

A RECHARGED 'HART'

*Synergizing the Housing
Pressure in the Depleted
Landscape on the Fringe of
the 'Groene Hart'*

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P5 Thesis Presentation
24-06-2024

Delft University of Technology
MSc Architecture, Urbanism & Building Sciences

*Transitional Territories
Altered Nature Poetics of Change*

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Content

1. The Proposition
2. The Composition of the Fringe
3. The Problem Foundation
4. Design Perquisite
5. Design Strategy
6. Evaluation
7. Conclusion



The Gouw in Weespersluis embodies the anthropogenic terrestrial development and its problematisation.

Proposition



The Proposition

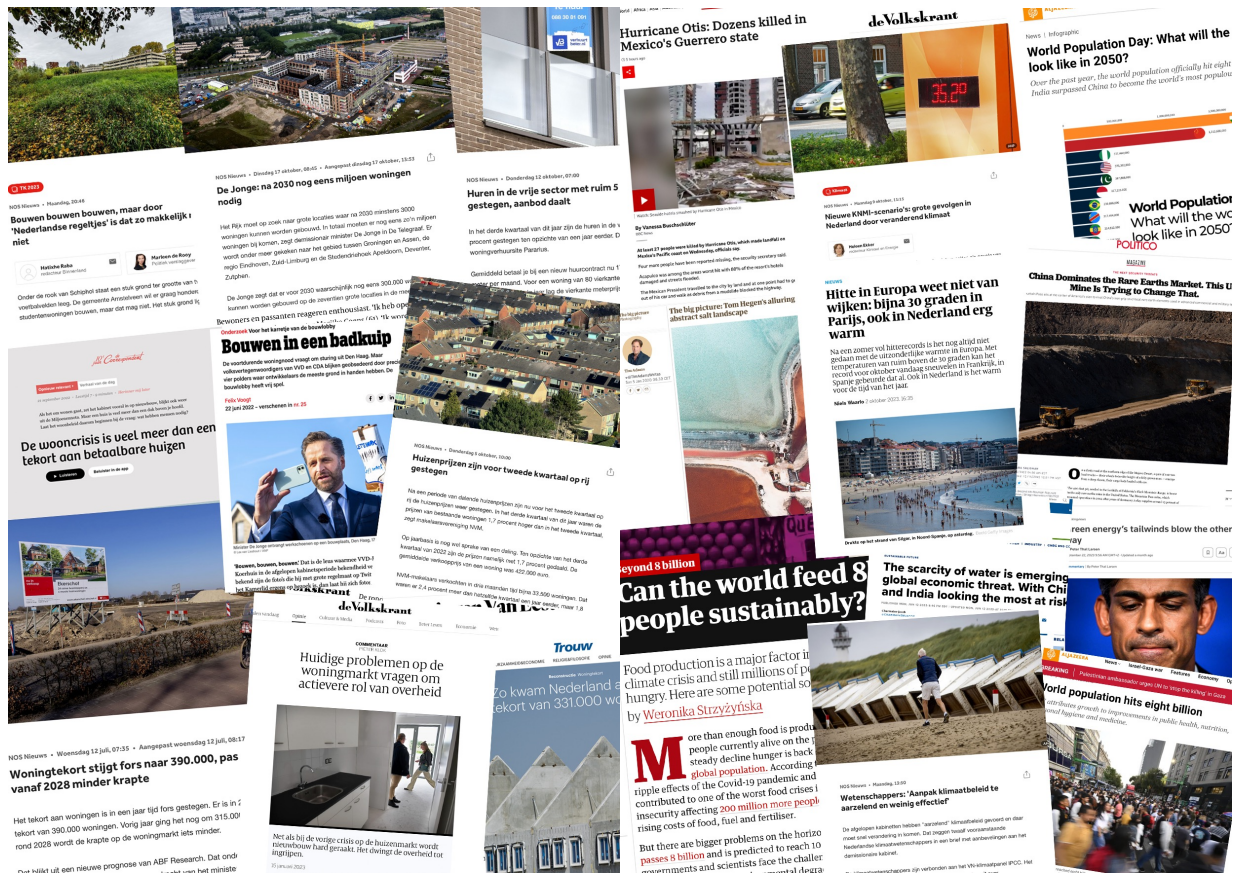
Terrestrial Urbanisation



The current fringe of the 'Groene Hart' near Weesp.

The Proposition

The Time of the Anthropocene



The Anthropocene, a time of crisis (Adams, 2020; Aljazeera, 2022; Bockmeier, 2022; Buschslüter, 2023; Ekker, 2023; Haddad, 2023; Hetixhe Raba & Rooy, 2023; Klok, 2023; Larsen, 2023; NOS, 2023a, 2023b, 2023c, 2023d, 2023e, 2023f; selgman, 2022; Strzyzyska, 2022; Voogt, 2022; Waarlo, 2023).

The Proposition

A Pseudo-countryside Development

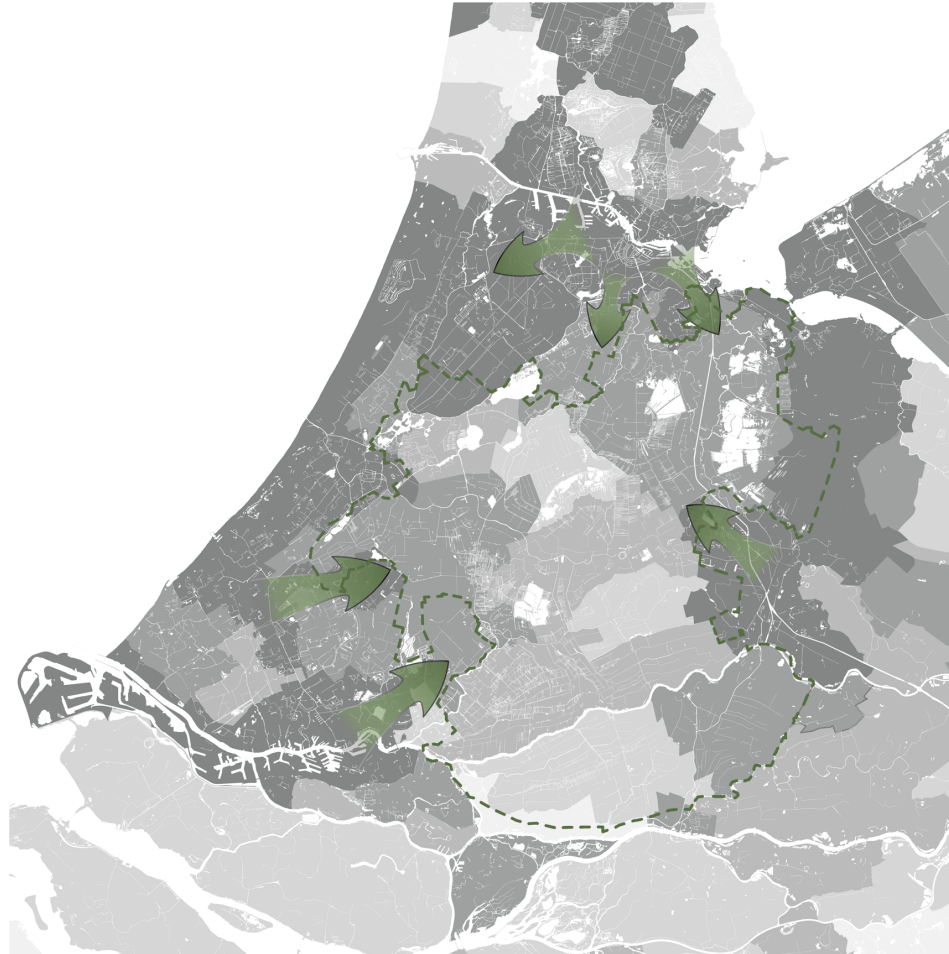
Exemplified by Weesperluis



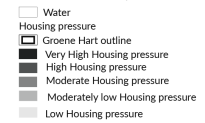
Photographic atlas of the fringe neighbourhood of Weesperluis, Weesp.

The Proposition

Terrestrial Urbanisation



Housing pressure heat map
 ((BPD, 2024; BPD et al., 2023) edited by author)



The Composition of the Fringe



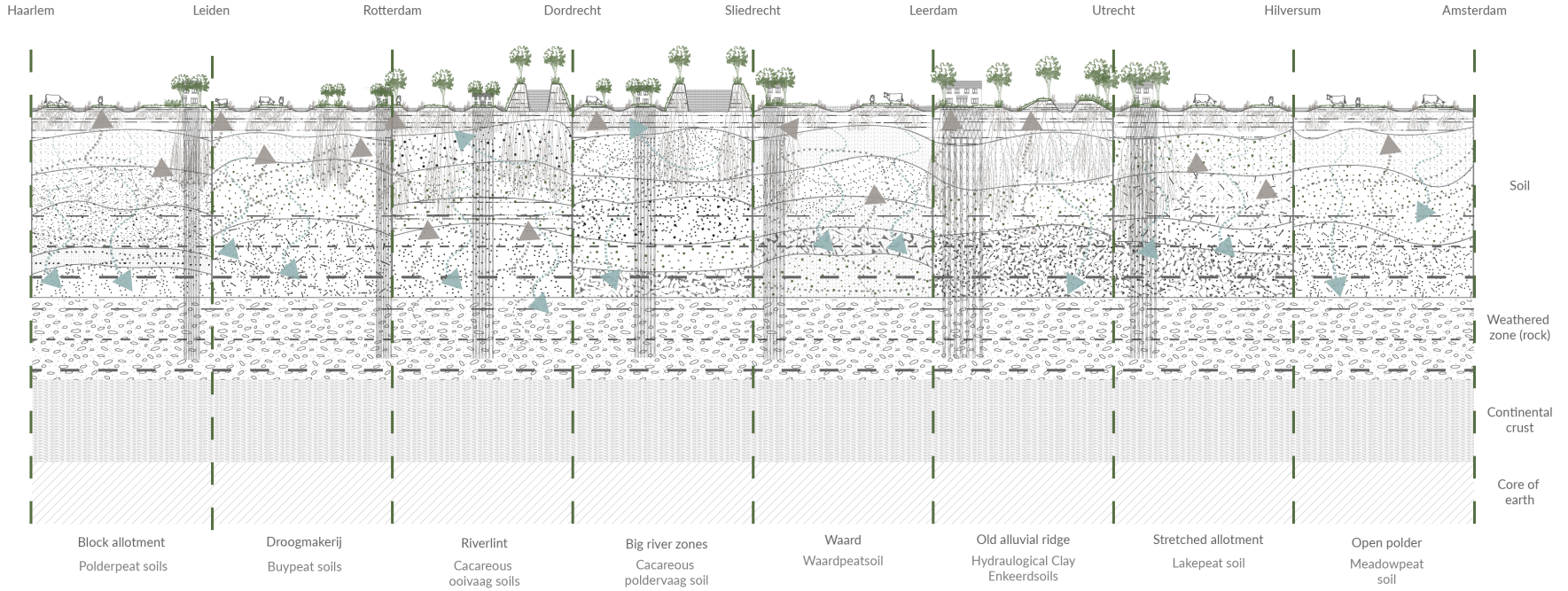
The Composition of the Fringe

The Parts of the Fringe



The Composition of the Fringe

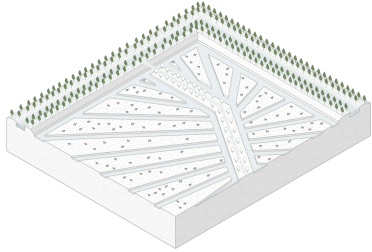
The Parts of the Fringe



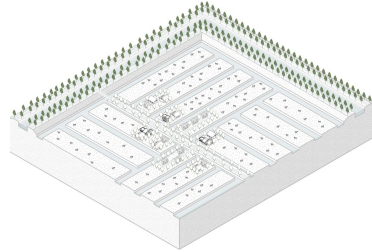
The regionalism of the Fringe and its depleted state.

The Composition of the Fringe

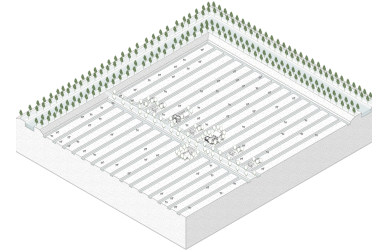
The Parts of the Fringe



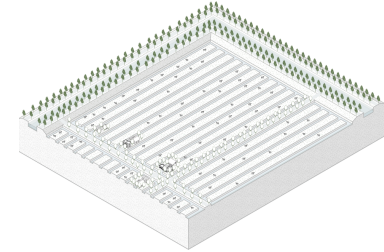
Open polder



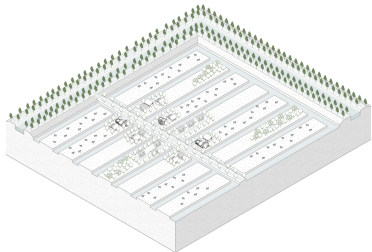
Block allotment



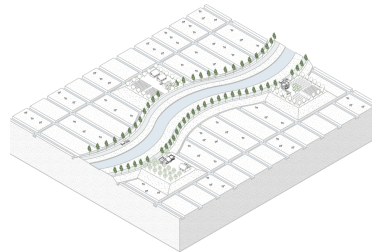
Stretched allotment



Droogmakerij polder



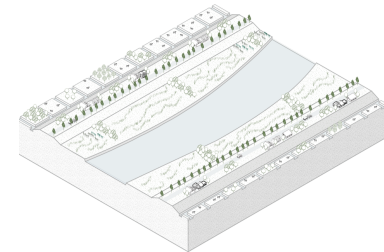
Waard



Riverlint



Old alluvial ridge



Big river zones

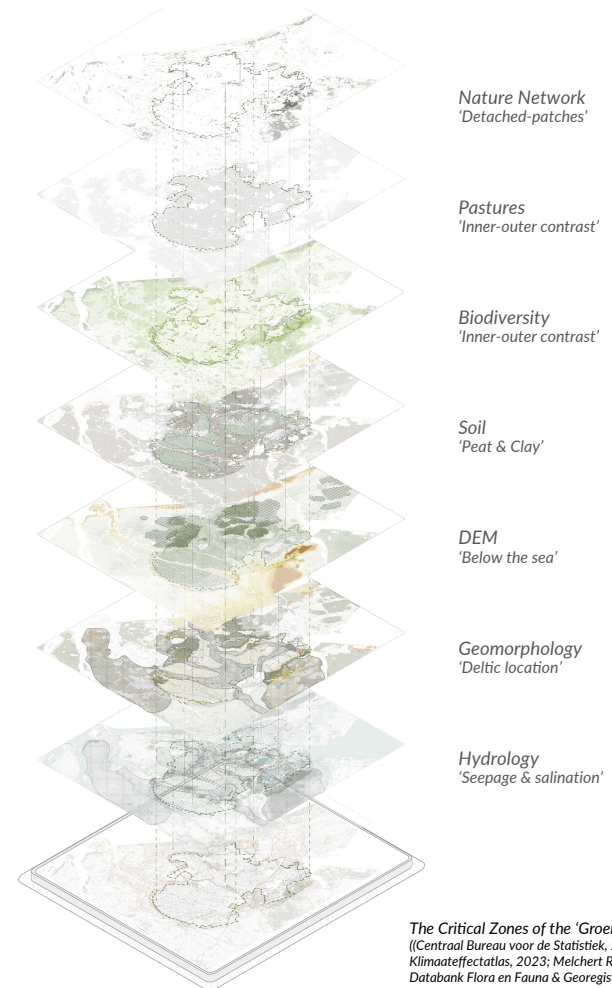
The Problem Foundation

The Problem Foundation

A Depleted Landscape?

A Depleted Landscape

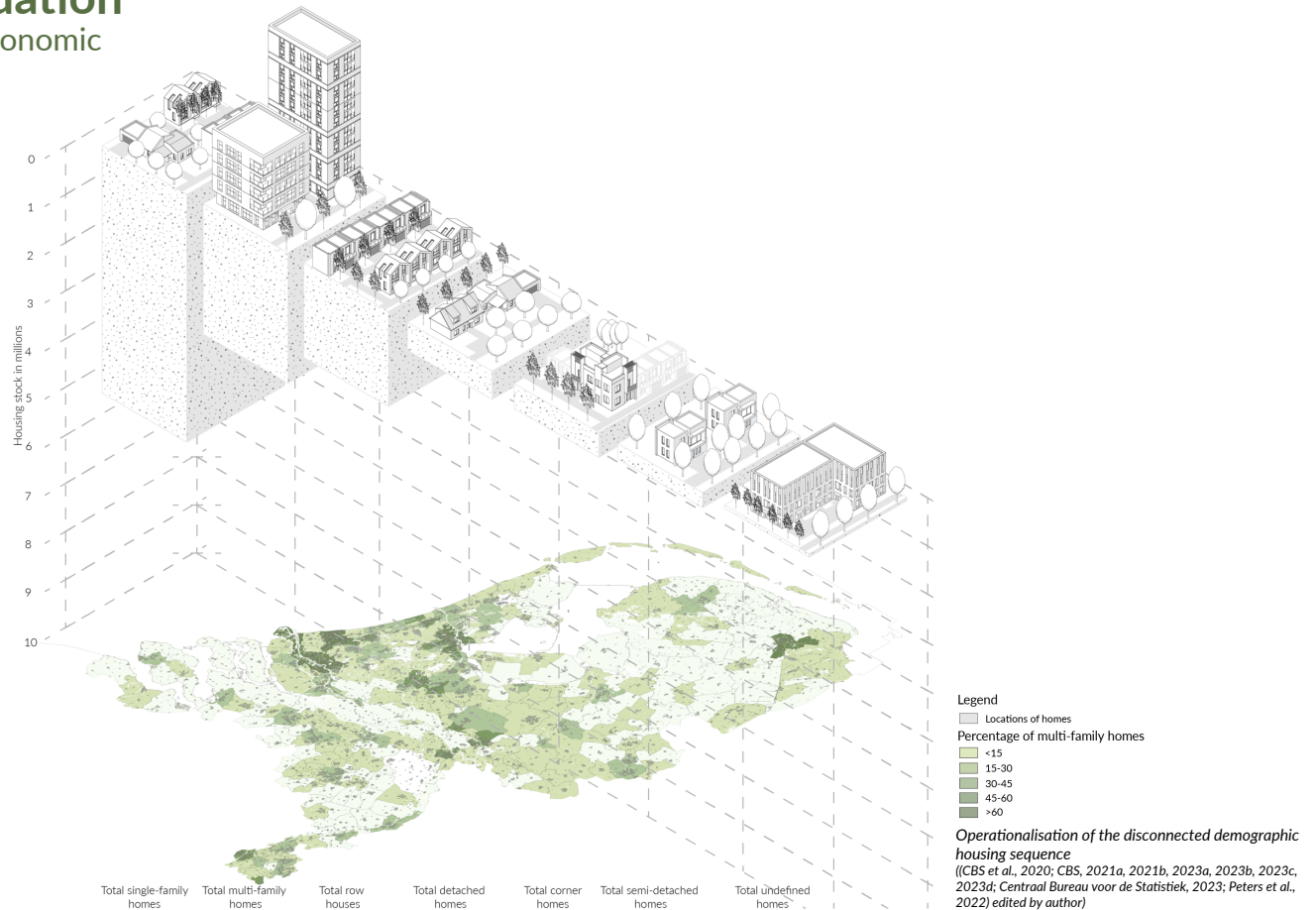
A landscape that has suffered from forms of land degradation and have lost their qualities due to human interventions, leading to the reduction of its operationalisation.



