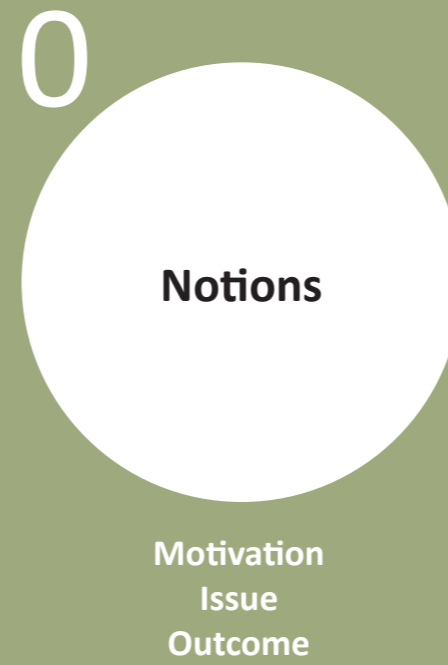


# Biophilic Urban Childhood

A Healthy Childhood with Biophilic City Model under  
Urban Densification in Post-war Neighbourhood, Zuidwijk

Chingfang Wang 5022444  
14<sup>th</sup> January 2022

1st mentor: Machiel van Dorst  
2nd mentor: Robbert Jan van der Veen



MOTIVATION 動機

*“We need to allow children to develop their biophilia, their love for the Earth, before we ask them to save it. The more personal children’s experience with nature, the more environmentally concerned and active children are likely to become.”*

*Randy White*



*Biophilia*

*“The innately emotional affiliation of human beings to other living organisms.”*

*Edward O. Wilson (1984)*





Unhealthy childhood



Unfriendly Urban Environment

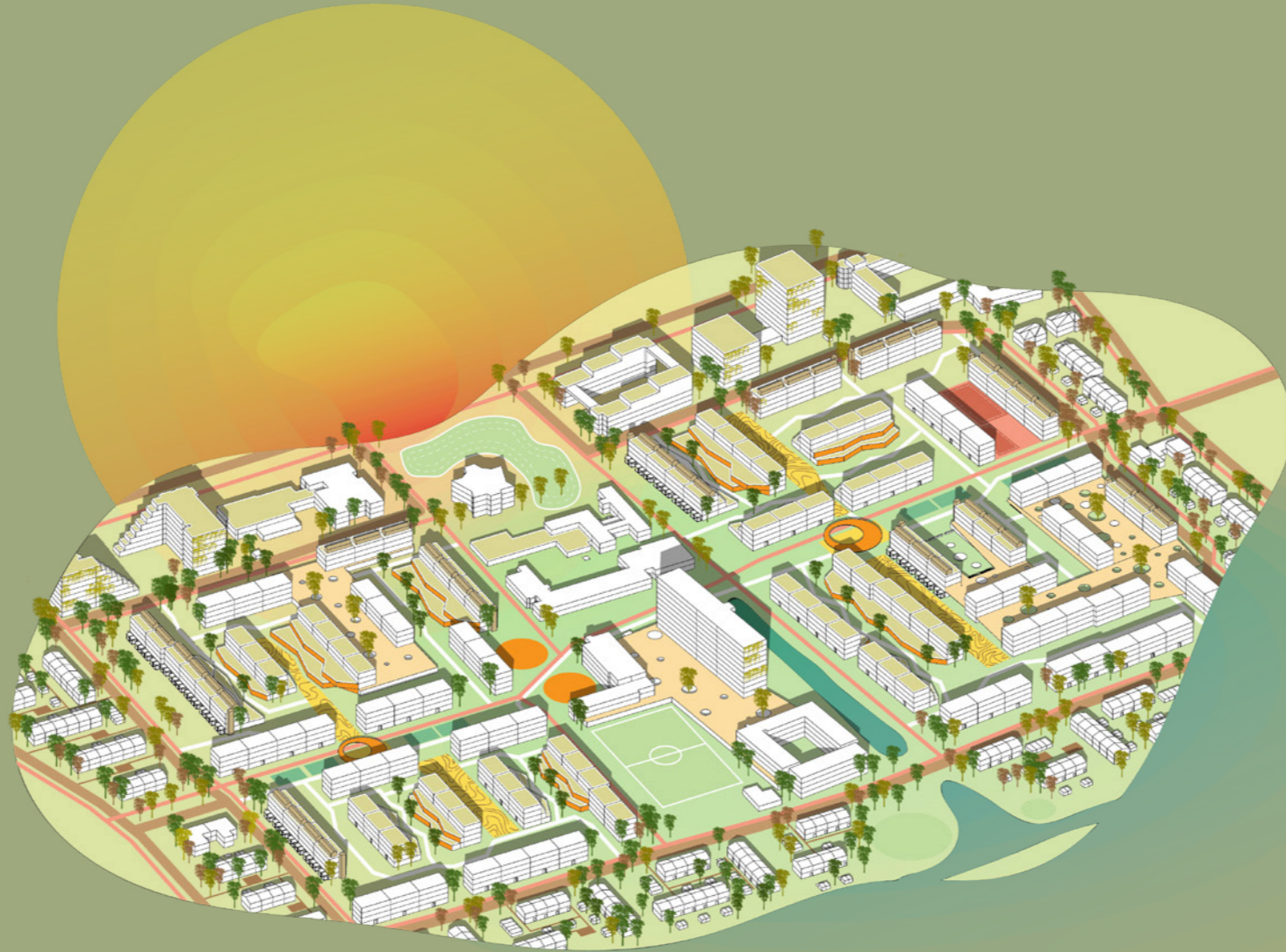


Biophilic Design

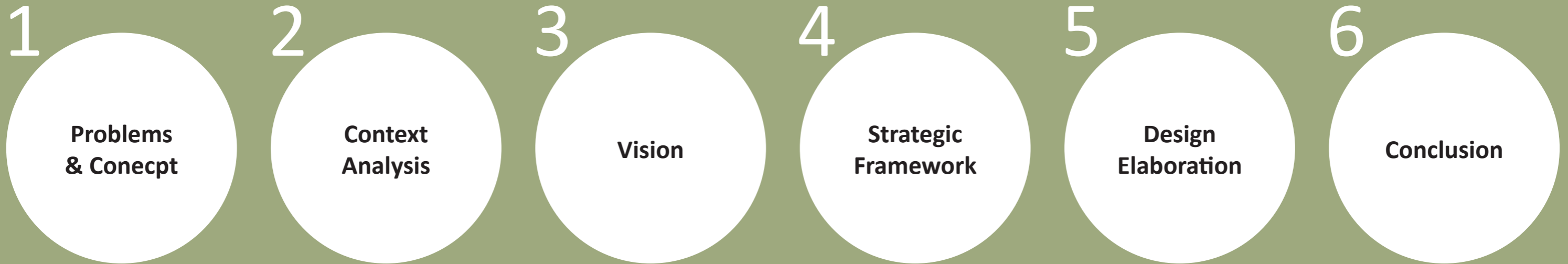


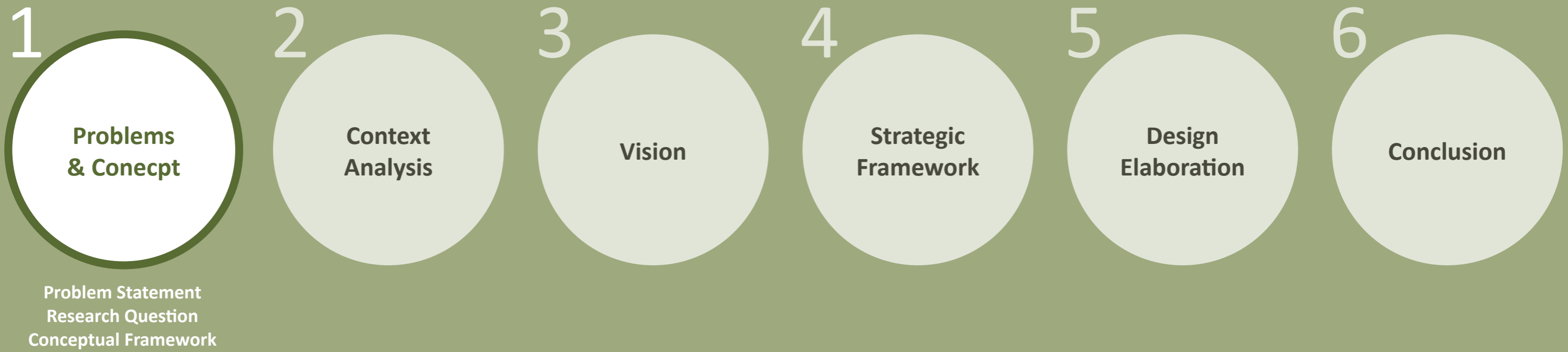
Child-friendly Design

# OUTCOME 預期結果



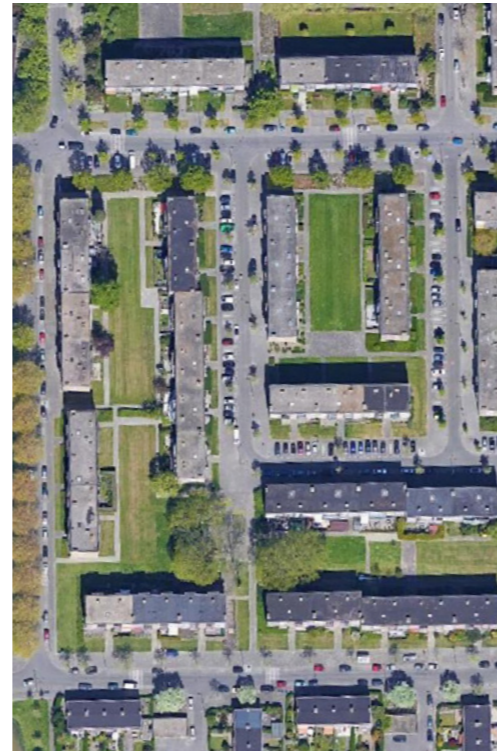
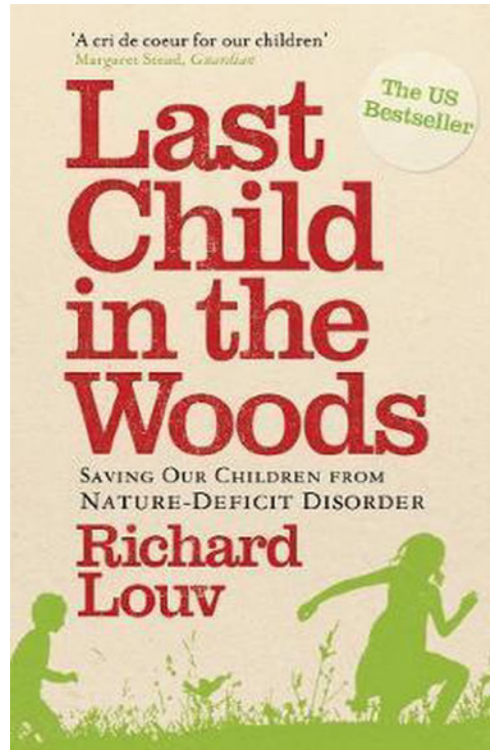
Biophilic Urban Childhood







## PROBLEM STATEMENT 問題陳述



### ***The Trend | Unhealthy Childhood***

1. Decreasing outdoor & physical activities  
- mental acuity and concentration." (Munter et al, 2004).
2. Nature-Deficit Disorder  
- the absence, or inaccessibility, of open space with high crime rates, depression, and other urban maladies." (Louv, 2005)

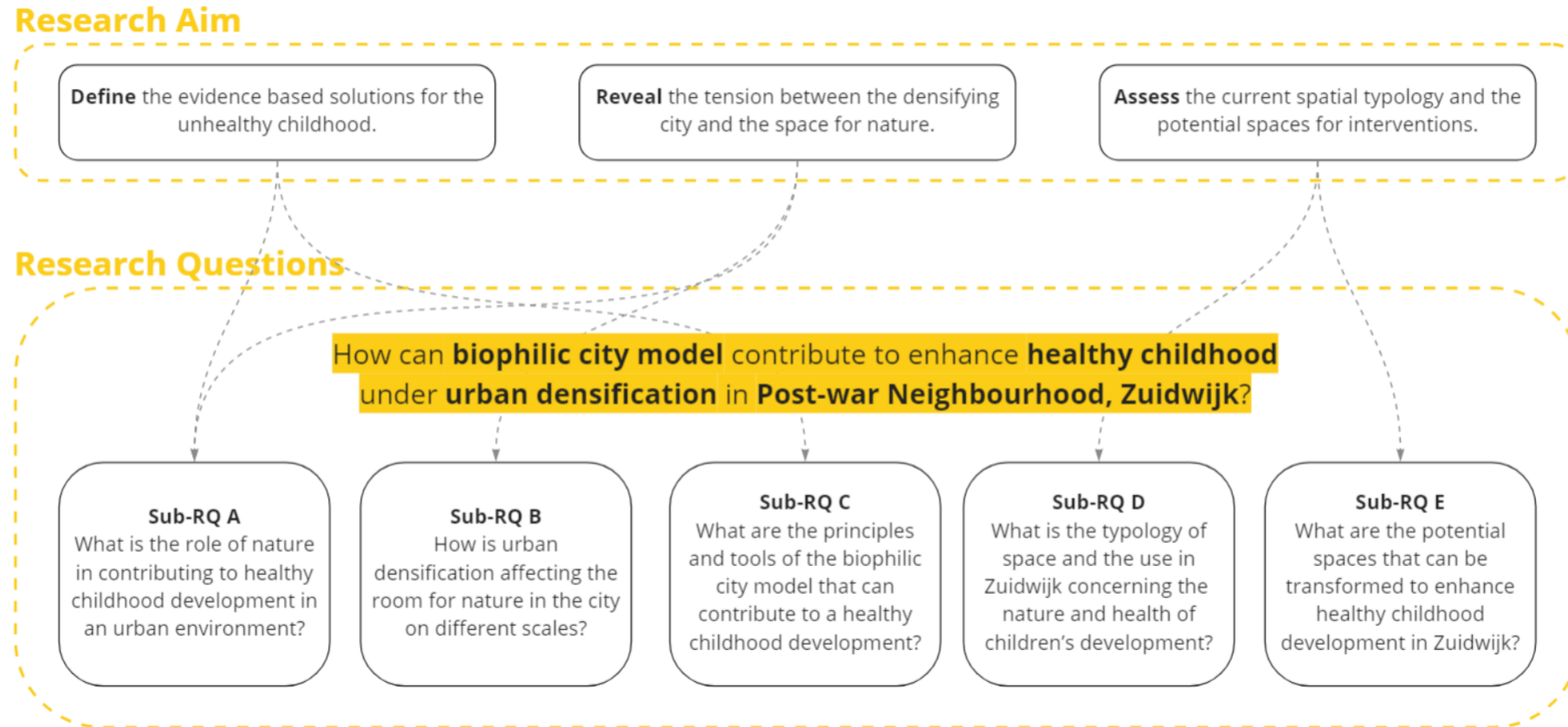
### ***The Process | Urban densification***

