CONNECTIVE CITIES

Action for Cool Cities: Pathways for carbon reduction in buildings and improvement of outdoor thermal comfort

Partners of Connective Cities

Deutscher Städtetag

ENGAGEMENT GLOBAL
Service für Entwicklungsinitiativen

with its SERVICE AGENCY
COMMUNITIES IN ONE WORLD

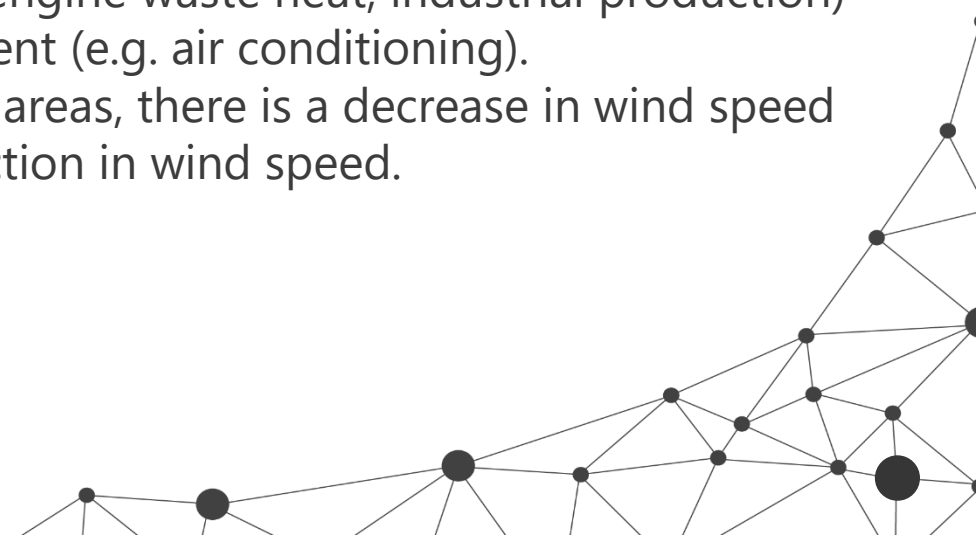
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Commissioned by

Federal Ministry for Economic Cooperation and Development

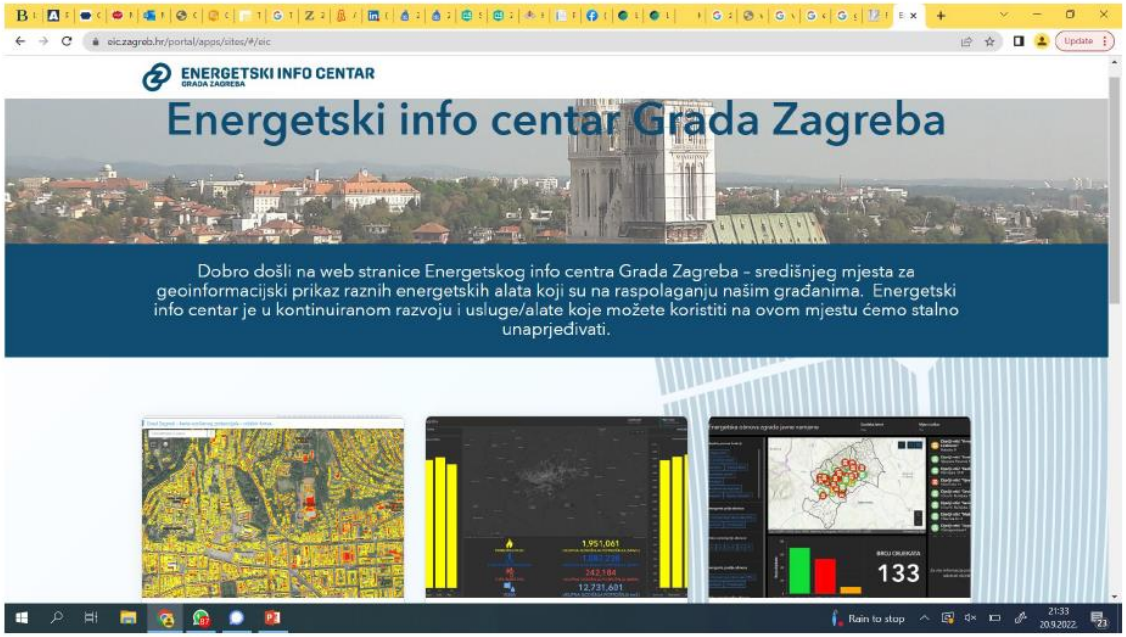
Cool Cities: why & how?

