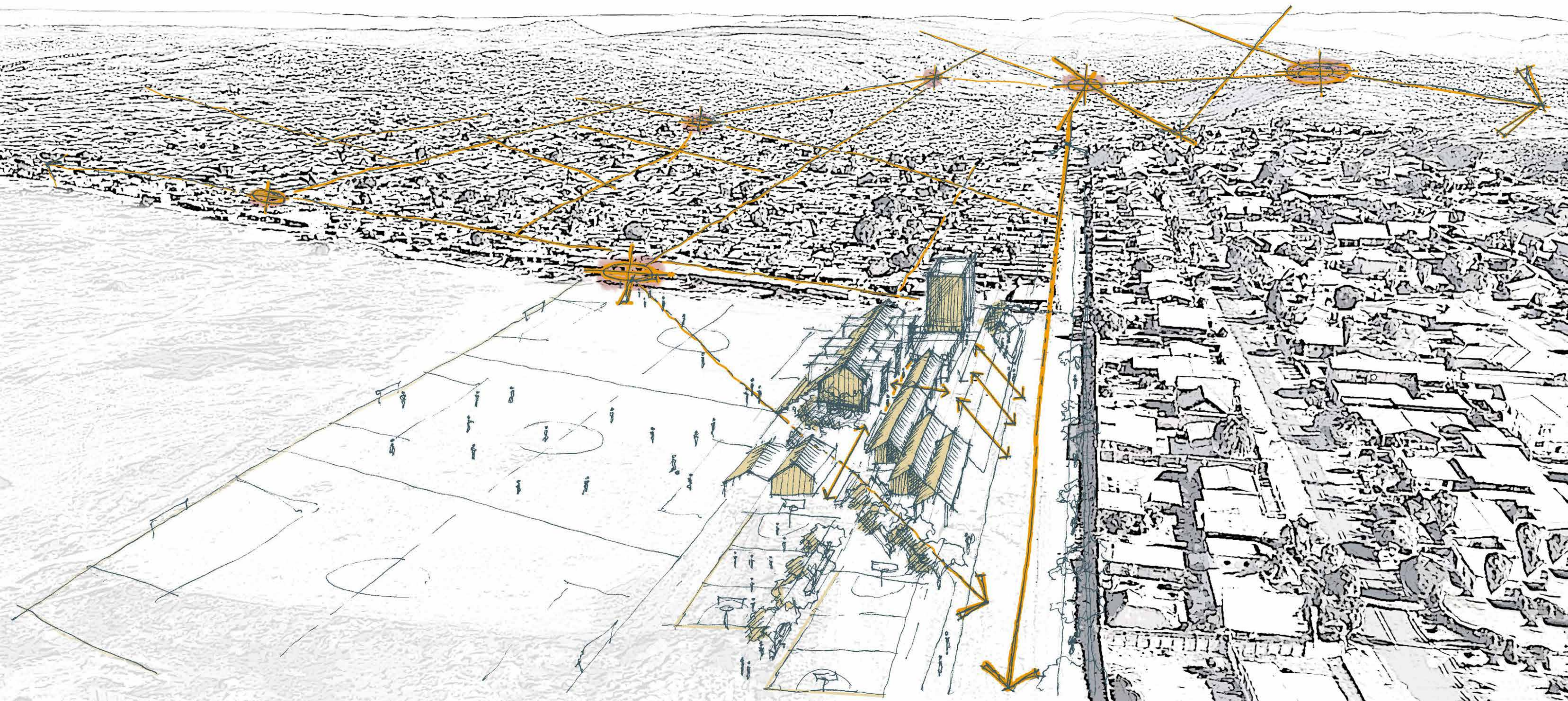


ITIRELENG

Community and Climate Resilience through Multivalency



Looking through an informal lens.

ITIRELENG

Community and Climate
Resilience Through Multivalency

AUTHOR:

Grant Cannon

SUPERVISOR:

Dr. Jan Hugo

PROJECT LOCATION:

cnr 1st Avenue and Outline Road, Itireleng,
Centurion, City of Tshwane, Gauteng

PROJECT COORDINATES:

25°47'12.9"S 28°04'45.5"E

BUILDING PROGRAMME:

Community Centre

PRIMARY STAKEHOLDER:

Department of Social Development,
Department of Transport, Department of Sports,
Art and Culture,
Department of Education.

THEORETICAL PREMISE:

Incremental Development & Climate Change
Adaptation

KEYWORDS:

Incremental development, Informal settlement,
Socio-economic upliftment, Flexibility and
Multivalency

Abstract

In response to rapid urbanization and the apartheid scars of spatial segregation, this project proposes a multifunctional community centre in Itireleng, an informal settlement near Laudium, Gauteng. The design explores how architecture can catalyse socio-economic upliftment in marginalized communities by incorporating multivalency, flexibility, and resource efficiency. The project integrates sustainable design principles and incremental urban development, creating resilient, adaptive spaces that fosters community engagement and growth in challenging environmental and social conditions.

Context

In the post-apartheid era, the city faces the challenge of reintegrating segregated and marginalised communities, which suffer from inadequate infrastructure, unemployment, insecure land tenure, and lack of access to essential services like water, electricity, and sanitation. The population of region 4 in the City of Tshwane is growing at a rate of 4,6% per year, exceeding all other regions. The vulnerability of informal settlements like Itireleng is further exacerbated by climate change risks, with rising temperatures putting added stress on residents and infrastructure. This project seeks to address these pressing socio-economic and environmental challenges through architectural intervention.

Programme

The proposed community centre will serve as a hub for socio-economic development, offering a multiple services and functions. Educational facilities such as an Early Childhood Development Centre, vocational and skills development training and workshop spaces, a library, and digital labs are integral parts of the design. Additionally, transport facilities, sports facilities, market areas, and workshops for mechanics and local traders create opportunities for skills development and economic growth. By addressing the immediate and long-term needs of the community. The programmes aim to foster social interaction, learning, and empowerment.

Concept

The concept revolves around multivalency, where building elements serve multiple purposes to maximize efficiency and utility. Flexibility and modularity are central to the design, allowing spaces to adapt as community needs evolve. Bioclimatic façade responses enhance indoor climate control with minimal energy input, while incremental development ensures the project can expand in line with the future growth of the surrounding urban fabric.

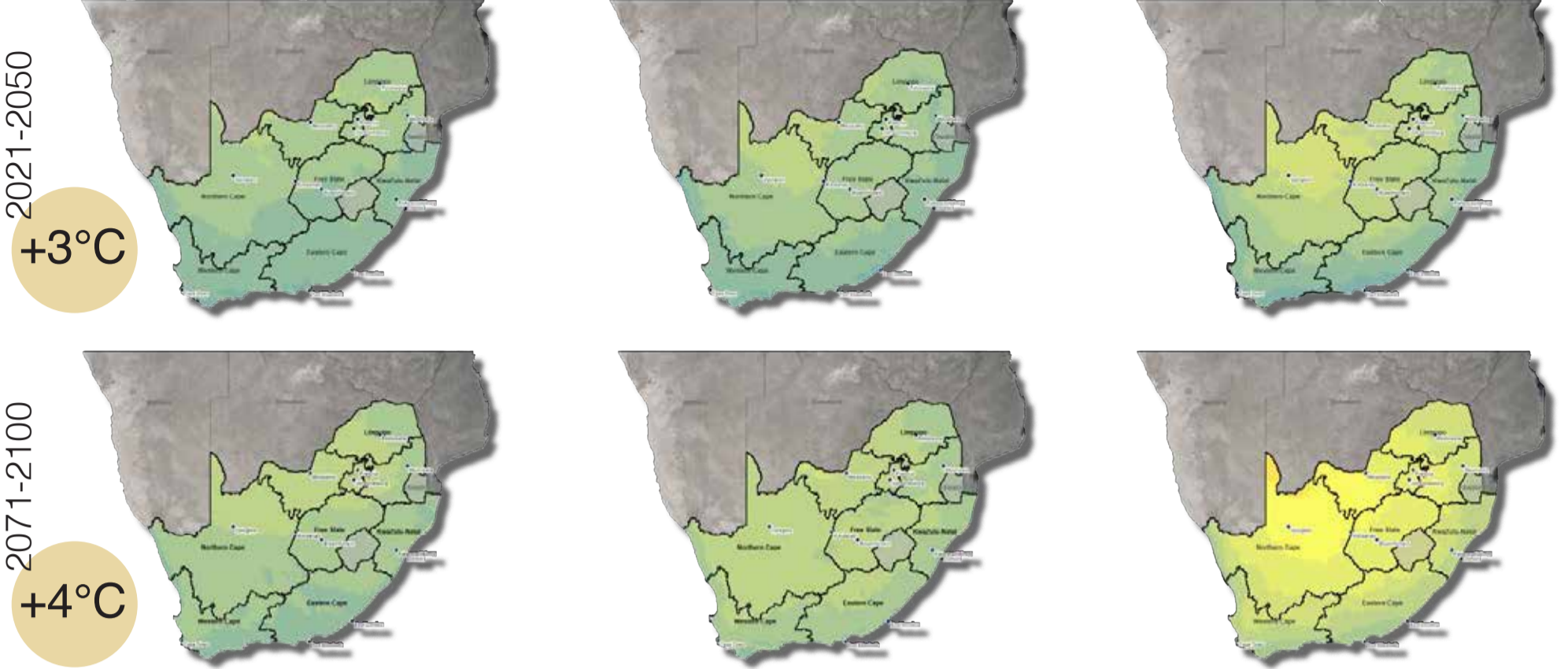


PROBLEM STATEMENTS

CLIMATE CHANGE

RCP PROJECTIONS

Representative Concentration Pathway 4.5 Intermediate Scenario



CLIMATE ADAPTATION MEASURES

basic services
and
infrastructure



clean, safe, reliable
energy provision



quality, dignified water
& sanitation systems



improved waste
management systems

housing
and
construction



strong, resilient
buildings



insulation (thermal
comfort)



alternative building
materials (fire retardant
paint etc.)

neighbourhood
level



developing green
spaces (food gardens
contribute to 'greening'
the area and can buffer
food insecurity)



protecting natural
areas



early evacuation plans
in case of disaster



sustainable drainage
systems

(adapted from Isandla, 2024)

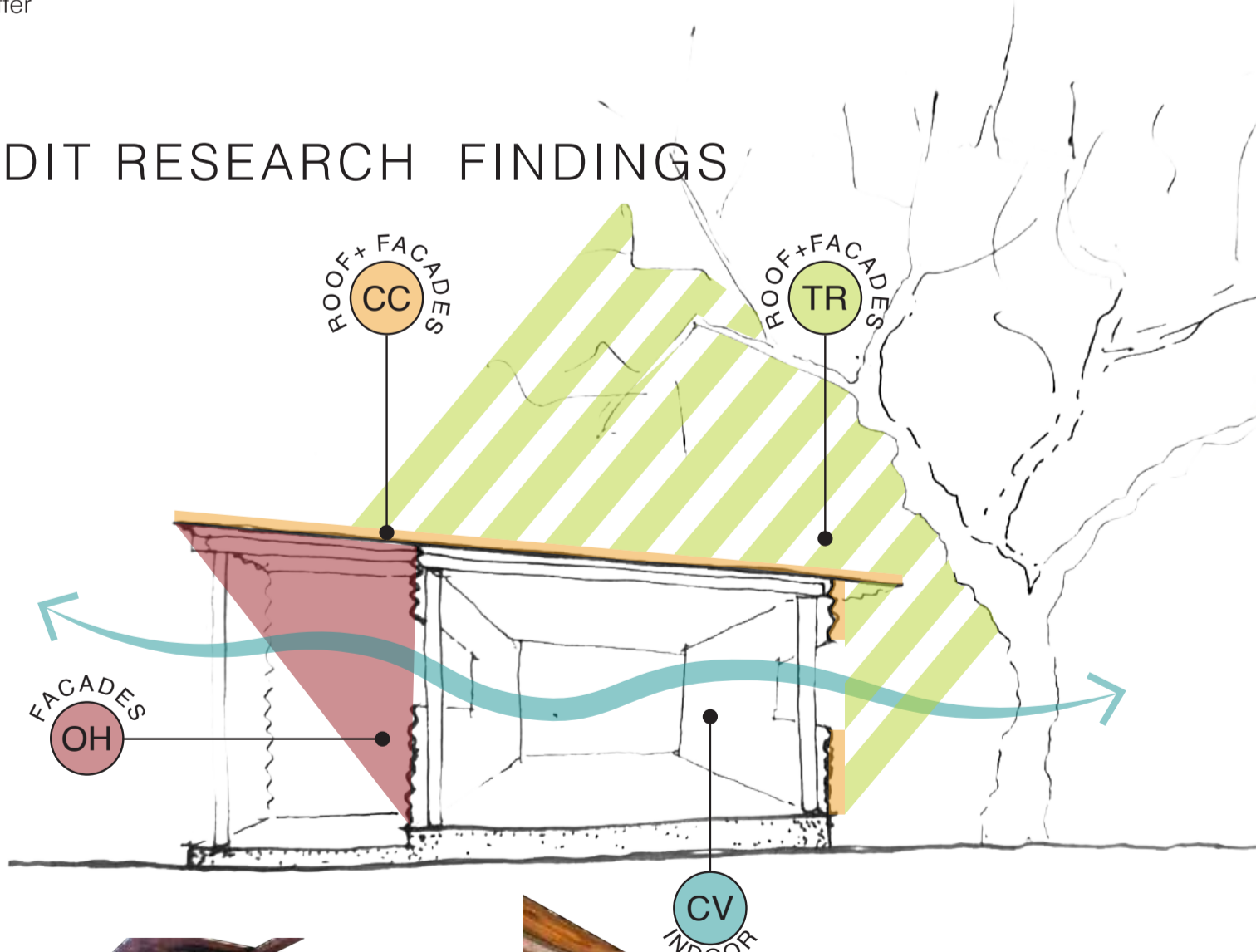
DIT RESEARCH FINDINGS

TR Tree - solar shading
active on highest solar gain
envelop element (roof)
active on second highest solar
gain envelop element (walls)

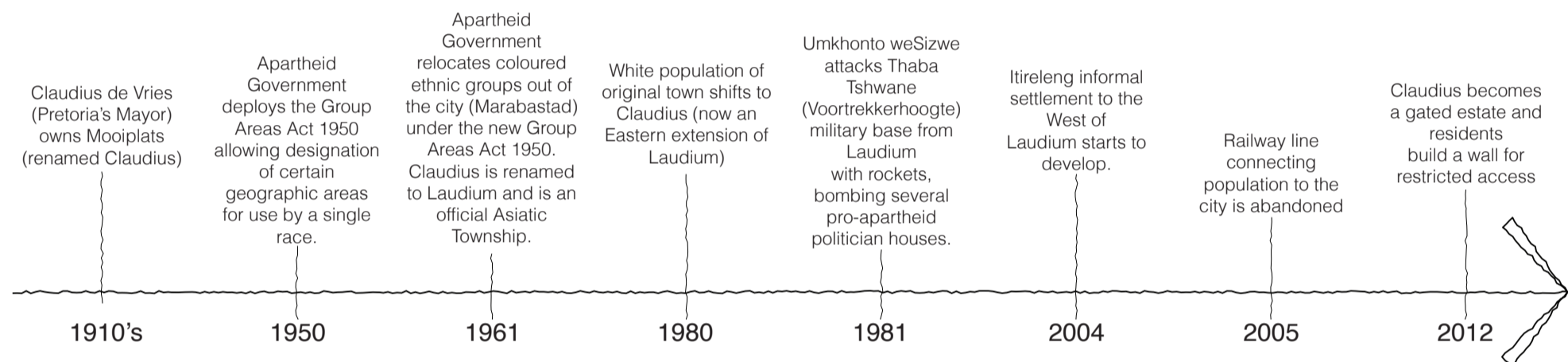
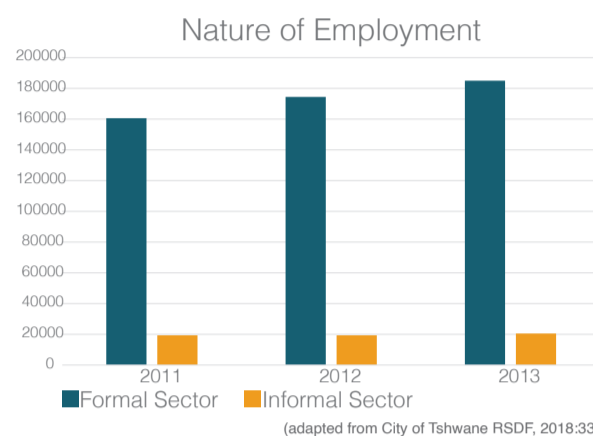
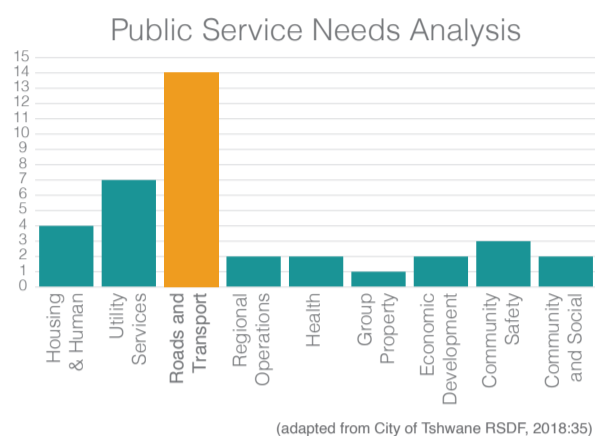
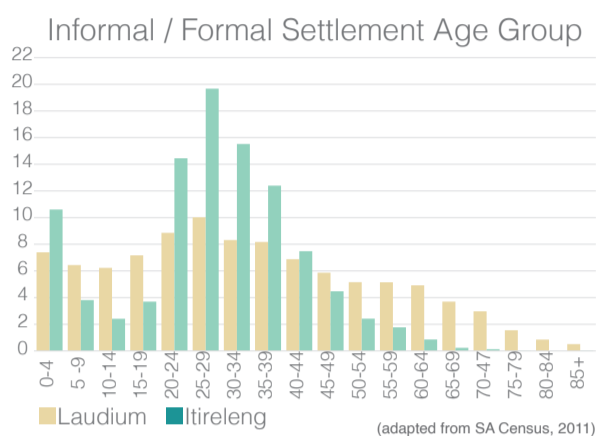
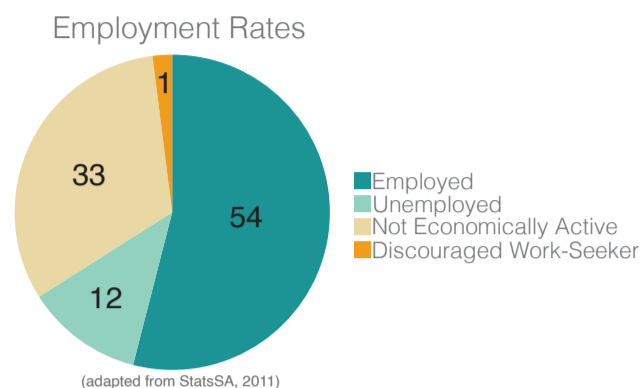
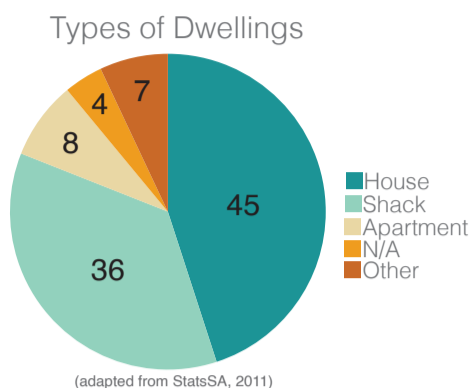
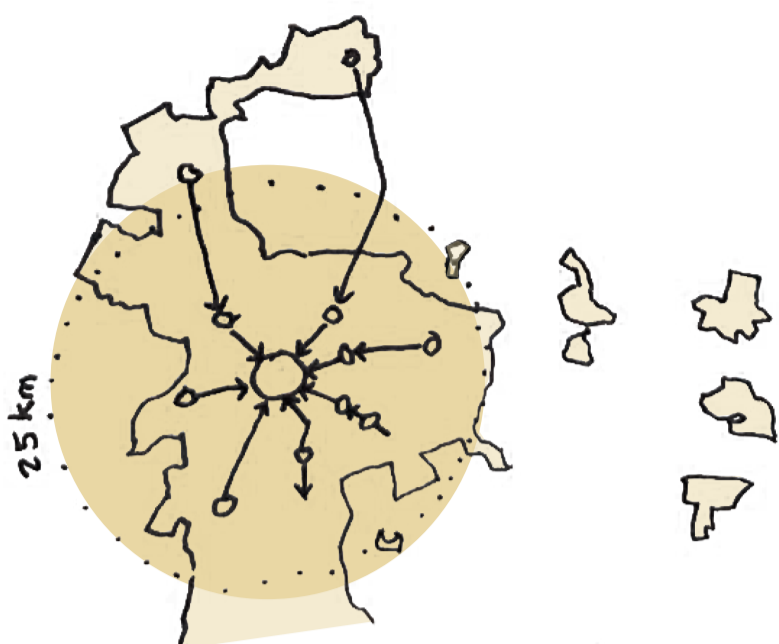
OH Overhangs - solar shading
active on second highest solar
gain envelop element (walls)