The Critical Zones of the 'Groene Hart'
 ((Centraal Bureau voor de Statistiek, 2018, 2023c; Erfgoed, 2015;
 Klimaateffectatlas, 2023; Melchert Reudink et al., 2023; Nationale
 Databank Flora en Fauna & Georegister, 2017; Panagos et al., 2022;
 Rijksinstituut voor Volksgezondheid en Milieu, 2015) edited by author).

The Problem Foundation

The Pseudo-countryside Economic



The Problem Foundation

The Societal Residual Identity



Perceived identity, depicting a picturesque pseudo-countryside neighbourhood.



Actual identity, depicting an agricultural rural production landscape, with terrestrial lines of urbanisation.

The Problem Foundation

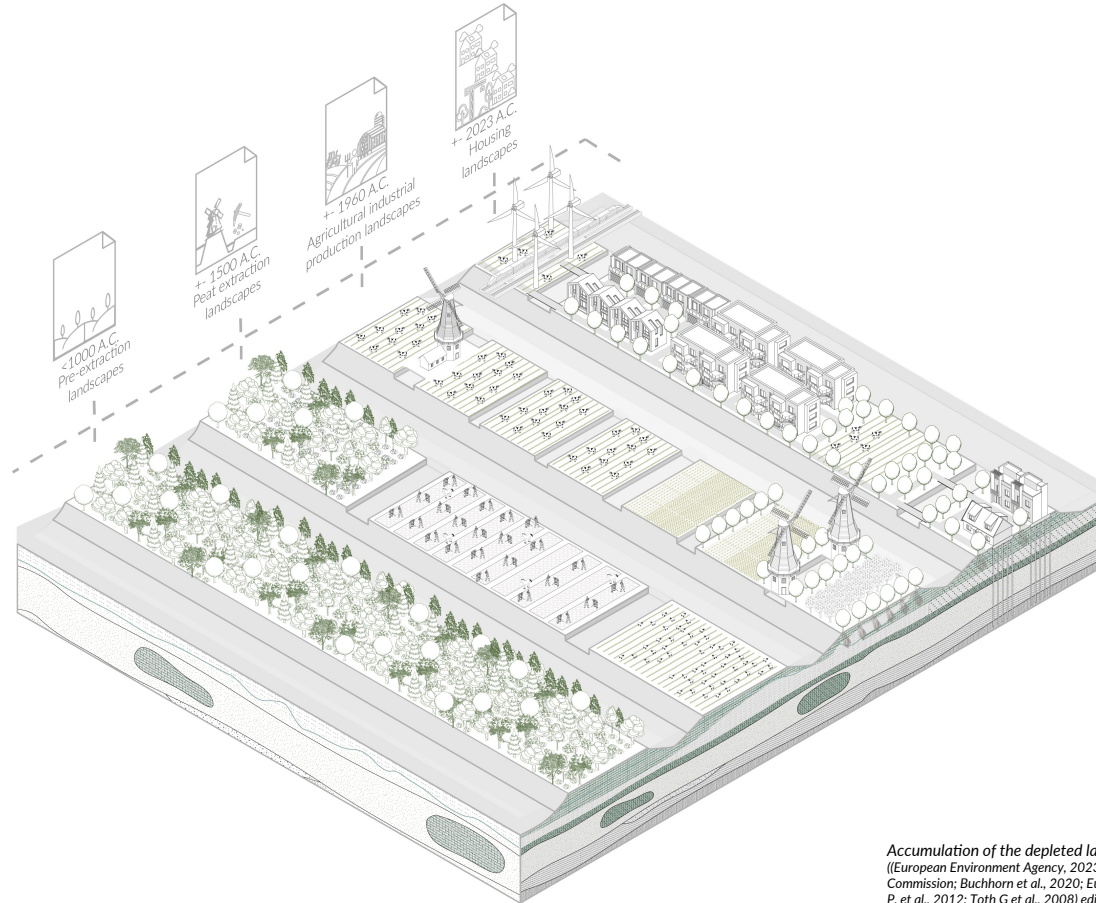
The Societal Residual Identity



Social rationalities
 ((Douglas, 1970, Mamadouh, 1999) edited by author).

The Problem Foundation

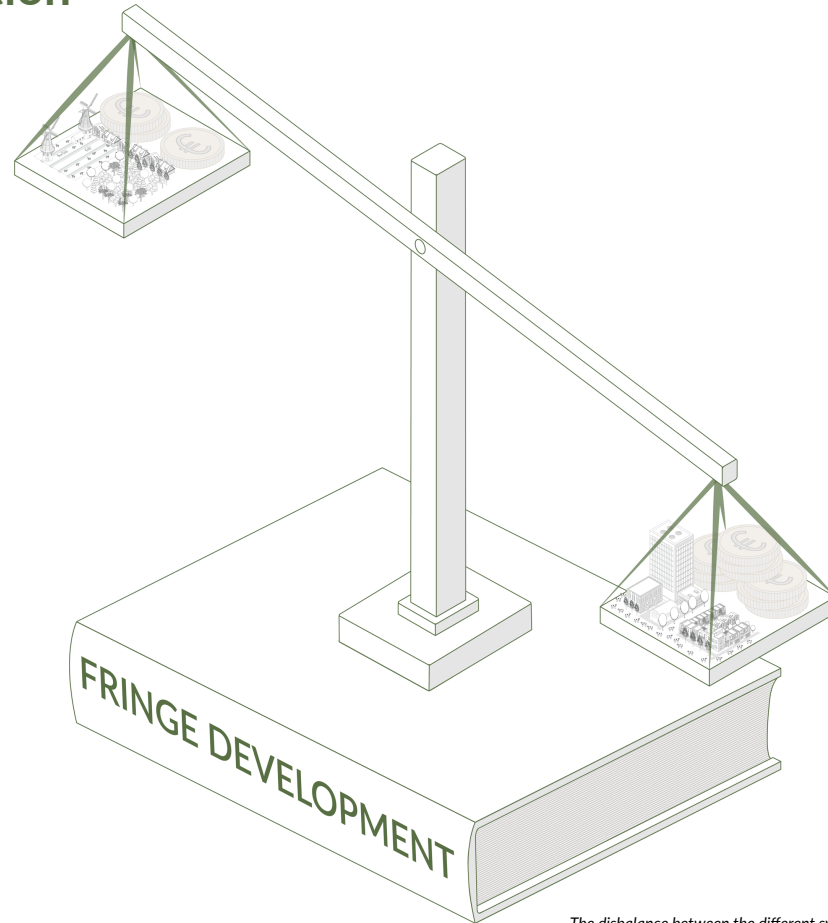
The Altered Nature



The Problem Foundation

The Three Pillared Foundation

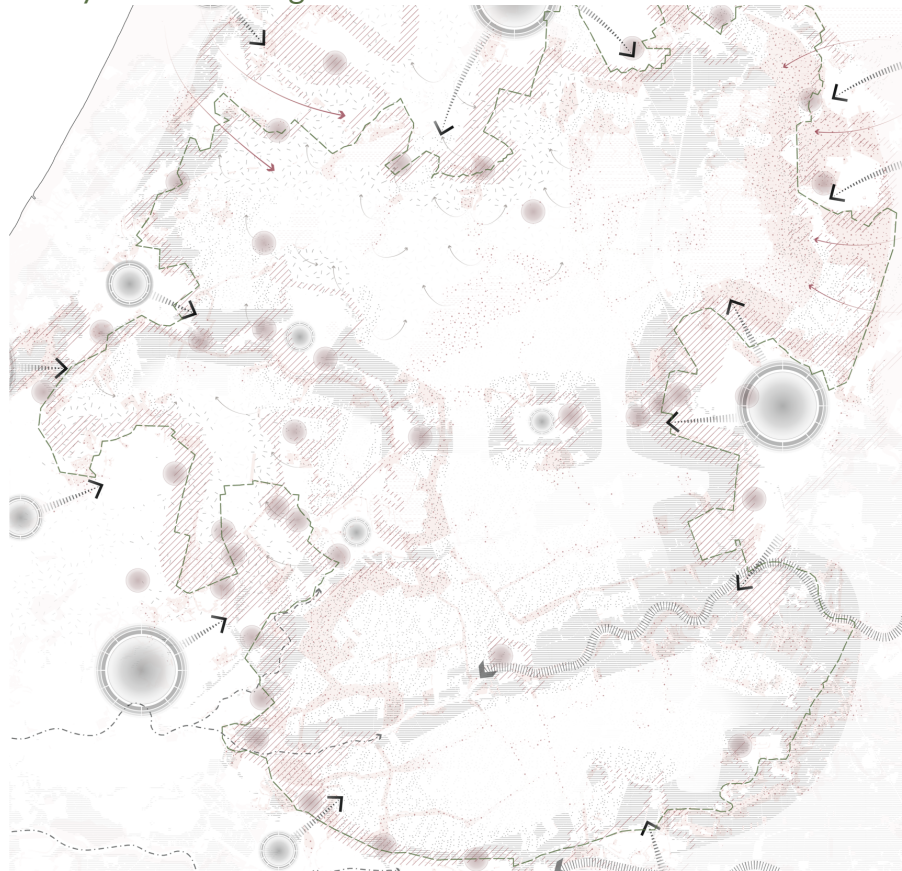
- Economic unbalance
- Social unbalance
- Natural unbalance



The disbalance between the different systems?

The Problem Foundation

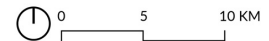
The Conclusion of the Spatial Analysis of the Fringe



Fringe analysis conclusion map

((Buchhorn et al., 2020; CBS & PBL, 2015; Centraal Bureau voor de Statistiek, 2018, 2023c; Erfgoed, 2015; Klimateffectatlas, 2023; Melchert Reudink et al., 2023; Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2021; Nabeleek et al., 2020; Nationale Databank Flora en Fauna & Georegister, 2017; Panagos et al., 2022; Rijksinstituut voor Volksgezondheid en Milieu, 2015; RIVM et al., 2019; Rutte & Abrahamse, 2014).

Fringe	Border
<ul style="list-style-type: none"> The Rural-Urban Fringe Urbanisation problematisation Urbanisation pressure Urbanised areas with bottlenecks Current and proposed housing developments Water & nature problematisation Contaminated surface water Vulnerable nature area Detached nature patches 	<ul style="list-style-type: none"> 'Groene Hart' Soil problematisation Peat soils with predominate drought problems Claysoils with predominate draught problems Reclaimed lands with salination problems Supra-local systems contribution to dehydratation or salination Seepage Drainage/leakage of water Multi seasonal riverwater supply problems Salt water intrusion



The Problem Foundation

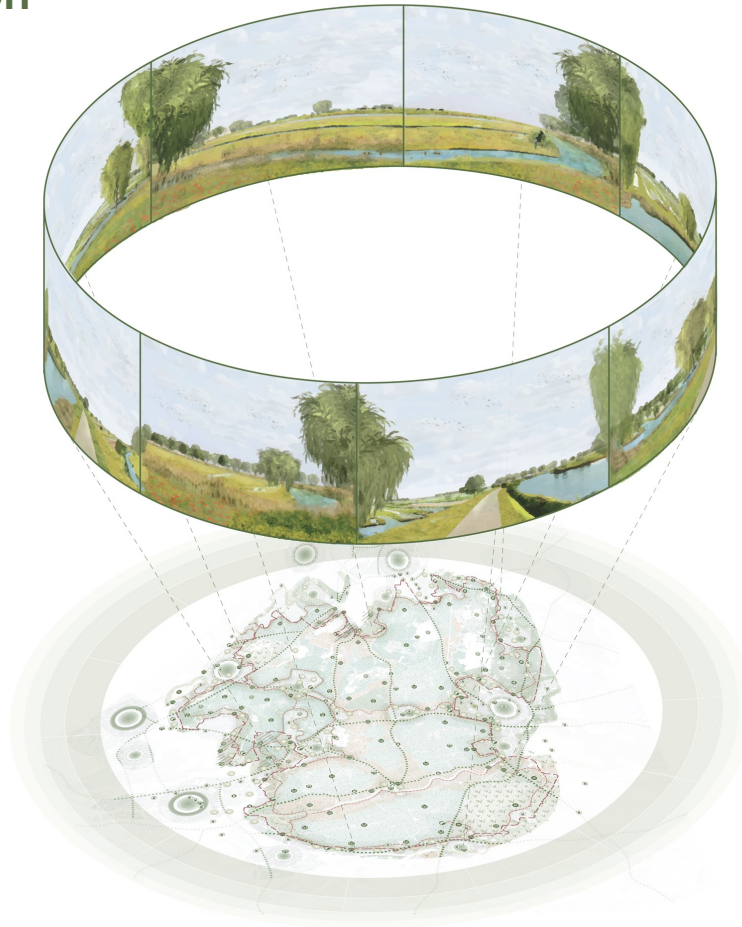
The Problem Statement

Problem Statement

'The predominant market-driven, human-centric economic emphasis of spatial development policies tackling the housing scarcity in the Netherlands, has led to a disbalance within society and nature. Giving rise to economic, ecological, and social unaligned housing developments on the fringe of the 'Groene Hart' susceptible to similar pitfalls as the previous VINEX developments.'

The Problem Foundation

A Recharged 'Hart'



The 'Recharged Hart'

The Problem Foundation

The Research Question

The Research Question

Considering the growing (urban) population and its subsequent scarcity of available housing in a time of environmental (ecological) crisis:

How can we **create a synergy** between social, economic, and environmental interests in depleted landscapes like **the fringe of the 'Groene Hart'** through the **implementation of the ecocentric paradigm** in terrestrial development to allow for an alleviation of the **housing scarcity**?

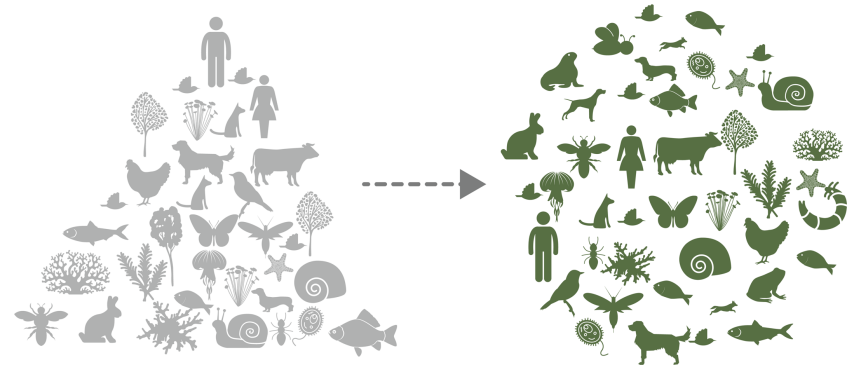
The Design Perquisite

The Design Perquisite

An Ecocentric Future

Ecocentric Paradigm

A worldview describing a synergy between humans and nature, in which neither element is more significant than the other, with their well-being being tied to the well-being of the entire natural system (Curry, 2011; Daly, 2014; Vieira & Sampaio, 2022; Vink et al., 2024; Washington et al., 2017).



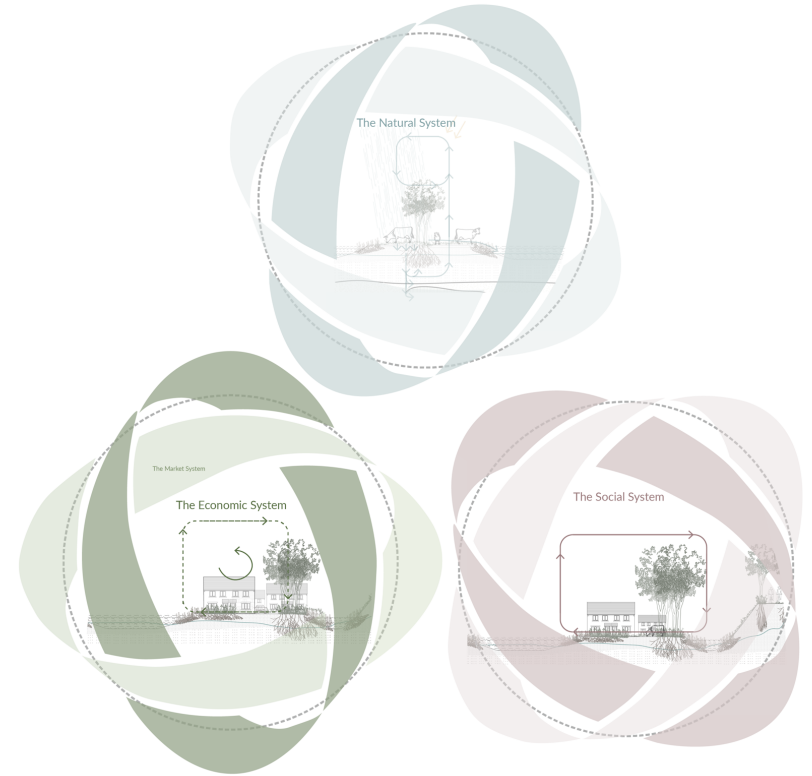
For nature-inclusive ecocentric developments, one must shift from an anthropogenic to an ecocentric paradigm (Butler, 2018) edited by author.

