

# STRESS AND CITY

Research of spatial solution to reduce  
**STRESS** for urban immigrants in highly  
dense urban villages in Shenzhen, China

Jiabiao Lin (Bill)

Tutor: Egbert Stolk, Birgit Hausleitner, Maurice Hartevelde



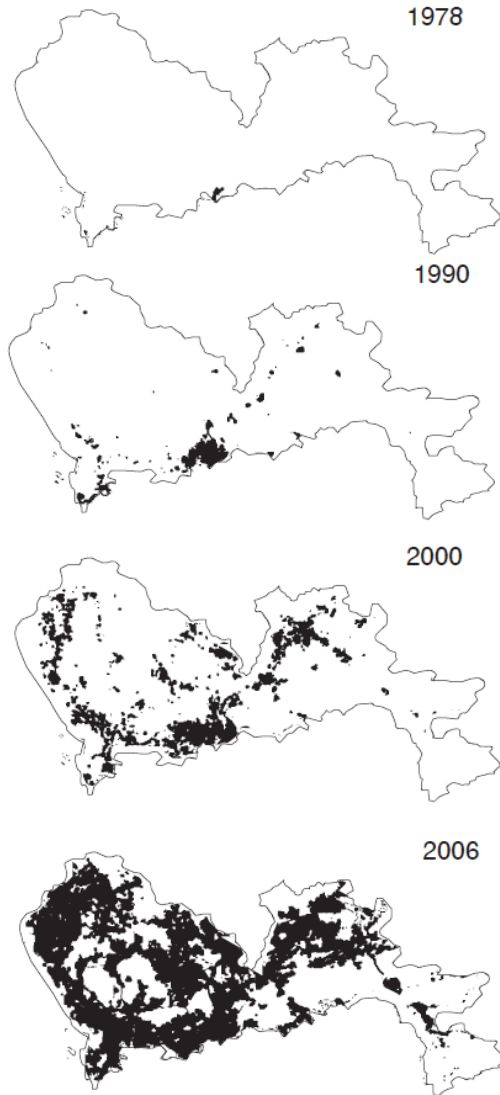
## PROBLEM STATEMENT



Stress in the city: Mazda Adli at TEDxBerlin

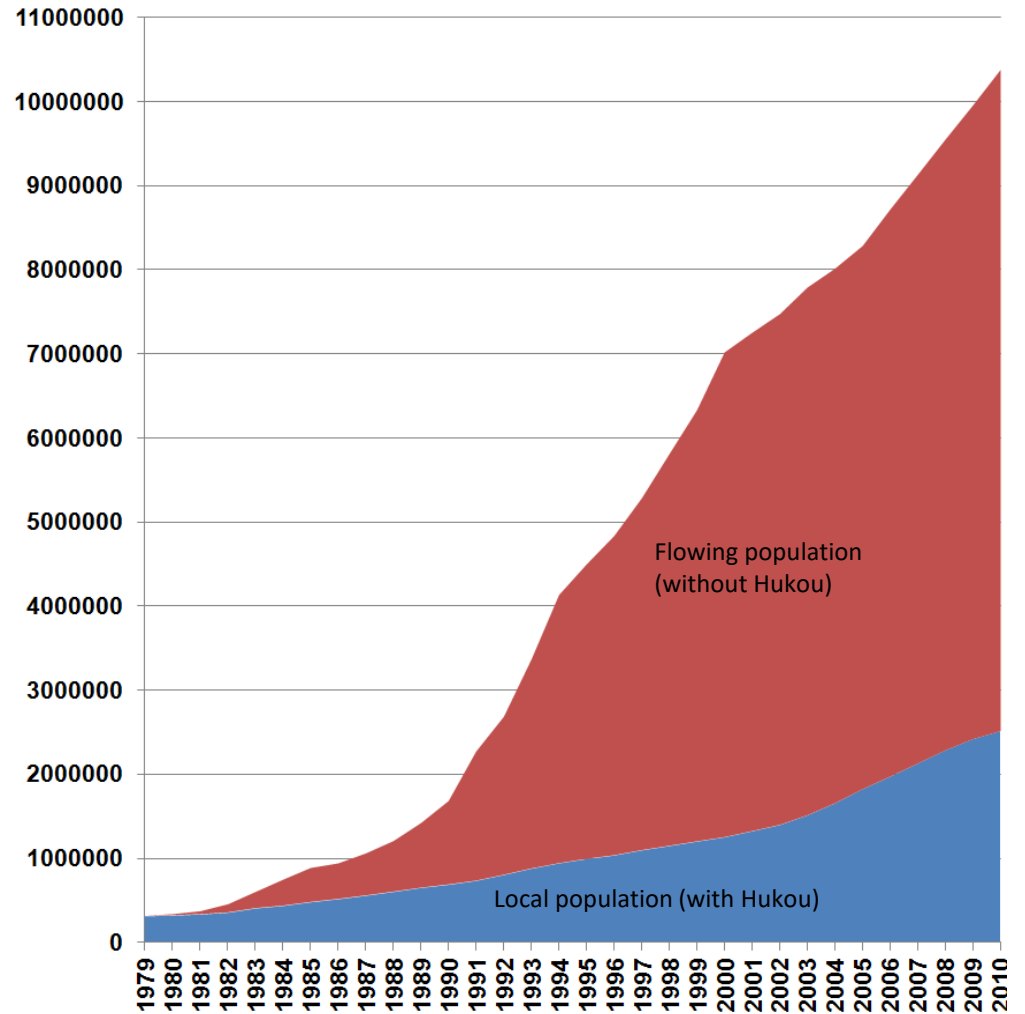
# PROBLEM STATEMENT

## Urban growth in Shenzhen, China



Author: Andrew Reynolds (2013), Resource: Master thesis: A regeneration approach for Rapid functional transformation

## Population growth in Shenzhen, China



Author: Bogomolov.PL, Resource: [https://commons.wikimedia.org/wiki/File:Shenzhen,\\_China,\\_city\\_population\\_dynamics.png](https://commons.wikimedia.org/wiki/File:Shenzhen,_China,_city_population_dynamics.png)

By author

## PROBLEM STATEMENT

Spatial density in city scale



Spatial Density in neighborhood scale



Social isolation



Social density



PROBLEM STATEMENT – possible solution?

**Minimize density  
but provide  
opportunities for  
social contacts**



Stress in the city: Mazda Adli at TEDxBerlin

## PROBLEM STATEMENT – possible solution?

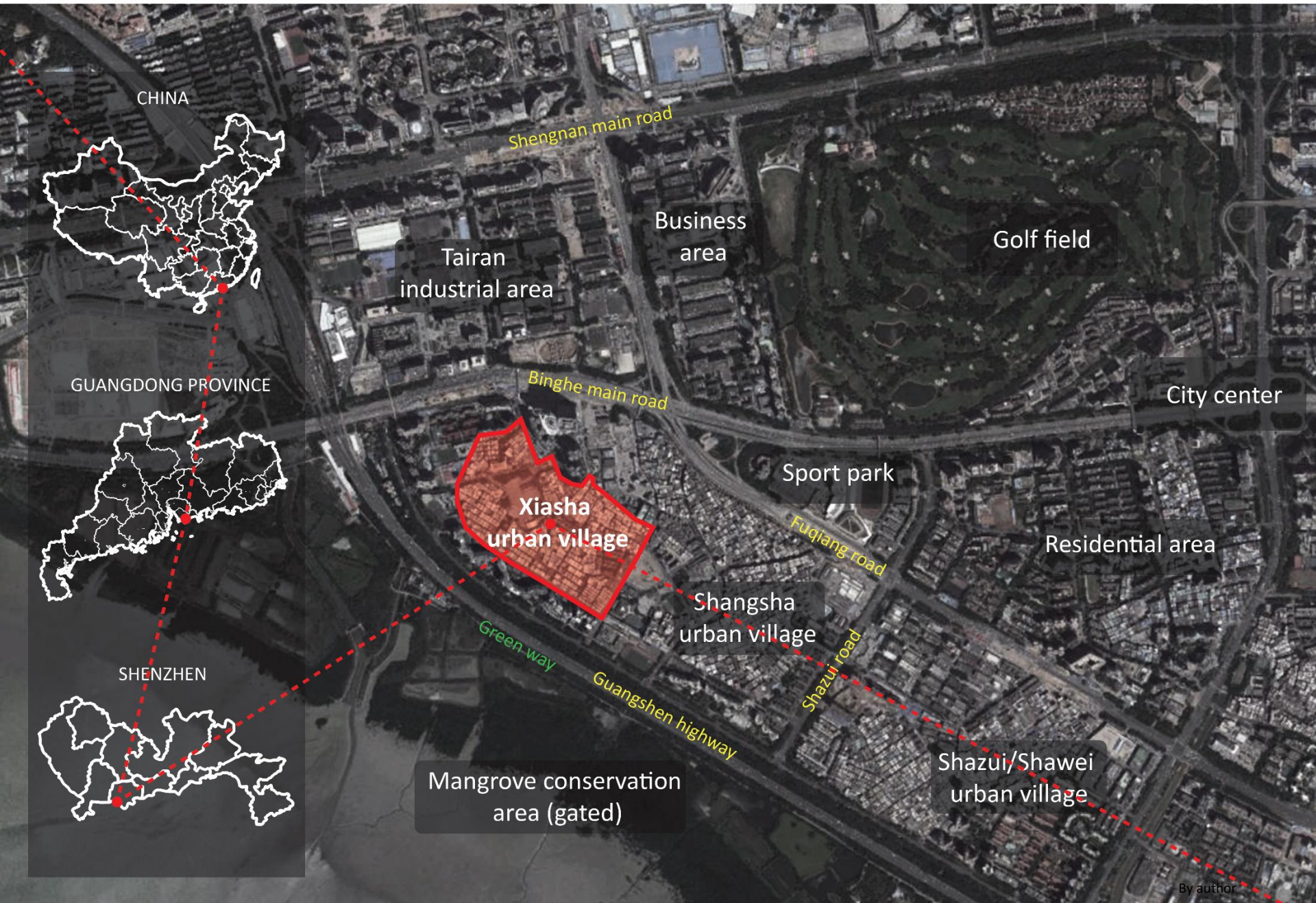


Difficulty and fight during construction. Resource: <http://www.chaiqzx.com/news.asp?id=348>

## RESEARCH QUESTION

How can socio-spatial stress of urban immigrants in the highly dense Xiasha urban village be reduced by spatial measures ?

# DESIGN CASE – XIASHA URBAN VILLAGE



CHINA

Shengnan main road

Tairan industrial area

Business area

Golf field

GUANGDONG PROVINCE

Binghe main road

City center

**Xiasha urban village**

Sport park

Fuqiang road

Residential area

SHENZHEN

Shangsha urban village

Green way

Guangshen highway

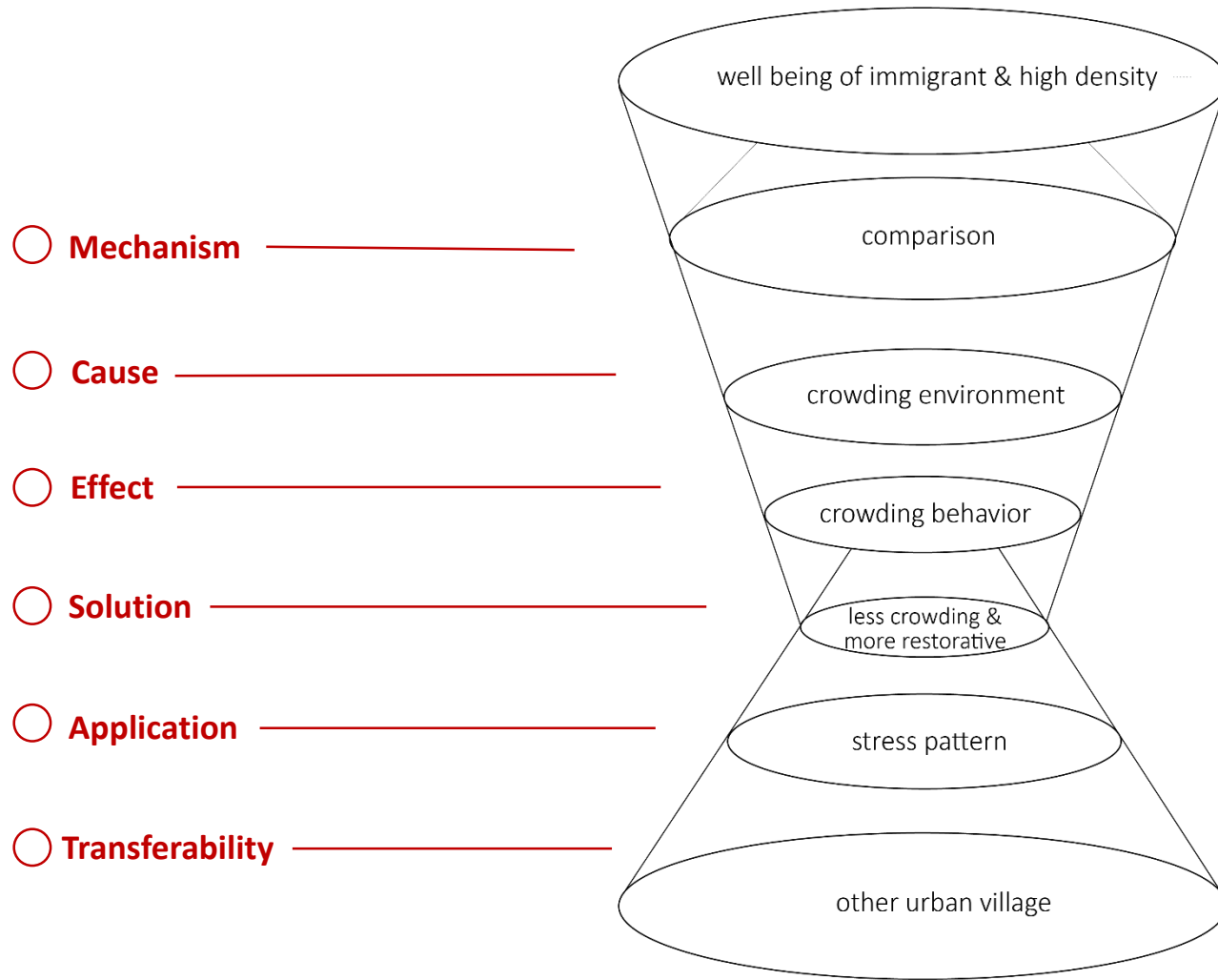
Shazui road

Shazui/Shawei urban village

Mangrove conservation area (gated)