CV Cross Ventilation
active within indoor environment

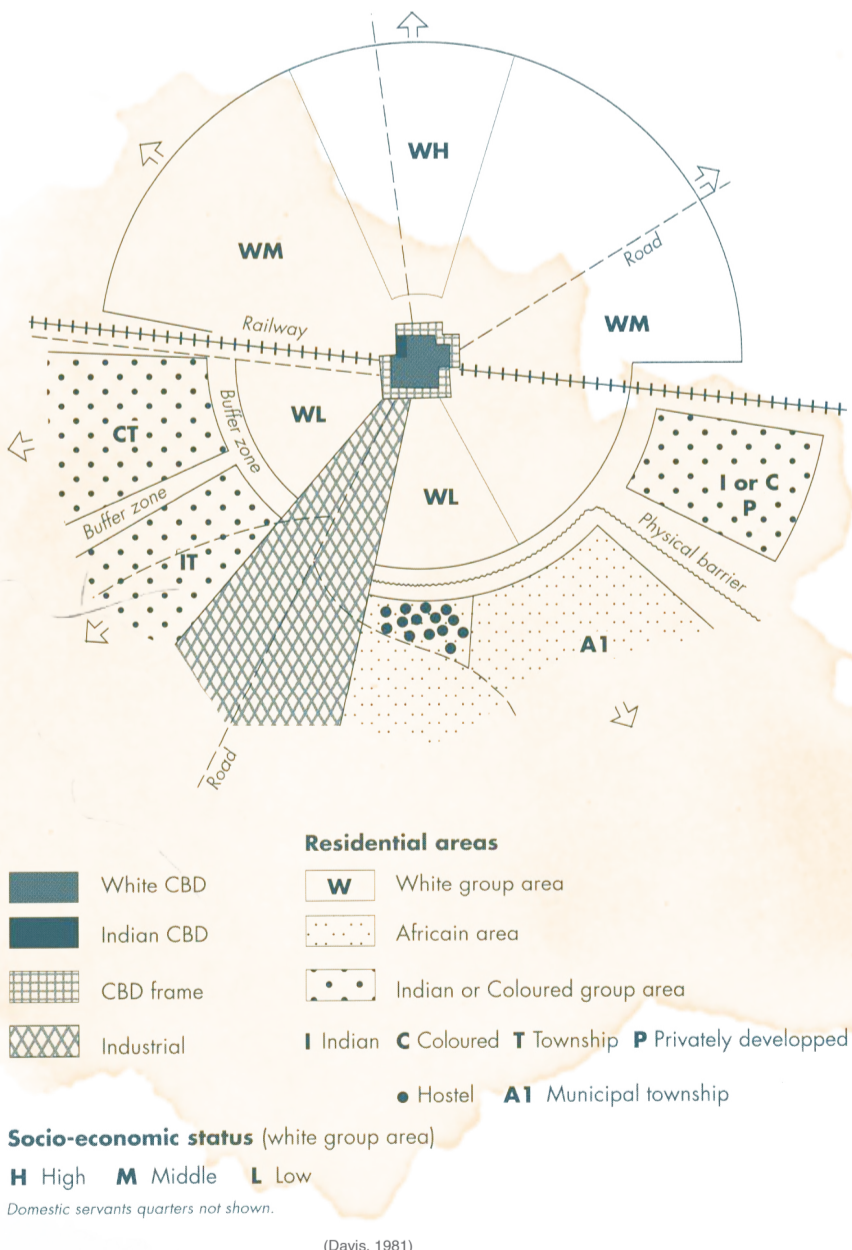
CC Cool Coating - active on highest
and second highest solar gain
envelope elements (roof and
walls)



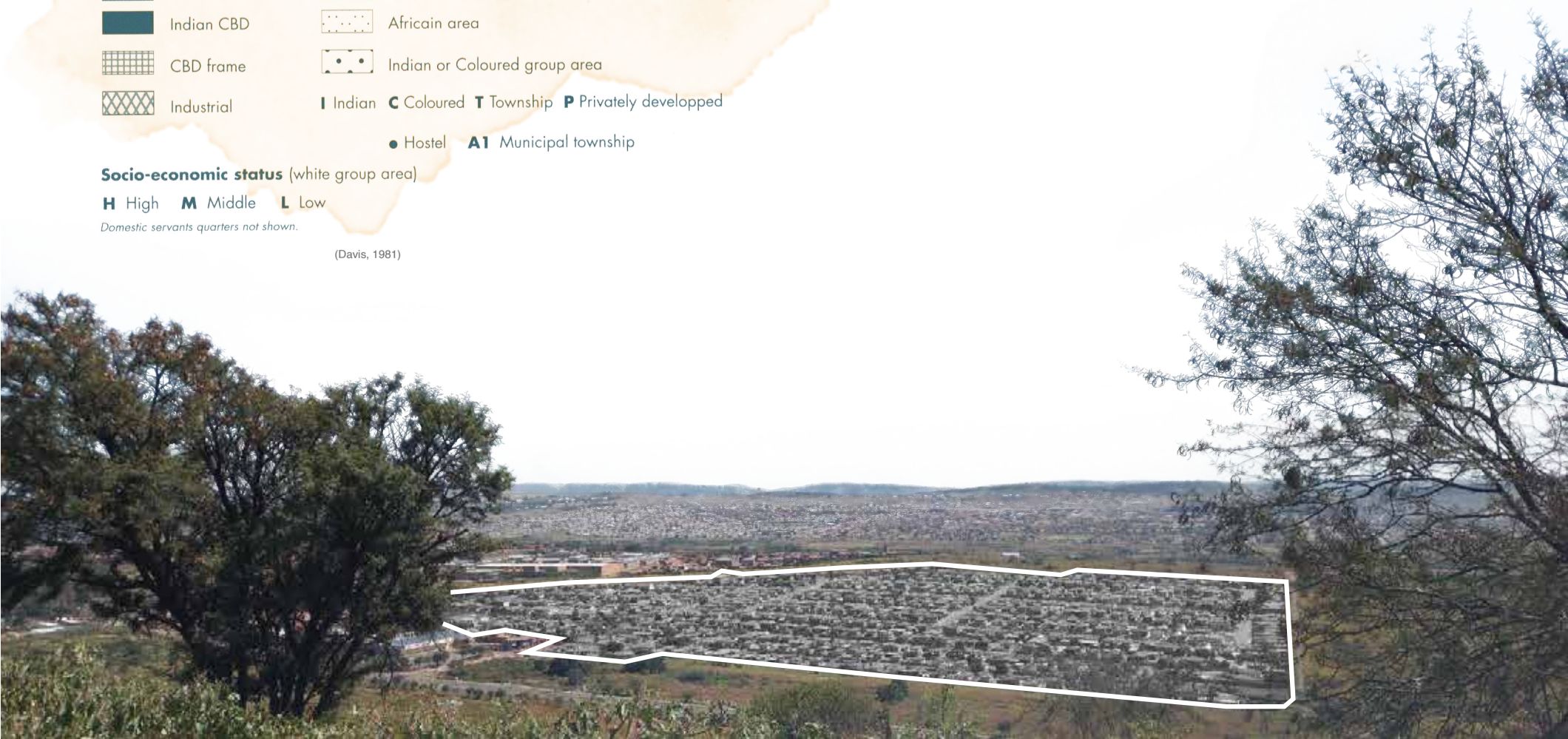
RAPID RURAL-URBAN MIGRATION AND HISTORICAL SEGREGATION



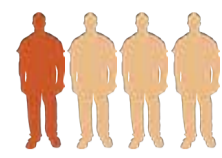
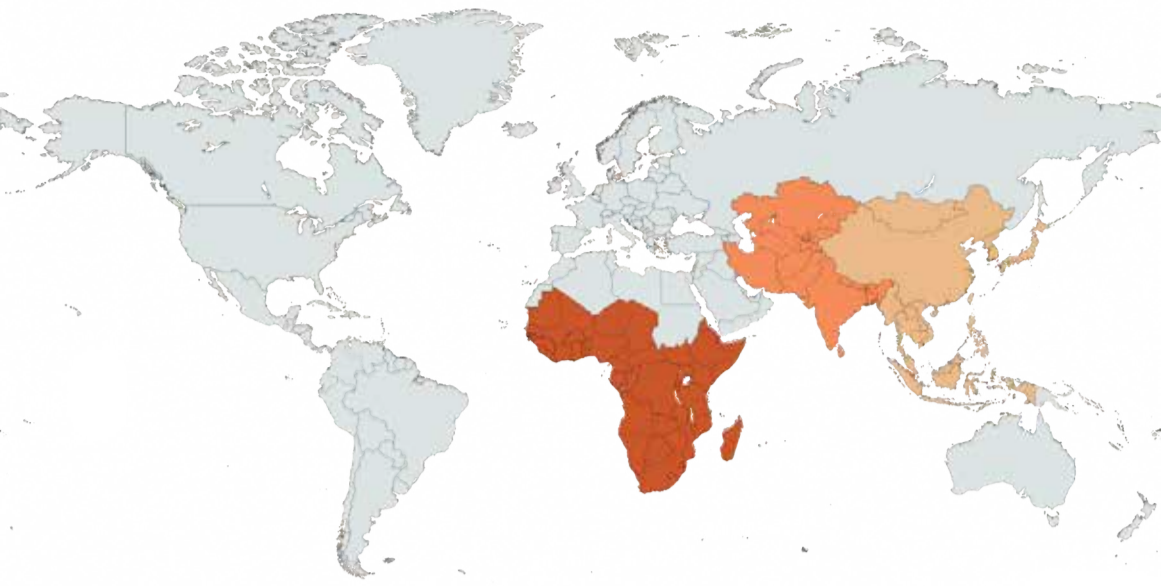
Apartheid Spatial Planning



Relocation of Asiatic and Black people from Marabastad



INFORMALITY



1 in 4 urban dwellers worldwide lived in informal settlements in 2020.

Meaning more than 1 billion people, 85% of whom live in three regions:

Sub-Saharan Africa (230 million)	Central & Southern Asia (359 million)	Eastern and South-Eastern Asia (306 million)
50,2% of the urban population live in informal settlements	48,2% of the urban population live in informal settlements	21,7% of the urban population live in informal settlements

(adapted from Global Action Plan, 2022:11)

POLICY SUPPORT

1. UN Sustainable Development Goals (SGD)



(adapted from United Nations, 2022:8)

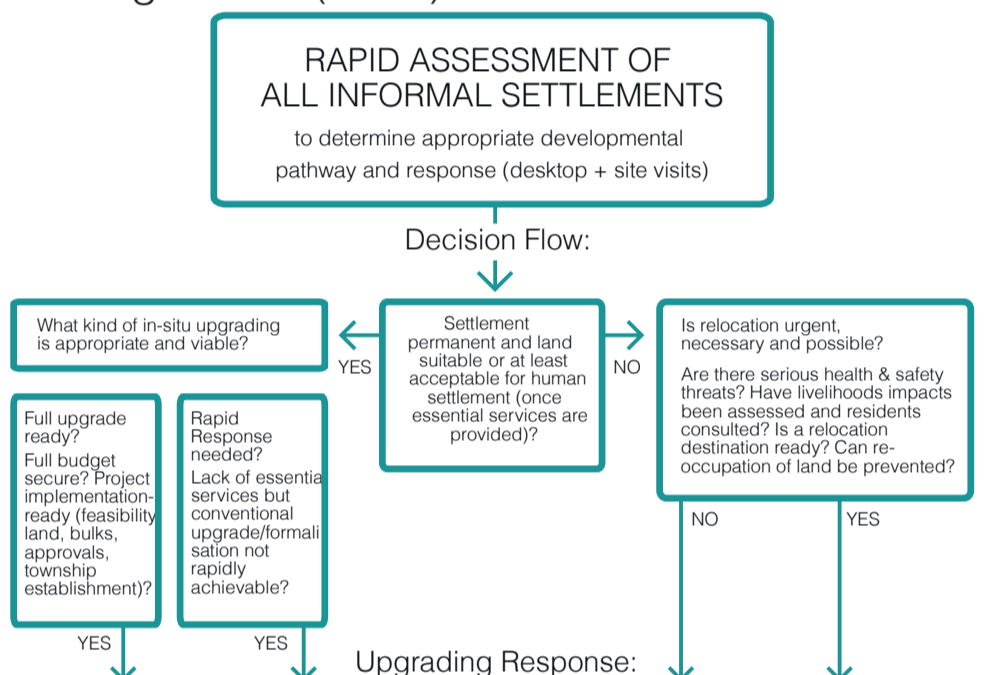
2. Global Action Plan

3. Upgrading Informal Settlements Programme (UISP)

Informal Settlement Transformation

- Inclusive and participatory
- Evidence and data-driven
- Integrated and proactive
- Equitable and catalytic
- Sustainable and climate-smart
- Affordable and replicable

(UN-Habitat, 2022: 25)



CATEGORY A:	CATEGORY B1:	CATEGORY B2:	CATEGORY C:
Full Conventional Upgrade	Incremental Upgrade with essential services	Deferred Relocation with emergency services	Immediate Relocation
Formalisation consisting of full services, state-funded housing, formal tenure (e.g. title deeds), township establishment. May be conventional 'RDP' or densified housing solution.	Commencing with comprehensive essential services package (e.g. water, sanitation, roads & footpaths, electricity, fire protection, waste removal key social facilities). Incremental tenure. People build own housing in the short term. May lead to formalisation or other permanent settlement solution.	Commencing with emergency services package (e.g. water, sanitation, fire protection, solid waste removal). Eventual relocation	Rapid relocation to a prepared site [i.e. greenfields housing project, temporary relocation area (TRA), site and service (serviced land release)].