The Design Perquisite

A Synergetic Design Theory

Synergetic Design Theory

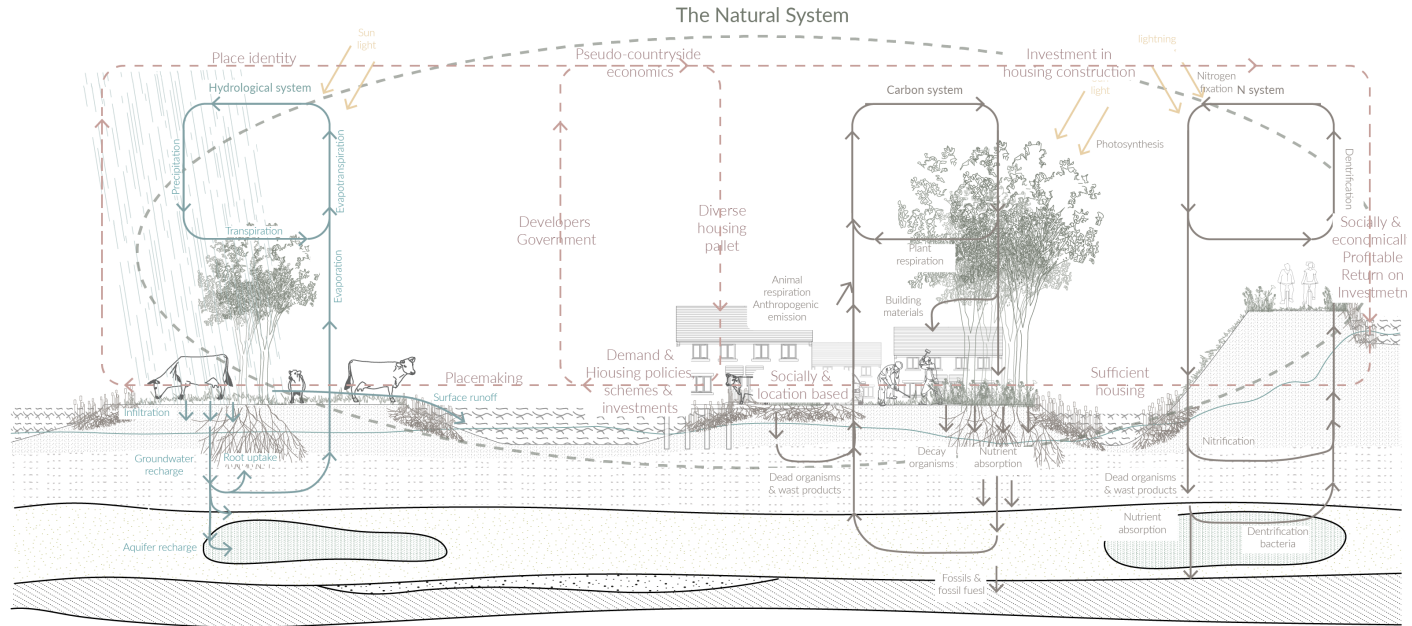
Implies that the interaction or cooperation of two or more elements within the landscape result in a combined effect that is greater than the effects of each entity alone (Tillie, 2018).



The non-synergetic systems of my thesis, the economic, the social and the natural system.

The Design Perquisite

The Synergizing System Strategy

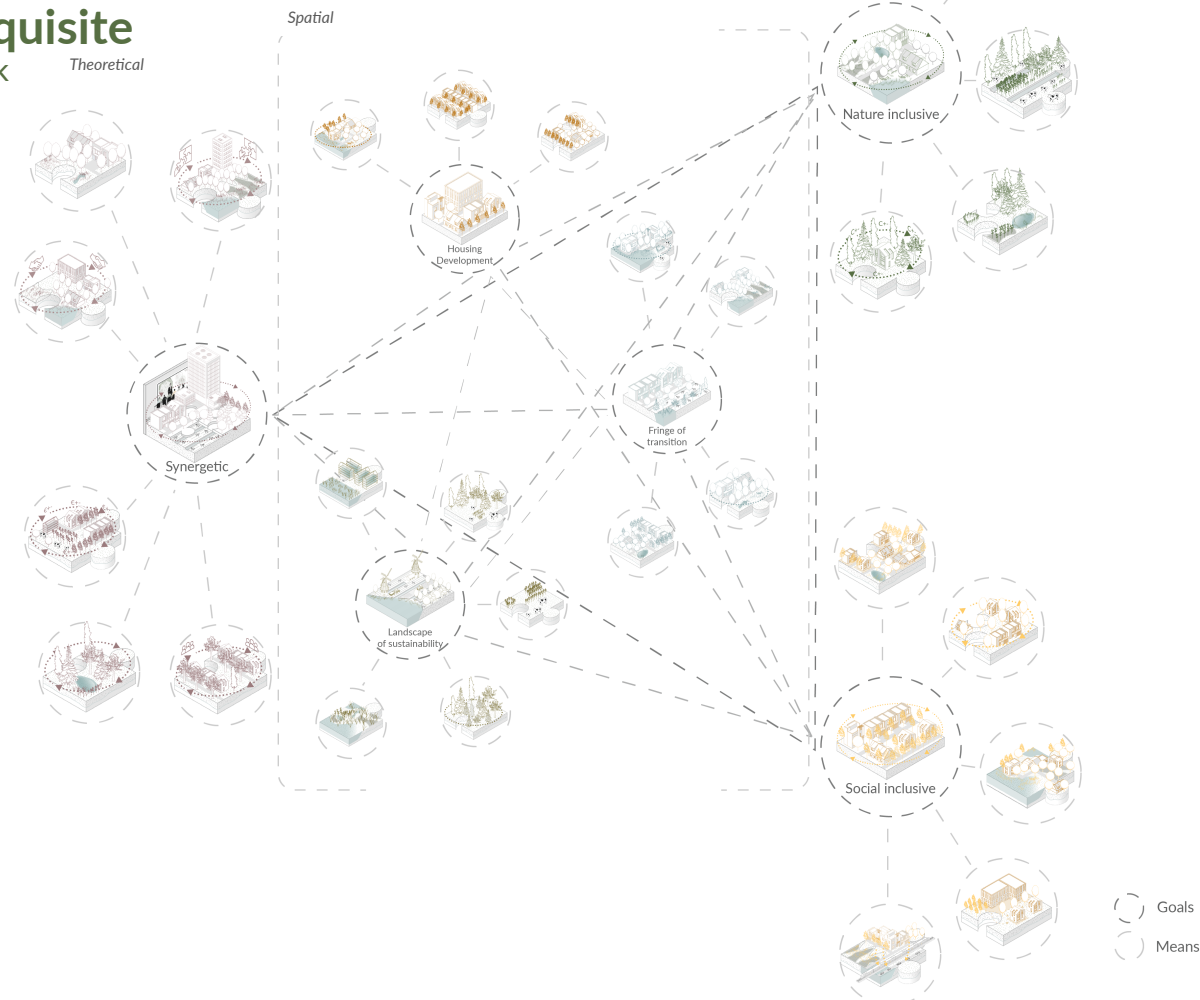


The Synergetic system

The synergised spatial systems.

The Design Perquisite

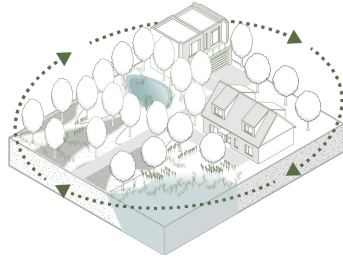
The Design Framework



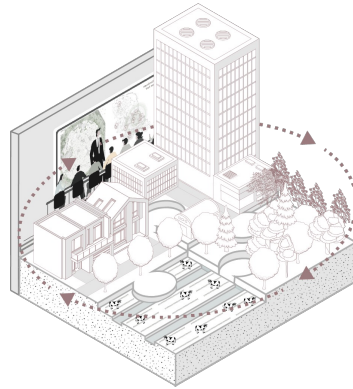
The Design Perquisite

The Design Goals & Values

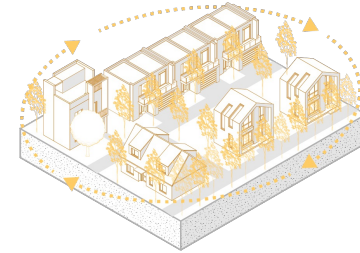
Theoretical pillar



Nature inclusive

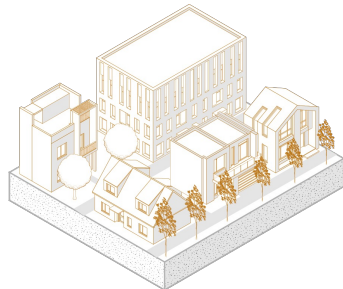


Synergetic system

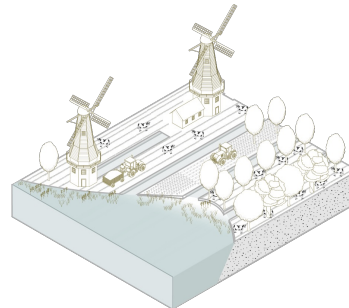


Social inclusivity

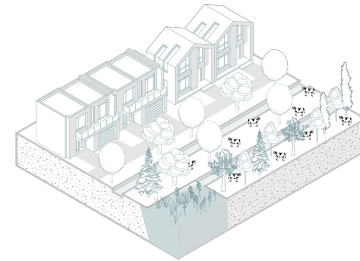
Spatial pillar



Housing developments



Landscape of sustainability



Fringe of transition

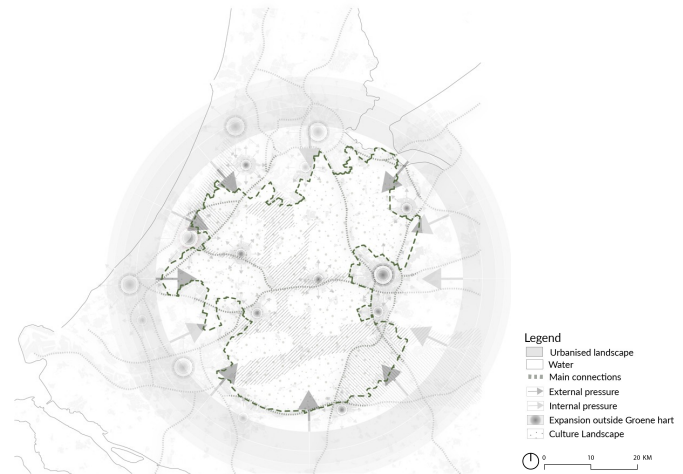
The Design Perquisite

The Synergizing System Strategy

Spatial synergetic translation



Locations capacity, their natural and agricultural suitability according to height, soils, hydrology and networks.



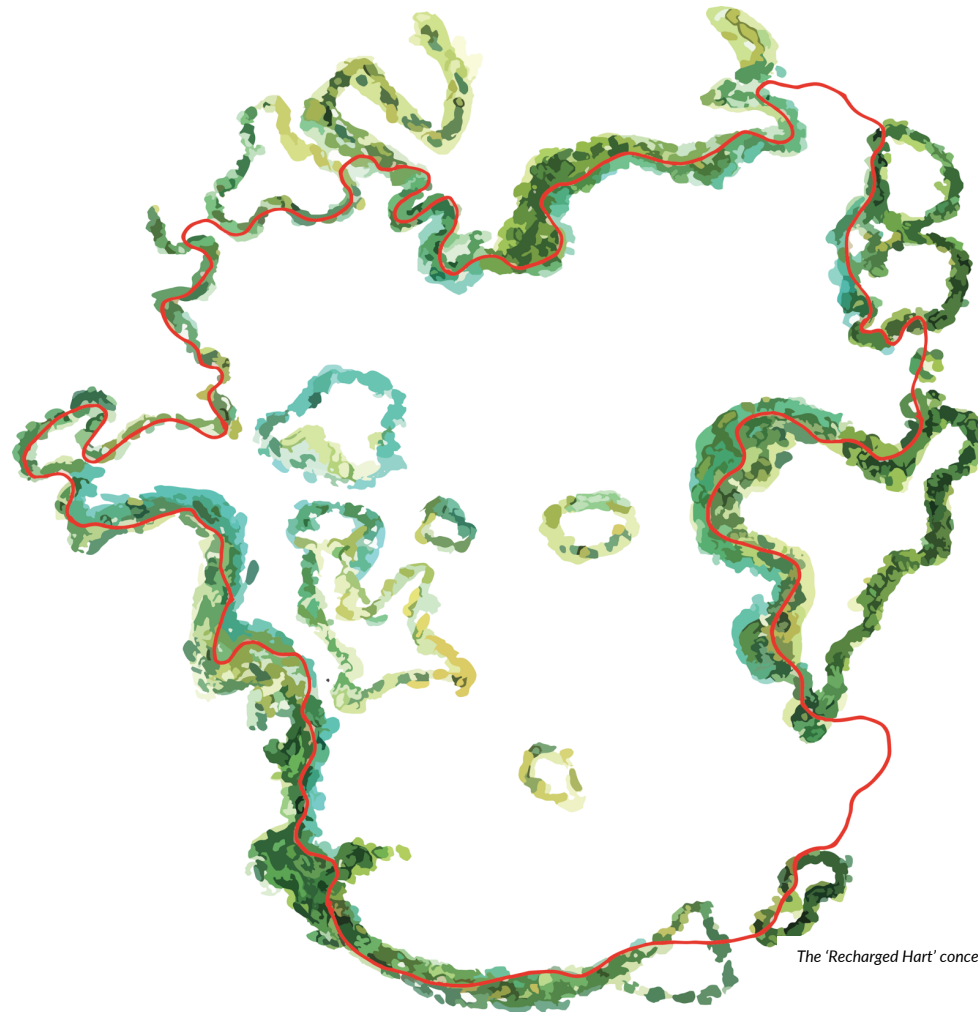
Network inclusive aspect to connect the external and internal pressure through axes.

The Design Strategy

Concept

Design Strategy

The Concept



The 'Recharged Hart' concept

The Design Strategy

Territorial re-ensemble

Design Strategy

Territorial Re-ensemble - Macro Scale

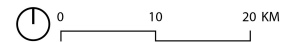


Preliminary design strategy at macro scale

- Housing**
 - Wet Nature-inclusive Housing Developments
- Agriculture**
 - Greenhouses for (urban) food production
 - Wet Agricultural, Paludiculture, Aquaculture
 - (Wetland) Silvoarable, Silvopasture, Silviculture
 - Dry Agricultural Landscape
- Nature & recreation sites**
 - Wet Peat Meadows, for natural development
 - Amphibious Delta Forest and Dry Nature
 - Ecological network
- Society & economy**
 - Knowledge hub
 - Society hub
 - Cultural sites
 - Current train stop
 - Proposed train stop

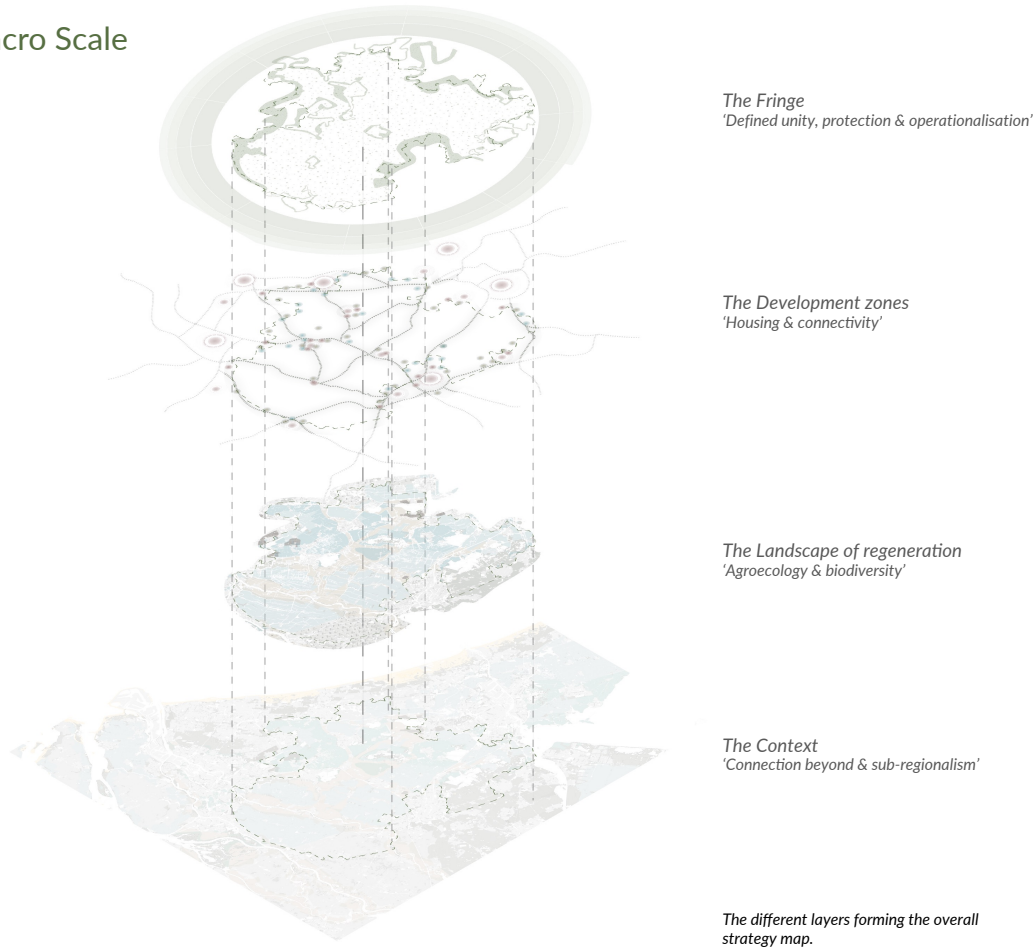
Meso scale Territorial framing

- Landuse**
 - Urbanised landscape
 - Water
 - Main connections
- Fringe**
 - Fringe with mixed Housing, Nature and Agriculture
 - Expansion outside Groene hart
 - Culture Landscape
 - Fringe trail
- Housing**
 - (Wet) Nature-Inclusive Housing Developments Zones
- Agriculture**
 - Greenhouses for (urban) food production
 - Wet Agricultural, Paludiculture, Aquaculture
 - (Wetland) Silvoarable, Silvopasture, Silviculture
 - Dry Agricultural Landscape
- Nature**
 - Wet Peat Meadows, for natural development
 - Amphibious Delta Forstry and Dry Nature



