



Designing The 21st Century City in Nature; Prospects for a High(er) Density Urbanism

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Cities Are THE Global Issue

Population growth and rapid urbanization mean we need to create the equivalent of one new city of one million people every 5 days between now and 2050.
(*source: The Anthropocene Journal*)

How we continue to modify natural systems in cities will be fundamental to survival: **design** is pivotal

So why are we still designing 20th century cities?

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The City versus Nature

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Long drives in air-conditioned cars from large air-conditioned homes to air-conditioned workplaces……

ARUP

“…reconnection to the natural world is fundamental to human health, well-being, spirit, and survival.”

Richard Louv, *The Nature Principle: Human Restoration and the End of Nature-Deficit Disorder*:

How do you do that in high density?

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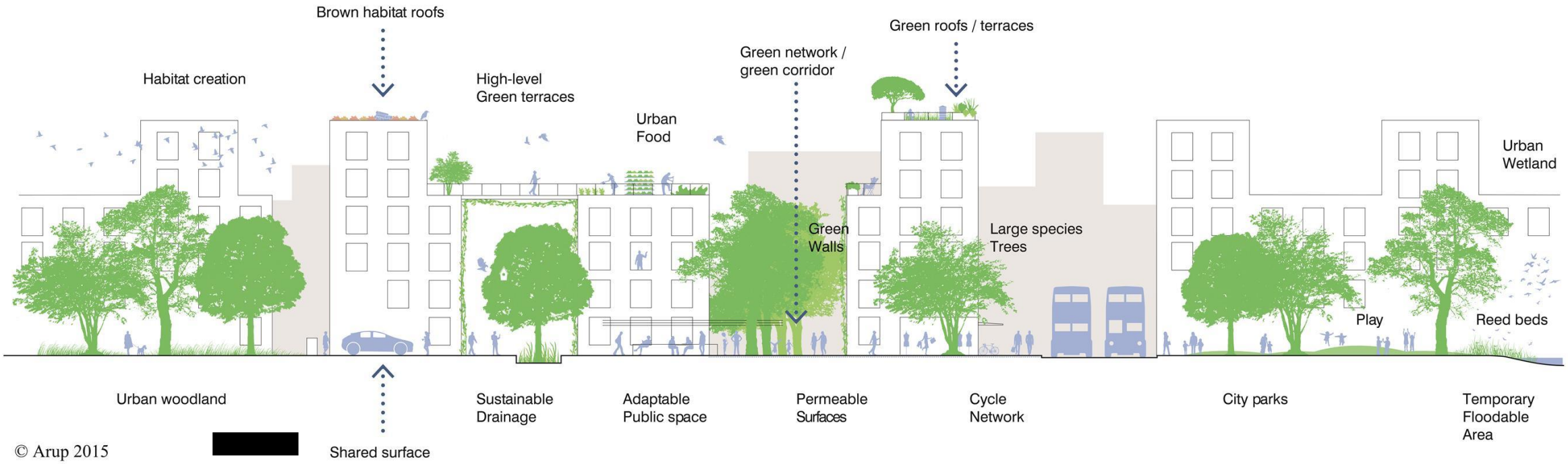
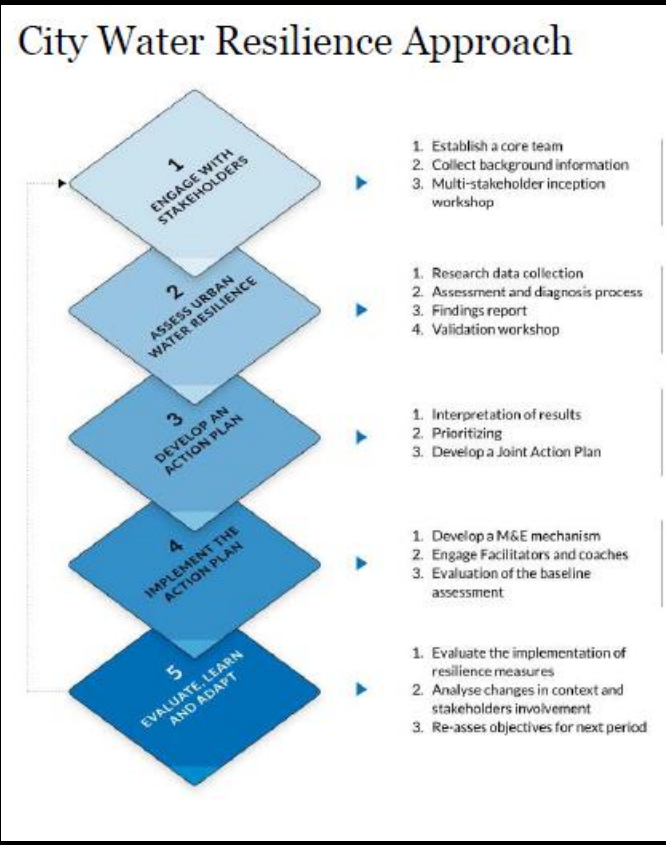
Definition of green+blue infrastructure

‘Natural or semi-natural networks of green (soil covered or vegetated) and blue (water covered) spaces and corridors that maintain and enhance ecosystem services’



NAUMANN S, DAVIS M, KAPHENGST T, PIETERSE M, RATMENT M (2011) DESIGN, IMPLEMENTATION & COST ELEMENTS OF GREEN INFRASTRUCTURE PROJECTS, FINAL REPORT TO THE EU COMMISSION (ECOLOGIC INSTITUTE AND GHK CONSULTING)

Arup City Water Resilience Framework



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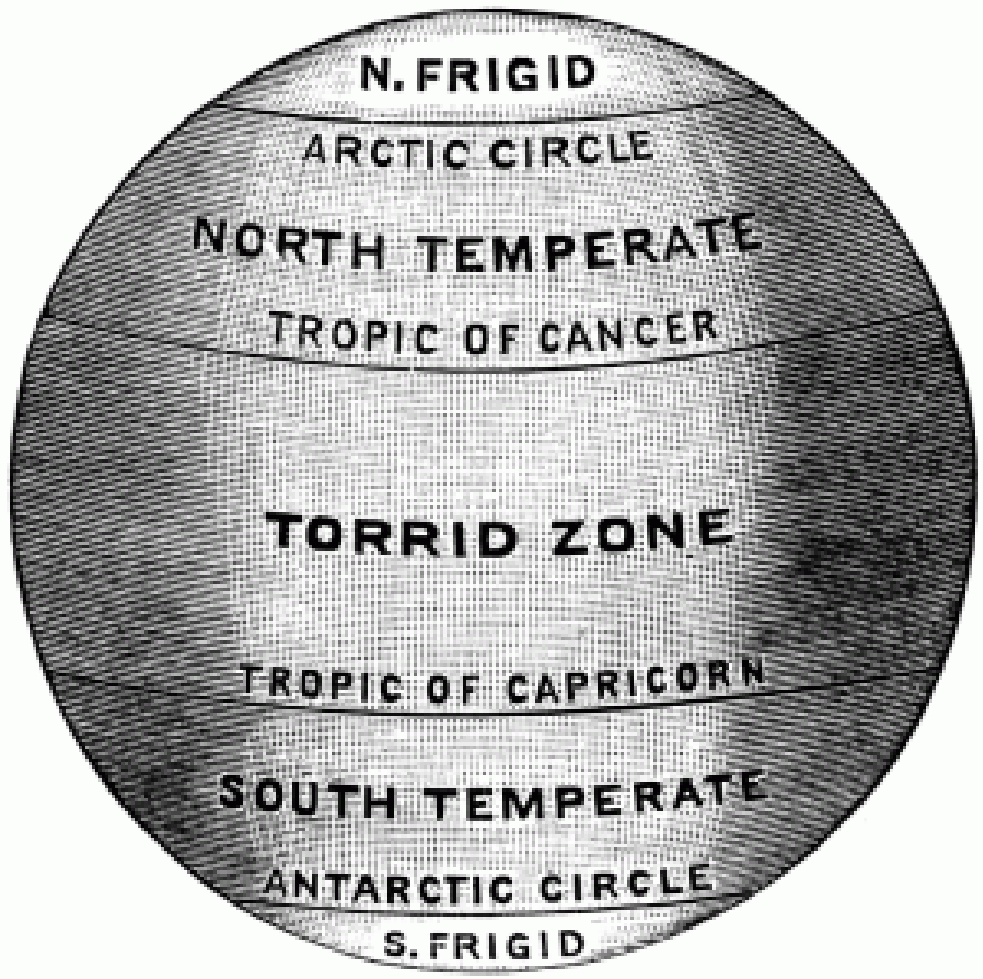
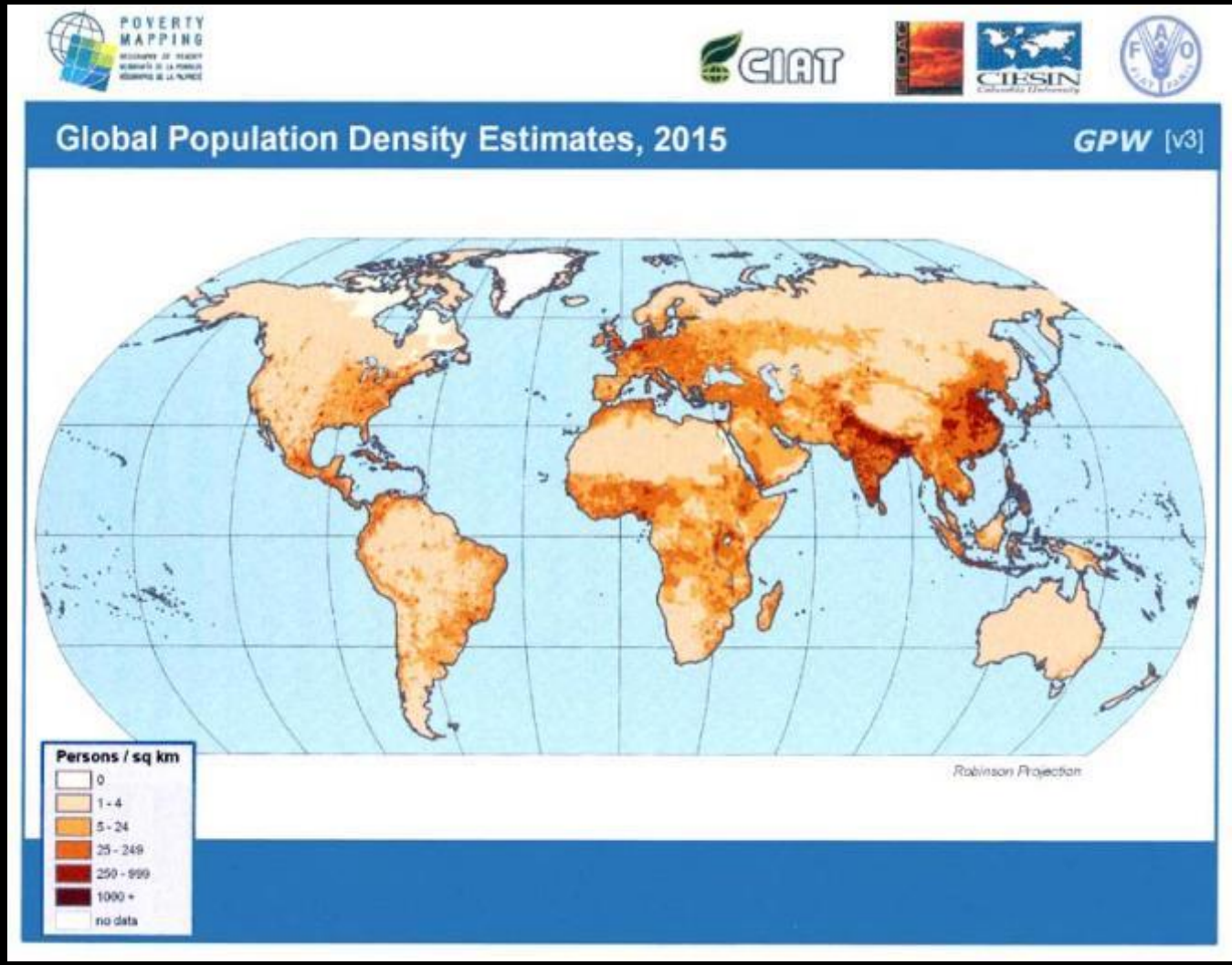
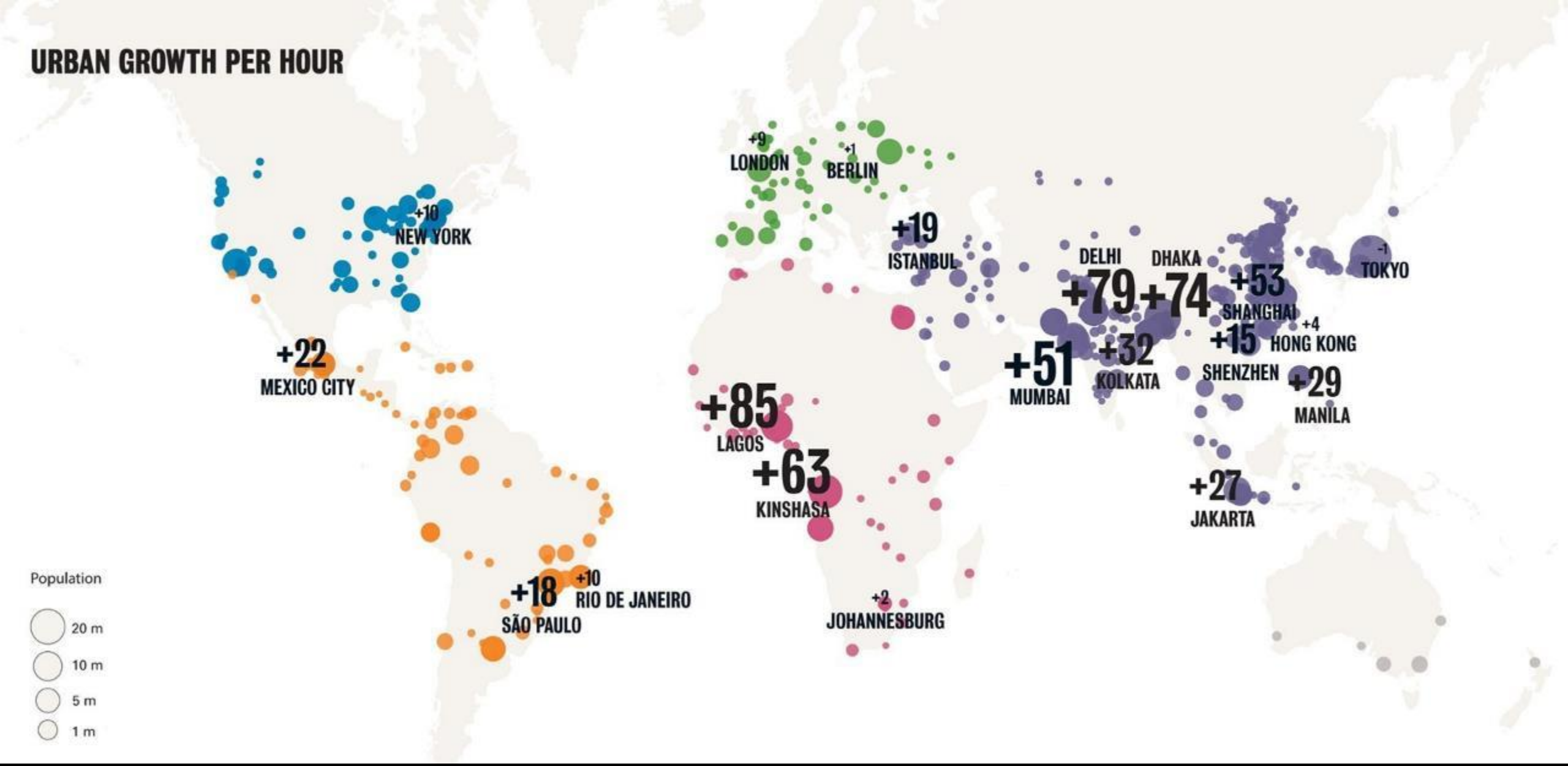