1. Smaller child-accessible range (Fetto, 2002)
2. Lower freedom playing in outdoor public space (L. Karsten, 2005)
3. Restricted freedom of mobility (Hillman & Adams, 1992)
4. Public & Private regulations (Louv, 2005)

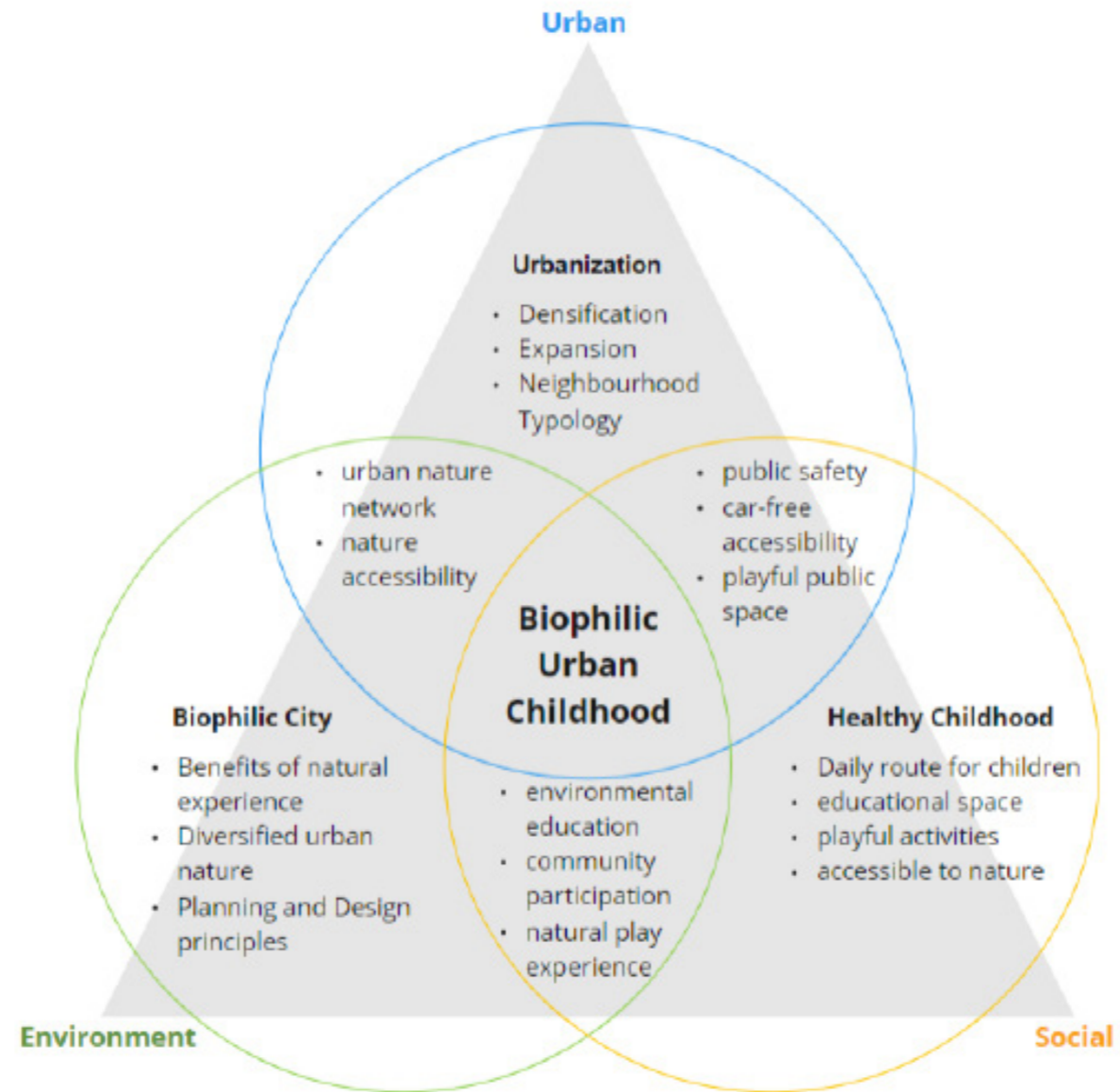
### ***The Context | Post-war Neighbourhood, Zuidwijk***

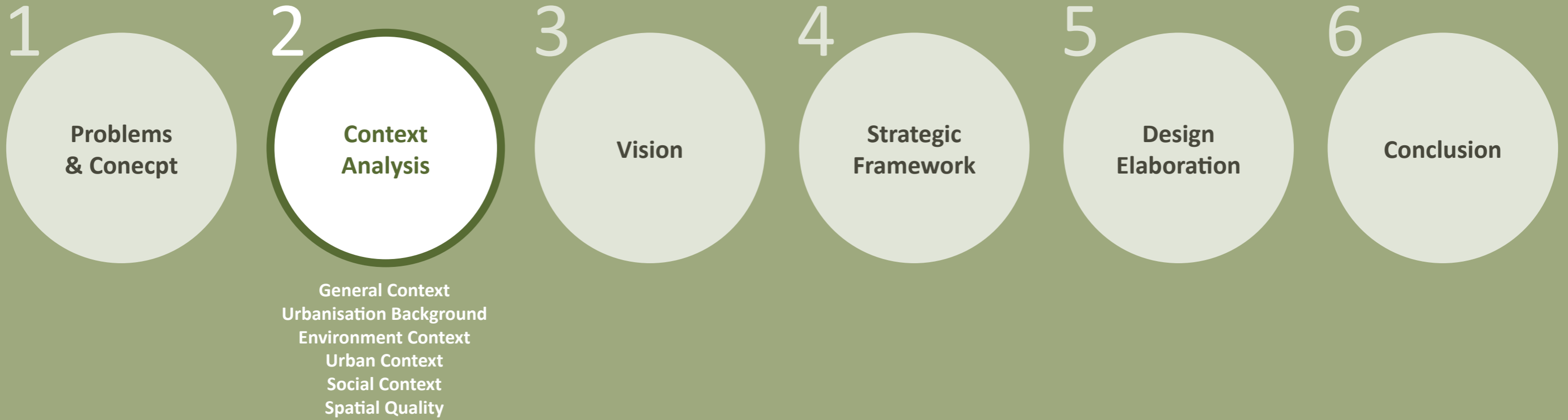
1. Original vision of connecting the residents together with more public space
2. Lacking social cohesion with its presence of public green spaces
3. Higher percentage of young children population

# RESEARCH QUESTION 研究問題



CONCEPTUAL FRAMEWORK 概念框架



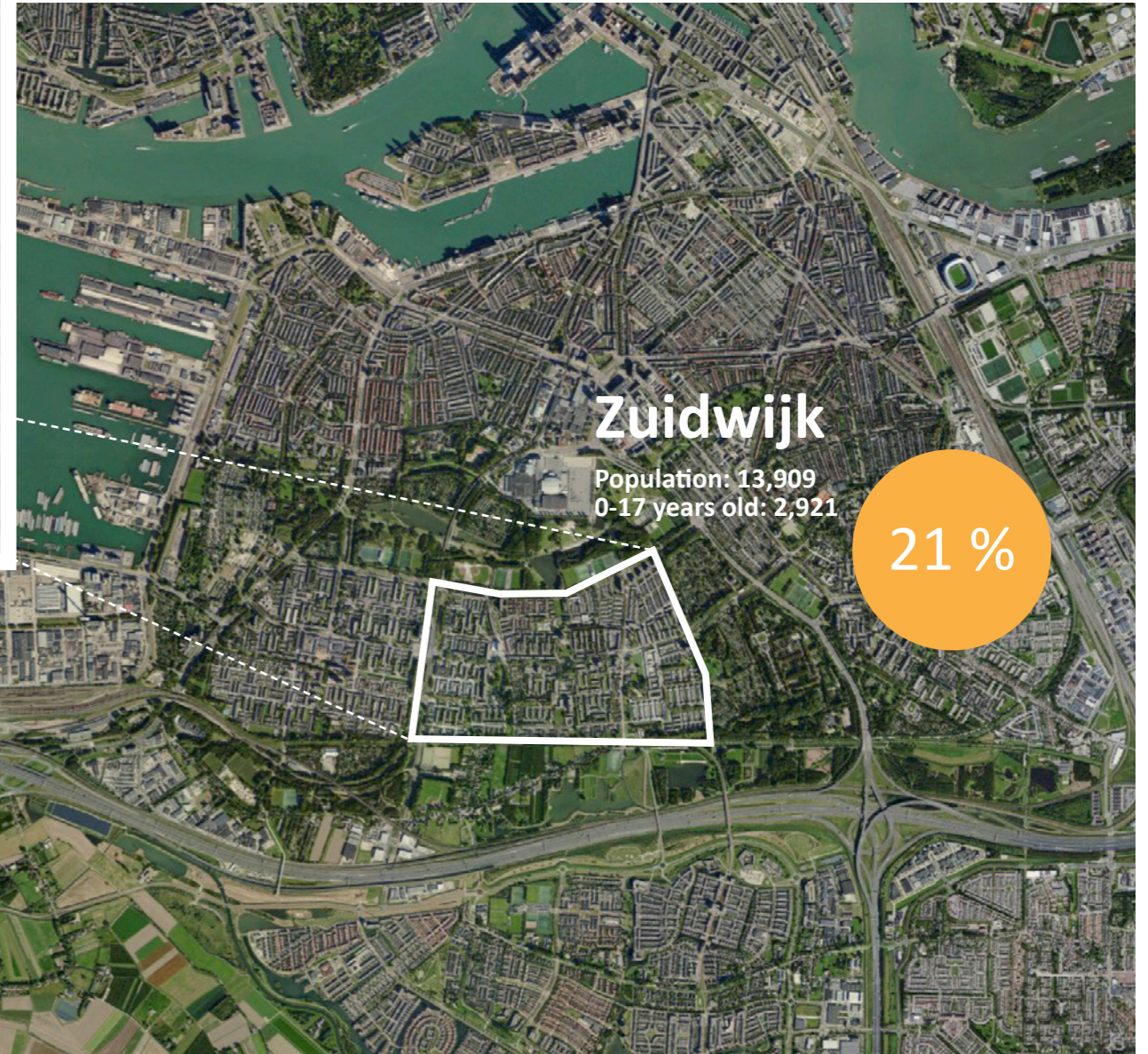
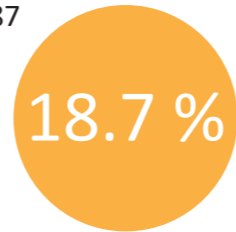


