

ALTAMIRA BEYOND BELO MONTE

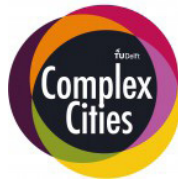
*Gaps and opportunities for promoting
sustainable development in a
new energy landscape*

*P5 Presentation
June 2018*

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2nd mentor: Leo van den Burg

Complex Cities Studio



*Delft University of Technology
Faculty of Architecture and Built Environment
Department of Urbanism
MSc 4 Urbanism*

ALTAMIRA BEYOND BELO MONTE

*Gaps and opportunities for promoting
sustainable development in a
new energy landscape*



Boys playing in a flooded tree

@ Aaron Vincent Elkaim



“An energy landscape is a landscape whose images and functions (be they natural, productive, residential, recreational, cultural, etc.) have been significantly affected by energy development.”

(Frantál et al., 2014)

Derivation canal and the new landscape

@ Marizilda Cruppe

ALTAMIRA



A view from Altamira

@ Dario Bosio

ALTAMIRA



A view from Altamira
@ Dario Bosio

BELO MONTE

3rd largest
hydroelectric powerplant
in the world



The Belo Monte dam
@ Betto Silva

ALTAMIRA



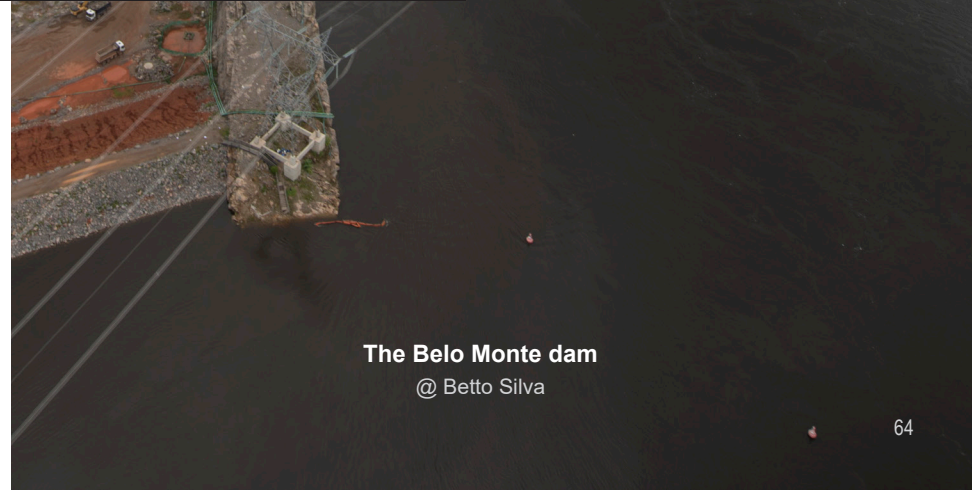
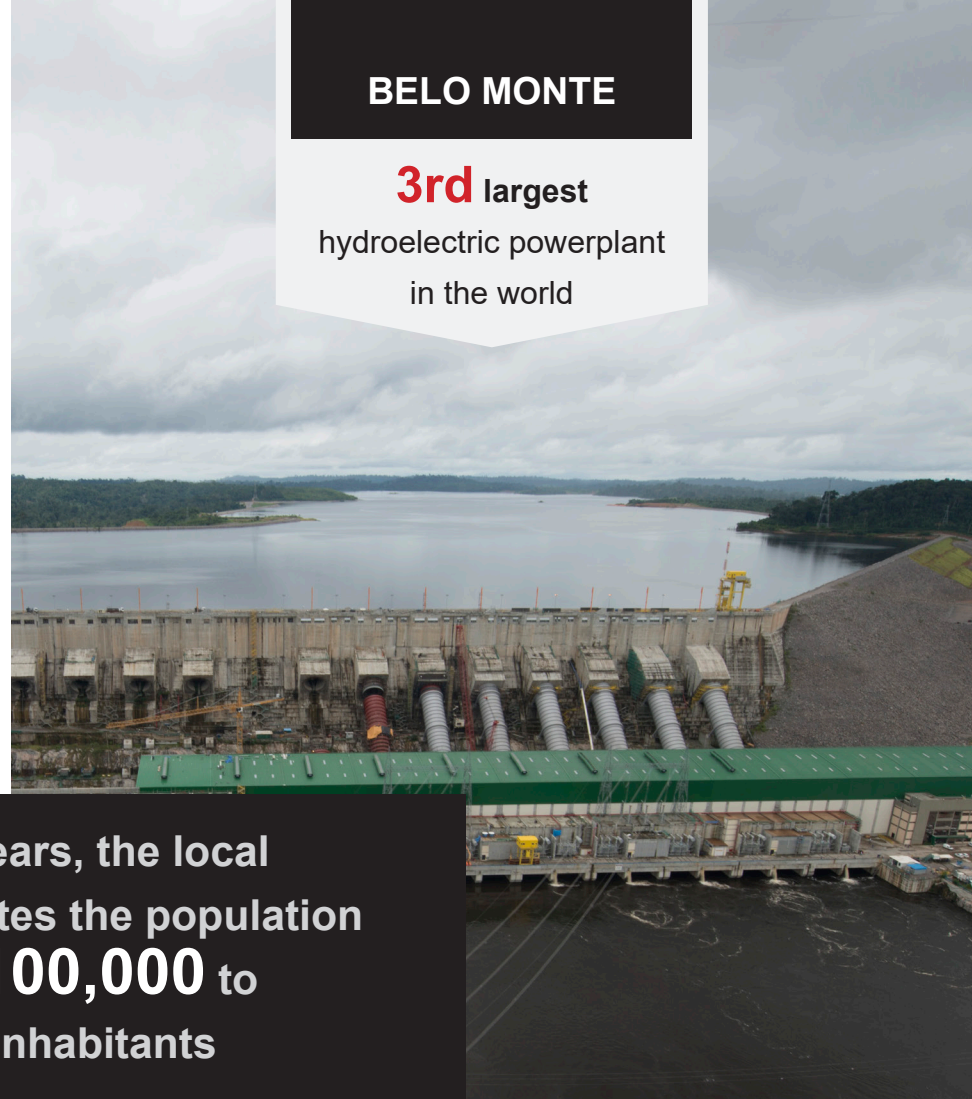
Over past 10 years, the local municipality estimates the population inflated from **100,000** to **140,000** inhabitants



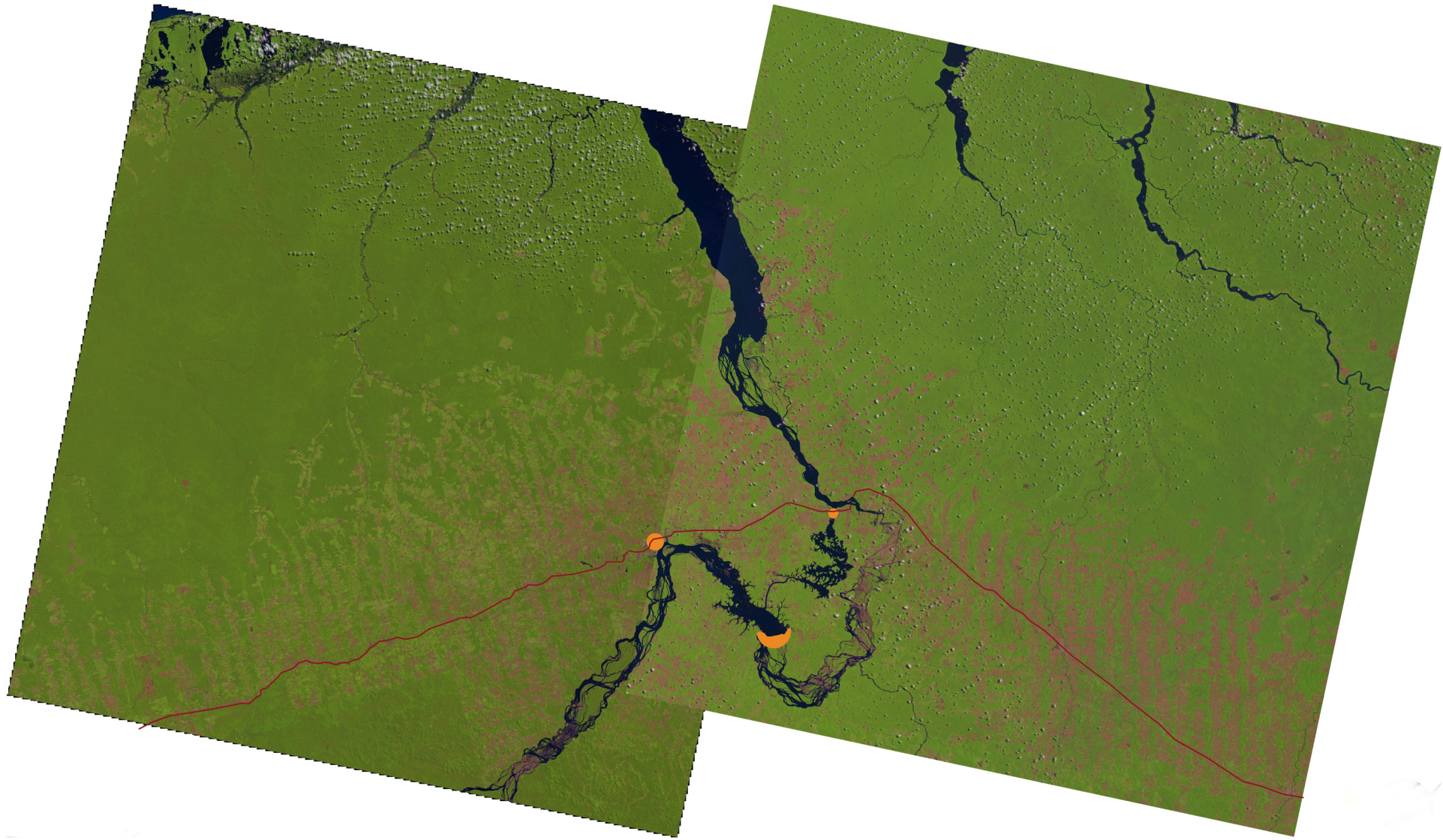
A view from Altamira
@ Dario Bosio

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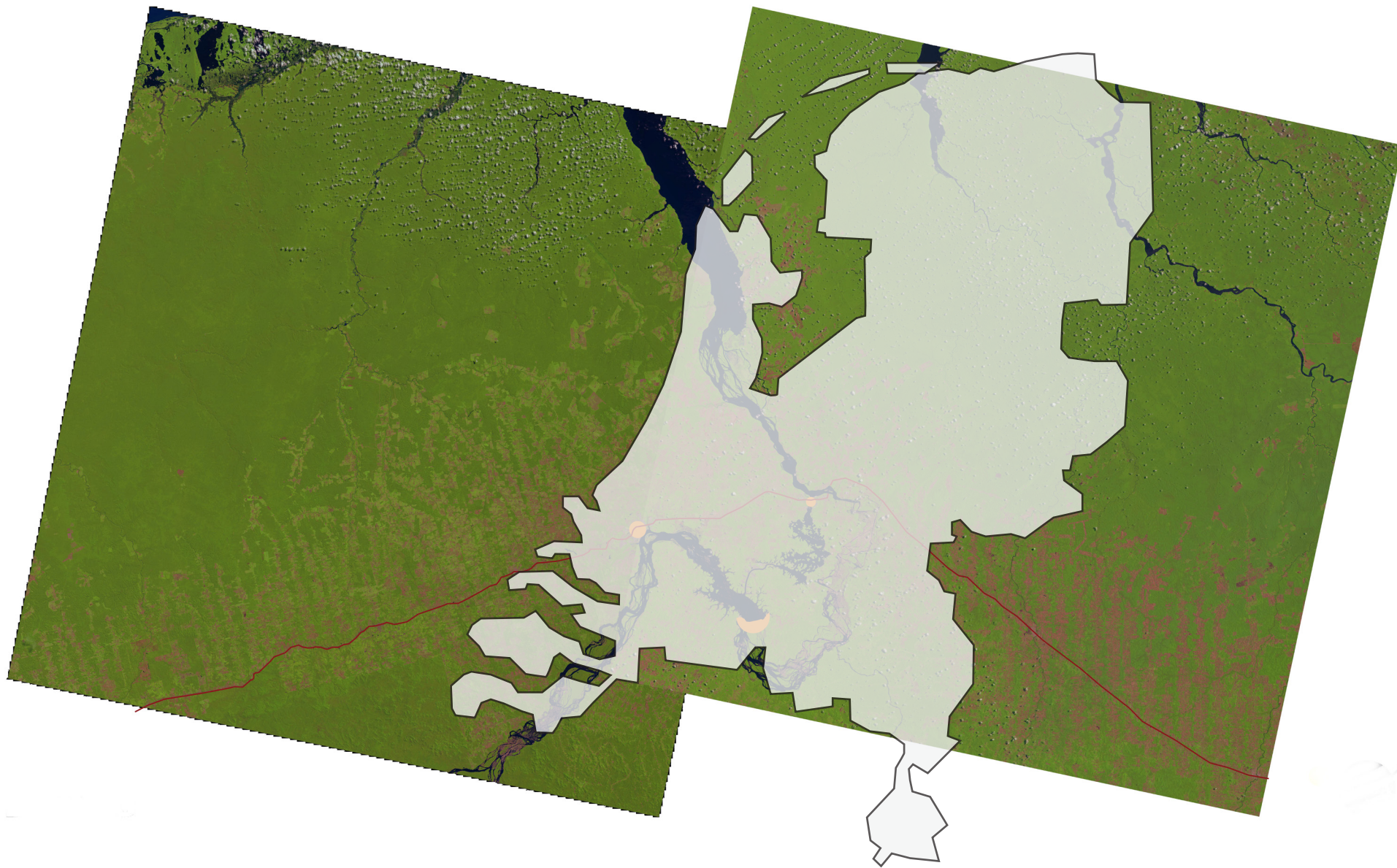


The Belo Monte dam
@ Betto Silva



Altamira, Belo Monte, Xingu river and the Transamazonica highway

@ Landsat 8 (Sep. 2017)



Altamira, Belo Monte, Xingu river and the Transamazonica highway

@ Landsat 8 (Sep. 2017)



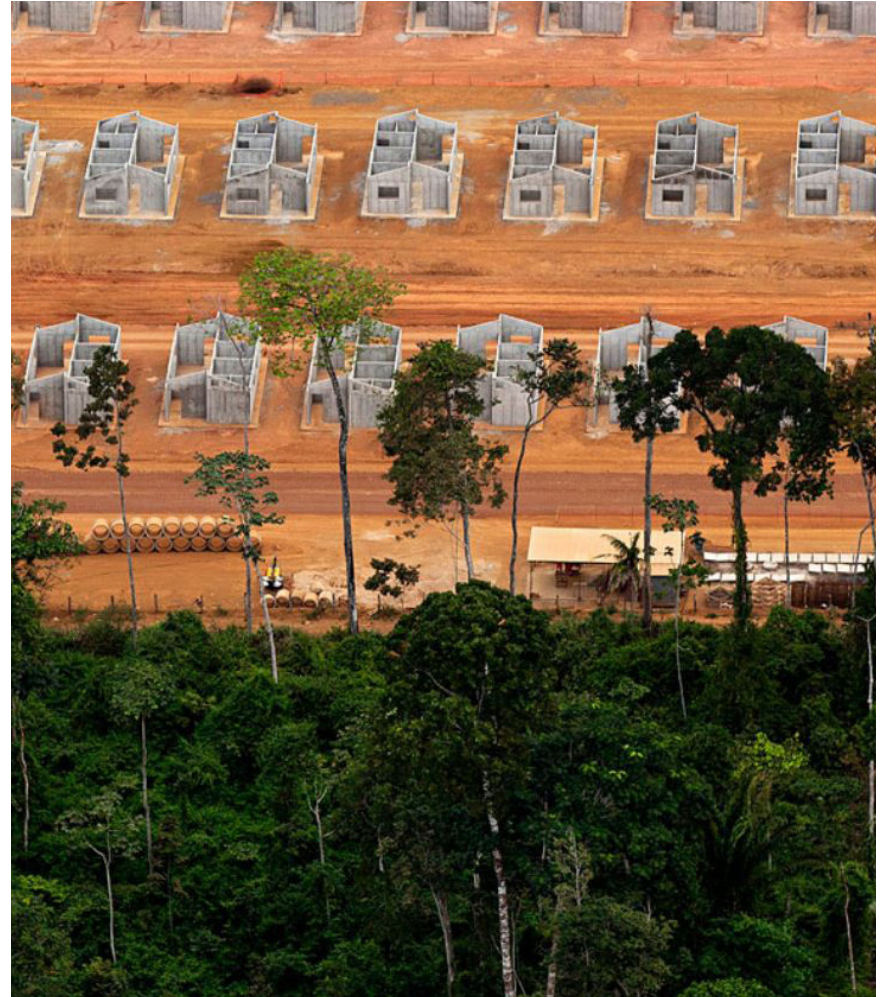
Indigenous leader puts a knife in the face of Belo Monte's chief engineer, in a public hearing in the 1970's