Urbanism in the ‘torrid’ zone - torrid: weather, intensity of urbanization. “Torrid zones” are special, and important.

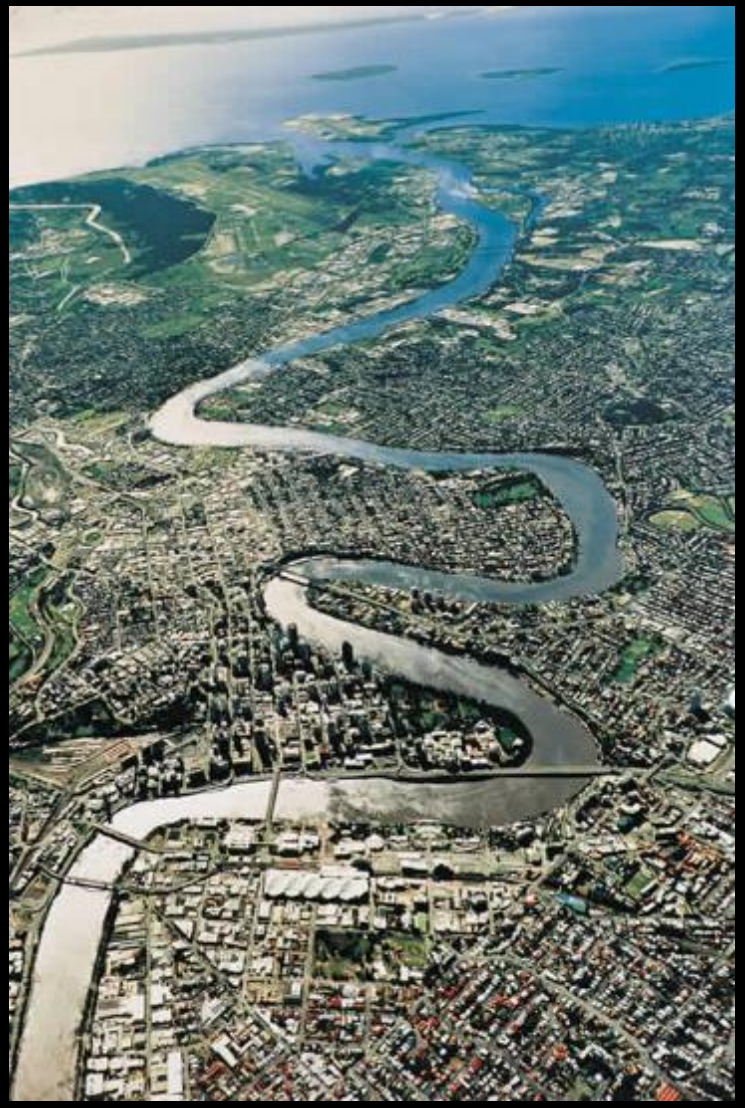
40% of the world's population live in the tropics. By 2050, it will be over 50%

Tropics the most bio-diverse region on Earth, hosting about 80% of the planet's terrestrial species and over 95% of its corals and mangroves
Source: State of the Tropics Report 2015



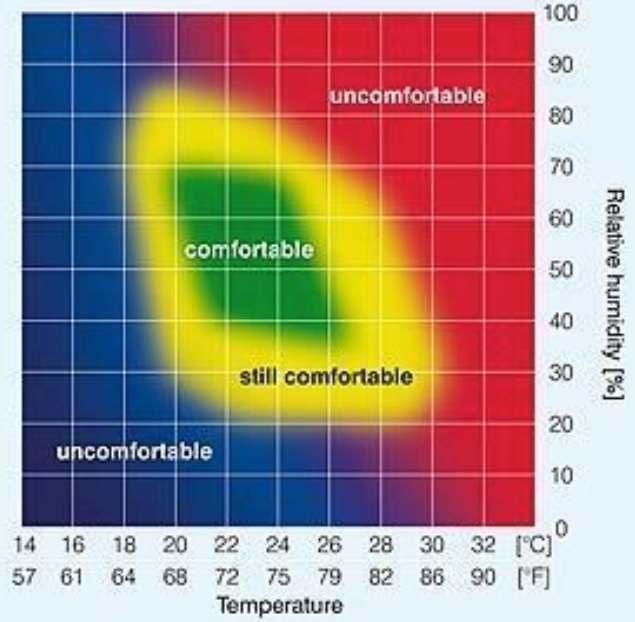


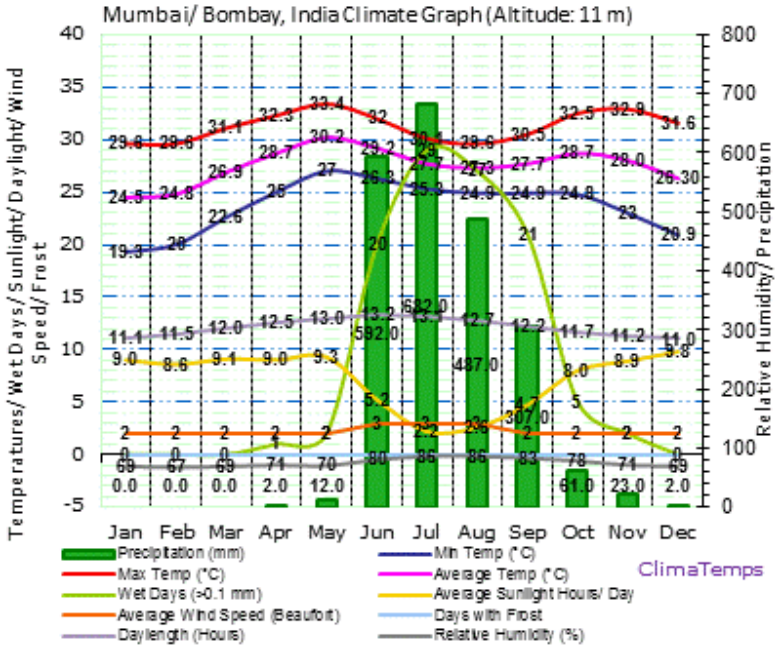
Many of the world's fastest growing cities are in the tropics and subtropics

