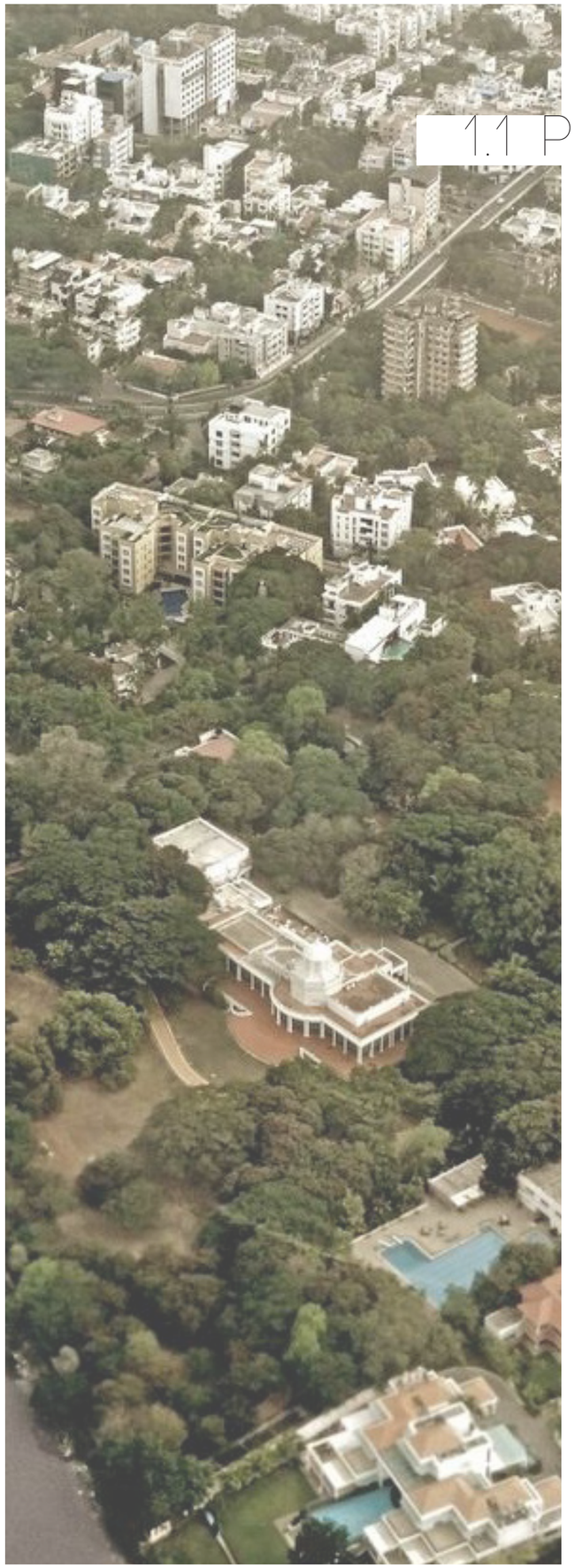


Fig. 02 Infrastructure networks in Tamil Nadu
Fig. 03 Chennai city - Characteristics

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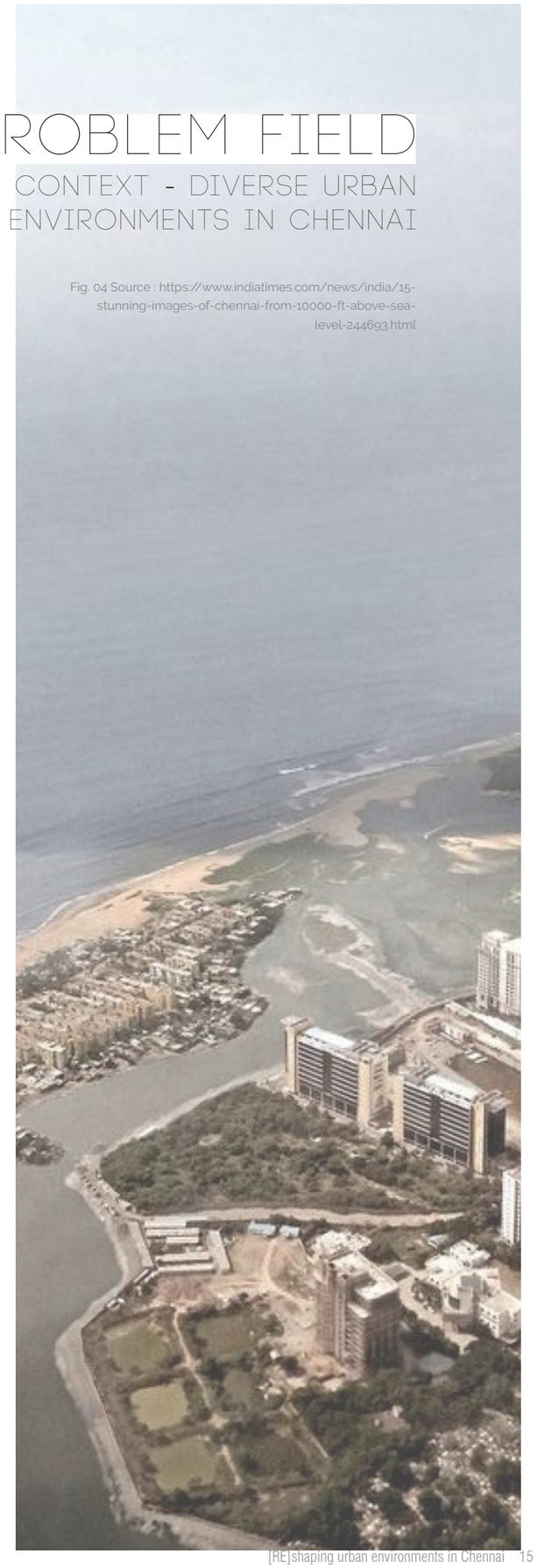


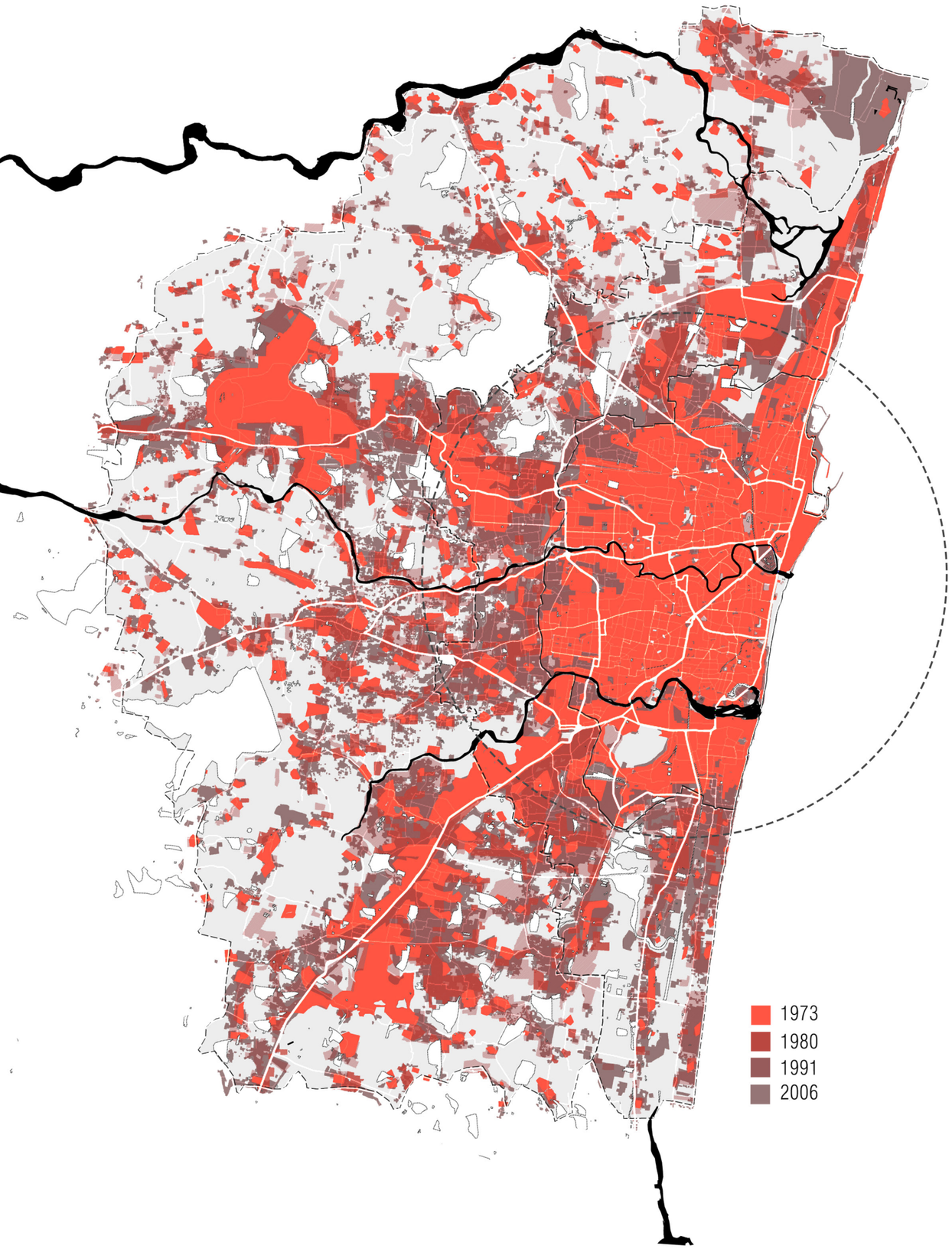


1.1 PROBLEM FIELD

CONTEXT - DIVERSE URBAN ENVIRONMENTS IN CHENNAI

Fig. 04 Source : https://www.indiatimes.com/news/india/15-stunning-images-of-chennai-from-10000-ft-above-sea-level-244693.html



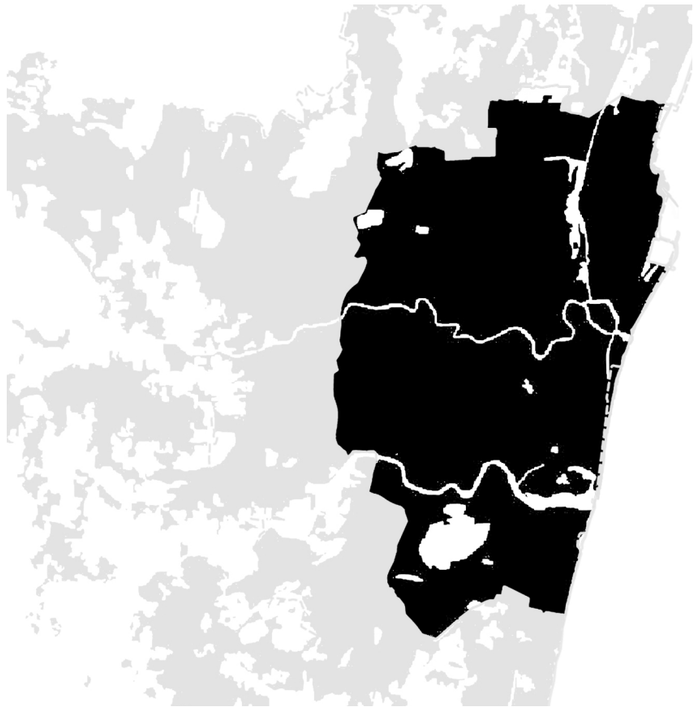


1.2 PROBLEM FIELD

URBANISATION PROCESS

Chennai has a long history of being a city of corridors. A spatial pattern that was established from the inception of the city, today these corridors are major infrastructure routes along which the city grows. This leads to a situation of sprawl, as the areas beyond the immediate vicinity of the infrastructure are underdeveloped (Srivathsan, 2015) With complete urbanisation within the old city limits and the sprawling growth of the city into its periphery, urban transformation was necessary in order to sustain the continuously growing population in the city and to bring the development under the city authority.

This was enabled through policy changes with respect to - building codes and jurisdiction of the city and the Chennai metropolitan area.



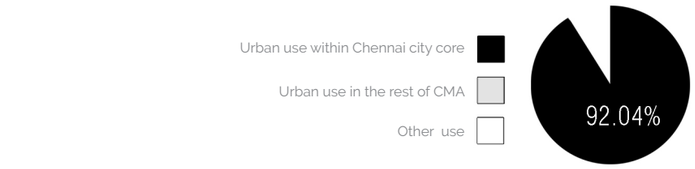
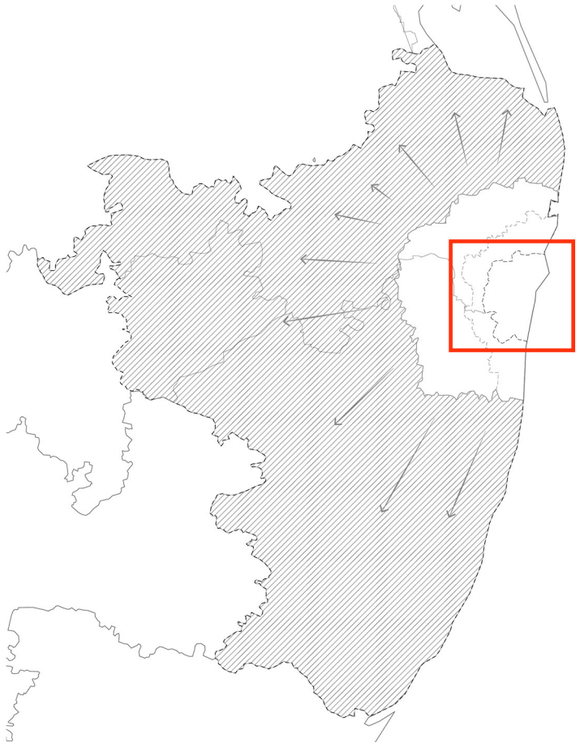
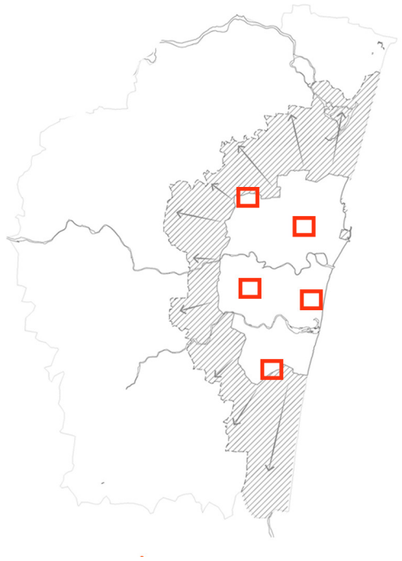


Fig. 05 Urbanisation pattern - Tamil Nadu. Source : (CMDA,2011)
Fig. 06 Urban use in Chennai city. Source : (NRSC, Government of India, 2019)

1.3 PROBLEM FIELD

URBAN TRANFORMATION THROUGH GOVERNANCE





XL → L → M → S

1 Chennai Metropolitan Area

Expansion of the Chennai Metropolitan Area

The Chennai Metropolitan area boundary has been expanded almost eight-fold, transforming from a region of 1189 sq. km to one of 8878 sq.km. This makes it the second largest region in the country, after the Delhi metropolitan region. With the development from Chennai city sprawling to the surround area, a balanced regional development, developing a larger road network, implementing an integrated transport plan and identifying a Chennai Mega Region is necessary. (Srivathsan,2011)

2 Chennai City Corpration

Expansion of Chennai City

Chennai cities boundary has also expanded to bring into its jurisdiction the fast growing peripheries and suburban areas. The Information technology industry, Chennai's fastest growing economic sector is situated to the south of the city, sprawling down a corridor to its peripheries. Similarly, several automobile industries, another important economic sector is found the south-western periphery of the city. Therefore, this expansion allows for all these spaces to be included within the city, allowing for greater regulation over the development of these areas.

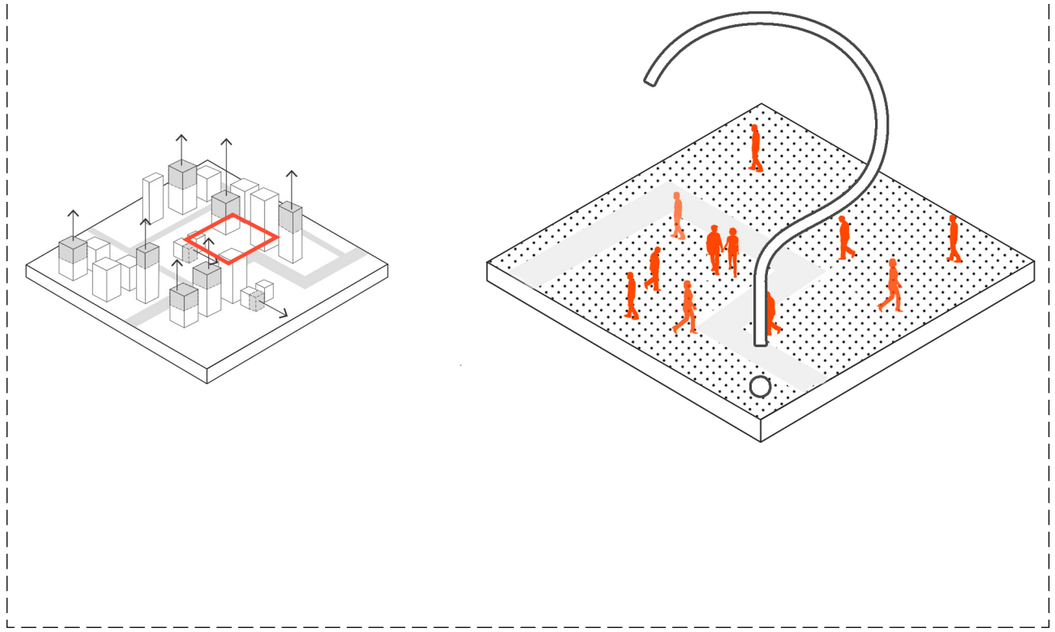


Fig. 07 Urban transformation across scales

PROBLEM FOCUS

3 Chennai City

Increase in permissible density and heights

The Chennai Metropolitan Development Area (CMDA) has amended the building codes to allow for proximately 30% increase in the building density throughout the city. Further, all height restriction from high-rise developments have been removed. This is an enormous change in policy that can lad to considerable transformation of the city over the course of the next few years. As this change in policy applies to all parts of the city, both the urbanised core and the still developing peripheries, drastic change in the scale and form of the urban fabric can be expected in the newer parts of the city.

4 neighbourhood

Impact of transformation at the local scale

This project will focus on the expansion and densification of Chennai city, and its spatial implication at the local scale. The next sections will focus on the exacerbation of existing issues in the urban environment of the city, due to this change, as well as potential opportunities that can be explored. This will be organised as -

> Density x public space

> Density x mobility

> Density x ecological systems

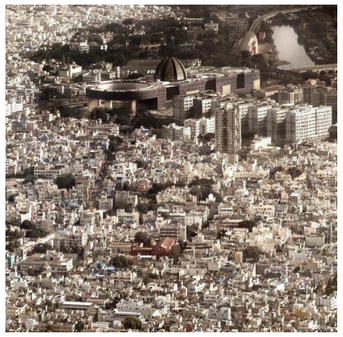
1.4 PROBLEM STATEMENT
QUANTIFYING DENSITY

At first glance, Chennai does not seem to be of a very high density. Most of the city displays a continuous urbansiation pattern of fine grained fabric with mid to low rise development. In order to quantify the density in the city and understand it in terms of population and space, it was compared in terms of building density, built space available per person and the resulting number of people per hectare. As seen in Fig.9, while Manhattan centre has almost ten times the built density of Chennai city core, leading to an urban form composed of high rises, the very low built space available per person in Chennai leads to almost the same number of people per hectare of space in both cities. An increase of built density by thirty percent can lead to an increase of almost thousand people per hectare in the city. Therefore, a uniform densification of this scale throughout the city will lead to a drastic change in the quality of space. This is explored in the next section, in terms of public space, mobility networks and ecological system

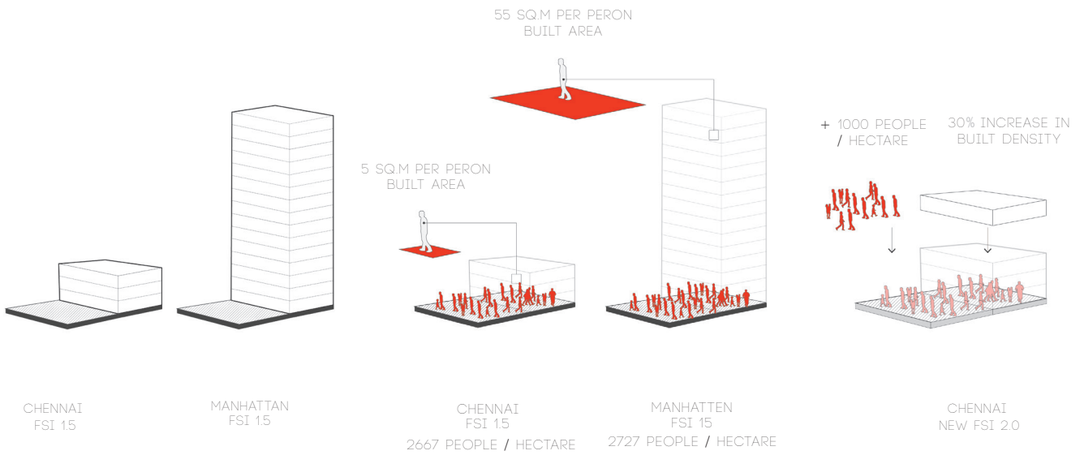
Fig. 08 Urban environments in Chennai centre and Manhattan. Source :
Fig. 09 Building density and population density comparison. Data source:
Fig. 10 Ennore highway, Chennai. Source : Getty images

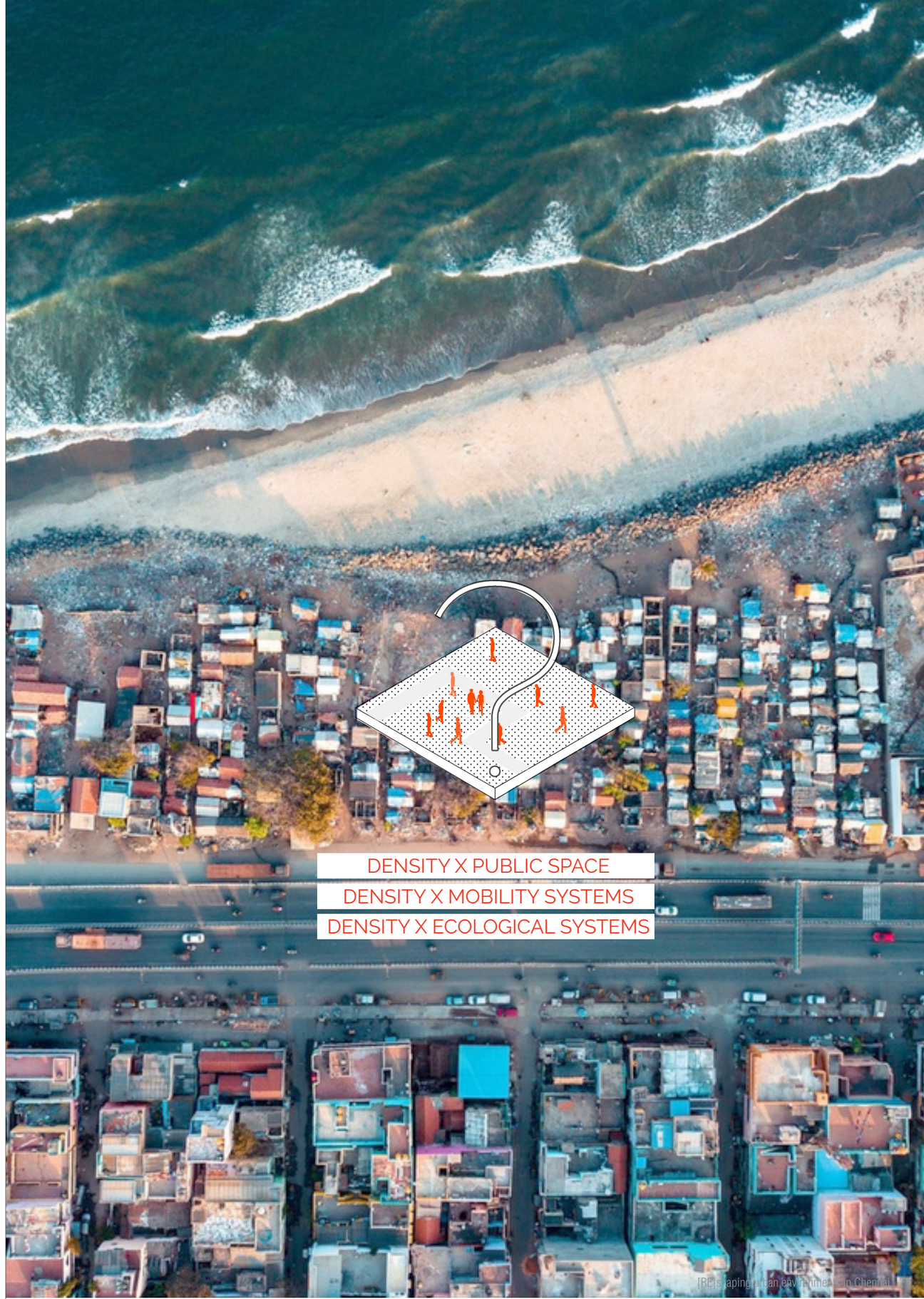


MANHATTAN



CHENNAI





1.5 PROBLEM STATEMENT

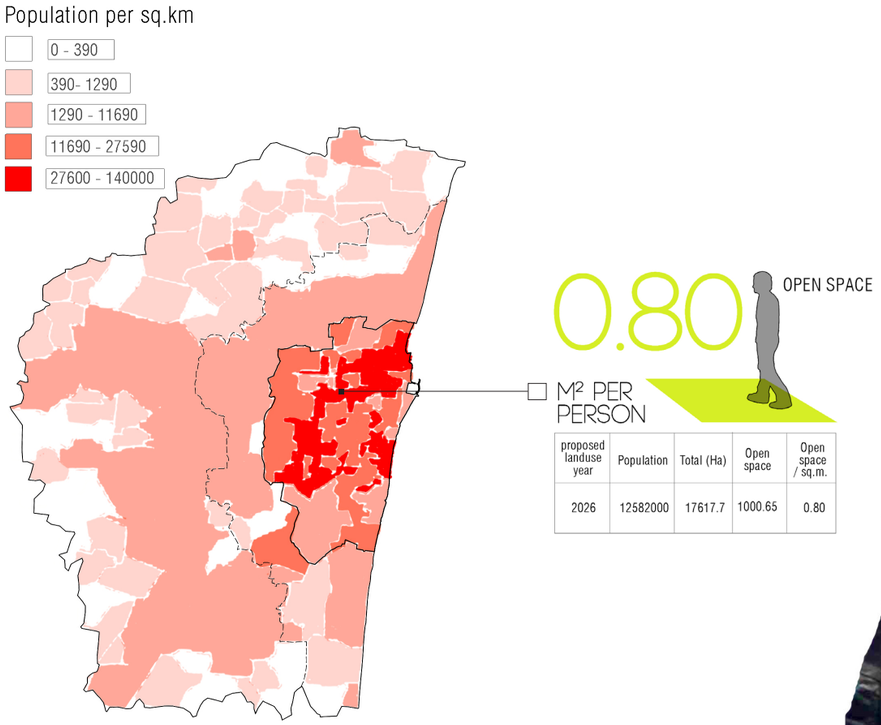
DENSITY X PUBLIC SPACE

Chennai city has very low amount of open space available with a ratio of just 0.8 sq.m per person, which stands in stark contrast to the prescribed WHO standard of 9 sq.m person. High dense situations in Indian cities mean not only a higher built density, but a very high population density as well, owing to the fact that the space available per person in quite low. (Patel, 2014) This can often lead to congestion and put high pressures on social and mobility infrastructures, leading to poor liveability.

Density reconfiguration must also consider the amount of open space required in proportion to increase in density. The existing density of areas in the city must be a criteria for evaluation of density increase.

Fig. 11 Open space per person in Chennai city. Source : (Town and country planning organisation, 2014)

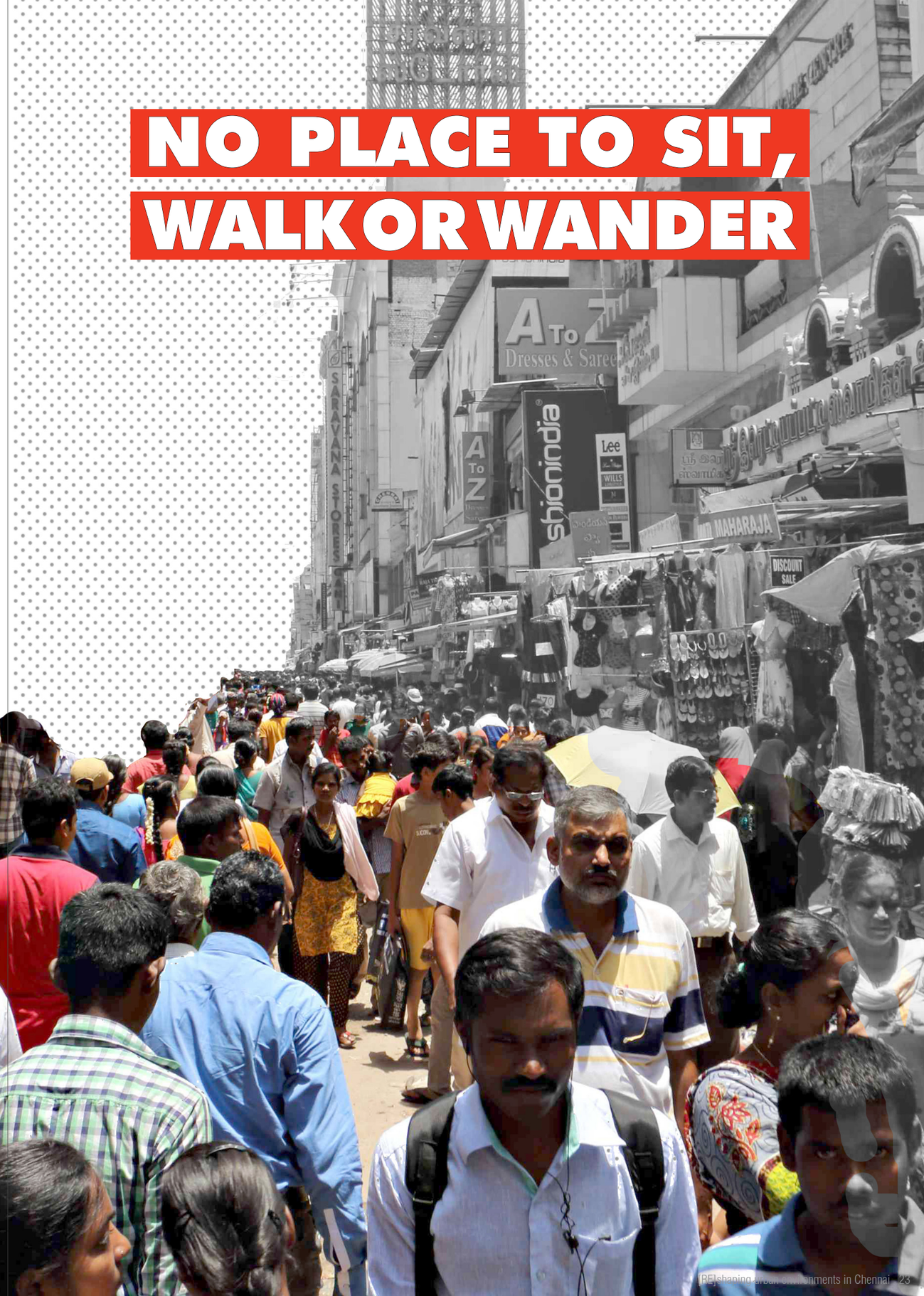
Fig. 12 Population density in Chennai city. Source : (Chennai Metropolitan Development Authority,



0.80 OPEN SPACE

M² PER PERSON

proposed landuse year	Population	Total (Ha)	Open space	Open space / sq.m.
2026	12582000	17617.7	1000.65	0.80



1.6 PROBLEM STATEMENT

DENSITY X MOBILITY

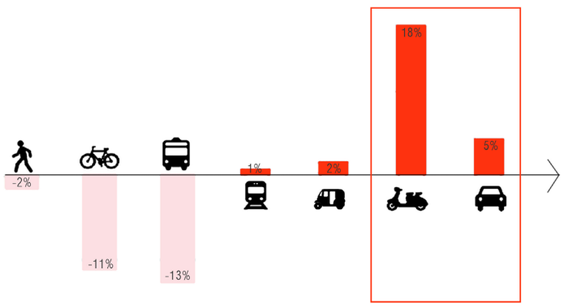
Chennai city has several modes of public transport - an upcoming metro rail system, a MRTS system, a suburban train system, and a bus transit system. However, as seen in Fig. 15, the use of private motorised vehicles has been exponentially increasing, with use of public transport and pedestrian movement dropping through the years. Chennai becoming home to an extensive automobile industry has also been a contributing factor to this phenomenon. In the face of increasing density within the city, a continued dependency on motorised private vehicles will lead to extreme traffic congestion in the city. Mobility networks and access to public transport play an important role in mitigating crowding and congestion in high density environments.. While transit oriented development (TOD) is now a common pattern of growth found in European countries, it still needs to be explored and adapted in the Indian context, where vehicular mode of transport is still predominant

A study of the modes (Fig.16) of transport for daily trip shows that following a "business as usual" model will lead to a massive increase in privatised vehicular transport. A large shift towards public transport is required, which requires increased last mile connectivity, walkability and multi-modal transport.

Fig. 14 Percentage change in transport modes in Chennai city. (Chennai Metropolitan Development Authority, 2005)

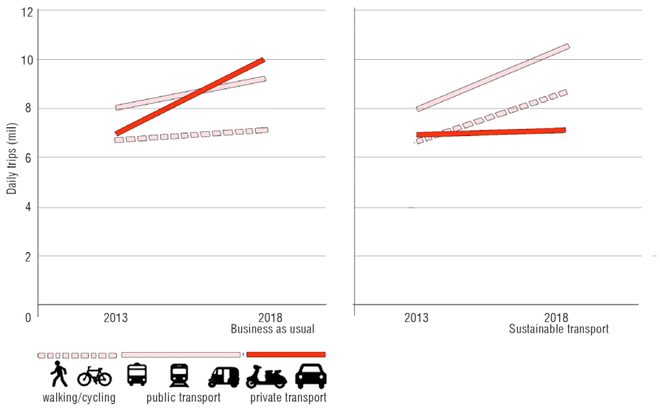
Fig. 15 Projection of transport usage in two scenarios. Source : (ITDP, 2013)

Fig. 16 (right) Dependence on private motorised vehicles leading to high congestion. Source : Retrieved from https://www.itdp.in/are-flyovers-the-problem-or-the-solution-to-traffic-woes-in-indian-cities/htm



change in transit mode usage in Chennai city,

1980 - 2010



Projection of transit mode usage in Chennai city, two scenarios

A CITY DRIVEN BY CARS

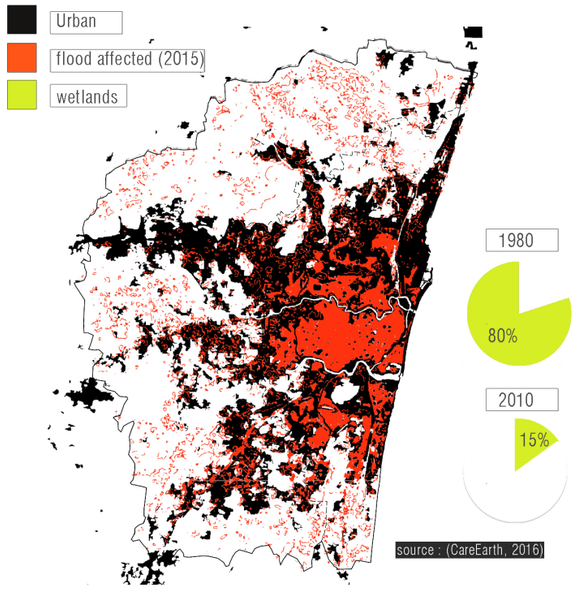


1.7 PROBLEM STATEMENT

DENSITY X ECOLOGICAL SYSTEMS

Urbanisation in Chennai has caused the disappearance of 70 percent of the wetlands in the city over a period of 30 years. (Fig.18) This has caused enormous flooding and drought issues in the city in the recent past. A map of the devastating floods of 2016 shows that the affected areas were mostly the heavily urbanised areas in the cities core. Therefore, it is very important for the densification process to take into account spaces required to make room for the water systems in the city. One of the reasons for the deterioration of the blue-green system in the city is that the city has turned its back to it. Most of these areas are disconnected from the cities fabric, inaccessible and turned into waste dumps, resulting in very unhealthy environments. A relationship between ecologically sensitive areas and public space can lead to inclusion of these spaces in the social realm and create a sense of responsibility for their protection. At the same time, these open spaces can be points of relief that complement high-density urbanisation. They can facilitate healthy environments of slow development and recreation in a city that is otherwise fast paced and economically driven.

Fig. 17 Flood affected areas in urbanised zones and wetland percentage. Source : CARE Earth
Fig. 18 Neglected ecological systems. Source :Retrieved from https://www.radford.edu/gmartin/chennai2slum.htm



THE CITY TURNS ITS BACK TO THE WATER



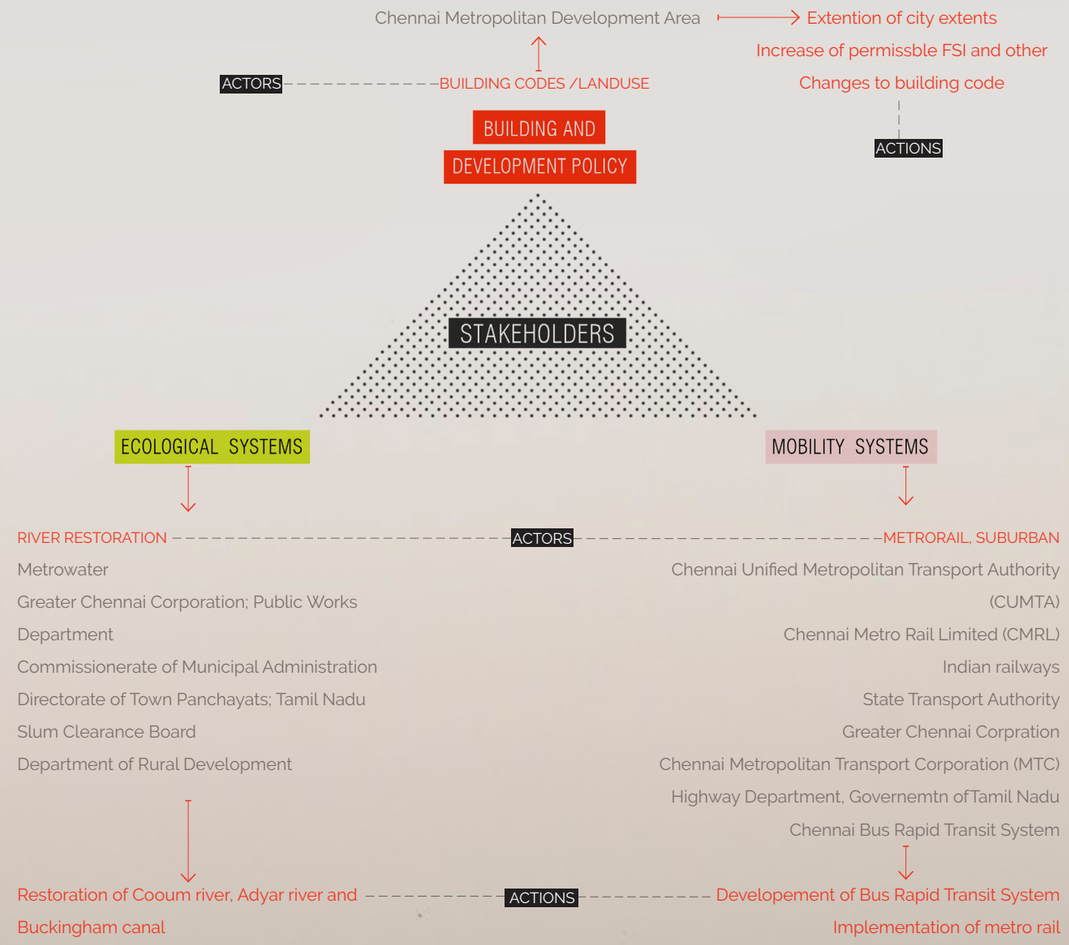
1.9 PROBLEM STATEMENT

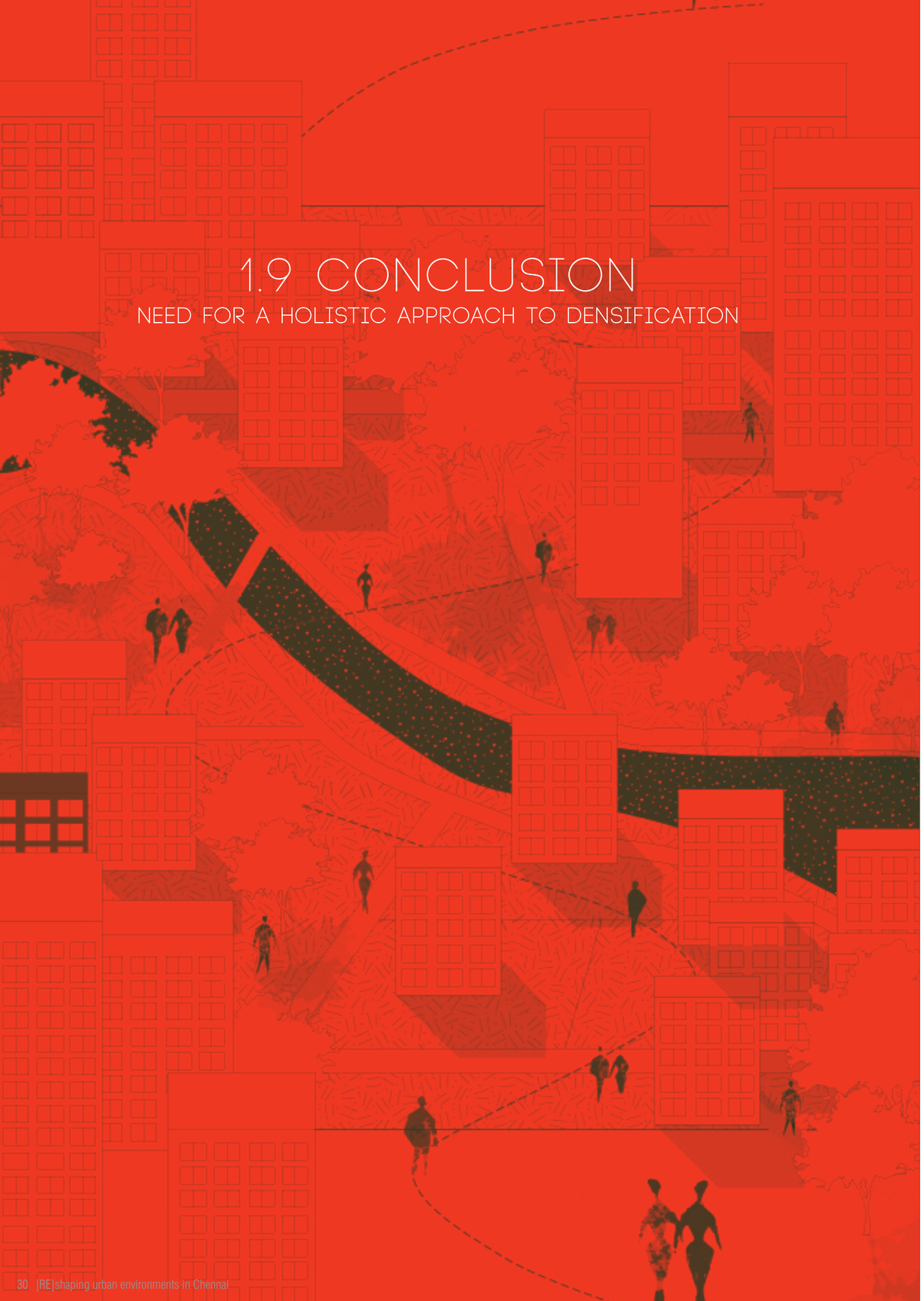
A NEED FOR AN INTEGRATED APPROACH

Chennai has a major issue of vehicular congestion and a lack of accessible public space in the city. Further, the existing ecological networks within the city have been neglected and polluted. All these aspects contribute to an unhealthy environment that does not foster wellbeing in the cities' residents. In this situation, densification of the city has the potential to exacerbate this problem, unless an integrated approach is adopted.

Separate government authorities deal with these individual issues without much communication between. This then leads to policy implementation that is independent from one another, lacking a holistic approach and a lack of cooperation and knowledge sharing about the interdependencies between these different types of city development. Fig.21 shows the different projects that are current being implemented in the city. While they will have an enormous impact on one another, they are being treated in an isolated manner.

Fig. 19 Pallikaranai marsh lands. Source : Vasistan Photography
Fig. 20 Stakeholders - Actors and actions





1.9 CONCLUSION

NEED FOR A HOLISTIC APPROACH TO DENSIFICATION

Chennai is a rapidly metropolising city with an ever increasing population that needs to be accommodated. The Chennai Metropolitan Development Authority (CMDA) has proposed a strategy of densification throughout the region. While this will help curb the sprawling growth of the city and utilise resources more efficiently, this a quantitative approach towards the issue, with the primary aim being to accommodate a certain quantity of people within the city. However, a qualitative approach is required in the process of densification to ensure that it does not lead to overcrowding, congestion, a lack of open space and deterioration of ecological systems, all of which are already urban issues present in the city. Densification of a highly urbanised fabric is an enormous spatial transformation process and can be used as an opportunity to improve the quality of spaces, accessibility to public transport and ecological networks in the city, leading to increased health and well-being of the poeple. This requires a shift in the planning strategy and building regulation process at the city scale and effective design interventions at the local scale. Therefore this project aims to take a holistic and phenomenological approach to densification, where it is not considered the end goal, but a process that is an opportunity to provide liveable, vibrant, diverse and accessible spaces within the city.

02 RESEARCH METHODOLOGY



Chapter overview:

This chapter explains in detail, the research framework of the project. The research questions are posed, with an explanation of the different methods used to answer every question and the intended outcome. The project is framed though the perspective of the research framework along with an outline of the analytical process used.

Chapter contents:

2.1 Research Aim and question
2.2 Methods and outcomes
2.3 Theoretical underpinning
2.4 Conceptual framework
2.5 Analytical framework
2.6 Design goals and intended outcomes

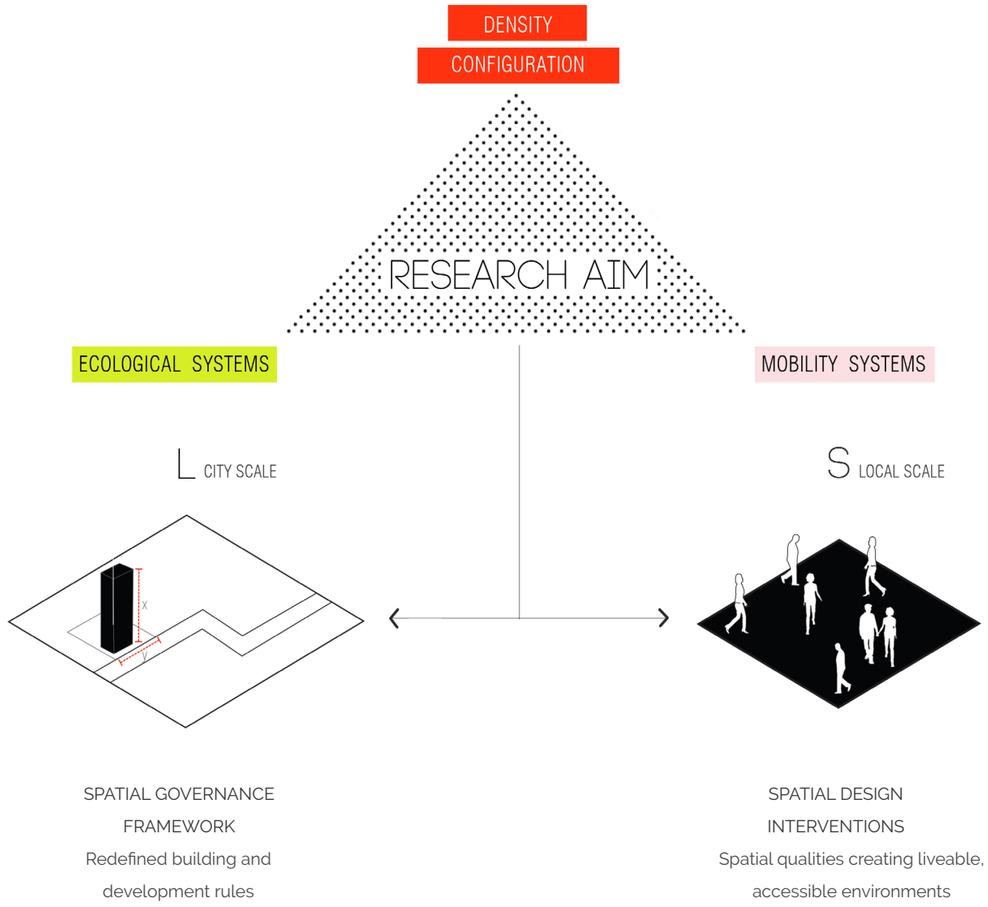
2.1 RESEARCH AIM

This research argues for the need for a holistic approach towards densification with a focus on the quality of living environments created as a result. It takes a multi-scalar approach with -

- A design proposal and toolkit that enable vibrant, liveable and accessible environments at local scales through transformation of the urban fabric in different contexts of the densifying city.

- A strategic integrated model for the city, that reorganises development and building rules to take a holistic approach to permissible density configuration, mobility networks and ecological systems with an assessment of the synergy required between the different stakeholders involved at the city scale.

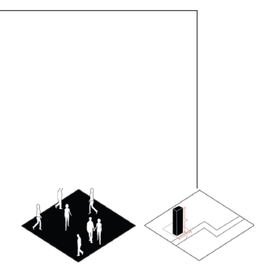
Fig. 21 Research aims



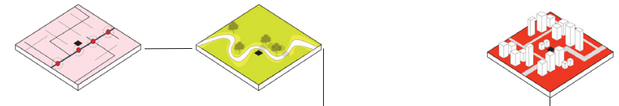
2.1 RESEARCH QUESTION

01 What does the concept of liveability mean in the socio-cultural context of Chennai city?

02 What are the driving forces that have shaped the fabric in different parts of the city? How are these parts different/similar in terms of their physical and social composition?



How to facilitate the spatial transformation of the urban fabric of Chennai to enable liveable environments for all people, in different contexts of the city, through a reorganisation of the building density using a holistic approach that takes into account mobility infrastructure and ecological systems?



03 What is the current density and spatial organisation in the city? How will the change in building rules affect the fabric of the city? Where will the impact of this transformation be the most prominent?

04 What is the relationship between building density, population density social infrastructure and liveability?

05 How to increase the of use of public transport and pedestrian movement in the city?

06 How to integrate the neglected ecological network with the city structure, in order to regenerate these spaces and improve the quality of public life?

06 What are the development plans for the mobility and ecological network in the city ? What are the synergies and conflicts between these plans and the densification of the city?

2.2 METHODS AND OUTCOMES

How to facilitate the spatial transformation of the urban fabric of Chennai to enable liveable environments for all people, in different contexts of the city, through a reorganisation of the building density using a holistic approach that takes into account mobility infrastructure and ecologicat systems?

METHODS → OUTCOMES → AIMS

01 What are the driving forces that have shaped the fabric in different parts of the city? How are these parts different/similar in terms of their physical and social composition?

Historic study / Literature review - A study focussing on the evolution of the city through time and its shaping factors.
Morphological Trans-scalar mapping- Identifying patterns that occur in the city as a result of social and physical forces through time

A catalogue/typology of patterns - recurring and distinct - in the city across scales, with an understanding of its characteristic physical and social composition - A base for testing design concepts.

02 What does the concept of liveability mean in the socio-cultural context of Chennai city?

Literature review + on-site interviews - literature studies that focus on qualitative approaches to determine people's perceptions of what constitutes a livable environment, tested against onsite observations and interviews to contextualise livebility.

A set of indicators that assess the livablity in the context of Chennai - spatial quality input for design interventions.

03 What is the current density and spatial organisation in the city? How will the change in building rules affect the fabric of the city? Where will the impact of this transformation be the most prominent?

Literature review - Relationship between building rules and the spatial form of the city.
Policy analysis - Relationship between building rules and the spatial form of the city in Chennai.
Stakeholder interviews - Expert opinions on transformation of the city with the change in building rules. [City Scale]

Potentials, challenges and locations [Local scale] of interest due to transformation.
Critical position of existing building rules based on literature study.

04 What is the relationship between building density, population density social infrastructure and liveability?

Literature review - Focus on spatial relationships + learnings from SRQ 1.

Perception study - On site perception study to understand impact of built morphology and social infrastructre on liveability. [Local Scale]

A set of design principles that facilitate liveabilty in high dense environments.
Potentials, challenges and locations [Local scale] of interest due to transformation.
Spatial relationship - density, open space and infrastructure.

05 What are the development plans for the mobility and ecological network in the city ? What are the synergies and conflicts between these plans and the densification of the city?

Policy analysis - Proposed development plans
GIS Mapping - Mapping the transformation of the city with new developments.
Stakeholder interviews - Experts - Intentions / visions for developments. Citizens - Needs in the public realm

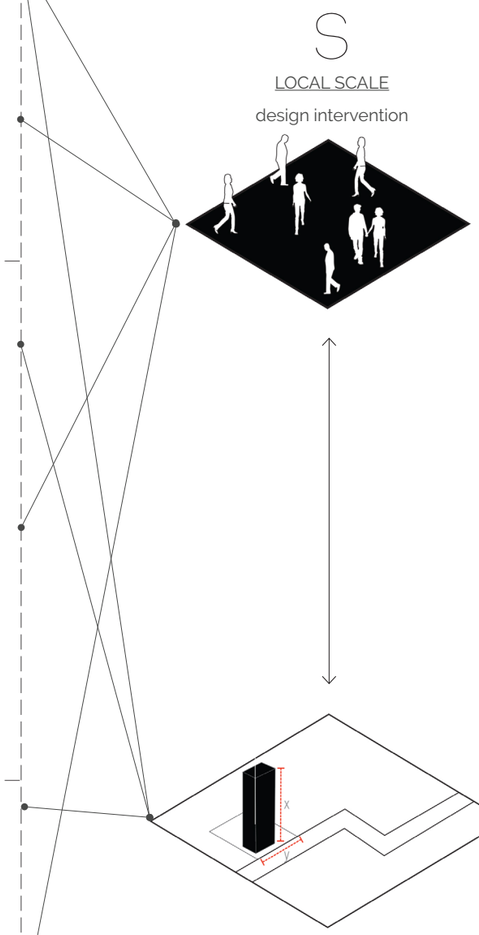
Potentials and challenges of new developments
Strategic model to integrate mobility and ecological networks and density configuration of the city (input from SRQ2, SRQ3 and SRQ4

06 How to increase the of use of public transport and pedestrian movement in the city?

07 How to integrate the neglected ecological network with the city structure, in order to regenerate these spaces and improve the quality of public life?

Literature review + onsite interviews - literature studies that focus on qualitative approaches to determine people's perception towards -
- convenience of public transport use and pedestrian movement.
- ecological systems as a part of everyday life.
Case studies - Mobility and ecological network models in cities, TOD implementation in Indian cities, regeneration of waterfronts.

A set of indicators and design principles that
- Activate the ecological system and integrate it with everyday social space.
- Increase the use of public transport.



Theoretical methods
- Literature review

Analytical methods
- Documentary analysis
  - Policy review
  - Historical documentation
- Mapping and analysis
  - GIS Mapping
  - Morphological study
- Comparative Case study

Research by design methods
- Field work
  - On-site Interviews
  - Spatial analysis
  - Photo documentation
  - Expert interviews

2.3 THEORETICAL UNDERPINNING

[This section includes extracts from the paper " Evaluating the two-network strategy in the context of Chennai, India. Author : Kavya Suresh; course : AR3U023]

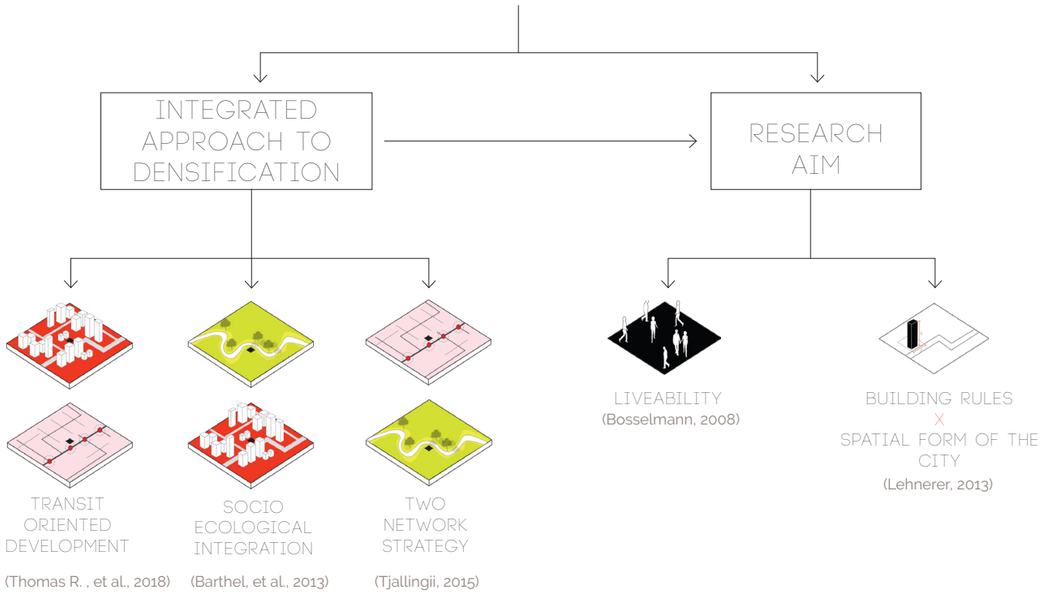


Fig. 22 Theoretical underpinning diagram

The theoretical bodies chosen for this project are catagorised into those that contribute to the final design aim and those that facilitate the integrated approach to densification. The following sections explore the definition of these concepts and further explain them in the context of Chennai.

INTEGRATED APPROACH TO DENSIFICATION

This project puts forward the hypothesis that in Chennai, the process of densification must adopt a more holistic approach, with the aim of creating liveable places in the public realm of the city. The problem statement explained the effects of densification on the ecological systems and transit networks in the city, stating the need to approach them in an integrated manner. In order to do this, the theoretical underpinnings used are the concepts of the two-network strategy, Transit oriented development and Socio-ecological integration. This section further explains these concepts, the importance of adapting them to Chennai, the process of contextualising them and the relationship between the three, giving rise to the integrated approach of this project.

The theoretical concepts used to frame the relationship between the three layers of mobility, ecology and density configuration are selected based on the contextual challenges faced by Chennai, with respect to these aspects. This is further illustrated below.

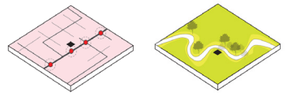


Fig. 23 The two-network strategy (Tjallingii, 2015)

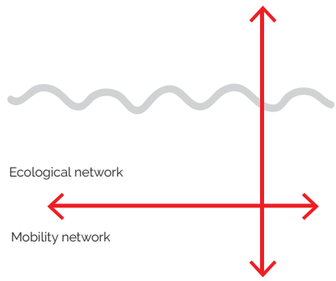
THE TWO NETWORK STRATEGY

(Tjallingii, 2015)

The two-network strategy as proposed by Sybrand Tjallingii is a conceptual design and planning tool that considers ecological and traffic networks as carrying structures of urban development and proposes a city model based on a balance between them. Embedded in the Dutch planning tradition, this model emphasises the need to approach ecological networks, as carrying structures as opposed to restricting conditions. (Tjallingii, 2015)

The role of the two networks is defined through three different lenses, the area, the flows and the actors. The area perspective describes the two networks through a common framework of space, in terms of the activities and functions that are facilitated by the configuration of two networks, and their relationship to each other. In the examples illustrated across different scales of the city, the mobility network allows for functions that are economically driven, competitive and require high accessibility. In contrast, the ecological network can facilitate the activities in the city oriented towards the well-being of its people. Green open spaces, recreation and productive landscapes are associated with this network. The area perspective allows for a planning and design process that balances economic drivers and ecological systems at the regional scale, city scale as well as local neighbourhood scales.

The flows perspective explains the spatial implications of the ecological and traffic flows and their role in shaping the city. In terms of the ecological network, water flows can allow for the spatial structuring of the city, scaling from drainage basins and valleys up to rivers and their floodplains. Traffic flows are defined in terms of the flow of resources and activities that they service, such as industry, business or residences. Further, the role of mobility networks in the planning process is distinguished in terms of locations that require accessibility, locations where the type of mobility network is the focus and locations where the flow of mobility needs to be regulated. These situations require very different types of interventions and offer different levels of flexibility in the process. Therefore, the flows perspective makes the spatial implications of the different flows explicit, allowing for intrinsic properties of the two networks to be in synergy with the functions and uses associated with them.



Finally, the actor perspective focuses on the role of the actors with respect to these two networks and the implications of this strategic thinking on daily life in the city. This strategy gives rise to two networks that facilitate different spatial qualities and potential functions. The ecological network is described as the “slow lane “which focuses on the long-term benefits for the city in terms of health and well-being. The mobility network is considered the fast lane, which allows for economy driven development. These two networks can be thought of as “cooperative” and “competitive” networks (Tjallingii, 2015). The social roles of the two networks also informs the type of stakeholders that will be involved in the different locations.

Looking through the lenses of these three perspectives, a planning model emerges. It essentially facilitates a development framework where the two networks act as distributors of different activities and functions in the city, based on resources and flows they each require, in order to shape the possibility of diverse experiences in daily social life.

Chennai is a city where infrastructure development and the free market largely drives the growth of the city. The negative externalities of a sprawling, developer driven urbanisation pattern has led to an inefficient and unsustainable mobility network and a neglected and polluted ecological network. These conditions, along with the very high population density found in the city result in very poor living quality within Chennai, with a severe lack of social spaces that are dedicated to long term health and well-being.

The two-network strategy is a concept that can facilitate the creation of diverse environments within the city, and at the same time, allow for balanced growth as opposed to the purely economy driven growth prevalent today. The “slow lane” can facilitate environments in the city that caters to the long-term well-being and health of the city and its residents, in the form of accessible ecological spaces and social spaces. Further, Chennai could benefit from shifting from private motorised vehicles to other modes of transport such as walking and cycling, especially for shorter trips. The presence of an ecological network will greatly help these modes of transport, as the green network complements slow modes of traffic very well (Tjallingii, 2015).

Different spatial relationships between the mobility network and ecological network afford diverse social spaces that allow for contrasts and transitions in the social realm. This is a much-needed quality in Chennai, which lacks spaces in the city that can complement the fast paced, vehicle dominated streets of the city. (The Hindu, 2017)



Fig. 24 Cooum river, Chennai. Source: Author



Fig. 25 Socio-ecological integration - space as a common framework
Fig. 26 Socio ecological resilience. Source : (Barthel, et al., 2013).

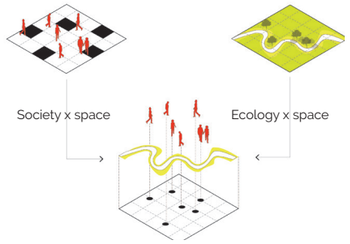
SOCIO ECOLOGICAL INTEGRATION

Socio-ecological integration allows for a system to combine social and ecological resources, to alleviate conflicts and sustain synergies. (Forgaci, 2018)

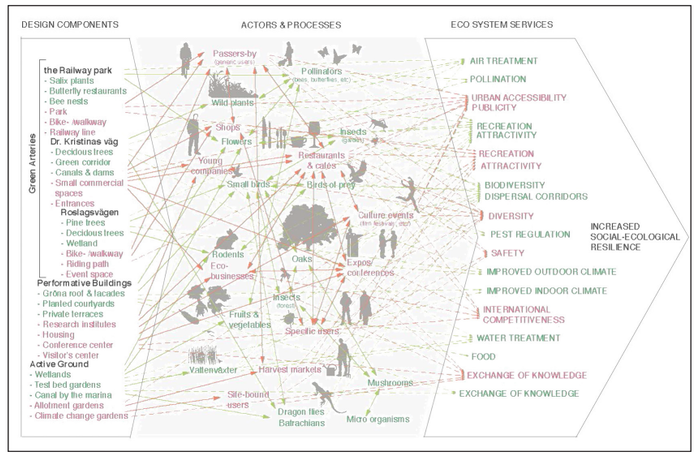
Socio- ecological integration requires the understanding of the social and ecological systems through the common ground of the spatial system. The spatial system in a city provides the structure to facilitate social processes, and is a manifestation of the same. Ecological processes when understood similarly, allow the spatial system to become the shared framework for integration (Barthel, et al., 2013).
In the process of socio-ecological integration, synergies and conflicts between ecosystem services and social services are determined in order to identify the potential for urban transformation. Points of synergy, for example, can facilitate city scale destinations, which translates to a large flow of people to these locations. Fig. x shows the “Principles of Social-Ecological Urbanism”, study of Albano Campus in Stockholm by Barthel et al. (2013) identifying design potentials by considering both ecosystem and social services, leading to increased socio-ecological resilience.

Historically, Chennai possessed a community driven water management system that created an intimate relationship between society and ecology. This communal thinking towards the common goods (lakes, rivers, forests and marshlands) was gradually eroded as the society shifted towards the ideas of public and private space introduced in the colonial period (100 resilient cities, 2019). The rampant urbanisation that followed, along with the disconnect between man and nature resulted in the encroachment and depletion of these natural systems. Current efforts to rejuvenate these systems in order to prevent the frequent floods and droughts in the city must take into account the importance of this relationship. These ecological systems, when integrated with the urban fabric, have an immense value in enriching everyday life. Conversely, this also nurtures a sense of responsibility to protect these systems. This mutually beneficial outcome can be achieved through the process of socio-ecological integration.

Currently, the effort to restore these water systems focus on providinng the ecosystem services that are required while neglecting the social services that are essential to sustain the process.



Space as a common framework



TRANSIT ORIENTED DEVELOPMENT

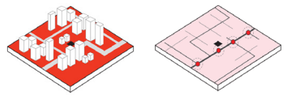


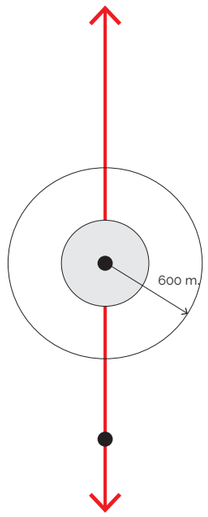
Fig. 27 Concept of TOD
Fig. 28 Urban design guidelines for TOD. Source : (Thomas, et al., 2018)

A TOD (Transit Oriented Development) is defined as "Mixed-use communities within an average 600 metre walking distance of a transit stop and a core commercial area. TODs mix residential, retail, office, open space, and public uses in a walkable environment, making it convenient for residents and employees to travel by transit, bicycle, foot or car" (Calthorpe, 1993). TOD is a process of creating dense and diverse areas around public transit stops in order to maximise the use of public transport over private motorised vehicles and promote more walkable streets in the city.

Density concentrations in the city is determined by the transit nodes, leading to an urbanisation pattern of compact clusters. Further, the transit nodes start gaining a sense of hierarchy in terms of their accessibility and connections. Therefore, multimodal access points become important nodes in the city, ideally providing access to city scale destinations as well as connections to different modes of transport. This hierarchy can provide a spatial structure to the city, informing the location of city scale destinations, local commercial functions and businesses. Activation of transit nodes that already exist can be facilitated by understandinng the catchment area for various metropolitan functions in a city, as illustrated in Fig.30, an example of catchement analysis by Andrew Wright associates (Urban task force, 2005). This process can be used to identify the missing functions around a transit node.

Based on national urban development policy, Indian cities, including Chennai are aiming to shift towards transit-oriented development (Ministry of housing and Urban affairs, 2017). However, access to rail transit is not the only factor that facilitates a shift away from private vehicle use. Other aspects such as on- and off-street parking, housing type and tenure, density and bus services also play a key role (Thomas, et al., 2018). Specifically, inadequate densities, improper mix of functions, poor accessibility and walkability and a lack of multi modal integration are some of the larger issues that pose a challenge to the implementation of TOD in Indian cities (Joshi, Joseph, Patel, & Darji, 2017). Further, when adapting concepts like TOD in the context of Chennai, it becomes important to explore development models and policy implementation in the densification process, as land acquisition and development becomes a challenge due to the high degree of private ownership of land in the city. Fig. 31. identifies instruments and policies used in the process of implementing TOD in different cities. (Thomas, et al., 2018)

Therefore, at a larger scale, multi modal connectivity, network configurations and accessibility to jobs, city destinations and recreation is essential for the public mobility network to be successful, while at the local scale, density and function mix, adequate parking and spatial conditions that improve walkability are some of the important factors. .



Dimension	Recommended guideline or approach
Place-making	
Scale and density	Ensure comfortable walking distances between points (i.e., TOD encompassing a 0.5 km or a five-minute walk radius, doubled for major stops, with placement of homes near transit at sufficient density)
	Place commercial uses, jobs, parks and civic uses within walking distance of transit stops to allow for trip linking or consolidation
	Taper densities with distance from a station (i.e., a 'wedding cake' density)
	Provide sufficient densities to sustain transit investments (i.e., set minimum floor-area ratios, and do not exclude tall buildings and intensive development)
Public spaces for human use	Design individual parts of the overall plan with human activity in mind
	Make public spaces the focus of building orientation and pedestrian activity (i.e., cluster benches and sitting ledges, provide special public art, allow for flexible use, accommodate outdoor dining, encourage water features and discourage large setbacks, i.e., more than 6 m from the street edge)
	Add human-scale details, such as architectural features and textures on buildings, street furniture, colourful vegetation, public seating, a mix of building colours and plantings
	Design public spaces for a sense of 'an outdoor room'; a recommended minimum height-to-width ratio is 1:3
	Ensure that main entrances and windows face the street
	Provide large shade trees that form continuous canopies over the street
	Create attractive landmarks and gateways to the development
Safety	Provide physical measures such as good lighting at night
	Control access in non-public spaces through fencing, lighting and landscape
	Avoid blank facades (provide transparent facades with non-reflective glass)
	Ensure adequate sight lines
	Avoid tunnels, narrow paths and other entrapment spots or isolated areas
	Encourage a variety of uses to ensure round-the-clock activity
Variety and complexity	Break up long streets with parks and other diverse, colourful and interesting public spaces
	Avoid monotony, in terms of either appearance or use
	Avoid uniform planning regulations
	Create a sense of identity (i.e., have a common vocabulary for buildings and public spaces)
	Encourage every price point to live around transit, i.e., provide affordable housing options
Connections	Design relatively small blocks (i.e., a proposed average block perimeter limits is 400–450 m)
	Provide pedestrian-friendly street networks that directly connect local destinations (i.e., pedestrian cut-through paths)
	Avoid cul-de-sacs
	Avoid barriers such as highways or large parking lots
	Prefer grid street networks
Facilities/logistics	
Pedestrian/cyclist orientation	Apply traffic-calming devices such as signal timing, speed bumps/tables, medians, undulating roads (chicanes), small curb radii, lower speeds and narrow roadways. Provide buffers that separate moving traffic from pedestrians (i.e., through landscaping elements such as trees, flower boxes or grass strips, or special features such as different materials or curb bulb-outs)
	Provide a continuous network of pavements/sidewalks
	Set maximum and minimum pavement/sidewalk widths (to accommodate pedestrian traffic but not appear empty); a recommended range is 1.5–7 m
	Provide bicycle stations at major stops
	Provide secure bicycle parking at more minor stops
	Allow two- or four-lane streets maximum (with rare exceptions)
Transit in the urban pattern	Locate transit stops in the centre of the community rather than on the periphery
	Ensure high-quality design of the main transit stop
	Provide attractive, comfortable, informative and sheltered transit stops
	For underground stations: open up stairs and escalator area for easy and pleasant access
	Ensure modal integration, i.e., connections between buses and trains
Car movement and parking	Eliminate minimum parking requirements and require maximum parking requirements (up to 9% of the surface area)
	Apply flexible parking standards
	Move parking away from the platform to open prime real estate for development
	Provide shared/pooled parking facilities
	Prefer enclosed parking over surface parking lots
	Wrap parking structures with service and entertainment establishments
	Place surface parking in the back of buildings and wrap with walls or hedges
	Allow on-street parking
	Allow park-and-ride lots to be used for other activities past business hours
Process	
Timeframe	Design with short- and long-term timeframes in mind
	Take an 'evolutionary' approach to development, with layering and infill over time
	Factor in the possibility of future growth
	Allow uses (functions) to change easily over time
Public engagement	Include various stakeholders in the design stage
	Use visioning and communication processes to elicit design ideas and create the design plan
Programming	Plan events and activities in public spaces (i.e., concerts, flea markets, farmers' markets, art shows, outdoor theatre etc. occurring at different times of the day, week and year)
Maintenance	Budget for maintenance requirements, especially landscaping and greenery

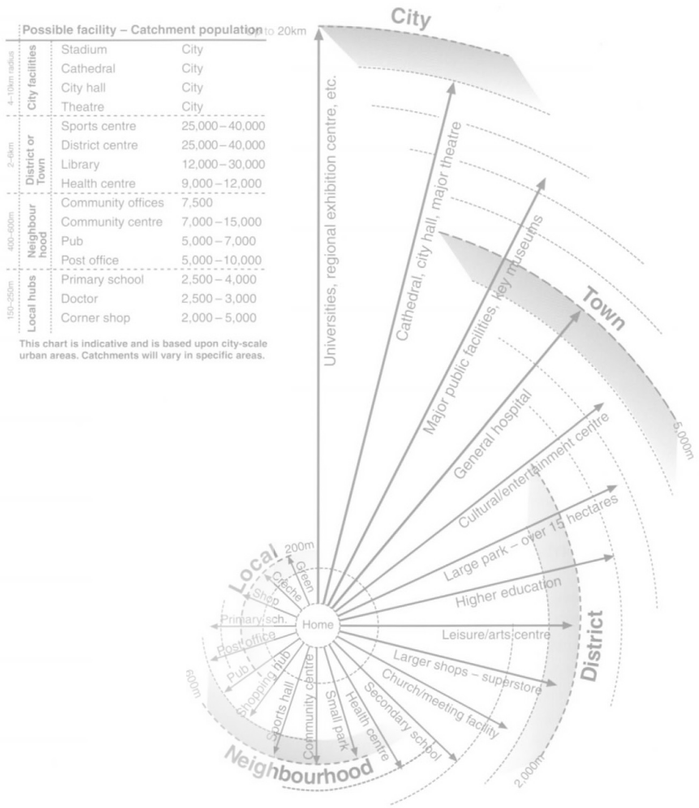


Fig. 29 Funtions and Catchement population
Source : (Urban task force, 2005)
Fig. 30 Instruments for TOD implements. Source : (Thomas, et al., 2018)

Governance instruments	Financial instruments	Legal instruments
Design competitions	Assessment districts	Unbundled parking
Area concessions	**Tax increment financing (TIF)**[b]	Long land lease
Organic development	Owner shareholder constructions	Temporary lease/functions
Urban land readjustment (ULR)[a]	Owners association on location level	Vacancy legislation
Building claim model	Transportation utility fees	Guarantee requirements
Private maintenance of public space	Co-financing	Open zoning plan
Collective actions for housing development	Development fees/impact fees	**Transferable development rights (TDRs)**[d]
	Funding constructions	Transferable CO_2-emission rights
Public developer	**Business-improvement district (BID)**[c]	Design–build–finance–maintain(–operate) contracts (DBFM(O))
Regional development company		Building envelopes
Alliance/coalition model		Exploitation permit
Area development company		
Supply chain arrangements		



INTEGRATED APPROACH TO DENSIFICATION

By integrating the two-network strategy with the concepts of transit-oriented development and socio-ecological integration, a complex relationship is made explicit between mobility networks, ecological networks and their impact on building functions and densities. The two-network strategy utilises mobility and ecological networks to distribute activities and functions in the city. This model allows the activities associated with the networks to work in synergy with intrinsic characteristics of the respective networks. Further, it can allow for diverse spaces and experiences within the city. The integrated strategy proposed, relates this network distribution to the flow and concentration of people in the city, by defining configuration of building density and functions through the concept of TOD and social and ecosystem infrastructures through Socio-ecological integration.. This provides a framework of growth that not only facilitates the “fast lane” and “slow lane “, but also points of densification based on the public mobility network and the scale of activities and accessibility as related to the ecological network. Conversely, these points of densification are required to facilitate the urban transformation to allow for the slow and fats lane.

This approach has the potential to transform the spatial conditions in the city through different means. The primary aim of the transformation is the creation of more accessible green spaces, public places and liveable environments in the city. It promotes a shift towards public transport, from private motorised vehicles, allowing the decrease in congestion of roads in the city, leading to a better environmental quality and well-being. The inclusion of the ecological systems as part of the accessible urban fabric and a part of daily life patterns adds to the quality of open spaces in the city. Conversely, it also helps better manage the fragile ecological systems in the city.

As the strategy describes relational qualities and not absolute quantities, it allows for flexibility in the actual implementation in terms of urban form, spatial definitions and functions. The strategy is a tool that establishes a network thinking in the city that guides the movement of people through it, identifying potentials based on location, scale and interrelations amongst the networks. The integrated strategy can be utilised as a trans-scalar design and planning tool. At the city scale, it can facilitate a common spatial framework for the different projects the city is undertaking, in terms of mobility networks, ecological restoration and densification, to find synergies that enable liveable environments. At local scales, it can indicate the spatial strategies that are required to ensure that the networks function as intended. This process puts the long-term well-being of the people of the city at the forefront of the design and planning process, by facilitating a more liveable city that is walkable, accessible and fosters a positive relationship with the ecological systems present

LIVEABILITY IN THE INDIAN CONTEXT

(Bosselmann, 2008)



Fig. 31 Spatial indicators of liveabilty. Source : (Ministry of Urban development, 2017)

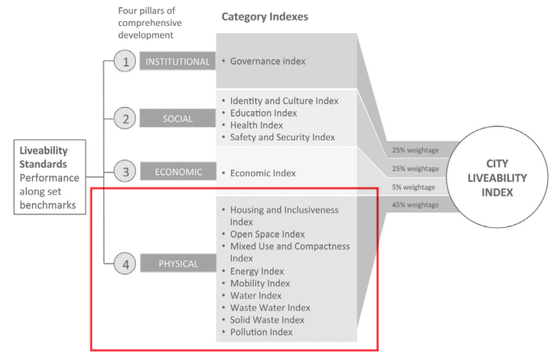
The term liveability was originally used to describe neighborhoods qualities that facilitated spaces that were relatively free of intrusions. This has however evolved to include not only proper traffic management in neighborhoods, but also the qualities associated with human life integrated with ecology, personal safety, comfort, accessibility to services and transit within walking distance. (Bosselmann, 2008)

Liveability is a qualitative measure of individual perception rather than a quantitative measure of spatial qualities. refers to the individual perception and cognition of the environment, where people associate certain positive qualities to physical attributes such as traffic, comfort in outdoor space, places to walk and sound ecology - an integration of human activities with the forces of nature. (Bosselmann, 2008). The subjective notion of this concept results in indicators of liveability being very culturally specific. Therefore, when designing liveable environments, emphasis must be placed on the Indian context, Chennai city context, as well as the different lifestyles of the diverse groups of people living in the city.

The wider scope of Liveability is closely associated with the more specific qualities of vibrancy and vitality in a living environment. Urban vitality refers to the beneficial qualities found in dense and heterogeneous environments and its positive impact on the functionality and desirability of the space. It essentially stems from the argument for mixed-use and compact environments. Urban vibrancy refers to the spatial quality that facilitates diverse environments and activities. These concepts also have a direct correlation with built density, as often, a higher density has the potential to allow for higher urban vitality and vibrancy, which can lead to increased liveability.

The need to create more liveable cities has been one of the issues identified in Indian cities in recent times (Ministry of Urban development, 2017). During the process of economic develoment, these cities focussed on merely providing basic infrastructure, amenities and emplomentoppurtunities, rather than a focus on any form of quality of life. However, as the cities become more globalised and people progress economically, the need for higher living standards has shifted the conversation to the standards the need to think about liveabilty.

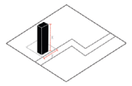
The concept of liveability has a spatial, economical, social and institutional dimension to it. As this project uses public spaces as a tool to create liveabilty, the focus will on the spatial indicators of liveability. Fig.32 shows the spatial indicators of liveability identified by the Ministry of Urban development in the Government of India, in the document “Liveability standards in cities” These indicators need to be further tested against local perceptions to validate them.



Housing and Inclusiveness	7.1 Percentage of Slum/EWS households covered through formal/ affordable housing	C	Target 1.4 Indicator 1.4.2 Target 11.1
	7.2 Percentage of slum areas covered through basic services	C	Target 1.4 Indicator 1.4.1 Target 11.1
Public Open Spaces	8.1 Per capita availability of green spaces	C	Target 11.7
	8.2 Per capita availability of public and recreational places	C	Target 11.7
Mixed Land Use and Compactness	9.1 Share of mixed land use area in overall city land use	C	Target 11.3
	9.2 Net Density	C	Target 11.3
Transportation and Mobility	11.1 Geographical coverage of public transport	C	Target 11.2
	11.2 Availability of public transport	S	Target 11.2
	11.3 Mode share of public transport	C	Target 11.2 Target 12.2
	11.4 Percentage of road network with dedicated bicycle tracks	C	Target 11.2
	11.5 Percentage of interchanges with bicycle parking facilities	S	Target 11.2
	11.6 Mode share of non-motorized transport	C	Target 11.2 Target 11.3 Target 12.2
	11.7 Availability of Passenger Information System	S	Target 11.2
	11.8 Extent of signal synchronization	S	Target 11.2
	11.9 Availability of paid parking spaces	C	Target 11.3
	11.10 Percentage coverage of footpaths – wider than 1.2 m	C	Target 11.2 Target 11.3
	11.11 Percentage of traffic intersections with pedestrian crossing facilities	S	Target 11.2
	11.12 Extent to which universal accessibility is incorporated in public rights-of-way	S	Target 11.2

BUILDING RULES AND SPATIAL FORM OF THE CITY

(Lehnerer, 2013)



Building regulations are often designed to just determine the constraints a developer must comply with. However the effects of these rules transcend the scale of a building, and determine the spatial pattern of cities. Conversely, building regulations are constantly informed by the needs of the city, as it grows.(Lehnerer, 2013)

Understanding the set of rules that govern city development is a tool to unraveling the complex nature of cities. While the rules together result in the complex form of the city, each rule by itself, has a simple and clear purpose. Quantifying these relationships allows for the use of regulations as a tool to steer development and urban transformation.

Chennai is a city whose rapid development is very heavily driven by the market forces. In this context of fast paced growth of the city, understanding the role of regulation in shaping the city towards a vision is an effective method of facilitating liveable environments through urban transfrmation in the city.

THEORETICAL INPUT

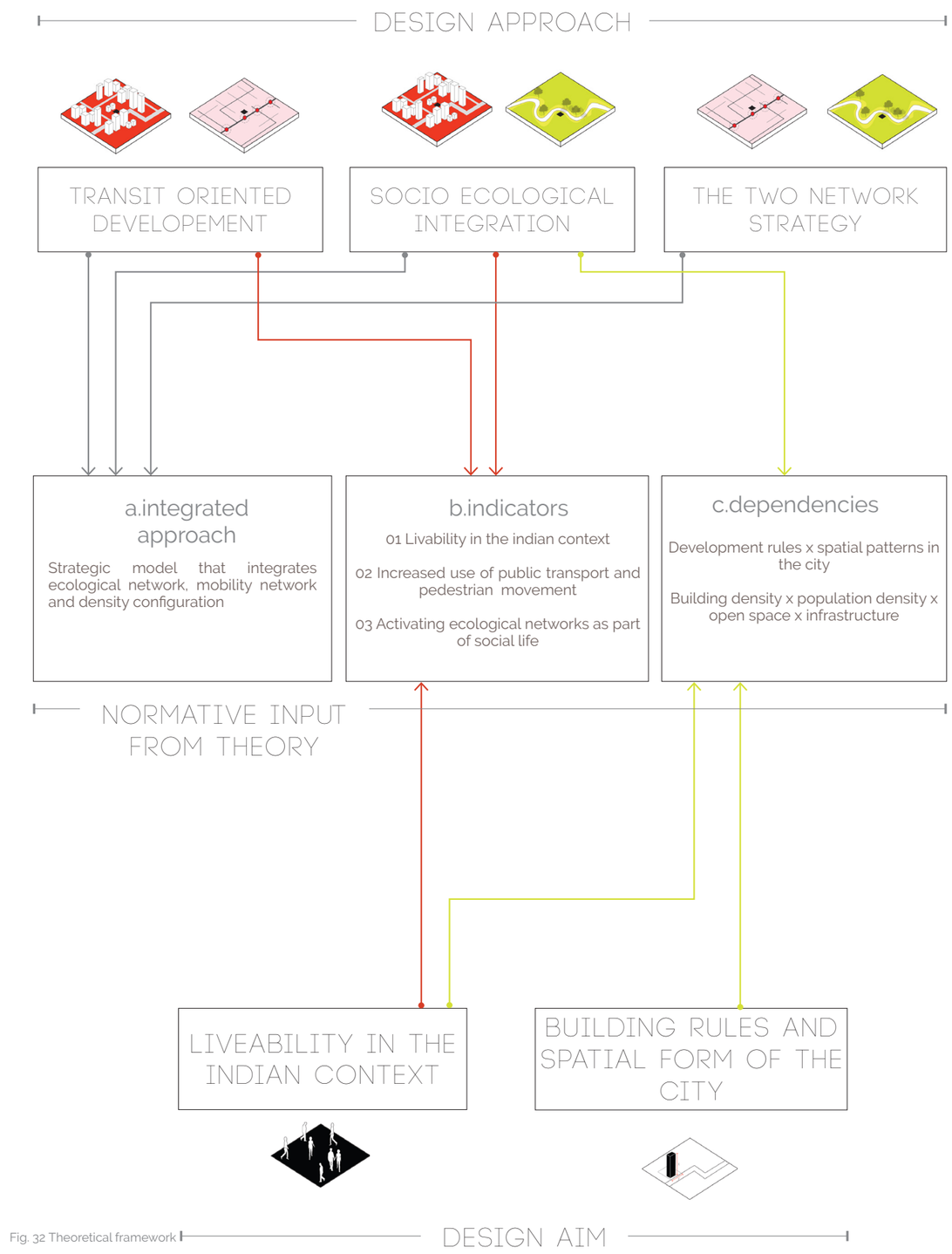


Fig. 32 Theoretical framework

2.4 CONCEPTUAL FRAMEWORK

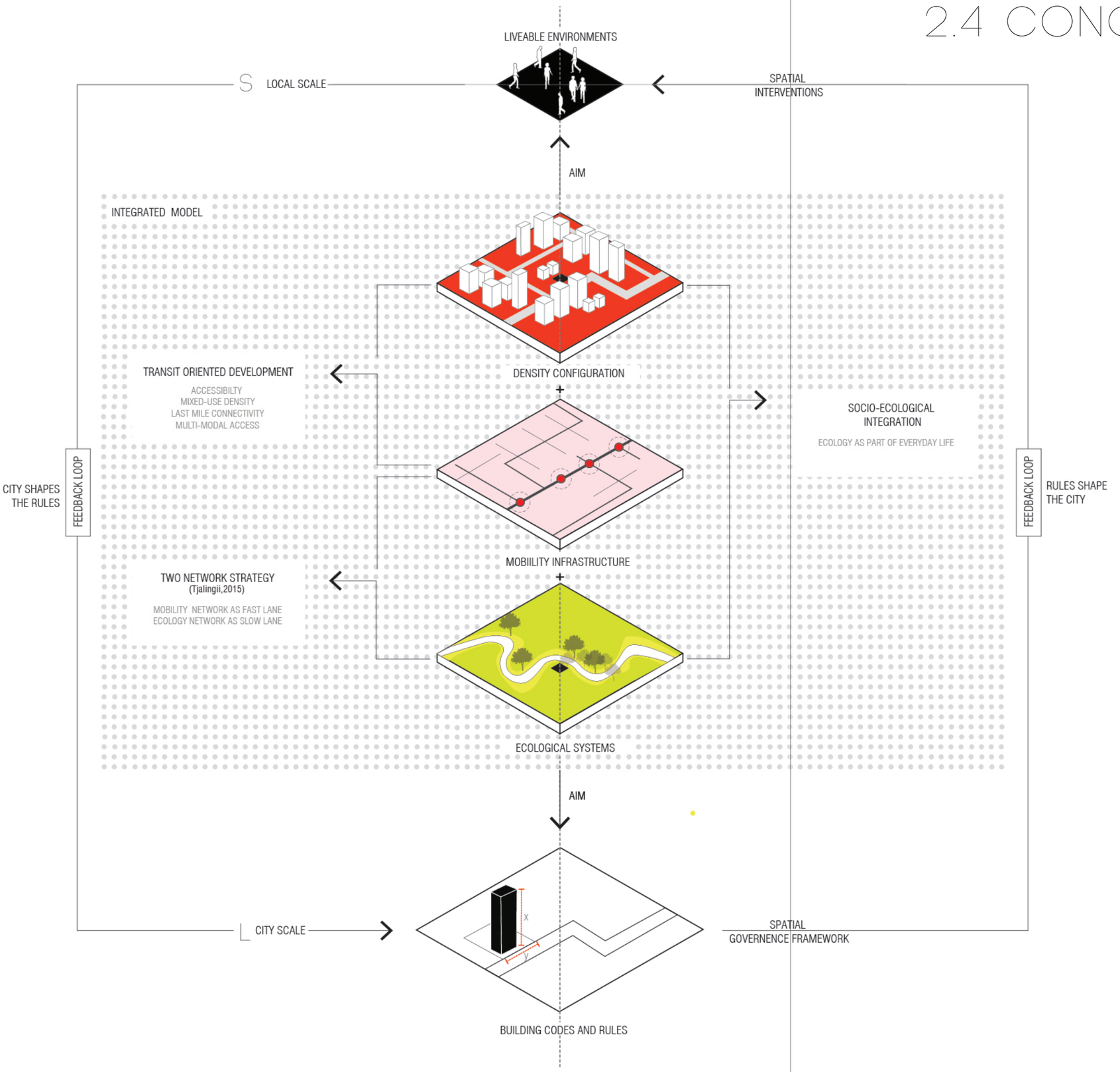


Fig. 33 Conceptual framework

The conceptual framework depicts the project's approach to use the densification process as a holistic approach that takes into account ecological and mobility systems in order to shape liveable environments. Therefore, an understanding between these three layers is required to form a strategic integrated model of development for the city. This requires an understanding between the different systems, individually.

