

# The lost and hidden water of *São Paulo*

The strategic value of landscape-based green-blue infrastructure

## Welkom - Welcome - Bem Vindo

Harm van der Zanden

Graduation Presentation

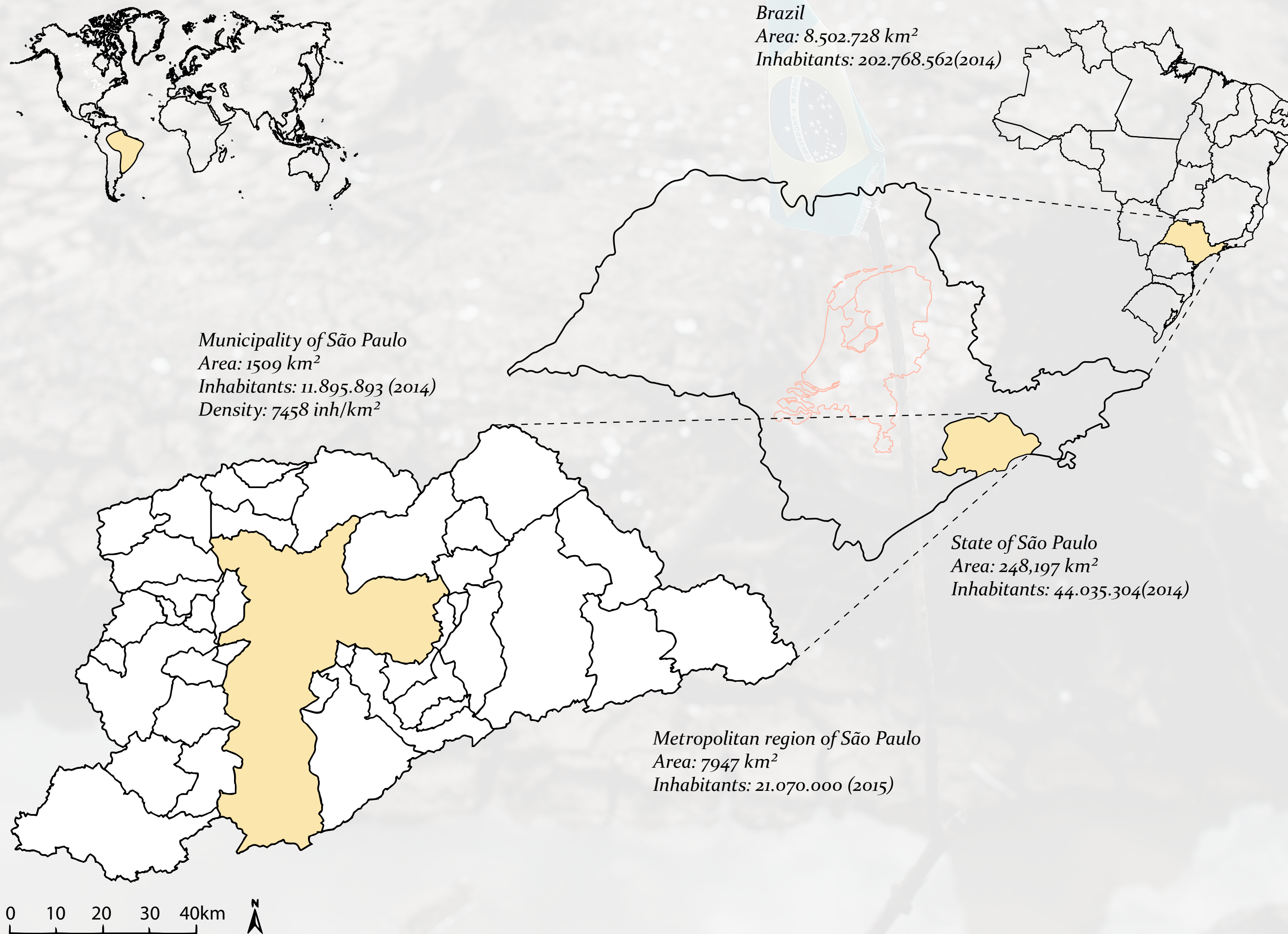
An aerial photograph of São Paulo, Brazil, showing a vast, dense urban landscape with numerous high-rise apartment buildings and a complex network of roads and green spaces. The city extends to the horizon under a clear sky. A solid green horizontal bar is positioned at the top of the image.

# Introduction

The lost and hidden water of *São Paulo*

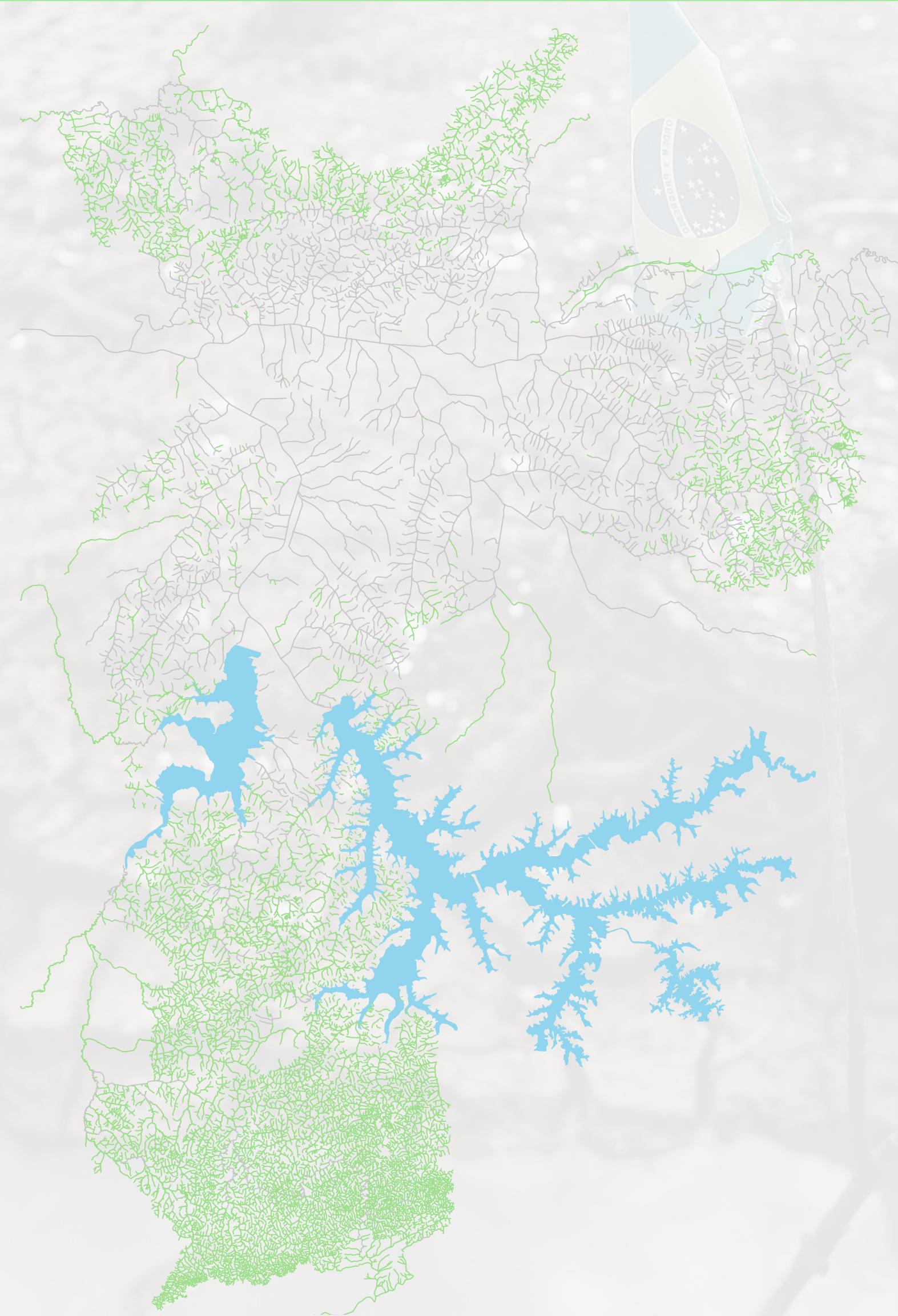
2/X







# Why the search?



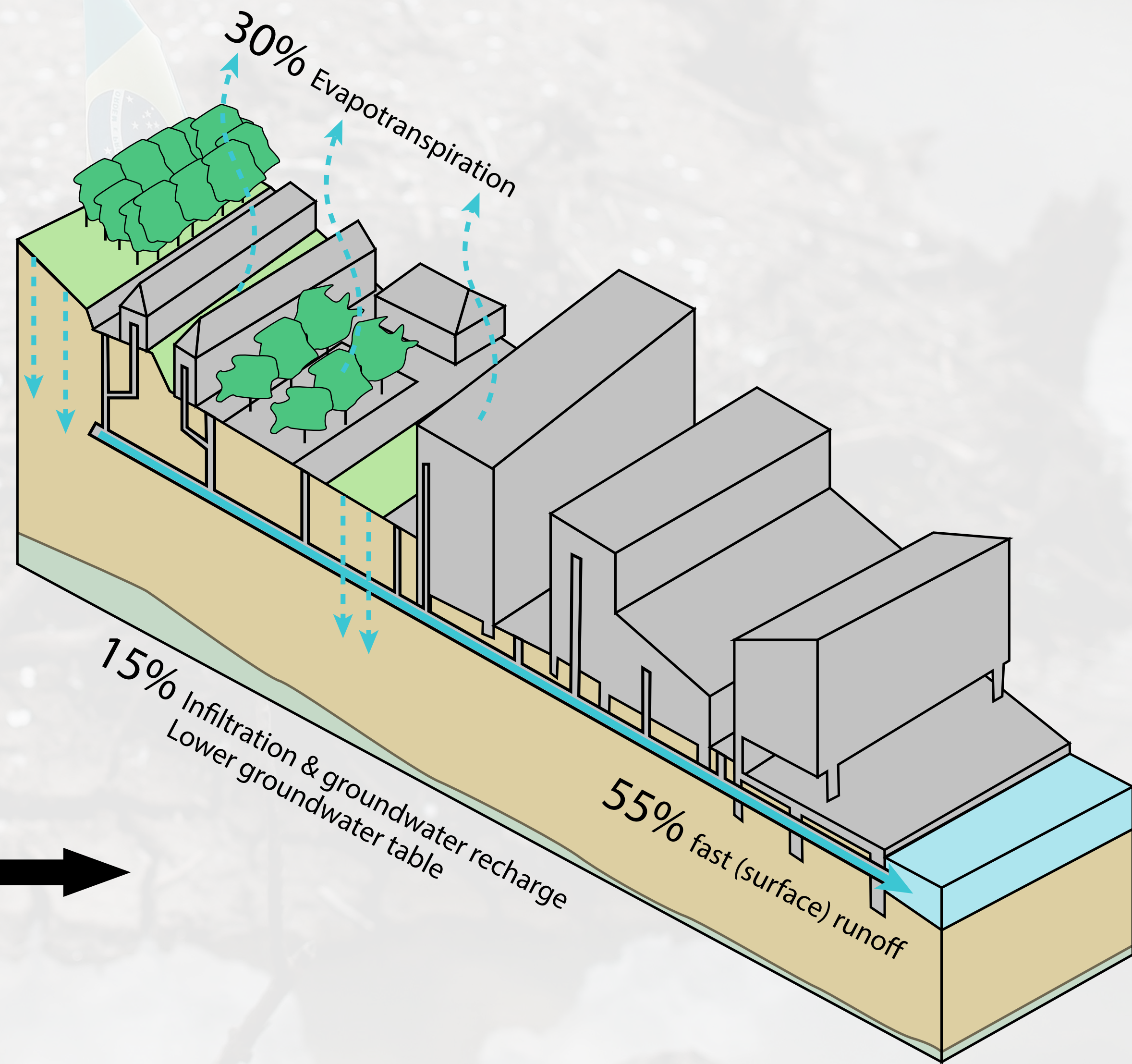
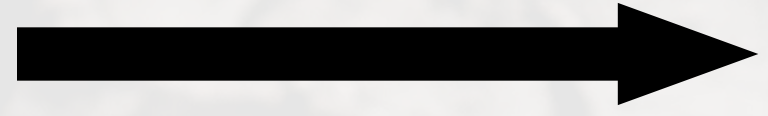
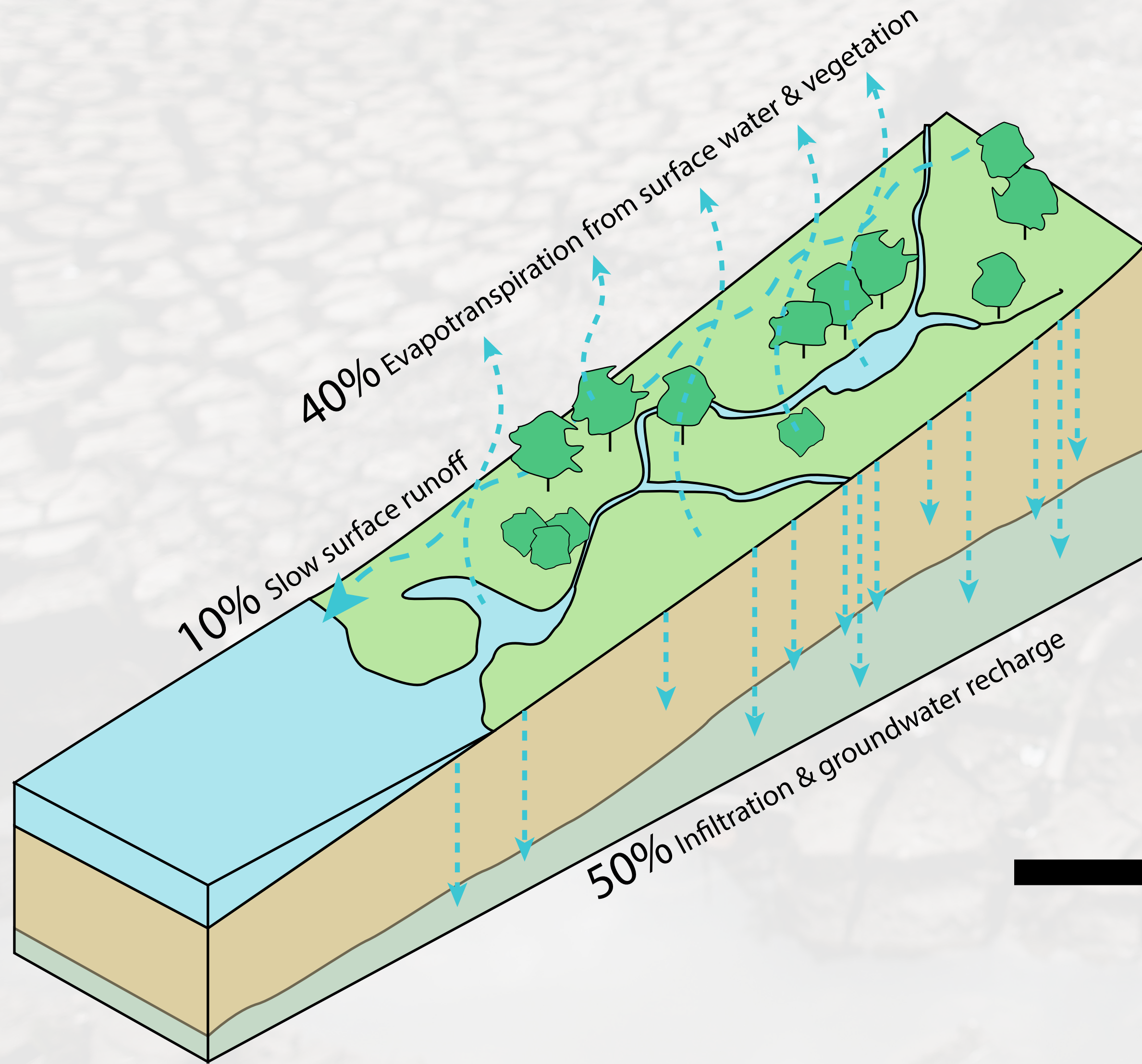
## Water system