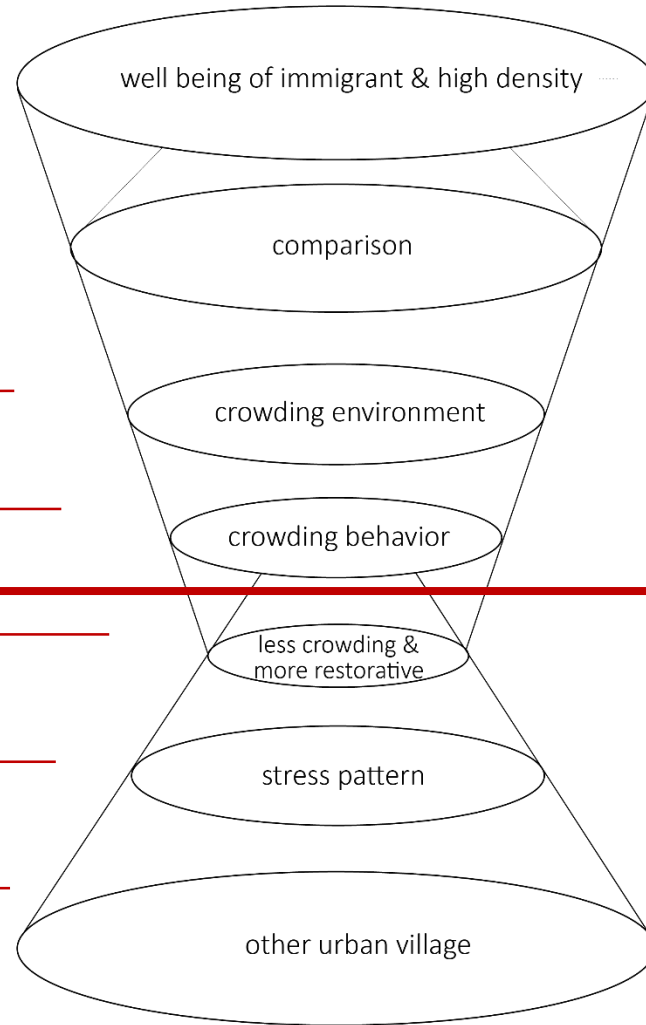
# STRUCTURE OF RESEARCH



# PART 1

- Mechanism \_\_\_\_\_
- Cause \_\_\_\_\_
- Effect \_\_\_\_\_

- Solution \_\_\_\_\_
- Application \_\_\_\_\_
- Transferability \_\_\_\_\_



## Comparison - Higher stress level

Half urbanized



Rural area scene

Resource: <http://rfunderwear.com>



Traditional scene

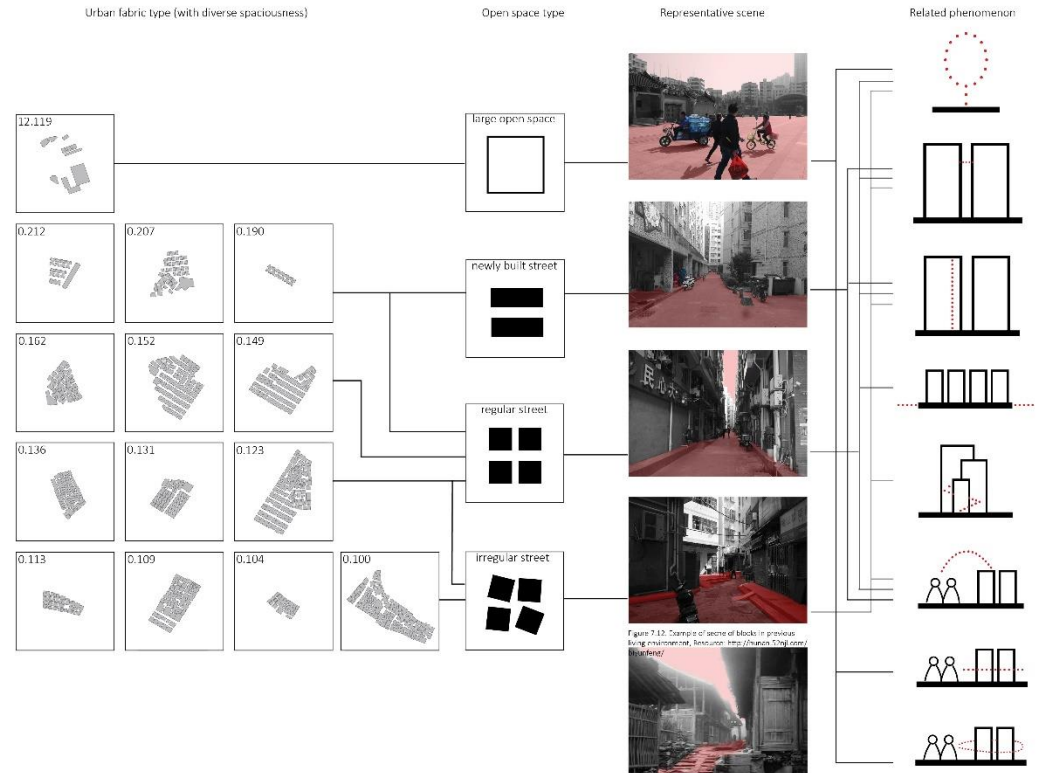
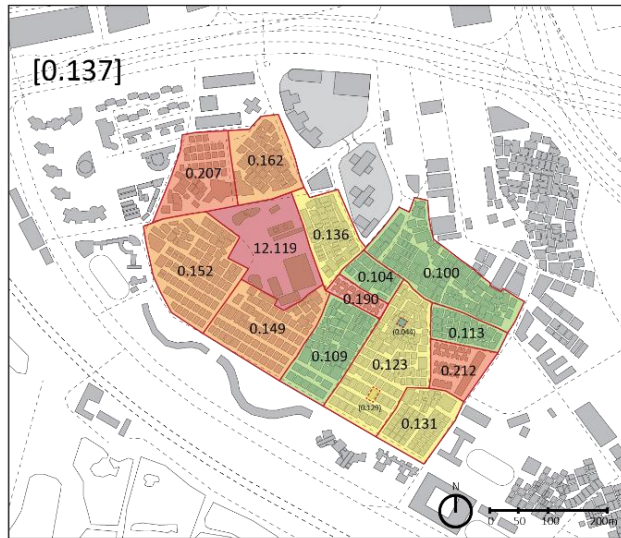
Resource: <http://rfunderwear.com>



Urban village scene

By author

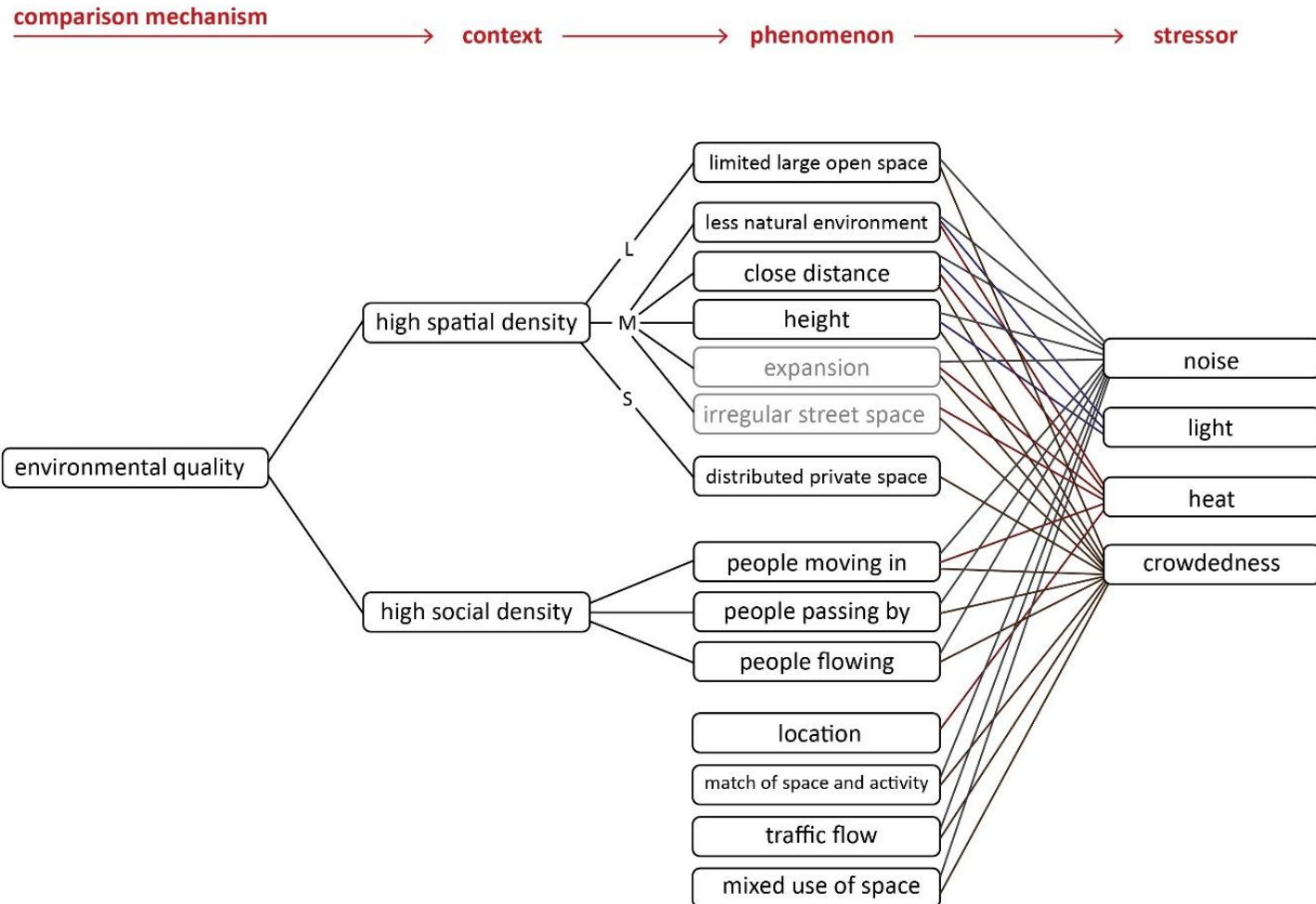
## Comparison - Density – Phenomenon in 3 scales



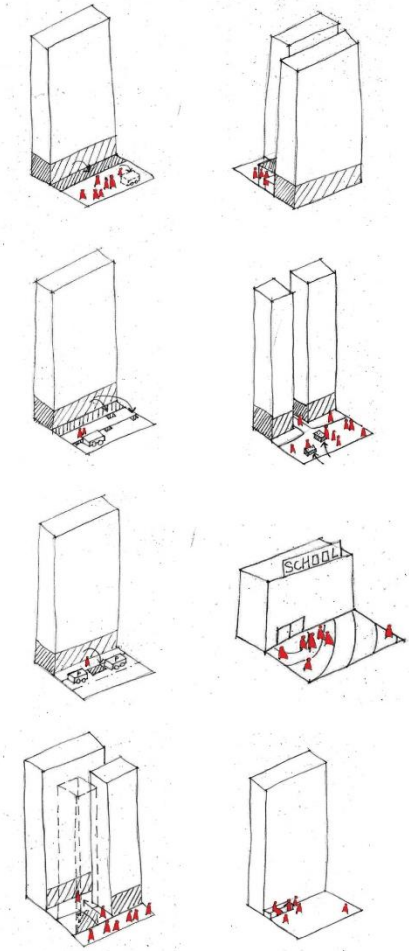
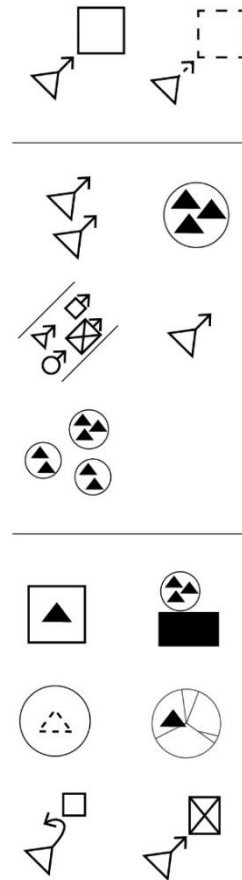
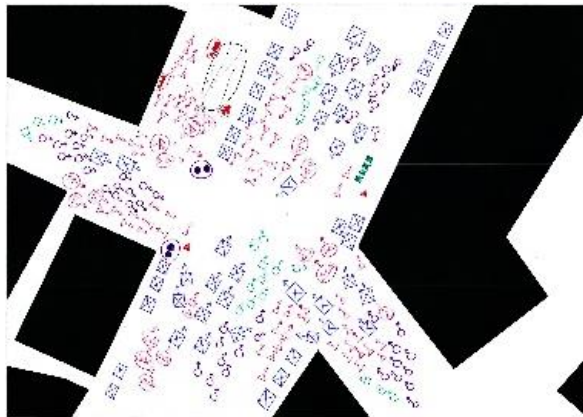
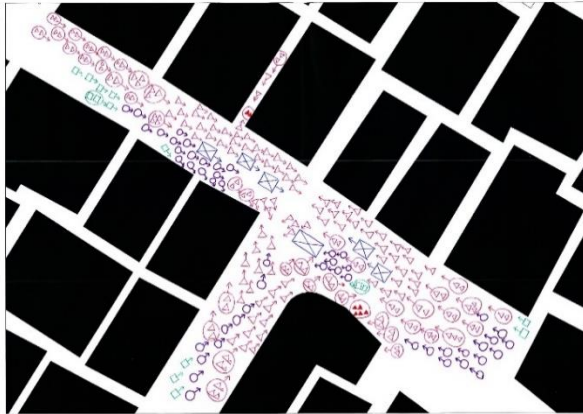
## Comparison - Density – Phenomenon in 3 scales - stressor