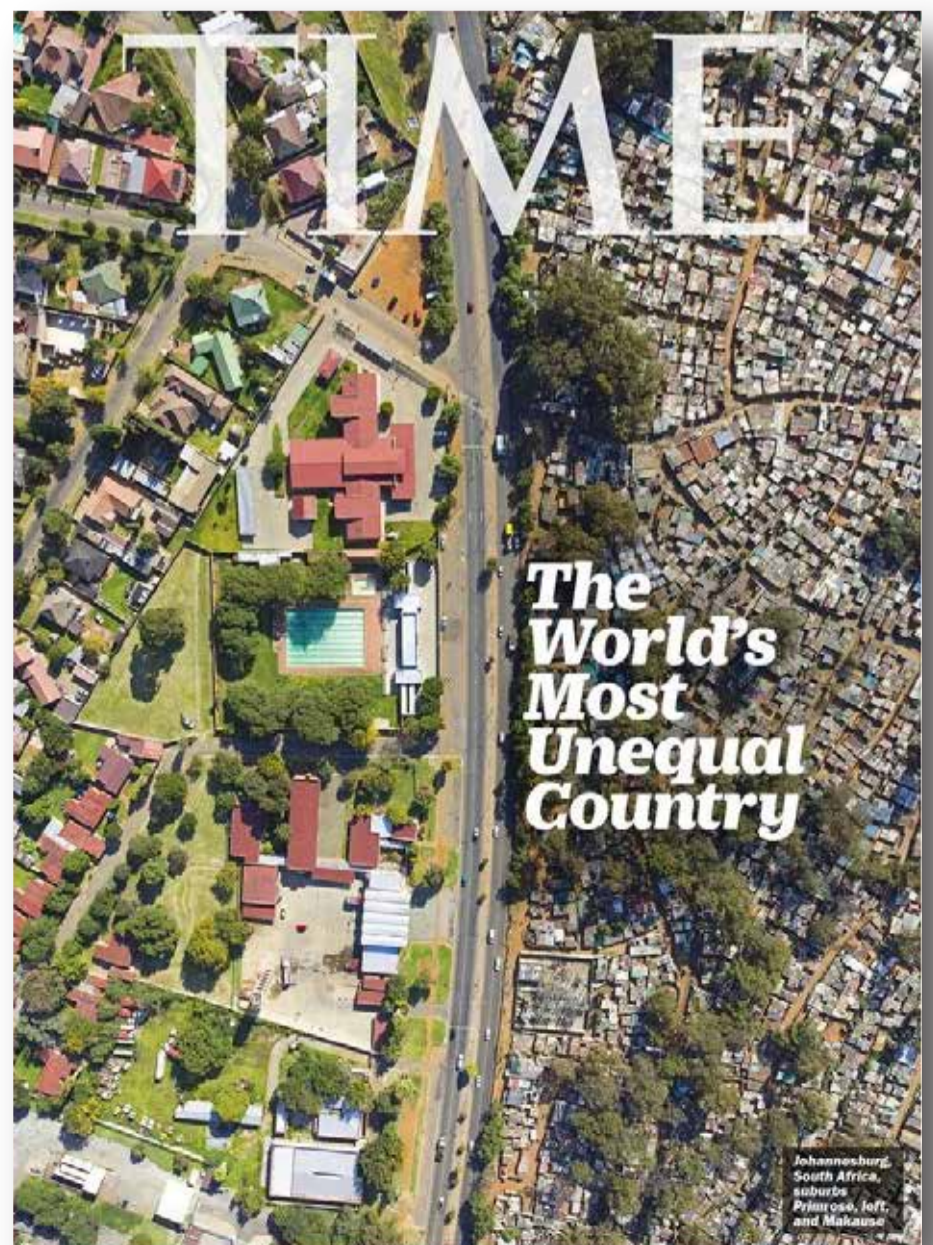
(adapted from Isandla, 2022:9)

Challenges Facing Upgrading Policy

Regulatory dimension	Institutional dimension	Financial dimension	Participatory dimension
Tenure regulation and affordable land Supply of affordable housing Supply of urban infrastructure and basic services	Informal areas sensitive urban planning framework Decentralised and institutionalised	Financing informal settlements upgrading	Inclusion and participation of informal settlements residents Stakeholders participation and coordination

(adapted from Hegazy, 2016)

SOCIO-ECONOMIC DISCONNECT

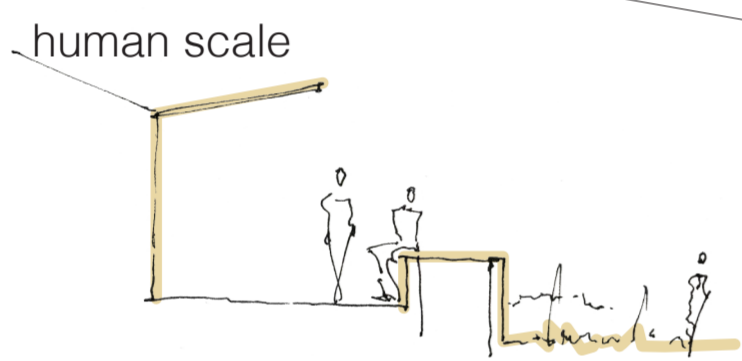
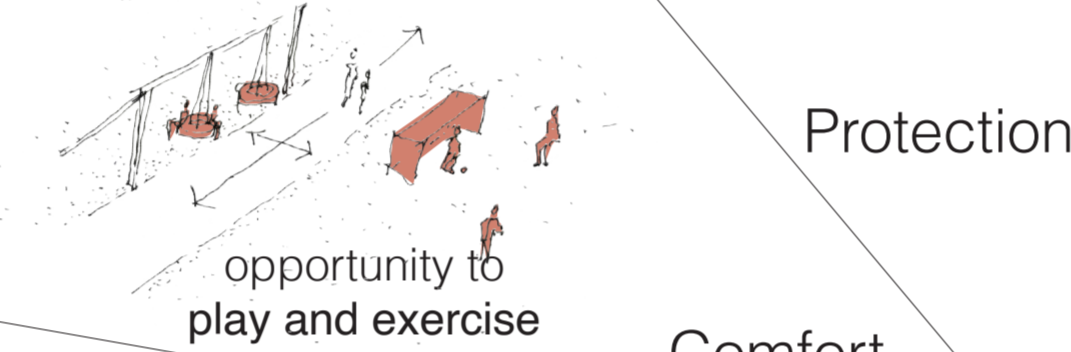
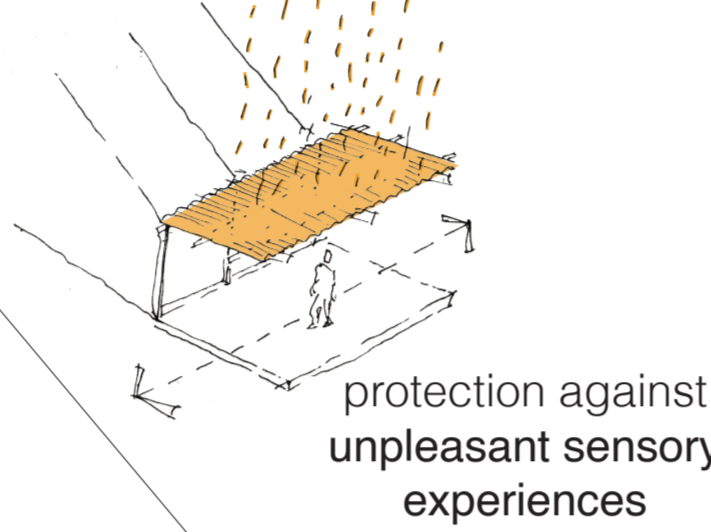
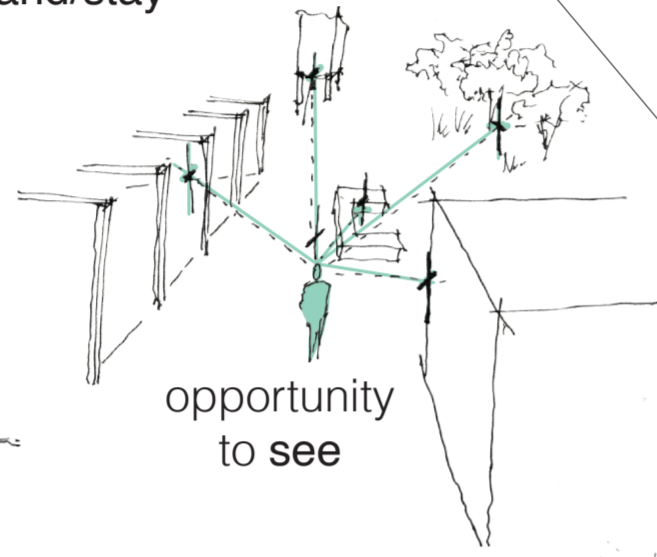
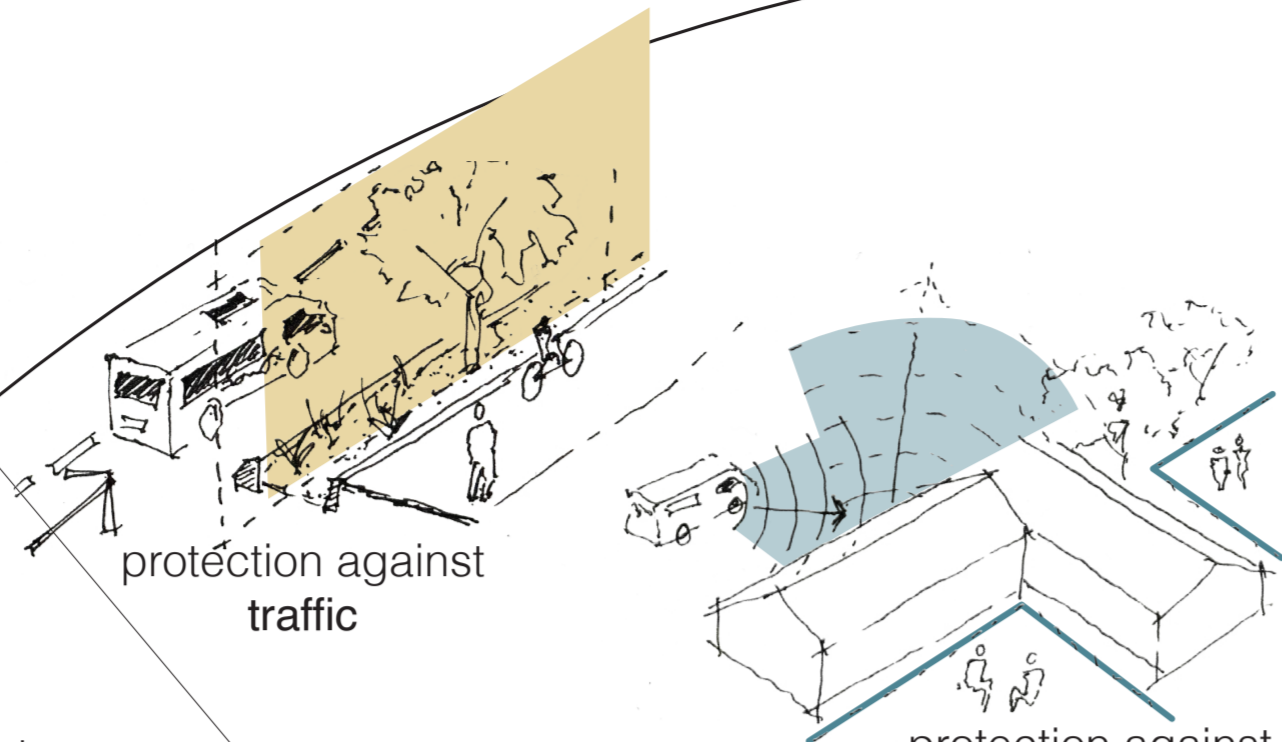


(Time, 2019)

THEORETICAL FRAMEWORK

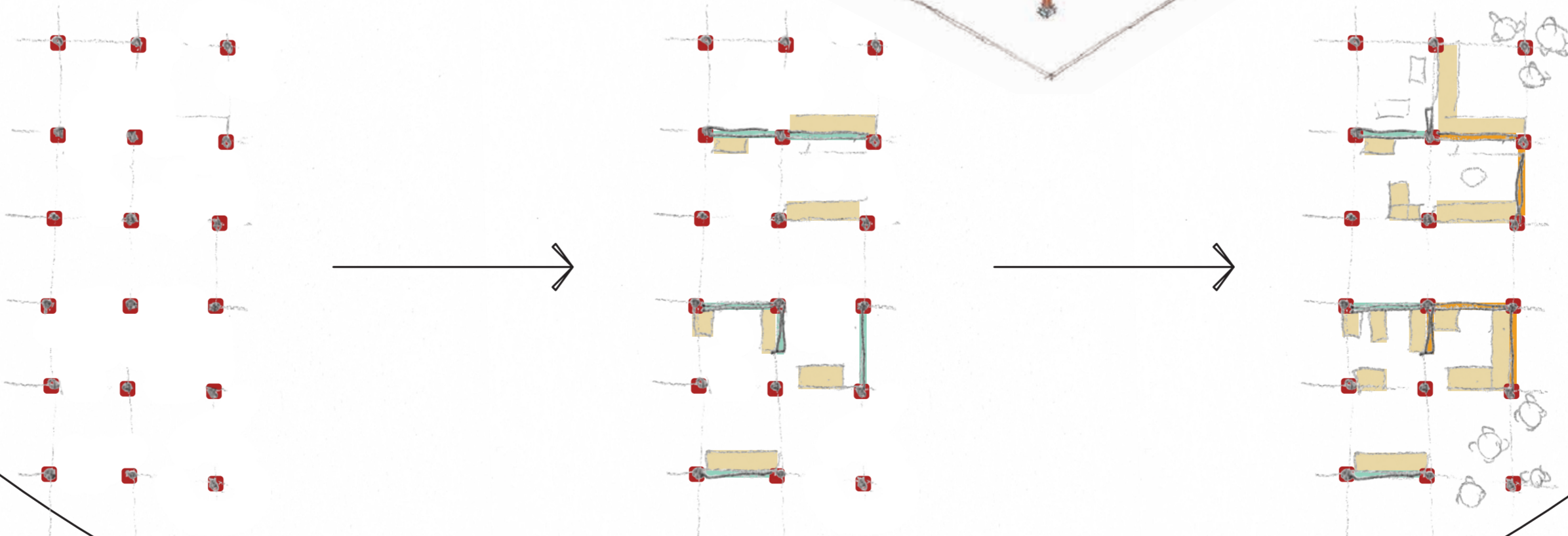
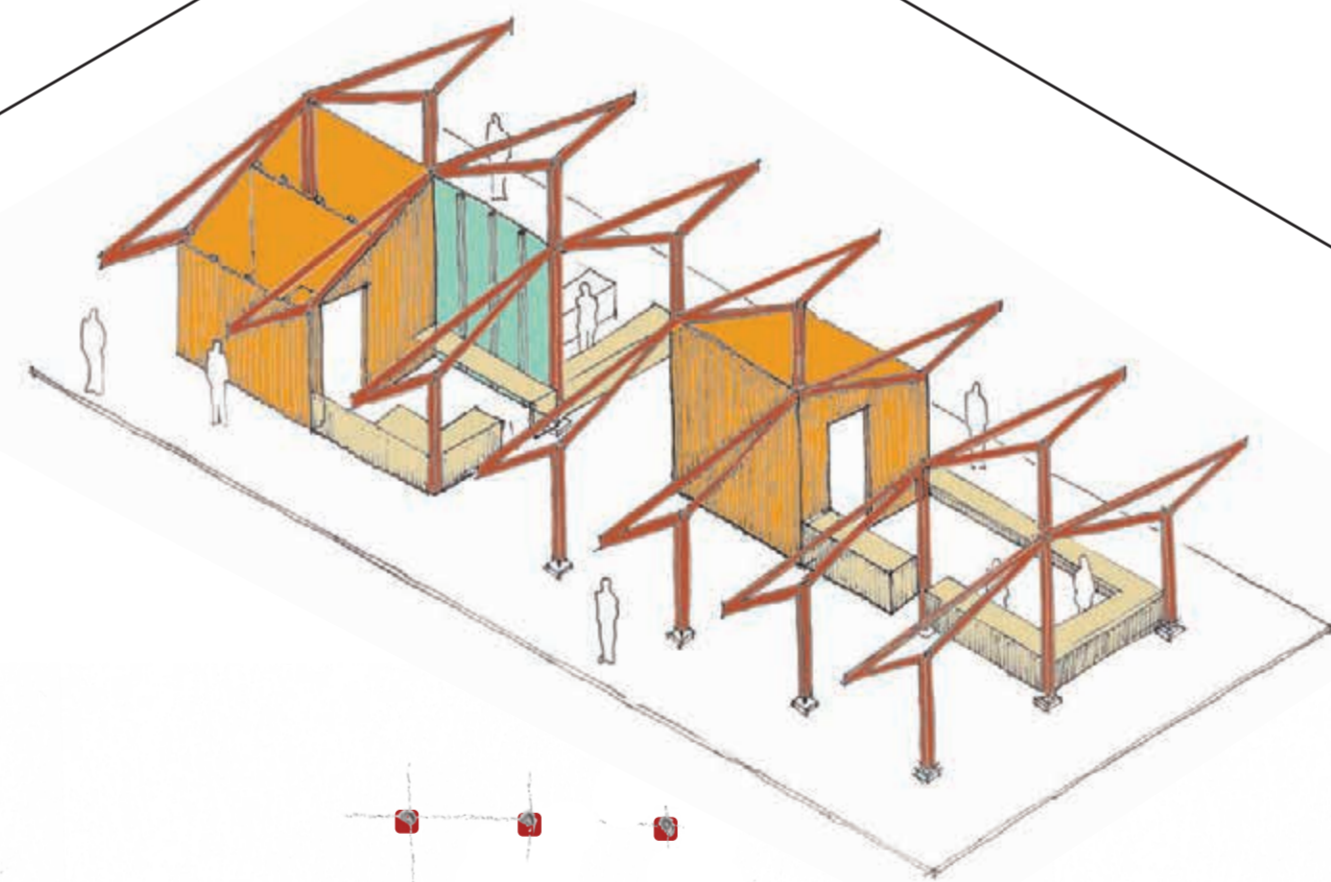
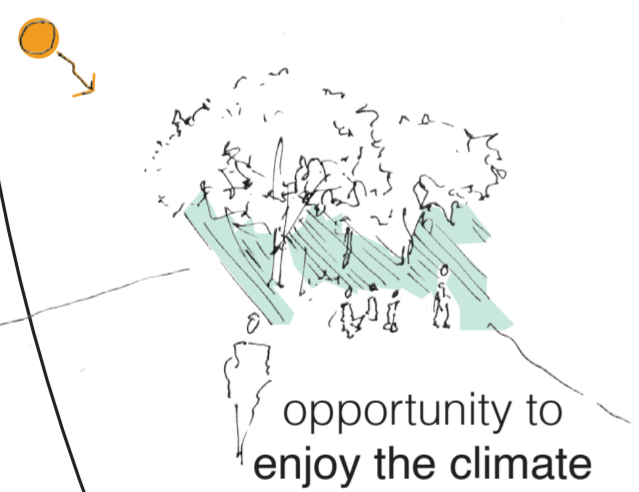
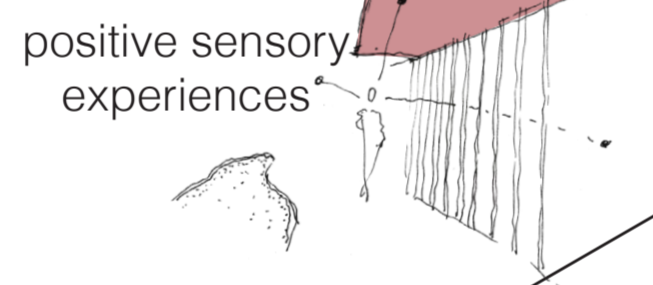
CITIES FOR PEOPLE
Jan Gehl 2013