 Natural

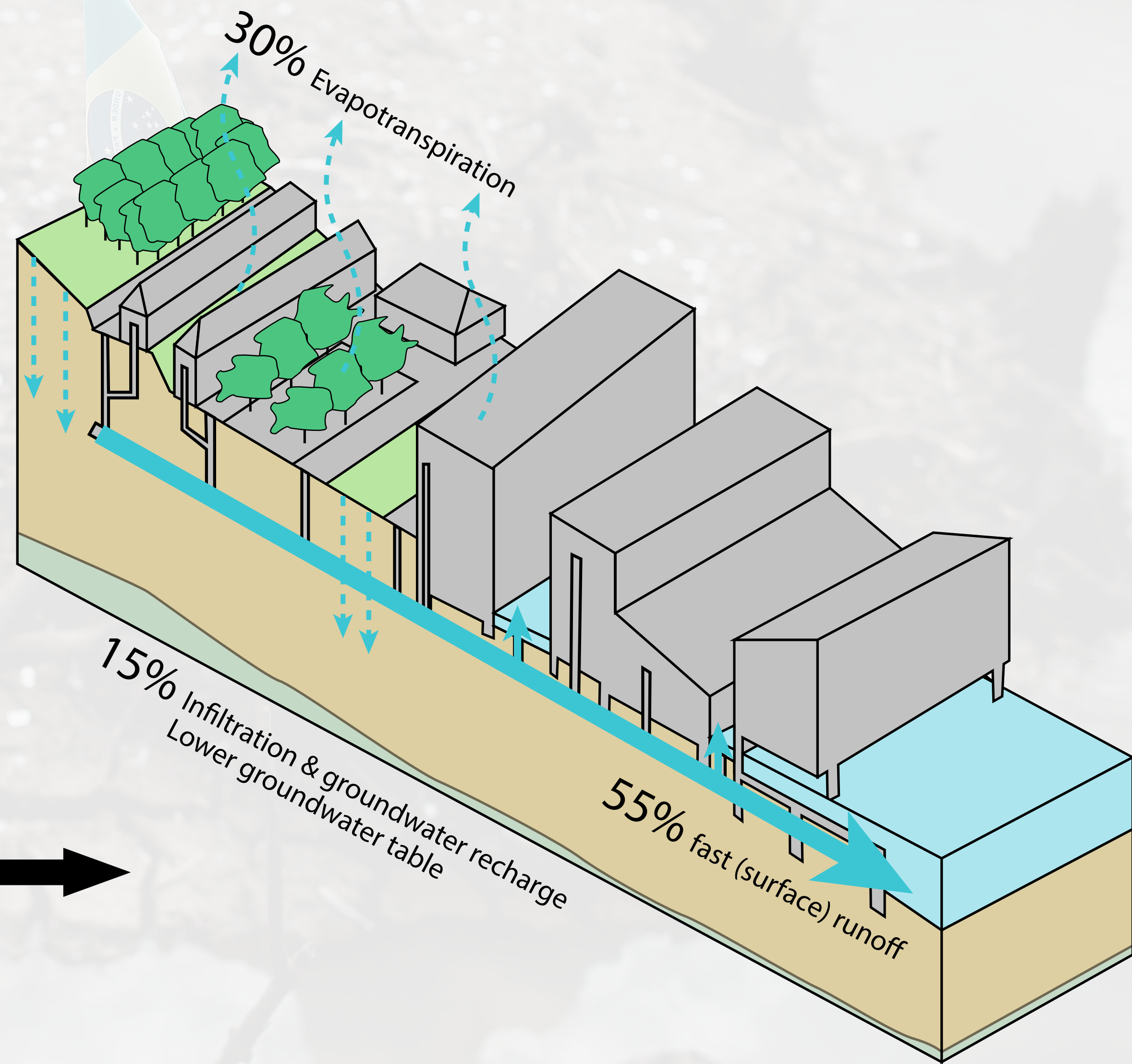
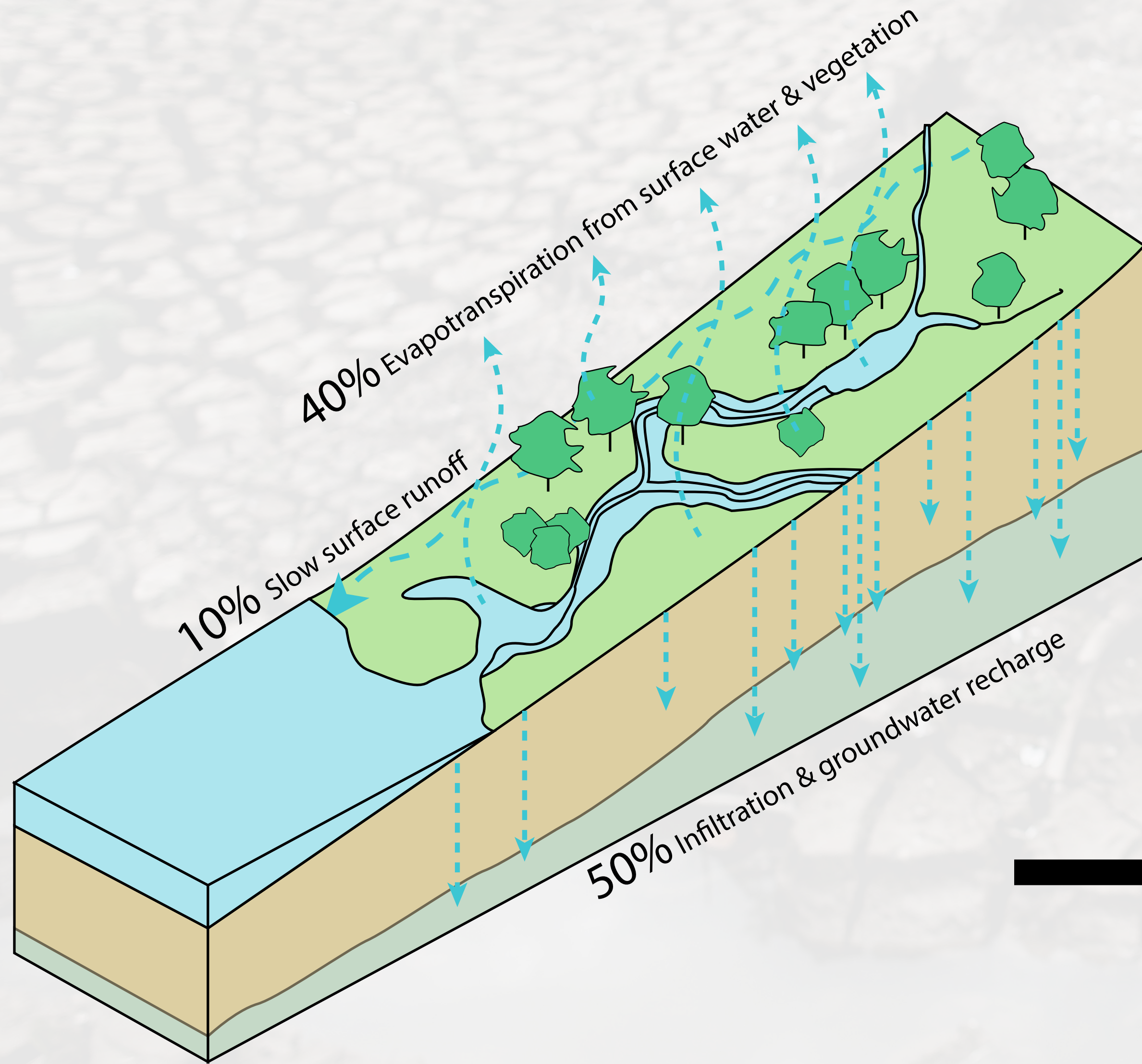
 Modified or hidden

# Why the search?









folha  
cotidiano







# Defining Green-Blue Infrastructure

*Access*

*Natural benefits*

*Spatial variance*

*Sustainability*

***Green-blue infrastructure consists of a managed network of natural and human-modified multifunctional, multi-scalar green and water-based elements, that support ecological, economic and social interests.***

*Human benefits*

*Connectivity*

*Multi-functionality*

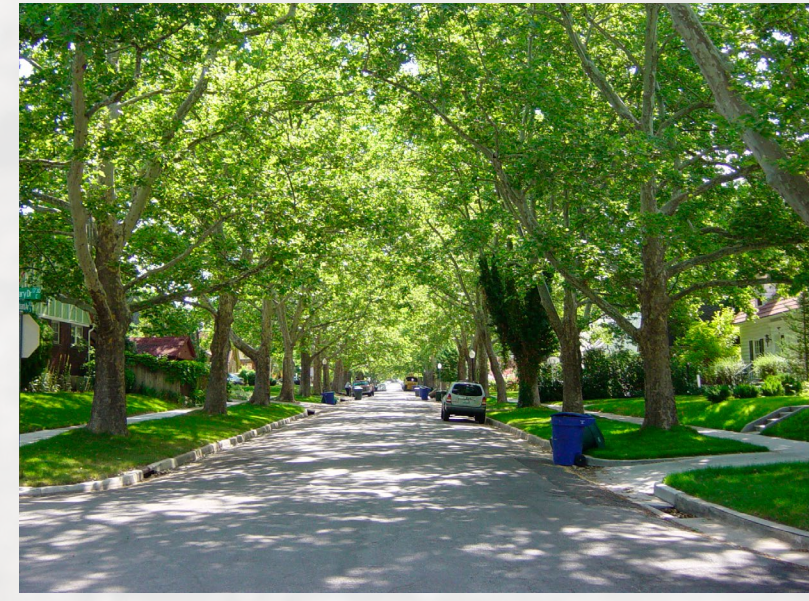
# Scale

## Building



**Garden**  
**Green roof**  
**Vertical garden**

## Street



**Street trees**  
**Verges**  
**Hedges**

## Neighbourhood



**Community garden**  
**Park**  
**Square**  
**Playground**  
**Sport field**  
**Cemeteries**

**Pond**  
**Stream**

## Regional



**City/regional park**  
**Urban forest**  
  
**Lake**  
**River**  
**Reserve**

## Research questions

**What are the potentials of a strategy focusing on green-blue infrastructure to revitalize the natural water system of São Paulo and improve the living environment of the city?**

What are the benefits and components of green-blue infrastructure?