# GENERAL CONTEXT 基地背景



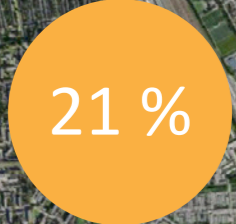
## Rotterdam

Population: 651,269  
0-17 years old: 121,787



## Zuidwijk

Population: 13,909  
0-17 years old: 2,921



# GENERAL CONTEXT 基地背景

1940



1960



1980



2000

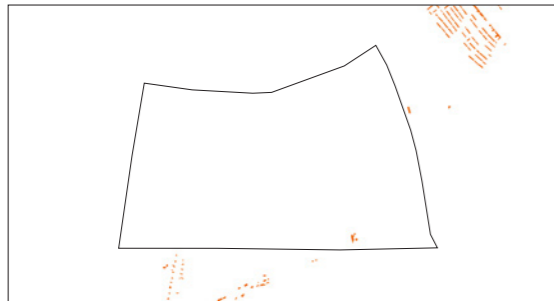


2020

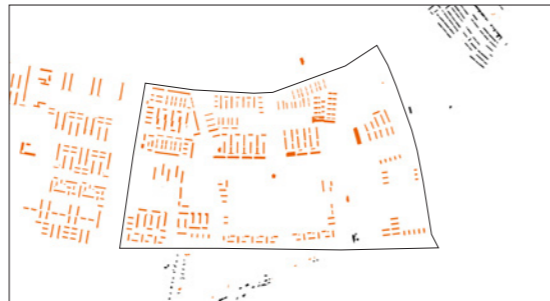


Fig. 4.5 Expansion of Rotterdam South. Source: <https://www.tbootjdreis.nl>

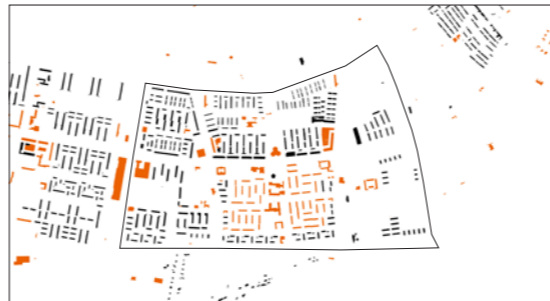
< 1945



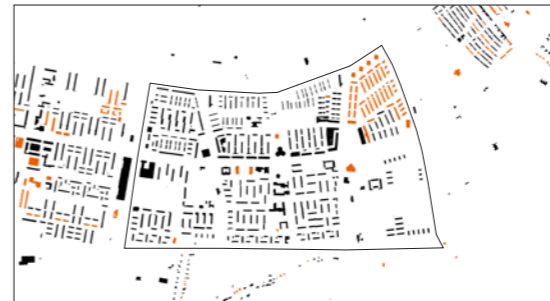
1945 - 1960



1960 - 1985



1985 - 2000

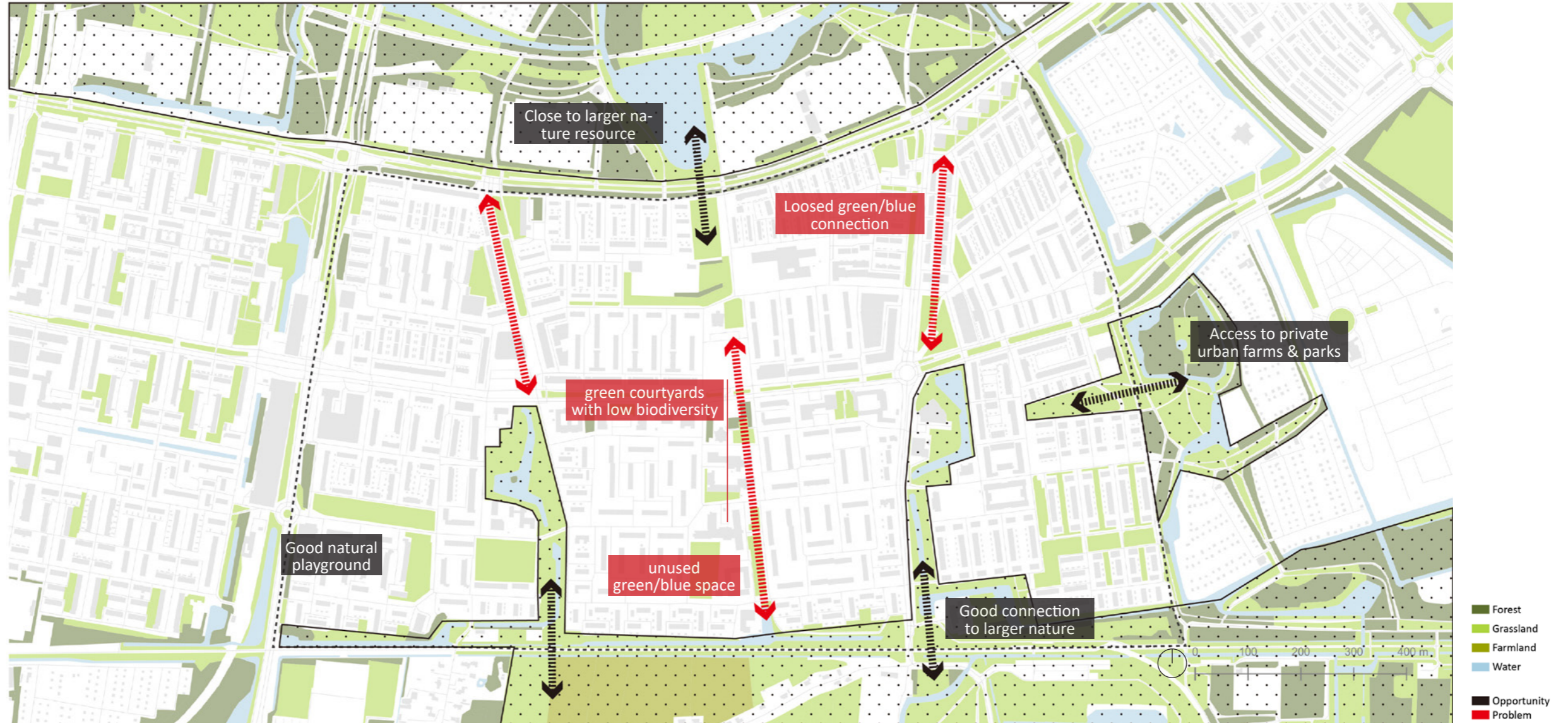


> 2005

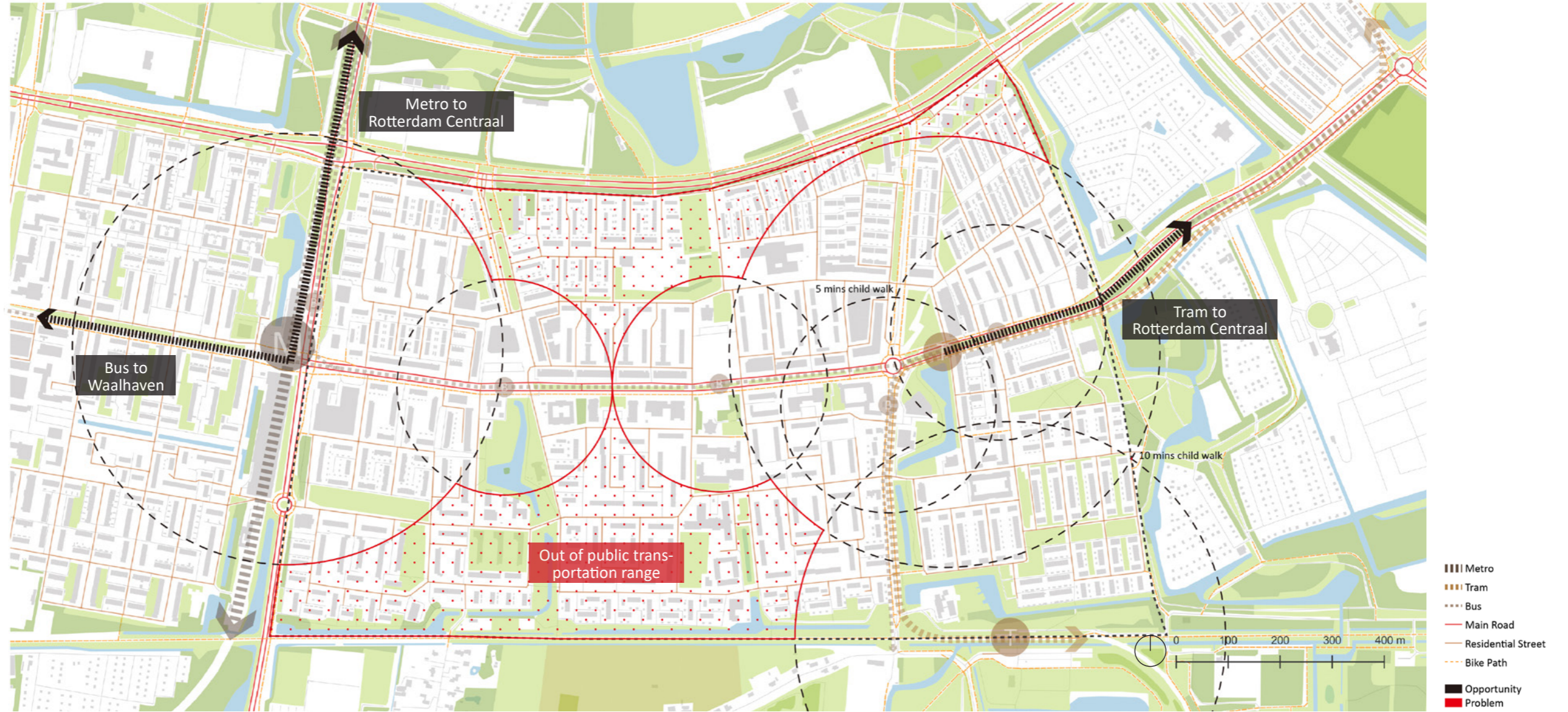


Fig. 4.7 Building age of Zuidwijk. Source: [code.waag.org](http://code.waag.org), edited by author

# ENVIRONMENT CONTEXT 環境背景

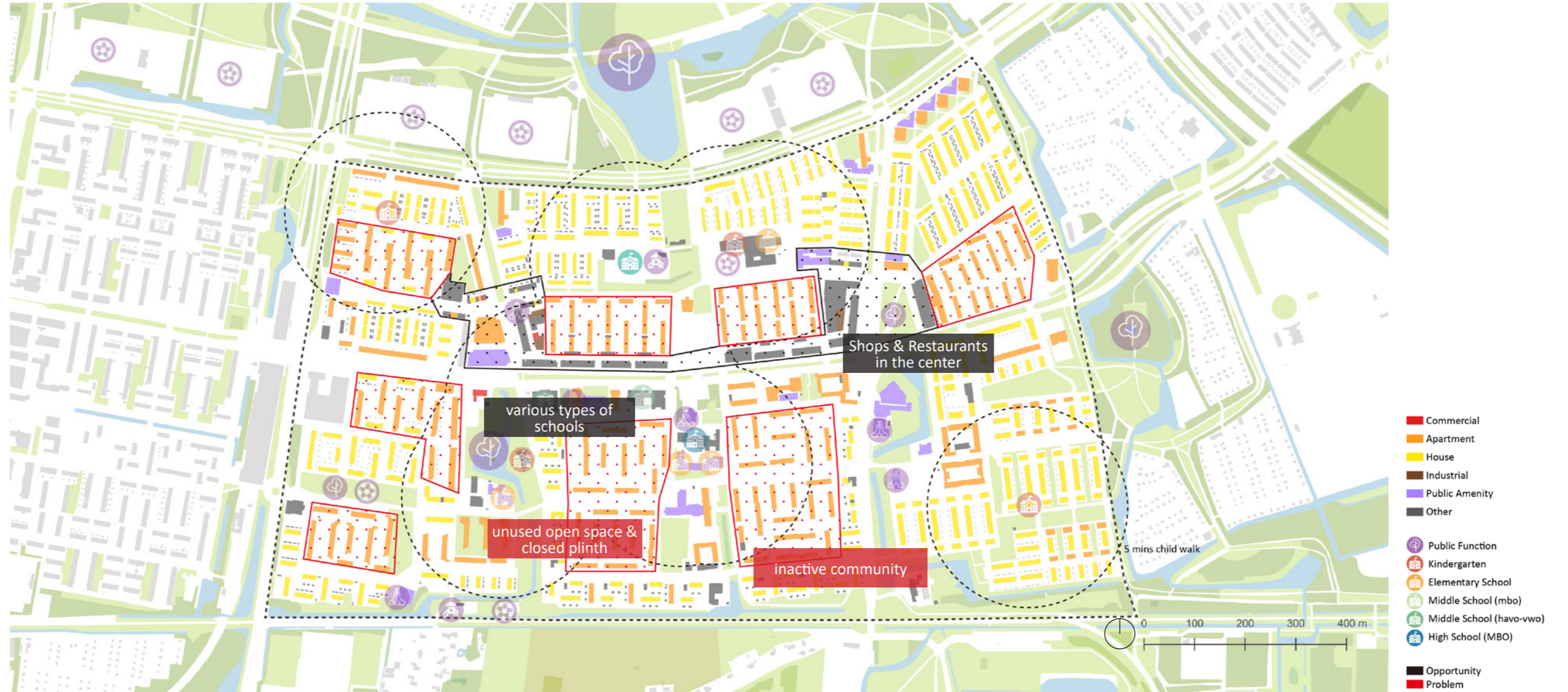


# URBAN CONTEXT 都市背景



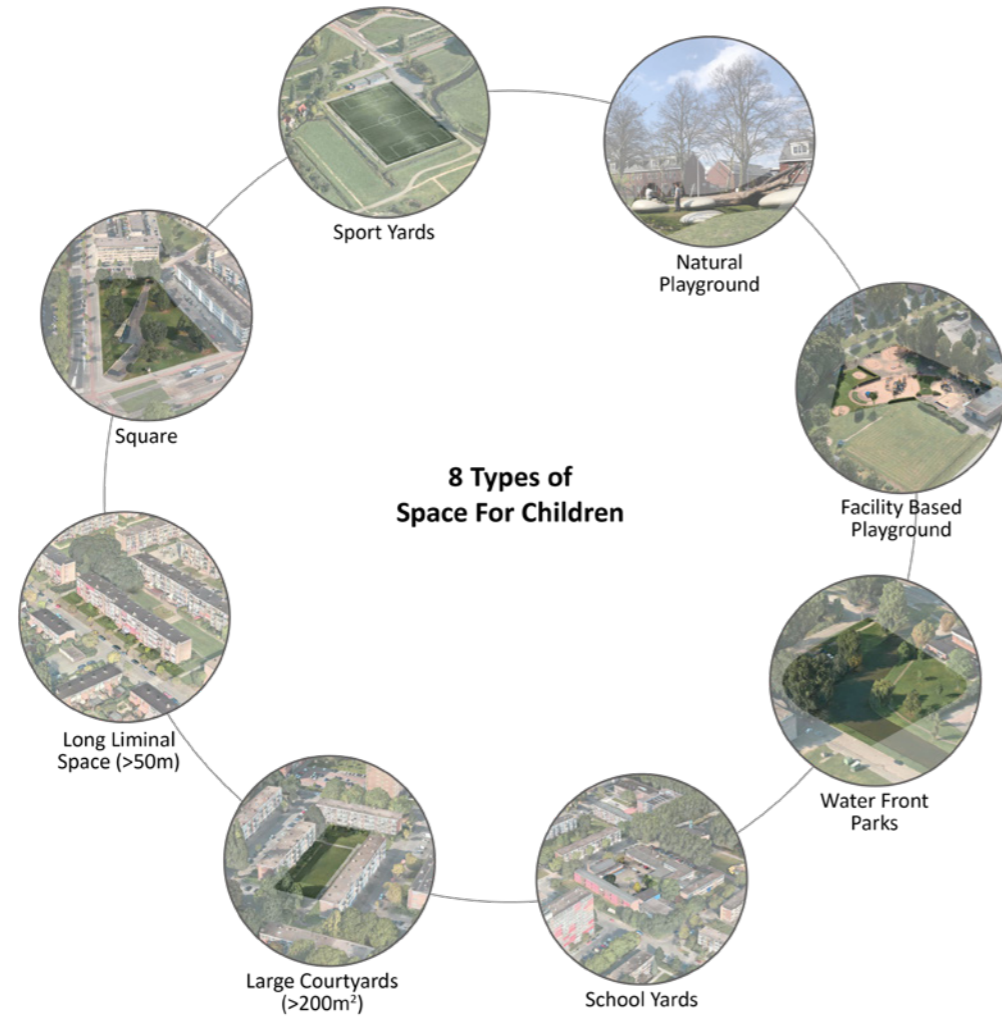


# SOCIAL CONTEXT 社會背景



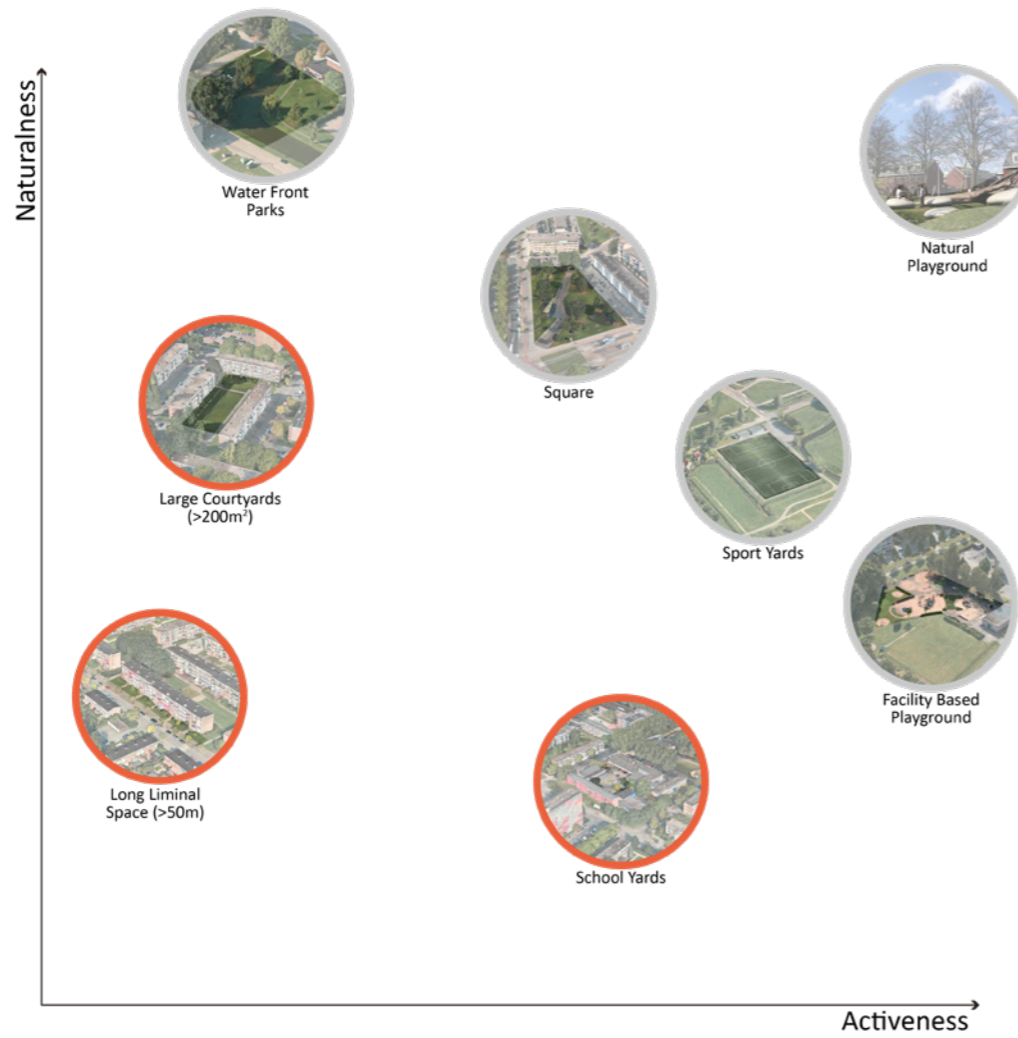
- Commercial
- Apartment
- House
- Industrial
- Public Amenity
- Other
- Public Function
- Kindergarten
- Elementary School
- Middle School (mbo)
- Middle School (havo-vwo)
- High School (MBO)
- Opportunity
- Problem