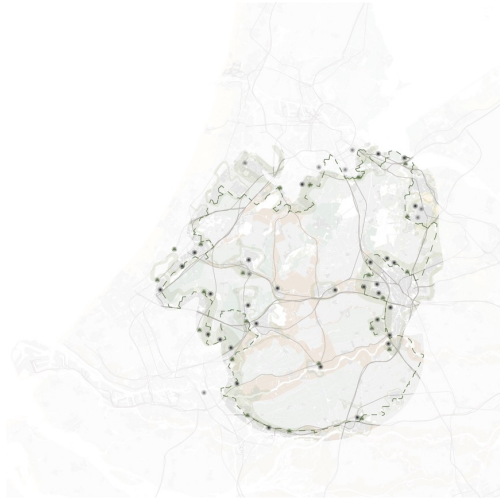
Design Strategy

Territorial Re-ensemble - Macro Scale



Design Strategy

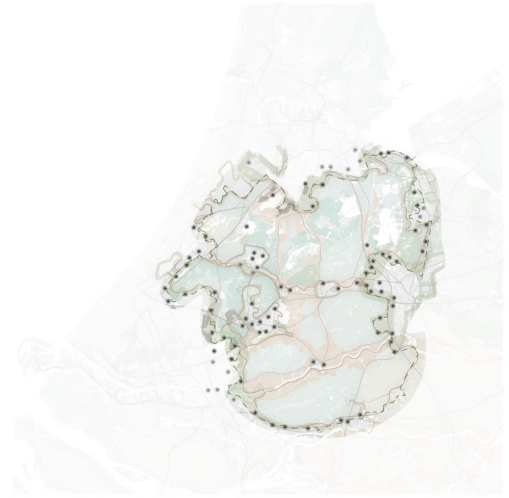
Phasing



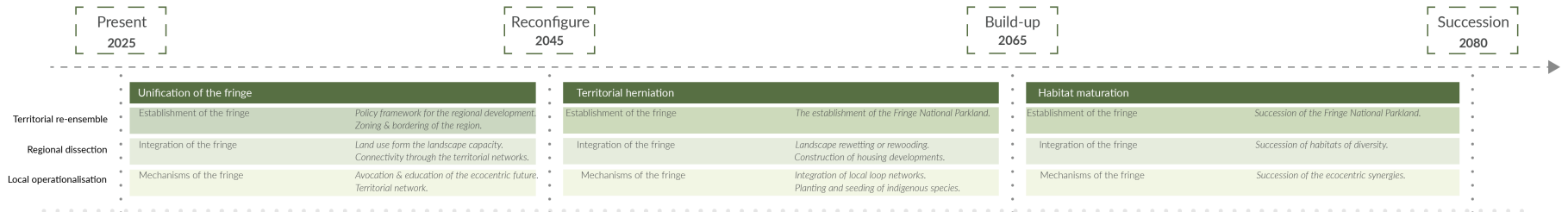
The reconfiguration phase
2045, unification of the fringe



The build-up phase
2065, territorial herniation



The succession phase
2080, habitat maturation



The Design Strategy

Reconfiguration phase +- 2045

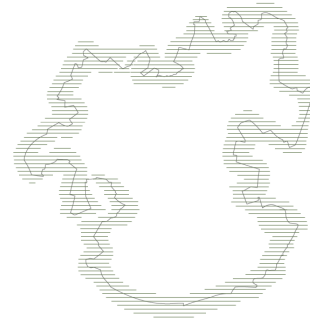
Territorial re-ensemble

Design Strategy

Reconfiguration Phase



*The reconfiguration phase
2045, unification of the fringe*



The fringe governance as a unity

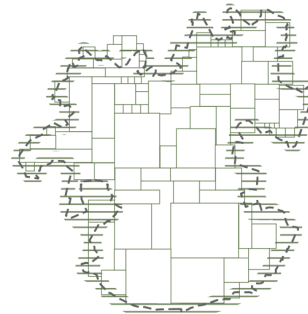


The implementation of enhanced connectivity

Present
2025

Reconfigure
2045

	Unification of the fringe	
Territorial re-ensemble	Establishment of the fringe	Policy framework for the regional development. Zoning & bordering of the region.
Regional dissection	Integration of the fringe	Land use form the landscape capacity. Connectivity through the territorial networks.
Local operationalisation	Mechanisms of the fringe	Avocation & education of the ecocentric future. Territorial network.



The agroecological transition

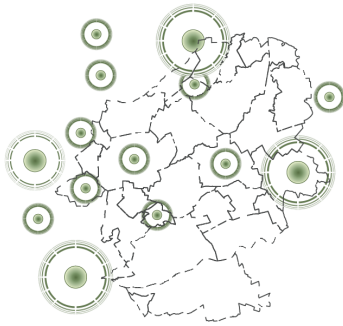


The sub-regional approach to development

Design Strategy

Critical Action

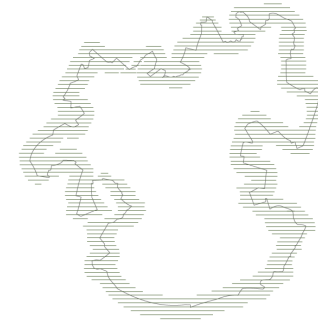
The fringe governance
as a unity.



Current
system of
fragmentation
& competition



Policies &
Communal consensus



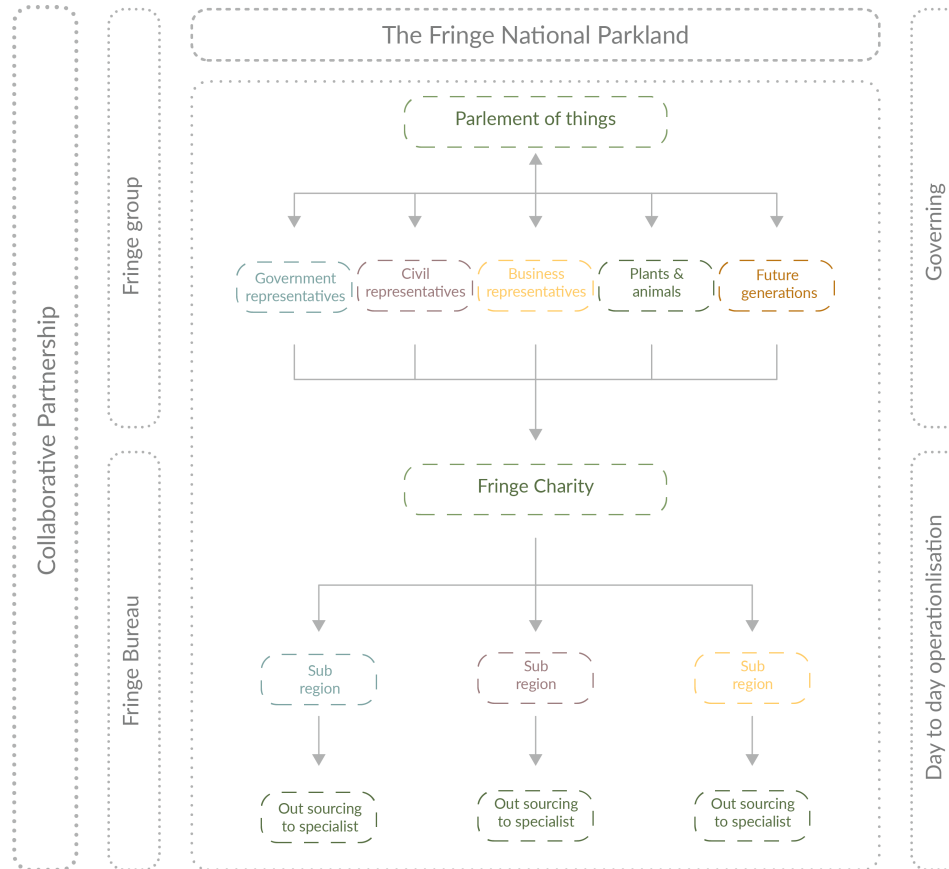
Fringe as
a unity

The critical action of fringe governance as a unity

Design Strategy

Critical Action

The fringe governance as a unity.



The fringe unity structure

The Design Strategy

Build-up phase +- 2065

Regional dissection

Design Strategy

Build-up Phase

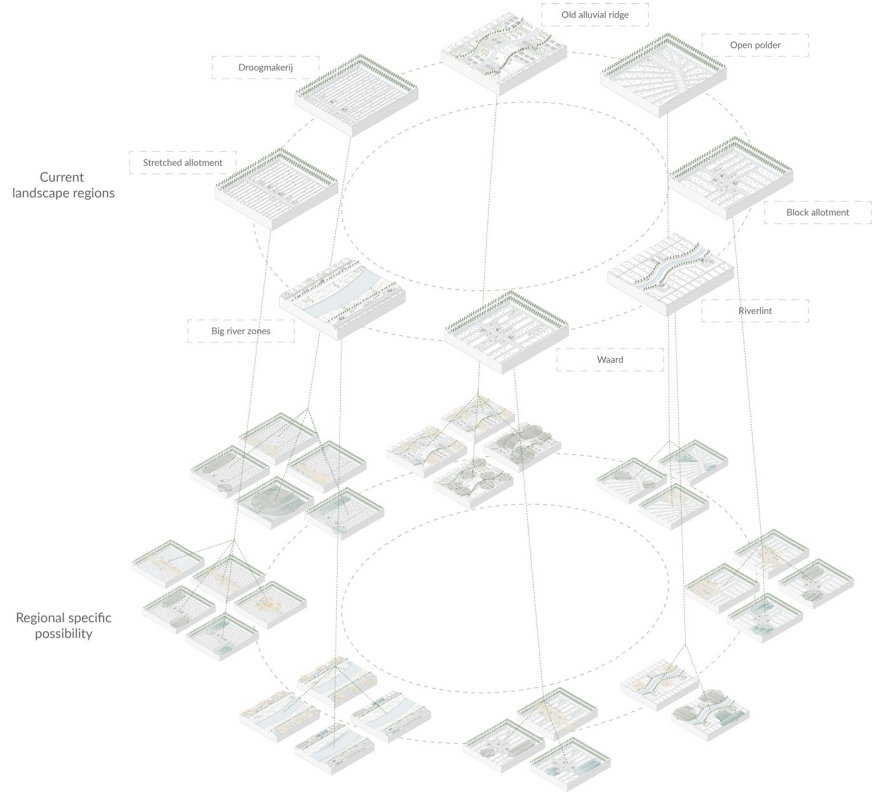


*The build-up phase
2065, territorial herniation*

Reconfigure
2045

Build-up
2065

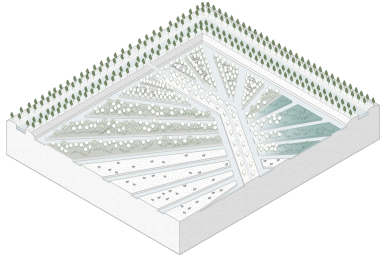
	Territorial herniation	
Territorial re-ensemble	Establishment of the fringe	<i>The establishment of the Fringe National Parkland.</i>
Regional dissection	Integration of the fringe	<i>Landscape rewetting or rewooding. Construction of housing developments.</i>
Local operationalisation	Mechanisms of the fringe	<i>Integration of local loop networks. Planting and seeding of indigenous species.</i>



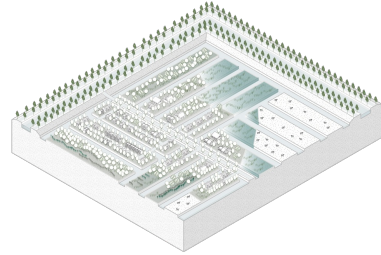
Mesoscale design language matrix.

Design Strategy

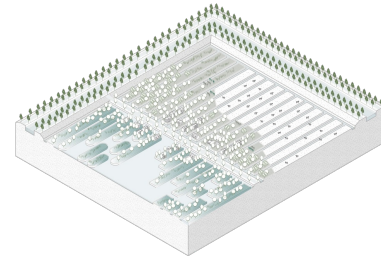
Regional Dissection - Ecocentric Regionalism



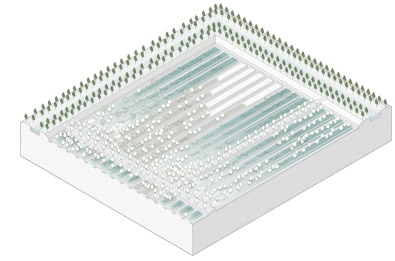
Open polder



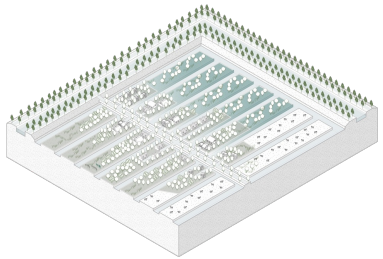
Block allotment



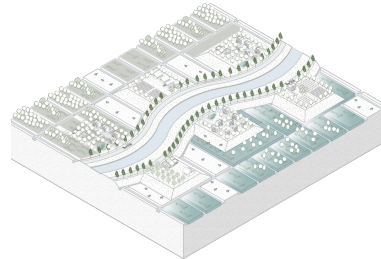
Stretched allotment



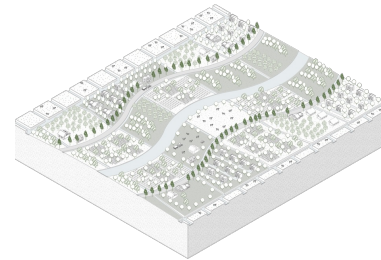
Droogmakerij polder



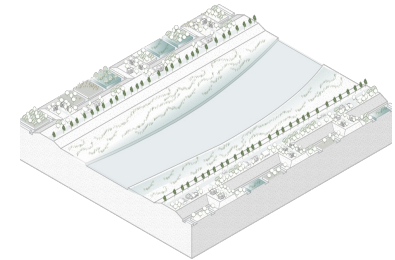
Waard polder



Riverlint



Old alluvial ridge



Big river zone

Design Strategy

Regional Dissection – Ecocentric Regionalism



Open polder



Block allotment



Stretched allotment



Droogmakerij polder



Waard polder



Riverlint



Old alluvial ridges

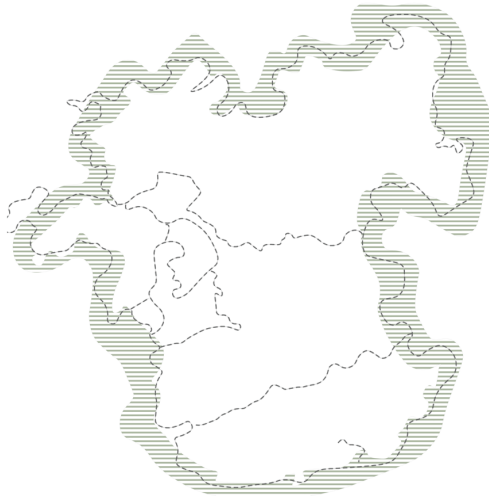


Big river zones

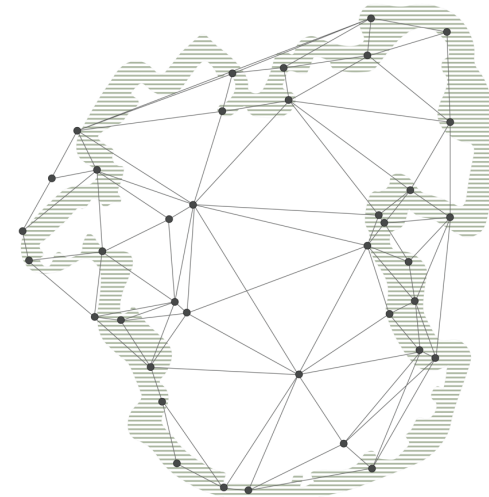
Design Strategy

Regional Dissection – Regional Operationalisation

Meso scale critical actions



Action the fringe trail, connecting developments..



Action network of social and knowledge hub, the Critical Zone observatories.

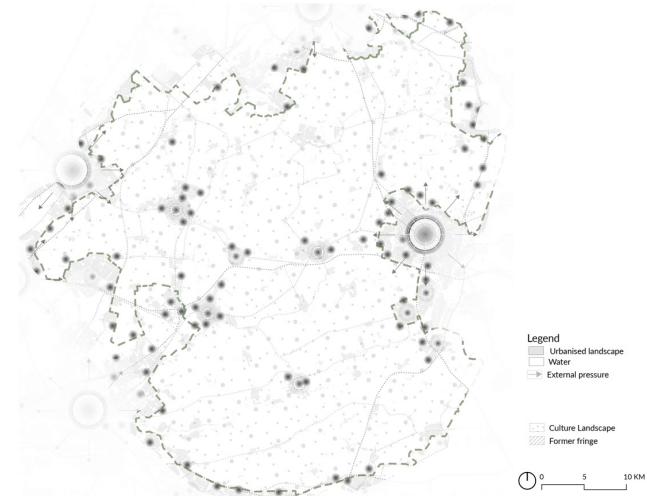
Design Strategy

Regional Dissection – Regional Operationalisation

Meso scale foundations



Proposed development sites at natural inclusive locations of height and soil.

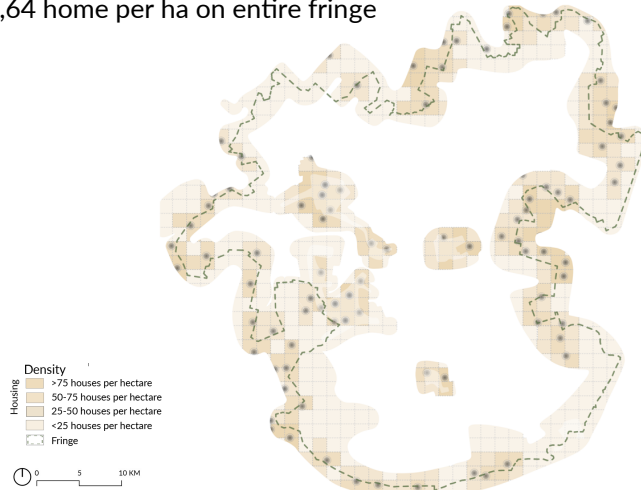


Network inclusive aspect of proposed developments.