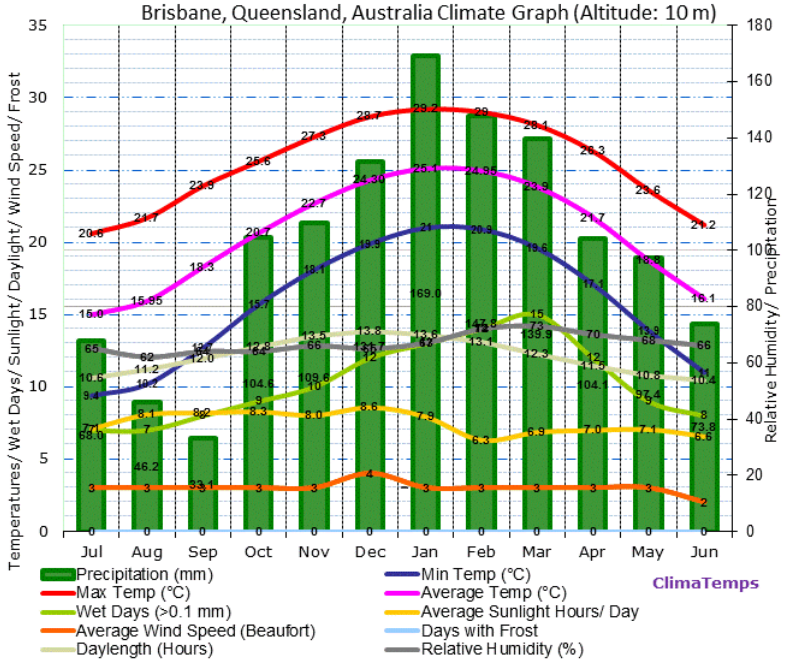


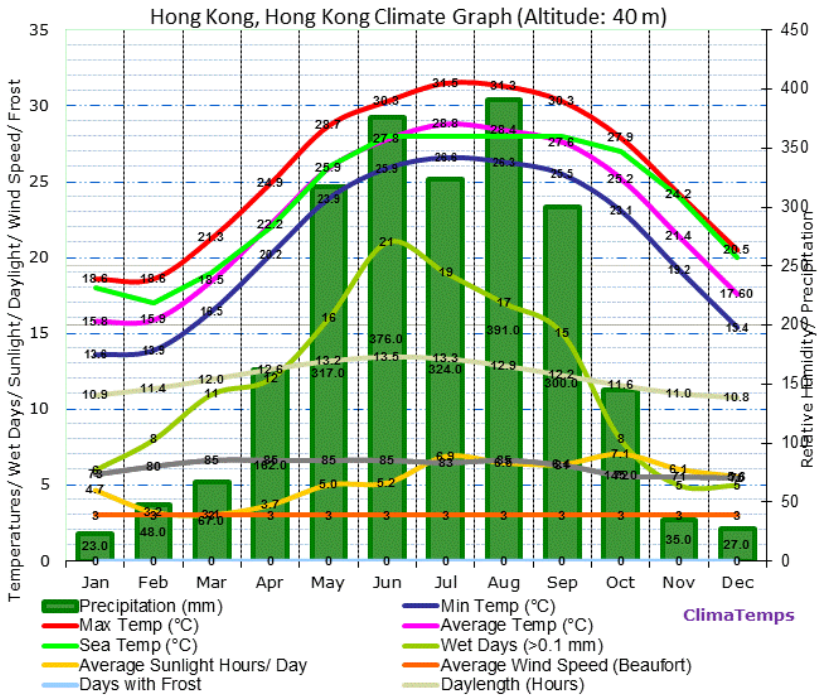
Tropics and subtropics are fantastic places to make 21st century ecological cities:
CLIMATE WATER VEGETATION

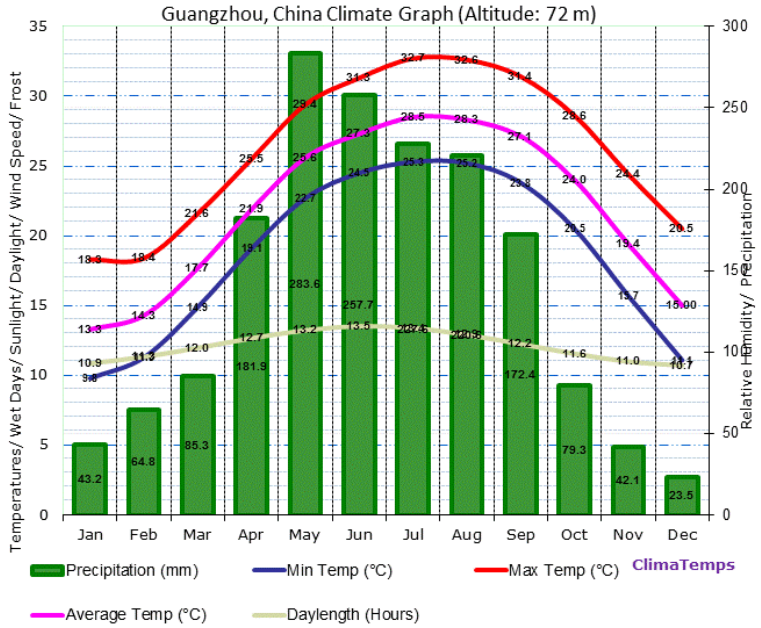
Climate comparisons; Mumbai, Brisbane, Hong Kong, Guangzhou















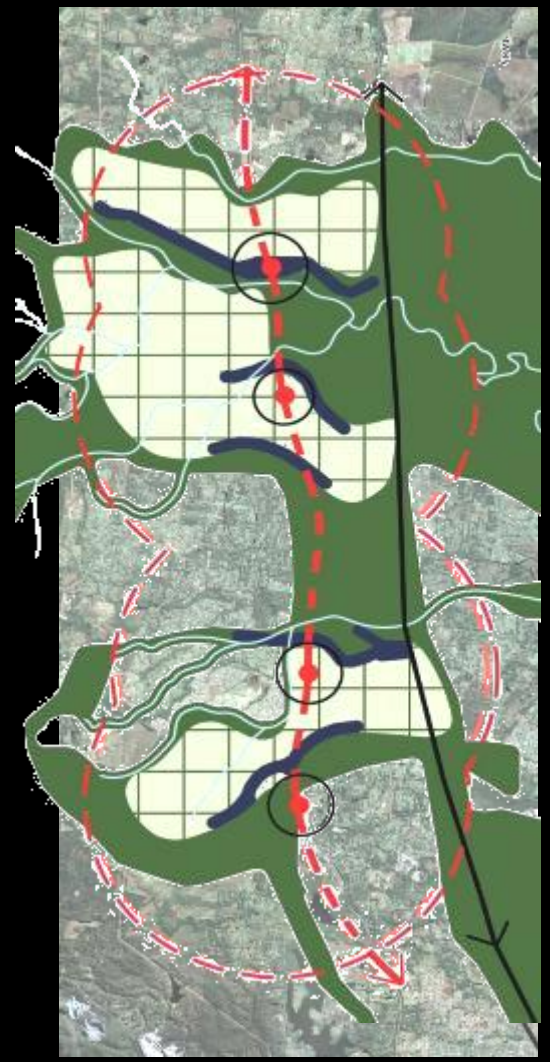

Water a resource; with climate change flood, drought – resilience key





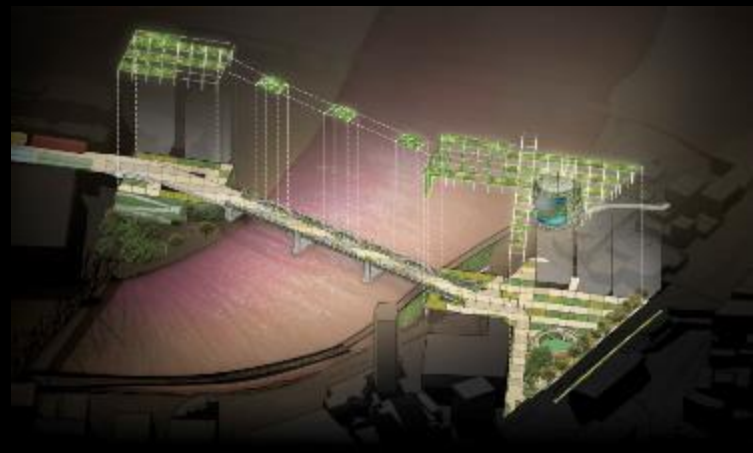

Vegetation can grow profusely in tropical and subtropical climates; coolness, ecology, water, air, human health

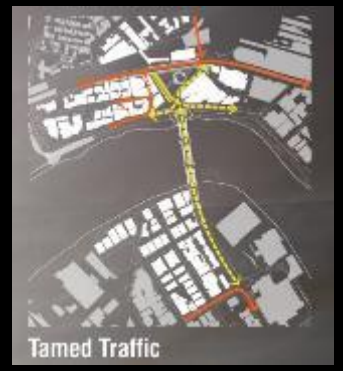
How to make subtropical and tropical green cities at higher densities?
Transport is fundamental, but we need L.O.D as well as T.O.D.



In tropics and subtropics more sense to create linear neighbourhoods organised around transport and ecological/water and landscape corridors

Architectus project





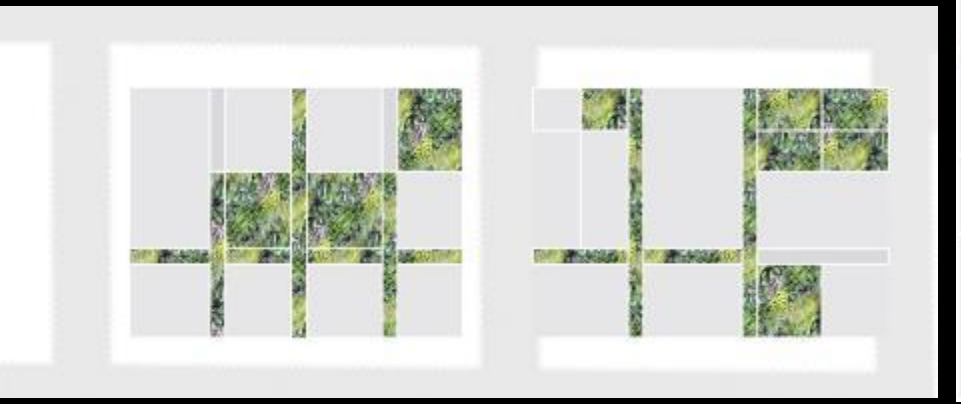
Will the driverless car make it possible to recapture urban green and manage water?

Architectus

Brisbane - we are consolidating – higher densities - how can we rebuild natural systems at the same time?