@ Paulo Jares



Informal settlements in the Altamira stream

@ Lalo de Almeida



Construction of new resettlement neighborhoods

@ Lalo de Almeida



Local fishermen, traditional practices

@ Lalo de Almeida



New neighborhoods, located on the outskirts

@ Marizilda Cruppe



Spread of waste over the city

@ Taylor Weidman



Provision of waste treatment infrastructure

@ Lalo de Almeida



Increased violence in Altamira

@ Tommaso Protti



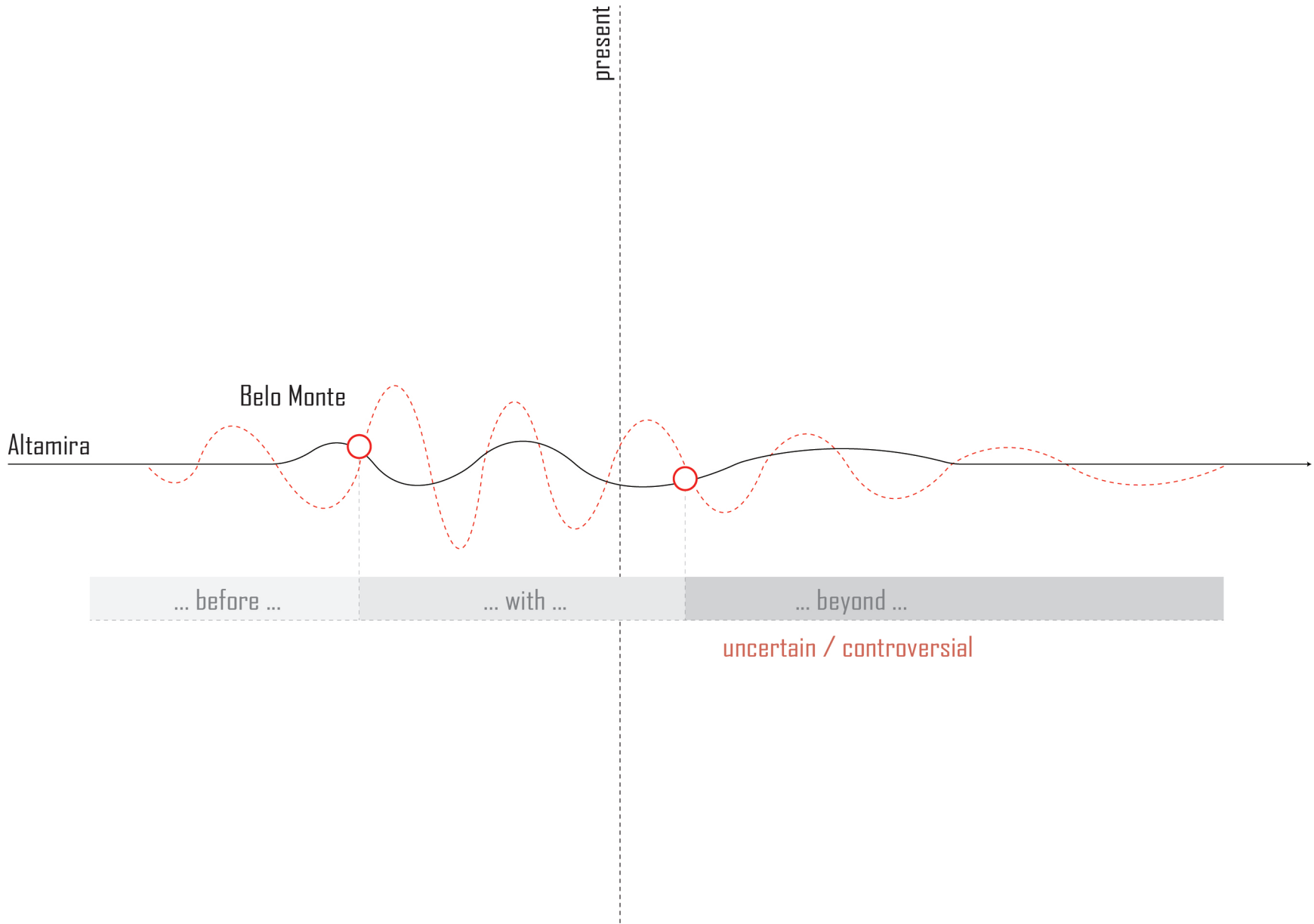
Inflated jobs opportunities

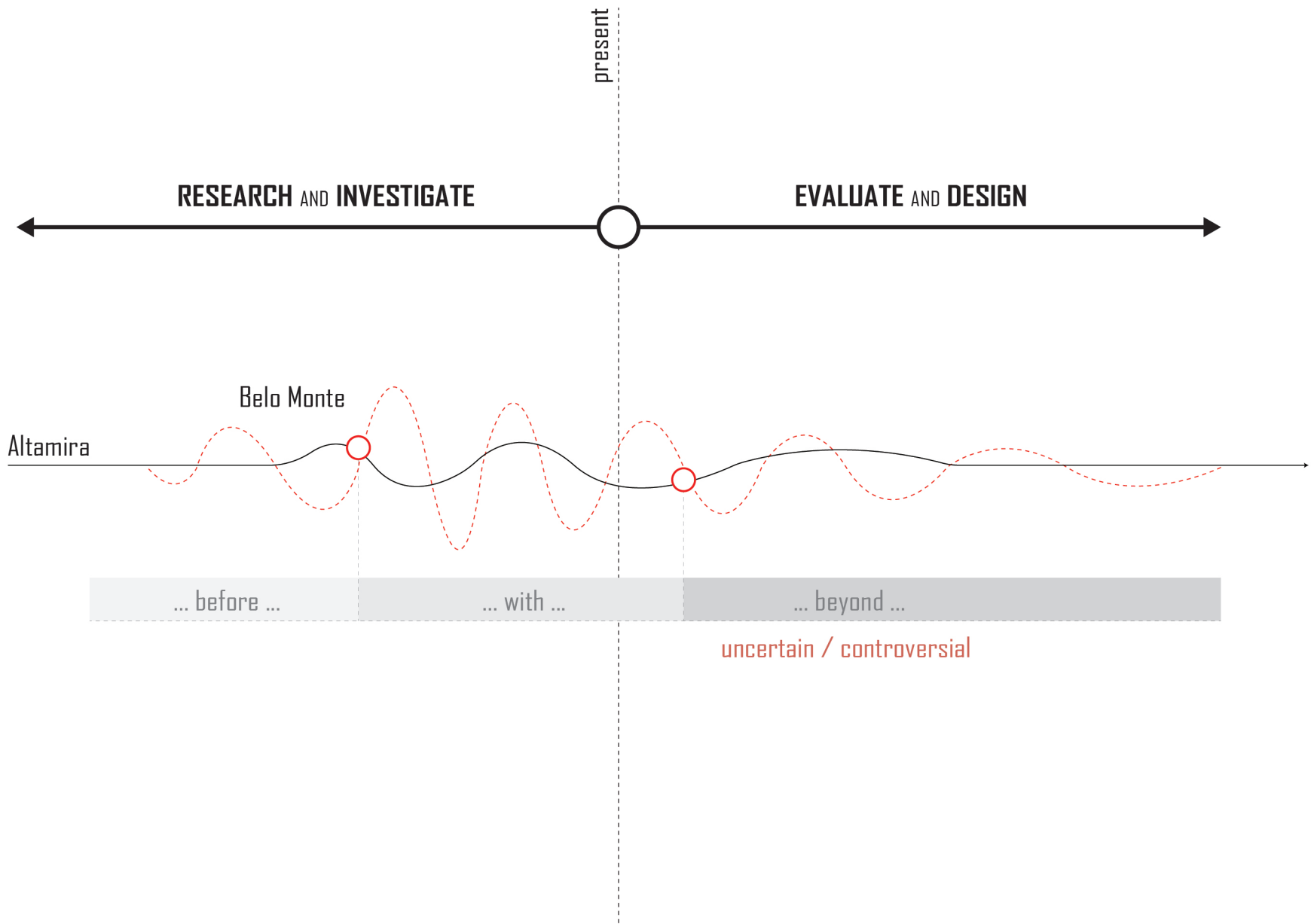
@ Dario Bosio

Considering the **new development dynamic** of Altamira, is the model created by the compensation and mitigation guidelines resilient, capable of accommodating future transformations and **promoting sustainable development?**

new resettlement neighborhood, under construction

@ Lalo de Almeida









THEORETICAL FRAMEWORK

definition of [4] key factors

01. Population

migration and population figures

urban fabric & growth

neighborhoods & typologies



a crowd in the streets

@ Tommaso Protti

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migration and population figures
urban fabric & growth
neighborhoods & typologies



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02. Public Resources

GDP variations
governance & management
infrastructure & public space



indigenous tribe participates in public hearing

@ Aaron Vincent Elkaim

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indigenous tribe participates in public hearing
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03. Jobs & Income