Design Strategy

Regional Dissection – Regional Operationalisation

- 468.929 homes in fringe
- 7706 ha housing
- Average 93 ha per development
- 3,64 home per ha on entire fringe



Fringe density map of developments

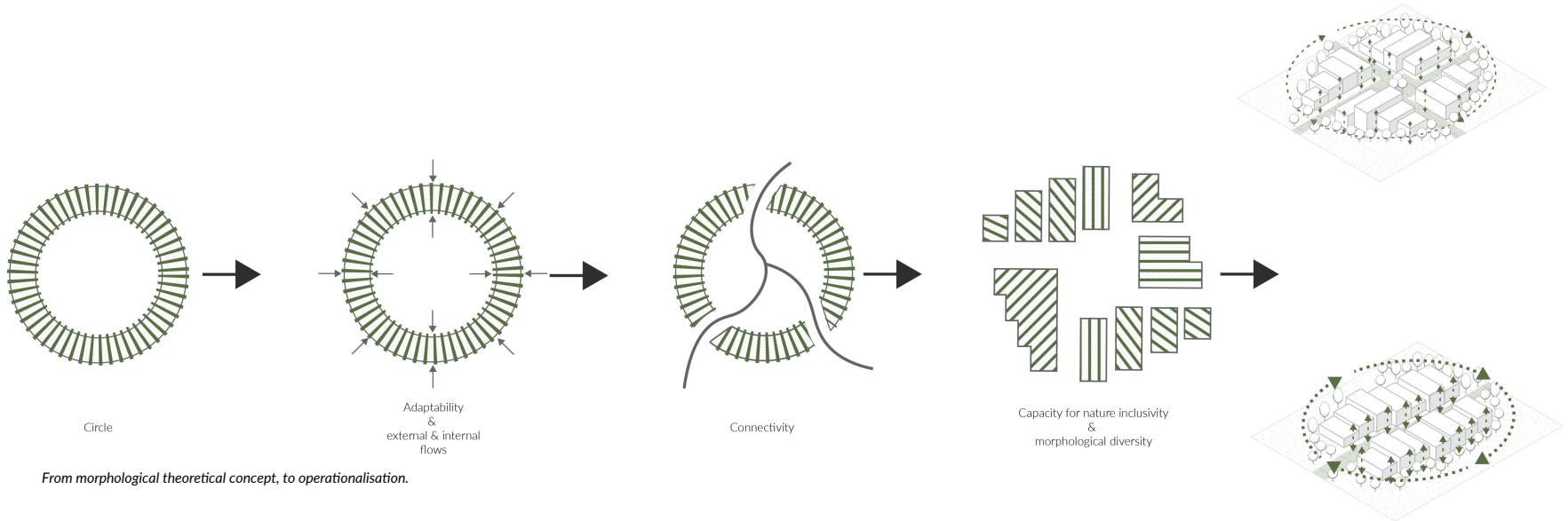


Fringe agroecology density map.

Design Strategy

Regional Dissection – Ecocentric Regionalism

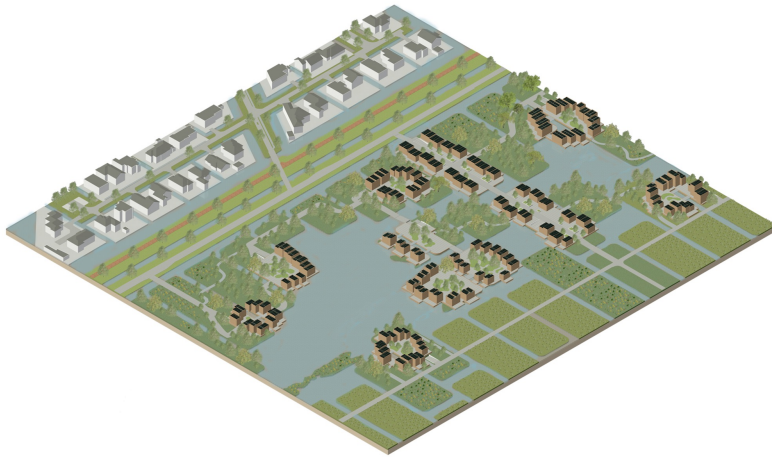
Morphology concept & options



Design Strategy

Regional Dissection - Ecocentric Developments

Developments



Isometric model of a nature inclusive development along the fringe.



Isometric model of a village inclusive development along the fringe.

Design Strategy

Regional Dissection – Ecocentric Developments

Nature inclusive development



An example of a nature inclusive housing cluster.

The Design Strategy

Succession phase +- 2080

Local operationalisation

Design Strategy

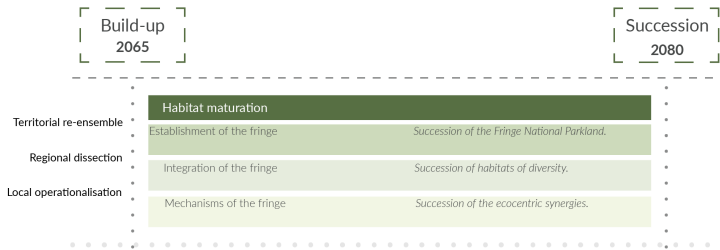
Succession Phase



*The succession phase
2080, habitat maturation*



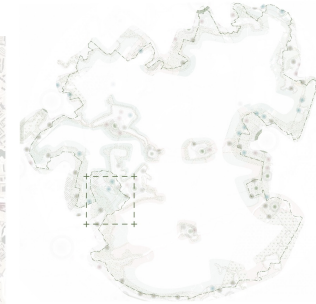
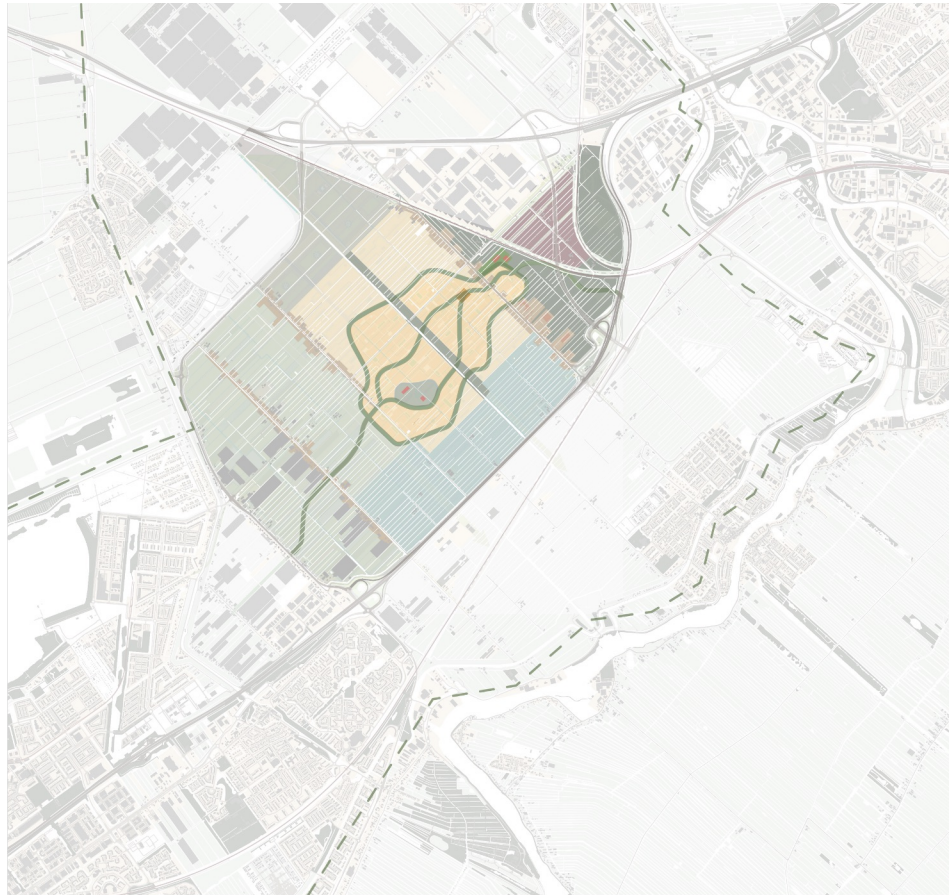
A conceptual diagrammatic transect of a possible Fringe



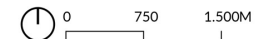
Design Strategy

Local Operationalisation - Microscale

Microscale



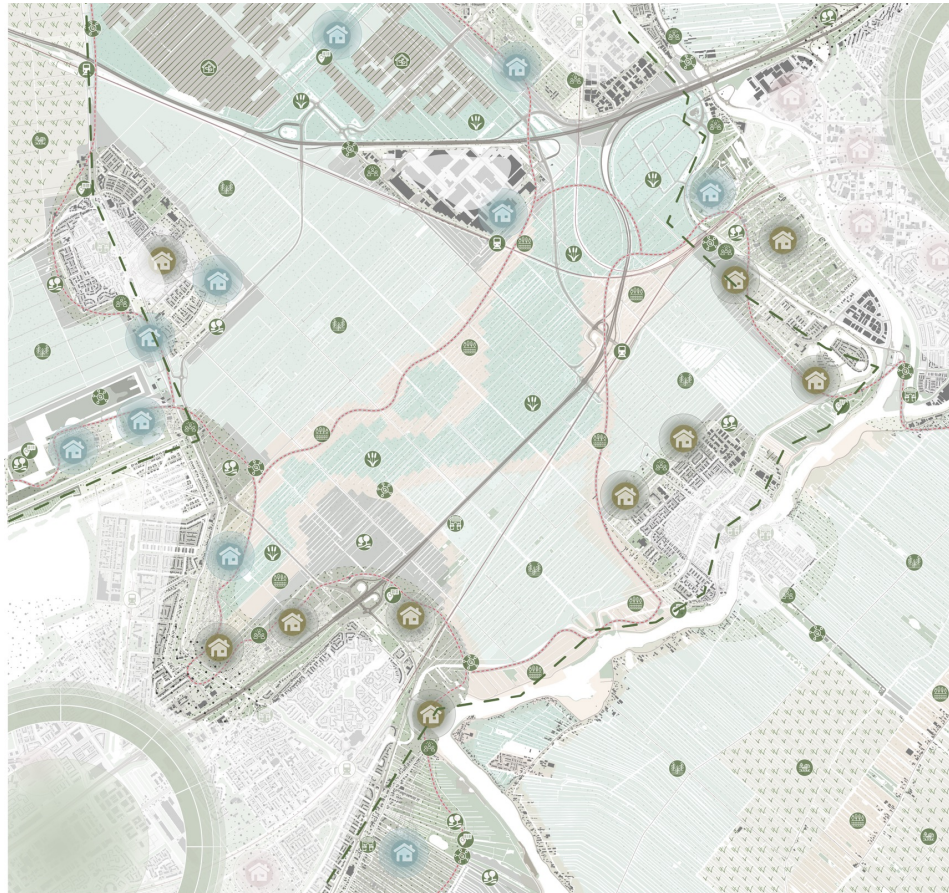
Currently proposed masterplan for the fifth village, see figure 71 for detail ((Gemeente Zuidplas & KuiperCompagnons, 2021), but edited by author).



Design Strategy

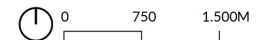
Local Operationalisation - Microscale

Microscale design proposal



Preliminary design strategy at microscale

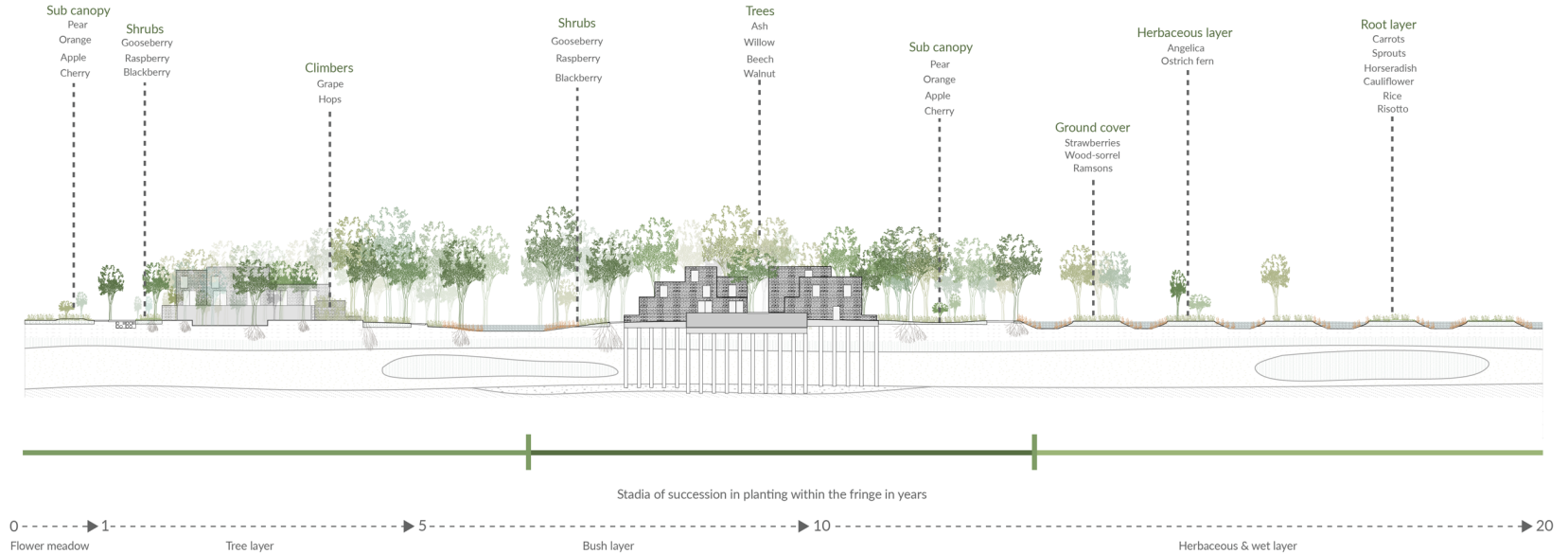
- Housing**
 - Wet Nature-inclusive Housing Developments
 - Dry Nature-inclusive Housing Developments
 - Compact Urban-inclusive Developments
- Agriculture**
 - Greenhouses for (urban) food production
 - Wet Agricultural, Paludiculture, Aquaculture
 - (Wetland) Silviculture, Silvopasture, Silviculture
 - Dry Agricultural Landscape
- Nature & recreation sites**
 - Wet Peat Meadows, for natural development
 - Amphibious Delta Forest and Dry Nature
- Ecological network**
 - Ecological network
- Society & economy**
 - Knowledge hub
 - Society hub
 - Cultural sites
 - Current train stop
 - Proposed train stop
- Landscape**
 - Urbanised landscape
 - Water
 - Main connections
 - Secondary connections
 - Train connections
 - Proposed recreation connections
- Fringe**
 - Area previously perceived as the Fringe
 - Now synergised to be included in the landscape
 - Expansion outside Groene hart
 - Culture Landscape
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 - Greenhouses for (urban) food production
 - Wet Agricultural, Paludiculture, Aquaculture
 - (Wetland) Silviculture, Silvopasture, Silviculture
 - Dry Agricultural Landscape
- Nature**
 - Wet Peat Meadows, for natural development
 - Amphibious Delta Forstry and Dry Nature



Design Strategy

Local Operationalisation

Fringe transition

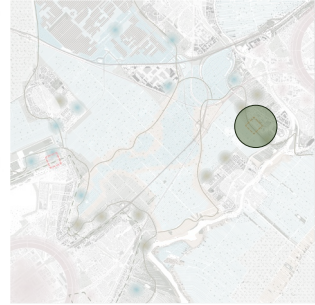


The fringe transition principle in cross-section.

Design Strategy

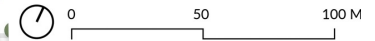
Regional Dissection - Ecocentric Developments

Village inclusive development



Preliminary design strategy at microscale

- Greenhouses for (urban) food production
 - Wet Agricultural, Paludiculture, Aquaculture
 - (Wetland) Silvoarable, Silvopasture, Silviculture
 - Dry Agricultural Landscape
- Nature & recreation sites**
- Wet Plant Meadows, for natural development
 - Amphibious Delta Forest and Dry Nature
 - Ecological network
- Society & economy**
- Knowledge hub
 - Society hub
 - Cultural sites
 - Proposed public transport stop
 - Parking spots, either above or belowground
- Landuse**
- Water
 - Buildings
 - Road
 - Bicycle path
 - Walking trail
 - Parking
 - Groome Hart
 - Fringe
 - Trees
 - New development
 - Existing development
 - Existing green
 - >+1 Crosssection
 - Viewpoint



Design Strategy

Local Operationalisation



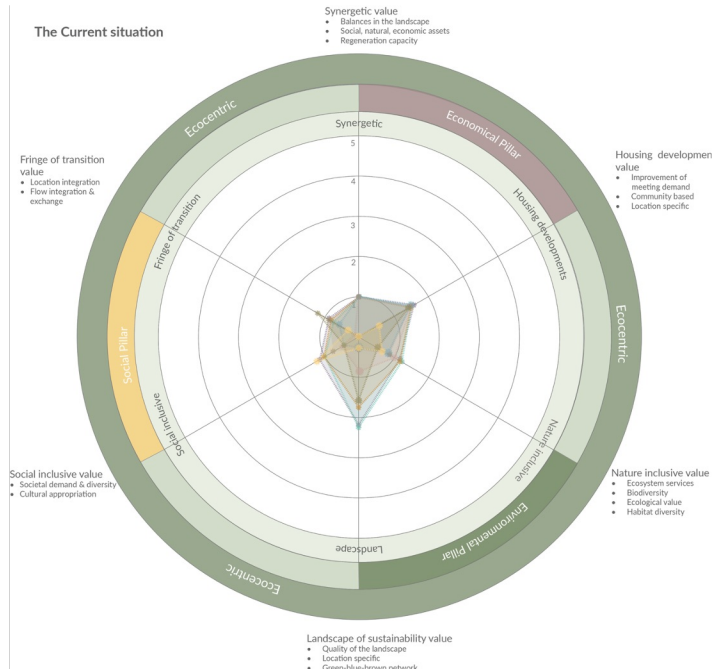
An example of how nature inclusive housing can be included within the landscape.