The Transit oriented development (TOD) model puts forward a strong relationship between mobility networks and building density. While this organisation ensures an increased use of public transport and an efficient network that avoids congestion and maximises accessibility, the challenges to this model in the Indian context and more specifically in the context of Chennai must be addressed, as mentioned in the previous sections.

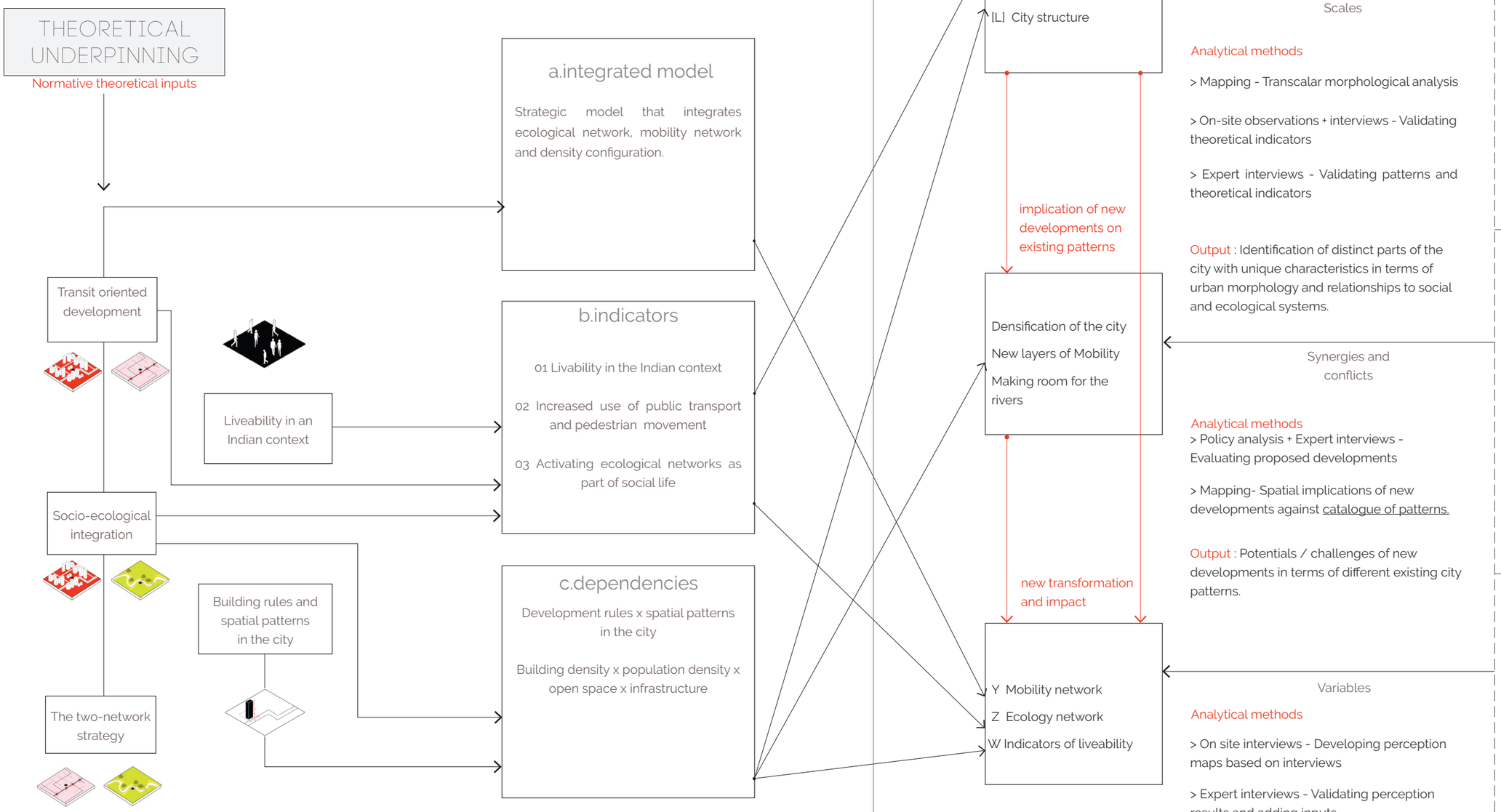
The two network strategy considers ecological and traffic networks as carrying structures for urban development and proposes a city model based on a balance between them (Tjalingii,2015) This allows the mobility network, or the fast lane, to become the competitive, economically driven network, while the ecological network, or the slow lane, becomes the social and recreational driven network. This is specially relevant in Chennai, where the ecological systems are completely neglected and excluded from the urban fabric.

It is very important to consider the social integration of the ecological system in the city with the built environment, ensuring it becomes a part of everyday life in the city, creating a sense of responsibility to protect them.

2.5.1 ANALYTICAL FRAMEWORK

The analytical framework diagram presents expected process of analysis based on the methods and outcomes specified, and the input from the theoretical framework. The process of analysis is split into three stages, patterns, intentions and explorations. "Patterns" is a morphological approach to identifying the patterns that occur in the city, across scales. "Intentions" is the study of the visions and development plans for the city. "Explorations" is the evaluation of the site against the indicators from literature, and testing of new design ideas in these urban environment, using the input from the first two stages of the analysis process.

Fig. 34 Preliminary research framework



2.5.2 ANALYTICAL FRAMEWORK

FIELD WORK

The field work consisted of four components :

a. Site visit and observation : This was an observation of the sites in order to understand the spatial qualities that exist, in terms of street character, public space and functions in order to understand the public realm.

b. Site interviews of local residents : These interviews were conducted in a semi-informal manner, with the same questions being asked across all the sites to people of different age groups and economic status. The aim was to understand the peoples perception of the city, specifically the public realm in terms of their mobility patterns, public space use patterns and the perception towards the water systems in the city.

c. Expert interviews : Experts who had experience with urban design and construction in the city and working with the Chennai corporation were interviewed for a professional opinion on the current state of densification in the city, the shift to TOD and the water restoration projects. They were also asked to weigh in about the nature of public space in the city.

d. Academia interviews : An interview with a person of Academia was conducted to receive input on the methodology of the project, specifically the contextual adaptation of certain theoretical frameworks used.

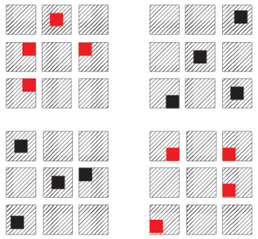
This process gave rise to insights about the general potentials and challenges found in the city as well as specific ones in the chosen sites, in the form of micro analysis. This is explained as part of the analysis section.

The complete transcripts of the interviews can be found in the Appendix section.

Fig. 35 Image from field work conducted along OMR, Chennai. Source : Author

2.6 DESIGN GOALS AND STRATEGIES

DESIGN AS A RESEARCH PROCESS

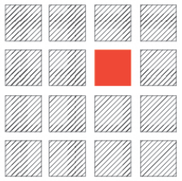


This project utilises design as part of the research process. The different relationships between systems and the integrated model will be tested through design scenario explorations, which will in turn inform the relationships. Further, the aims of this project, at both the local and city scale, are not seen as only the final goals, but as an evolving process where one receives feedback from the other. Therefore, the relationship between building regulations and rules, and the quality of spaces at the local scale will also be made explicit.

DESIGN INTERVENTIONS

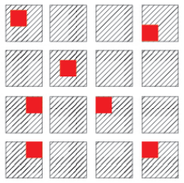
The locations chosen for design interventions in this project will consider two different approaches. 01 projects that are key strategic points to the city. 02 identification and classification of typical locations in the city

KEY INTERVENTIONS



Key locations are those which have a major impact on the city and will restructure functioning at a city scale. Design interventions in these locations will be very specific to the local site.

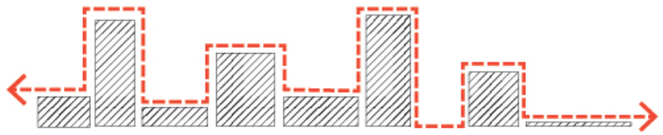
TRANSFERABILITY



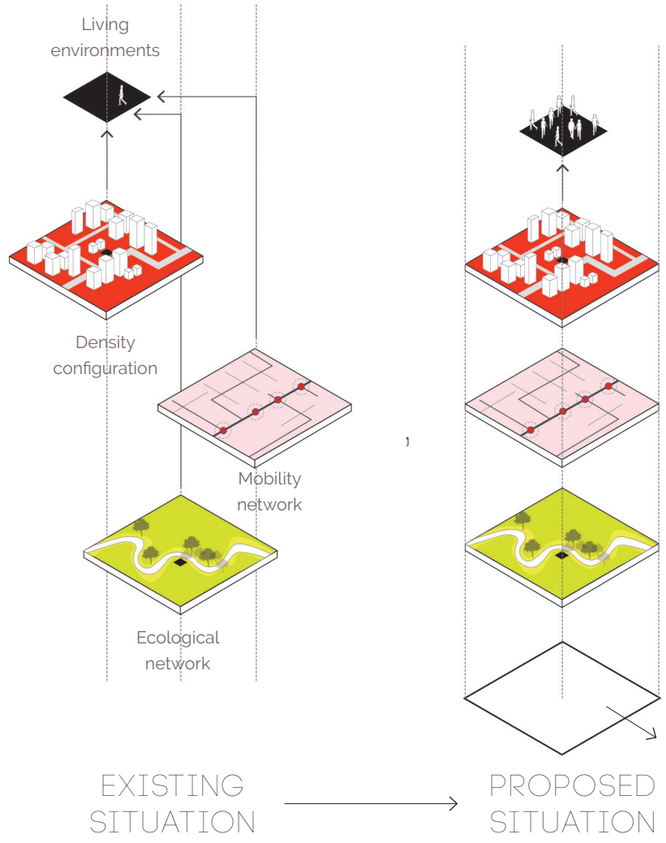
Extrapolating general design strategies for different contexts of the city from typical sites. Transferable aspects of the local scale design intervention will inform the building and development rules at the city scale. Conversely, the general strategic model will be adapted to the specific local context as well.

DESIGN INFORMED BUILDING RULE POLICY

Transferable general strategies from different sites will be used to determine larger building regulations. This interventions can then be tested at various local sites to understand the diversity of outcomes

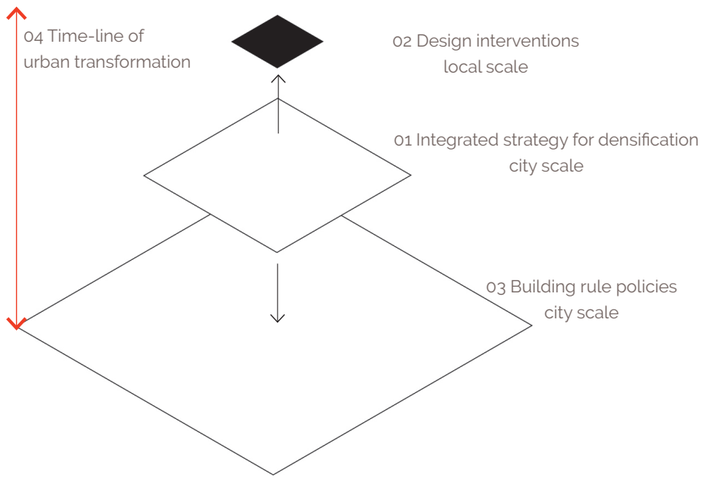


INTENDED OUTCOMES



Chennai is currently undergoing several major transformations with respect to the densification of the city, expansion of its public transport networks and the restoration of its rivers. These projects are being undertaken as a knee-jerk reaction to increasing population, vehicular congestion and recurring floods, without considering the interrelationship amongst them. This results in a negative impact to the living environments in the city. This project proposes an integrated strategy that will consider these different aspects in a holistic manner, identifying the synergy between these different undertakings, with the focus of creating more liveable environments for the people of this city.

Fig. 36 Existing vs proposed situations
Fig. 37 Intended design outcomes



This project proposes an 01 Integrated strategy for densification, to enable more liveable environments in the city, using 02 local design interventions to inform as well as test this strategy. The strategy, which restructures the density configuration, mobility and ecology networks at the city scale, with evidence of its application at the local scale, is used to propose a 03 revised building policy for Chennai. Further, the different scales of implementation (city scale to local scale) and types of outcomes (spatial component and policy component) are proposed through 04 a time-line of urban transformation.



03 ANALYSIS

Chapter overview:

The next section covers the three stages of analysis - Patterns, Intentions and perceptions. This is used in the process of site selection for future design testing and interventions. Patterns is a morphological study of the city, understanding the evoluiton of various urban patterns that exist in Chennai city. Intentions is the study of new urban develpments in the city, pertaining to the research topic, with an anlysis of its potential effects of transformation. Perceptions is a study of peoples views towards different aspects of the city, like public spaces and ecological systems, as well as a study of daily patterns of the residents. This section includes a large portion of the field visit study.

Chapter contents:

3.1 Patterns
3.2 Intentions
3.3 Perceptions
3.4 Conclusions

3.1 PATTERNS

Peoples perception towards the water system in the city was evaluated. They were asked about their hopes for these locations, post the cleaning process. Experts were asked for their opinion of the ongoing restoration

Fig. 38 Perungudi pond Source : Author

3.1.1 PATTERNS: MORPHOLOGICAL EVOLUTION

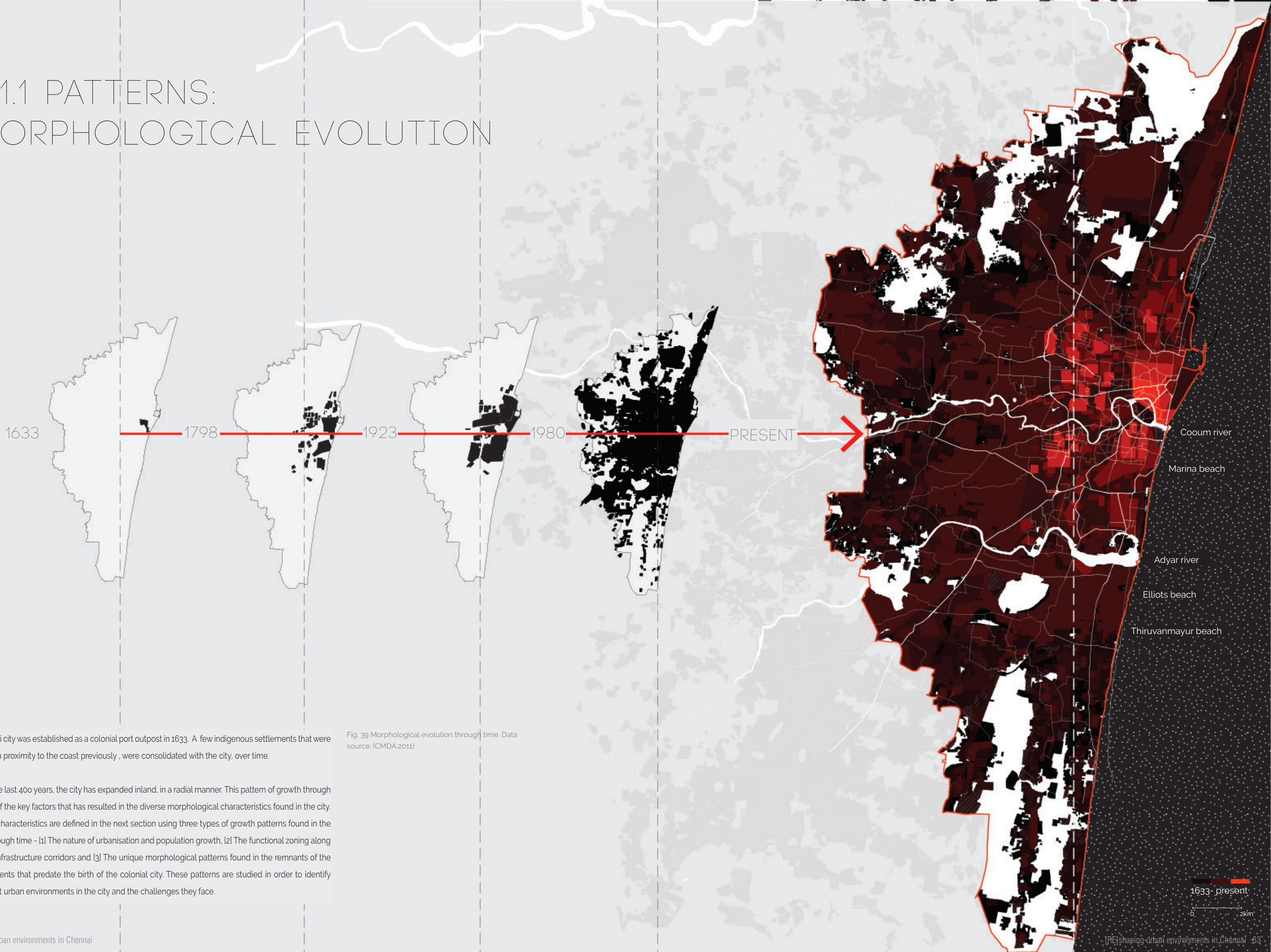


Fig. 39 Morphological evolution through time. Data source: (CMDA,2011)

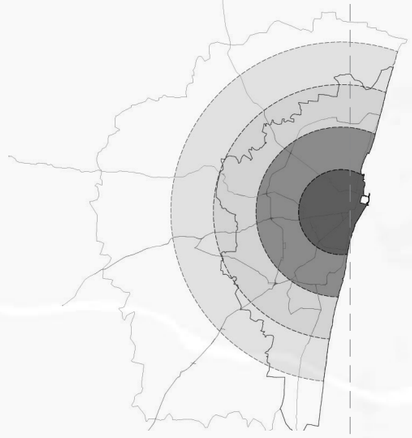
Chennai city was established as a colonial port outpost in 1633. A few indigenous settlements that were found in proximity to the coast previously , were consolidated with the city, over time.

Over the last 400 years, the city has expanded inland, in a radial manner. This pattern of growth through is one of the key factors that has resulted in the diverse morphological characteristics found in the city. These characteristics are defined in the next section using three types of growth patterns found in the city through time - [1] The nature of urbanisation and population growth, [2] The functional zoning along major infrastructure corridors and [3] The unique morphological patterns found in the remnants of the settlements that predate the birth of the colonial city. These patterns are studied in order to identify different urban environments in the city and the challenges they face.

3.1.1 PATTERNS: MORPHOLOGICAL EVOLUTION

URBANISATION AND POPULATION GROWTH PATTERNS

There are distinct rings from the centre of the city, at radii of 5km, 10km, 15km and 20 km, where the population density, rate of population change and nature of urbanisation varies drastically. (Dowall & Monkkonen, 2007) Chennai as a city is constantly densifying along the periphery, creating a situation of sprawl. However, this does not result in a de-densification in the centre, as seen in most western countries. To the contrary, the population in the central ring is also rising, though as a percentage of total population, it s dropping.



FUNCTIONAL ZONING PATTERN ALONG MAJOR INFRASTRUCTURE

Chennai has grown inland in the form of five radial corridors. Development in the city has followed this corridor pattern, with the zoning of major institutional, industrial and commercial functions placed along it. Therefore, this nature of zoning promotes private vehicular transit, with the corridors being highly urbanised, while the in-between areas are poorly developed due to lack of provision of basic infrastructure and amenities. This contrast becomes more pronounced as the corridors move away from the centre, where they are in close proximity, to the periphery, where they diverge.



BUILT ENVIRONMENT MORPHOLOGY

The portions of the city that are remnants of the per-colonial period are unique in their built characteristics. They are continuously built areas, without any setbacks within the parcels. This built form, combined with the narrow street configuration results in intimate, well enclosed streets that are t human scale.

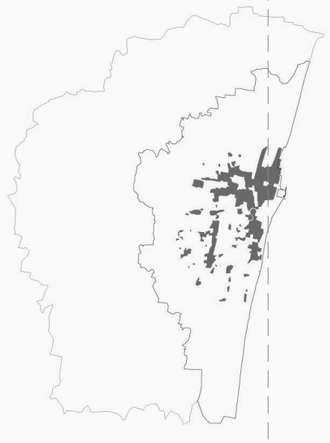
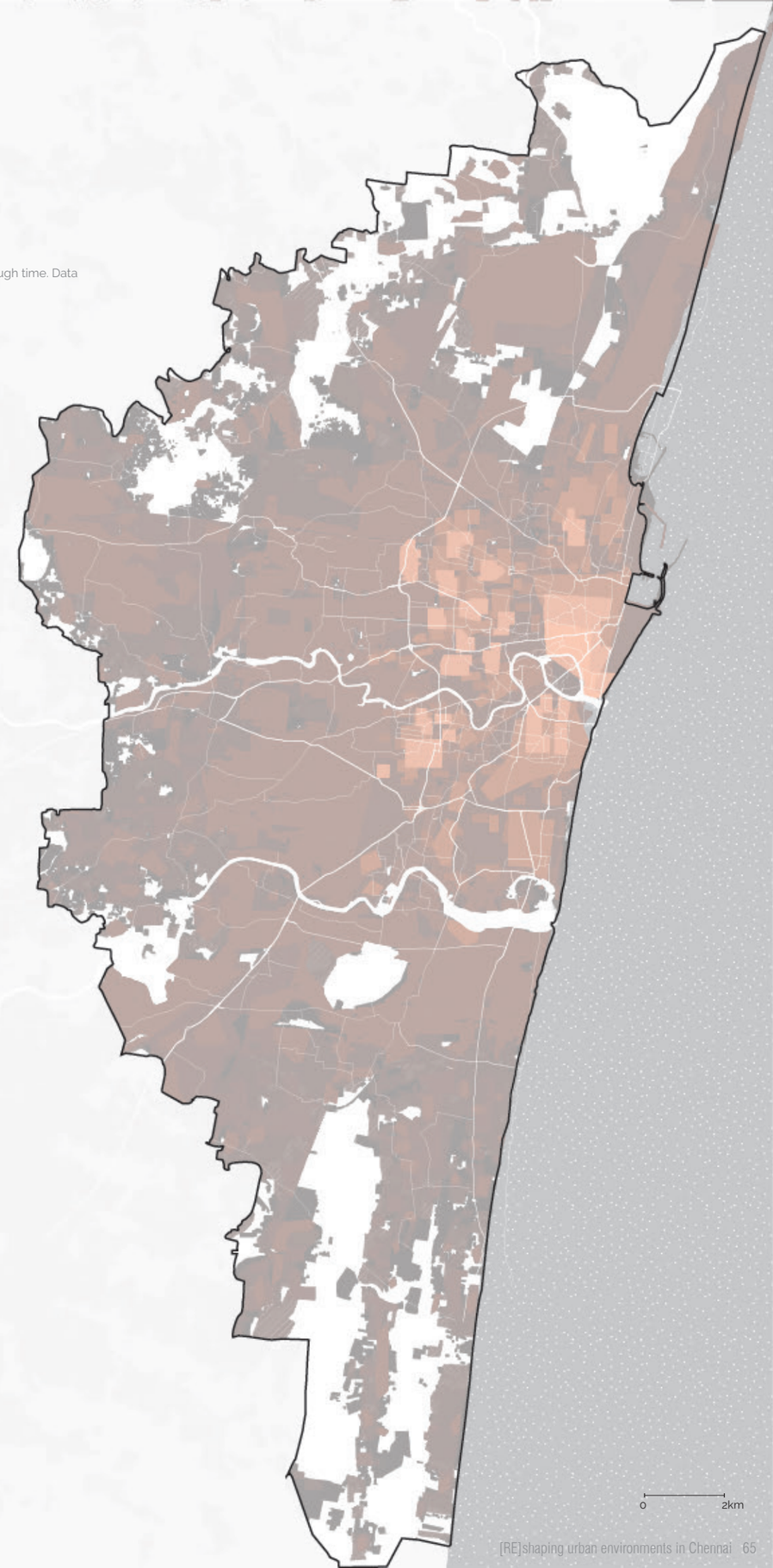


Fig. 40 Morphological evolution through time. Data source: (CMDA.2011)



3.1.1 PATTERNS: MORPHOLOGICAL EVOLUTION

URBANISATION AND POPULATION GROWTH PATTERNS

Chennai is a city that is consistently densifying at its core and sprawling along its periphery, simultaneously. Acording to Dr. A Srivathsan and M.S.S. Pandian, this gives rise to a city with three regions of distinctly identifiable characteristics, namely, "The Museum" , "The Backyard" and "The Exhibit". (Srivathsan,2015) (fig. 37.)

Fig. 41 Growth patterns, Chennai city. Data Source: (Dowall & Monkkonen, 2007)

1

For a radius of 5km form the centre of the city, total population has doubled (1971 -2001) without any significant new housing developments. Therefore, in this part of the city, people are living in increasingly congested environments. Further, the high population density in this part of the city is not due to high-rise buildings, but due to the fact that space per person is quiet low. Over the last few years, the population increase has significantly reduced, showing that the urban environment in its current configuration is saturated. (Dowall & Monkkonen, 2007) The availability of public transport, however, is very high in this part of the city, owing to the fact that the Chennai central station, a national train station, is present in this part of the city and therefore, all other transit modes have an intersection point here. As the oldest part of the city, all the major government buildings and other buildings of high historic and architecture value are found here.

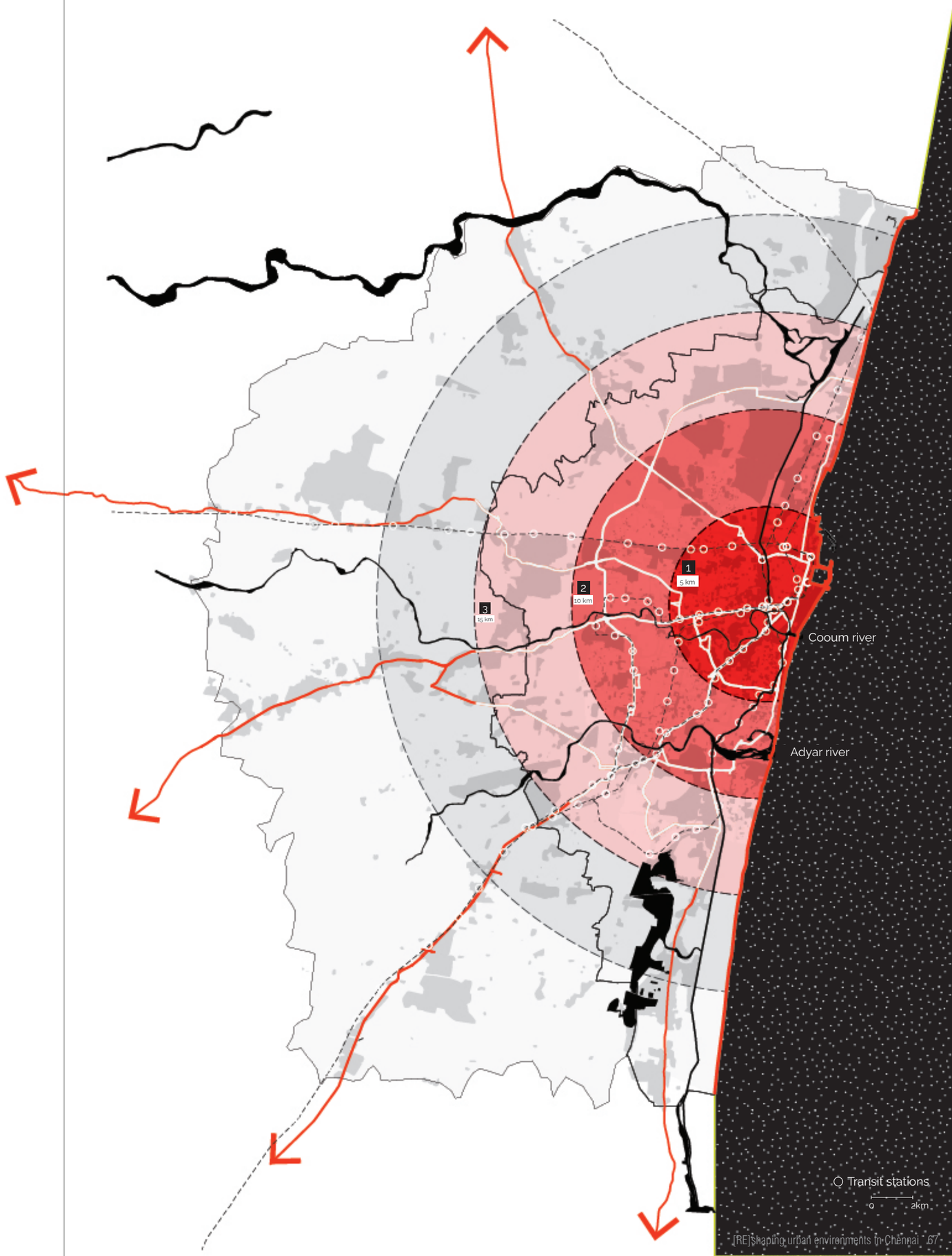
2

From a radius of 5km to a radius of 10km from the centre of the city,the locations with the highest real-estate prices exist. Similar to the first 5km, this part of the city has also saturated in terms of population growth. Most of the neighbourhoods in this part of the city are planned layouts frm the 60's, with grid patterns, planned parks and garden

3

Beyond the 10km radius from the city centre, is the fastest growing parts of the city. Along with a steady increase in population density, there is also an increase in percentage of total population in these regions. (Dowall & Monkkonen, 2007) The automobile industry and the Information technology industry, the two of the greatest contributing sectors in Chennai, are present in this region and as a result, offers the most opportunities for service sector jobs. The part of the city is being promoted and developed as a " Global city", with an attempt to create a westernised image of glass high rises. wide roads and luxury gated communities. (Srivathsan,2015)

The three parts of the city were formed during very different times and therefore, the urban fabric is drastically different between these areas. While the centre of the city carries over traces of it urban from four decades ago, the peripheries are being shaped today. As a result, these areas have very different set of challenges that face them in the process of densification, which is further discussed in the next section.



3.1.1 PATTERNS: MORPHOLOGICAL EVOLUTION

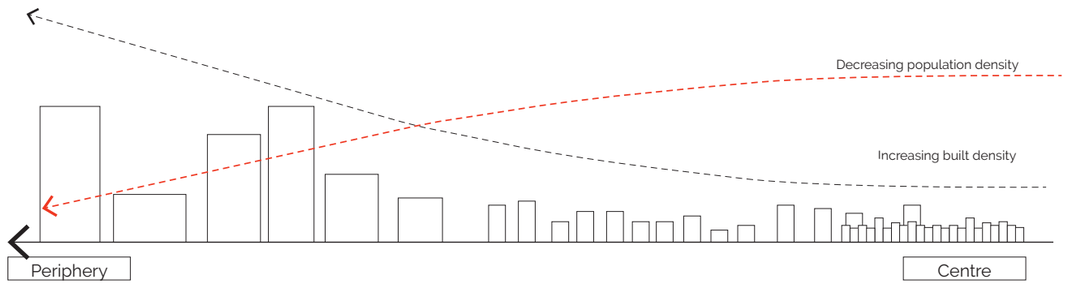
FUNCTIONAL ZONING PATTERN ALONG MAJOR INFRASTRUCTURE CORRIDORS

The developemt pattern of the city strongly follows the five major infrastructural corridors. These corridors are zoned with the important industrial and institutional functions, towards the periphery of the city. Therefore, these corridors have become highly urbanised, consisting of the major locations for employment in the city.

This pattern of developement result in very strong spatial contrasts in the city. The first contrast can be seen in the centre and the periphery. As the corridors diverge away from each other towards the perphery of the city, there are no strong transitions, perpendicular to the infrastructure lines. Therefore patterns of development , movement and use in these parts of the city are predominantly longitudinal. This leads to a situation of sprawl, high vehicular usage and high travel times in this part of the city. This is in contrast to the centre of the city, where the infrastructure network is well developed, at the point of convergence of the corridors, leading to well defined city blocks. The second major contrast can be seen in the peripheries of the city, between the urban environement along the corridor and that which is found in the interior areas, away from the corridors. This due to the development model implemented in the city, where only these corridors are provided with infrastructure and amenities for developement. This results in large parcels, high-rise offices and industries and high rise residential buildings along the corridors, while the interior areas are low rise- low dense environments, mostly residental in anture, lacking basic social infrastructur. Further, this was expained in a couple of the expert interviews as one of the reasons for the lack of strong neighbourhood charecteristics in the periphery of the city.

This project particularly focuses on two of the typicalcorridors in the process of site selection, the OMR corridor to the south, along the coast and the Poonamalee high road corridor to Banglore, to the West. While the OMR corridor houses the IT industry in the city, the Ponamalee high road is home to the auto industry.

Fig. 42 Morphological evolution through time. Data source: (CMDA.2011)
Fig. 43 Conceptual section - typical corridor charecteristics





3.1.1 PATTERNS: MORPHOLOGICAL EVOLUTION

BUILT ENVIRONMENT MORPHOLOGY

The continuously built areas in the city have a separate set of building laws governing them. These are the portions of the city where the urban fabric reflects the settlements that existed in the pre-colonial period. These areas are largly foun in the centre of the city. They consist of low rise high dense urban environments. They are charecterised by barrow streets and three to five storey builds of very small parcel sizes. This results in streets that are highly enclosed by the urban form andvery relatable to the human scale. These areas are often found in proximity to the very old temples in the city.

Due to the vehicular upgradation of all streets in the city, the streets f these continuous built areas are very congested, with a high degree of pedestrian-vehicle collision. Situated in the older part of the city, there is a strong juxtapoistion of these small continuously built environmnets and large institutional buildings, often with a strong architectural heritage.



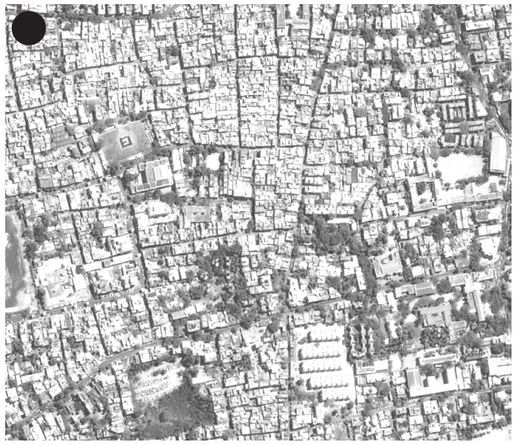
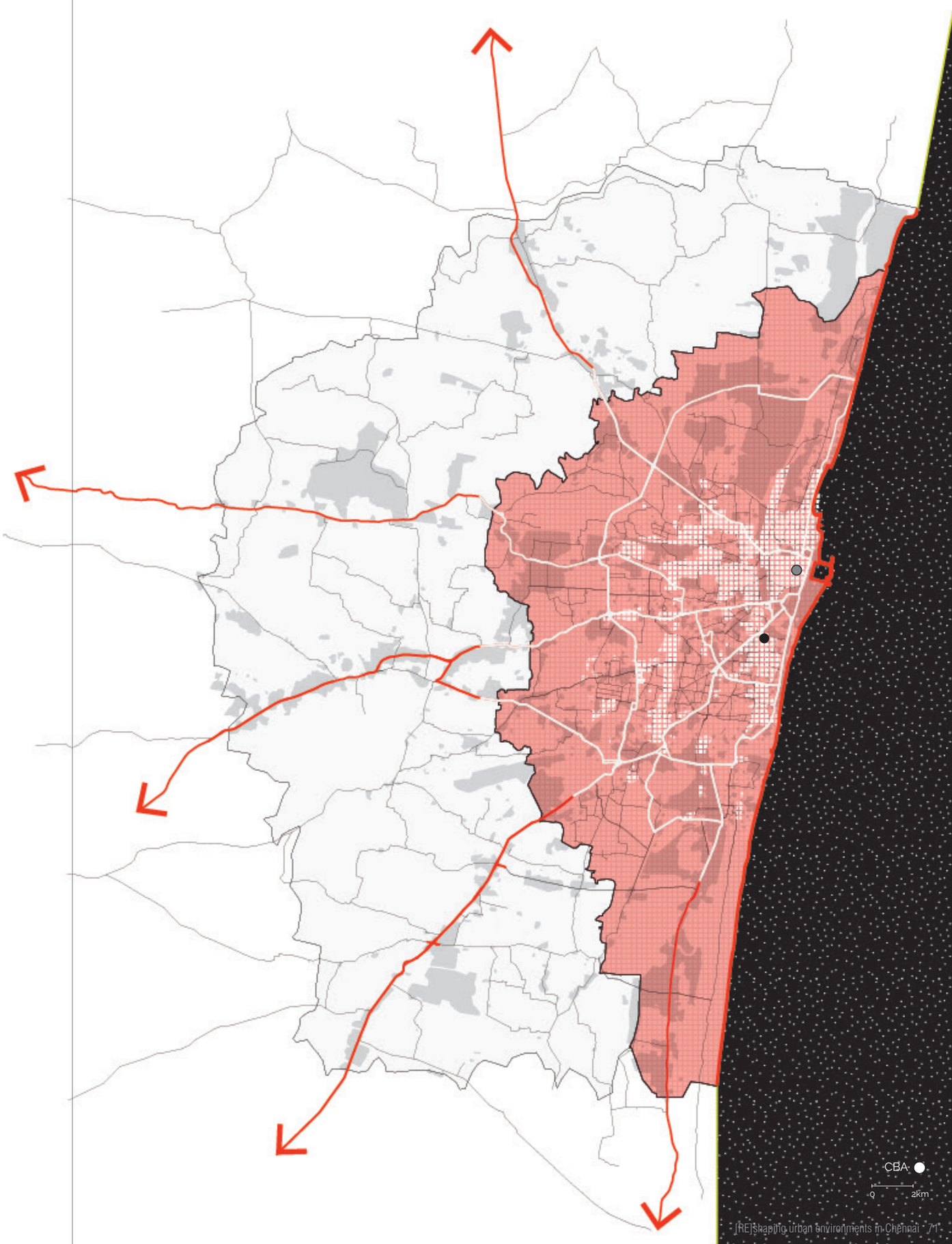


Fig. 44 Morphological evolution through time. Data source: (CMDA.2011)
Fig. 45 Plan of continuously built areas. Source: Google earth



3.1.1 PATTERNS: MORPHOLOGICAL EVOLUTION

SITE SELECTION

Looking at the three patterns together, certain common charecteristics emerge. Three locations with typical charecteristic were further chosen to analyse the network configurations and morphology patterns at a smaller scale.

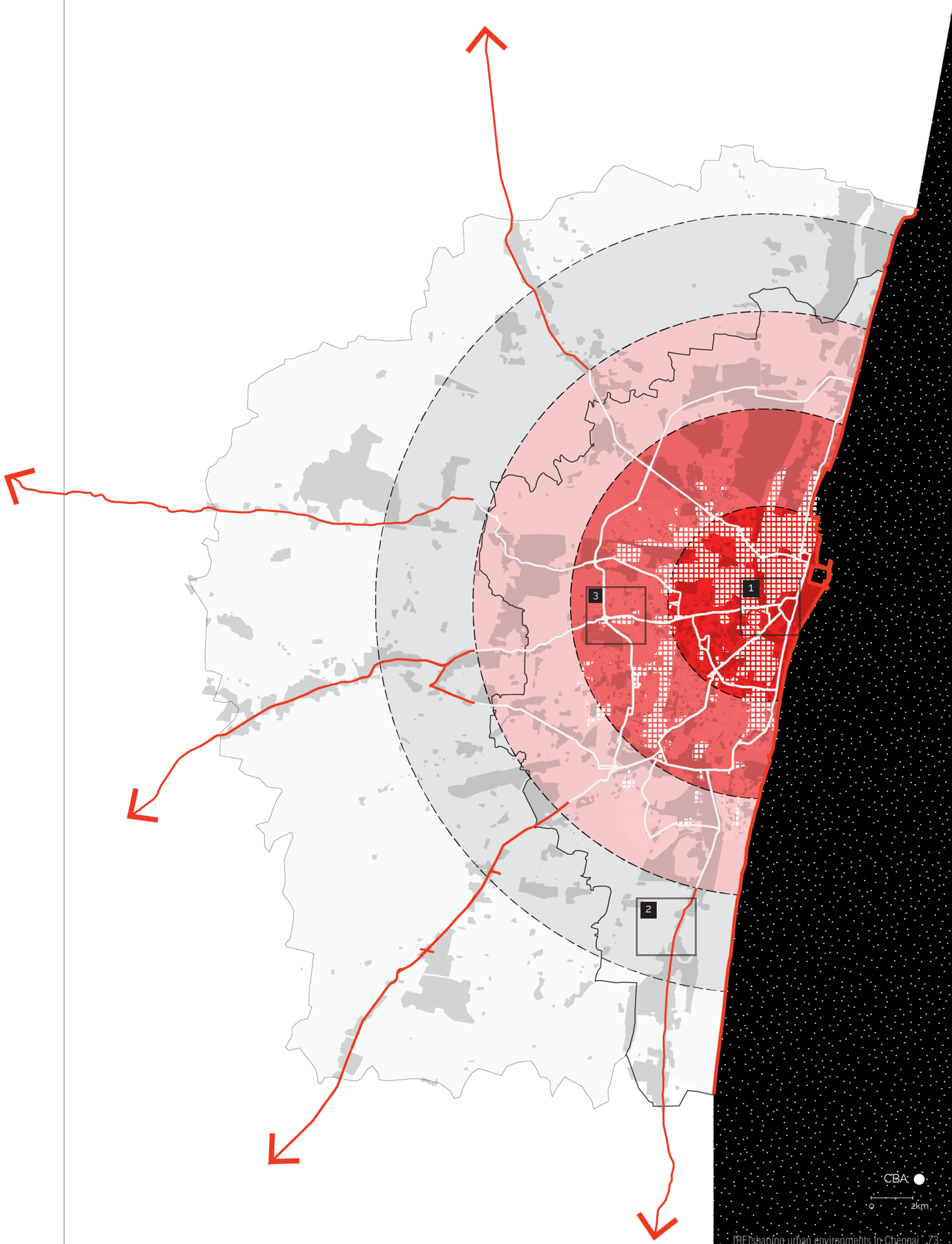
Location 01 : Located at the centre of the city, this area has a juxtaposition of continuously built environments which are low rise and high dense and larger institutional and government buildings. There is a lack of new developement in this part of the city, while the population here increases, causing increasingly congested urban environments.

Location 02 ; Located at the periphery of the city, this area is a fast developing loction, with a strong contrast between the high rise office buildings and residential complexes along the main roa dand the low rise low dense neighbourhoods in the periphery. This is one of the fastest growing parts of the city, with all new development focused along the main road.

Locatioon 03 : Located in between the centre and the periphery, this part of the city is almost completely saturated in terms of population gowth. However, there are gated community developments taking place here. There is a presence of larger residential parcels, the typical garden house parcels and a few larger commercial buidings present here.

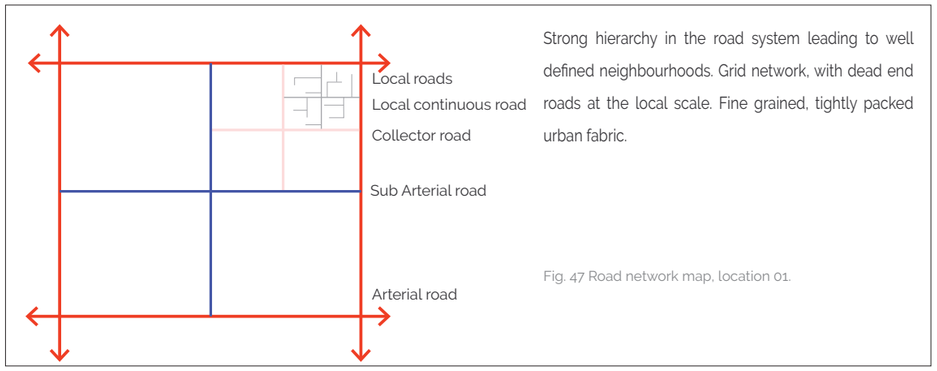
The next section further presents further analysis of these three locations at a smaller scale.

Fig. 46 Morphological evolution through time. Data



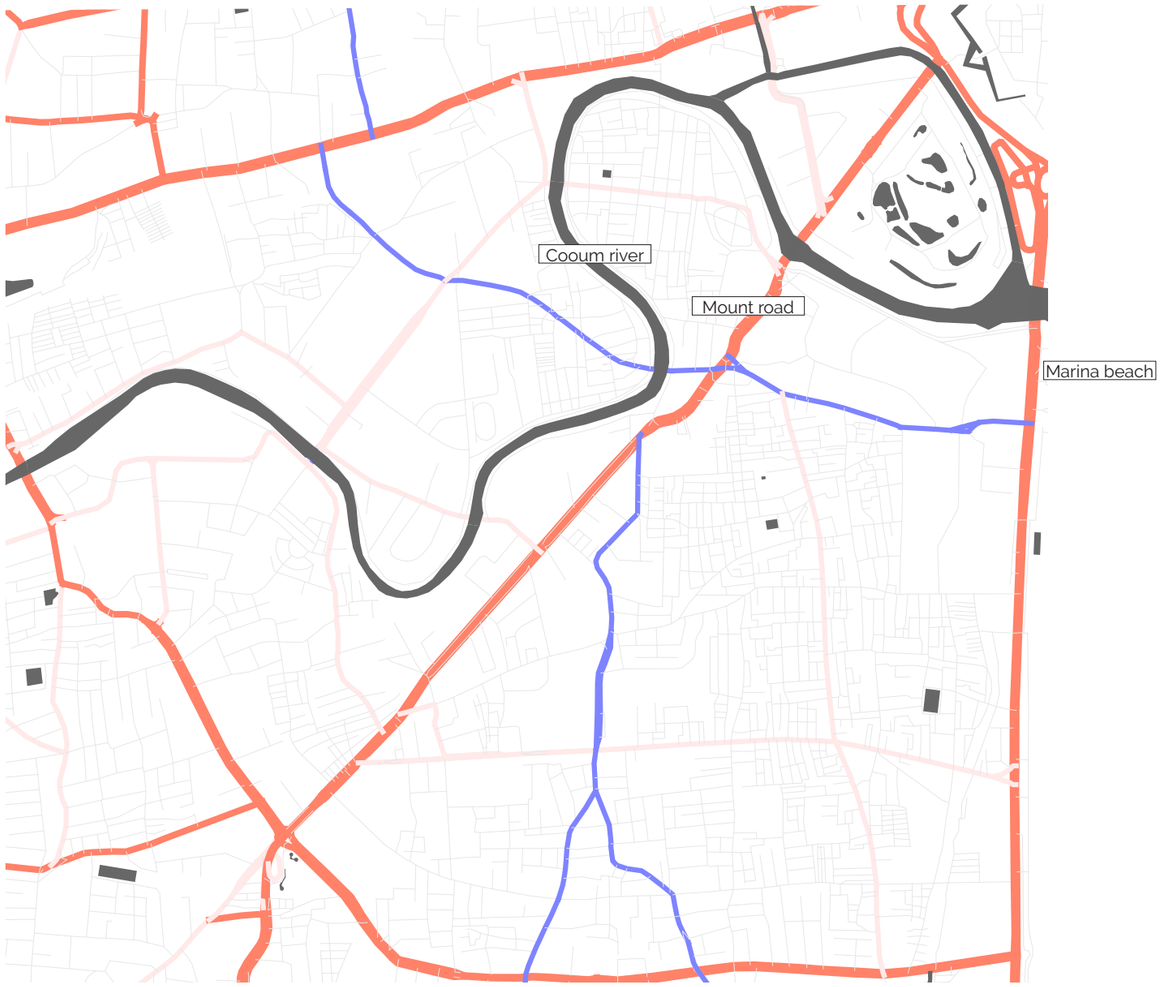
3.1.2 PATTERNS: LOCATION 01

EXISTING MORPHOLOGICAL PATTERNS



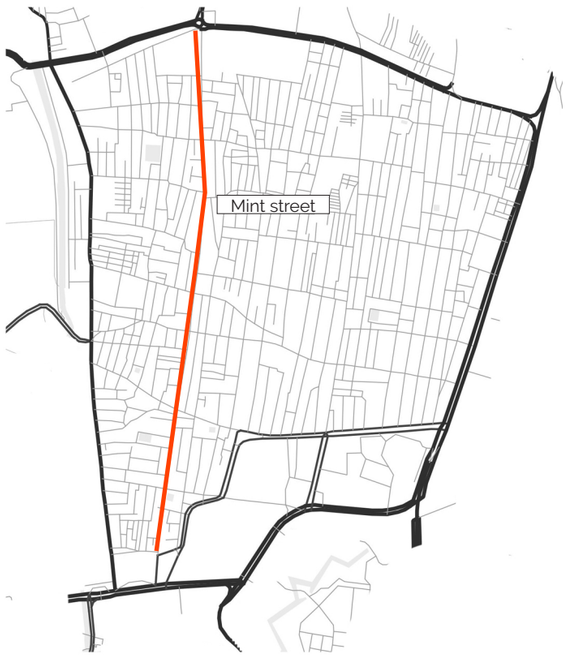
Strong hierarchy in the road system leading to well defined neighbourhoods. Grid network, with dead end roads at the local scale. Fine grained, tightly packed urban fabric.

Fig. 47 Road network map, location 01.



Analysing different areas in location 01, within a distance of 2km x 2km, the distinct street characteristics of the continuous built area can be seen, tightly packed, fine grained and highly vibrant and active with a lot of pedestrian - vehicle collisions. Close proximity to large institutional buildings and temples creates large, visual landmarks in the streetscape.

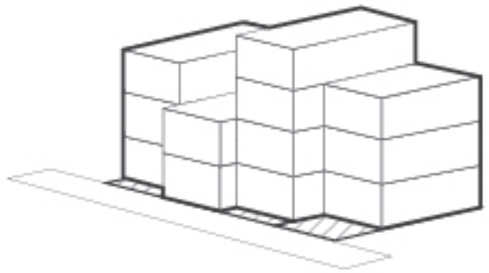
Fig. 48 2km x 2km zoom in , Location 01



GEORGE TOWN

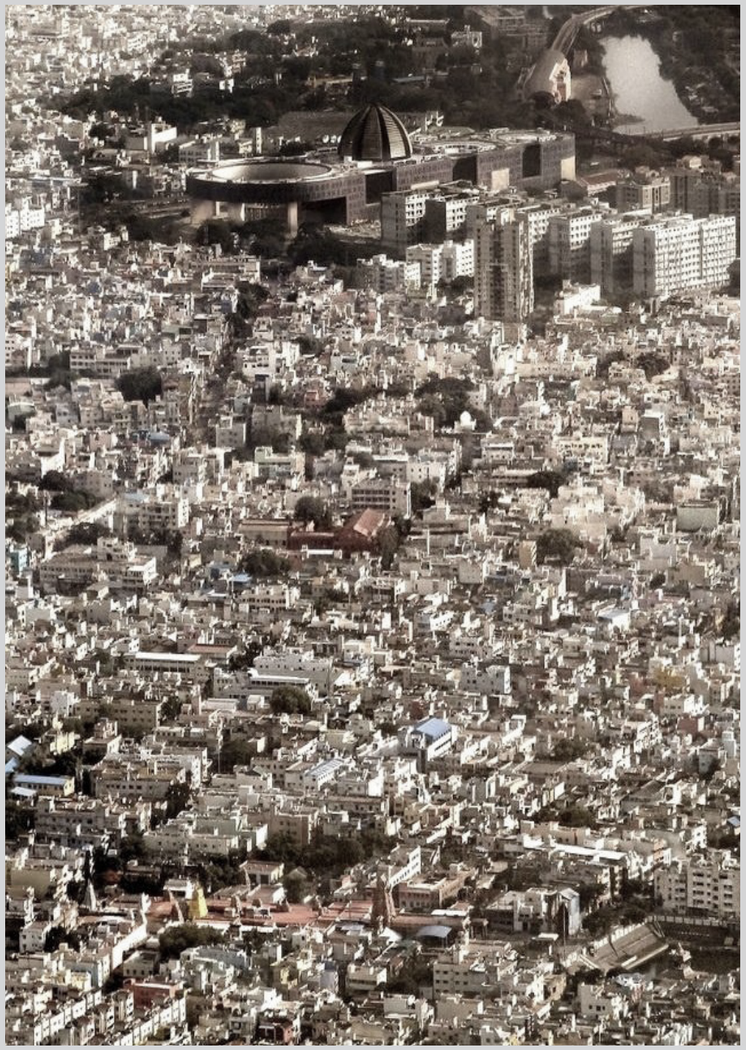


TRIPLICANE



3.1.2 PATTERNS: LOCATION 01

EXISTING MORPHOLOGICAL PATTERNS



Dense and compact inner city with a strong network. Plenty of important institutional buildings are present in theis portion of the city.

Fig. 49 Urban fabric in Chennai centre. Source : https://www.indiatimes.com/news/india/15-stunning-images-of-chennai-from-10000-ft-above-sea-level-244693.html

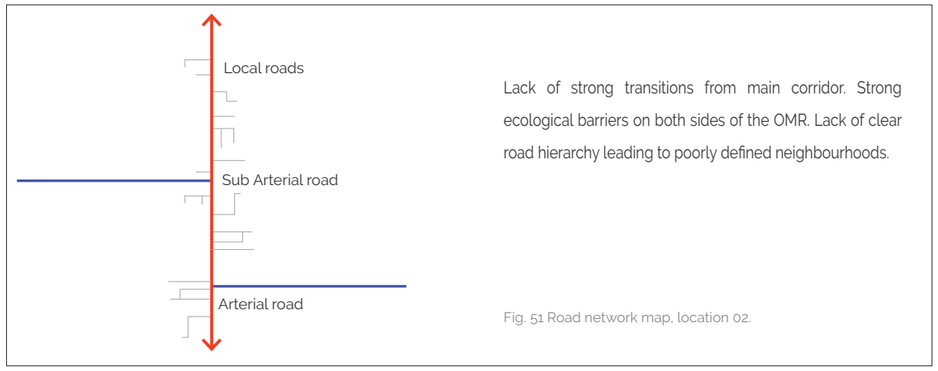


Small intimate and mixed use streets with a continuously built morpholgy are common in local neighbourhoods in this part of the city.

Fig. 50 Mint street, George town

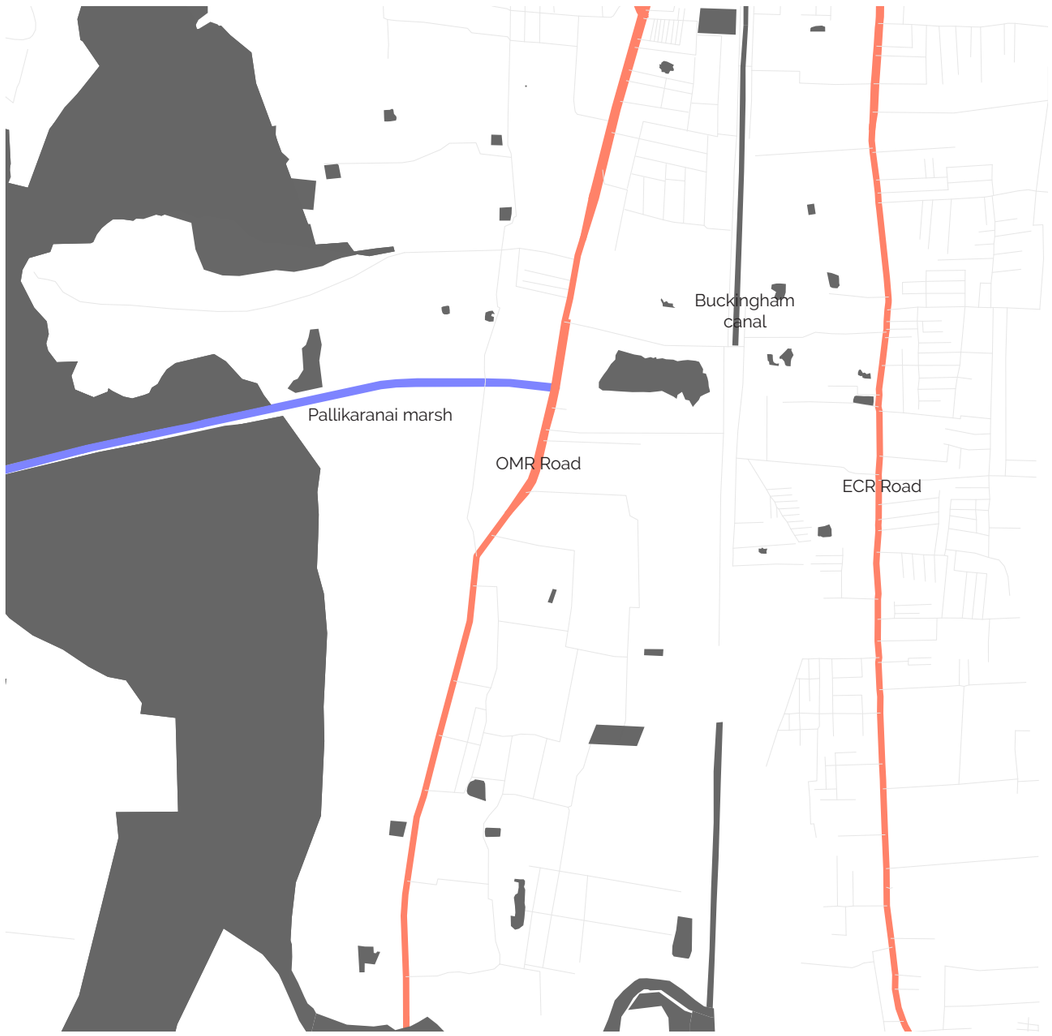
3.1.3 PATTERNS: LOCATION 02

EXISTING MORPHOLOGICAL PATTERNS



Lack of strong transitions from main corridor. Strong ecological barriers on both sides of the OMR. Lack of clear road hierarchy leading to poorly defined neighbourhoods.

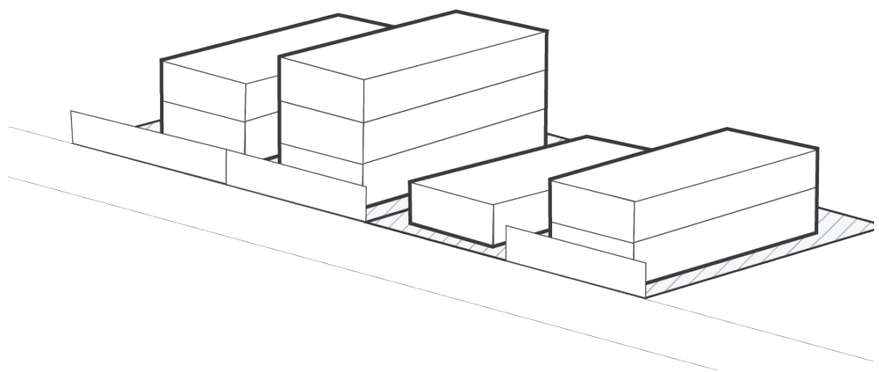
Fig. 51 Road network map, location 02.



Analysing areas in location 02, within a distance of 2km x 2km, the juxtaposition of large parcels of the IT offices and gated communities and the small parcels of the low rise -low dense neighbourhoods can be seen. In the interior neighbourhoods, there is a clear lack of pedestrian infrastructure.

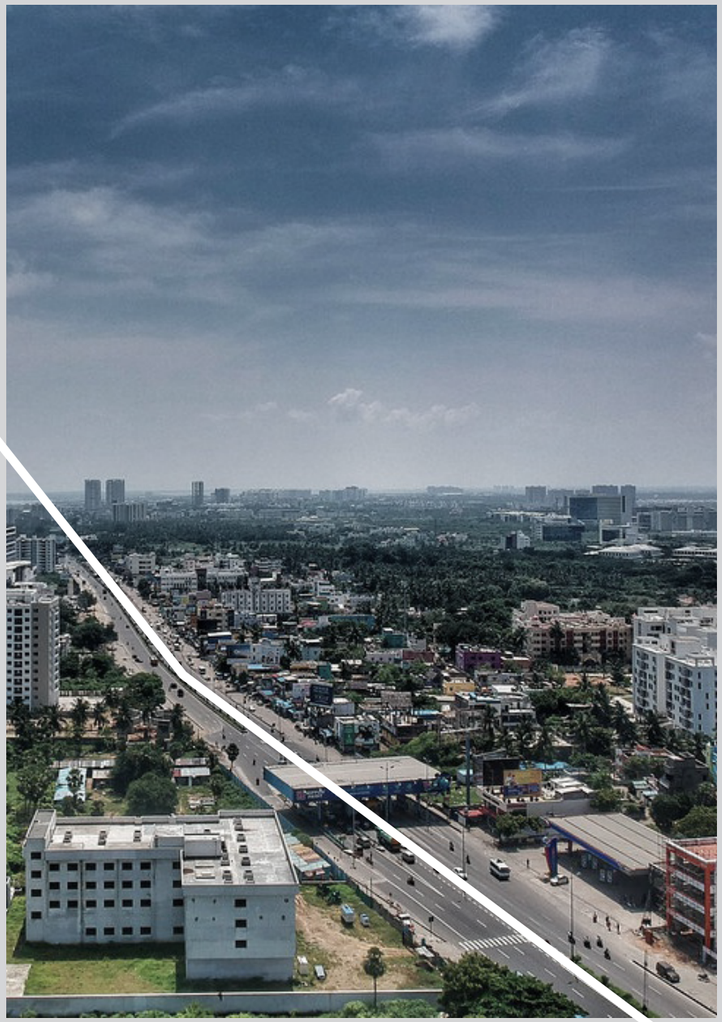
Fig. 52 2km x 2km zoom in , Location 02





3.1.3 PATTERNS: LOCATION 02

EXISTING MORPHOLOGICAL PATTERNS



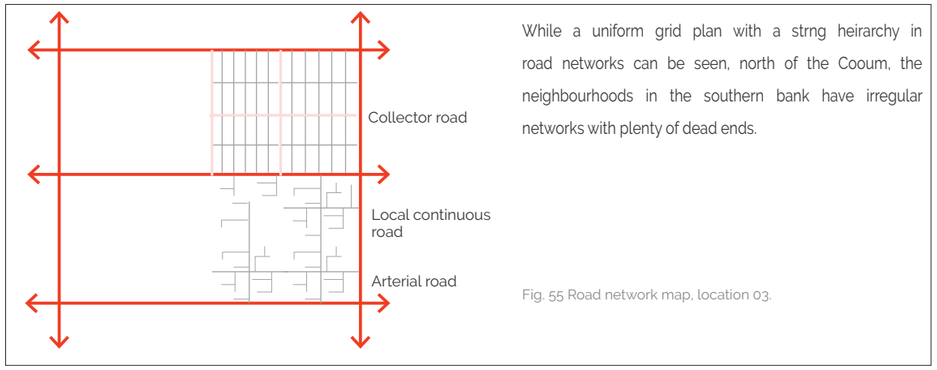
OMR is a linear corridor develpment of IT offices, industries and housing.
Fig. 53 Urban fabric in the periphery.



The neighborhoods adjacent to the OMR roads are low dense developmetns with very poor infrastructure and lack of social sspaces or a strong sense of neighbourhood.
Fig. 54 neighbourhood streets,

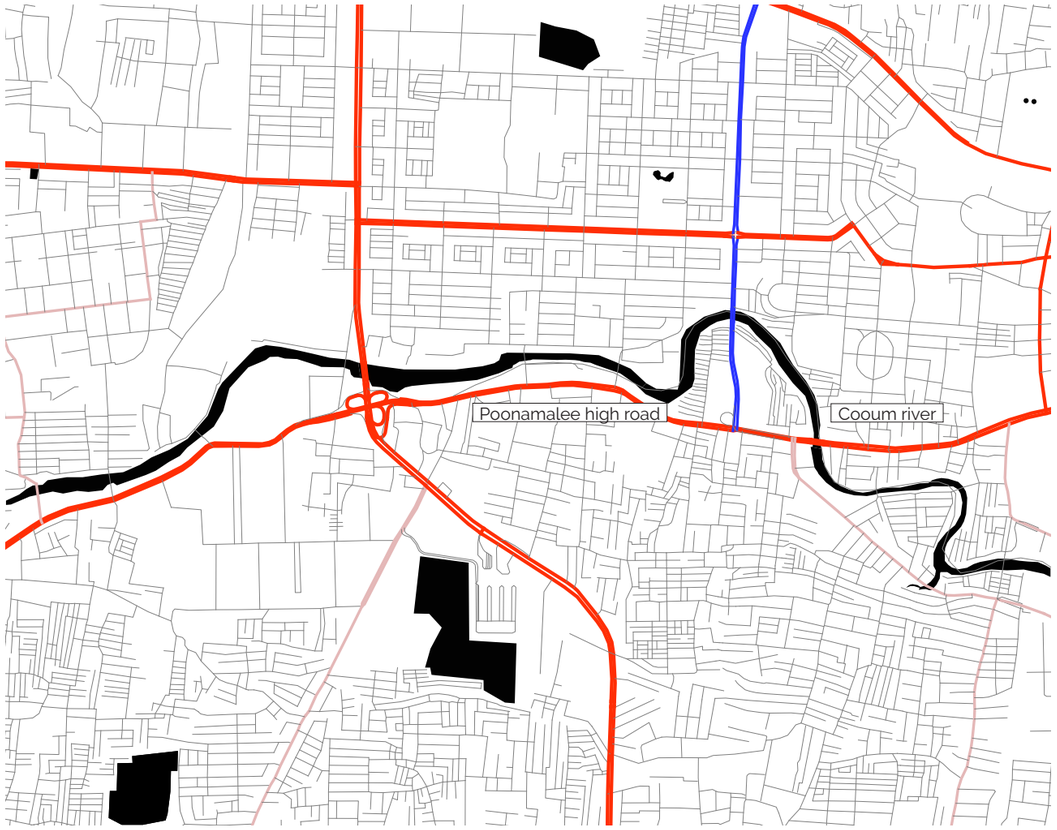
3.1.4 PATTERNS: LOCATION 03

EXISTING MORPHOLOGICAL PATTERNS



While a uniform grid plan with a strng heirarchy in road networks can be seen, north of the Cooum, the neighbourhoods in the southern bank have irregular networks with plenty of dead ends.

Fig. 55 Road network map, location 03.

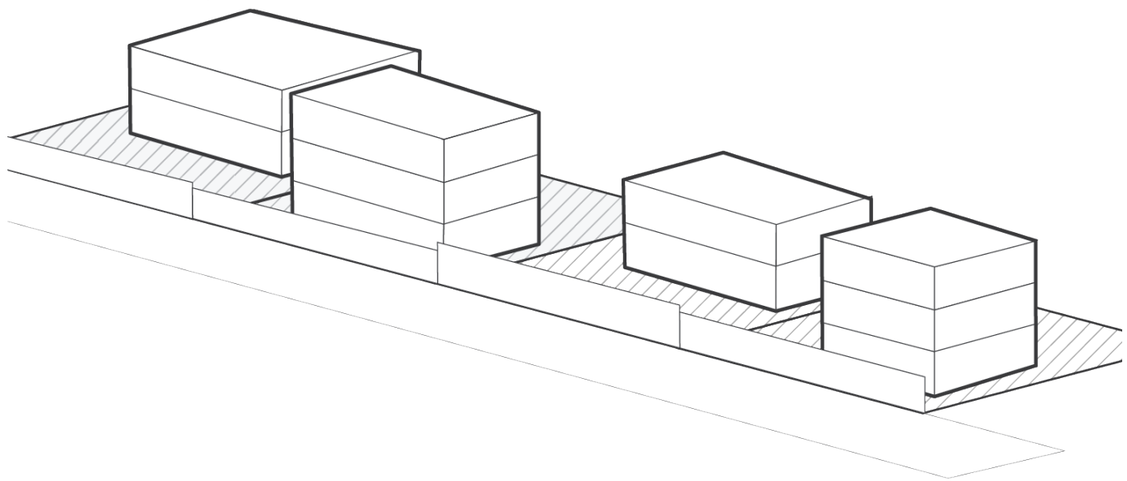


Analysing areas in location 03, within a distance of 2km x 2km, the wide roads, the typical parcel developemnt with setbacks and compound walls along with the continuous tree plantation with large foliages leads to the built form being hidden from view. The trees create a sense of enclosure along the streetscape. The neighbourhood has been planned with uniform grids and plenty of parks.

Fig. 56 2km x 2km zoom in , Location 03



ANNA NAGAR



3.1.4 PATTERNS: LOCATION 03

EXISTING MORPHOLOGICAL PATTERNS



Low too medium density neighbourhoods with a strong grid pattern layout. Predominantly independant houses with generous parcel sizes.

Fig. 57 Urban fabric , Anna nagar. Source : Madhan Vasudevan



Wide roads shaded by tall trees. Most buildings are behind compound walls, setback away fro the road.

Fig. 58 Anna nagar streets, Source : Viswanathan

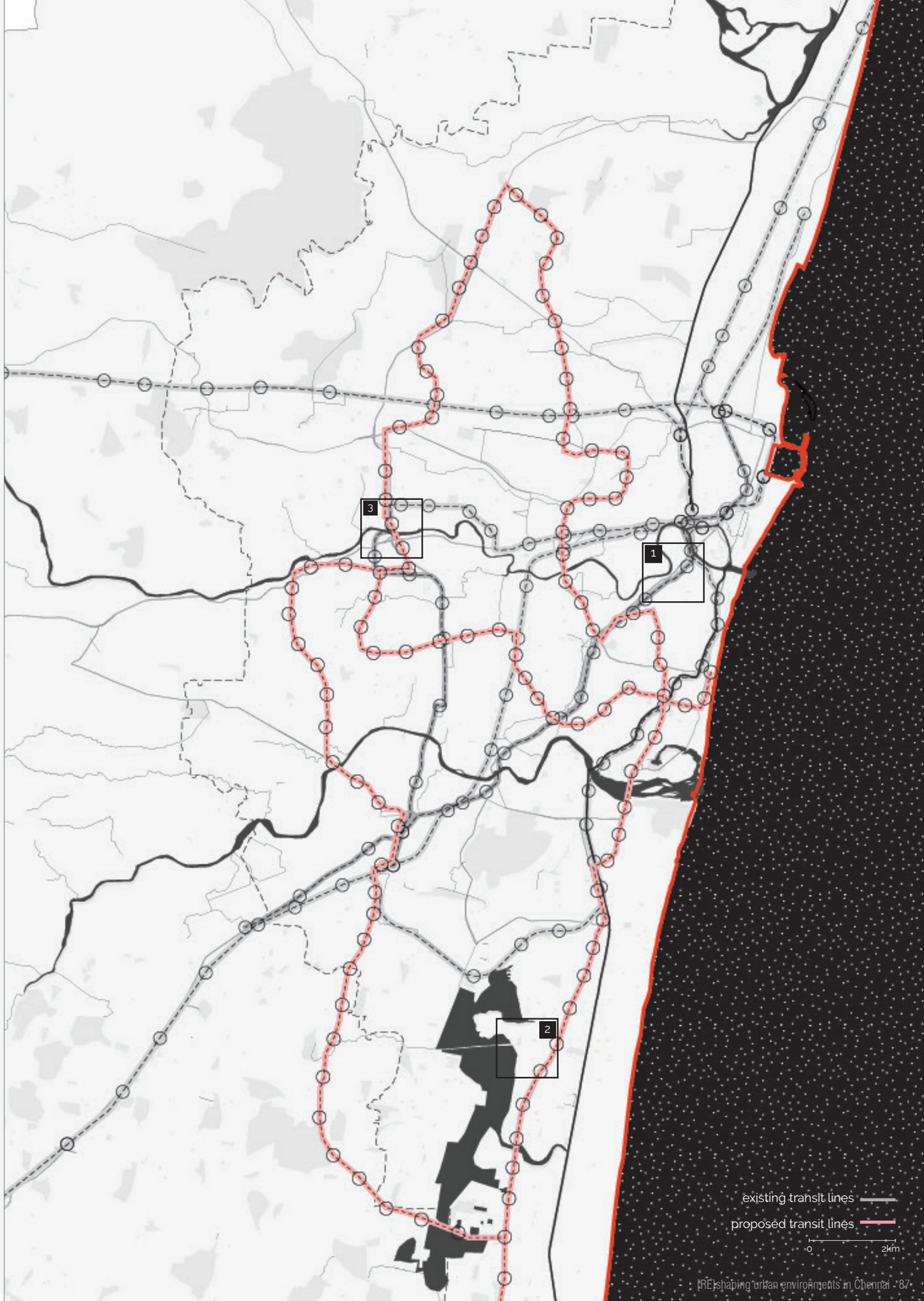
3.1.5 PATTERNS: CONCLUSIONS

SITE SELECTION

Having identified the different urban environements in the city, based on the evoloving morphological patterns over time, three broader locations have been identified, with very different charectersitics of the urban fabric and different needs and potentials in terms of densification. Local sites for design testing and intervention are chosen in these three location, based on the configuration of the two networks;- water and public mobility.

The sites are chosen based on their relationship with the water system and the new metro construction, in order to explore the integrated strategy of densification through deisgn, in these locations.

Fig. 59 Ecological and mobility networks, Chennai

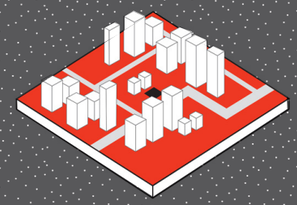


3.2 INTENTIONS

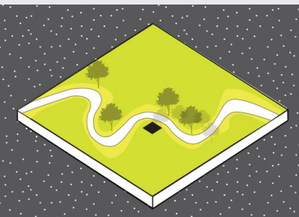
This section explores the new developments in the city in terms of the densification process, metro developemnt and the river cleaning process. Further, experts were asked for their opinion on the impact of these chages to the city.

Fig. 60 Perungudi pond Source : Author

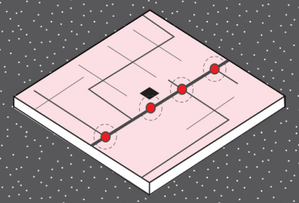
THE DENSIFYING CITY



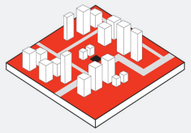
RESTORING ECOLOGICAL SYSTEMS



RECONFIGURING THE MOBILITY NETWORKS



3.2.1 INTENTIONS: THE DENSIFYING CITY



EXPERT OPINIONS ON THE DENSIFICATION PROCESS IN CHENNAI

The unanimous conclusion from the expert interviews is that the blanket increase in FSI is not a suitable solution. All the interviewees pointed out the market driven nature of the regulation change, where the densification process would result in more profits for the developers and not a positive urban transformation for the city.

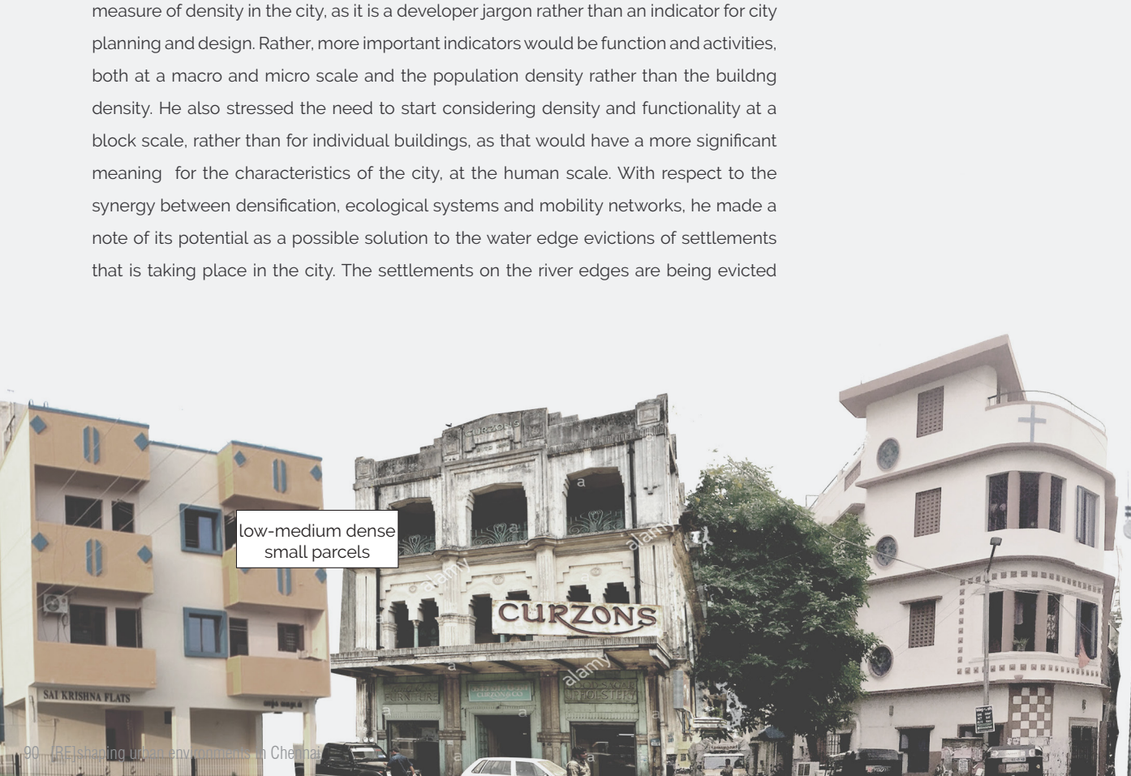
Ar. Tahear Zoyab emphasised the lack of equity in the increased permissible FSI. Large developments will gain a much larger buildable area as opposed to smaller plots, where the difference would be negligible. As a result, people with an economically weaker background, who would only be able to afford small plots, would not gain much out of this whereas the builders and developers in the city, who consolidate larger blocks, would gain immensely. Further, the locations for densification will not be based on planning strategies or need for urban transformation or densification. Rather, it will be based on locations that will yield the maximum profits. As a result this would lead to densification in neighbourhoods that are already of good spatial quality, with good infrastructure and services.

Ar. Mahesh Radakrishnan emphasised on the need to shift away from using FSI as a measure of density in the city, as it is a developer jargon rather than an indicator for city planning and design. Rather, more important indicators would be function and activities, both at a macro and micro scale and the population density rather than the buildng density. He also stressed the need to start considering density and functionality at a block scale, rather than for individual buildings, as that would have a more significant meaning for the characteristics of the city, at the human scale. With respect to the synergy between densification, ecological systems and mobility networks, he made a note of its potential as a possible solution to the water edge evictions of settlements that is taking place in the city. The settlements on the river edges are being evicted

Fig. 61 Types of built densities in Chennair

to areas in the peri-urban peripheries of the city, which disrupts the life of the people living there, in terms of employment and education. He reflected that in the process of densification, a certain amount of housing near the transit nodes within the city could be allocated to these settlements that are being evicted, allowing them to stay in the city, with good public transport accessibility, while allowing for the transformation of the riverfronts as well.

Ar. Vidhya Mohankumar stressed on the need for a densification model in the city. She explained the fact the government owned very little land in the city. The privatised nature of land ownership results in very little control over densification, housing and any form of urban transformation in the city. This is one of the reasons for complete free market control over densification in the city, as well as the reason why the settlements along the river edges are moved so far away form the centre. As the government does not own much land in the city, they develop housing on ecologically sensitive land (porombokke land) that they own in the peripheries. Therefore, she reflected on the need for a model that identifies the different type of urban environments that exist in the city, in order to understand which locations would be able to densify further. She also emphasised on the need to think about different densification process (e.g infill densification, incremental densification, densification through more specific building rules based on planning strategies, public private partnership models like the TP model in Ahmedabad or collective housing model in Mumbai). She explained that the traditional mode of densification around transit nodes as found in western countries would be a challenge in Chennai, due to the privatised nature of the land as mentioned previously. Therefore these kind of developments would require an incentive based implementation scheme.





3.2.1 INTENTIONS: THE DENSIFYING CITY

CONCLUSIONS: DENSIFICATION POTENTIAL

Density needs to be reimagined as landuse, functionality and the flow of people. Thinking along these lines, there are many forms of densification possible, as illustrated in Fig. 82, each with a very different impact on the urban fabric. Therefore, when considering densification as an integrated process that considers mobility and ecological networks, design exploration with different models of densification is neceessary. Further, each mode of densification may require a different type od development model, be it through policy, consolidation or public-private partnerships.

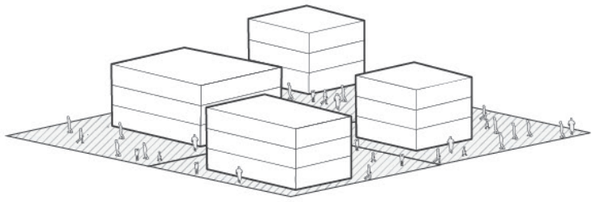
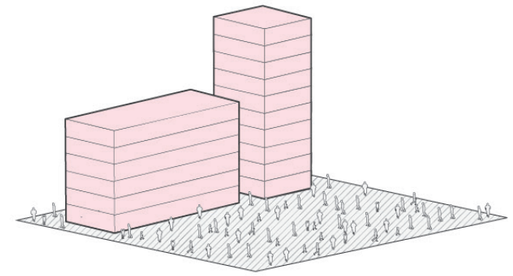
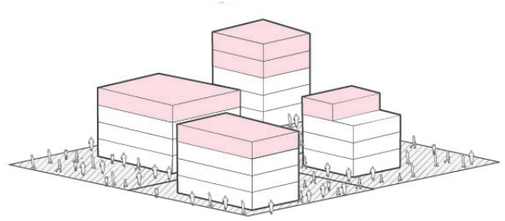


Fig. 62 Densification Potential

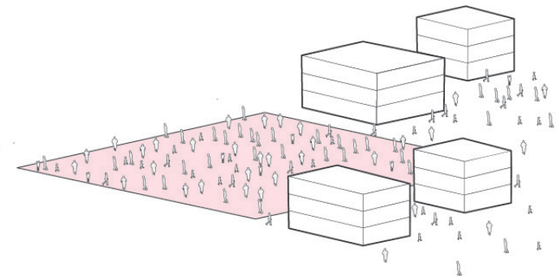
REBUILD



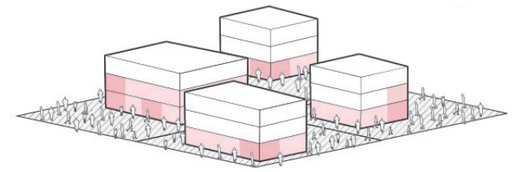
INFILL



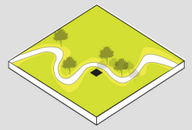
RELOCATE



TRANSFORM



3.2.2 INTENTIONS: RESTORING ECOLOGICAL SYSTEMS



WATERSHED SYSTEMS IN CHENNAI

Chennai city is a part of three major watershed sub-basins :

As the three sites selected fall in the Cooum and Pallikaranai sub-basins, these will be further analysed from a wider perspective.