employment & economic activities
land use & real estate
property & typologies



local inhabitants fishing
@ Aaron Vincent Elkaim

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local inhabitants fishing

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04. Health & Education

public equipment
accessibility



school in indigenous tribe

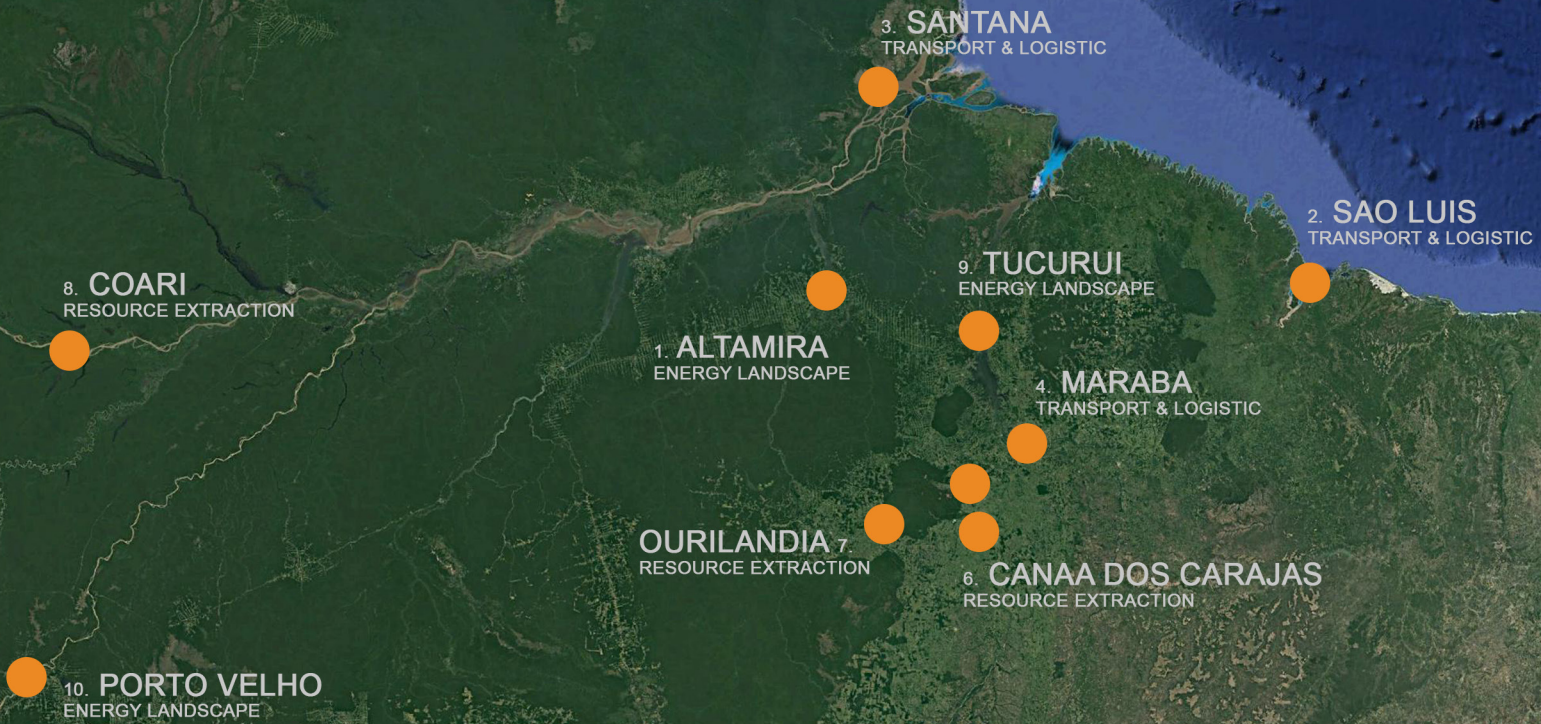
@ Betto Silva



1. ALTAMIRA
ENERGY LANDSCAPE

THEORETICAL FRAMEWORK

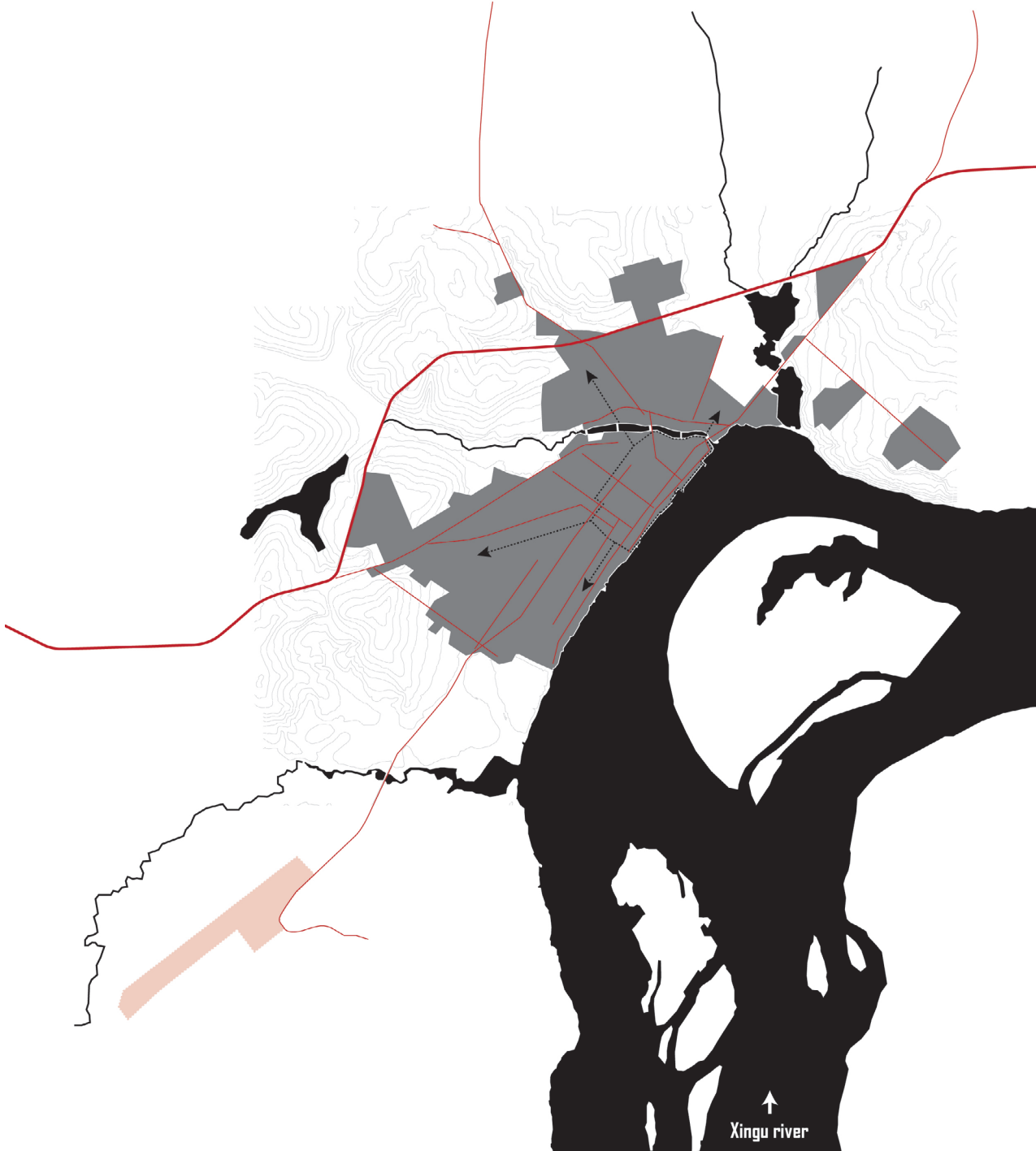
case studies



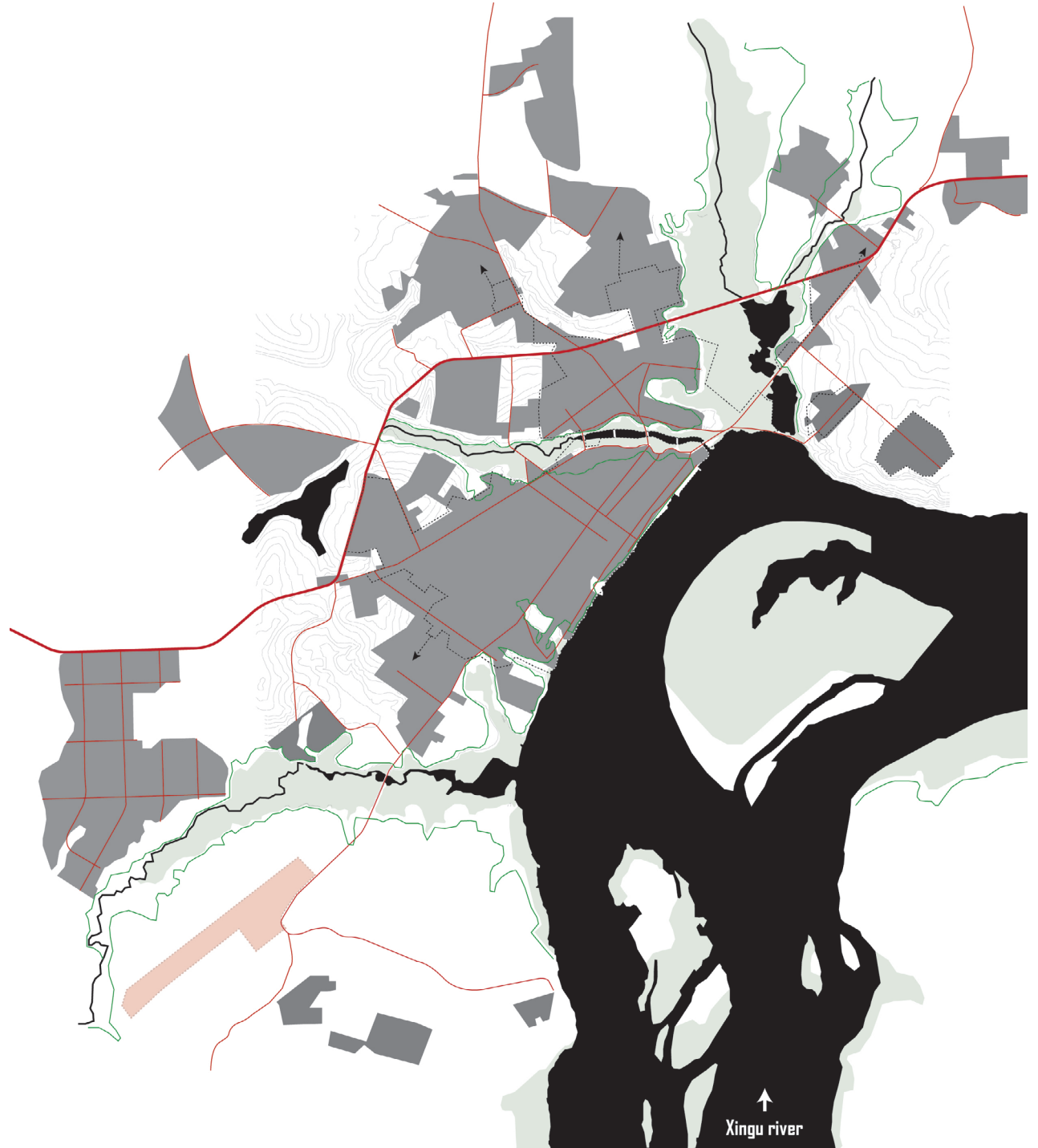
4/6







SPATIAL AND SCENARIO ANALYSIS
socio-spatial transformations in Altamira

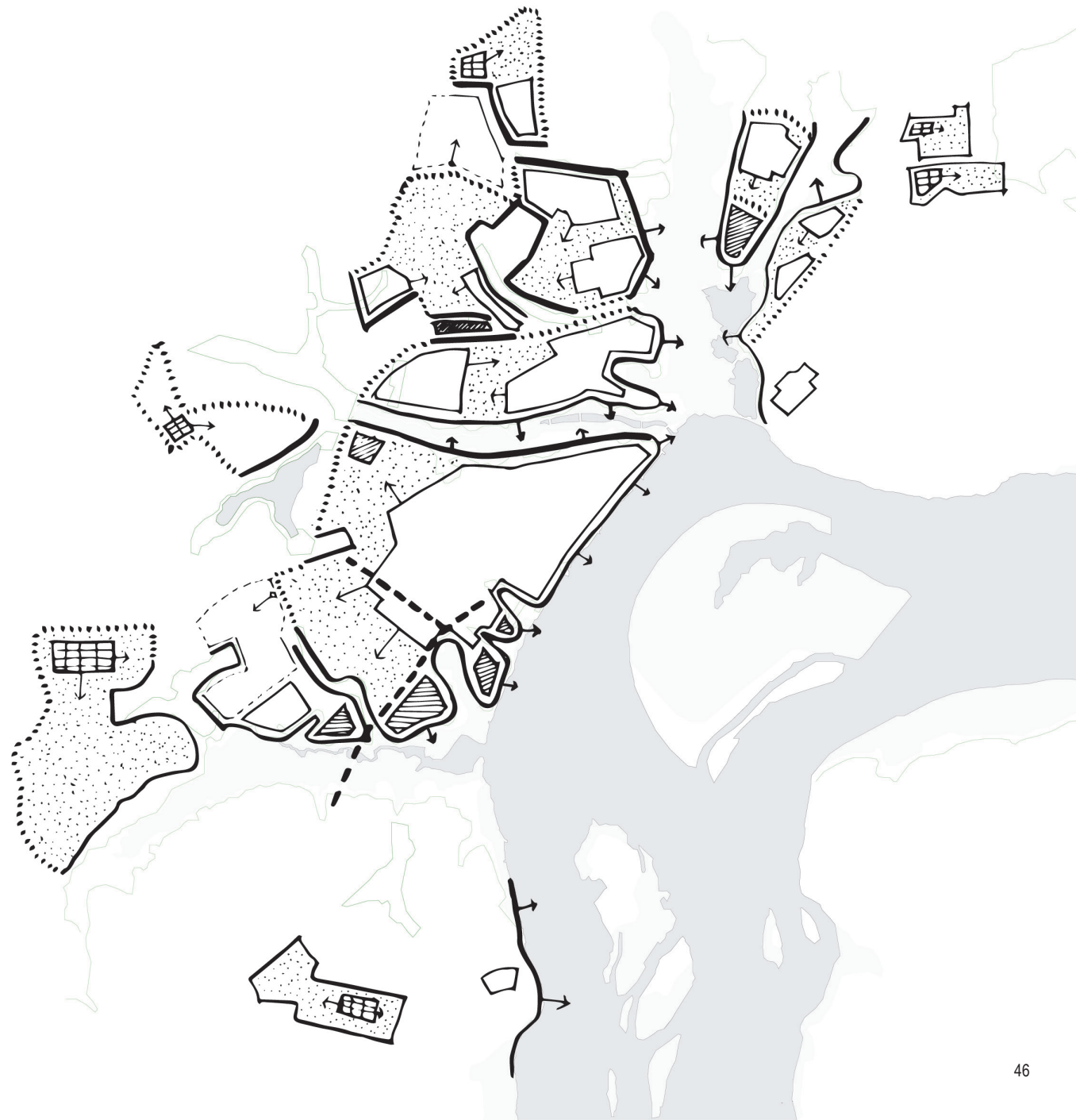









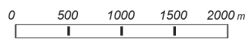
SPATIAL AND SCENARIO ANALYSIS

socio-spatial transformations in Altamira

Population Principles



-  hard boundaries
-  soft boundaries
-  densification of existing urban tissue
-  risk areas, special attention
-  nodes for densification

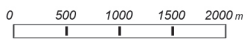


SPATIAL AND SCENARIO ANALYSIS

socio-spatial transformations in Altamira

Public Res. + Health & Edu. Principles

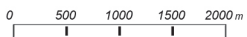
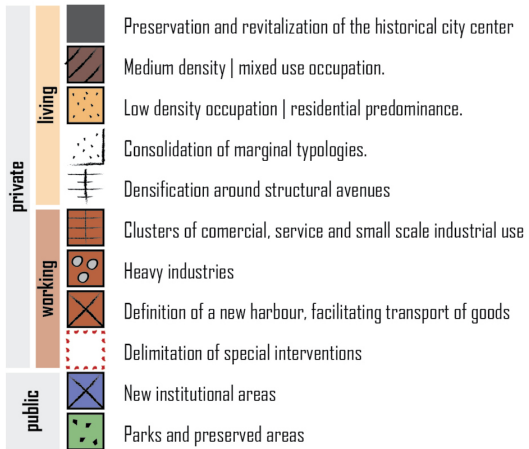
- proposed waterfront road network
- - - private occupation hampering waterfront accessibility
- delimitation of parks and preserved areas
- ↻ roundabouts and primary connections across the transamazonica highway
- /// interruption of secondary connections to the transamazonica
- new and reinforced axis for connected city



SPATIAL AND SCENARIO ANALYSIS

socio-spatial transformations in Altamira

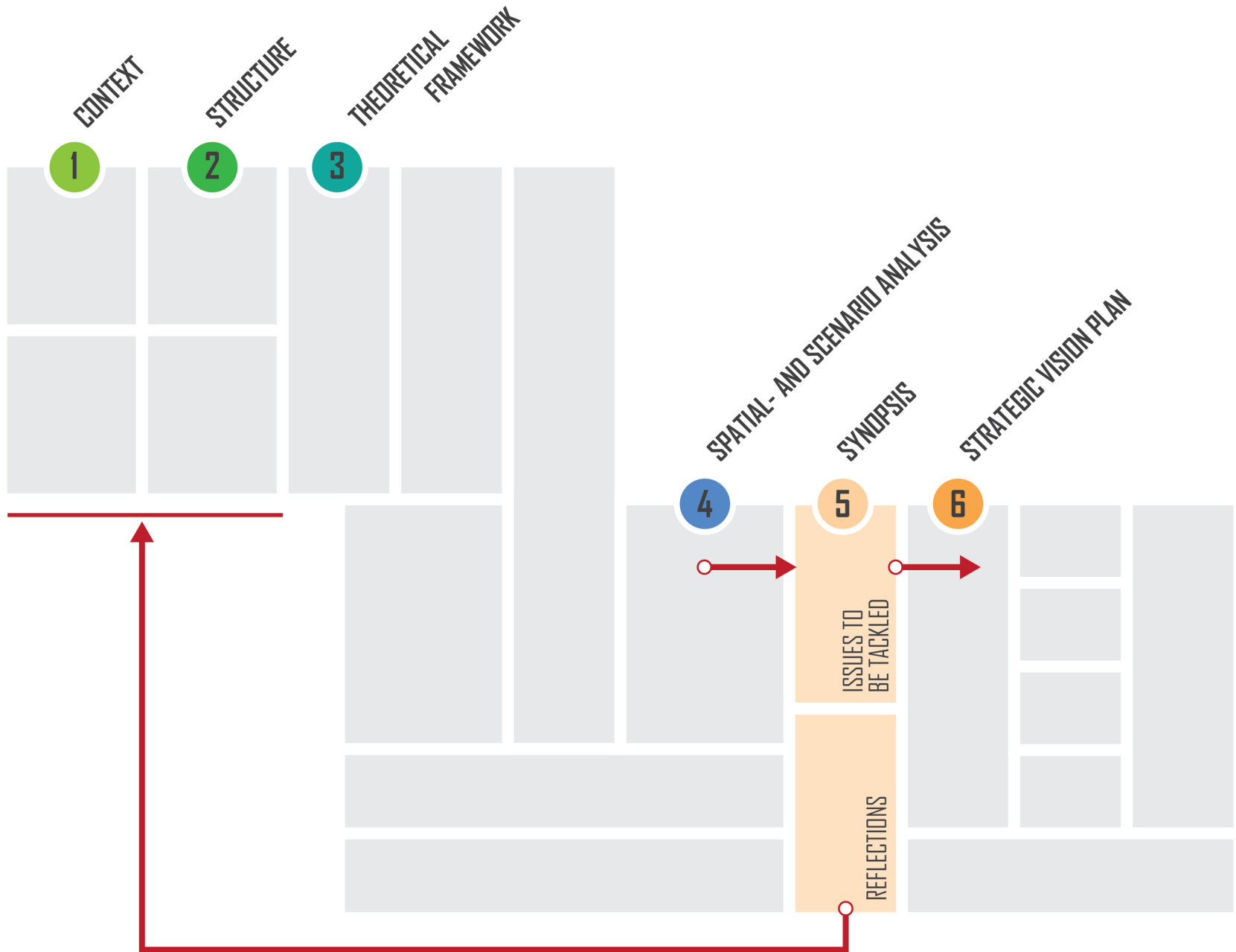
Jobs & Income Principles



5/6



@ the author



SYNOPSIS

[5] issues to be tackled



1. Intensity of the construction process and migratory flows

@ Lalo de Almeida

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[5] issues to be tackled



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2. The natural environment and productive practices

@ Aaron Vincent Elkaim

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3. Land-use and urban expansion

@ Betto Silva



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4. Society, local communities and inclusiveness

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5. Governance and public management

@ Lalo de Almeida



2. The natural environment and productive practices

@ Aaron Vincent Elkaim



4. Society, local communities and inclusiveness

@ Aaron Vincent Elkaim

Up to what extent is the **current dynamic of development**, promoted by the construction of the Belo Monte dam and mitigation guidelines, **resulting in a resilient model** for Altamira, capable of **promoting sustainable development ...**



Boys playing in a stream in Altamira

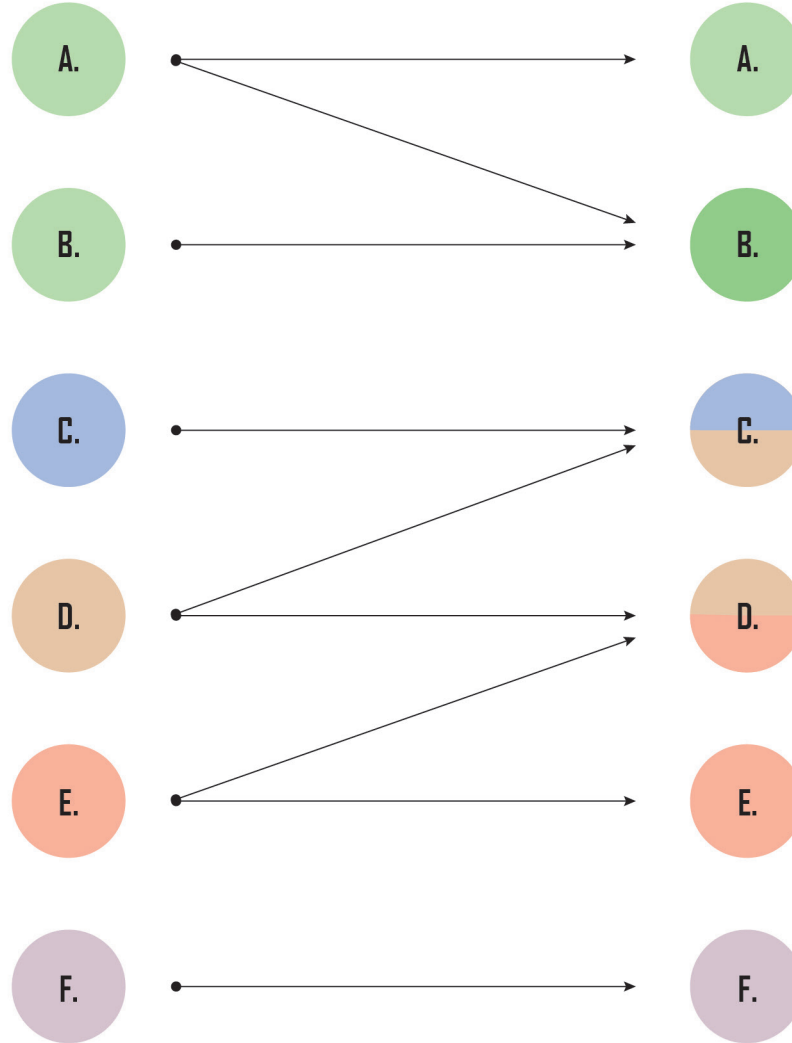
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SYNOPSIS

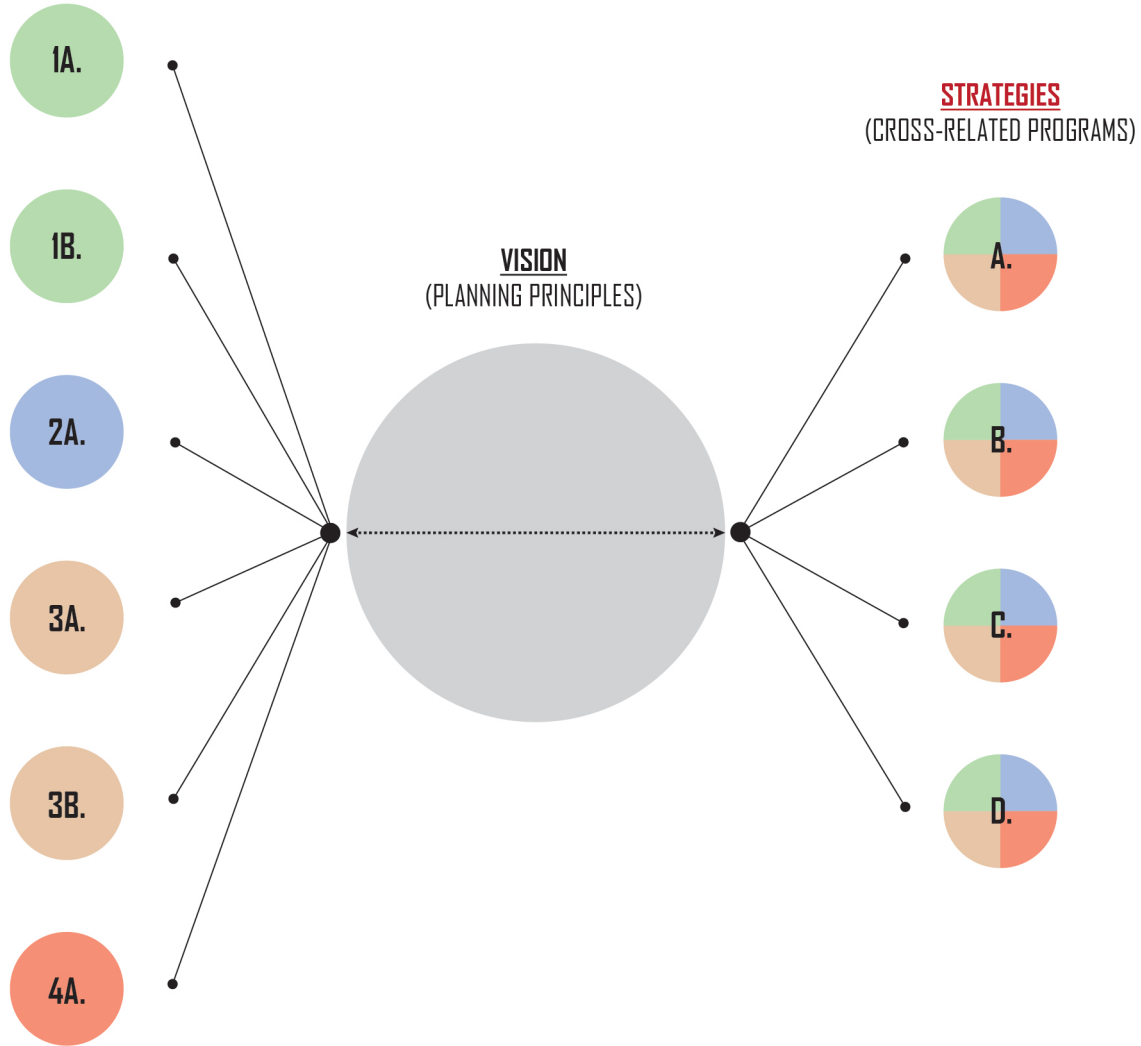
current planning approach

PROBLEM FIELD
(IMPACTS)

SOLUTIONS
(PROGRAMS & PROJECTS)



NEW URBAN CHALLENGES



... how can **strategies and policies** be used to further explore the economic potential generated, stimulating growth while minimizing possible risks?