# SPATIAL QUALITY 空間品質

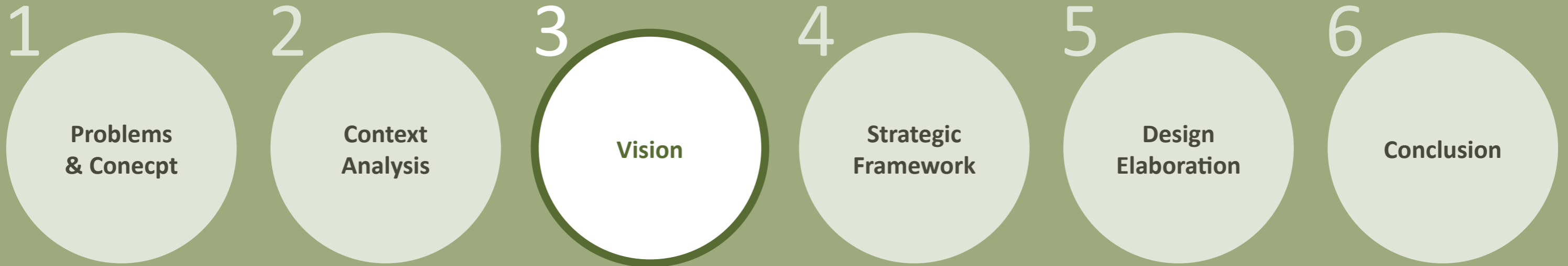


- Natural Playground
- Facility Based Playground
- Water Front Parks
- School Yards
- Large Courtyards (200m<sup>2</sup>)
- ▨ Long Liminal Space (50m)
- Square
- Sport Yards

# SPATIAL QUALITY 空間品質

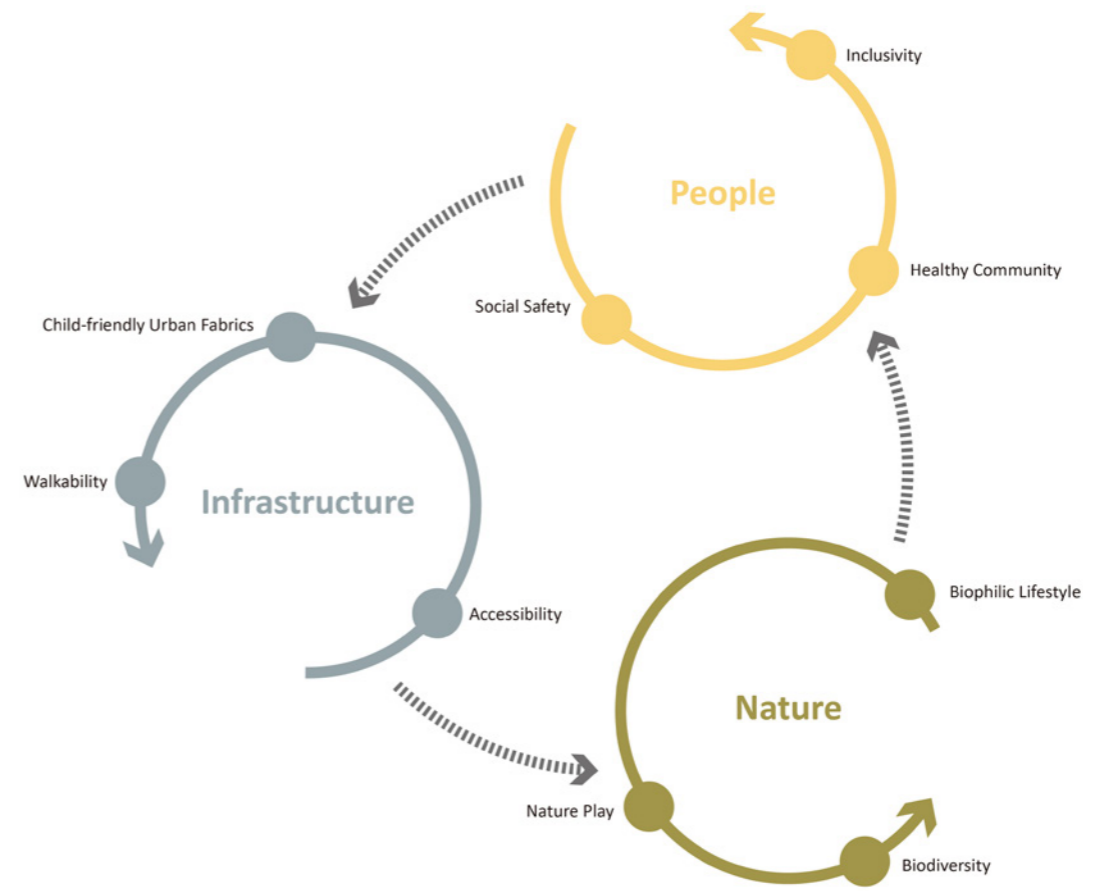
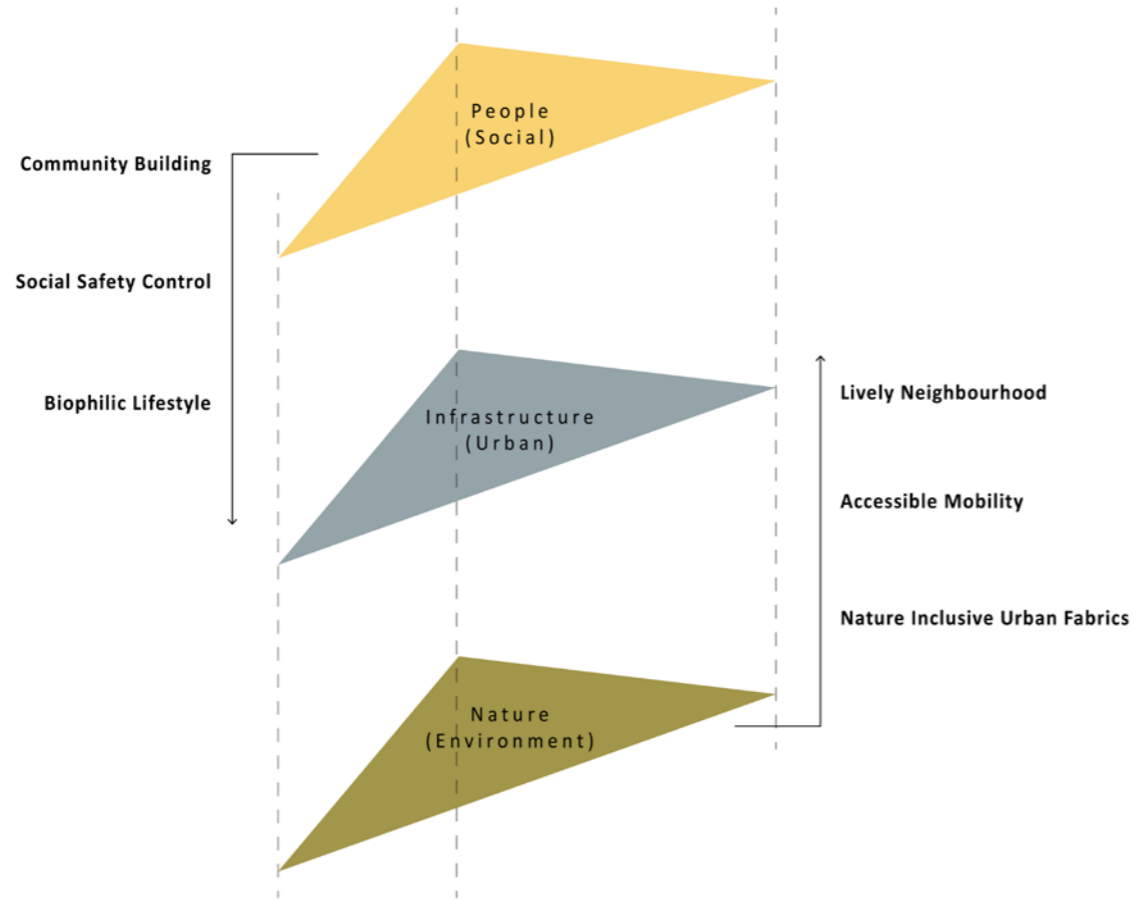


- Higher quality space
- Lower quality space
- Focused area

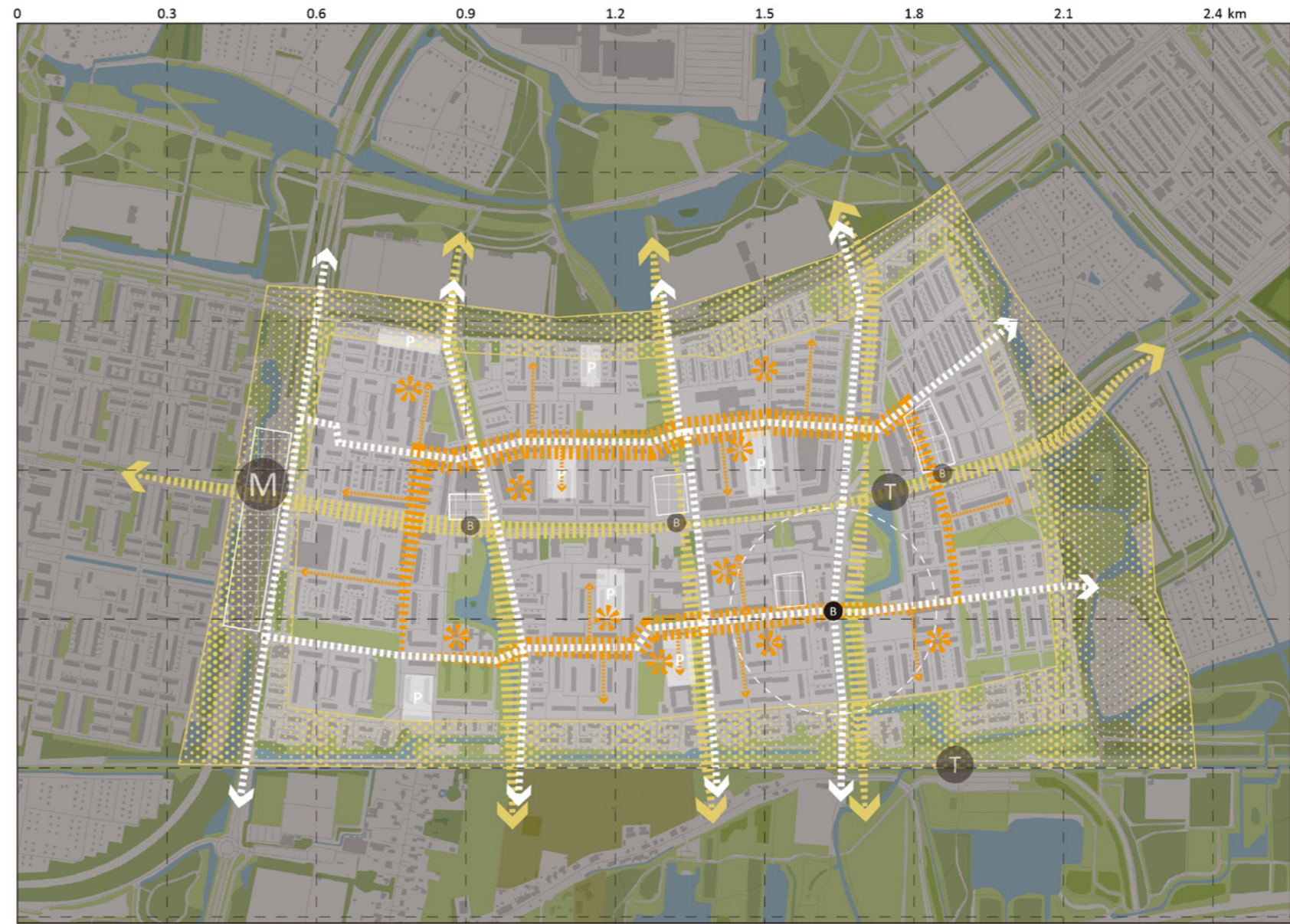
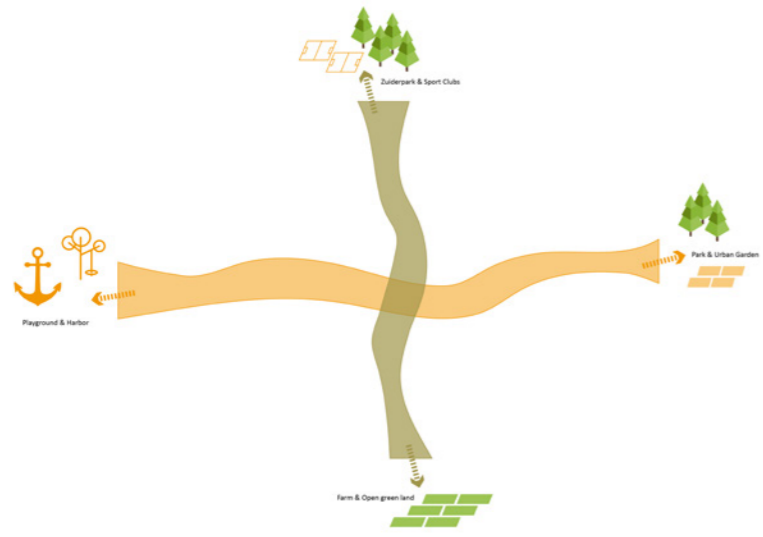