## Comparison - Density – Phenomenon in 3 scales - stressor

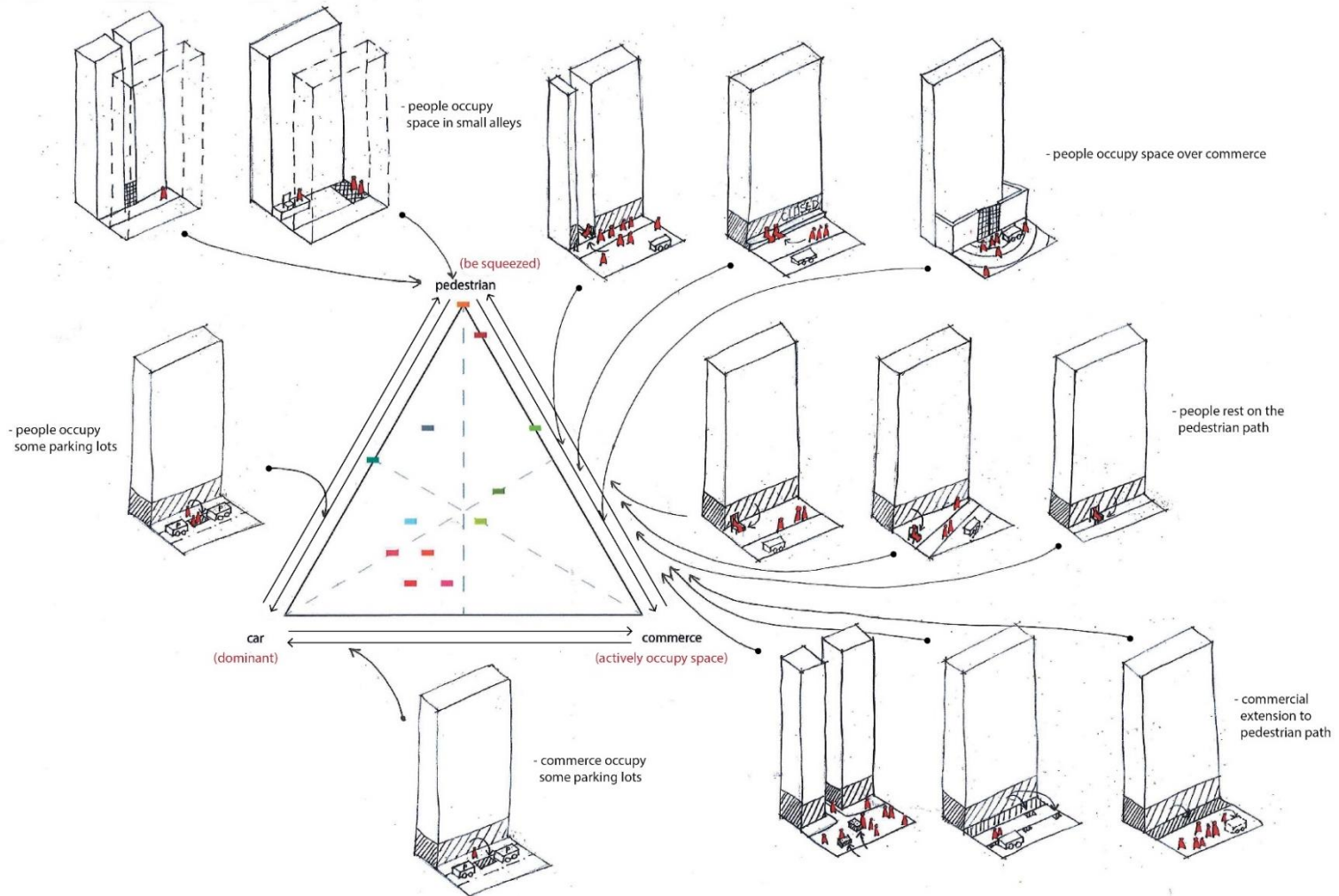


## Behavior - Competition of space



## Behavior - Competition of space

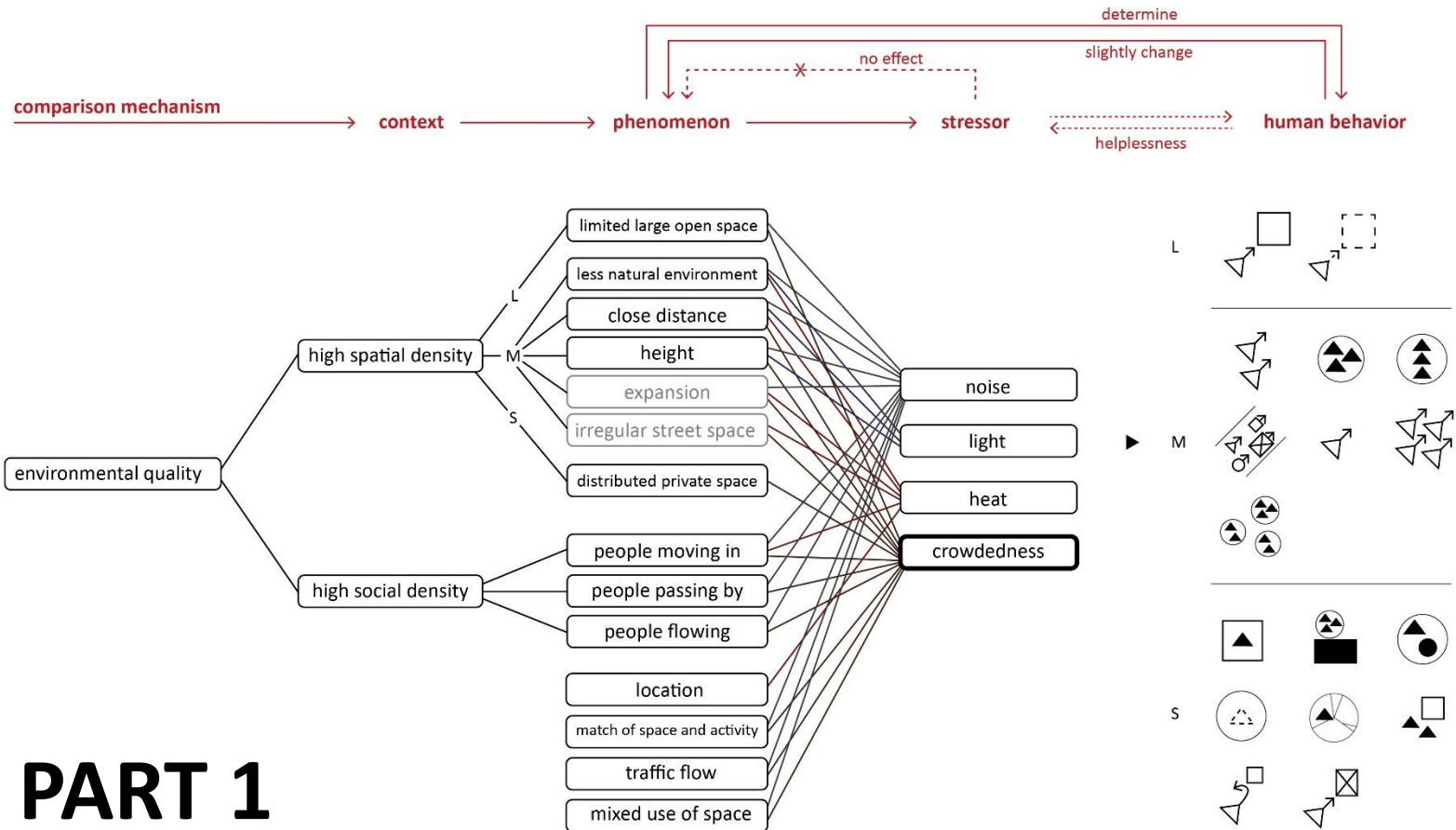
### - Crowdedness (most relevant and easily affected stress factor)





# Steps towards common language of stress from spatial perspective

## Lay the systematic basis and set the focus for latter design

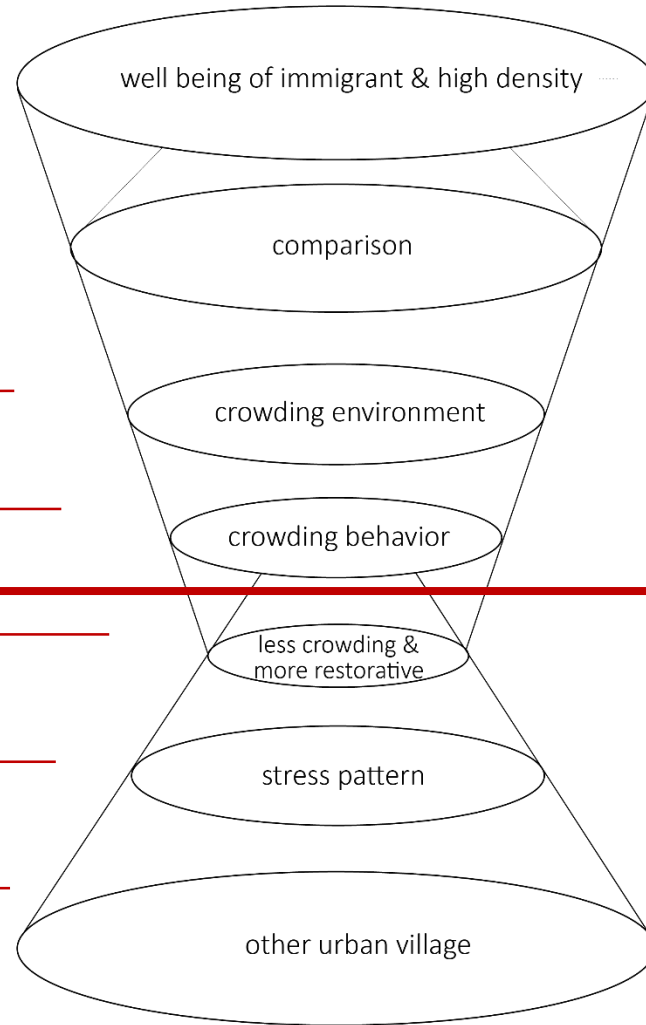


# PART 1

- Mechanism \_\_\_\_\_
- Cause \_\_\_\_\_
- Effect \_\_\_\_\_

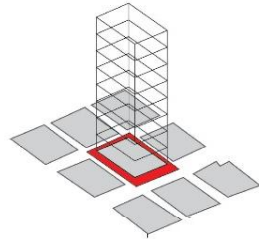
- Solution \_\_\_\_\_
- Application \_\_\_\_\_
- Transferability \_\_\_\_\_

## PART 2



Mechanism — Cause — Effect — **Solution** — Application — Transferability

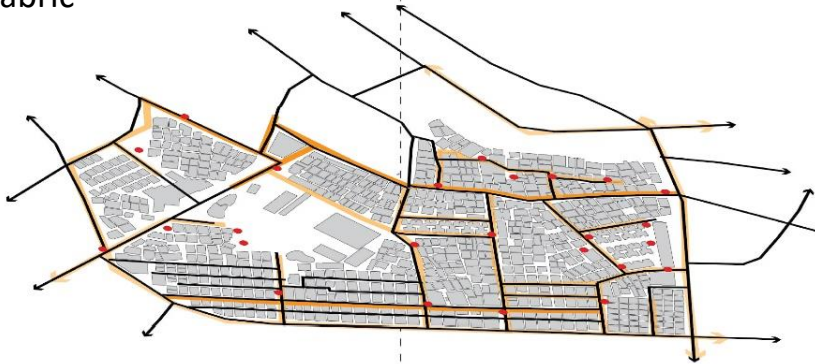
Scale of lot



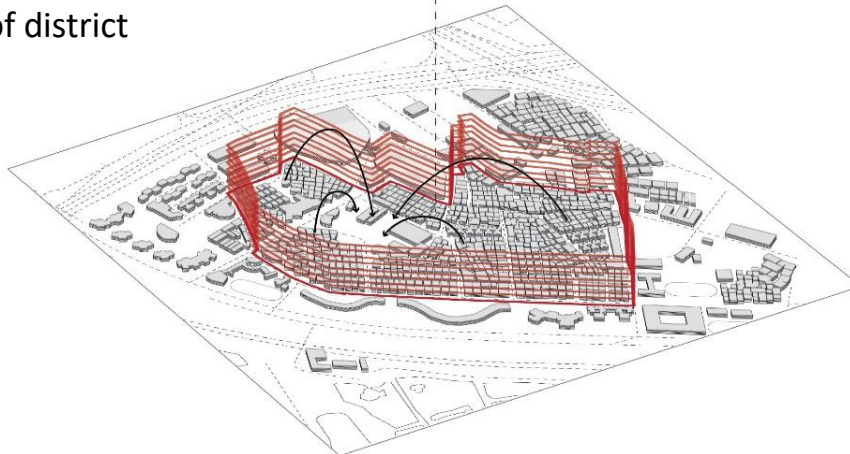
3 problems



Scale of fabric



Scale of district

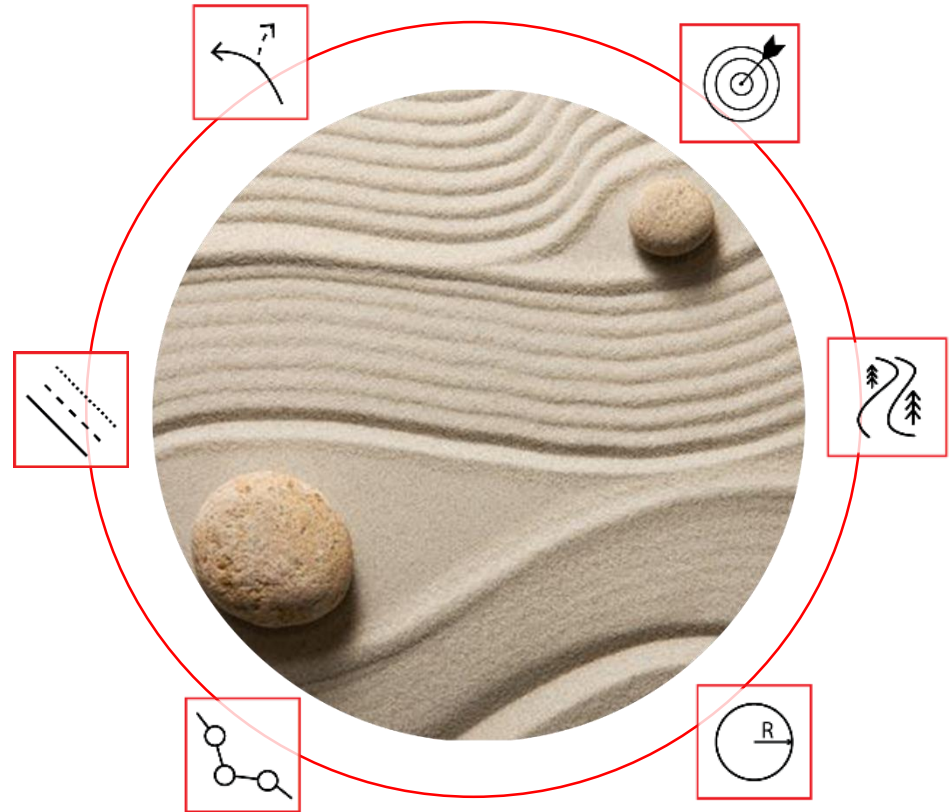


Mechanism — Cause — Effect — **Solution** — Application — Transferability

WHAT (Goal)