BCC CCMP 50 new towers in 20 years

Reinvest informal/modified inner city ecology into high rise? Habitat, green, small spaces, canopy



Porous urban mesh in plan and section

Patchwork of green (backyards, parks and treed streets)

Seams of green (watershed and ecological corridors)

Architectus




Model ‘porous green’ high rise

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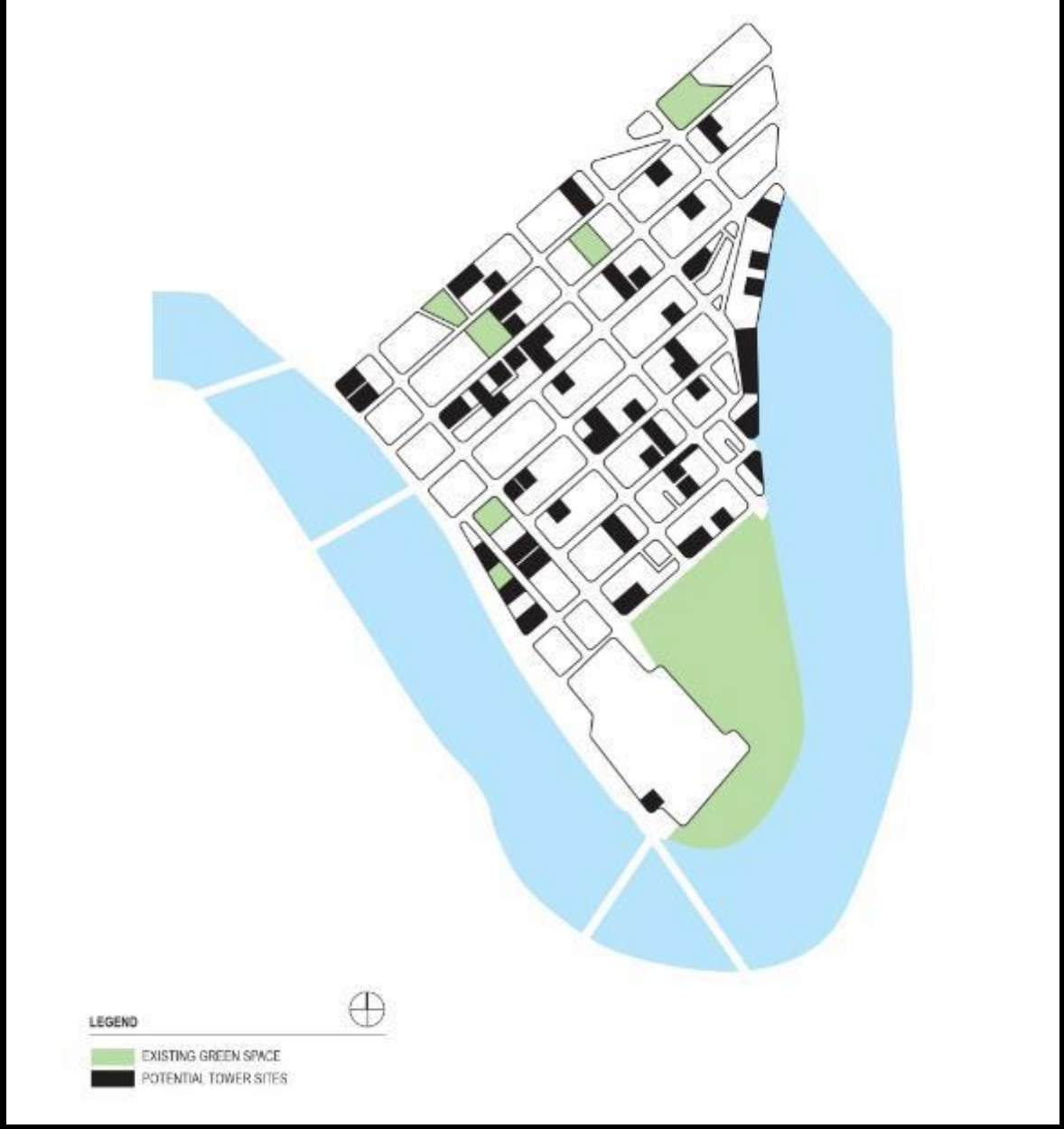
Connect green
on the ground

Architectus

Sky gardens, garden rooms, green meeting spaces, apartment gardens, green terraces

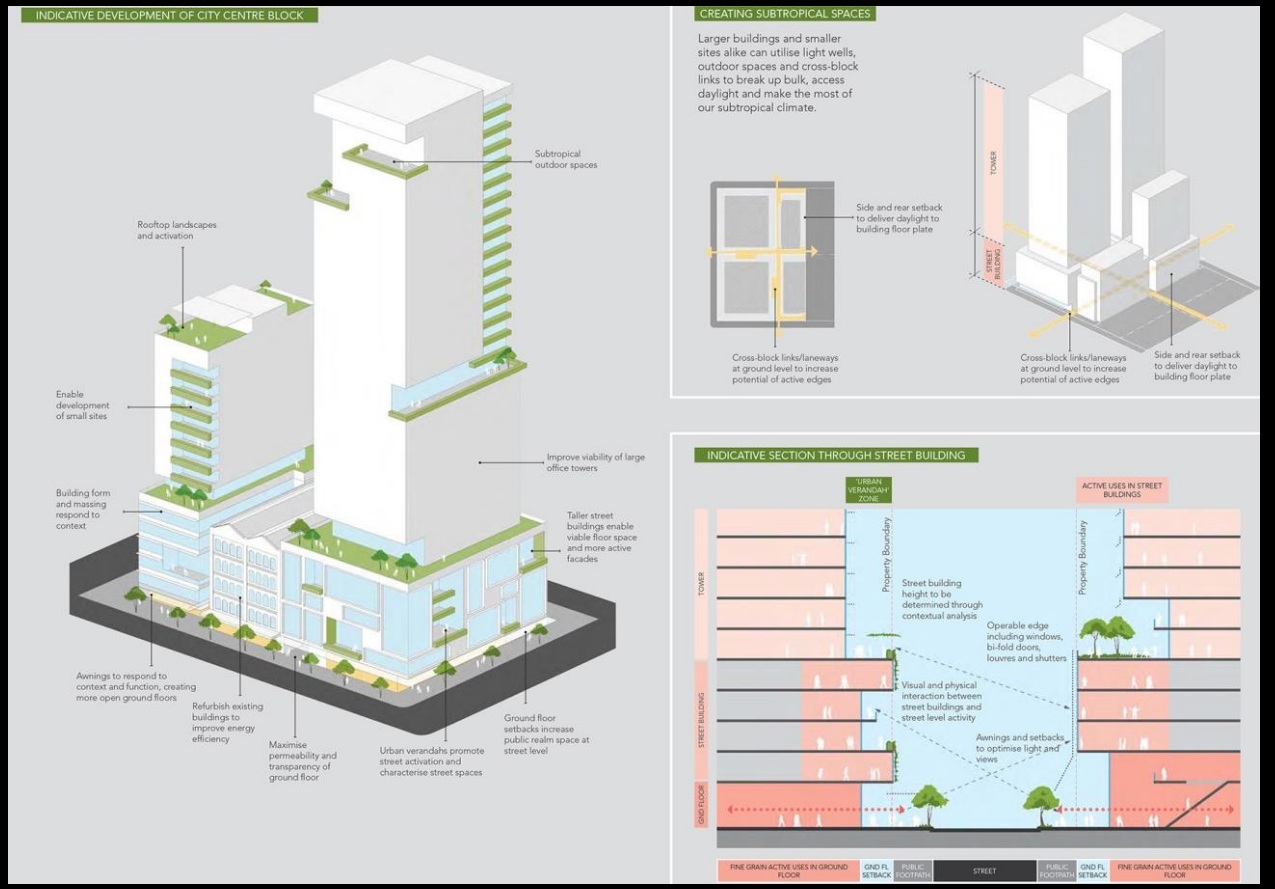
Architectus



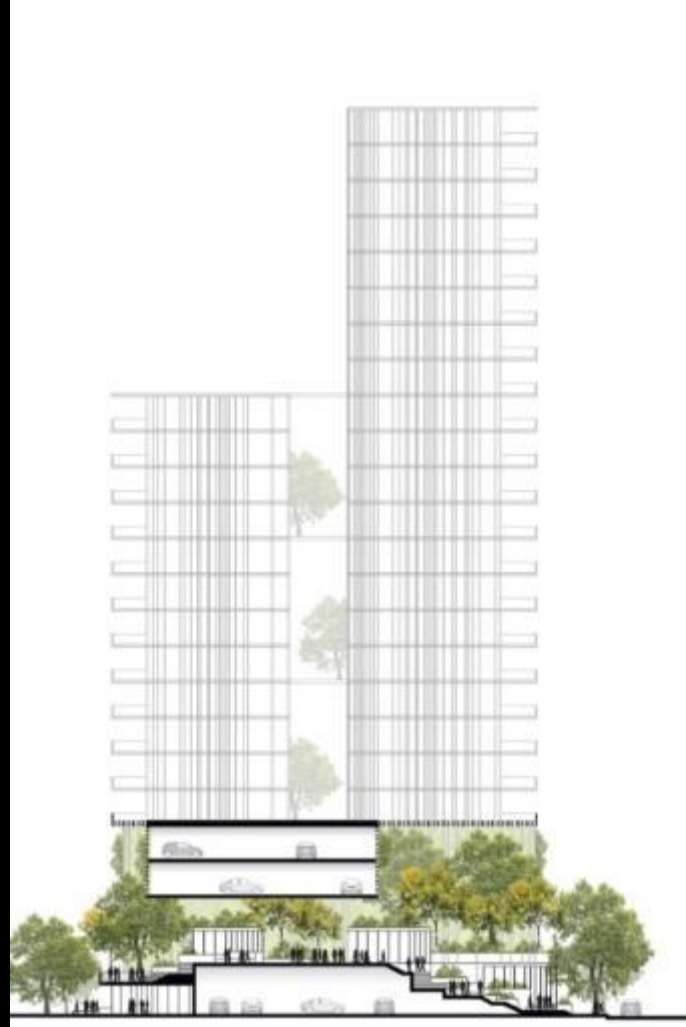
BCC CCMP 50 new towers over 20 years – hypothetical sites mapped to demonstrate transformative impacts

Architectus

Brisbane streets 21m wide

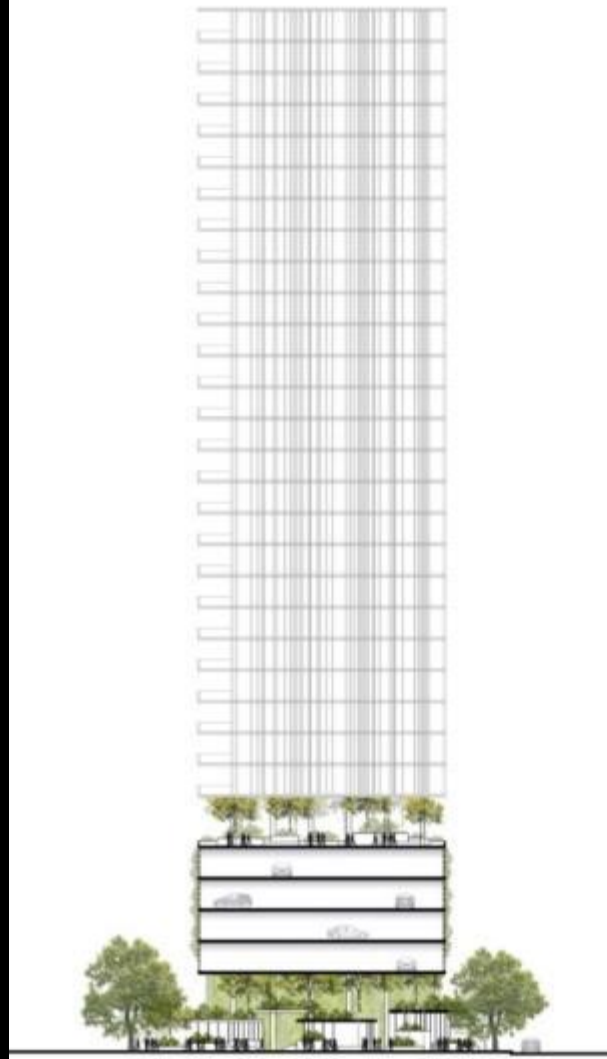


Brisbane City Council City Centre Master Plan
‘Buildings that Breathe’



Design projects over several years – more porous, open and green ground plane, public and semi public areas - series of ‘types’.