opportunity to walk
opportunity to stand/stay

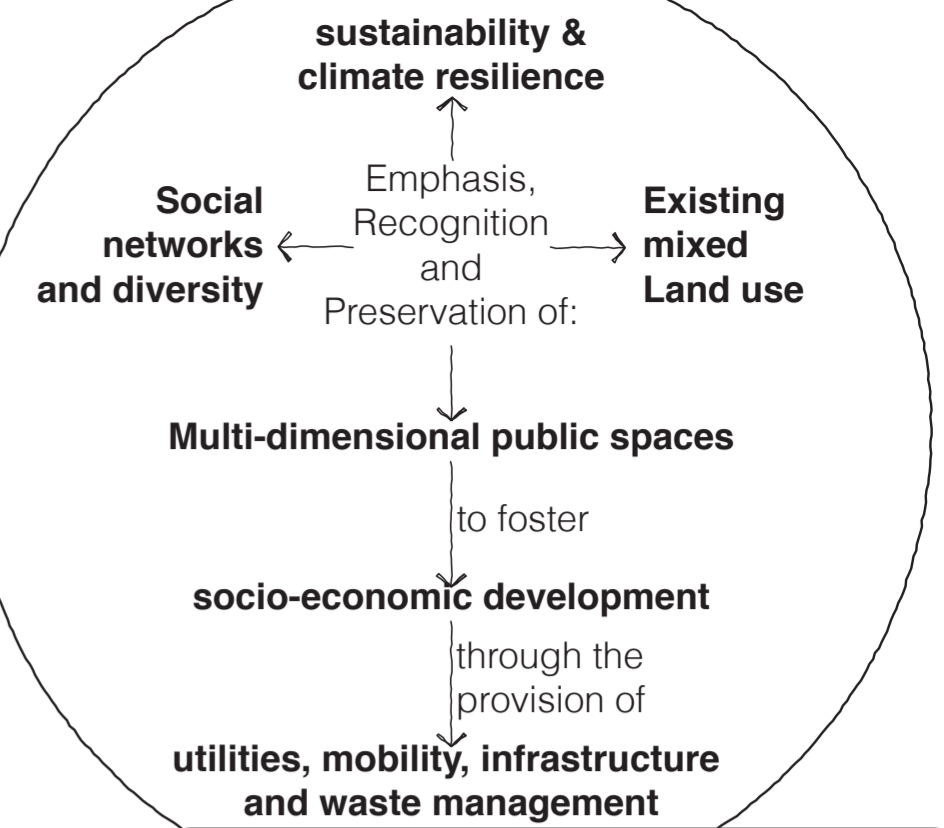
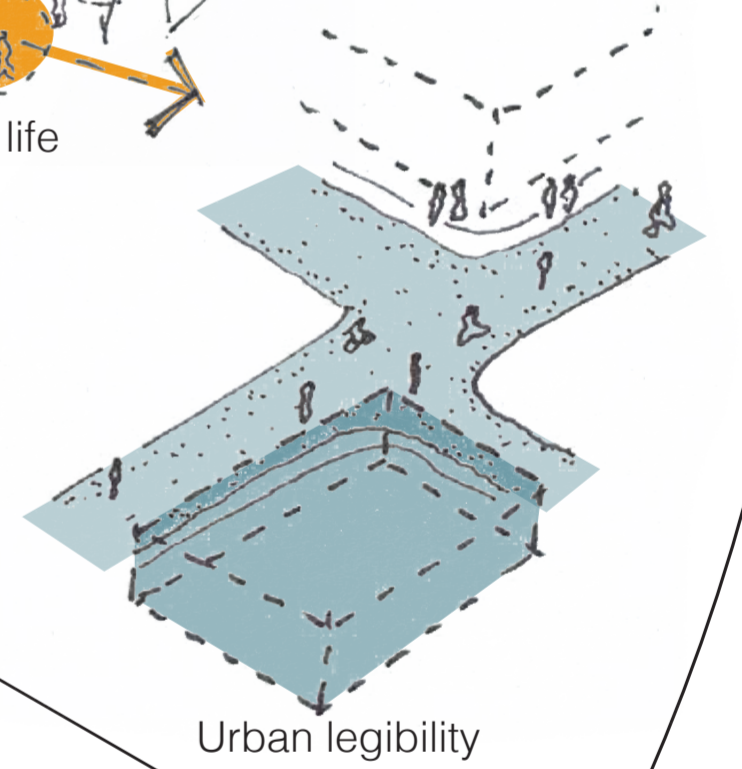
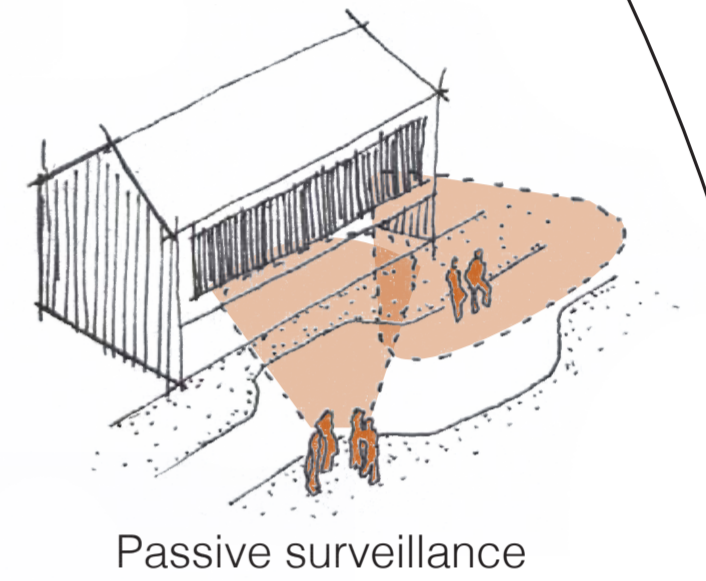
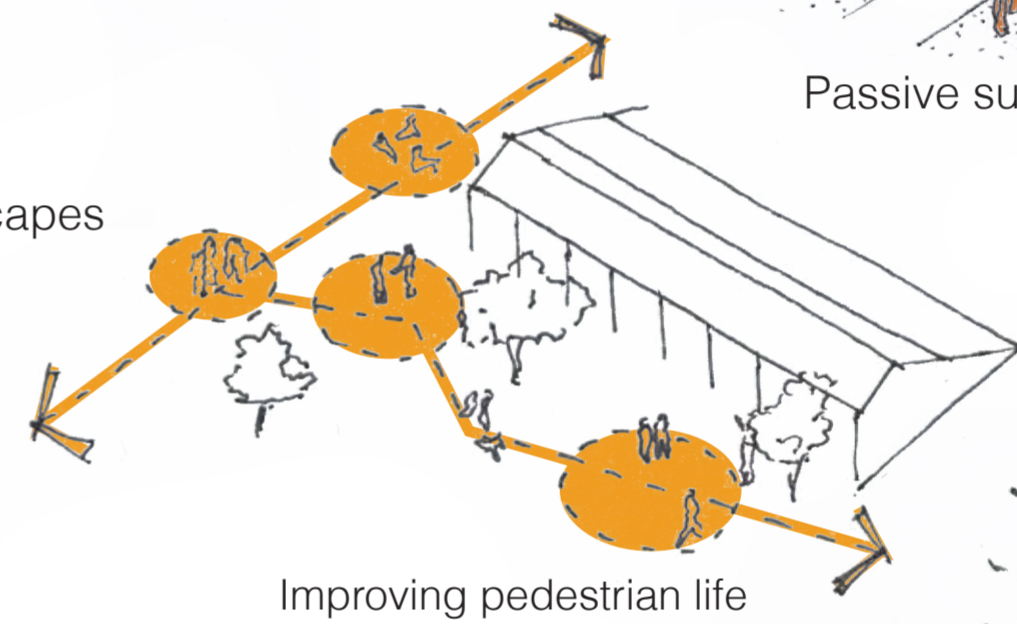
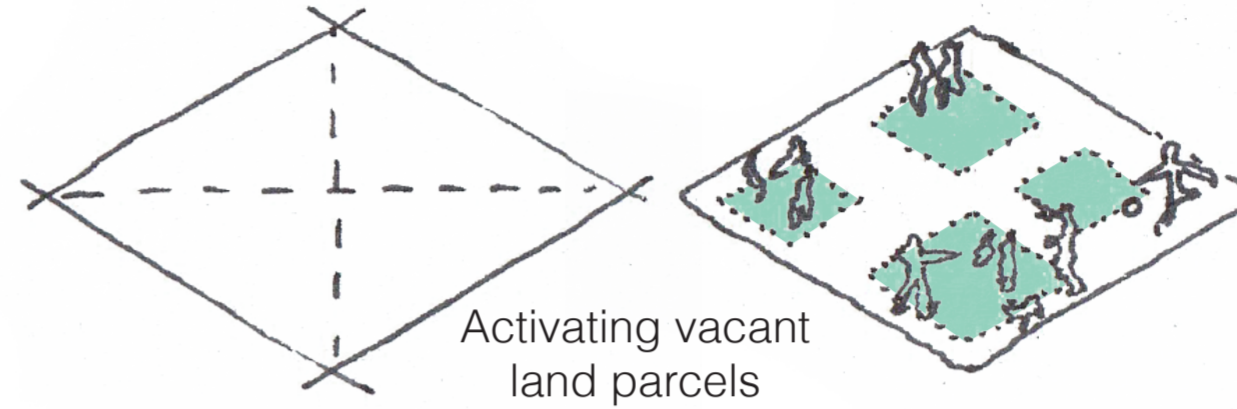
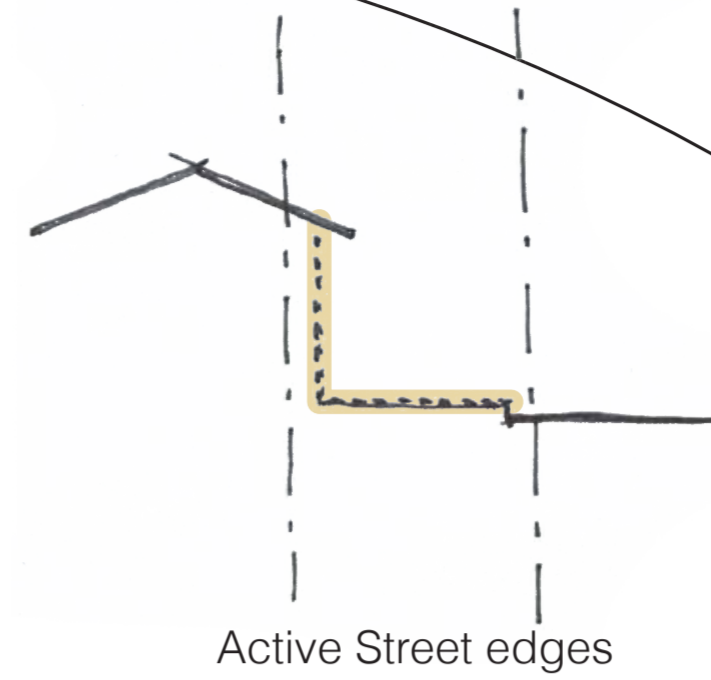