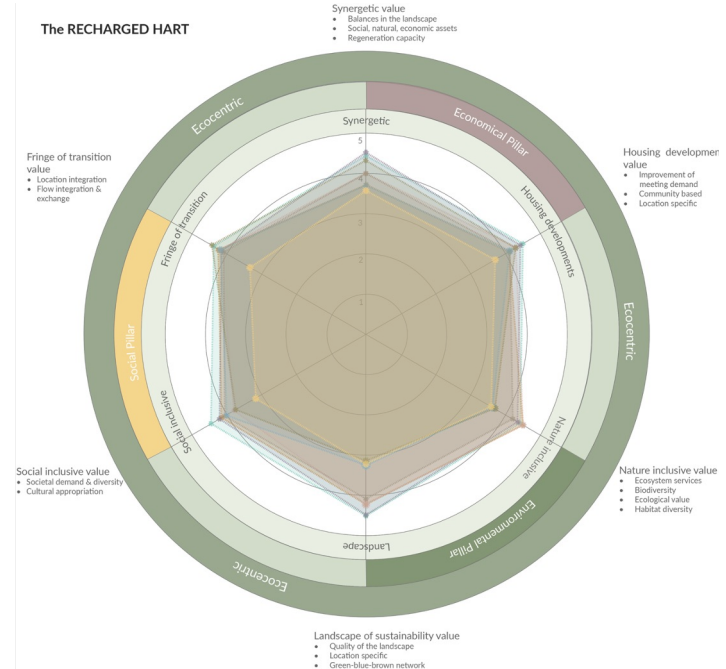
An example of the fringe trail through the village inclusive housing development.

Evaluation

Evaluation



Evaluation of the current situation



Evaluation of the future situation

Conclusion

Discussion & conclusion

Conclusion

Discussion



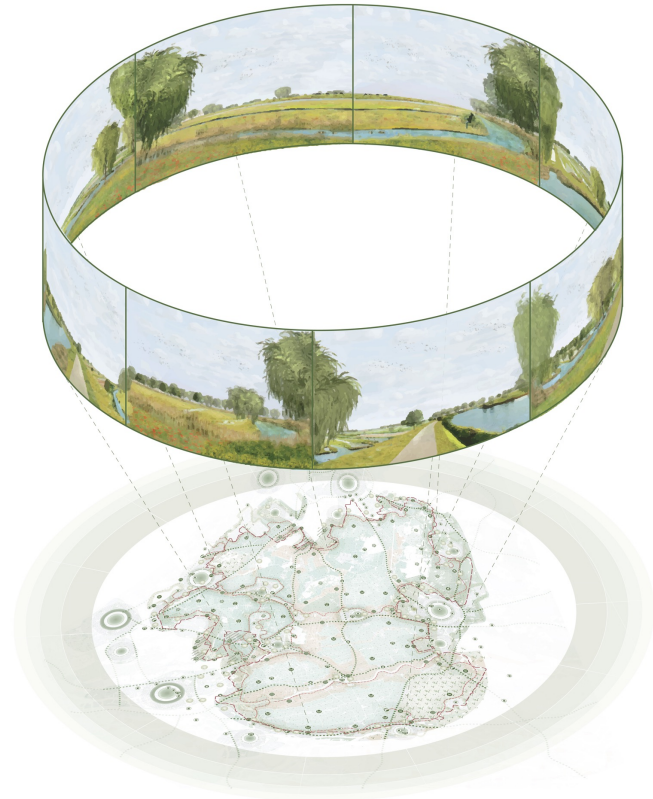
Panorama towards the fringe

Conclusion

The Conclusion

The Research Question

How can we **create a synergy** between social, economic, and environmental interests in depleted landscapes like the **fringe of the 'Groene Hart'** through the **implementation of the ecocentric paradigm** in terrestrial development to allow for an alleviation of the **housing scarcity**?



The ecocentric regionalism of Recharged 'Hart'

Questions & Comments

Appendix

Conceptual Definitions

Residual Identity

The identity of a place that remains in that place or is perceived to be the identity of the place after it has transformed over time.

Altered Nature

A human-initiated environmental alteration aimed at adapting the ecosystem to serve humans, beyond the state of co-existence, to a state of dependency.

Appendix

Theoretical Definitions

Panarchy

A framework to comprehend and order the complexity within human urban-rural spheres (Gunderson & Holling, 2002).

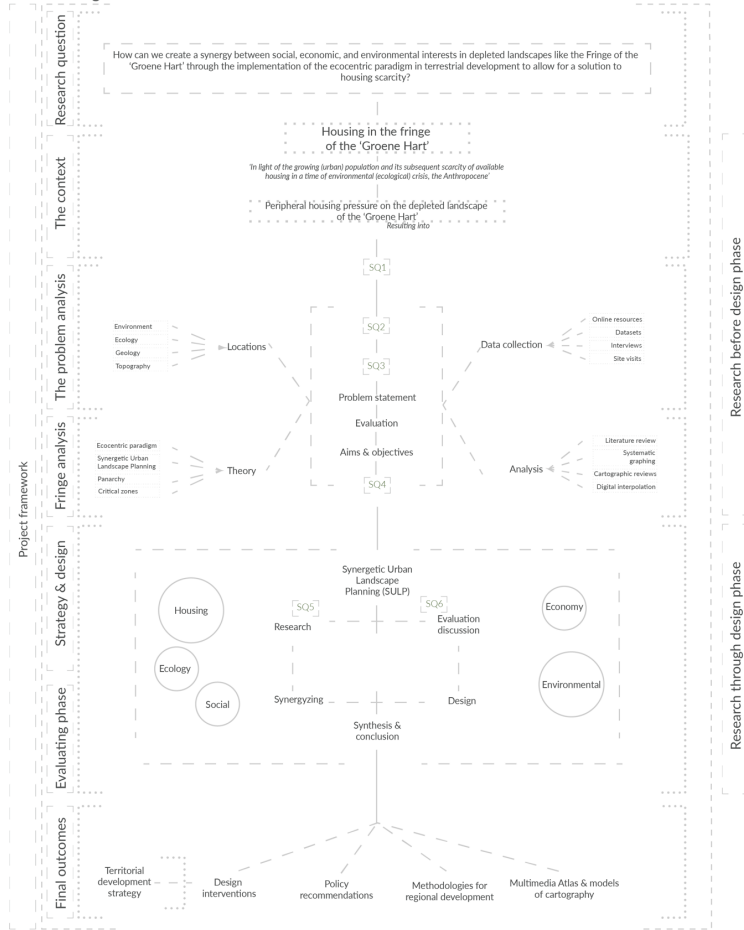
Critical Zone

The layers that sustain life, which offers a framework for analysis of natural non-human agencies (Latour et al., 2020).

Appendix

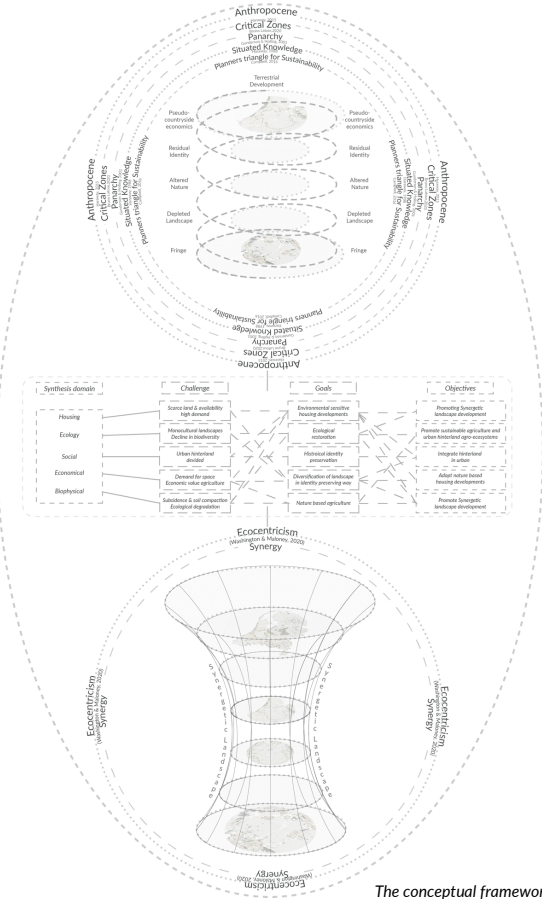
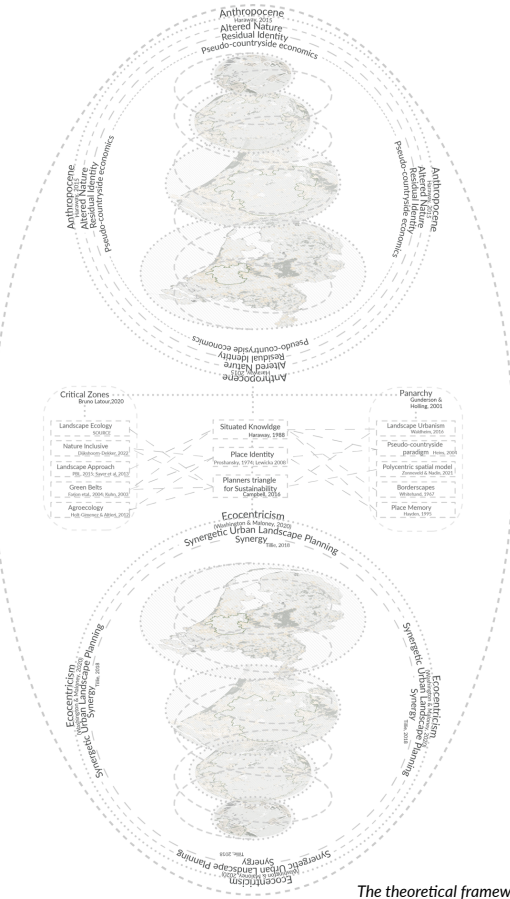
The Methodological Framework

Methodological Research Framework



Appendix

The Research Frameworks

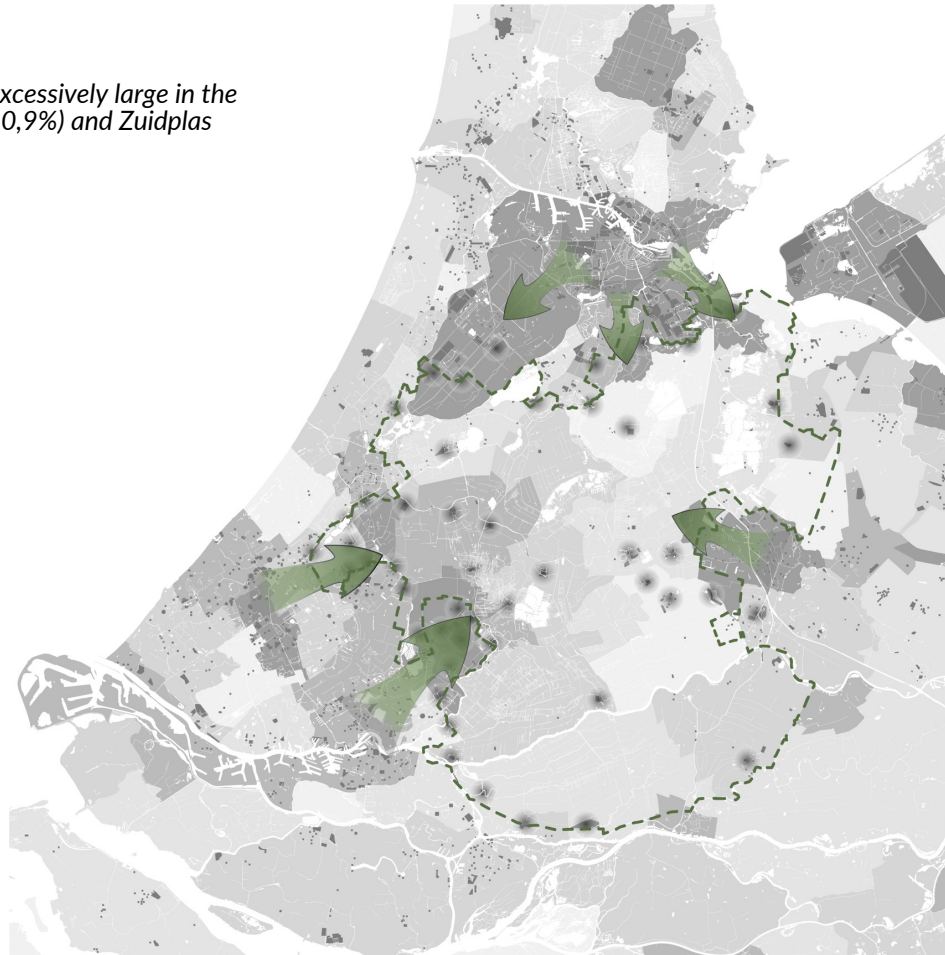


Appendix

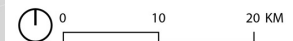
A Suburban Future

'The population growth will be excessively large in the municipality of Ouder-Amstel (40,9%) and Zuidplas (40,6%) in the 'Groene Hart.'

(CBS, 2023a)



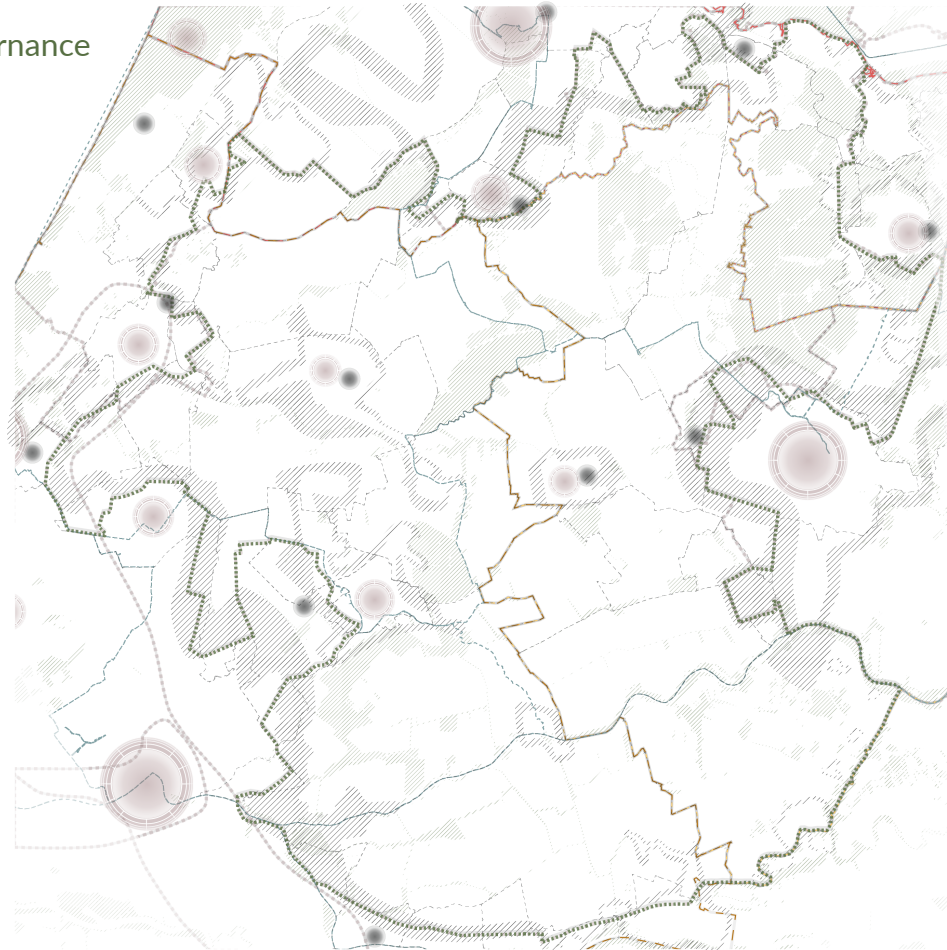
The population growth expectations for 2035 according to the Planbureau voor de Leefomgeving and Centraal Bureau voor de Statistiek (Centraal Bureau voor de Statistiek, 2023a).



Appendix

The Spatial Puzzle of Governance

*'A region of fragmented
internal competitiveness'*



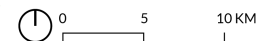
The spatial conflicts and fragmentation of the political zeitgeist.

