Untold waters

Regrowing a coextensive urban riverine landscape through flood mitigation and rehabilitation strategies

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P5
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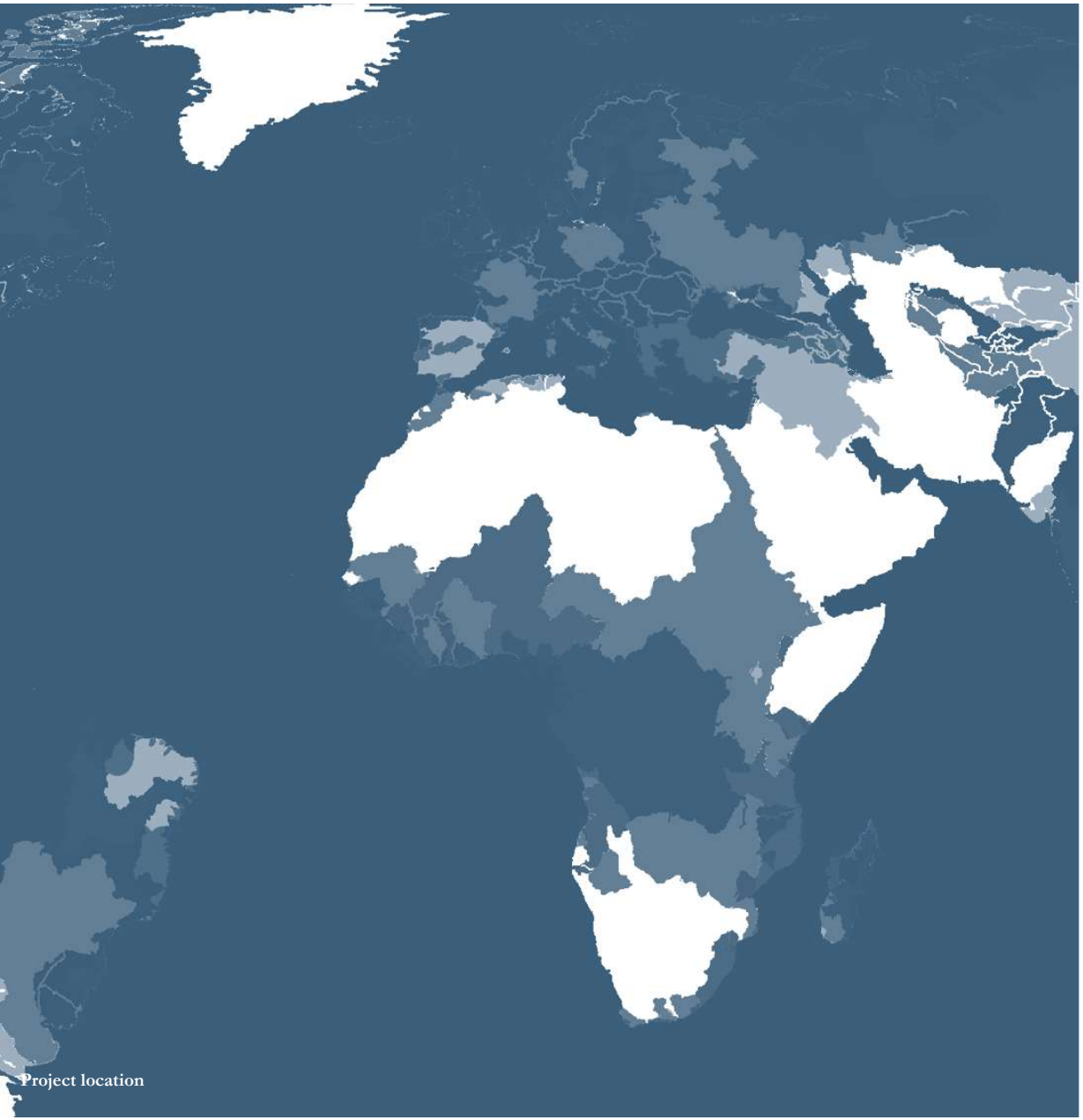
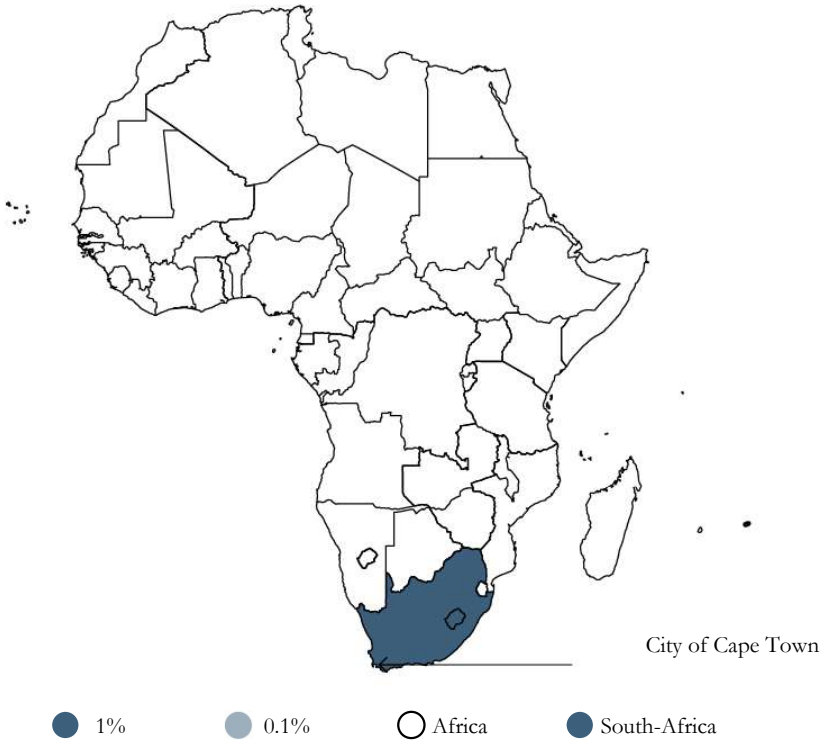
Second mentor: Gert van der Merwe
External Examiner: Dr.ir. Michaël Peeters

25.05.2025

Nakkie van Wyk Photography





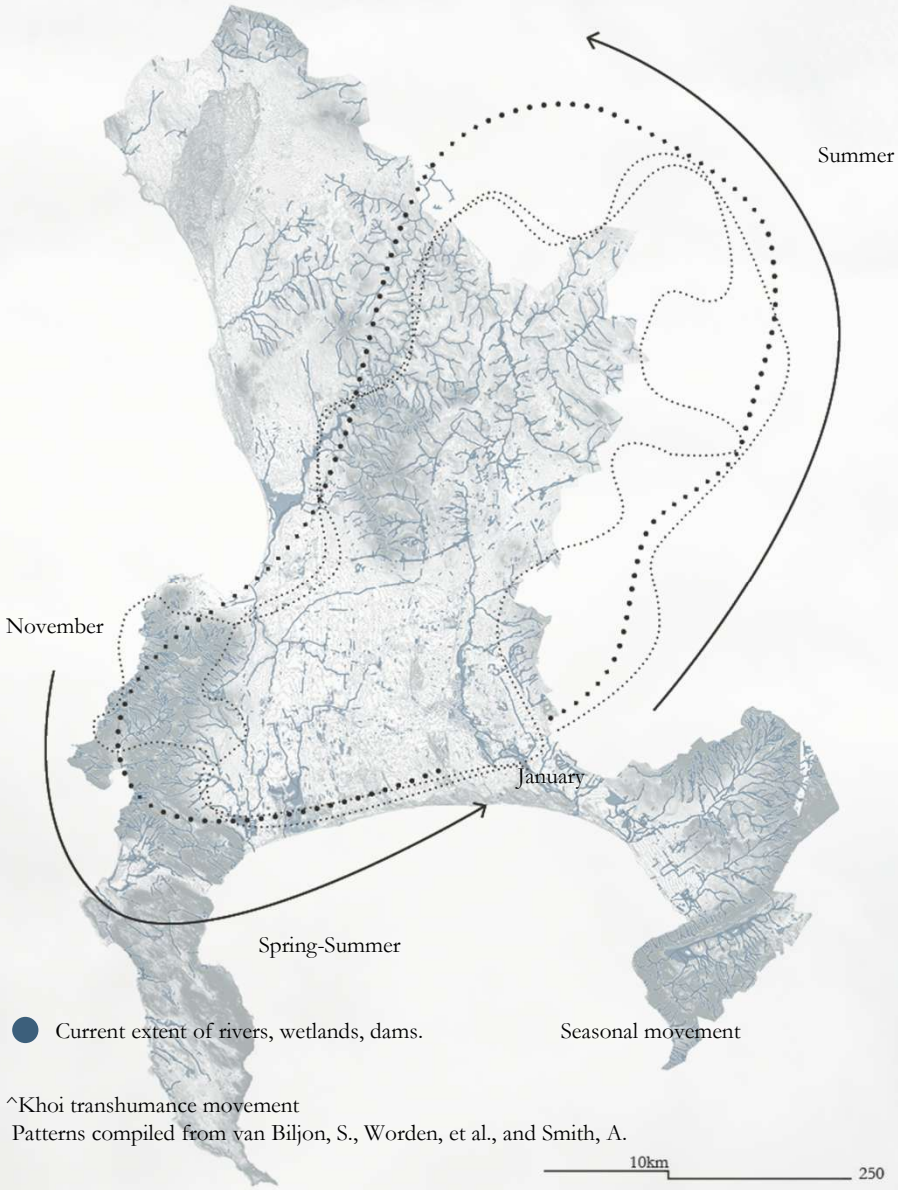
^The rich cultural, geographical, and hydrological heritage of Africa can be found in its striking contrasts. River and stream surface area (%) map by Stevens (2018), edited by author.

Mountain landscape

Project location

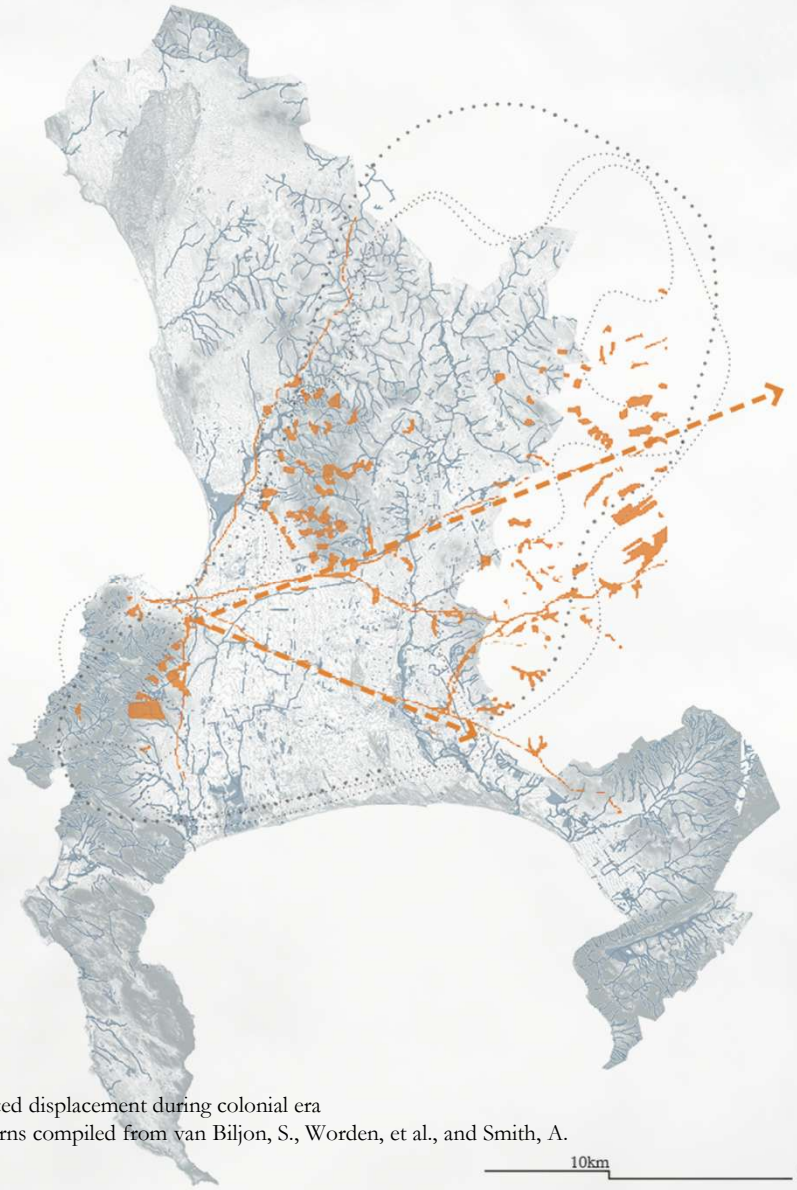
Project context

Native understanding of the land



Project context

Colonial authority



^Forced displacement during colonial era
Patterns compiled from van Biljon, S., Worden, et al., and Smith, A.