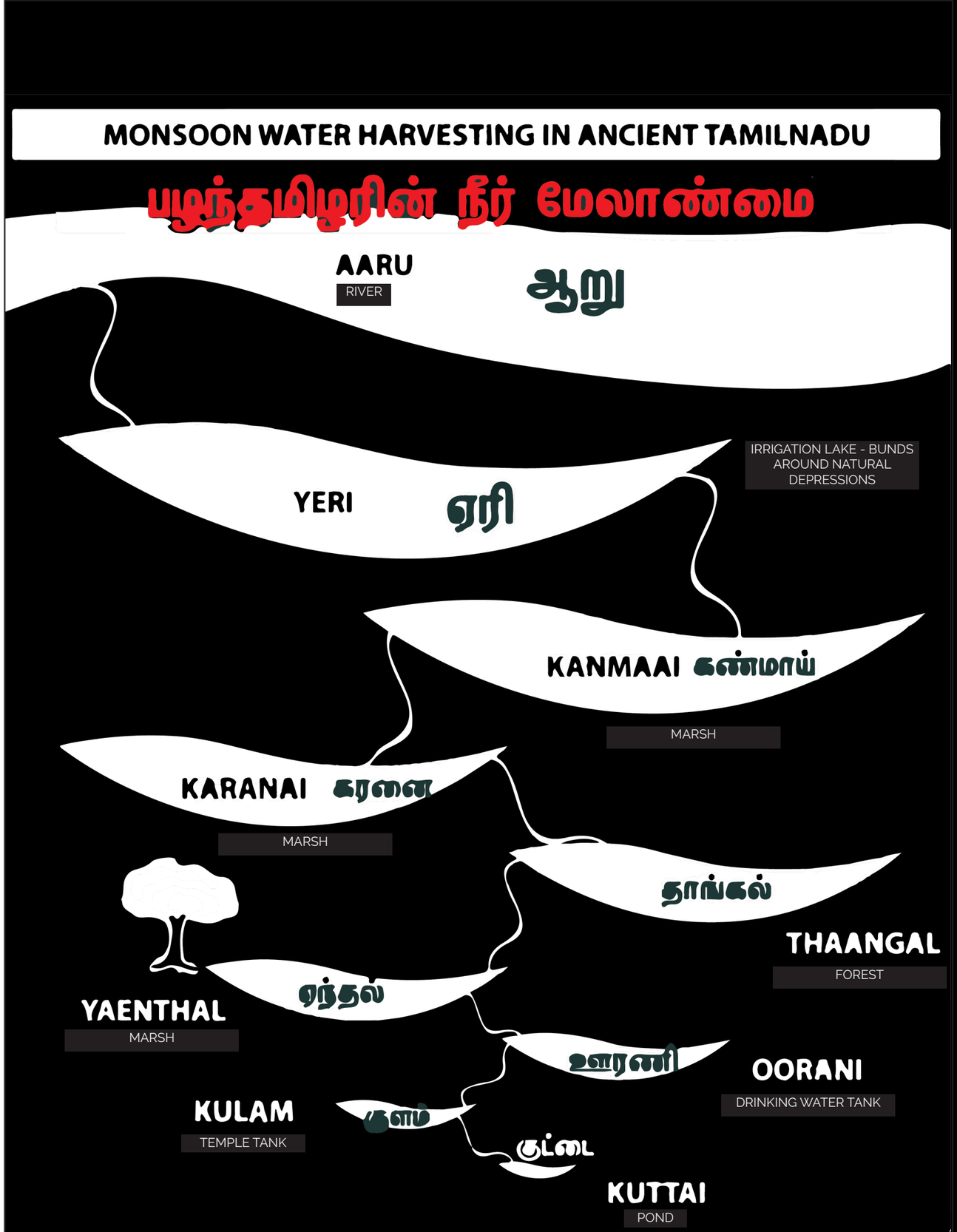
Fig. 63 Watershed basins, Chennai. Data Source: (CMDA,2005)

3.2.2 INTENTIONS: RESTORING ECOLOGICAL SYSTEMS

TRADITIONAL WATER MANAGEMENT

The traditional water management system in Chennai and the rest of Tamil Nadu was a process to ensure water supply through the year, despite the rivers being seasonal in nature. The aim was also to bring access to water in regions located away from major water bodies. This was achieved through the creation and linkage of a series of hierarchical water bodies, each with its own purpose. This series of water bodies functioned as a system of cascading tanks with wiers and sluices to control the flow of water. (India water portal, 2014)

Fig. 64 Water management system. Source : http://jayasreesaranathan.blogspot.com/2015/12/chennai-floods-have-vanished-water.html

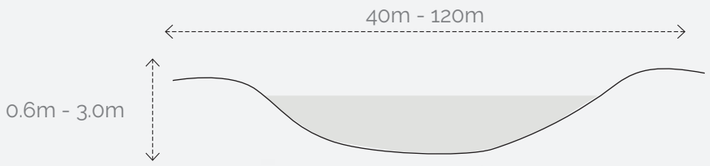


3.2.2 INTENTIONS: RESTORING ECOLOGICAL SYSTEMS

COOUM RIVER SUB BASIN - ECOLOGICAL ISSUES

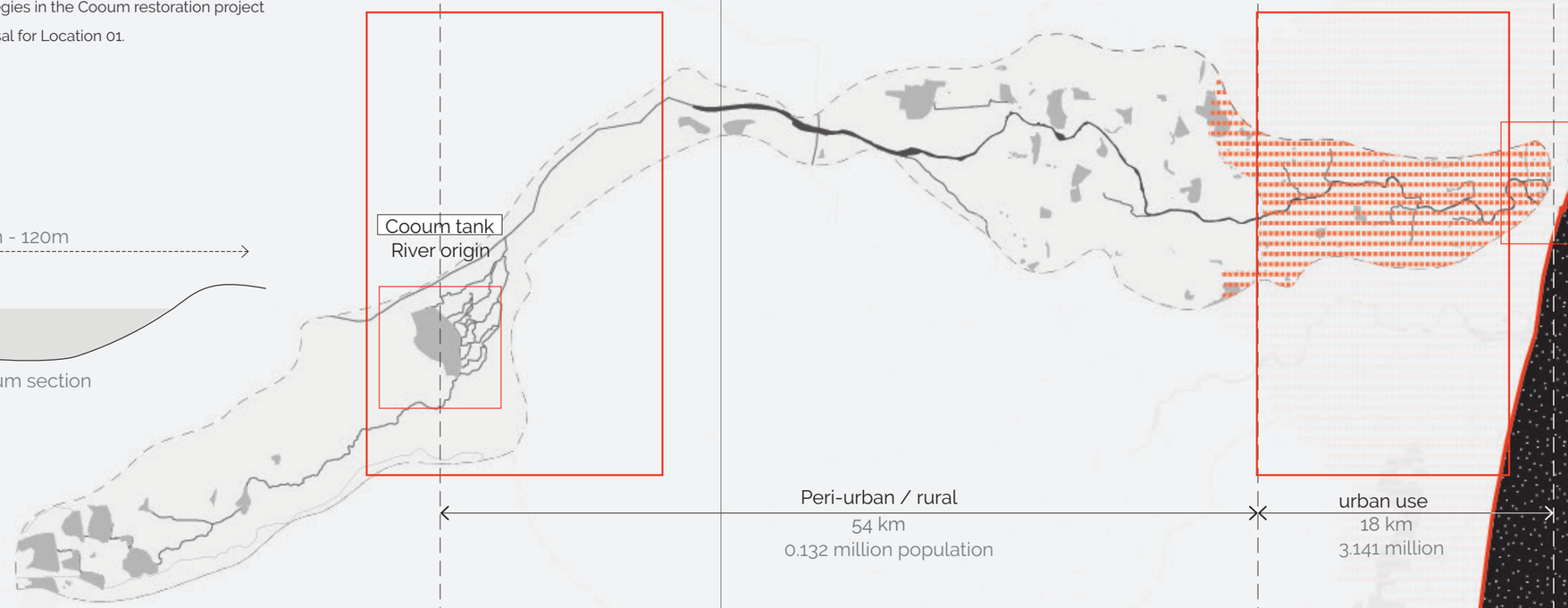
The urban section of the Cooum river faces high levels of pollution and reduction in water carrying capacities due to the large amounts of encroachments into the water edge, the disposal of untreated sewage and the garbage disposal that chocks up the river and prevents a continuous flow of watter in the already narrow and shallow stream. (TNUIFSL, 2014) The proposed intervention strategies in the Cooum restoration project are further elaborated on in CH.04 Design proposal for Location 01.

Fig. 65 Cooum Watershed basins, Chennai.



River Section:
Low depth and width

Upstream:
Over irrigation for agriculture



Urban area:
Pollution, untreated sewage disposal, industrial waste dumping and corparation waste dumping and encroachment

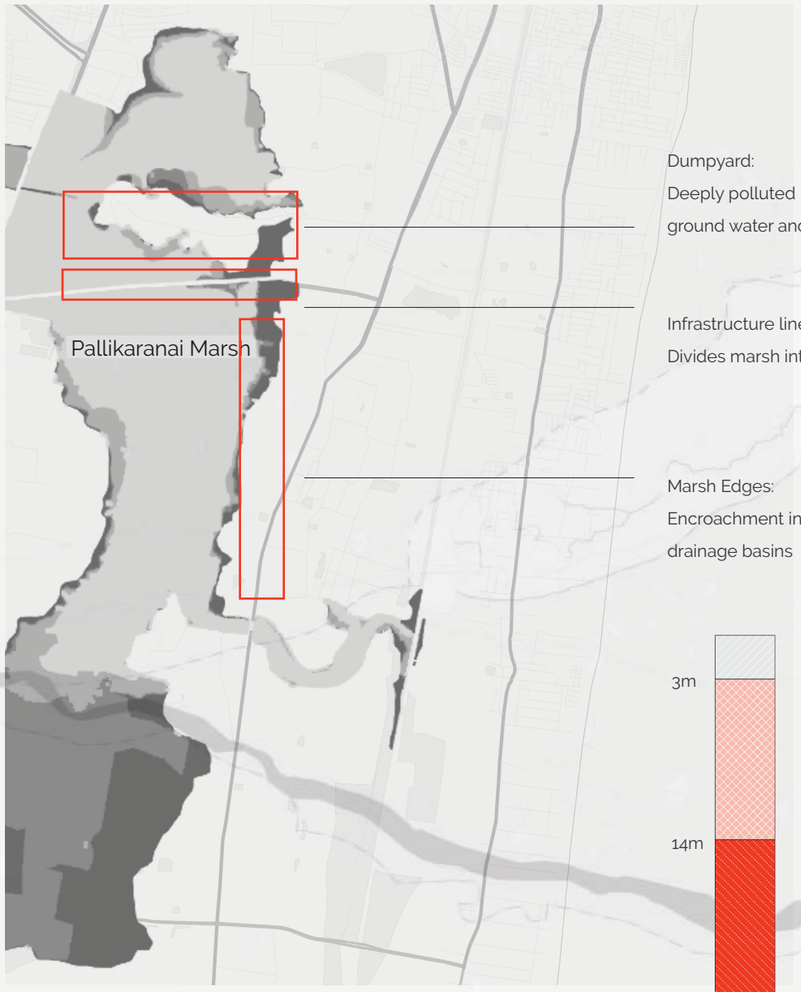
Estuary:
Sand bar accumalation due to Littoral drift and port construction

3.2.2 INTENTIONS: RESTORING ECOLOGICAL SYSTEMS

PALLIKARANAI MARSH SUB BASIN - ECOLOGICL ISSUES

The Pallikaranai marsh has been reducing in its size drastically, with severe impacts to the surrounding area during flooding events. Some of the larger reasons for the ecological issues in the marsh are connected to encroachment into the marshland due to improper urbanisation, waste dumping that causes pollution and chocking of waterways and poor storm-water drainage in the surrounding areas. (Sálim Ali Centre for Ornithology and Natural History , 2007) The proposed interventions for these issues are delved into more detail in Ch.04, design proposal for Location 02.

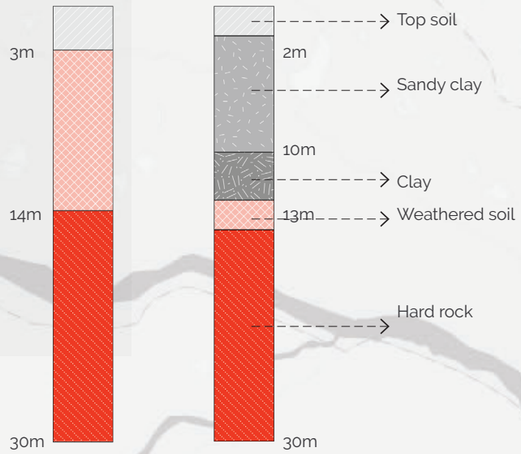
Fig. 67 Pallikaranai sub-basin



Dumpyard:
Deeply polluted
ground water and soil

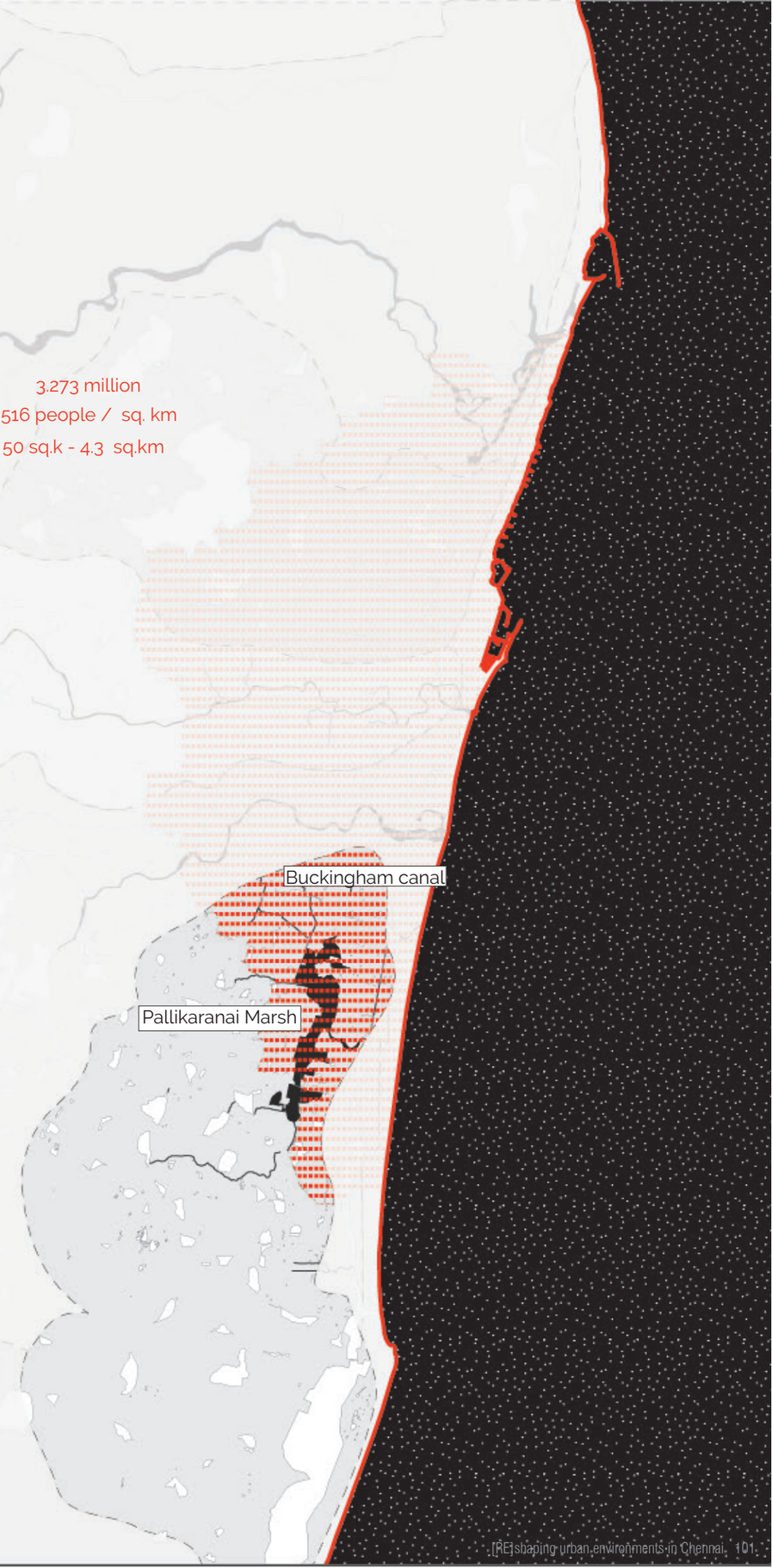
Infrastructure line:
Divides marsh into patches

Marsh Edges:
Encroachment into marsh and
drainage basins





3.273 million
6516 people / sq. km
50 sq.k - 4.3 sq.km



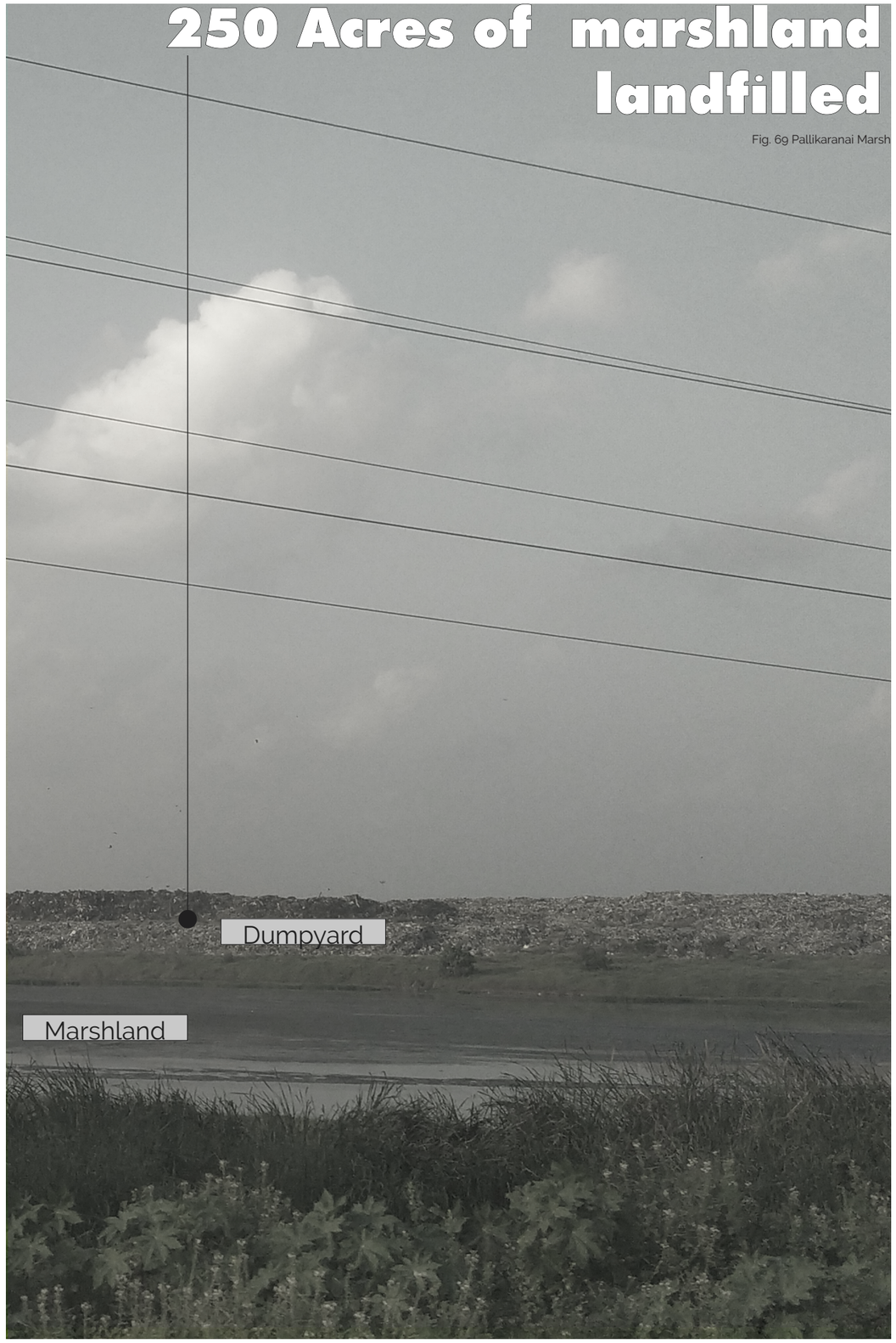
80% more polluted than treated sewer

Fig. 68 Coum river, Source: Flikr.com

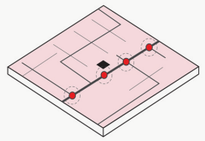


250 Acres of marshland landfilled

Fig. 69 Pallikaranai Marsh



3.2.3 INTENTIONS: REDEFINING MOBILITY NETWORK



CHALLENGES TO TOD IMPLEMENTATION

Chennai city consists different type of public transport systems, ranging from the long established suburban rail and MRTS train lines, the metro train lines, which is currently undergoing construction and the MTC bus network, a highly successful transit system within the city. This project focuses on the Metro system as this transit method has been facing issues in terms of ridership numbers (The Hindu, 2019). Also, as it is still being constructed, there is more flexibility in the potential design proposals. While the First and the third site already are in proximity to a constructed metro line, the second site is yet to receive a metro line connection.

From the on-site interview process, it could be seen that most interviewees took the bus or the suburban train rather than the metro. This can be explained by the fact that the metro network is not yet complete with very few of the routes functioning currently. While most people are satisfied with the public transport, those who have to commute from the central part of the city, down to the IT corridor do not have a convenient mode of transport yet. The construction of this line in particular, is very important, as the average daily travel time along the IT corridor is currently very high.

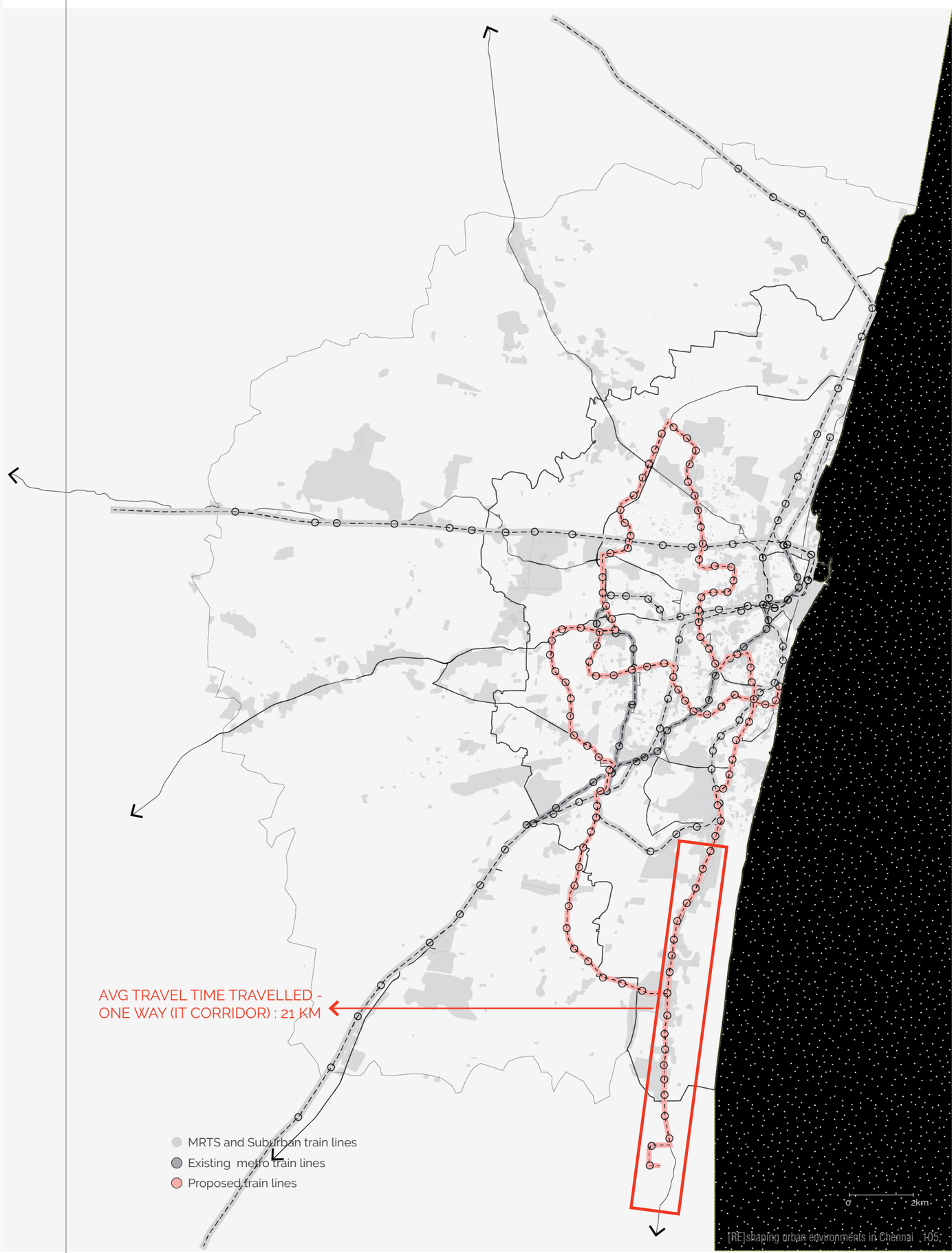
TOD IMPLEMENTATION CHALLENGES - PROPOSED LINES

The urbanisation pattern in the peripheral parts of the city strongly followed linear corridors, with the adjacent areas left underdeveloped, without development of basic neighbourhood infrastructures. When the metro stops become active along these sides, a dense mixed use neighbourhood surrounding it will maximise the ridership and shift to using the metro. However, this is currently not the case.

One of the conclusions from the expert interviews is that the implementation of this metro line down the IT corridor is a challenge, due to to the morphology of the city. The linear character of the corridor, without transversal roads to compensate for vehicular load, will become a major issue during construction, unlike the other lines, which have so far been constructed within the city. Therefore, the phasing as well as network reconfiguration is extremely important in this case.



Fig. 71 Public transit network - existing and proposed
Fig. 72 OMR morphology



3.2.3 INTENTIONS: REDEFINING MOBILITY NETWORK

CHALLENGES TO TOD IMPLEMENTATION

TOD IMPLEMENTATION CHALLENGES - EXISTING LINES

In the inner city, where the metro lines have already been constructed, pedestrian access to the station as well as way finding and visual identity is quite poor. Surrounded by Institutions, high rise office buildings and small shops, there isn't a very active mixed use ground plane. Due to the presence of arterial roads road along the metro line as a large dividing infrastructure, the crossing from the metro is also made less accessible and visually less prominant in the form of subways.

Another important issue that came to light through the expert interviews was the location of metro stations. There is a significant difference from the suburban line, where every station is placed at an important institutional or industrial location in the city. This is one of the reasons for the high percentage of use of the suburban lines. This is not the case with the new Metro lines. However, this can be used as a potential to develop certain city functions at these station locations, through the process of densification. The functions present near the station at a walking distance, neighbourhood scale and area scale is further explored in the micro analysis.

Fig. 73 Interior neighbourhoods along OMR
Fig. 74 Metro and bus stop along Mount road

CITY PERIPHERY
PROPOSED METRO LINES



INNER CITY
EXISTING METRO LINES



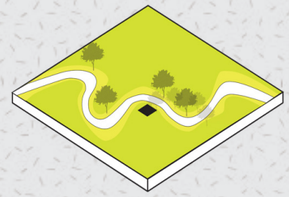
3.3 PERCEPTIONS

Peoples perception towards the water system in the city was evaluated. They were asked about their hopes for these locations, post the cleaning process. Experts were asked for their opinion of the ongoing restoration process and the impact it would have on the city.

Fig. 76 Perungudi pond Source : Author



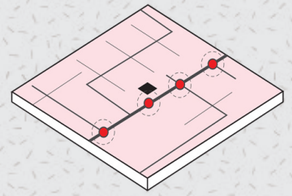
ENGAGING WITH ECOLOGY



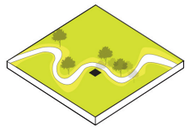
PEOPLE AND PUBLIC SPACE



MOVING IN THE CITY



3.3.1 PERCEPTIONS: ENGAGING WITH ECOLOGY



CONCEPT OF PORAMBOKE

WHATS IN A WORD?

/ por-um-pokku /

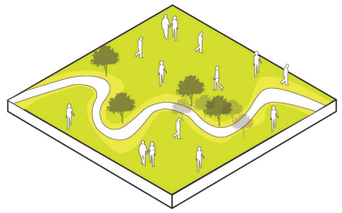
PORAMBOKE [n.]

Places reserved for communal shared uses (rivers, river banks, marshlands irrigation tanks)

A prejarative meant to demean or devalue a person or a place.

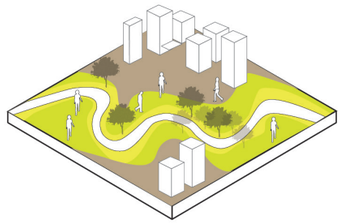


Fig. 77 Etymology - Poramboke. Source : https://www.indiawaterportal.org/articles/no-mans-land
Fig. 78 Buckingham canal . Source : https://eyesonthecanal.in/2019/08/07/central-railway-station-madras/
Fig. 79 Evolution of Poramboke. Data source : (100 resilient cities, 2019).



COMMUNAL
PORAMBOKE

Communal lands were classified as Poramboke, which could not be owned or profitted from, and was maintained by the community as common space. This included rivers, river banks, irrigation tanks, marshlands and salt pans.

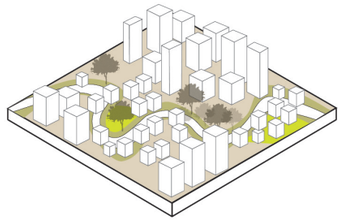


PUBLIC VS PRIVATE
WASTELANDS

Lack of economic benefit from these communal lands lent them the translation of "wastelands" in English, during the colonial period.

Concepts of public and private were established based on property ownership right and economical value, as opposed to a communal space

The "wastelands" were rezoned into institutional and colonial buildings.



NEGLECTED
ENCROACHED
POLLUTED

Rapid urbansiation and a race for economic development has led to these communal lands being built upon.

PRE COLONIAL PERIOD

COLONIAL PERIOD

POST COLONIAL PERIOD

3.3.1 PERCEPTIONS: ENGAGING WITH ECOLOGY

CURRENT PERCEPTION TOWARDS ECOLOGICAL SYSTEMS: FIELD WORK

The perception study conducted amongst the residents of the three neighbourhoods show that the water systems are not perceived as spaces but rather as a service. Therefore, when asked about their hopes or thoughts about the cleaning of the river, all the responses focused on the provision of water, removal of the smell and mosquitoes. Further, most of the responses were negative regarding the cleaning of the river. There is a lack of trust in the institutions to implement this cleaning process, as also echoed in th expert interviews, and the prolonged nature of the process has led to the rivers, canals and the marshes losing the perception of place in the city. This is further exacerbated by the lack of visibility and accessibility of these water systems, as illustrated in the maps in the next section. As per the responses to the interview questions, most people have not seen these water bodies up close, catching passing glimpses from the bridges that run across.

Fig. 80 Potential interventions along water edge.
Fig. 81 Cooum water edge, Anna nagar. Source : Author



WHAT IS YOUR IMPRESSION ABOUT THE RIVER/ MARSH/ CANAL CLEANING PROCESS?

There is no point cleaning it, would be better to find a different source of water

It will never happen.

They keep cleaning it and it keeps getting polluted. There is no point.

The amount of garbage in the marsh has decreased, but there is still a lot.

No idea

It must be cleaned. When it rains, the whole place starts smelling, as its downwind from the marsh. Yes comfortable, though roads are not very good.

The process is too slow. It is causing a lot of mosquitoes.

It causes mosquito and diseases and smells really bad. They have been saying they are cleaning it for a long time but I don't see any change.

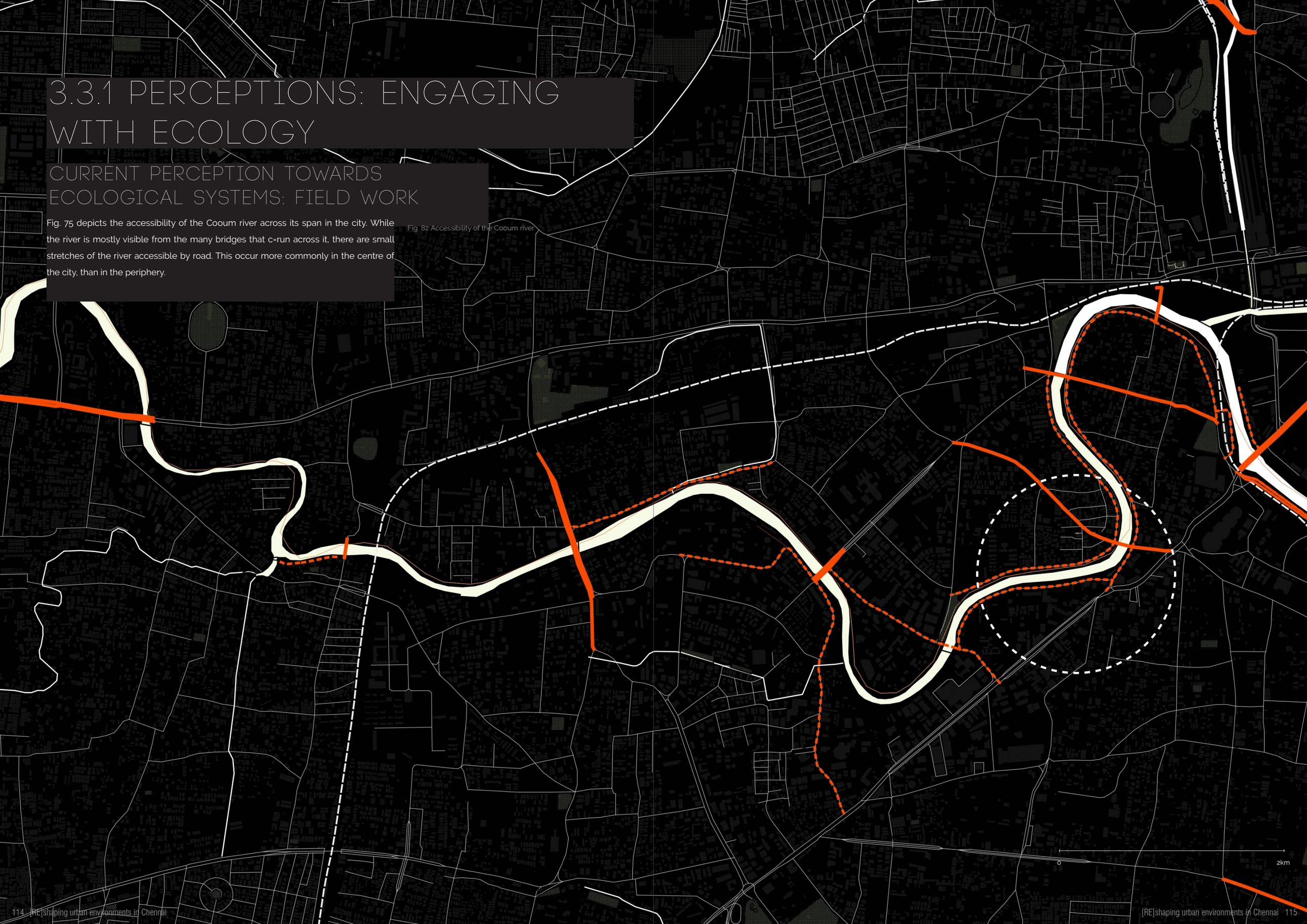
They should spend money on something more useful to the people. This will never happen.

3.3.1 PERCEPTIONS: ENGAGING WITH ECOLOGY

CURRENT PERCEPTION TOWARDS ECOLOGICAL SYSTEMS: FIELD WORK

Fig. 75 depicts the accessibility of the Cooum river across its span in the city. While the river is mostly visible from the many bridges that c=run across it, there are small stretches of the river accessible by road. This occur more commonly in the centre of the city, than in the periphery.

Fig. 82 Accessibility of the Cooum river



3.3.1 PERCEPTIONS: ENGAGING WITH ECOLOGY

CURRENT PERCEPTION TOWARDS ECOLOGICAL SYSTEMS: FIELD WORK

Fig. 78 depicts the accessibility of the Pallikaranai marsh from the areas adjacent t it in the southern portion of the city. The marsh is most visible from the highway that across it. However, this highway also divides the ecological system into two patches. Other than this, the accessibility to the marsh is very low, in comparison to its scale.

Fig. 78 Accessibility of the Pallikaranai marsh



3.3.1 PERCEPTIONS: ENGAGING WITH ECOLOGY

POTENTIAL STRATEGIES: SOCIO ECOLOGICAL INTEGRATION

The process of socio-ecological integration, required to bring these water systems back into the city fabric, has challenges which are multi-fold. Firstly, from an execution point of view, the activation of the water edge is a large scale top down planning process. According to the experts and past examples from the city, projects of this scale are rarely executed as intended and on time. Further, there is no trust in the people that these projects will be completed successfully and hence, there isn't any support for it. Secondly, as reflected in the interview responses, most people do not express the desire for more public spaces around them as they do not have time to use it. It appears that smaller scale interventions at the street level, that integrates spaces into everyday life and improves walkability, are more important. On the other hand, there is aso a requirement for more city scale public spaces. Considering these challenges, It becomes important for a slow mobility network to be established along the water edges, that allow for higher degree of pedestrianisation while moving through adjoining neighbourghoods , while increasing the visibility of the water front to the people. This will be a relatively smaller scale intervention. The cleaning process and the planning of larger city scale activites can follow this, once the space has been socially activated on an everday basis.

Fig. 84 Potential interventions along water edge.
Fig. 85 Cooum water edge, Anna nagar. Source : Author

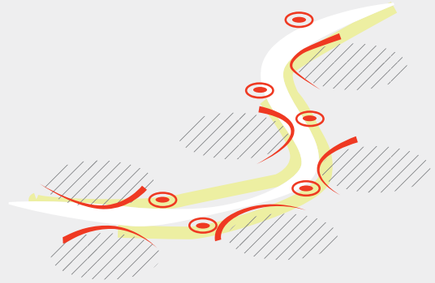




Existing conditon



Implementation process



Ideal conditon

Fig. 86 Potential interventions along water edge.
Fig. 87 Cooum water edge, Anna nagar. Source : Author

3.3.2 PERCEPTIONS: PEOPLE AND PUBLIC SPACE



CITY SCALE PUBLIC SPACE

Fig. 88 Interview responses : local scale public space destinations

This is a map of the local public places that the interviewees used on a regular basis.

Majority of the interviewees do not visit any destinations for leisure on a regular basis. The reason given by most people is that they don't have time in their working day to go anywhere. A few children and elderly people said they visit parks. In Anna nagar, a larger number of people visited the parks, as they took their children. This could be because Anna nagar is planned with many parks, including the Anna tower park.

None of the interviewees in any of the neighbourhoods felt the need for any more public space. The reason for this was slightly different amongst the different sites. The most common reason given for this was the lack of time in the working day and the preference of visiting religious institutions as it provided peace of mind. Further, a lot of the people working in the IT industry in OMR felt that they spent most of the day travelling to and from work. and did not have time for anything else.

Some people in the Mount road/ Triplicane area felt the proximity of the beach compensated for the need of any local public spaces.

3.3.2 PERCEPTIONS: PEOPLE AND PUBLIC SPACE

LOCAL SCALE PUBLIC SPACE

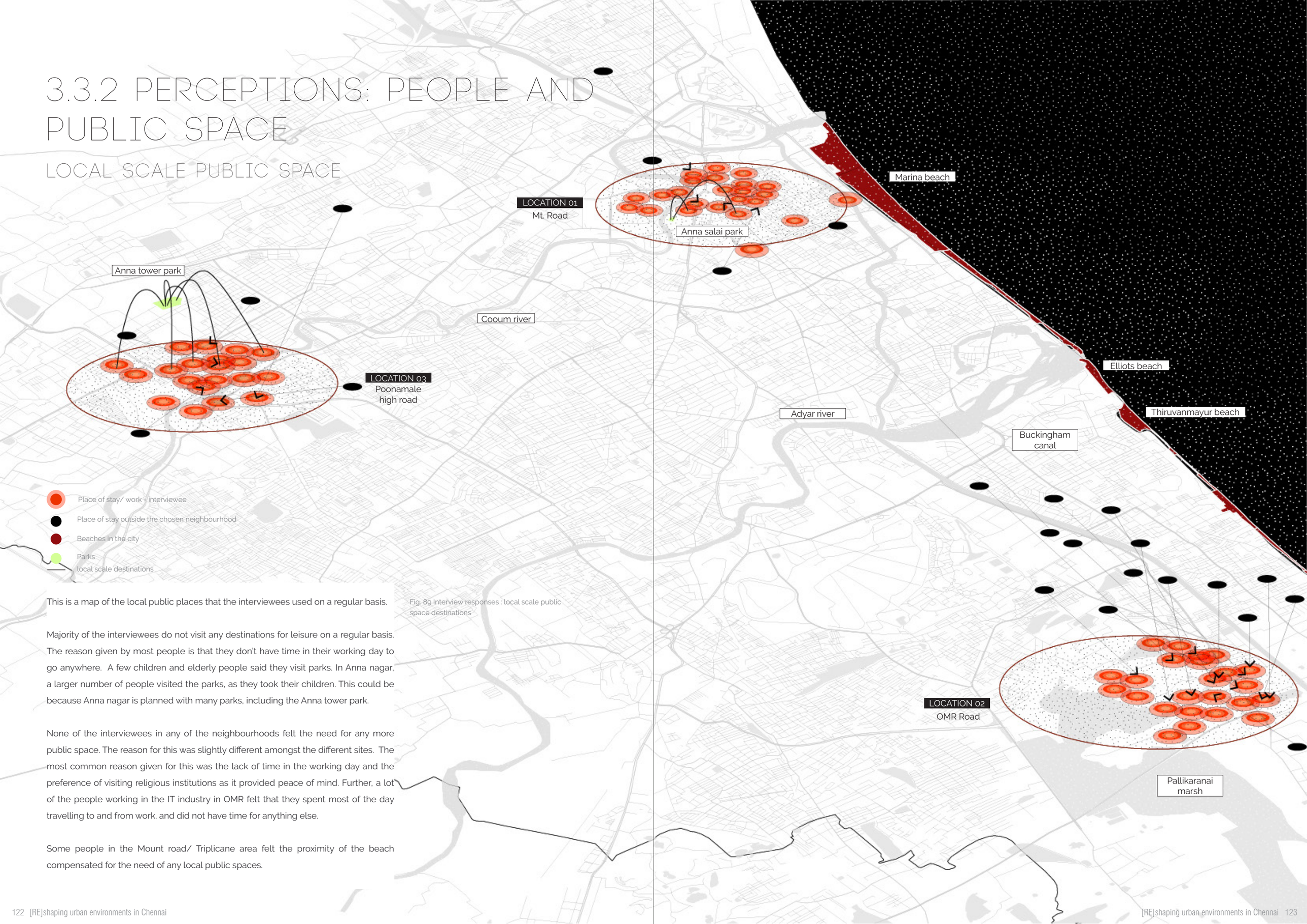


Fig. 89 Interview responses : local scale public space destinations

This is a map of the local public places that the interviewees used on a regular basis.

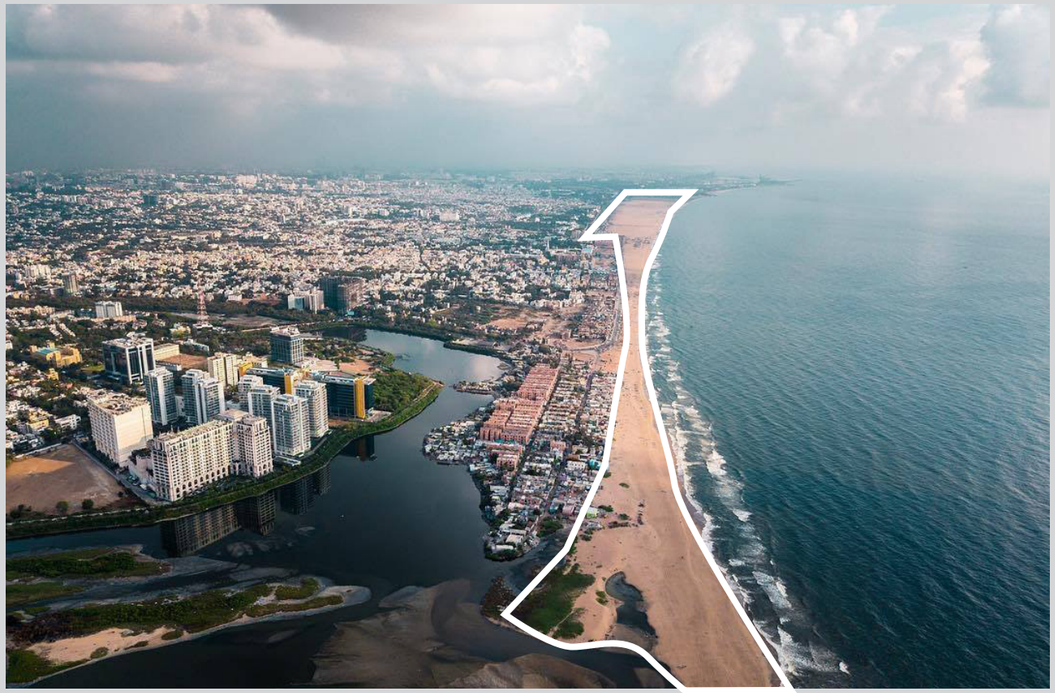
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3.3.2 PERCEPTIONS: PEOPLE AND PUBLIC SPACE

PUBLIC SPACE USE



The beach is the most popular (and one of the very few) city scale public spaces in Chennai. It is also one of the important elements that contribute to the image of the city. . Its geographical position across the city as well as its vastness and open character results in it being the most inclusive place in the city, regardless of age, economic status, gender or use of space. The presence of this beach also results in a of compensation for the lack of social spaces in the city, atleast to the neighborhoods that are in the centre of the city, in proximity to the coast.

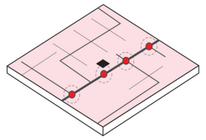
Fig. 90 Chennai coast. Source : Harish T



The Anna tower park is one of the most succesful parks in Chennai city. Anna nagar is by itself a neighbourhood planned with many parks. The scale of the park allows it to become a breathing space for the entire area of Anna nagar, while accomodating diverse functions that draws people of different age groups.

Fig. 91 Anna tower park, Anna nagar. Source : chanceyilla,

3.3.3 PERCEPTIONS: MOVING IN THE CITY



PERCEPTIONS OF WALKABILITY

Most people in the city prefer to walk for short trips rather than use a vehicle. The exceptions were those who preferred taking two wheelers for convenience and those who could physically not do so. However, the most common complaint was the amount of dust and vehicles present on the road. Further, the lack of continuous dedicated pavements in most of the city seemed to exacerbate this issue.

One of the inputs from the expert interviews was the vast advantage smaller public space interventions had to larger ones. As explained by Ar. Tahear Zoyab, in his experience with working with the city planning department, smaller interventions are easier to implement owing to their zonal jurisdiction, and lower costs. Hence, they are more likely to by implemented and are more flexible. Further, they can be tested repeatedly and easily tweaked and are very context based, tailored to the need of the neighbourhood. This stands in contrary to larger public space intervention, which are usually typical designs stamped across the city, without much context.

Further emphasising this point, Ar. Mahesh Radakrishnan talks about the cultural significance of public spaces that are intertwined with streets. He says that while water edges, nature walkways and promenades are important spaces in a city, the culturaly rooted public space in Chennai comes from the relationship between spaces that are strongly contextual and those that evolve along with them, relatively context free. They have never been liesurely in nature, rather they always served a communal purpose. This relationship can be seen in many public spaces around the city. An example is the Mylapore temple, its tank and the market streets that have formed around it. While the relationship between the temple and the tank give rise to a specific configuration of public space, the markets that evolve around the temple, as a result of a lot of pedestrian activity become a different kind of commercial public space. These relationships are allowed to flourish only in a highly pedestrian environment that is in synergy with public transport.

Therefore, public spaces that act as a part of daily mobility and as an extension of streets and vehicular roads that can be transformed into pedestrian streets are highly important in this context.

Fig. 92 Potential public space interventions

DO YOU FIND IT COMFORTABLE TO WALK IN YOUR NEIGHBOURHOOD? WHY/WHY NOT?

Yes. However too many cars and dust sometimes but that's a part of the roads.

No not really, it gets hot.

Yes, but sometimes in the day its too noisy because of the vehicles.

Yes its comfortable but too many cars.

Yes it is.

It's okay but too many vehicles as there is no space for pedestrians.

Yes comfortable, though roads are not very good.

Yes it is fine. A bit too many cars.

Its too dusty to walk outside. There are too many cars.

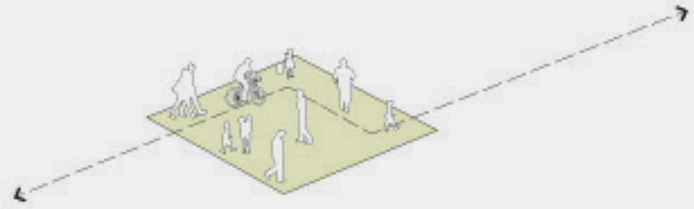
Too many cars

No. There is no shade and it is very hot.

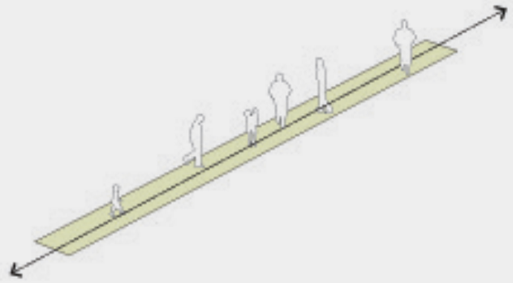
Yes, a bit dusty and noisy.

3.3.3 PERCEPTIONS: MOVING IN THE CITY

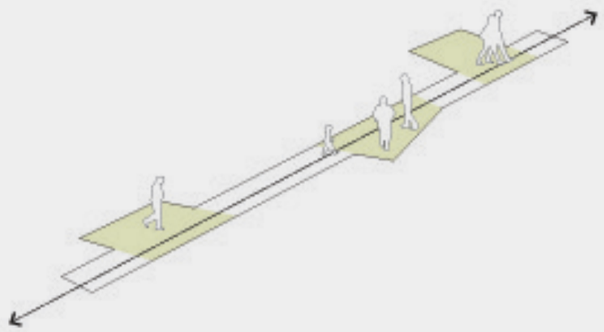
PERCEPTIONS OF WALKABILITY



Small spaces as a part of everyday mobility



Pedestrianised streets



Public space as an extention of streets

Fig. 93 Potential public space interventions

3.3.3 CONCLUSIONS

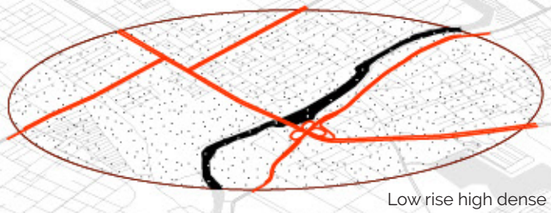
PROBLEM DEFINITION

Fig. 94 Design Inputs - 3 sites



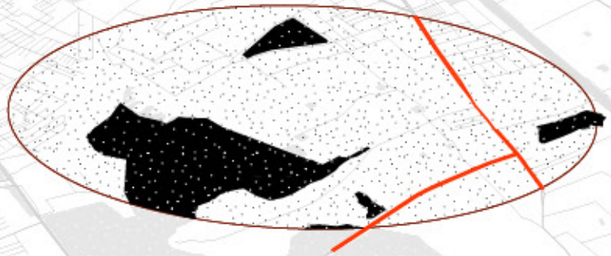
LOCATION 01
Mt. Road

Low rise-high dense
Continuously built area
Minimum open space available
Human scale streets
Accessible river edge
Developers will not build here - low incentive
High accessibility to beach
New metro line imminent
Small plots - challenge of redeveloping.
Lack of local public spaces



LOCATION 03
Poonamale
high road

Low rise high dense neighbourohood
Developers will build here - high incentive
Low accessibility to beach
Need for city scale public space
Small plots - challenge of redeveloping.
Strong access to river edge
Planned neighbourhoods with many parks
Mulitmodal transfer point - metro, city bus node



LOCATION 02
OMR Road

High rise medium dense housing along OMR
Low rise low dense interior neighbourohood
Streets not to human scale
Lack of transition roads/ strong neighbourhoods.
Developers will build here - high incentive
Low accessibility to beach
Need for city scale public space
Low accessibility to marsh land
New metro line imminent - implementation challenge due to morphology
Small plots in areas away from OMR - challenge of redeveloping.
Travel time to IT corridor - very high

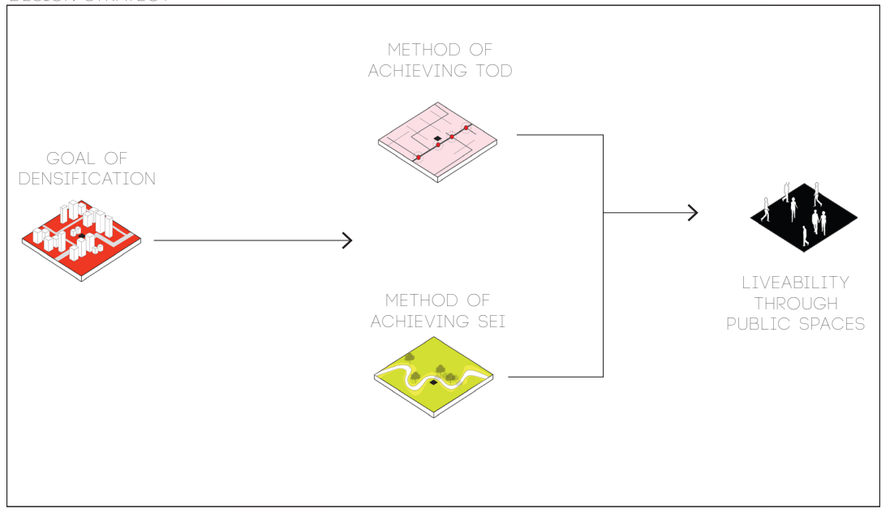
Cooum river
Marina beach
Elliots beach
Thiruvanmayur beach
Adyar river
Buckingham canal
Pallikaranai marsh

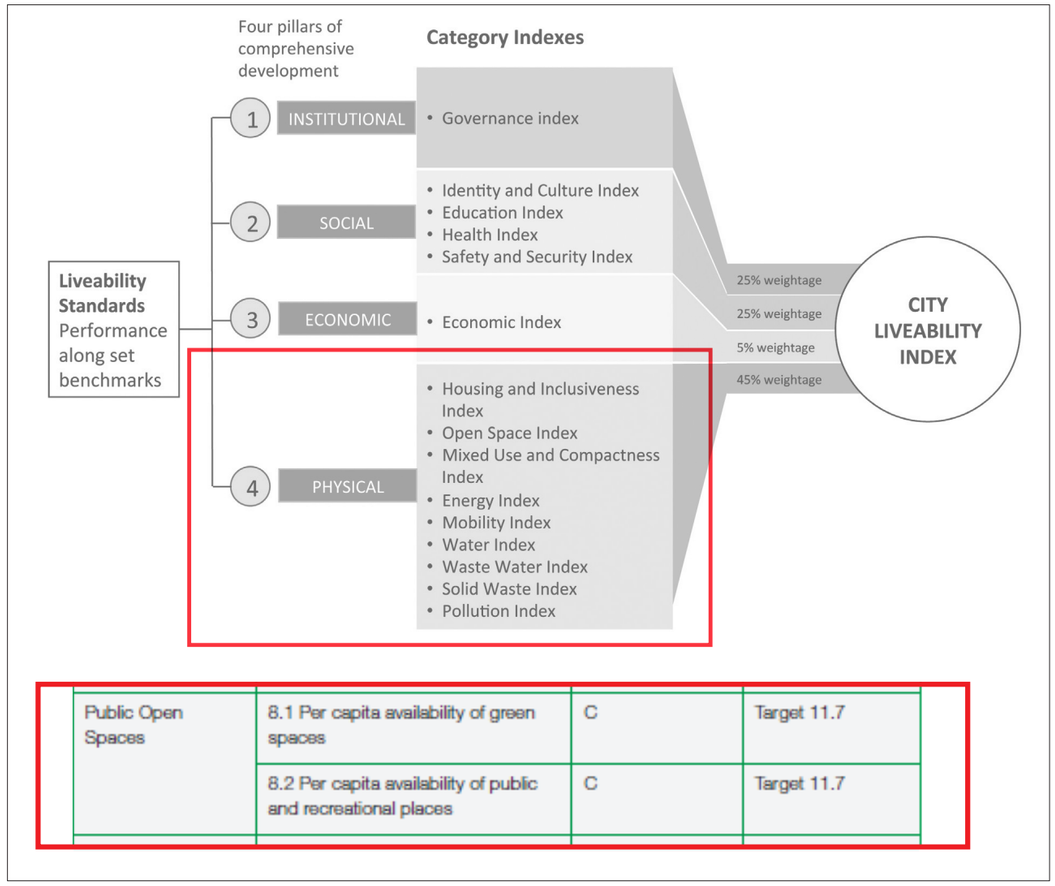
3.3.3 CONCLUSIONS

CONTEXTUALISING LIVEABILITY

In order to contextualise liveability in public space, the definition from the theoretical underpinning, the indicators defined by the government of India and the perception studies conducted are used. While the theoretical definition states the qualitative nature of liveable public spaces, defined by peoples perception, the indicators specified for the city consider only the quantity in the form of open space available per person. Therefore, it is proposed to expand this definition to also include qualities of the public space. This is done using the conclusions of the percpetion studies. The indicators are classified broadly into "availability", which is the indicator that is part of the existing definition as well, "accessibility", which defines the need for equitable access to public space not just in space but also time and finally, "walkability", which defines the spatial qualities that make the space confortable to use such as provision of shade or a safe pedestrian experience.

VARIABLES
DESIGN STRATEGY





Public Open Spaces	8.1 Per capita availability of green spaces	C	Target 11.7
	8.2 Per capita availability of public and recreational places	C	Target 11.7

AVAILABILITY
- OPEN SPACE PER P
- PUBLIC SPACE PER P

QUANTITY

ACCESSIBILITY
- SPATAL ACCESS
- LACK OF LIESURE TIME
- HIGH TRAVEL TIME

LOCATION AND TYPOLOGY

WALKABILITY
- LACK OF VEHICLE COLLISION
- ACCESS TO MIXED USE DIVERSE FUNCTIONS
- SHADE

SPATIAL DEFINITION

04 DESIGN PROPOSALS

Chapter overview:

The next section explores the different scales of design, starting from the proposal of a city scale strategy to the individual sites selected for further design. The research aims and conclusions from the analysis are spatialised and used as a framewrk for the design process.

Chapter contents:

4.1 The Supergrid - City scale design strategy
4.2 Location 01 - Regenerating the inner city
4.3 Location 02 - Strengthening local nodes

4.1.1 STRATEGY - CITY SCALE

EXISTING CONTEXT

The aim of proposing a city scale strategy is to create a larger city vision to move towards. The city is considered from two perspectives, structured through the mobility network and ecological network. They are considered, first individually and then together. The ecological system in Chennai city is fractured, interrupted and deteriorating. There is a need to reconnect the fragmented water bodies to ensure the flowing of water as well as maximising carrying capacity and improving ground storage. The strategy considers the elevation data of the region and older mappings of the city in addition to the existing water and green structures to determine the ideal means of connection. From a social perspective, the proposed network of green and blue also serves as a pedestrian network throughout the city.

The mobility infrastructure in the city is currently in the form of linear corridors, as seen in the analysis. It is vehicle dominated, with barely any pedestrian qualities or networks. Therefore, the aim of the strategy is to transform the important arterial roads into a set of spatially distributed grids to reduce vehicle dependency and increase potentials for densification and choice of routes. Further, the vehicular grid is upgraded to allow the finer grids to take on more pedestrian and cycle oriented spaces.

An important factor that is considered in this city vision is the contextual understanding of liveability, explained in the previous chapter, Ch.03. There is a need for equitable distribution of public space in the city as well as evenly distributed access to it.

Fig. 95 Existing ecological systems, Chennai
Fig. 96 Existing mobility network, Chennai



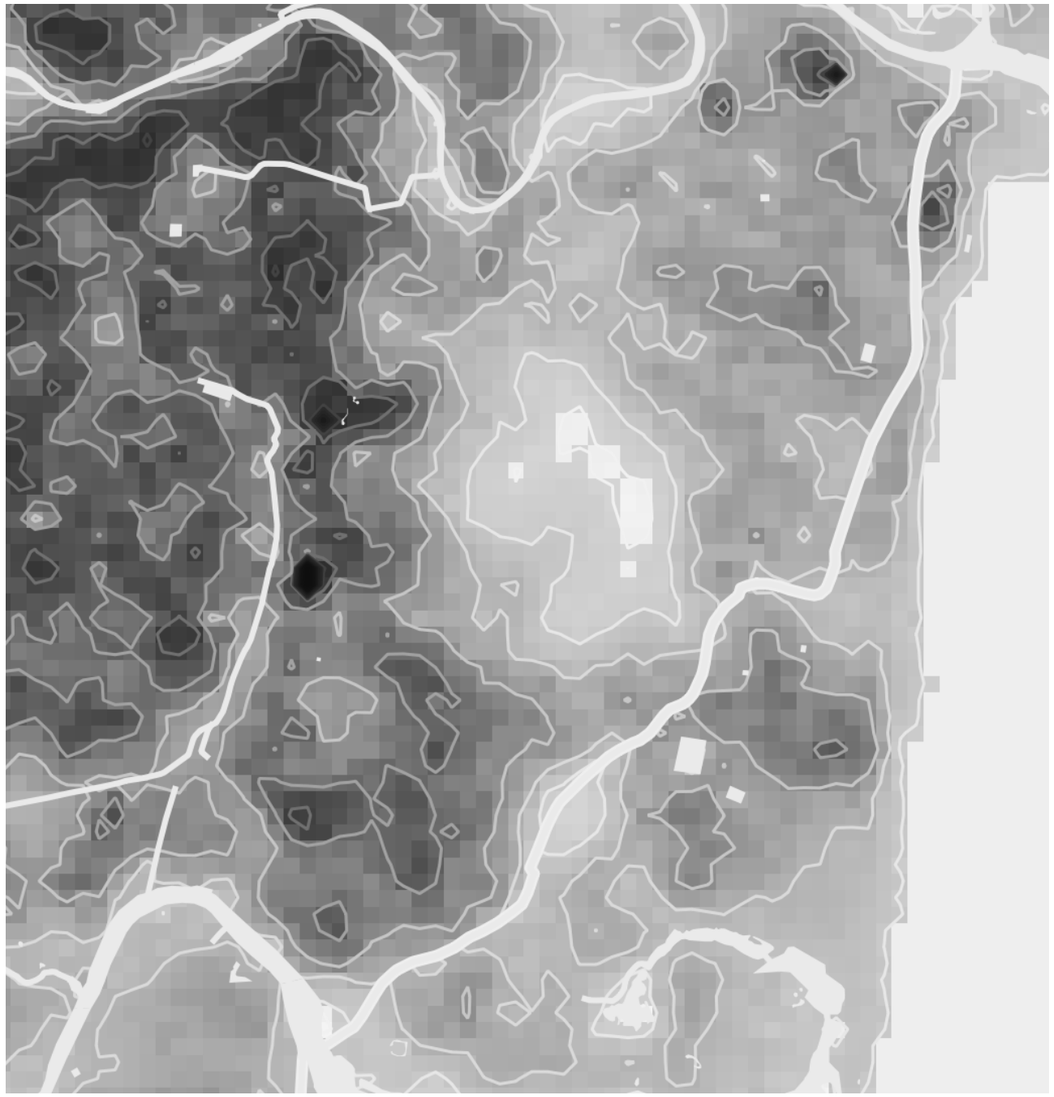


4.1.1 STRATEGY - CITY SCALE

EXISTING CONTEXT

In order to understand the ecological systems in the city, the topology of the city and historic maps are utilised. Several water bodies that were previously present, now disappeared, are documented. Similarly the ground level height at different parts of the city provides an understanding of the potential new connections in the ecological system.

Fig. 97 Topological elevation map, Chennai
Fig. 98 Historic mapping of Chennai city. Source: https://www.oldmapsonline.org/en/Chennai





4.1.2 STRATEGY - CITY SCALE

GREEN-BLUE NETWORK

Fig. 99 Evolution of strategy

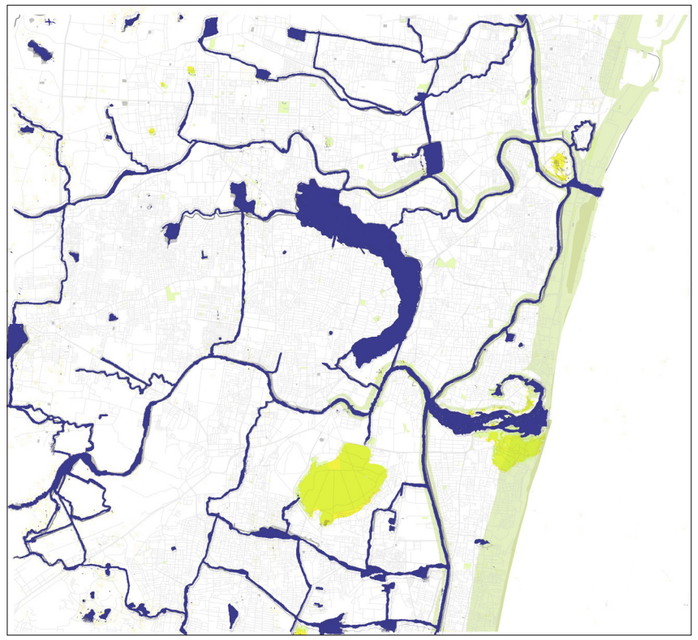
01 EXISTING GREEN BLUE STRUCTURE

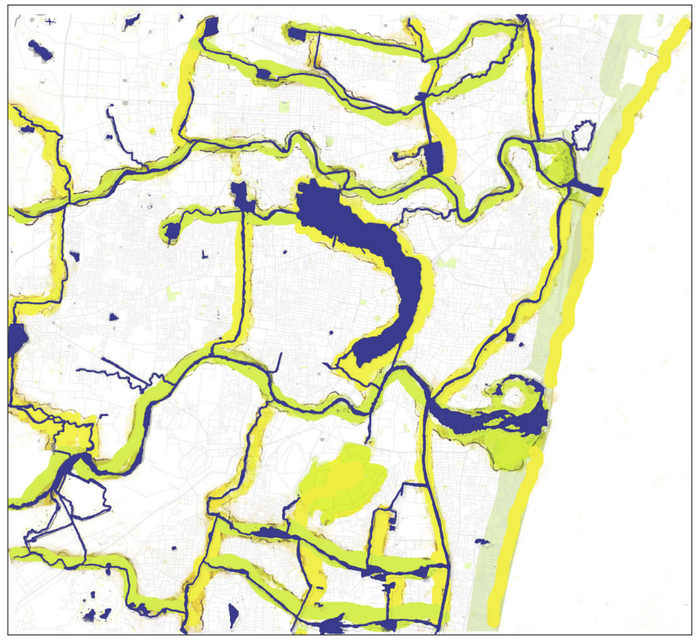
The two main rivers, Adyar and Cooum, and their various channels, the Buckingham canal, Pallikaranai marsh and all the lakes and green patches in the city are identified.



02 PROPOSED CONNECTIONS

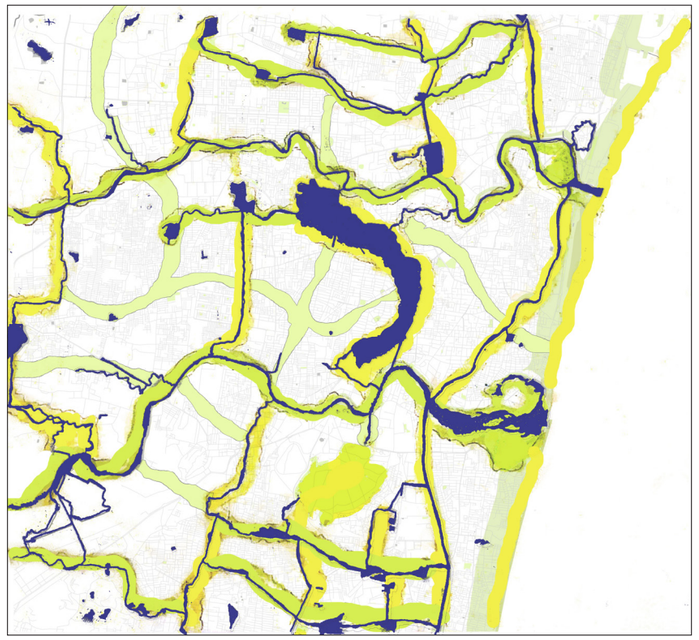
Based on elevation data and historic maps of preexisting waterbodies, new connections between existing water bodies are identified.





03 DEFINING SPATIAL QUALITIES

The blue structures are spatially defined with green edges, forming a grid of horizontal and vertical crridors. While the rivers form the primary green crridors, new connections form the secondary ones. This framework becomes a structuring element in the city.



04 PROPOSED GREEN CORRIDORS

Tertiary green corridors are proposed to increase accessibility to the larger green-blue grid. These green corridors can range from being ecological connections to just strong pedestrian connections.

4.1.2 STRATEGY - CITY SCALE

GREEN-BLUE NETWORK

Fig. 101 Proposed green-blue network
Fig. 102 Diagram of green-blue network

0m 2km

The proposed green-blue network allows for an equitable distribution of open spaces and nature in the city. It takes on the form of a super-grid,with the “blocks” in-between suitable for densification. Important nodes are highlighted to be ecological hotspots in the city, allowing for large open and natural spaces within the dense city. While this is a conceptuall representation of the idea of a grid f green-blue corridors, defining the spatial configuration and qualities require zooming in to more specific contexts. While the grid ensures that there is a distribution of public space throughout the city, the configuration of the networks, pedestrian, publiv and vehicular, will determine the accessibility to the grid. Therefore, the next step is to start from the pperspective of the mobility networks in the city.

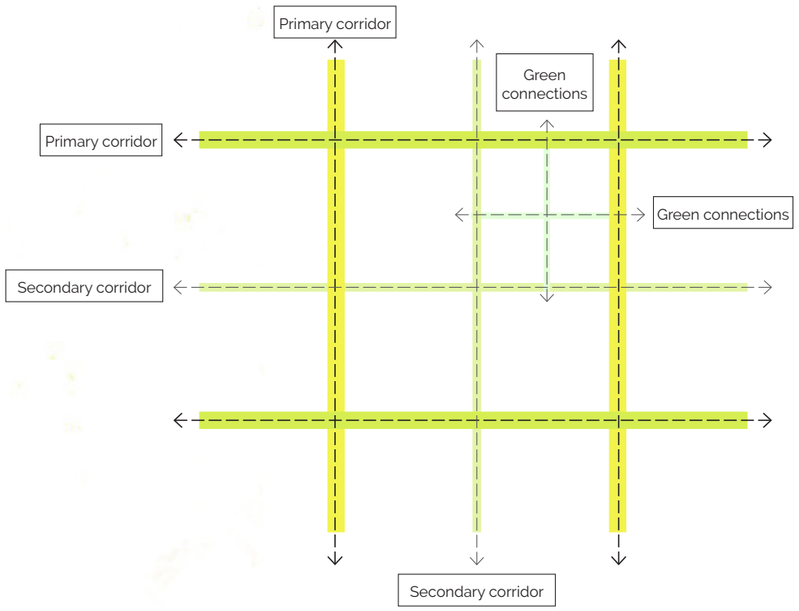


Fig. 100 Green-blue grid strategy

4.1.3 STRATEGY - CITY SCALE

MOBILITY NETWORK

Fig. 103 Evolution of strategy

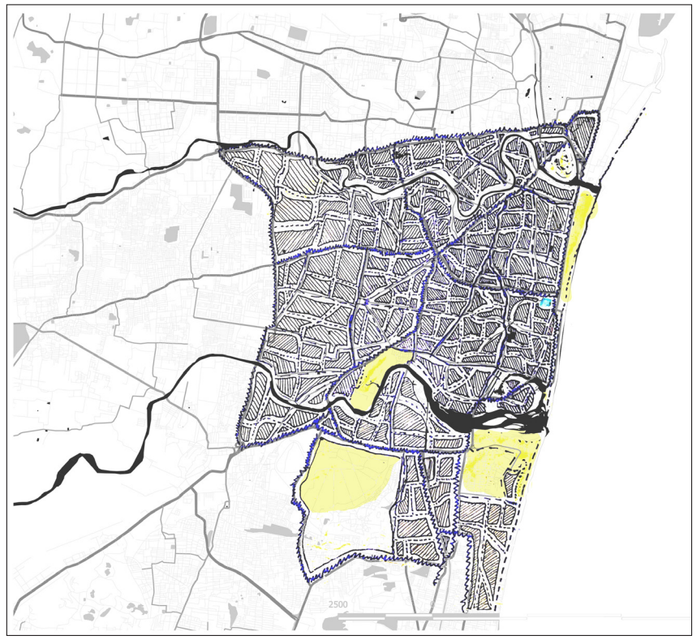
01 EXISTING NETWORK

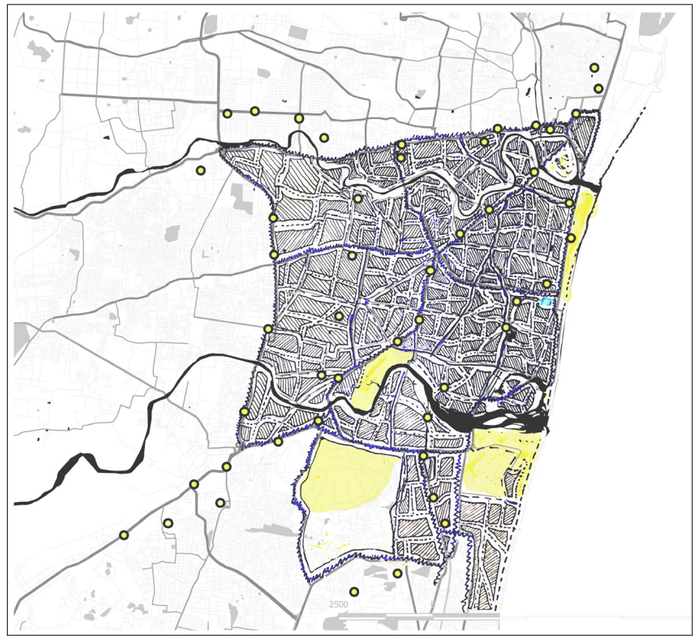
The existing network is classified into arterial, sub-arterial and collector roads. The radial corridor pattern oof the network can be identified, with a close knit grid structure found in the inner city and linear structures in the transitons and peripheries.



02 PROPOSED SUPERGRIDS

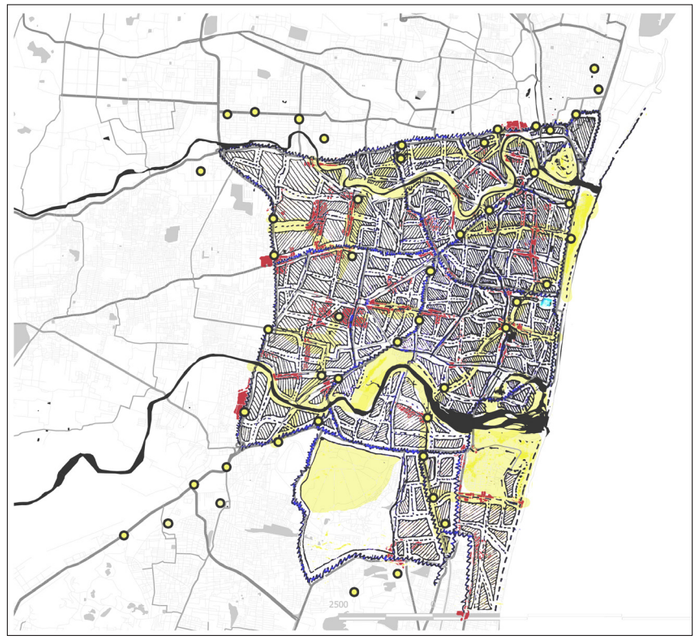
Based on the existing road network, units of approximately 500m x 500m are defined. Insome places, dead ends are connected or new roads are introduced to enable this. The structure follows a pattern where four basic units are encompassed by either a collector road, sub arterial or arterial road on all four sides.





03 EXISTING TRANSIT SYSTEM

The train lines and stops are supeimposed onto the base blocks.



04 IMPORTANT CITY DESTINATIONS

The important destinations in this part of the city is further superimposed onto the train lines and the base blocks. Green connections are prposed, traversing between strations and important locations in the city.

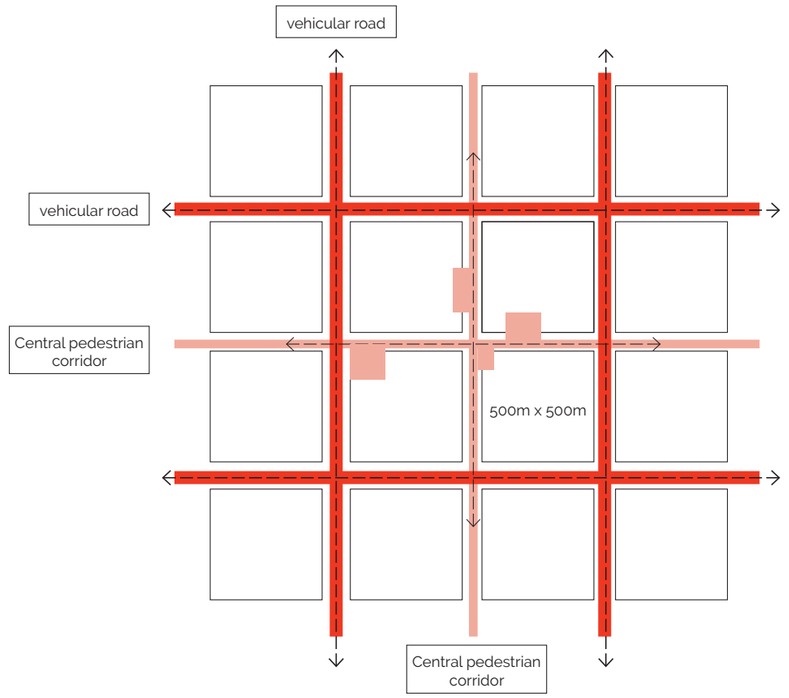
4.1.3 STRATEGY - CITY SCALE

MOBILITY NETWORK

Fig. 104 Proposed Mobility grid strategy
Fig. 105 Diagram of mobility network

0m 2km

This design strategy evolved from a design exploration exercise, where the concept of the Barcelona "Superblocks" (Inhabitat, 2017) was superimposed onto Chennai city, to understand its spatial implications. While the idea of upgrading vehicular blocks to create blocks of pedestrian spaces is transferable to the context of Chennai, for the problem posed, other aspects of the concept have been adapted to the context of Chennai. Unlike the urban blocks of Barcelona, the blocks in Chennai are not uniform in size and consists of plenty of dead end roads. Therefore, the proposed mobility network forms blocks of 500 x 500. Four of these blocks are surrounded by vehicle oriented roads while within the four blocks, the two through streets identified in-between them are more pedestrian in nature. These roads are also chosen so they can draw buildings that are mixed use in nature along with social and public function. This size of 1km x 1km was chosen because most people were comfortable walking this distance in the city and the existing road network allowed the definition of this size organically. These blocks can be considered units of density, where levels of densification can be defined based on proximity to transit , functions etc.



4.1.4 STRATEGY - CITY SCALE

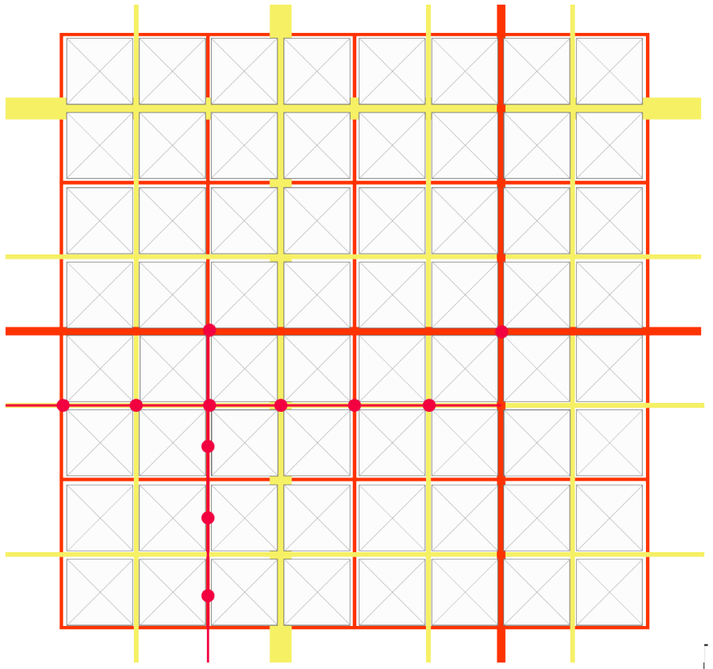
COMBINED STRATEGY - SUPERGRIDS

Fig. 106 Integrated Strategy
Fig. 107 Diagram of integrated strategy



Having derived two independent logics for the two networks, the next step is to understant their relationships to one another in an integrated manner. This is done by understanding the purpose the two networks serve, for the pedestrian quality and liveability in the city. While the blue-green grid acts a structuring element for the urbanisation process, it also allows equitable access to different types of open public spaces in the city, through a "slow lane". Similarly, the transit network upgrades the vehicular grid, to create a strong pedestrian local network in the city. When seen from the perspective of a pedestrian , It becomes a hierarchy of public spaces, the smallest network being local and defined as pedestrian streets while the largest are large natural spaces in the city. Therefore, when considered together, it takes the form of a hierarchical grid where local neighbourhoods are structured around the local pedestrian green corridors, while the larger green corridors structure and enable connections amongst many neighbourhoods. As described in, "Intensive urbanisation: Levels, networks and central places" (Read, 2013), it takes the form of a Supergrid.

Every four blocks are surrounded by a vehicular grid and bisected by a central pedestrian grid. The central pedestrian grid forms a direct spatial connection with the larger green-blue corridors.



SPATIAL ELEMENTS TO DEFINE



Hierarchial grids from blue-green grids to mobility grids



Transit lines



Mobility grid encompassing four basic blocks

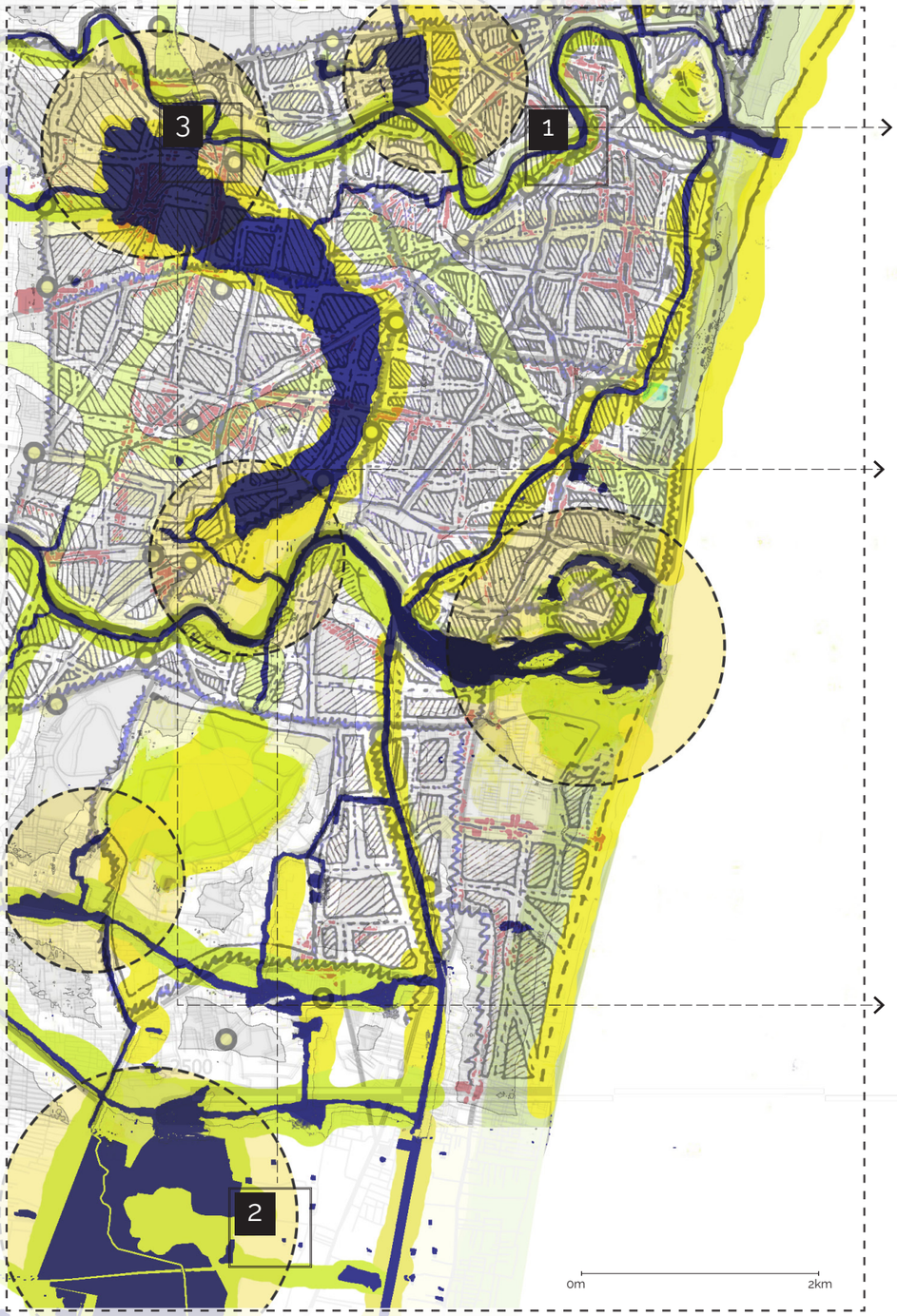


basic block 500M X 500M

4.1.4 STRATEGY - CITY SCALE

COMBINED STRATEGY - SUPERGRIDS

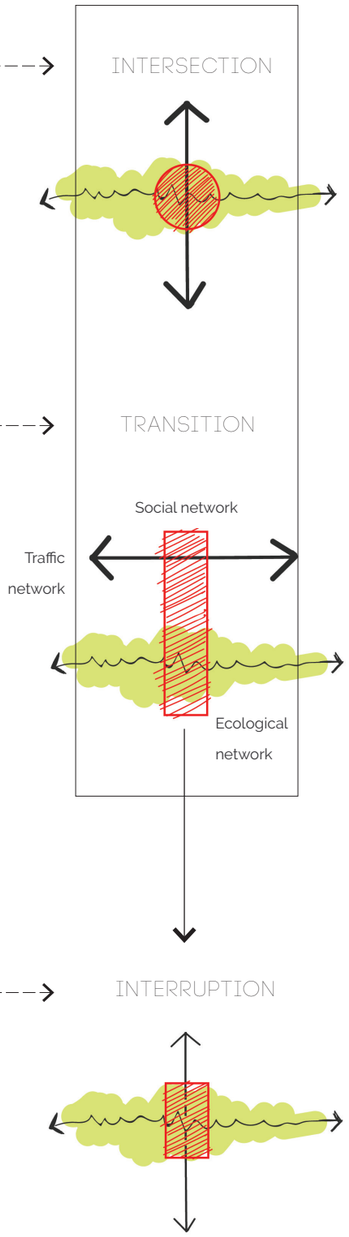
Fig. 108 Spatial definitions through local design sites



LOCATION 01
INNER CITY

LOCATION 02
PERIPHERAL
CORRIDORS

LOCATION 03
NEW GREEN-BLUE
CORRIDOR



The design process in the three local sites is utilised as a means to define certain spatial characteristics of the Supergrid structure. These are explained further below.

The first location falls at the intersection of a primary blue-green corridor and a primary transit corridor. The design process at this location will seek to understand the spatial relationship between the two networks and the potentials of creating strong pedeestrian local connections as well as city scale destinations.

The second location deals with the transition between a primary green-blue corridor and a primary transit corridor. The design process at this location focuses on the local networks of the supergrid and the spatial definition of a transition between the “slow lane” and the “fast lane”.

The third location involves the largest urban transformation of the three. The introduction of the large green-blue corridor in addition to the spatial intervention of the existing blue-green corridor and arterial road is the focus of this design process. Therefore, this site is treated as a test of transferability of design strategies from the first two locations. This helps break down the design into smaller components that have already been resolved while also evaluating the transferability of the design strategies.