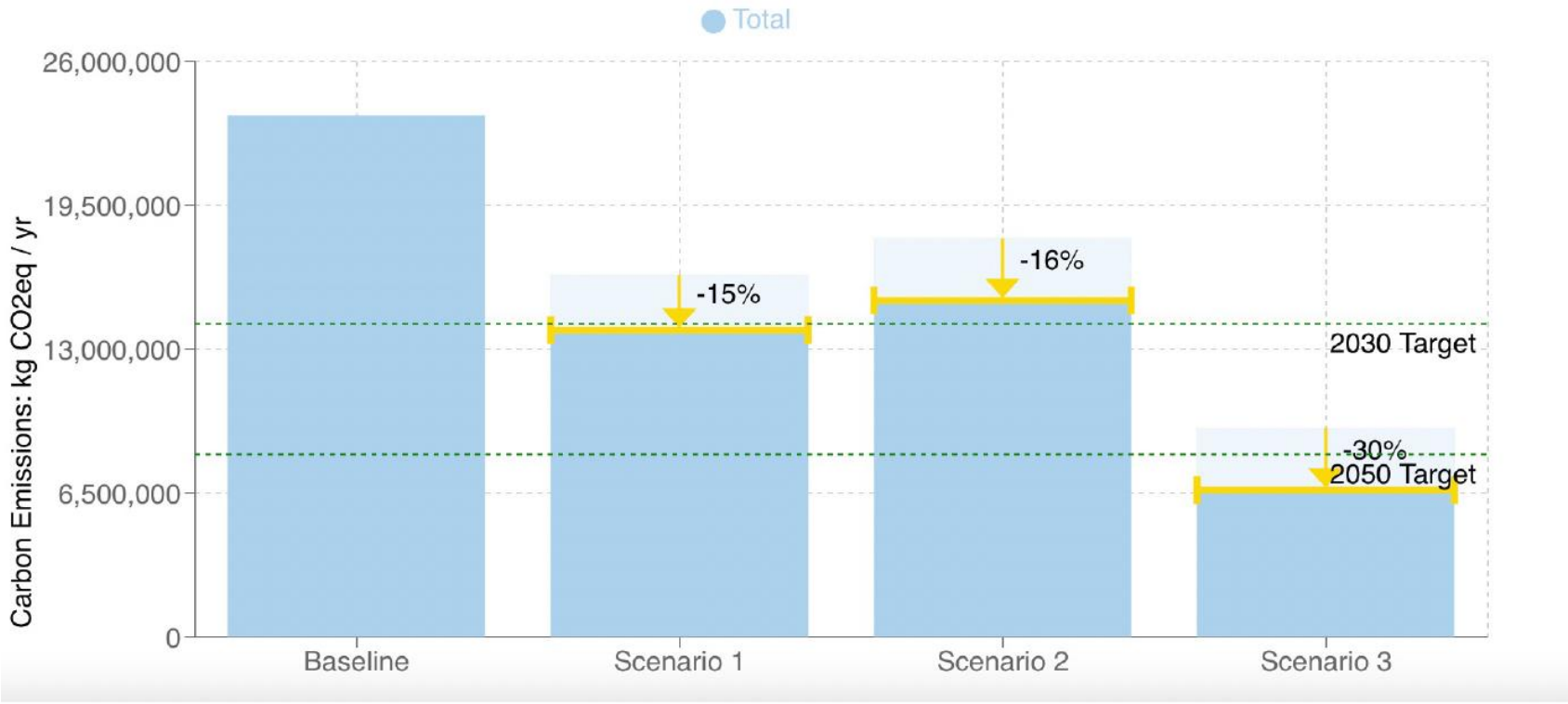
- climate in cities is not only getting warmer, but also more people will be affected by this warming **particularly the most vulnerable**.
- While urban heat islands are observed throughout the year, **the effect is particularly pronounced and critical in the summer months.**
- **Causes**
  - Significant reduction of permeable surfaces and vegetation → less evaporative cooling
  - Compared to rural areas, urban areas witness increased heat generation through combustion processes (e.g. engine waste heat, industrial production) or waste heat from electrical equipment (e.g. air conditioning).
    Change in wind conditions: In urban areas, there is a decrease in wind speed due to building development a reduction in wind speed.