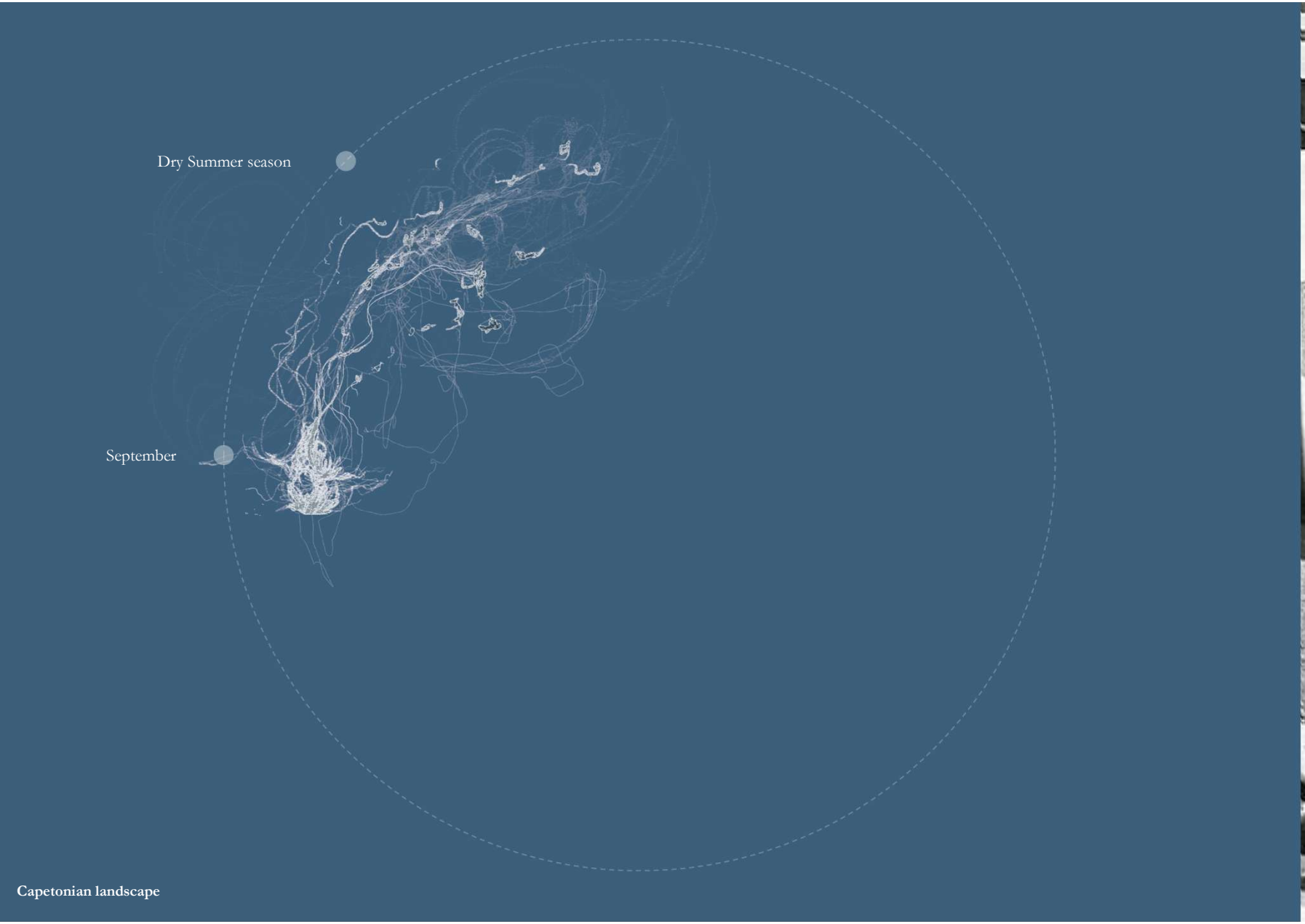
Project context

Present-day Capetonians

September

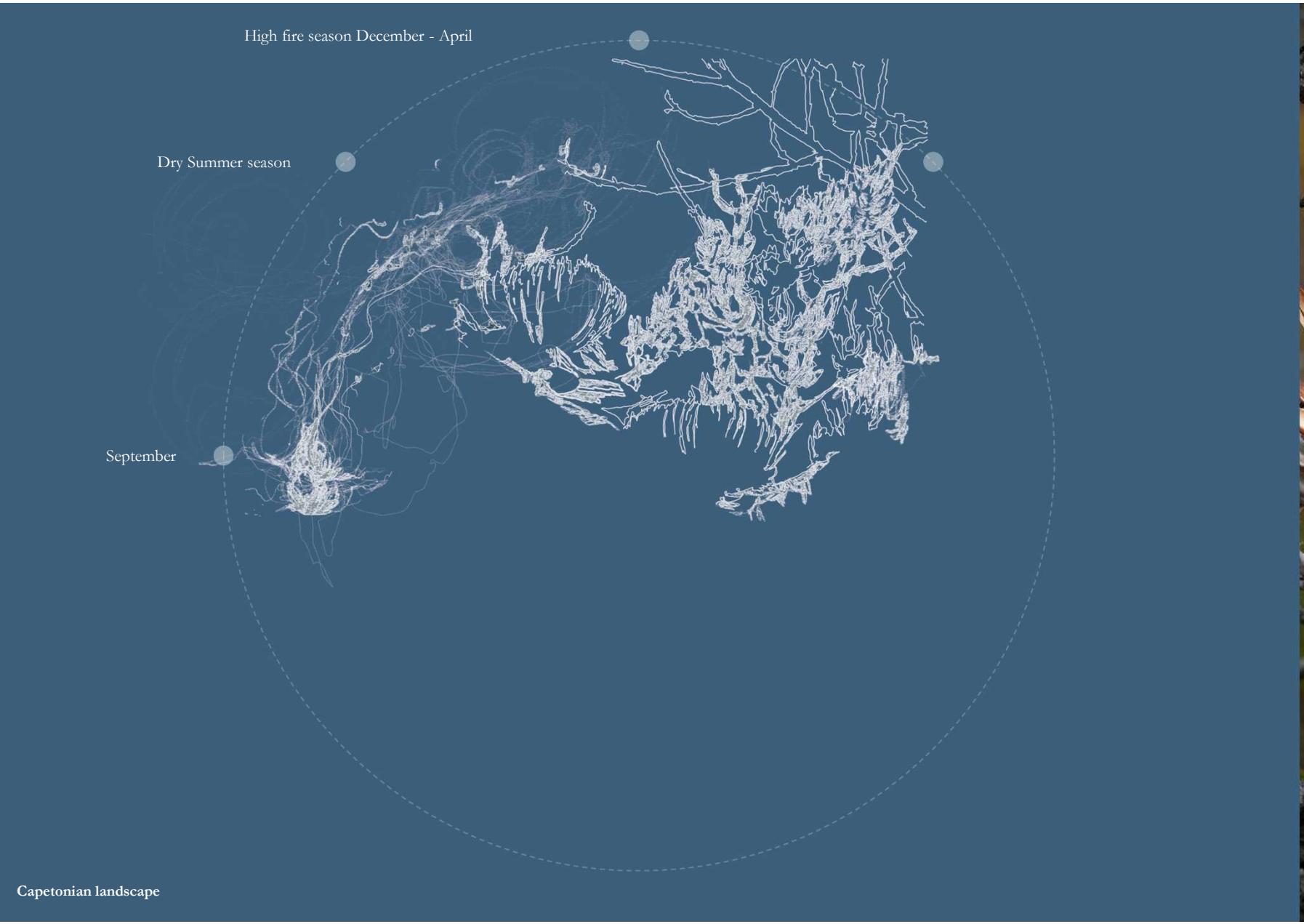
Capetonian landscape

Sullivan Photography, 2017



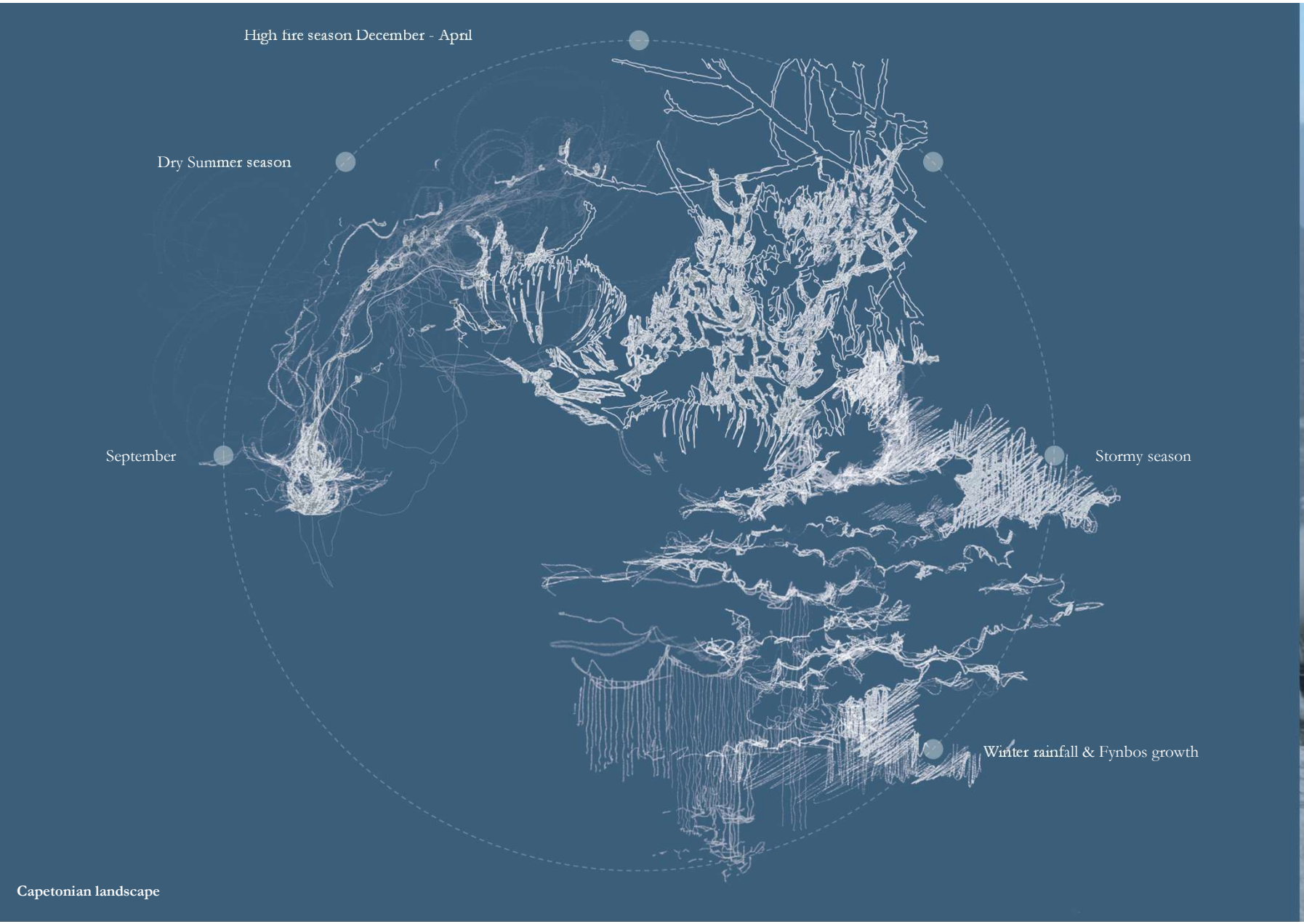
Capetonian landscape

The Argus



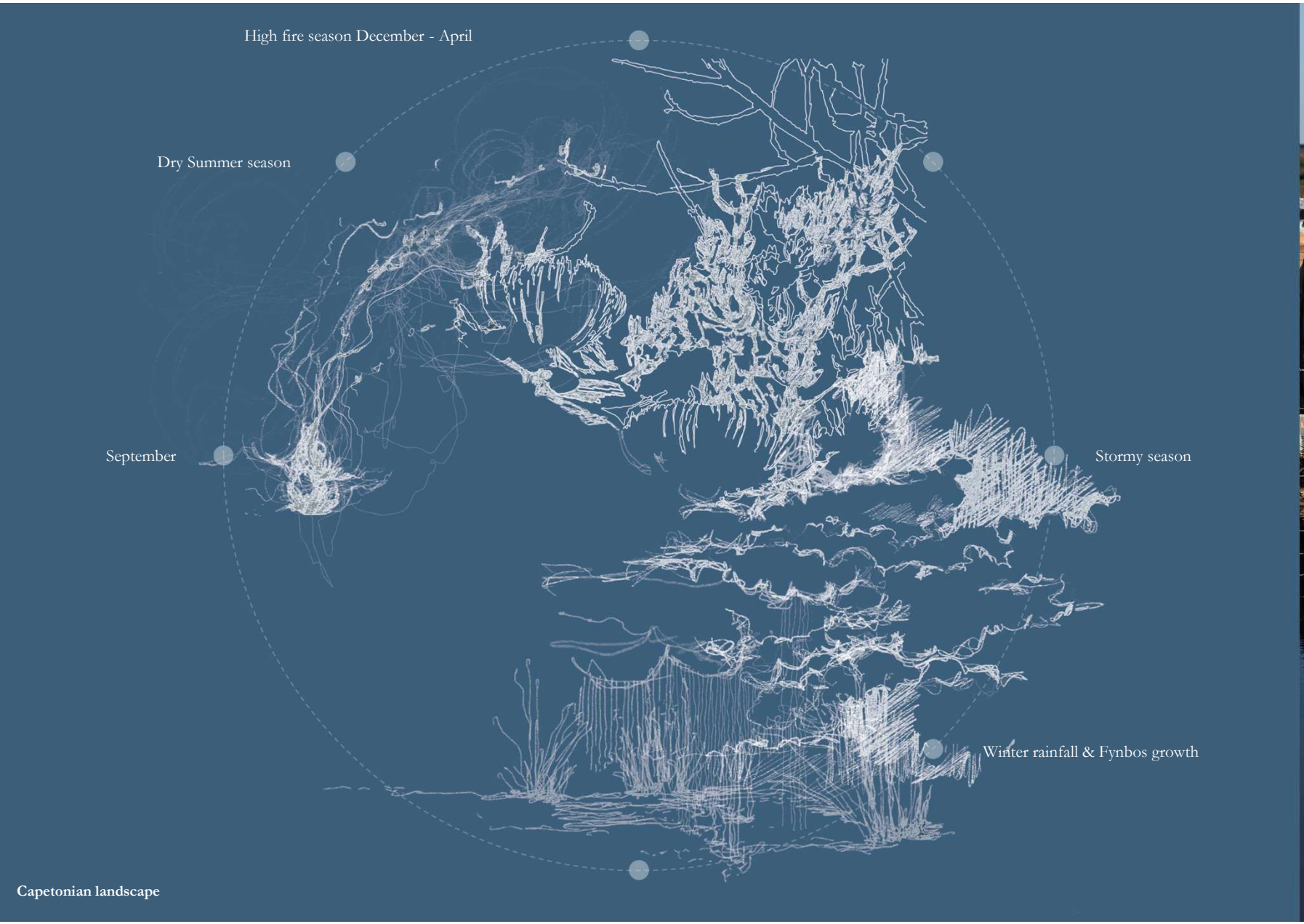
Capetonian landscape

Brett Cole



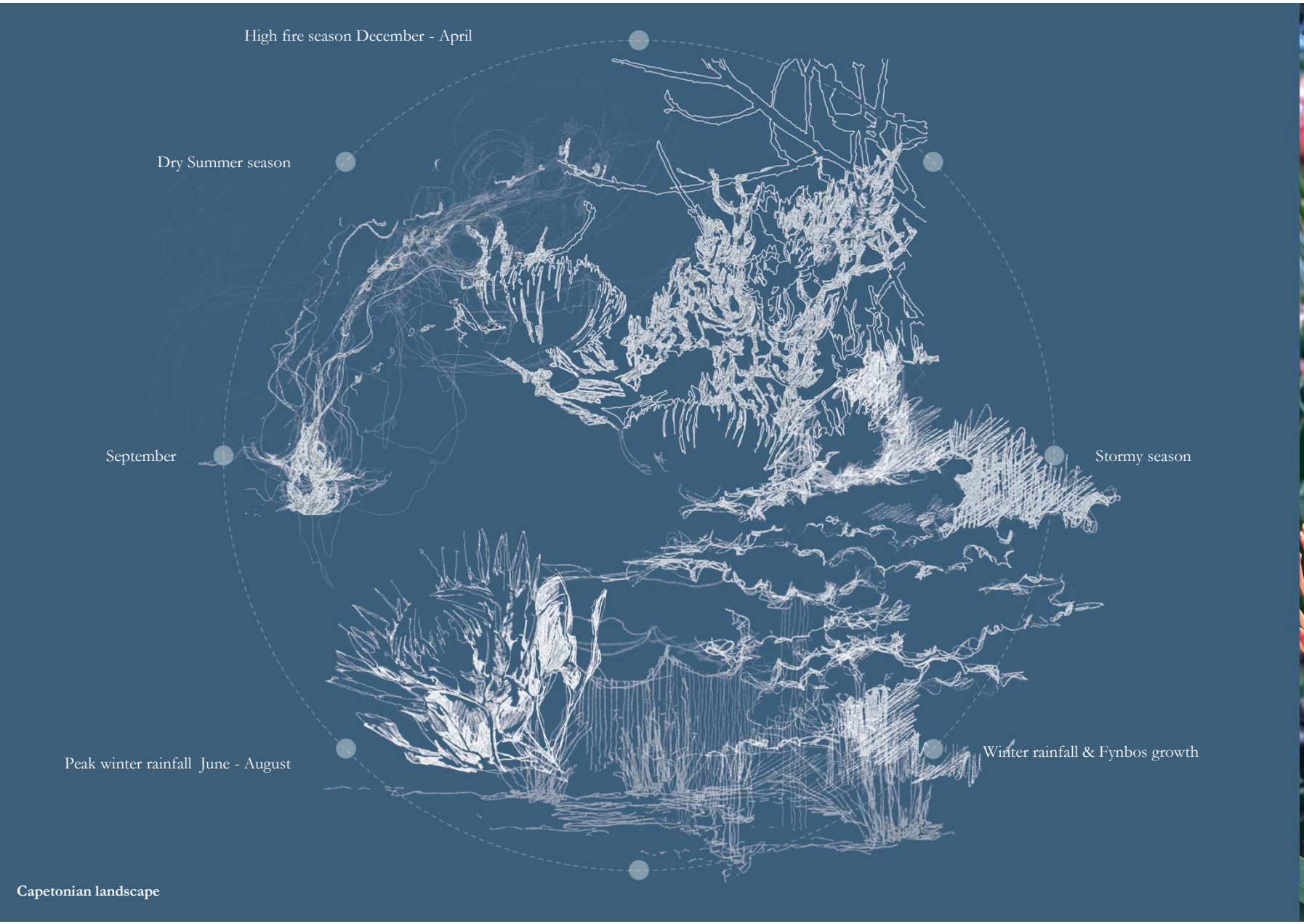
Capetonian landscape

Geach, 2024

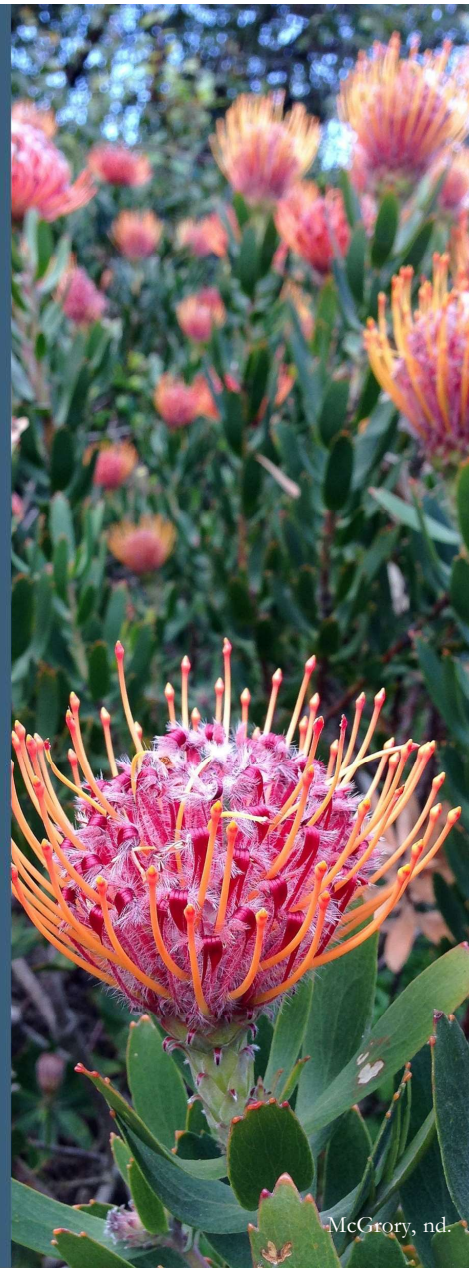


Capetonian landscape

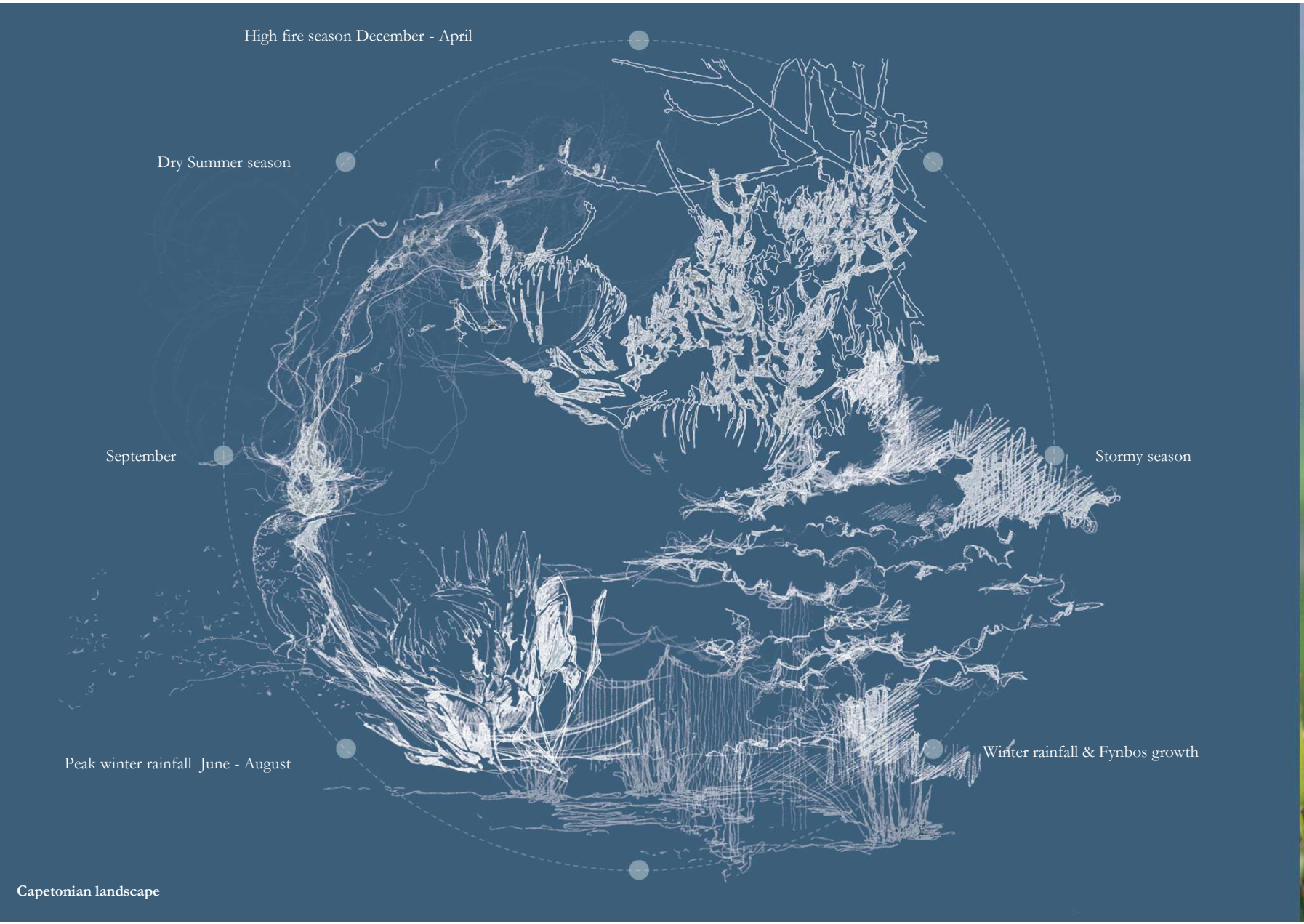
Harrison, 2020



Capetonian landscape



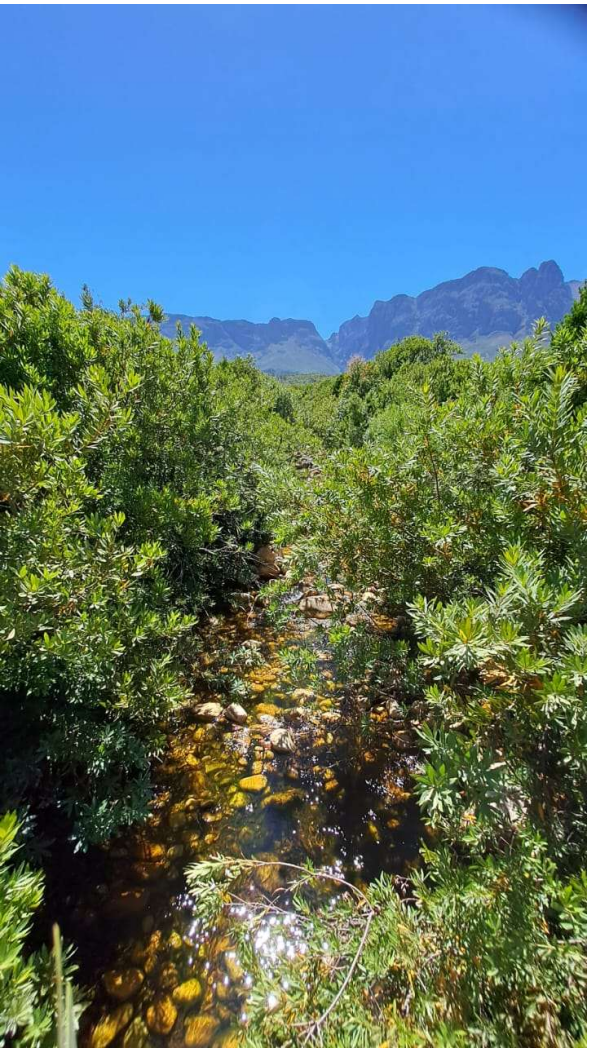
McGrory, nd.



Capetonian landscape

Manson, nd.