Spatial Framework  
Vision Layers  
Overall Vision  
Strategic Area

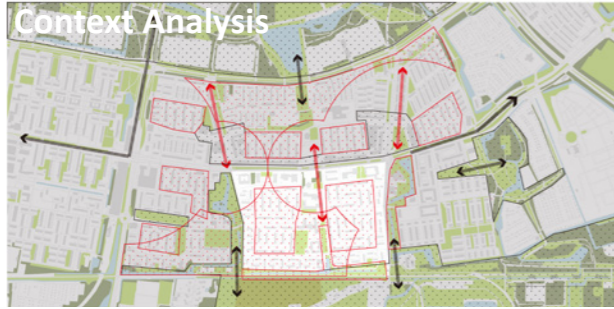
# SPATIAL FRAMEWORK 空間框架

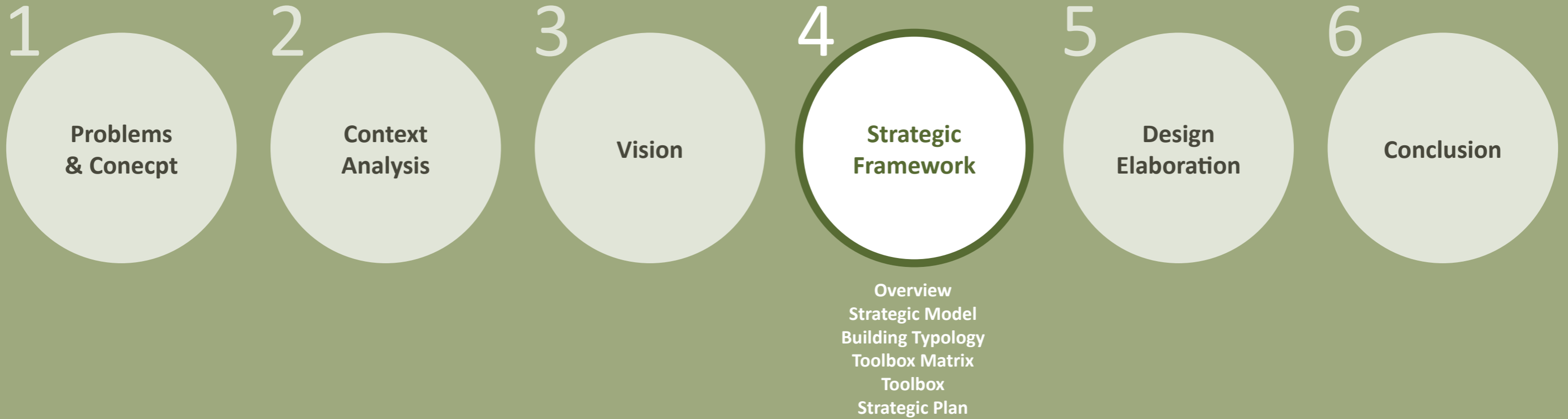


# OVERALL VISION 願景



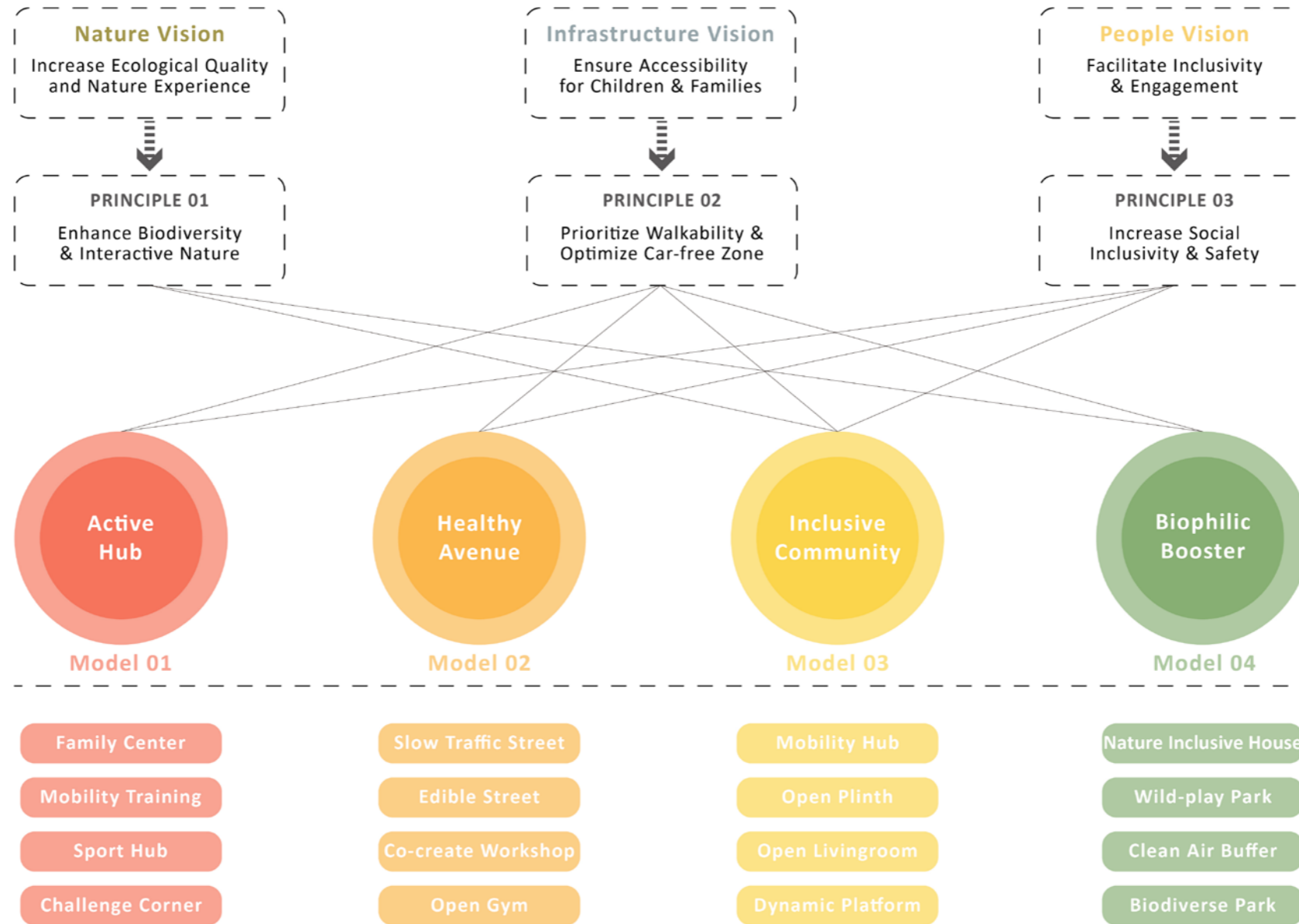
# STRATEGIC AREA 策略區域



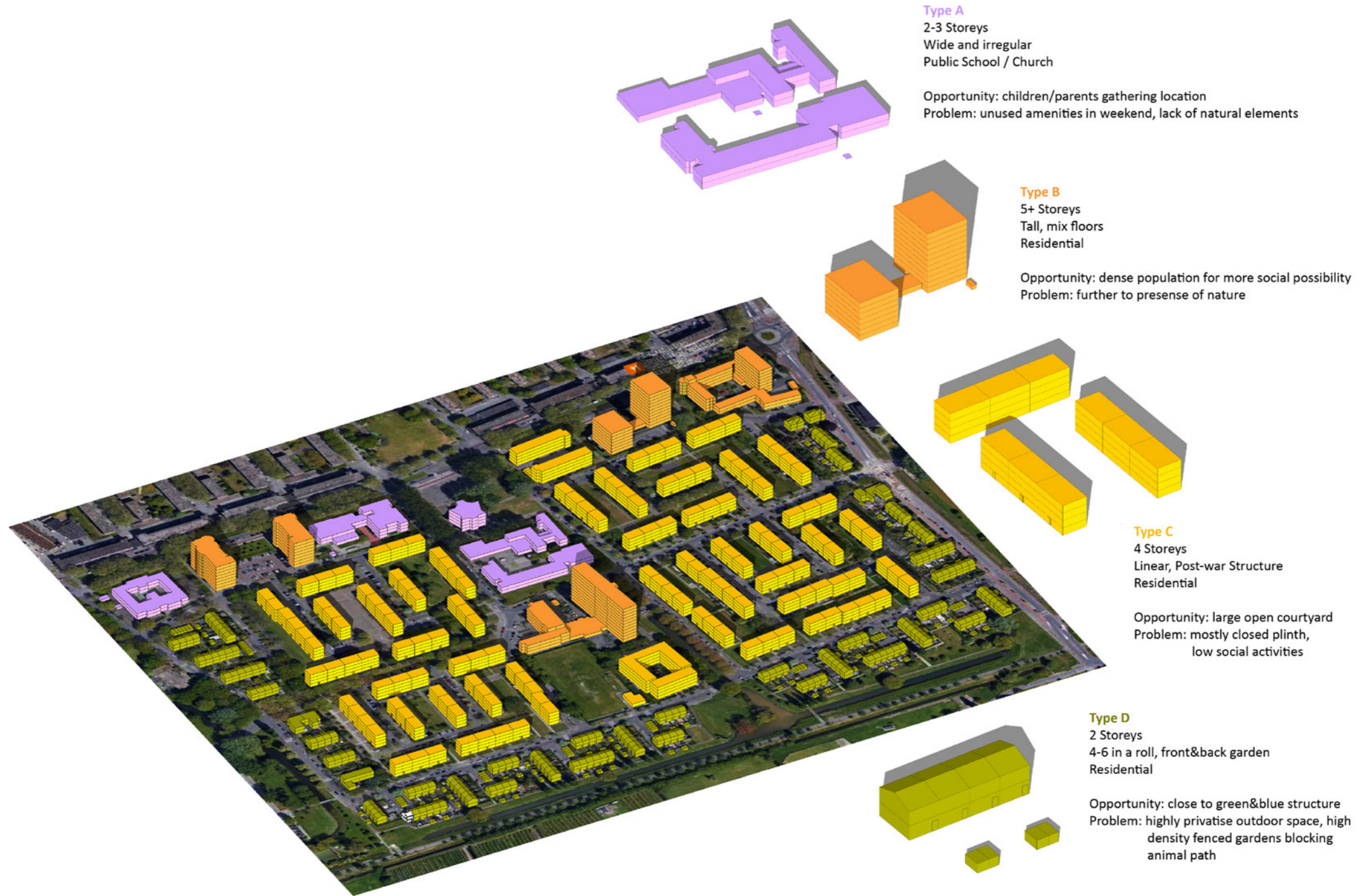




# OVERVIEW 策略框架



# BUILDING TYPOLOGY 建築類型



# TOOLBOX MATRIX 工具箱矩陣



**Access to Nature**



**Social Connectedness**



**Sense of Ownership**



**Playability**



**Active Mobility**



**Agency & Decision-Making**



1. **Visual Connection with Nature**  
A view to elements of nature, living systems and natural processes.
2. **Non-Visual Connection with Nature**  
Auditory, haptic, olfactory, or gustatory stimuli that engender a deliberate and positive reference to nature, living systems or natural processes.
3. **Non-Rhythmic Sensory Stimuli**  
Stochastic and ephemeral connections with nature that may be analyzed statistically but may not be predicted precisely.
4. **Thermal & Airflow Variability**  
Subtle changes in air temperature, relative humidity, airflow across the skin, and surface temperatures that mimic natural environments.
5. **Presence of Water**  
A condition that enhances the experience of a place through the seeing, hearing or touching of water.
6. **Dynamic & Diffuse Light**  
Leveraging varying intensities of light and shadow that change over time to create conditions that occur in nature.
7. **Connection with Natural Systems**  
Awareness of natural processes, especially seasonal and temporal changes characteristic of a healthy ecosystem.

8. **Biomorphic Forms & Patterns**  
Symbolic references to contoured, patterned, textured or numerical arrangements that prevail in nature.
9. **Material Connection with Nature**  
Material and elements from nature that, through minimal processing, reflect the local ecology or geology to create a distinct sense of place.
10. **Complexity & Order**  
Rich sensory information that adheres to a spatial hierarchy similar to those encountered in nature.

11. **Prospect**  
An unimpeded view over a distance for surveillance and planning.
12. **Refuge**  
A place for withdrawal, from environmental conditions or the main flow of activity, in which the individual is protected from behind and overhead.
13. **Mystery**  
The promise of more information achieved through partially obscured views or other sensory devices that entice the individual to travel deeper into the environment.
14. **Risky/Peril**  
An identifiable threat coupled with a reliable safeguard.



	 <b>Nature in the Space (Direct nature)</b>	 <b>Natural Analogues (Indirect Nature)</b>	 <b>Nature of the Space (Sense of nature)</b>
 <b>Access to Nature</b>	Direct connection with nature. Presence of nature and direct experience with nature that facilitates environment biodiversity and bond with other natural organism.  E.g. insect hotel, diversified plants	The use of natural materials or imitated nature to increase the sense of connection with nature.  E.g. natural building materials	Spaces with abundant natural materials that creates a sense of refuge and mystery.  E.g. walking paths with changing ground level and dense vegetation
 <b>Playability</b>	Playable design that includes water, light dynamics and various sensory to attract children to interact with nature and develop a sense of different texture in nature.  E.g. nature playground with natural elements	Play space with biomorphic pattern that creates multisensory nature with different actions.  E.g. various of simulated natural materials	Natural playground that promotes activities with identifiable threat and reliable safeguard.  E.g. wild play with height difference on shallow water
 <b>Sense of Ownership</b>	Multisensory activities to facilitate connection with natural system and associate individuals into part of the nature.  E.g. gardening and insect keeping	Creative activities with natural materials that encourage strong sense of ownership and association to the nature materials.  E.g. toy workshop with natural materials	Spaces with different types of natural elements to provide protected and identifiable sense of space.  E.g. fort spaces with various natural materials
 <b>Social Connectedness</b>	Social platform with diverse nature presence and activities with nature.  E.g. semi-private liminal garden	Social platforms with biomorphic patterns.  E.g. chatting space with biomorphic patterns on building materials	Covered spaces that provides protected sense for low active social activities.  E.g. resting area with pavilion or lower vegetation in the back
 <b>Active Mobility</b>	Space that promotes active actions with direct natural elements.  E.g. jumping points or balancing training with rocks or wood piles	Complexed sensory in between highly active space that change the visual or other sense of nature while being active.  E.g. biking and skating space with greens in-between	Changing height level to facilitate mobility and provide a sense of prospect.  E.g. climbing facilities to higher platform
 <b>Agency &amp; Decision-Making</b>	Activities to facilitate learning of the knowledge of natural systems.  E.g. guided forage trip	Learning skills to utilize local nature materials.  E.g. guided cooking activities with natural materials	Spaces that provides certain level of mystery and a sense of risk with reliable safety control.  E.g. nature maze with height difference

# STRATEGIC MODEL 策略模型



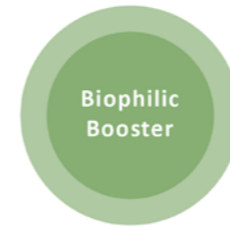
**Active Hub**  
Active space for children & physical development.