6/6



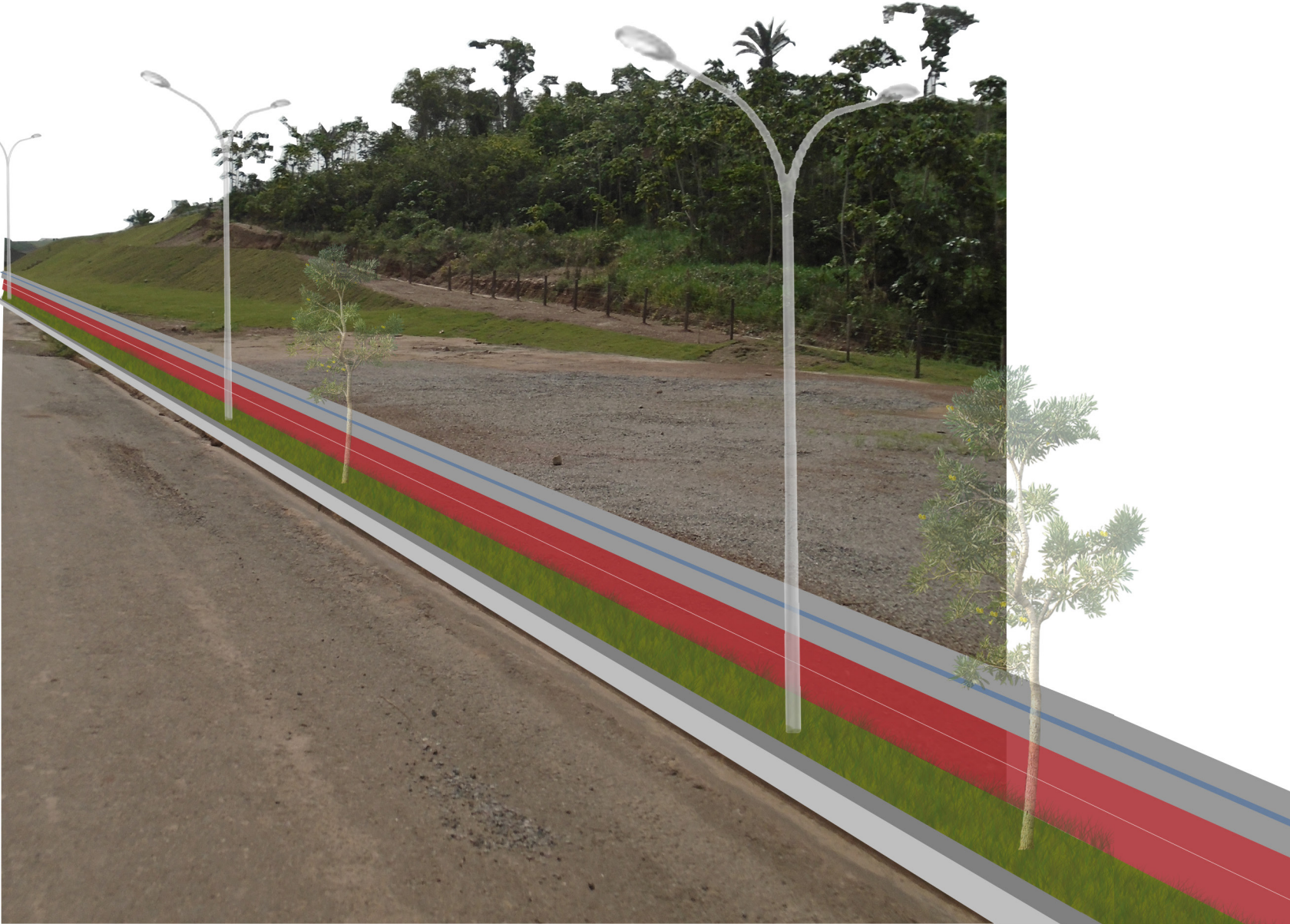
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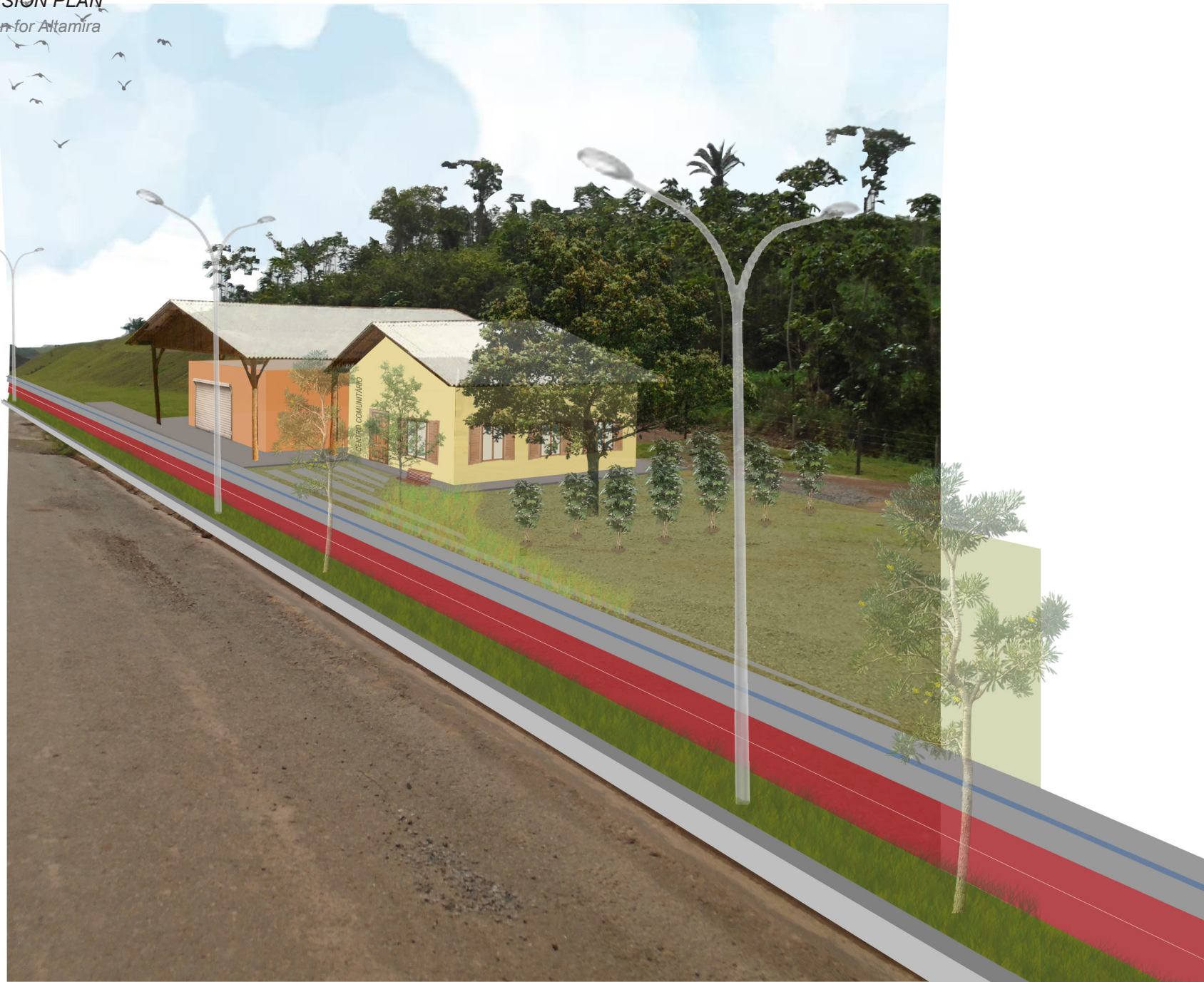


STRATEGIC VISION PLAN

vision for Altamira

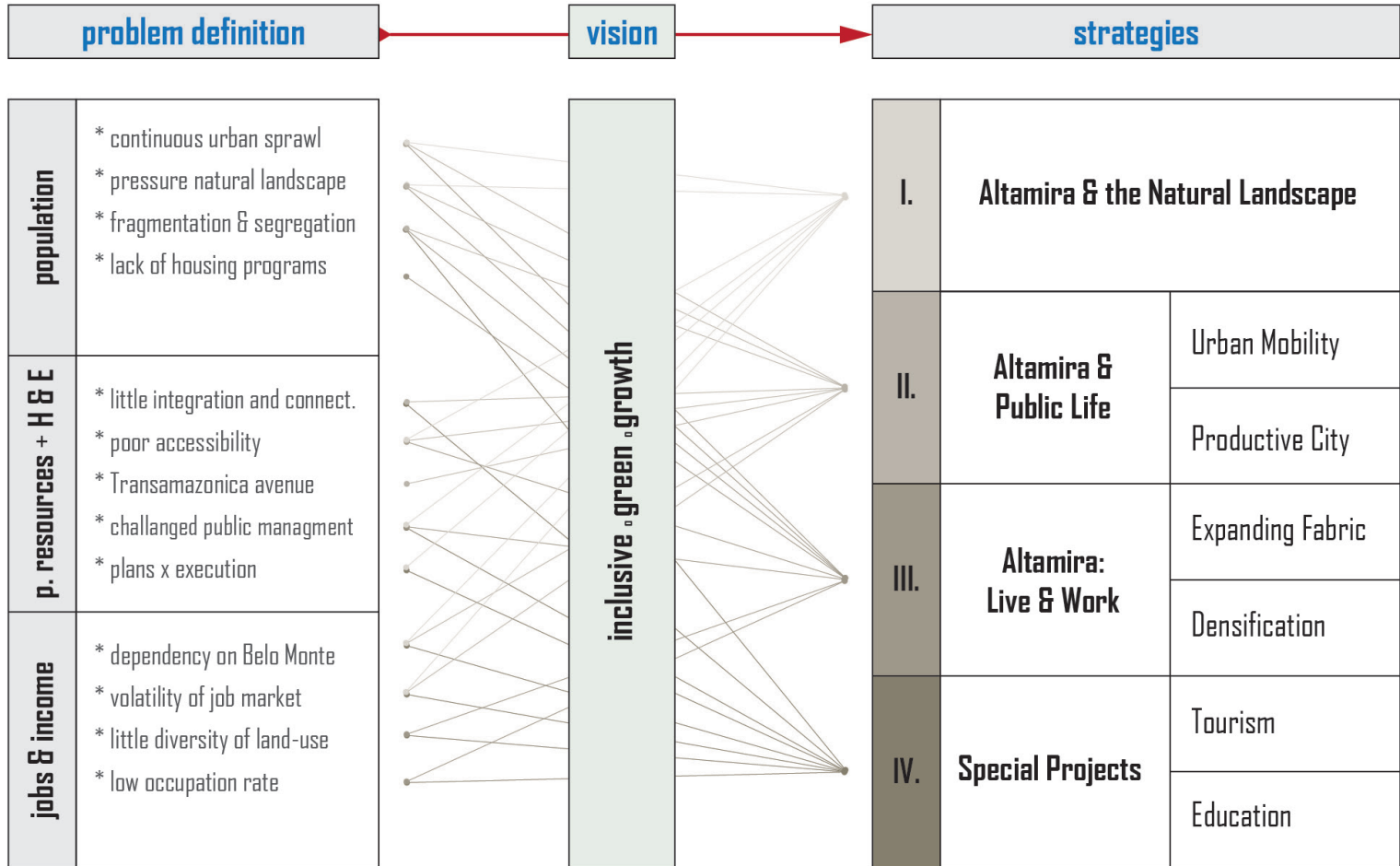


STRATEGIC VISION PLAN
vision for Altamira



STRATEGIC VISION PLAN
vision for Altamira





strategy |

ALTAMIRA & THE NATURAL LANDSCAPE

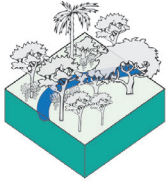


Vegetation condition next to the Transamazonica highway

@ Coen Wubbels

riparian vegetation

Vegetation next to streams and river, inside the APP's (protected areas).



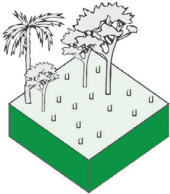
lry and Zry vegetations

Dense ombrophilous forest. Large biodiversity.



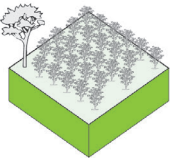
regeneration landscape

Reestablishment of vegetation or increase tree cover through natural or assisted processes.



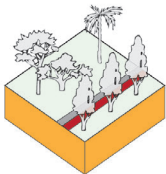
agriculture land

Productive fiels surrounding the urban areas. Some might considered degraded lands.



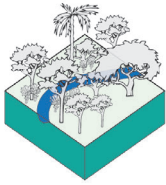
parks & leisure

Designed landscape for public use of the population of Altamira



riparian vegetation

Vegetation next to streams and river, inside the APP's (protected areas).



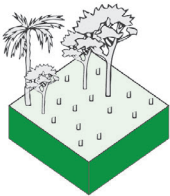
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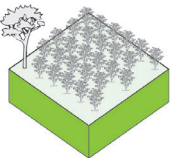
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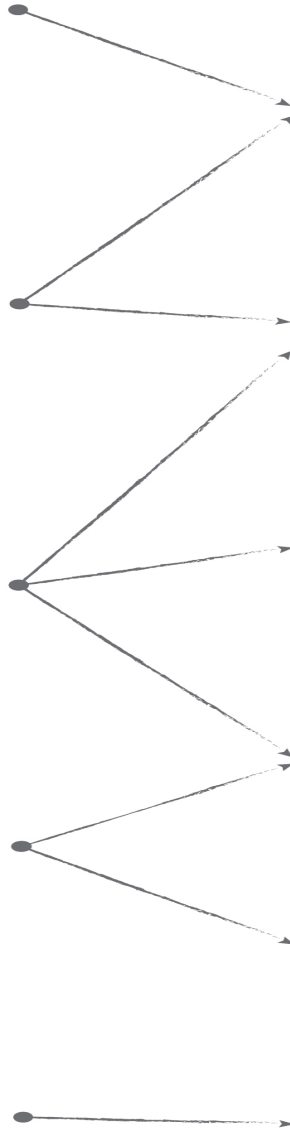
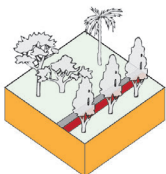
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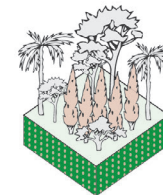
non-productive vegetation

Preserved and protected areas, without human extraction and activities



extractivism

Extraction and use of natural resources produced in the forest in small scale practices. Also ensures preservation and maintenance of the vegetation.



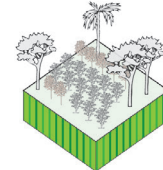
wood agroforestry

Production system integrating crop and forest components through a combination of tree species. Products imply a reduction (temporary) of forest biomass.



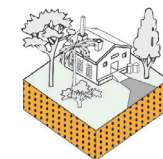
non-wood agroforestry

Production system integrating crop and forest components through a combination of agricultural crops. Products do not affect the standing forest. Focus on native species.



rotative agriculture

combination of permanent and temporary crops, ensuring rotativity of production and nutrients, preserving the fertility of the soil.



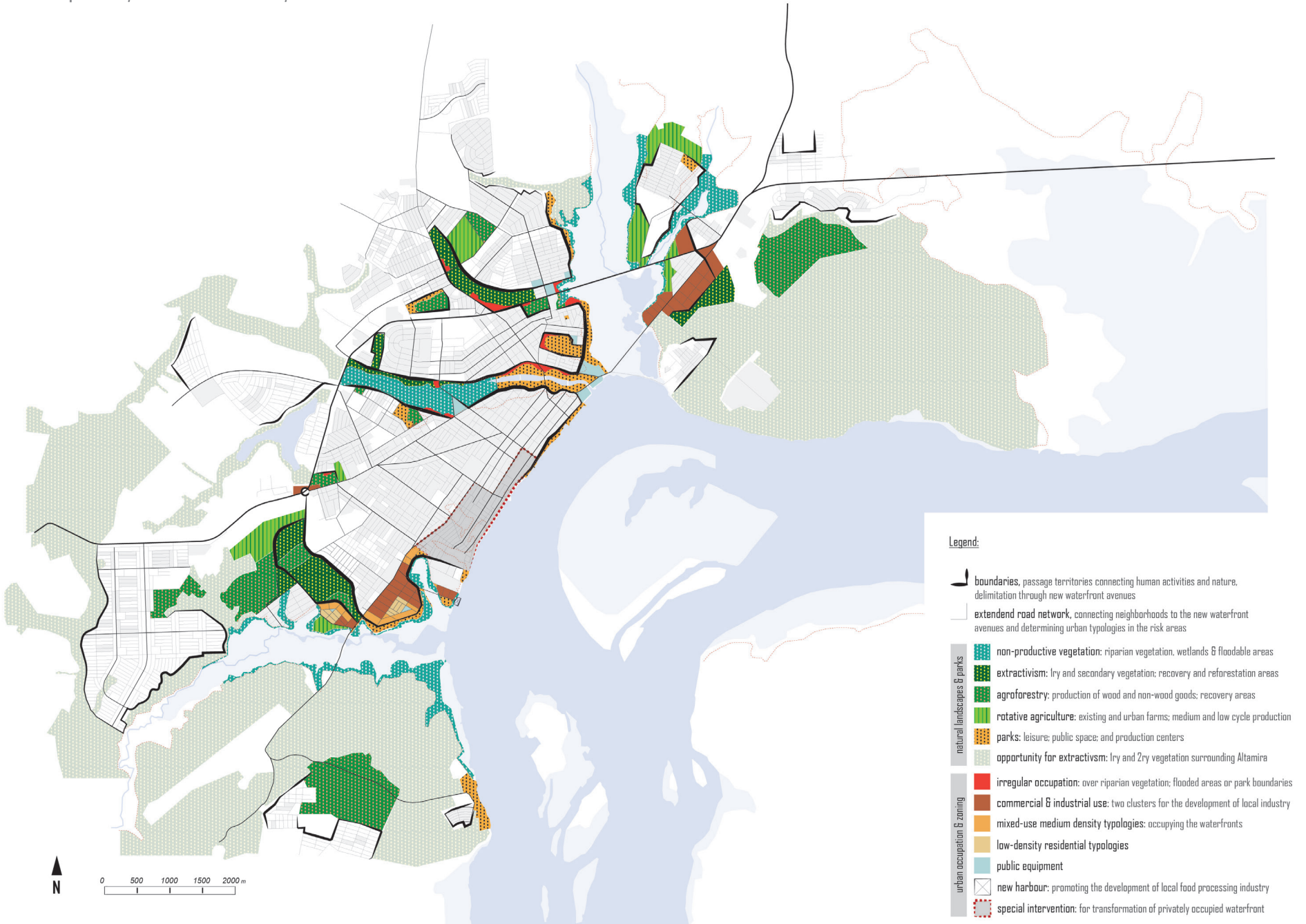
production centers

community centers for maintenance, gathering, selecting, connecting, learning, preserving and so on...

long cycles [+ 50 years]

medium cycles [+ 15 years]

short cycles [seasonal or - 15 years]



Legend:

- boundaries, passage territories connecting human activities and nature, delimitation through new waterfront avenues
- extend road network, connecting neighborhoods to the new waterfront avenues and determining urban typologies in the risk areas
- natural landscapes & parks**
 - non-productive vegetation: riparian vegetation, wetlands & floodable areas
 - extractivism: 1ry and secondary vegetation; recovery and reforestation areas
 - agroforestry: production of wood and non-wood goods; recovery areas
 - rotative agriculture: existing and urban farms; medium and low cycle production
 - parks: leisure; public space; and production centers
 - opportunity for extractivism: 1ry and 2ry vegetation surrounding Altamira
- urban occupation & zoning**
 - irregular occupation: over riparian vegetation; flooded areas or park boundaries
 - commercial & industrial use: two clusters for the development of local industry
 - mixed-use medium density typologies: occupying the waterfronts
 - low-density residential typologies
 - public equipment
 - new harbour: promoting the development of local food processing industry
 - special intervention: for transformation of privately occupied waterfront

strategy 2

ALTAMIRA & PUBLIC LIFE












the Xingu river, distant and isolated by private properties

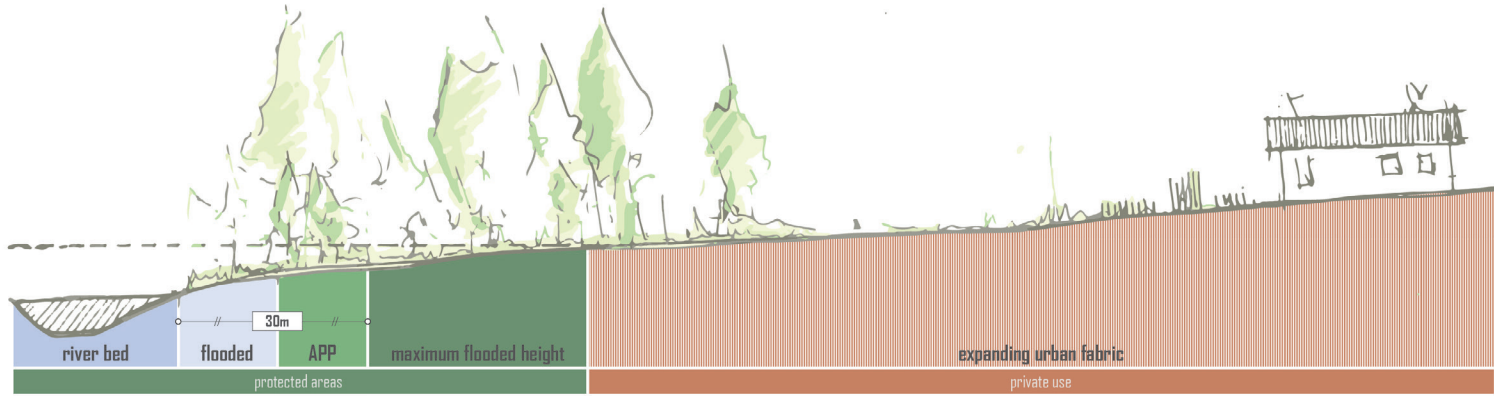
@ the author



Legend:

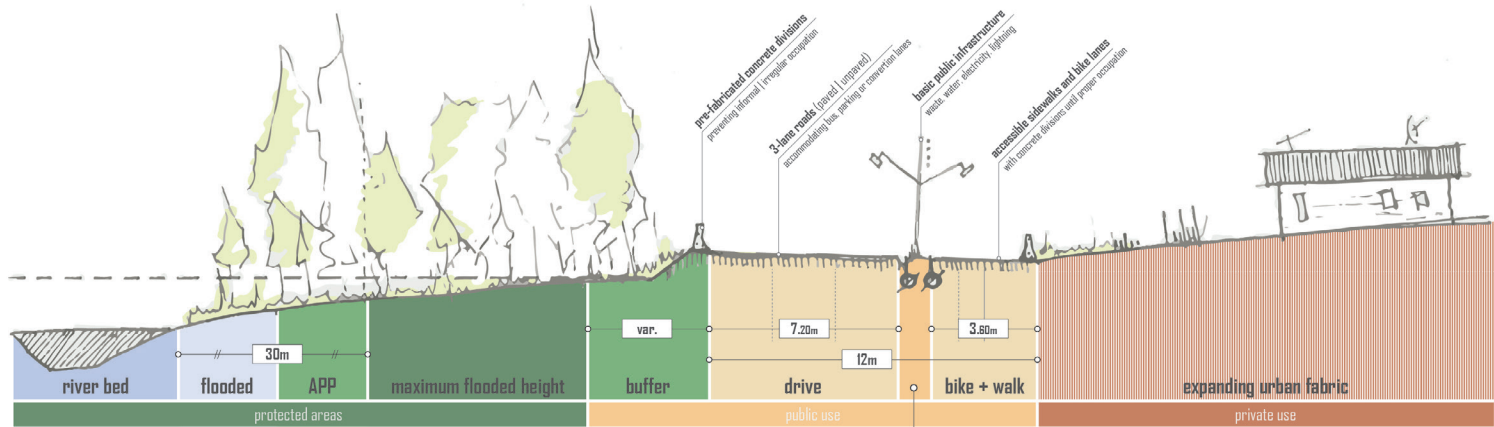
-  structural avenues and interventions, including new waterfront system
-  primary roads, connecting multiple neighborhoods
-  secondary roads, between different neighborhoods
-  local interventions, for improving local connectivity
-  new roads and connections, to be constructed
-  Transamazonica nodes & intersections
-  Cul-de-sac, limiting connections to the Transamazonica highway
-  informal occupations along the Transamazonica, to be regularized
-  possible site for heavy industry, along the Transamazonica highway





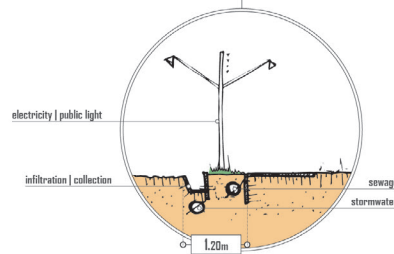
current waterfront occupation and land-use

private properties and urban allotments bordering protected areas



proposed waterfront roads and occupation

public roads in the boundaries between private allotments and preserved areas, ensuring access to the waterfront

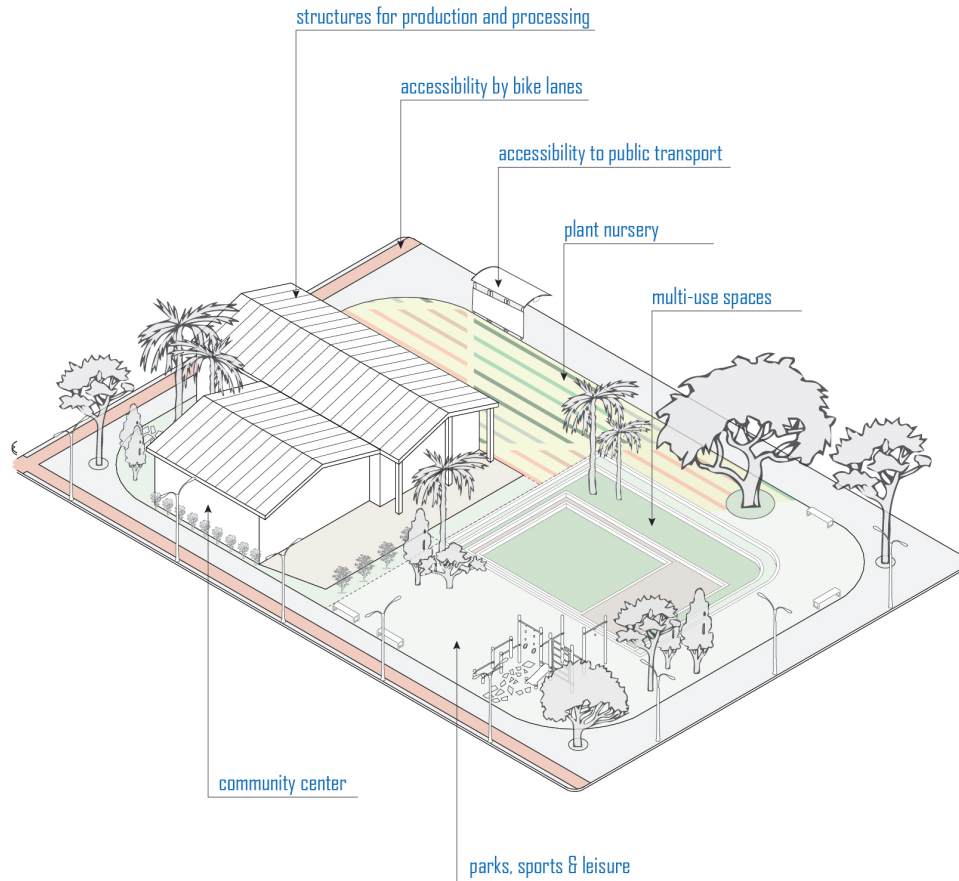


STRATEGIC VISION PLAN
S2 | New marginal avenues

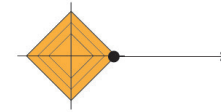




New “parks” of Altamira
@ the author



**multi-sector
management team**



- * public representatives
- * businesses | investors
- * NGO's | institutions
- * community represent.



coffee



cacau



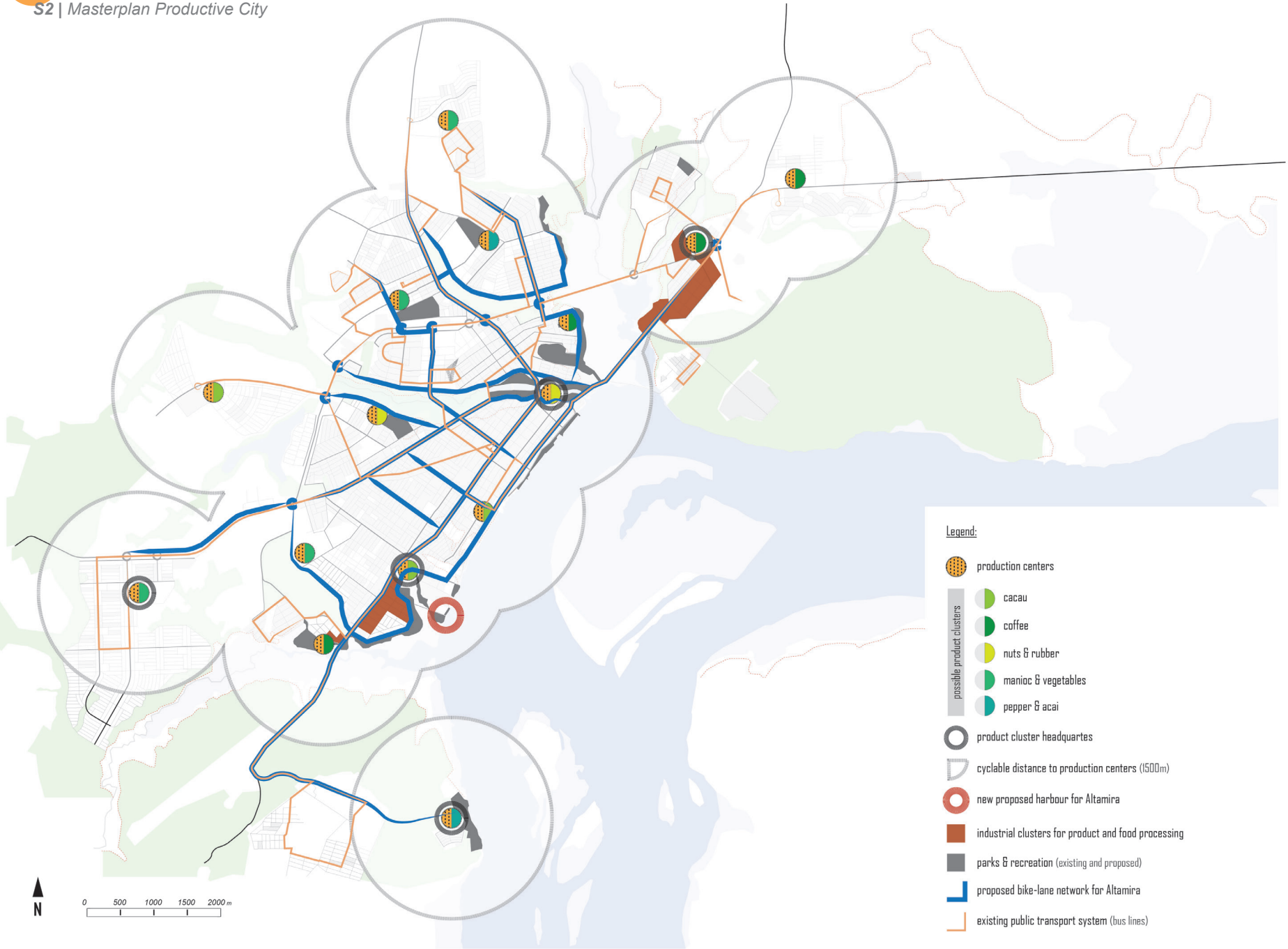
nuts
















manioc

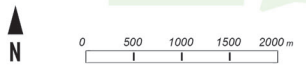


acai |
pepper



Legend:

-  production centers
-  cacao
-  coffee
-  nuts & rubber
-  manioc & vegetables
-  pepper & acai
-  product cluster headquarters
-  cyclable distance to production centers (1500m)
-  new proposed harbour for Altamira
-  industrial clusters for product and food processing
-  parks & recreation (existing and proposed)
-  proposed bike-lane network for Altamira
-  existing public transport system (bus lines)



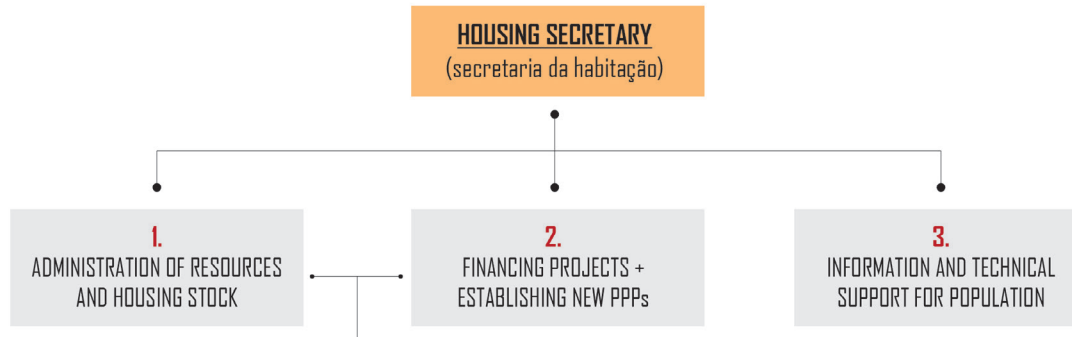
strategy 3

ALTAMIRA, LIVE & WORK

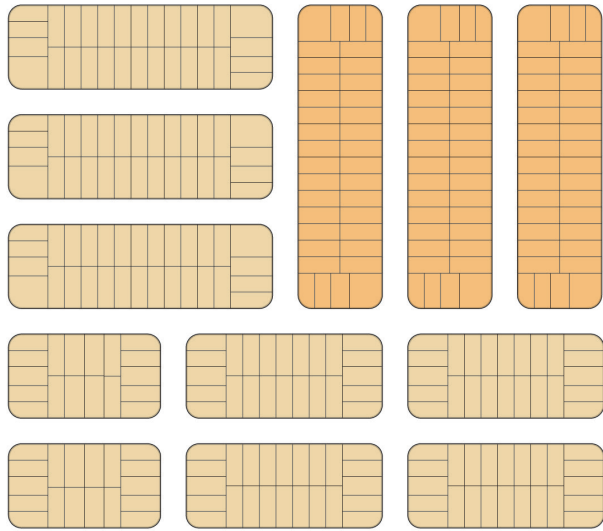


Government financed housing project

@ the author

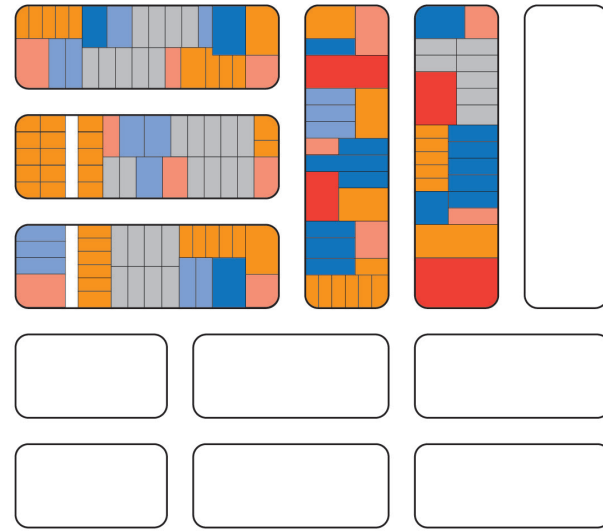


AVERAGE CITY BLOCK [2:1 | 3:1]
 CURRENT ZONING STRATEGIES



AVERAGE URBAN PLOT [10M X 25M]