Sir Lowry's Pass catchment area
Project location



^Natural state of the river

^The river brings stones and soil from the mountain

^The dry landscape becomes saturated during floods

Sir Lowry's Pass riverine landscape

^Roots of invasive species cause the soil to lift and worsen the erosive effects during floods

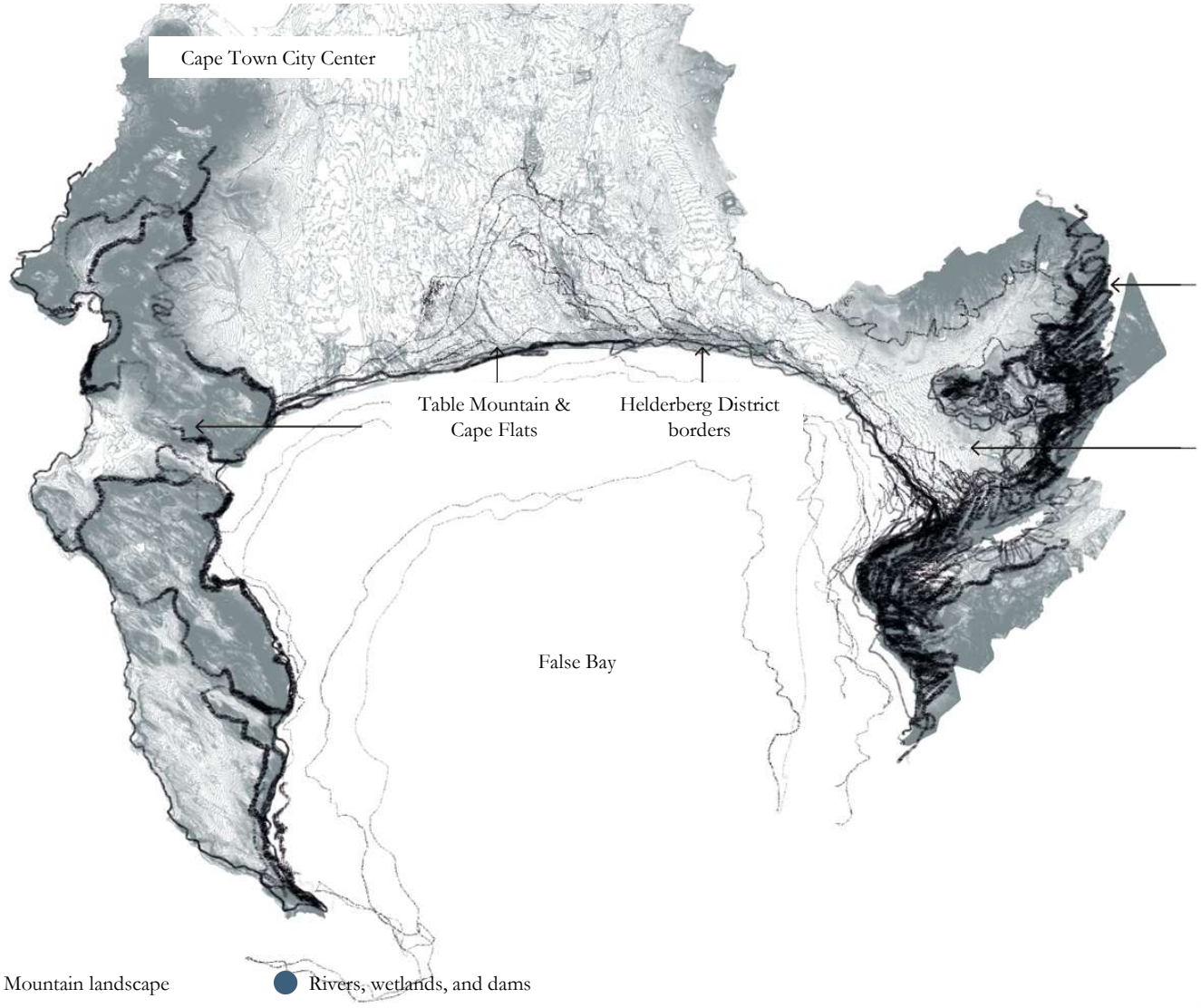
^Remaining natural wetlands

Sir Lowry's riverine landscape

^Meandering mid- to downstream river

^Canalised river in urban residential areas

Sir Lowry's Pass riverine landscape



^Helderberg District

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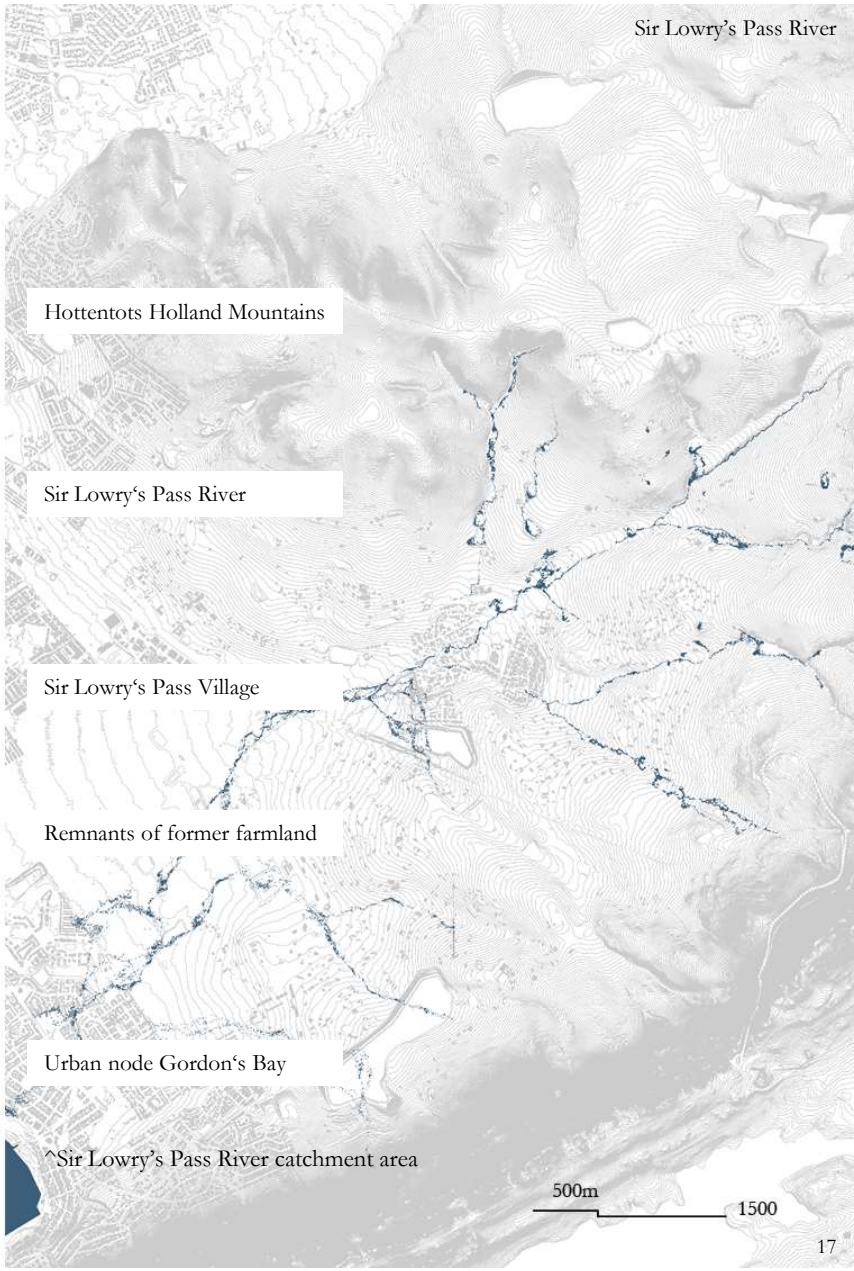
Sir Lowry‘s Pass riverine landscape