Inspirational good practices

Monitoring & energy transition strategies



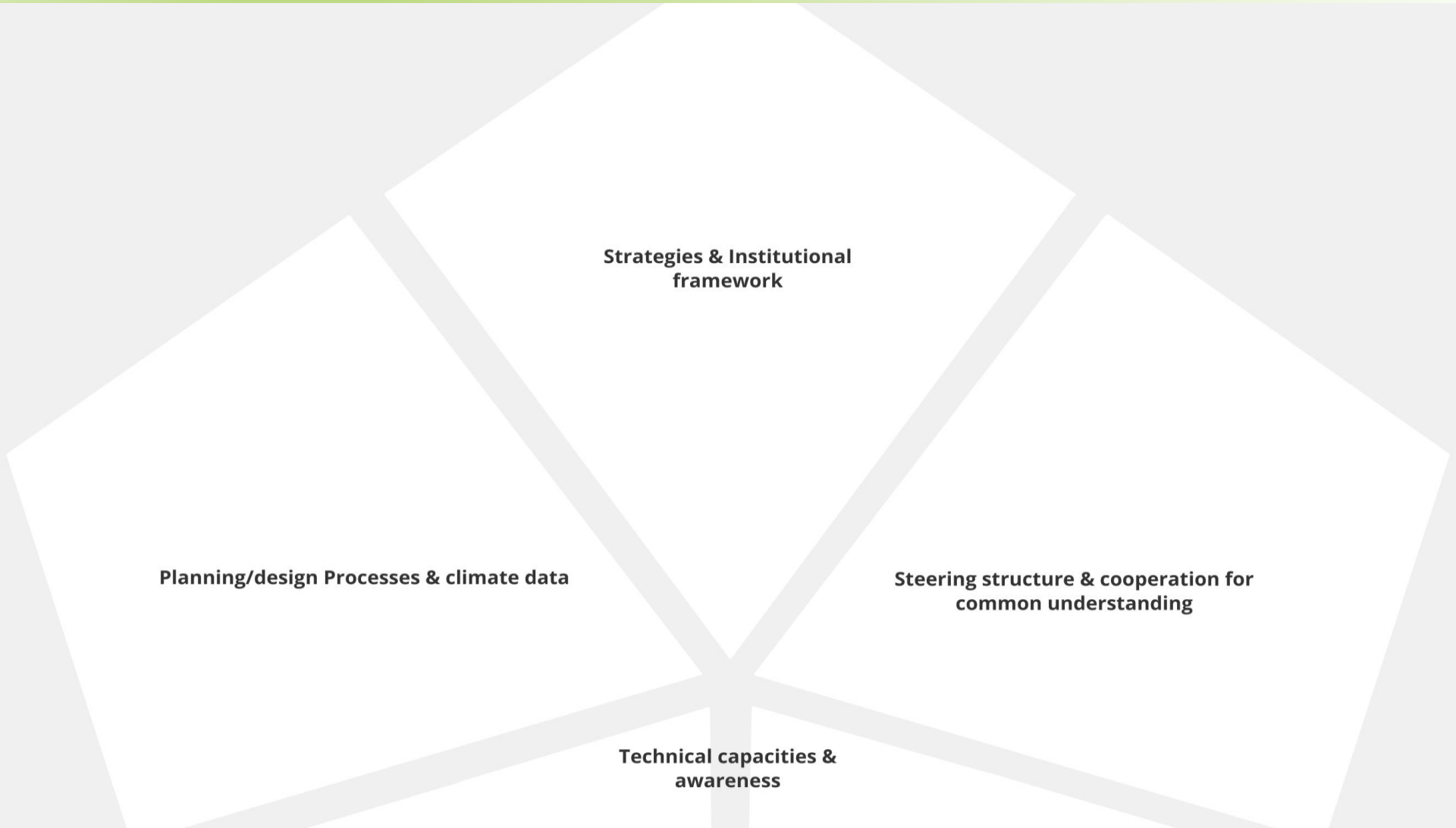


Envelope retrofit (insulation + windows)

Heat pump retrofit

Envelope + heat pump retrofit

Understanding & Observation



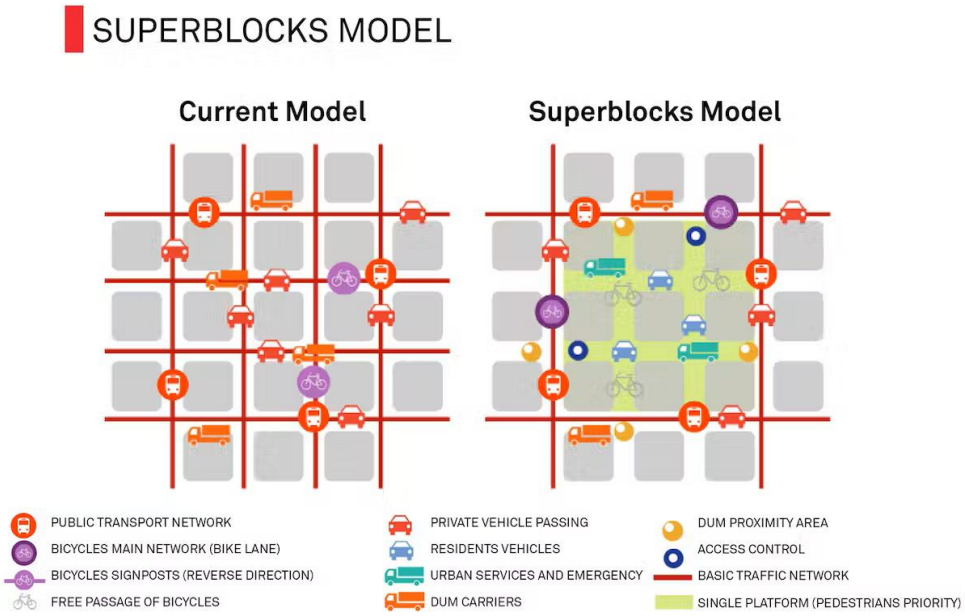
Ideation and prototyping of solutions by the participating municipalities within the thematic fields