How can the concept of green-blue infrastructure be used in a climate adaptation and urban regeneration strategy?

What is the current state of São Paulo's urban landscape and water system and what are the potentials and threats?

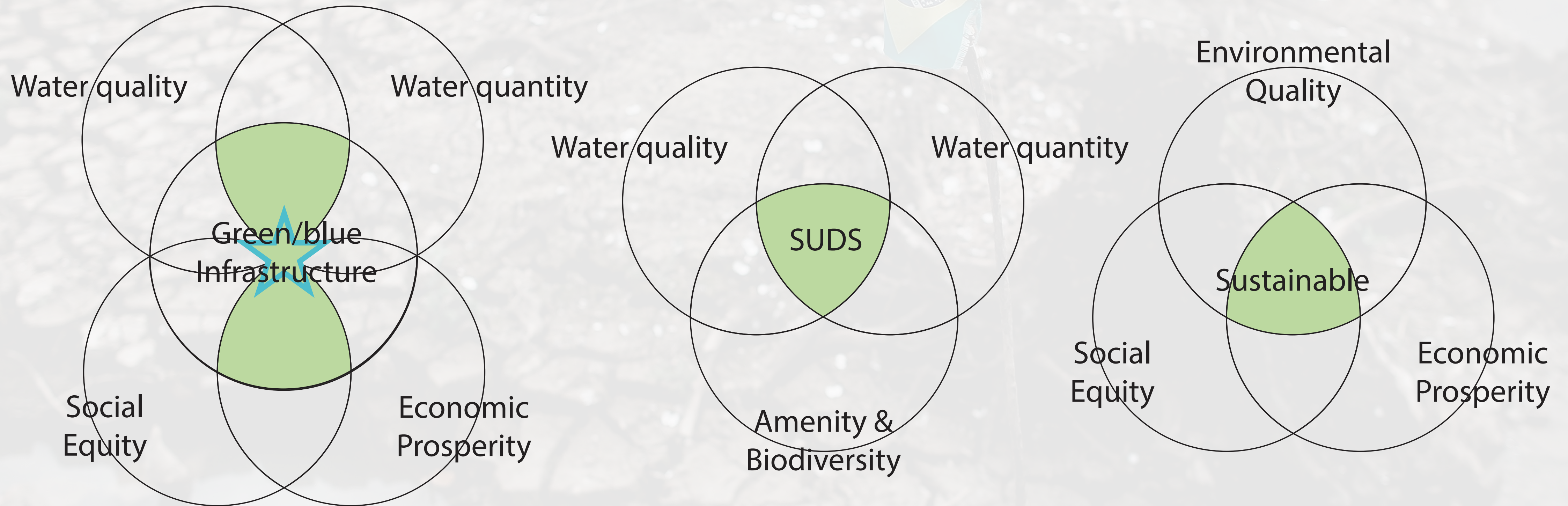
How can green-blue infrastructure be implemented on the case of São Paulo;  
to revitalize the historical water system?  
to improve the living environment of the city?  
to create a sustainable strategy?

An aerial photograph of a vast, densely populated urban area, likely a major city in Asia. The image shows a sea of high-rise apartment buildings and residential blocks, with a mix of modern skyscrapers and older, more compact structures. The city extends far into the distance, with a hazy horizon. A solid green horizontal bar is positioned at the top of the image. Centered over the middle of the city is the text "Main considerations" in a large, bold, black font.