4.1.5 IDENTYFING POTENTIALS

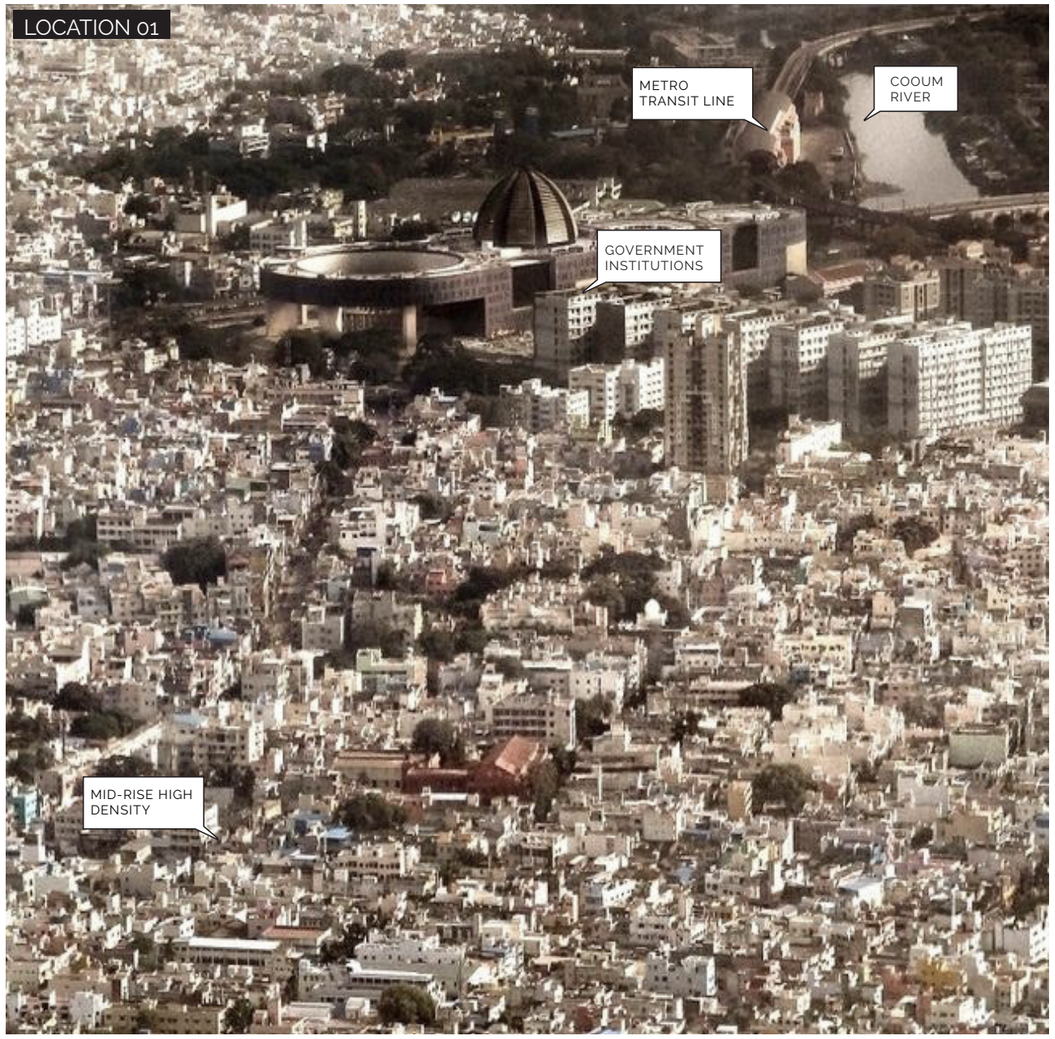




Fig. 109 Teynampet Source : https://www.indiatimes.com/news/india/15-stunning-images-of-chennai-from-10000-ft-above-sea-level-244693.html

The central part of the city is a combination of fine grained, mid rise high density housing and large institutional and government buildings. This area faces the challenge of a severe lack of public space and high levels of encroachment and pollution of the Cooum river. Further, the fine grained urban fabric, evolving from pre industrial periods, will face the challenge of scaling up to accomodate taller buildings, in the face of the new permissible densities. As this part of the city consists of the mejority of the economically weaker section of the society, an increase in density will lead to a much larger increase in population denisty as compared to the rest of the city, due to built space per person being quite low. Looking at the urban environment in terms of the two networks, there are a couple of intersections between the Cooum river and Mount road, one of the main rovers in the city and one of the important arterial roads that connects most of the city together.



The urban characteristics of the periphery is visibly very different from the centre. Having been shaped completely in the post economic reform era of Indian history, it is a place almost completely shaped by the free market forces. As a result, spaces are not designed to be of human scale. Lack of pedestrian facilities, tall building masses set away from the roads and fast traffic creates a very poor, unliveable public realm. Further, the development pattern in this part of the city follows a corridor pattern, with the main arterial road being developed, and the hinterlands left without the required services. As a result, corridors of sprawl are created, while the area surrounding it are sparsely developed with extremely poor living conditions. Majority of the new housing developments are in the form of gated communities, with their privatised amenities and common spaces, resulting in a fragmented fabric without any common ground.

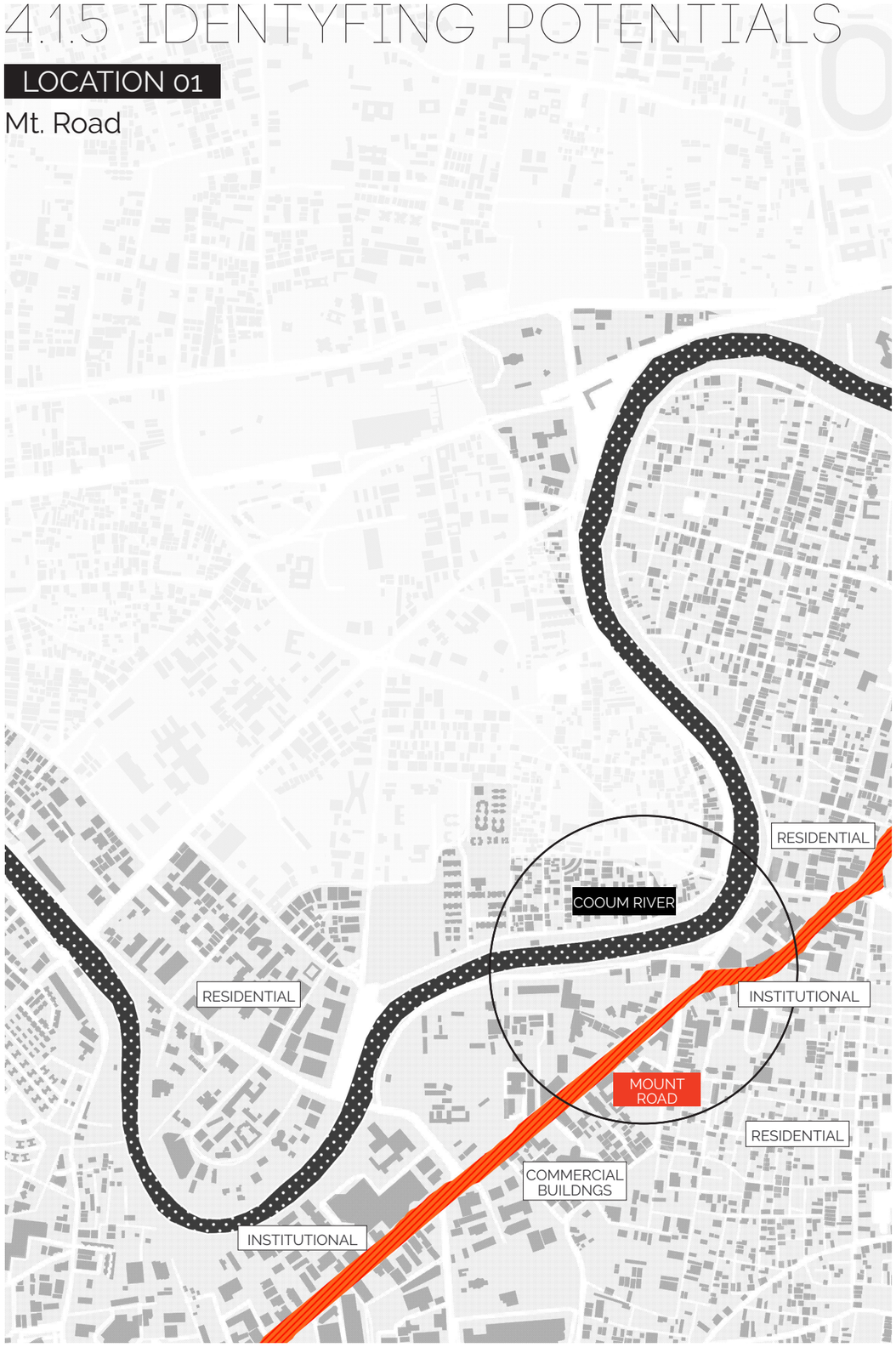


Fig. 110 Teynampet Source : Seekanpaul A

4.1.5 IDENTYFING POTENTIALS

LOCATION 01

Mt. Road



Mount road is one of the primary connecting roads within the city. Interesting potentials exist at the point where it intersects with the Cooum river. While the Cooum, a "slow lane" can facilitate recreational and ecological activities, Mount road, which is also the main metro transit line, allows for competive development. However, at the point they intersect, the recreational activites can occur at a city scale, owing to the high accessibility. Further, due to the proximity of the Metro station and availabilty of high quality of open space, this node has the potential for high densification. The presence of several government institutional buildings further gives an oppurtunity to create a series of public spaces connected by the river front. The diagram is an imagination of this potential, with the lower bank becomeing a city scale public space, while the upper bank of the river caters to the local residential neighbourhoods. The densification process can be utilised to make room for the river banks, while at the same time increasing density and functions near the metro transit node.

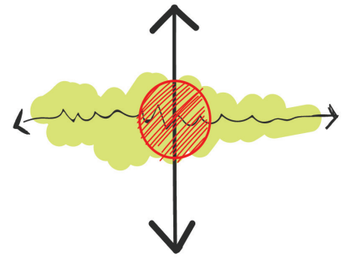
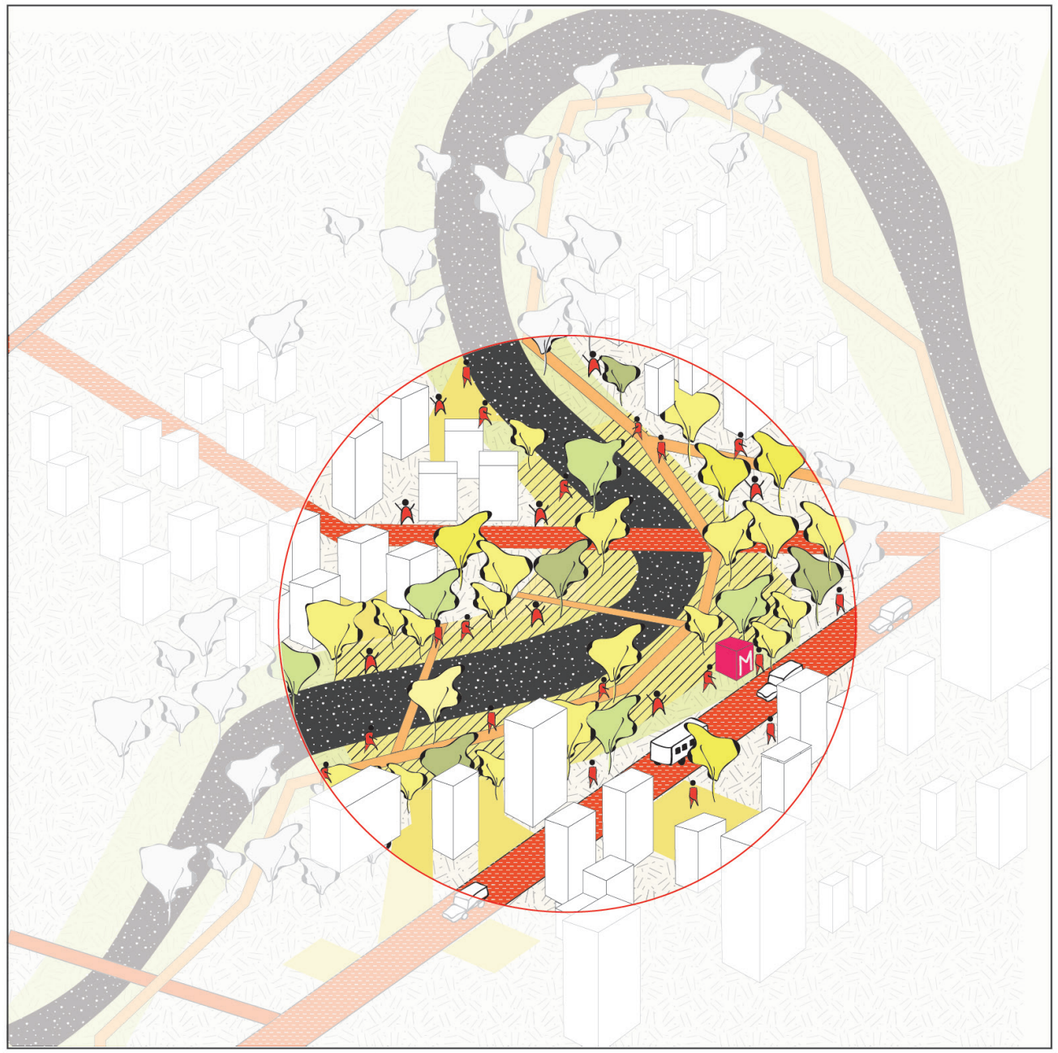


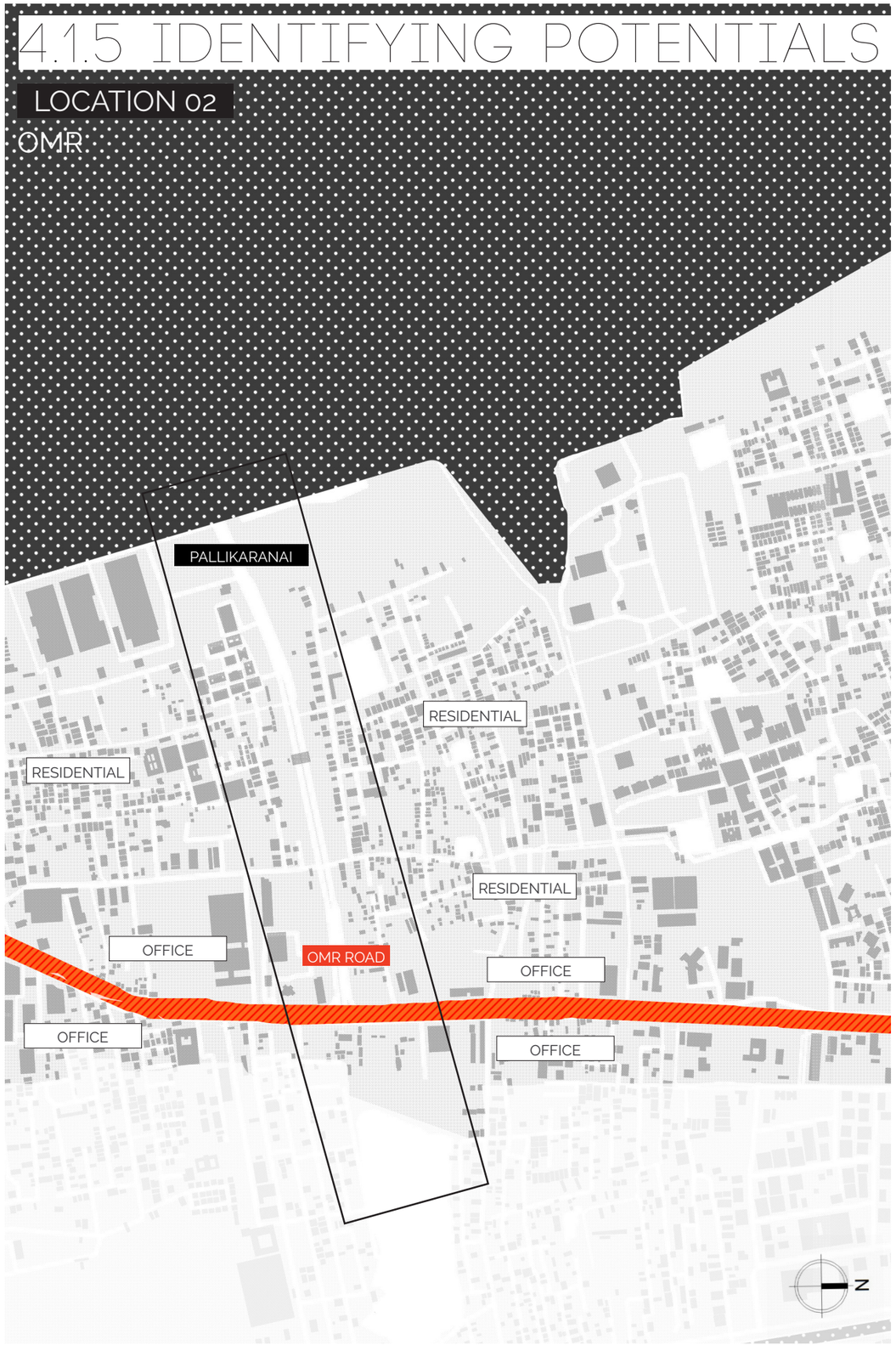
Fig. 111 Zoom in site - Mount road
Fig. 112 Envisioning potentials



4.1.5 IDENTIFYING POTENTIALS

LOCATION 02

OMR



The OMR is a corridor of IT industry development in the southern periphery of the city. In such situations the development pattern is such that, the sites along the main infrastructure line is well developed, while the interiors are not provided with adequate services to develop to their full capacity. This is a potential location for densification. The OMR runs parallel to the Pallikaranai marsh land, one of the last remaining wetlands in the city. The existing development conditions and the parallel nature of the two networks, allows for intervention in the transition space between the two. While the fabric along the main road is mainly offices and shops, leading to an extroverted and loud environment, the marsh lands is a place of vast openness and peace. Therefore, a transition through multiple connections that run through the residential neighbourhoods , providing recreational infrastructure locally, allows for multiple green edges to be formed, to create a peaceful and healthy neighbourhood. Therefore, while the fast lane and slow lane can be simply defined as " competitive" and "cooperative" respectively, the relationship between them in different spatial configurations and contexts affords different qualities of environments, creation contrasts and transitions within the city.

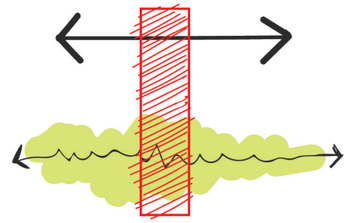
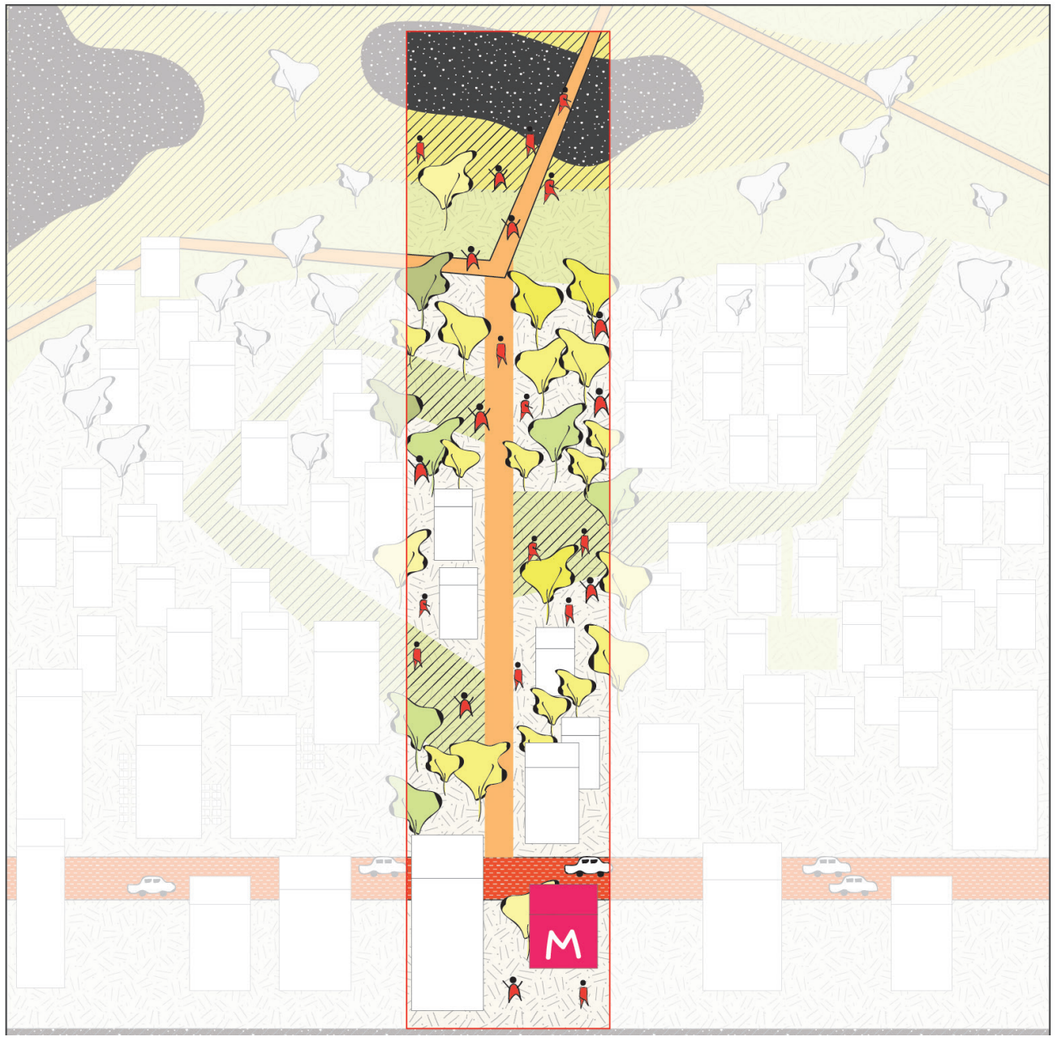


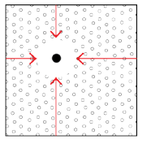
Fig. 113 Zoom in site - Shollinganallur
Fig. 114 Envisioning potentials



4.2 LOCATION 01

REGENERATING THE INNER CITY





Site 01 is situated in the center of the city in close proximity to The Cooum River and Mount road, one of the older arterial roads that also follow the metro line in Chennai. This part of the city, is home to some of the oldest neighborhoods in Chennai. This site is littered with various historical and cultural landmarks, being one of the old parts of the city. Several of the cities important destinations such as the seats of the political and administrative power, important government buildings, the most popular city beach, some of the oldest banks, some of the older colleges, the Museum of the city and the national Railway stations are in close proximity to this location. However, The lack of a strong pedestrian realm leads to the access to all these historical and cultural locations being predominantly by car and hence, fragmenting into smaller spaces that have no spatial relation to one another.

While the local neighborhoods have well-defined networks in this part of the city, the arterial road and the unused water edge fragment spaces creating disconnected local neighborhoods. Further, there is a lack of open spaces both at the city scale and at the neighbourhood scale in this area. While the close proximity of the Marina Beach alleviates the need for large open spaces and destinations in this part of the city, there is still a lack of every day public spaces and social realm. The polluted and unused river and its edge are further the source of pollution, foul smells and mosquitoes. The encroachment into the rivers floodplains over time, have resulted in poor water flow and periods of flooding in this portion of the city. With the minimum accessibility and visibility of the river, there is no relationship between the city and the river, causing an ill defined non-space in between the two, that serves no function or purpose, leading to it becoming a place of garbage dumping.

Vision

The design vision for this location is to create and strengthen the pedestrian realm and every day public spaces, that act as a framework that connects all the important historical, cultural and commercial locations at the city scale as well as the different local neighborhoods found here. Further, this will also enable and increase the amount of open space in this part of the city. An important part of the strategy is the activation of the river and its edge by facilitating compatible functions and allowing the city to engage with the river in order to revitalise it.

Fig. 115 Central Chennai. Source : https://www.indiatimes.com/news/india/15-stunning-images-of-chennai-from-10000-ft-above-sea-level-244693.html

4.2.1 EXISTING CONTEXT

FUNCTIONS AND NETWORKS

The chosen site for the design intervention is located near the three metro stops found in the centre of the city. Many city destinations are found in close proximity, as shown in the map. The stations are also in walking distance to the Cooum river, even though it is currently in a polluted and unusable condition and the road networks are not suitable to access it.

Fig. 116 Existing context and functions

scale : 1:10,000

Hockey stadium
Govt. Hospital
Egmore Museum
Stadium
park
Shopping mall
Thousand lights station
LIC station
500 m
1 km
Napier park
Government estate station
Island grounds
Multi-speciality hospital
Triplicane high street
Mosque
park
Shopping mall
Govt. Hospital
Chepauk stadium
Cricket ground
Parthasarathy temple

scale : 1:10,000

Important sites and functions

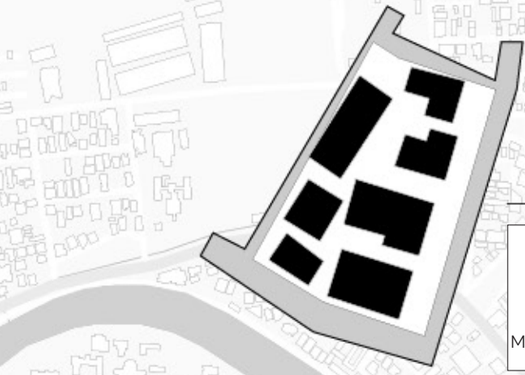
- Existing metro line
- Proposed metro line
- Suburban line
- Metro station
- Suburban station
- Bus station
- Industry
- Hospitals
- Cinemas
- Parks
- Schools
- Government buildings
- Mosques
- Shopping malls
- Temples

4.2.1 EXISTING CONTEXT

BUILT MORPHOLOGY

Fig. 117 Built morphology and types of blocks

scale : 1:10,000

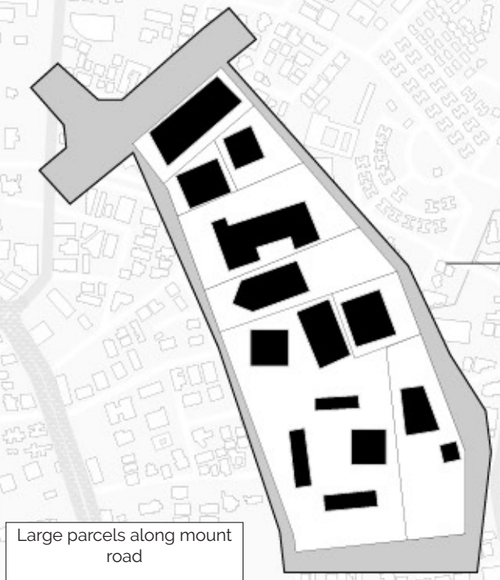


medium-large parcels

Institutional/ Mixed use

Medium rise- medium dense

Egmore



Large parcels along mount road

Commerial/ Institutional/ Industrial

High ride- low dense

Mount road

Roypettah



Continuous built area

Small parcels

Low rise- high dense

Residential/ residential with commercial in the ground floor



Triplicane

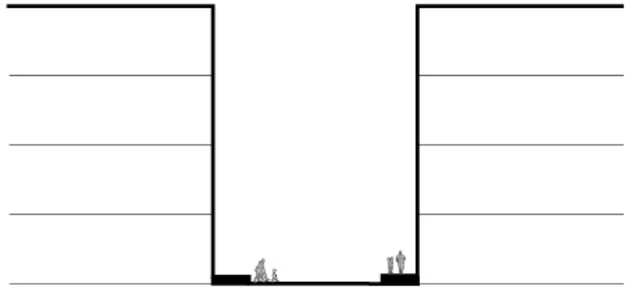
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4.2.1 EXISTING CONTEXT

BUILT MORPHOLOGY

Fig. 118 Mount road
Fig. 119 Triplicane high road





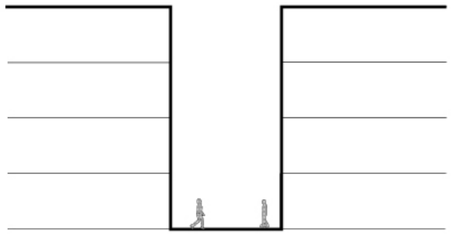


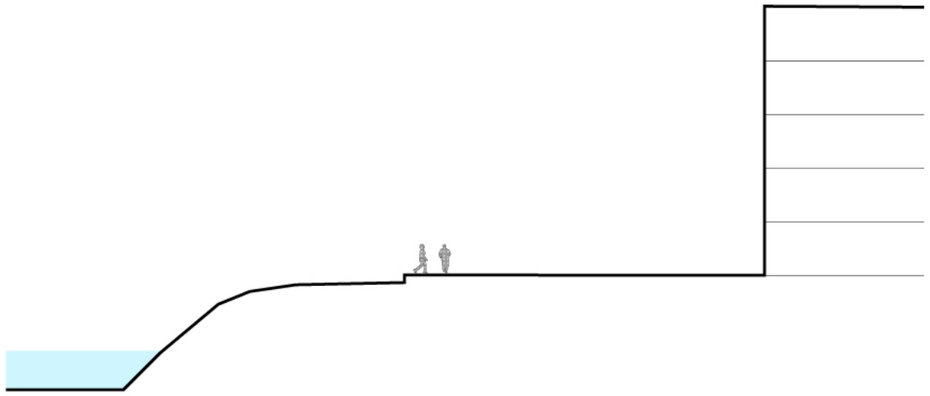


4.2.1 EXISTING CONTEXT

BUILT MORPHOLOGY

Fig. 120 Triplicane local street
Fig. 121 Cooum bank









4.2.1 EXISTING CONTEXT

LOCAL CHOICE AND SERVICE AREAS

The local choice values are very poor, especially along the Cooum river banks. The paths here requied to be connected better with the larger network to enable an active water edge.

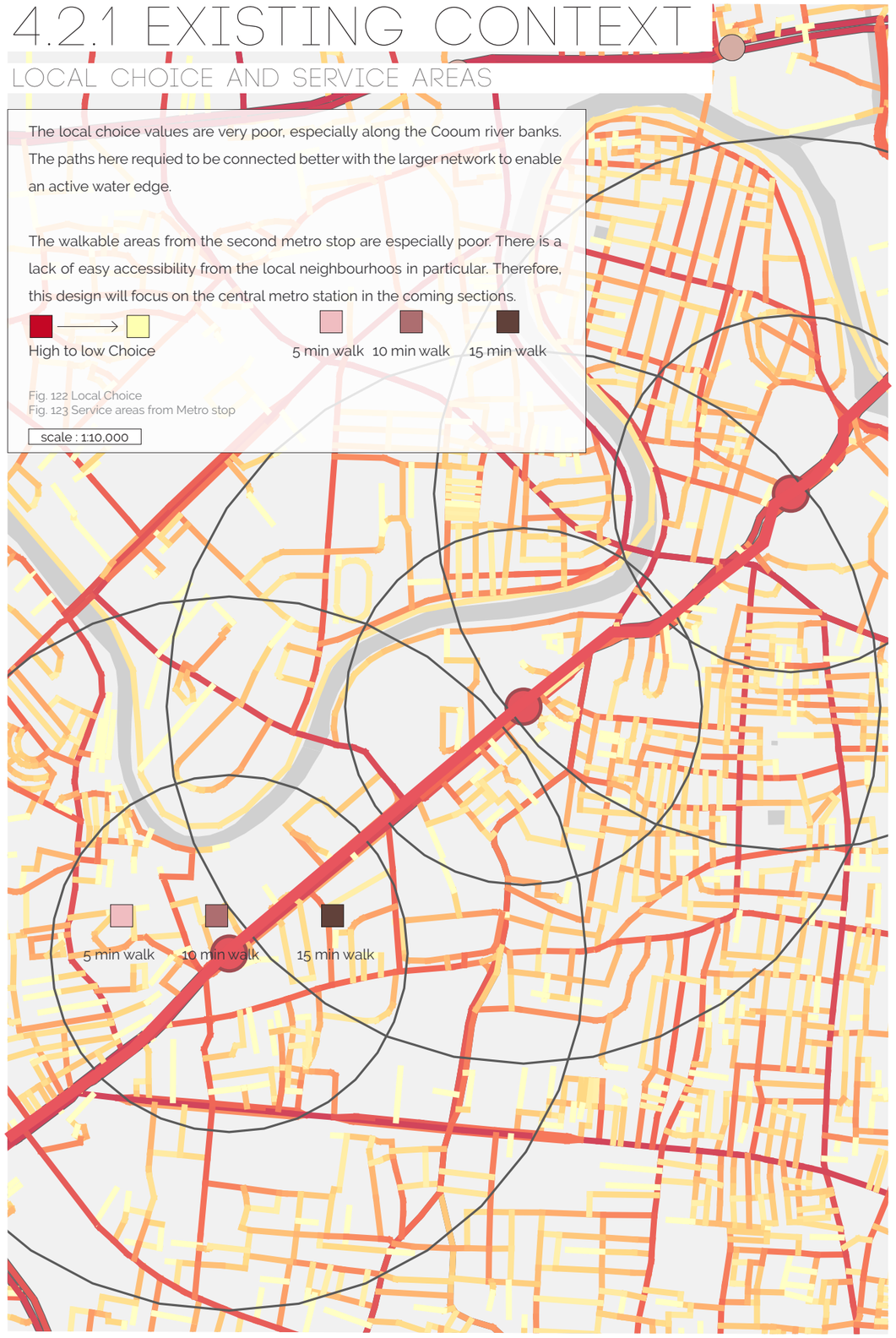
The walkable areas from the second metro stop are especially poor. There is a lack of easy accessibility from the local neighbourhoos in particular. Therefore, this design will focus on the central metro station in the coming sections.

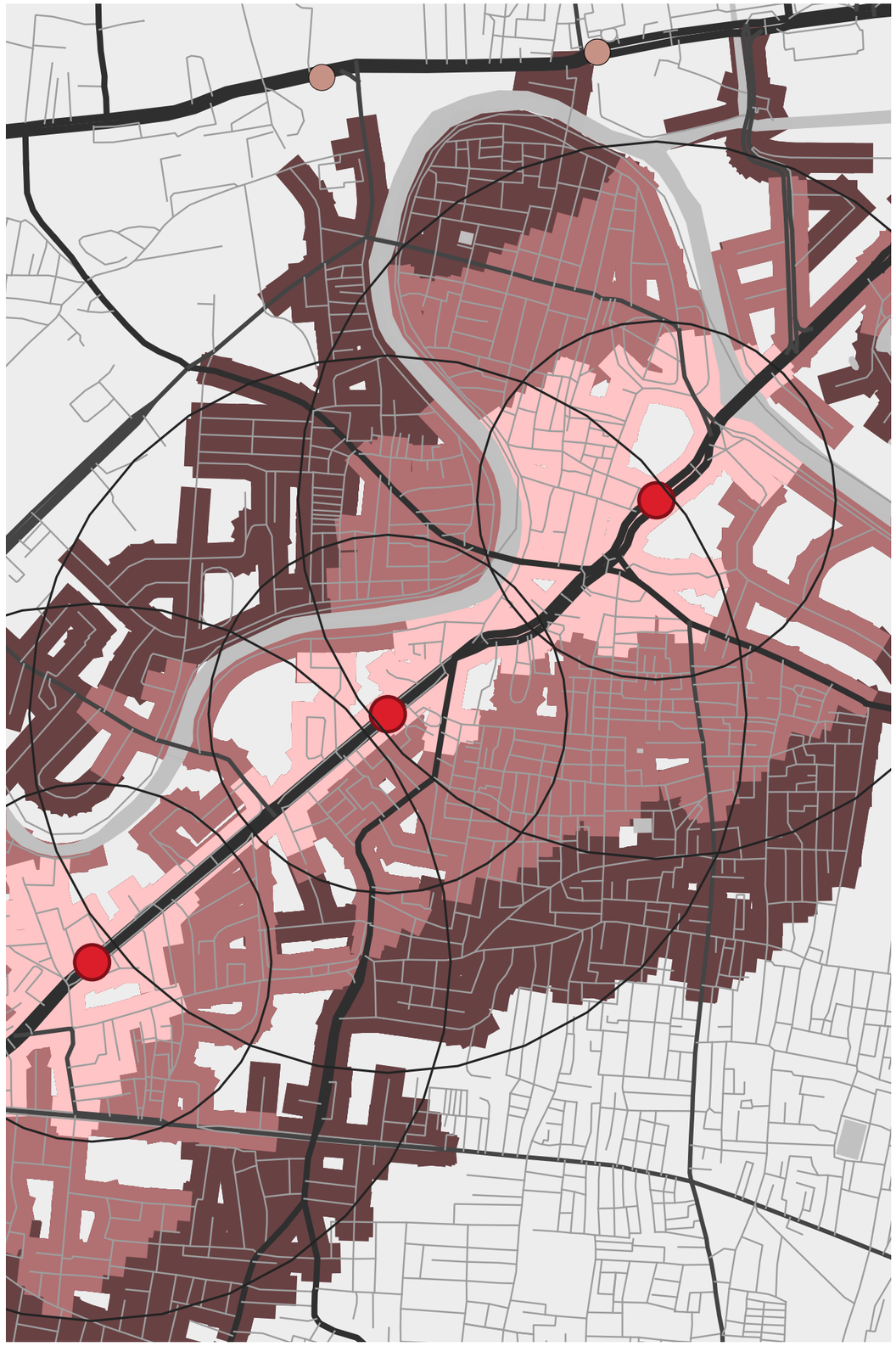
High to low Choice

5 min walk 10 min walk 15 min walk

Fig. 122 Local Choice
Fig. 123 Service areas from Metro stop

scale : 1:10,000





4.2.1 EXISTING CONTEXT

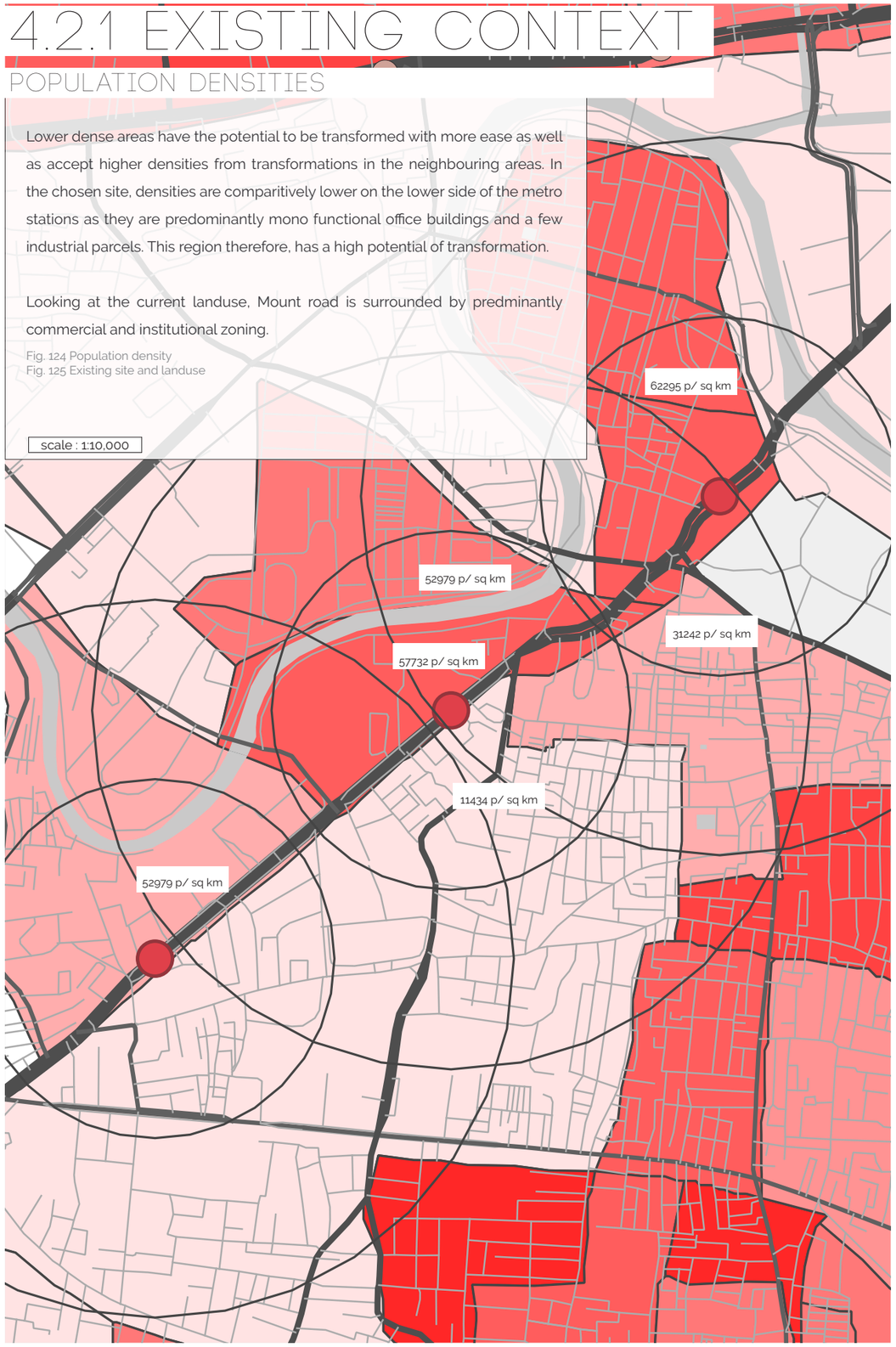
POPULATION DENSITIES

Lower dense areas have the potential to be transformed with more ease as well as accept higher densities from transformations in the neighbouring areas. In the chosen site, densities are comparitively lower on the lower side of the metro stations as they are predominantly mono functional office buildings and a few industrial parcels. This region therefore, has a high potential of transformation.

Looking at the current landuse, Mount road is surrounded by predminantly commercial and institutional zoning.

Fig. 124 Population density
Fig. 125 Existing site and landuse

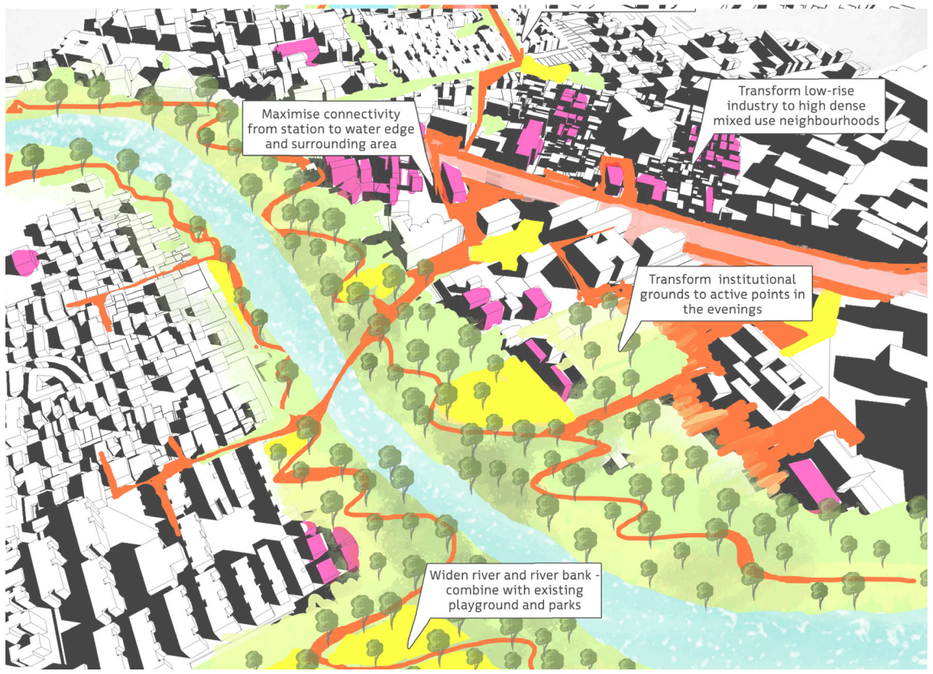
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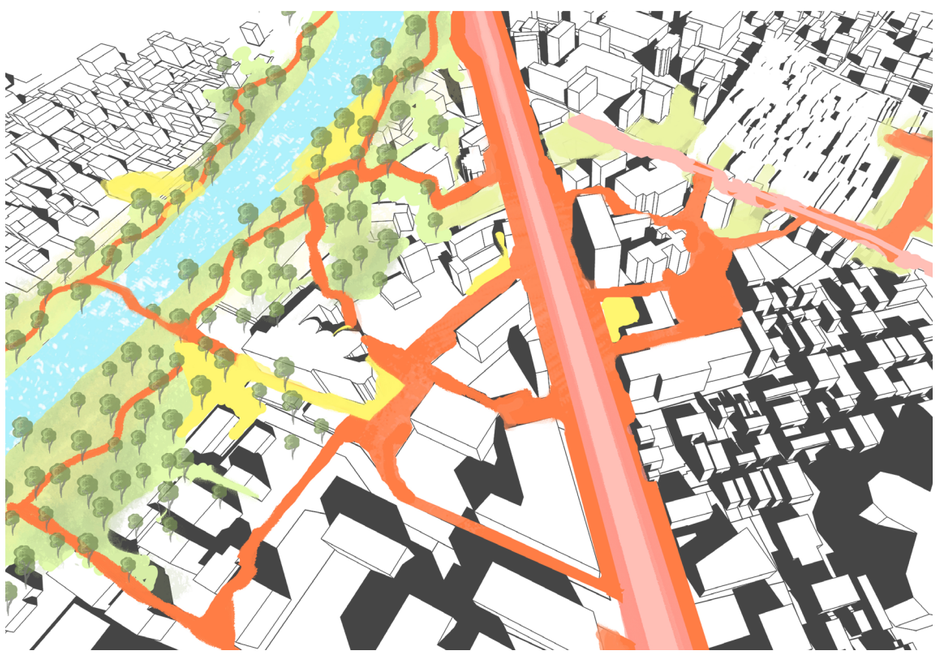
4.2.1 EXISTING CONTEXT

SELECTED SITE





LARGE OPEN GREENS IN THE CITY CENTRE



STRONG NETWORK OF PEDESTRIAN REALM
WITH DIVERSE ROUTES AND EXPERIENCES

4.2.2 DESIGN VISION

A large open green space is envisioned along the banks of the Cooum river, as respite from the dense and chaotic city centre. This open space integrates various recreational functions, both existing and new. This water edge has a strong local connection with the surround neighbourhoods through an improved pedestrian network as well as a good connection with the rest of the city owing to its proximity to the metro stations. Process of densification on industrial sites and monfunctional institutional and office buildings is carried out in order to carve out these public spaces in the city.

Fig. 126 Design Vision

4.2.3 DESIGN EVOLUTION

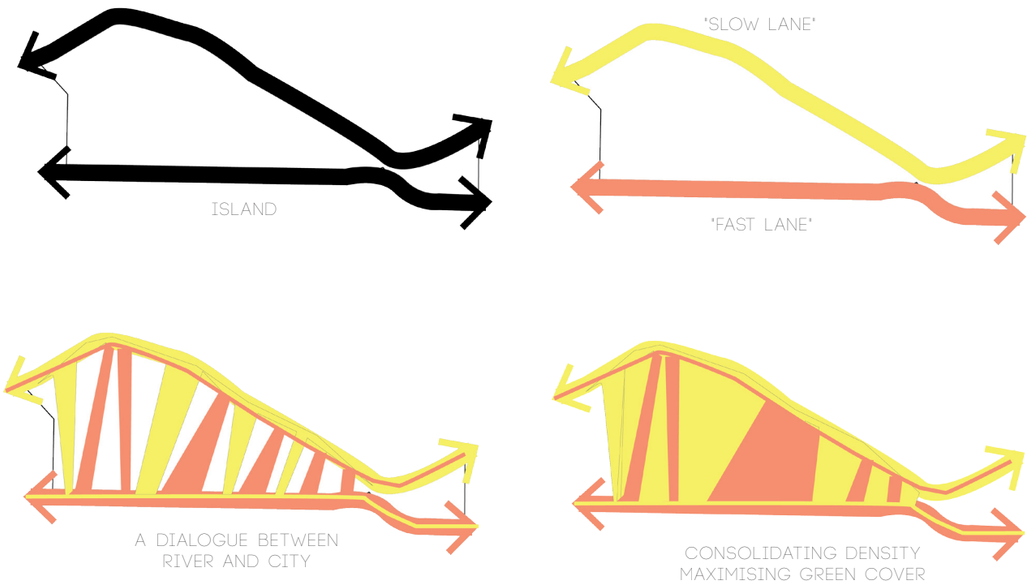
SUPERGRID STRUCTURE



Derived from the city scale strategy the diagram shows the definition of the Supergrid, with the Cooum being a primary blue-green corridor and the metro line a vehicular edge of the neighbourhood. In this location, the block present in-between the Cooum and the metro line is transformed into a new recreational and commercial centre, an interface between the city and the river. The design intervention focuses predominantly on this block.

Fig. 127 Supergrid structure
Fig. 128 Diagram - Evolution of design

The design evolution of the block is explored in the diagrams below. In the existing situation, the block is fragmented by two hard lines, namely, the Cooum river and the Mount road, The aim of the design is to open up this “island” to enable many new spatial relationships in the city. It is an oppurtunity for the city to engage with the river, a potential for city scale public space due to the proximity of the metro line to the river and the possibility for strong local connections between the different neighbourhoods. In order to facilitate these spatial conditions, the two dividing lines are to be redefined as the “slow lane” and the “ fast lane”, enabling diverse kinds of flows and functions. This requires strong spatial connections between the arterial road and the water edge, both in terms of urban functions as well as green connections. The urban connections are consolidated, in order to maximise green cover, increase the amount of open space in the city and increase the ground water percolation. Urbn crridors are then translated to built blocks and the central pedestrian path is activated.



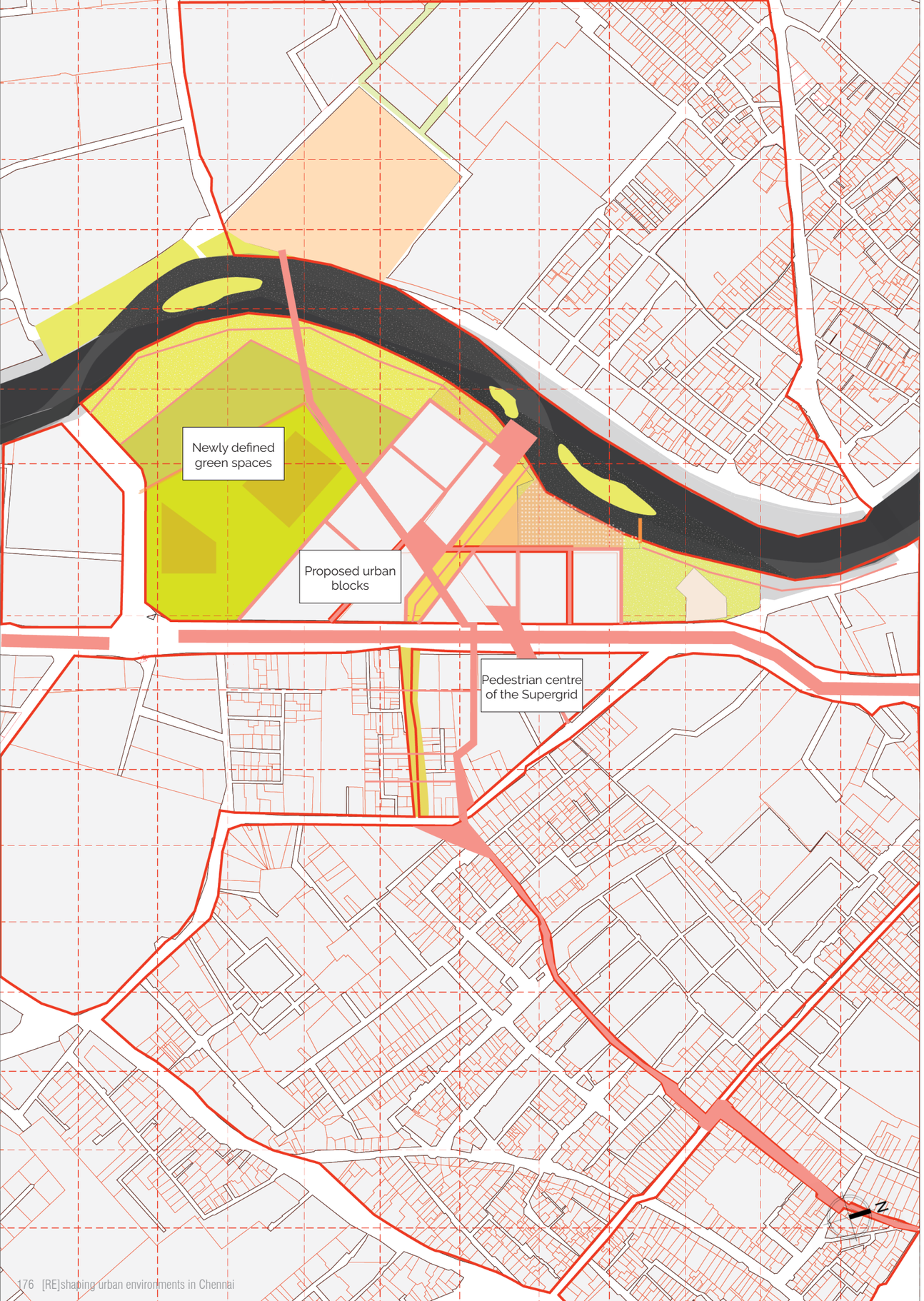


Fig. 129 Introduction of central pedestrian connection.

4.2.3 DESIGN EVOLUTION

CENTRAL PEDESTRIAN CONNECTION

The consolidated blocks are defined based on existing buildings and networks that have to retained (Historic buildings, huigh rise offices and residences) and the availability to transform existing functions and built form. The functionality in the green open spaces vary from, natural and dense green, urban green and commercial. These decisions are made based on the existing functions and their relation to the newly defined block. This is further explained in the next few pages. Once the blocks are defined, the pedestrian centre of the different supergrids is treated as one long path that connects the various local neighbourhoods. The spatial dimension of this path is chosen in a way that passes through all the major functions and public spaces, both city scale and local.



LOCAL CONNECTION BETWEEN
NEIGHBOURHOOD BLOCKS

4.2.3 DESIGN EVOLUTION

FUNCTIONS PRESENT ALONG NEW AXIS AND PROPOSED NEW FLOWS

The existing functions along the primary paths are identified. Based on this, new functions and spatial qualities are proposed. The local path transitions from within the neighbourhoods, crosses city scale flows of Mount road, enters more local neighbourhoods and finally crosses the Cooum,which also facilittes city scale flows. Therefore, the scale and nature along the path also reflects this. The potential for transformation of existing functions plays an important role in deciding the new flos and spatial qualitites. For example, colleges and other institutions can be made publicly accessible at certain times of the day, small low dense buildings can be relocated to denser buildings within the same block etc.

Fig. 130 Existing functions
Fig. 131 Proposed flows

4.2.4 PROPOSED DESIGN

Zoom in 04:
Local square

Zoom in 01:
Cooum river
edge

Zoom in 02:
Mount road
transformation

Zoom in 02:
Metro stop

The design of the new block is expressed in terms of the built, unbuilt spaces and the new networks in the first drawing and in terms of characteristics of densification in the second site. This is further explored in detail in the following sections, with focus on the water edge, Mount road, The metro stop and the local square. The densification strategy indicates the functions and typology of each block. The blocks are a combination of existing buildings that have been retained, transformed and newly developed buildings. The precise strategy is explained in detail in Ch.05. Block configurations are tentative and are dependanton the involved stakeholders during implementation

Fig. 132 Design proposal
Fig. 133 densification strategy

New buildings
Retained Buildings
Flexible typology

N

Mixed use residential - small scale commercial activity - mid to high
Mixed use office residential and commercial activity- high dense
Mixed use with recreational public activities at ground level
Increase in permissible density + incentivsing mixed use and active

4.2.4 PROPOSED DESIGN

CURRENT PROPOSALS FOR RESTORATION OF THE COOUM

The predominant ecological issues and subsequent goals are understood from the goals of the river restoration committee (TNUIFSL, 2014). Keeping this goals in mind, the design proposes alternate spatial implementations that not only fulfill the ecological goals, but also enable in activating the water edge and allowing the people of the city to engage with the river in multiple ways. This is further elaborated on in the detailed design.

Fig. 134 Restoration goals
Fig. 135 Engaging with the Cooum river



MAINTAIN MINIMUM ECOLOGICAL FLOWS THROUGH THE YEAR



IMPROVE AND MAINTAIN FLOOD CARRYING CAPACITY

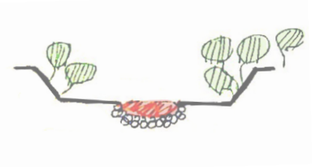


URBAN WATERFRONT DEVELOPMENT

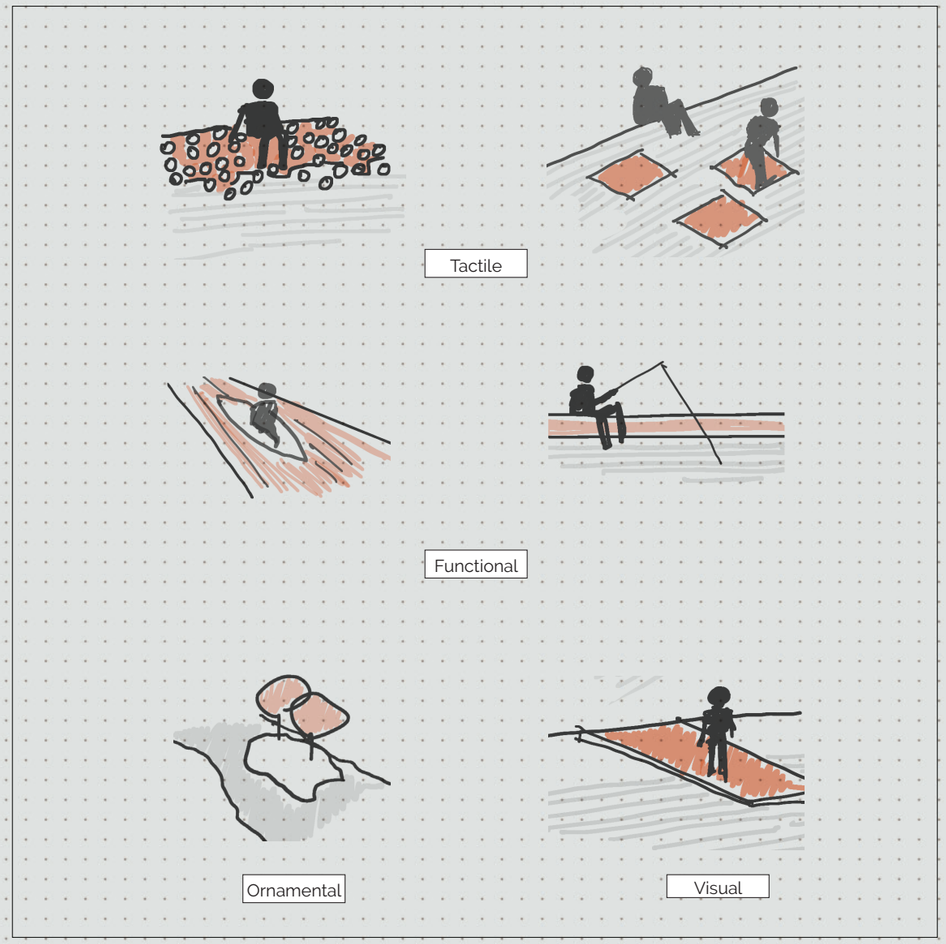


EXPLORE NAVIGATION POTENTIAL

The sections depicted below are propsed as a means to improve water carrying capacity. No intervention is put in place to address the river edges or the horizontal expansion of the river, as the report states that there is not enough space within the city to allow for this. However, as this project taken into account densification and urban transformation along with river restoration, it opens up more possibilities of spatialising these interventions and activating the water edge



SECTIONAL DETAILS TO INCREASE WATER CARRYING CAPACITY



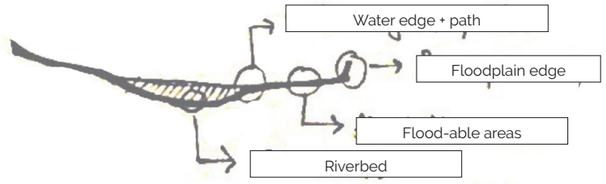
ENGAGING WITH THE COOUM RIVER

4.2.4 DESIGN PROPOSAL

ZOOM IN 01 : WATER EDGE

Fig. 136 Ecological interventions

The predominant ecological goals considered are the need for a smaller channel to allow perennial flow, the need to increase flood carrying capacity and the need for an accessible path along the river edge. The design proposal considers the potential flood-able areas, the characteristics found in the inner and outer bend of the river and the flow of the water. Functions compatible with the water edge, like play grounds and parks, are identified and become an extended part of the public realm. The design details are further explained through a series of cross sections



Playground opened up to water edge

Integrated park and playground with the river edge

Island used to define a smaller channel for continuous flow

River expanded along the outer bend

Shallow beach in the inner bank

Dense natural vegetation with minimum paved paths

EB Building - activated lower floors with a viewing deck

River expanded along the outer bend

Accessible public capus as path to water edge

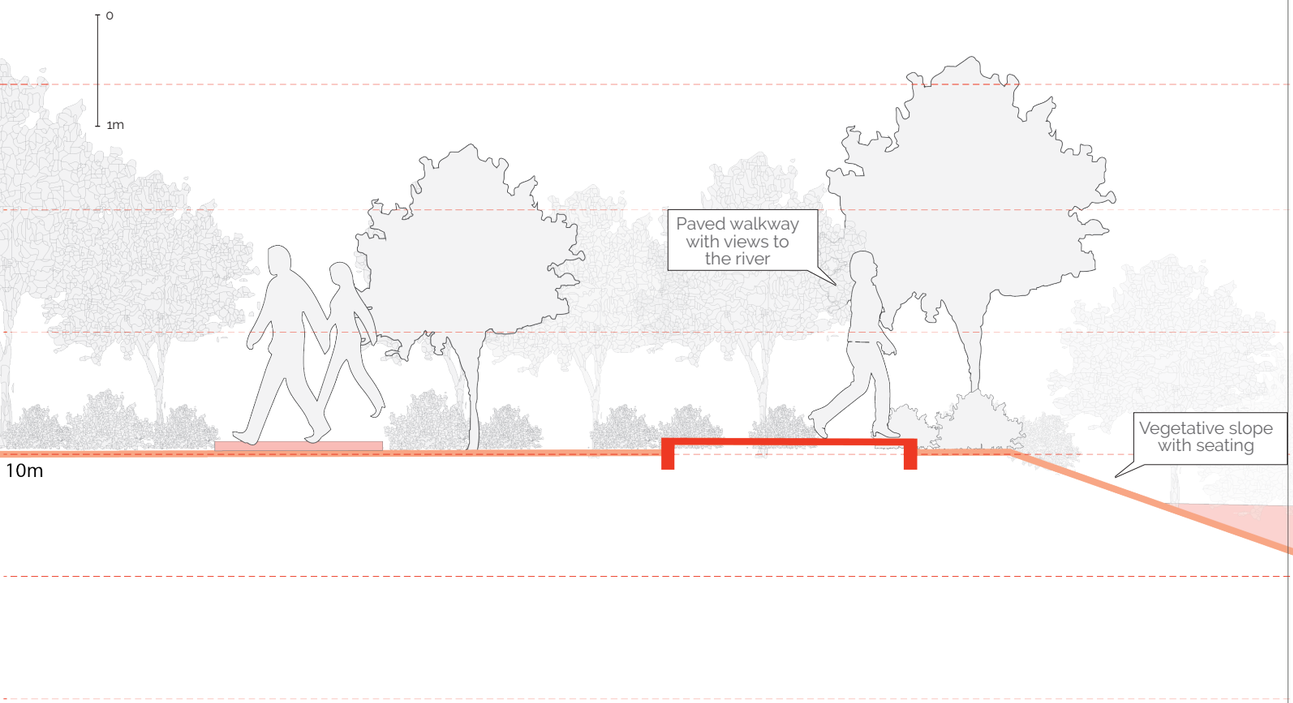
Urban market place abutted by small local shops at ground level

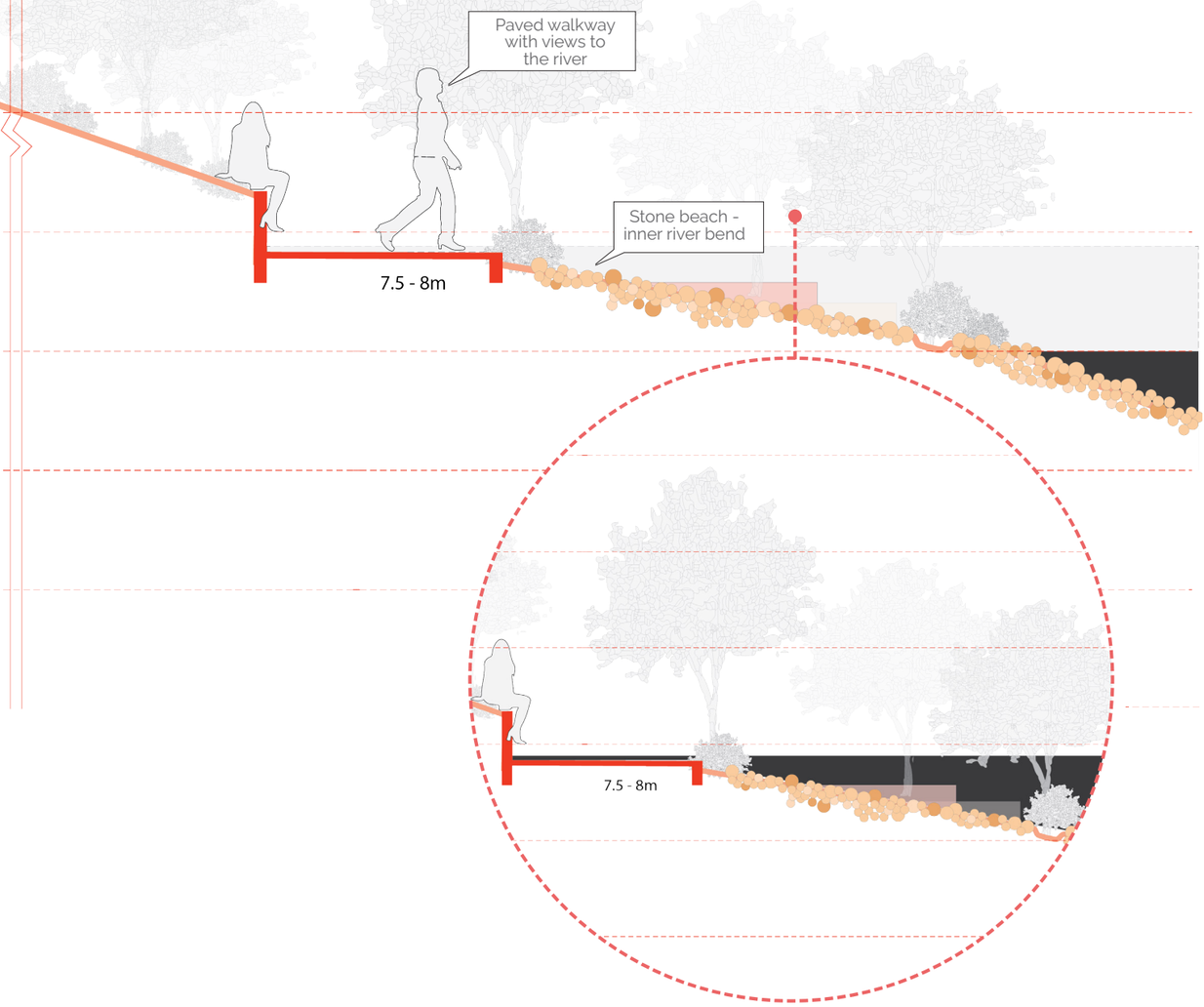
Urban park

N

4.2.4 DESIGN PROPOSAL

TYPICAL CROSS SECTION ACROSS INNER RIVER BEND





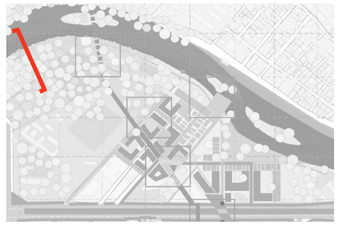
This diagram depicts the typical proposed cross-section along the inner bend of the Cooum river. The inner bend, being the shallower side of the river due to constant sedimentation, is defined as a beach, with course pebble cover. Preceded by dense and wild vegetation, this " beach" acts as a calm and peaceful clearing, with the gentle sounds of the water clinking against the pebbles and as a space that allows for visual and tactile contact with the Cooum.

The continuous pathway that runs along the Cooum river, at the elevation of this beach as well as proximity to the pedestrian bridge that connects local neighbourhoods across the river (see plan) ensures a regular flow of human activity to enhance a sense of safety while facilitating chance social encounters.

The main streets and built block level is around 3m higher than the bank of the river, allowing for a gentle vegetative slope with opportunities for seating and views of the river. Further, the path along the river is designed to act as a barrier to the water, in the times of floods, allowing the increase of the Cooum rivers water carrying capacities, while submerging the path in these situations.

A Parallel pathway runs at the height of the streets through the dense vegetation proposed along the eastern bank of the Cooum. This large green cover is interrupted with minimum paved paths to ensure maximum seepage of water and to create a largely natural green space in this part of the city that is highly congested and dense.

Fig. 137 Cross section - Inner bend



4.2.4 DESIGN PROPOSAL

TYPICAL CROSS SECTION ACROSS OUTER RIVER BEND

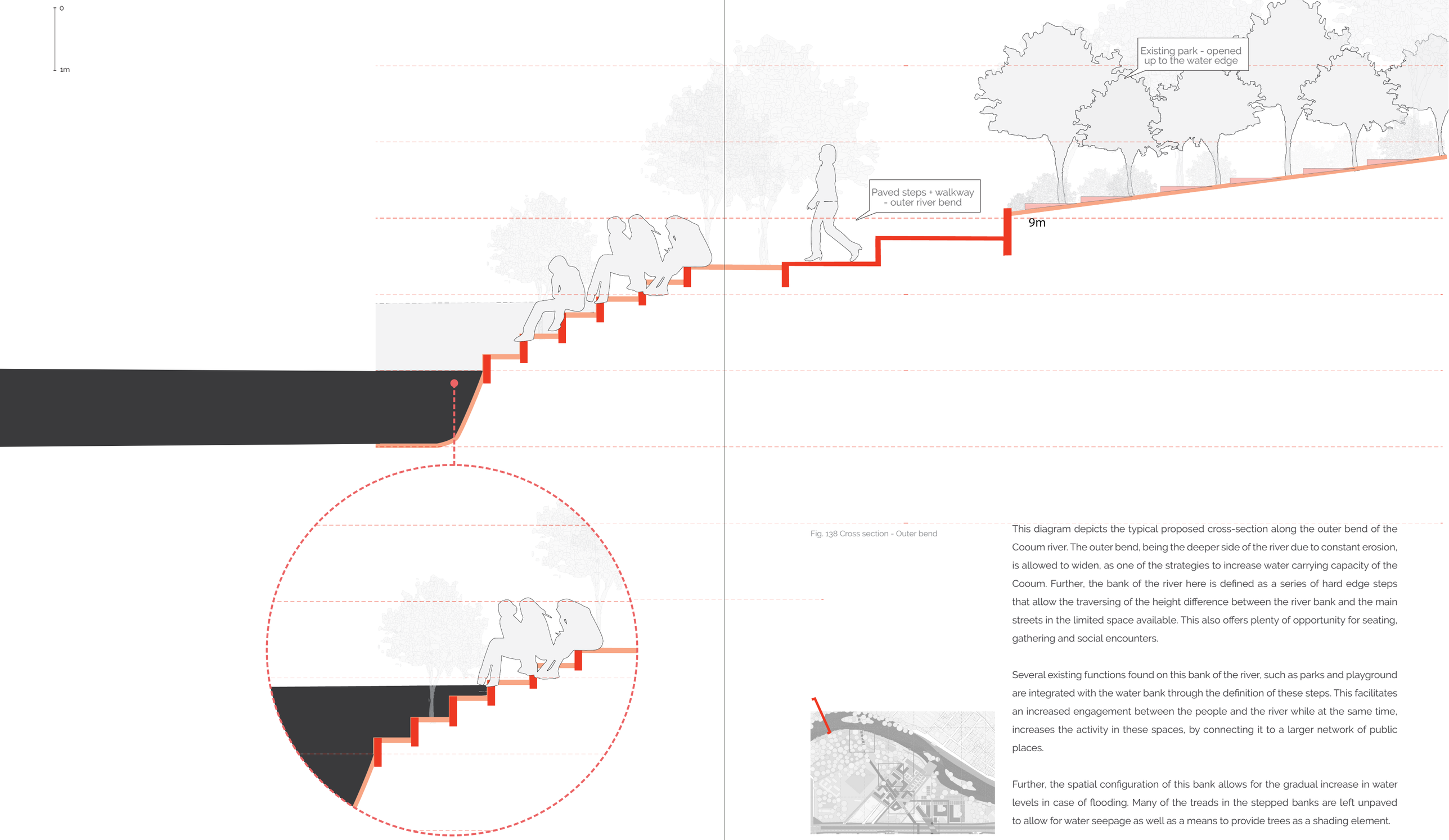


Fig. 138 Cross section - Outer bend

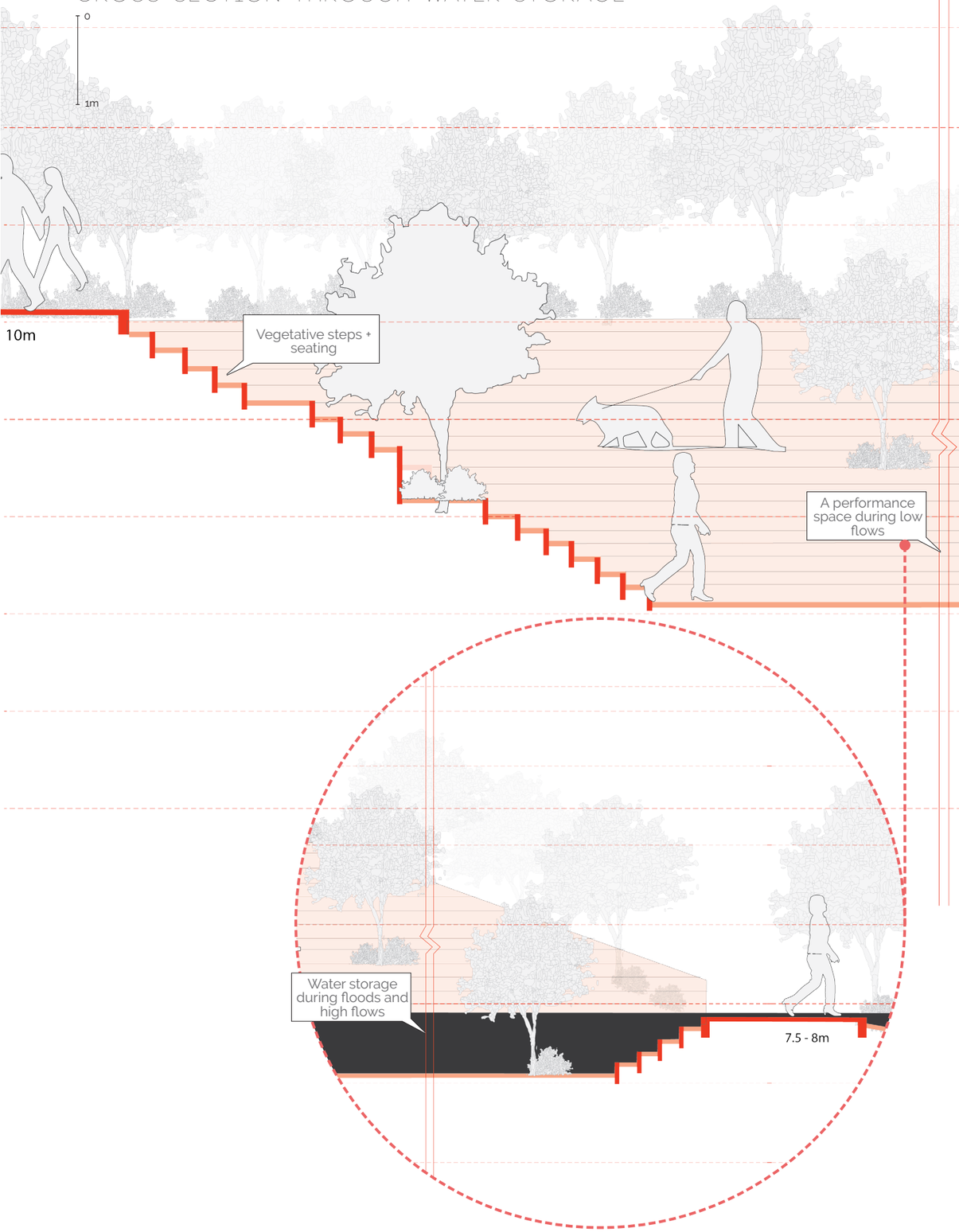
This diagram depicts the typical proposed cross-section along the outer bend of the Cooum river. The outer bend, being the deeper side of the river due to constant erosion, is allowed to widen, as one of the strategies to increase water carrying capacity of the Cooum. Further, the bank of the river here is defined as a series of hard edge steps that allow the traversing of the height difference between the river bank and the main streets in the limited space available. This also offers plenty of opportunity for seating, gathering and social encounters.

Several existing functions found on this bank of the river, such as parks and playground are integrated with the water bank through the definition of these steps. This facilitates an increased engagement between the people and the river while at the same time, increases the activity in these spaces, by connecting it to a larger network of public places.

Further, the spatial configuration of this bank allows for the gradual increase in water levels in case of flooding. Many of the treads in the stepped banks are left unpaved to allow for water seepage as well as a means to provide trees as a shading element.

4.2.4 DESIGN PROPOSAL

CROSS SECTION THROUGH WATER STORAGE



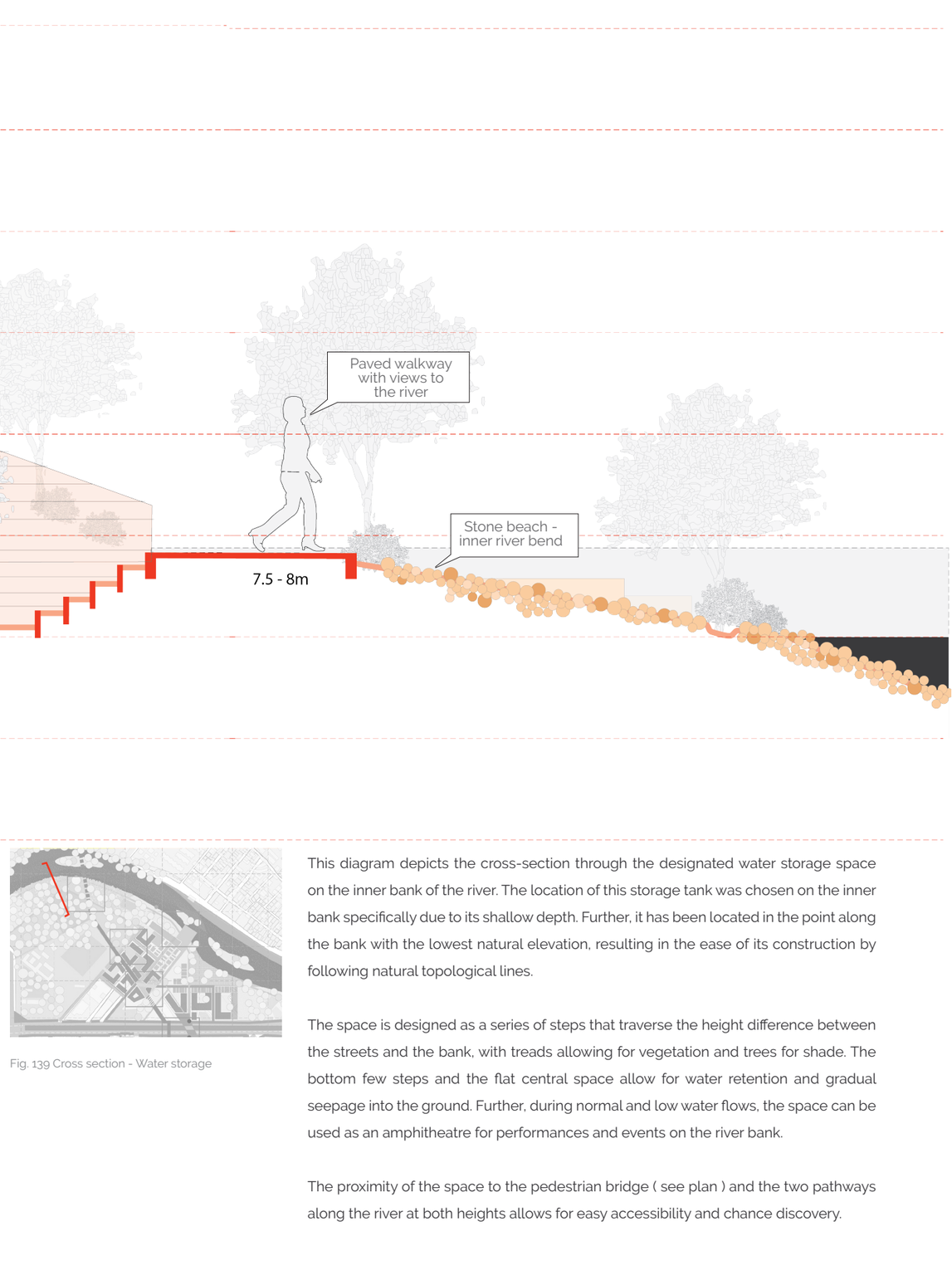


Fig. 139 Cross section - Water storage

This diagram depicts the cross-section through the designated water storage space on the inner bank of the river. The location of this storage tank was chosen on the inner bank specifically due to its shallow depth. Further, it has been located in the point along the bank with the lowest natural elevation, resulting in the ease of its construction by following natural topological lines.

The space is designed as a series of steps that traverse the height difference between the streets and the bank, with treads allowing for vegetation and trees for shade. The bottom few steps and the flat central space allow for water retention and gradual seepage into the ground. Further, during normal and low water flows, the space can be used as an amphitheatre for performances and events on the river bank.

The proximity of the space to the pedestrian bridge (see plan) and the two pathways along the river at both heights allows for easy accessibility and chance discovery.

4.2.4 DESIGN PROPOSAL

CROSS SECTION THROUGH PEDESTRIAN BRIDGE

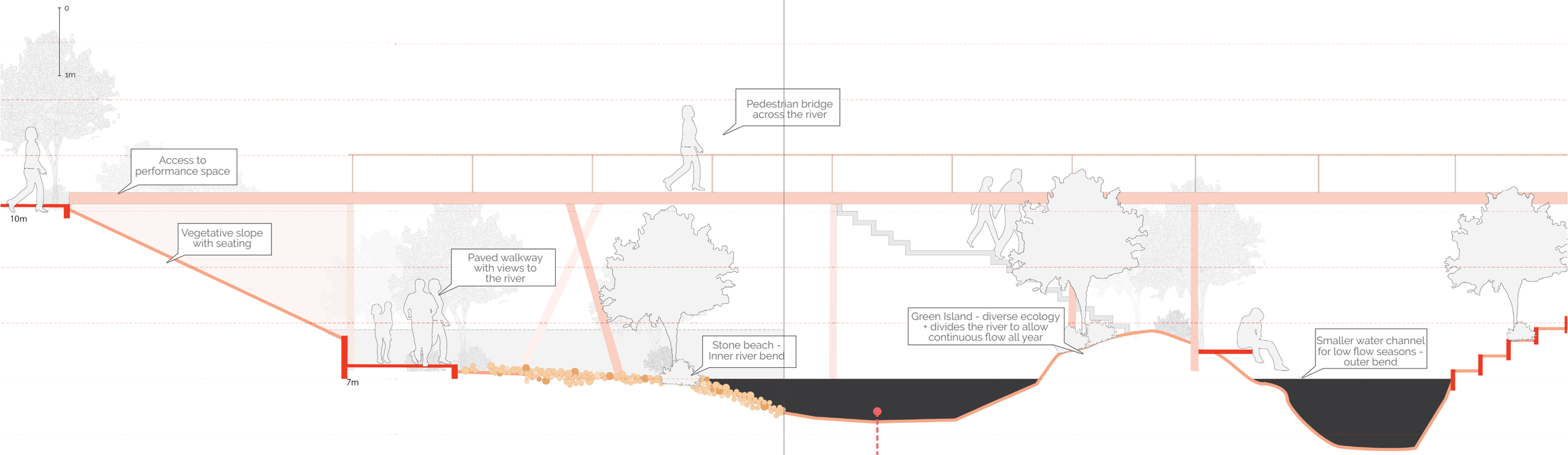
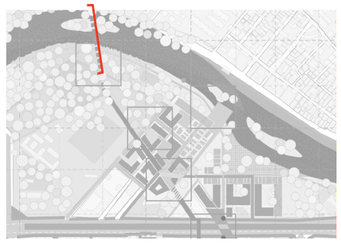


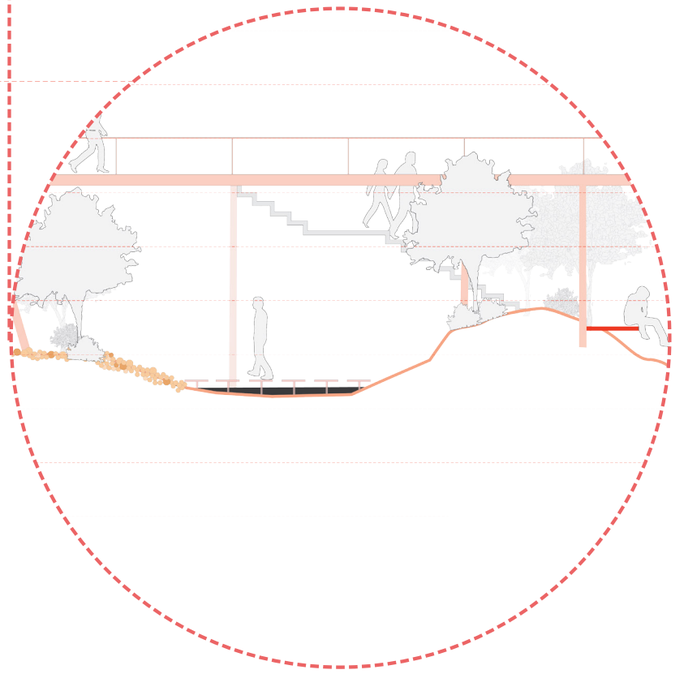
Fig. 140 Cross section - Pedestrian bridge

This cross-section depicts the pedestrian bridge that connects the local neighbourhoods in this area, on both sides of the river. This bridge is a part of the path that connects the central pedestrian axis of the different local neighbourhoods, the access to the metro station., the amphitheatre space as well as the parks and playground on the opposite river bank and leads all the way up to the city museum and museum park.. Therefore this ensures maximium social activity along this axis. Therefore, this bridge is designed as a series of spaces rather than just an infrastructure for crossing. While the beginning of the bridge also acts as the first step of the amphitheatre, the end of the bridge, on the other river bank reaches the topmost step of the stepped bank, in level with the parks and playground. In the middle, over the river, there is a means of acess to the proposed island in the river.

These proposed islands serve seveal purposes. Firstly, they allow the division of the river channel into two, the deeper one in the outer bend allowing for waterflow even in the dasons of least flow thereby improving the bio-diversity in this area. Further, they act as small intimate spaces that allow for birds and other species, with minimal human disturbance.