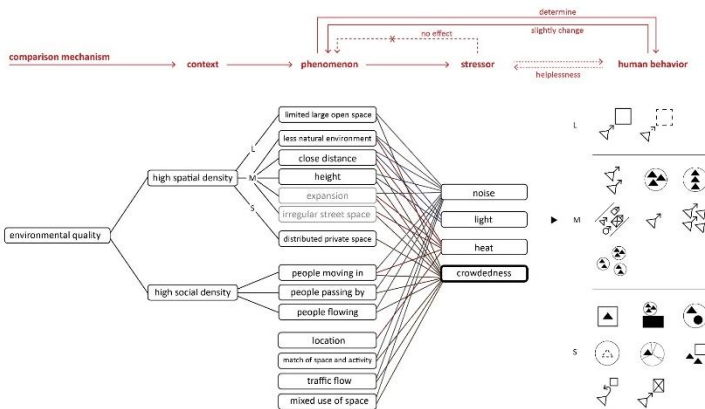
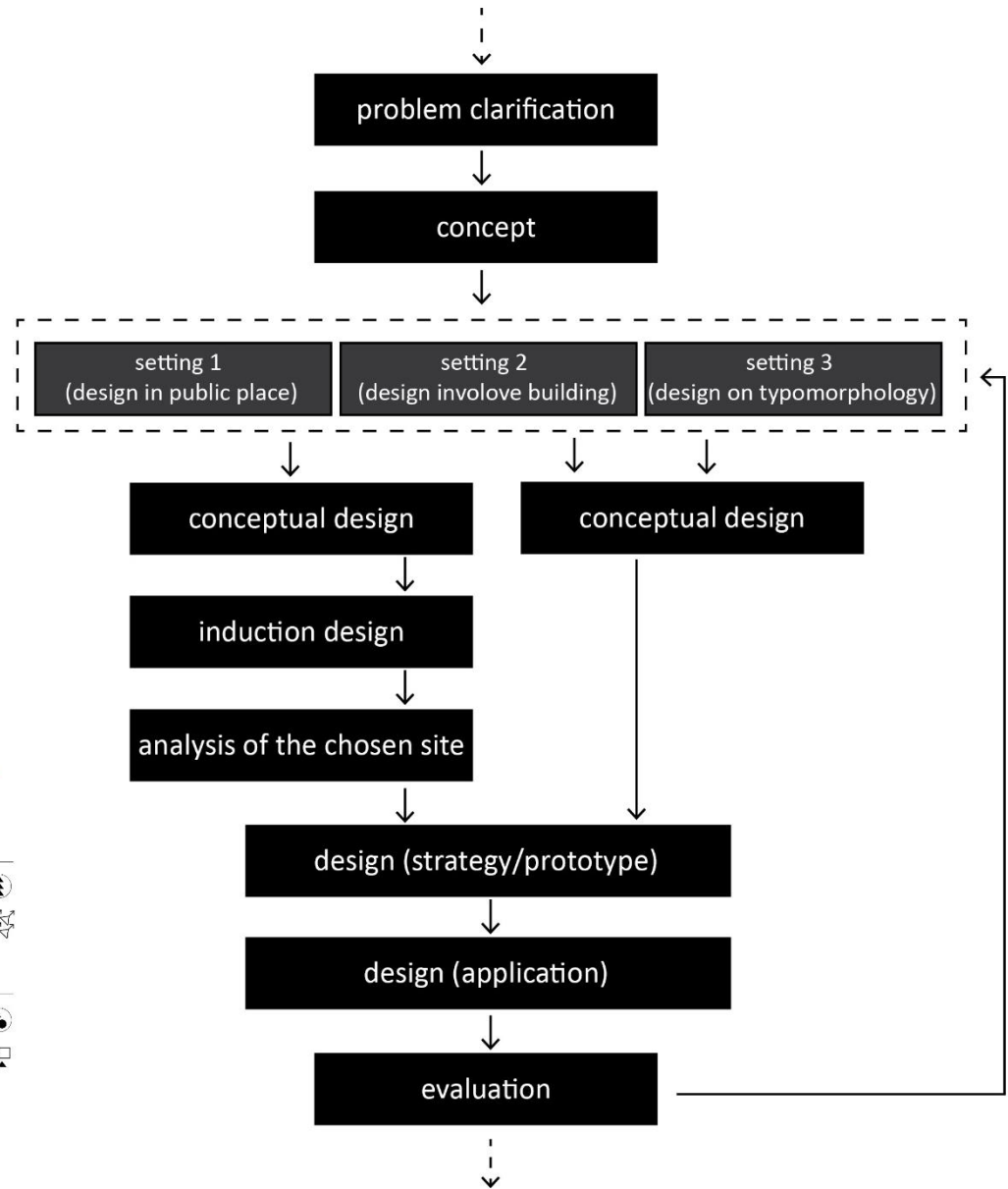
**Less crowding more restorative Built environment**

HOW (Theoretical/Practical)



Mechanism — Cause — Effect — **Solution** — Application — Transferability

**3 settings  
(different intervention levels)**

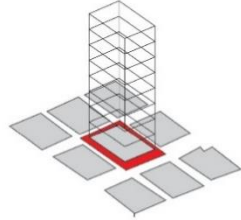


Solution:  
(setting 1)

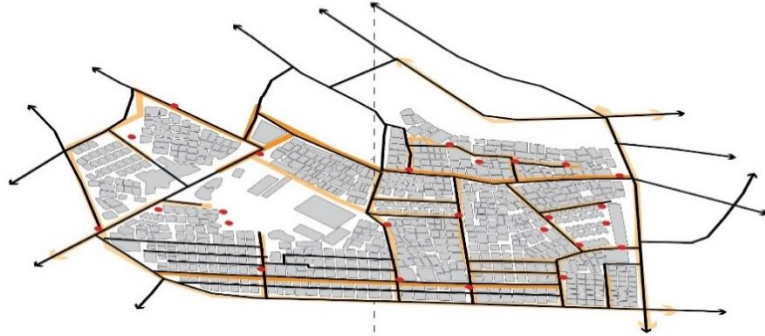
Conceptual  
plan



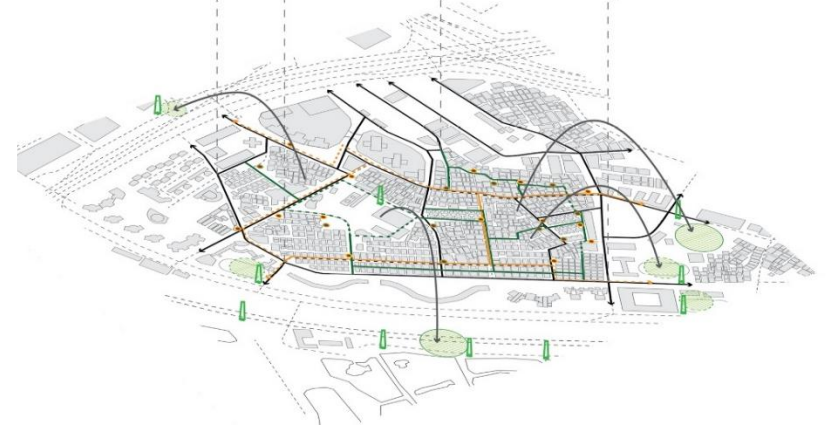
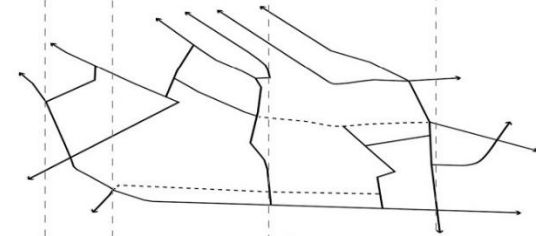
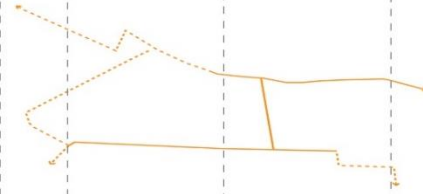
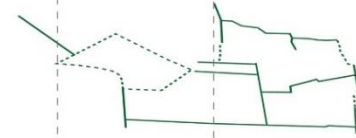
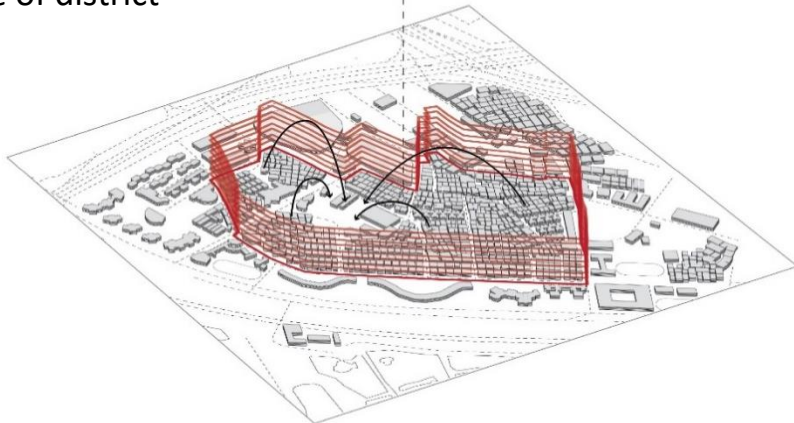
Scale of lot



Scale of fabric



Scale of district



Solution:  
(setting 1)

Conceptual  
plan

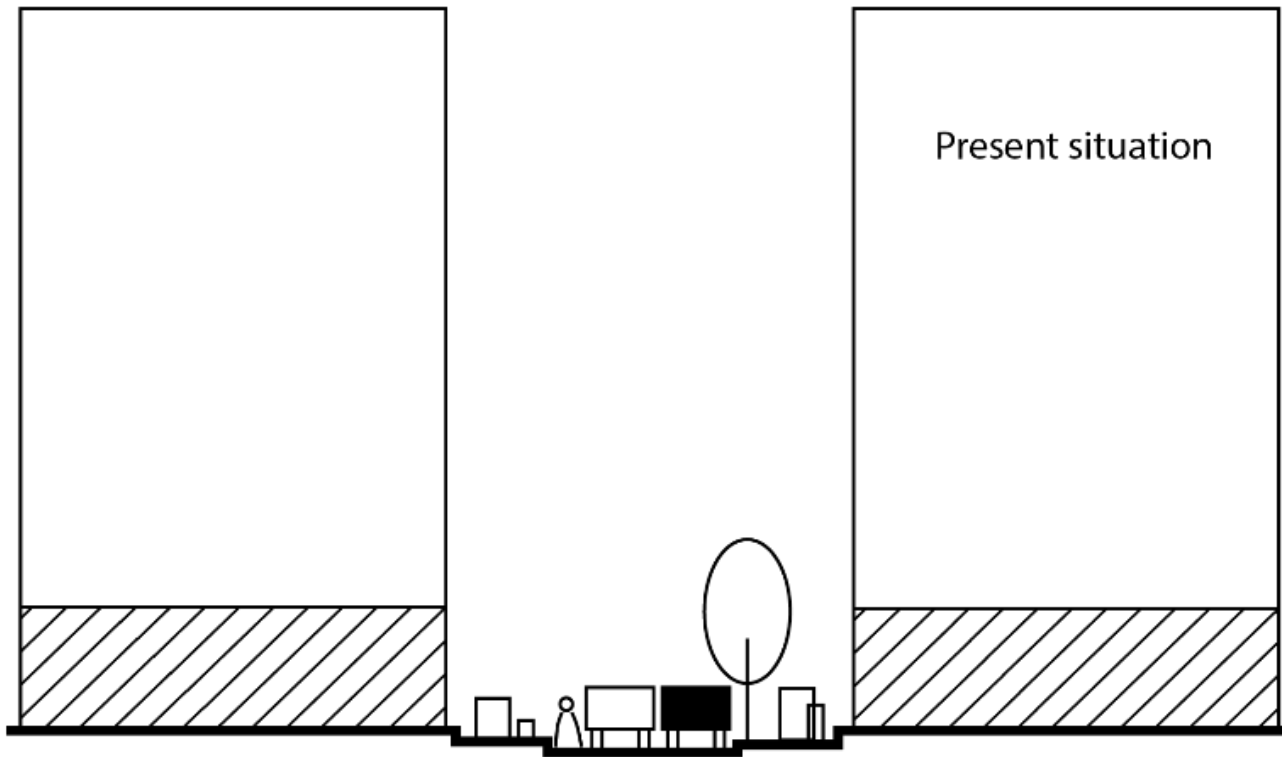
Induction

analysis

Strategy &  
prototype

application

evaluation



Solution:  
(setting 1)

Conceptual  
plan

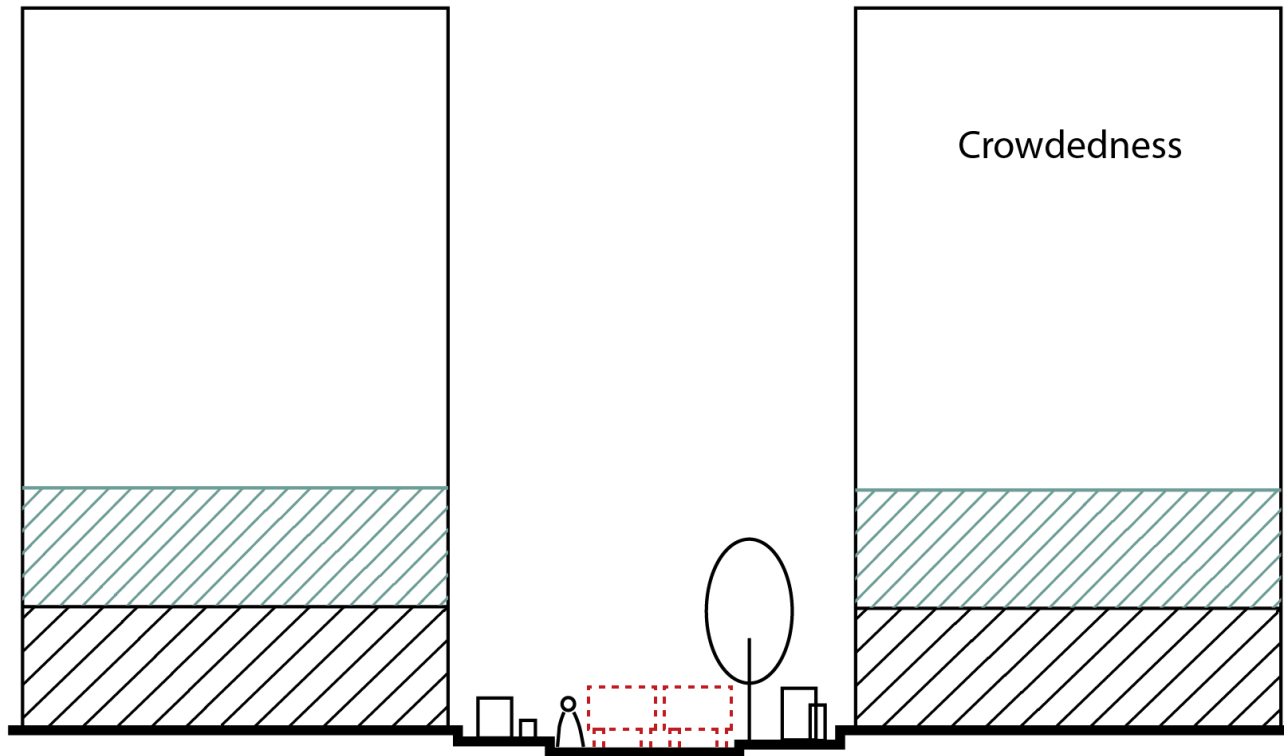
Induction

analysis

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prototype

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evaluation





Solution:  
(setting 1)