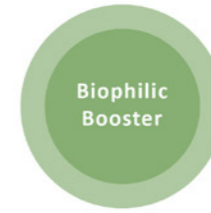
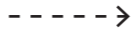
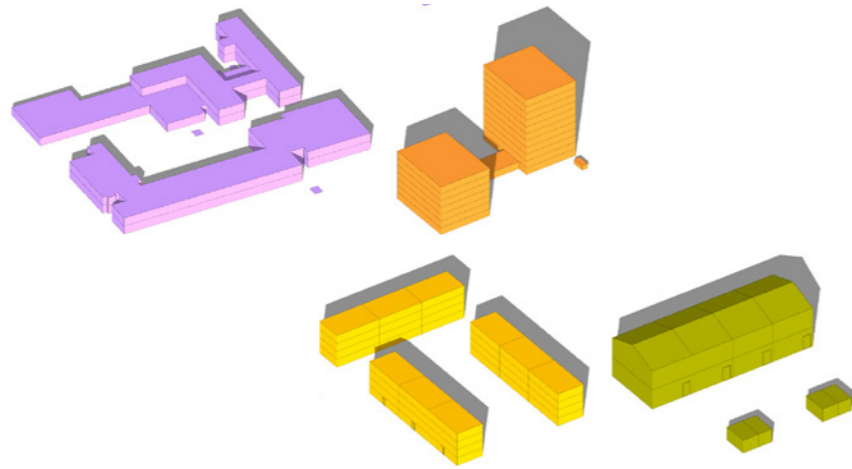
**Healthy Avenue**  
Safe & social space for healthy lifestyle.



**Inclusive Community**  
Inclusive urban fabrics for community building.

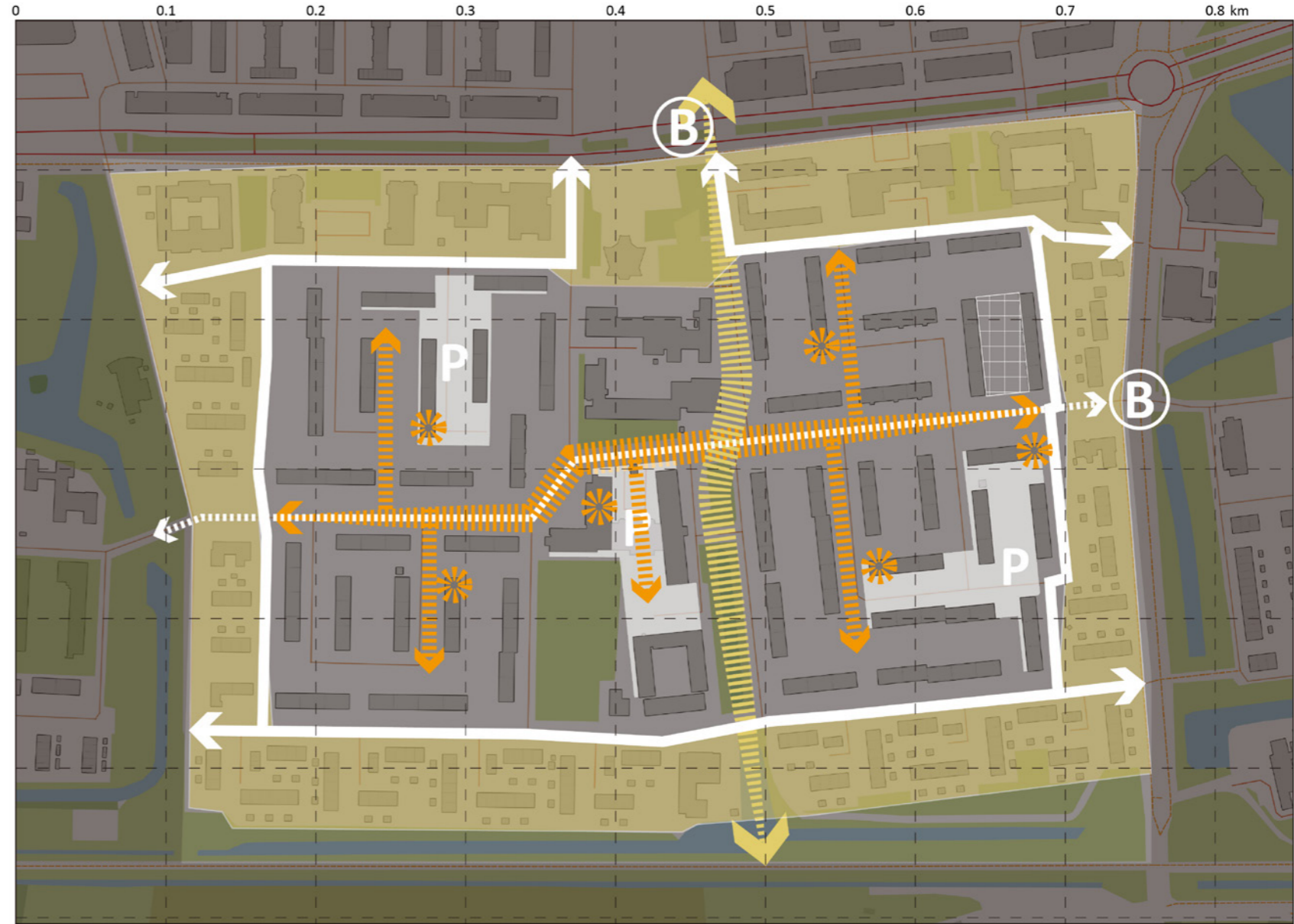
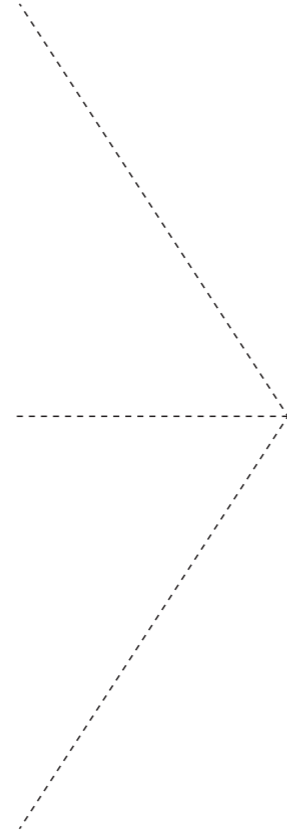


**Biophilic Booster**  
Nature inclusive living environment

<p>A1</p> <p>Family Center</p>	<p>H1</p> <p>Slow Traffic Street</p>	<p>I1</p> <p>Mobility Hub</p>	<p>B1</p> <p>Nature Inclusive Housing</p>
<p>A2</p> <p>Mobility Training Park</p>	<p>H2</p> <p>Edible Street</p>	<p>I2</p> <p>Open Plinth</p>	<p>B2</p> <p>Wild-Play Park</p>
<p>A3</p> <p>Sport Hub</p>	<p>H3</p> <p>Co-create Workshop</p>	<p>I3</p> <p>Open Livingroom</p>	<p>B3</p> <p>Clean Air Buffer</p>
<p>A4</p> <p>Challenge Corner</p>	<p>H4</p> <p>Open Gym</p>	<p>I4</p> <p>Dynamic Platform</p>	<p>B4</p> <p>Biodiverse Park</p>

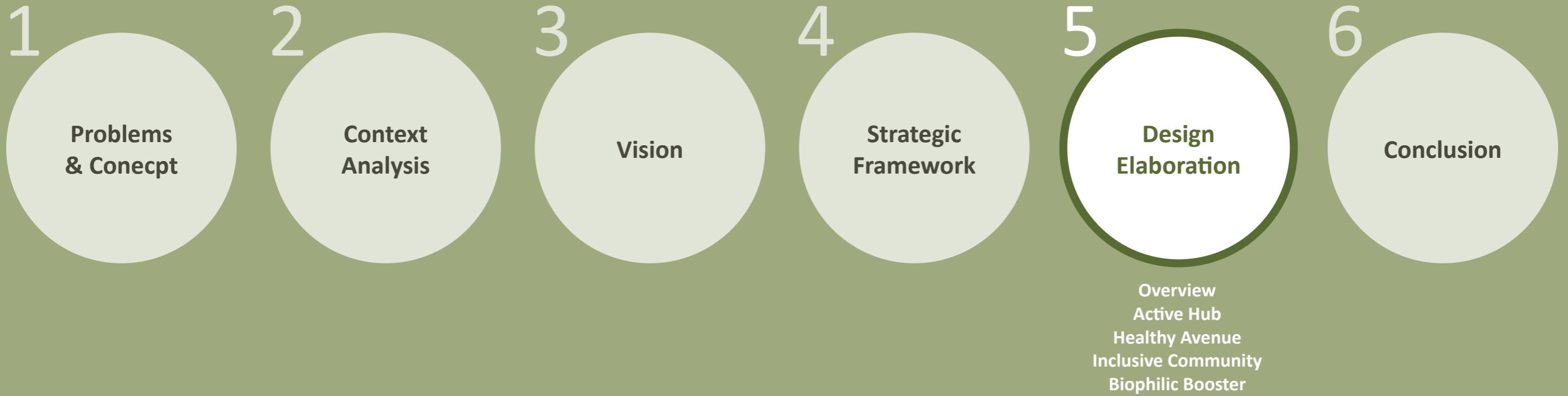
# STRATEGIC PLAN 策略計畫



STRATEGIC PLAN 策略計畫

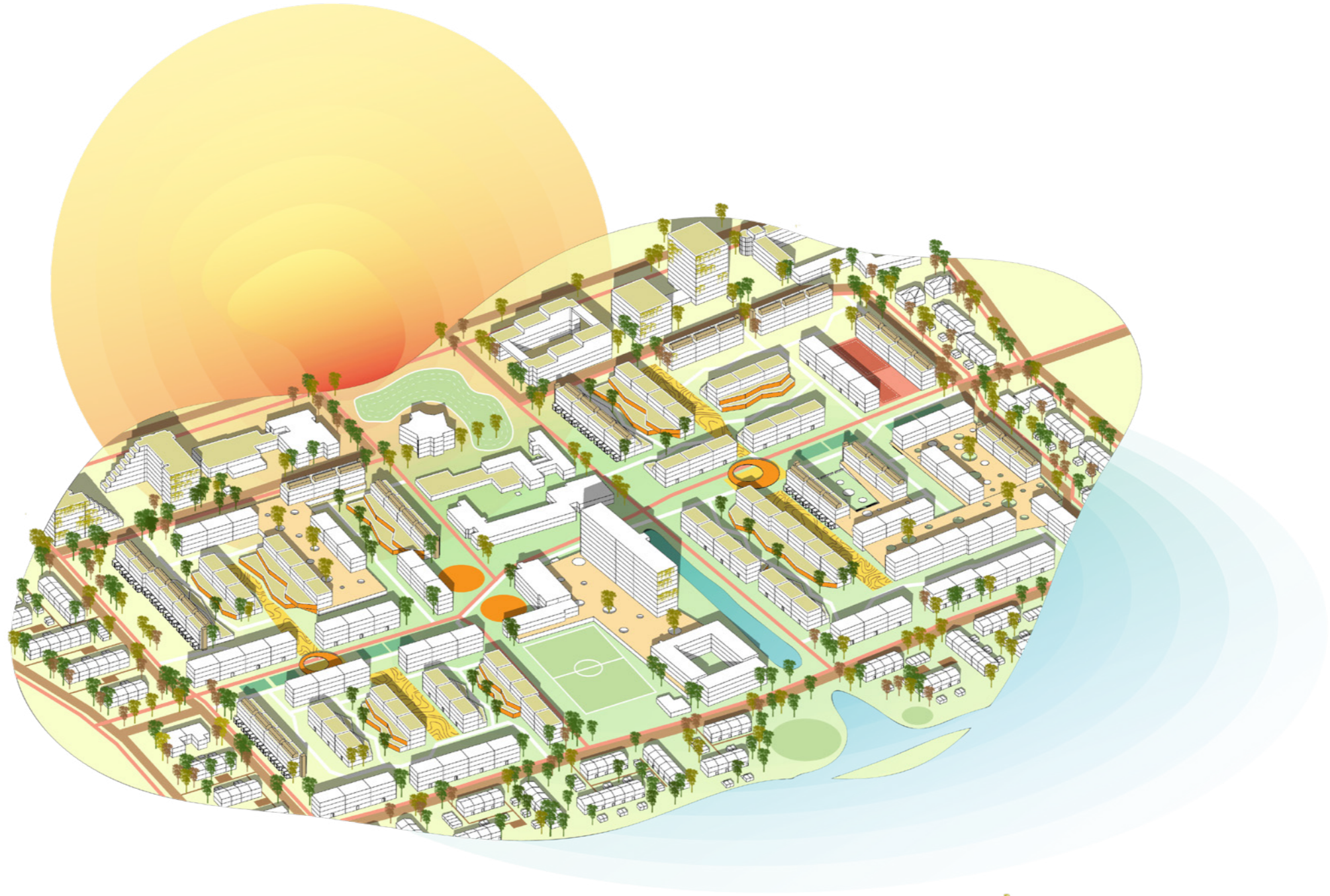
A1  Family Center	H1  Slow Traffic Street	I1  Mobility Hub	B1  Nature Inclusive Housing
A2  Mobility Training Park	H2  Edible Street	I2  Open Plinth	B2  Wild-Play Park
A3  Sport Hub	H3  Co-create Workshop	I3  Open Livingroom	B3  Clean Air Buffer
A4  Challenge Corner	H4  Open Gym	I4  Dynamic Platform	B4  Biodiverse Park







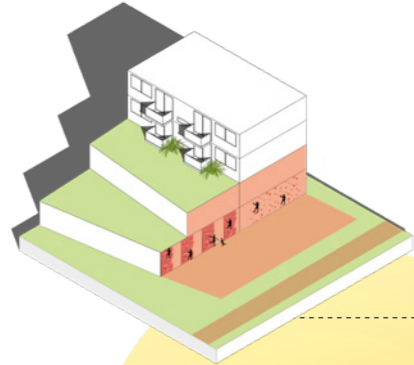
OVERVIEW 設計發展



# ACTIVE HUB



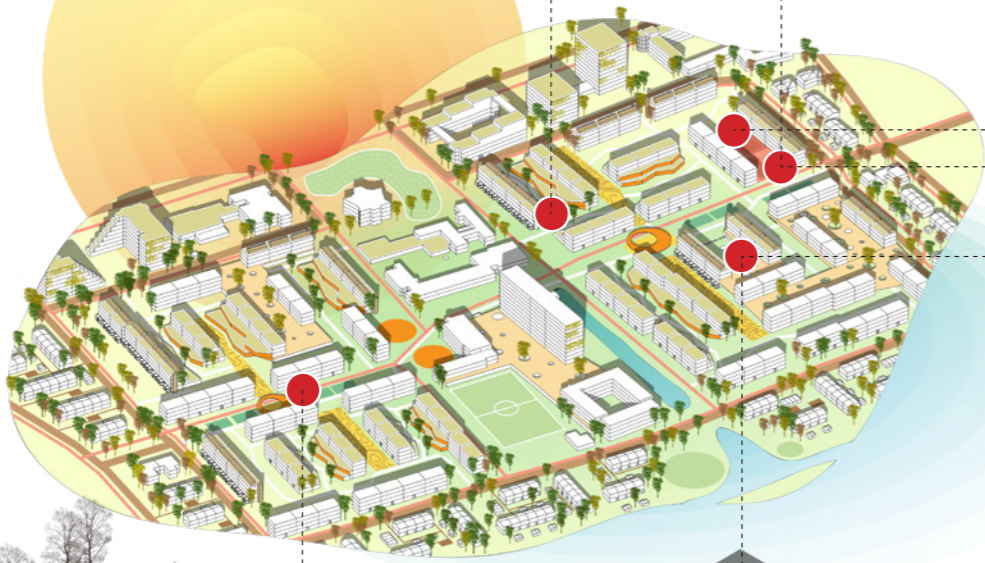
**Active Hub**  
Active space for children & physical development.