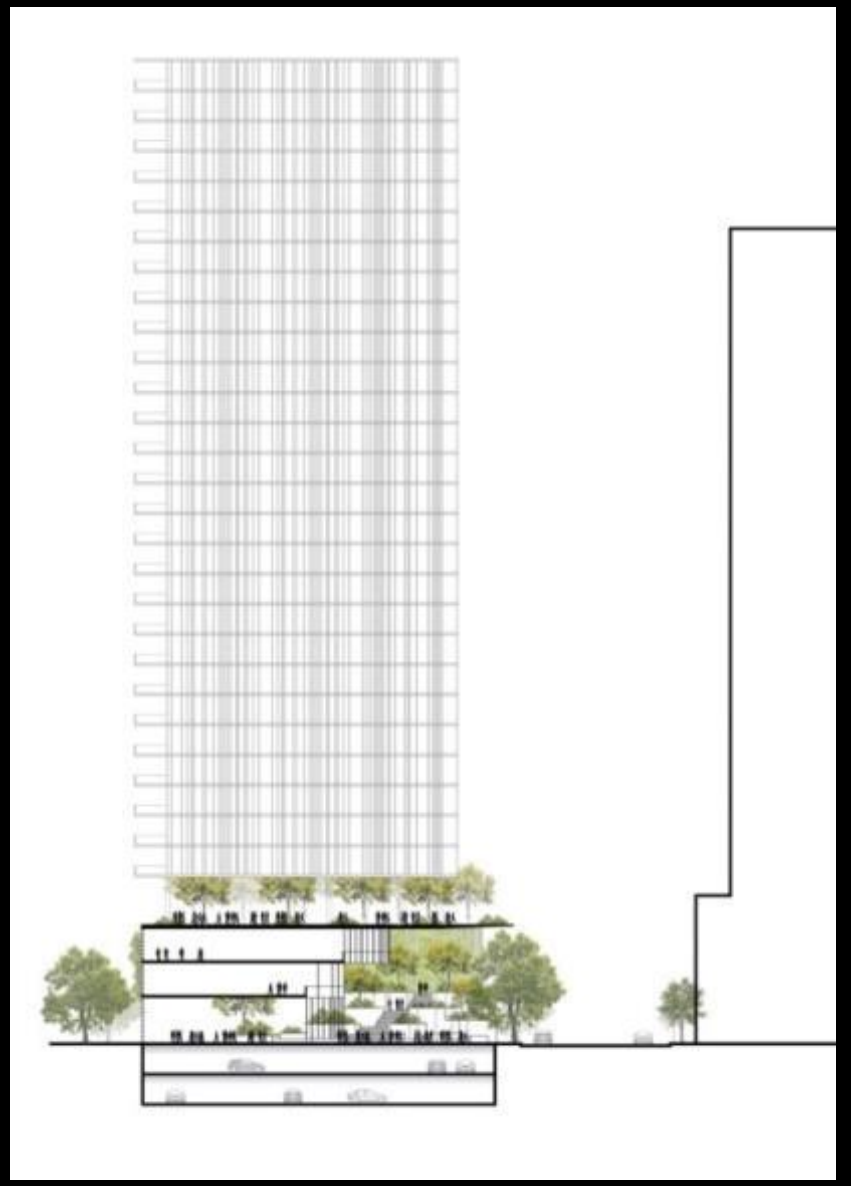
Architectus



Cool shady retreat – stepped levels for entries – porous to breezes and raingardens

‘Urban undercroft’

Architectus



Subtropical Loggia

Deep shaded occupied edges for west and east facing buildings

Architectus

The ‘biophilic’ aspects have to have tangible value — usable gardens, indoor outdoor spaces designed for climate, filtering water that are commercially viable, valued.

ARCHITECTURE

Rain Garden: the vertical garden that uses no power

Stu Robarts | September 25th, 2015

The design forgoes a pressurised irrigation system in favor of one that supplies water from the tanks to the planting by way of "wicking rope" (Credit: Treebox)

HOW DO RAIN GARDENS WORK?

A rain garden lets water collect and settle on the garden surface then soak through the plants and soil. Rubbish and sediment is trapped on the surface. Nutrients dissolved in the rainwater are used by the plants. The soil and plant roots work together to naturally filter the water and remove pollutants. It is important that the soil used is correct to let plants grow and hold moisture but also allow infiltration. There are many types of rain gardens. The following images are provided coutesy of Melbourne Water.

Planter box

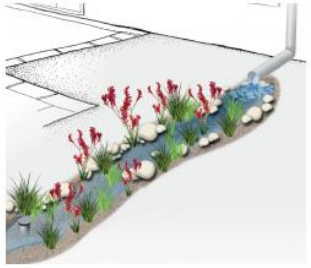
This type of rain garden is positioned above the ground to collect stormwater from a diverted roof downpipe, allowing it to filter through the rain garden before connecting to the stormwater system.

Infiltration

This type of rain garden is positioned in the ground to collect stormwater from hard surfaces or a diverted roof downpipe, allowing it to filter through the rain garden and penetrate into the surrounding soil.

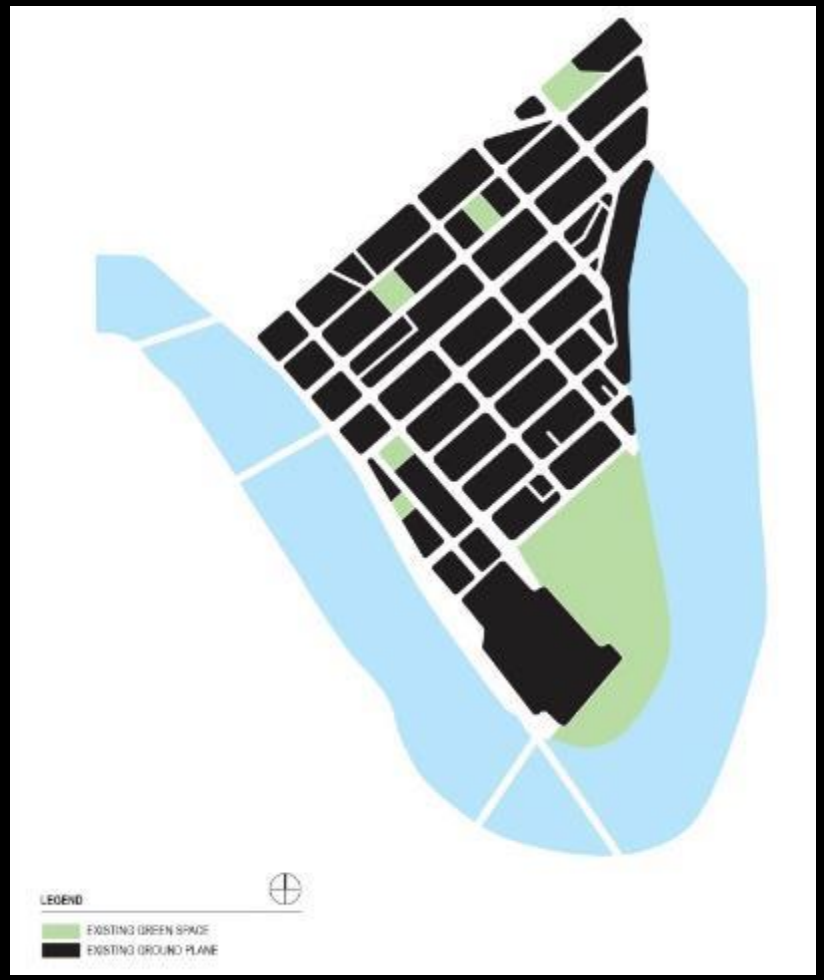
In-ground

This type of rain garden is positioned in the ground to collect stormwater from hard surfaces or a diverted roof downpipe, allowing it to filter through the rain garden before connecting to the stormwater system.



Swale

A slight depression in the landscape which can be either grassed or planted with other vegetation.



Brisbane ground plane now

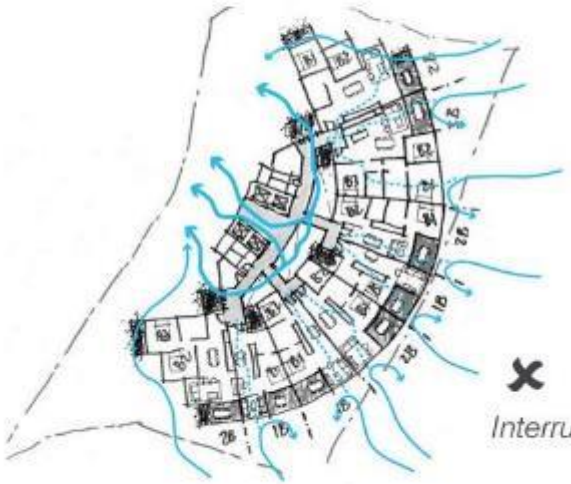
Effect of 50 subtropical building bases over 20 years



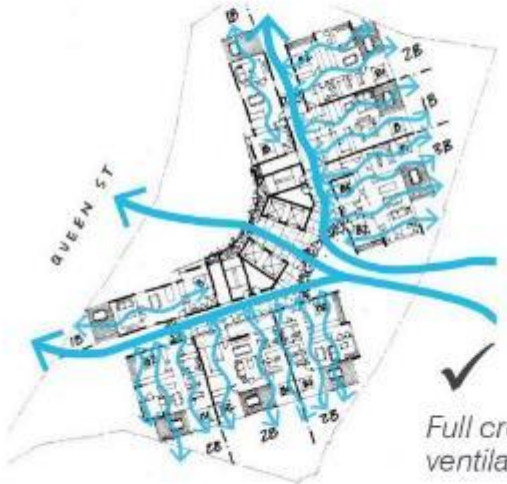




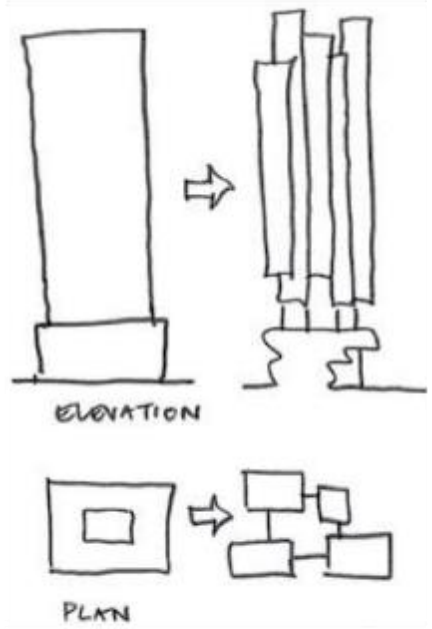
NATURAL VENTILATION



✗ *Interrupted.*



✓ *Full cross ventilation.*



✗ *'Standard'*

✓ *'Porous'*

APARTMENT VIEW ANGLES

✗ *Mostly narrow 'tunnel' views.*

✓ *Generous view angles.*

443 Queen St Brisbane
Architects: WOHA and Architectus

443 Queen St Brisbane
Architects: WOHA and Architectus






Implementation - Singapore world leaders in making biophilic cities

Vancouver

- Sustained initiatives, ‘branding’ and commitment to being an ecological city
- Unique series of leaders with planning backgrounds
-Unique combination of history, geography, culture and politics

Ecological cities in Australia ……. utopian?