During the seasons of low flow, the watr level drops in the inner bnd of the river, allowing a new way of access to the isalnd. This allows the different seasons and nature of the water flow to become explicit as changing social experiences, provding a deeper engagement with the ecology of the city.





4.2.4 DESIGN PROPOSAL

CROSS SECTION THROUGH EB BOARD BUILDING

This section depicts the new relationship between the river, existing buildings and the people using these spaces. The Electricity board headquarters building is situated on the banks of the Cooum river. The important public function of the building and the high built density makes it more suitable to transform the lower floors by introducing recreational and commercial activities rather than clearing the building all together. Th building allows access to the river both at the the bank level as well as through an elevated deck, which acts as a continuation of the activities indoors. During periods of high water flow, the bottom few steps of the building hold water, creating a new way of experiencing the river from within the building

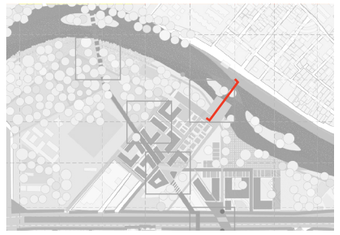
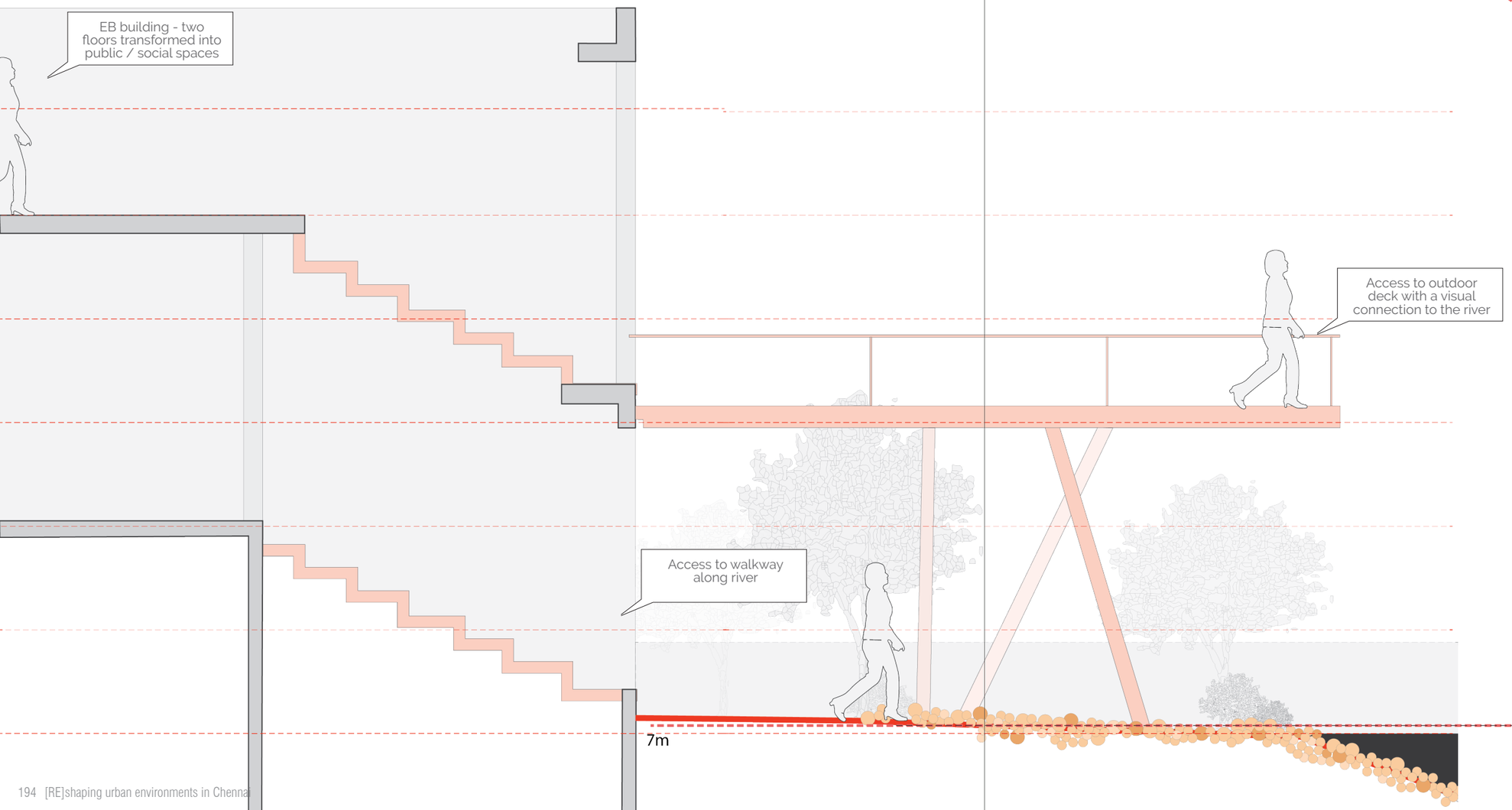
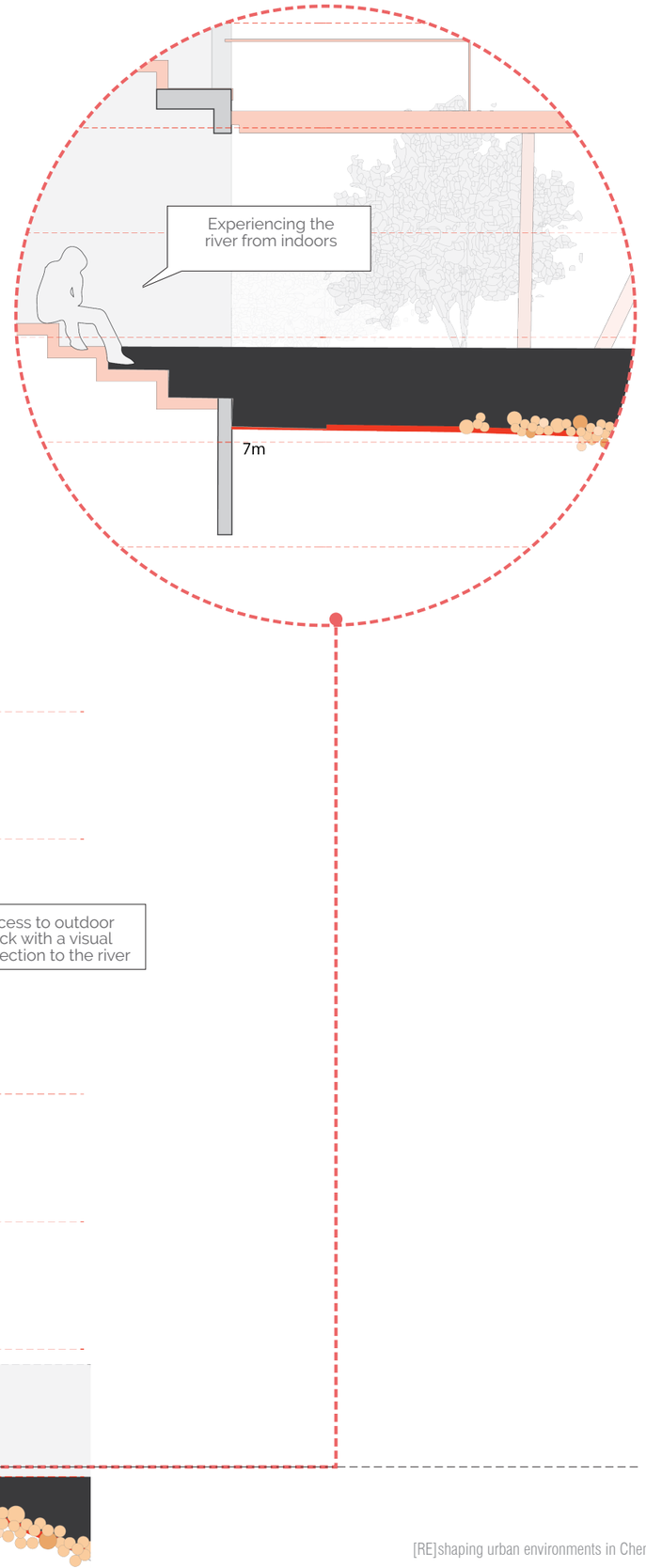


Fig. 141 Cross section - EB Board at water edge





4.2.4 DESIGN PROPOSAL

EXISTING CONTEXT



INACCESSIBLE WATER EDGE

Fig. 142 Current context 01

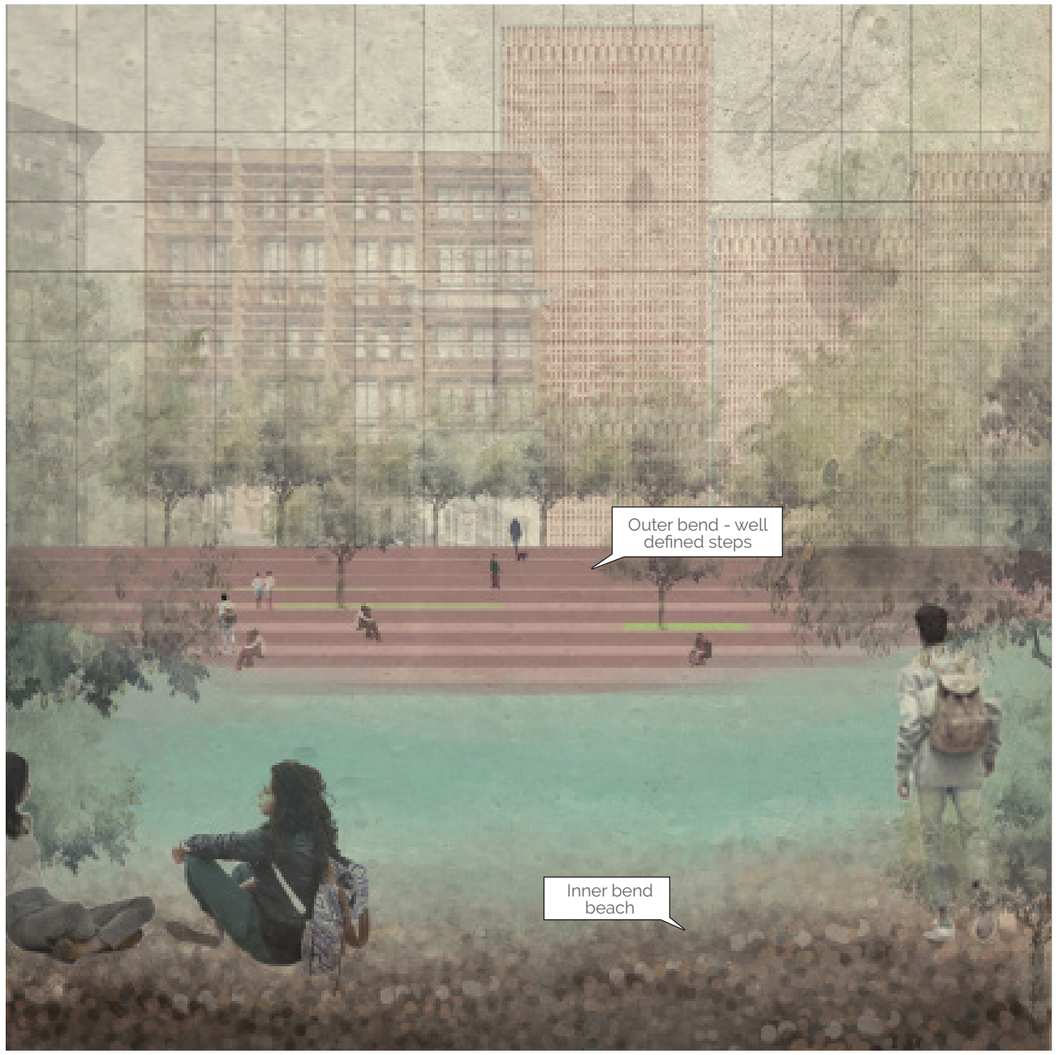


INACTIVE AND POLLUTED RIVER

Fig. 143 current context 02

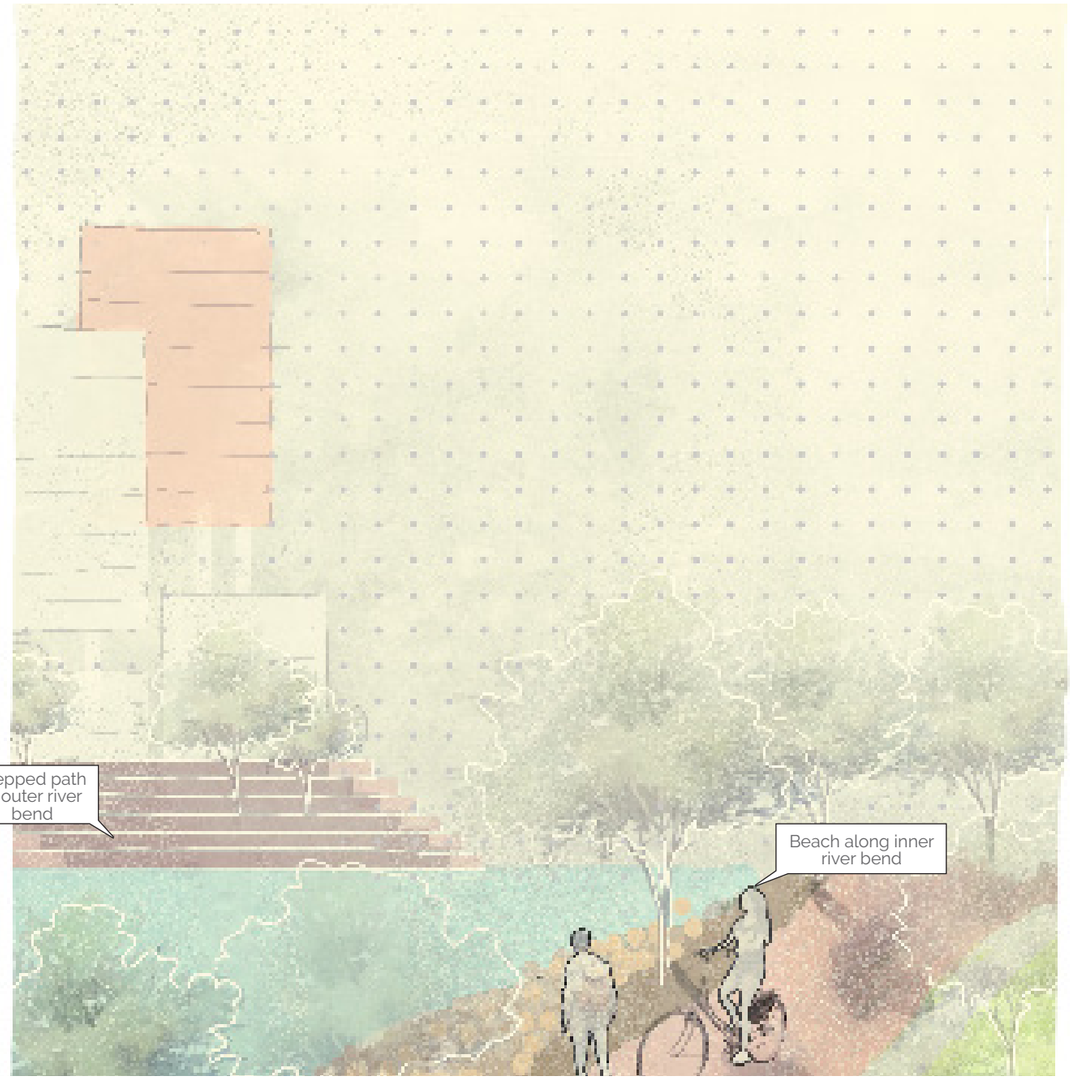
4.2.4 DESIGN PROPOSAL

PERSPECTIVE VIEWS



BEACH ALONG THE COOUM RIVER

Fig. 144 Perspective view 01



ACTIVATED WATER EDGE

Fig. 145 Perspective view 02

4.2.4 DESIGN PROPOSAL

ZOOM IN 02 :TRANSFORMATION OF MOUNT ROAD

Mount road is one of the most important arterial roads in Chennai city, connecting most of the central part of the city with one another. It's historical nature results in the presence of most of the older landmarks and institutional establishment in the city. Mount road is also one of the roads with the highest traffic congestion in Chennai. It is around 40m wide, with three two way lanes and the occasional service road. However, the presence of bus stops and a lack of pedestrian path results in the outermost lanes being used for slow traffic, people and buses. This lack of distinction between the different uses is also one of the reasons why Mount road is one of the most accident prone hotspots in Chennai.

In this scenario, the introduction of the metro line and consequently, the metro stations laong this road poses a problem in achieving the ideal spatial quality of a metro stop in a transit oriented development. The ideal metro stop should be at the centre of a neighbourhood with a high degree of mixed use functions rather than at the edge of it. Further, there must be a strong pedestrian network connecting in all directions from the metro stop, in order to ensure maximum usability and easy walkability to the highest catchement area. However, the presence of an arterial road compromises these qualities as it acts as a barrier to one whole side of the metro catchment. Further, it divides the metro from the Cooum river edge, while the intent of the design is to maximise the potential of the river as a public space accessible by public transport.

Therefore, the next section explores spatial intervetions in terms of the > general layout of Mount road and specifically, > the LIC metro station on Mount road.

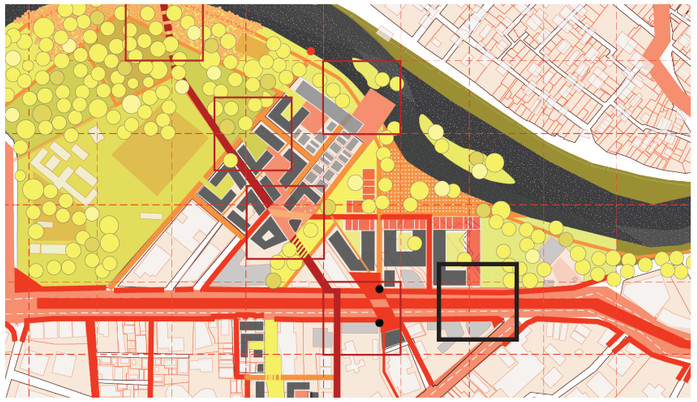


Fig. 146 Mount Road. Source: https://www.thenewsminute.com/article/stretch-near-lic-chennai-s-anna-salai-see-two-way-traffic-two-days-108702



Fig. 147 Mount road. Source: Kamal Photography



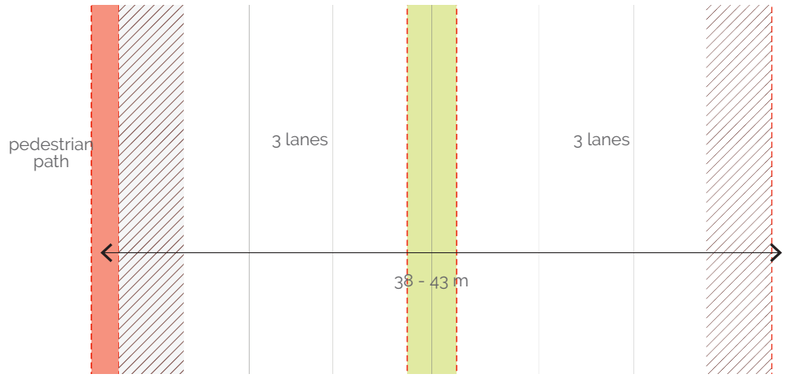
4.2.4 DESIGN PROPOSAL

ZOOM IN 02 :TRANSFORMATION OF MOUNT ROAD

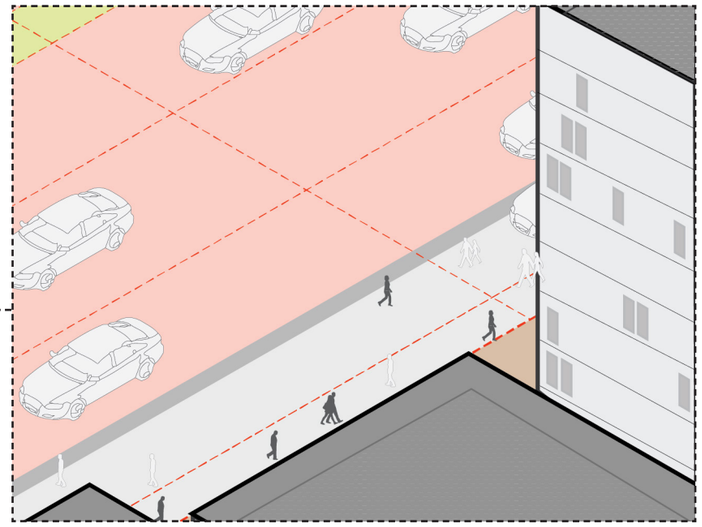
Fig. 148 Current situation - Mount road
Fig. 149 Current layout - Mount road

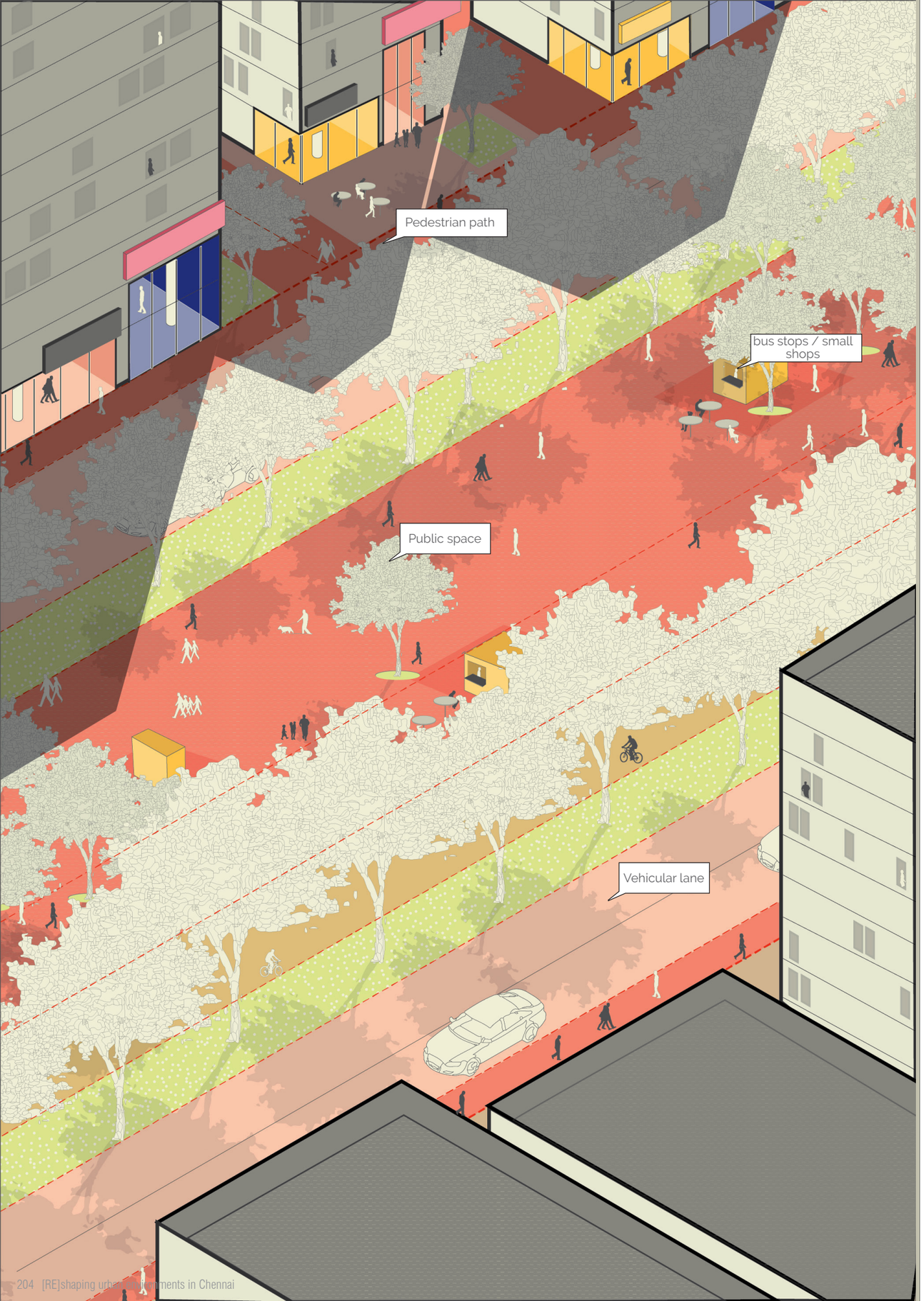
In the current situation, the vehicular lanes are quite wide, with lacking pedestrian space. As a result, peple often tend to use the outermost paths to walk, creating an undefined space of slow moving vehicles, people and buses. The aim of the design is to maximise pedestrian spaces and dwngrade the vehicular traffic.

CUURRENT ROAD SECTION



Service roads to access parcels with high traffic or important road turns.





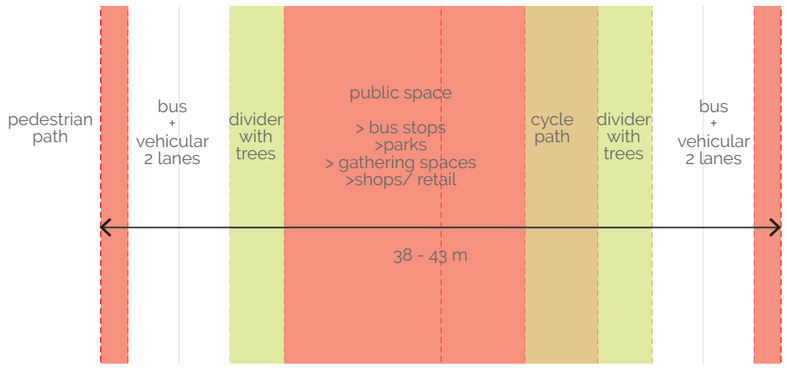
4.2.4 DESIGN PROPOSAL

ZOOM IN 02 :TRANSFORMATION OF MOUNT ROAD

Fig. 150 Proposed situation - Mount road
Fig. 151 Proposed layout - Mount road

The proposed design reduces the number of vehicular lanes in order to encourage lesser use of cars. This additional space is used to create a central public space that divides the vehicular lanes into two, making them smaller in scale. The central public space created can become a pedestrian and bike friendly path to move from metro stations and to move along Mount road. It is activated with varying functions along its length such as urban parks, small kiosks, shops and restaurants, play spaces, gathering spaces and bus stops. The lower floor sof buildings are transformed to more active and mixed use functions.

PROPOSED ROAD SECTION



4.2.4 DESIGN PROPOSAL

EXISTING CONTEXT



MOUNT ROAD WITH POOR PEDESTRIAN QUALITIES

Fig. 152 Existing context 03

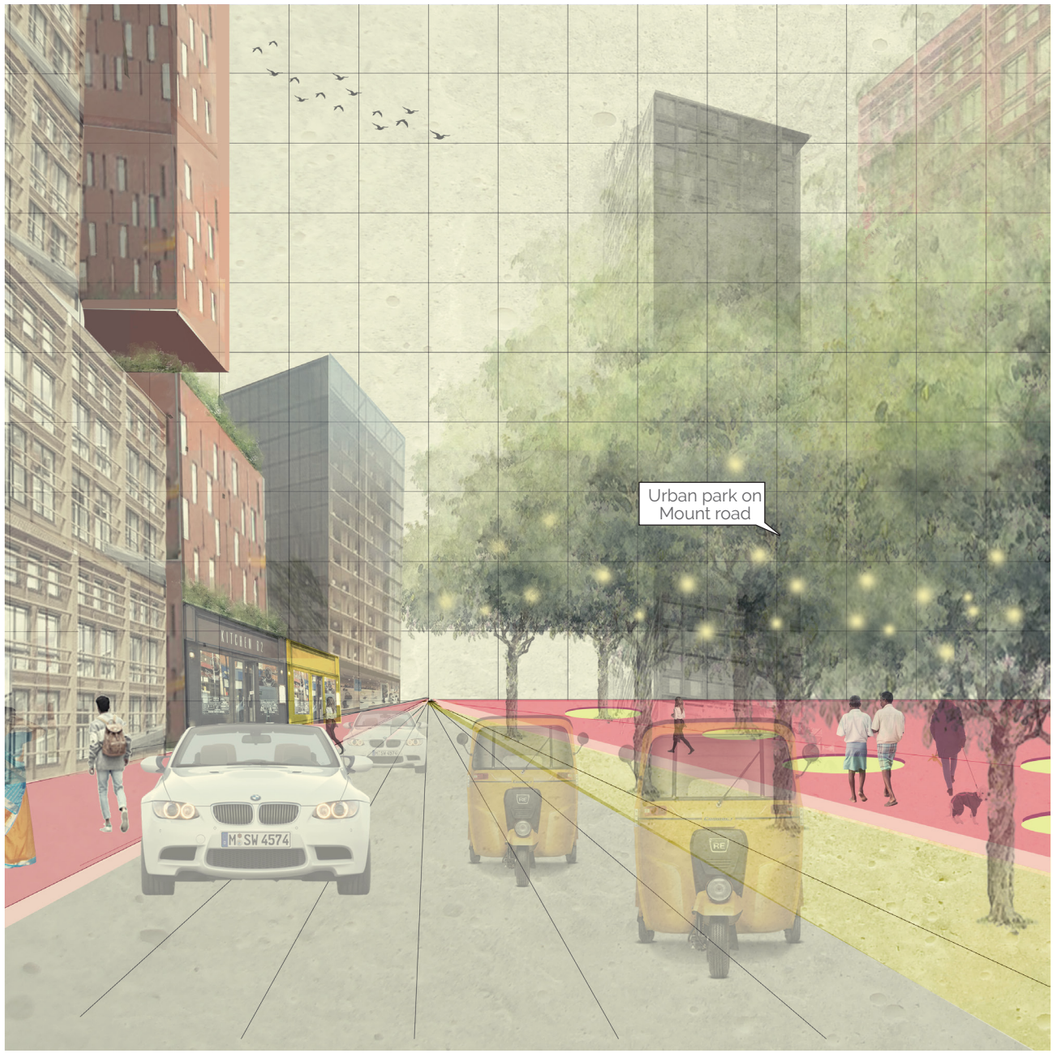


MOUNT ROAD AS A FRAGMENTING ELEMENT

Fig. 153 Existing context 04. Source: Source: https://www.thenewsminute.com/article/stretch-near-lic-chennai-s-anna-salai-see-two-way-traffic-two-days-108702

4.2.4 DESIGN PROPOSAL

PERSPECTIVE VIEWS



DOWNGRADED VEHICULAR ACTIVITY AND ACTIVATED PEDESTRIAN RELAM

Fig. 154 Perspective view 03



NEW PUBLIC SPACE ALONG MOUNT ROAD

Fig. 155 Perspective view 04

4.2.4 DESIGN PROPOSAL

ZOOM IN 03 :TRANSFORMATION OF STATION SQUARE

The LIC metro station is found adjacent to the historic LIC building, Pedestrian access to the station as well as way finding and visual identity is quite poor. Surrounded by Institutions, high rise office buildings and small shops, there isn't a very active mixed use ground plane. Due to the presence of the Mount road a a large dividing infrastructure, the access to the station from the other side of the road is through a subway, which also does not have a strong visual presence on the streetscape. The design challenge here is to activate the space around the station with higher pedestrian flows and strengthen the visual presence of the station and the crossing. The important historic buildings, high dense office buildings and government institutions are first identified. Low dense mono-functional buildings are redeveloped to high dense mixed use buildings. Governemnt offices, high rise offices and historic buildings are retained and the lower floors are transformed to more active functions. In addition to the transformation proposed for Mount road, the spatial interventions are explained in the following pages.

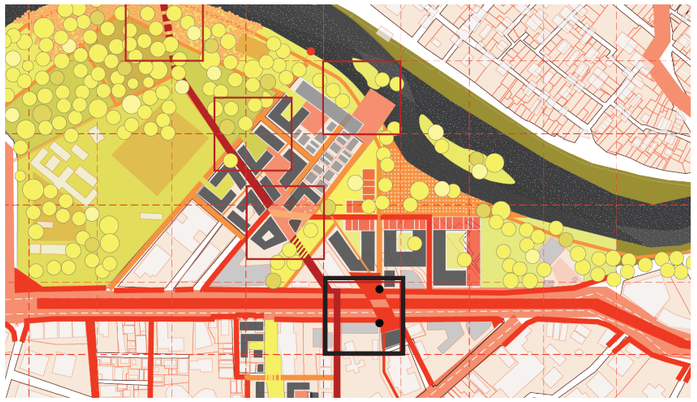
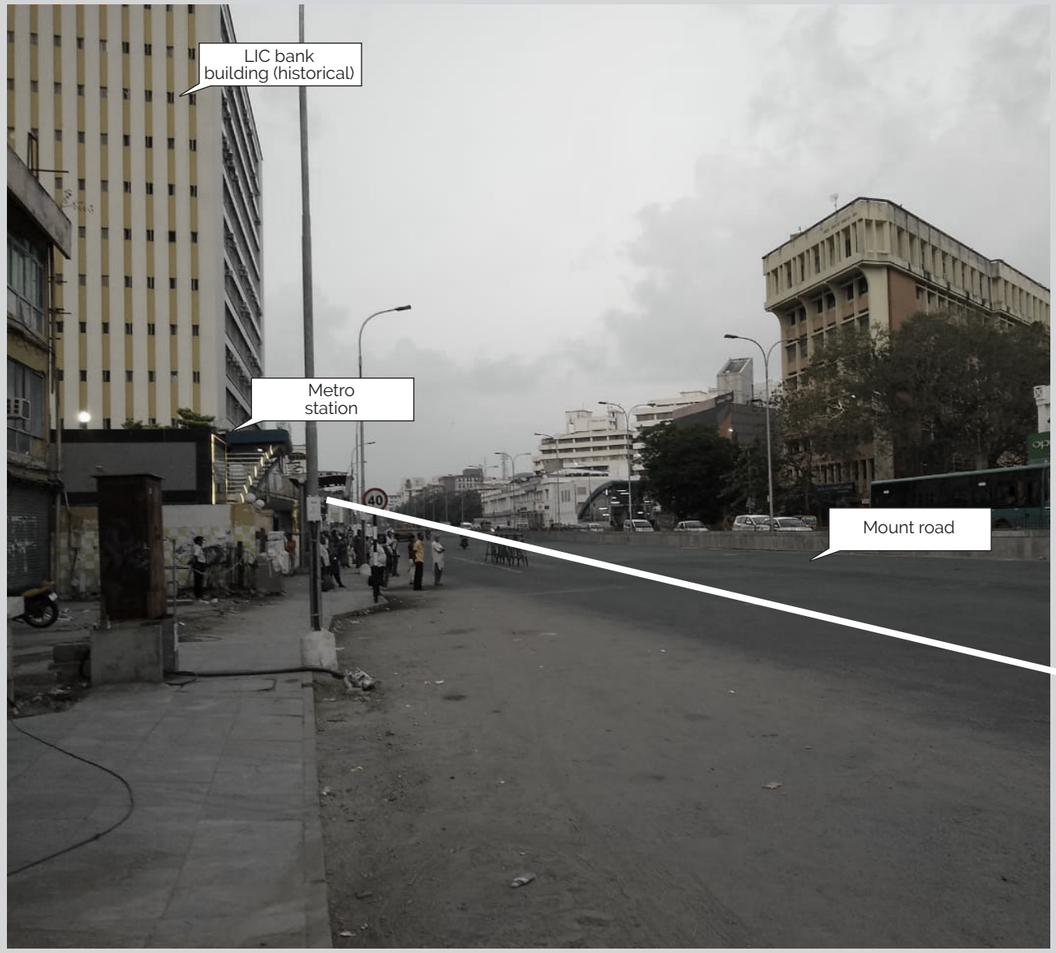


Fig. 156 Mount Road. LIC Metro stop



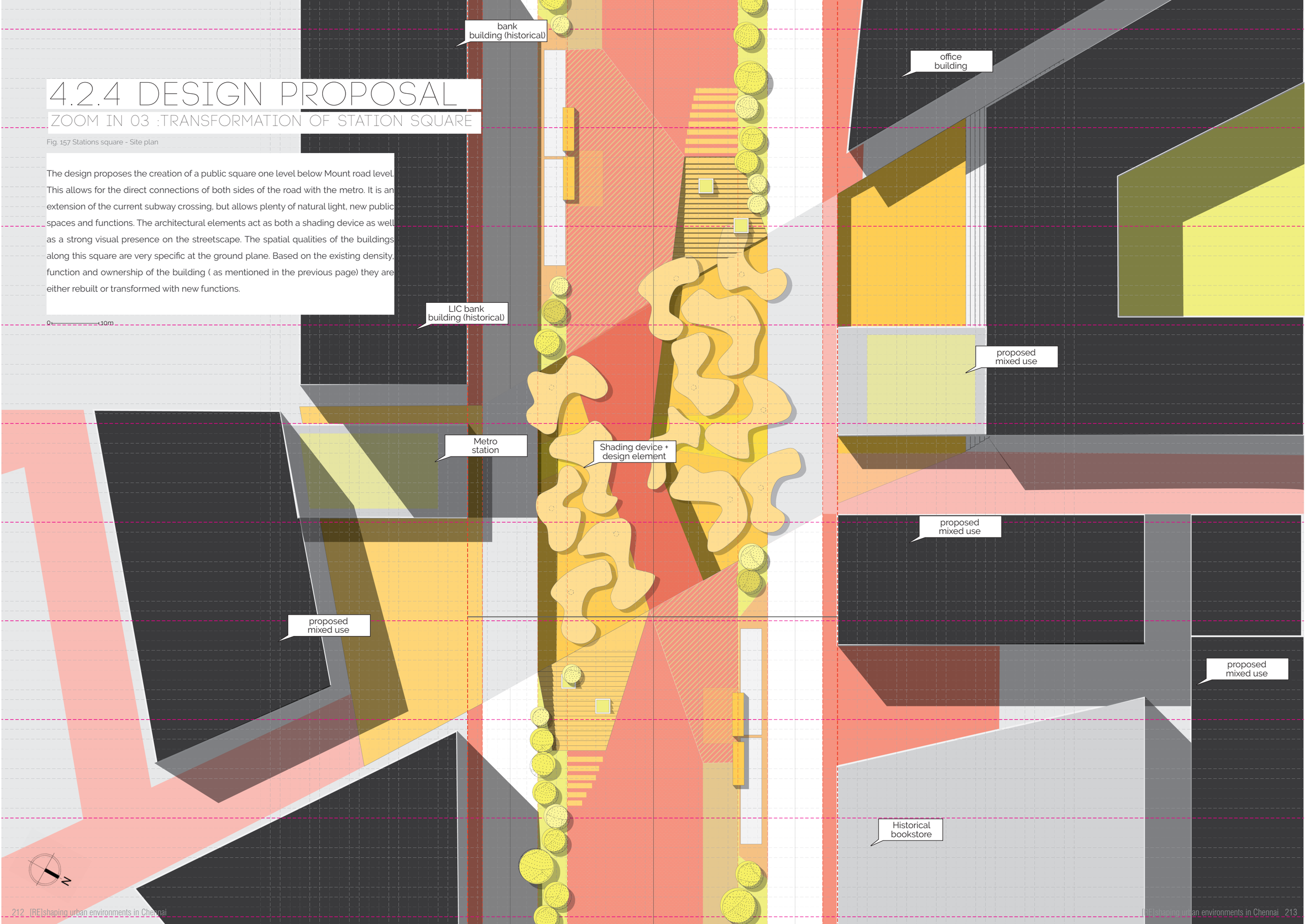
4.2.4 DESIGN PROPOSAL

ZOOM IN 03 :TRANSFORMATION OF STATION SQUARE

Fig. 157 Stations square - Site plan

The design proposes the creation of a public square one level below Mount road level. This allows for the direct connections of both sides of the road with the metro. It is an extension of the current subway crossing, but allows plenty of natural light, new public spaces and functions. The architectural elements act as both a shading device as well as a strong visual presence on the streetscape. The spatial qualities of the buildings along this square are very specific at the ground plane. Based on the existing density, function and ownership of the building (as mentioned in the previous page) they are either rebuilt or transformed with new functions.

0 10m



4.2.4 DESIGN PROPOSAL

ZOOM IN 03 :TRANSFORMATION OF STATION SQUARE

Fig. 158 Stations square - Ground level plan

At the ground level, active commerical functions such as shops, deprtmental stores and restaurants are encouraged arouond the metro stop. Historic buildings are activated this way, at the ground level. The central public space has a large cut out above the sunken crossing, creating a square. This portion of the central plaza beomes a shared space between pedestrians and cycles, creating a slow moving and calm space.

Once crossed, the sunken square terminates at a vast series of steps that continues onto a local path through the plinth of the building. The different steps into the plaza act as seating space as well as an occasional amphitheatre, promoting performances.

0 10m

Bus stop

commercial activity

Path to square/waterfront

commercial activity

Shaded entrace from Metro

Shared path

Retail/ supermarkets

commercial activity

Metro entrance

Sunken square

small shops/ hawkers

Cycle path

Bookstores/ library

N

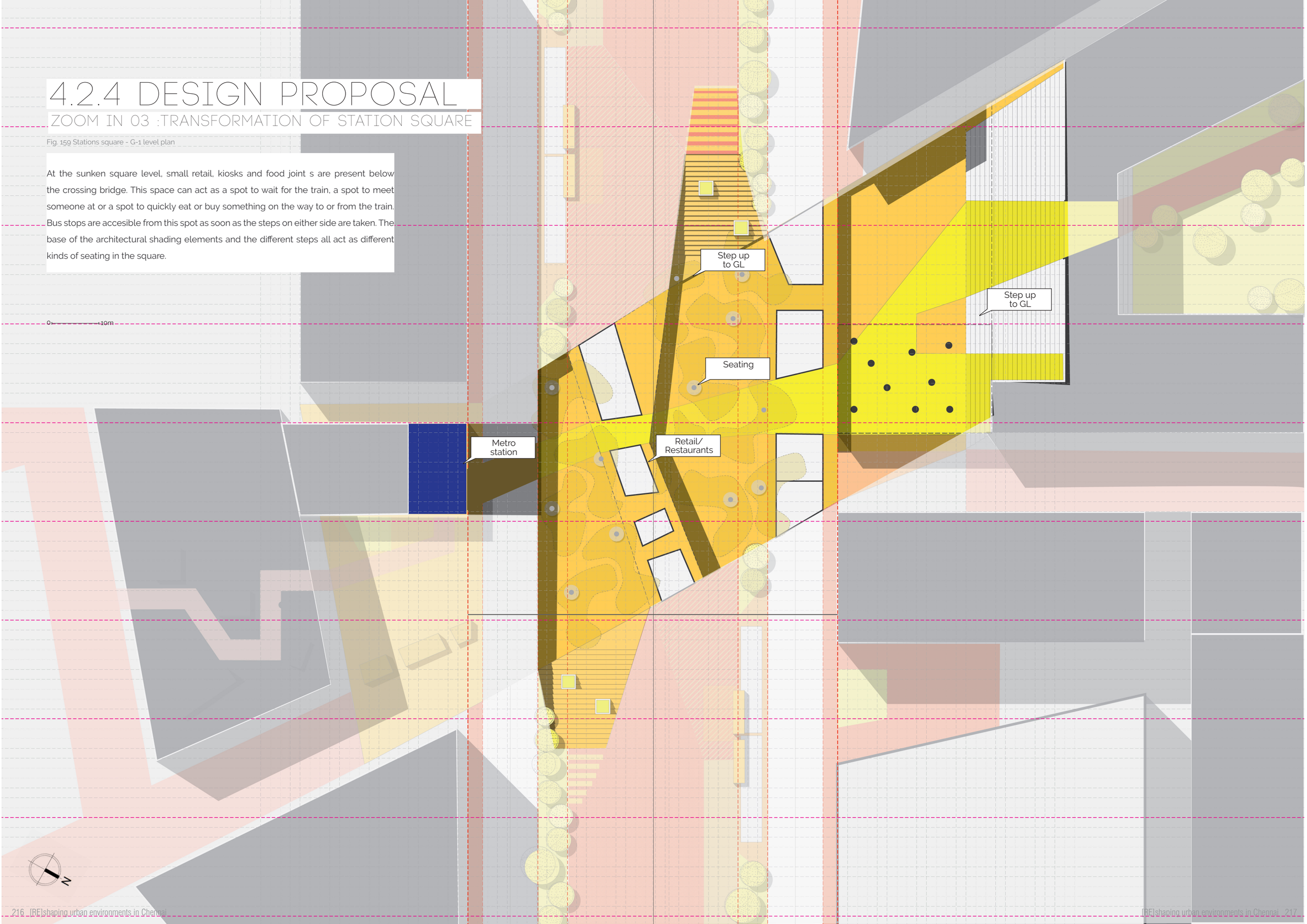
4.2.4 DESIGN PROPOSAL

ZOOM IN 03 :TRANSFORMATION OF STATION SQUARE

Fig. 159 Stations square - G-1 level plan

At the sunken square level, small retail, kiosks and food joint s are present below the crossing bridge. This space can act as a spot to wait for the train, a spot to meet someone at or a spot to quickly eat or buy something on the way to or from the train. Bus stops are accesible from this spot as soon as the steps on either side are taken. The base of the architectural shading elements and the different steps all act as different kinds of seating in the square.

0 ——— 10m



4.2.4 DESIGN PROPOSAL

ZOOM IN 03 :TRANSFORMATION OF STATION SQUARE

Fig. 168 Stations square - Isometric view



4.2.4 DESIGN PROPOSAL

EXISTING CONTEXT



POOR PEDESTRIAN ACCESS TO METRO STOP

Fig. 161 Existing context 05



MOUNT ROAD ADJACENT TO METRO STOP

Fig. 162 Existing Context 06

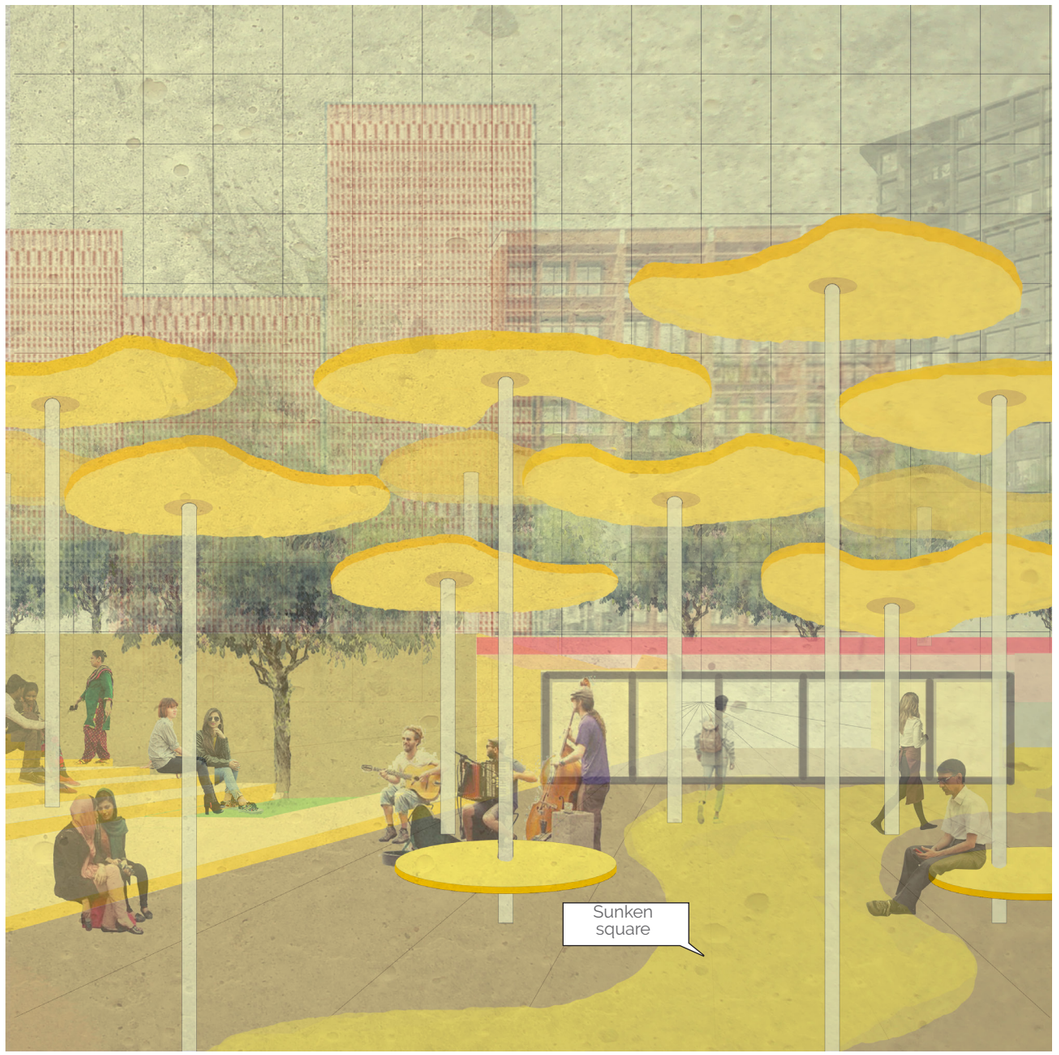
4.2.4 DESIGN PROPOSAL

PERSPECTIVE VIEWS



LIC METRO STOP AS AN ACTIVE PEDESTRIAN SPACE

Fig. 163 Perspective view 05



SUNKEN SQUARE AT THE METRO CROSSING

Fig. 164 Perspective view 06



4.2.4 DESIGN PROPOSAL

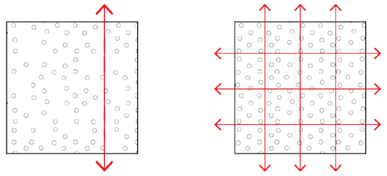
ZOOM IN 04 :BLOCK SQUARE

Fig. 165 Block square- Isometric view

Local squares are opened up at the centre of the new blocks, meeting the urban park that runs along. All the ground floors are programmed to be commercial and recreational activities. The vehicular path that runs through the block also intersects with the square, making it the location for the local bus stand. The scale of this square is intimate in nature, with smaller size and higher enclosures maximising the shading of the spaces. The various squares are programmed with the different local functions such as playgrounds and local shops.

4.3 LOCATION 02

REINFORCING LOCAL NODES



Site 02 is situated close to the heart of the IT corridor along OMR road. It is a place f transition from the busy, congested OMR to the quiet, residential edge of the Pallikaranai marsh. The OMR road and the IT industry along it are some of the newer developments in the city, with the economic boom of the IT sector. The growth of this new part f the city, having followed a the OMR corridor, has resulted in a linear distribution of key functions in the city, without proper development of areas adjacent to the corridor. As a result, a huge contrast can be seen in the built morphology, flows and functions along the corridor and adjacent to it. This linear pattern of development has resulted in major traffic congestions and large travel times from the inner city as a part of daily life. In order to mitigate this, a new metro line has been proposed, also along the OMR.

However, without a more integrated development of adjacent neighbourhoods, dense transit nodes are not possible and will lead to poor ridership of the metro. Further, it is important to develop denser neighbourhoods in this area with good quality streets and public spaces and diverse housing typology to make it an attractive place to live. This can also help reduce daily travel times to the IT offices. The specific site chosen also abuts the Pallikaranai marsh, a rapidly disappearing marshland that is intrinsic to the water carrying capacity and flood protection of the area. This design, therefore, focuses on facilitating a strong local network that transitions from the IT corridor (OMR) to the marshland, in order to allow for well defined local neighbourhoods with a diverse and liveabe public realm. It also re-looks the ideal location and spatial conditions for a new metro line.

Fig. 166 Urban fabric in the periphery. Source : Flickr.com

4.3.1 EXISTING CONTEXT

FUNCTIONS AND NETWORKS

The chosen site for the design intervention is located near the three proposed metro stops along the OMR, in the couth peripherals of the city. This is predominantly the location for the IT industry, with a lot of service jobs in the city being concentrated here. It also has a large concentration of light industries. The Pallikaranai marsh lies very close to the OMR, with the Pallikaranai former dumpyard occupying a large percentage of its surface.

Fig 167 Location 02 context

scale : 1:10,000

Pallikaranai

OMR Road

Proposed metro stop

Dumpyard causing soil + ground water pollution

Buckingham canal

Proposed metro stop

Important sites and functions

- Proposed metro line
- Metro station
- IT Offices
- Low dense light industry
- Industry
- Hospitals
- Cinemas
- Parks
- Schools
- Government buildings
- Mosques
- Shopping malls
- Temples

4.3.1 EXISTING CONTEXT

CONTRASTS IN BUILT MORPHOLOGY

Fig. 168 Location 02 context

scale : 1:10,000

Large parcels of land with private communal spaces and streets are found in plenty in this area.

Large low dense parcels and blocks of light industry and commercial dealers.

Medium/large parcels of housing development found here as a result of the job opportunities in the IT sector.

Small parcels of low income housing and slums encroaching into the Buckingham canal









4.3.1 EXISTING CONTEXT

CONTRASTS IN BUILT MORPHOLOGY

Fig. 169 Gated community. Source: https://www.magicbricks.com/property-for-sale-rent-in-Chennai/residential-real-estate-Chennai
Fig. 170 Local streets near OMR
Fig. 171 Neighbourhoods in OMR
Fig. 172 OMR Industries along OMR. Source: Google maps
Fig. 173 Service vehicle on OMR. Source: Google maps

A lot of contrasting built morphology is found in this site. Firstly, as explained in the Analysis chapter, the main arterial highway, OMR, is a wide vehicle dominated road, with the IT industry of the city predominantly situated here. This results in tall high-rise office buildings abutting it. To its left, right, several light industries are set up, making it a low dense parcel with large blocks. This also results in several service vehicles that are bound to this location. To the left of the OMR, there is a juxtaposition of small low income households that abut streets that lack basic infrastructure and luxury gated communities that dot this location, with large parcels, privatised communal spaces and streets that fragment the neighbourhoods here.

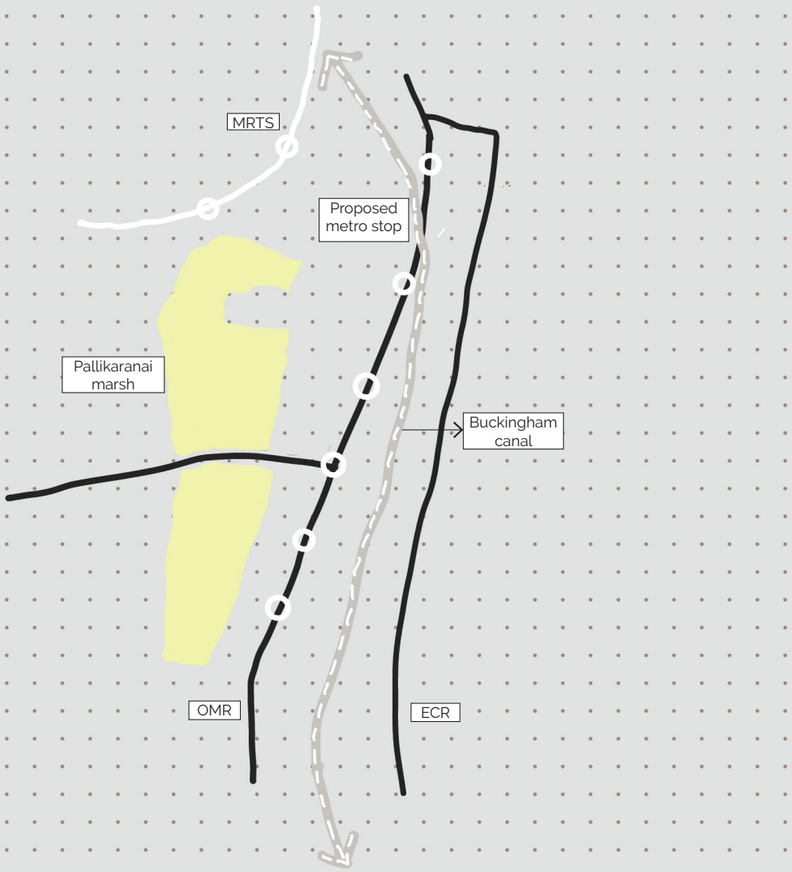




4.3.1 EXISTING CONTEXT

FLOWS ALONG THE OMR

This diagram explains the larger structure of the mobility network in this area and specifically, the flows along the OMR. OMR and ECR are two parallel state highways that connect Chennai with the surrounding cities of the state. However, they are drastically different in character. While the ECR is a largely scenic route along the coast, the OMR is also home to the IT industry, leading to different kind of transit flows, in addition the fast paced highway traffic, there is local flows from surrounding neighburhoods and city scale flows towards the offices. Further, a new metro line is proposed along OMR.



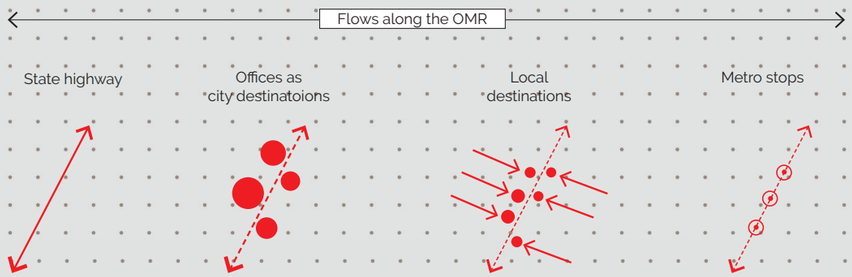


Fig. 174 ECR. Source : https://theculturetrip.com/asia/india/articles/best-cycling-routes-explore-chennai/
Fig. 175 OMR



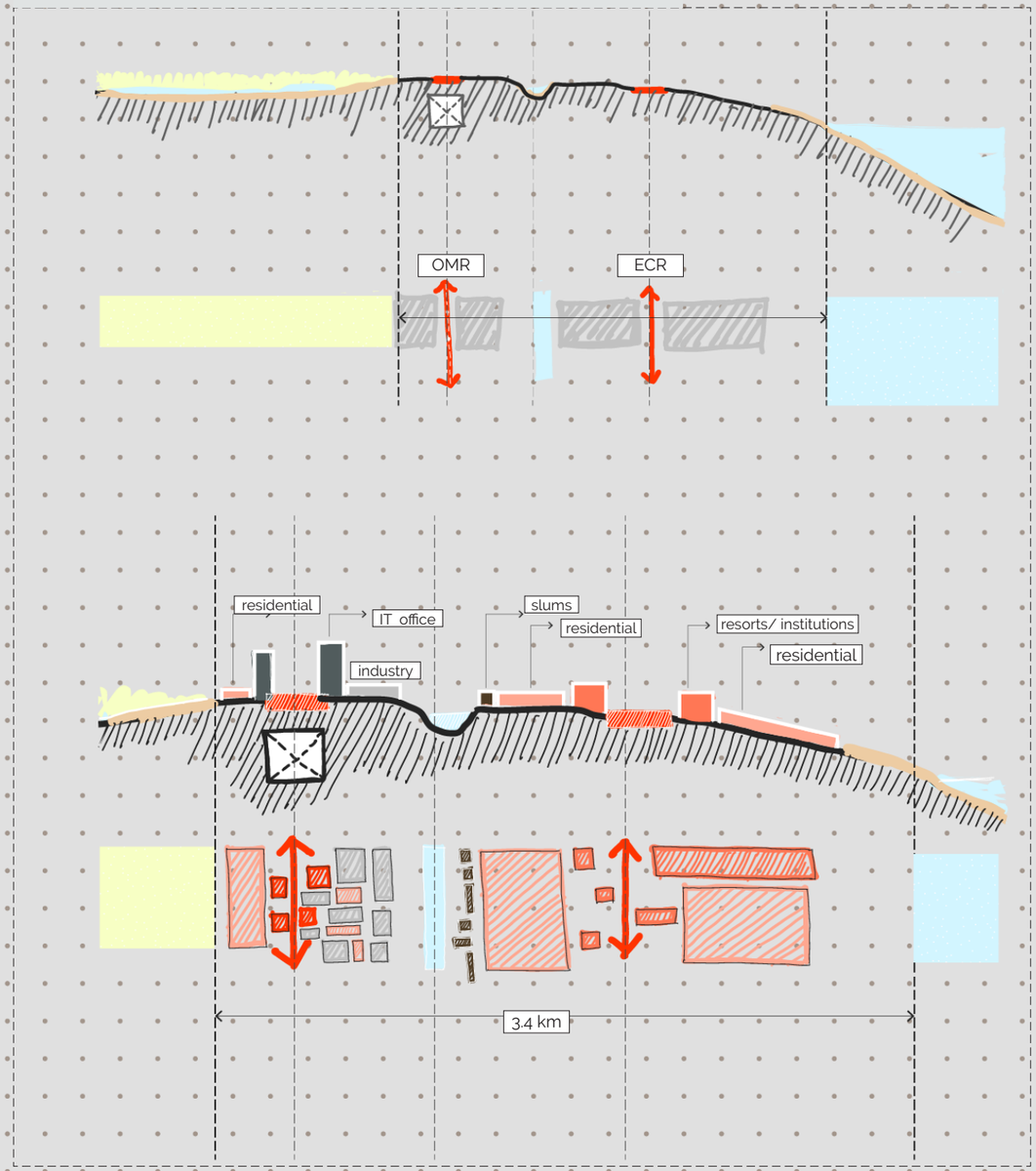


4.3.1 EXISTING CONTEXT

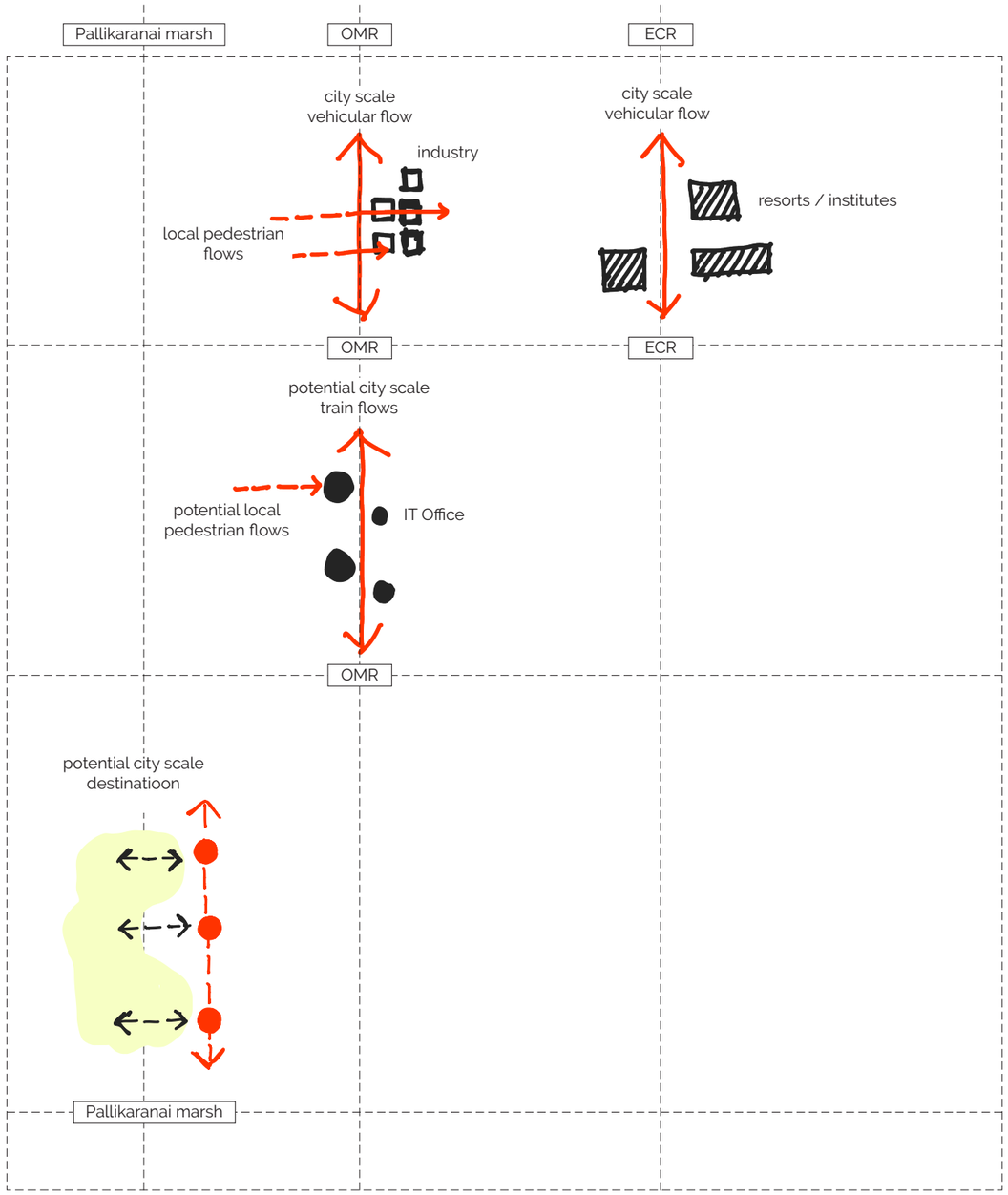
SYSTEMIC SECTION OF MAJOR FLOWS

The flows along these two roads are understood in terms of the different functions and the patterns of movement. This is used to determine the ideal location of the metro line, as well as the other necessary reconfiguration to ensure the strengthening of the local neighbourhood structures and the local centrality of the metro stops within the neighbourhoods.

Fig. 176 Systemic section along the city peripheries
Fig. 177 Mapping of different flows



While the functions along ECR are ideal to be accessed by vehicles (Resorts, Hotels and scenic driving spots), the functions along OMR have to potential to shift from vehicle based flows towards public transit and pedestrian flows. Further, close proximity of the metro line to the Pallikaranai marsh can enable it to become a city scale destination.

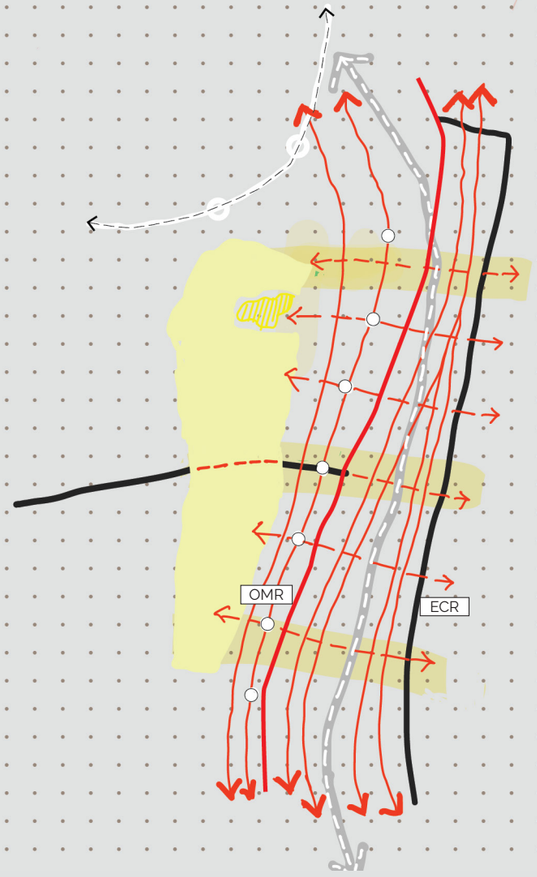


4.3.2 RECONFIGURING FLOWS

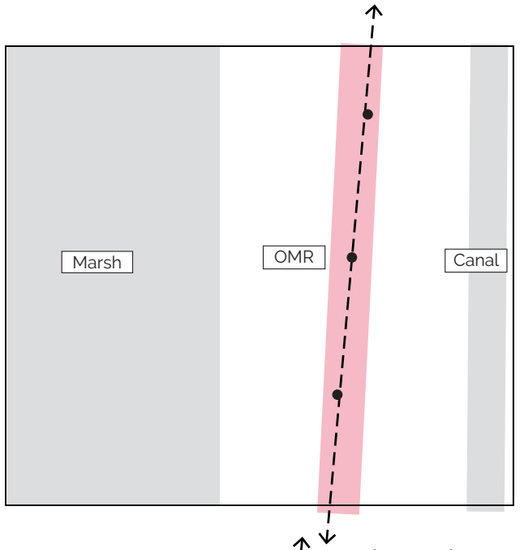
PROPOSING AN ALTERNATE METHOD OF DISTRIBUTION

The OMR is downgraded from a highway and this function solely exists along the ECR, as it already contains private vehicle intensive functions and a scenic road thats ideal to drive along. Meanwhile, the OMR is downgraded to a primary road with access to large scale offices and industries, while the metro is shifted to a parallel road within the neighbourhood to the left of OMR. This allows the transformation from a linear road to a more spatially distributed grid. Additionally, the road above the metro-stop can be transformed into the central pedestrian road structuring the neighbourhood. With the metro stops now situated at walking distance from the Pallikaranai marsh, strengthened pedestrian paths allow for it to become a city scale destination.

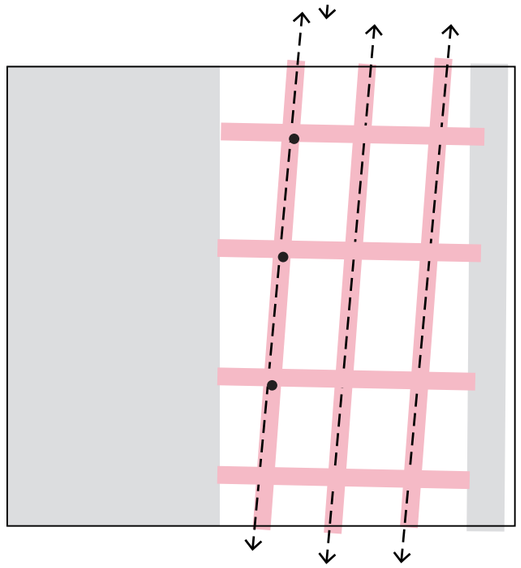
Fig. 178 Alternate method of distribution
Fig. 179 Evolution of redesigned network



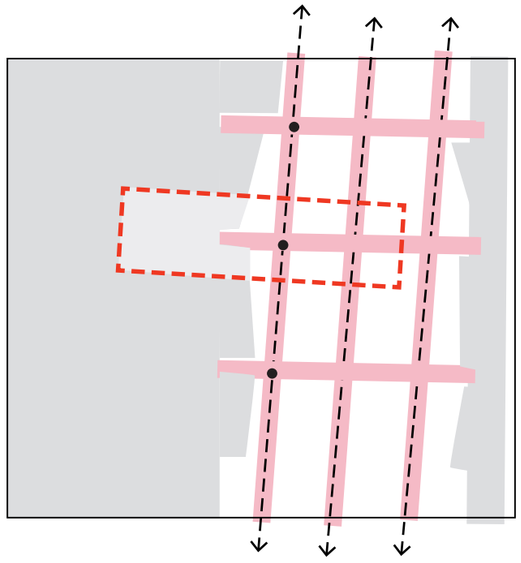
STATE HIGHWAY + ARTERIAL
DESTINATION + LOCAL ROAD
+ METRO STOPS

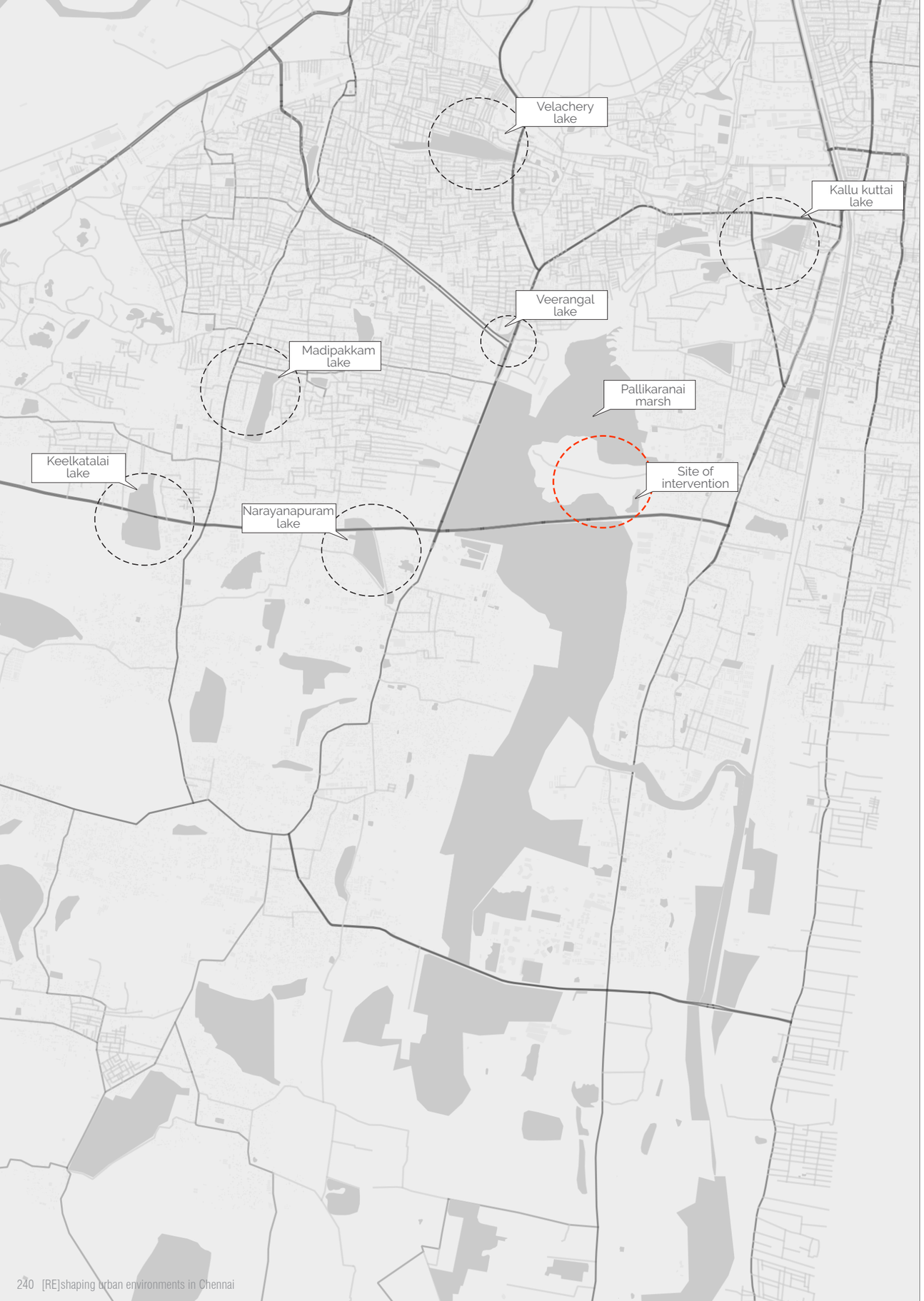


STRENGTHEN GRID AND
SEPARATE ROAD FUNCTIONS AND
METRO LINE



CREATE CITY SCALE
DESTINATION AND NEW CENTRES





4.3.3 RESTORATION GOALS

DEFINING SPATIAL ACTIONS ALONG THE PALLIKARANAI MARSH

Fig. 180 Pallikaranai sub basiin
Fig. 181 Ecological study of Pallikarani marsh.
Source : https://spiritofchennai.com/city/pallikaranai-marsh/

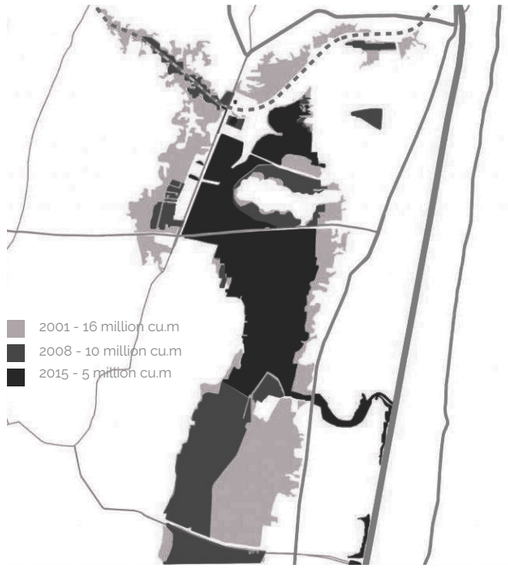
The map shows the series of lakes found in the drainage basin of the Pallikaranai marsh. Once, all these tanks were an interconnected system while today, they are fragmented due to the nature of urbanisation.

The goals identified by the government research project in the restoration of these marshlands are as follows -

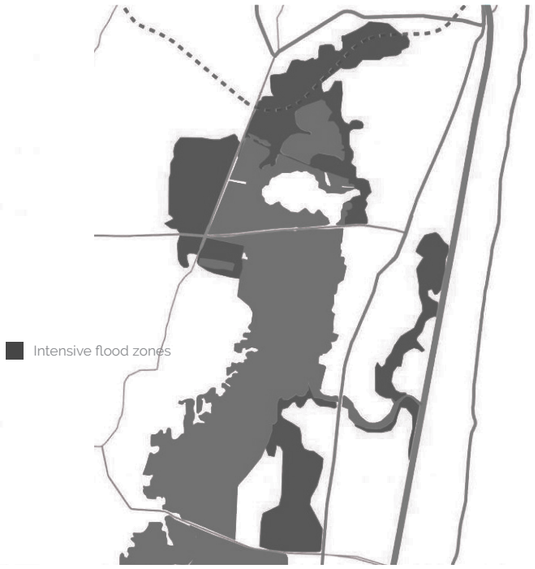
> Determining a protected edge for the marsh to prevent further encroachment
> Connecting the upper and lower parts of the marsh
> Reconnecting the marsh to the other lakes and tanks in the vicinity.
> Stop waste dumping

(Sálim Ali Centre for Ornithology and Natural History , 2007)

While the larger city scale strategy proposes the ideal spatial connections between these water bodies, at the local scale, the design will seek to understand the spatial dimensions of the protective edge fr the marsh, while also considering functions and network structures required to allow the city to engage with the marsh, while still protecting it from noise and high human movement, due to fragile species present in it. . The new protected edge of the marsh is determined using a combination of the flooding data, the change in water carrying capacity over the years and topological data of the area. This propose outline is later adapted the the site in terms of buildings and road networks.



WATER CARRYING CAPACITY



FLOOD RISK

4.3.4 PROPOSED STRATEGY

The two concepts of the distributed grid and the protective edge are combined to propose a framework of roads and functions. The metro line is shifted to the centre of the neighbourhood, with a pedestrian oriented path above it. The metro stops are located at the intersection of two such pedestrian paths. The distributed network is adapted to the existing context by identifying through roads and connecting dead end roads where necessary. The buffer space line along the marsh is established, with the dumpyard regenerated as a new city scale park for the area as a whole, with a string access from the metro stops.

The metro line, along with the three stops and the path within the buffer space form a large recreational loop. Vast open lands, industrial sites and existing parks are identified in order to integrate them with the pedestrian network, with the potential for transformation.

Fig. 182 Proposed design framework

scale : 1:10,000

Proposed demarcated protected zone

Central pedestrian path integrted with metro line

Industrial cluster

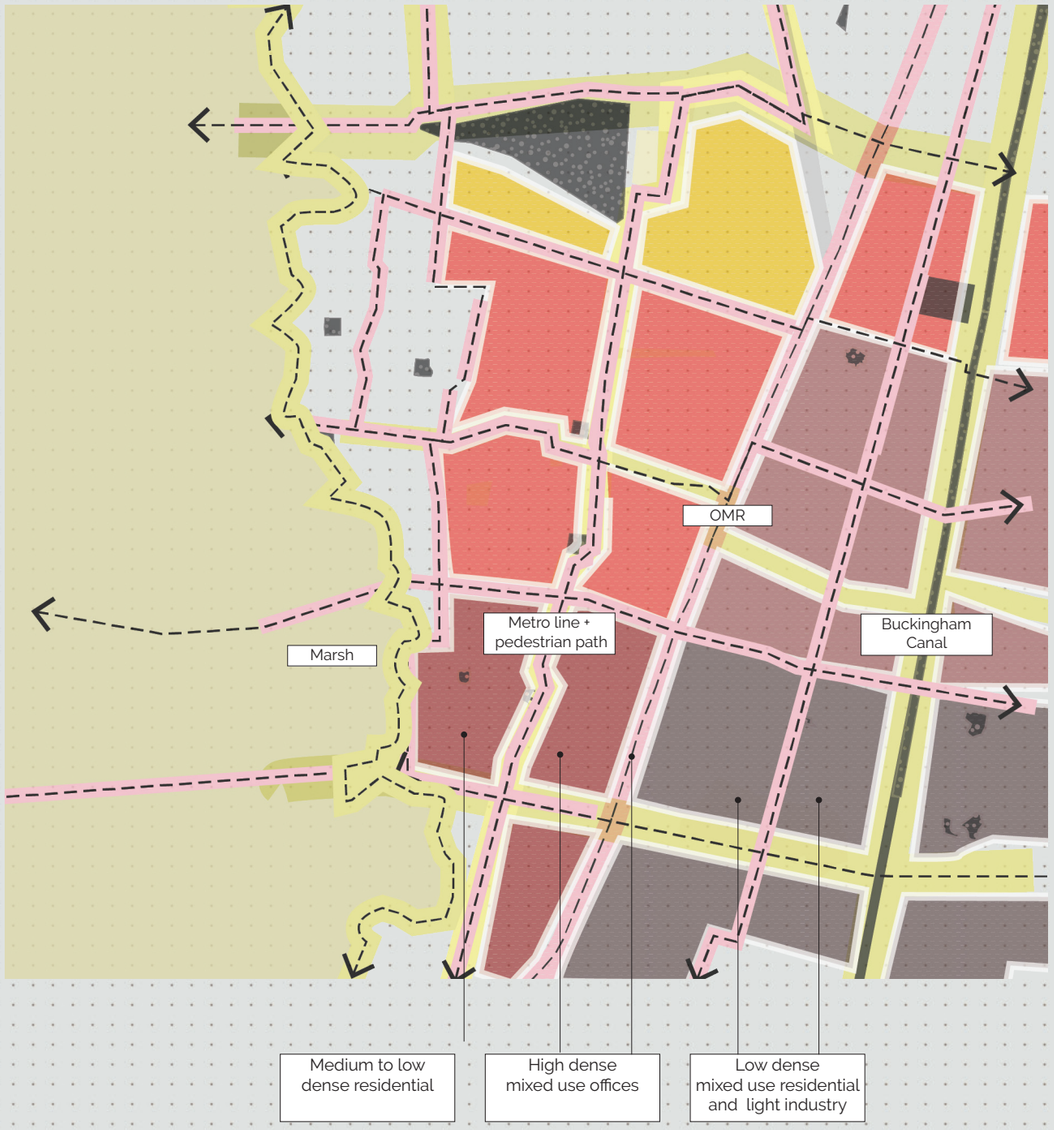
Industrial site partially redeveloped as part of the green corridor

City destination park th forms a ring with the metro stations and marsh

Regenerated dumpyard as city scale park

Arterial road is elevated, allowing the two sides of the marsh to reconnect.

Pallikarnai marsh



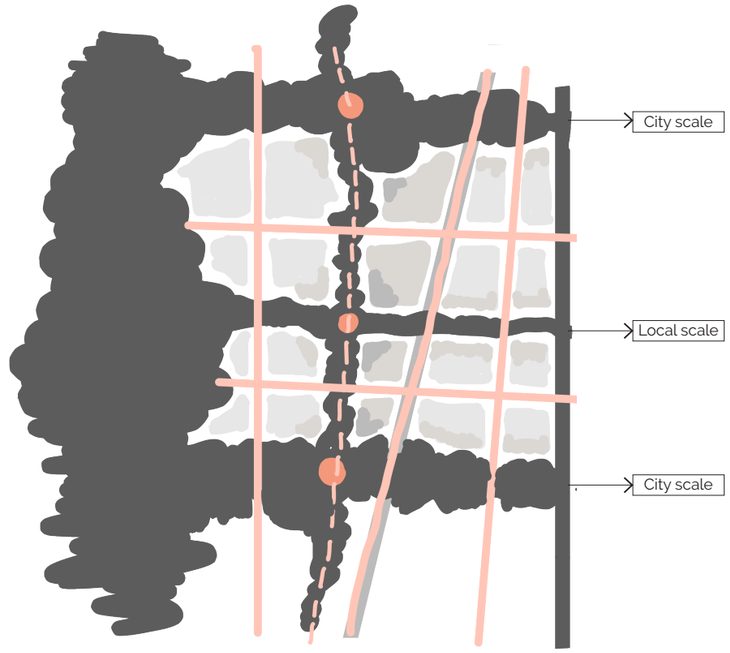
4.3.4 PROPOSED STRATEGY

SUPERGRID STRUCTURE AND DENSIFICATION STRATEGY

Fig. 183 Superblock definition and densification strategy
Fig. 184 Networks - City scale and local scale

The local strategy is adapted to the proposed city scale strategy by defining the super-grid and base blocks. The pedestrian path with the metro line below becomes the central pedestrian path for many of the base blocks. While the marsh and Buckingham canal serve as primary green-blue corridors, the two secondary green-blue corridors are aligned with the two metro stations on either extreme. The tertiary, pedestrian oriented corridor aligns with the metro station in the middle, making this path an important structure in the local neighbourhood context.

Based on this, the densification plan is also determined. Between OMR and Buckingham canal, industries are incentivised to transform into low to medium dense mixed use residential buildings with light industry at the lower level. Between OMR and the Metro line, blocks are set to have high dense mixed use office buildings, with commercial functions at the lower floor. Between teh Metro line and the marsh, the blocks are set to have medium to high dense mixed use residential buildings, with local commercial functions at the ground level along the main roads.