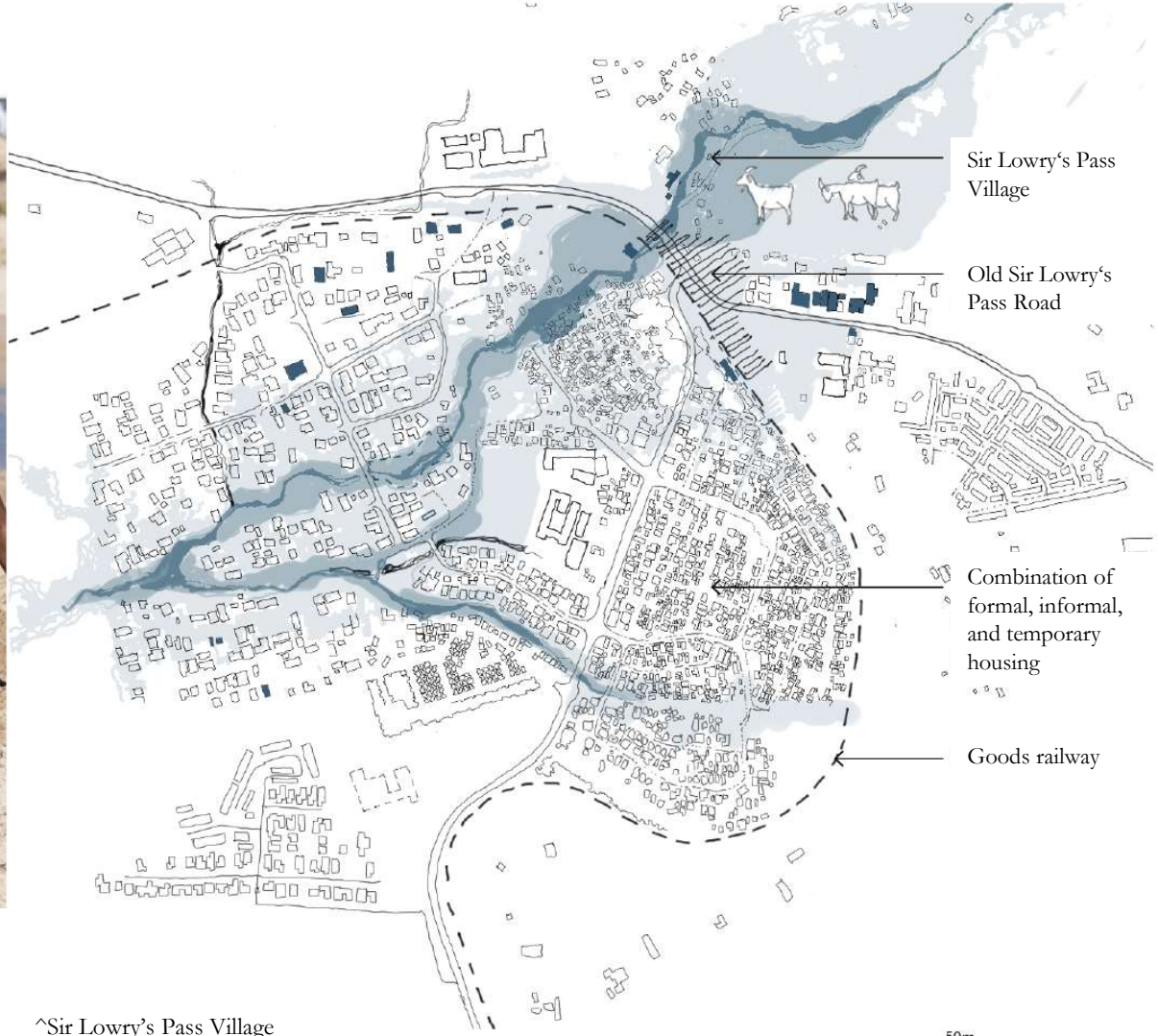


Sir Lowry's Pass Flood 2023

Hendricks, 2023

^Traces left after the flooding

Sir Lowry‘s Pass Flood 2023



^Sir Lowry’s Pass Village

Sir Lowry's Pass Flood 2023

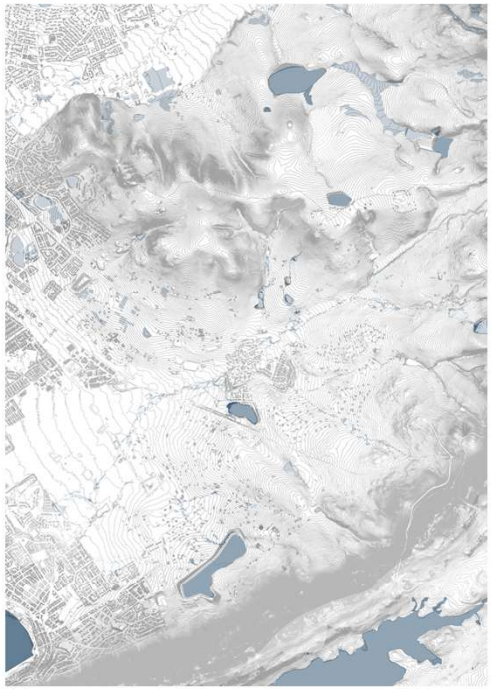
Bosch, 2023

Sir Lowry's Pass Flood 2023

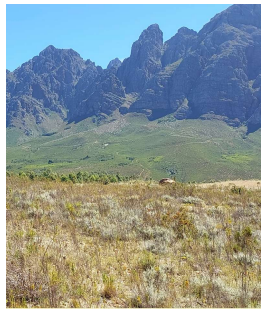
Bosch, 2023

Sir Lowry's Pass Flood 2023

Bosch, 2023



^Reference plan



Informal and polluted river

Invasive tree species

Agricultural land

120mm within 48 hours

+1000m

+0m

0

1000m

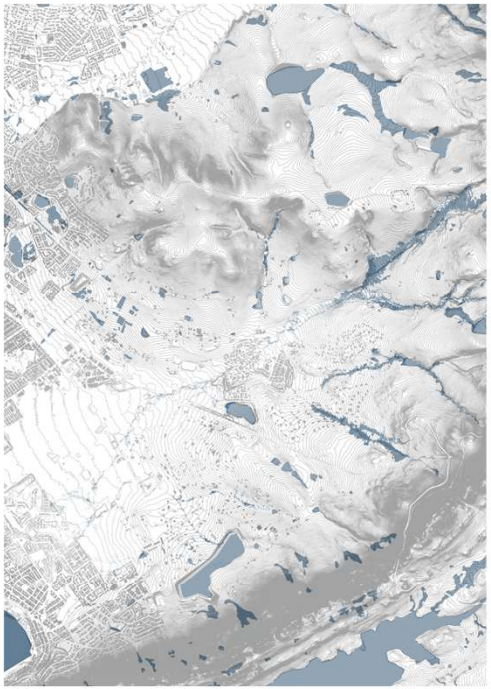
^Mountain stream

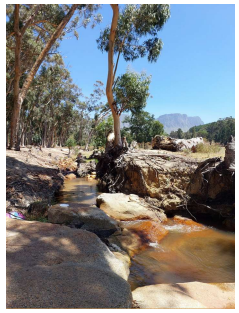
Downstream

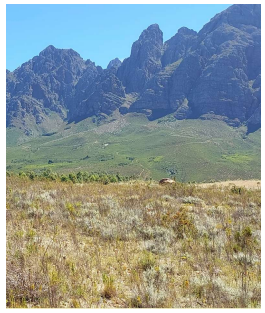
Midstream

Upstream river

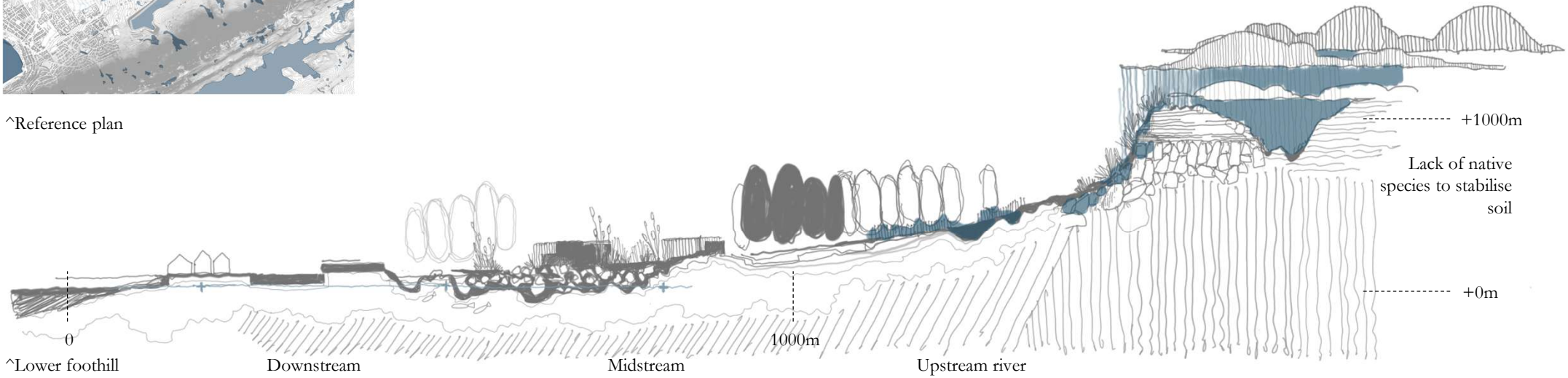
Annual rainfall
600 – 2000mm

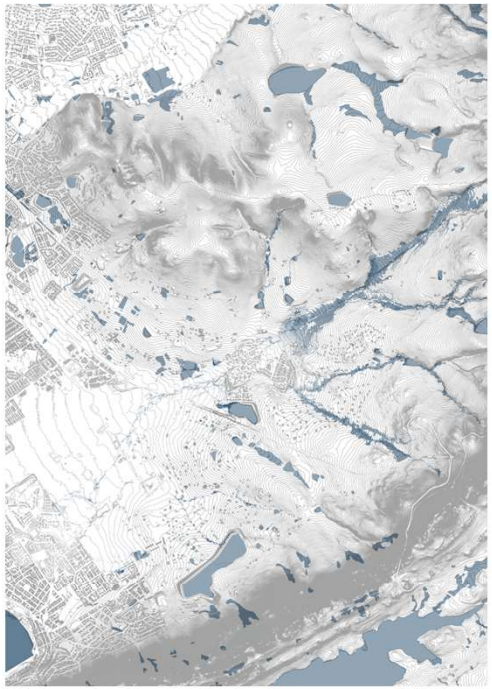


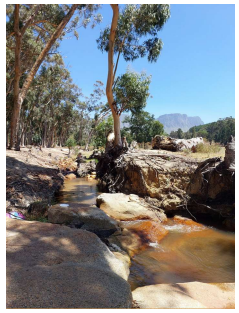


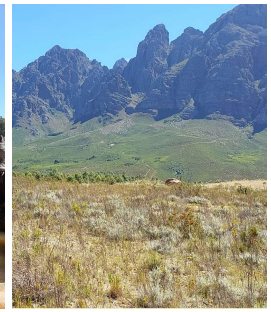


^Reference plan

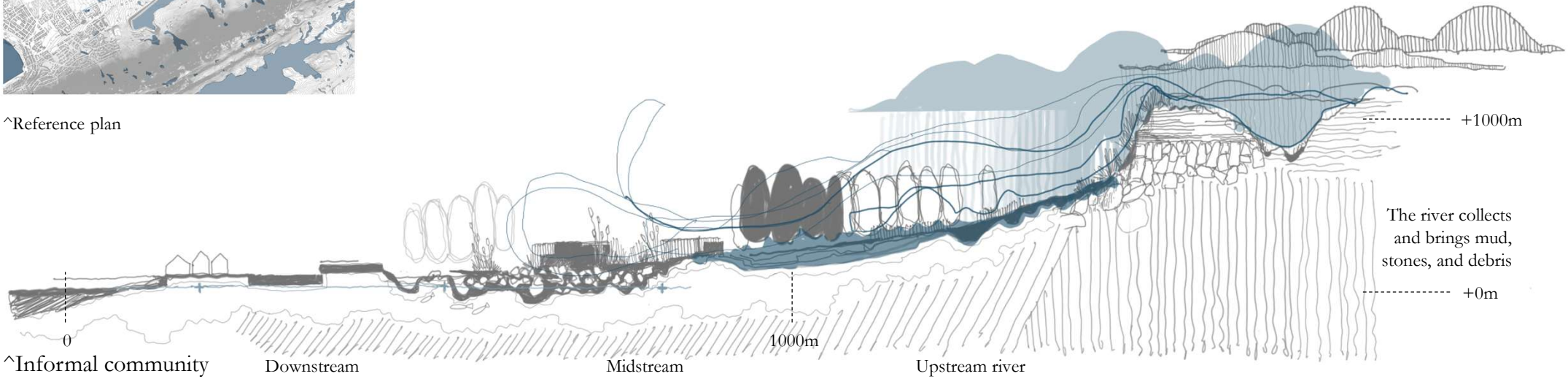




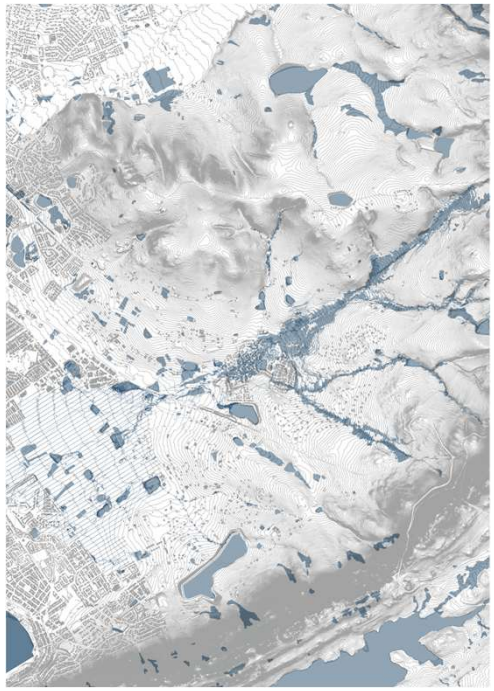




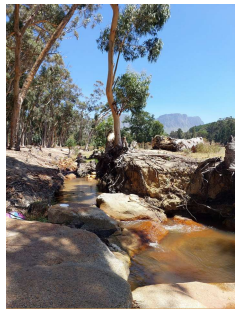
^Reference plan

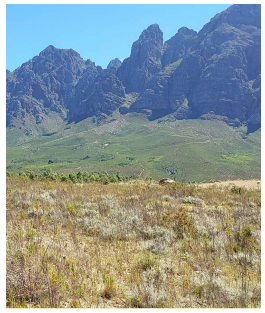


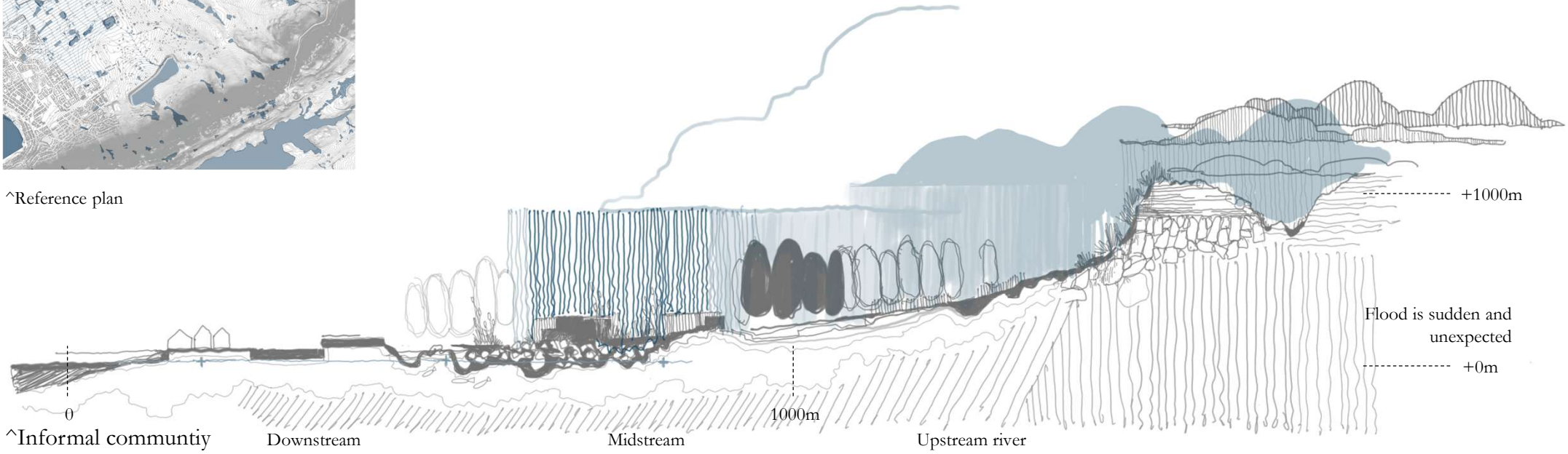
^Informal community

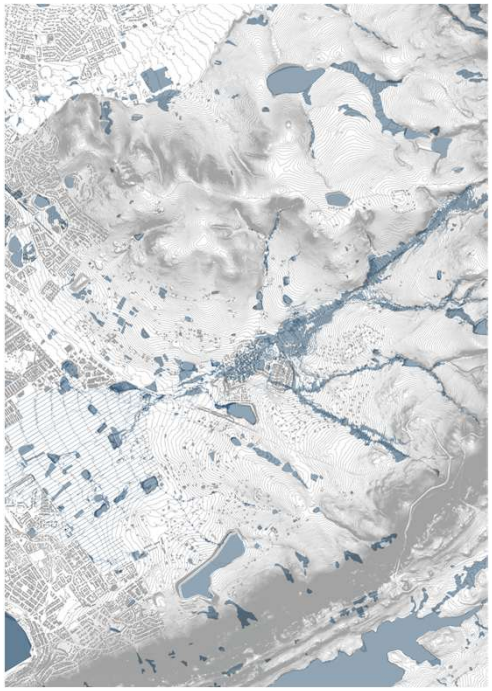


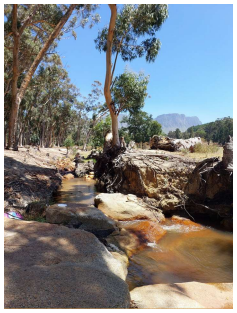
^Reference plan

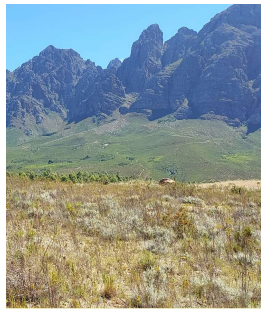




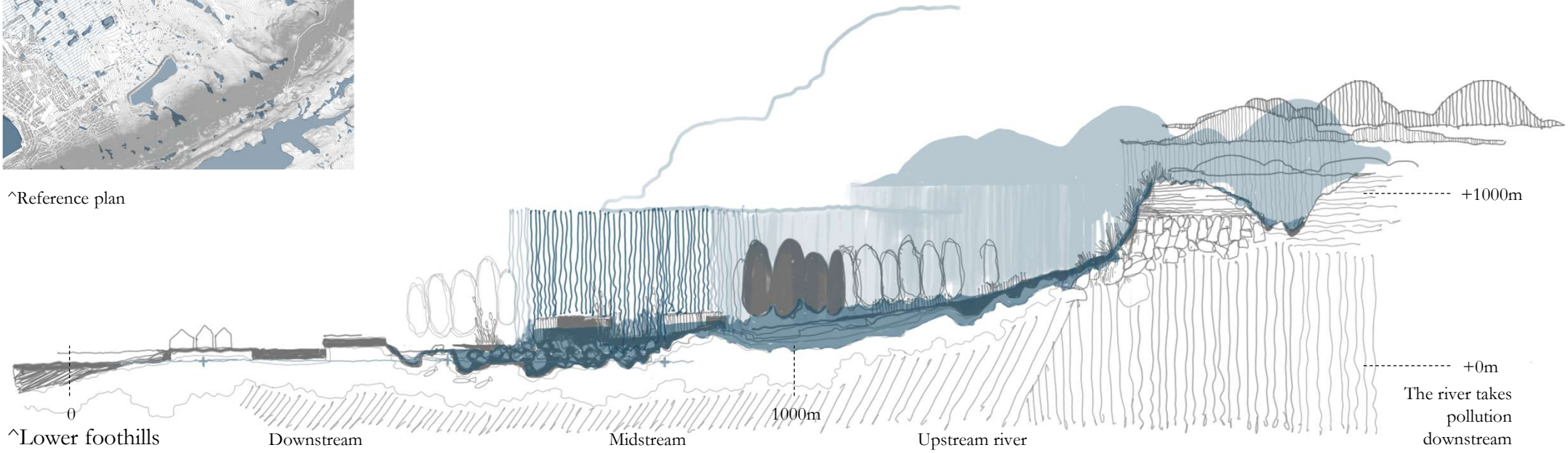








^Reference plan

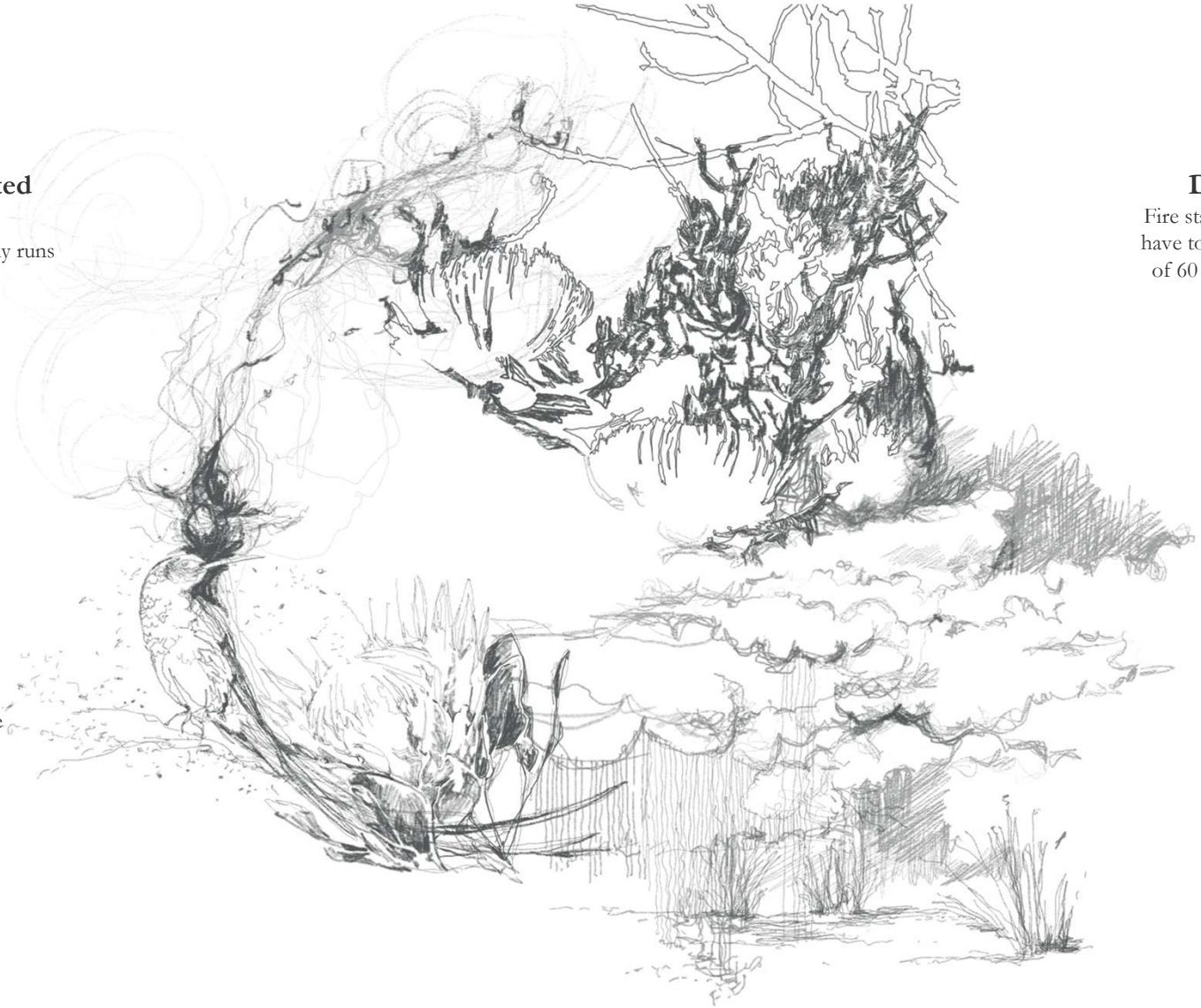


^Flooded informal dwelling
Ndamane, 2020

^River sedimentation informal settlement Sir Lowry‘s Pass Village
Hendricks, 2023

Drought and limited water resources
Day Zero – the city nearly runs out of water

Loss of native Fynbos sepcies
The Fynbos biome is one of the world's most threatened ecosystems.



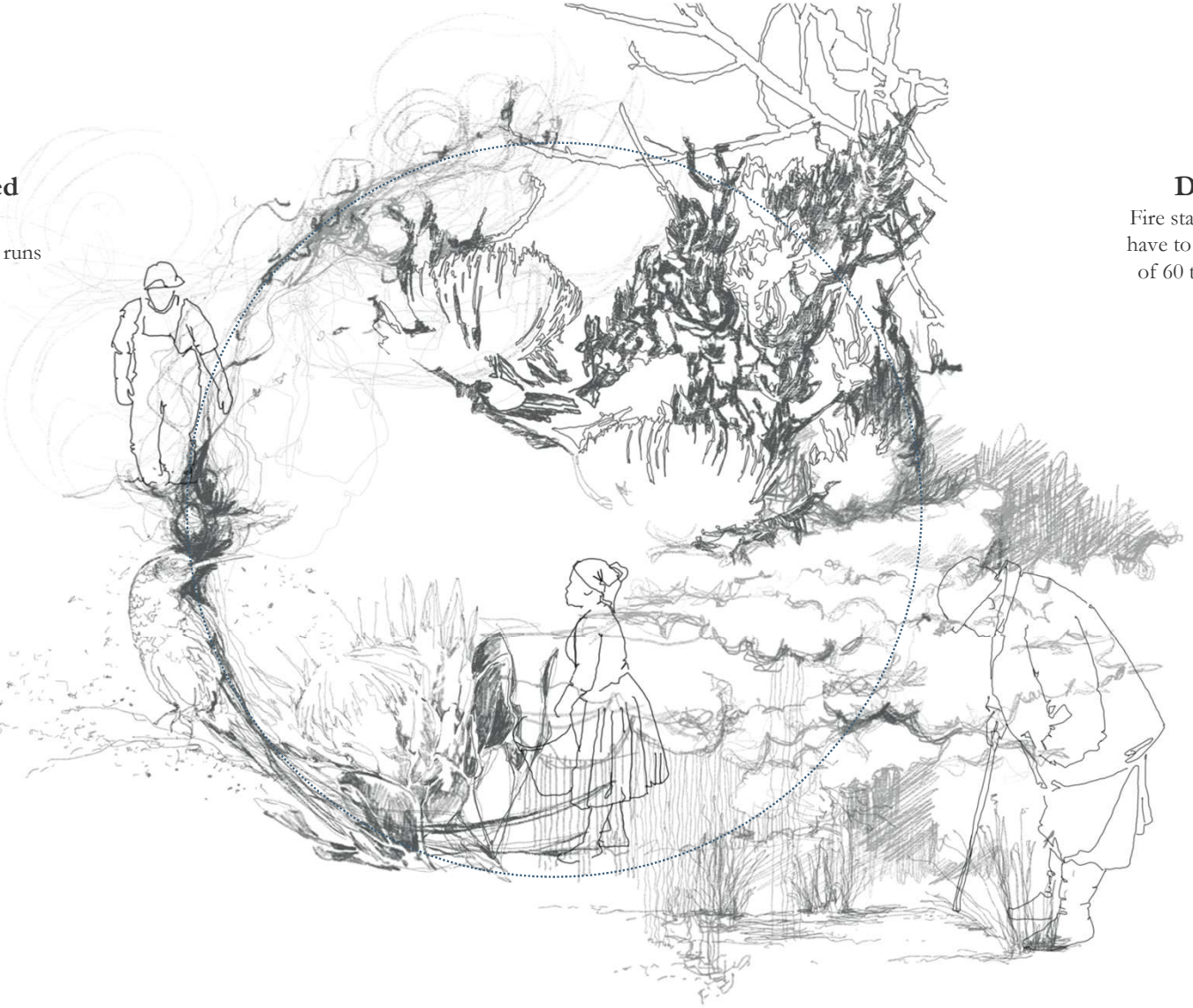
Destructive fires
Fire stations in the City that have to deal with an average of 60 to 130 incidents daily

Flooding
Annula floodings in informal areas

^Main landscape factors

Drought and limited water resources
Day Zero – the city nearly runs out of water

Destructive fires
Fire stations in the City that have to deal with an average of 60 to 130 incidents daily



Loss of native Fynbos sepcies
The Fynbos biome is one of the world's most threatened ecosystems.

Flooding
Annula floodings in informal areas

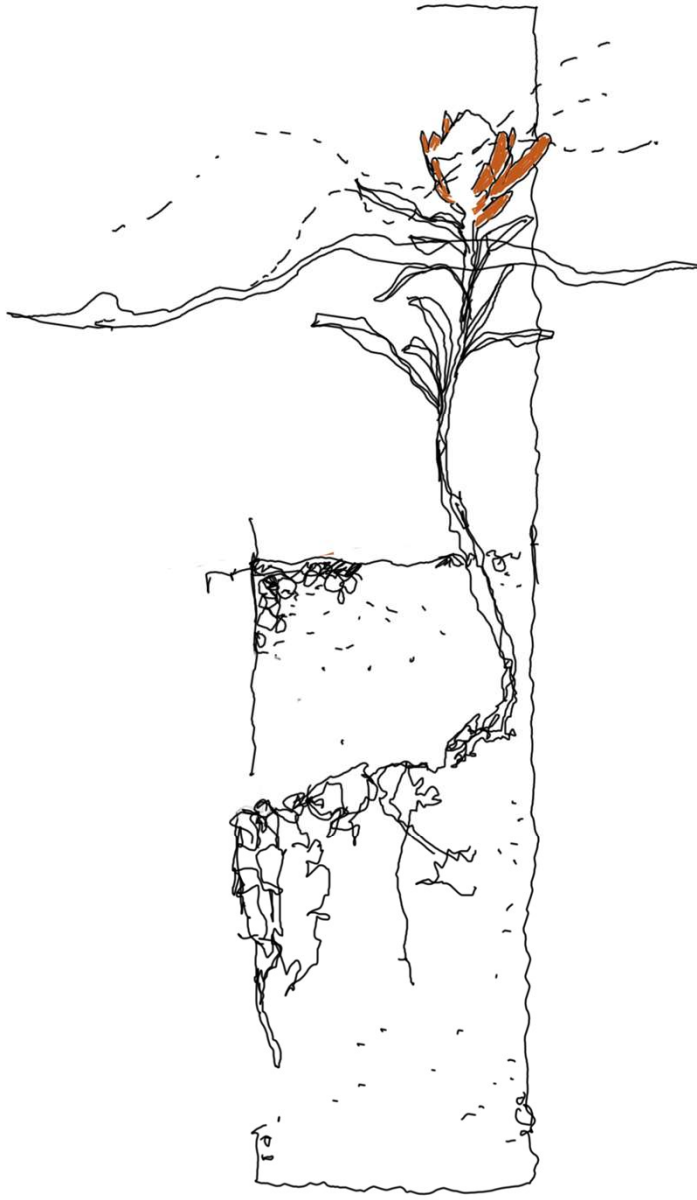
^Human and landscape entanglement

Coextensive riverine landscape

Context
River‘s landscape

riverine

landscape?



Coextensive riverine landscape

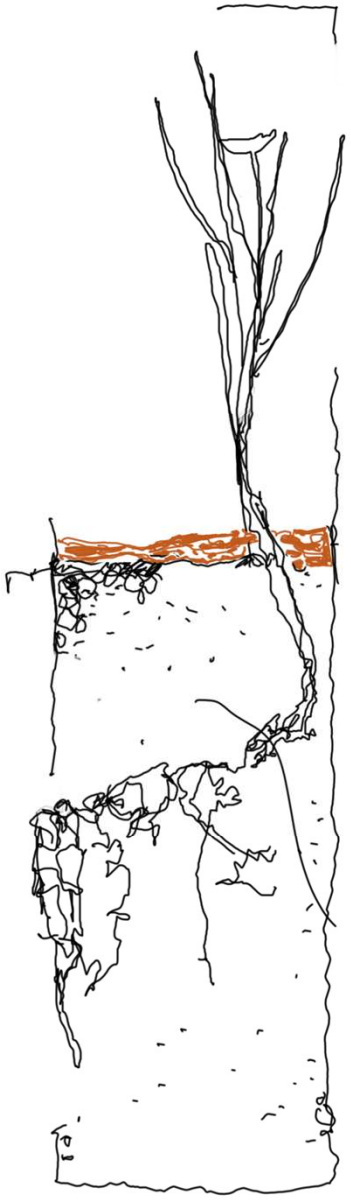
Human position
Urbanisation within the river‘s landscape

to foster a coextensive urban riverine landscape?

Coextensive riverine landscape

Method
Intimate and entangled awareness, through hands-on, adaptable, and human-scaled landscape architecture approach

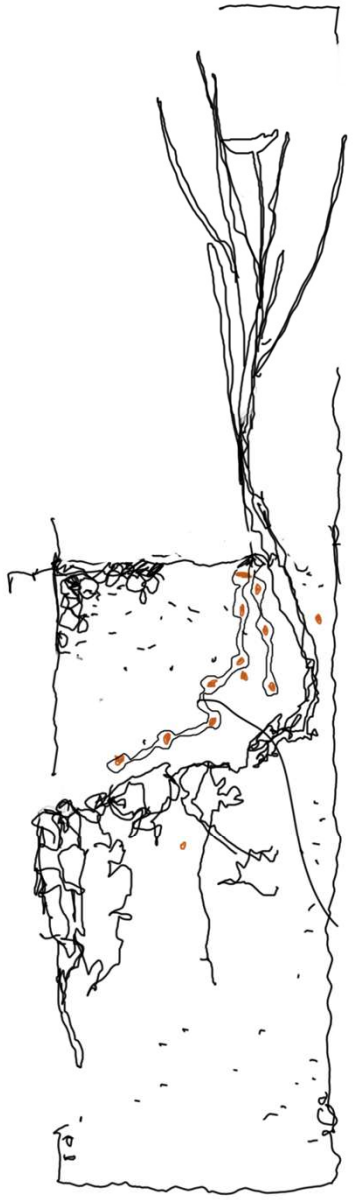
How can hands-on water management principles
inform
to foster a coextensive urban riverine landscape?



Coextensive riverine landscape

Landscape architecture
Catalyst for human and non-human coexistence

How can hands-on water management principles inform flood mitigation and rehabilitation strategies to foster a coextensive urban riverine landscape?