AVERAGE CITY BLOCK [2:1 | 3:1]
 PROPOSED ZONING STRATEGIES



MULTIPLE PLOT SIZES



STRATEGIC VISION PLAN

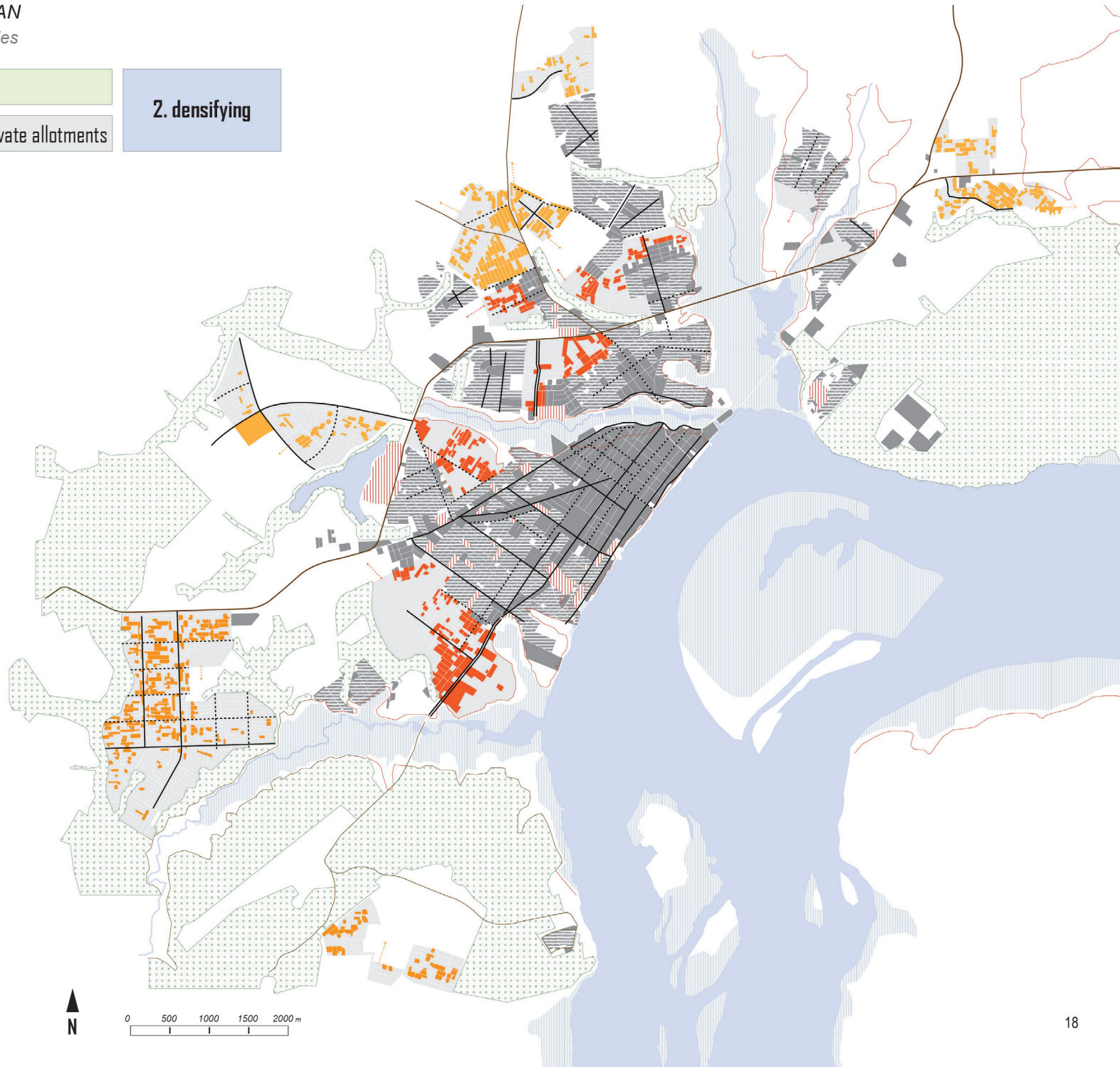
S3 | Urban Typologies

1. expanding

a. urban allotments

b. private allotments

2. densifying



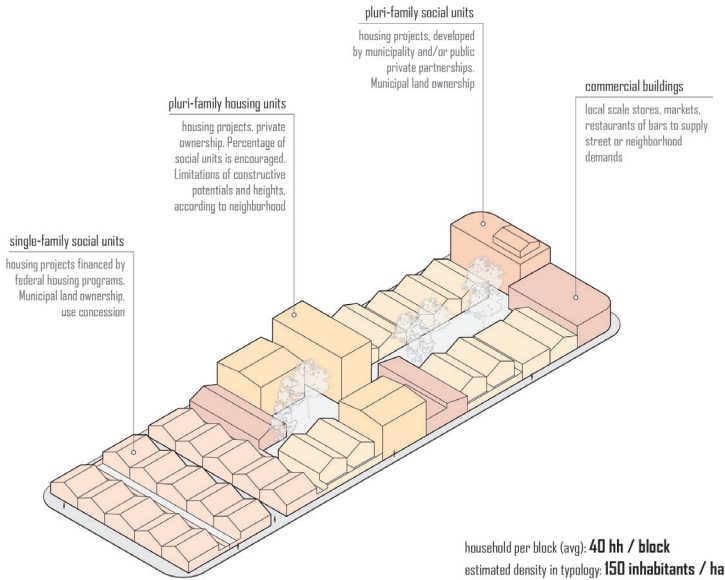
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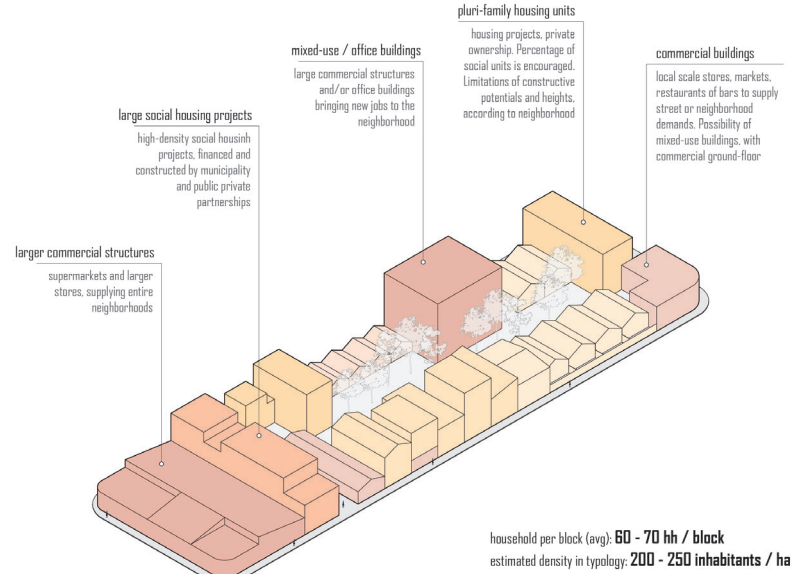
Low density residential typology



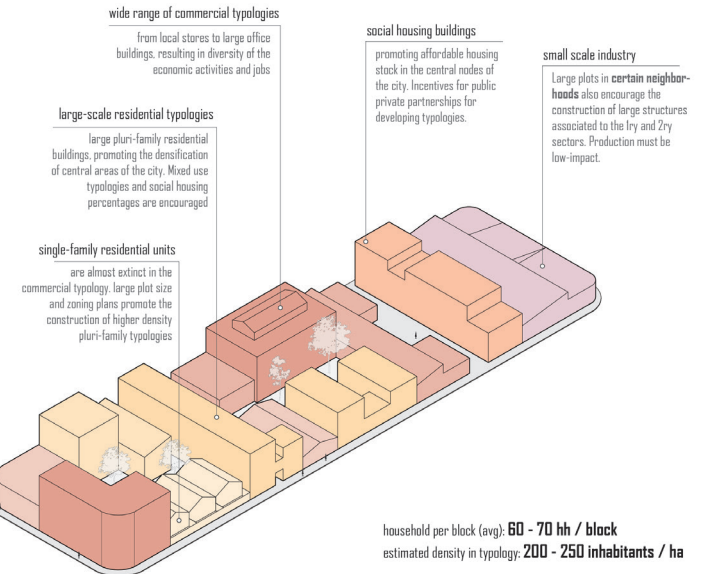
legend:

social h.	Single-family units
	Pluri-family unit, medium density
	Pluri-family unit, large structures
res.	Single-family units
	Pluri-family unit, medium density
	Pluri-family unit, large structures
com.	Local market and stores
	Neighborhood-scale commercial use and offices
	Larger structures, city and region scales
ind.	Local industry, low impact
	Heavy industry

Medium density mixed-use typology



Medium density commercial typology



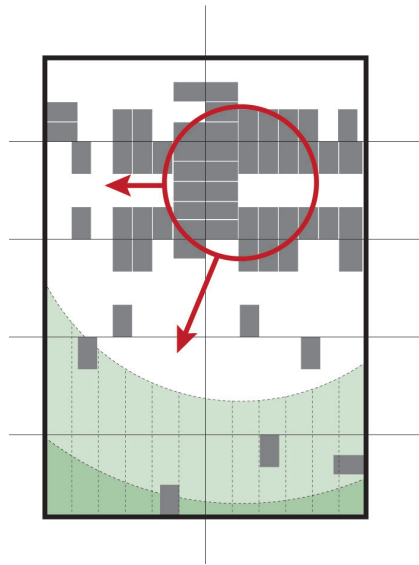
1. expanding

a. urban allotments

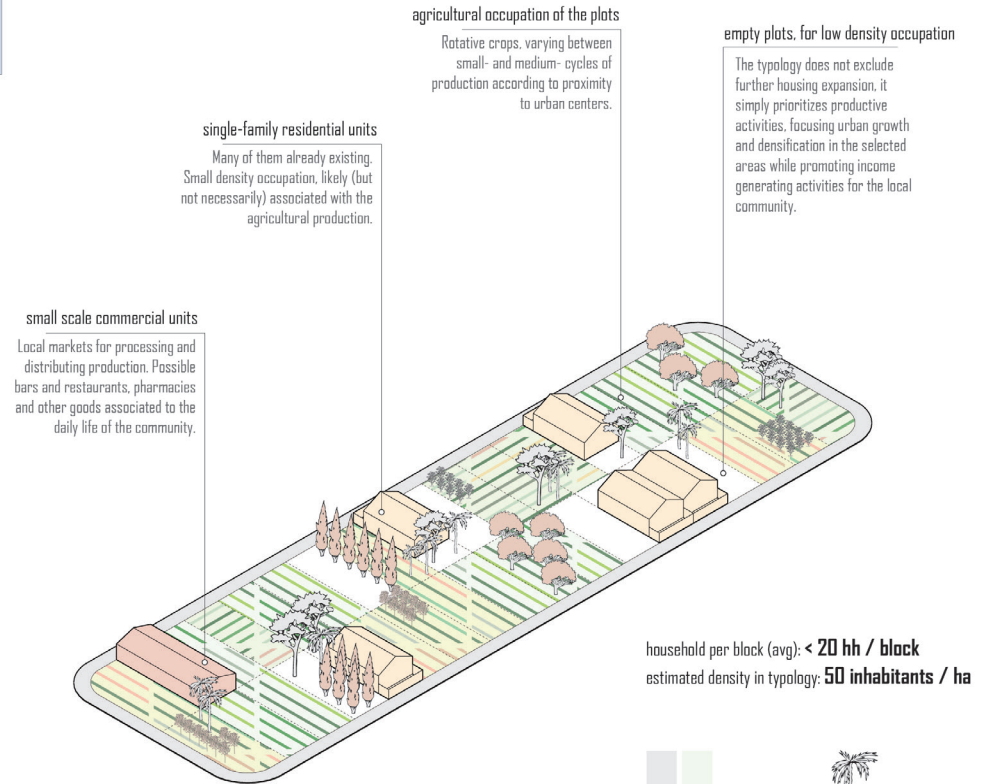
b. private allotments

2. densifying

possible sustainable occupation pattern of the allotments

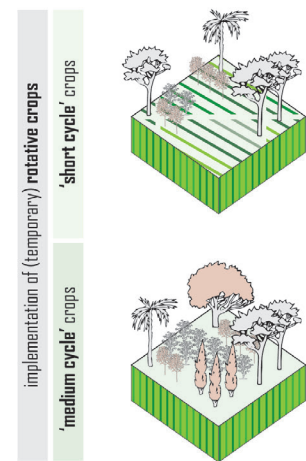


Rural occupation typology



legend:

social h.	Single-family units
	Pluri-family unit, medium density
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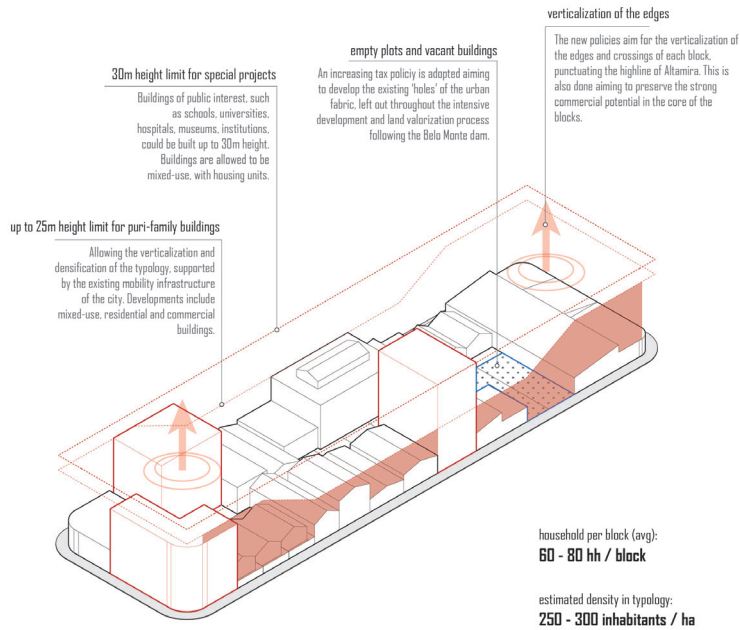
1. expanding

a. urban allotments

b. private allotments

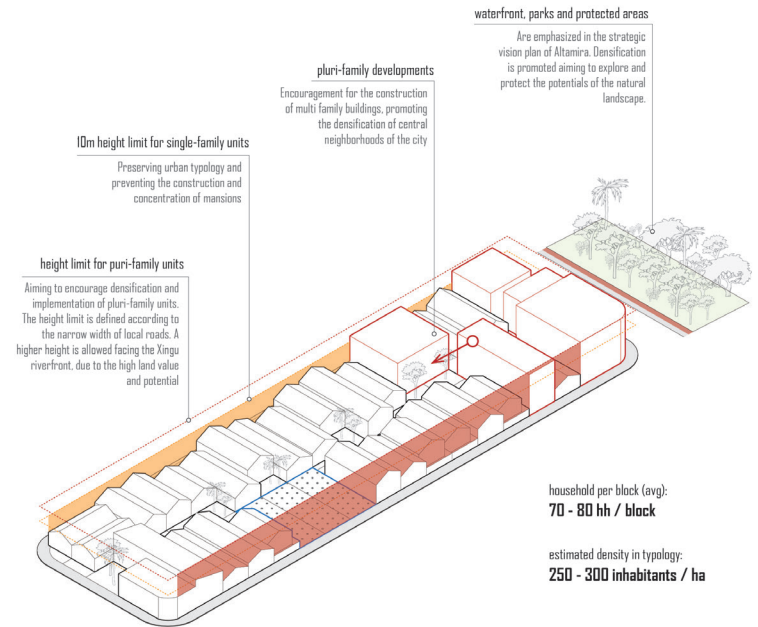
2. densifying

Axial densification typology

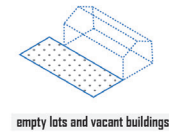


- legend:**
- Existing typology (mixed-use, low density)
 - Proposed densification pattern
 - Height limit for puri-family projects (up to 25m for mixed-use buildings and 30m for buildings of special interest)
 - Verticalization of the crossings

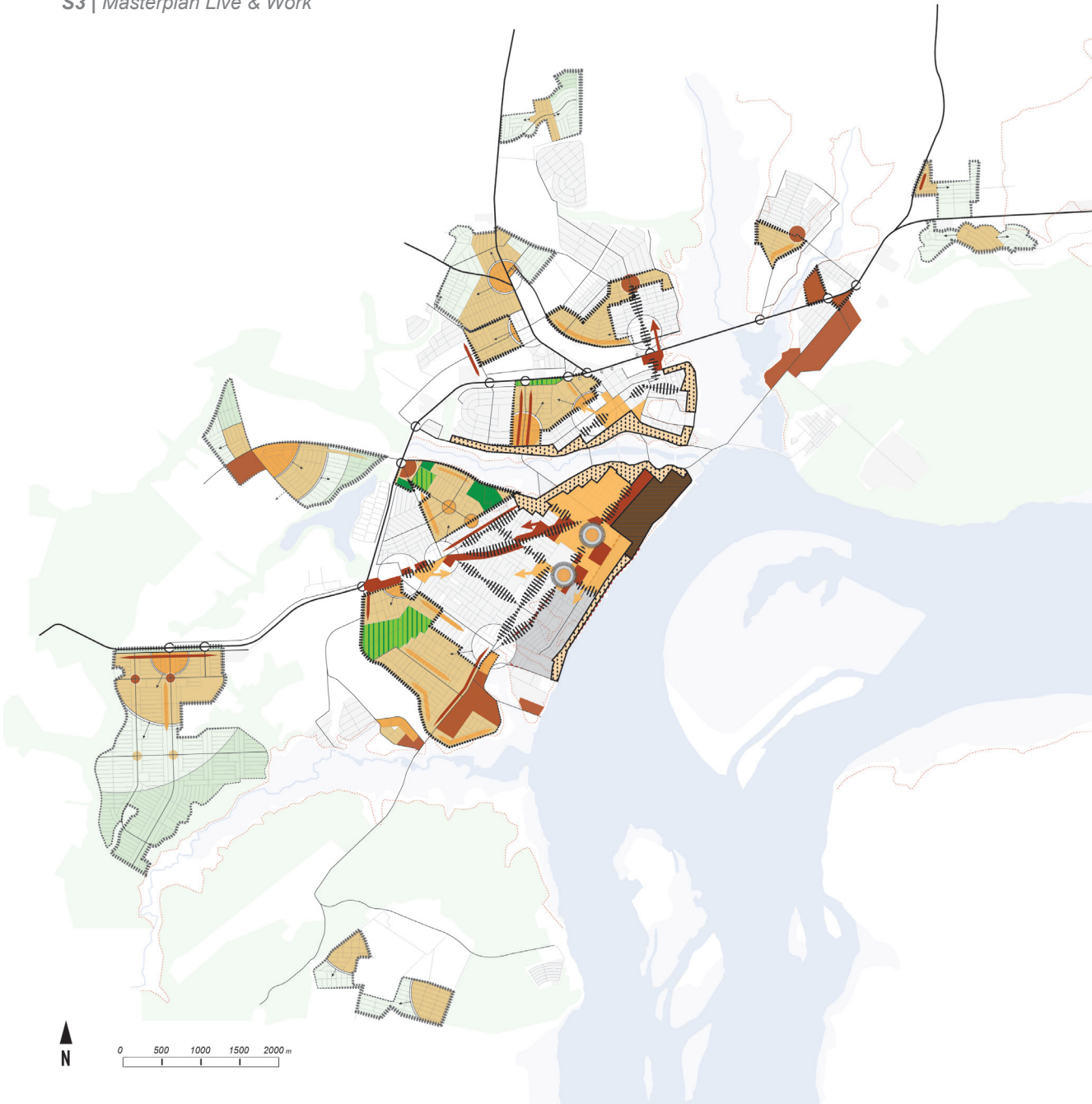
Waterfront densification typology



- legend:**
- Existing typology (mixed-use, low density)
 - Proposed densification pattern
 - 10 meter high limit for single-family housing units
 - height limit for pluri-family projects (15m in streams and 20m in the Xingu waterfront)
 - Waterfront, parks and protected areas
 - Expansion of proposed typology



One constant observation in the built environment of Altamira is the abundance of empty lots and vacant buildings, waiting for real-estate speculation. To cope with this, a growing tax rate (IPTU) policy should be implemented, pressuring land- and building owners to develop or occupy. The policy also allows the municipality to purchase the property after a period of 5 years, if not occupied. A similar strategy is currently being adopted in Sao Paulo, setting the Brazilian precedent.