4.3.4 PROPOSED STRATEGY

NETWORK STRUCTURE, , FUNCTIONS AND DESIGN FOCUS

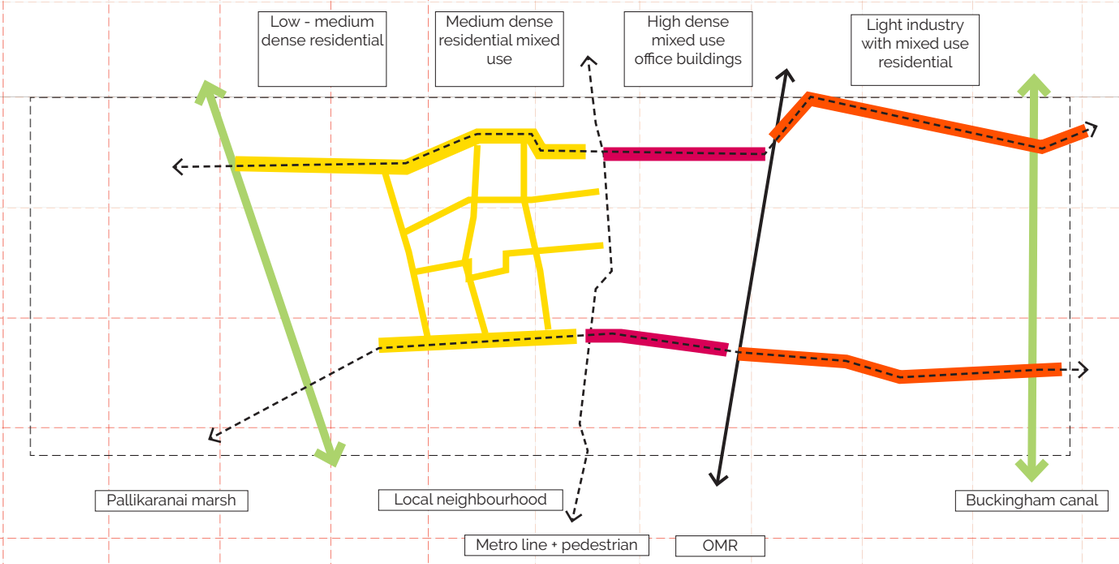
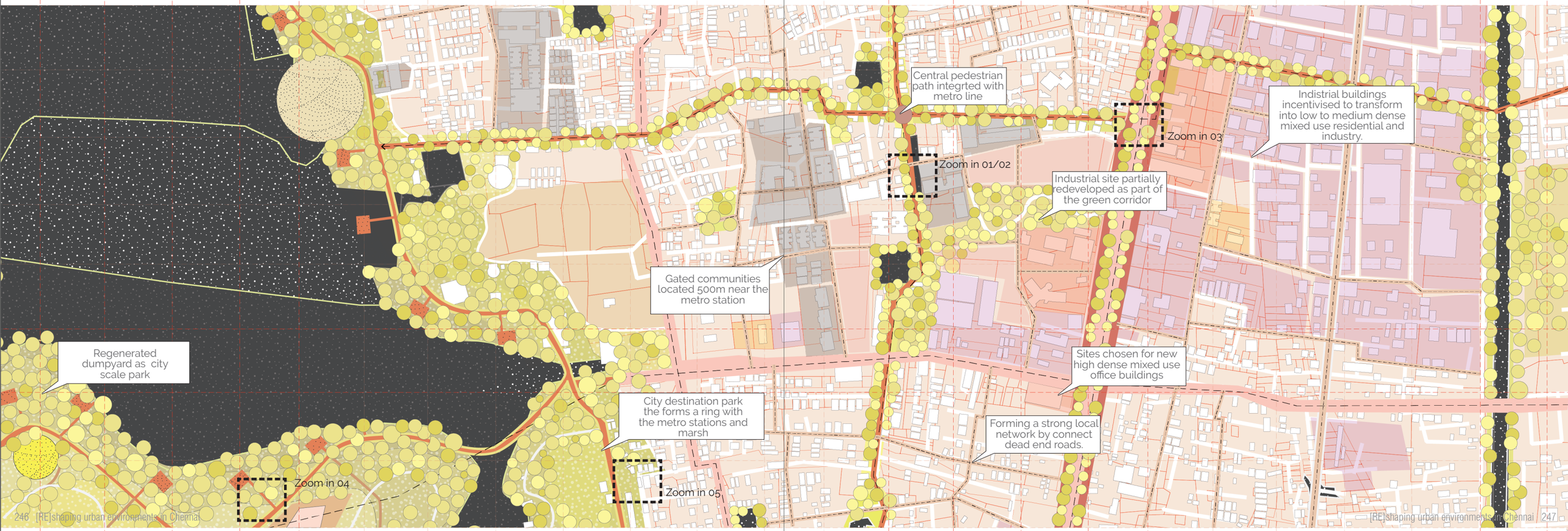


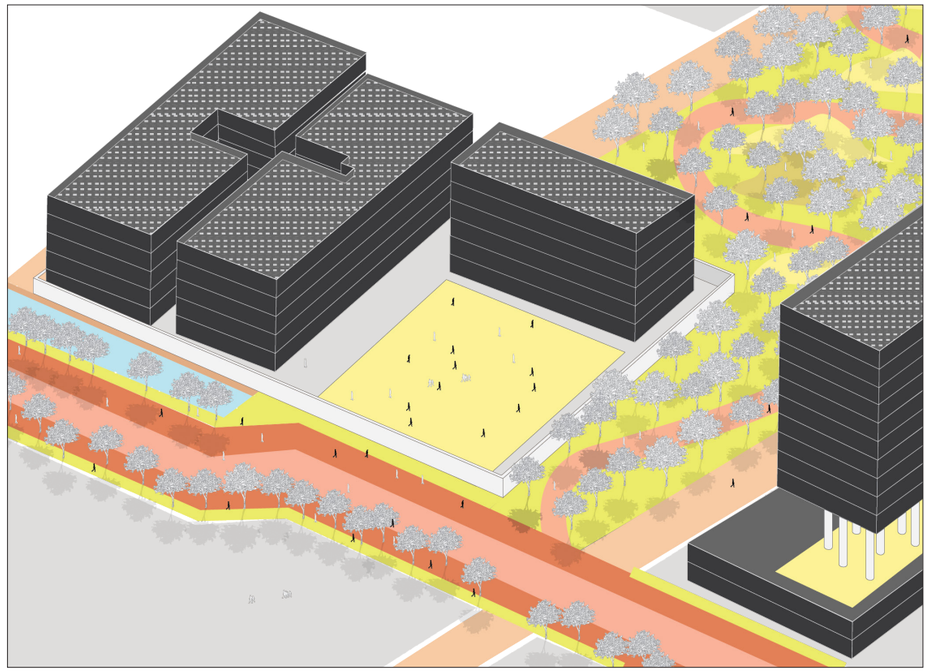
Fig. 185 Schematic diagram of networks and functions

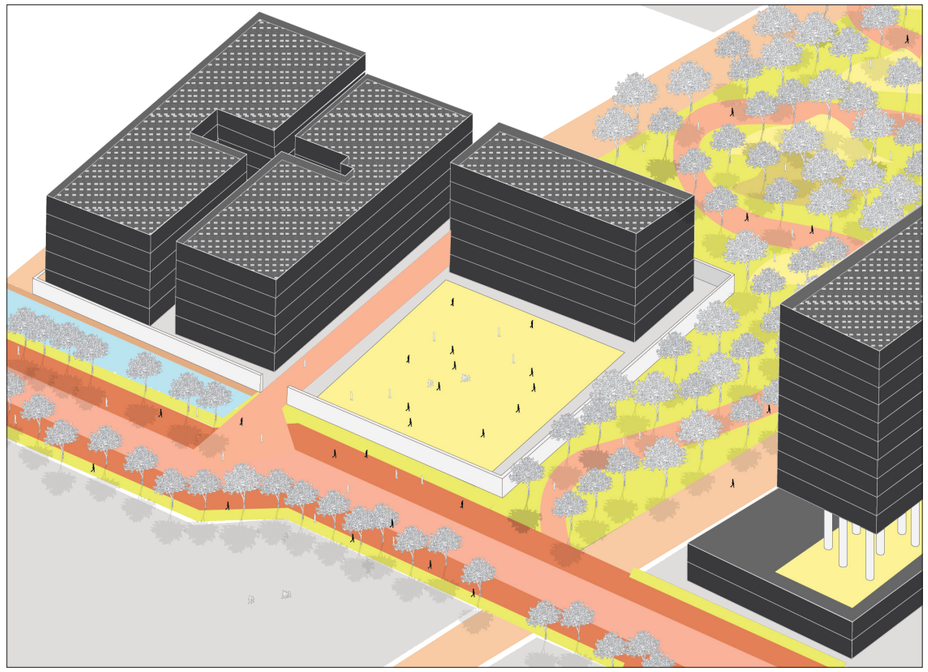
Fig. 186 Proposed design for selected site highlighting further points of design

The transition through the metro station in the middle, from the OMR to the marsh is chosen as the portion of the site to further detail. The reson for this choice is to explore ways to strengthen the local neighbourhood structures and maximise public spaces and social infrastructure.

Based on the densification strategy, the industrial sites found to the right of the OMR are allowed to stay as they are, with mixed use residential and light industrial development provided as an incentive, specially along the main paths. The blocks in-between OMR and the metro line are proposed to be transformed into high dense mixed use office buildings. This allows the formation of a cluster of offices, residences and large commercial functions in walking distance from the metro. Industrial functions present in these blocks are relocated to the right of OMR, with the parcel being transformed into high dense mixed use buildings or public spaces and infrastructure as ashown below. Blocks to the left of the metro line, especially the blocks along the main pedestrian path, are transformed into medium to high dense residential mixed use., with active ground floors. Gated communities present here, pose a challenge to this requirement, which is further dealth with in the next few pages, along woth the tranformation of the pedestrian path, transformation of OMR and the transformations along thr marsh.







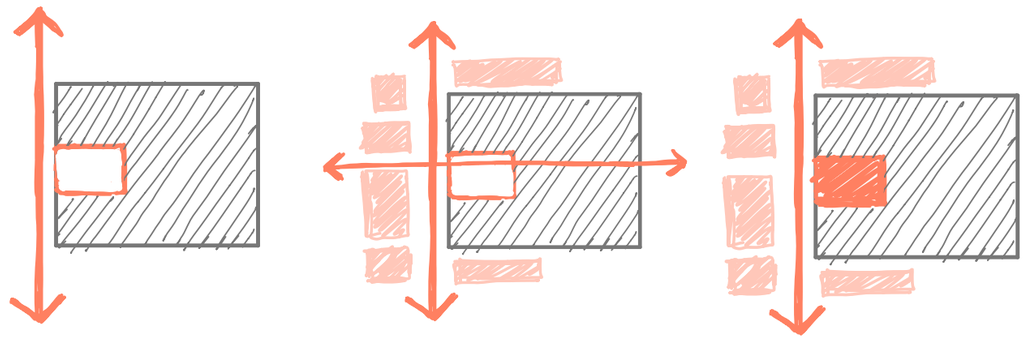
4.3.5 DESIGN PROPOSAL

ZOOM IN 01: GATED COMMUNITIES



Fig. 187 Diagrams describing process of transforming gated communities.
Fig. 188 Existing condition of gated community
Fig. 189 1st phase - allowing access through the sate and developing large park in close proximity

Gated communities near the metro station cause inactive ground planes behind compound walls. Further, they replicate communal functions, minimising the ability to densify while also fragmenting the neighbourhood by creating inaccessible blocks. Therefore, the goal is to open up the gated communities over time and make their communal spaces public. In order to do this, it is important to understand the advantages provided to the homeowners by gated communities in this area and offer them as incentives. As this area is quite underdeveloped and lacks basic quality of infrastructure like pedestrian paths, public spaces and recreational activities, the gated community model, which provides all of the above, is popular. Therefore, the spatial quality of the abutting pedestrian oriented street is highly improved, with a focus on the quality of spatial experience and access to diverse functions and spaces by promoting high dense mixed-use along the road. Development of these spatial characteristics encourage the gated communities to gradually open over time, first as a means of through access and eventually the removal of the compound wall and provision of public access to communal spaces. These are in addition to the incentives proposed, which are explained in more detail in Ch.05.



01 CURRENT SITUATION

02 MIXED USE DEVELOPMENT AND IMPROVED PEDESTRIAN QUALITIES.

ACCESS THROUGH GATED COMMUNITY IF POSSIBLE

03 COMPOUND WALL REMOVED AND COMMUNAL SPACE MADE PUBLIC

4.3.5 DESIGN PROPOSAL

ZOOM IN 01: GATED COMMUNITIES

Fig. 190 Final phase - open community accessible communal space, mixed use high dense neighbourhood and transformed landscape

Industrial site partially redeveloped as part of the green corridor

Smaller waterbodies interconnected to allow for flowing water

Transformed central pedestrian path [Zoom in 02]

Communal space of gated community opened up.

Path thrugh park allows an alternate route of access to OMR road

Development of new mixed use high rise buildings with an active ground plane



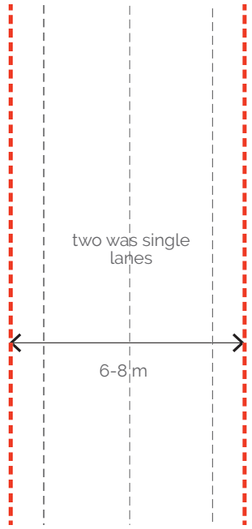
4.3.5 DESIGN PROPOSAL

ZOOM IN 02: CENTRAL PEDESTRIAN PATH

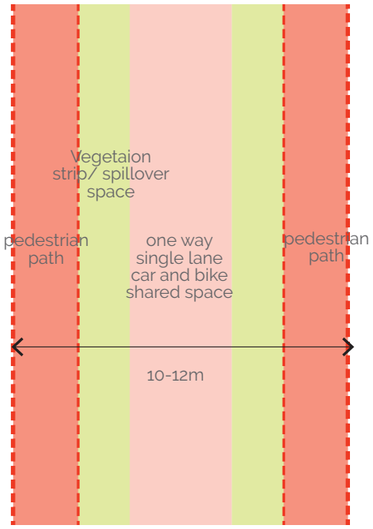


Fig. 191 Image of current situation. Source: Google Earth
Fig. 192 diagram showing current and proposed layout

Currently, the road has no pedestrian path and only two lanes for vehicular traffic. The width of the road varies from 6 -8m. In order to active this road as the central pedestrian path, 2m of land is acquired from either side of the road from the building setback. Then, the vehicle flow is reduced to a single lane that is shared with cycles, allowing for pedestrian space and vegetation strips. This creates an intimate pedestrian oriented street with low vehicular flows. Important neighbourhood functions such as shops, departmental stores, libraries are ideally suited for this street. This street also has plenty of gated communities which are proposed to transformed as explained previously. The vegetation strip has breaks to allow for spill over of activities from the mixed use buildings and for positive appropriation of space, like street food, hawker shops etc. When in front of the gated communities, the vegitation strip remains continuous, to provide an additional layer of privacy.



CURRENT LAYOUT

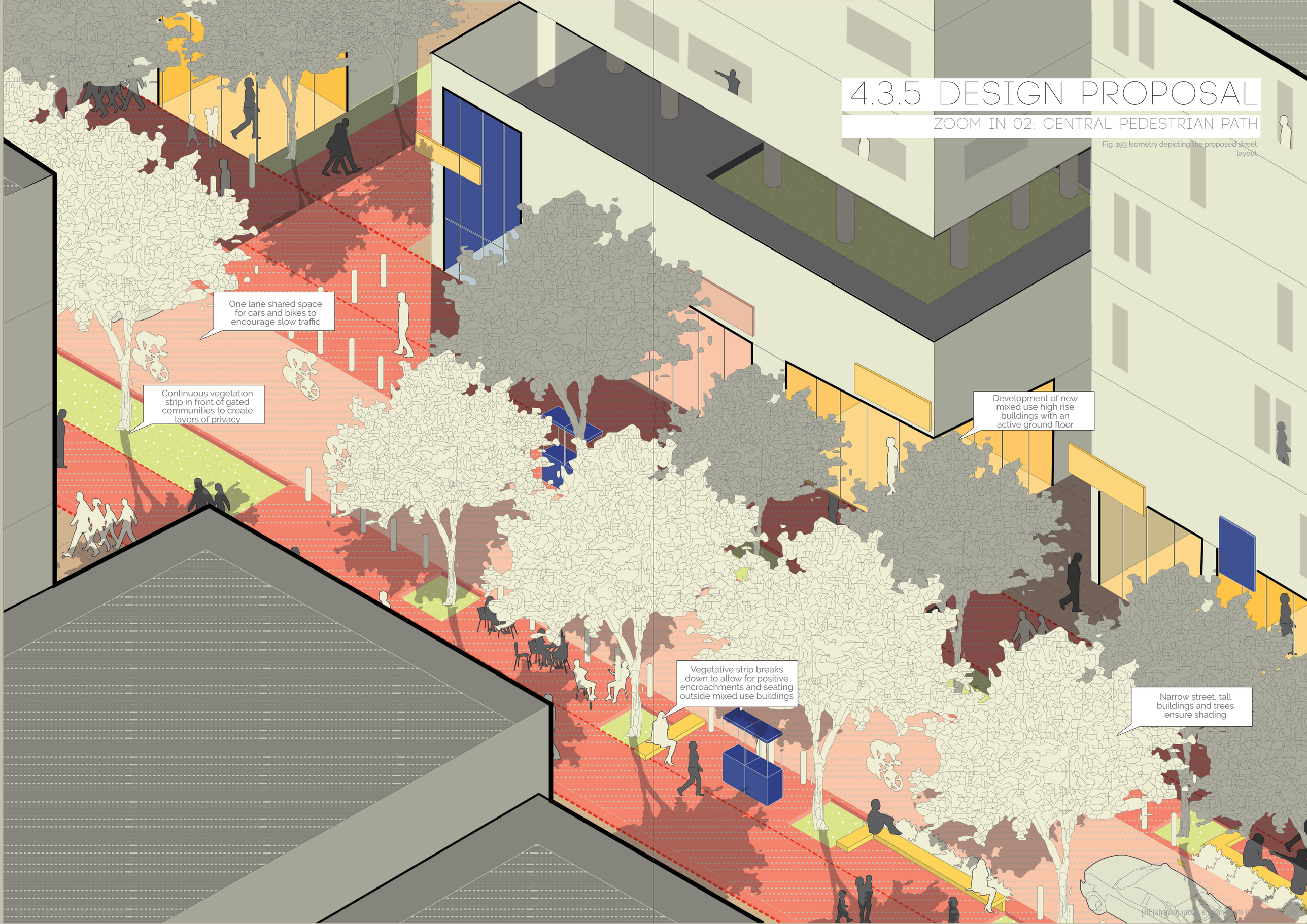


PROPOSED LAYOUT

4.3.5 DESIGN PROPOSAL

ZOOM IN 02: CENTRAL PEDESTRIAN PATH

Fig. 193 Isometry depicting the proposed street layout



4.3.5 DESIGN PROPOSAL

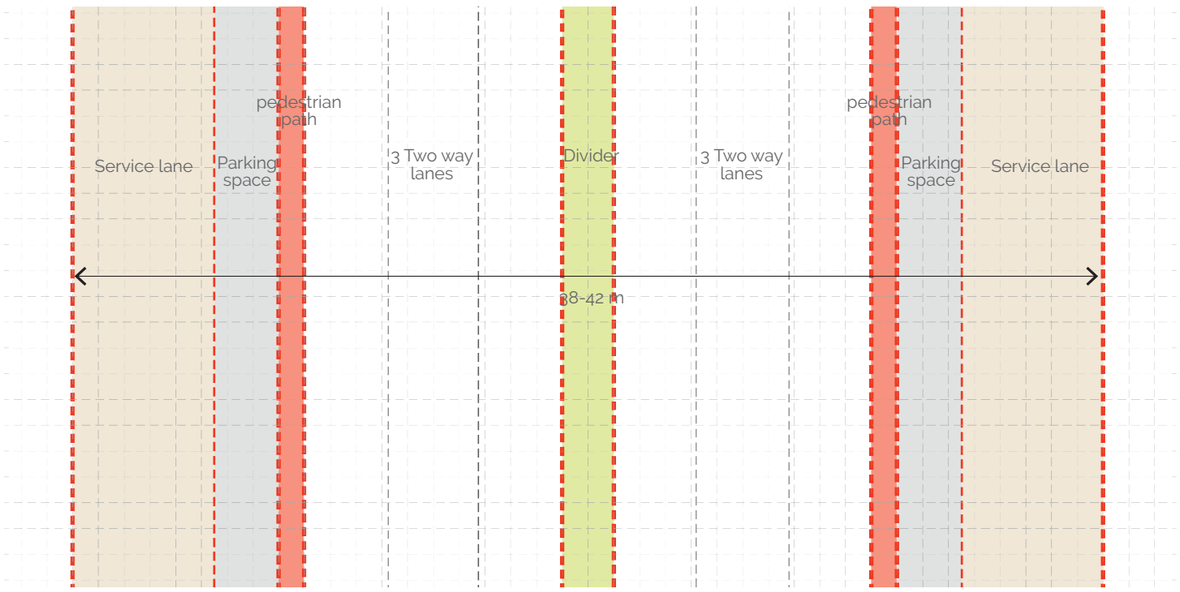
ZOOM IN 03: TRANSFORMATION OF OMR

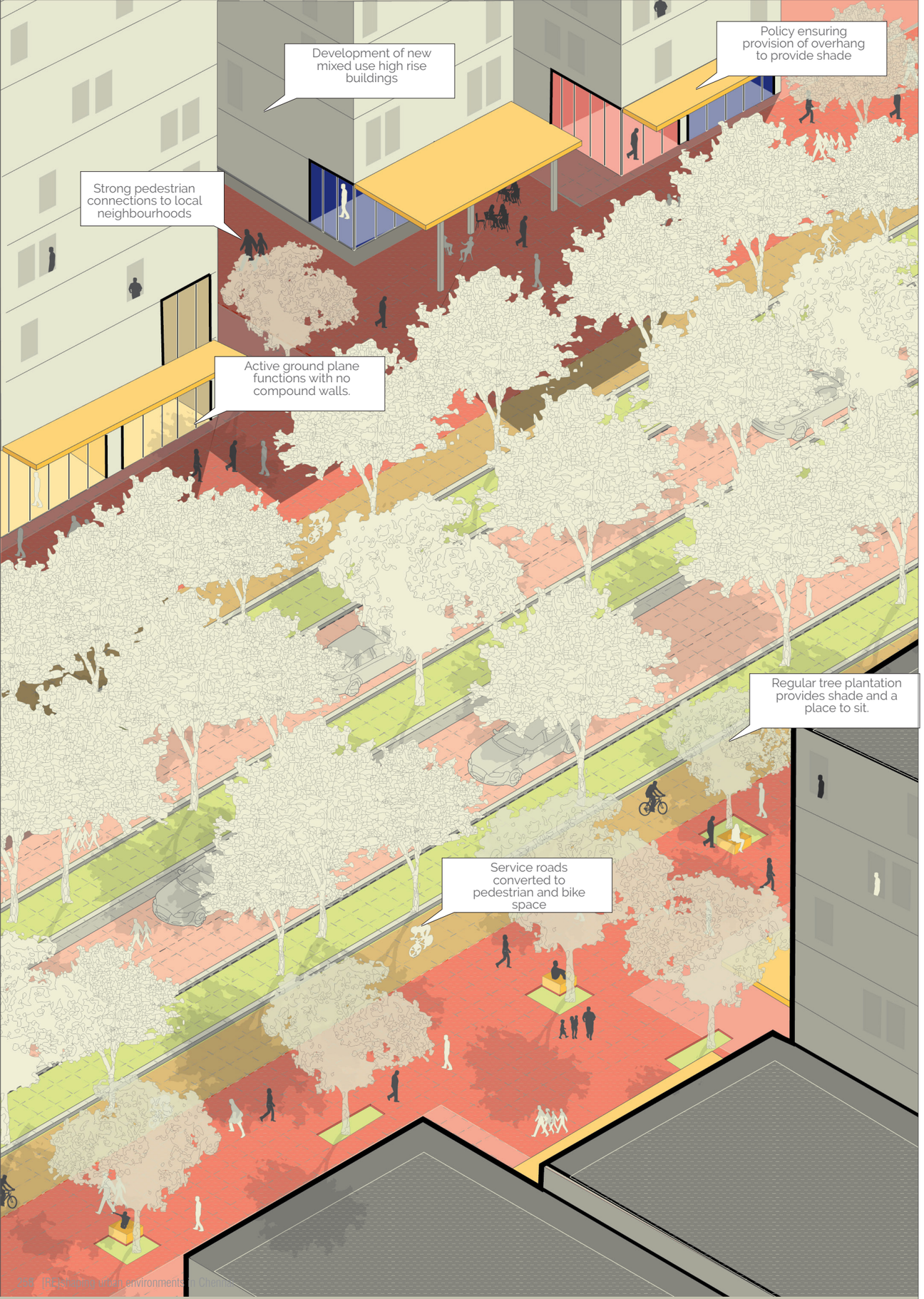


Having downgraded the OMR from a highway, it is imprtant to make this road more pedestrian friendly. With the densification of local neighbourhoods and the presence of many offices, retail and restaurants, local flows are set to increase. The current road consists of 6 vehicle lanes and a divider inbetween. There are two service roads to access shops to either side of the road and for parking. This arrangement results in a lot of people-vehicle collisions.

Fig. 194 OMR
Fig. 195 OMR Current layout
Fig. 196 OMR current situation





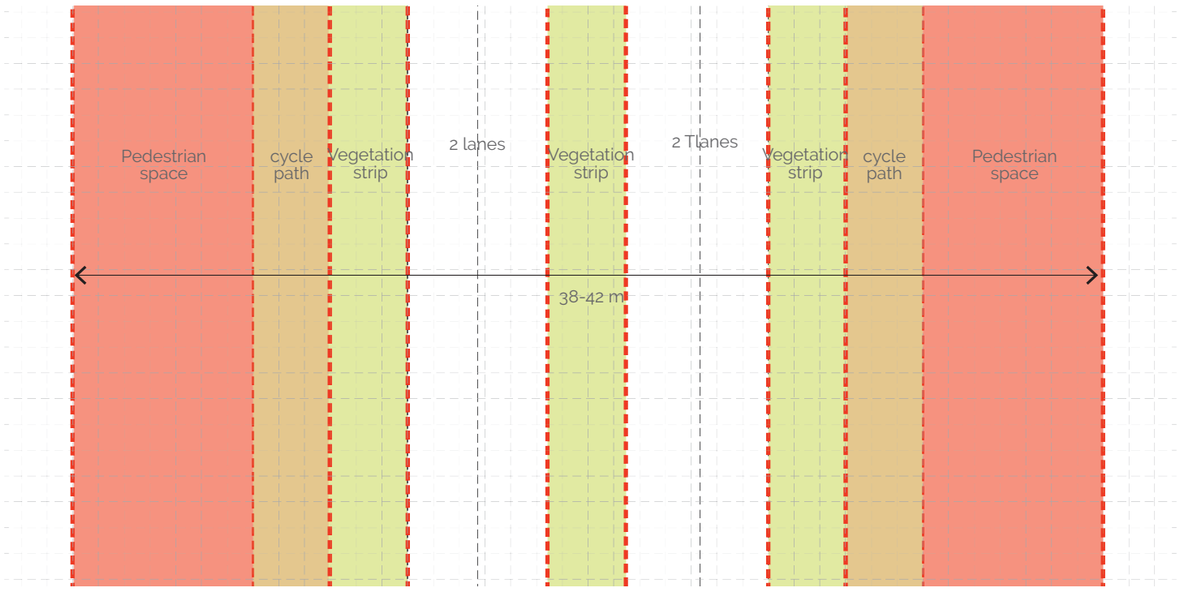


4.3.5 DESIGN PROPOSAL

ZOOM IN 03: TRANSFORMATION OF OMR

Fig. 197 OMR
Fig. 198 OMR Current layout
Fig. 199 OMR current situation

With the increase in local pedestrian flows, the service roads are no longer needed. Instead there is a requirement for more pedestrian access. Therefore, the number of vehicle lanes are reduced to two (each way), with vegetation strips on both sides to minimise noise and pollution. Furhter, the service roads are transformed into pedestrian and cycle spaces. The wide pedestrian path allows for other activities such as seating and extention of the activities to the street, Policy changes that enable overhangs from buildings are used to provide shade., in addition to the trees. The distributed grid network ensures many pedestrian connections from the adjacent neighbourhoods to the wide pedestrian spaces, allowing for a high level of connectivity. Therefore, this space brings in both city scale flows through the metro and the OMR as well as local flows from the neighbourhoods.



4.3.5 DESIGN PROPOSAL

EXISTING CONTEXT



SERVICE ROAD ALONG OMR

Fig. 200 Existing contect 01



POORLY MAINTAINED NEIGHBOURHOOD ROADS

Fig. 201 Existing context 02

4.3.5 DESIGN PROPOSAL

PERSPECTIVE VIEWS



TRANSFORMATION OF OMR

Fig. 202 Perspective View 01



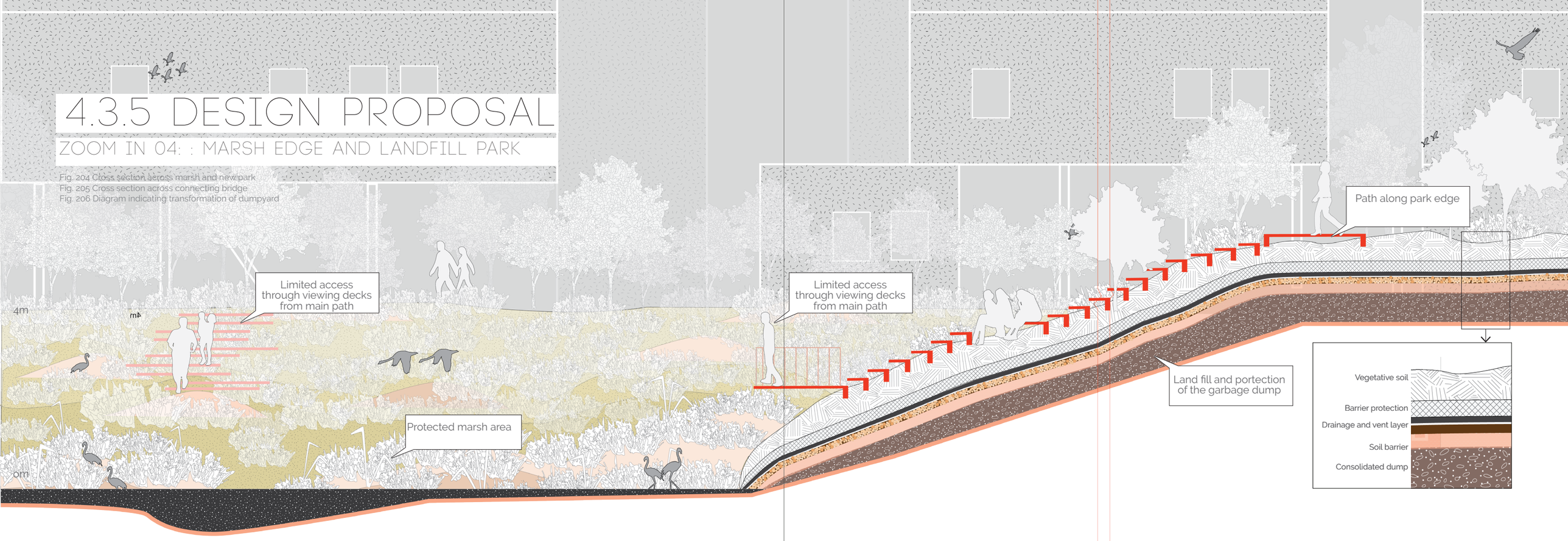
TRANSFORMATION OF LOCAL THROUGH ROAD

Fig. 203 Perspective view 02

4.3.5 DESIGN PROPOSAL

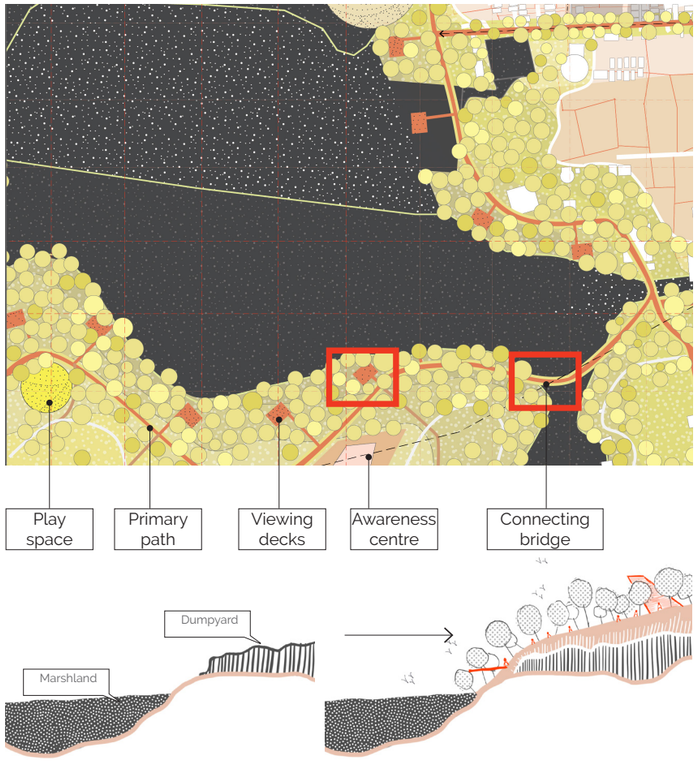
ZOOM IN 04: : MARSH EDGE AND LANDFILL PARK

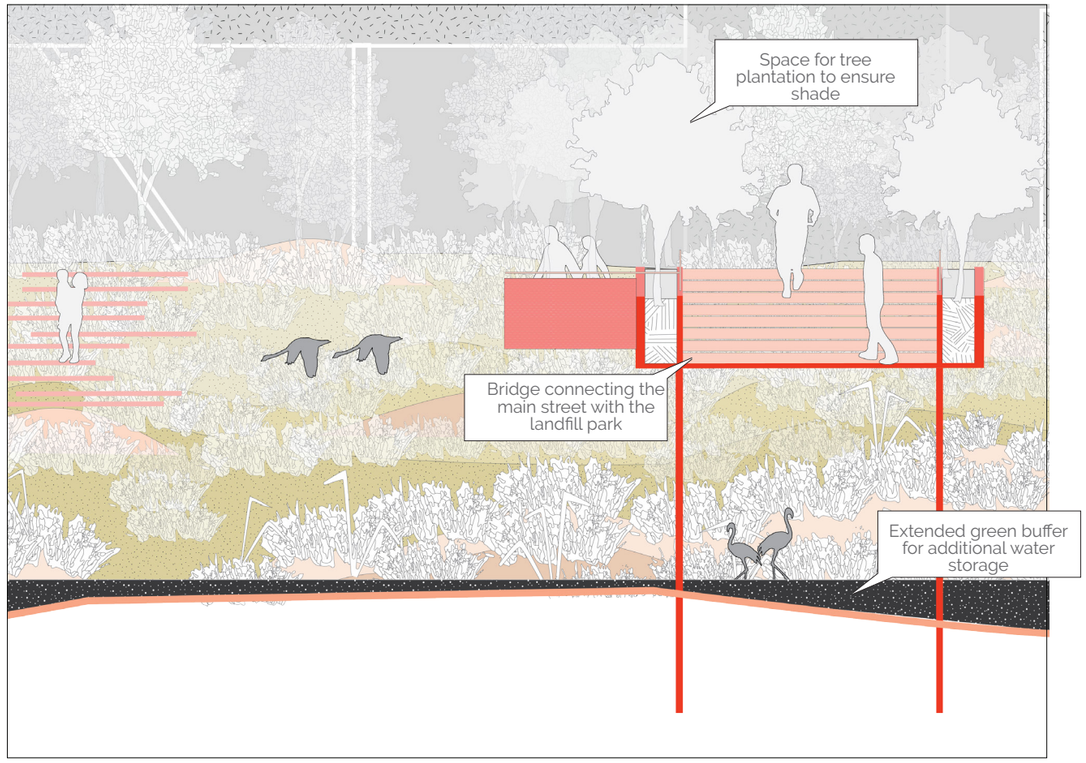
Fig. 204 Cross section across marsh and new park
Fig. 205 Cross section across connecting bridge
Fig. 206 Diagram indicating transformation of dumpyard



The dumpyard is regenerated as a city scale park with recreational activities, bird watching centres and learning and awareness centres. The regeneration of the Freshkills dumpyard in New York was used as a study case for the implementation process. (Stamp, 2012). This regeneration is possible by compacting the existing waste, constructing the layers of soil, gravel, insulating layer and vegetative soil layer required. This results in the entire park being raised above its surroundings,

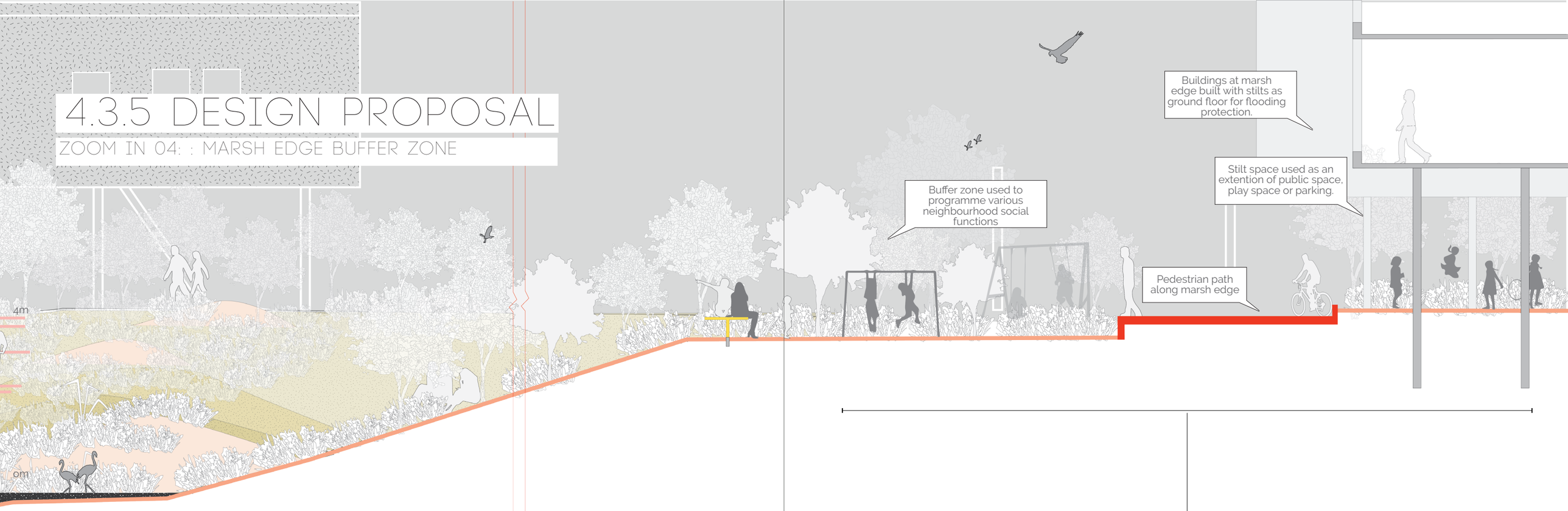
With the creation of the protected edge, the lower elevation points in the buffer serve as water retention locations in cases of high water flow. This requires a bridge to cross over from the main street to the regenerated park. The bridge is shaded with trees and consists of viewing decks.





4.3.5 DESIGN PROPOSAL

ZOOM IN 04: : MARSH EDGE BUFFER ZONE



The buildings found in the edge near the marsh are recomendded to be built on stilts to avoid any serious flooding damage. the buffer area is programmed with all the neighbourhood functions along the perpendicular nodes. Stilt spaces are incentivised to be publicly accessible and are used as extentions of the street.

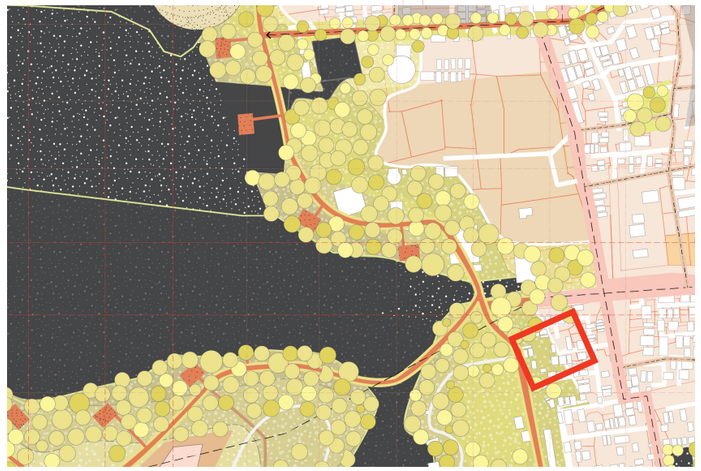
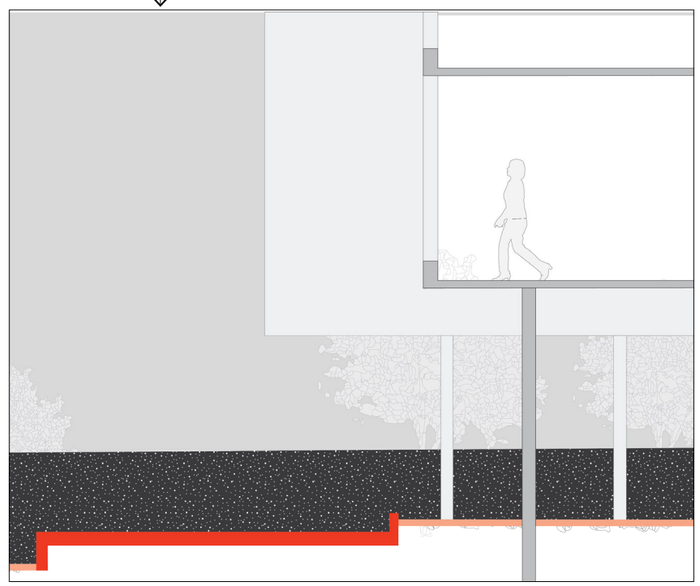


Fig. 207 Cross section across marsh edge



4.3.5 DESIGN PROPOSAL

EXISTING CONTEXT



CURRENT VIEW OF THE MARSH

Fig. 208 Existing context 03



POORLY MAINTAINED LOCAL ROADS

Fig. 209 Existing contect 04

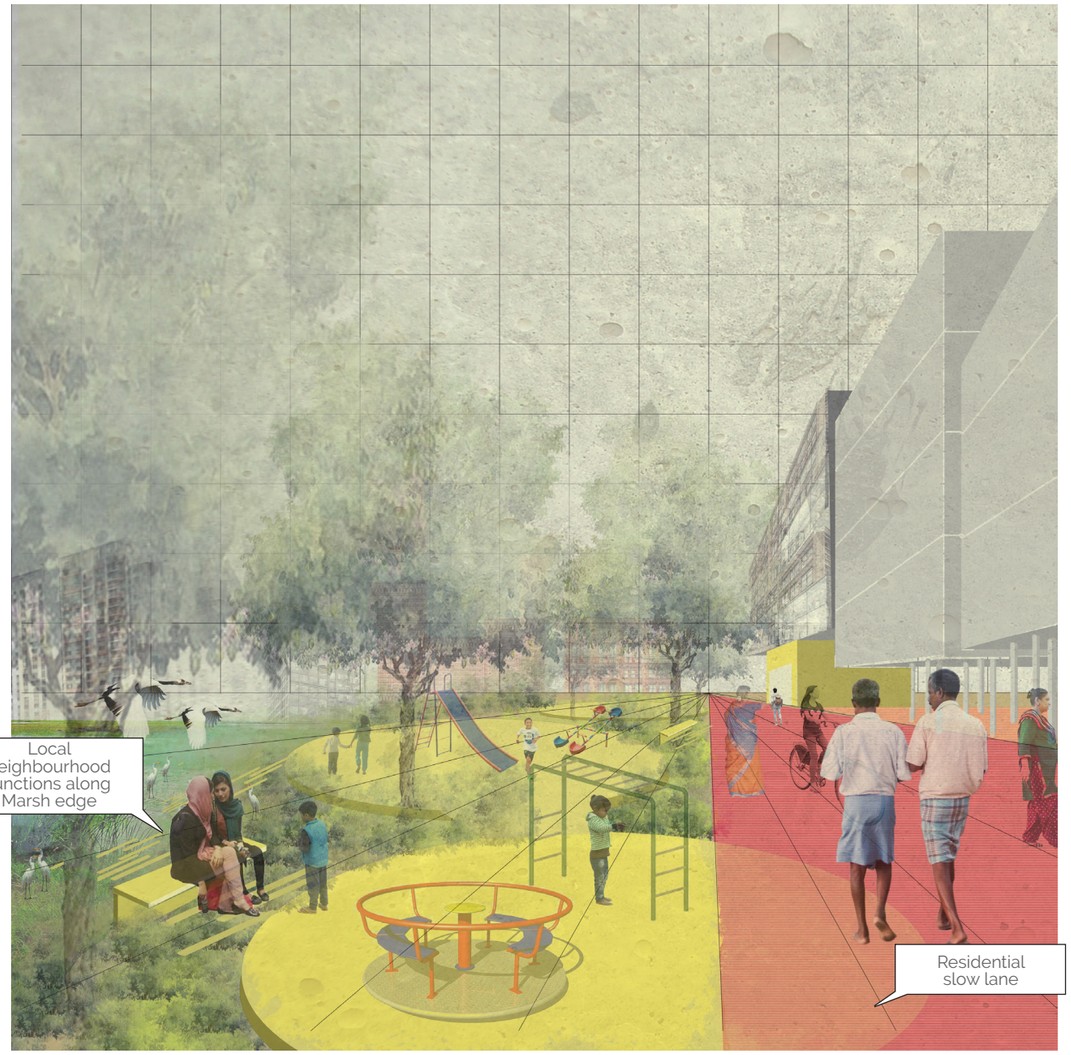
4.3.5 DESIGN PROPOSAL

PERSPECTIVE VIEWS



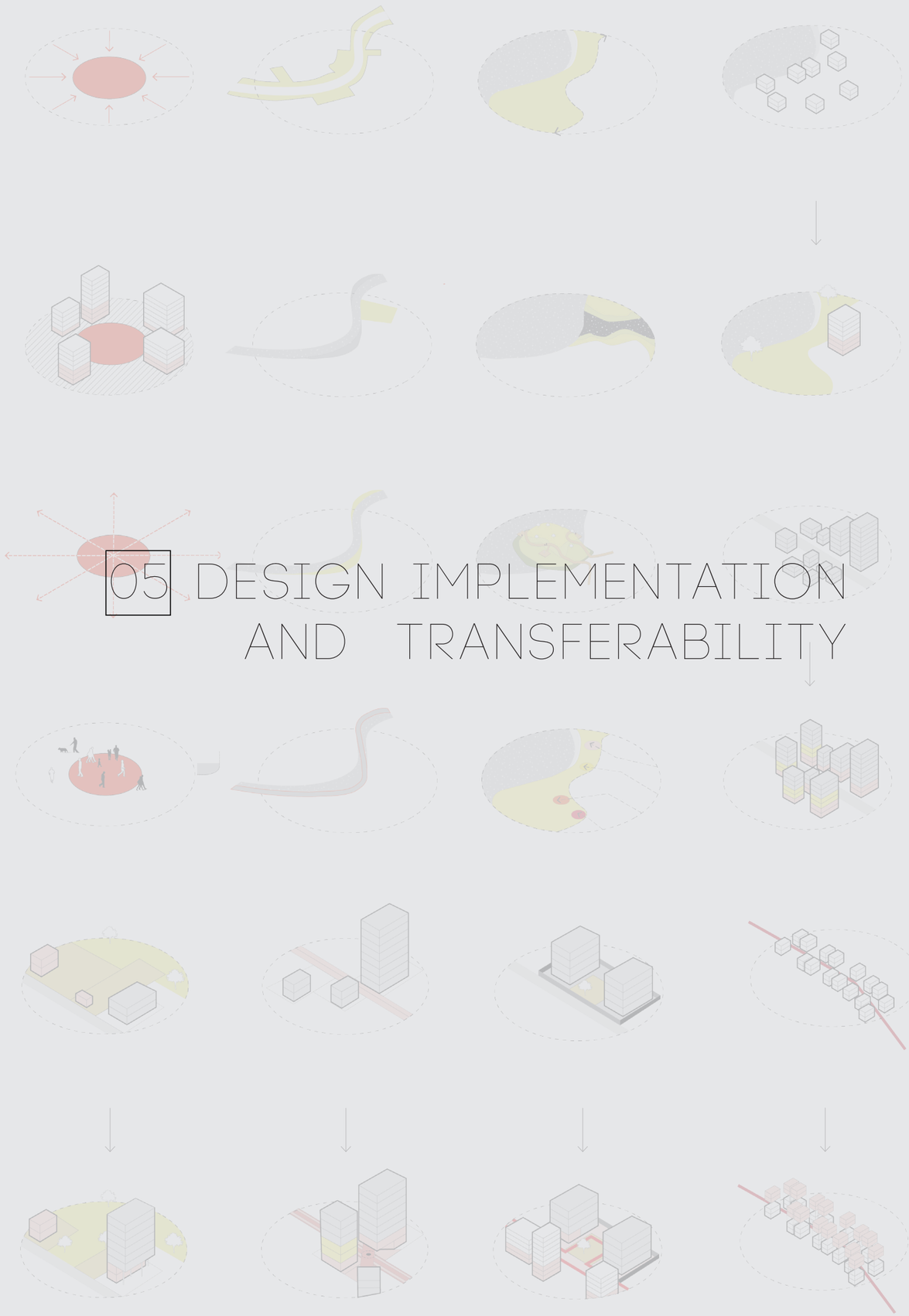
VIEW OF THE MARSH FROM NEW PARK

Fig. 210 Perspective View 03



SOCIAL FUNCTIONS ALONG THE BUFFER ZONE

Fig. 211 Perspective view 04



05 DESIGN IMPLEMENTATION AND TRANSFERABILITY

Chapter overview:

This chapter ellaborates in the process of design implementation, by first breaking down the different components of the proposal to strategic actions which are then explained in terms of stakeholders involved, policy changes and spatial implementation required. The strategies are classified as those pertaining to Transit Oriented developement and Socio-ecological integration. These two then build up to the densification strategies required to intiiate these transformations. The transferability of these strategies are tested by applying them to the design location 03, as a means to formulate a design process. Finally the the time line of execution of the three projects is explained.

Chapter contents:

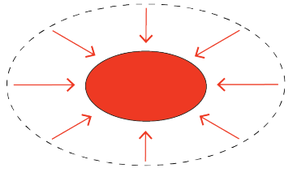
5.1 Design strategies, policies and spatial interventions
5.2 Testing design transferability
5.3 Project phasing

5.1.1 DESIGN STRATEGIES

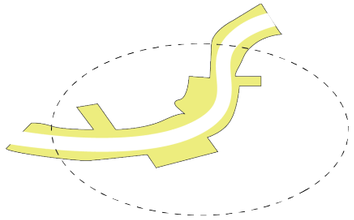
LOCATION 01

The design proposal is broken down into strategies that fall under three main categories; Transit stations, ecological interventions and densification proposals. The strategies that fall under the densification proposals are built up from the strategies in the first two categories.

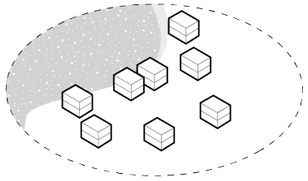
The densification strategies are explained through the stakeholders involved and the incentives required to facilitate the transformation. They are defined in terms of both intervention level required and level of policy change.

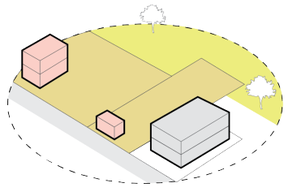


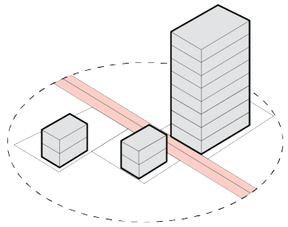
S.T.1
TRANSIT STOPS AS LOCAL CENTERS

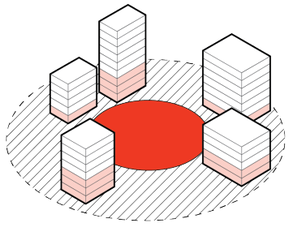


S.E.1
ACTIVATE WATER EDGE

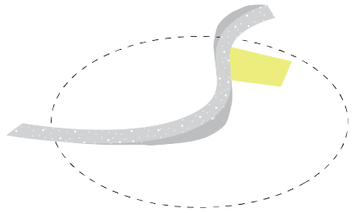




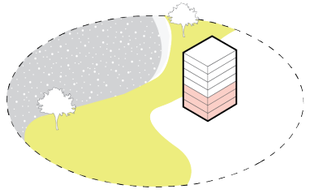




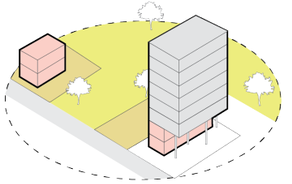
S.T.2
HIGH DENSE MIXED USE AROUND TRANSIT STOPS



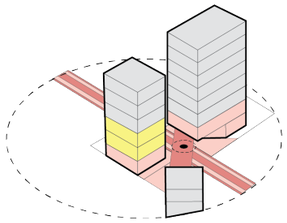
S.E.2
SOCIAL SPACE X WATER STORAGE



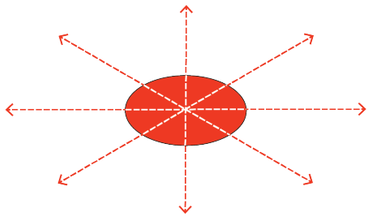
S.D.1
RELOCATE + REBUILD



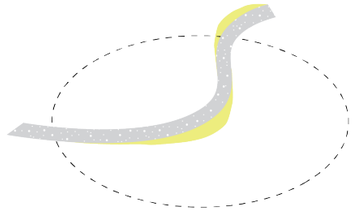
S.D.2
PUBLIC ACCESSIBILITY + GREEN COVER ON INSTITUTION SITES



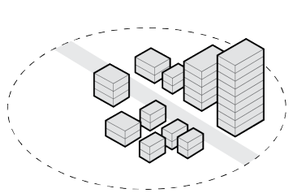
S.D3
TRANSFORMATION OF METRO SQUARE

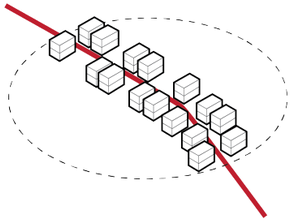


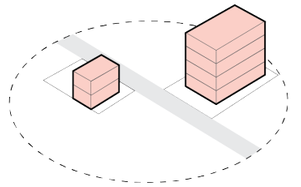
S.T.3
MAXIMUM CONNECTIONS FROM TRANSIT STOPS

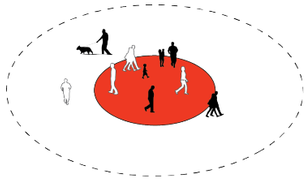


S.E.3
WIDEN RIVER ALONG OUTER BEND

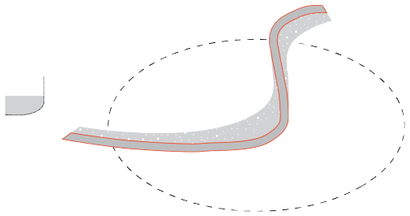




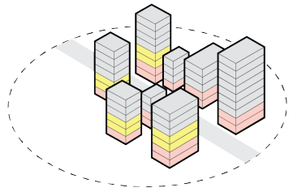




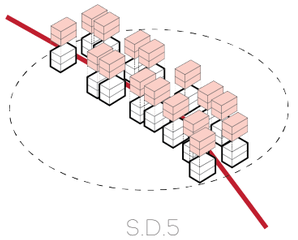
S.T.4
HIGH OPPURTUNITY FOR PEDESTRIAN MOVEMENT



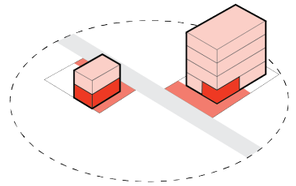
S.E.4
CREATE SMALLER CHANNEL FOR PERINNIAL FLOW



S.D.4
MIXED USE TRANSFORMATION OF OFFICE AND INDUSTRY



S.D.5
INCREASE IN PERMISSIBLE DENSITY ALONG PEDESTRIAN PATH



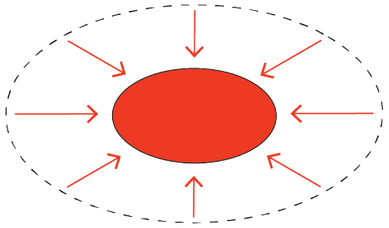
S.D.6
PUBLIC ENGAGEMENT WITH HISTORIC BUILDINGS

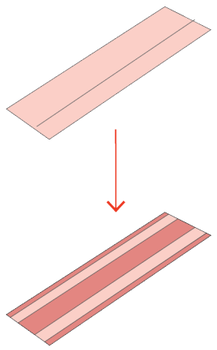
5.1.1 DESIGN STRATEGIES

S.T.1 TRANSIT STOPS AS LOCAL CENTERS

While Transit stops are ideally located at neighbourhoods centres, the metro lines in Chennai are planned along major arterial roads, which act as fragmenting elements to pedestrian flow, owing to the large number vehicle lanes, fast and high vehicular activity and difficulty of crossing.

Therefore, the arterial road is transformed to reduce the number and width of the car lanes, encouraging a reduction in vehicular traffic, while maximising the pedestrian flow by increasing public space, cycle lanes integrated with urban parks, seating, restaurants, kiosks and bus stops.





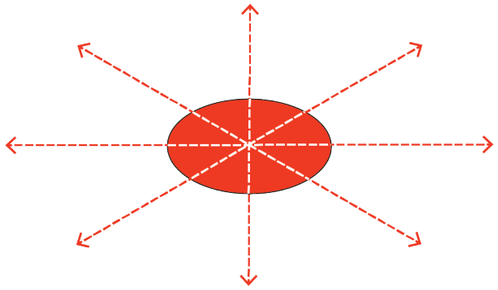
Arterial road transformation

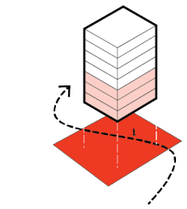
limiting vehicles maximising public space

S.T.2 MAXIMUM CONNECTIONS FROM TRANSIT STOPS

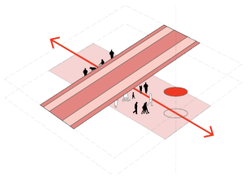
The service areas for walking and cycling comfortably from the metro stop is maximised when there are streets in all the directions from the stop. When considering the existing street patterns and buildings, it is quiet challenging to implement paths in all directions.

Therefore, in addition to strengthening the street network, the parcels in close proximity to the public transit stop are made publicly accessible, often with public functions and paths connecting to the street network. Additionally, a station square is proposed that connects the two sides of the arterial road to the metro stop while also acting as public space in the city.

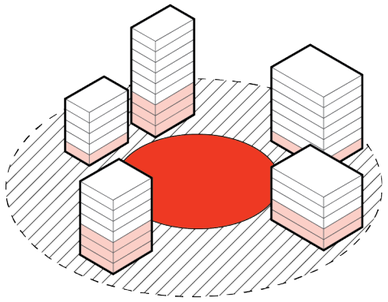


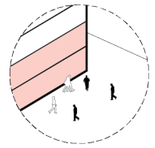


parcel accessible to public near transit

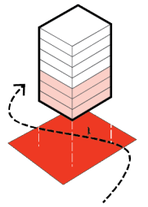


station square

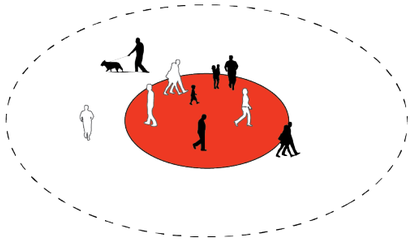




Active functions at the ground level - retail/ restaurants etc.



parcel accessible to public near transit point - allowing through movement





Public spaces to be shaded



Continuous pedestrian and cycle paths

S.T.3 MIXED USE AND ACTIVE FUNCTIONS NEAR TRANSIT STOP

High dense buildings are developed 500 m from the metro stop. Public, commercial and recreational functions are planned in the lower few floors of these buildings to create an active pedestrian environment

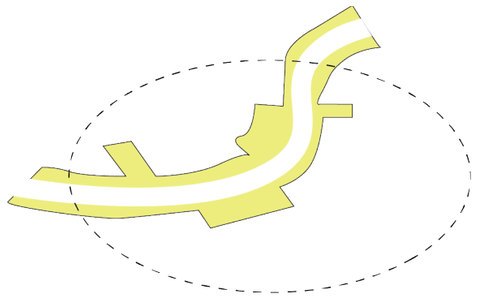
S.T.4 HIGH OPPORTUNITY FOR PEDESTRIAN MOVEMENT

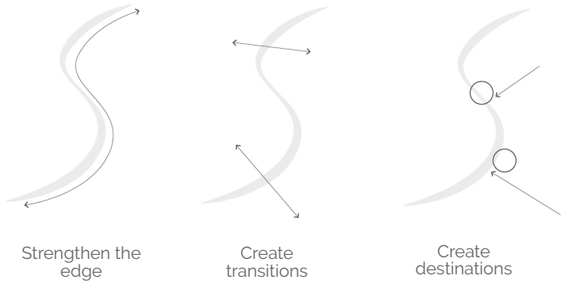
Spatial conditions to create maximum comfort for pedestrian movement is facilitated by ensuring continuous pedestrian and cyle paths as well as different methods of creating shade, through tree cover, architectural shading elements and building configurations as well.

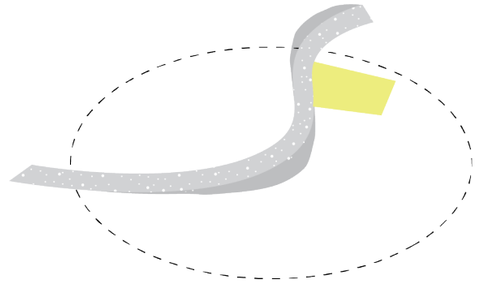
5.1.1 DESIGN STRATEGIES

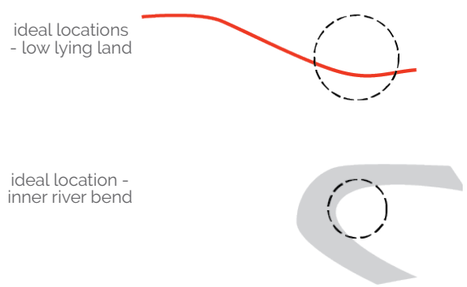
S.E.1 ACTIVATE WATER EDGE

The water edge is made accessible and an active part of the city fabric. This is done by creating a continuously accessible path along the water edge that is well connected with the rest of the street network. Further, important transitions are created across the river, connecting different local neighbourhoods to one another and to other important functions such as the metro stops. Important functions are placed along these paths acting as destinations and pause points along the water edge.



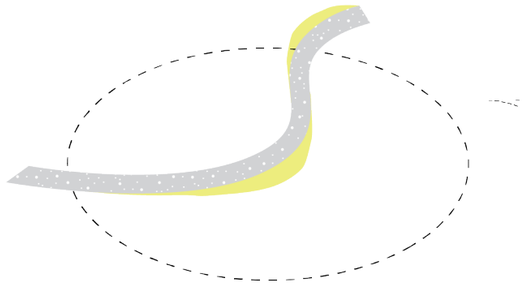


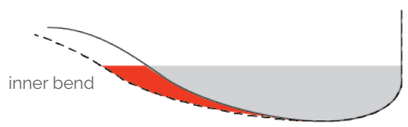


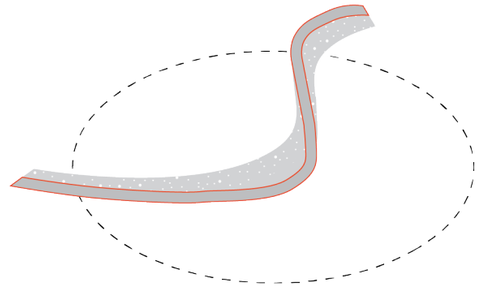


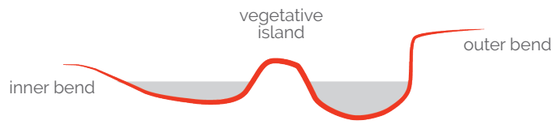
S.E.2 WIDEN RIVER ALONG THE OUTER BENDS

One of the ways the water carrying capacity of the river is increased is the widening of the river at its inner bends of the river, which are naturally more shallow owing to constant sedimentation. This also facilitates the presence of diverse environments to engage with the river edge, with the shallow inner bend allowing for gradual slopes to the water and the possibility for a tactile relationship.









S.E.3 SOCIAL SPACE X WATER STORAGE

One of the ways the water carrying capacity of the river is increased is the introduction of several water storage possibilities during seasons of high flows or sudden events. These spaces are further used as important public spaces along the river, that not only facilitate better social interactions and diverse experiences, but also increase engagement between the city and the river. The ideal locations along the river for water storage are chosen firstly, at naturally lower lying areas in comparison to the surroundings as well as at the inner bends of the river, which are naturally more shallow owing to constant sedimentation.

S.E.4 FACILITATE A SMALLER CHANNEL TO CARRY WATER DURING LOWER FLOWS

One of the restoration goals of the Cooum river is to enable a continuous flow of water throughout the year to maximise biodiversity and maintain the possibility f water transport. As the river is seasonal, with a large contrast in flows throughout the year, Therefore, in order to achieve a continuous flow throughout the year, a smaller channel is demarcated along the outer edge of the river, which is deeper as compared to the inner edge. During seasons of lower flow, the water continuous to flow along the deeper channel. This also giver rise to the creation of vegetative islands between the two channels.

5.1.1 DESIGN STRATEGIES

The densification strategies are described in terms of the actions and their relation with the strategies for mobility and ecology, the level of policy change and spatial intervention required and a list of the major interventions reccomended.

SPATIAL INTERVENTIONS 01 02 03 04 05

01. No interventions required

02. Minimal interventions in terms of integrating site with public street network.

03. Moderate interventions in government owned parcels and buildings with predominantly public stakeholders.

04. Moderate to high interventions in institutional and large corpration/ developer owned parcels.

05. High interventions in parcels owned by multiple private hindividuals and small bussinesses.

POLICY 01 02 03 04 05

01. No policy changes

02. Policy amendment regarding built density and function

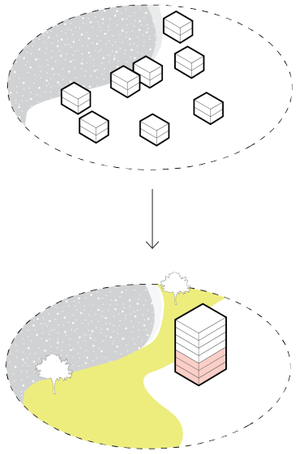
03. Policy amendment regarding built density and function and additional incentives.

04. New policies addressing additional restrictions such as spatial configuration, access to public and relation to streets.

05. Key location with specific regulation.

S.D.1 RELOCATE + REBUILD ALONG RIVER BANK

SPATIAL INTERVENTIONS ■■■■■
POLICY ■■■■■



Buildings which are [1] mono-functional [2] lower than five floors [3] without any significant historic value present in the proposed block are slated to be demolished and accommodated in new high dense developments, with the lower floors utilised for commercial or recreational function.

This allows to replace low dense mono-functional buildings with a more mixed use building with a smaller footprint, allowing for more vegetative cover and open spaces.

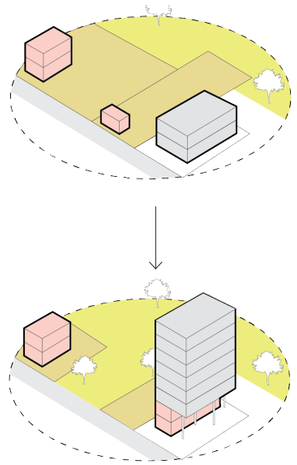
STAKEHOLDERS
Public : CMDA, TNEB,
Private : Developers
Civil society : Individuals and households,

INTERVENTIONS
> Selection of buildings to be removed.
> Stakeholder meeting to negotiate displacement and gather inputs on the new buildings.
> Provision of the required infrastructure such as new roads etc.

POLICY
> Demarcation of open space to prohibit any permanent structures
> Policy defining the function and density of new building.
> Reservation of units in the new buildiing for the displaced households.

S.D.2 PUBLIC ACCESSIBILITY + GREEN COVER ON INSTITUTIONS SITES

SPATIAL INTERVENTIONS ■■■□□
POLICY ■■■□□



Large parcels of institutional buildings along the river edge are transformed to allow public access to the grounds, which are developed as large green spaces with pedestrian paths and landscape. Schools, colleges, research institutes fall inder this category. Depending on the specific conditions, public access at certain times in the day can also be worked, eg. After school hours.

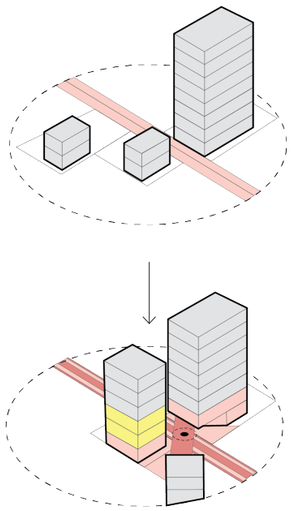
STAKEHOLDERS
Public : CMDA, Government schools and colleges,
Private : Corporate offices and banks
Civil society : small businesses.

INTERVENTIONS
> Selection of buildings to opened to public and those to be displaced.
> Stakeholder meeting to negotiate public use of space in terms of boundries, timing etc.
> Provision of the required infrastructure such as new paths accessible to the public and new vegetation.

POLICY
> Policy allowing parcels of historic buildings to become publicly accessible.
> Incentives such as allowances/ maintainance costs as a benifit to making parcels accessible to public.

S.D.3 TRANSFORMATION OF METRO SQUARE

SPATIAL INTERVENTIONS ■■■■■
POLICY ■■■■■



The buildings around the metro square play an important role in shaping the public realm and therefore require specific regulations and coordinations wooth stakeholders to ensure ideal spatial design.

STAKEHOLDERS

Public : CMDA

Private : Corporate offices, banks

Civil society : Households, housing associations and small businesses.

INTERVENTIONS

> Selection of buildings to be rebuilt.

> Stakeholder meeting to negotiate building function and form.

> Spatial interventions on site accessible to public as per design proposal.

POLICY

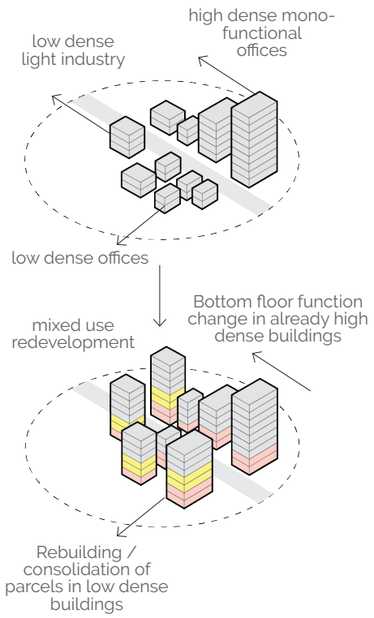
> Demarcation of public space on site to prohibit any permanent structures/ compound walls and incentives such as allowances/ maintenance costs as a benefit.

> Policy defining the functions and density of new building.

> Reservation of units in the new buildiing for the displaced households.

S.D.4 MIXED USE TRANSFORMATION OF OFFICE AND INDUSTRY

SPATIAL INTERVENTIONS ■■■■□
POLICY ■■■□□



The buildings found 500m from the metro stop are mostly office buildings, institutions and some industries, all mono-functional in nature. Therefore, to develop a more mixed use neighbourhood and increase the number of households that are walking distance from public transit, lower dense office buildings are incentivised to consolidate parcels and rebuild as high dense mixed use buildings while high dense buildings are incentivised to transform their lower floors to more active commercial and recreational functions. On the other hand, industrial sites are encouraged to relocate away from sites within 500m

STAKEHOLDERS

Public : CMDA

Private : Developers, Offices and industries

Civil society : Individuals and households, small businesses.

INTERVENTIONS

> Catogorisation of buildings to be rebuilt, relocated or transformed.

> Stakeholder meeting to negotiate displacement and gather inputs on the new buildings.

> Provision of the required infrastructure such as new roads etc.

POLICY

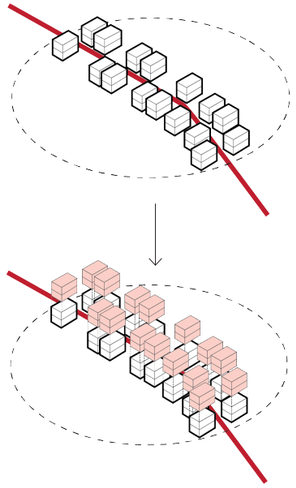
> low dense industry : relocate to a different site with incentives of TDR.

> low dense offices : rebuild as high dense mixed use commercial, residential and office.

> High dense mono-functional office: Assign lower floor(s) function as commercial or public, with public access to site and no compound wall with incentive of higher FSI.

S.D.5 INCREASE IN PERMISSIBLE DENSITY ALONG PEDESTRIAN PATH

SPATIAL INTERVENTIONS ■□□□□
POLICY ■■■□□



While the inner city is littered with several historic landmarks, a lot of these are currently occupied by private offices and banks. Therefore, to bring these buildings back to the public realm, [1] the parcels on which the historic buildings stand are made publicly accessible. [2] Every historic building has a percentage of the lower floor reserved for active commercial or public functions such as restaurants or retail.

STAKEHOLDERS

Public : CMDA

Private : -

Civil society : Individuals,households, housing associations and small businesses.

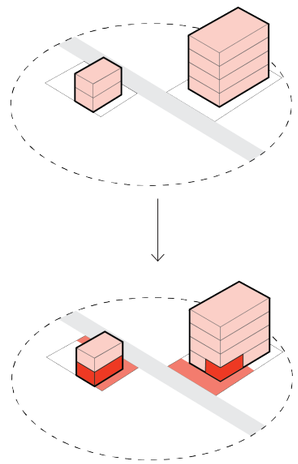
POLICY

> An increase in permissible density along the central pedestrian routes within the neighbourhood.

> Additional increase in permissable density as an incentive when 1. the ground floor is allocated to local small businesses. 2. when there is no compound wall along the front facade.

S.D.6 PUBLIC ENGAGEMENT WITH HISTORIC BUILDINGS

SPATIAL INTERVENTIONS ■■□□□
POLICY ■□□□□



While the inner city is littered with several historic landmarks, a lot of these are currently occupied by private offices and banks. Therefore, to bring these buildings back to the public realm, [1] the parcels on which the historic buildings stand are made publicly accessible. [2] Every historic building has a percentage of the lower floor reserved for active commercial or public functions such as restaurants or retail.

STAKEHOLDERS

Public : CMDA

Private : Corporate offices and banks occupying historic buildings

Civil society : Small businesses occupying historic buildings.

INTERVENTIONS

> Coordinate with the individual building occupants to ensure a relationship between the public street, parcel of land and the commercial / recreational function.

POLICY

> Policy allowing parcels of historic buildings to become publicly accessible.

> Reserving a minimum percentage of the ground floor for recreational, commercial or public functions.

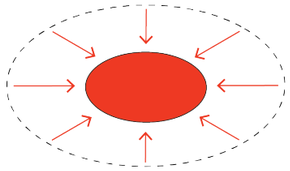
5.1.2 DESIGN STRATEGIES

LOCATION 02

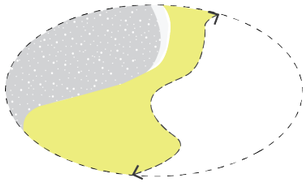
The design proposal is broken down into strategies that fall under three main categories; Transit stations, ecological interventions and densification proposals. The strategies that fall under the densification proposals are built up from the strategies in the first two categories.

The densification strategies are explained through the stakeholders involved and the incentives required to facilitate the transformation. They are defined in terms of both intervention level required and level of policy change.

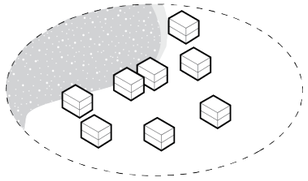
The stratheies that are different from those of Location 01 are highlighted.

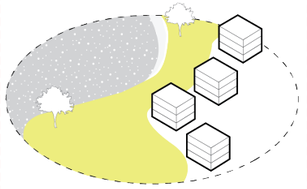


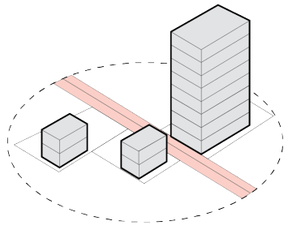
S.T.1
TRANSIT STOPS AS LOCAL CENTERS

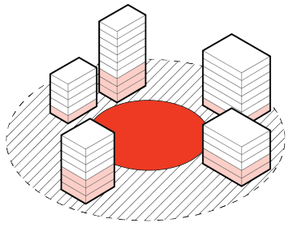


S.E.1
ACTIVATE + RECLAI,M WATER EDGE

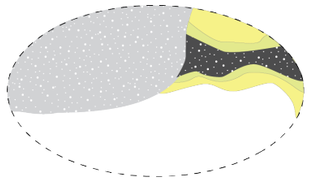




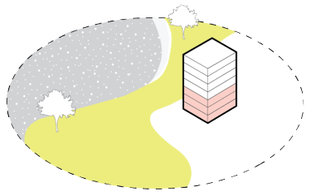




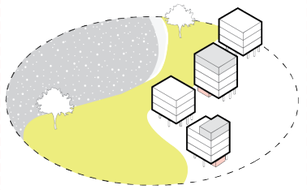
S.T.2
HIGH DENSE MIXED USE AROUND TRANSIT STOPS



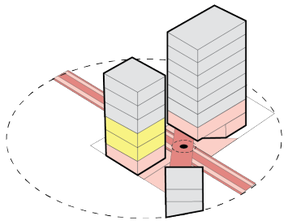
S.E.2
SOCIAL SPACE X WATER STORAGE



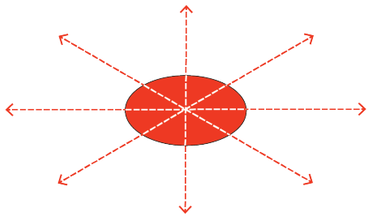
S.D.1
RELOCATE + REBUILD



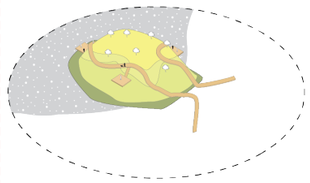
S.D.7
HOUSING TRANSFORMATION ALONG MARSH EDGE



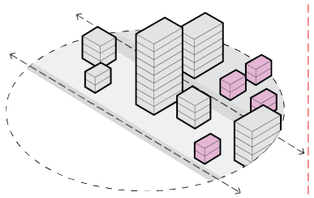
S.D3
TRANSFORMATION OF METRO SQUARE

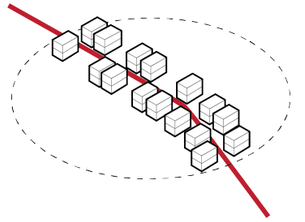


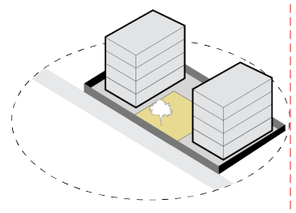
S.T.3
MAXIMUM CONNECTIONS FROM TRANSIT STOPS

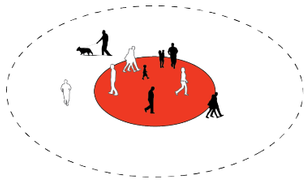


S.E.5
REGENERATE DUMPYARD AS A NEW PARK

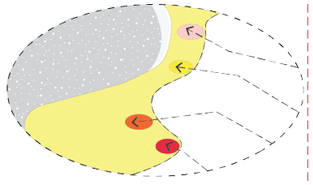




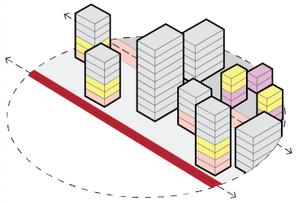




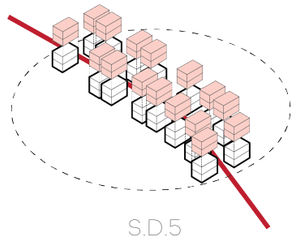
S.T.4
HIGH OPPURTUNITY FOR PEDESTRIAN MOVEMENT



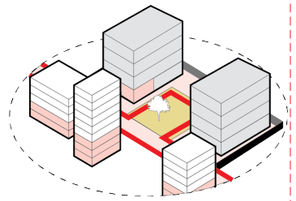
S.E.6
ACTIVATE BUFFER AREA WITH LOCAL NEIGHBOURHOOD FUNCTIONS AT NODES



S.D.8
MIXED USE TRANSFORMATION OF OFFICE AND INDUSTRY 500M FROM METRO STOP



S.D.5
INCREASE IN PERMISSIBLE DENSITY ALONG PEDESTRIAN PATH



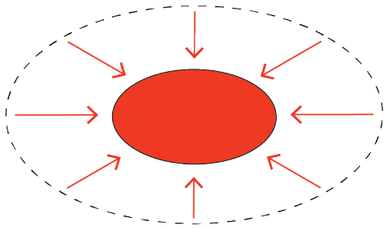
S.D.9
TRANSFORMATION OF GATED COMMUNITY

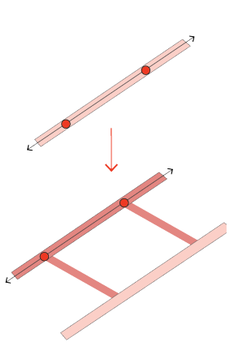
5.1.2 DESIGN STRATEGIES

S.T.1 TRANSIT STOPS AS LOCAL CENTERS

While Transit stops are ideally located at neighbourhoods centres, the metro lines in Chennai are planned along major arterial roads, which act as fragmenting elements to pedestrian flow, owing to the large number vehicle lanes, fast and high vehicular activity and difficulty of crossing.

Therefore, in the condition where the metro stop hasn't been built yet, the metro line is shifted away from the arterial road and proposed along the local through road, transforming it into the centre of the local neighbourhoods.



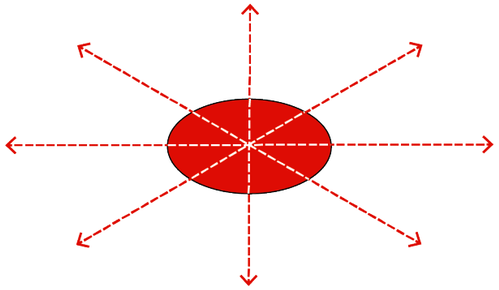


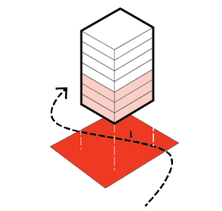
Current proposal metro line along OMR

Proposed location of metro line

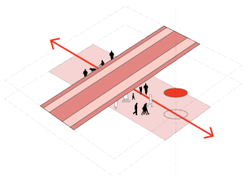
S.T.2 MAXIMUM CONNECTIONS FROM TRANSIT STOPS

This strategy isidentitical to the one propsed for location 01.

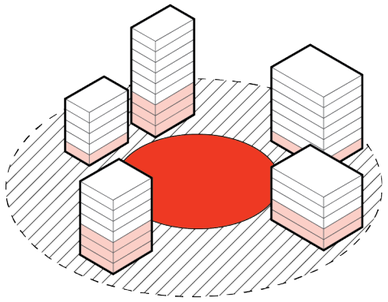


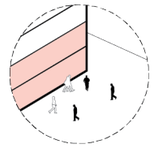


parcel accessible to public near transit

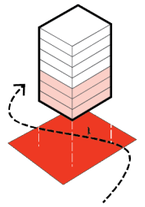


station square

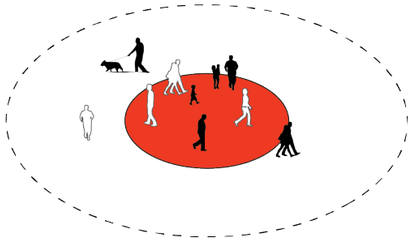


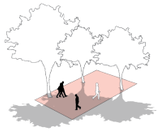


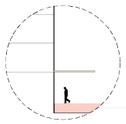
Active functions at the ground level - retail/ restaurants etc.

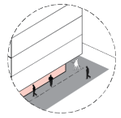


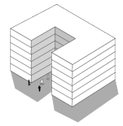
parcel accessible to public near transit point - allowing through movement

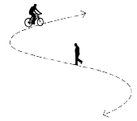












Public spaces to be shaded

Continuous pedestrian and cycle paths

S.T.3 MIXED USE AND ACTIVE FUNCTIONS NEAR TRANSIT STOP

This strategy isidentitical to the one propsed for location 01.

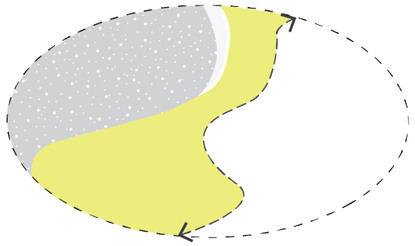
S.T.4 HIGH OPPORTUNITY FOR PEDESTRIAN MOVEMENT

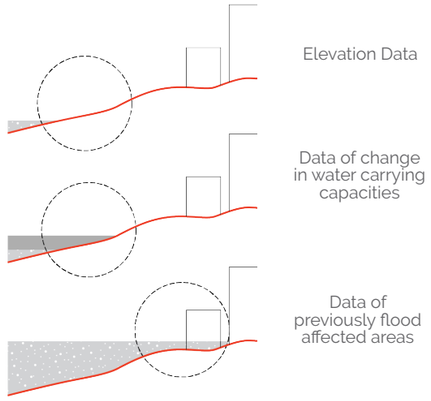
Spatial conditions to create maximum comfort for pedestrian movement is facilitated by ensuring continuous pedestrian and cyle paths as well as different methods of creating shade, through tree cover, architectural shading elements and building configurations as well.

5.1.2 DESIGN STRATEGIES

S.E.1 ACTIVATE + RECLAIM WATER EDGE

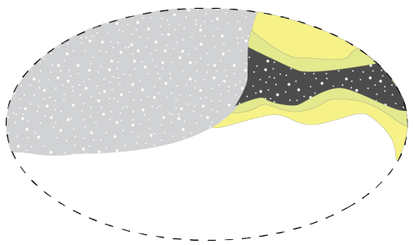
The water edge is made accessible and an active part of the city fabric. Further, a protective edge is defined to allow an increase in water percolation, increase water carrying capacity and protect built areas from floods. This edge is determined using the elevation data, flooding data and change in water carrying capacity of this area.

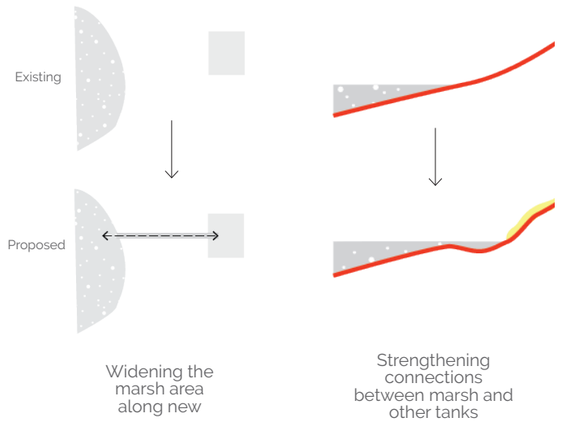


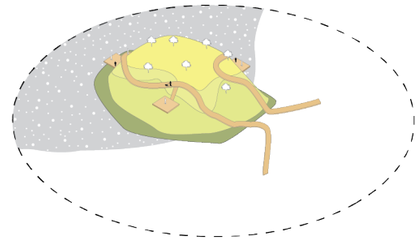


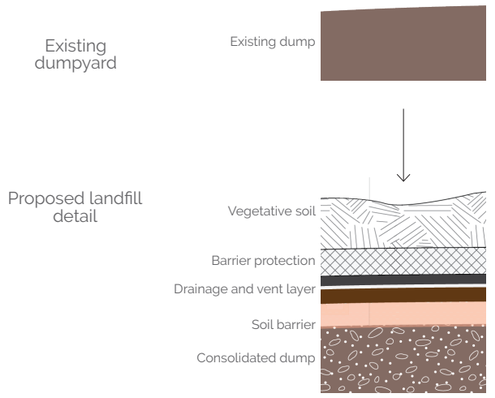
S.E.2 SOCIAL SPACE X WATER STORAGE

The water carrying capacity of the marsh is increased by allowing for storage spaces along the new buffer spaces for seasons of high flow. Further, spatial connections to the surrounding water tanks are made, to increase water carrying capacity of the entire system.



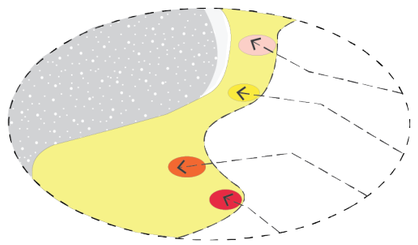






S.E.5 REGENERATE DUMPYARD AS A NEW PARK

The existing dumpyard, while officially inactive due to ecological concerns, is used for illegal dumping, which is polluting the soil and ground water and creating poor living environments for the near by neighbourhoods. Therefore, it is proposed to regenrate this dumpayard as a large city scale park, by consolidating the existing dump and landfilling.