Conceptual  
plan

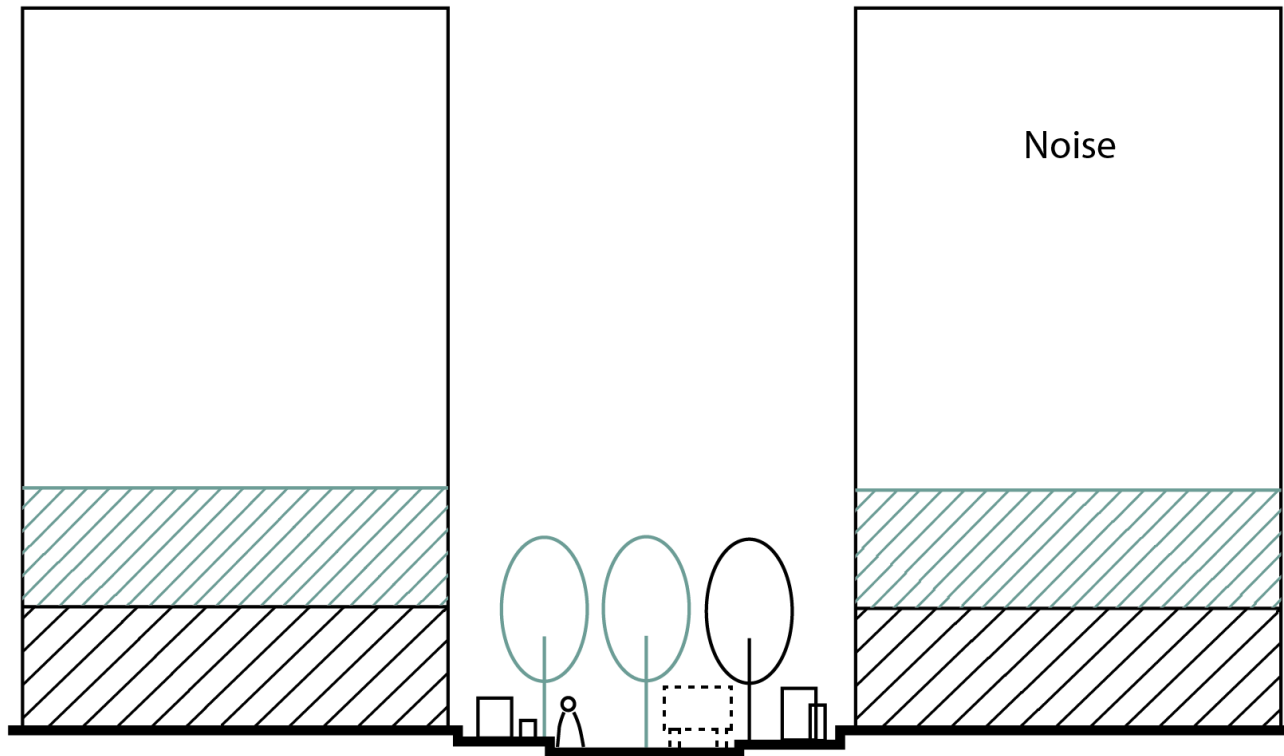
Induction

analysis

Strategy &  
prototype

application

evaluation



Solution:  
(setting 1)

Conceptual  
plan

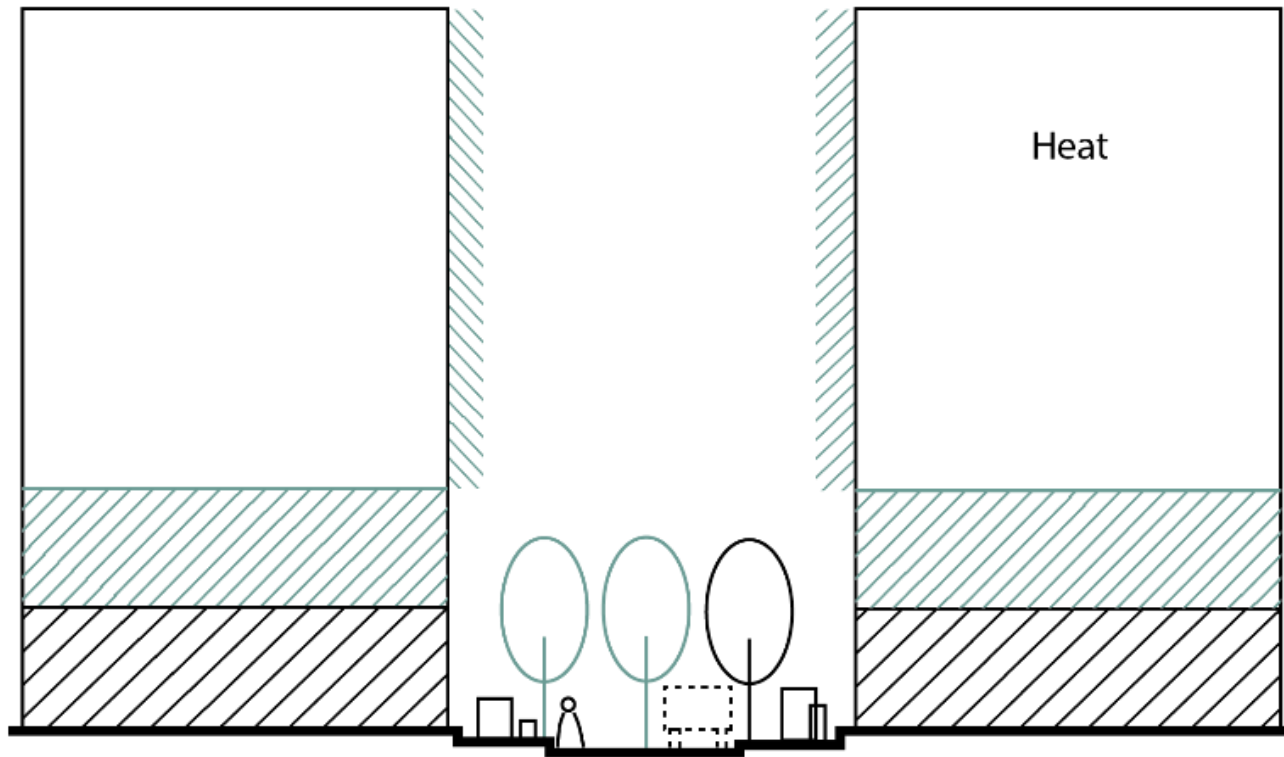
Induction

analysis

Strategy &  
prototype

application

evaluation



Solution:  
(setting 1)

Conceptual  
plan

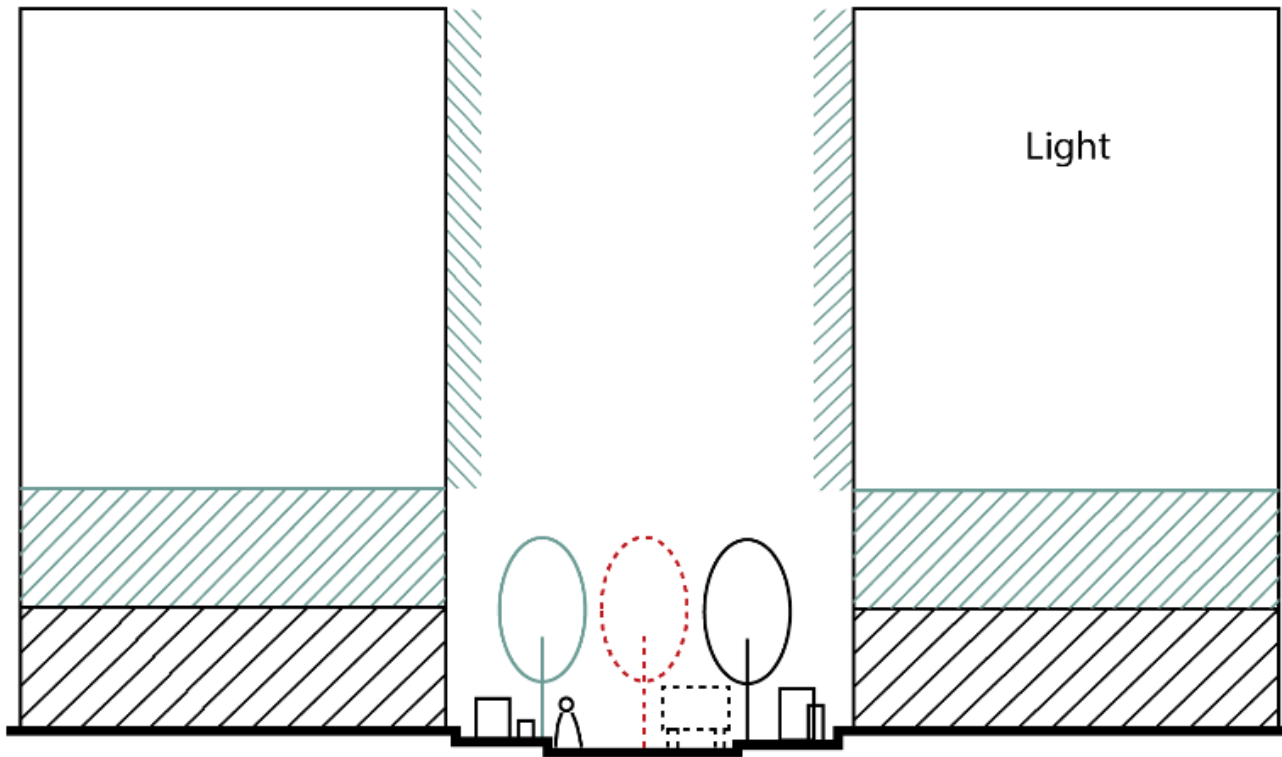
Induction

analysis

Strategy &  
prototype

application

evaluation



Solution:  
(setting 1)

Conceptual  
plan

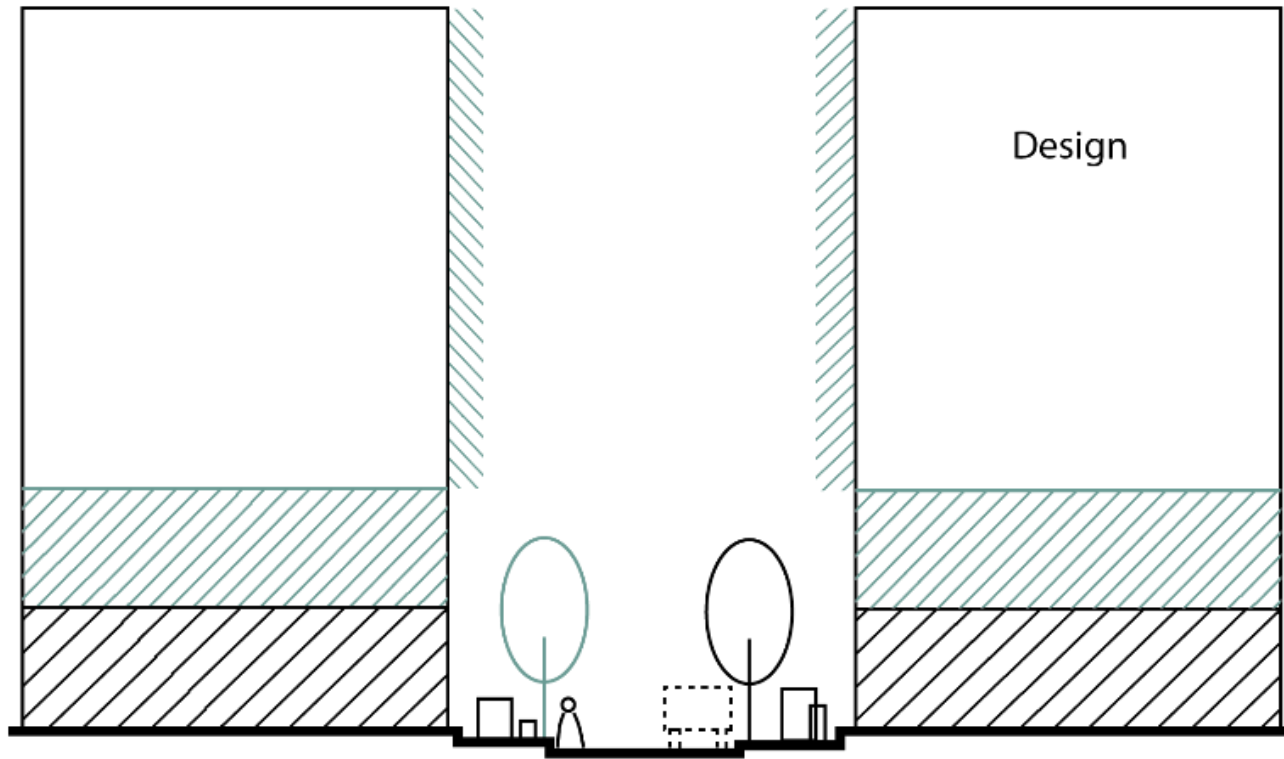
Induction

analysis

Strategy &  
prototype

application

evaluation



Solution:  
(setting 1)