Protection
Comfort

Delight



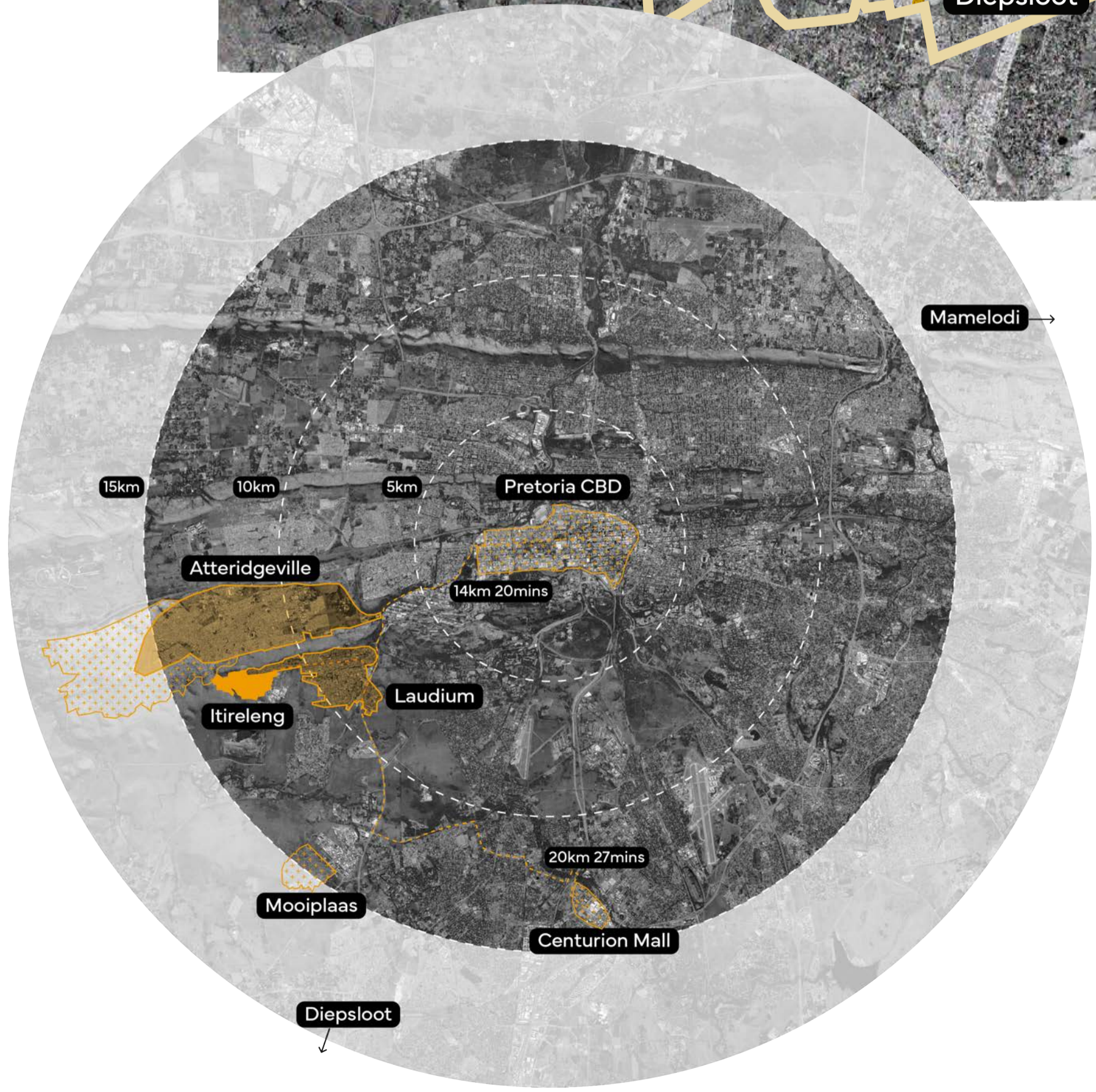
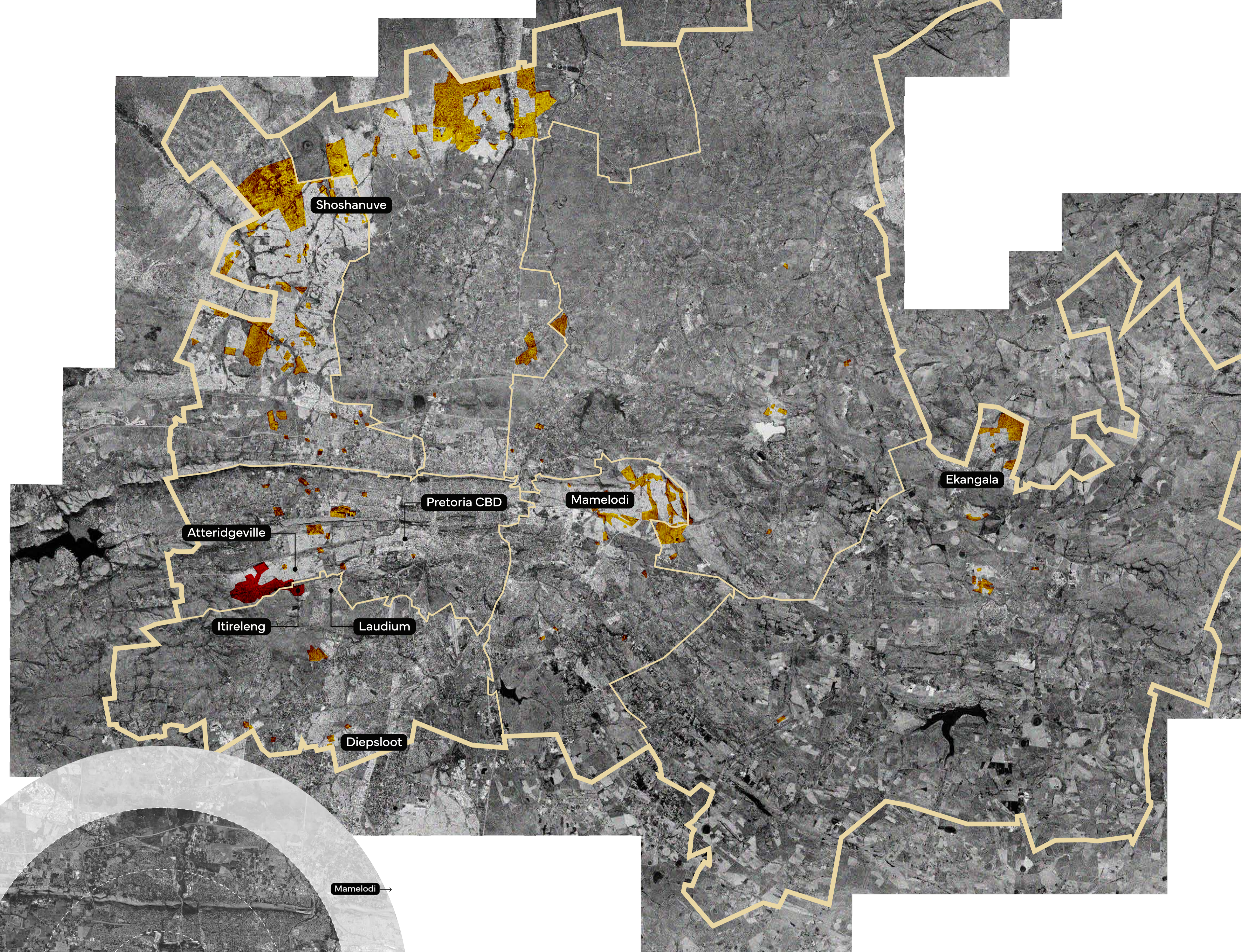
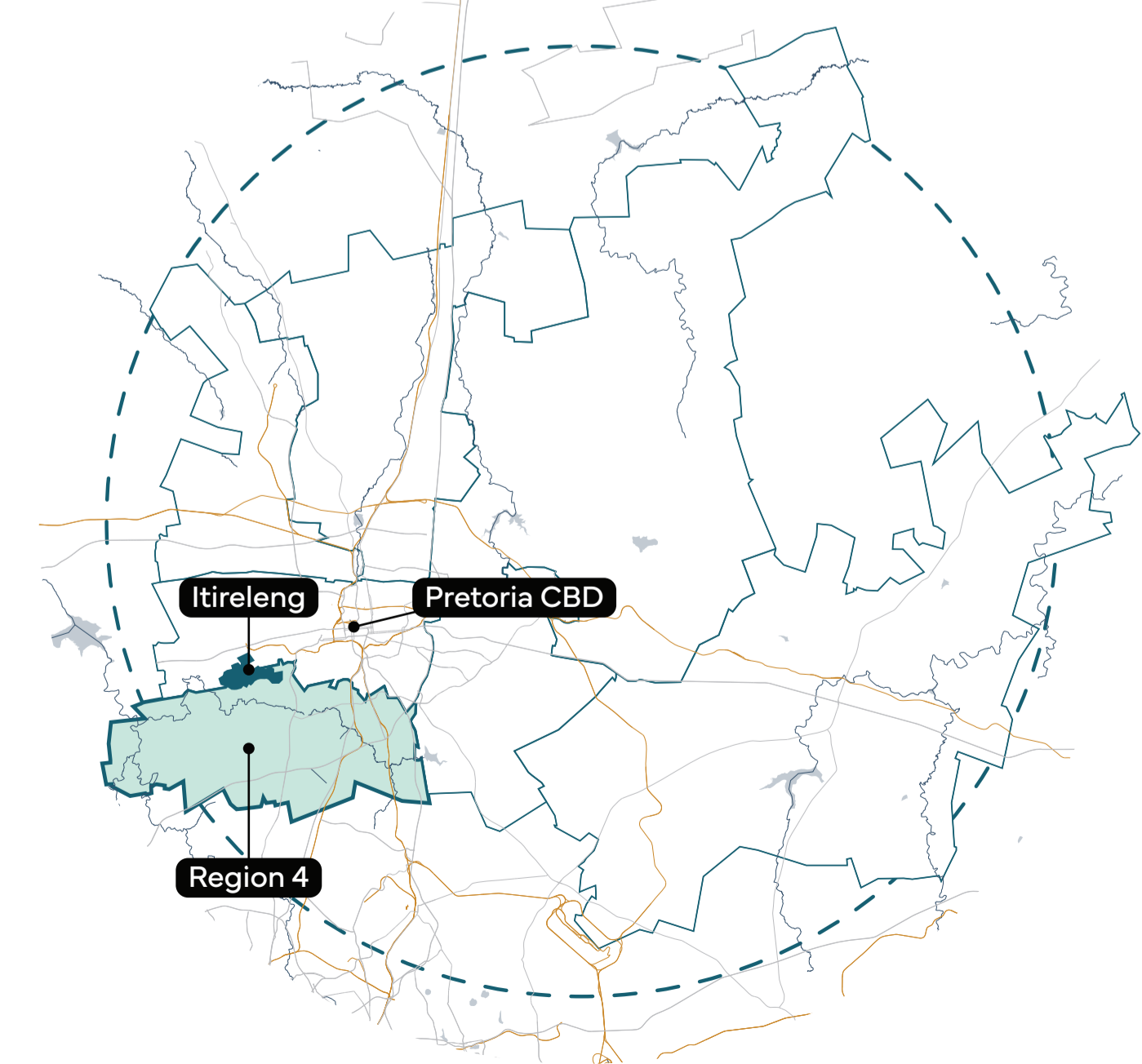
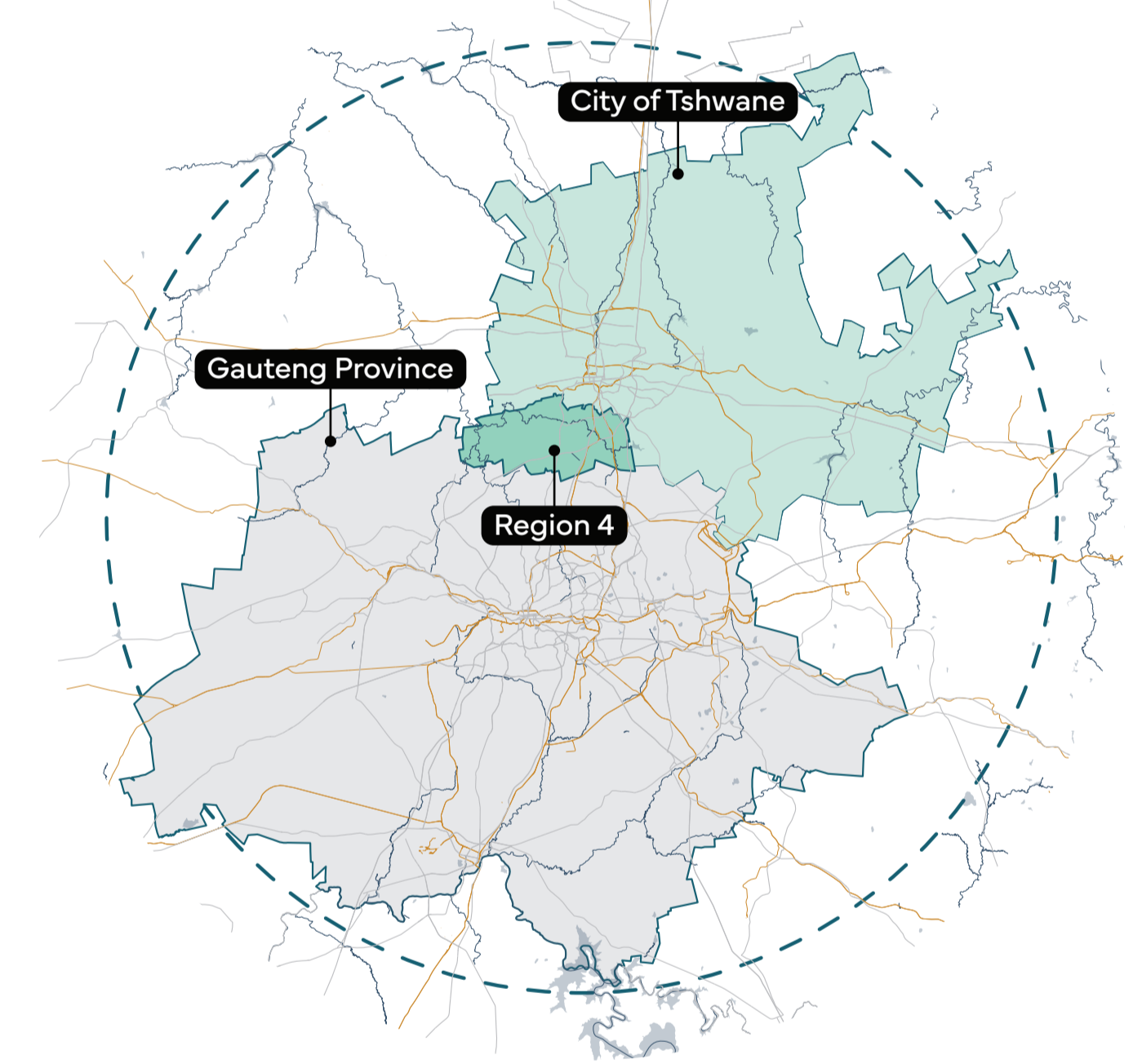
RESILIENCE THROUGH FLEXIBILITY
Till and Schneider 2005



INCREMENTAL DEVELOPMENT
Jane Jacobs 1989

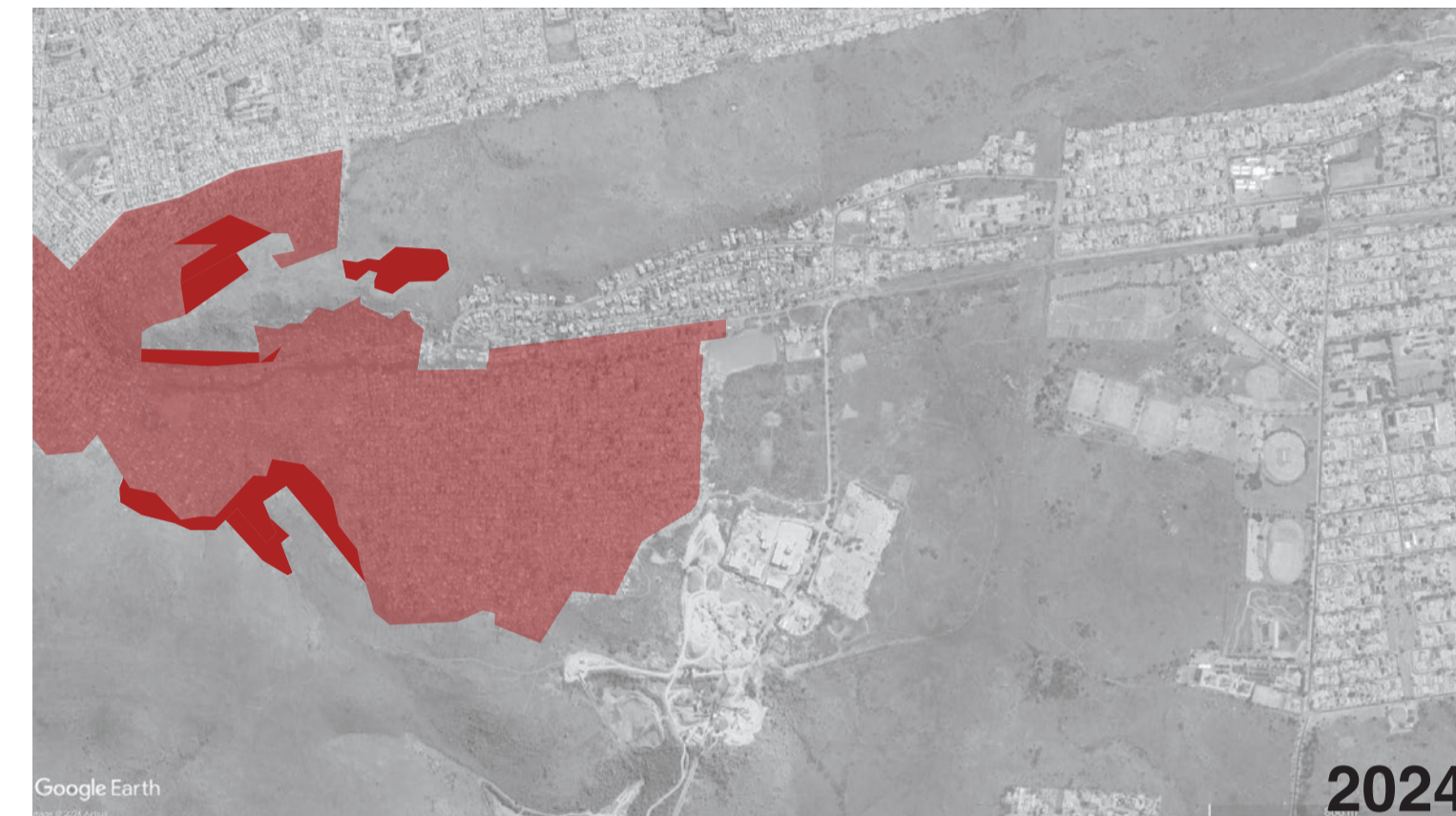
SITE ANALYSIS

MACRO SCALE ANALYSIS



Informality in the City of Tshwane
19,3% informal living conditions
227 informal settlements