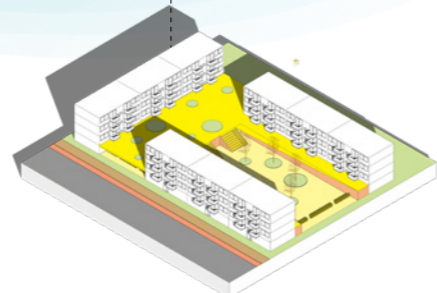
Challenge Corner



Mobility Training Hub



Sport Hub



Family Center



Active Mobility



Playability



Nature in the Space  
(Direct nature)



Social Connectedness



Nature of the Space  
(Sense of nature)



Access to Nature

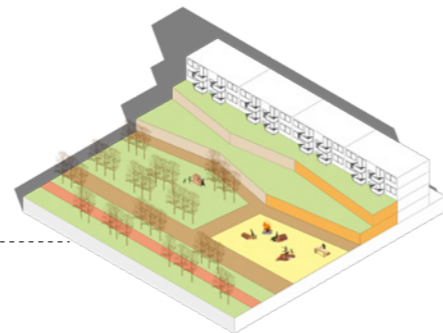
# HEALTHY AVENUE



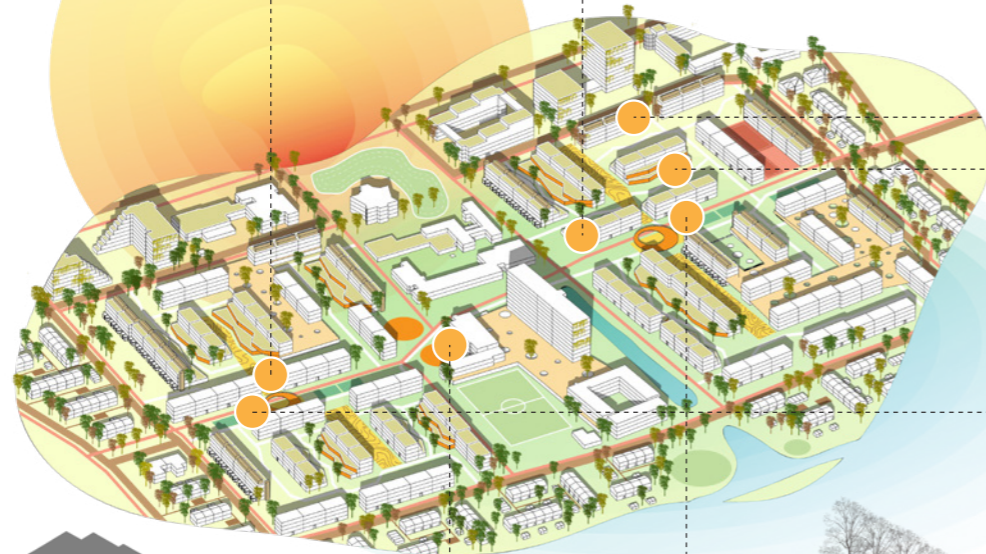
**Healthy Avenue**  
Safe & social space for healthy lifestyle.



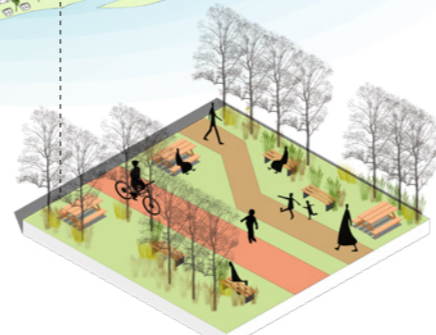
Edible Street



Co-create Workshop



Open Gym



Slow Traffic Street



Nature in the Space  
(Direct nature)



Active  
Mobility



Access  
to Nature



Playability



Natural Analogues  
(Indirect Nature)



Social  
Connectedness

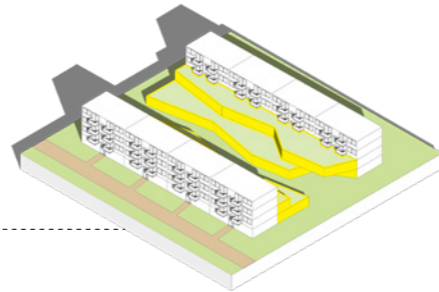
# INCLUSIVE COMMUNITY



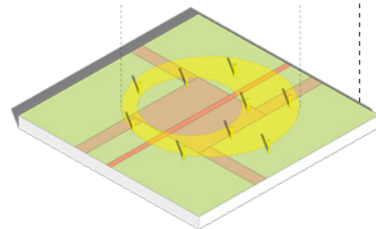
**Inclusive Community**  
Inclusive urban fabrics for community building.



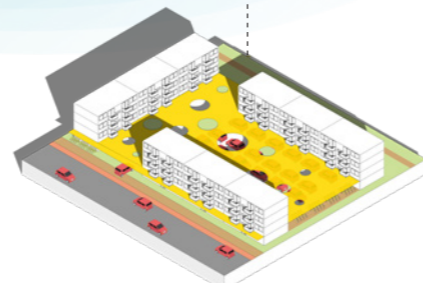
Open Plinth



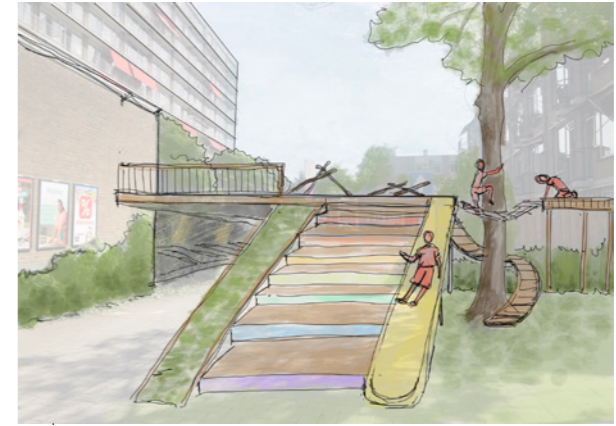
Dynamic Platform



Open Livingroom



Mobility Hub



Sense of Ownership



Playability



Access to Nature



Social Connectedness

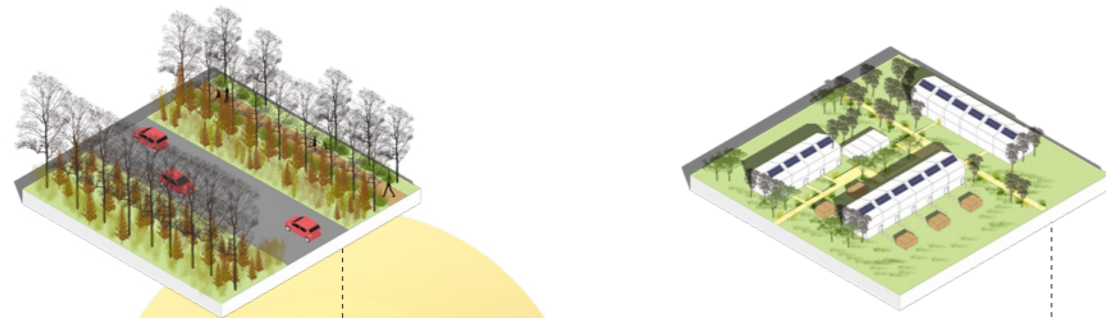


Nature of the Space  
(Sense of nature)

# BIOPHILIC BOOSTER

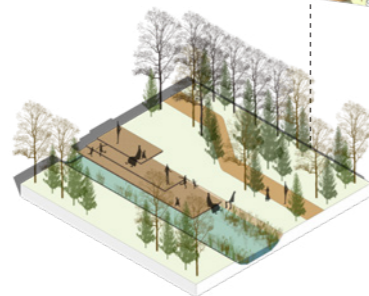
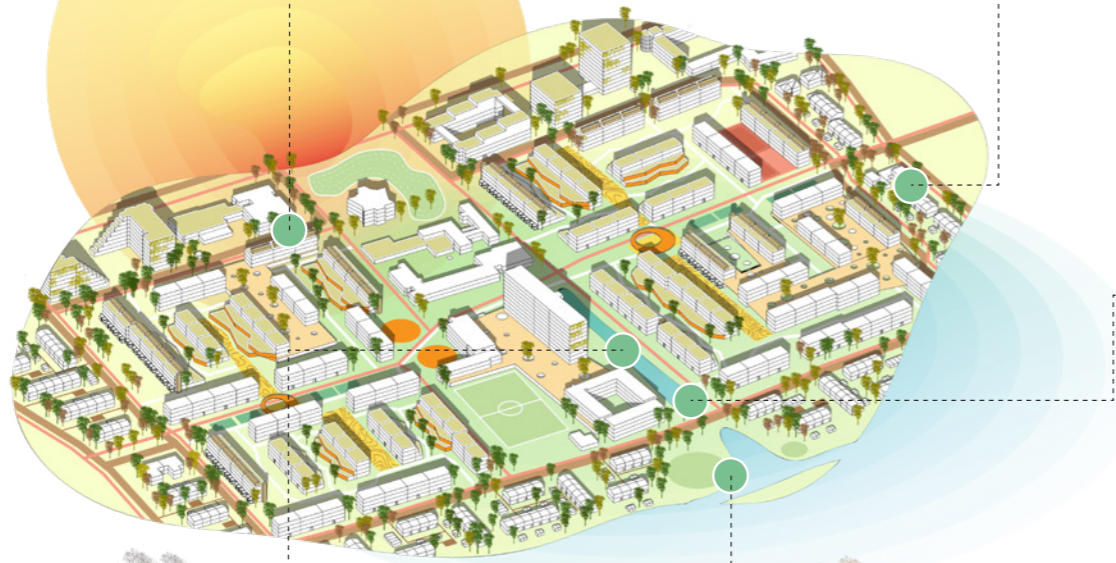


**Biophilic Booster**  
Nature inclusive living environment

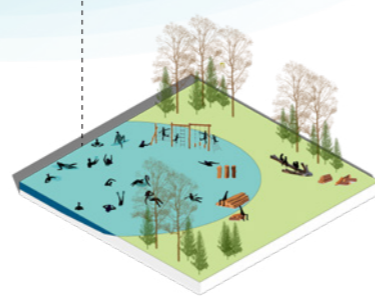


Clean Air Buffer

Nature Inclusive Housing



Biodiverse Park



Wild Play Park



Nature in the Space (Direct nature)



Social Connectedness



Playability



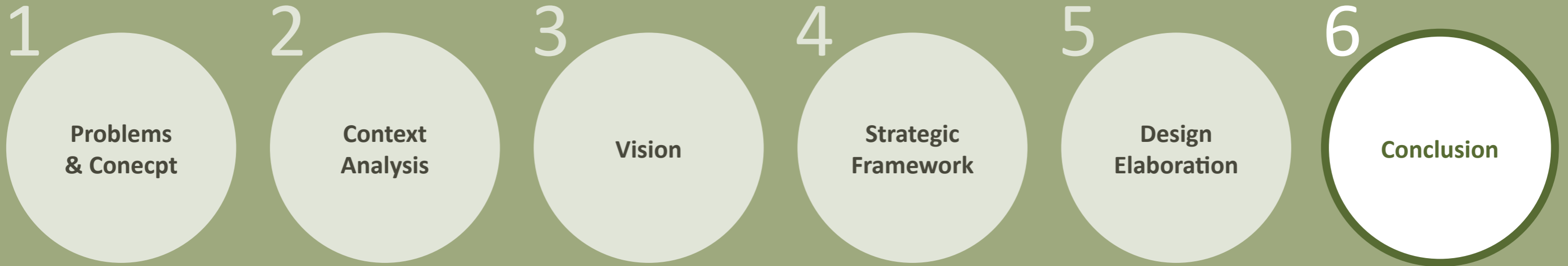
Agency & Decision-Making



Nature of the Space (Sense of nature)