# Main considerations



# The Green-Blue infrastructure framework



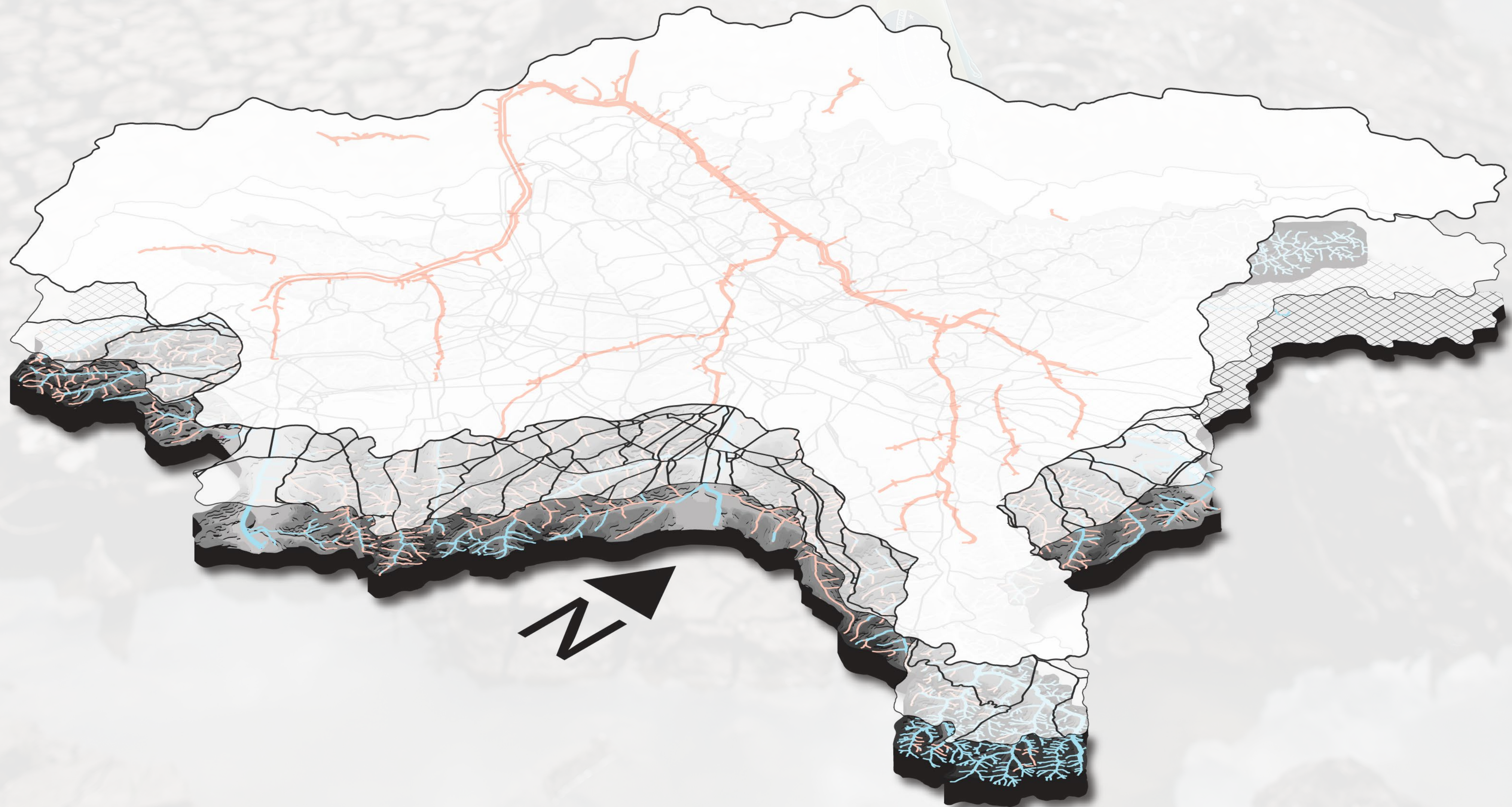
# Water vs. Roads



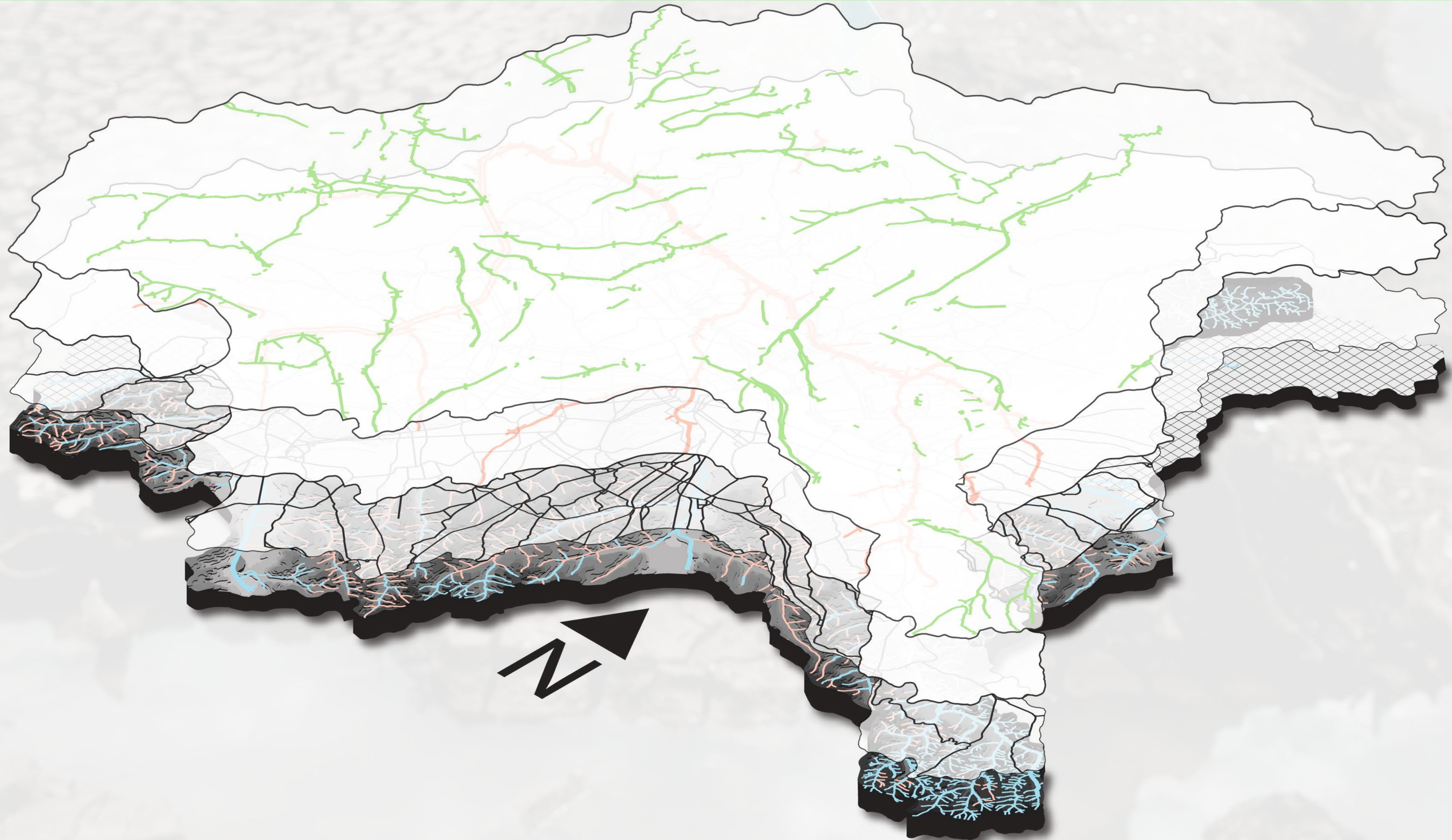
# Water vs. Roads



# Water vs. Roads



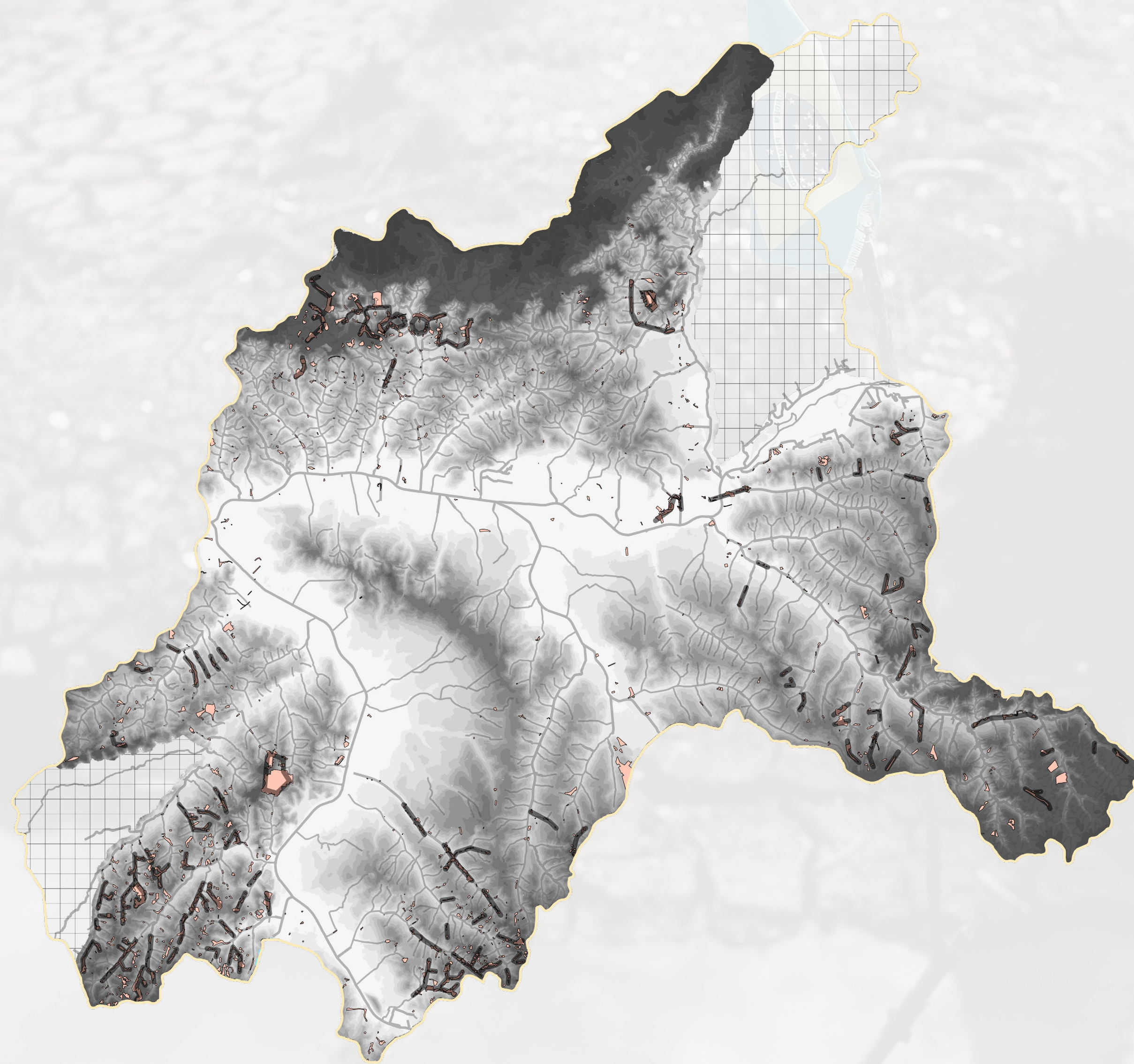
# Water vs. Roads



## Water vs. Roads



# The threat of informal urbanisation



## The threat of informal urbanisation





# The