Conceptual  
plan

Induction

analysis

Strategy &  
prototype

application

evaluation



**Solution:  
(setting 1)**

**Conceptual  
plan**

**Induction**

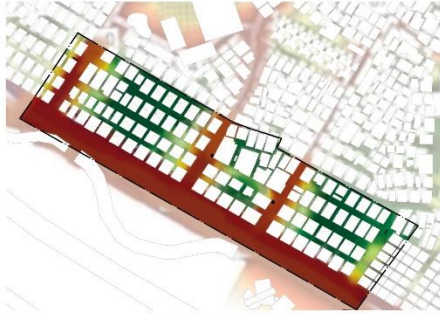
**analysis**

**Strategy &  
prototype**

**application**

**evaluation**

Noise analysis 

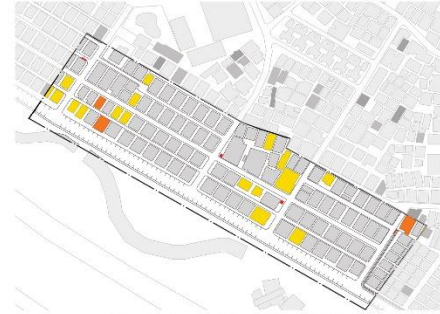


Information from Lou Yun (2012), Mapping By author

Behavior of immigrant



Building quality



Information from Liu, Q; Lu, X; Wang, J (2010), Mapping By author

Space and active level analysis

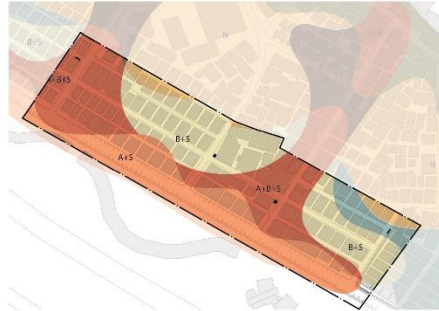


Heat analysis



Information from Lou Yun (2012), Mapping By author

Behavior of different groups



Visual integration



Integration analysis (r3)



Light analysis



Information from Lou Yun (2012), Mapping By author

Function and opening analysis



Visual clustering coefficient



T1024 Choice (r400m)



Other maps: By author

Solution:  
(setting 1)

Conceptual  
plan

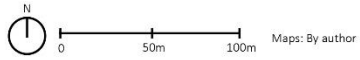
Induction

analysis

Strategy &  
prototype

application

evaluation



Configuration of street - related to territory and behavior



Potential area



Use of space



Impact of other stressor







**Solution:  
(setting 1)**

**Conceptual  
plan**

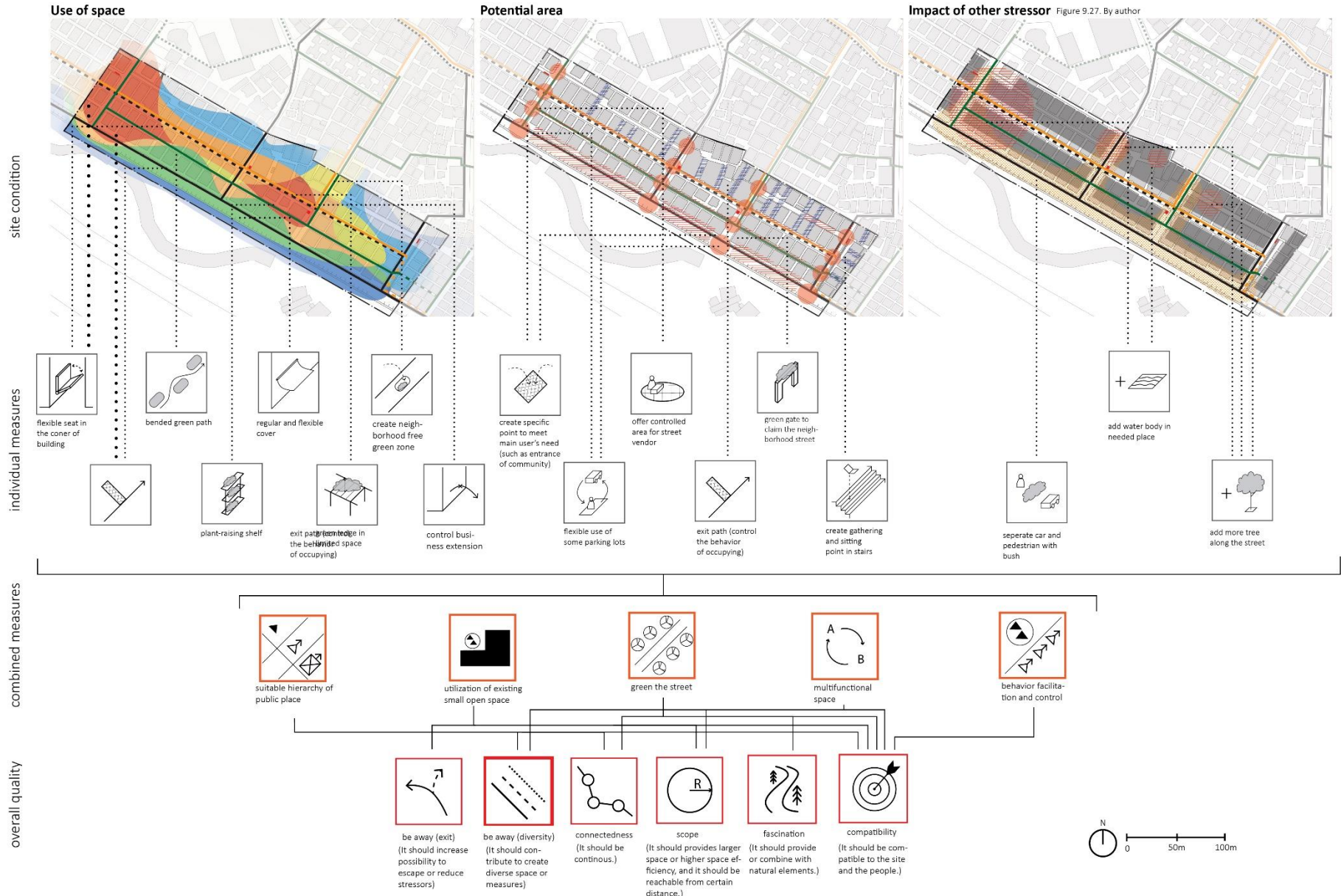
**Induction**

**analysis**

**Strategy &  
prototype**

**application**

**evaluation**



Solution:  
(setting 1)

Conceptual  
plan

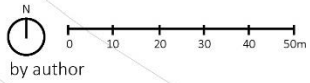
Induction

analysis

Strategy &  
prototype

application

evaluation



combined measures



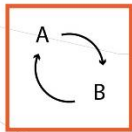
suitable  
separation and  
connection



utilization of  
existing small  
open space



green the street



multifunctional  
space



behavior fa-  
cilitation and  
control

Solution:  
(setting 1)

Conceptual  
plan

Induction

analysis

Strategy &  
prototype

application

evaluation



small scope  
& lack of program

general problem: problematic phenomenon are not addressed, such as the unbalanced height and building distance, distributed space

not be away within the neighborhood (other street) especially for the low illumination