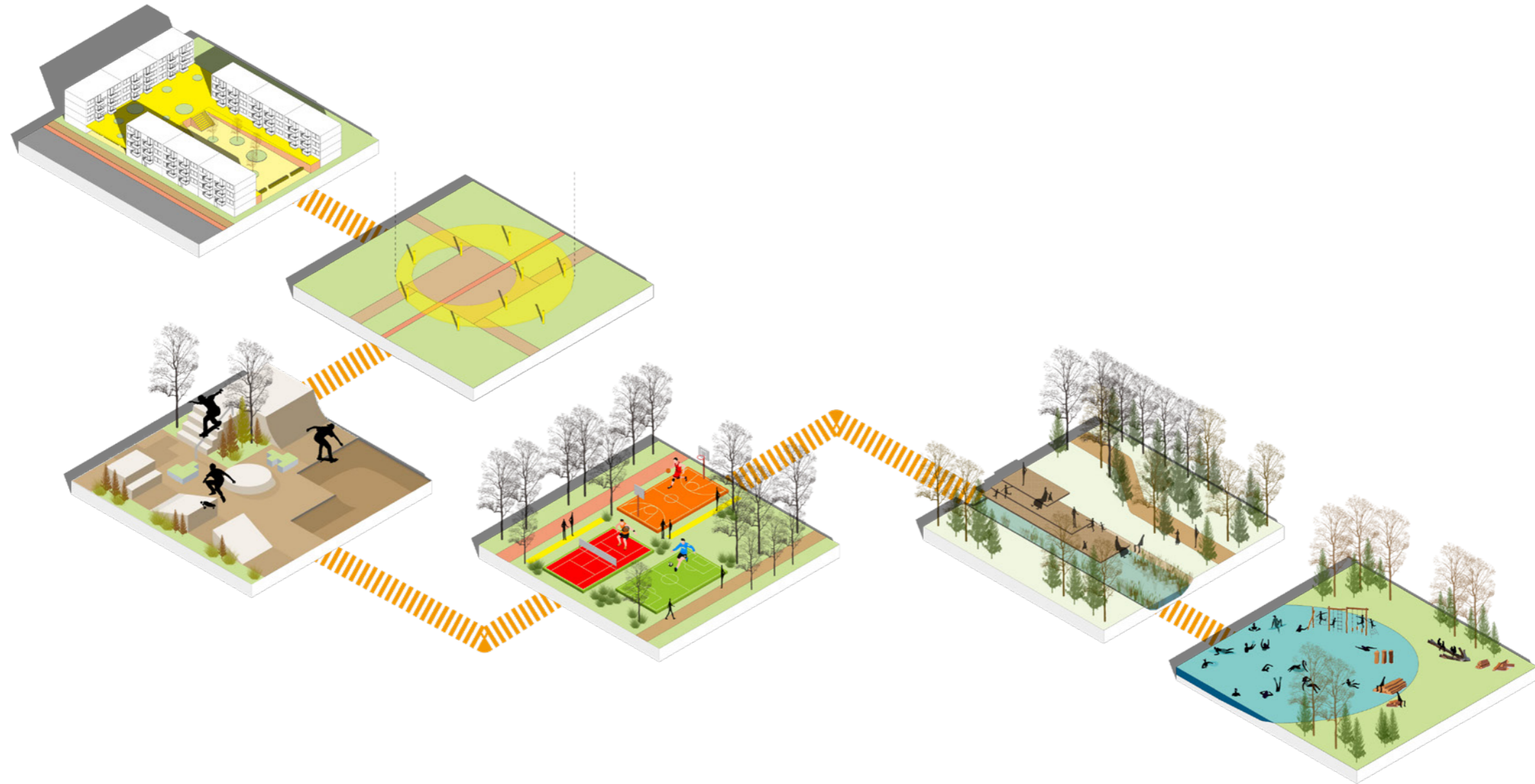


Access to Nature

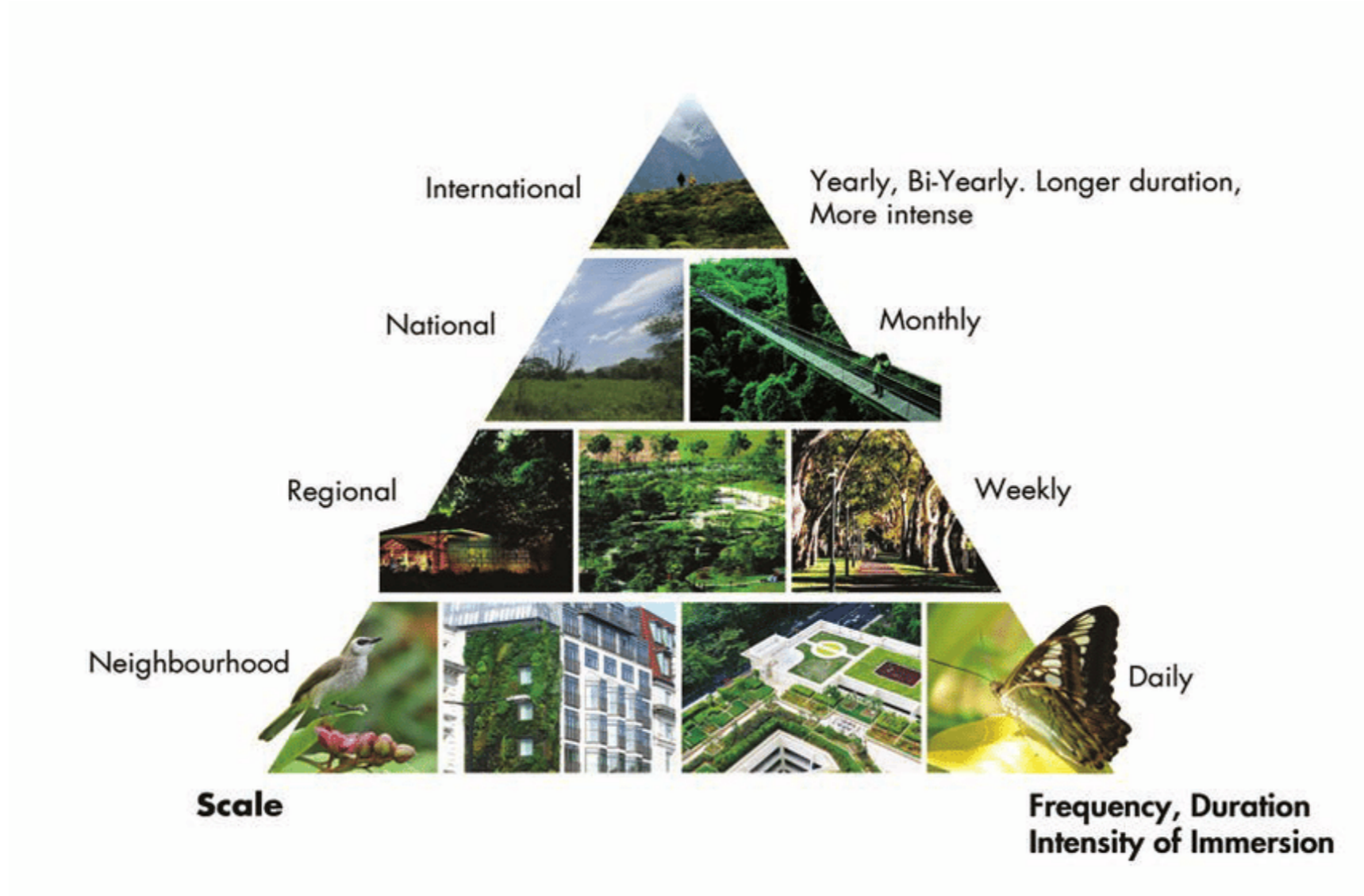


# HEALTHY URBAN CHILDHOOD & APPLICATION

## 健康都市童年與應用

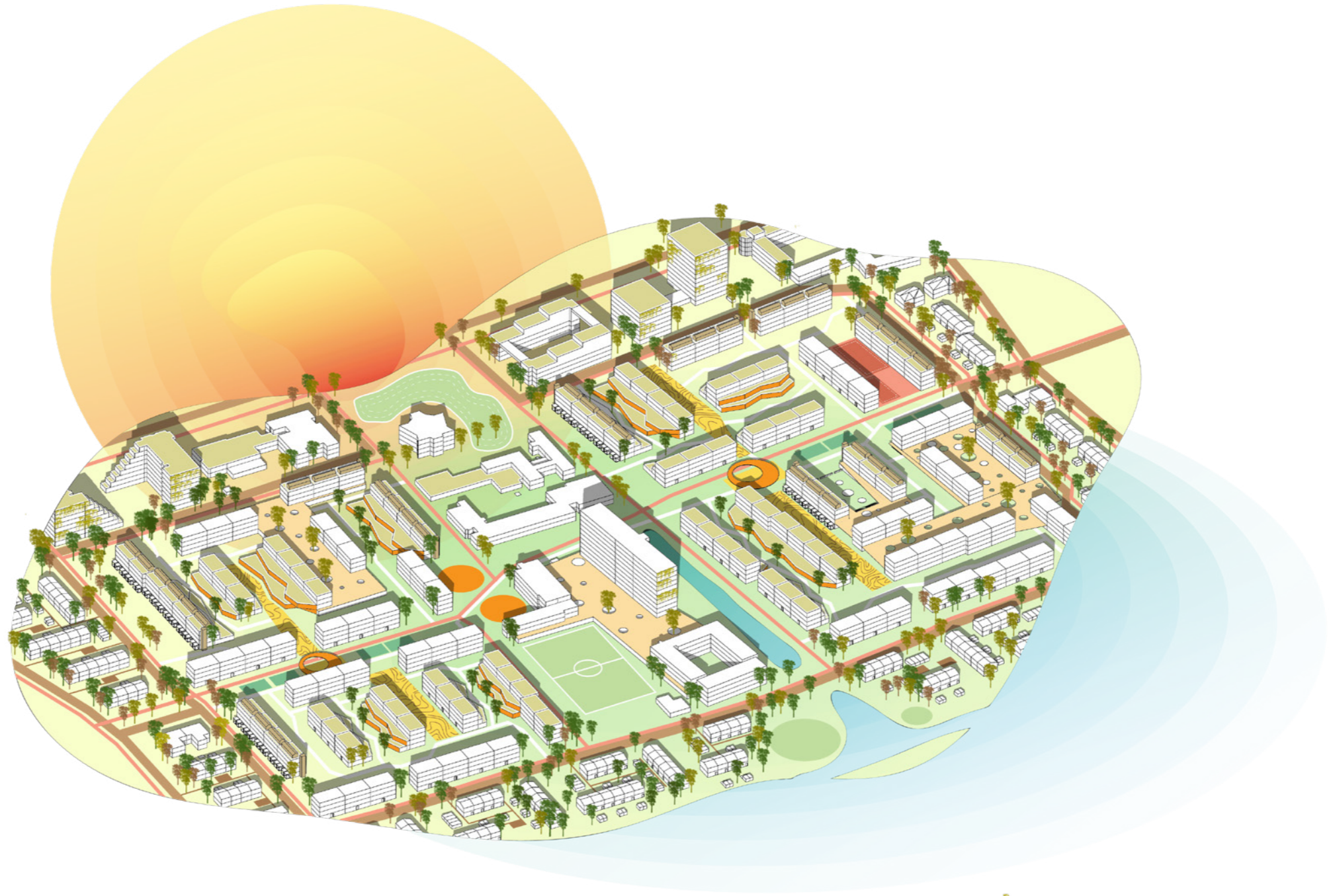


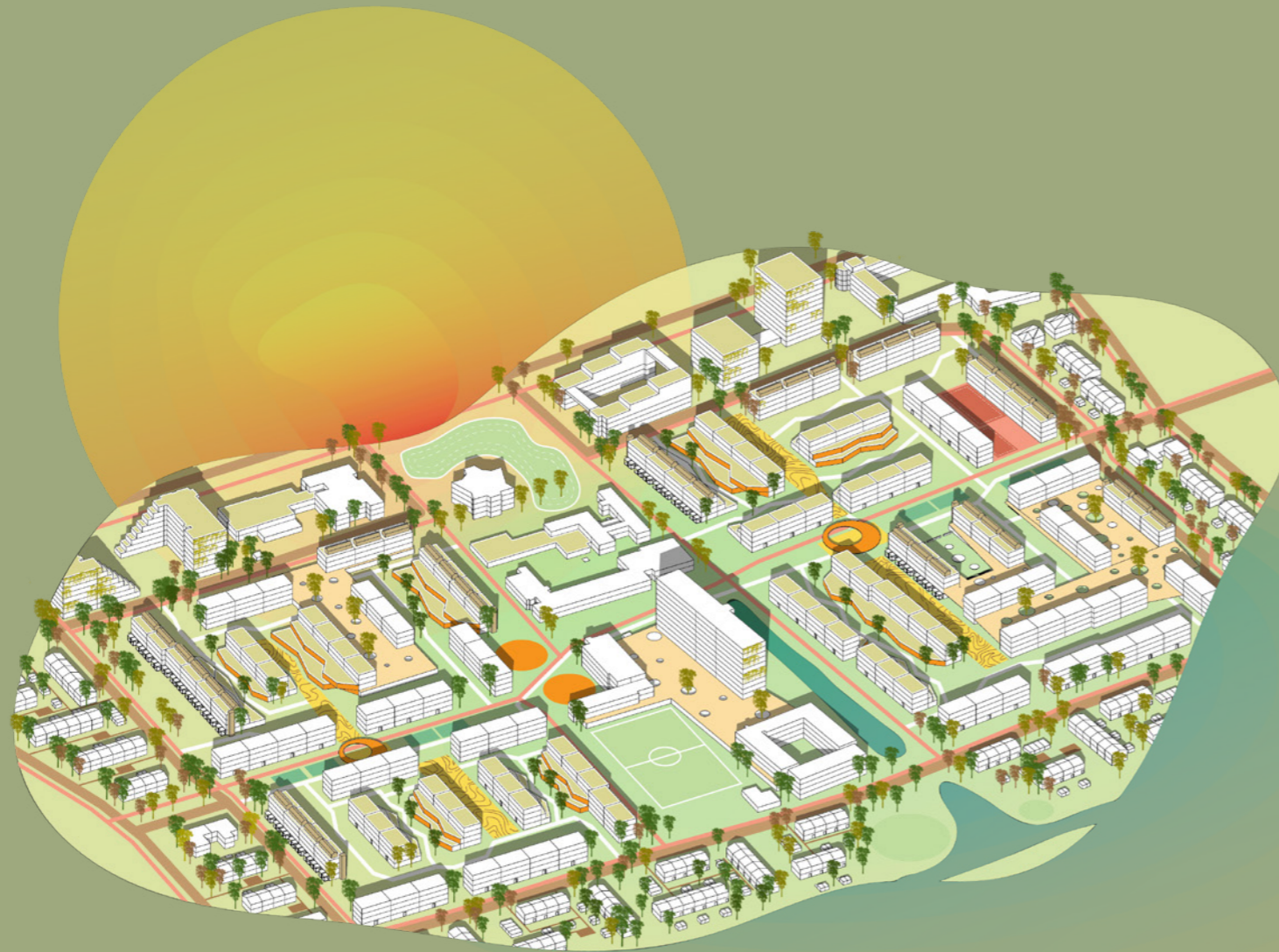
**BIOPHILIC OR GREEN WASH**  
**親生命或綠化**





**BIOPHILIC URBAN CHILDHOOD**  
親生命都市童年





# Biophilic Urban Childhood

A Healthy Childhood with Biophilic City Model under  
Urban Densification in Post-war Neighbourhood, Zuidwijk

Chingfang Wang 5022444  
14<sup>th</sup> January 2022

1st mentor: Machiel van Dorst  
2nd mentor: Robbert Jan van der Veen