S.E.6 ACTIVATE BUFFER AREA WITH LOCAL FUNCTIONS AT NODES

Complementary functions are planned along the buffer zone, such as local neighbourhood social functions like playgrounds and parks. They are concentrated along through streets that are accessible nodes.

5.1.2 DESIGN STRATEGIES

The densification strategies are described in terms of the actions and their relation with the strategies for mobility and ecology, the level of policy change and spatial intervention required and a list of the major interventions reccomended.

SPATIAL INTERVENTIONS 01 02 03 04 05

01. No interventions required

02. Minimal interventions in terms of integrating site with public street network.

03. Moderate interventions in government owned parcels and buildings with predominantly public stakeholders.

04. Moderate to high interventions in institutional and large corpration/ developer owned parcels.

05. High interventions in parcels owned by multiple private hindividuals and small businesses.

POLICY 01 02 03 04 05

01. No policy changes

02. Policy amendment regarding built density and function

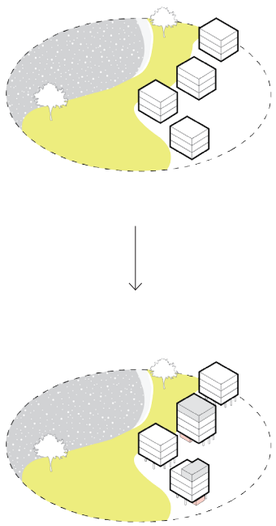
03. Policy amendment regarding built density and function and additional incentives.

04. New policies addressing additional restrictions such as spatial configuration, access to public and relation to streets.

05. Key location with specific regulation.

S.D.7 HOUSING TRANSFORMATION ALONG MARSH EDGE

SPATIAL INTERVENTIONS ■□□□□
POLICY ■■■□□



The housing along the edge of the protected zone is incentivised with higher densities to adopt the built typology of building on stilts, with publicly accessible lower floors and small scale commercial activites allowable. The typology is limited to mostly residential, as it si in the current situation, as this will results in quieter environemtns that are suitable for the various bird species present in the marsh.

STAKEHOLDERS

Public : CMDA

Private : Developers

Civil society : Individuals and households, small businesses.

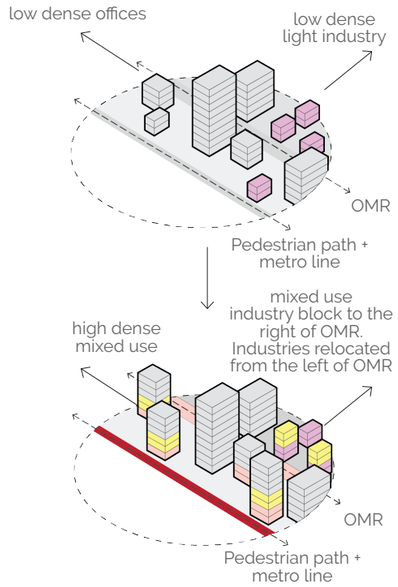
POLICY

> Incentive of higher permissible density to build ground floor on stilts, allowing for public activity parking or small scale commercial activity.

> Zoned as primary residential with medium to low density, to ensure minimum disturbances to bird species in the marsh.

S.D.8 MIXED USE TRANSFORMATION OF OFFICE AND INDUSTRY

SPATIAL INTERVENTIONS ■■■■□
POLICY ■■■□□



The buildings found 500m from the metro stop are mostly IT office buildings, several light industries, all mono-functional in nature. Therefore, to develop a more mixed use neighbourhood and increase the number of households that are walking distance from public transit, lower dense office buildings are incentivised to consolidate parcels and rebuild as high dense mixed use buildings while low dense industries are incentivised to move to the industry cluster to the right of OMR, and also incentivised to densify as mixed use light industry and residences, specially along important through roads.

STAKEHOLDERS

Public : CMDA

Private : - Corprate offices, industries

Civil society: Households, housing associaions and small businesses.

Private: CMDA, private home owners,

INTERVENTIONS

> Catogorisation of buildings to be rebuilt, relocated or transformed.

> Stakeholder meeting to negotiate displacement and gather inputs on the new buildings.

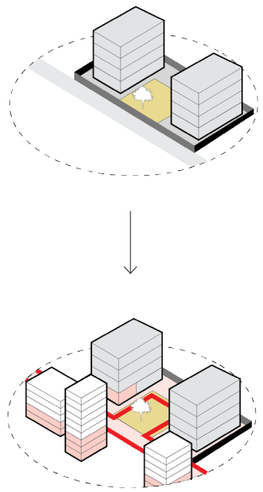
POLICY

> Low dense industry : relocate to right side of OMR with incentives of TDR/ increaased permissible density with mixed use housing and industry.

> Low dense offices : rebuild as high dense mixed use commercial, residential and office.

S.D.9 PUBLIC TRANSFORMATION OF GATED COMMUNITY

SPATIAL INTERVENTIONS ■■■■□
POLICY ■■■□□



Presence of many gated communities within 500m of the metro stop not only creates dead walls along streets, but also is unfavourable to achieve high block density, as recreational activities are repeated in every parcel. Therefore, this strategy proposes methods of intervention over a period of time to open up these gated communties, with recreational activites being meade public.

STAKEHOLDERS

Public : CMDA

Private : Developers

INTERVENTIONS

> Identify communities 500m from the metro stop with communal spaces suitable for public accessibilty

> Coordinate with the individual building occupants and developers to open communal spaces to public, offering incentives such as highly pedestrian and mixed use abutting road,

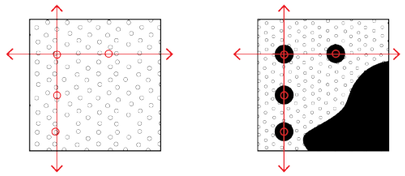
POLICY

> Policy allowing parcels of gated communities to become publicly accessible.

> Incentives allowinig flexibility in timings of public access, allowances or contribution to maintenance of communal spaces.

5.2 LOCATION 03

MAKING SPACE FOR GREEN-BLUE NETWORKS



Site 03 is situated just outside the inner city, comprising of predominantly planned neighborhoods from the 60's. Recent urban projects in the context of this location include the recently executed metro line as well as newly proposed metro lines. Further, the Cooum river also runs through this location, in which the river restoration project, as explained in the first site is taking place. This particular location is significant from the perspective of the city scale design strategy, where a large green-blue structure is proposed in this location. The long tank, a large lake spanning 5km of the city, previously filled in and built over, is rejuvenated as part of the larger super grid network. The scale of the blue green structure and the extent of urbanisation, both in terms of density as well as the city networks and functions, makes this an extensive and major urban transformation, with multiple components, including a shift to transit oriented development based on existing and newly proposed metro lines, restoration of the Cooum river and river edge relationship with the city as well as the mechanics of introducing the large green-blue structure. Therefore, the design process for this site is derived from the design of the first two sites, where the design is broken down into transferable strategies and expressed in new combinations in this site. Therefore, the third site also acts as a way to evaluate the extent and process of transferability of the proposed design and strategies of the project. At the local scale, the design aims to create an active water edge, well accessible from the city network and understand relationships with the existing context to evolve a diverse, multi-functional public realm.

Fig. 212 Urban fabric , Anna nagar. Source : Madhan Vasudevan

5.2.1 EXISTING CONTEXT

FUNCTIONS AND NETWORKS

The chosen site for the design intervention is located near the Cooum river in the transition area between the inner city and the periphery. It is in close proximity to the Metro line and the suburban line. Two smaller channels from the river, remnants of the larger eater body present in this location, can be seen. This area is predominantly of a mono-functional residential landuse, except along the arterial roads and through roads which have more commercial and office buildings.

scale : 1:10,000

Fig. 213 Map of existing context

Metro line

Couum river

Poonamalee road

Nelson Manikkam road

Cooum Channel

Suburban line

Water Channel

5.2.1 EXISTING CONTEXT

BUILT MORPHOLOGY

Fig. 214 Map of existing context and types of blocks

A steady growth in these types blocks is being seen in this area. This are large gated communities, with high rise residential towers and privatised communal spaces.

Small to large residential blocks with single detached housing two to five floors high. These blocks contain commercial functions when abutting the main roads

Small low dense residential blocks , one to four floors high. A lot of these buildings are quite old and poorly constructed, falling to disrepair.

5.2.1 EXISTING CONTEXT

BUILT MORPHOLOGY







Fig. 215 Metro line in Anna nagar. Source : chennaimetrorail.org
Fig. 216 Cooum river edge
Fig. 217 Nelson Manikkam road. Source https://annanagardaily.blogspot.com/2013/02/a-vital-link-to-anna-nagar-is-set-for.html
Fig. 218 Lake view street. Source: V Ganesan. https://www.thehindu.com/features/metroplus/society/mambalams-missing-links/article6271937.ece



There are several instances found in the city that indicate the presence of a large lake, previously. The Long tank was a large lake that spanned the city from the Cooum river till the Adyar river. During the colonial period, it was filled in parts to make room for more housing (Sriram, 2014) .The long tank was a seasonal lake that was used for boat racing festivals during the seasons of high water flow.

The chosen site falls on the site where the proposed blue-green corridor meets the Cooum. While this location is predominantly characterised by a strong network grid, the Cooum river edge is inaccessible, currently accumulating garbage on the water edge. A major through road runs through at the meeting point between the Cooum and proposed corridor. This location is surrounded my an existing metro line, a proposed metro line and the suburban train line.

5.2.2 PROPOSED DESIGN

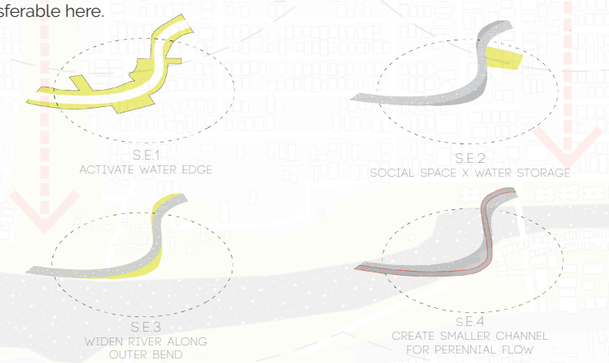
IMPLICATIONS OF CITY SCALE STRATEGY

Fig 220 Map of prposed subdivision

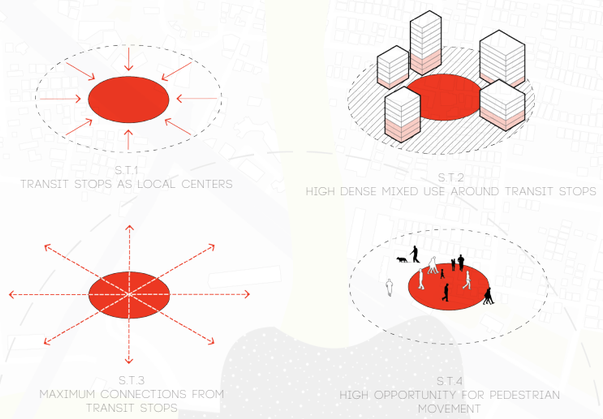
vBased on the city scale strategy, there are three main areas of focus in this location -

01. Restoration and socio ecological integration of the Cooum., as elaborated in the design proposal for location 01, Ch.04.

Therefore, the strategies from site 01 for Socio-ecological integration are transferable here.



02. Transit oriented development - Transit stops are made highly accessible and the centre of local neighbourhoods with maximum pedestrian flow. Strong connections are made from the transit stop to the water edge. Here, once again the strategies from the first two sites are transferable to the third site.



03. Interruption of the urban fabric with a large blue-green corridor that consists of a seasonal water-body as well as a protective edge. Social functions are ideally planned along this edge, leading to transferability of some of the Socio-ecological strategies from location 02. This component will be the primary focus in the following pages.



Densification around transit nodes

Strengthen connections

Metro line

Activate river edge

1

2

3

Poonamalee road

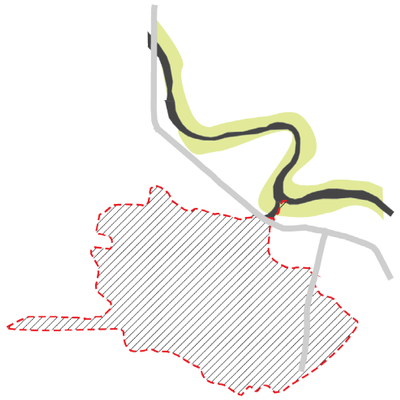
Restoration of old lake as new green-blue corridor

5.2.3 DEFINING THE DESIGN PROCESS

The design intent is focused on identifying the process required to facilitate this transformation of creating the green-blue corridor in the urban fabric. While the current boundary of the proposed corridor is based on historic maps of the previously existing water body, the implementation also considers contextual factors, as explained below.

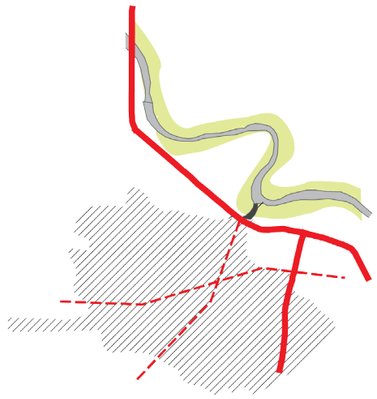
01 MAKING SPACE FOR THE GREEN BLUE CORRIDOR

The first step is to identify the spatial extents of the new green-blue corridor. This is determined predominantly by the topological conditions present on site, to allow easy implementation of the water structure. The elevations are considered in comparison to the elevation of the Cooum river and the surround built blocks. In addition to topological conditions, road networks, landuse and population density are considered. Areas with mono-functional zoning and low population density are given higher priority in transformation, allowing the creation of more dense and mixed use neighbourhoods.



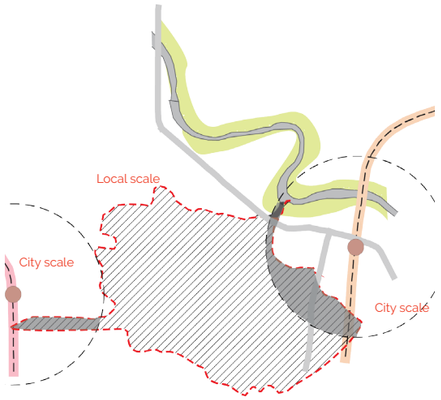
02 SPATIAL DEFINITIONS OF NETWORK RELATIONSHIPS

The second step is the exploration of the relationship between existing road networks and the new proposed green-blue structure. This will define the spatial interventions required to allow the continuous flow of the proposed green-blue structures, while still maintaining high levels of accessibility in the city, across the corridor. This is done through an understanding of the existing networks, through roads and important functions inthis part of the city.



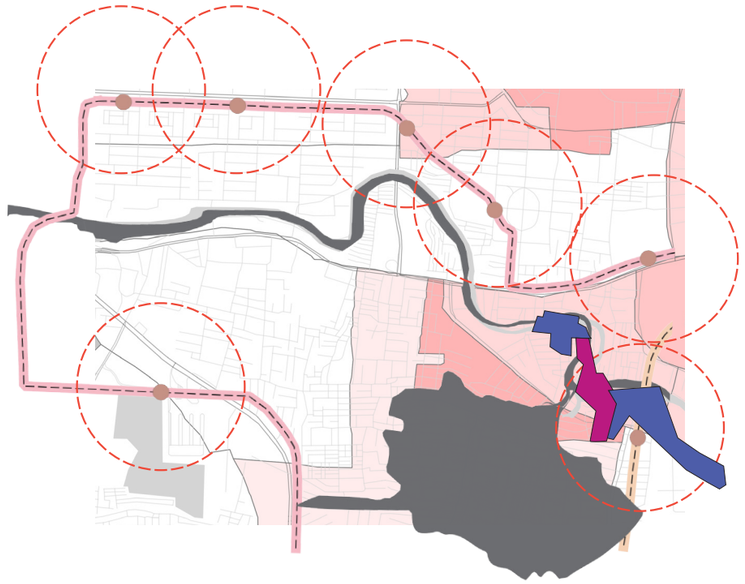
03 FUNCTION AND ACCESSIBILITY

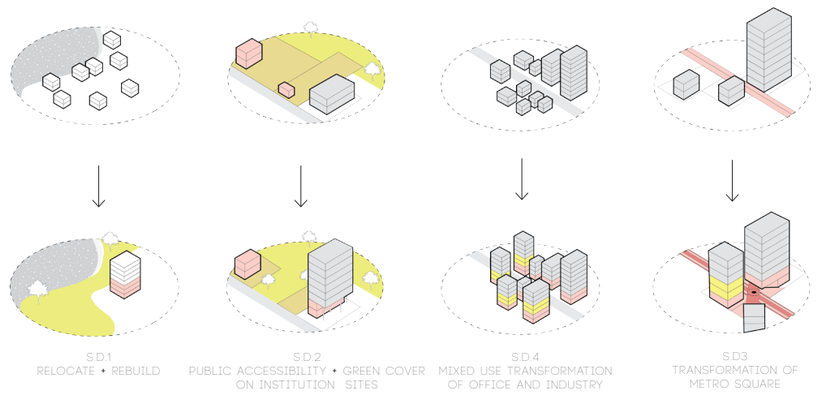
The next step explores the functions that are suitable to be programmed along the green-blue corridor and the means to access it. For this, transit stops, arterial and through roads and existing block definitions are considered. Ideal spatial design and location for city scale functions and local functions are determined. Further, as this water body is seasonal in nature, the temporal aspect must also be considered,



04 RELOCATION OF DISPLACED HOUSING AND FUNCTIONS

The ideal relocation process of the displaced housing and functions is based on transferable strategies from the first two design proposals, as explained in Ch.05. Therefore, it is ensured that the relocation takes place within the same part of the city, with priority being given to the transit stops nearby, which provides an incentive for the local residents to accept the relocation proposal and at the same time, contributes to creating high dense mixed use transit stops. Another priority in relocation is mono-functional office and industrial sites in close proximity to metro stops.





5.2.3 DESIGN PROCESS

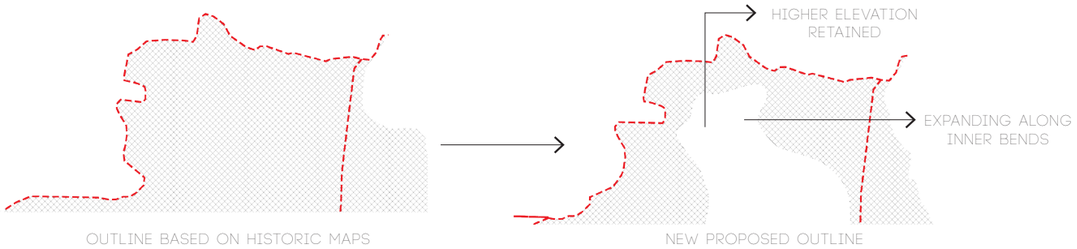
MAKING SPACE FOR THE GREEN BLUE CORRIDOR

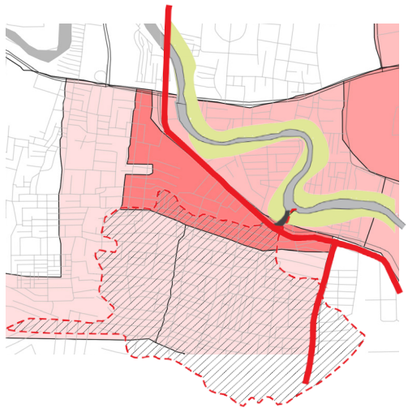
The current topological conditions are important to determine the actual profile of the new waterbody. As seen in the diagram the existing cross section through the proposed area shows a topological pattern with a higher ground in the middle. This will reflect in the spatial configuration of the waterbody. The ground levels can be seen to be lower along the two existing water channels. Therefore, the strategy for defining the spatial boundries of the water body begins with an expansion of the two water channels. The channels are expanded when the adjoining elevations are low and in cases where the inner bend of the channel results in a gradual slope gradient. Steep slope gradients are left as natural edges to the new green-blue corridor. The excavated soil is used to level and define the edges of the water body.

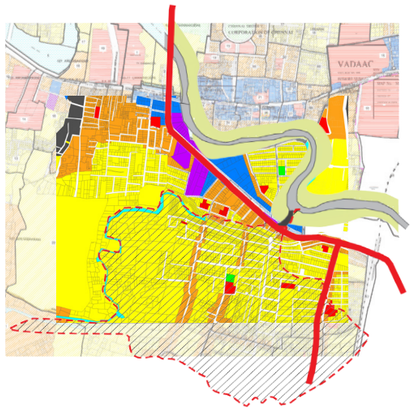
In terms of landuse and population density, most of the area falling under the proposed green-blue corridor is monofunctional and residential in nature, with low to medium density, with the exception of two prominant streets that are zoned with mixed residential functions. This is further discussed in the following section dealing with networks. However, these th=wo mixed use streets are retained in the newly defined corridor.

Fig. 221 Diagram of spatial definition of green-blue corridor
Fig. 222 Map of topological elevations and proposed changes.

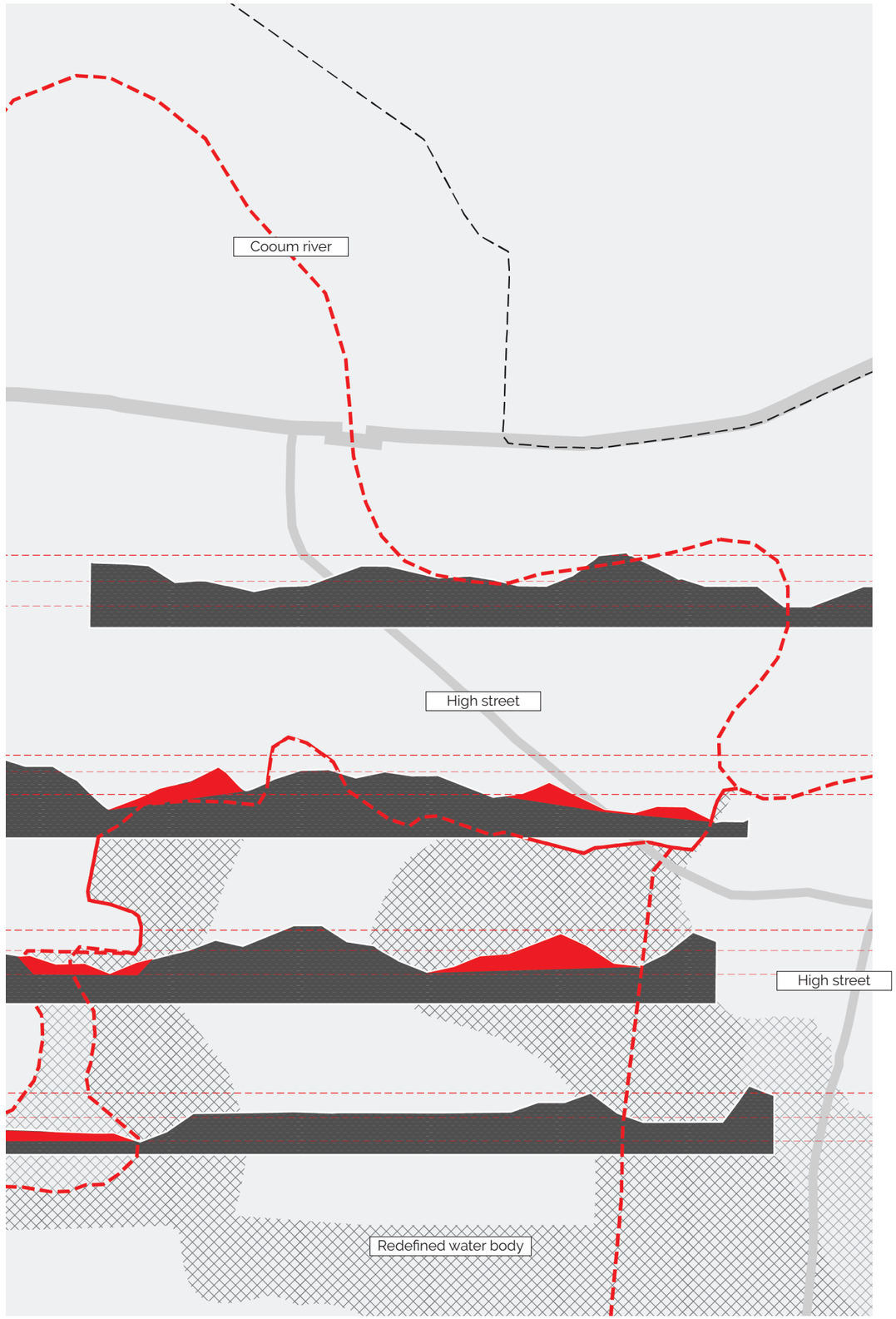





POOPULATION DENSITY



LANDUSE ZONING



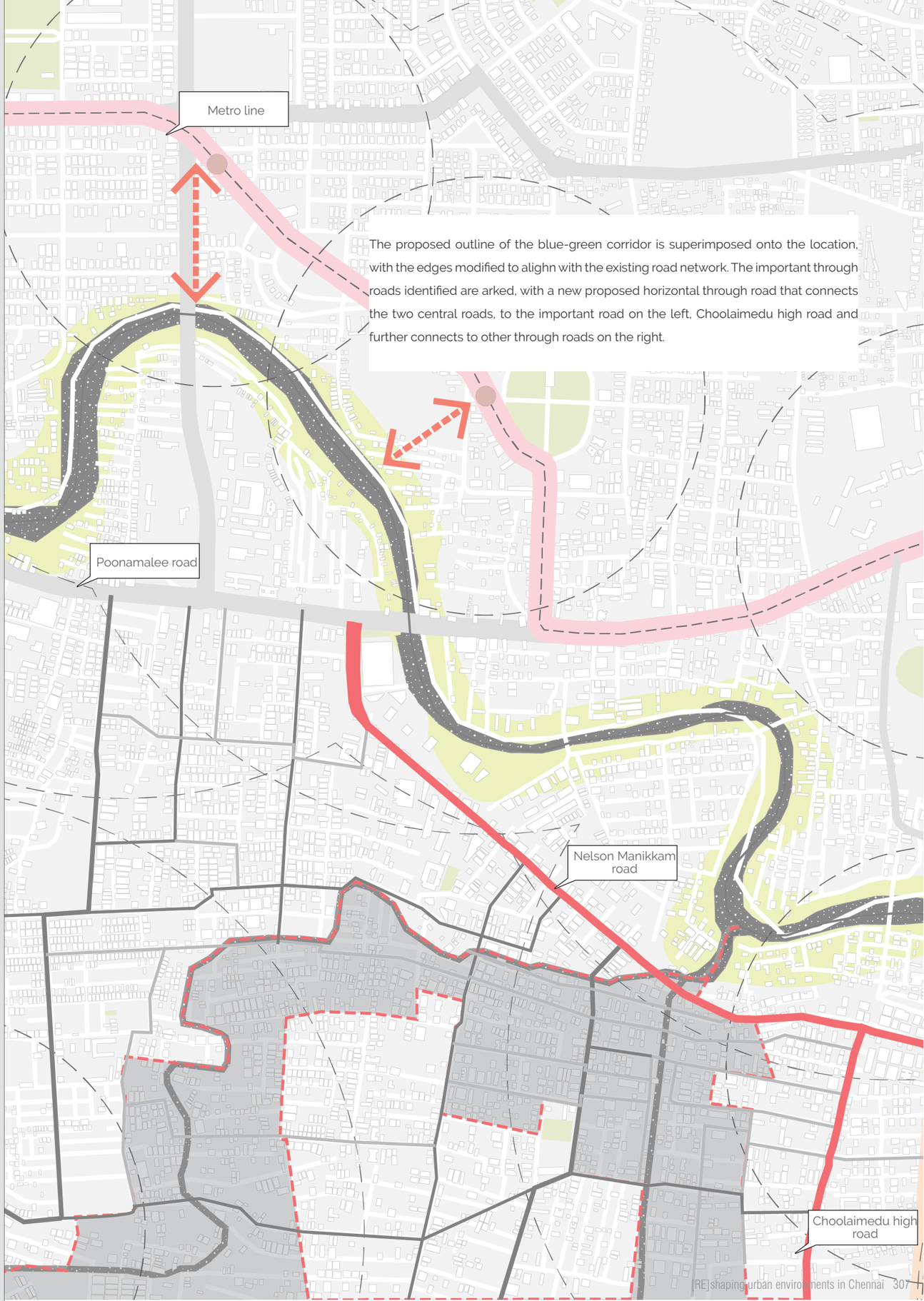
5.2.3 DESIGN PROCESS

SPATIAL DEFINITION OF NETWORK RELATIONSHIPS

In order to ensure that the interruption in the urban fabric due to the blue-green corridor does not cause inaccessible spaces with poor connectivity, the larger area was studied and all the through roads were mapped. In the process, it could be seen that, two important roads (marked in red) were important connectors to the larger arterial network, that passed through the proposed corridor. When looking at the landuse patterns, these two roads are surrounded by mixed-use zoning, in a vast area of mono-functional residential housing. Further, it can be seen that, there are no through roads connecting horizontally for a large area, over the proposed corridor, which could cause a major gap in connectivity after the transformation.

Fig. 223 Mapping of through roads and lahdúse.
Fig. 224 Implementation of blue-green corridor



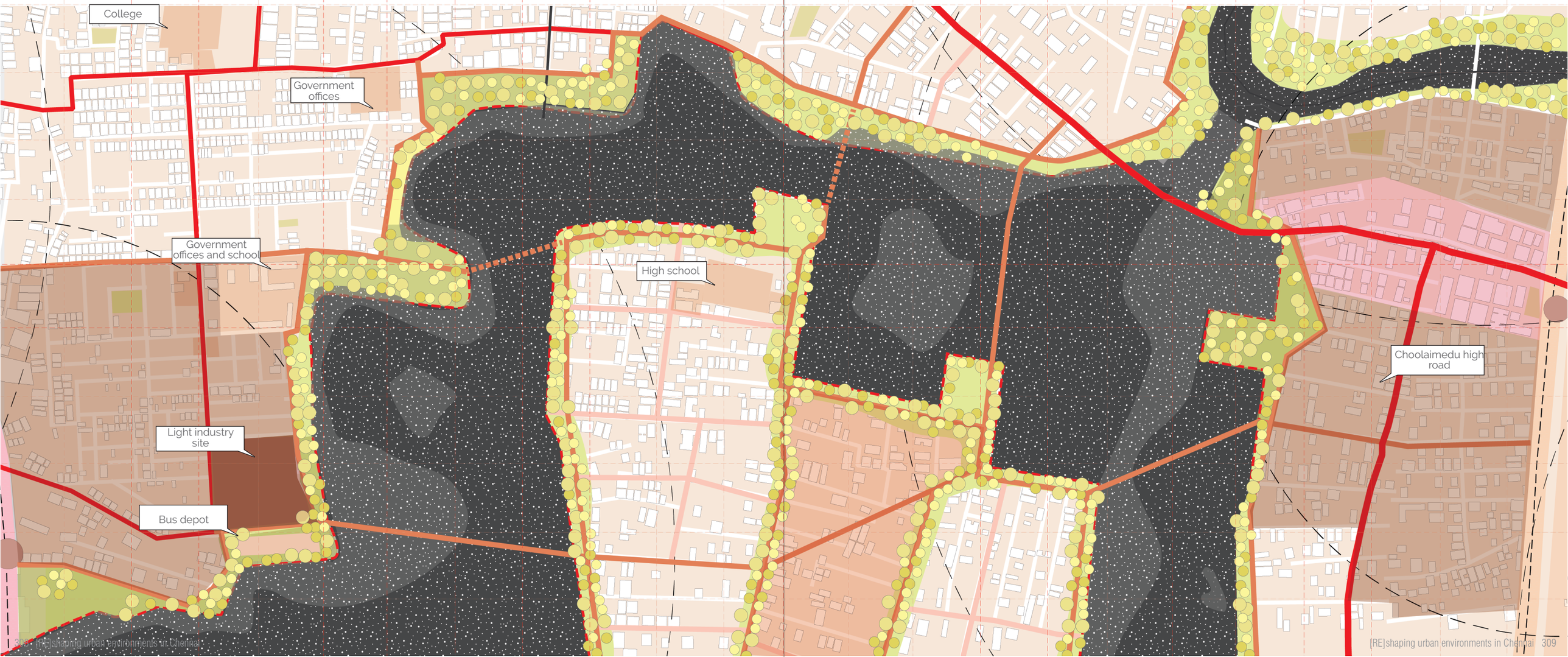


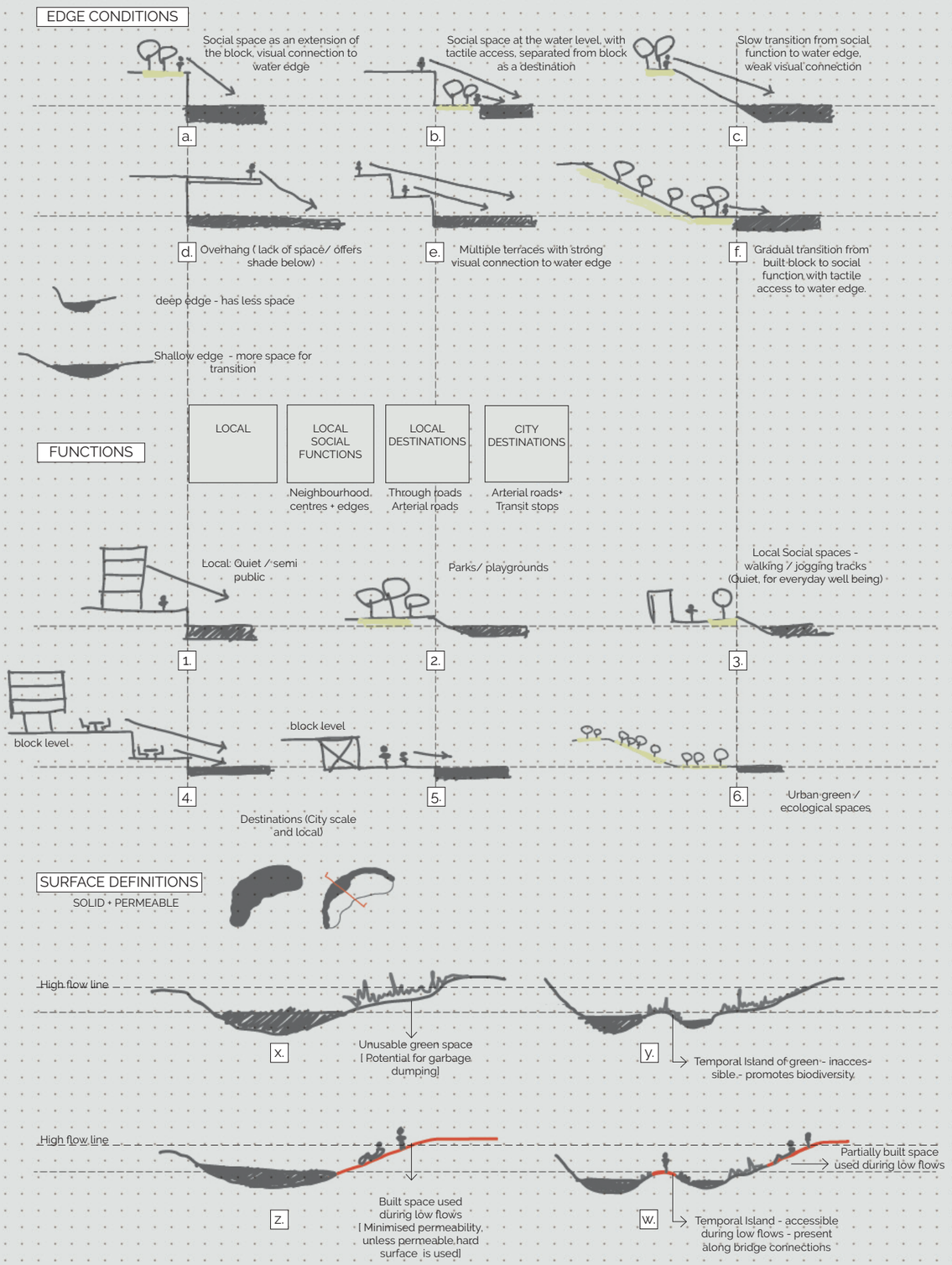
5.2.3 DESIGN PROCESS

NETWORKS AND DENSIFICATION

Fig. 225 Design proposal

Having defined the outline of the blue-green corridor and the network structure, the existing functions and spaces that are compatible with the water edge are combined to form a continuous public realm. Schools, colleges and government offices can be transformed (As elaborated in Ch.04, design of location 01) to be publicly accessible for certain hours of the day or to transform the lower floors to active functions. Within 500m of the transit stops, high dense mixed use neighbourhoods are proposed. Here, the existing dense commercial activity around Nelson Mannikam road is adapted and transformed to a more mixed use function. The industrial site near the metro stop has the potential to become a very high dense mixed use residential neighbourhood along the water edge. The blocks found within the green-blue structure are not ideal for higher densities, as they are not in proximity to transit stops, but a more mixed use function is encouraged din between the two through roads, consisting of local neighbourhood destinations. The next step is to define the edge conditions and function of the different water edges created, based on the densification strategy and existing context.





5.2.3 DESIGN PROCESS

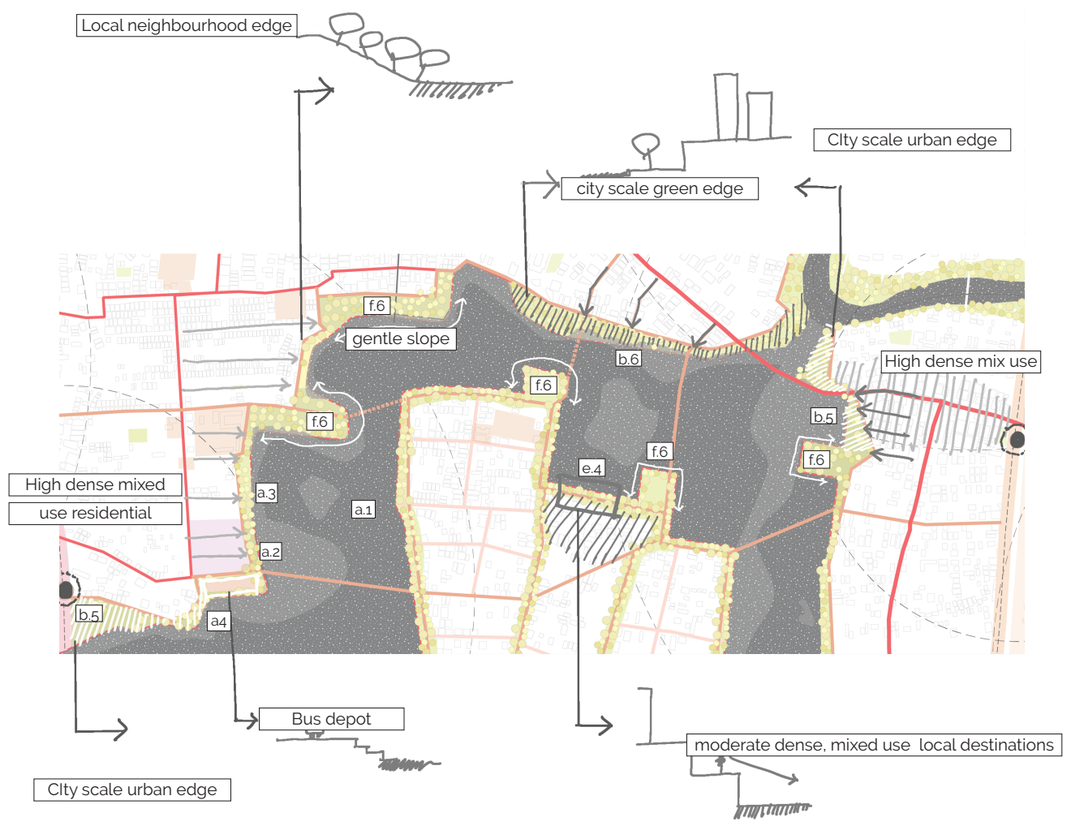
EDGE CONDITIONS, FUNCTIONS AND SURFACE DEFINITIONS

Fig. 227 Design of edges, functions and surfaces.
Fig. 228 Design of edges and functions

The design of the water front consists of predominantly three parameters - the spatial edge condition, type of function and the surface definition of the water body itself. Different types of edges are explored with an understanding of the type of experience they each create. Predominantly, the edges vary from hard to soft, with the accessible portions varying from being located at block level to water level.

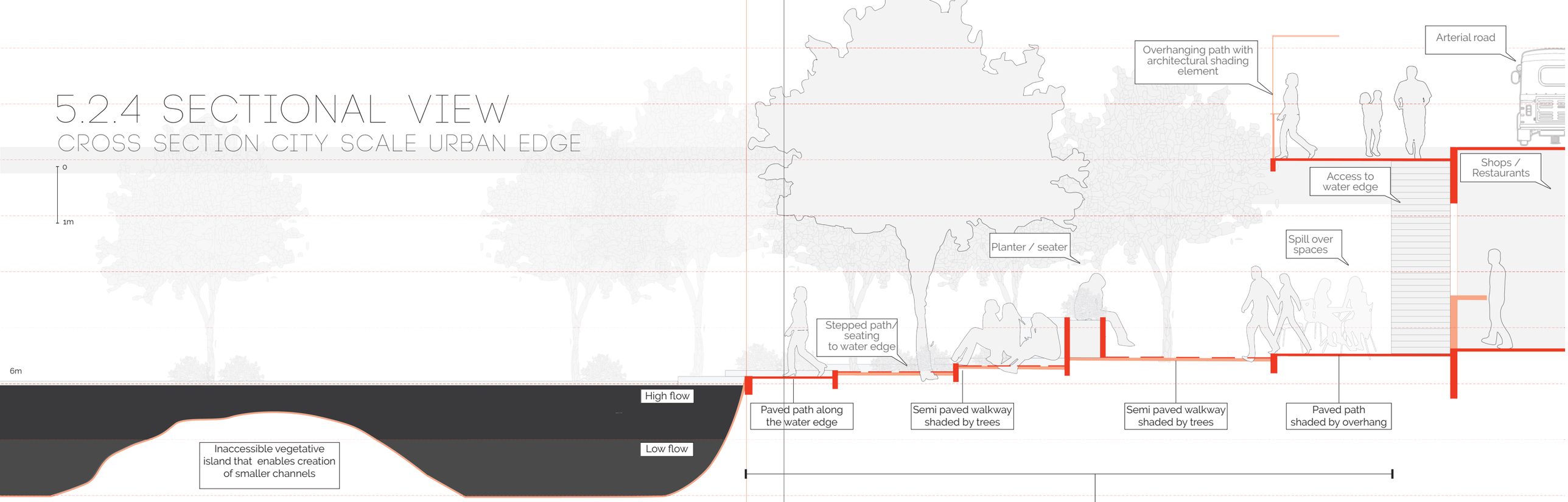
Type of functions broadly fall under local neighbourhood social functions like play areas, neighbourhood destinations like restaurants and small shops and city destinations such as large urban and grreen waterfronts. Walkable distances from transit stops are ideal for large urban edges, while arterial roads and through roads are good locations for local shops and restaurants. When the water edge is abutted by dense neighbourhoods wth strong connections to the water edge, it becomes an ideal location for local neighbourhood functions.

The changing water levels through the year make the design of the surface very important as the quality of space in all seasons have to be considered. Different sectional details are defined (x,y,z,w) and utilsed based on slope of water edge and edge definitions.



5.2.4 SECTIONAL VIEW

CROSS SECTION CITY SCALE URBAN EDGE



This diagram depicts the typical proposed cross-section along the city scale urban river edge. The urban public space is created at the level of the water, as a destination detached from the level of the urban block. This portion of the blue-green corridor is located at walking distance from the transit stop as well as the arterial road.

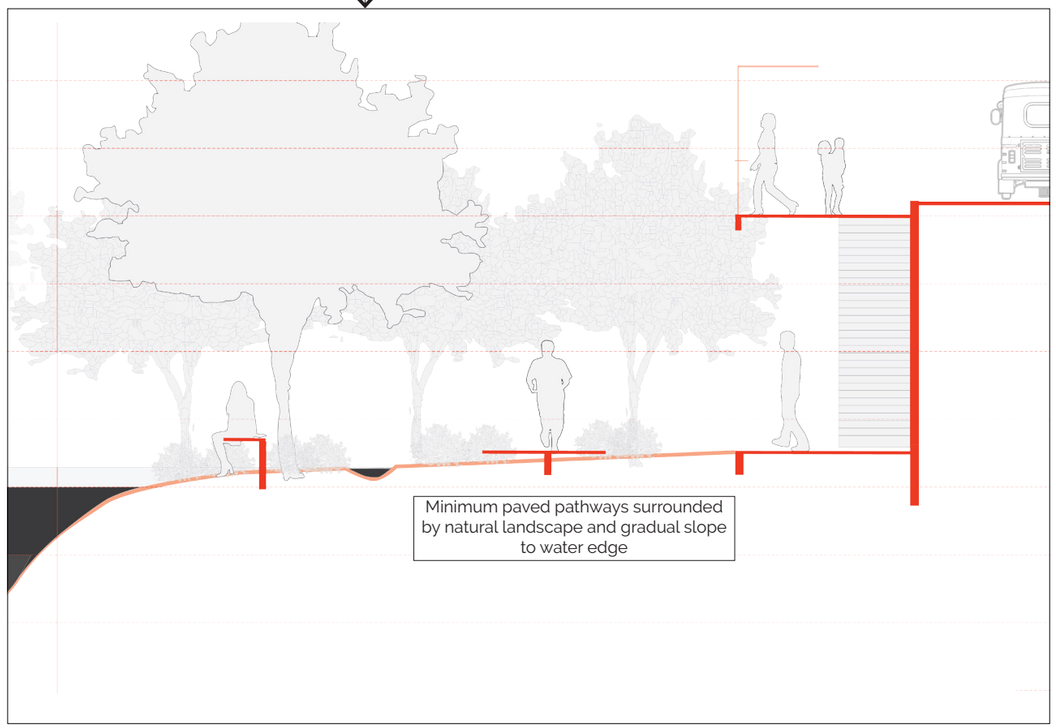
The space consists of a continuous row of restaurants and shops with space for these activities to spillover. this slowly transitions into a series of quieter paths, towards the water edge. The active restaurant and shopping space is separated from the calmer paths with a planter and plenty of vegetation.

The pathways are defined as a combination of paved and semi paved surfaces, to ensure ground water percolation and presence of trees for shade. Additionally, an overhanging path at the block level provides shade for the path below.

The second diagram represents the cross section through a similar location, where the arterial road is in close proximity but not the transit stop. Here, the space is treated to be quieter and calmer, predominantly defined by natural vegetation with minimum paved paths for human access.

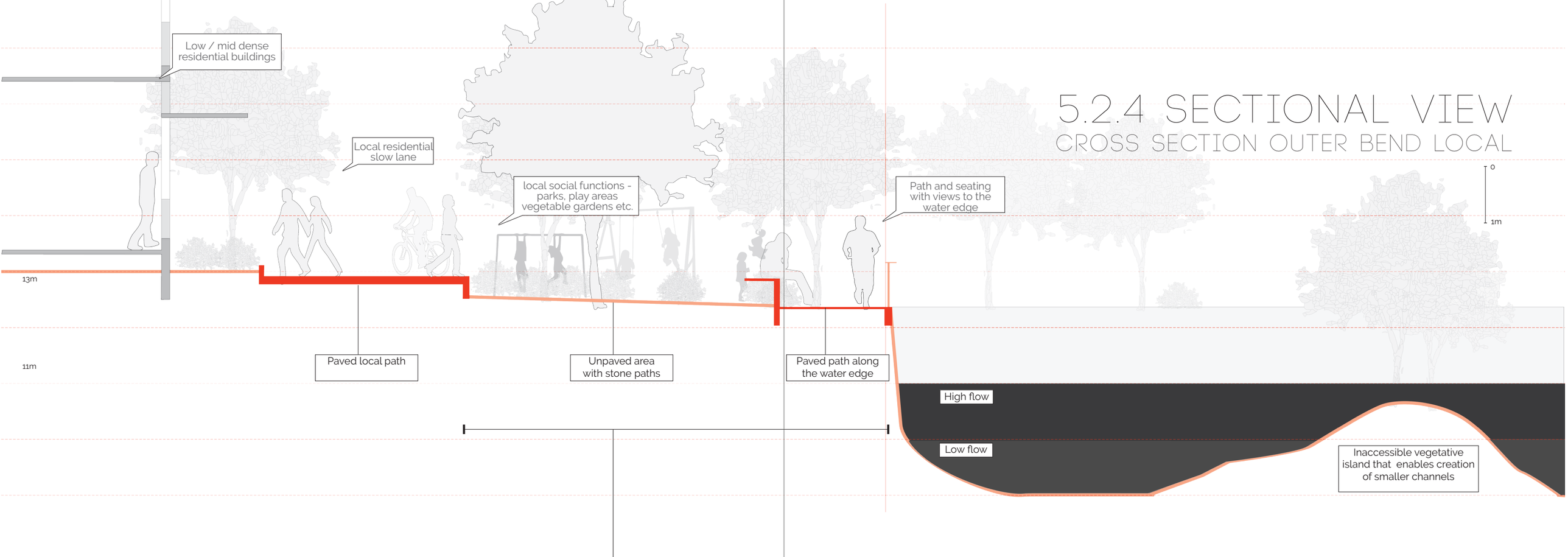


Fig. 229 Cross section - city scale urban edge
Fig. 230 Cross section - city scale green edge



5.2.4 SECTIONAL VIEW

CROSS SECTION OUTER BEND LOCAL



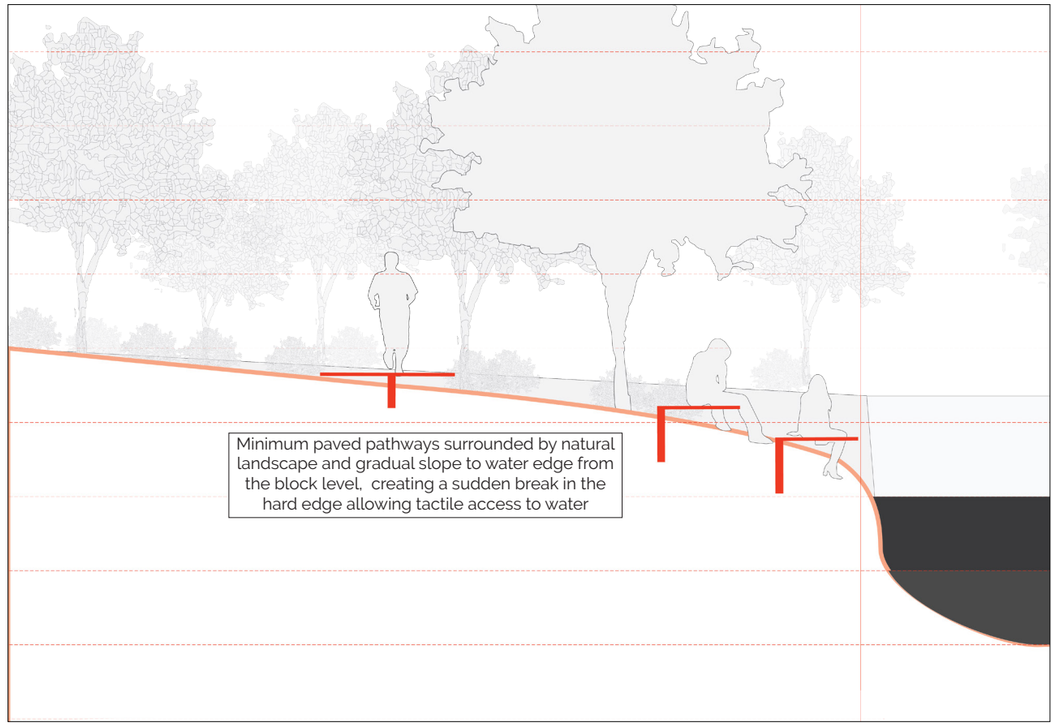




Fig. 231 Cross section - neighbourhood scale social edge
Fig. 232 Cross section - neighourhood scale green edge

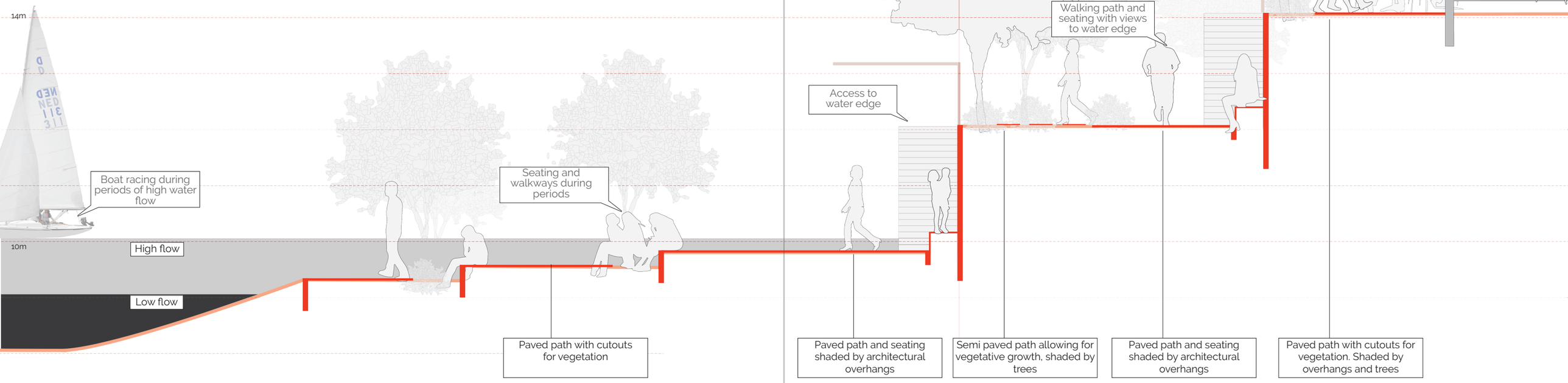
This diagram depicts the typical proposed cross-section along the neighbourhood scale river edge. Contrasting t the previous cross section, this water edge is of a more intimate scale, located at the edge of mixed use, high dense as well as mono-functional low dense residential neighbourhoods. These neighbourhoods are ensured to have a strong connectivity to the river edge, where social functions like parks, playgrounds, play areas and small shops are present along the water edge.

These spaces act as a gradual transition from the more active local road to the calmer walking path along the waters edge. The activities planned in these spaces are ensured to utilise minimum paved paths, allowing maximum ground water percolation.

The second diagram represents the cross section through the same edge, where the landscape gently slopes down to the water edge, breaking the continuity of the hard edge. These locations are completely unpaved, with very dense vegetation and minimal paths.

5.2.4 SECTIONAL VIEW

CROSS SECTION NEIGHBOURHOOD DESTINATIONS



This diagram depicts the typical proposed cross-section along the neighbourhood scale destination. The urban space is created as a series of stepped terraces right to the water edge, from the built block level. This is located between the two important through roads that traverse the blue-green corridor, which is proposed to be a low to medium dense mixed neighbourhood, consisting of restaurants, local shops, libraries and departmental stores.

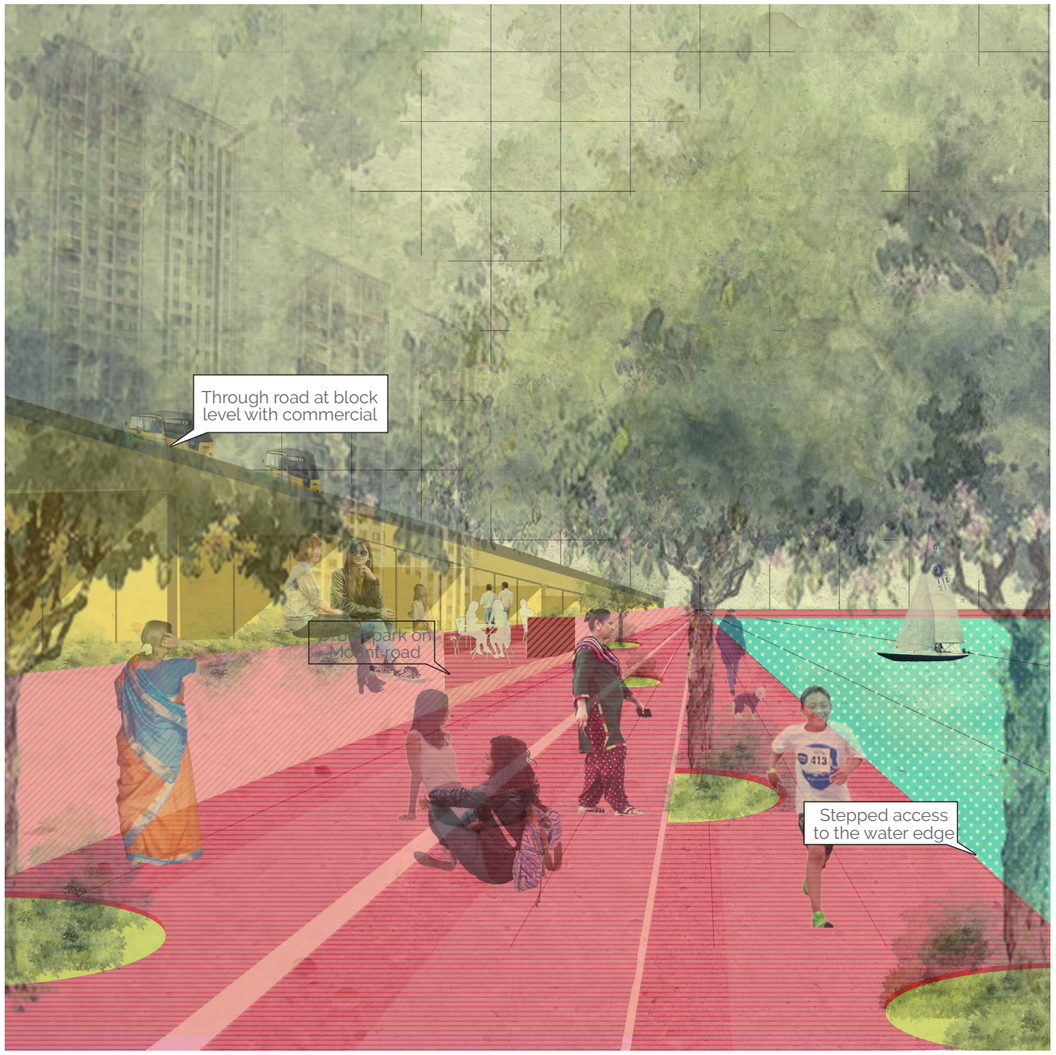
The buildings along the water edge are specifically planned with functions at the ground floor level that activate the public realm and are allowed to spill over to the streets. The terraced layout maximises views to the water edge, with each level consisting of shaded walkways, seating and vegetation. During periods of low water flow, an additional level of walkways can be utilised, which allows for tactile engagement with the water.

The pathway here are predominantly paved, as the require to be seasonally submerged, with occasional cut outs for vegetation. During periods of high flow, the boat racing festival, an intrinsic part of the historic lake before it was filled, can take place, for which the terraced edge provides plenty of views.



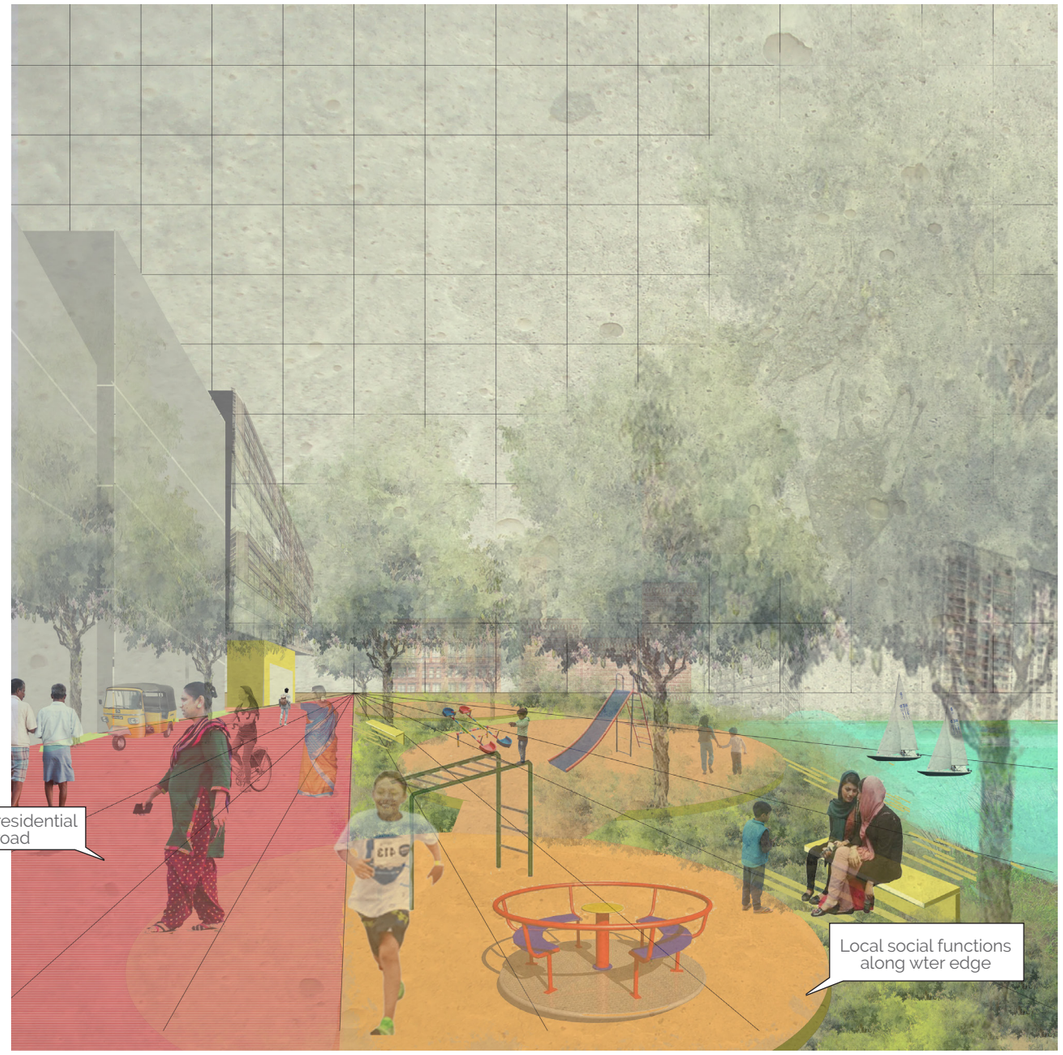
Fig. 233 Cross section - Neighbourhood scale local destination.

5.2.5 PERSPECTIVE VIEWS



CITY SCALE URBAN WATER EDGE ACCESSIBLE FROM TRANSIT STOP

Fig. 234 Perspective view 01



LOCAL NEIGHBOURHOOD WATER EDGE WITH SOCIAL FUNCTIONS

Fig. 235 Perspective view 02

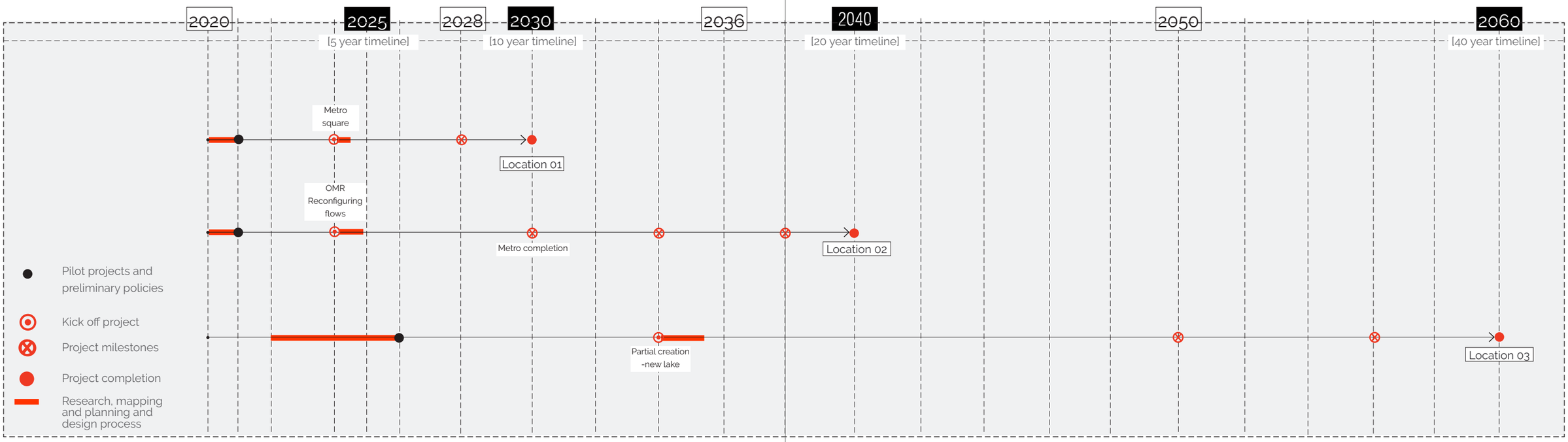
5.3.1 PROJECT PHASING
OVERVIEW

This section explores the tentative phasing of the three proposals. Further, the three projects are compared together on the basis of certain key moments in the project - pilot project initiation, kick-off project, key milestones and completion. Further, the sequence of execution of each site is explained individually. Two major factors are considered in the phasing process -

01 Execution : The practical issues of execution are considered, such as the time taken for construction, the need for certain developments to trigger other developments etc. The time-line provided by the planning authorities for certain public projects such as the metro construction are used a s points of reference.

02 Acceptance : As seen in the perception analysis, on site and expert interviews, there is some reluctance and lack of trust in the implementation of new public spaces and interventions involving better quality of pedestrian life in the public realm. Further, stakeholder concerns, cooperations and incentives are important. Therefore, the phasing of the proposals is considerate of this, and ensure a sequence of implementation that engages with the people in a step-by-step manner, to garner more public support , participation and push for larger interventions.

Fig. 236 Overview of project phasing



Broadly comparing the three design proposals, location 01 is the easiest to take off the ground and begin implementation while location 03 is the one which requires the most time and preparation. There are several factors that influence this. Firstly, in terms of the scale of the project, the first site has major interventions focusing on a couple of blocks in the centre of the city, along the banks of the Cooum, where there is plenty of unbuilt land available. The second site proposes interventions at a larger scale, including an alternate proposal for the metro line, along with large scale densification over time. Finally, the third site is a massive city scale restoration of an ecological green-blue corridor, that in its current state is a heavily urbanised and built fabric. As a result, this will take the most amount of time.

Secondly, in terms of the research, mapping, design and planning process, the first site, which involves interventions in the Cooum river, has plenty of ongoing research to support the proposal. In the second location, while there is ongoing research on the ecological conditions of the Pallikaranai marsh, there is not yet much exploration into transforming the massive dump-yard into regenerated space inn the city. Further, the alternate proposal for the metro line will require a detailed preparatory research. On the other hand, the implementation of the massive blue green corridor in the third site will require extensive research at the scale of the water catchment basins of the region, which currently does not exist. Results from the first two sites are also used as a learning process for the third site. Therefore, these different levels of preparations required for the three projects also influences the projected time-line of execution.

5.3.2 PROJECT PHASING

LOCATION 01 : SEQUENCE OF IMPLEMENTATION

01 Execution : Mount road and the pedestrian path transformation have two components to it, the redesign of the flow and the spatial design. In the first stage, as a test pilot project, only the flows are reconfigured, without implementing the proposed spatial transformation. This can help determine the success of the proposal and make changes as required.

The densification process is phased out so that, first, the strategies that require policy change with minimum spatial interventions are carried out. Therefore, increasing permissible density and allowing accessibility to public to certain parcels are implemented. The increasing density combined with increased pedestrianisation and implementation of the pedestrian bridge can help boost the number of daily users for the metro stop. At this stage, the metro square project is initiated as a stimulant to catalyse the densification around it. Once this space along with the new buildings have been implemented, the larger densification process 500 m from the station can take place. The densification is phased in such a way that higher densities are built on mono-functional office and industry sites before clearing housing along the river bank, in order to simplify the relocation process.

02 Acceptance : The phasing of the project allows for the gradual introduction of local public spaces and access to the river edge, in order to increase engagement and awareness and to introduce the use of everyday public spaces in the daily life patterns of people. This can be seen in the implementation process of the public spaces and pathways along the river edge. First, the existing vehicular path is converted to a pedestrian path and the pedestrian bridge is constructed. This increases pedestrian activity, as it provides a shorter and vehicle-free journey to reach Mount road and the metro stop. Additionally, it also brings the river back into the everyday life of people,

Similarly, pedestrian streets are first implemented as pedestrian networks without making the spatial transformations proposed. Smaller public spaces are implemented along this pedestrian path, such as seating near busy restaurants or street shops and small spaces for children to play. Over time, this can build up into a larger network of public spaces.

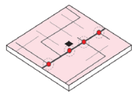
Fig. 237 Sequence of implementation: Location 01

- Pilot projects
- Policy changes
- Kick off project
- Project milestones
- Project completion

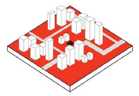
RIVER
+
RIVER EDGE

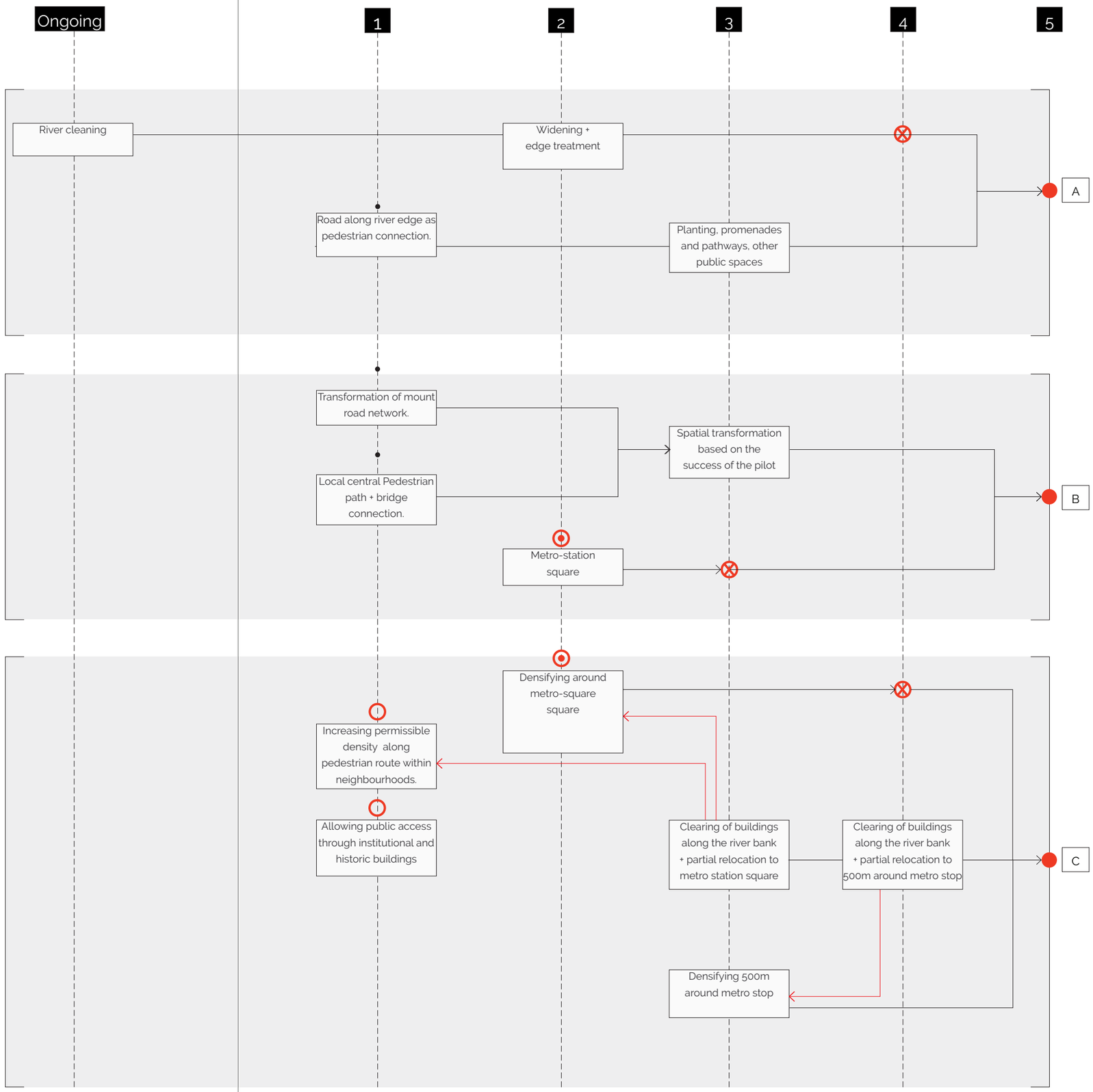


METRO STOP
+
PEDESTRIAN
NETWORK



DENSIFICATION





5.3.3 PROJECT PHASING

LOCATION 02 : SEQUENCE OF IMPLEMENTATION

01 Execution : The implementation of pedestrian oriented networks is similar to location 01, using pilot projects as a means to test the design intentions.

The process of cleaning and landfill of the garbage dump initiates the transformation. Overtime, the clearing of buildings from the demarcated protected zone is undertaken, However, before implementing this, densification process along the OMR is carried out, allowing the relocation process to be easier. Similarly, buildings that stand in the way of connecting dead end streets to create a legible neighbourhood structure are prioritised in the relocation process.

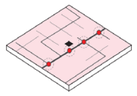
02 Acceptance : The phasing of the project allows time for the policy that allows public access to communal spaces in gated communities. Currently, the predominant reason people choose to live in gated communities in this part of the city is that they need to relocate here for their IT sector job, however, there is a lack of well defined neighbourhoods, basic requirements such as public spaces and safe roads and other amenities. Therefore, this phasing sequence allows for such qualities as the pedestrian oriented streets, metro stop accessibility, mixed use commercial and recreational functions to develop, making a more persuasive case to the respective stakeholders.

Similar to location 01, pedestrian oriented streets are first implemented just by changing the movement and flows of vehicles and poeple, before carrying out the spatial implementation. This allows for treduced car use and increased public transport usage, making the implementation process easier.

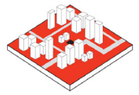
RIVER
+
RIVER EDGE



METRO STOP
+
PEDESTRIAN
NETWORK



DENSIFICATION



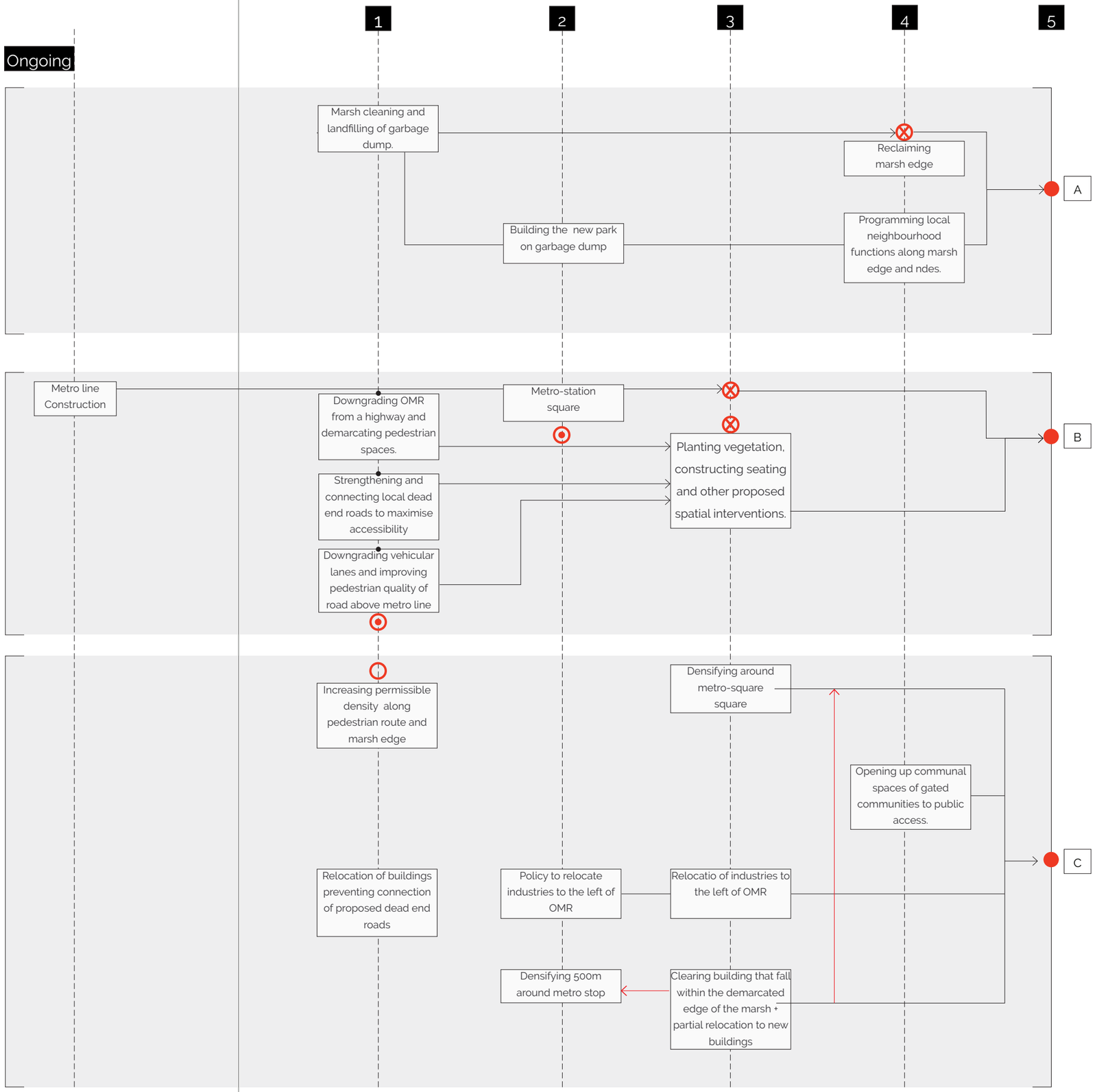
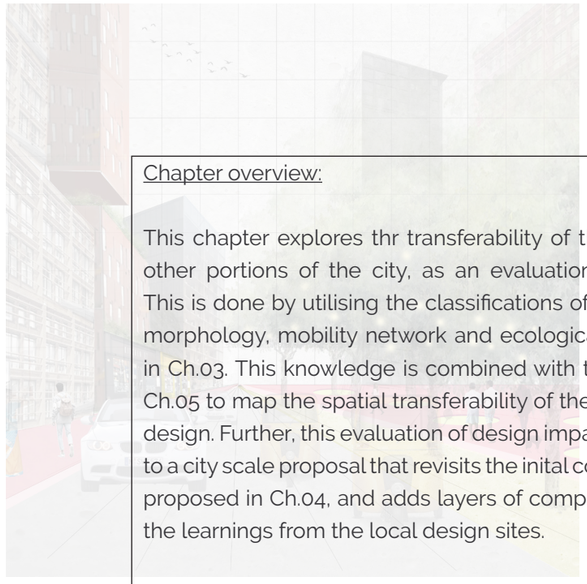
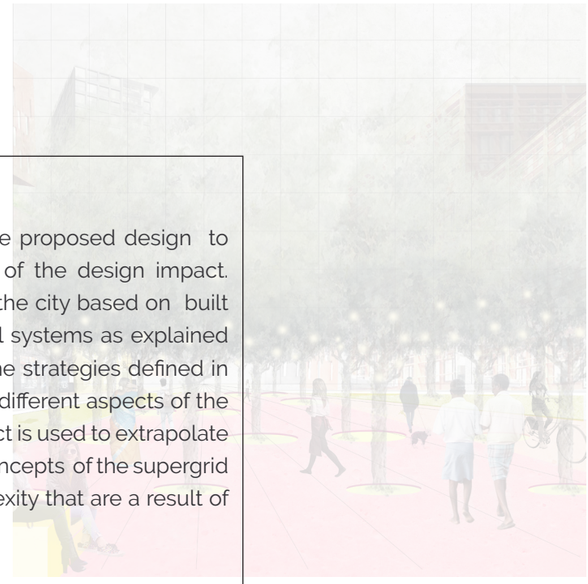


Fig. 238 Sequence of implementation: Location 02

- Pilot projects
- Policy changes
- Kick off project
- Project milestones
- Project completion

06 DESIGN EXTRAPOLATION TO THE CITY SCALE



Chapter overview:

This chapter explores thr transferability of the proposed design to other portions of the city, as an evaluation of the design impact. This is done by utilising the classifications of the city based on built morphology, mobility network and ecological systems as explained in Ch.03. This knowledge is combined with the strategies defined in Ch.05 to map the spatial transferability of the different aspects of the design. Further, this evaluation of design impact is used to extrapolate to a city scale proposal that revisits the inital concepts of the supergrid proposed in Ch.04, and adds layers of complexity that are a result of the learnings from the local design sites.

Chapter contents:

6.1 Design impacts
6.2 Revisting the supergrids






6.1 DESIGN IMPACT

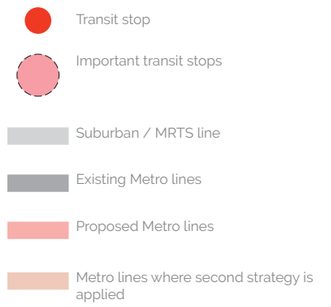
STRATEGIES FOR TOD

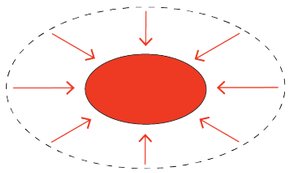
The design proposals and strategies that enable the metro stops to become active social centres, with high dense, mixed use and walkable neighbourhoods are transferable to all other metro stops in the city. Specifically, important train stops, located near important city destinations as well as those that are in close proximity to transit stops of other lines, are higher in priority of the strategy implementation. The strategies for this are broadly divided into two, those metro stops that have already been built in the inner city, and those metro lines proposed along major infrastructural corridors in the peripheries, as seen from location 01 and 02, respectively (Ch.04).

The strategies for the existing metro stops involves spatial design interventions that enable increase in pedestrian qualities and downgrading of the arterial roads along which the transit lines currently exist. This involves design proposals such as the sunken metro square running at a level below the arterial road, reduction of vehicular lanes and increase in space for pedestrians and cyclists. This strategy can also be further extended to the MRTS and suburban train line, which are also completely constructed transit systems.

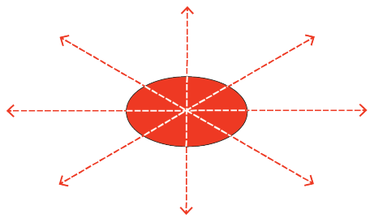
The strategies for the proposed metro lines have more flexibility in terms of the design proposal. Therefore, in these situations, after an analysis of the various flows and functions, the metro line and arterial road are separated, allowing the metro stops to become local centres of dense, mixed use neighbourhoods.

Fig. 239 Transit map indicating transferability of different design strategies

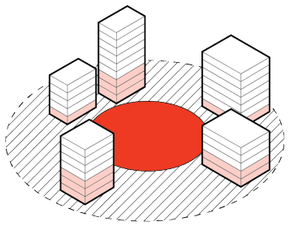




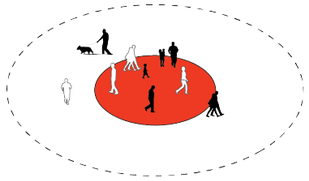
S.T.1
TRANSIT STOPS AS LOCAL CENTERS



S.T.3
MAXIMUM CONNECTIONS FROM TRANSIT STOPS



S.T.2
HIGH DENSE MIXED USE AROUND TRANSIT STOPS

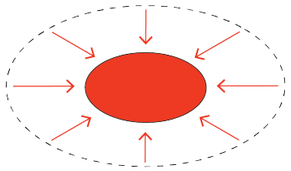


S.T.4
HIGH OPPURTUNITY FOR PEDESTRIAN MOVEMENT

6.1 DESIGN IMPACT

STRATEGIES FOR TOD

As mentioned in the previous map, the arterial roads in the inner city are transformed in order to allow for better pedestrian qualities and reduced vehicular flow in the city. This strategy can partially be extended to other arterial roads in the inner city as well, allowing for more pedestrian and open space. This allows for a network of better accessible pedestrian and cycle routes.



S.T.1
TRANSIT STOPS AS
LOCAL CENTERS

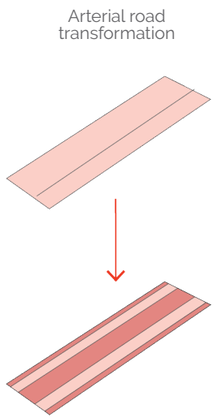
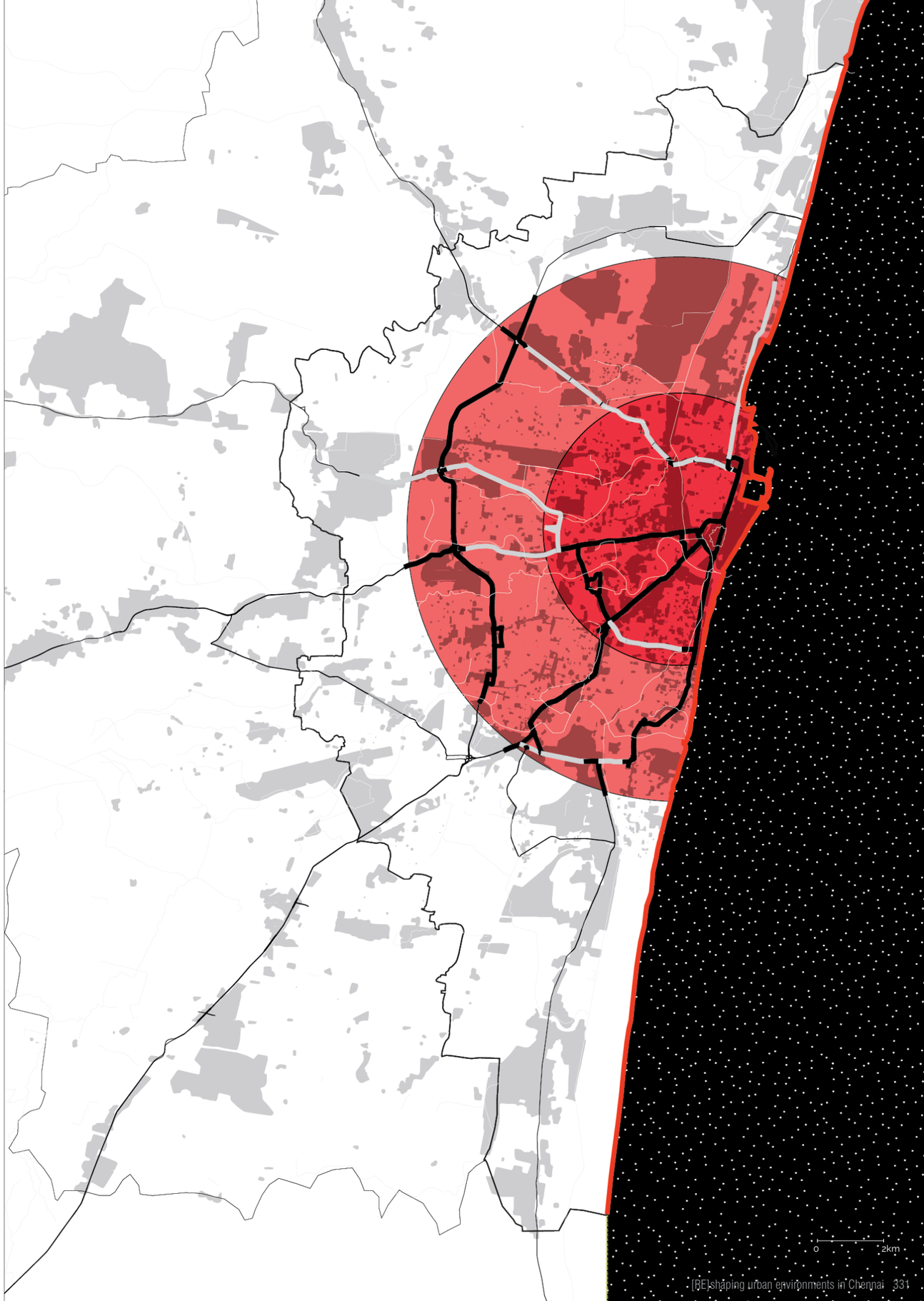


Fig. 240 Road network indicating transferability of different design strategies

Transit line along arterial road

Only arterial roads



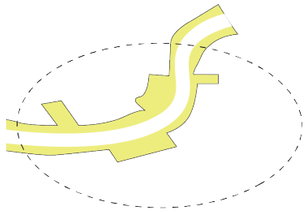
6.1 DESIGN IMPACT

STRATEGIS FOR SOCIO ECOLOGICAL INTEGRATION

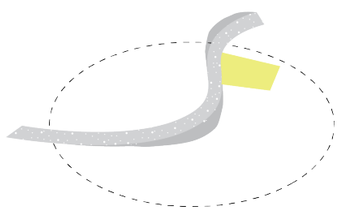
The design proposals and strategies that enable the restoration of the ecological systems in the city and enable spatial conditions that allow the city to engage with ecology and at the same time facilitate diverse social spaces in the city are tranferable to other ecologicals structures in the city. These are broadly divided into two catagories - Rivers and Marshes/ lakes. These two types of systems require dfferent means of restoration and socio ecologicla integration, as explained in Location 01 and 02 respectively, in Ch.04.