Informal Settlement Urban Growth - creating an informal connection



MESO SCALE ANALYSIS

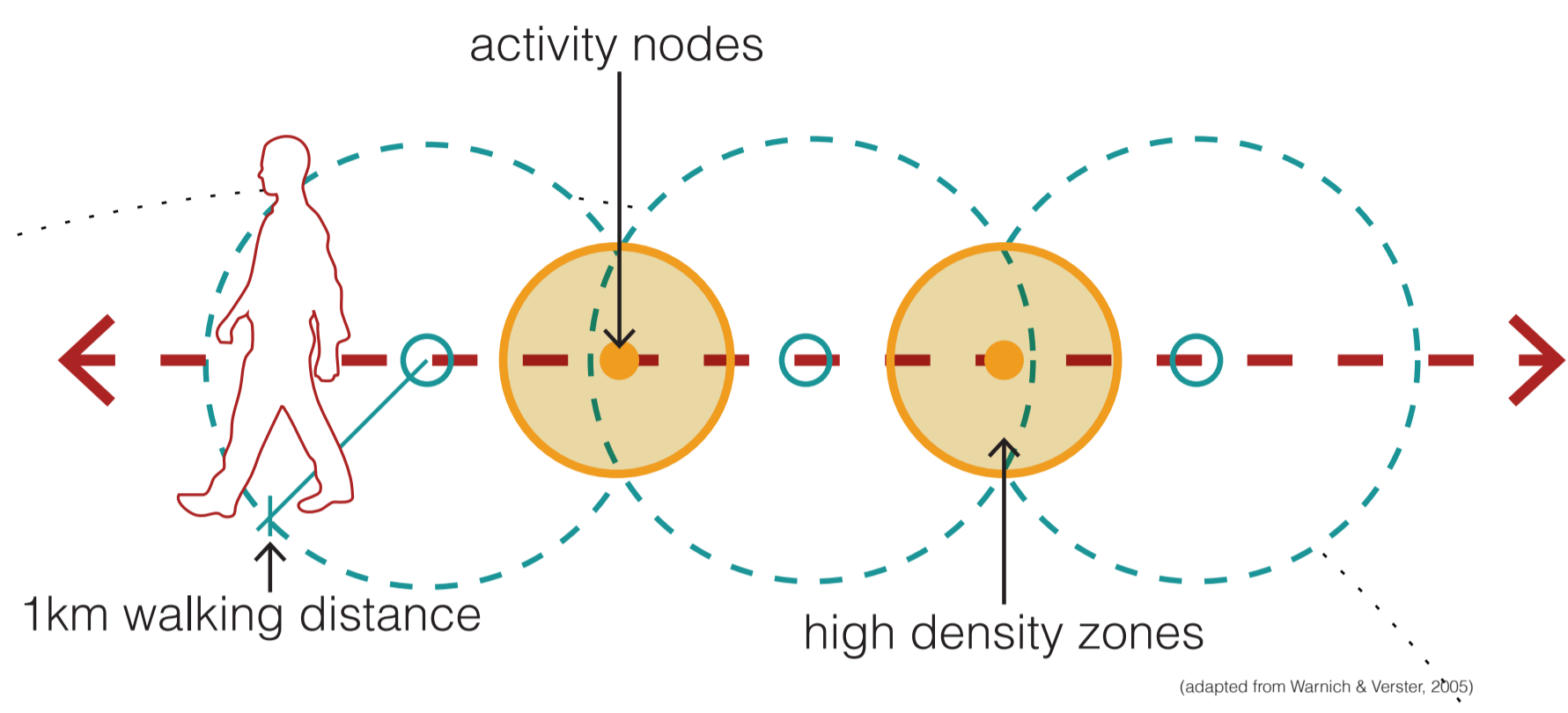
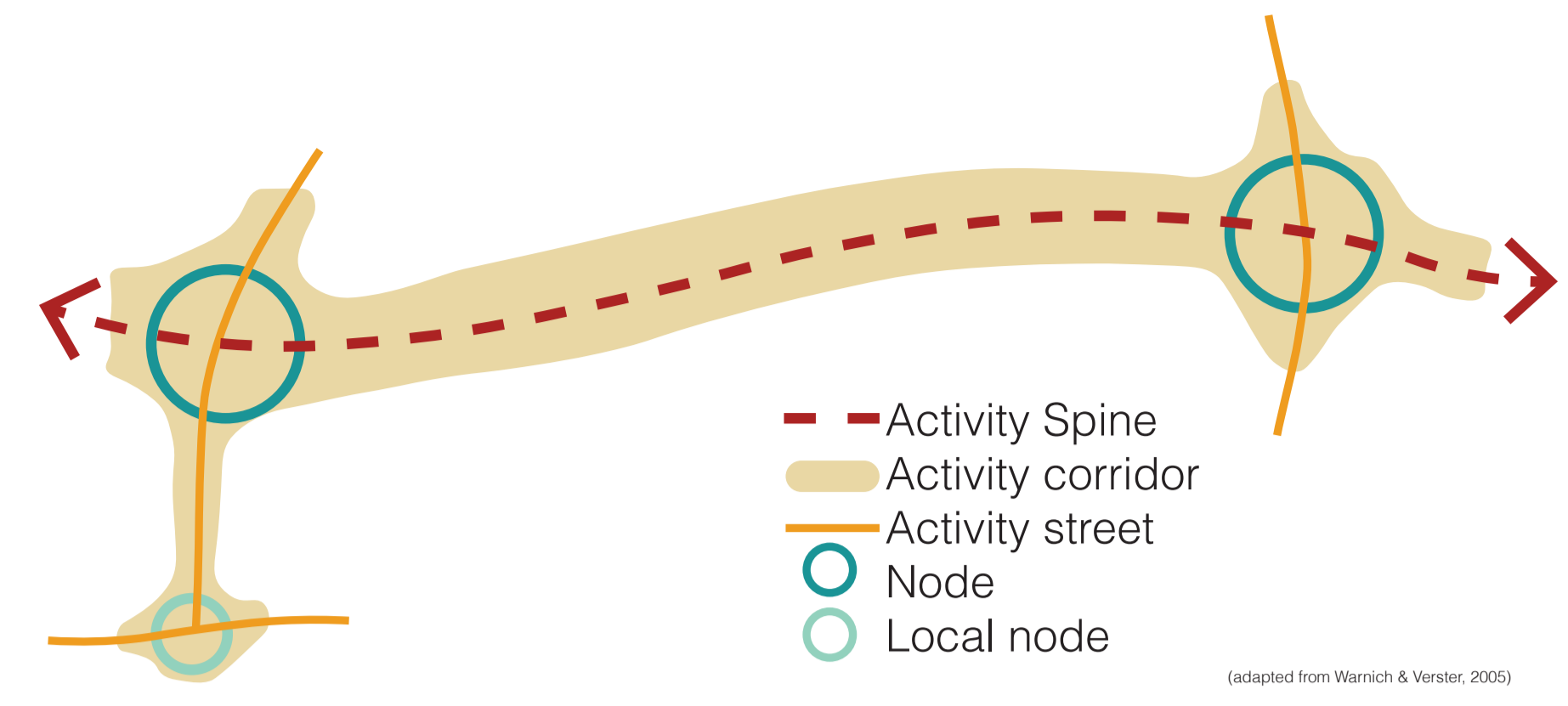
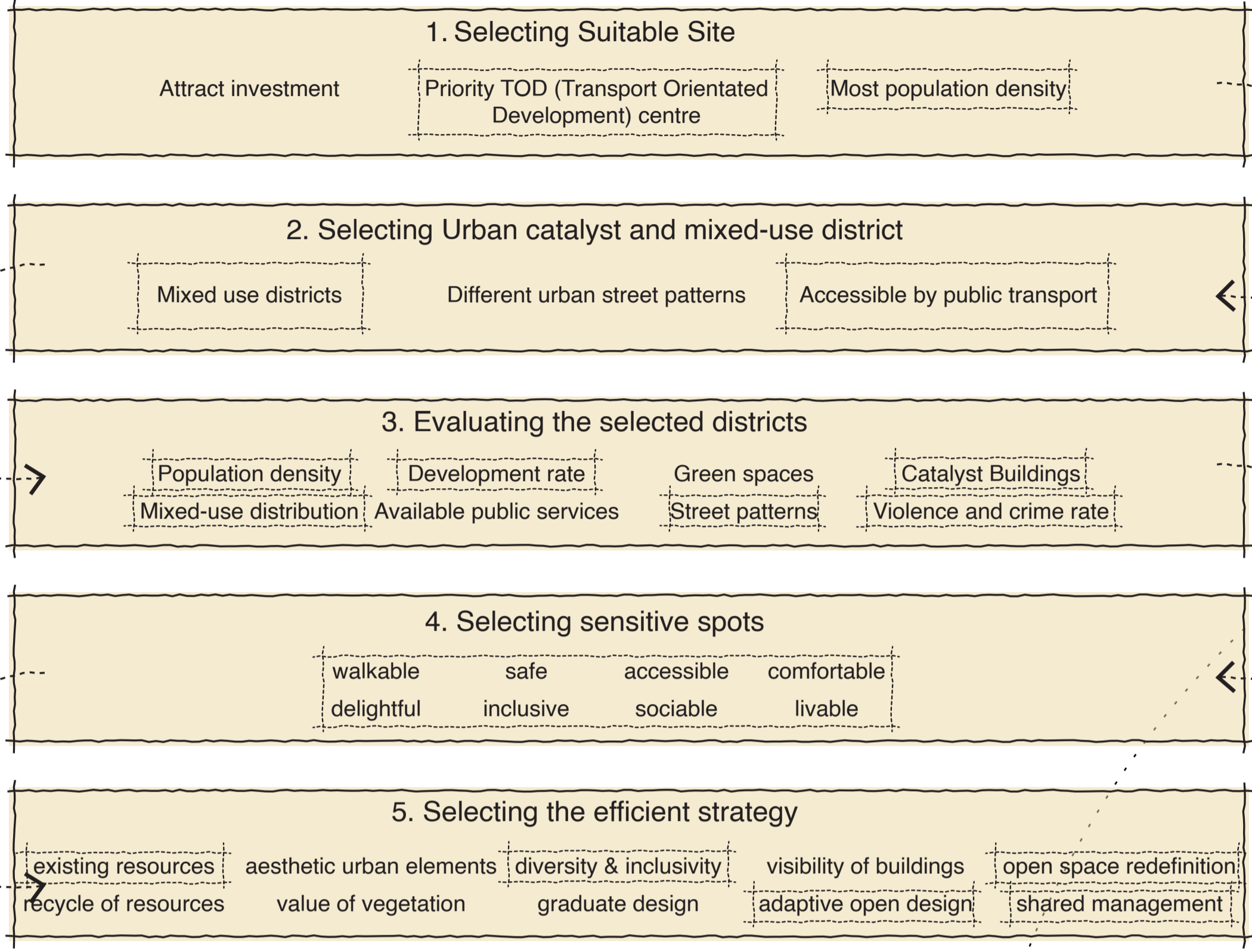


PLEASE! JOIN US FOR A FREE LUNCH
DAILY Monday To Friday 1 pm - 3pm
All Welcome. No Questions Asked
 330 Carmine Street Laudium

**"IF YOU GIVE A MAN A FISH, YOU FEED HIM FOR A DAY.
 IF YOU TEACH A MAN TO FISH, YOU FEED HIM FOR A LIFE TIME!"**
SKILLS DEVELOPMENT ELECTRICAL
 012 374 1584 / 079 911 9118
 330 Carmine Street Laudium

URBAN VISION SITE SELECTION

Sensitive Site Selection:
Filtering framework for Urban Acupuncture application

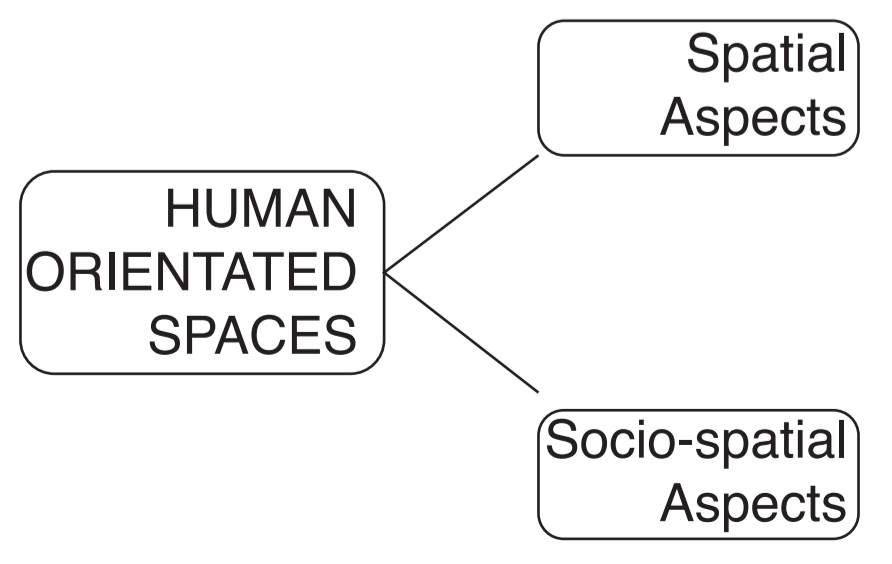


Urban Acupuncture Nassar (2021)

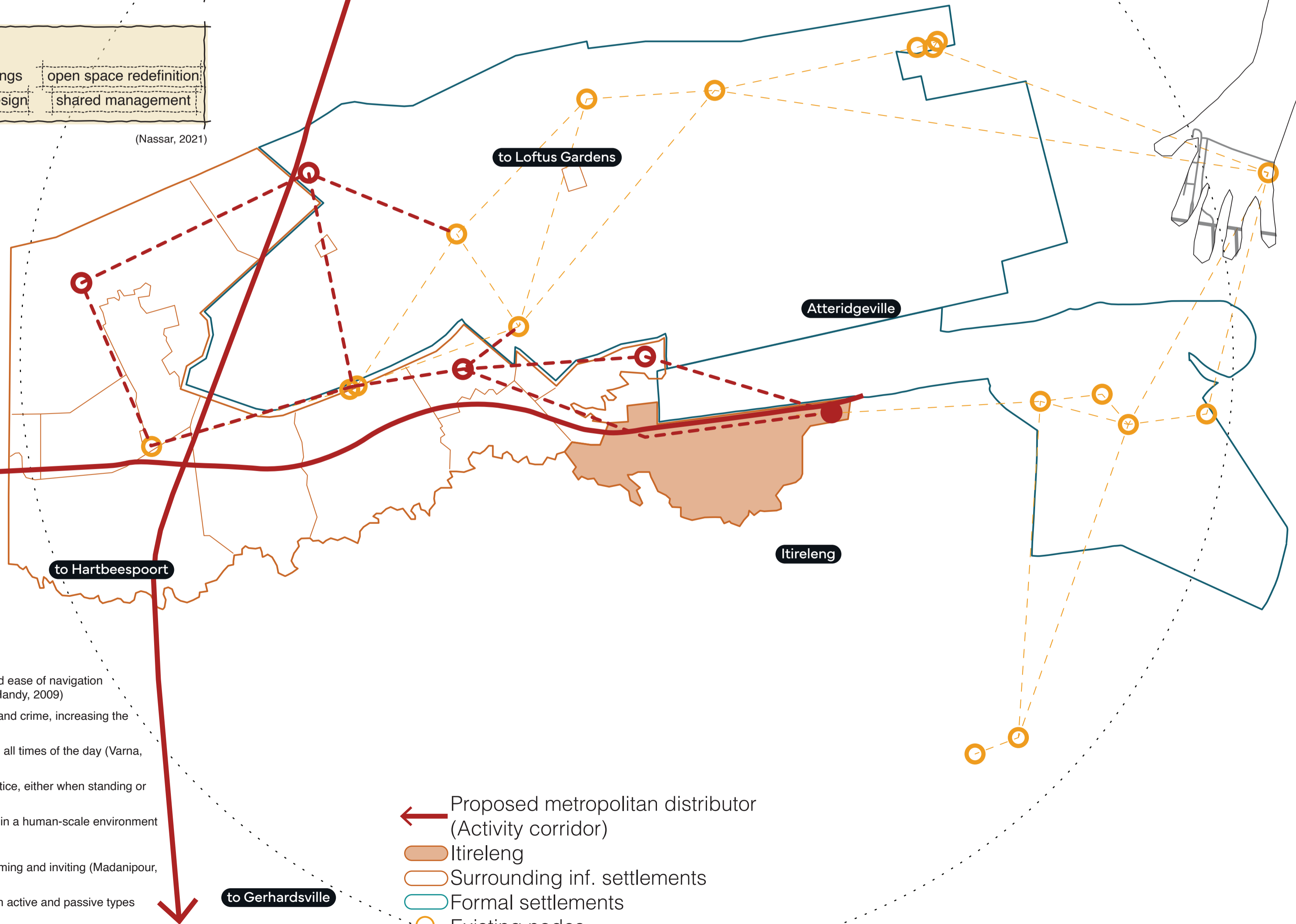
Aims to have an impact on every potential space in the city
Thinking of city as a living organism to understand the urban environment as a dynamic accumulative process
A successful city must, therefore, have the ability to understand and interact with the inhabitants to solve its difficulties

Flexible strategic application
Step-by-step-improvement on urban development
Considers preservation of local history and context
High economic land-use benefit
High sustainable aspect with and ongoing development

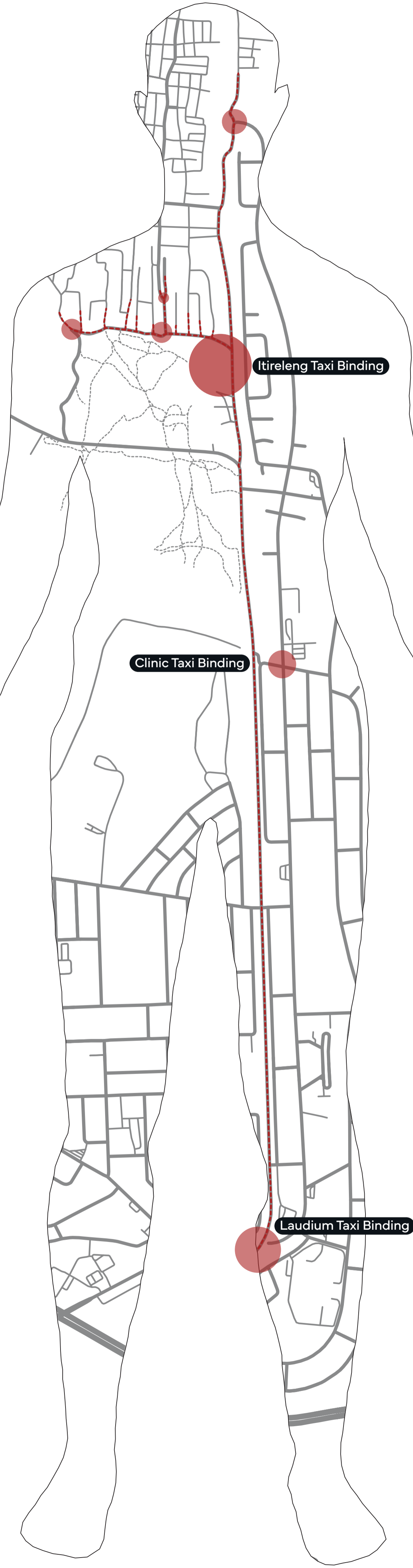
Considers government, developers, and local community as directors.
Accumulative effect development method
Funded by various / unlimited channels
Top to bottom planning and design strategy
Bottom to top construction strategy