Agendas Lower level of lower governance

- NOVEX
- Woondials
- 'Groene Hart' Agenda
- Natura 2000 & NNN
- Municipal outwards competition
- 'Groene Hart' outward pressure & attractiveness
- Waterboard outlines
- Municipal outlines
- Fringe

Provincial

- South-Holland
- Noord-Holland
- Utrecht



Appendix

The Panarchy & Critical Zones of the 'Groene Hart'

'An identity of contrasts and connectivity'

Built-up
'Surrounding patches'

Protected areas
'Surrounding & few'

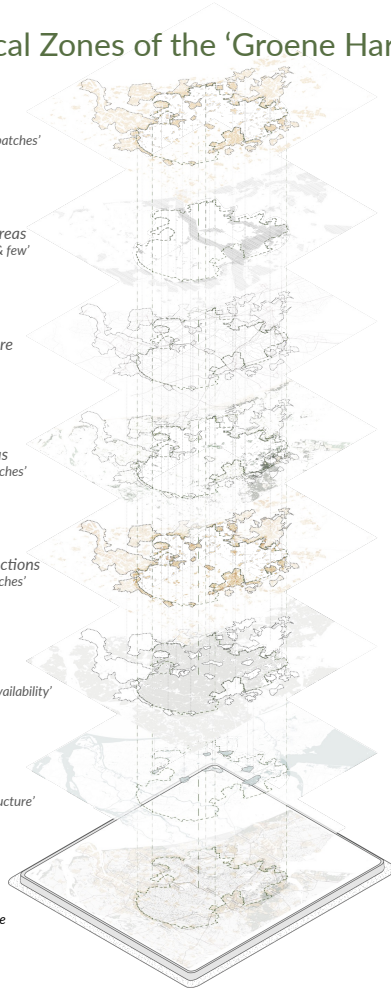
Infrastructure
'Connecting'

Nature areas
'Detached patches'

Built-up functions
'Clustered patches'

Agriculture
'Abundance availability'

Hydrology
'Backbone structure'



The spatial structural layers within the 'Groene Hart' within the Panarchy
 ((Buchhorn et al., 2020; CBS & PBL, 2015; Centraal Bureau voor de Statistiek, 2018, 2023c; Klimateffectatlas, 2023; Nabielek et al., 2020; RIVM et al., 2019; Rutte & Abrahamse, 2014)

Nature Network
'Detached-patches'

Pastures
'Inner-outer contrast'

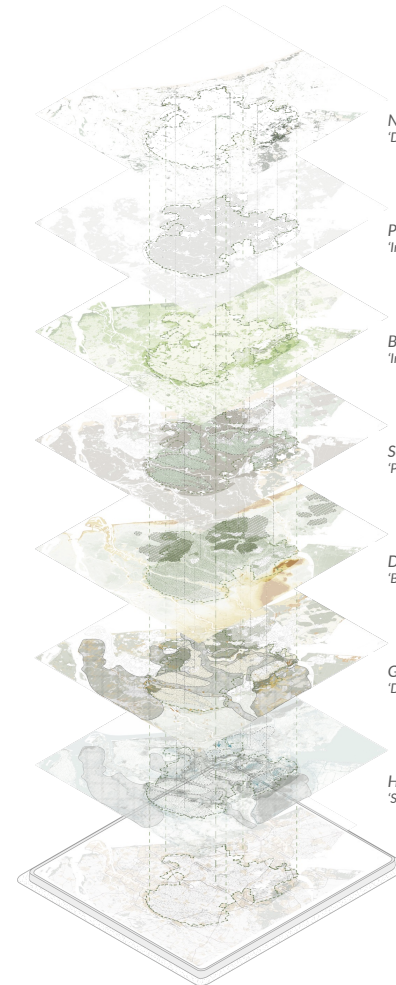
Biodiversity
'Inner-outer contrast'

Soil
'Peat & Clay'

DEM
'Below the sea'

Geomorphology
'Detic location'

Hydrology
'Seepage & salination'

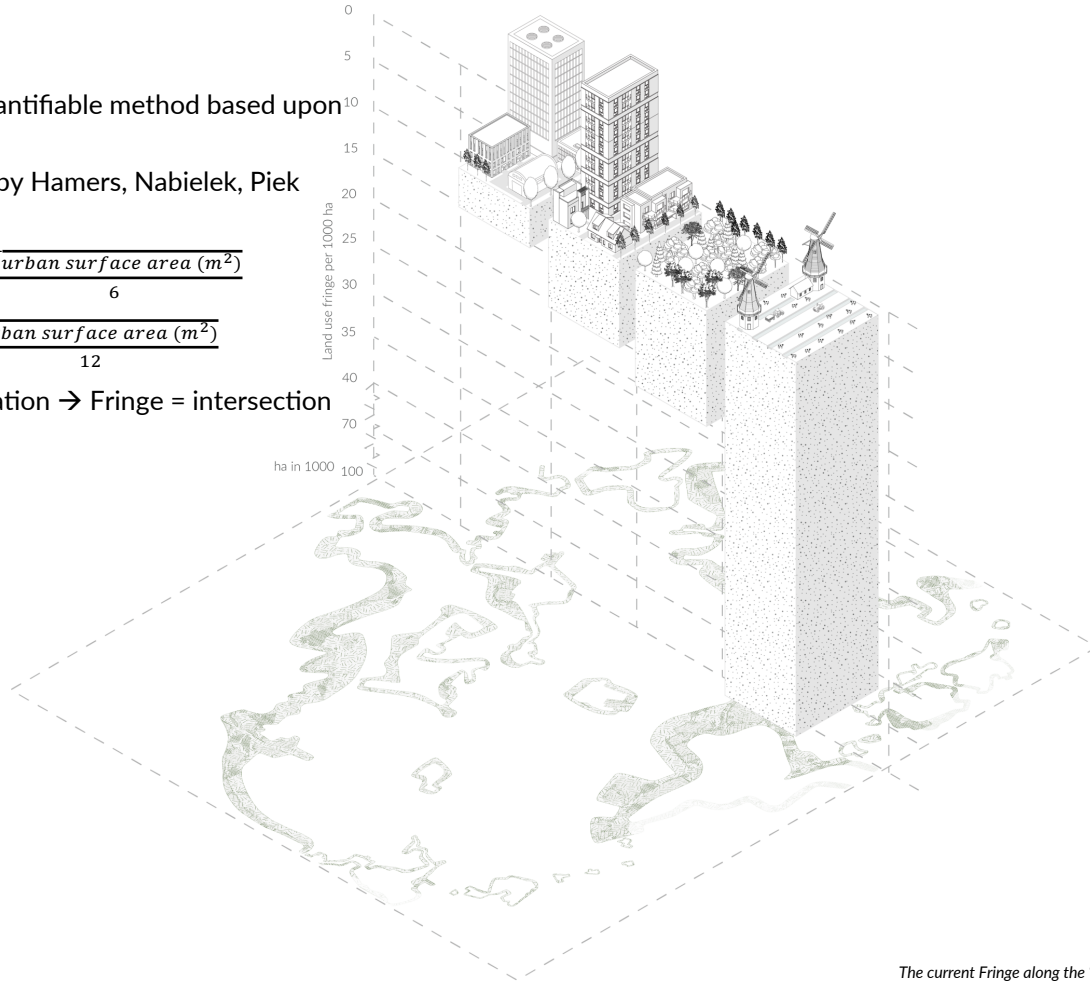


The layers comprising the Critical Zone the Geomorphology of the 'Groene Hart'
 ((Centraal Bureau voor de Statistiek, 2018, 2023c; Erfgoed, 2015; Klimateffectatlas, 2023; Melchert Reudink et al., 2023; Nationale Databank Flora en Fauna & Georegister, 2017; Panagos et al., 2022; Rijksinstituut voor Volksgezondheid en Milieu, 2015).

Appendix

Fringe

- Fringe defined by quantifiable method based upon size of urban area.
- Based upon method by Hamers, Nabielek, Piek and Sorel (2009)
- Outline fringe (m) = $\frac{\sqrt{\text{urban surface area (m}^2\text{)}}}{6}$
- Inline fringe (m) = $\frac{\sqrt{\text{urban surface area (m}^2\text{)}}}{12}$
- QGIS digital interpolation → Fringe = intersection of the two



Appendix

Superfluous Maps & Data

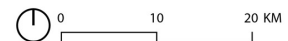
Prospected & developed housing developments

Since 1995



The continual housing development along the fringes of the 'Groene Hart'

- Agricultural Landscape
- Urbanized landscape
- Natural Landscape
- Water
- Groene Hart outline
- Fringe
- Development in soil usage 1990-2015
- Built-up area
- Business park
- Proposed future developments
- NOVEX
- Fast Tracked developments



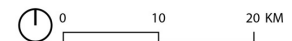
Appendix

Superfluous Maps & Data

Developer owned land

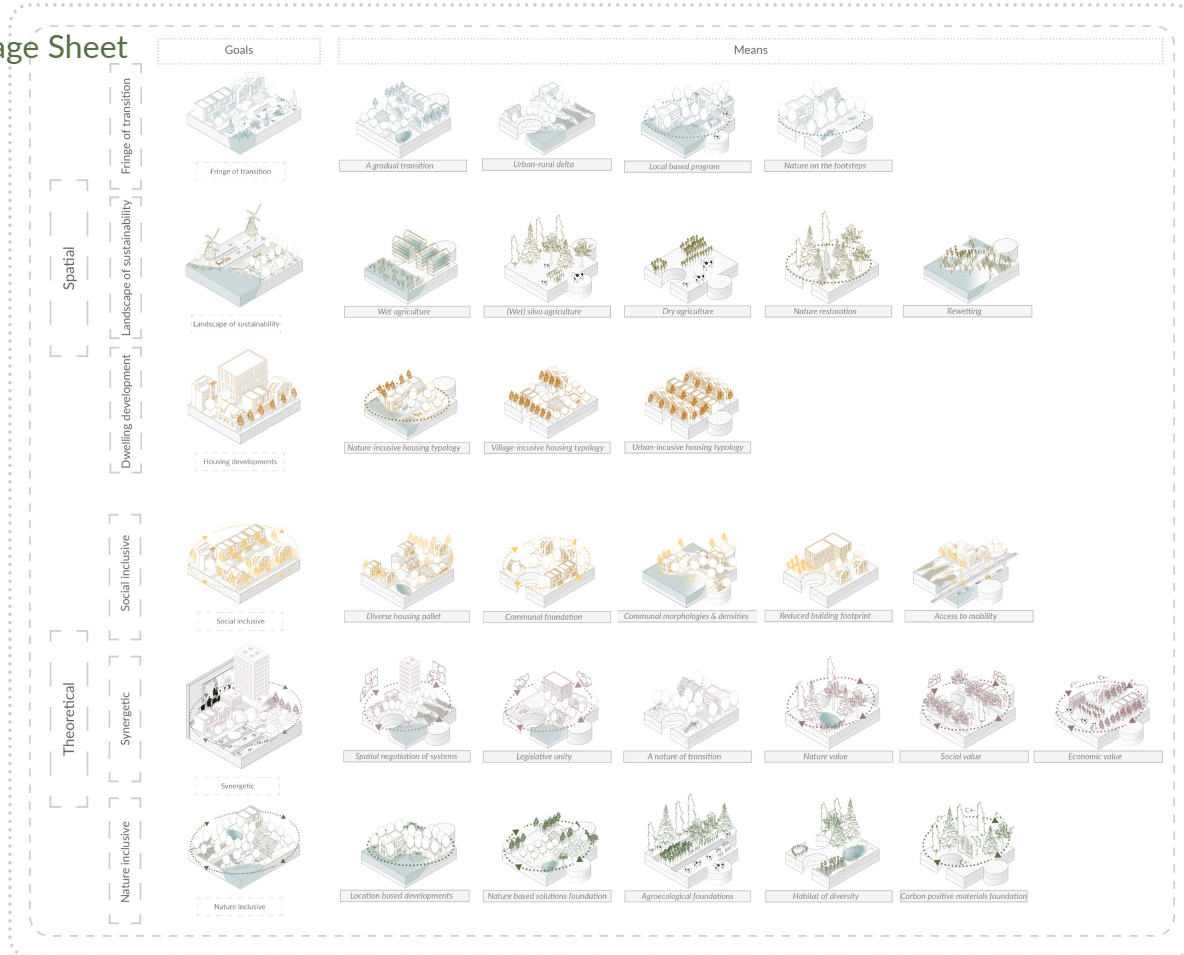


Developer owned land (Nabielek et al., 2020).



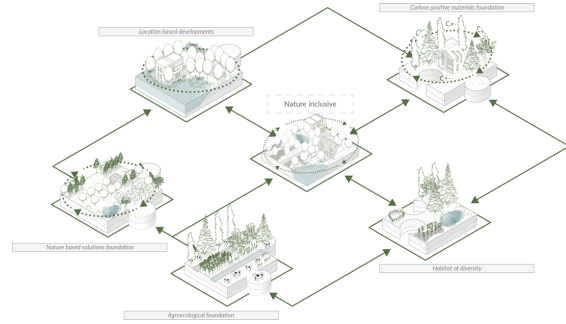
Appendix

The Design Language Sheet

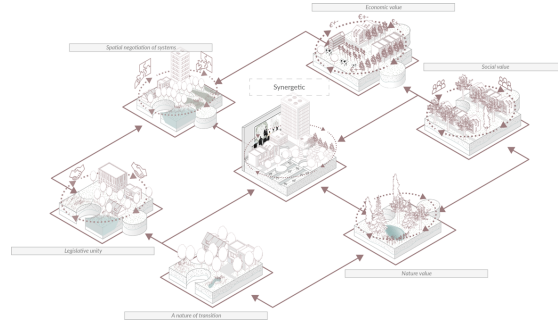


Appendix

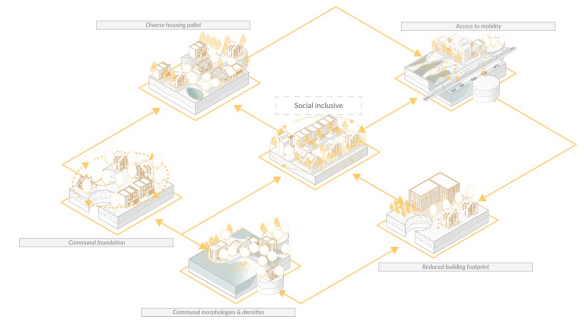
The Design Goals & Values



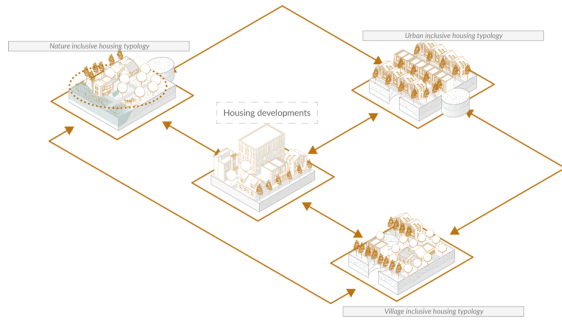
Nature inclusivity



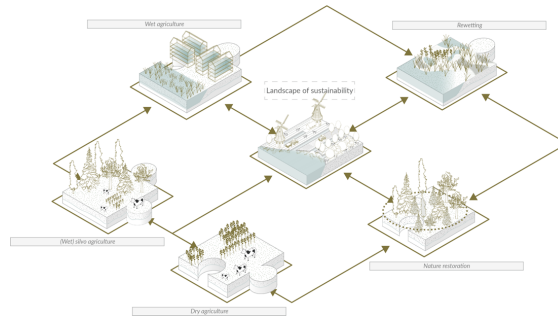
Synergetic system



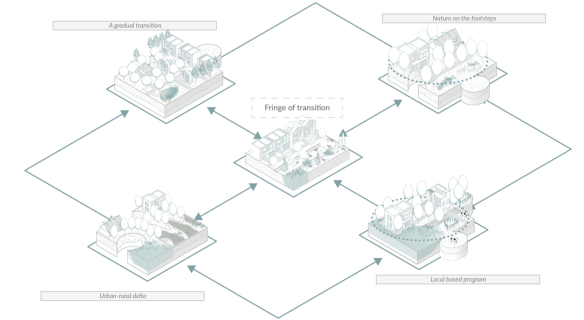
Social inclusivity



Housing developments



Landscape of sustainability

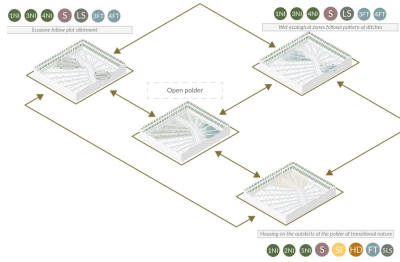


Fringe of transition

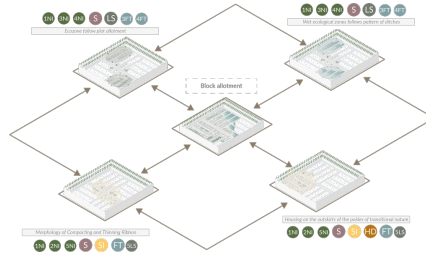
Appendix

Regional Dissection

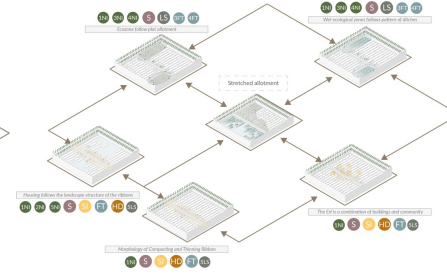
Meso Scale regional principal matrixes



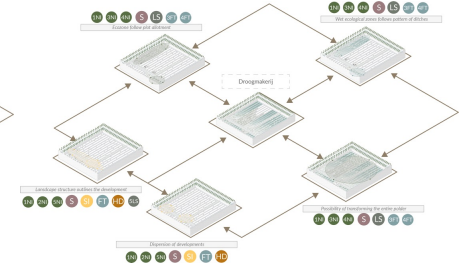
Open polder



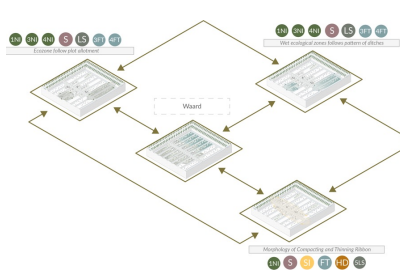
Block allotment



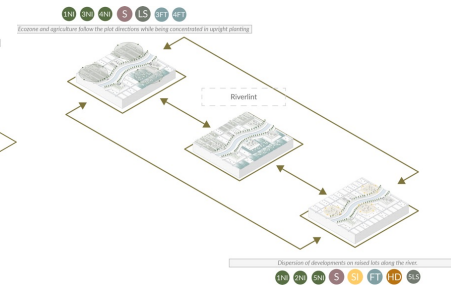
Stretched allotment



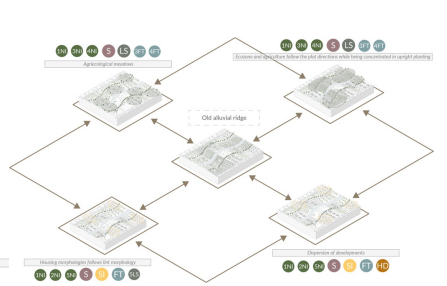
Droogmakerij polder



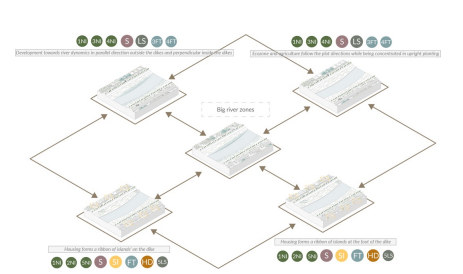
Waard polder



Riverlint



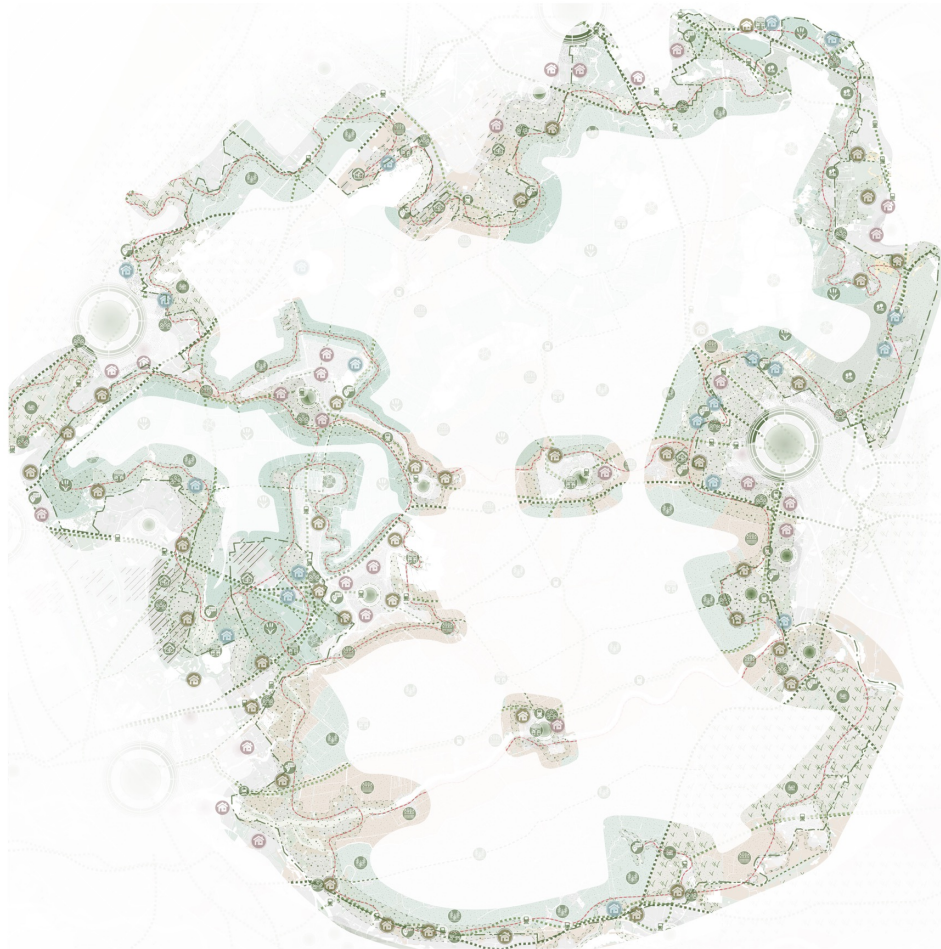
Old alluvial ridges



Big river zones

Appendix

Regional Dissection



Preliminary design strategy at meso scale

Housing

- Wet Nature-inclusive Housing Developments
- Dry Nature-inclusive Housing Developments
- Compact Urban-inclusive Developments