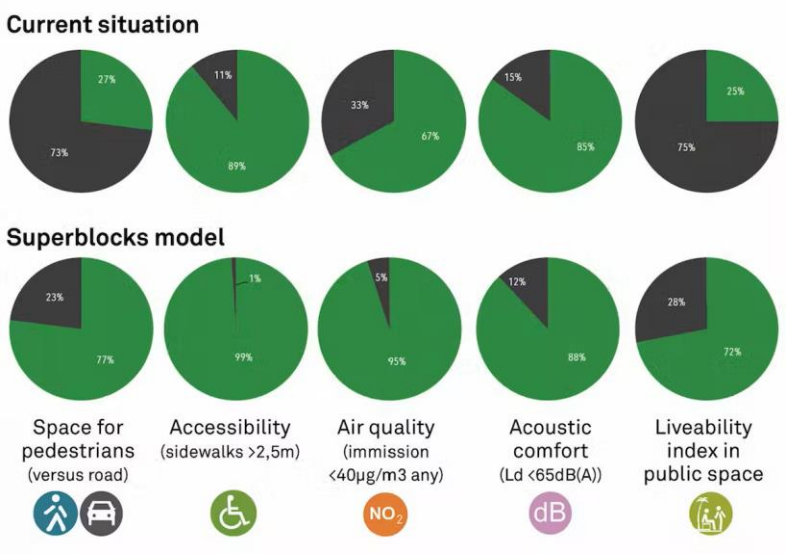
- Designing climate-responsive outdoor public spaces and promoting engagement of citizens
- Steering Structure: Interdepartmental Communication framework/platform in municipalities
- Optimizing existing building and urban design regulations by introducing key performance indicators and improving in-house capacity

municipality as a regulator and implementer: budget analysis and strategies for cost recovery of climate action measures

- Biodiversity park/ forest reserve in the municipalities of **El-Kef in Tunisia and Bab Amman in Jordan**
- Piloting the green infrastructure master plan of **Irbid municipality in Jordan** and introducing KPIs for improving outdoor thermal comfort in urban design
- Establishing a specialised unit for climate change in Hebron municipality- Palestine
- A regional urban park for **Khan Younis in Gaza-Palestine**
- Urban upgrading of the riverside of the Auji creek in **Kisumu, Kenya**

Superblocks program in Tbilisi- georgia





***James Nyagol**- Senior Climate Change officer- Kisumu county government, Kenya*

Urban upgrading of the riverside of the Auji creek in **Kisumu, Kenya**

AUJI CREEK CONCEPT (KISUMU CITY)

Urban Renewal & Regeneration
Auji Creek

Auji Creek is the main one of several wetland areas in the city. Auji Creek Park is envisioned as a People's Park is that created, owned and managed by the community for the environmental and social benefits of all people for present and future generations. The overall goal is to conserve and secure the Park as a key asset for Kisumu Metropolis and its peoples.

The wetland faces several challenges including;

- Clearing of wetlands and Swamps for settlement and Agriculture. This results in increased and more devastating flooding
- Cultivation up to river banks leading to bank and soil erosion
- Pollution from farms and industries as well as dumped solid waste
- Lack of clear tenure leading to encroachment

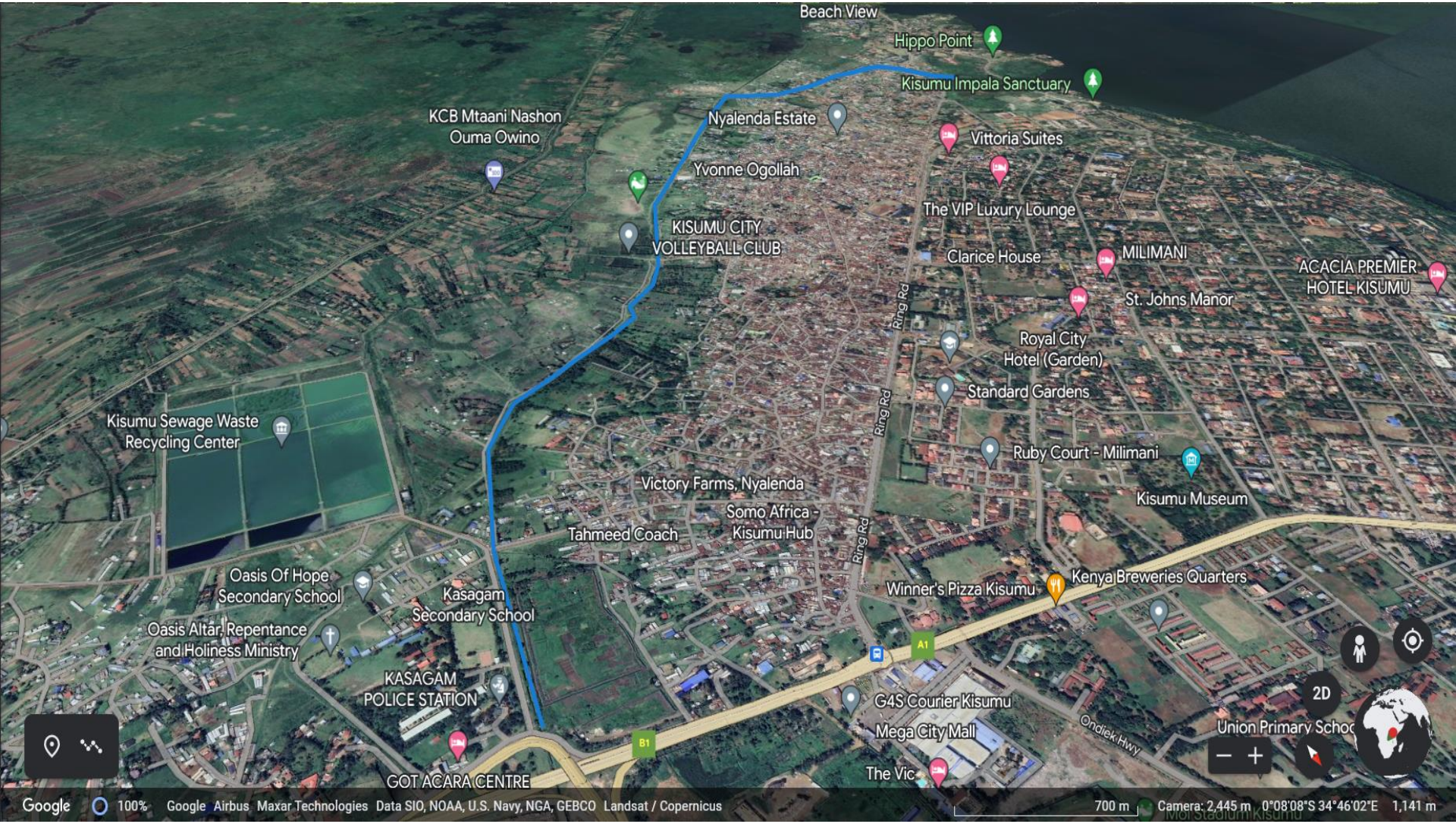
Several objectives and strategies are employed to create the envisioned People's Park;