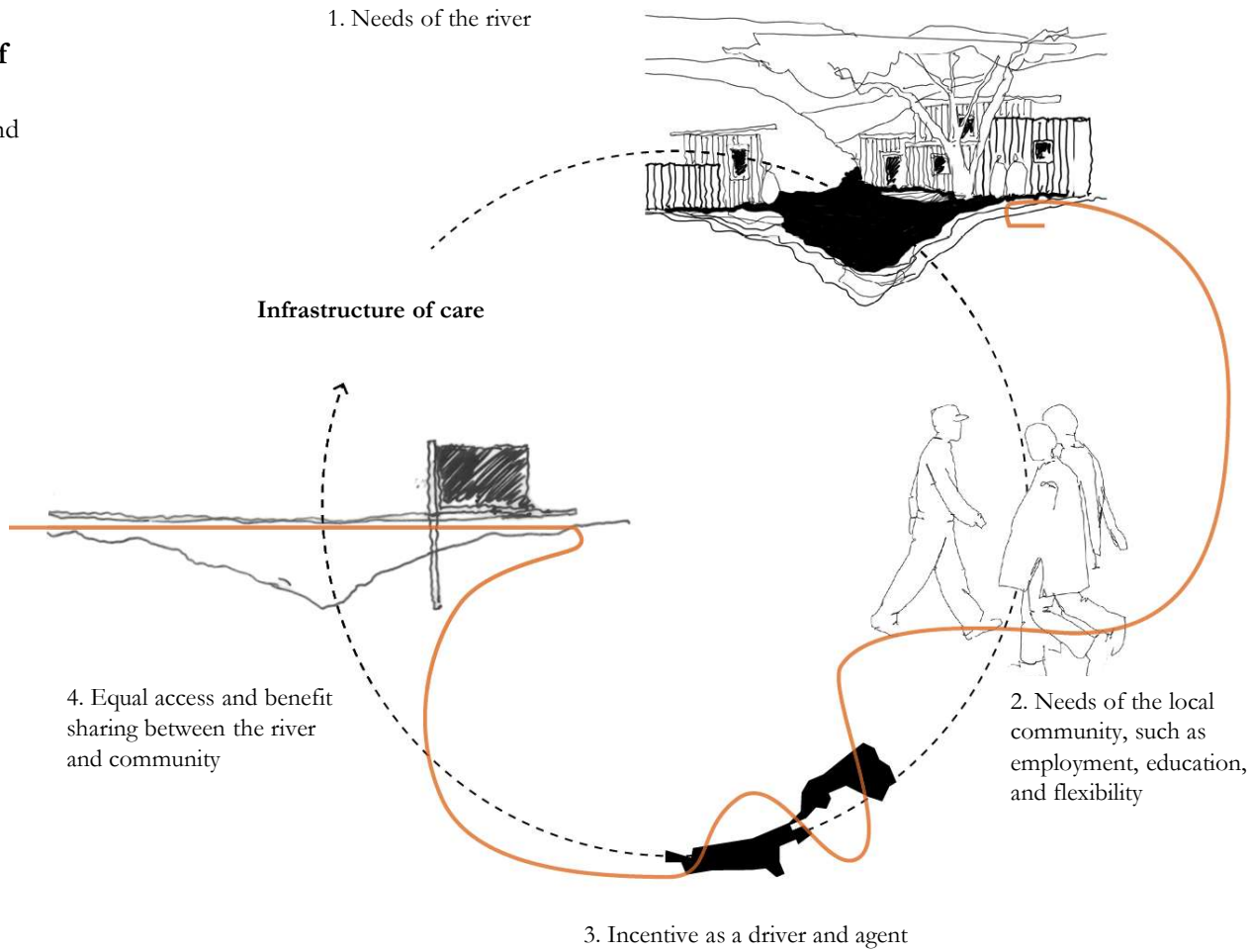
Infrastructure of care

Integration of the needs of the river and the needs of the local community.

^City implementation vs. the needs of marginalised communities

Infrastructure of care

Needs, incentives, and shared access and benefits



^Human and landscape entanglement

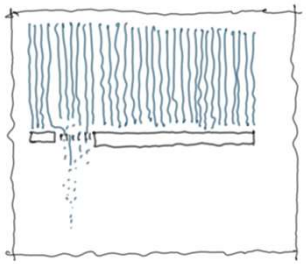
Infrastructure of care

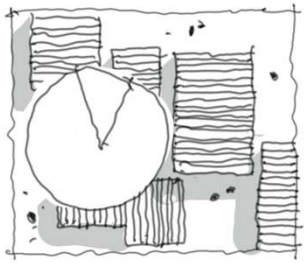
Threats to the urban riverine landscape

Drought and limited water resources

City-scale:
Day Zero – the city nearly runs out of water

River and community-scale:
Water resources are limited because groundwater can't infiltrate effectively.

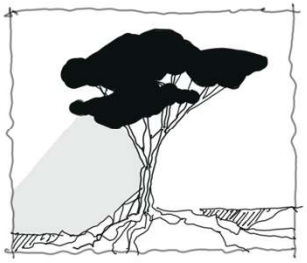




Urban fires

City-scale:
Fire stations in the City have to deal with an average of 60 to 130 incidents daily

River and community-scale:
Habitat destruction caused by frequent fires associated with high urban density



Loss of native Fynbos species

City-scale:
The Fynbos biome is one of the world's most threatened ecosystems.

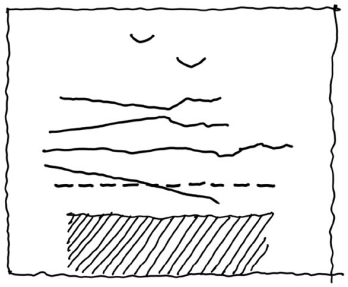
River and community-scale:
Agricultural and urban development contribute to the loss of biodiversity and indigenous knowledge

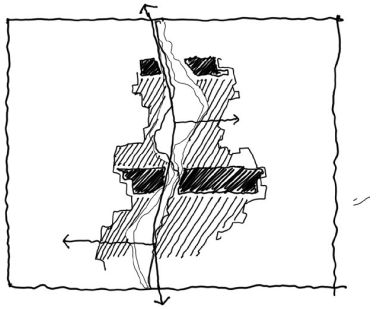
Flooding

City-scale:
Annual floods in informal areas

River and community-scale:
River pollution resulting from the collapse of fragile dwellings and infrastructure within the floodplain

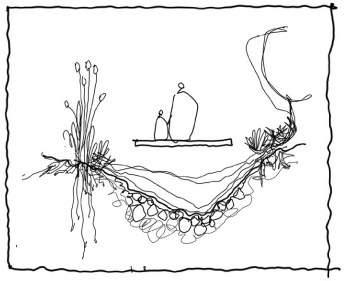
Improve groundwater infiltration and enhance awareness of the forgotten value of riverine landscapes

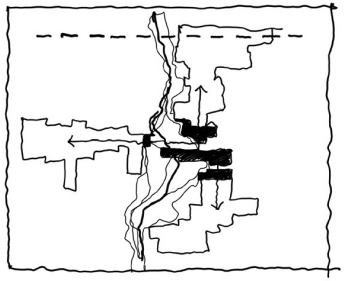




Community-centered urban planning that prioritizes local needs and inclusivity

Mitigate the impacts of rapid urbanization while promoting ecological conditions favorable to Fynbos growth





Bridging the divide between human and non-human agencies in shared environments.

Infrastructure of care

Threats to the urban riverine landscape

Spatial landscape assignments

Project stakeholders & city-wide social and environmental goals

SDG's
Sustainable Development Goals

UNDRIP
United Nations Declaration on the Rights of Indigenous Peoples

Nagoya protocol

↓↑

City of Cape Town

↓↑ ↓↑ ↓↑

Education

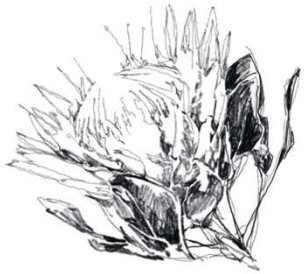
Informal community

Businesses /employers /tourism

Value recognition

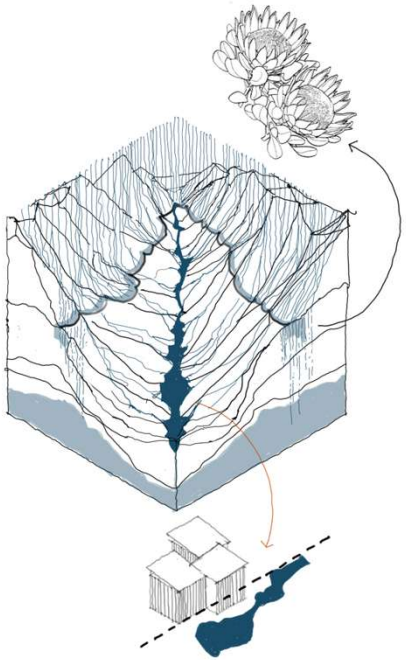
Inclusive knowledge creation and credibility of marginalised voices.

Fair and equitable sharing of the benefits

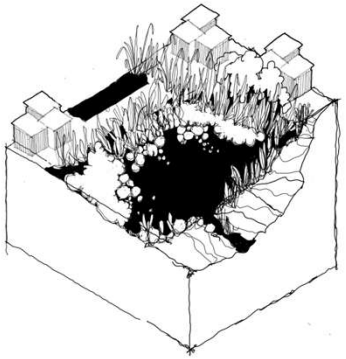


Up-, mid-, and downstream river strategies

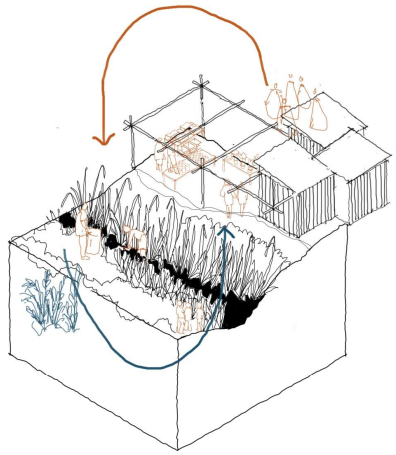
“Water-layer”
The prioritisation and protection of rivers, wetlands, and ecological corridors - integrating these valuable habitats into the fragmented urban context.



“Fynbos-layer”
Urban flood management and water strategies that allow the flexibility, intimacy and adaptability of the informal community.



“Human layer”
Enhance the awareness and care to the value of marginalized communities and forgotten rivers

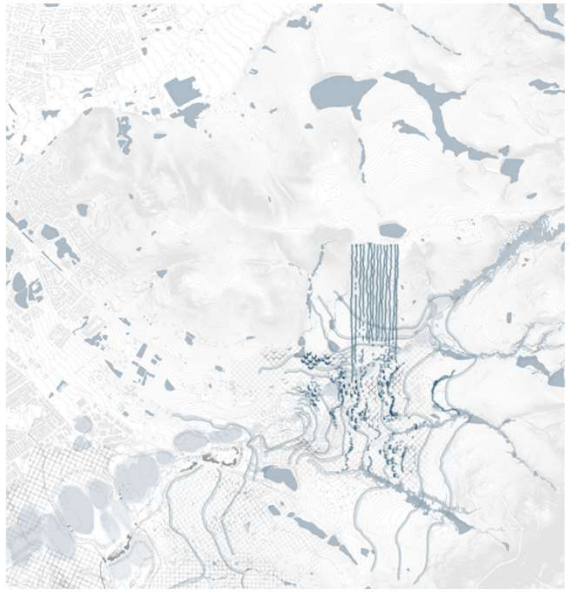


Sir Lowry’s Pass Zoom ins:

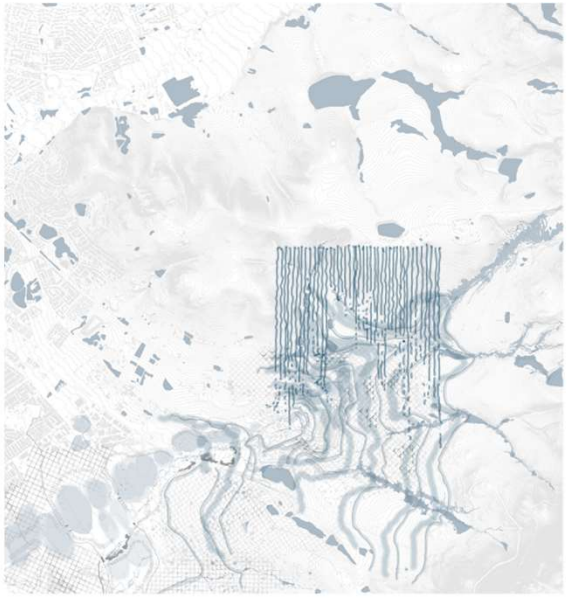
Temporary flood basins

Urban water integration

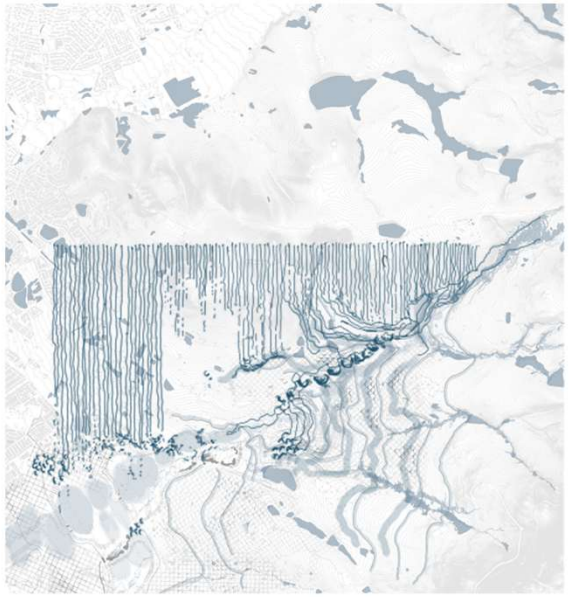
Waterkeepers



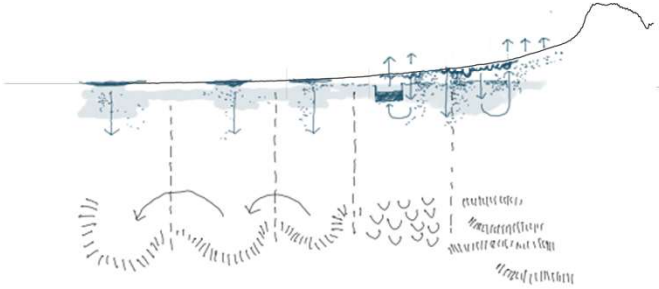
1. Dry summer season with low rainfall



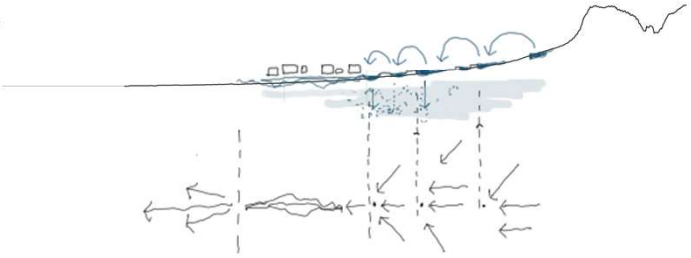
2. Wet winter season with steady river flow



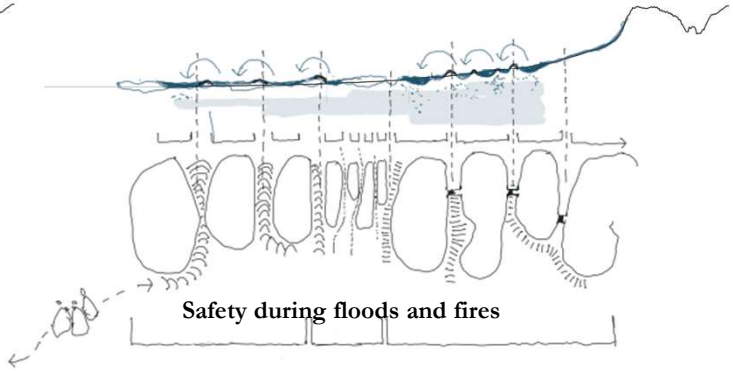
3. Flood and fire regime scenario



Microcatchments



Slow down and allow the river to meander



Safety during floods and fires

^Overall strategies

River strategy

^*Saaidam*

^Hands-on: Traditional Water Management System

Case studies

^Fynbos corridors

^Valuing the native Fynbos landscapes

Case studies

^Ecological burning

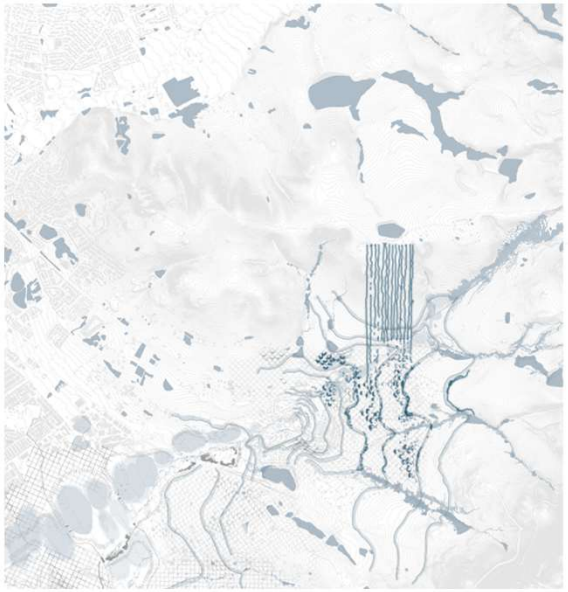
^Layered functions: Natural processes

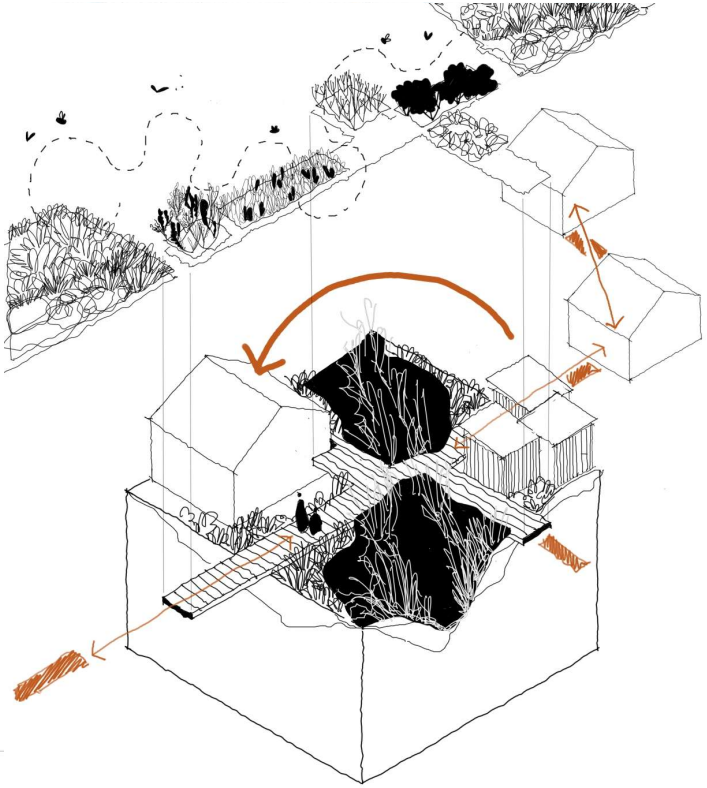
Case studies

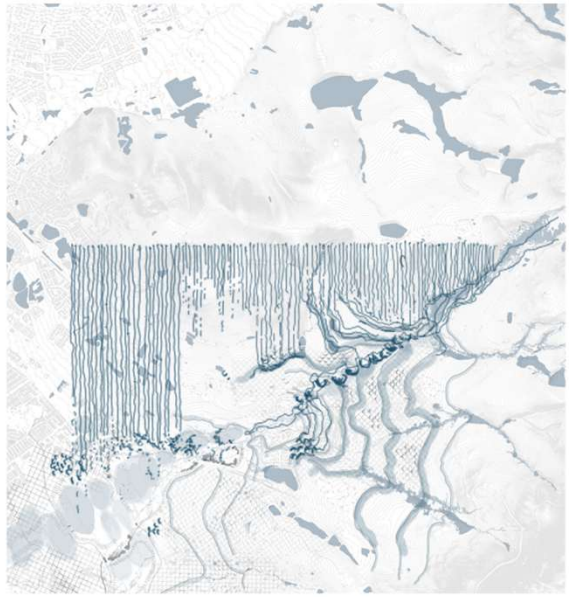
^Waste management

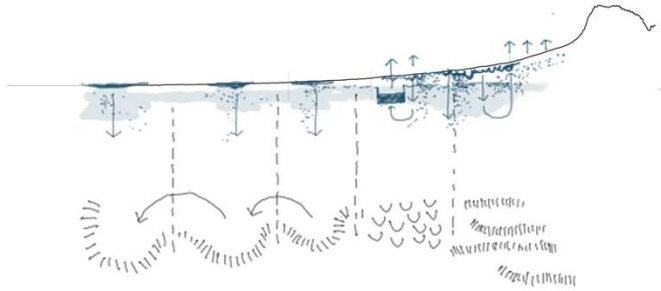
^Urban integration and services

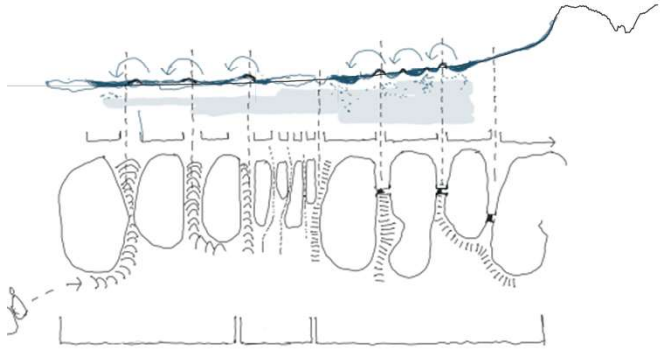
Case study







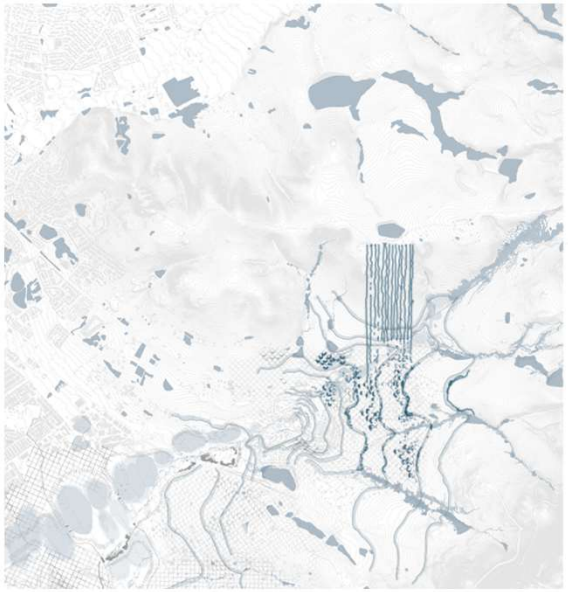




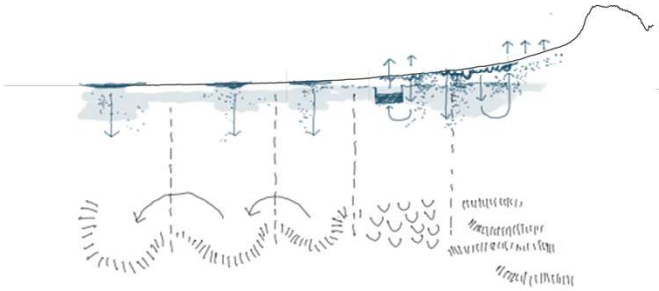
Connecting fragmented environmental and social nodes