The strategies for rivers increases accessibility to water edge, creating social spaces in relation to the river and increaasing the water carrying capacity and biodiversity of the river, as explained in Ch.05. This encompasses selection of spaces with ideal spatial conditions such as topology, land use, networks and ground cover. These strategies, while proposed in location 01 for Cooum river based on research conduct for the restortion of the river, the general spatial pronciples aare also transferable to the Adayar river as it is in very similar urban characteristics.

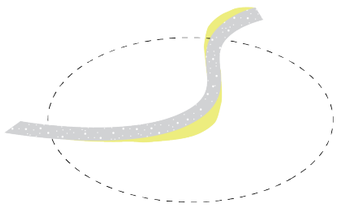
The strategies for the Marsh and lakes are derived from the design proposal for the Pallikaranai marsh in Location 02. This is broadly based on defining a protective edge based on topology, change in water carrying capacity and flooding data. This edge is used to increase ground water seepage and as a space to provide local neighbourhood functions or city scale destinations, based on the mobility network. While marshes and rivers have different ecological conditions, the strategies for the edge conditions are transferable between the two. Further, river and lake edges in close proximity to transit stops have the potential to becme important city destinations.



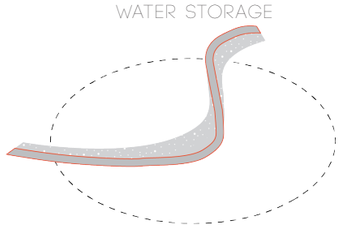
S.E.1
ACTIVATE WATER EDGE



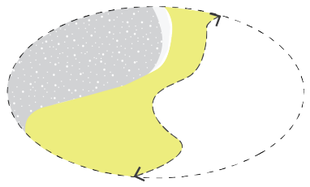
S.E.2
SOCIAL SPACE X
WATER STORAGE



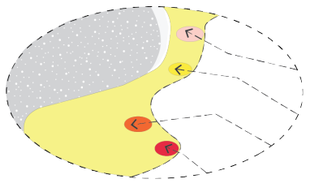
S.E.3
WIDEN RIVER ALONG
OUTER BEND



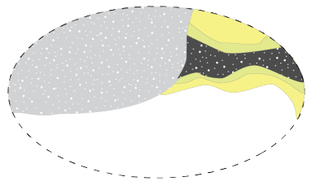
S.E.4
CREATE SMALLER CHANNEL
FOR PERINNIAL FLOW



S.E.1
ACTIVATE + RECLAIM
WATER EDGE

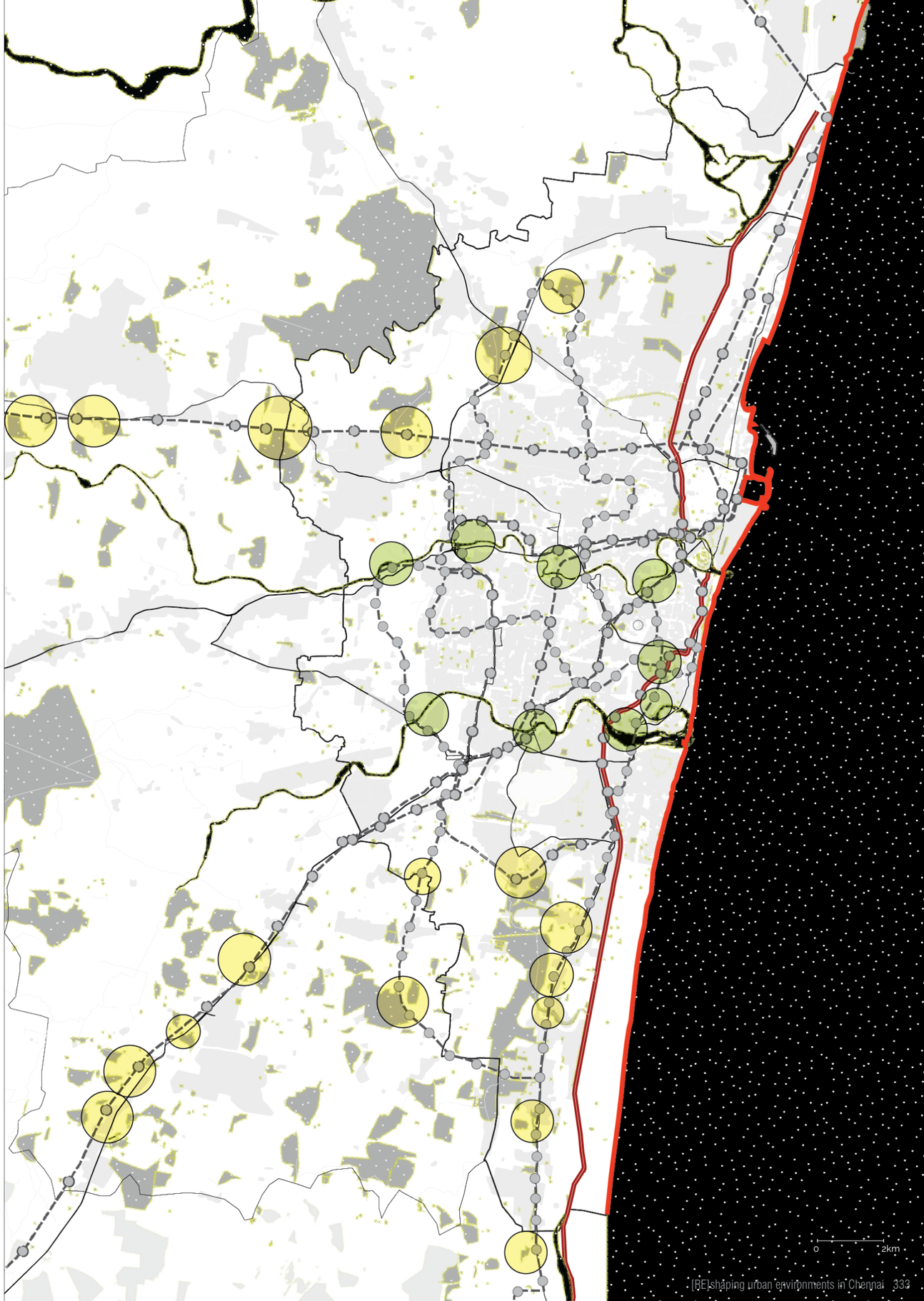


S.E.6
ACTIVATE BUFFER AREA
WITH LOCAL NEIGHBOURHOOD
FUNCTIONS AT NODES



S.E.2
SOCIAL SPACE X
WATER STORAGE

Fig. 241 Map of ecological system indicating transferability of different design strategies



6.2 REVISITING THE SUPERGRIDS

The different strategies extrapolted to the city scale are used to further define the Supergrid city scale strategy.

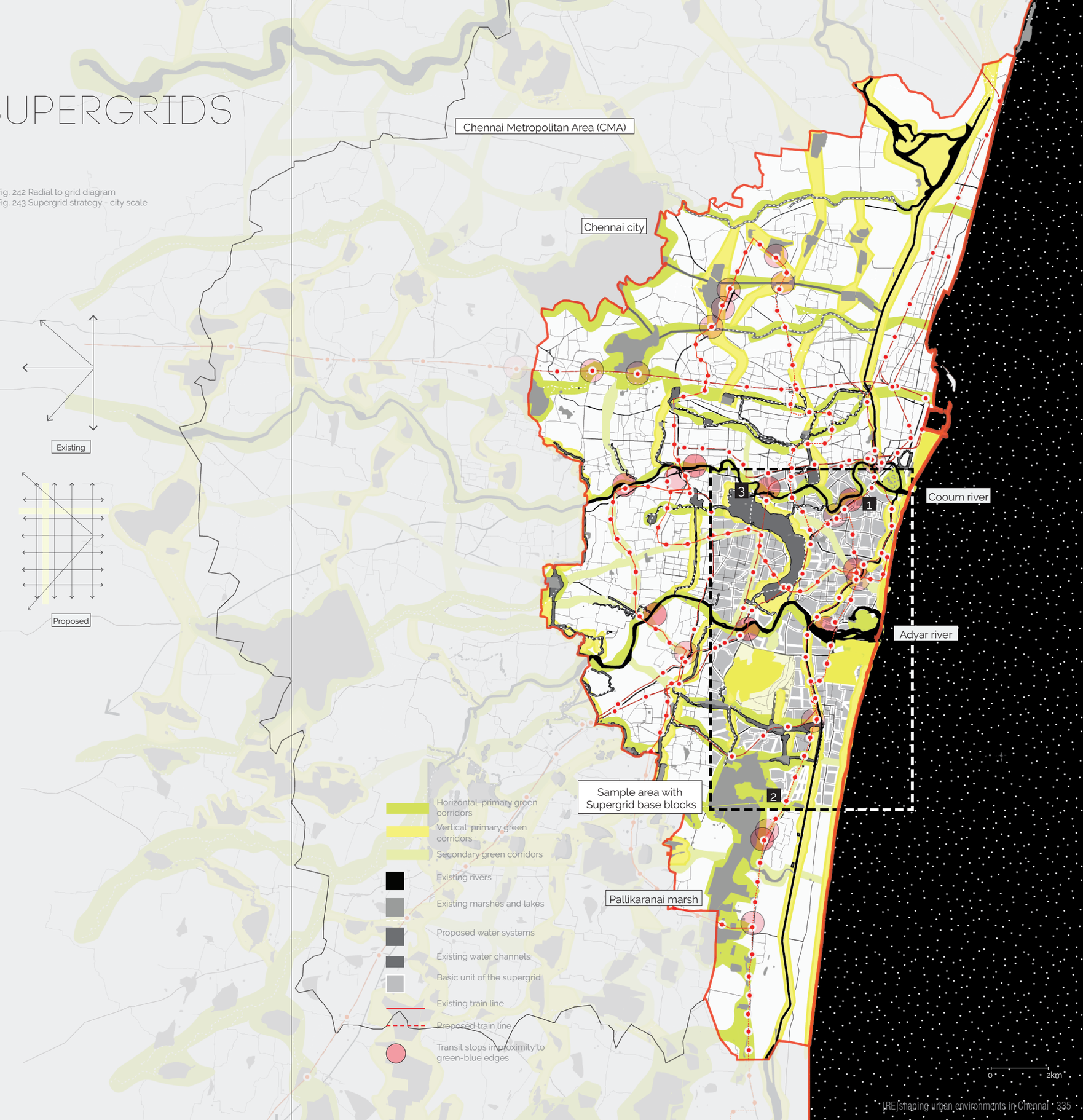
Fig. 242 Radial to grid diagram
Fig. 243 Supergrid strategy - city scale

RADIAL TO GRID

The Supergrids allow for equitable distribution and access to ecological spaces, open and public spaces and pedestrian network in the city. Neighbourhood sizes are subdivided in such a way that the central pedestrian connection, which often also consists of transit lines, to the Supergrid is always somewhere around a five minute walking distance. By utilising the existing networks, this shifts the city structure from radial corridors to a hierarchal grid. This provides several advantages in terms of the urbanisation process. Firstly, it creates a framework for further densification of the city. Instead of incrementally growing along the arterial corridors as it happens in the current situation, there are well defined neighbourhoods that can densify as the need arises, based on the different parameters defined (public transit, ecological systems). The Supergrid provides a framework that can allow for new centres and functions in distributed clusters, rather than creating long corridors of travel.
Secondly, this Supergrid can be expanded and applied not just t Chennai city but to the whole metropolitan region. As the rest of the metropolitan region is still in the process of shifting towards an urban environment, it is easier to implement and provides a direction for growth. The nature of the hierarchal grid structure also means that the network can be expanded to larger areas as required, connecting to even the larger state of Tamil Nadu. Additionally, it can also be infilled in patches, as long as the larger connection exist, ensuring accessibility without completion of the whole network.

INCREMENTAL EXECUTION

While the Supergrid is a major transformation to the city of Chennai, it does use the existing network as the basis for the transformation. . The concept behind the strategy has two major components as displayed through the local designs in Ch.04, the network configuration (direction, quantity and type of flow) and the spatial definitions (landscape, built densities, path definition etc). While the latter will take extensive time and resources to achieve, the former can be implemented relatively quicker, as it requires a change in traffic flow of people and vehicles in the existing network. This is a useful distinction when undertaking the process of implementation, as similar to the local project phasing proposed in Ch. 05, implementing the network first provides quick feedback regarding the impact of the transformation and can be modified based on real time information. Once the transformation is successful, spatial interventions can follow. This is therefore an oppurtunity to not only test the design but also to provide quick improvements to the city from its current condition.



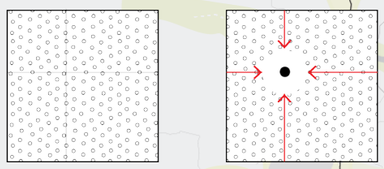
6.2 REVISITING THE SUPERGRIDS

SPATIAL DEFINITION THROUGH LOCAL DESIGN

The contribution from the three local designs to the Supergrid strategy are explained below, where each design proposal is used to elaborate the spatial quality of different components of the Supergrid. Further clarification in the spatial structure will require design exploration in different locations, as demonstrated in this project.

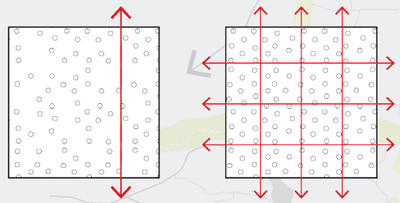
Fig. 244 Loxal design conclusions
Fig. 245 Supergrid strategy - city scale

LOCATION 01
INNER CITY



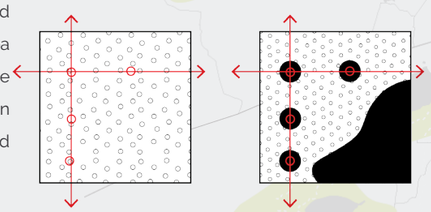
Location 01 deals with the inner city, where the population density is already very high, and there is a severe lack of open space and a liveable public realm. Further, while this location has a well connected road network with a hierarchal grid structure, pedestrian flows are fragmented and limited. From the perspective of the Supergrid strategy, this location consists of an intersection between primary green-blue corridor and a primary transit line (Mount road and the metro line) Considering all these factors, the local design at this site contributes towards the spatial definition of the local pedestrian connection in-between four basic units, nature of treatment of the two primary corridors and the potentials of their intersection. Additionally, the first site also specifies the ideal means of densification in the inner city. The strategy proposed is to identify ideal locations with high potential for public space or maximised local connections and transform these points by introducing high density built areas and freeing up space for the required public and social infrastructure.

LOCATION 02
PERIPHERAL CORRIDORS

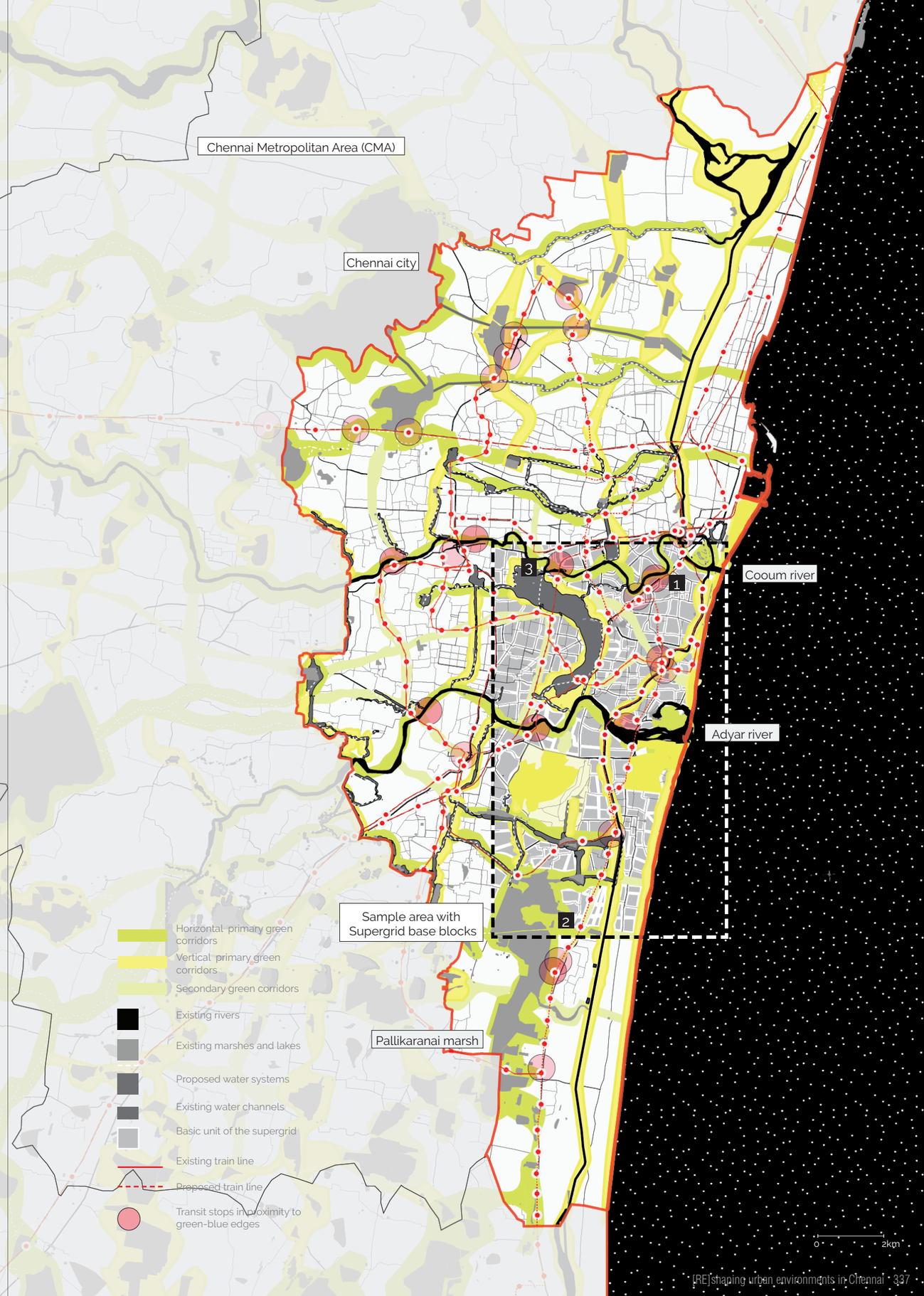


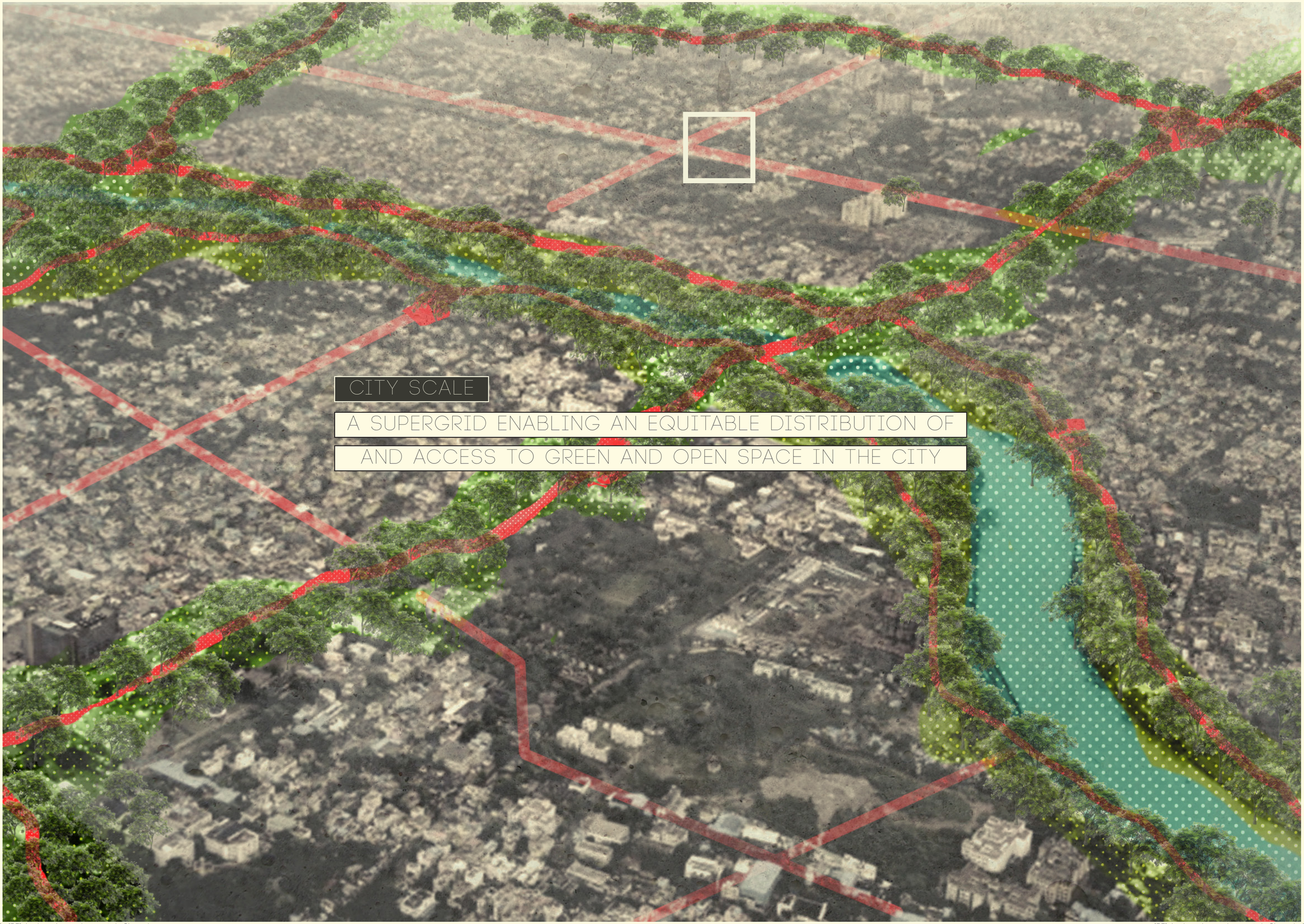
Location 02 deals with the peripheral city, where the population density is low except for the arterial corridors, which are developed with residential high rise, industries and offices. The areas away from these are underdeveloped. From the perspective of the Supergrid strategy, this location consists of a transition space from a primary green-blue corridor (Pallikaranai marsh) a primary (potential) transit corridor(OMR road and proposed metro line). Considering all these factors, the local design at this site contributes towards the spatial definition of a local network transitioning from green-blue corridor to transit corridor, spatial interventions for the two primary corridors. Additionally, the second site also specifies the ideal means of densification in the peripheral city. The strategy proposed is the creation of a frame of networks, reconfiguring different flows and functions, in order to facilitate an overall densification of entire neighbourhoods over time. Creation of this network also involves the separation of the metro line and the arterial road.

LOCATION 03
TRANSITION AREA

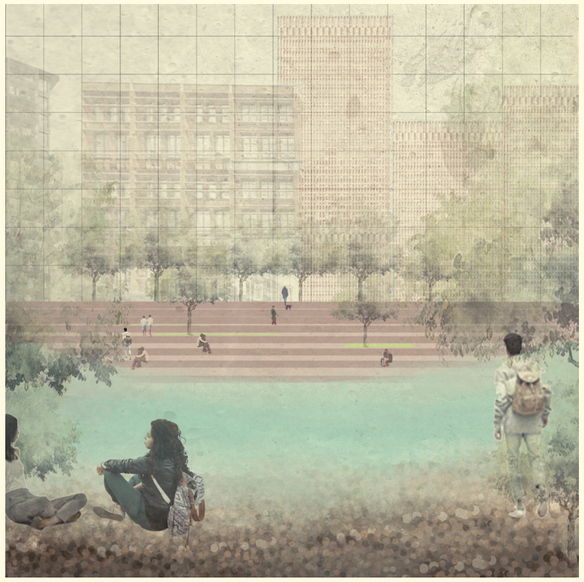


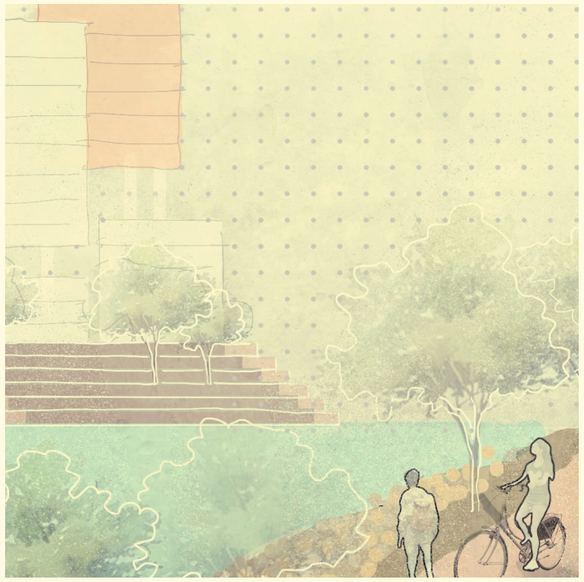
Location 03 deals with transition area between the inner city and the periphery,where the population density varies from low to moderate. This part of the city, predominantly consisting of planned neighbourhoods, has a strong and highly accessible road network. From the perspective of the Supergrid strategy, this location lies in an area that will undergo a massive interruption in the urban form in order to facilitate a large green- blue corridor. While this design proposal is used as means to test the design transferability from the first two locations, it also provides the design process required to create the ecological Supergrids in other locations as well.



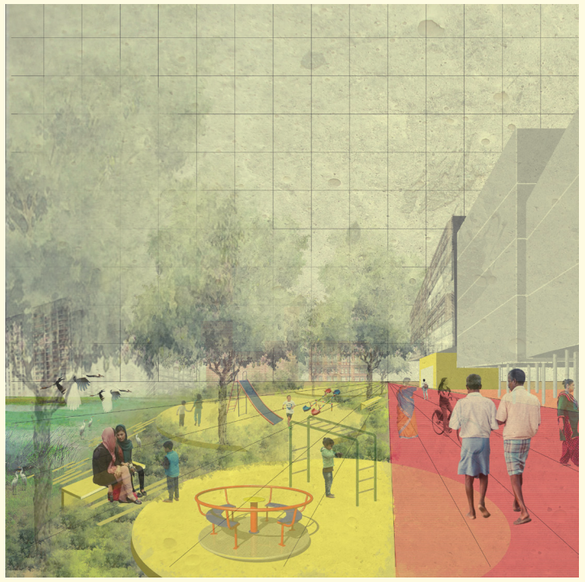

CITY SCALE
A SUPERGRID ENABLING AN EQUITABLE DISTRIBUTION OF
AND ACCESS TO GREEN AND OPEN SPACE IN THE CITY

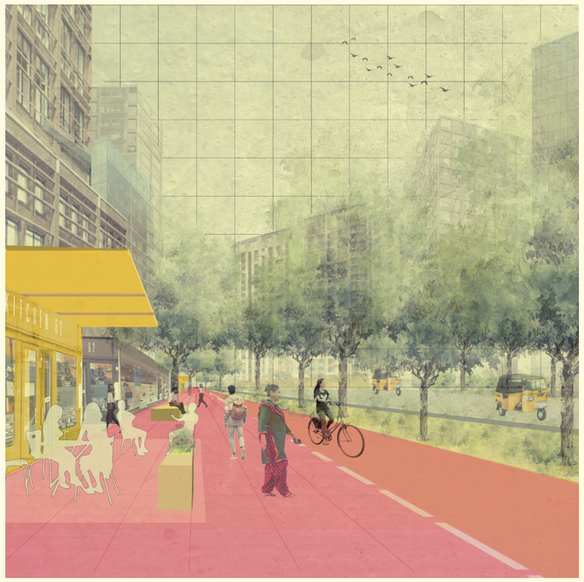

NEIGHBOURHOOD SCALE
FACILITATING A FRAMEWORK OF SOCIAL
ACTIVITIES, FLOWS AND COMPLEMENTARY FUNCTIONS













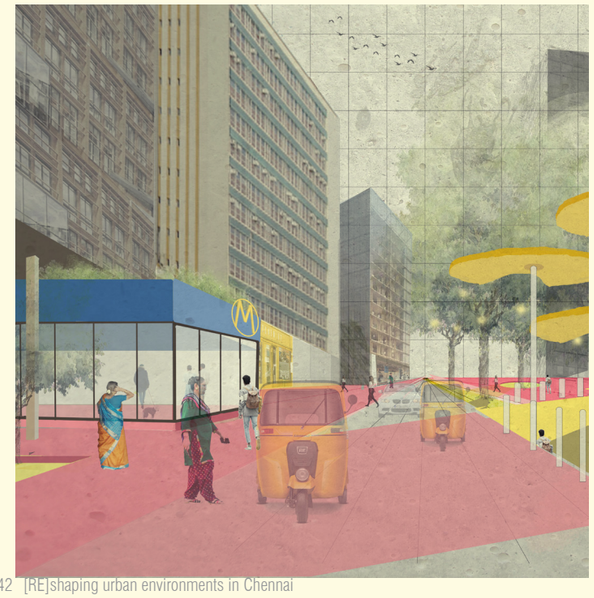
HUMAN SCALE

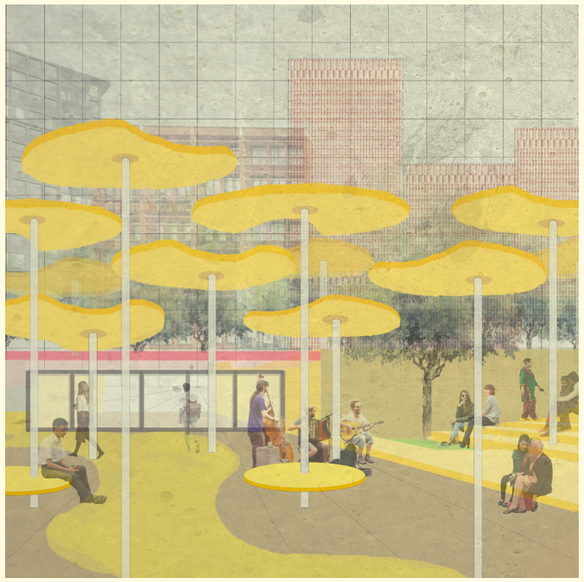
ENABLING DIVERSE AND CONTRASTING EXPERIENCES

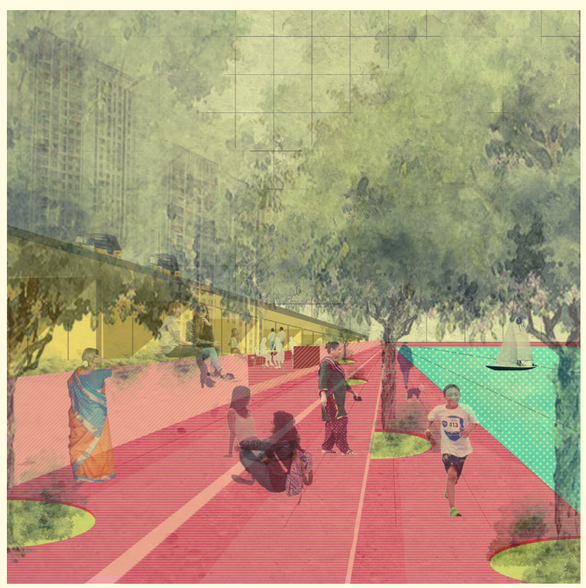
CONTRIBUTING TO A LIVEABLE PUBLIC REALM

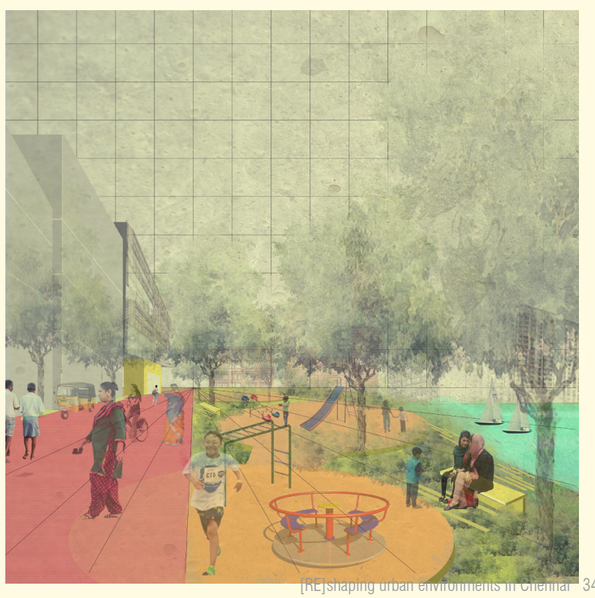












07 CONCLUSIONS AND REFLECTION

Chapter overview:

The next section concludes the project by looking back at the research question and understanding how this research has answered the questions raised. This is followed by a reflection of the entire research process.

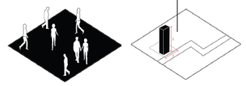
Chapter contents:

7.1 Conclusions
72 Reflections

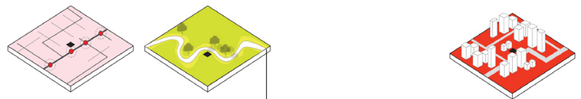
7.1 CONCLUSIONS

01 What does the concept of liveability mean in the socio-cultural context of Chennai city?

02 What are the driving forces that have shaped the fabric in different parts of the city? How are these parts different/similar in terms of their physical and social composition?



How to facilitate the spatial transformation of the urban fabric of Chennai to enable liveable environments for all people, in different contexts of the city, through a reorganisation of the building density using a holistic approach that takes into account mobility infrastructure and ecological systems?



03 What is the current density and spatial organisation in the city? How will the change in building rules affect the fabric of the city? Where will the impact of this transformation be the most prominent?

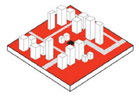
04 What is the relationship between building density, population density social infrastructure and liveability?

05 How to increase the of use of public transport and pedestrian movement in the city?

06 How to integrate the neglected ecological network with the city structure, in order to regenerate these spaces and improve the quality of public life?

07 What are the development plans for the mobility and ecological network in the city ? What are the synergies and conflicts between these plans and the densification of the city?

A. ON DENSITY AND THE DENSIFICATION PROCESS



This project recommends a densification model for the city, as a means to create more liveable public spaces. The current densification model is found to be inadequate on two major counts. Firstly, the regulations are almost completely homogeneous throughout the city, without consideration for the diverse existing built morphologies, household sizes and social groups in the city. Further, as seen from the analysis and expert interviews, these regulations define density as the gross built area and the plot coverage only, leading to the recent regulation change being disproportionately favourable to construction developers and owners of large parcels of land, with no value added to the people and their daily patterns of use of the city.

Secondly, the regulations determining density, which over time shapes the process of urbanisation in the city, fails to take into account other planning processes that the city is currently undertaking, namely, the attempts to shift towards Transit-oriented development and the ongoing process of ecological restoration. This lack of synergy in the planning process is a major problem due to the fact that the ecological deterioration and the dominance of private motorised vehicles in the city is largely caused by the patterns of urbanisation found in the city through the years, in the first place.

Taking these conclusions into account, one of the first steps in the development of a new densification model is to redefine the densification process in a more nuanced manner. Therefore, density is defined not only by the FSI and GSI at a parcel level, but also considers the distribution of functions and their intensity, both at a larger block scale as well as vertically, along the floors of the building. This allows density to be thought of as process of defining the way people live and move in the city, Further, the densification process is defined not only as permissible FSI and GSI, but also considers the different means of achieving a change in density, such as rebuilding, relocation, functional transformation and infill building.

Another important aspect of the proposed densification model is the definition of a goal for densification. While the process currently is undertaken to deal with the increasing population, this proposal views densification as a process used to shape more liveable public spaces in the city, rather than as the final goal itself. Therefore, a lot of importance was placed on the potential to create positive experiential qualities for people. In order to achieve this the concepts of liveability, public space and daily patterns of movement where understood in the local context.

B. CONTEXTUALISING LIVEABILITY



As elaborated in the theoretical underpinning section, the quality of liveabilty is defined as peoples perception towards certain spatial qualities that allow them to view their environment positively. The qualitative nature of liveability requires it to be understood from the perspective of the local people in the city. This process of contextualisation was carried out through local perception studies, on-site interviews and expert interviews.

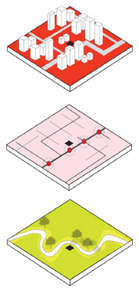
There were several interesting conclusions that came out from this study, contributing to

a localised understanding of liveability. A major takeaway was peoples attitude towards public spaces. While Chennai city is really lacking in public spaces, most people felt that they did not require any more public space in the city. The most common reason for this was that they did not have time for this in their day, most of which was spent working and traveling. The reason for this disconnect between the city and it's people could also be traced to the perception studies, where people were at best apathetic towards the ecological open spaces in the city, being physically and visually completely disengaged from it. Further, there was a deep mistrust in the government's ability to implement any public project successfully. These issues, led to daily life patterns that for many years now, have not included the idea of public space.

Public space was seen as a luxury for those who could afford to spend their time on it, rather than a necessity to create a healthy city life. This gave specific input regarding the nature of public space that the city needs. Firstly, it was important to start implementing smaller scale public spaces, such as pedestrians streets and spaces as an extension of streets. This would boost the trust in the governments ability to implement projects for the people, introduce public spaces that were not purely destinations that were recreational in nature, but those that were a part of daily life patterns, such as walking to work or stopping at the tea shop for a snack. This could over time, build up into a larger network of public spaces. Secondly, it's important to have an equitable distribution og public spaces, both large green spaces that bring people into nature as well as local and pedestrian oriented spaces. The current situation displays an even distribution, where some communities have access to spaces like the beach while other have none in reasonable distance. This need for equitable distribution informs the larger city scale strategy of green blue and mobility networks.

C. AN INTEGRATED DESIGN AND PLANNING STRATEGY

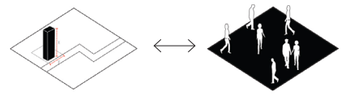
The need for an integrated framework - project methodology : Having explored the densification process as the tool for urban transformation and the contextualisation of the goal of liveable public spaces, this project proposes an integrated framework that reconfigures the mobility and ecological networks, in order to propose strategies for densification. The two predominant factors that are considered are the ecological systems and the mobility systems in the city, in relation to urbanisation and densification patterns. These were chosen based on the pressing issues that exist in the current planning process and as a way to overlap with the focus areas of the planning officials as well. Therefore, while the context informs the important systems to consider, the theoretical underpinnings helps construct the conceptual framework, which defines the relationships between the respective systems. This further guides the spatial requirements of the integrated strategy.



Role of research and design : Research by design is a key component of the project, where the design is not just the final product of the research but is used as an input into the research process. The preliminary research through theoretical underpinnings is used to define the spatial relationships between building density configuration, ecological systems and mobility systems. This is embedded in the concepts of Socio-ecological integration, Transit oriented development and the two-network strategy and liveability specific to public spaces. This is utilised in defining broad strategies and systemic relationships in the city, which are tested, contextualised and spatialised using the results from design interventions at typical locations in different parts of the city. In this manner, the inputs and results from different scales of analysis and design are used to inform one another, defining a methodology of trans-scalar interventions.

Defining the integrated framework : The integrated framework is a city scale strategy that enables a large reconfiguration of the existing networks in the city. It allows for the ecological systems in the city, currently deteriorating and inaccessible to become a part of the public space network. This not only enhances the social realm of the city by providing access to larger open and green spaces, but also helps maintaining the ecological conditions within the city, by allowing people to engage with and take responsibility for these systems. The mobility network restructures the way people move in the city, by upscaling the vehicular network, leading to its reduced use, while strengthening pedestrian connections by aligning them with the green networks, public transit and important functions.

D. TAKING A TRANS-SCALAR APPROACH



This project takes a trans-scalar approach in order to understand and redefine different systemic frameworks at the city scale and its spatial impact at the street scale. This revealed the need for validating the concepts and strategies at the city scale through design interventions at the local scale, that could actually define the spatial relationships and feasibility of strategies. Further, testing through design further reveals new possibilities at the metropolitan scale. The metropolitan scale strategies deal with the larger networks and structuring of mobility and ecological systems, It enables a design based on existing structures in the city and the need to equally distribute access to the network of public spaces. As the lens shifts to smaller scales, the contextual input increases and the exact densification process in relation to the green-blue structures and mobility network is defined. The final strategies proposed are constantly driven by the larger guiding vision of the metropolitan scale and at the same time, account for local contexts and complexities. This allows for a common goal guiding the city, while the methods of implementation are tailored to local needs and conditions. (fig x and y.)

E. FURTHER RESEARCH RECOMMENDATIONS

Ecology based research : There is a gap in research focusing on the current ecological condition in the city and the larger region. Specifically, studies that describe the larger watershed basins and river systems and the effects of urbanisation requires more updated research. Further, a detailed understanding of the traditional water management system that was implemented is absent. This can allow for a better understanding of the current system and result in more effective design and planning processes.

Localised understanding of public space : This project touched upon the process of contextualising the meaning of concepts like liveable public spaces. There is a need for research in this direction as more often than not, public projects are directly inspired

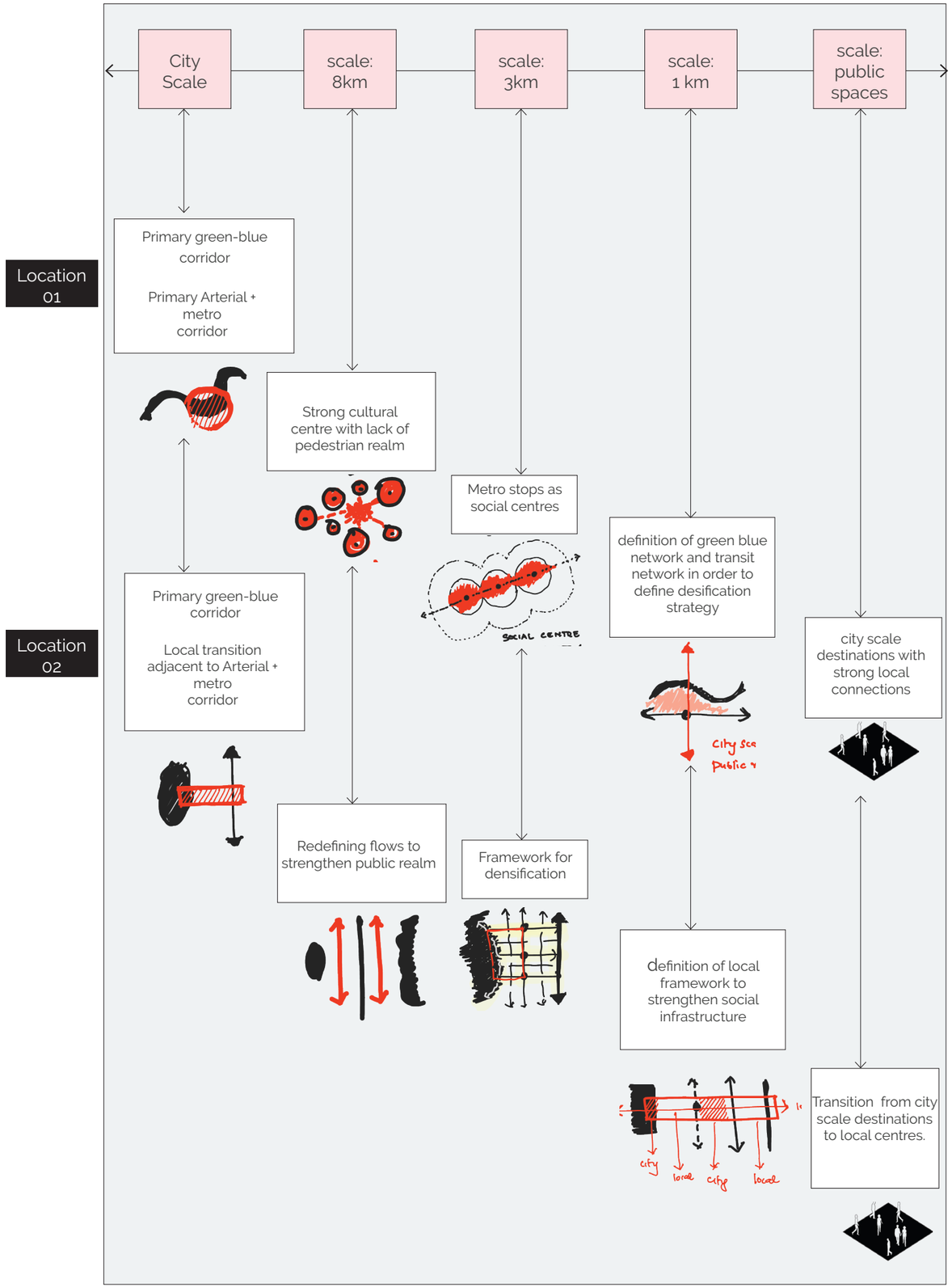
from western contexts, without understanding the cultural implications. While several local designers and researchers are sensitive too the importance of contextualising these ideas, seen in the expert interviews conducted, this knowledge comes through practical experience of several years of working in the field. Scientific research process es that provide conclusive results that are integrated in the formal planning systems will enable the streamlining, efficiency and uniformity in implementing ideal public spaces in the city.

F. FURTHER PROCEDURAL RECOMMENDATIONS

Goals for ecological restoration : This proposal utilises the existing goals towards ecological restoration in the city. This is done in order to demonstrate the effect of implementing this restoration in synergy with mobility networks and the densification process. Therefore, the same goals are spatialised and designed in alternate methods to the ones proposed. However, the next step to this process would be to start deepening these ecological goals to consider climate change and its increasing risks, as this isn't currently planned for by the authorities.

Density studies : The city currently lacks a mapping of the building footprints, building heights, densities and household quantities. This complicates the process of defining precise densification regulations. Undertaking this mapping process and making it available for research purposes in the public domain will greatly improve the results of the planning and design interventions in the city.

Citizen engagement : One of the results from this research that stood out particularly was the lack of public interest in the improvement of the social spaces in the city. This came down to the daily life patterns and the lack of trust in authorities. Therefore, initiations of outreach programs, workshops and awareness campaigns emphasising future potentials in regenerating the pedestrian realm of the city are important. The view of "public space as a luxury" must shift to "public space as a right"



7.2 PERSONAL REFLECTION

PROJEC T RELEVANCE

> Scientific relevance

This research aims to make explicit the mutual relationship between facilitating liveable environments at a local scale through the densification process and the larger mobility and ecology systems in the city. High building density in Indian cities also means a high population density, owing to low space available per person. (Patel, 2014) This can often lead to congestion and put high pressures on social, mobility and ecological infrastructures, leading to poor liveability. Mobility networks and access to public transport play an important role in mitigating this.

While transit-oriented development (TOD) is now a common pattern of growth found in Western cities, it still needs to be explored and adapted in the Indian context, where vehicular mode of transport is still predominant, especially due to the lack of multi-modal accessibility, last mile connectivity of public transport and insufficient building density. (Singh, 2005). Further, when adapting concepts like TOD in the context of Chennai, it becomes important to explore the development models in the densification process, as land acquisition and development becomes a challenge due to the high degree of private ownership of land in the city. Therefore, this research will test the concept of Transit oriented development in Chennai city and identify the greater challenges and interventions required to make it work in this specific context.

> Societal relevance

In Indian metropolitan cities like Chennai, the planning process focuses on economic development above all and constantly plays catch up to the rapid pace of urbanisation. This has led to a lack of quality in public life for the people. There is a lack of space to facilitate social interactions and a lack of opportunity to sit, walk or just wander in the city. This research aims to create these opportunities through an integrated densification strategy and design proposed across multiple scales. Further, there is a mismatch between people's daily life patterns and public space use and the actual typology of public spaces being built in the city today. This research explores the way public spaces are perceived and used by the people in the city and contextualises the concept of liveable public spaces to Chennai and will therefore have a significant societal relevance.

> Transferability of the project

Several Indian cities have a similar problem of unchecked urbanisation, where the planning process is not implemented in synergy with the ecological systems and mobility systems. Therefore, the proposed methodology, integrated framework and the general design strategies can be applied to other major cities in India. At the more local scale, while the design strategies can be adapted, context specific interventions, specifically those pertaining to the climatic conditions and the current ecological condition have to be redefined.

Further, as seen in the case of Chennai, concepts like liveability in public spaces is very rooted to specific contexts and is an important factor to consider in the planning process. Therefore, a similar process of trans-scalar context analysis and perception studies through fieldwork can be used to determine a contextualised understanding of liveability and similar perception-based concepts in other cities as well.

PROJECT LIMITATIONS

> Scope and Limitation of Methodology

This project deals with ecological systems purely from a socio-spatial perspective. Therefore, the aspect of biodiversity, resilience to climate change and natural disasters are not within the scope of this project. When considering the concept of socio-ecological integration, the goals for ecological remediation are aligned with those proposed by the city already, without further analysis. Rather, the focus is on how these goals can be achieved by also activating the ecological systems as social spaces to engage with the city. Therefore, the socio-ecological integration aspect is approached through the lens of the human dimension.

This research deals with the analysis of diverse social groups and morphological typologies leading to different requirements and usage of public space within Chennai. However, the city is home to a very large number of diverse cultures, in terms of religion, socio-economic class, occupation, immigrants from other parts of the country and so on. Each of these groups have a very distinct culture that affects the way they use space. However, due to the limitation of time, the analysis of the characteristics of space will be taken forward with a broader classification.

One of the important aspects of the project deals with increasing the use of public transport over private vehicles, through spatial interventions and design strategies. While Chennai has several modes of public transport such as the Metro system, the suburban and MRTS train system and the MTC public bus system, this project predominantly focuses on the metro system, as it is one of the most recently implemented public transit system, with several lines yet to be constructed, allowing for more possibilities with respect to the design proposals. As explained in Ch. 03, the metro currently has not achieved it's intended ridership due to the fact that the entire network isn't complete, lacking spatial conditions around the metro stops and very high ticket costs. This project specifically focuses solutions for othe spatial issues that cause this problem, while practically, the issue with the ticket cost is an important issue to be resolved as well.

> Current spatial governance process

The current governance structure in Chennai is weak, with rampant corruption and the lack of a transparent process of research, design and implementations. This has lead to illegal developments, improper implementation of city projects and more often than not, a lack of proactive action and strategy in the context of city planning. This

project proposes several spatial interventions and design strategies that require a high degree of spatial governance and policy implementation., which is currently not the case. Therefore, this project is viewed from the perspective of a design exploration that exhibits possibilities of transforming the city to facilitate a diverse and liveable public realm, using the development processes that are already undertaken by the city. Further, this project also intends to showcase the possibilities of creating a positive public environment for the people of the city, who currently believe that these kind of urban transformations are impossible in the city, due to the prolonged lack of effectiveness in spatial governance, as seen in Ch.03.

> Problems with data collection

The most recent census data collection in Chennai happened in the year 2011. As a result, a lot of the data available is not up to date. Further, a lack of data availability, specifically in terms building footprints and density throughout the city, building typology and functions, elevation and flooding data resulted in the need for alternate methods of data collection such as on-site mapping, cataloging and approximation of the results, which may be less precise in comparison.

The lack of precise data for all parts of the city played a role in the process of site selection site for the detailed design. The city was analysed and classified in terms of various factors such as built morphology, network structure and ecological conditions. Then, typical cases representing various situations were picked, ensuring that the chosen sites had the most amount of reliable data available.

ETHICAL CONSIDERATIONS

Considering scenarios of intensification of building density in the city proposes locations and strategies for building anew, but also locations for restricting and removing urban growth as well as replacing existing structures, specifically in relation to the ecological systems present, The ecologically vulnerable regions of the city are also the locations where the most economically vulnerable groups are present. This research may then result in spatial transformations to these vulnerable settlements that will lead to an upheaval to their lifestyles in the short term, despite them benefitting from these changes in the long term.

RELATION BETWEEN GRADUATION TOPIC AND THE " DESIGN OF THE URBAN FABRIC " TOPIC"

The diverse range of graduation studios offered, situate themselves at different points of entry and focus in this methodology of research, design and engineering, resulting in the presence of experts in different fields and a rich and varied knowledge base to learn from. The design of the Urban Fabrics studio focuses on a morphological, design-based approach along with the studio methodology of research through design testing and a focus on the human dimension of urban space. Further, this year's studio theme is "density and intensity" with its focus on transformation of existing urban fabrics through build density redistribution and strategic social infrastructure planning. Therefore, this studio and the current theme is very relevant to this thesis, which focuses on urban transformation through densification.
Additionally, this thesis also requires the guidance and expertise from a spatial planning perspective, in order to understand the larger strategies and policies required to facilitate the transformation of the urban fabric. This derives from the field of expertise of the Planning Complex cities studio.

ON THE PROFESSION OF URBAN DESIGN

This thesis has been a learning process in terms of a systemic approach towards urban design and planning. The relationships that are revealed with taking a trans-scalar approach helped understand concepts like liveability and built density, which are typically local spatial characteristics as products of systemic planning processes and strategies at the metropolitan scale.
Another important insight from this process is the methods of contextualising design concepts and theoretical notions. Today, a lot of the literature present in the Urban design and planning community generates from North America and Western Europe. As a result, they take on perspectives that and are not always a direct fit to other contexts, such as the Indian one, where cultures, the way of life as well as governance structures, climate and demographics are completely different. Through this thesis, I have learnt methods to contextualise these ideas and understand critically, their transferability to the chosen context.

This thesis has also been an experience in assimilating different inputs of data or information that one receives in the course of a project, be it scientific papers, local news, expert opinions and the opinions of the users of the space, books and publications of other designers works,guidance from the mentors and peers, and putting together a coherent project, making sure to take into account all these different perspectives. Having such a wide variety of views greatly enriches the research and design process and is important to seek them out in while working on professional projects as well. Through the course of this year, I have also tried to explore different methods of drawing, both digital and manual, and understood the strong influence diagrams have on the design process itself, in addition to being a method of representation. Quick ideation and design testing of concepts to keep in touch with spatial implications was emphasised both in the Urban Fabrics studio as well as by my mentors. This process helped translating research and analysis into spatial terms and make quick decisions in the designing process.

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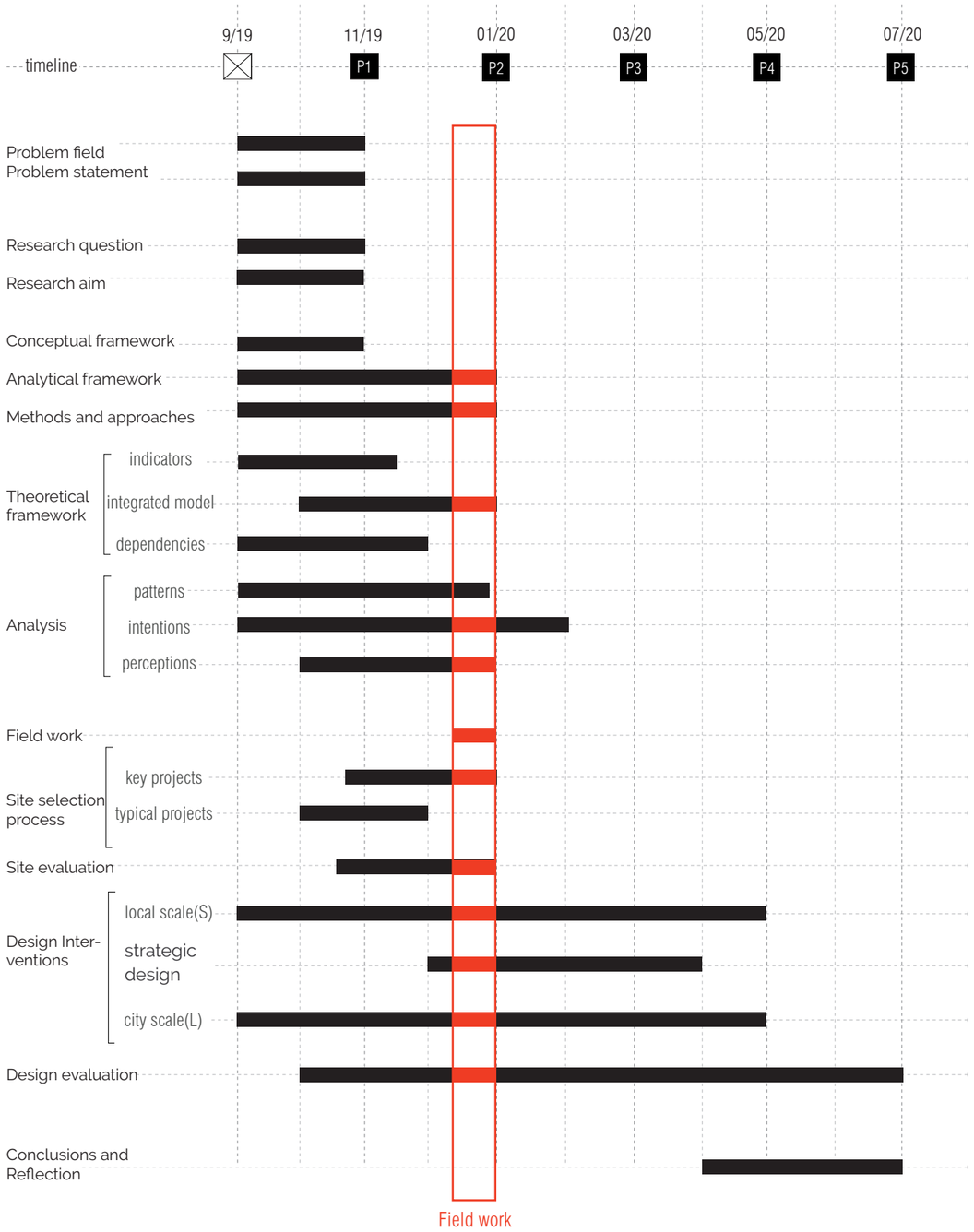
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APPENDIX

PROJECT TIME-LINE



Evaluating the Two-network strategy in the context of Chennai, India

AR3U023 Theories of urban planning and design

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Abstract:
The two-network strategy as proposed by Sybrand Tjallingii is a conceptual design and planning tool that considers ecological and traffic networks as carrying structures of urban development and puts forward a city model based on a balance between them. This paper elucidates the merits of utilising this approach to develop a design and planning strategy for Chennai, India, a city where infrastructure development largely drives growth, while neglecting the ecological structures present. Further, the contextual challenges that arise in this process are elaborated, specifically focussing on the high population density of Chennai city, which has a large impact on the mobility and ecological systems in the city. Therefore, this paper identifies methods to adapt this conceptual tool to take into account the configuration of built density and functions, which determine a third kind of network, which is a social network. This adapted strategy is synthesised by integrating the concepts of Transit-oriented Development (TOD) and Socio-ecological integration with the two-network strategy.
Keywords: mobility, network, social network, density, Chennai

01 INTRODUCTION

The two-network strategy

1.1 The two-network strategy – a description

The two-network strategy as proposed by Sybrand Tjallingii is a conceptual design and planning tool that considers ecological and traffic networks as carrying structures of urban development and proposes a city model based on a balance between them. Embedded in the Dutch planning tradition, this model emphasises the need to approach ecological networks, as carrying structures as opposed to restricting conditions. (Tjallingii, 2015)

The role of the two networks is defined through three different lenses, the area, the flows and the actors. The area perspective describes the two networks through a common framework of space, in terms of the activities and functions that are facilitated by the configuration of two networks, and their relationship to each other. In the examples illustrated across different scales of the city, the mobility network allows for functions that are economically driven, competitive and require high accessibility. In contrast, the ecological network can facilitate the activities in the city oriented towards the well-being of its people. Green open spaces, recreation and productive landscapes are associated with this network. The area perspective allows for a planning and design process that balances economic drivers and ecological systems at the regional scale, city scale as well as local neighbourhood scales.

The flows perspective explains the spatial implications of the ecological and traffic flows and their role in shaping the city. In terms of the ecological network, water flows can allow for the spatial structuring of the city, scaling from drainage basins and valleys up to rivers and their floodplains. Traffic flows are defined in terms of the flow of resources and activities that they service, such as industry, business or residences. Further, the role of mobility networks in the planning process is distinguished in terms of locations that require accessibility, locations where the type of mobility network is the focus and locations where the flow of mobility needs to be regulated. These situations require very different types of interventions and offer different levels of flexibility in the process. Therefore, the flows perspective makes the spatial implications of the different flows explicit, allowing for intrinsic properties of the two networks to be in synergy with the functions and uses associated with them.

Finally, the actor perspective focusses on the role of the actors with respect to these two networks and the implications of this strategic thinking on daily life in the city. This strategy gives rise to two networks that facilitate different spatial qualities and potential functions. The ecological network is described as the “slow lane “which focuses on the long-term benefits for the city in terms of health and well-being. The mobility network is considered the fast lane, which allows for economy driven development. These two networks can be thought of as “cooperative” and “competitive” networks (Tjallingii, 2015). The social roles of the two networks also informs the type of stakeholders that will be involved in the different locations.

Looking through the lenses of these three perspectives, a planning model emerges. It essentially facilitates a development framework where the two networks act as distributors of different activities and functions in the city, based on resources and flows they each require, in order to shape the possibility of diverse experiences in daily social life.

1.3 Adapting the two-network strategy

This paper will elaborate on the current process of urbanisation in the city of Chennai, located in India and will explore the transferability of the Dutch concept of the two-network strategy to this context. Firstly, Chapter 2 will validate the suitability of this strategy to the context of Chennai, based on the existing urban conditions in the city. It will further explain the potentials of adapting this strategy and the challenges present in the process. These challenges focus on the population densities found in Chennai, which is significantly higher than in the Dutch context. Chapter 3 will elaborate on the methods of contextualising this strategy to Chennai. This particularly focuses on the third perspective mentioned in section 1.1, the actors. Therefore, the adapted strategy will make explicit, the relationship of the two networks with the social layer of the city, by quantifying concentration (population densities) and flows (movement of people), as regulated by built densities and urban functions. This can be defined as the social network.

1.4 Research scope

This research focuses on the socio-spatial or territorial implications of the two-network strategy. The ecological factors of importance, specifically related to flooding, biodiversity and climate change resilience faced by Chennai are not discussed in this paper.

02 CONTEXTUALISING THE TWO-NETWORK STRATEGY

Potentials and Challenges of adaptation - Chennai

2.1 Need for the two-network strategy in Chennai

2.1.1 Urbanisation patterns in the city – economy driven

In Chennai, like most Indian cities, infrastructure development and the free market largely drive the growth of the city. A spatial pattern that was established from its inception; the city grows along major vehicular corridors in a radial pattern. This leads to a situation of sprawl along these corridors and the underdevelopment of areas beyond its immediate vicinity (Srivathsan, 2015).

This urbanisation pattern has had a negative impact on both the mobility networks and the ecological networks in the city. The spatial pattern in the city has resulted in jobs and other functions being distributed along long infrastructure corridors. This is one of the contributing factors to private motorised vehicles increasingly being the dominant mode of transport. As the city grows, vehicular congestion increases, while the existing public transport system receives significantly lesser users than expected. This contributes to poor living environments in the city. (ITDP, 2013)

Further, the development of these corridors has ignored the existing ecological systems in the city, constantly urbanising over rivers, river banks, drainage basins and marshlands. This has affected the water systems in the city, causing large scale flooding (Care Earth Trust, 2017). Encroachment into the major rivers in the city has resulted in non-accessible waterfronts that are no longer a part of the urban fabric. These issues have further affected the quality of life in the city as well as increased the environmental risks in the dense urban core.

Therefore, the negative externalities of a sprawling, market driven urbanisation pattern has led to an inefficient and unsustainable mobility network and a neglected and polluted ecological network. These conditions, along with the very high population density found in the city result in very poor living quality within Chennai, with a severe lack of social spaces that are dedicated to long term health and well-being.

2.1.2 Lack of an integrated vision

The city is currently undertaking large scale Metro rail and bus network construction to improve the quality and accessibility of public transport as well as restoration projects to clean the rivers, canals and marshes. However, the governing bodies involved in this process are many in number, lack communication and collaboration amongst them (100 resilient cities, 2019). Specifically, the mobility and ecology networks are approached as two unrelated aspects of the city, resulting in the interdependencies between them being neglected.

2.1.3 Applying the two-network strategy

The two-network strategy is a crucial concept that, when utilised in Chennai city, can provide an integrated strategy for urbanisation that is currently lacking, as explained in sections 2.1.1 and 2. 1.2. This will allow for the public transport network to be well integrated with the patterns of movement in the city, while providing accessibility and social functionality to the ecological systems, facilitating slower moving social spaces, as a contrast to the dense and chaotic city. The next section will further elaborate on the potentials created in the city when the two-network strategy is employed.

2.2 Potentials of the two-network approach – Socio-spatial implications

2.2.1 Liveable environments

Driving the growth of the city based on an integrated strategy can facilitate the creation of diverse environments within the city, and at the same time, allow for balanced growth as opposed to the purely economy driven growth prevalent today. The "slow lane" can facilitate environments in the city that caters to the long-term well-being and health of the city and its residents, in the form of accessible ecological spaces and social spaces. Further, Chennai could benefit from shifting from private motorised vehicles to other modes of transport such as walking and cycling, especially for shorter trips. The presence of an ecological network will greatly help these modes of transport, as the green network complements slow modes of traffic very well (Tjallingii, 2015).

2.2.2 Contrasts in the city

"……how vital it is for a town to give people both intense activity and deep and satisfying quiet" (Alexander, Ishikawa, & Silverstein, 1977) Different spatial relationships between the mobility network and ecological network afford diverse social spaces that allow for contrasts and transitions. This is a much-needed quality in Chennai city, which lacks spaces in the city that can complement the fast paced, vehicle dominated streets of the city. (The Hindu, 2017)

2.3 Challenges in adapting the two-network approach

2.3.1 Identifying contextual challenges

While section 2.2 illustrates the suitability of the two-network strategy in Chennai, it is important to recognise the contextual difference between the Dutch scenario, where this concept originates, and the context in Chennai. From a spatial perspective, Chennai is a city of 7 million inhabitants (Chennai Metropolitan Development Authority, 2005) as compared to the Netherlands where the most populous city, Amsterdam, consists of around 700,000 inhabitants (CBS, 2018). This leads to very different city scales, in terms of organisation and functions. However, the strategy prescribes relational qualities with respect to the different networks rather than absolute quantities. Therefore, it is transferable to Chennai as long as the different scales of application are adapted to the new context i.e. regional, city and neighbourhood scales.

A difference of larger significance arises in the population densities of the two regions. Chennai is a city with a very high population density, specially at its core, averaging at around 26,000 people per square kilometre (Chennai Metropolitan Development Authority, 2005). Population density is determined by the built density of an urban environment, which in turn depends on land-use allocation and infrastructure provision. In Chennai, the built density is almost completely uniform in the city. Despite this, there is an uneven distribution of population density. This can be attributed to different plot and housing sizes depending on economic status (Patel, 2014) , and the provision of services predominantly along infrastructure corridors (see section 2.1.1). Therefore, the concentration and flow of people is largely regulated by the radial infrastructure lines of the city, leading to longer travel times. Further, the concentration of lower income groups at the core of the city (Srivathsan, 2015) leads to larger population densities despite the uniform building density, due to smaller household sizes. This leads to this portion of the city being highly congested, with poor living qualities and a lack of social services. Encroachment of ecological drainage systems within the city has taken place in order to accommodate larger concentration of people, leading to an almost completely urbanised inner city (NRSC, Government of India, 2019). This has further led to deterioration of ecology, specifically the water carrying capacity within the city. Therefore, Population density has a major impact on the functioning of the two networks, both qualitatively and quantitatively.

2.3.2 Implications of population density – the social network

In the context of Chennai, the concentration, distribution and flow of people has a large impact on the fabric of the city and its spatial quality. Therefore, this aspect needs to be integrated with the two-network strategy, in order for the networks to function as intended. This allows the city to be visualised as a framework of networks that facilitate patterns of movement of people in the city, resulting in social life quality and public place networks becoming the focus of the design and planning process. The next chapter explores the implicit role of the social network in the existing two network strategy and proposes methods to incorporate it in a more explicit and defined manner.

03 ADAPTING THE TWO-NETWORK STRATEGY
Methods of adaptation - Chennai

3.1 Social perspectives in the current two-network strategy

Section 1.1 elaborates on the actor perspective of the two-network strategy, describing the two networks as "slow lanes and "fast lanes". While this hints at the relationship between the two networks and society, another important factor that largely determines the flow and concentration of people is building densities and functions. Residential densities result in large concentration of people in certain regions, while commercial densities cause a large flow of people to certain regions. This flow and concentration of people in turn, has a large impact on the quality of spaces facilitated by the two networks, as well as its ability to function as an efficient and accessible network.

An example illustrating this would be the focus of higher densities across wider roads in Chennai, rather than transit hubs. As previously mentioned, higher densities and city activities such as industries, institutions and business are situated along long corridors, radiating out from the city, causing the preferred mode of transport to be vehicular, as opposed to public transit (ITDP, 2013). Therefore, the configuration of the built density and function in the city, often determined by the permissible densities and land use patterns, play an important role in the functioning of the two networks as intended.

The current two network model does not explicitly state the density configuration in the city in relation to the structure of the two networks. While there is an implicit indication of the intended functions attached to the two networks, explicitly defining this relationship allows this model to be adapted to complex conditions like Chennai city, where the current patterns of urbanisation are mismatched with the configuration of the two networks, leading to poor liveability in the city.

3.2 Integrating the social network in the two-network strategy

3.2.1 Methods - integrating the social network

Adapting the two-network strategy to include the third layer of social networks requires an understanding of the built densities and functions as a moderator of the flows and concentrations of people in the city. When this is informed by the two networks, it provides a holistic framework for the growth of the city. In order to quantify the relationship of this third layer with the existing ones, the concepts of transit-oriented development and socio-ecological integration are employed. This establishes a direct relationship between the social layer in the city with transit corridors as well as a relationship between society and ecology, as defined by space.
3.2.2 Transit-oriented Development

When considering the relationship between flow of people and mobility networks, it is important to distinguish the types of mobility networks. There is a need to shift towards public transportation networks from private motorised vehicles in Chennai. (see section 2.1.1). This requires a reconfiguration of the relation between public mobility networks and the concentrations and flows in the social network. For this reason, the concept of Transit oriented development is explored in relation to the two networks.

A TOD (Transit Oriented Development) is defined as "Mixed-use communities within an average 600 metre walking distance of a transit stop and a core commercial area. TODs mix residential, retail, office, open space, and public uses in a walkable environment, making it convenient for residents and employees to travel by transit, bicycle, foot or car" (Calthorpe, 1993). TOD is a process of

creating dense and diverse areas around public transit stops in order to maximise the use of public transport over private motorised vehicles and promote more walkable streets in the city.

Concentrations in the city is determined by the transit nodes, leading to an urbanisation pattern of compact clusters. Further, the transit nodes start gaining a sense of hierarchy in terms of their accessibility and connections. Therefore, multimodal access points would become important nodes in the city, ideally providing access to city scale destinations as well as connections to different modes of transport. This is followed by other transit nodes in decreasing order of scale and connectivity (Metrorail, MRTS, Suburban rail, bus network, pedestrian and bike networks). This hierarchy can provide a spatial structure to the city informing the location of city scale destinations as opposed to local commercial functions and businesses. Therefore, this relationship determines local flows, city flows and concentration of people in relation to the public mobility network, prioritising this mode of transit as the carrying structure of urbanisation.

Based on national urban development policy, Indian cities, including Chennai are aiming to shift towards transit-oriented development (Ministry of housing and Urban affairs, 2017). However, access to rail transit is not the only factor that facilitates a shift away from private vehicle use. Other aspects such as on- and off-street parking, housing type and tenure, density and bus services also play a key role (Thomas, et al., 2018). Specifically, inadequate densities, improper mix of functions, poor accessibility and walkability and a lack of multi modal integration are some of the larger issues that pose a challenge to the implementation of TOD in Indian cities (Joshi, Joseph, Patel, & Darji, 2017).

Therefore, at a larger scale, multi modal connectivity, network configurations and accessibility to jobs, city destinations and recreation is essential for the public mobility network to be successful, while at the local scale, density and function mix, adequate parking and spatial conditions that improve walkability are necessary.

3.2.3 Socio-ecological Integration

Historically, Chennai possessed a community driven water management system that created an intimate relationship between society and ecology. This communal thinking towards the common goods (lakes, rivers, forests and marshlands) was gradually eroded as the society shifted towards the ideas of public and private space introduced in the colonial period (100 resilient cities, 2019). The rampant urbanisation that followed, along with the disconnect between man and nature resulted in the encroachment and depletion of these natural systems. Current efforts to rejuvenate these systems in order to prevent the frequent floods and droughts in the city must take into account the importance of this relationship. These ecological systems, when integrated with the urban fabric, have an immense value in enriching everyday life. Conversely, this also nurtures a sense of responsibility to protect these systems. This mutually beneficial outcome can be achieved through the process of socio-ecological integration. This allows for a system to combine social and ecological resources, to alleviate conflicts and sustain synergies. (Forgaci, 2018)

Socio- ecological integration requires the understanding of the social and ecological systems through the common ground of the spatial system. The spatial system in a city provides the structure to facilitate social processes, and is a manifestation of the same. Ecological processes when understood similarly, allow the spatial system to become the shared framework for integration (Barthel, et al., 2013).
In the process of socio-ecological integration, synergies and conflicts between ecosystem services and social services are determined in order to identify the potential for urban transformation. Points of synergy, for example, can facilitate city scale destinations, which translates to a large a flow of people to these locations.

3.3 New relationship between the layers

By integrating the two-network strategy with the concepts of transit-oriented development and socio-ecological integration, a complex relationship is made explicit between mobility networks, ecological networks and their impact on building functions and densities. This directs the flows and concentrations of the social network in the city. This integrated strategy provides a framework of growth that not only facilitates the “fast lane” and “slow lane “, but also points of densification based on the public mobility network and the scale of activities and accessibility as related to the ecological network. Further, it proposes strategies across scales, specifically in the case of Chennai. At the city scale, it defines relationships between the three networks, and at more local scales, it makes explicit spatial conditions required for the networks to function as intended. Therefore, this leads to a strategy, that can guide a trans-scalar design and planning process, contextualised to the city of Chennai.

3.4 Generating opportunities through the integrated strategy
This approach has the potential to transform the spatial conditions in the city through different means. The primary aim of the transformation is the creation of more accessible green spaces, public places and liveable environments in the city. It promotes a shift towards public transport, from private motorised vehicles, allowing the decrease in congestion of roads in the city, leading to a better environmental quality and well-being in the city. The inclusion of the ecological systems as part of the accessible urban fabric and a part of daily life patterns adds to the quality of open spaces in the city. Conversely, it also helps better manage the fragile ecological systems in the city.

3.5 Framework and flexibility
The integrated strategy essentially provides a framework that can guide the design and planning process in the city, across scales. As the strategy describes relational qualities and not absolute quantities, it allows for flexibility in the actual implementation in terms of urban form, spatial definitions and functions. The strategy is a tool that establishes a network thinking in the city that guides the movement of people through it, identifying potentials based on location, scale and interrelations amongst the networks.

3.6 Complexity and diversity
While the two-network strategy describes networks as slow and fast lanes, with the integration of the social network, which considers building density, functions and the flow of people, the classifications start increasing in complexity. In addition to defining activities as fast and slow, they can also be assigned scale that reflect flows and concentrations in the social network. Activities and locations can be differentiated, for example, as slow lanes at the city scale and at the local scale, based on the flow of people. Therefore, a slow lane at a city scale could become a city destination and would then require access to a fast lane as well. On the other hand, the slow lanes at local scales can be differentiated based on the concentration of people or in other words, residential density, leading to different spatial configurations and functions. An understanding of the flows and concentration of the social network, in relation to the mobility and ecology networks can facilitate multitudes of contrasts, spatially and experientially in the city.

3.6 Further recommendations
Implementing the integrated strategy in Chennai would require further study into the density and function mix required for the feasibility of transit hubs, using literature, case studies and analysis of existing urban conditions. Next, spatial definitions of the ecosystem services and social services is required in order to understand points of synergies and conflicts. This requires a study of the existing ecological conditions and restoration processes that have been proposed as well as an analysis of the potential social services that are needed in the city. With this, the city can be described in terms of the three networks, revealing potential points of intervention and spatial transformations with further analysis.

04 CONCLUSIONS
An integrated approach to design and planning in Chennai

The two-network strategy provides a framework that promotes a balance between economy driven development and long-term well-being of the city (Tjallingii, 2015). The ecological systems in the city are envisioned as a network of places that contributes to society, rather than spaces that have to be preserved or restricted. Therefore, this facilitates contrasting spaces, experiences and functions in the city, by enabling a “slow lane” and a “fast lane”. This paper explores the need to adapt the two-network strategy in the context of Chennai city. The economically driven growth of the city has led to negligence of ecological systems and liveability in the city.

To adapt this strategy to Chennai, this paper proposes extending the model to define explicit relationships between the two existing networks and a third, social network. This is important in the context of Chennai, a city with very high population densities, as a lot of the urban problems it faces in terms of mobility and ecology in the city, such as traffic congestion and destruction of wetlands are related to the concentration and flows of people in the city, as moderated by built density and functions. The integrated strategy defines relationships to this social aspect by bringing together the concepts of transit-oriented development and socio-ecological integration with the two-network strategy. The city is currently trying to adapt the concept of TOD, as there is a need to shift away from private motorised vehicles towards public transport. Therefore, integrating TOD with the two-network strategy prioritises the public mobility networks as the carrying structures of urbanisation. Complementing the two-network strategy with socio-ecological integration allows the water systems in the city to become a part of daily life. This places an emphasis on the spatial transformation required to reinforce a positive relationship between society and ecology in the city.

The two-network strategy utilises mobility and ecological networks to distribute activities and functions in the city. This model allows the activities associated with the networks to work in synergy with intrinsic characteristics of the respective networks. Further, it can allow for diverse spaces and experiences within the city. The integrated strategy proposed, relates this network distribution to the flow and concentration of people in the city, by defining configuration of building density and functions.

The integrated strategy can be utilised as a trans-scalar design and planning tool. At the city scale, it can facilitate a common spatial framework for the different projects the city is undertaking, in terms of mobility networks and ecological restoration, to find synergies that enable liveable environments. At local scales, it can indicate the spatial strategies that are required to ensure that the networks function as intended. This process puts the long-term well-being of the people of the city at the forefront of the design and planning process, by facilitating a more liveable city that is walkable, accessible and fosters a positive relationship with the ecological systems present.

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EXPERT INTERVIEWS

EXPERT INTERVIEW LIST AND QUESTIONNAIRE

INTERVIEWEE LIST:

01 Mahesh Radhakrishnan (Architect) - Principal designer, The Madras Office for Architects and Designers (MOAD)

02. Vidhya Mohankumar (Architect and Urban designer) - Founder, Urban Design Collective (UDC)

03. Tahaer Zoyab (Architect and Urban designer) - Co founder, Triple O Studio

04. Rohini Raghavan - Principal architect, Studio r+r

05. Mr. Kabilan, URC Construction Pvt. Ltd

SECTION 01

Chennai, along with other Indian cities, is planning to shift towards TOD. TOD is generally defined as:
"Mixed-use communities within an average 600 metre walking distance of a transit stop and a core commercial area. TODs mix residential, retail, office, open space, and public uses in a walkable environment, making it convenient for residents and employees to travel by transit, bicycle, foot or car "
This is being done in order to shift the city towards more sustainable modes of transport (public transit, walking, cycling) and to reduce the vehicular congestion and pollution in the city.

Q1. Should Chennai adopt the concept of TOD? Why/Why not?

Q2: If yes, what are the largest socio-spatial challenges the city faces in the process of adaptation to TOD? (Provision of public transport, accessibility to public transport, social perception/ usage patterns, density and mix-use etc.)

Q3. If yes, what are the potentials existing in the city, in the process of adaptation to TOD?

The city is currently implementing upgraded sidewalk along many streets in the city to improve walkability. Further, the new building regulations provide incentives to buy higher FSI in sites 500m from metro corridors.

Q4. Are there any other measures planned, that you are aware of?

Q5. Are these measures sufficient to implement TOD? Why/ why not?

Q6. In your opinion, are there any other specific strategies that are crucial to implementing TOD in the city?

Q7. If no to Q1, are there other strategies/ transformations that can be implemented in the city that will be more effective in improving public transport usage and reducing vehicular congestion?

SECTION 02

Chennai is currently undertaking the process of restoring the water systems in the city (rivers, lakes, Buckingham canal). This process includes dredging of the water bodies and clearing developments off the water edge.

Q1: Do you agree with these efforts to restore the water systems in the city? Why/Why not?

Q2. Q4. Are there any other measures planned, that you are aware of?

Q3. Is It important for these ecological systems to become an active part of the city that is accessible by people or is it sufficient to clean and preserve them? Why/ Why not?

Q4: Will these measures enable these water systems to become a part of the social fabric of the city? Why/ Why not?

Q5. Are there any additional/alternate strategies that are important to rejuvenated these water systems and transform them into actively used places in the city?

05. What kind of functions can the water edges can provide for the city?

Q6. Do you see any relationship between this process of restoration and the implementation of TOD in the city?

SECTION 03

The new building regulations in Chennai have made a significant transformation to the building rules in the city.

- FSI of non-high rose buildings has been raised from 1.5 to 2,
- All primary residential zones have been redefined as mixed-use residential.
- High rise buildings do not have a hight limit, with an allowable FSI up to 3.42 and additional 50 percent buying option.
- Plot coverage (all areas but CRZ and aquifer recharge zones) removed.

This change is intended to accommodate larger number of people in the city, with an increased affordability in housing prices.

Q1: Do you agree that the city needs to densify? Why/ Why not?

Q2. Are there some parts of the city that are better or worse suited for further densification?

Q3. Do you think the changed building rules will have a positive impact on the city? Why/ Why not?

Q4. Are there any specific changes in the rules you agree with or disagree with? What are they and why?

Q5. Would you recommend adding/ removing any of the building rules prescribed? Why?

While the new building rules allow for larger built densities throughout the city, there are no recommendations, goals or visions in terms of quantity of new households to be achieved or important locations of transformations. in other words, while the rules have changed, the actual degree and location of transformation is left up to the free market.

Q6. Do you think this change will result in major urban transformation in the city? Are there specific portions of the city that will be transformed to a higher degree than the others?

Q6. Should the building regulations provide further rules that direct the urban transformation towards particular locations / particular spatial requirements? What are they?

Q7. Is the planning process in the city currently equipped to deal with the increased load on infrastructure and public spaces in the city that will occur due to densification? If not, can you recommend any specific planning and design procedures for this purpose?

08. What kind of public place does the city need? (Streets as public place, squares, waterfronts, shopping areas)

Q9. Do you see any relationship between this densification process, TOD policy and the eco-restoration projects in the city?

STAKEHOLDER INTERVIEWS

ON SITE INTERVIEW RESPONSE SAMPLE

	TRIPLICANE						
	Mr. Arul	mr. Kishore	Mt Road Mr. S kumar	Mr. K Moorthy	Mr. Deepak	Mr. Gopal	Mr. Shankar
Where do you live ?	Triplicane	Park town	Triplicane	Thorraipakkam	Okkiayam Thorraipakkam, OMR	Shollinganallur, OMR	Triplicane
Where do you work?	Mint street	Triplicane, Parry's	Parry's	Triplicane	Around the city	Around the city	Triplicane
How do you commute between work and home ?	Bus, train	Bus	Bus	Train	Two wheeler	Own auto	Bus, train
Why do you prefer private vehicle to public transport?	NA	NA	NA	NA	Much more convenient and relaxed even if it a bit more expensive. Buses are very crowded.	Last took buses aroung 7-8 years ago. Now I only use my two-wheeler as it is very convenient.	NA
Do you find this mode of transport to be convenient?	Yes, but buses do not come often enough.	Yes	Yes	It is good	NA	NA	A bit crowded but it is okay.
How do you commute short trips?	Walk (10-15 min)	Walk (1km)	Walk (5-10 min)	Walk	Walk (10 min)	walk sometimes (5 min)	Two-wheeler
Is it comfortabe to walk in your neighbourhood? Why? Why not?	Yes its comfortable but too many cars.	Yes it is.	Yes, but sometimes in the day its too noisy becaue of the vehicles.	Yes, I walk to shops and restaurants comfortably.	Yes, a bit dusty and noisy.	Yes it is fine. A bit too many cars.	No. there is no shade and it is very hot.
What changes would convice you to walk/cycle for short trips?	NA	NA	NA	NA	NA	NA	I find my two wheeler convenient.
Where do you go in your neighbourhood in your free time for entertainment/leisure/relaxation?	Nowhere	Temple	Nowhere	Nowhere	I watch movies, go to shop or to eat in restaurants regularly.	Nowhere	Temple.
Where do you go in the city in your free time for entertainment/leisure/relaxation?	Mint street, Parry's, Marina beach	Marina Beach	Marina beach	Beach, Watch movies	Beach	Beach sometimes, temple, rationshop	Nowhere. I just go to the temple for peace of mind.
Would you ike more pubic places / places to go in your neighbourhood? What would they be ?	No	No	No	No	No	No	No
What is your impression of (Cooum/ Buckingham canal/ Adyar river? How have you experienced it ?	I only see it when driving by the bridges.	I see it when travelling to work everyday.	Not much	I see it when visiting family that lives there. It smells bad.	I see it when I cross the river.	I see it when I cross the river.	No
What do you think of the ongoing cleaning process?	It will never be clean.	There is no point cleaning it, would be better to find a different source of water	They keep cleaning it and it keeps getting polluted. There is no point.	They have been cleaning it for more than six years. It wall never be clean. They want to have some boating place, but it will never happen.	It's a good thing. I would like to contribute, but I don't have time as my job takes up the whole day. But it is a very good initiative.	They should spend money on something mre useful to the peope. This will never happen.	It is a good effort and hopefully it will be clean soon.

P5 REPORT

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