- Creating a Park that conserves biodiversity, benefits local people and is a centre for culture and recreation
- Ensure biodiversity conservation and managemed for the benefit of residents and visitors
- Develop and enhance key environmental services – especially with respect to mitigating flood waters
- Auji Creek Park as a key part of a network of open spaces linking the city with the Lake
- Adoption of a community-based approach to conservation which begins from education and training on the practices and importance to agreed to rights and responsibilities of use as in a management plan

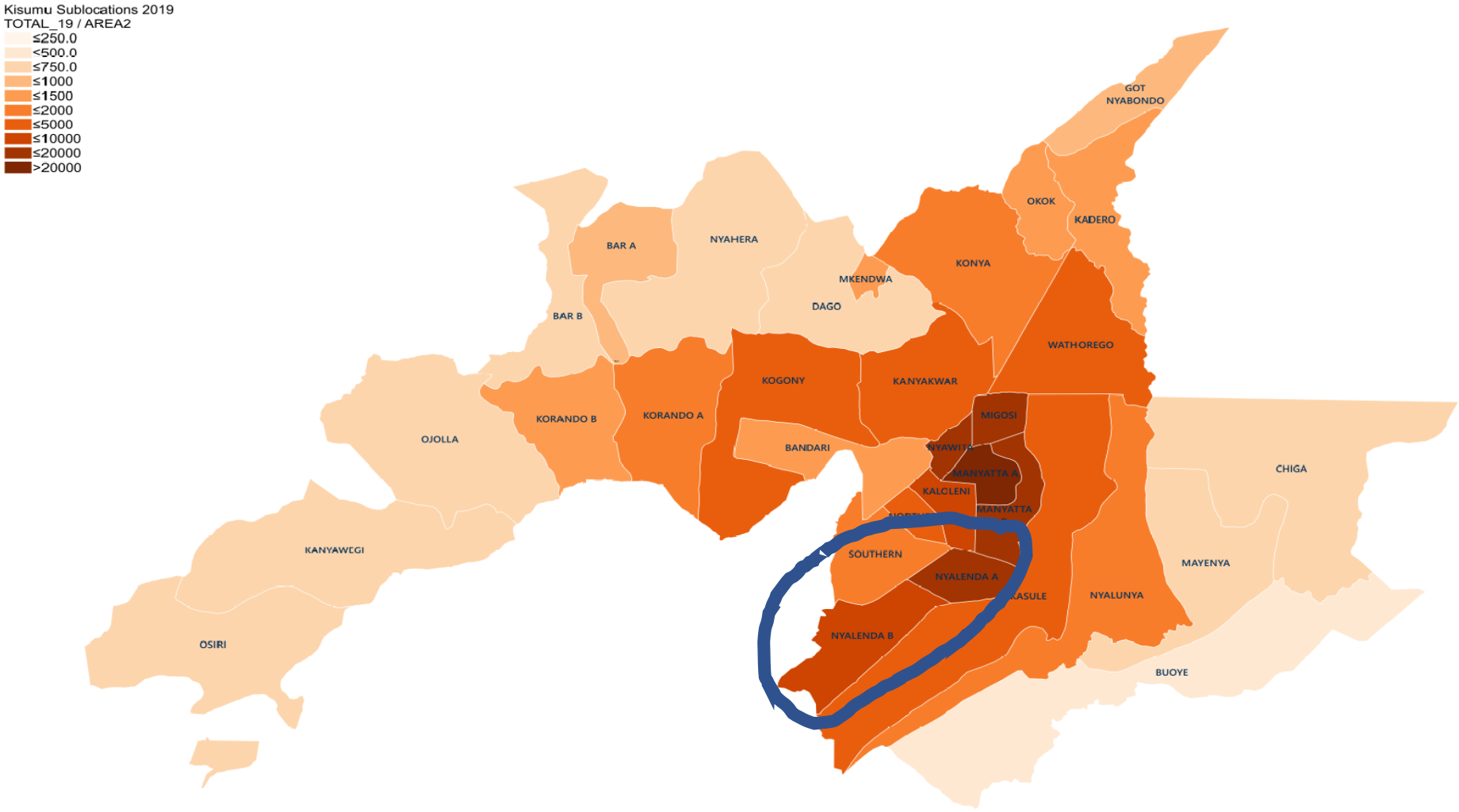
Low and Raised Boardwalks with nodes and contemplation stations.
Tianjin Qiaoyuan Wetland Park