Legend:

- expanding urban fabric: inner-ring of development. Assuming current and future expansion and occupation.
 - private residential allotments: outer-ring of expanding urban fabric.
 - special intervention: for transformation of privately occupied waterfront.
 - existing rural properties or urban farms
 - parks, forests and preserved landscapes
-
- predominance of **low density residential** typology
 - clusters or nodes of **low density residential** typology
 - predominance of **medium density mixed-use** typology
 - corridor development of **medium density mixed-use** typology
 - clusters of **medium density mixed-use** typology
 - node (intersection) oriented development
 - predominance of **medium density commercial** typology
 - corridor development of **medium density commercial** typology
 - commercial or industrial clusters
 - rural occupation of the urban fabric (**short cycle crops**)
 - rural occupation of the urban fabric (**long cycle crops**)
 - expansion of typologies
-
- densification according to waterfront urban typologies
 - historic city center, preservation of urban characteristics
 - axial densification, of the main roads of the urban network
 - node densification: special occupation on the main articulations
 - existing mixed-use typologies (residential predominance)
 - axis of expansion, predicted in the vision plan
 - existing mixed-use typologies (commercial predominance)
 - axis of expansion, predicted in the vision plan

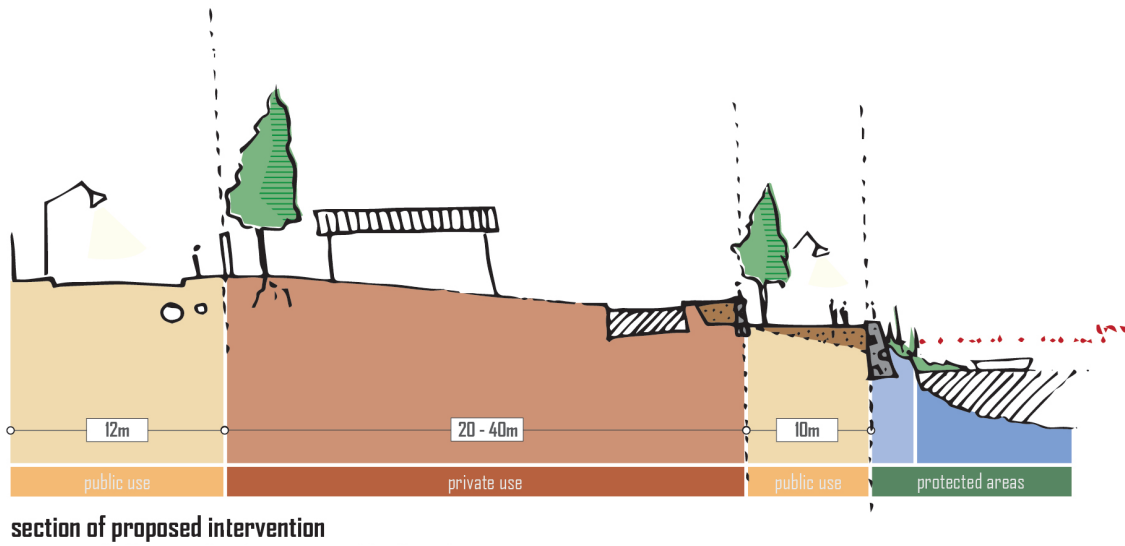
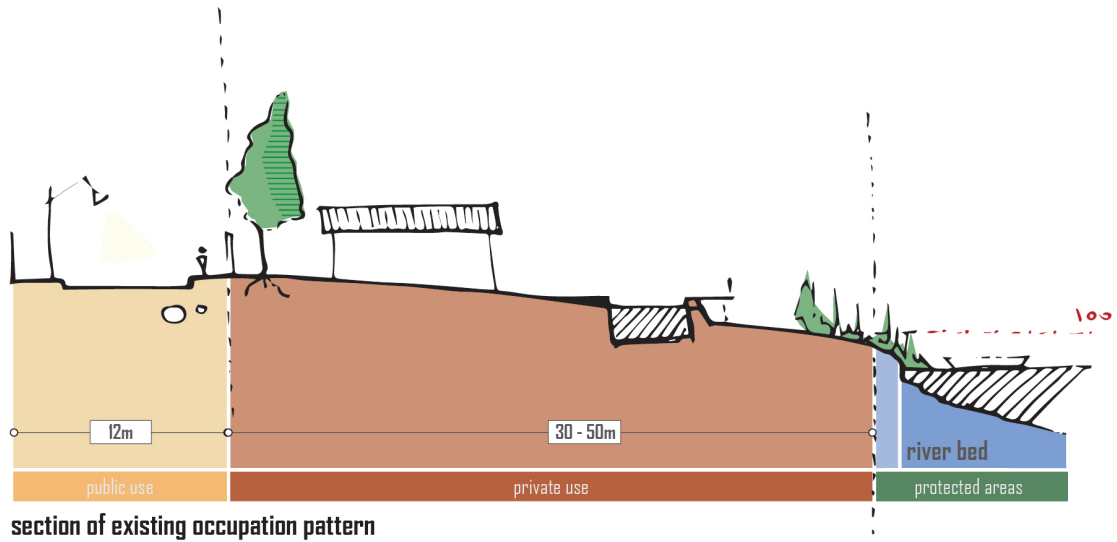
strategy 4

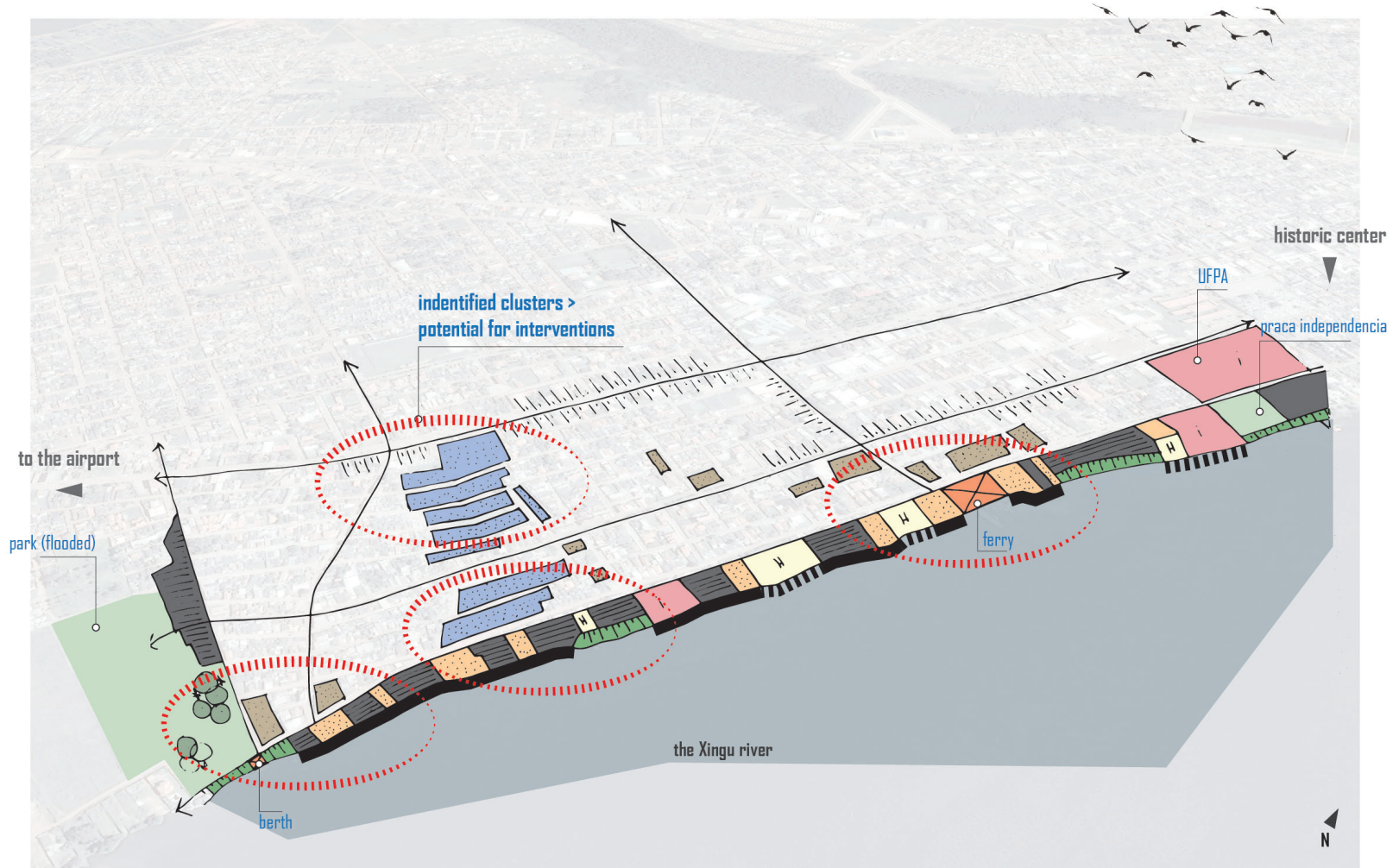
SPECIAL PROJECTS



'Marginal' road

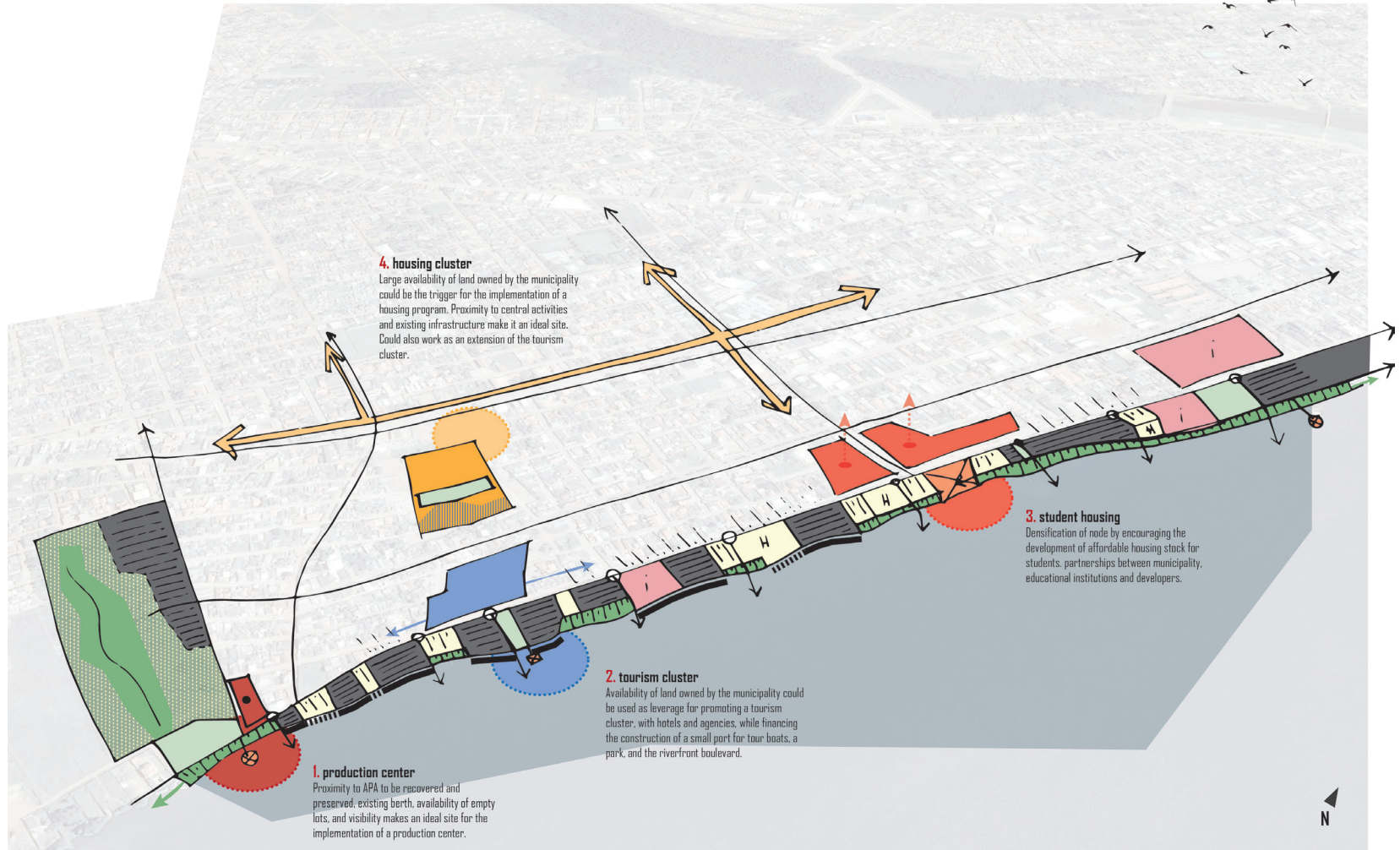
@ the author





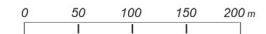
legend:

- | | | | |
|---|--|---|-------------------------------------|
|  | water equipment |  | public access to waterfront |
|  | private occupation of the waterfront |  | parks |
|  | vacant private lots in the waterfront |  | commercial axis |
|  | evicted properties, municipal owned land |  | HORECA (hotels, restaurants, cafes) |
|  | empty lots |  | institutional and educational |



legend:

- | | | | |
|--|--|--|-------------------------------------|
| | water equipment | | public access to waterfront |
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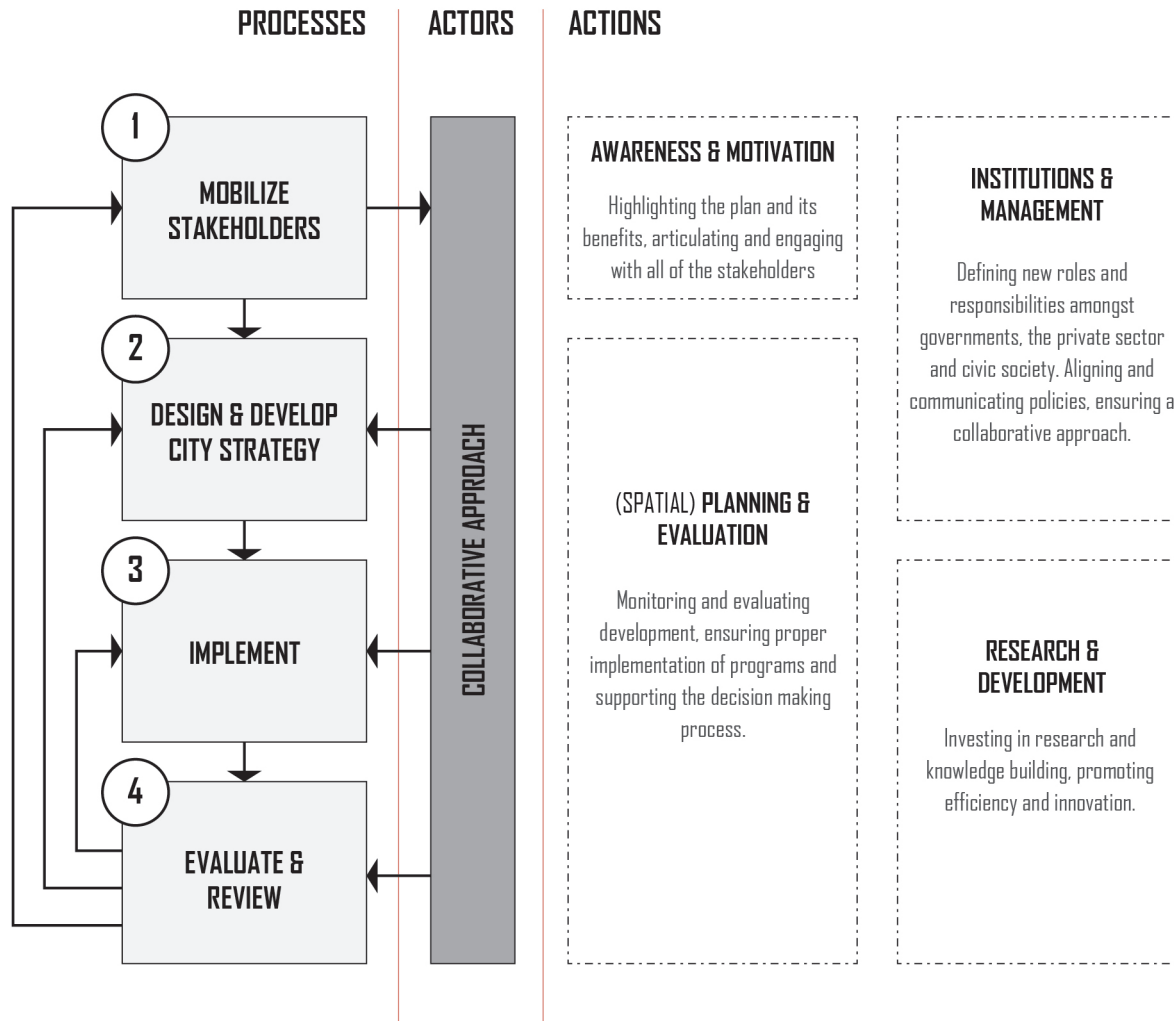