insufficient scope

very bad building quality

potential for more exit with larger scope & natural fascination

bad building quality

not well connected and utilized traffic way

insufficient scope

weak connectivity for the neighborhood gathering street



**Solution:**  
**(setting 2)**

Conceptual  
plan

Induction

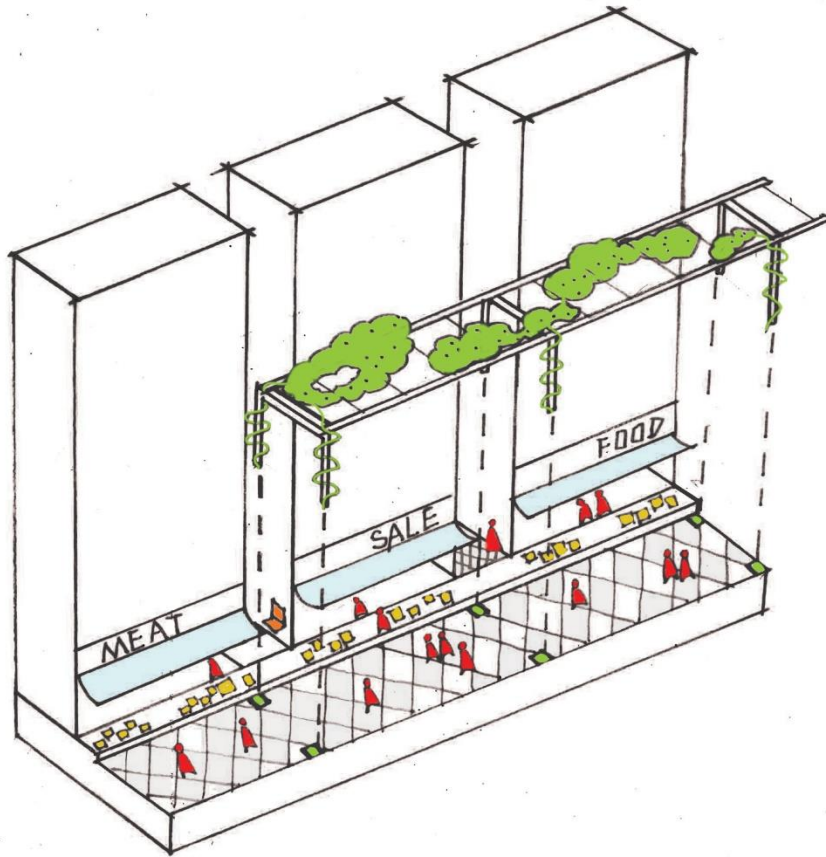
analysis

**Strategy &  
prototype**

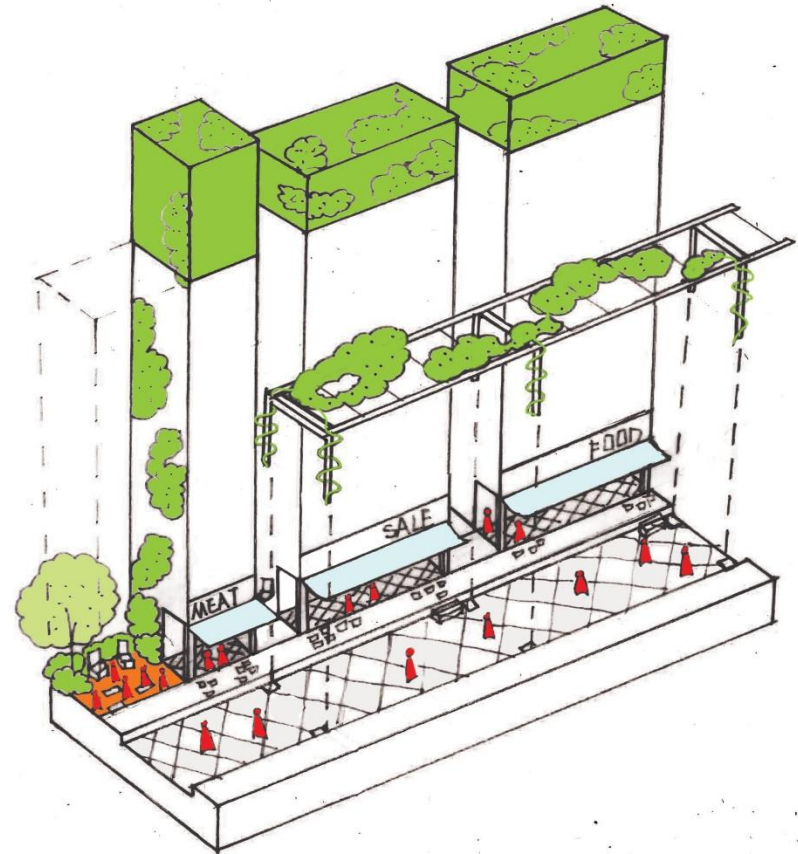
application

evaluation

prototype 1.0 for main commercial street by author



prototype 2.0 for main commercial street by author



**Solution:**  
**(setting 2)**

**Conceptual plan**

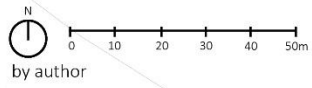
Induction

analysis

Strategy & prototype

**application**

evaluation



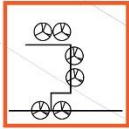
combined measures



street enlargement & height adaptation



gathering space within blocks



green the building

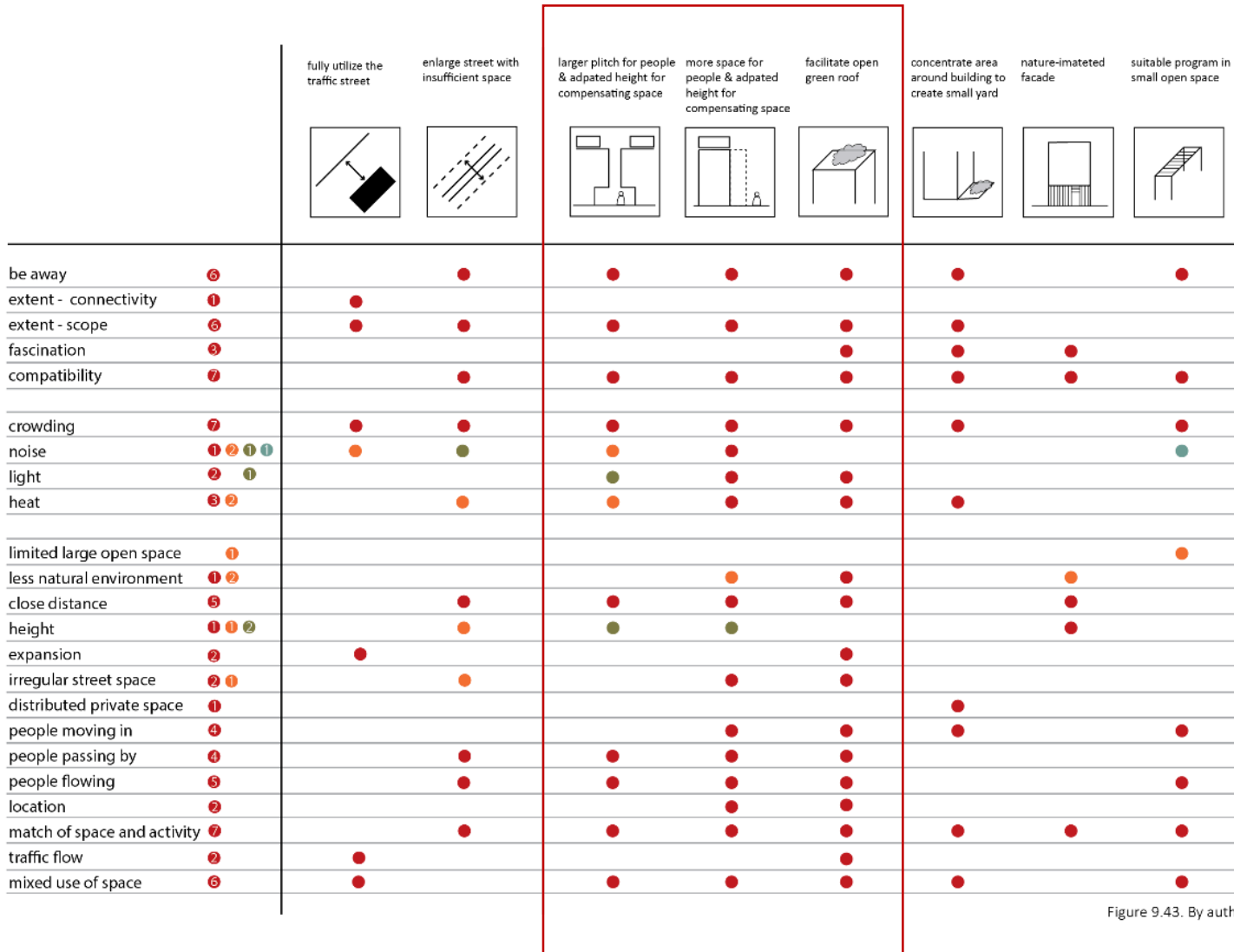


Figure 9.43. By author

**Solution:  
(setting 3)**

Conceptual  
plan

Induction

analysis

**Strategy &  
prototype**

application

evaluation

**prototype 3.0**

By author

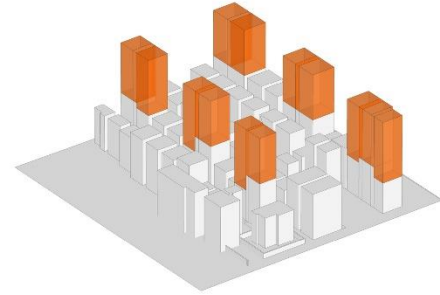
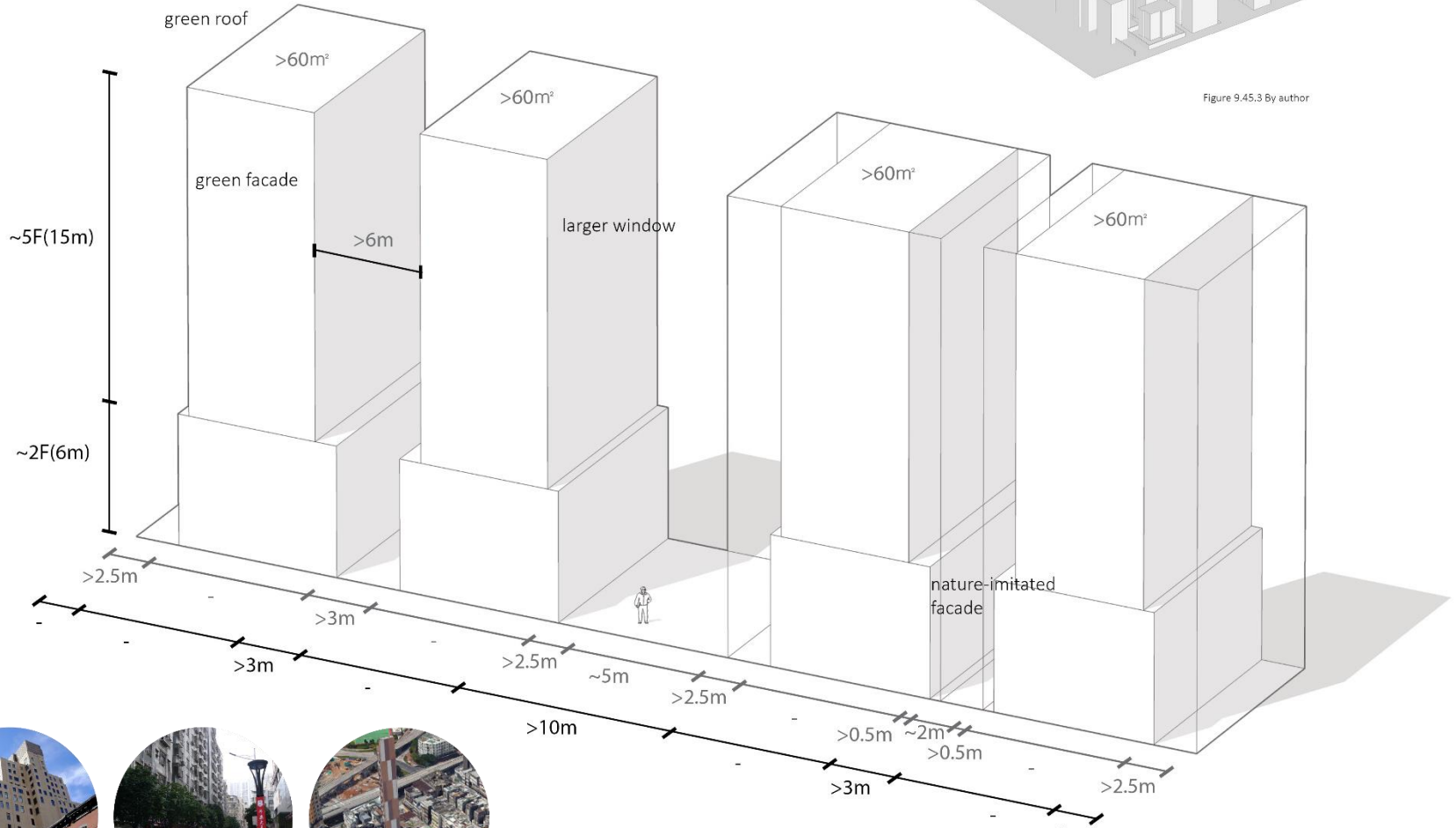


Figure 9.45.3 By author



**Solution:  
(setting 3)**

Conceptual  
plan

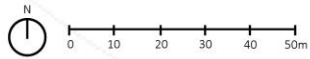
Induction

analysis

Strategy &  
prototype

**application**

evaluation



by author

combined measures



Typomorphology change  
by renovating building



**Overall evaluation – use space (area/length) to indicate**

SPACE		TERRITORY			IMPACT FROM OTHER STRESSOR	
site area	33545 m <sup>2</sup>	length		"exit path"	area of used space	11206 m <sup>2</sup>
setting 1		commercial street	434 m	110 m	area of unused space	6672 m <sup>2</sup>
ground floor area	15667 m <sup>2</sup>	neighborhood gathering street	330 m		area of newly-used area (neighborhood)	4134 m <sup>2</sup>
total floor area	117502.5 m <sup>2</sup>	traffic street	545 m	110 m	green area	1272 m <sup>2</sup>
		other street	286 m			
setting 3		setting 3	behavior of sitting/resting	exit path	added space in public place	2862 m <sup>2</sup>
ground floor area (low-rise)	8515 m <sup>2</sup>	commercial street	20 m	15 m	added space in public place (percentage)	16.0085 %
ground floor area (high-rise base)	3608 m <sup>2</sup>	neighborhood gathering street	10 m	15 m		
ground floor area (high-rise building)	2857 m <sup>2</sup>	traffic street	30 m	50 m		
total floor area	132504 m <sup>2</sup>	other street	50 m	30 m		
spaciousness					<b>CONCLUSION</b>	
setting 1	0.152149954	all open space	60 m		added space in public place	6641.76 m <sup>2</sup>
setting 3	0.161670591	relatively large open space	200 m		added space in public place (percentage)	37.15046 %
added space in public place	3544 m <sup>2</sup>	"added space in public place"	235.76 m <sup>2</sup>		added control (percentage)	29.54545 %
added space in public place (percentage)	19.82324645 %	"added space in public place" (percentage)	1.31871574 %		added restoration (open space)(percentage)	28.45956 %
					added restoration (open space)(area)	5088 m <sup>2</sup>

**CONCLUSION**

added space in public place	6641.76 m <sup>2</sup>
added space in public place (percentage)	37.15046 %
added control (percentage)	29.54545 %
added restoration (open space)(percentage)	28.45956 %
added restoration (open space)(area)	5088 m <sup>2</sup>

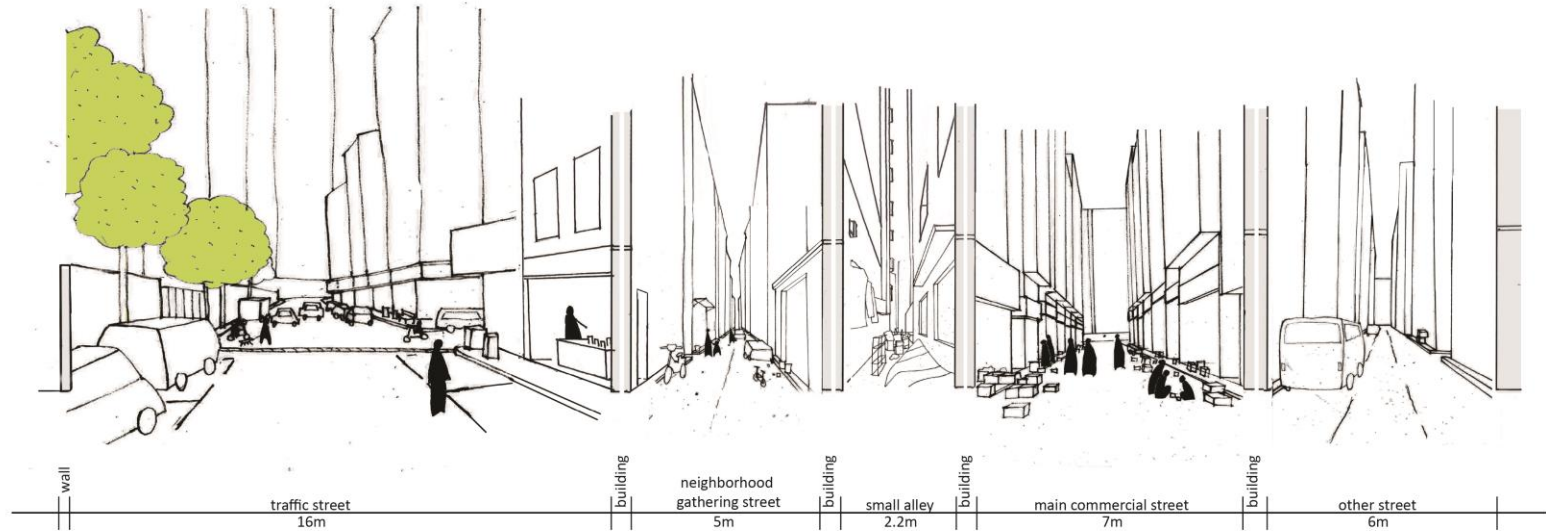
Mechanism — Cause — Effect — **Solution** — Application — Transferability

**Perspective: Setting 0**



Mechanism — Cause — Effect — **Solution** — Application — Transferability

**Perspective: Setting 0**



Mechanism — Cause — Effect — **Solution** — Application — Transferability

**Perspective: Setting 1**



Mechanism — Cause — Effect — **Solution** — Application — Transferability

**Perspective: Setting 2**



Mechanism — Cause — Effect — **Solution** — Application — Transferability

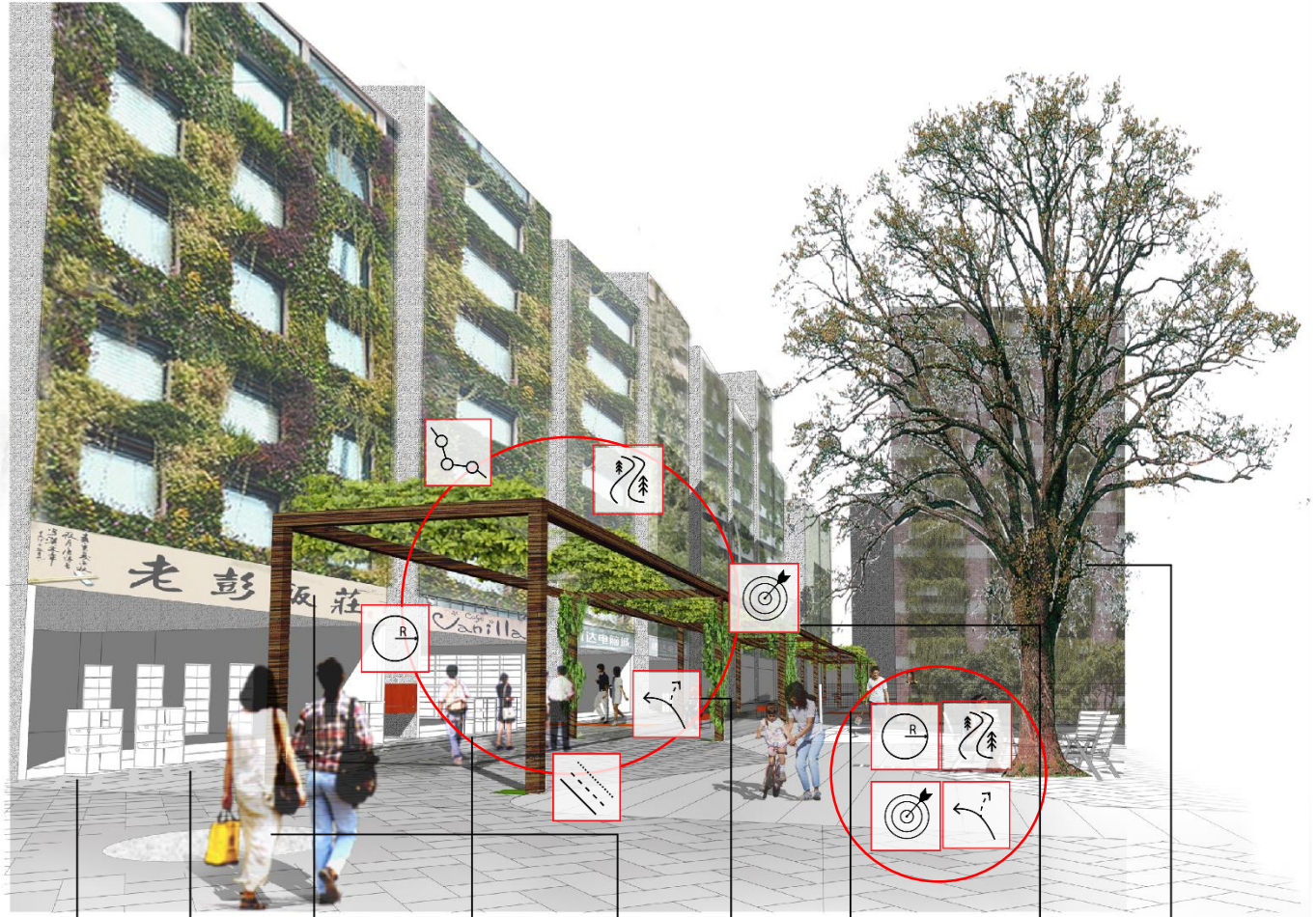
**Perspective: Setting 3**



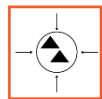
**Perspective  
(quality of  
commercial street)**