Nature Trails through linear protection areas.
Sugarlands Valley Nature Trail, Great Smoky Mountains National Park

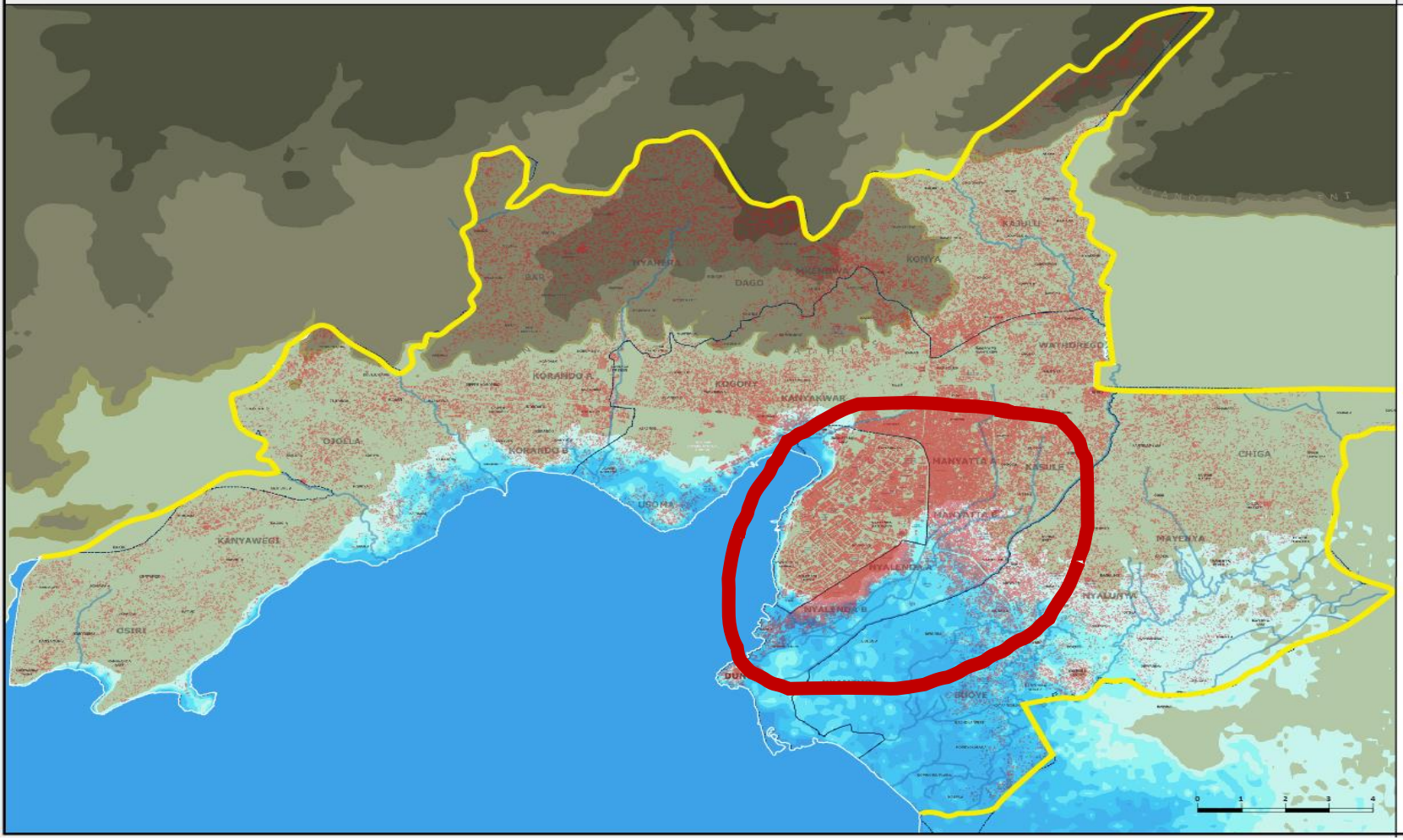
Network of bridges, pedestrian and cyclist paths.
Breda Municipality Netherlands Mountains National Park