Agriculture

- Greenhouses for (urban) food production
- Wet Agricultural, Paludiculture, Aquaculture
- (Wetland) Silvoarable, Silvopasture, Silviculture
- Dry Agricultural Landscape

Nature & recreation sites

- Wet Peat Meadows, for natural development
- Amphibious Delta Forest and Dry Nature
- Ecological network

Society & economy

- Knowledge hub
- Society hub
- Cultural sites
- Current train stop
- Proposed train stop

Landuse

- Urbanised landscape
- Water
- Main connections
- Secondary connections
- Train connections
- Proposed connections
- Proposed recreation connections

Fringe

- Area previously perceived as the Fringe
- Now synergised to be included in the landscape
- Expansion outside Groene hart
- Culture Landscape

Housing

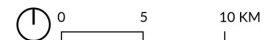
- Wet Nature-inclusive Housing Developments
- Dry Nature-inclusive Housing Developments
- Compact Urban-inclusive Developments

Agriculture

- Greenhouses for (urban) food production
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- (Wetland) Silvoarable, Silvopasture, Silviculture
- Dry Agricultural Landscape

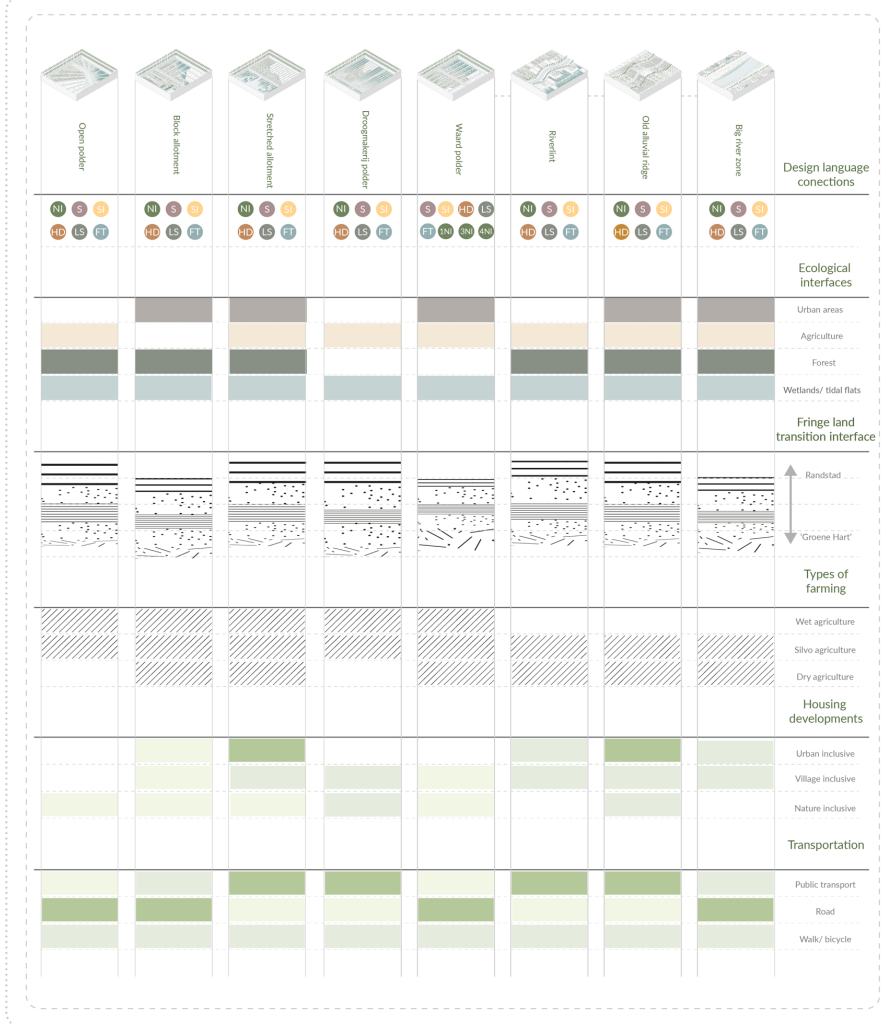
Nature

- Wet Peat Meadows, for natural development
- Amphibious Delta Forstry and Dry Nature

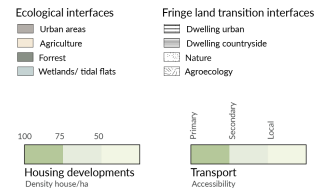


Appendix

Regional Dissection



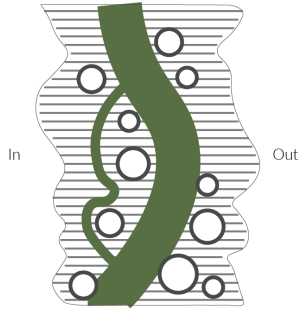
Regional dissection functions & interfaces matrix.



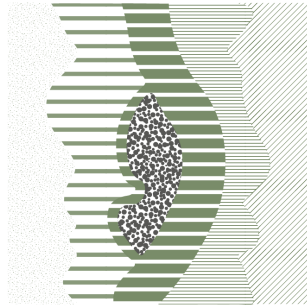
Appendix

Local Operationalisation

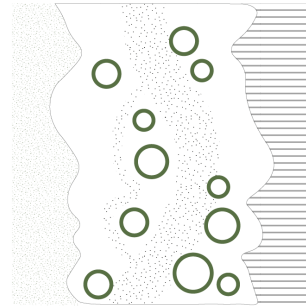
Fringe habitats of diversity concept



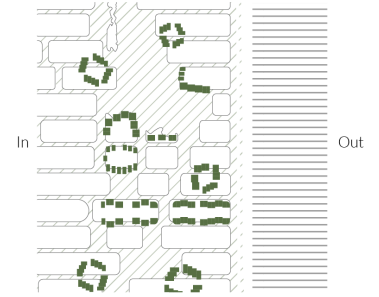
Fringe concept of navigating external pressures by separating density and movement.



Natural line of transition by going from enclosed to an opening up character



With the housing density being scattered across multiple small development clusters, within the core of the fringe.



Adapting the principles to fit the location.



Adapting the principles to fit the location.

Appendix

Regional Dissection - Ecocentric Developments

Nature inclusive development



Preliminary design strategy at microscale

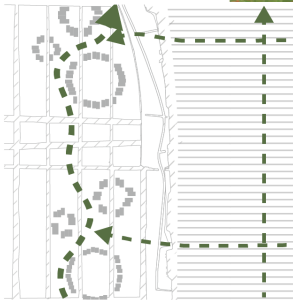
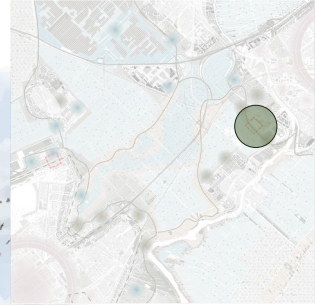
- Symbols**
- Agriculture**
- Greenhouses for (urban) food production
 - Wet Agricultural, Paludiculture, Aquaculture
 - (Wetland) Silvoarable, Silvopasture, Silvoculture
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- Water
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 - Road
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 - Walking trail
 - Parking
 - Green Hart
 - Fringe
 - Trees
 - New development
 - Existing development
 - Existing green
 - > +1 Crosssection
 - Viewport



Appendix

Regional Dissection - Ecocentric Developments

Nature village development

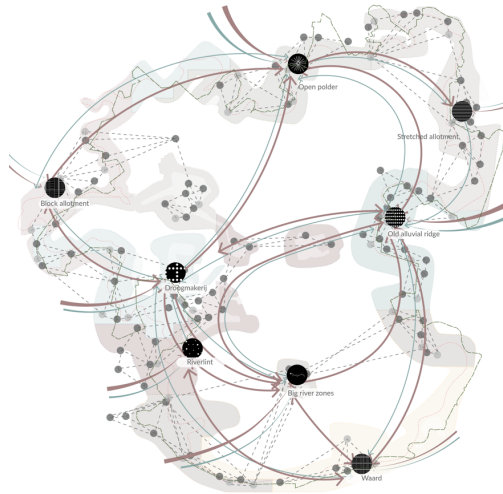


An example of a village inclusive housing cluster inner space.

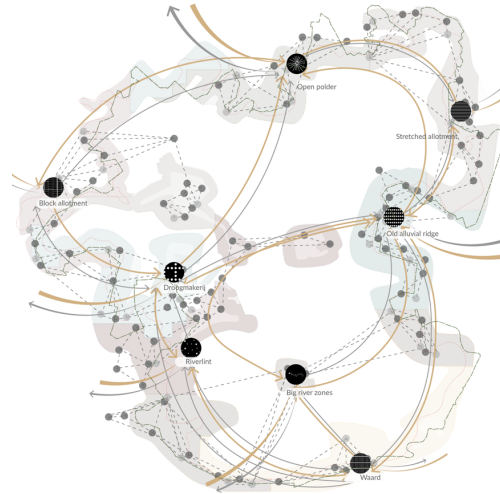
Appendix

Regional Dissection

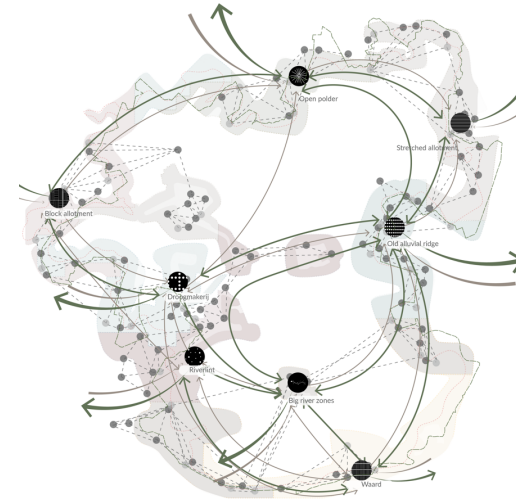
Regional flows of the fringe



The economic flows

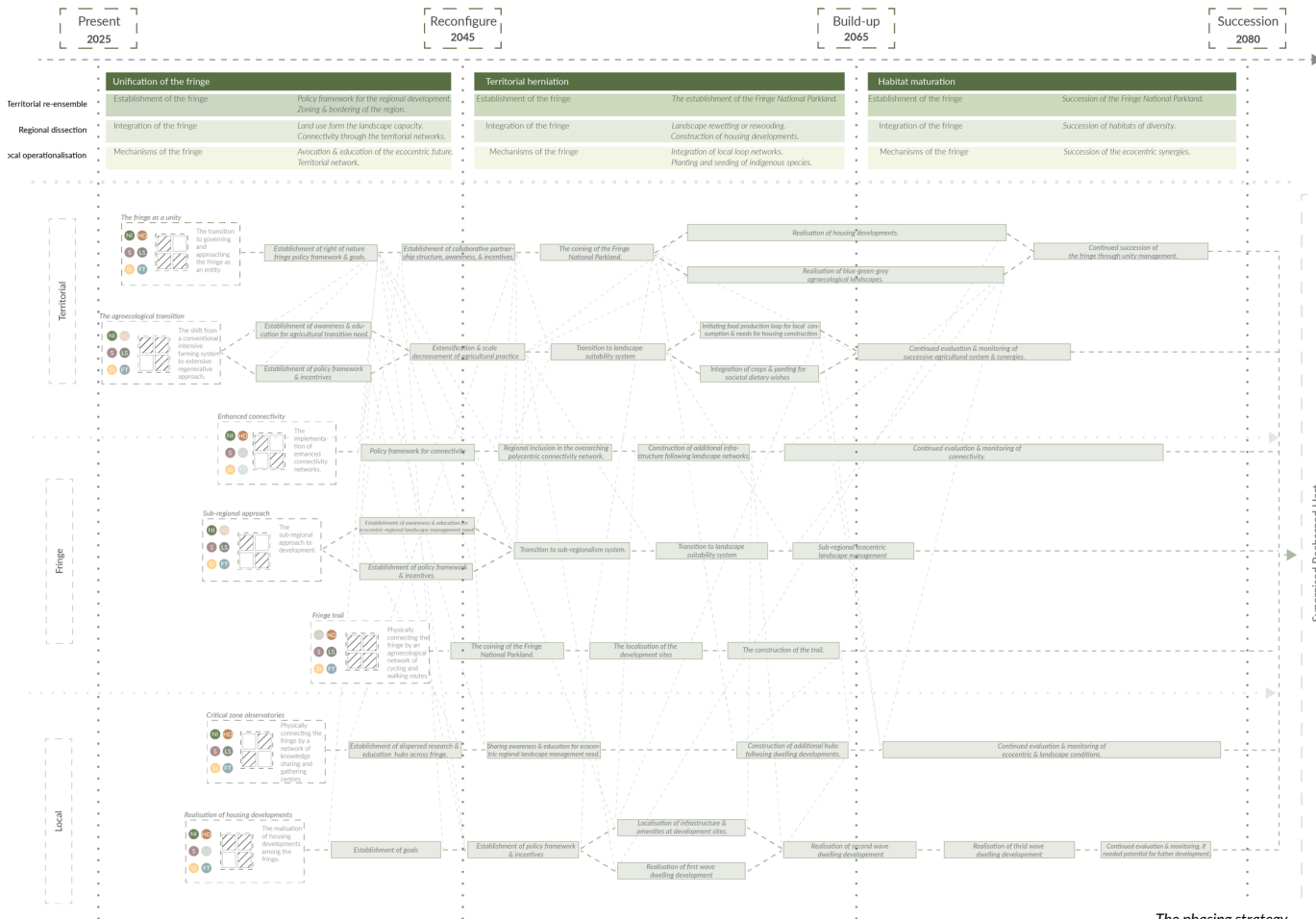


The social flows



The natural flows

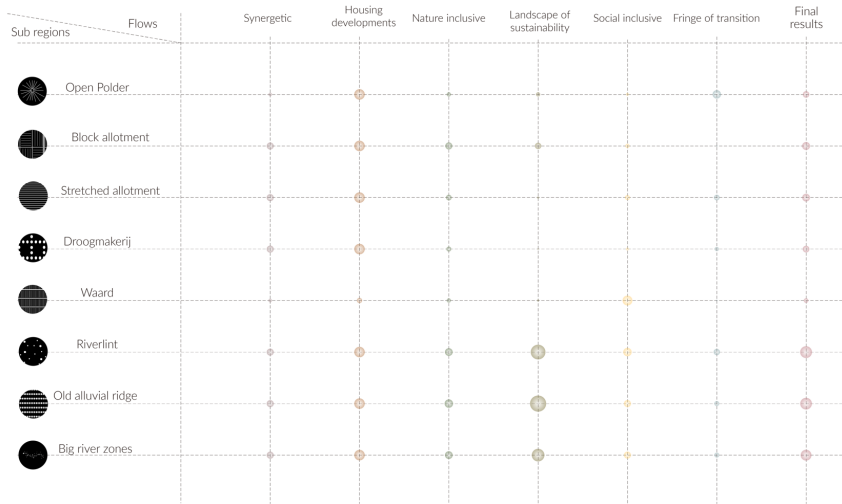
Appendix Phasing



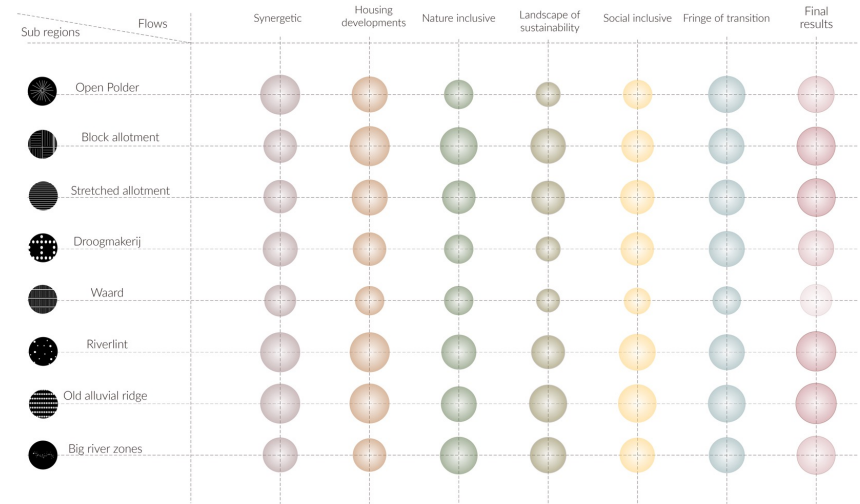
The phasing strategy

Appendix

Evaluation



Evaluation of the current situation.



Evaluation of the future situation.