- Era of:
  - small government struggling to keep up with basic service provision
  - political volatility, less leadership stability
  - no frameworks for incredible complexity of city making
  - inconsistent policy settings across scales and jurisdictions
- Need **robust strategies** that can survive this

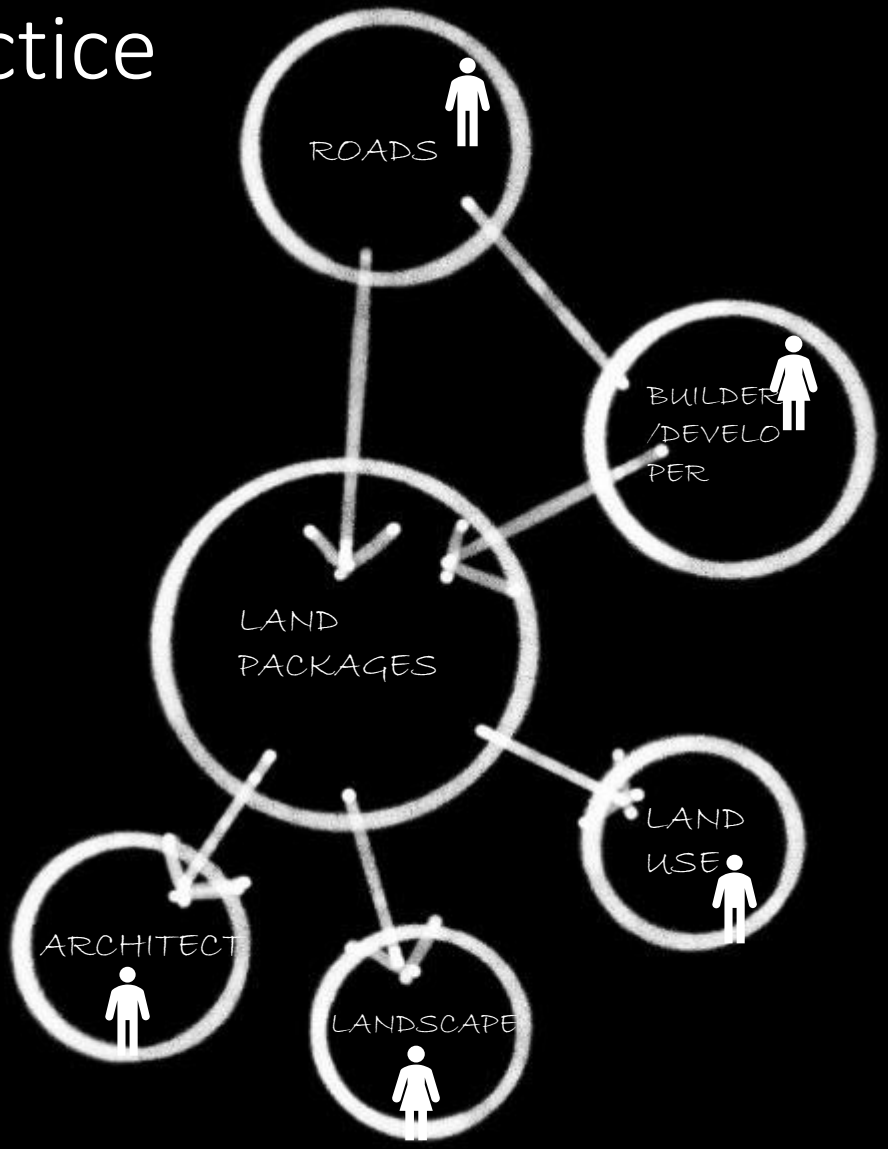
Ecological Utopia for Paris Proposed by Vincent Callebaut

Vision of Singapore by WOHA

Visions of Paris by Roland Castro

This is the city we get from siloed practice

Fragmented city



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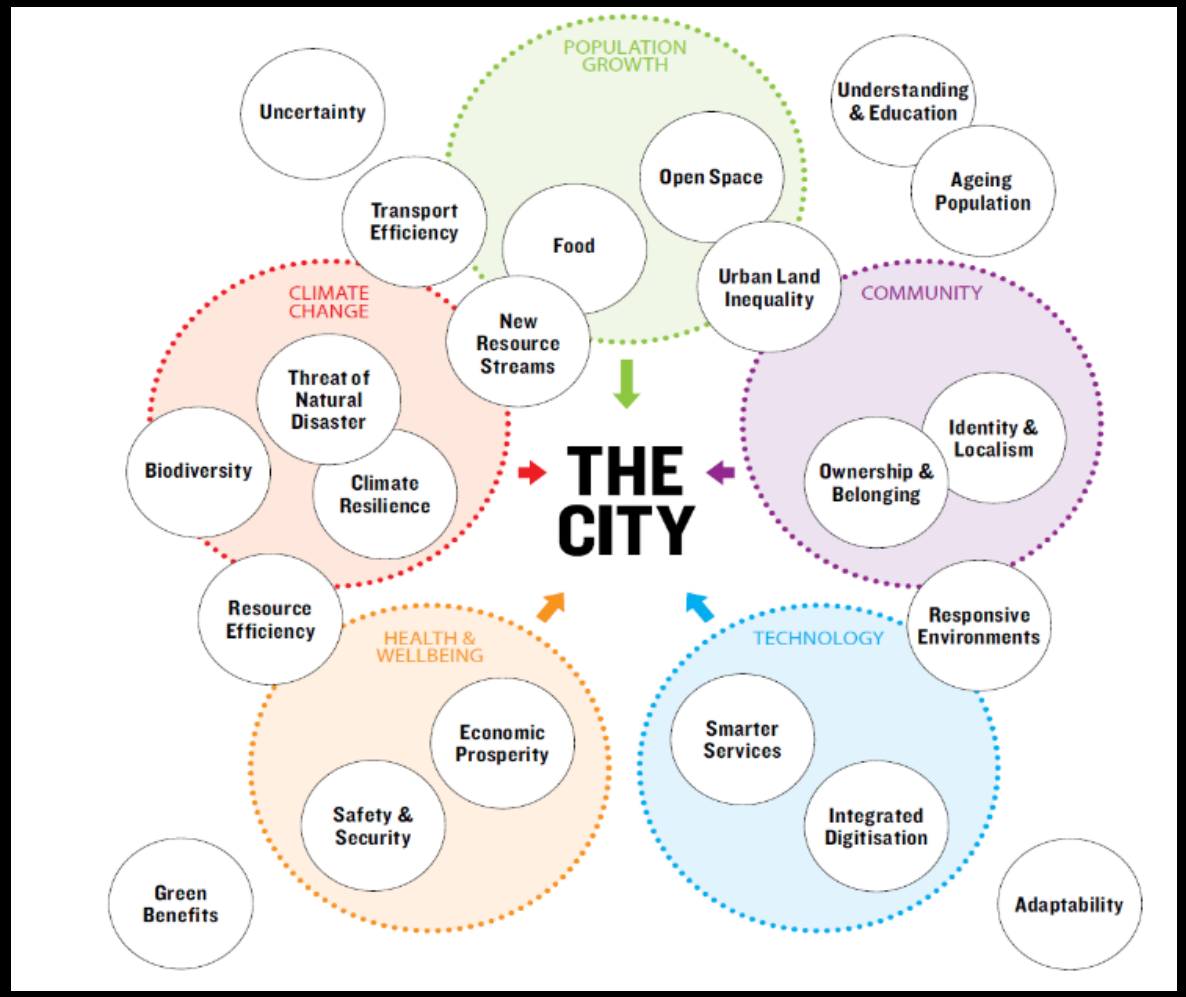
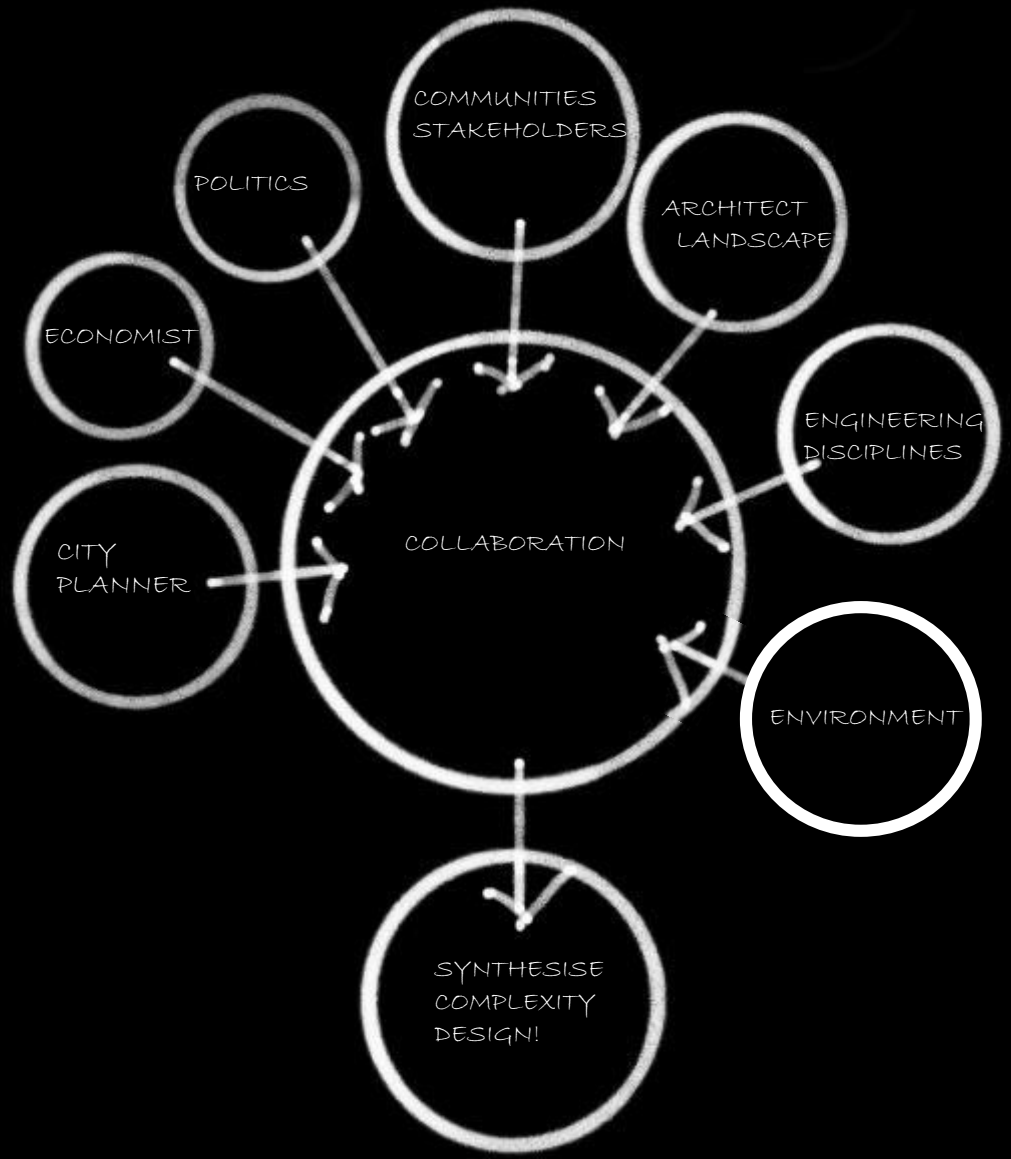


Complexity needs different approaches and tools



Design as a platform for collaboration
BUT STILL NEEDS TO BE ROBUST

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Robust strategies and integrated thinking across sectors, across scales

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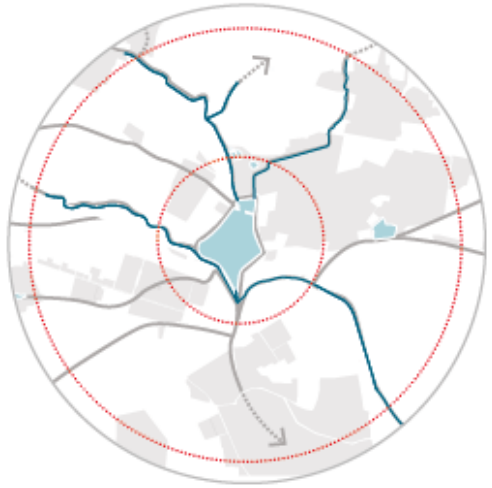
Meaningful Infrastructure
Ulsoor Lake, Bangalore

- Retrofitting polluted lake
- Physically reconnecting to high density city as a resource
- Private developer driven strategy

A holistic and lasting approach to transform Ulsoor lake

4 key moves for enduring transformation



1. clean the lake

The source of the pollution lies within the dense urban catchment. The strategy sets out a series of sequential measures that work in tandem towards the vision of a lake that once again provides a potable water source for Bangalore.