Beach View
Hippo Point
Kisumu Impala Sanctuary
KCB Mtaani Nashon
Ouma Owino
Nyalenda Estate
Vittoria Suites
Yvonne Ogollah
The VIP Luxury Lounge
KISUMU CITY
VOLLEYBALL CLUB
Clarice House
MILIMANI
ACACIA PREMIER
HOTEL KISUMU
St. Johns Manor
Ring Rd
Royal City
Hotel (Garden)
Standard Gardens
Kisumu Sewage Waste
Recycling Center
Ruby Court - Milimani
Victory Farms, Nyalenda
Kisumu Museum
Somo Africa -
Kisumu Hub
Tahmeed Coach
Oasis Of Hope
Secondary School
Kenya Breweries Quarters
Winner's Pizza Kisumu
Kasagam
Secondary School
Oasis Altar, Repentance
and Holiness Ministry
A1
KASAGAM
POLICE STATION
G4S Courier Kisumu
Mega City Mall
Ondiek Hwy
B1
The Vic
GOT ACARA CENTRE
2D
Union Primary Schoo
Google
100%
Google Airbus Maxar Technologies Data SIO, NOAA, U.S. Navy, NGA, GEBCO Landsat / Copernicus
700 m
Camera: 2,445 m 0°08'08"S 34°46'02"E 1,141 m