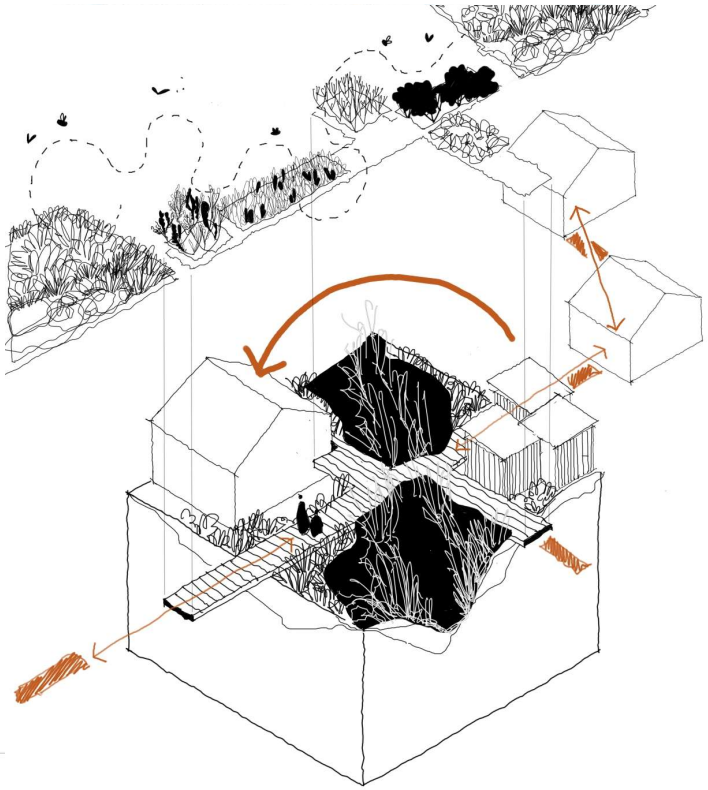
^Strategy 1. Fynbos Basin

River strategy

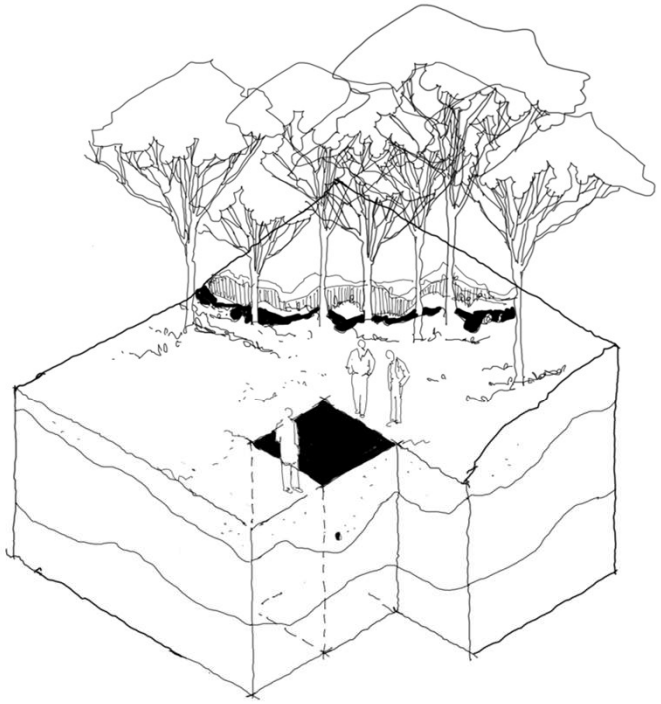


1. Dry summer season with low rainfall





Connecting fragmented environmental and social nodes



Employment, education, and responsibility

^Strategy 3. Socio-economic integration

River strategy

^Fieldwork photos – Summer, 2025

Informal land occupation

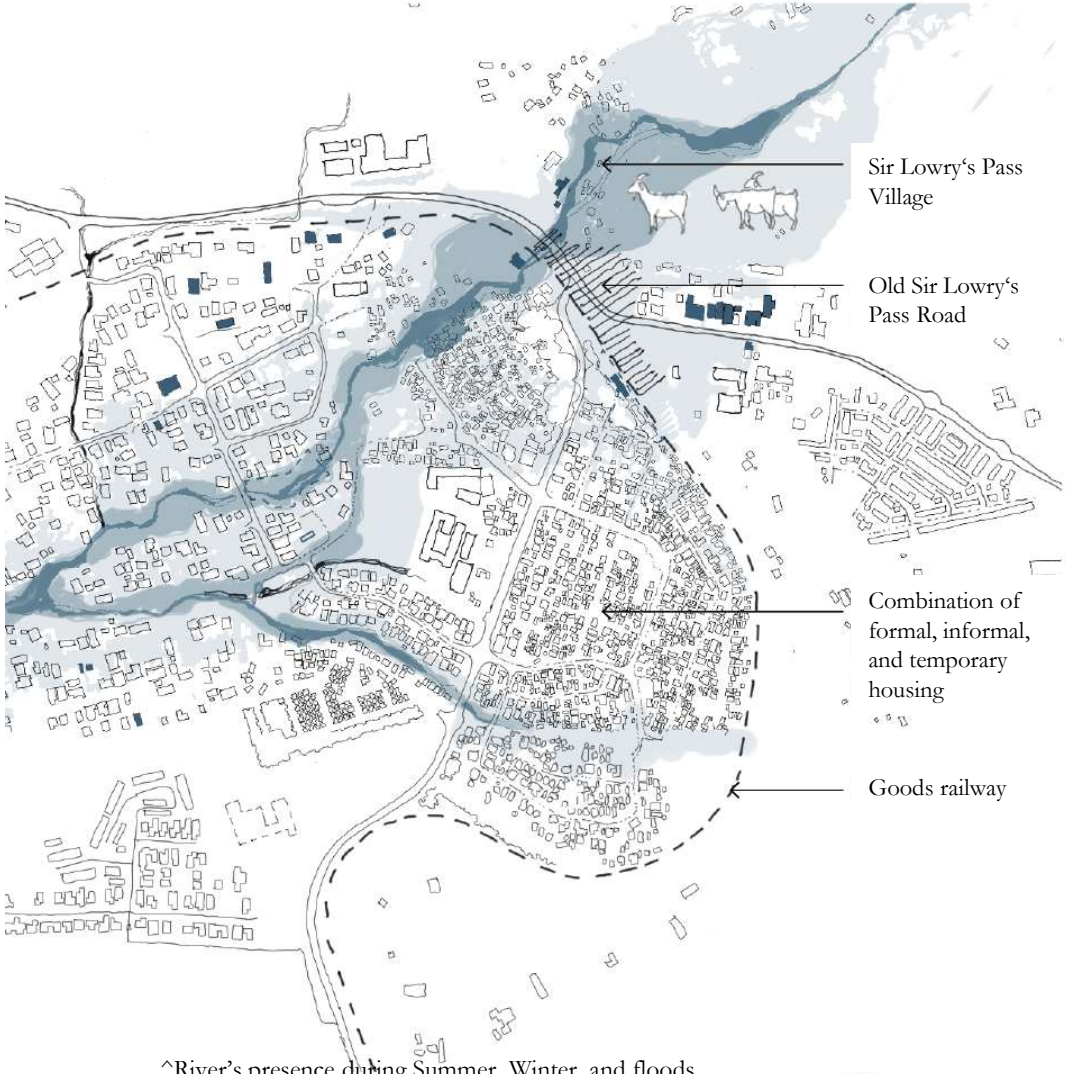
Grazing animals

Community nodes

Informal markets

^Tracing and observing the river's presence

Sir Lowry's Pass Village



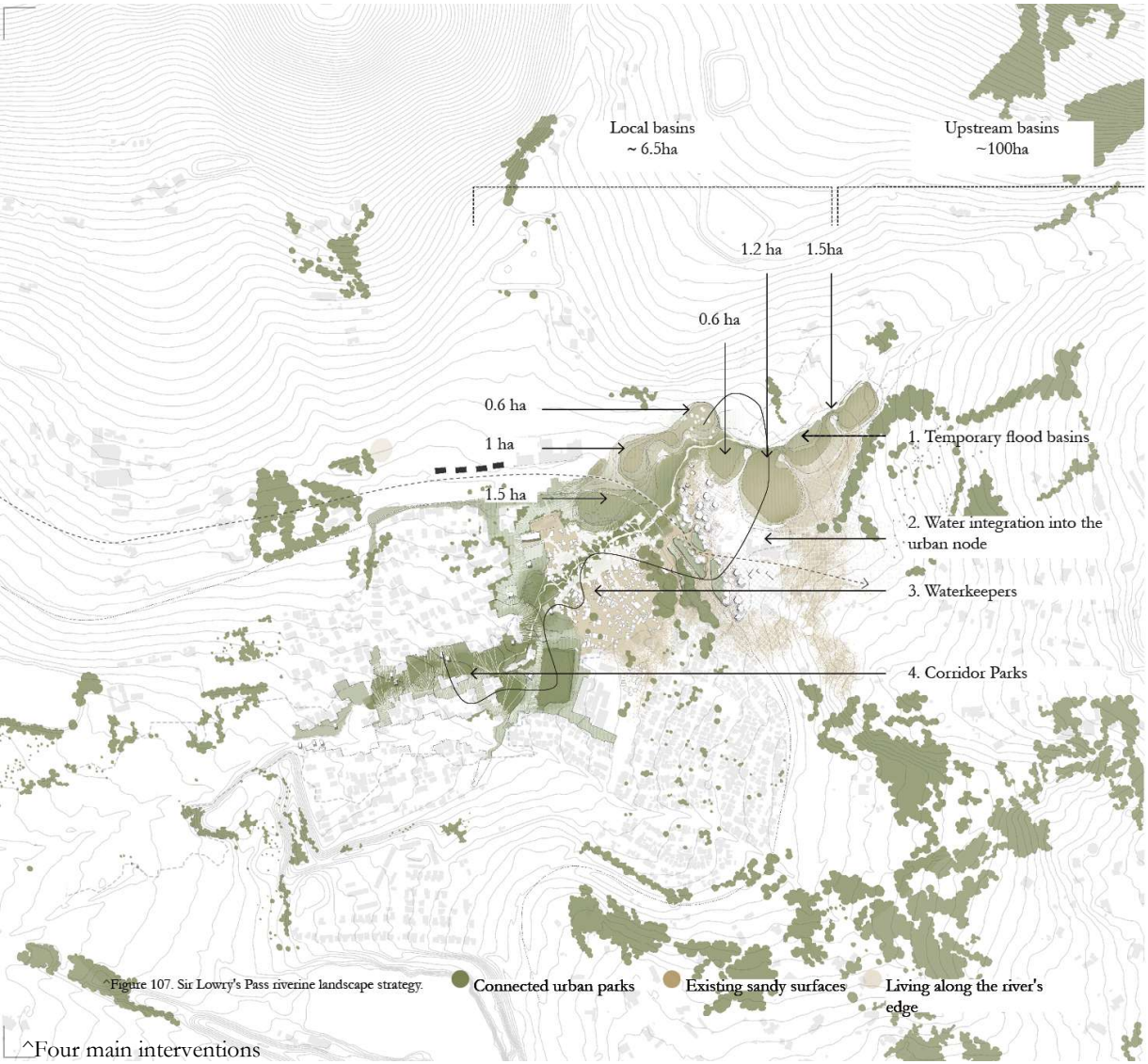
^River's presence during Summer, Winter, and floods

Village strategy:
Series of connected nodes along the river, linking water, Fynbos, and human layer

^Sir Lowry‘s Pass Corridor

^Village concept sketch

Spatial concept



^Figure 107. Sir Lowry's Pass riverine landscape strategy.

^Four main interventions

^Zoom-in 1: Temporary flood basins

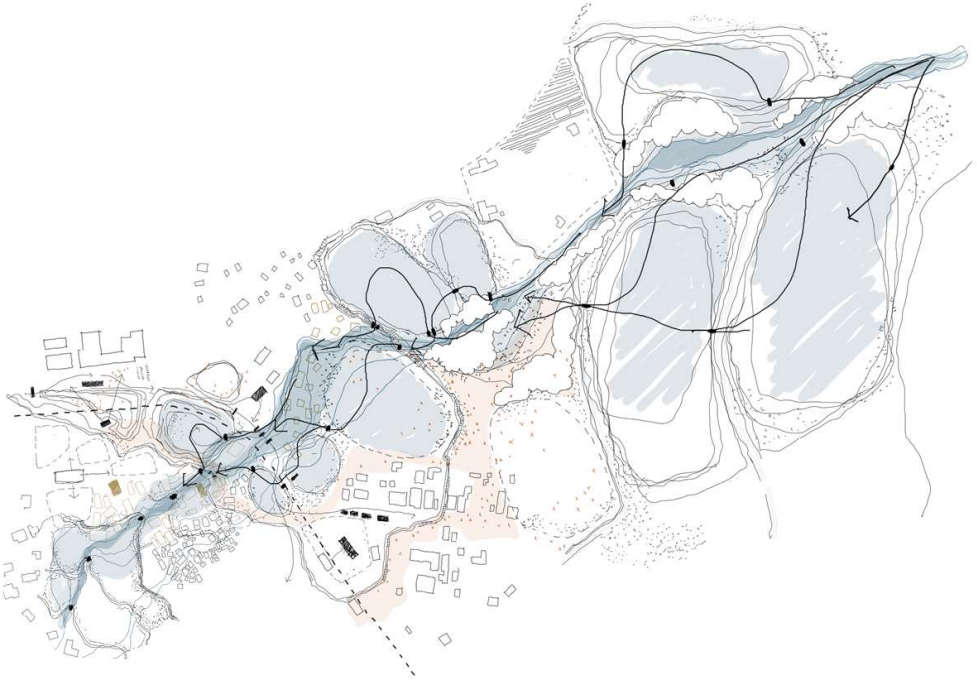
^Zoom-in 2: Integrating the river into the urban node

^Zoom-in 3: Waterkeepers

Spatial concept

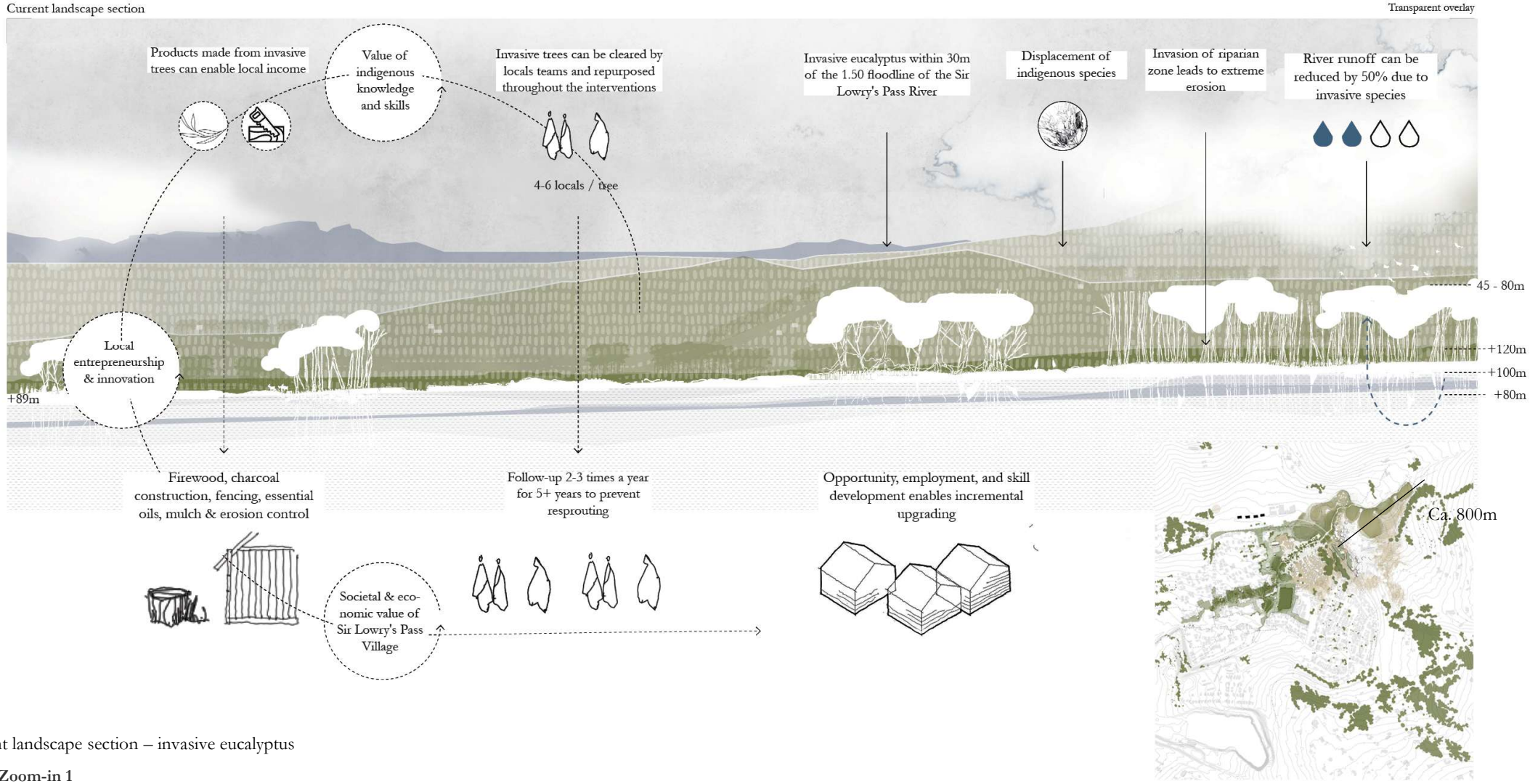
Village strategy:
Series of connected nodes along the river, linking water, Fynbos, and human layer

1. Temporary flood basins:
Improve groundwater infiltration and enhance awareness of the forgotten value of riverine landscapes



^Spread, slow down, and infiltrate

^Concept sketch



^Current landscape section – invasive eucalyptus

Design Zoom-in 1

Berms act as low dikes, and function as walkways, as well as fire breaks between the burning Fynbos blocks

Cape Sugarbird pollinator

Sluice managed by the caretakers

Local harvesting to produce products unique to the Sir Lowry's Pass riverine landscape