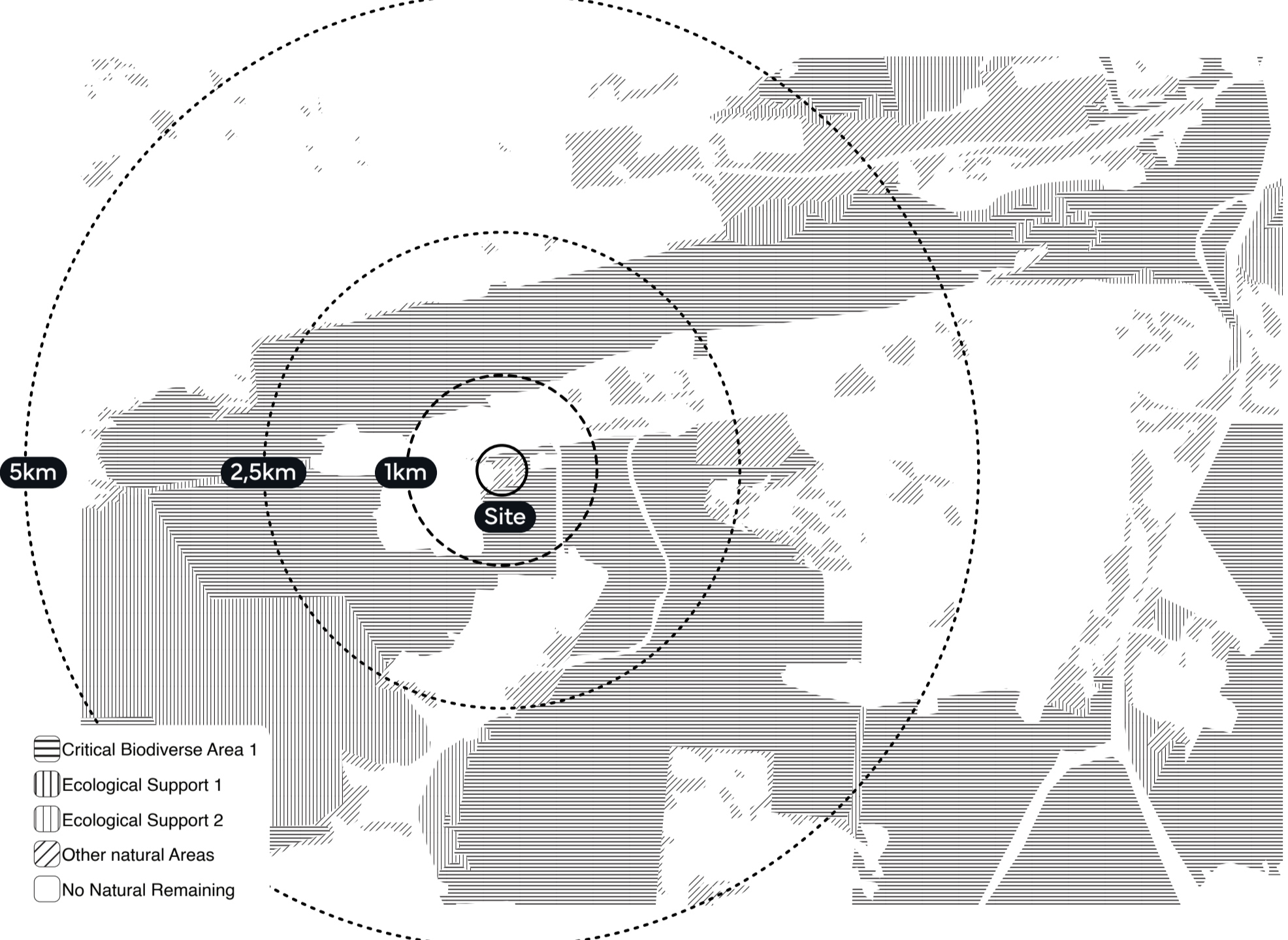
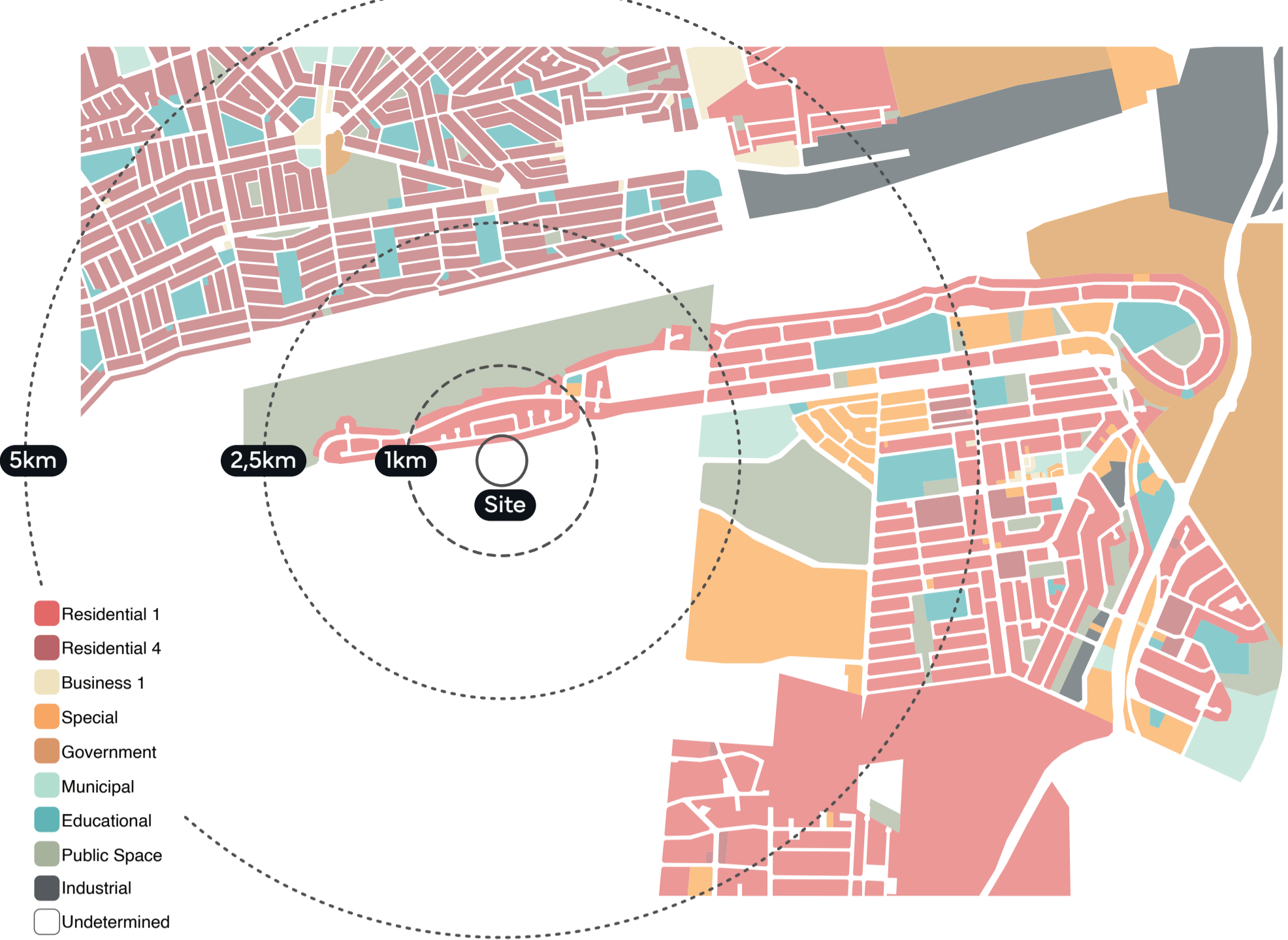
- Walkable**: Enhances pedestrian friendly activity and ease of navigation for people walking through (Ewing and Handy, 2009)
- Safe**: Offers protection from traffic movement and crime, increasing the feeling of safety (Gehl and Lars, 2008)
- Accessible**: Easy to access and move around during all times of the day (Varma, 2014; Mehta, 2014)
- Comfortable**: Offers different kinds of activities to practice, either when standing or sitting (Casagrande, 2020)
- Delightful**: Has special elements of aesthetic value in a human-scale environment (Kamel et al., 2017)
- Inclusive**: Encourages all types of activities; welcoming and inviting (Madanipour, 2010)
- Sociable**: Enhances social-user interaction for both active and passive types (Carmona et al., 2010)
- Livable**: Well used and busy all day long for both day and night activities (Gehl and Lars, 2008)

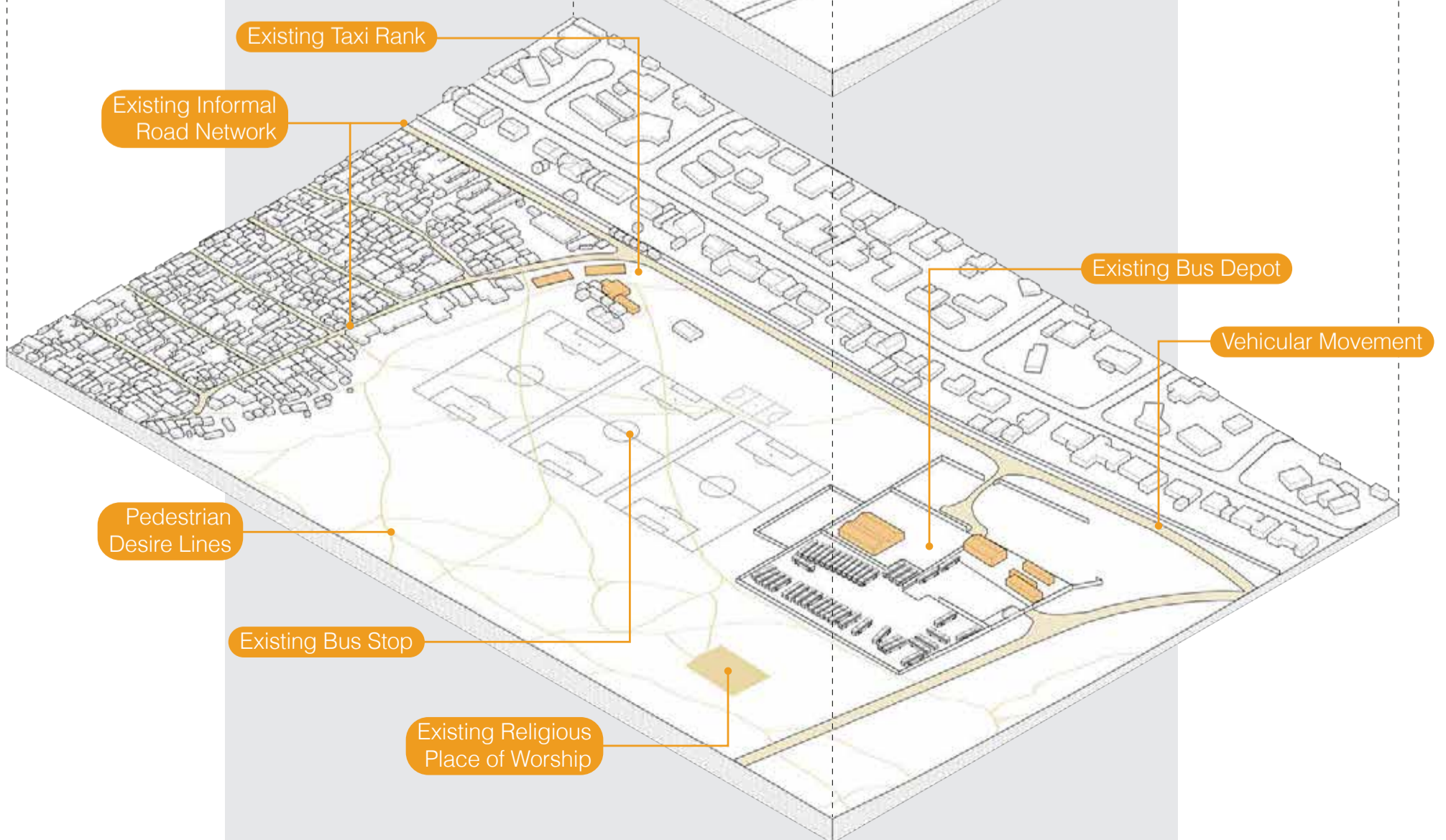
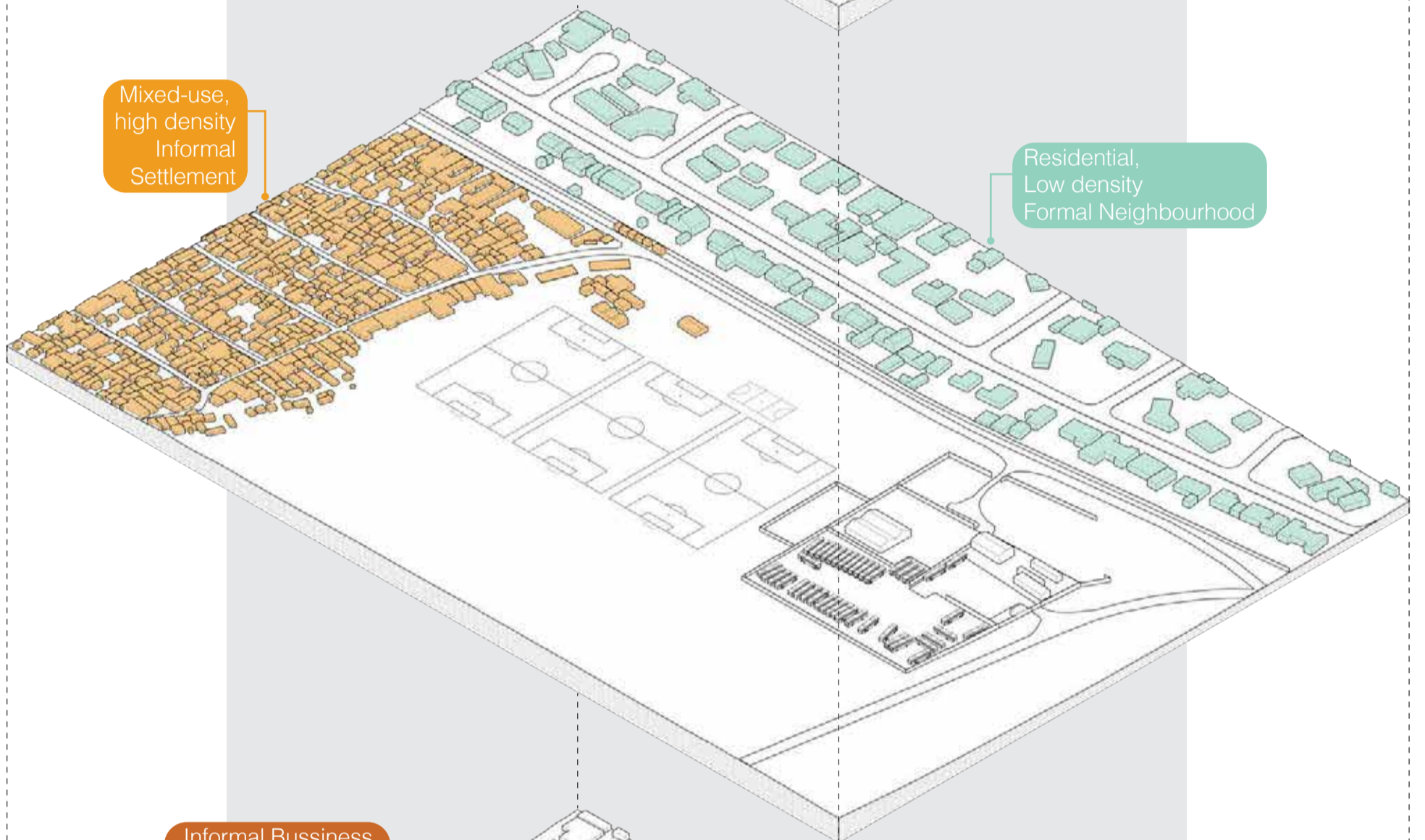
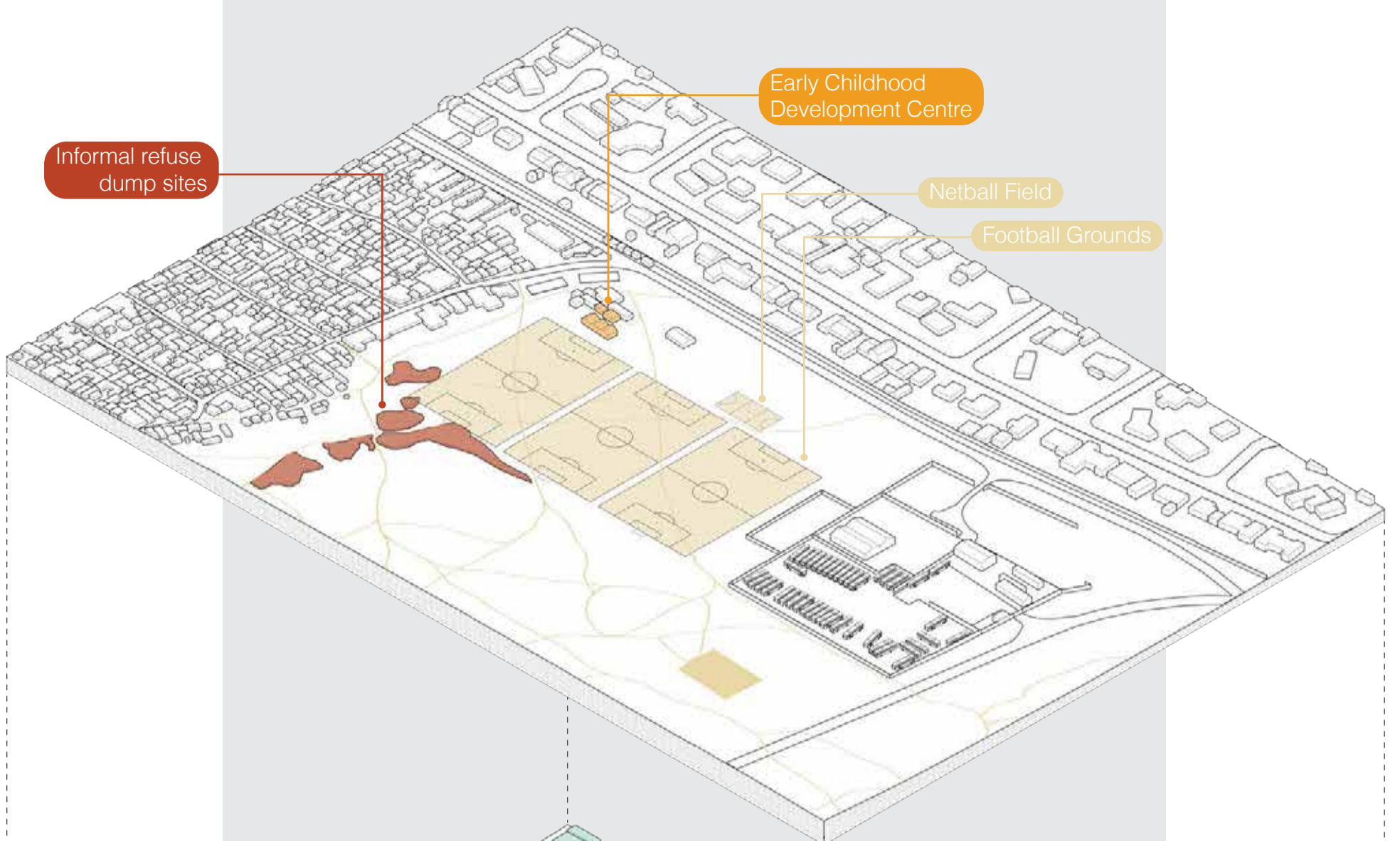