threat of informal urbanisation

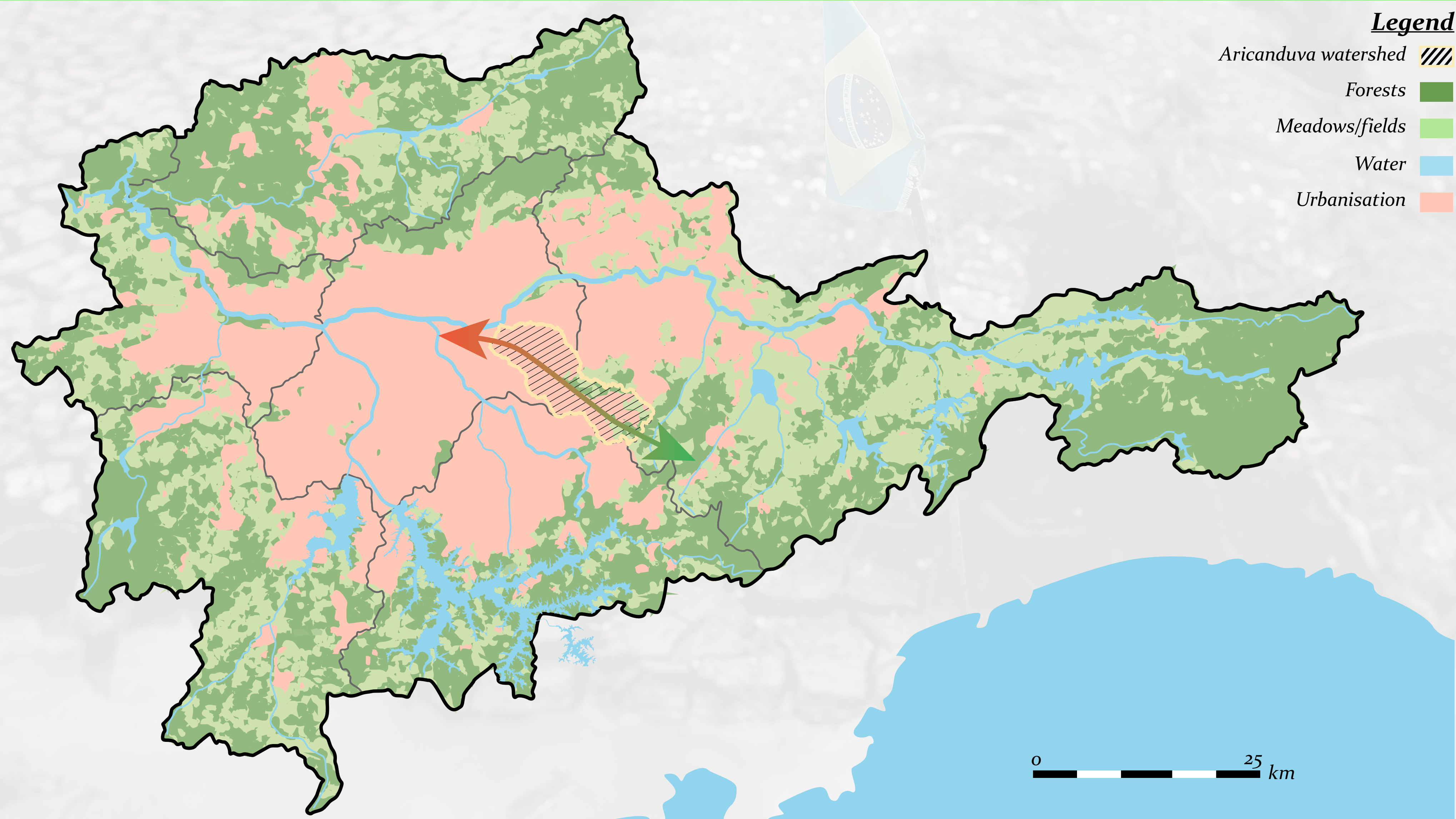


Google earth  
© 2017 Google

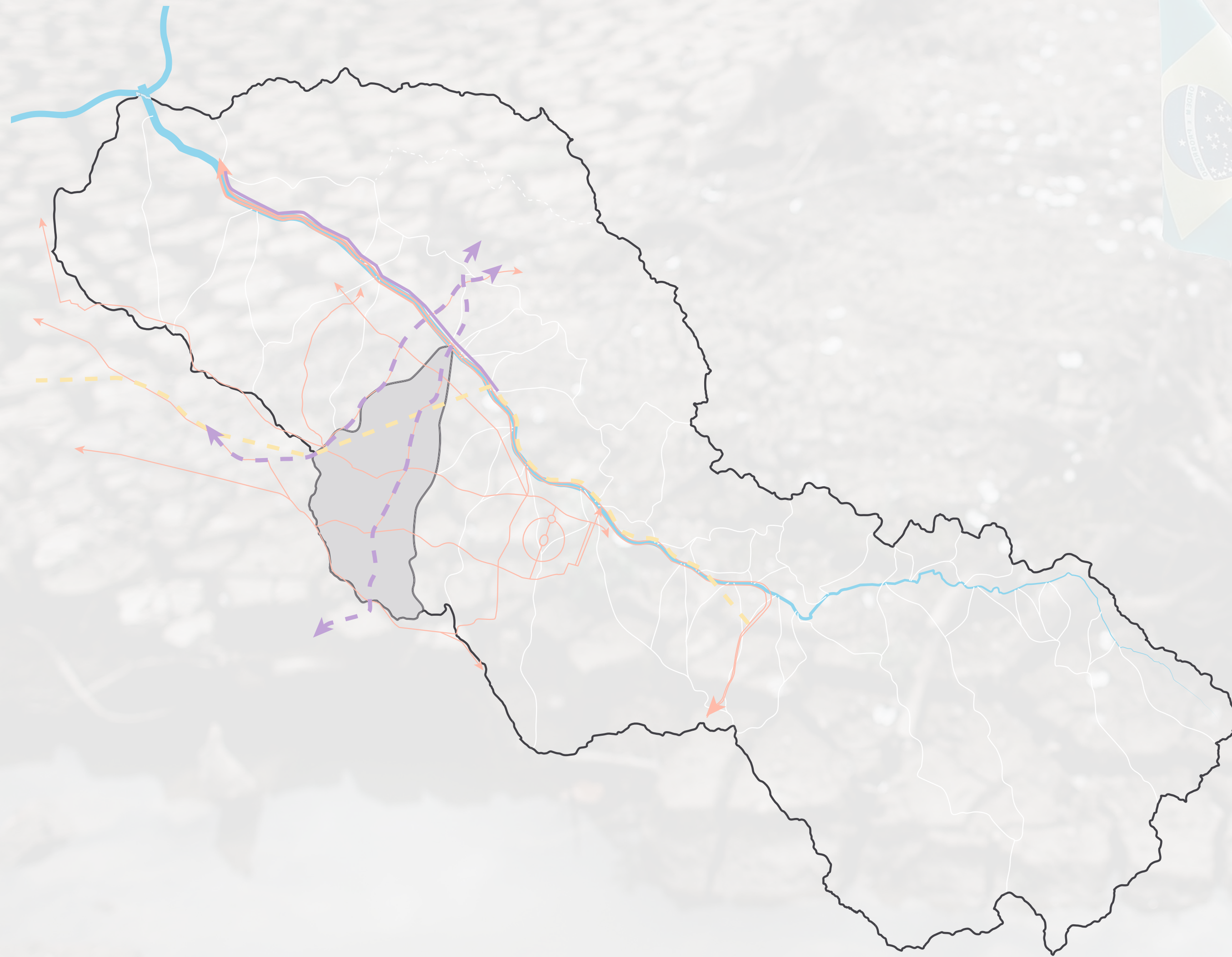
## The threat of informal urbanisation



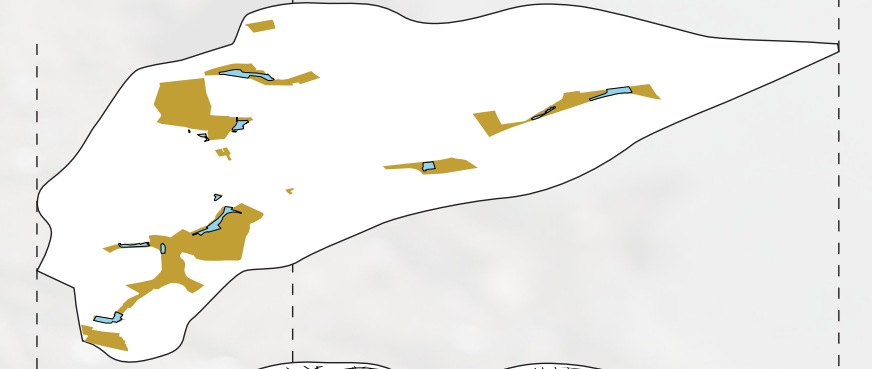
# Metropolis in a green-blue belt



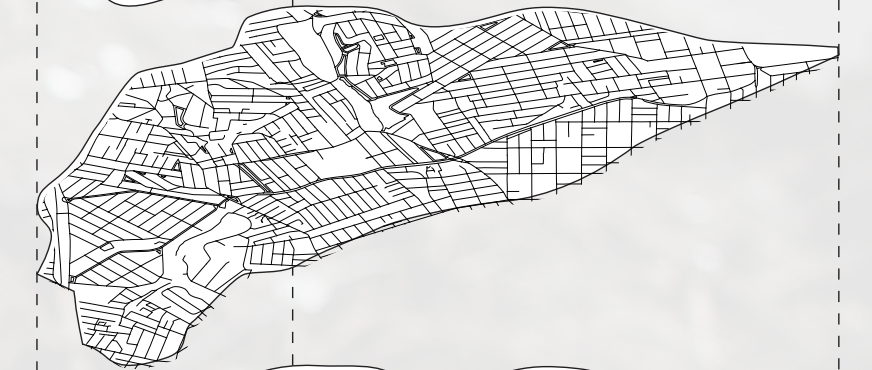
# Scaling down



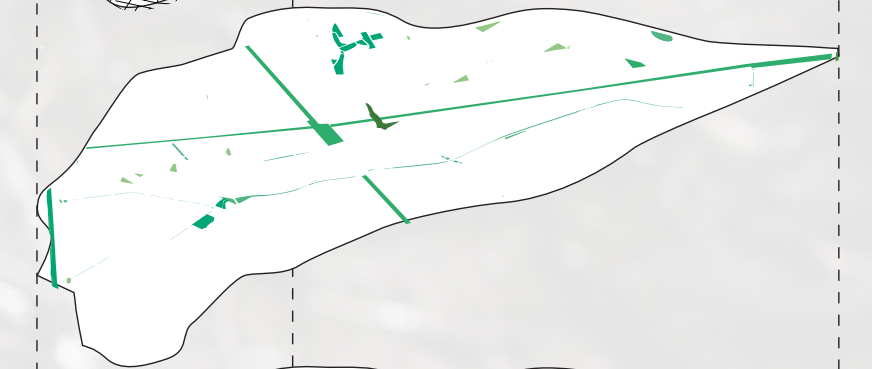
*Favelas and  
ZEIS-1 areas*