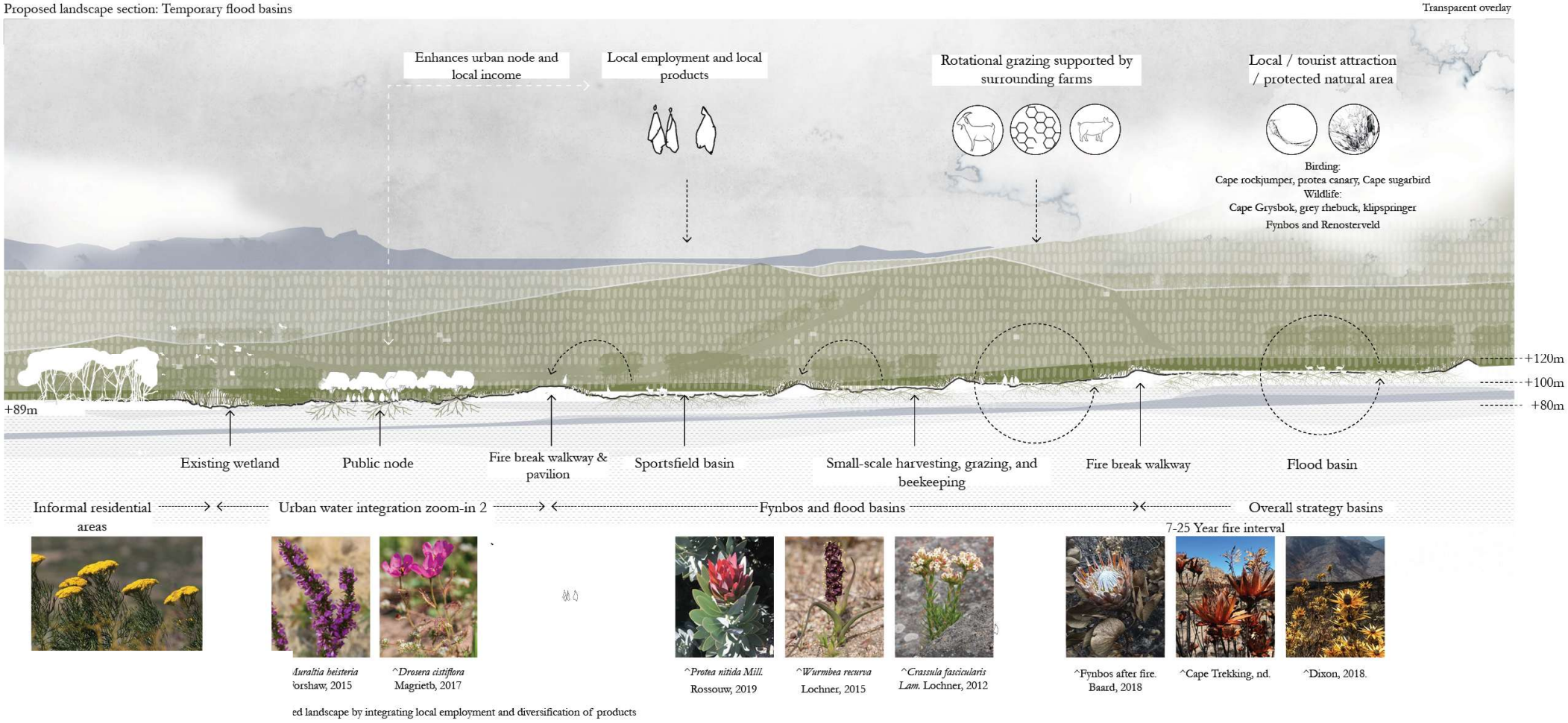
Boland Granite Fynbos

Lourensford Alluvium Fynbos

Abundance of shapes, colours, and fragrances attracts visitors and adds to the experienced value of this particular landscape

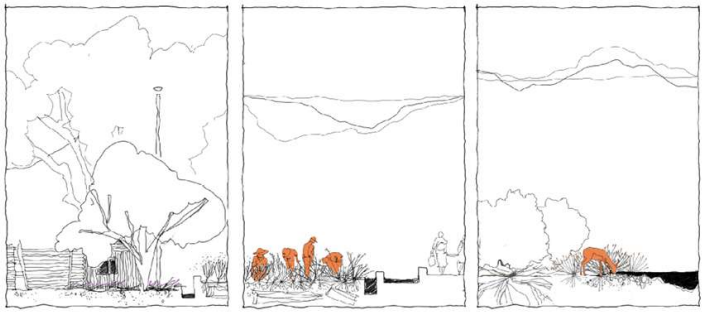
^Proposed Fynbos and temporary flood basins

Design Zoom-in 1

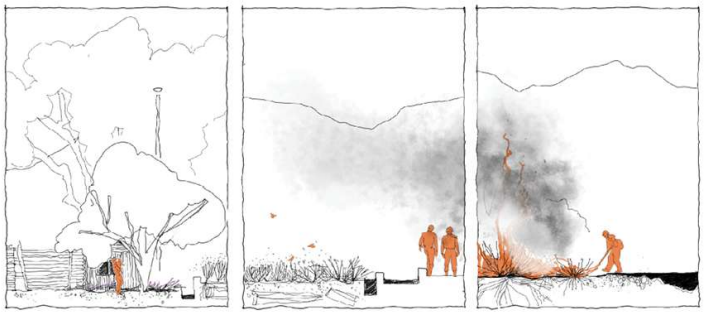


^Proposed landscape sections

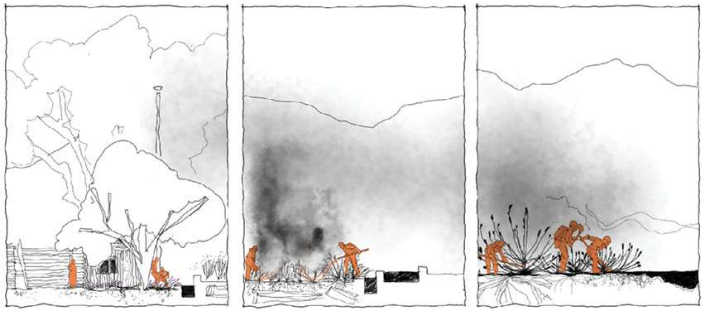
Design Zoom-in 1



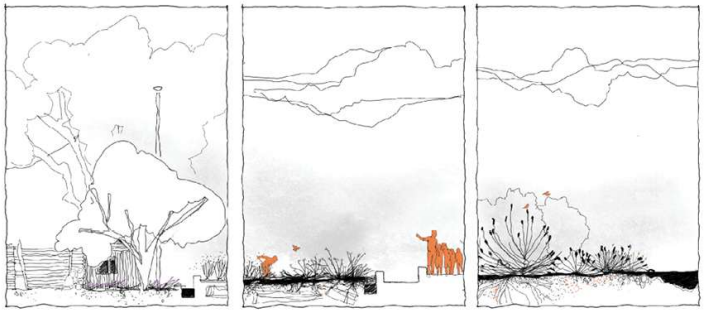
^Figure 148. Before controlled block burns



^Figure 149. First controlled block burn



^Figure 150. Burn clean-up & second block burn

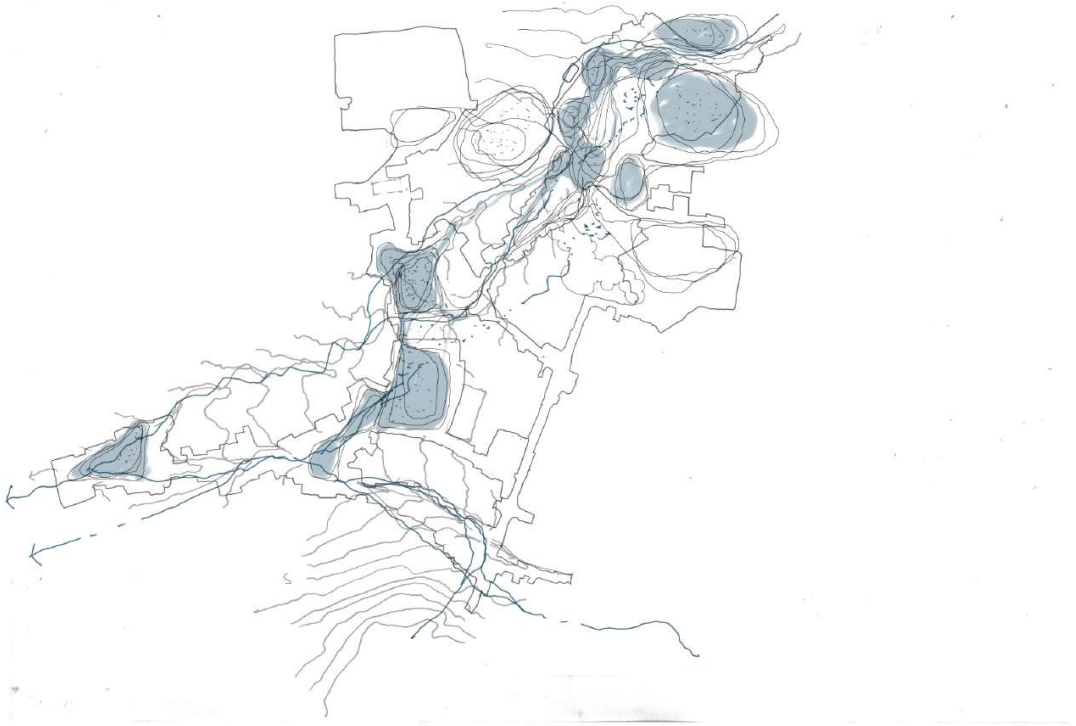


^Figure 151. After-burn

Village strategy:
Series of connected nodes along the river, linking water, Fynbos, and human layer

1. Temporary flood basins:
Improve groundwater infiltration and enhance awareness of the forgotten value of riverine landscapes

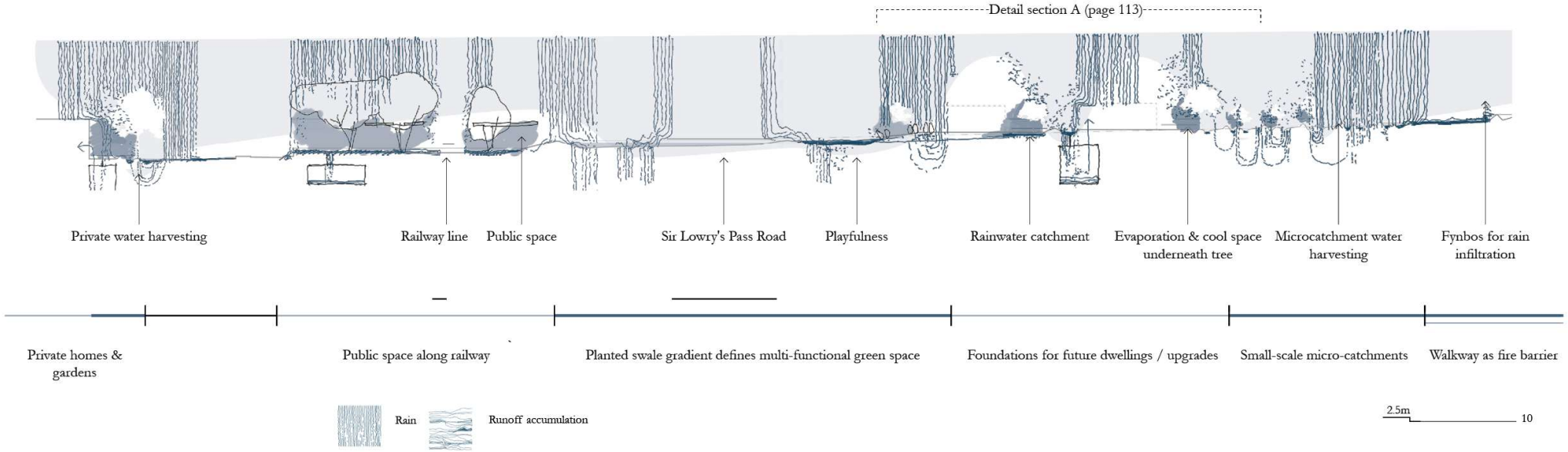
Zoom-in 2: Integrating the river into the urban node



^Generational care towards the river as an integral urban part

^Concept sketch

Design Zoom-in 2



^Conceptual urban integration of the river‘s presence

Design Zoom-in 2

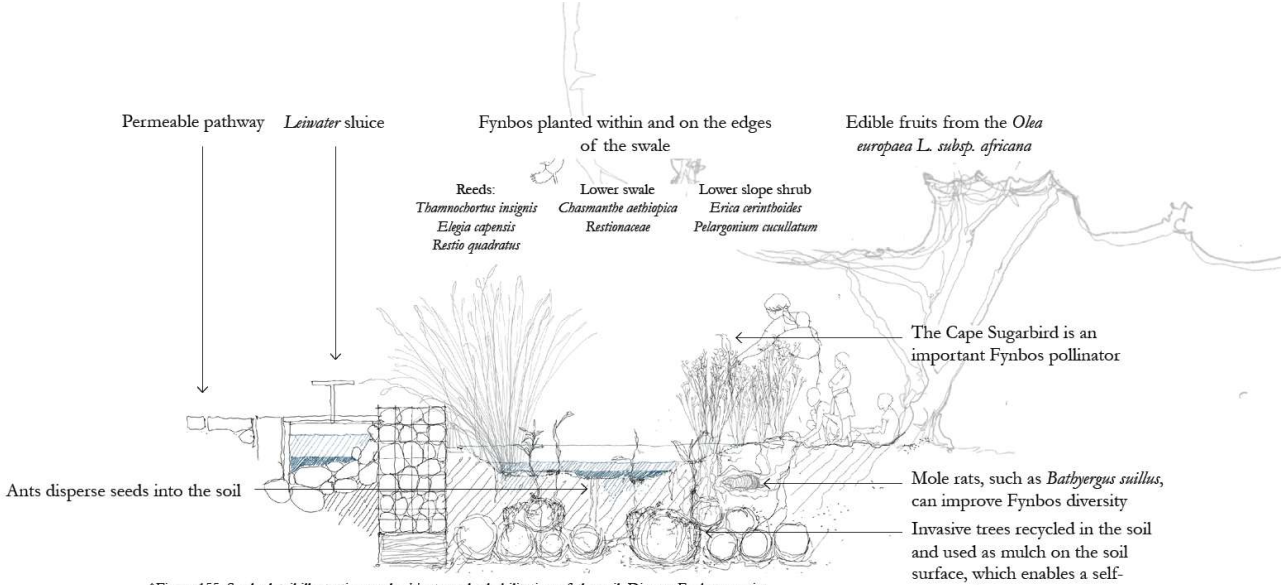
^Pollution

^Runoff

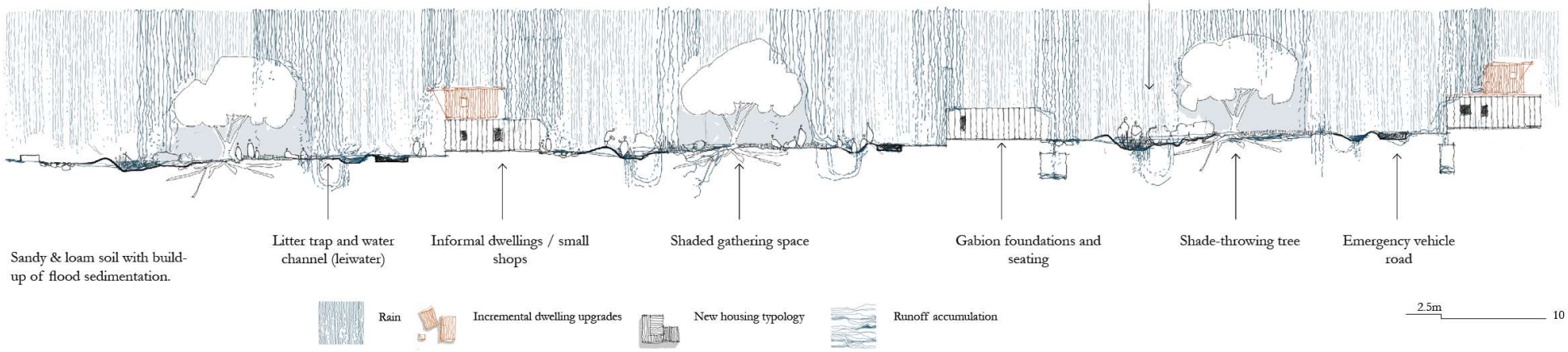
^Public spaces

^Water accumulation on-site

Design Zoom-in 2

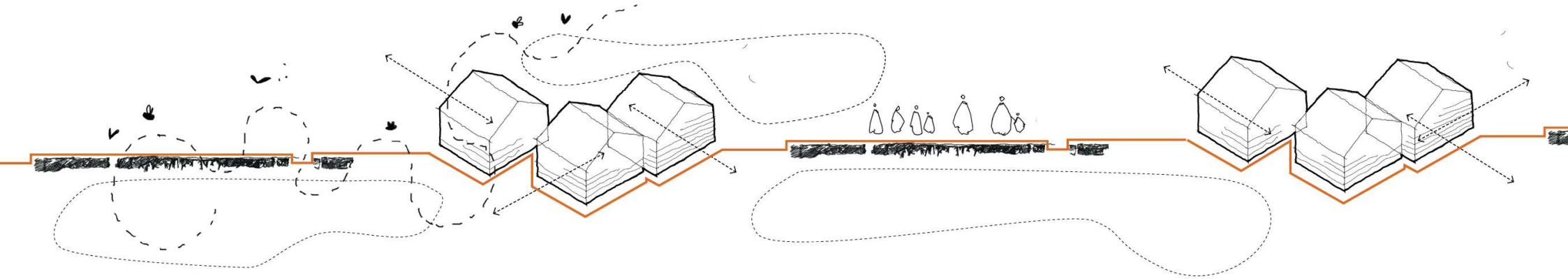


^Figure 155. Swale detail illustrating swale, *leiwater* and rehabilitation of the soil. Diverse Fynbos species can be planted as soil stabilisator and can be harvested for human uses, such as medicinal uses.



^Proposed landscape interventions and water infiltration

Design Zoom-in 2



^Conceptual strategy: enabling processes to take place

Design Zoom-in 2

Village strategy:
Series of connected nodes along the river, linking water, Fynbos, and human layer

1. Temporary flood basins:
Improve groundwater infiltration and enhance awareness of the forgotten value of riverine landscapes

Zoom-in 2: Integrating the river into the urban node

^Zoom-in 3: Waterkeepers

^Transition between the river's edge and lived-on areas

^Concept sketch

Design Zoom-in 3

Sir Lowry's Pass River

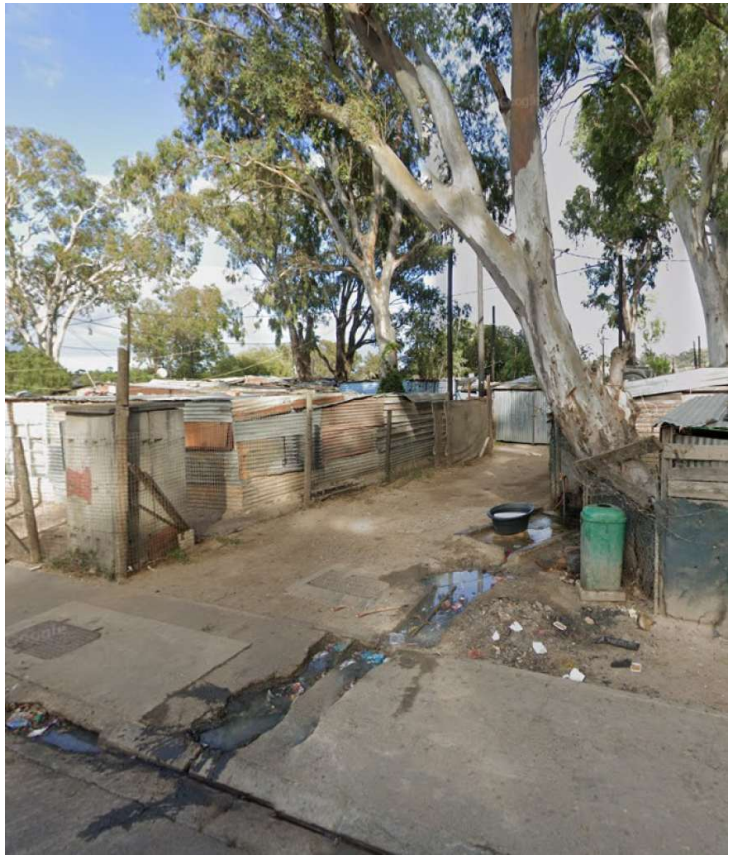
Fragile edge between river and the dwellings

Dense urban structure

● Litter in the river's bed ○ Dense invasive vegetation

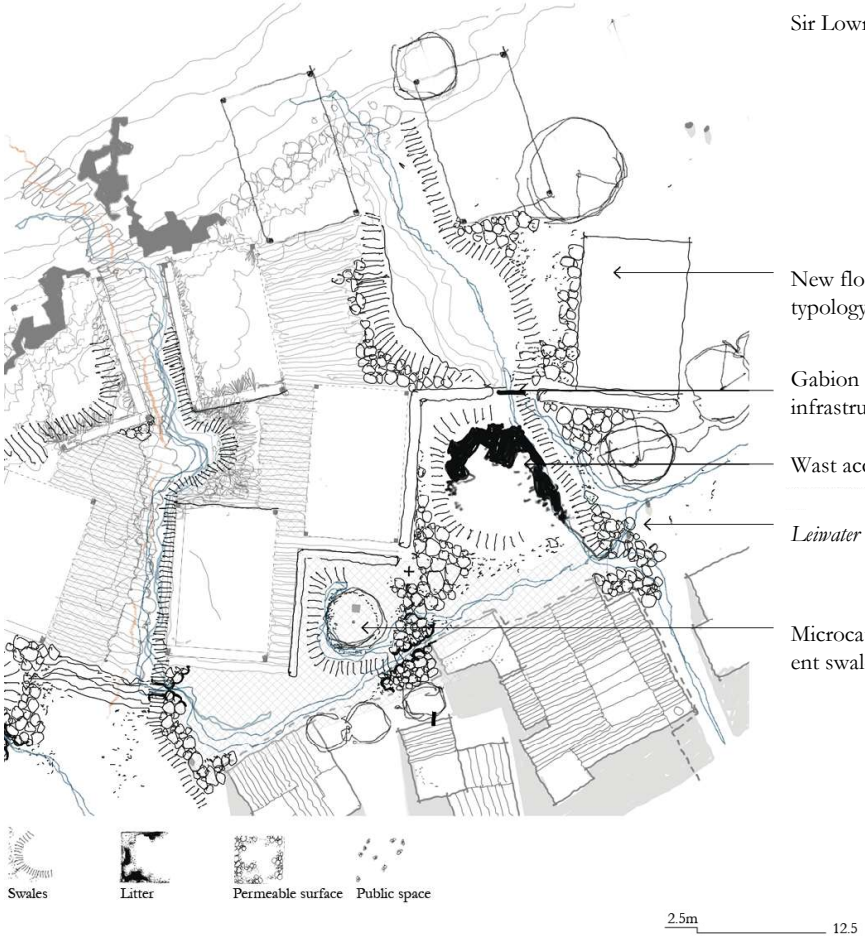
2.5m 12.5

^Existing water accumulation points, important nodes, river pollution, and invasive species on-site