After

Before



street enlargement & height adaptation



gathering space within blocks

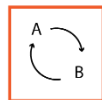


Typomorphology change by renovating building

space



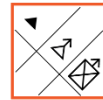
behavior facilitation and control



multifunctional space

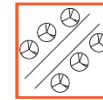


utilization of existing small open space

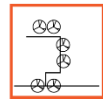


suitable separation and connection of public place

territory/control



green the street



green the building

impact on other stressor

Mechanism — Cause — Effect — Solution — **Application** — Transferability

**Design in larger scale (conceptual level)**





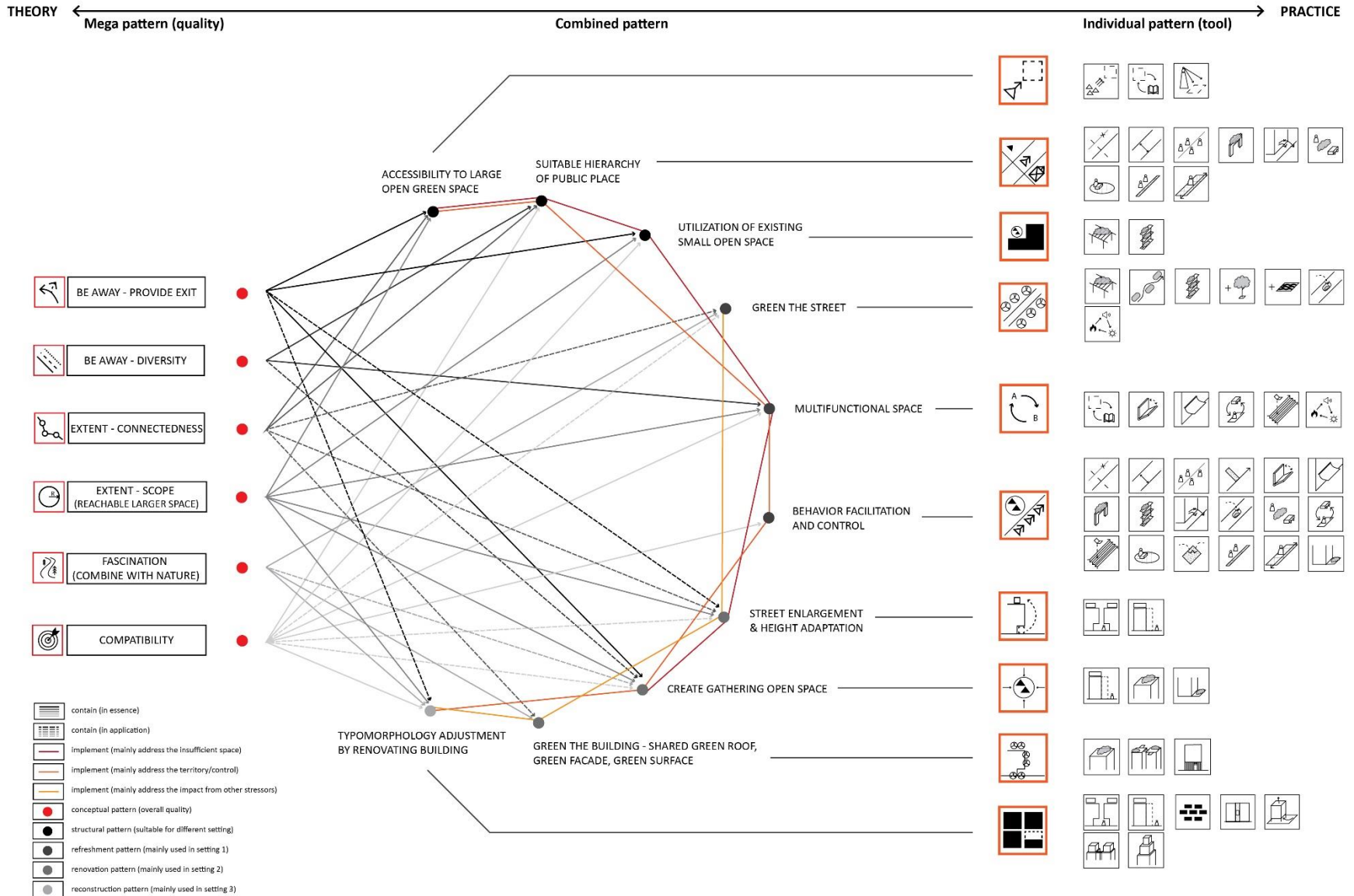
Mechanism — Cause — Effect — Solution — **Application** — Transferability

**Design in larger scale (conceptual level)**



Mechanism — Cause — Effect — Solution — **Application** — Transferability

**Pattern library**



Mechanism

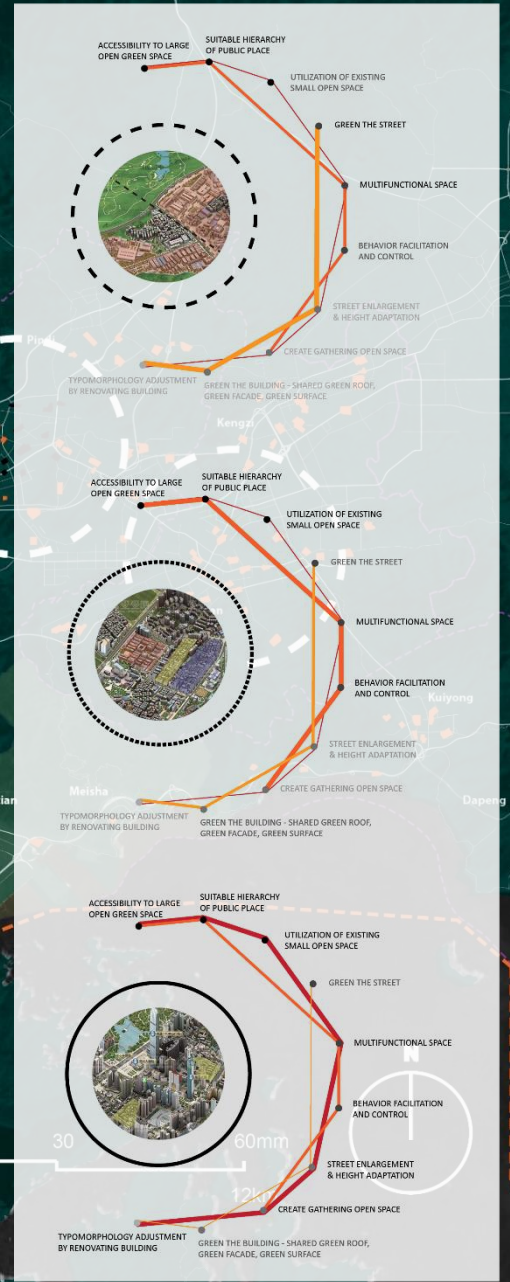
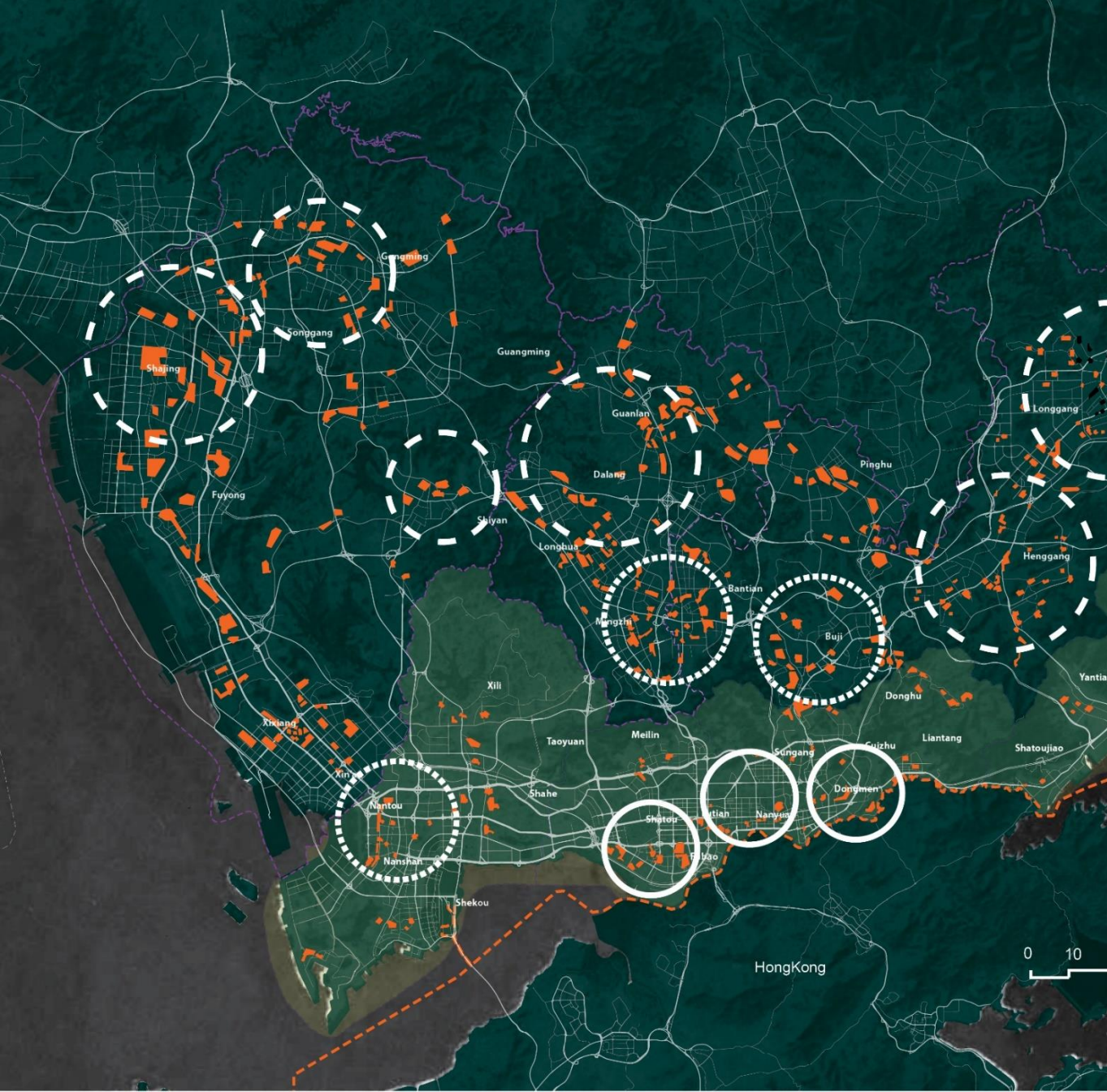
Cause

Effect

Solution

Application

Transferability



## **Conclusion**

- 1. Without reducing density, less crowding and more restorative design can be implemented to reduce the stress level.**
- 2. Stress pattern that can transferred to more other cases in latter design/research**

## **Recommendation**

- 1. Better way of gathering space-related psychological data to understand the relation between space & people & stress**
- 2. More in-depth research about the complex relation between different stress factors**

**Thank you**

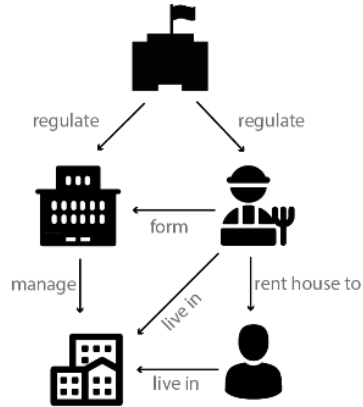
# Appendix – material plan



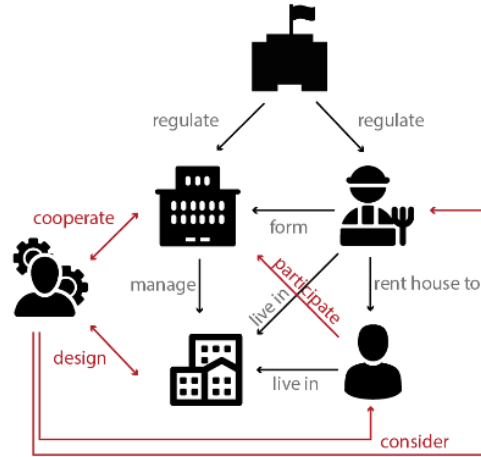
# Appendix – stakeholder cooperation



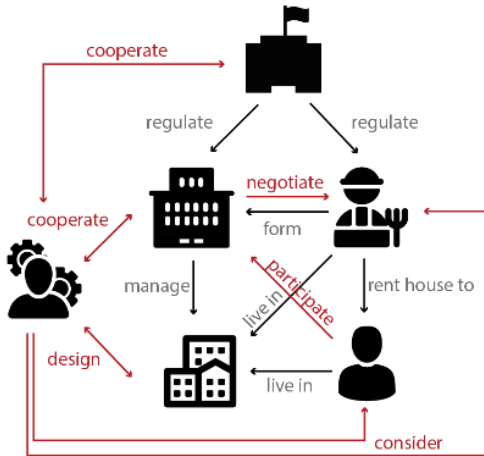
Setting 0



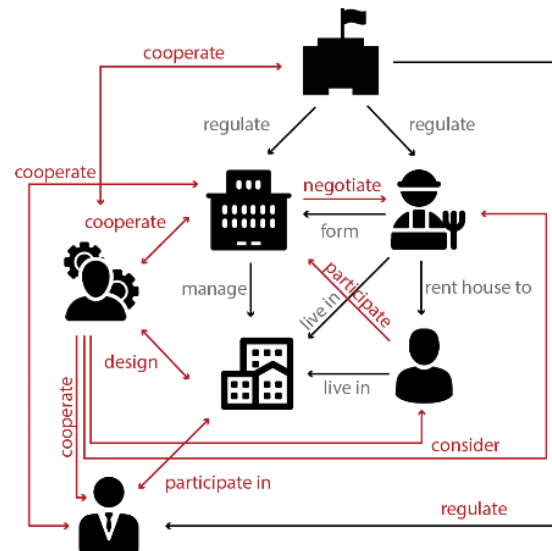
Setting 1



Setting 2



Setting 3



## Appendix – needed money and power for different pattern