*Road pattern*



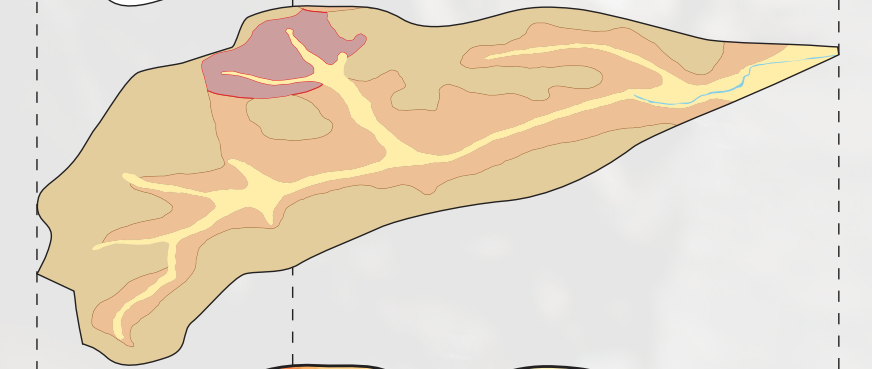
*Current green  
infrastructure*



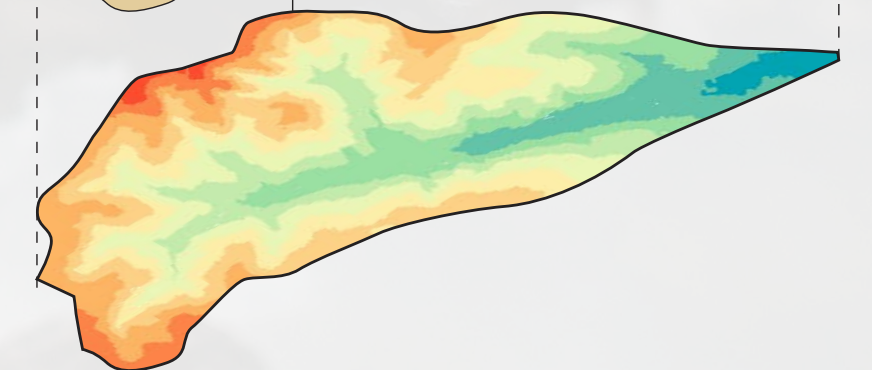
*Streams*



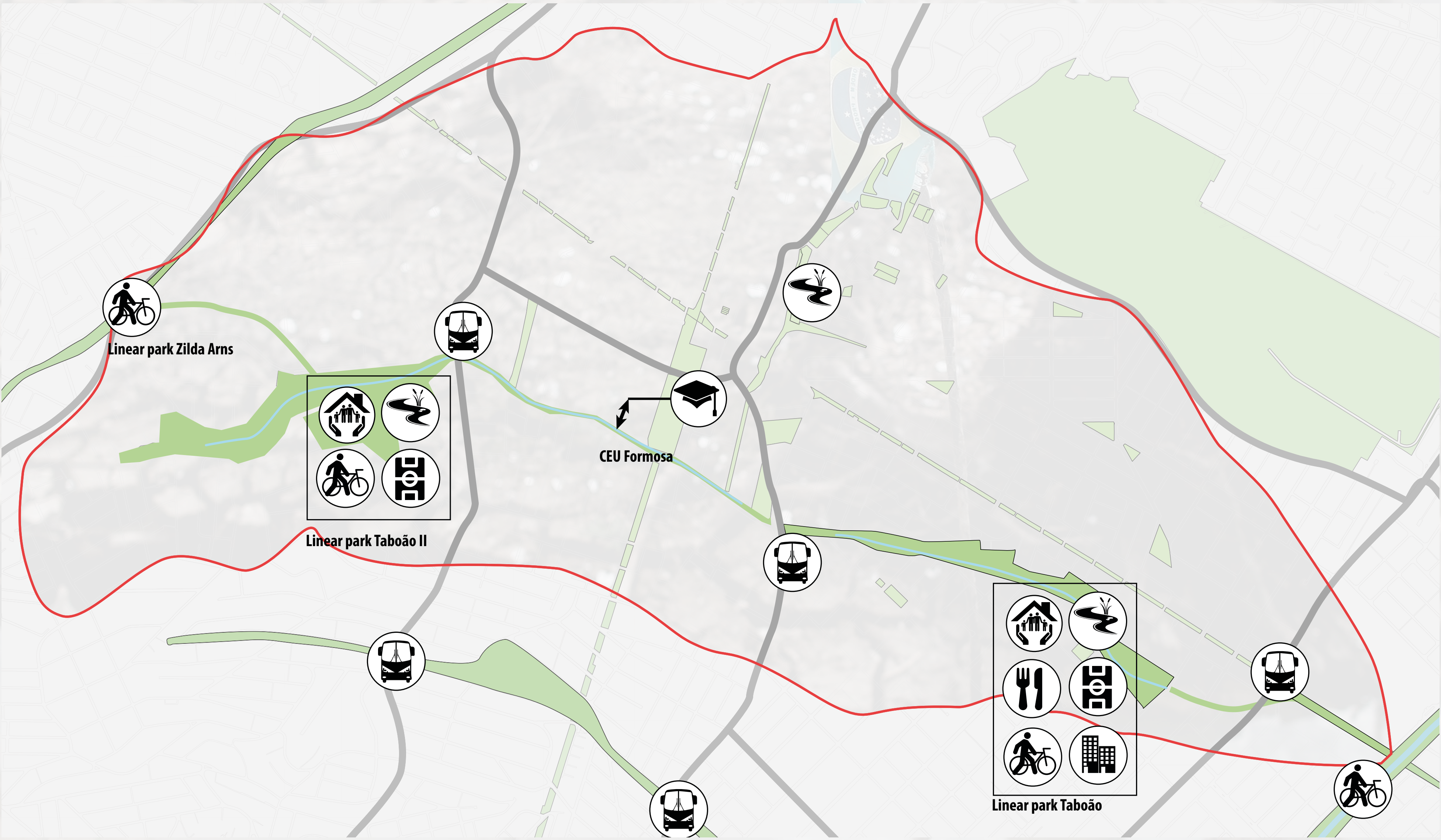
*Soil*



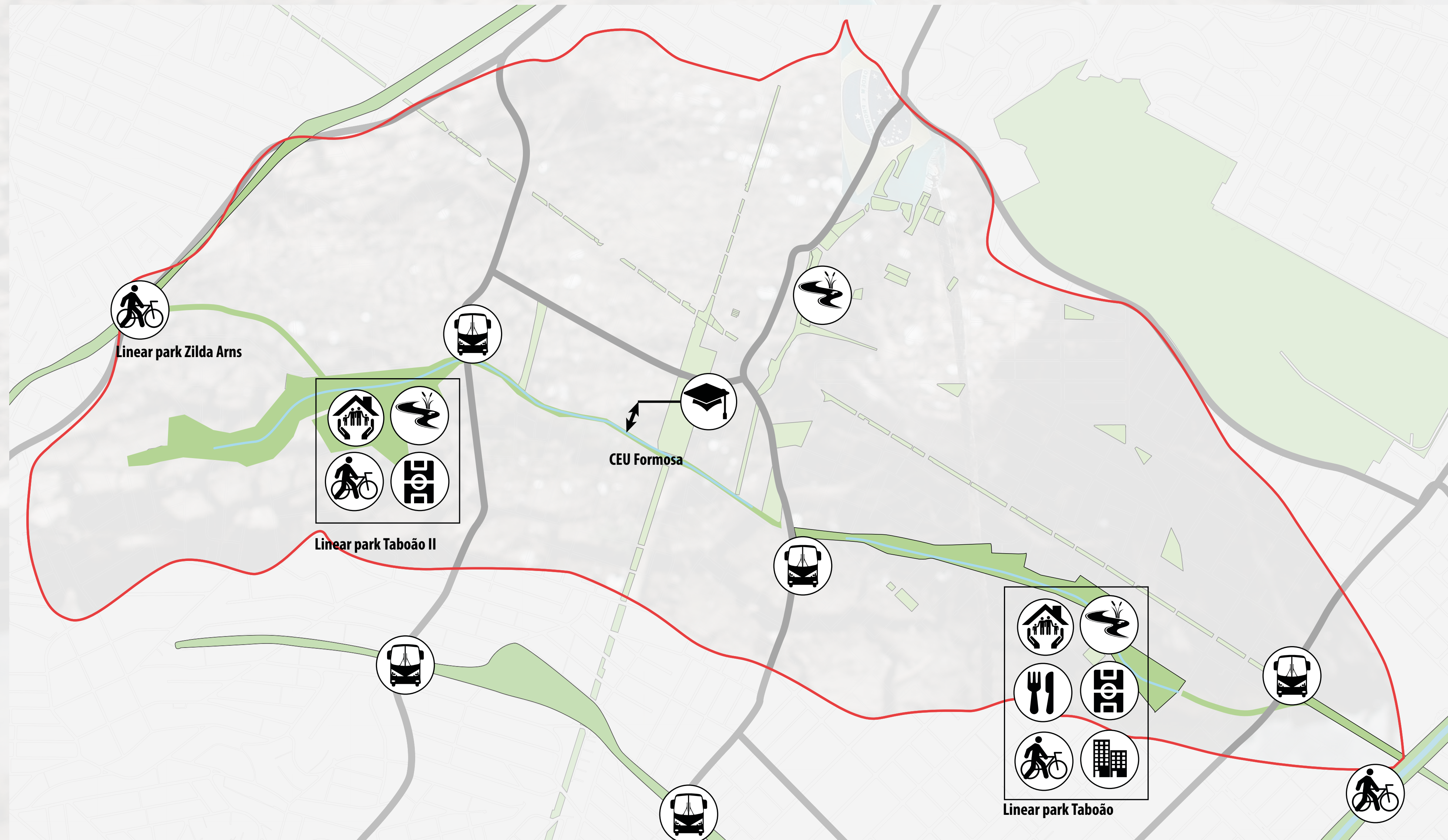
*Elevation*



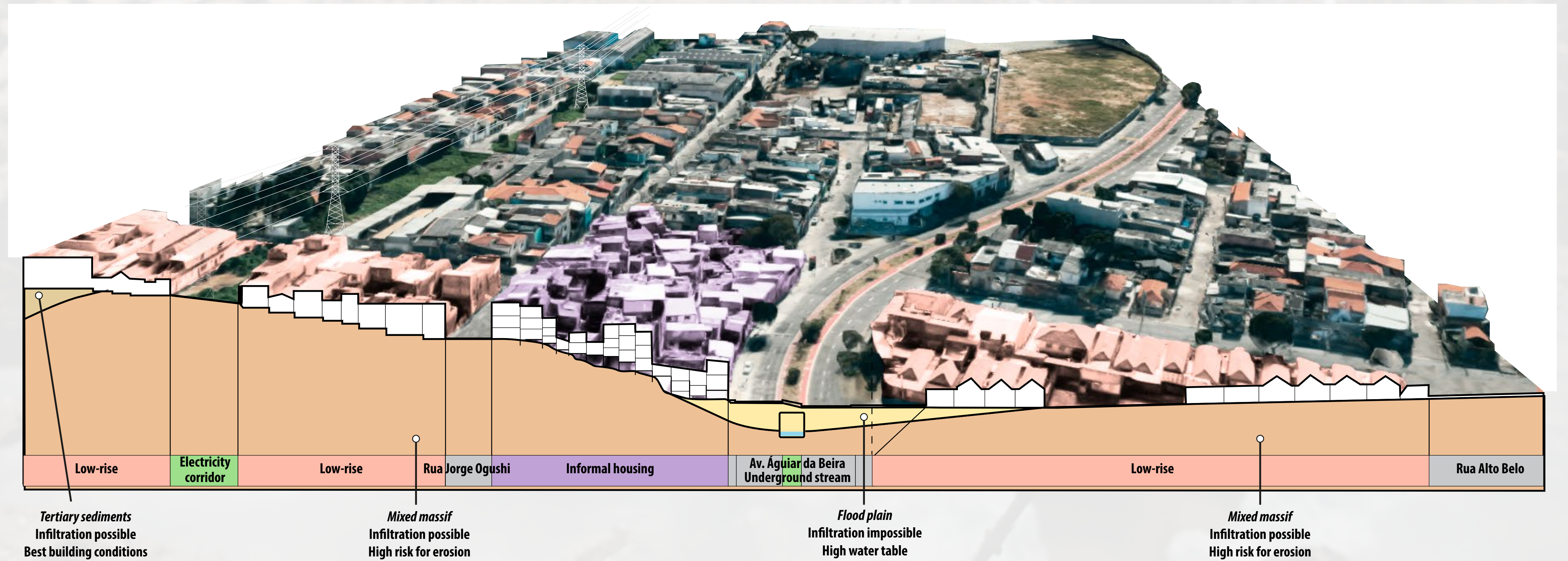
# The strategy



# The ecological axis



# Linear park Taboão

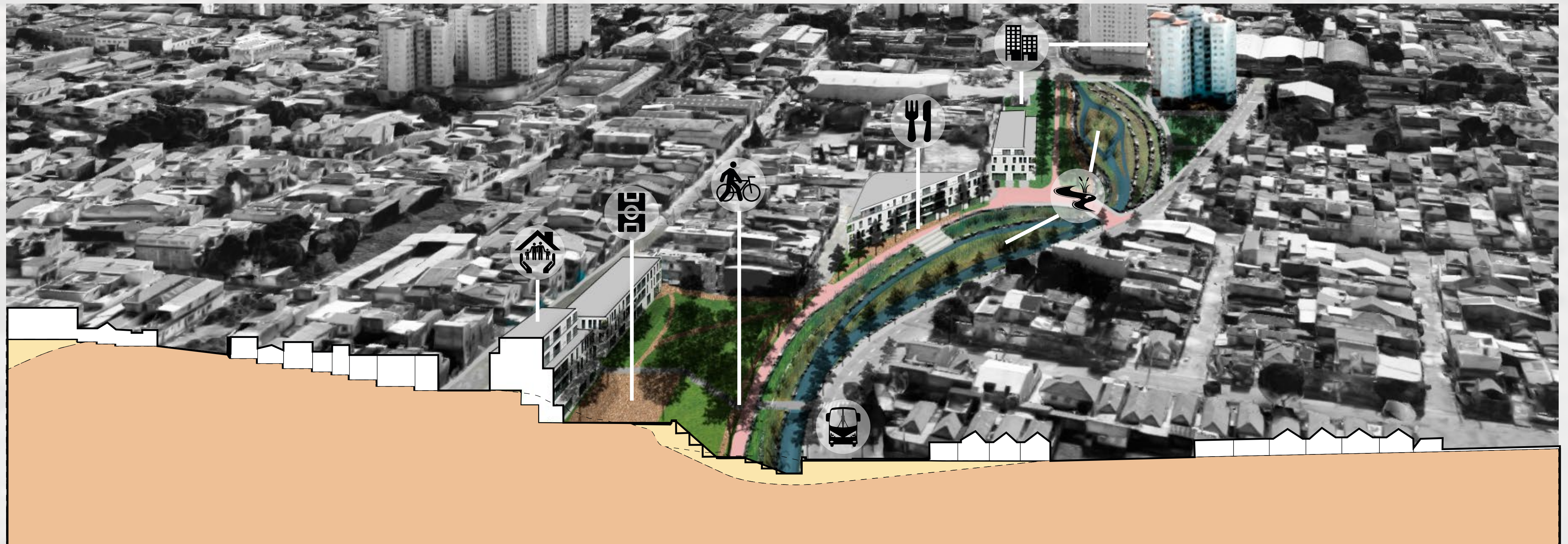