^Community water tap

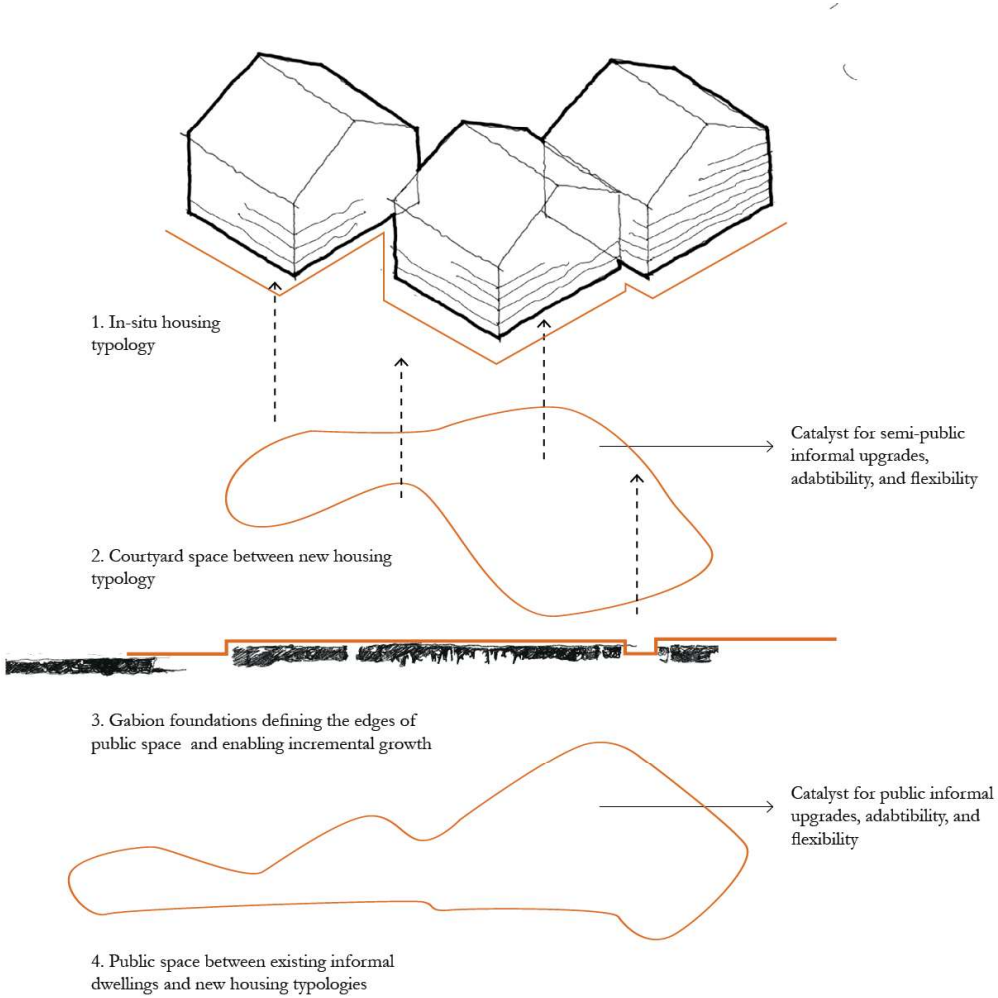
Design Zoom-in 3



^Proposed edge condition

Design Zoom-in 3

^Foundational fixed interventions

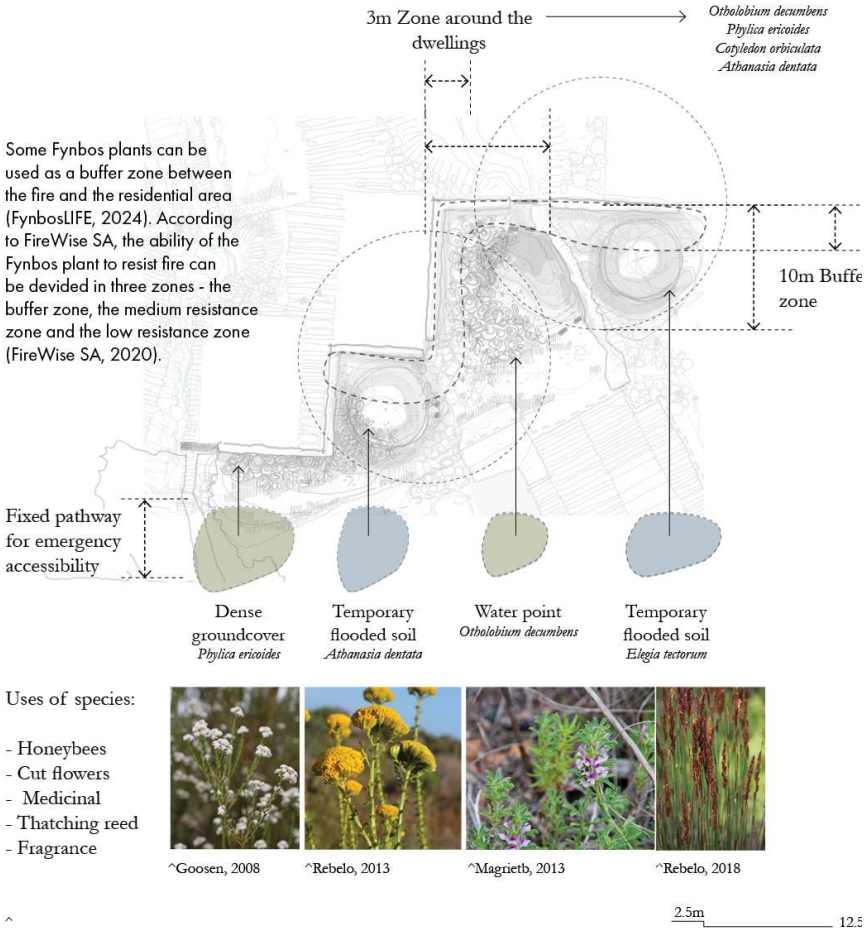


^Enables natural processes and social change to take place

Design Zoom-in 3

-

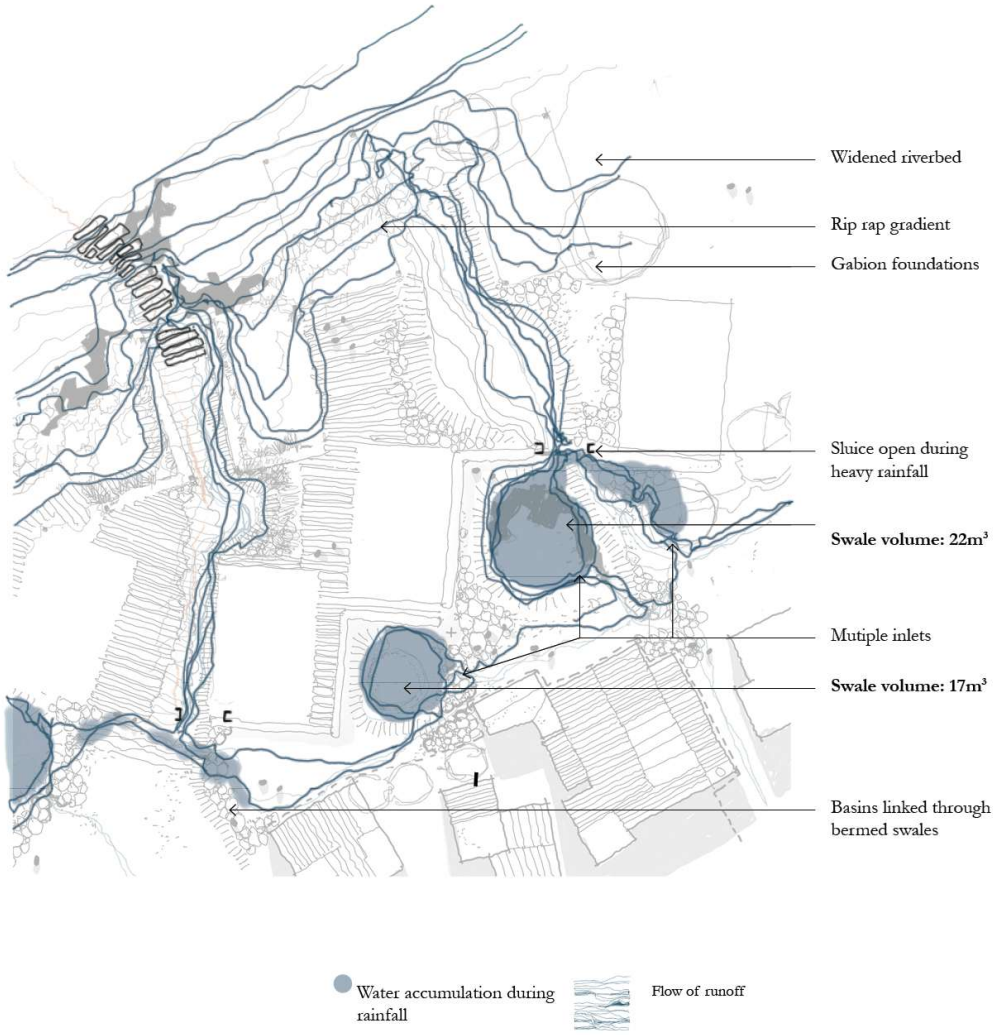
^Small-scale Fynbos pockets



^

^Fire-resistant species in between dwellings

Design Zoom-in 3



^Rainwater runoff and public spaces as flood basins

Design Zoom-in 3

^Proposed fixed interventions

Design Zoom-in 3

Transparent overlay

^**Figure 172**. Local skill development and employment. Photograph by U TT, 2019

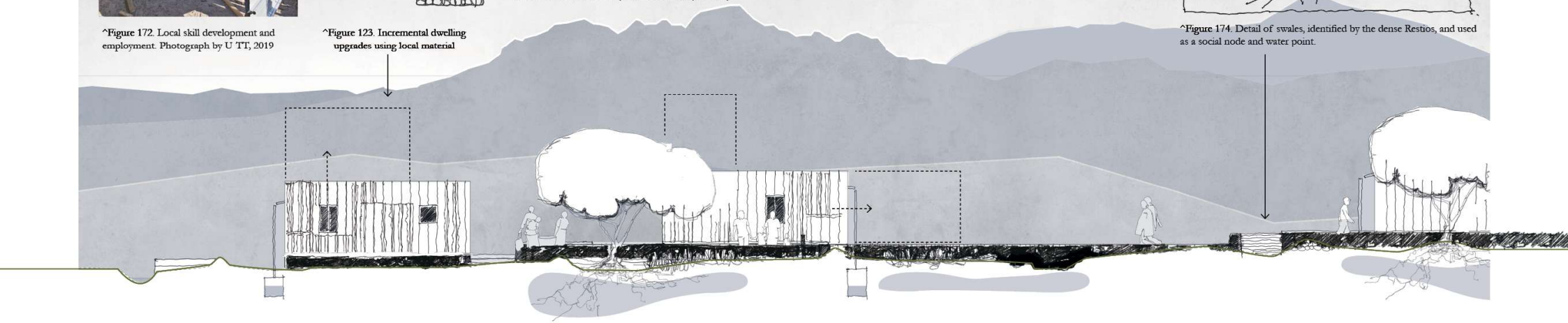
^**Figure 123**. Incremental dwelling upgrades using local material

Materiality

Reusing local material

Existing informal dwellings in the area are typically constructed using timber frames clad with lightweight corrugated metal sheeting. To support informal upgrading, the proposed housing typologies retain this familiar materiality while introducing the use of locally-produced sandbags and earth bricks. Additionally, local skills can be expanded through the production of woven fences and cladding using locally available Fynbos Restios, such as Cape thatching reed (*Elegia tectorum*). These golden-brown Restios gracefully mimick the movement of the wind. Reaching heights of up to 1.5 metres, they form prominent edges, particulary in urban areas with moist soil (The Gardener, 2021).

^**Figure 174**. Detail of swales, identified by the dense Restios, and used as a social node and water point.



Sedimentation and litter accumulation

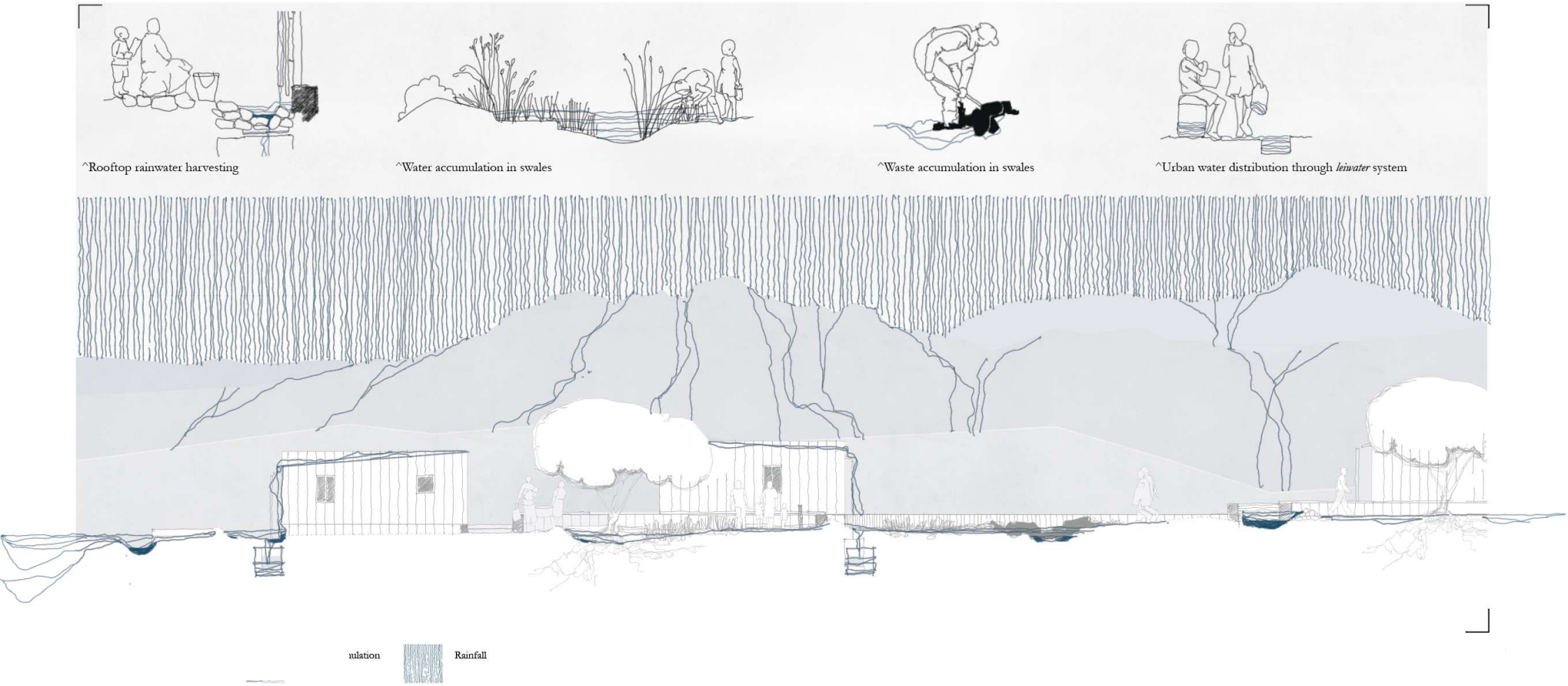
2.5m

10

^Informal change, unpredictability, and flexibility

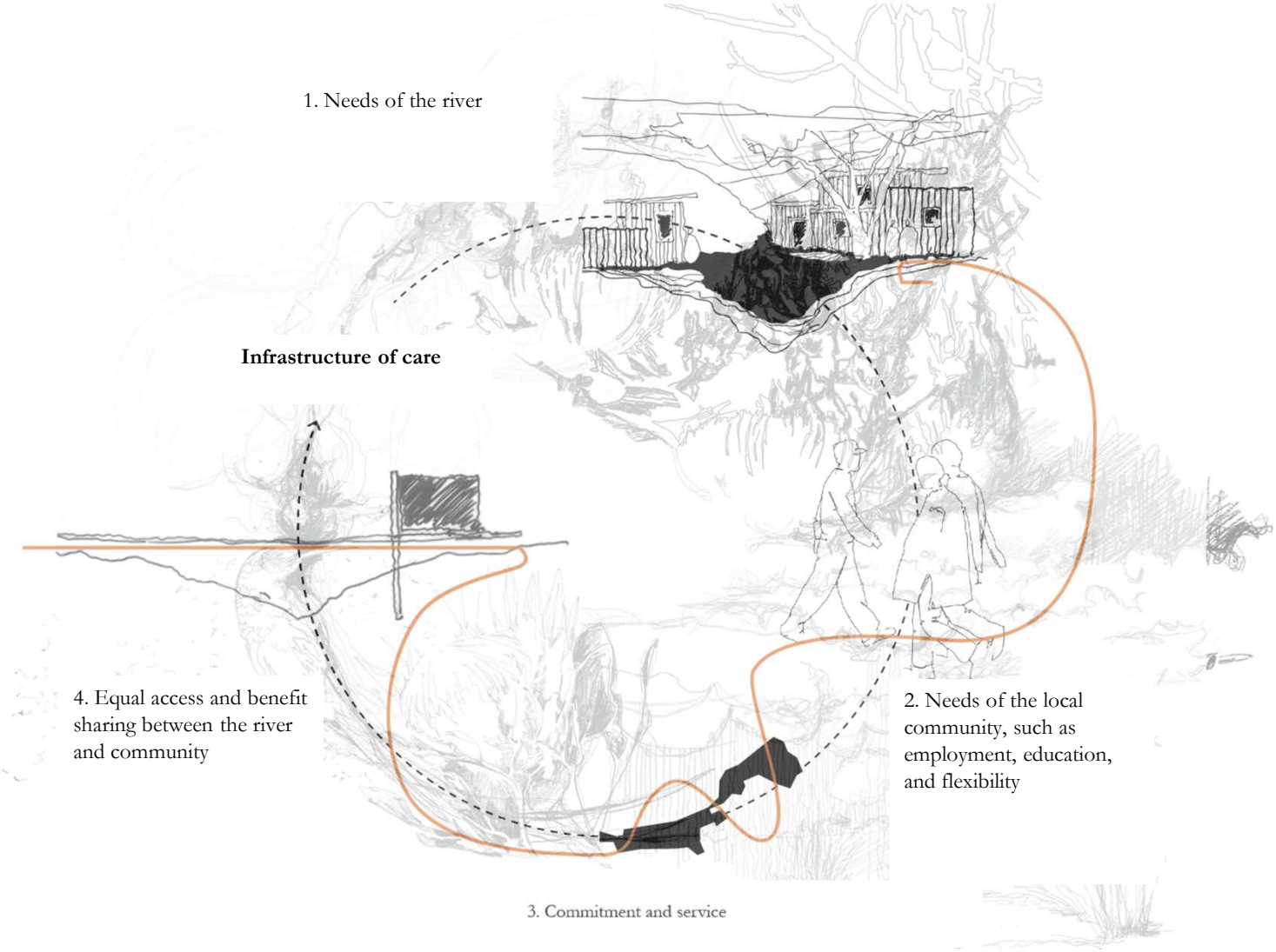
Design Zoom-in 3

Transparent overlay



^River's integration into the public spaces

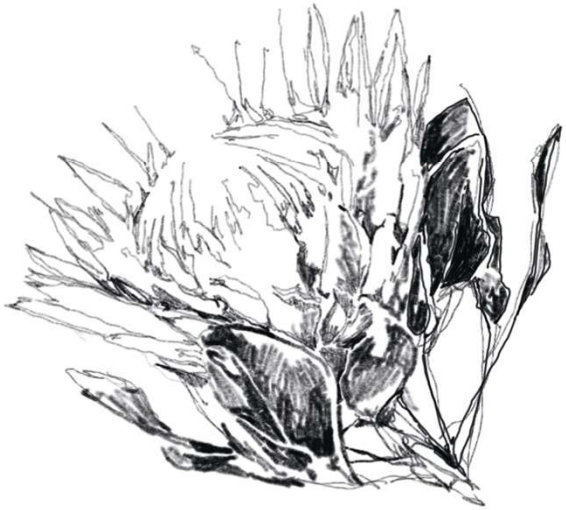
Design Zoom-in 3



^Generational care, understanding, and recognition of the Sir Lowry's Pass River and its community

Die aarde onthou wat mense vergeet

An Afrikaans proverb meaning "The earth remembers what people have forgotten".



Untold waters
Nicola Andrea Vollmer