2. Reactivate the lake

Unlocking the potential of the spaces surrounding the lake with new interventions into the landscape and lakeside edge, Ulsoor can once again form an active heart of the local community with capacity to provide for a broad range of existing and new public uses.

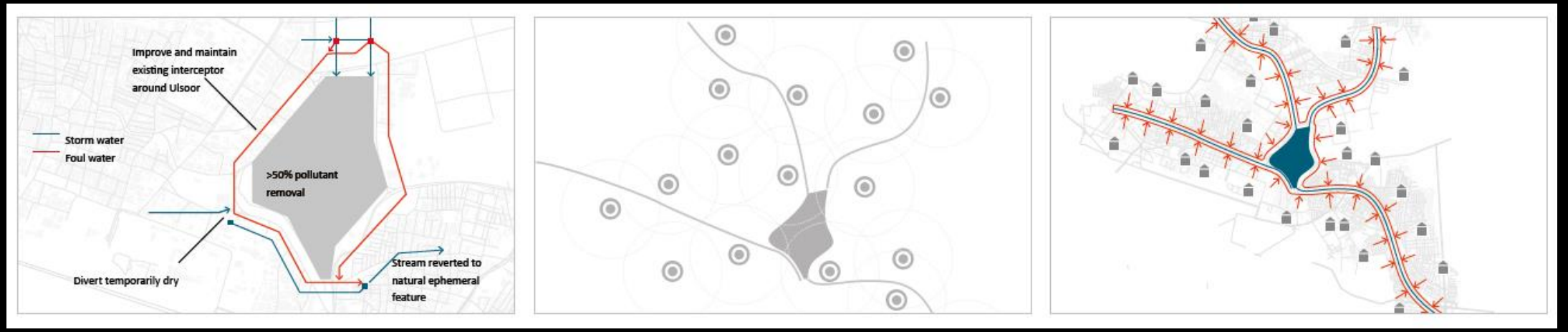
3. Connect the lake to the city

Ulsoor lake currently is disconnected from the thriving urban realm around it. The strategy creates bold moves to remove barriers and prioritise the movement of people over cars. Interventions along streets and the extensive nalah network will form a green infrastructure strategy for the city.

4. Engagement and governance

Key to the success of the overall strategy is building support with the local community in calibration with the organisations charged with its maintenance and curation. The success of the new spaces and the water quality strategy relies in part on behavioural change within the catchment, supported by some of the specific initiatives in the 20 projects by 2020 programme.

Clean the lake



Project intercept

Community toilets

Project connect

Ulsoor lake Skimmers

Project Aerate

Continuous wetland treatment

Reactivate the lake

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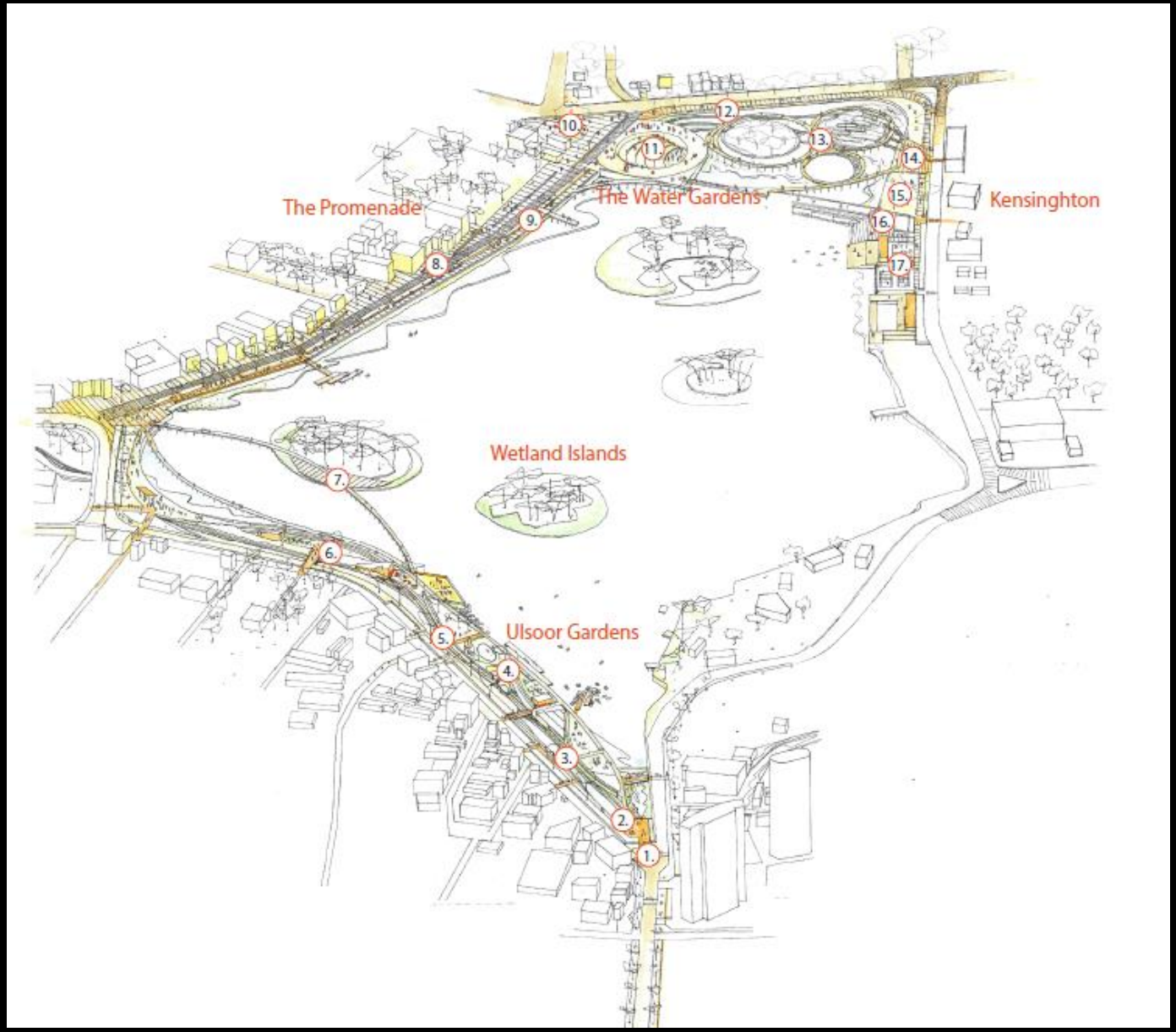

The Promenade, providing a continuous route away from traffic and close to the water and nature
Ulsoor Gardens with terraces giving access to the water

Ulsoor Lake, Bangalore


In process of delivery – the value of the infrastructure –
Queen Elizabeth Park , London – value of the property
around

Surfers Paradise

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North of Surfers; ear marked for higher density, but vulnerable to sea level rise

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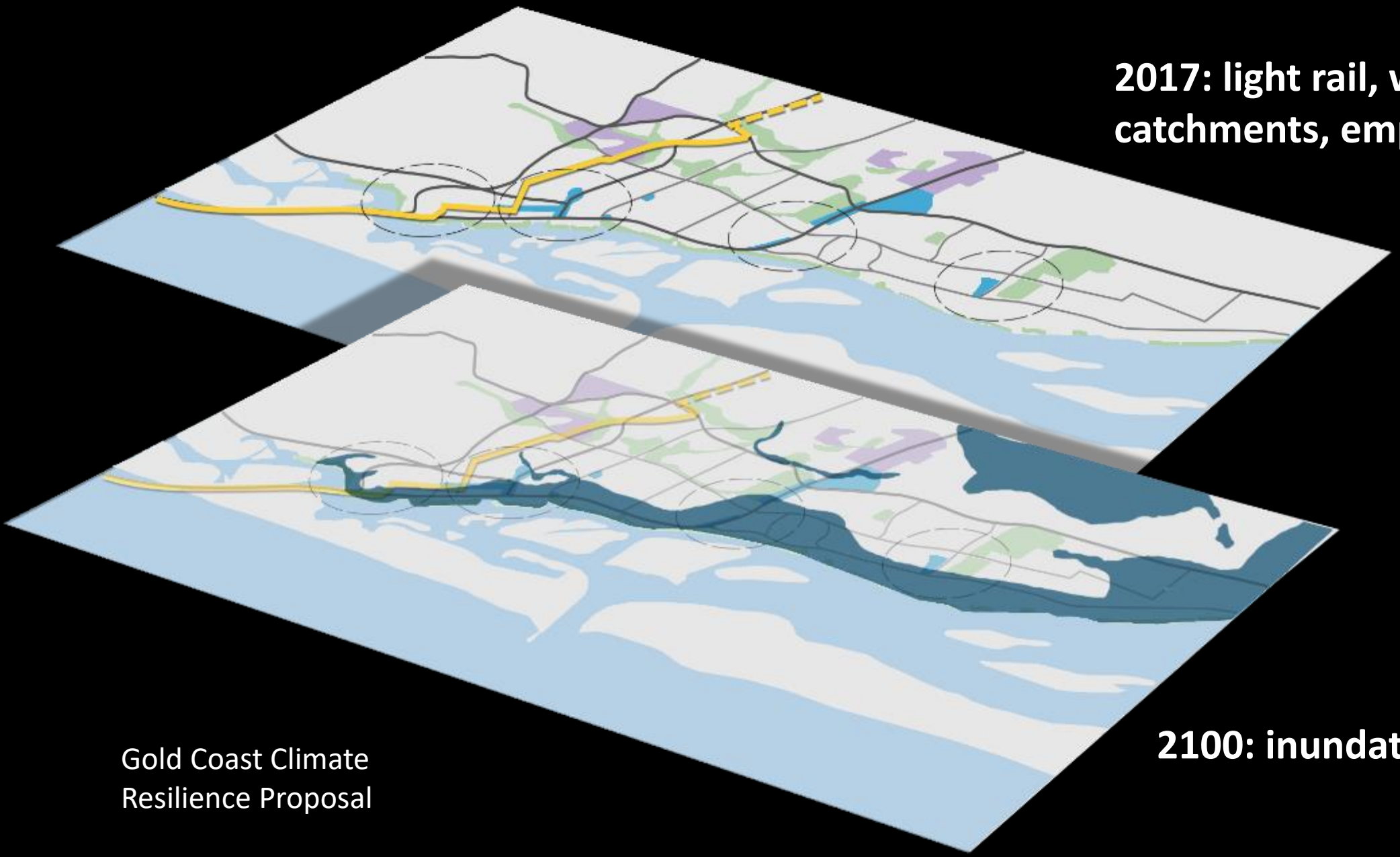