# Linear park Taboão





# Linear park Taboão



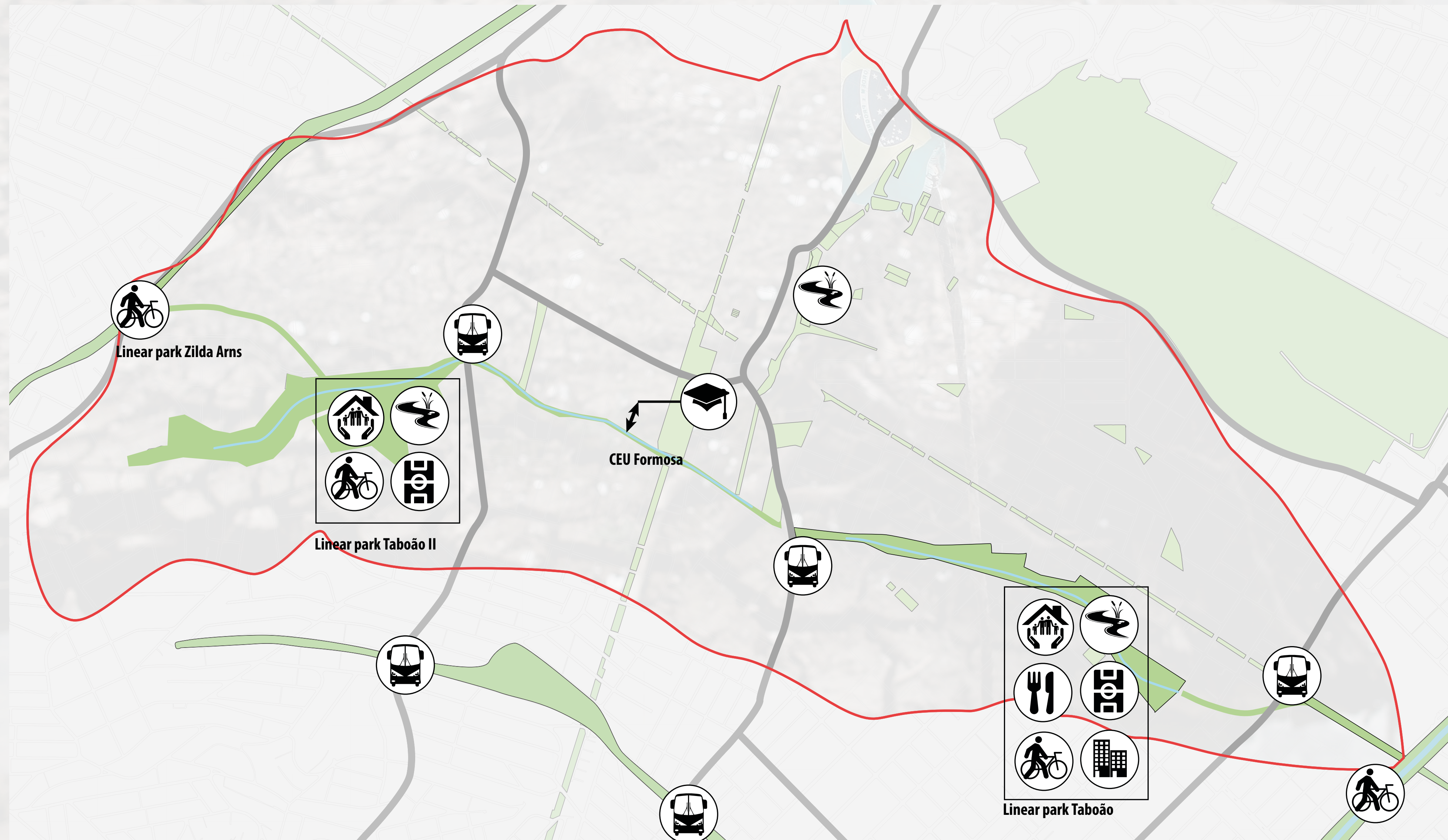
# Linear park Taboão



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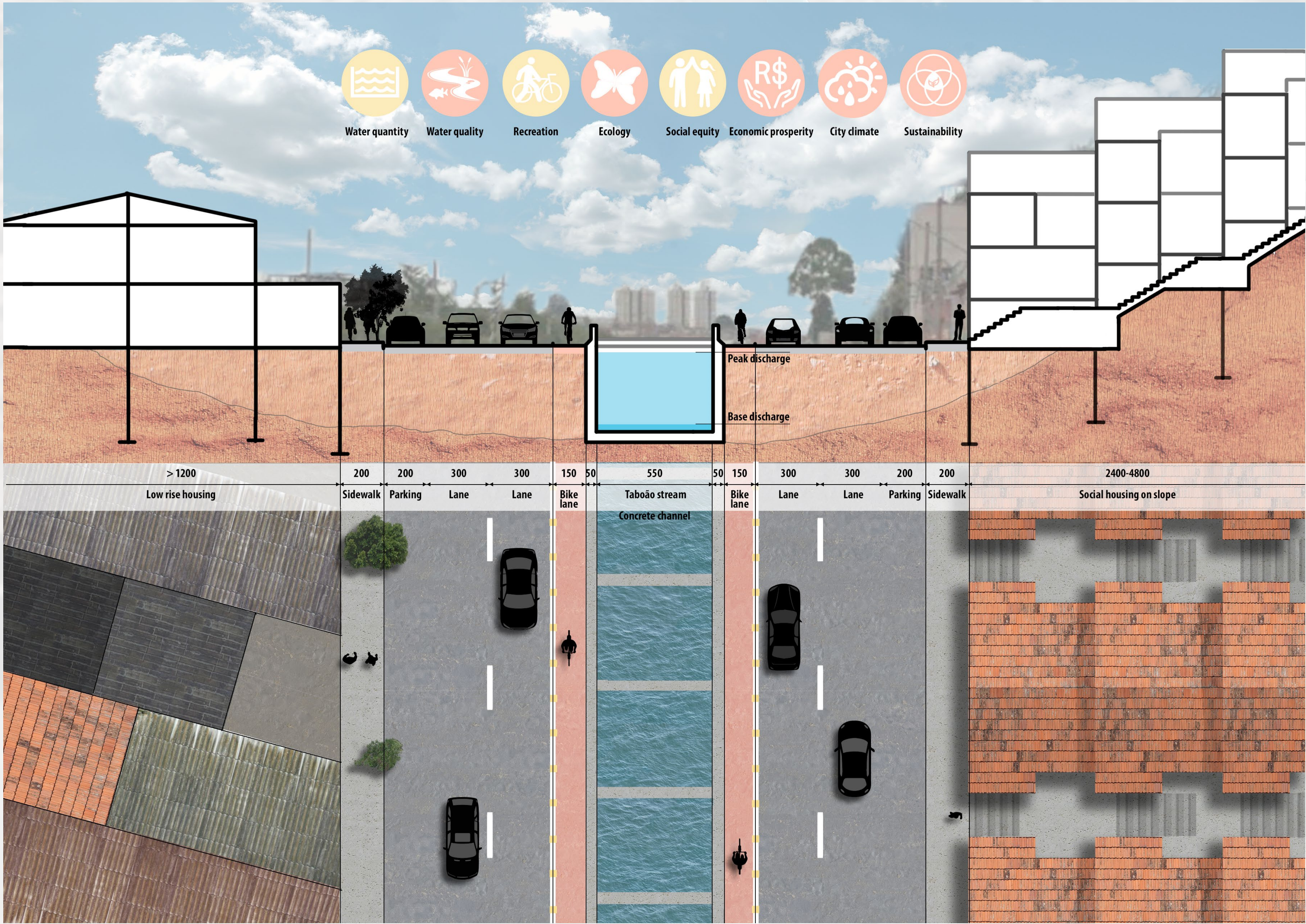
# The ecological axis



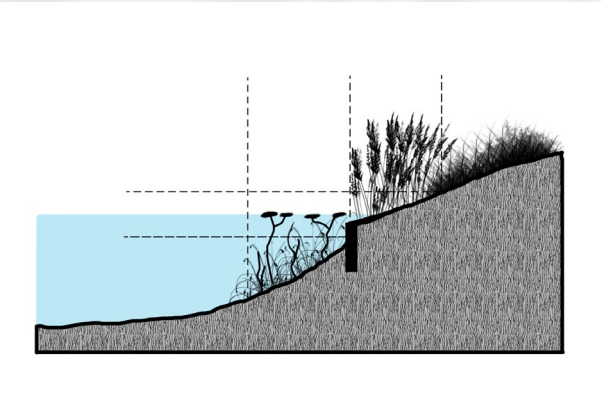
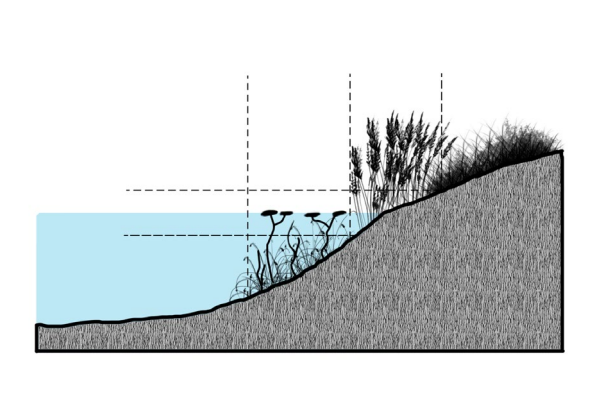
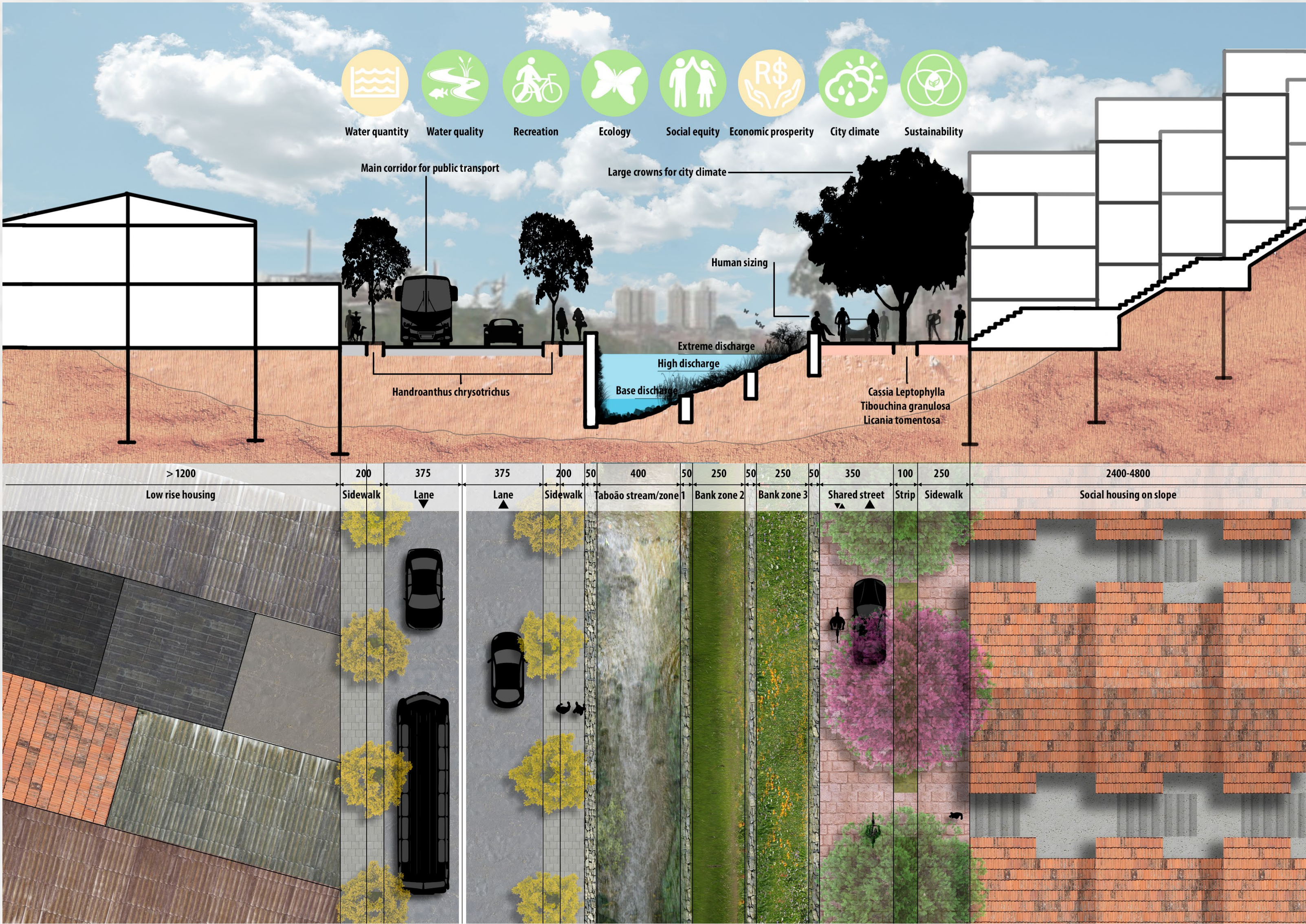
# Interconnectivity