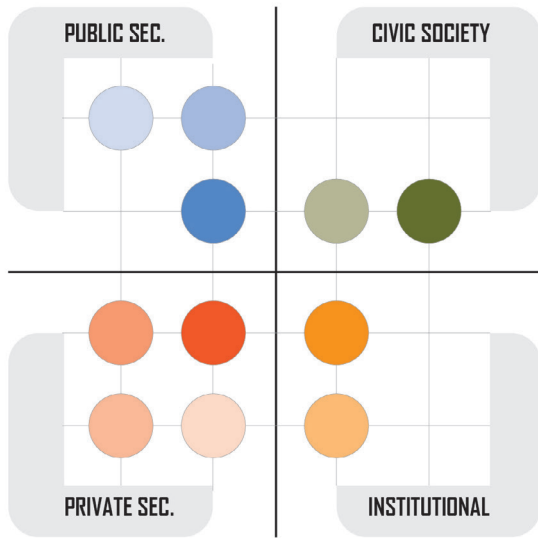
ACTION PLAN



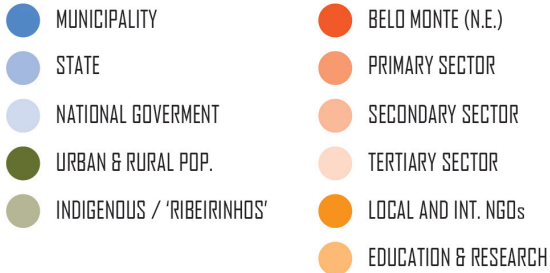
Worker and brick fabrication

@ Dario Bosio

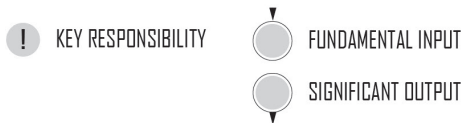




ACTORS CONSIDERED

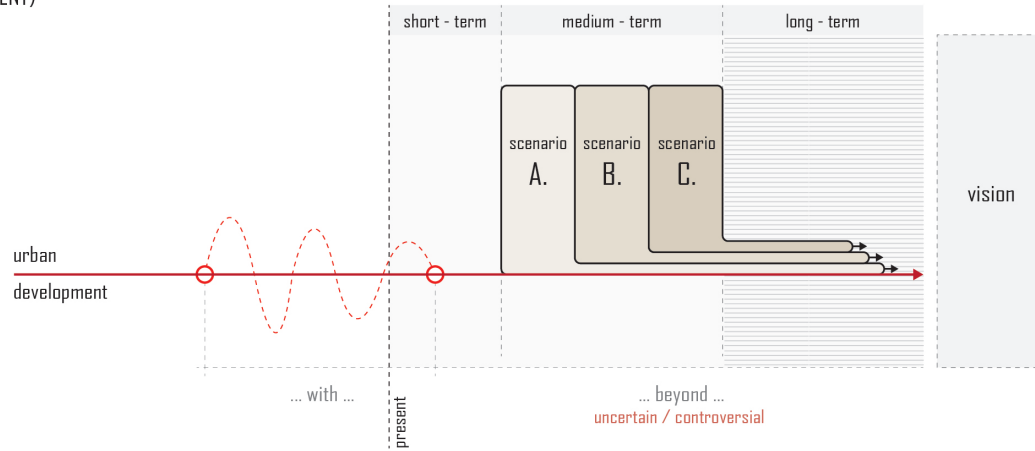


SYMBOLOLOGY

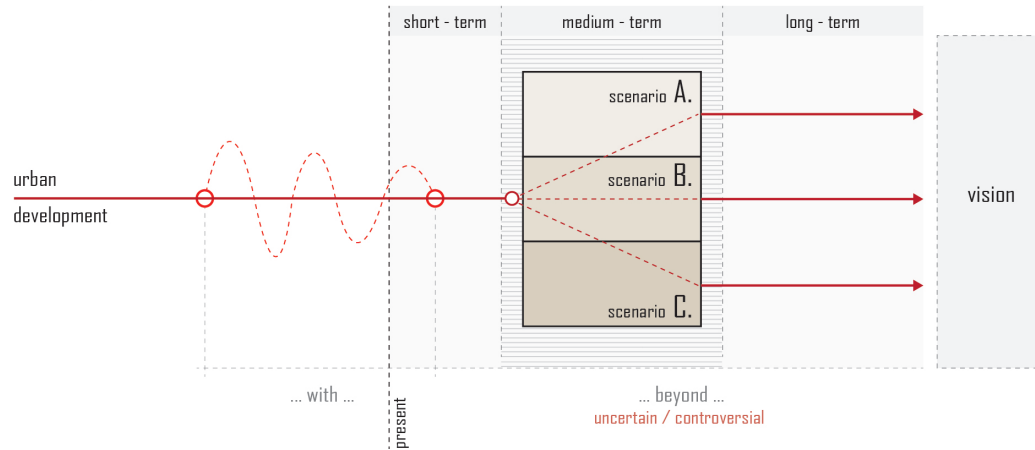


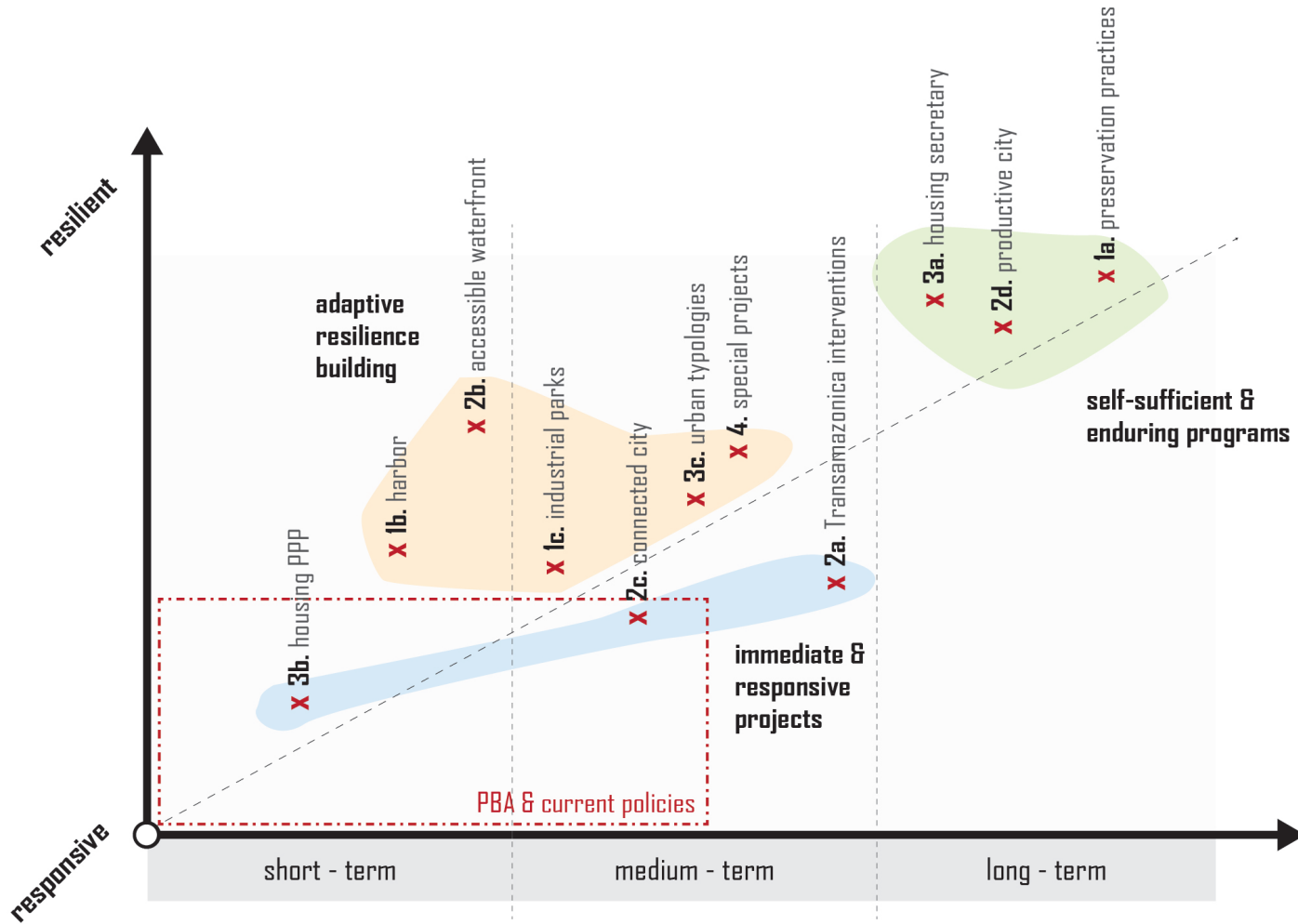
STRATEGIES	PROJECTS PROGRAMS	KEY ACTORS	DESCRIPTION
1. ALTAMIRA & THE NATURAL LANDSCAPE	1a. Preservation Practices (extractivism, agroforestry, rotative agriculture)		The public sector plays an important role in creating policies and facilitating the implementation process. The private sector is fundamental for the financial feasibility and sustainability of the strategy. Civic society, especially local communities, carry the know-how and are empowered with the proposal.
	1b. Construction of Harbor		
	1c. Implementation of Industrial Parks		
2. ALTAMIRA & PUBLIC LIFE	2a. Transamazonica Interventions		Again the public sector holds some responsibility of facilitating the implementation, even though the 'productive city' program could also be decentralized. The private sector and Belo Monte dam have a great interest in the economic potential of the strategy. Different groups of the civic society play a role in the proposal and the participation and support of institutions is fundamental.
	2b. Accessible Waterfront		
	2c. Connected City		
	2d. Productive City		
3. ALTAMIRA, LIVE & WORK	3a. Housing Secretary		High dependency on the public sector. The private sector is engaged through PPP's, aiming to assist in the financing of the projects. Institutions are important for articulating (and including) the civic society with the public and private sectors. Knowledge building is vital for a successful implementation.
	3b. Housing PPPs		
	3c. Urban Typologies		
4. SPECIAL PROJECTS	4a. Waterfront Promenade		The final strategy relies on the engagement with- and participation of the private sector. Both public sectors and institutions are responsible for evaluating and monitoring the process, ensuring the inclusiveness and accessibility of the promoted development.
	4b. Tourism Cluster		
	4c. Education Cluster		

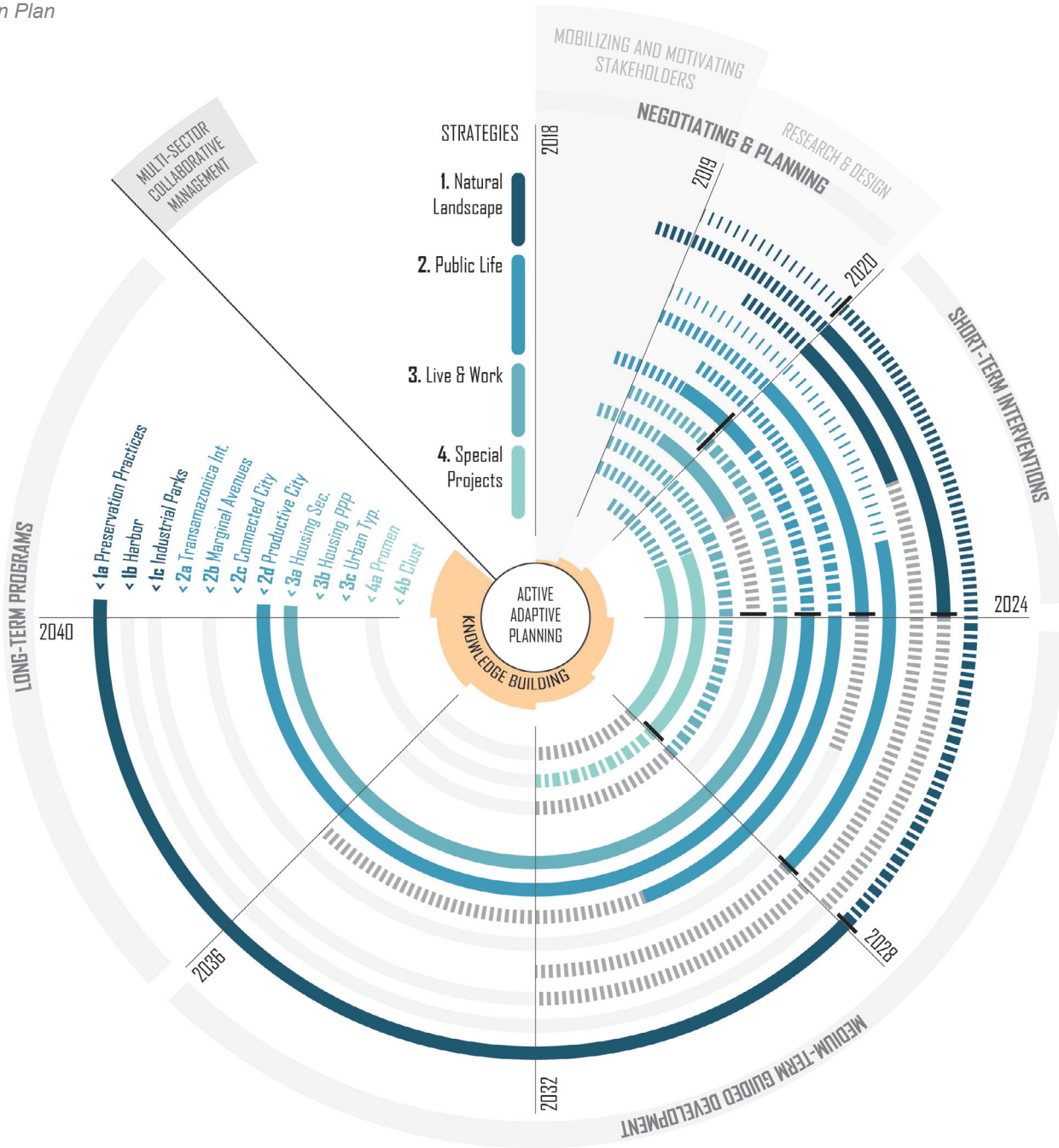
**LONG-TERM | ENDURING
(SELF SUFFICIENT)**



**GUIDED DEVELOPMENT
(FLEXIBLE TO SCENARIOS)**

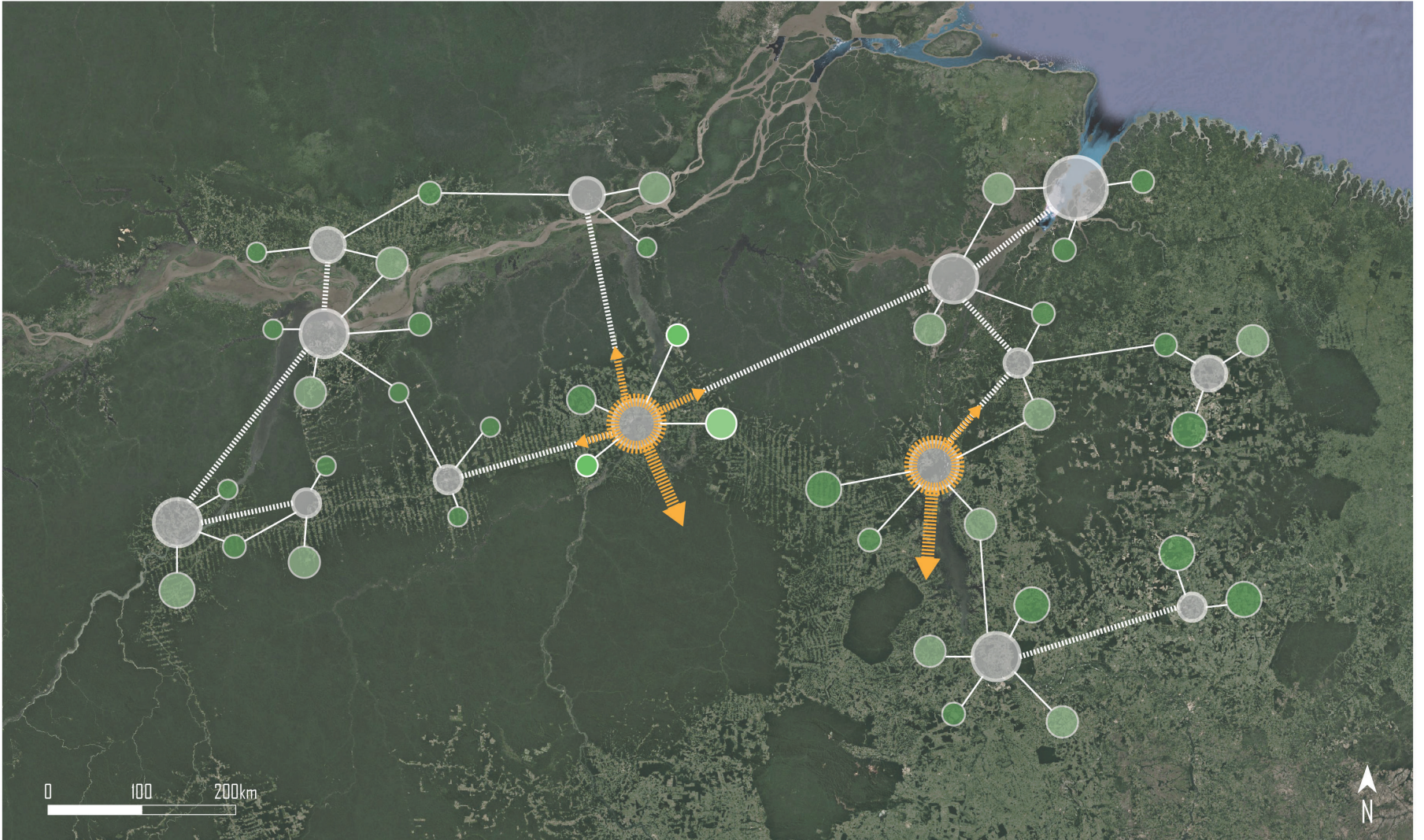


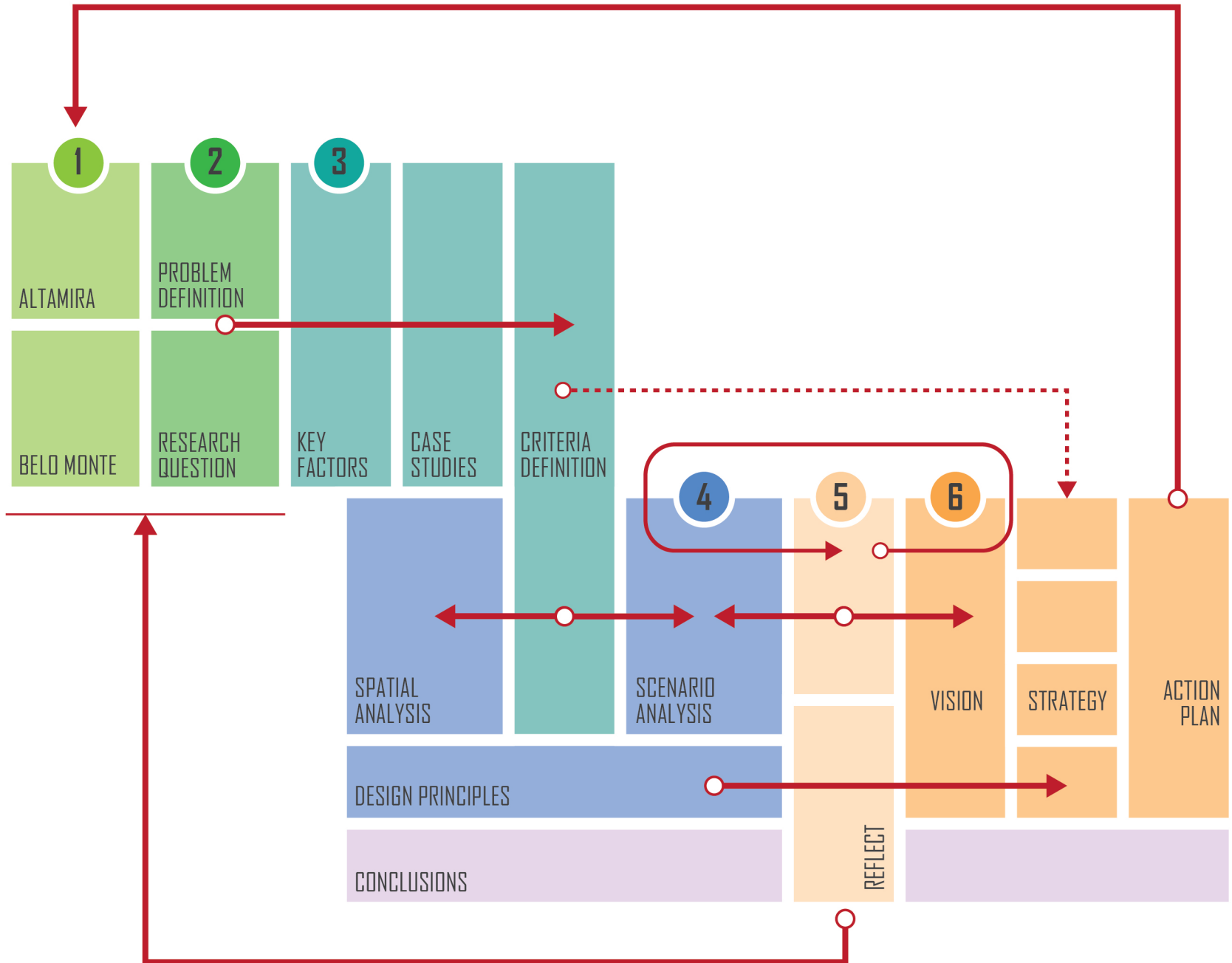






@ the author







THANK YOU
@ the author