- ← Proposed metropolitan distributor (Activity corridor)
- Itireleng
- Surrounding inf. settlements
- Formal settlements
- Existing nodes
- Proposed nodes
- Project focus node

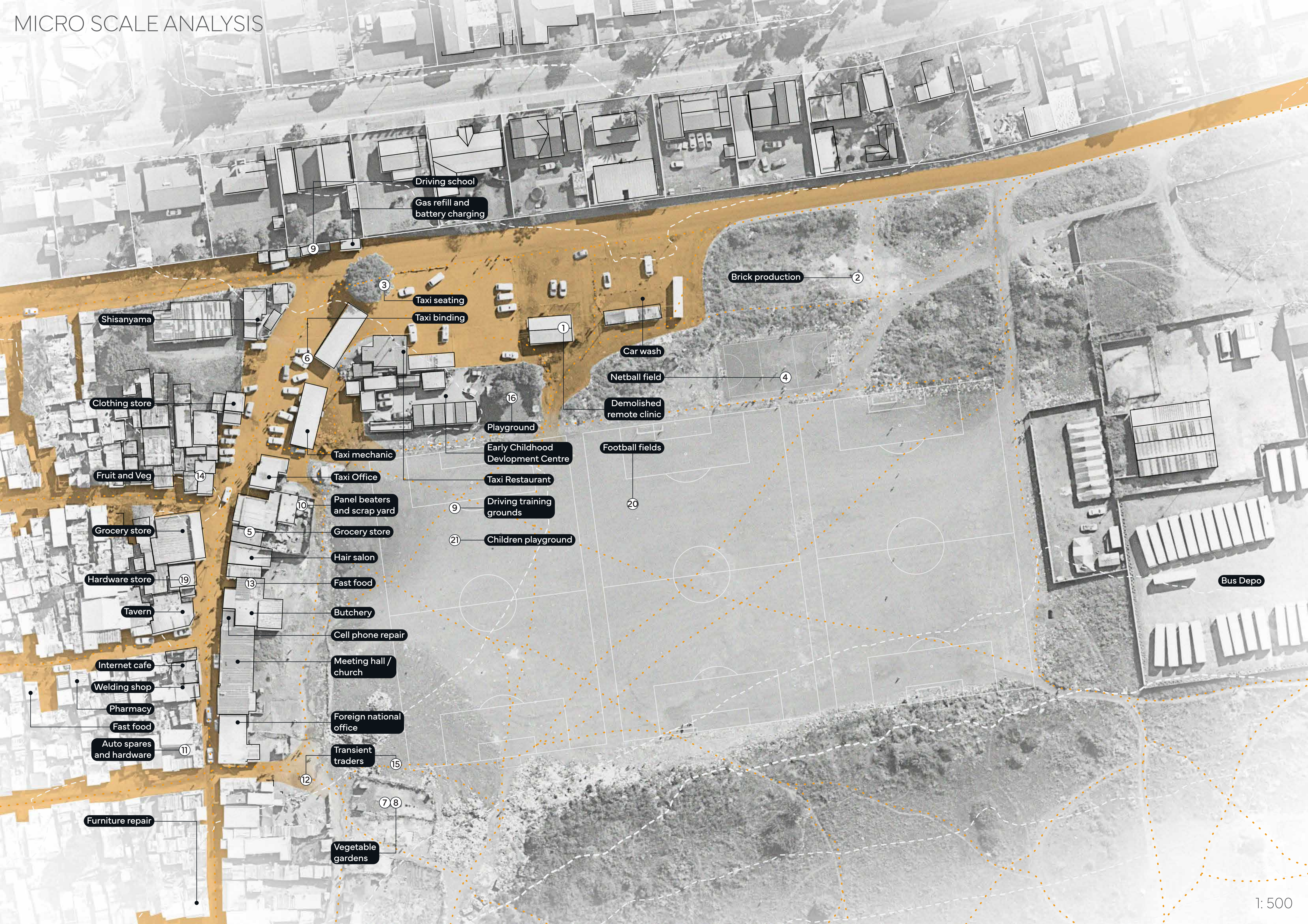


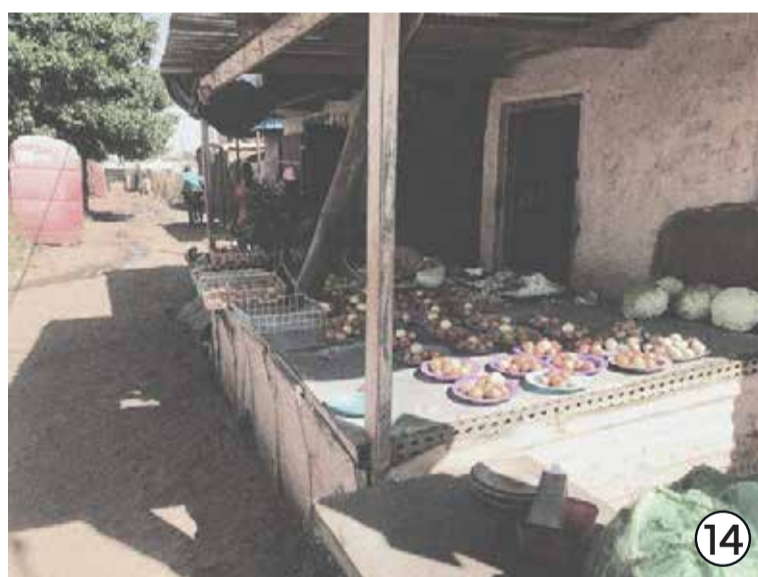
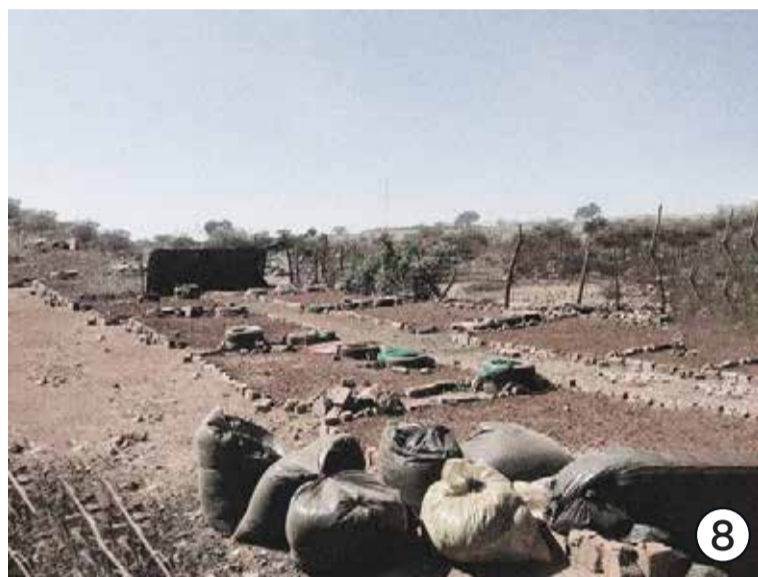
(adapted from City of Tshwane, 2018)



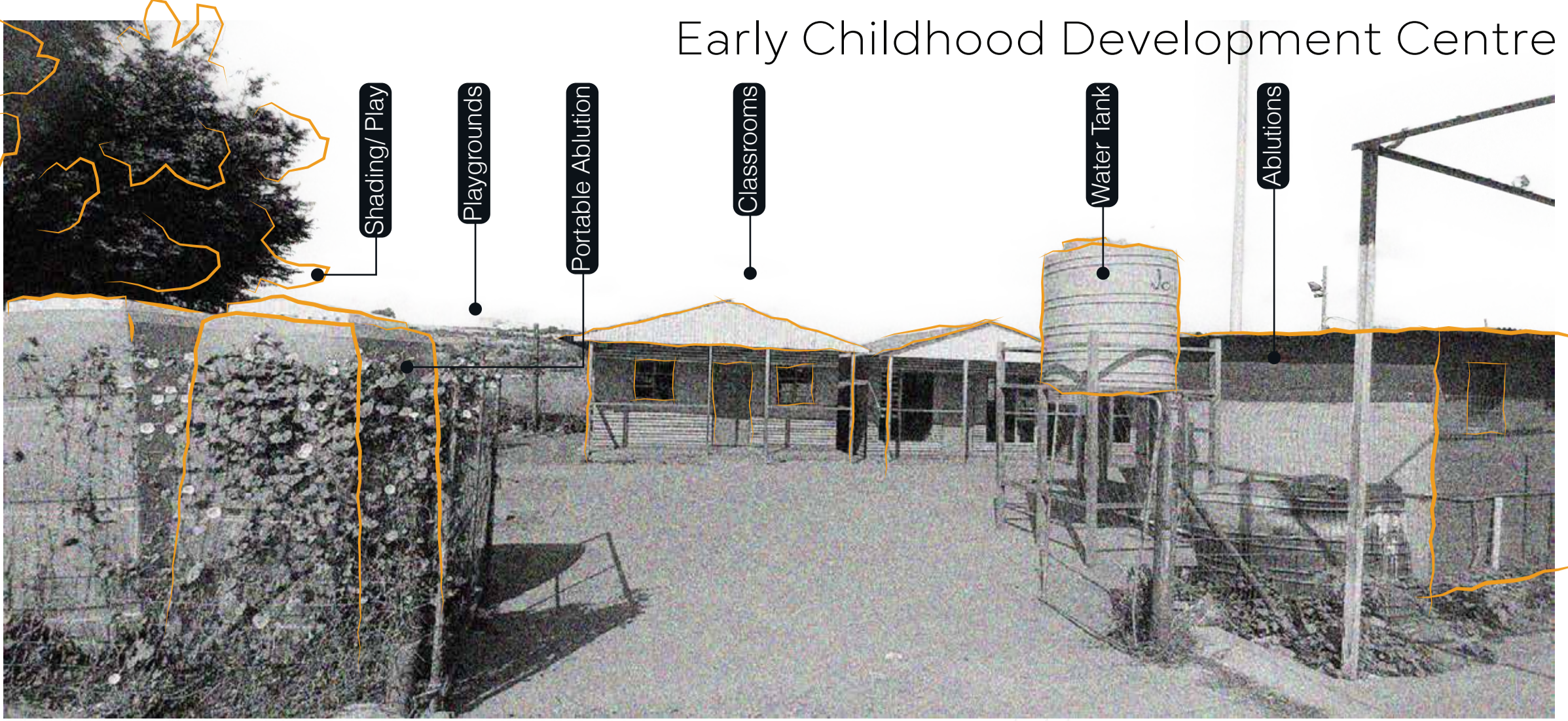


MICRO SCALE ANALYSIS





Early Childhood Development Centre



Shading/ Play

Playgrounds

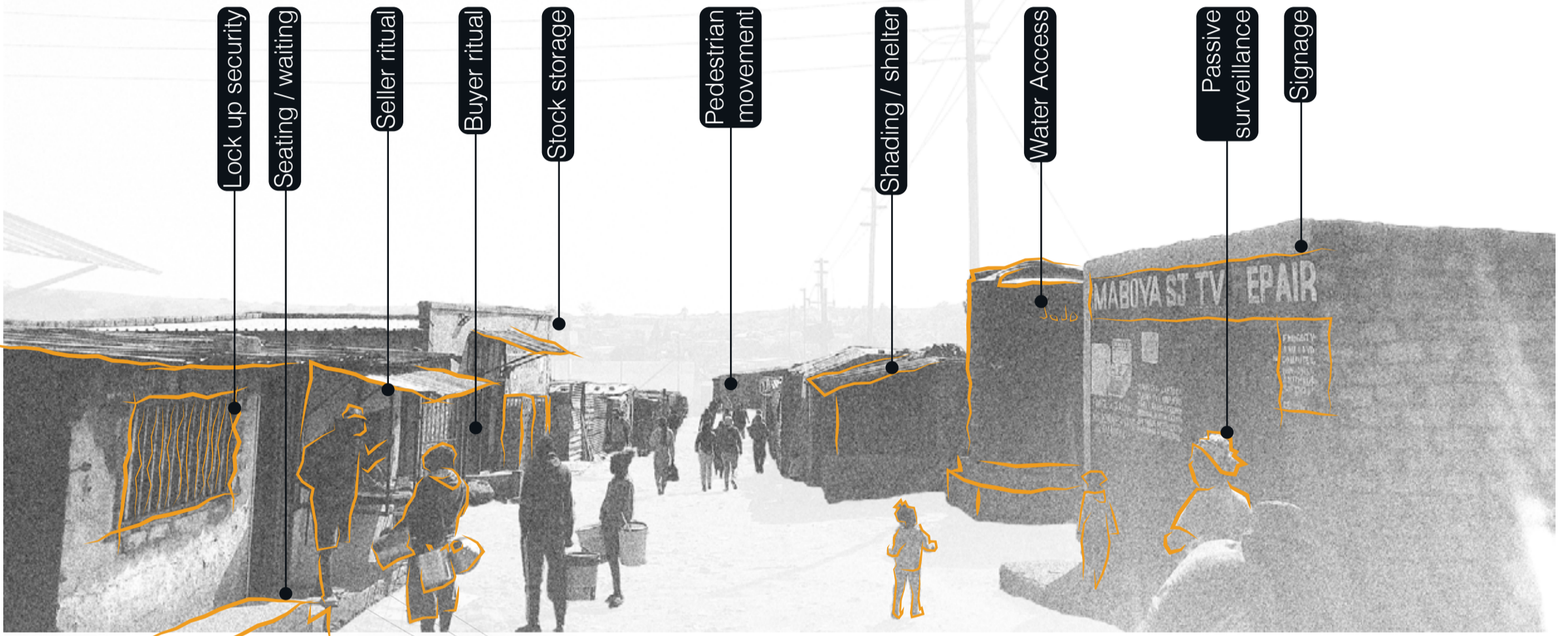
Portable Ablution

Classrooms

Water Tank

Ablutions

Streetscape



Lock up security

Seating / waiting

Seller ritual

Buyer ritual

Stock storage

Pedestrian movement

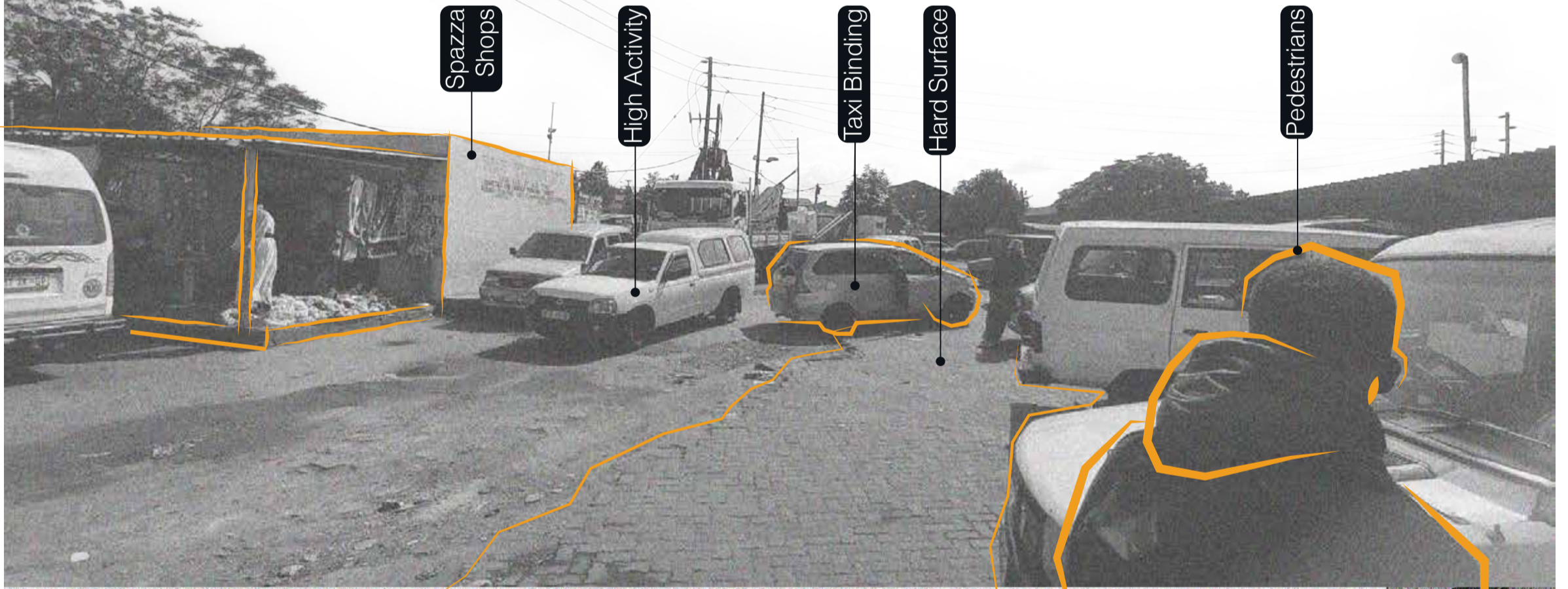
Shading / shelter

Water Access

Passive surveillance

Signage

Taxi Binding



Spazza Shops

High Activity

Taxi Binding

Hard Surface

Pedestrians

Streetscape



Cooking

Shelter

Display

Food Prep

Storage

Seating

Service access