2017: light rail, walking catchments, employment, retail

2100: inundation

Gold Coast Climate Resilience Proposal

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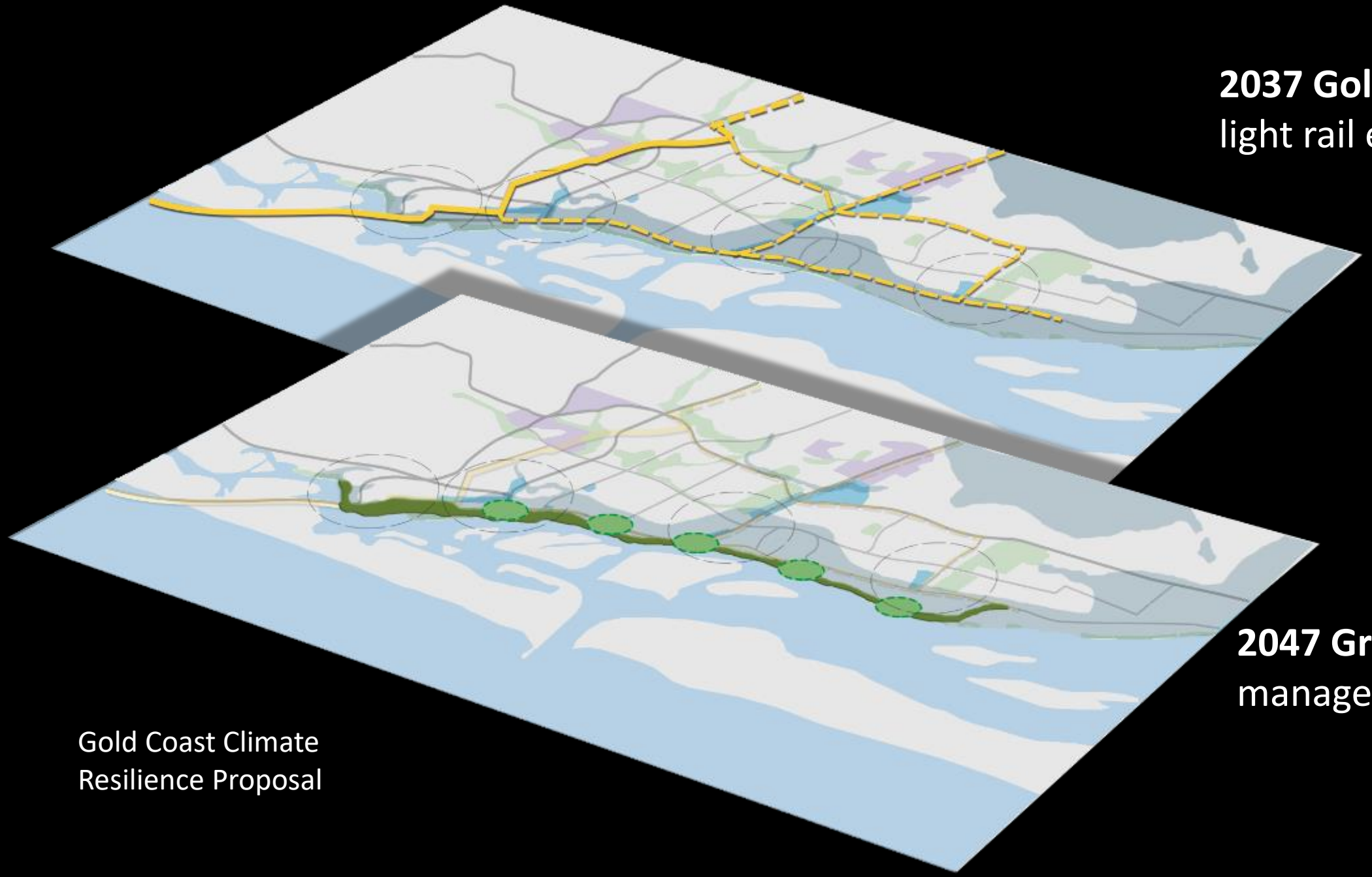

2037 Gold Line
light rail extended

2047 Green Line
manage water's edge

Gold Coast Climate
Resilience Proposal

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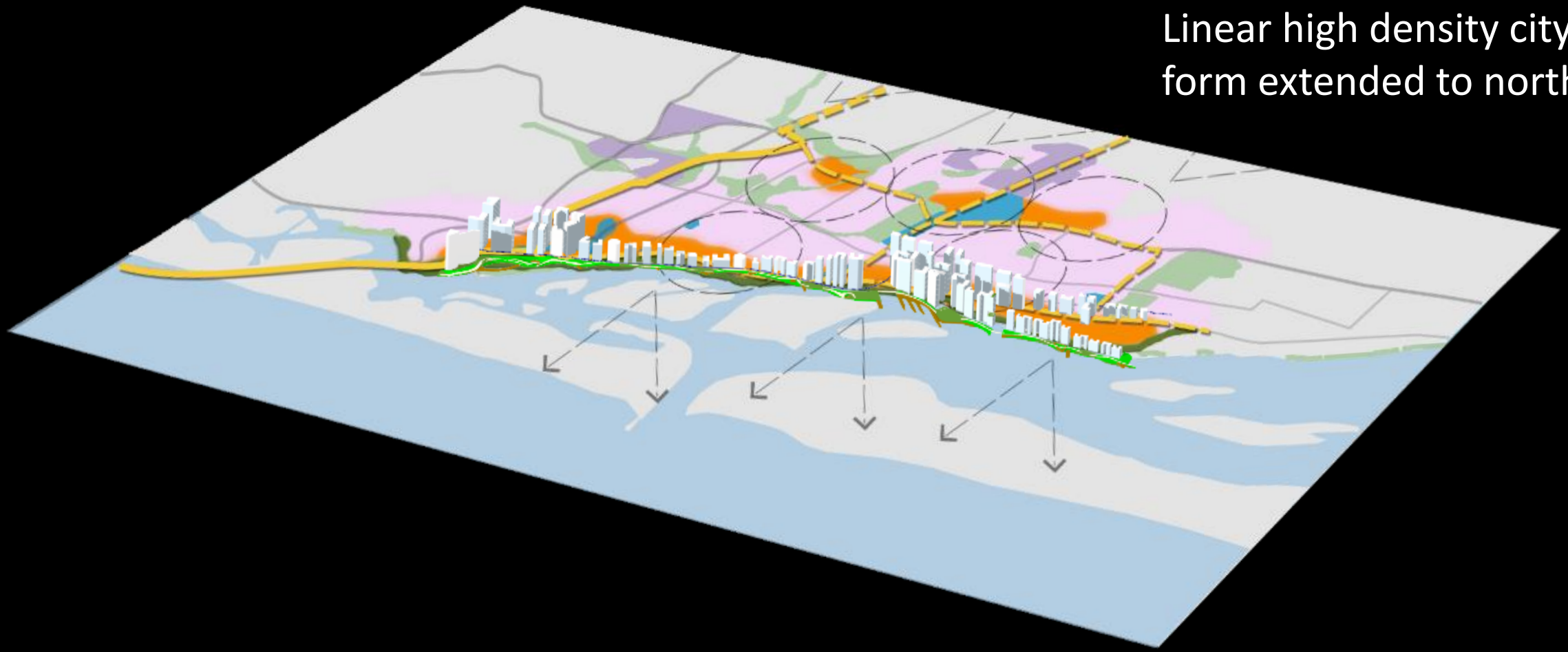
2057 Sky Line
Linear high density city form extended to north



Gold Coast Climate Resilience Proposal

ARUP

Gold Line




Green Line



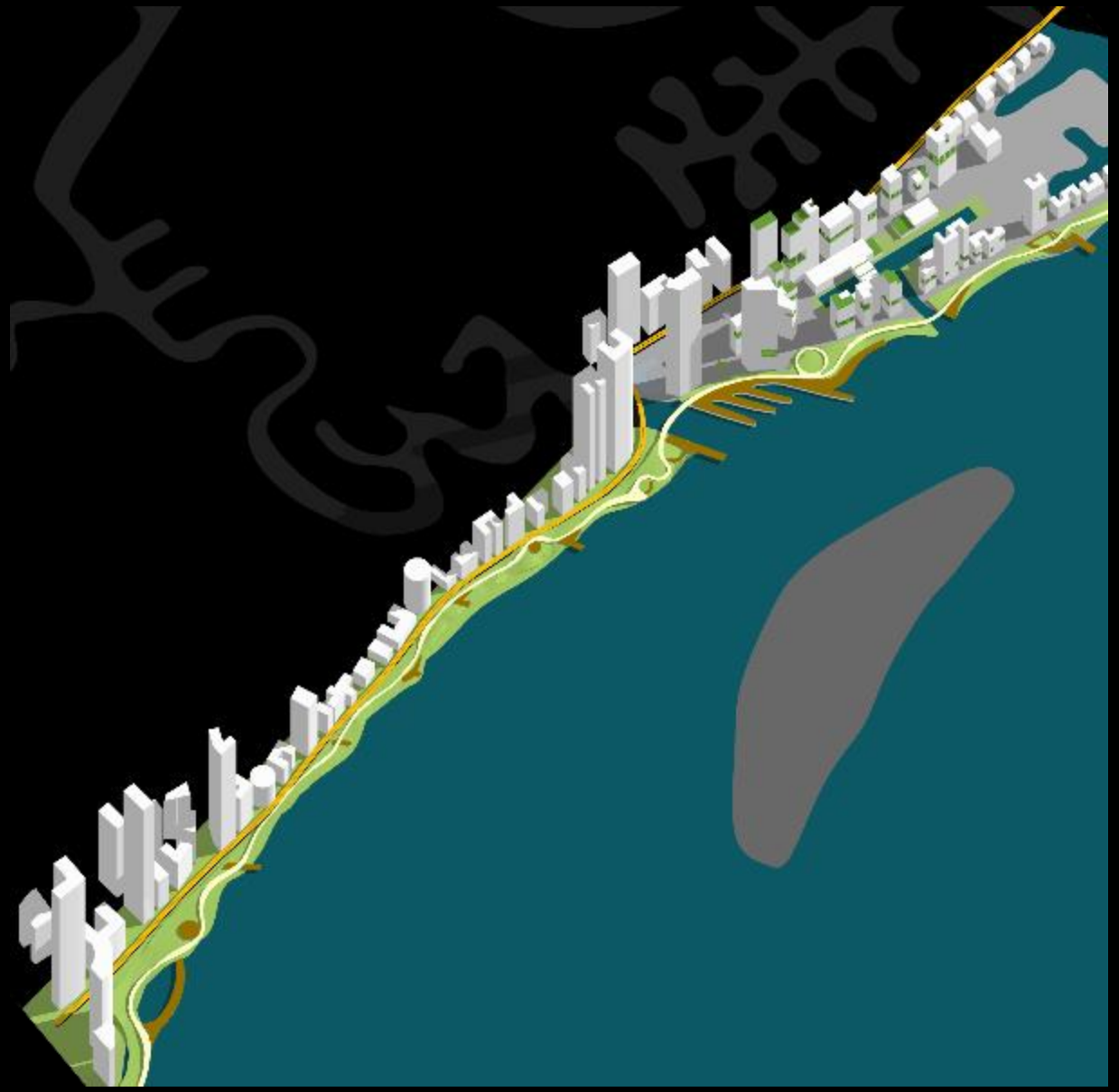

Skyline






Gold + Green + Sky Line

- Complete the linear city of high density villages
- Reinforce waterfront as destination whilst protecting land behind from sea level rise
- Urban framework to integrate public and private benefits – mutual dependence



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Resilience:

Integrated framework for:
-civil
-water
-architecture
-planning
-economics
-transport
-property
-community
-density

Waterfront – social/economic value enhanced whilst protective structure created

Interdependencies require integrated implementation and thinking

Creating the 21st century higher density city in nature

- Integrated, connected up thinking across disciplines and deliverers is critical: water, green, property, transport, architecture, planning, implementation , community
- Meaningful infrastructure – understanding the people and city shaping value – link to commercial nous in era of small government
- THE challenge of 21st C city making