# Interconnectivity



# Interconnectivity



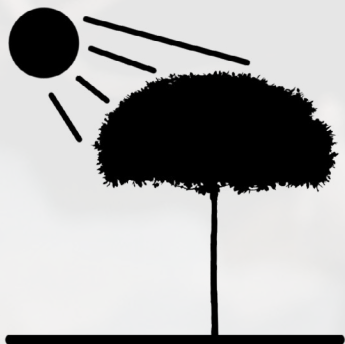
# Interconnectivity



Careful specie selection



Preferably conifer or evergreen

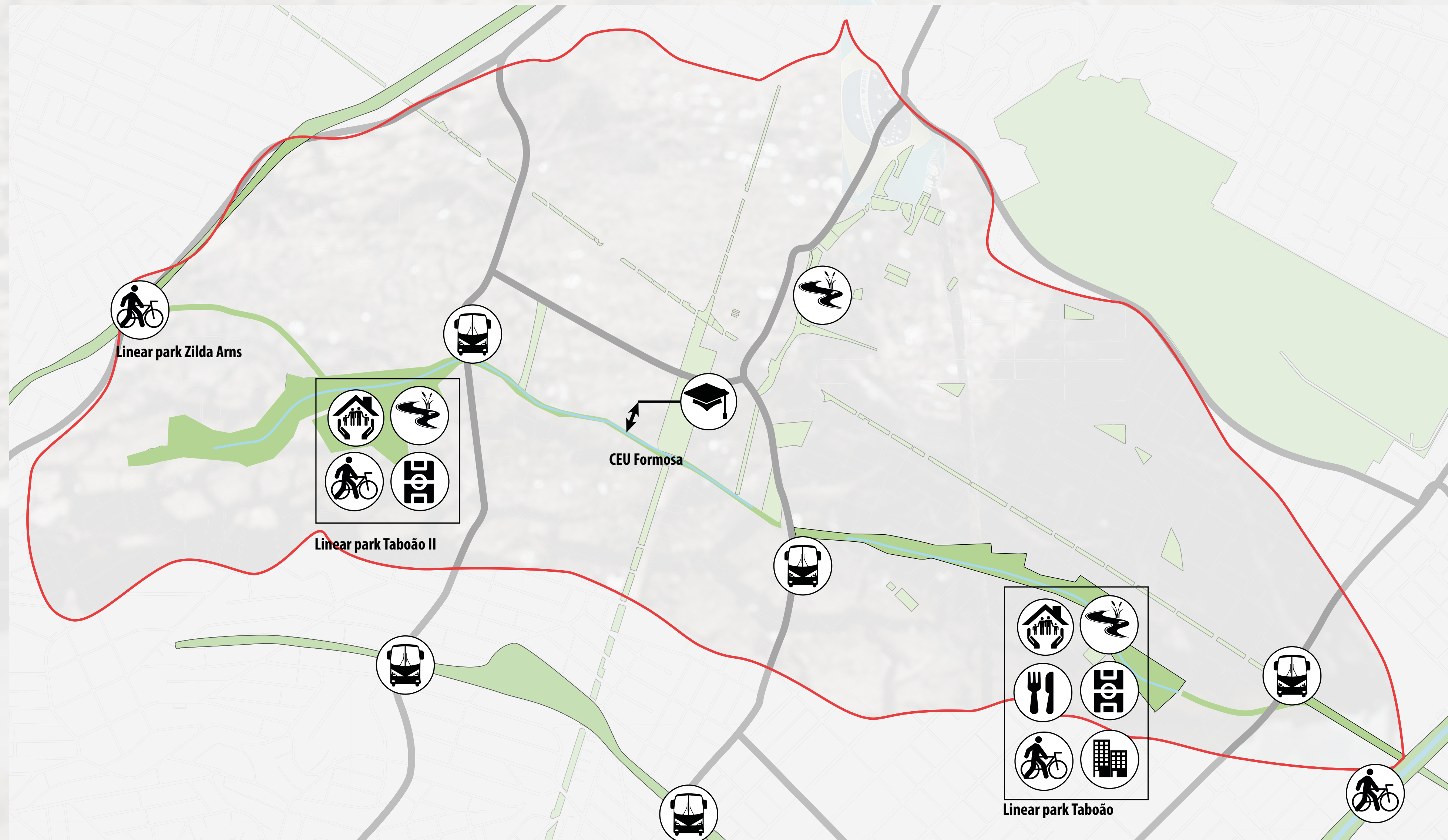


Larger crowns where possible





# The infrastructural axis



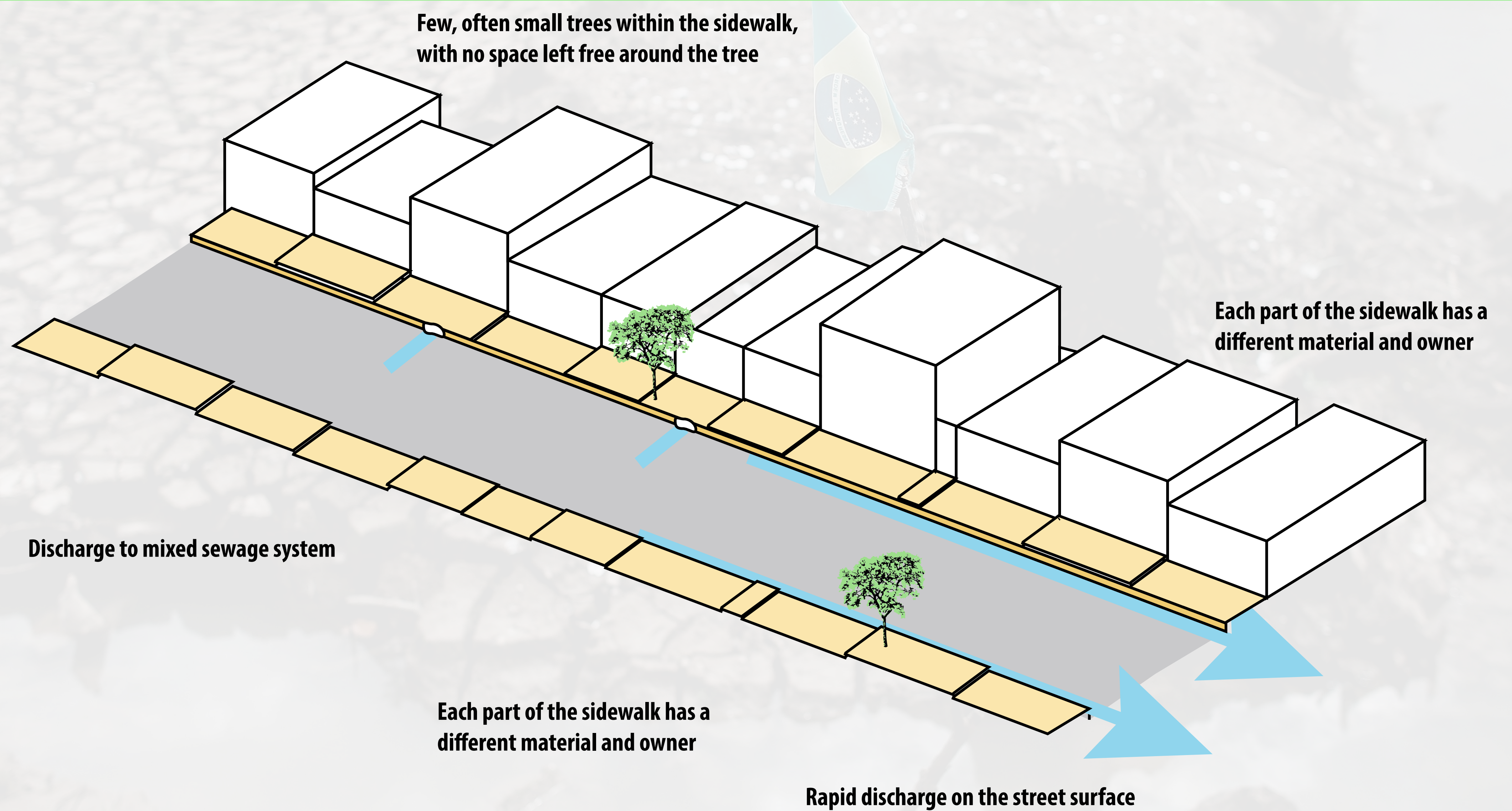
## The infrastructural axis



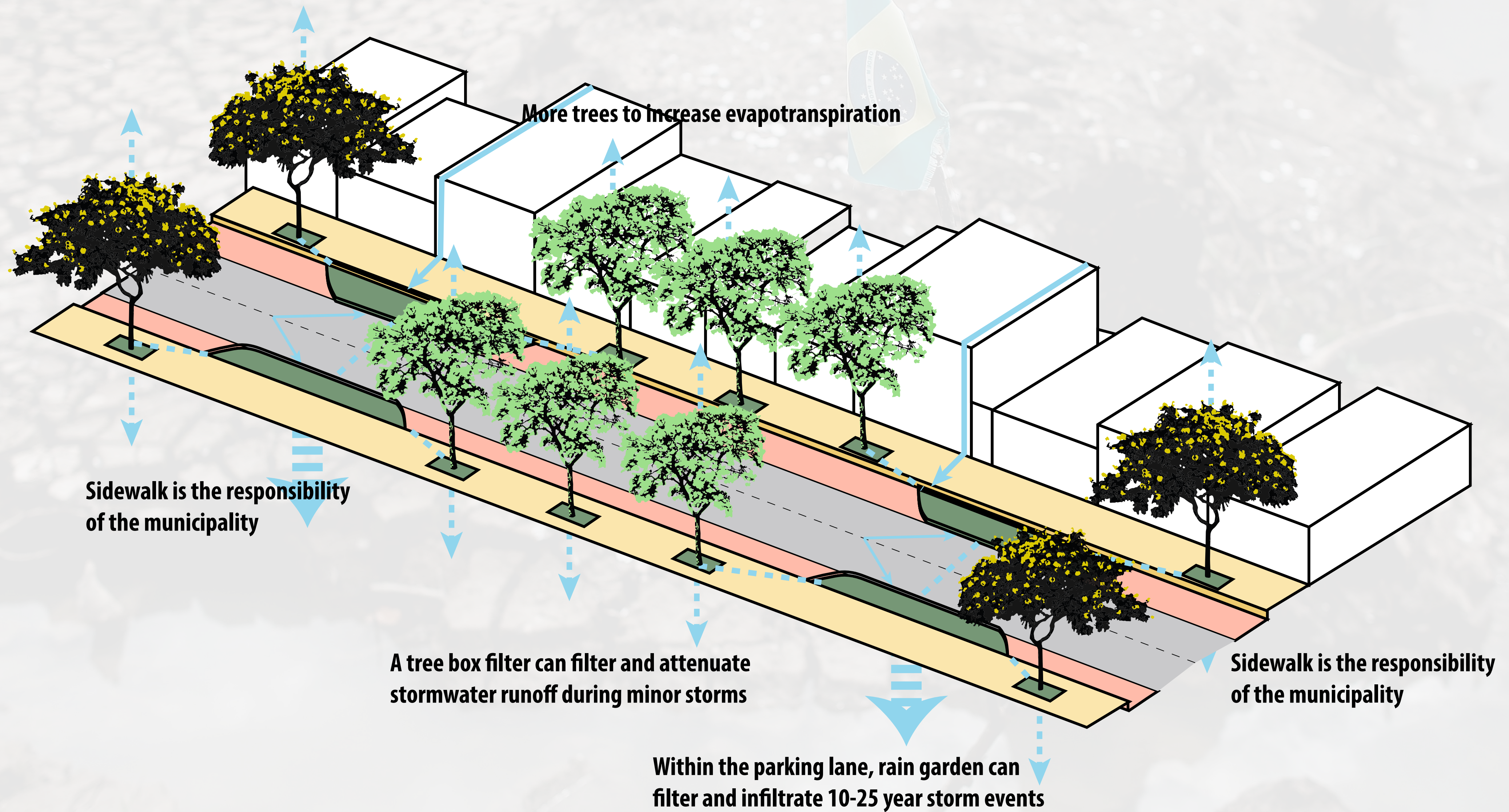
## Improvements throughout the watershed



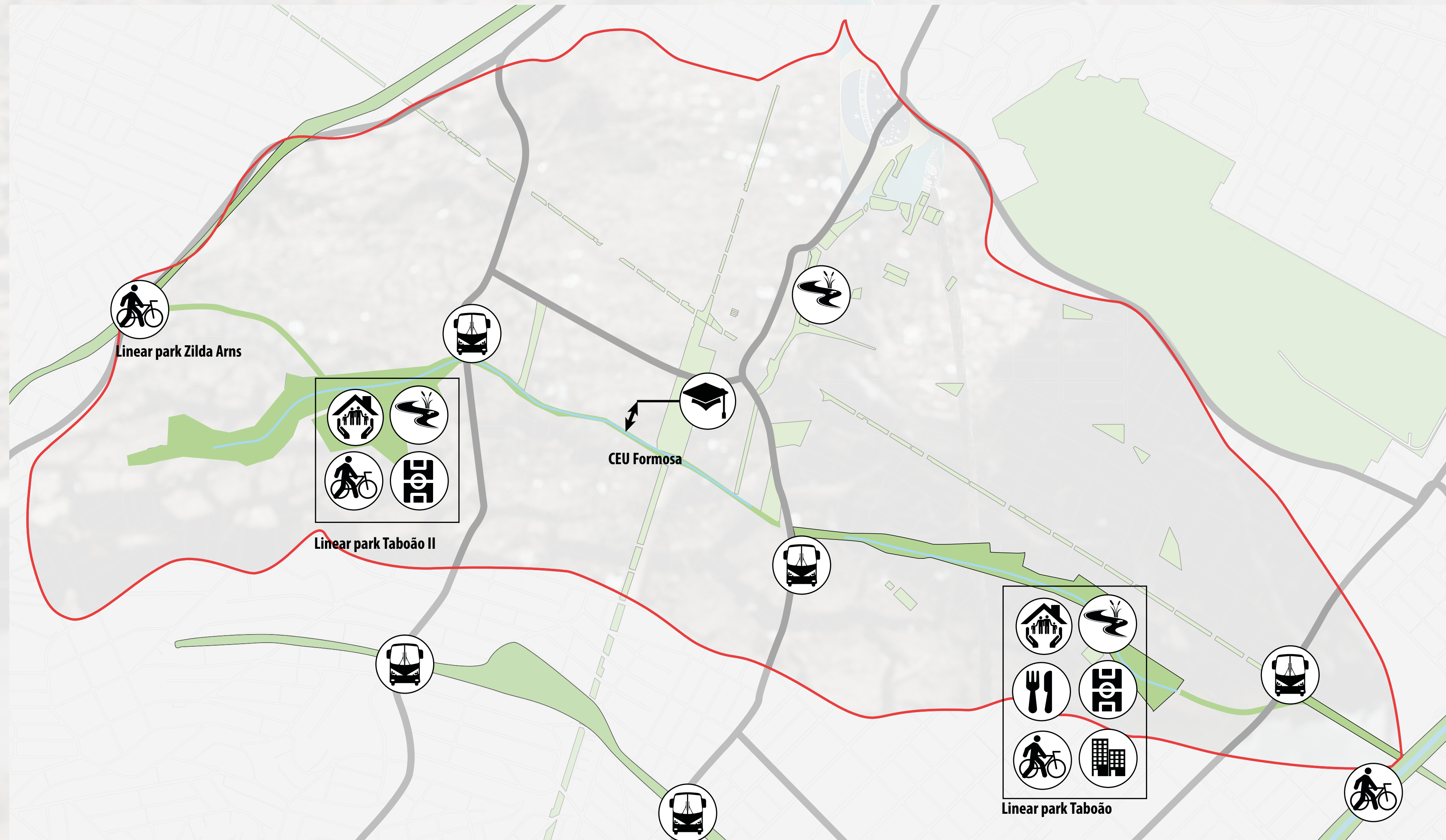
# Improvements throughout the watershed



# Improvements throughout the watershed



# Improvements throughout the watershed



# Towards a city strategy



## Conclusion

**What are the potentials of a strategy focusing on green-blue infrastructure to revitalize the natural water system of São Paulo and improve the living environment of the city?**

**A strategy focusing on green-blue infrastructure can ensure a sustainable balance within the city by:**

- **Creating a green-blue network as a counterweight to the economical and urban development of the city**
  - **Designated ecological axes, to ensure the restoration and future protection of the water system and increase biodiversity within the city**
  - **Creating the availability of sufficient public space in an ever expanding metropolis**
    - **Incorporating social housing in the design of the network, to reduce the vulnerability of both the landscape and the affected people**
      - **SUDS, more open water and urban green, to partially restore the natural water system and reduce the chance on urban floods and droughts**
      - **Integrated education, to educate people about water and nature, to create a sustainable new generation for the environment of the city**

**All while simultaneously adapting the city to climate change**



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Vragen? - Questions? - Perguntas?