Demography - Population Density 2019



Terrain Flood risk



LEGEND

Building

Lake

River

Terrain Flood Risk

Very High

Moderate

No risk

NORTH

CITY OF KISUMU

PREPARATION OF LOCAL PHYSICAL AND LAND USE DEVELOPMENT PLANS

June 2020

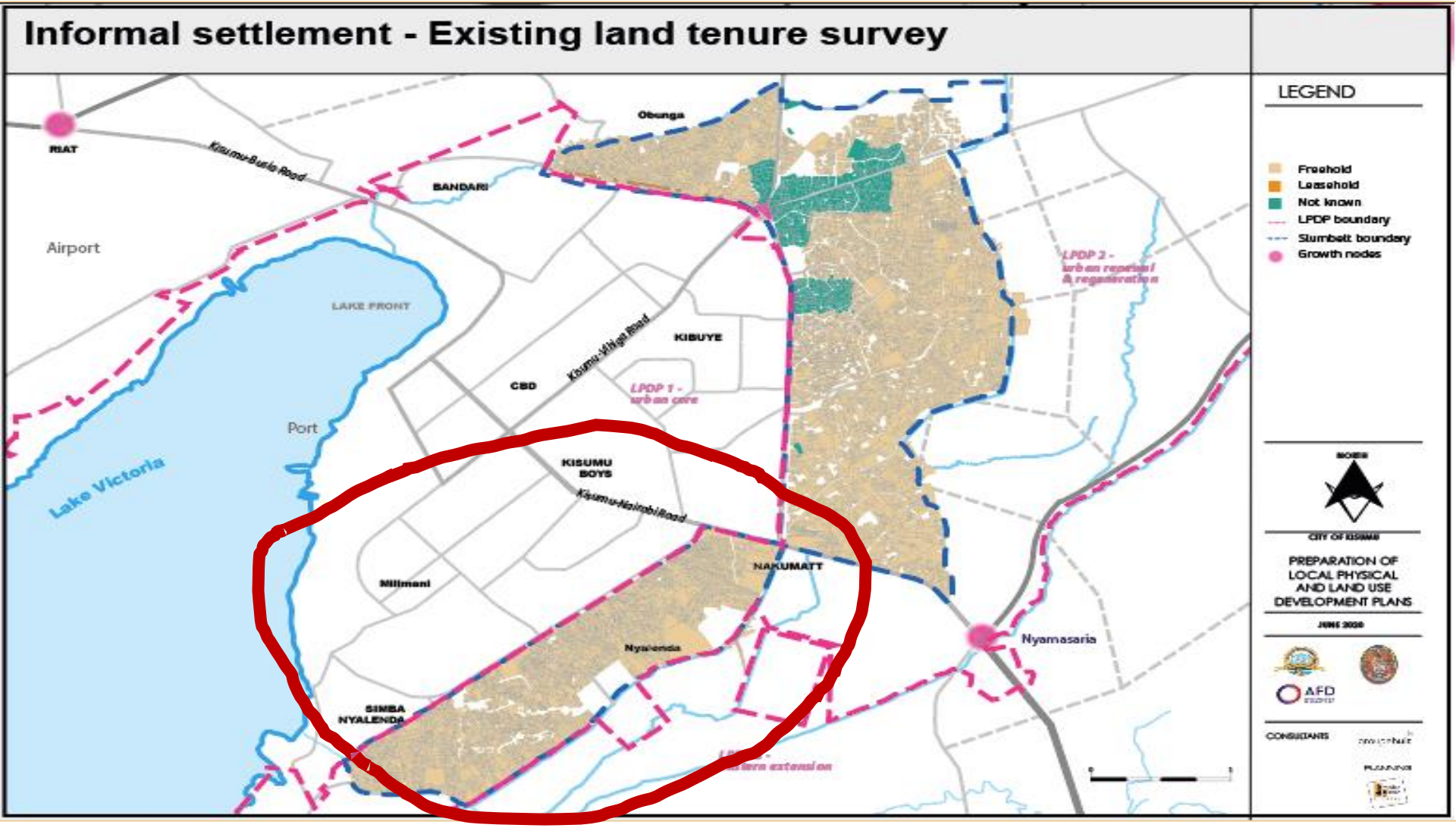
AFD

CONSULTANTS

groupehuit

PLANNING

Informal settlement - Existing land tenure survey



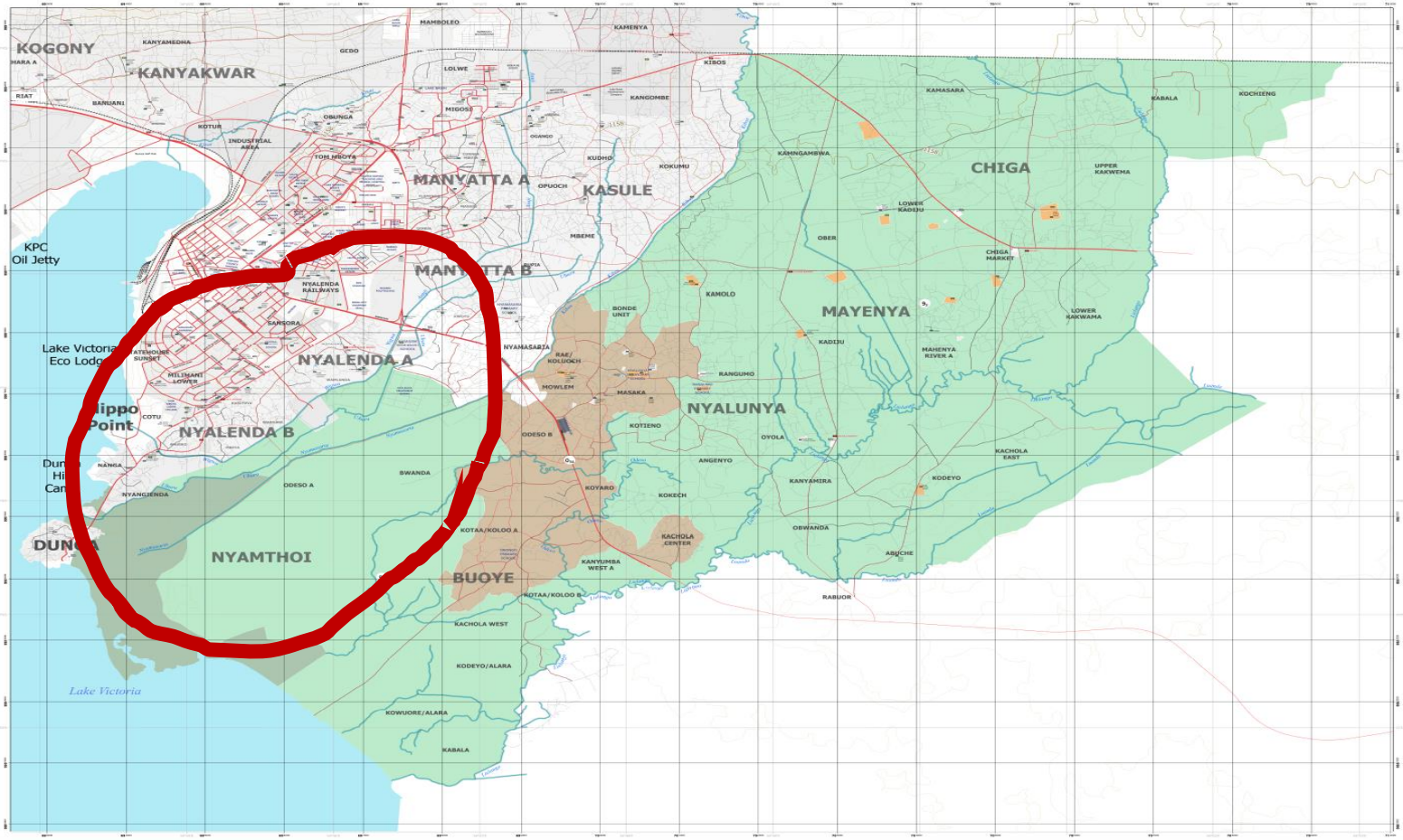
CITY OF KISUMU

LOCAL PHYSICAL DEVELOPMENT PLAN (LPDP)

LAND USE & ZONING PLAN

SCALE: 1:20,000
JUNE 2020

EASTERN EXTENSION
LPDP 3



LAND USE CLASSIFICATION LEGEND

- AGRICULTURAL
- COMMERCIAL
- CONSERVATIONAL
- EDUCATIONAL
- PUBLIC PURPOSE
- INDUSTRIAL
- HIGH DENSITY RESIDENTIAL
- LOW DENSITY RESIDENTIAL
- MEDIUM DENSITY RESIDENTIAL
- MIXED USE DEVELOPMENT
- PUBLIC UTILITY
- RECREATIONAL
- RESIDENTIAL
- TRANSPORTATION

Legend

SOCIAL FACILITIES

- Markets & Market Centers
- Health_Facitity_21st
- Primary & ECDE School
- Secondary School
- Social Halls

TERRAIN

Contours 5m Interval
- Intermediate Contour
- Index Contour
- River

ROADS CLASSIFICATION

Carriage Way Surface Type
- Earth
- Gravel
- Paved

Approvals

xxxxxxx

xxxxxxxx

xxxxxxx

Clients

County Government of Kisumu

City of Kisumu

Financed By

AFD
French Development Agency

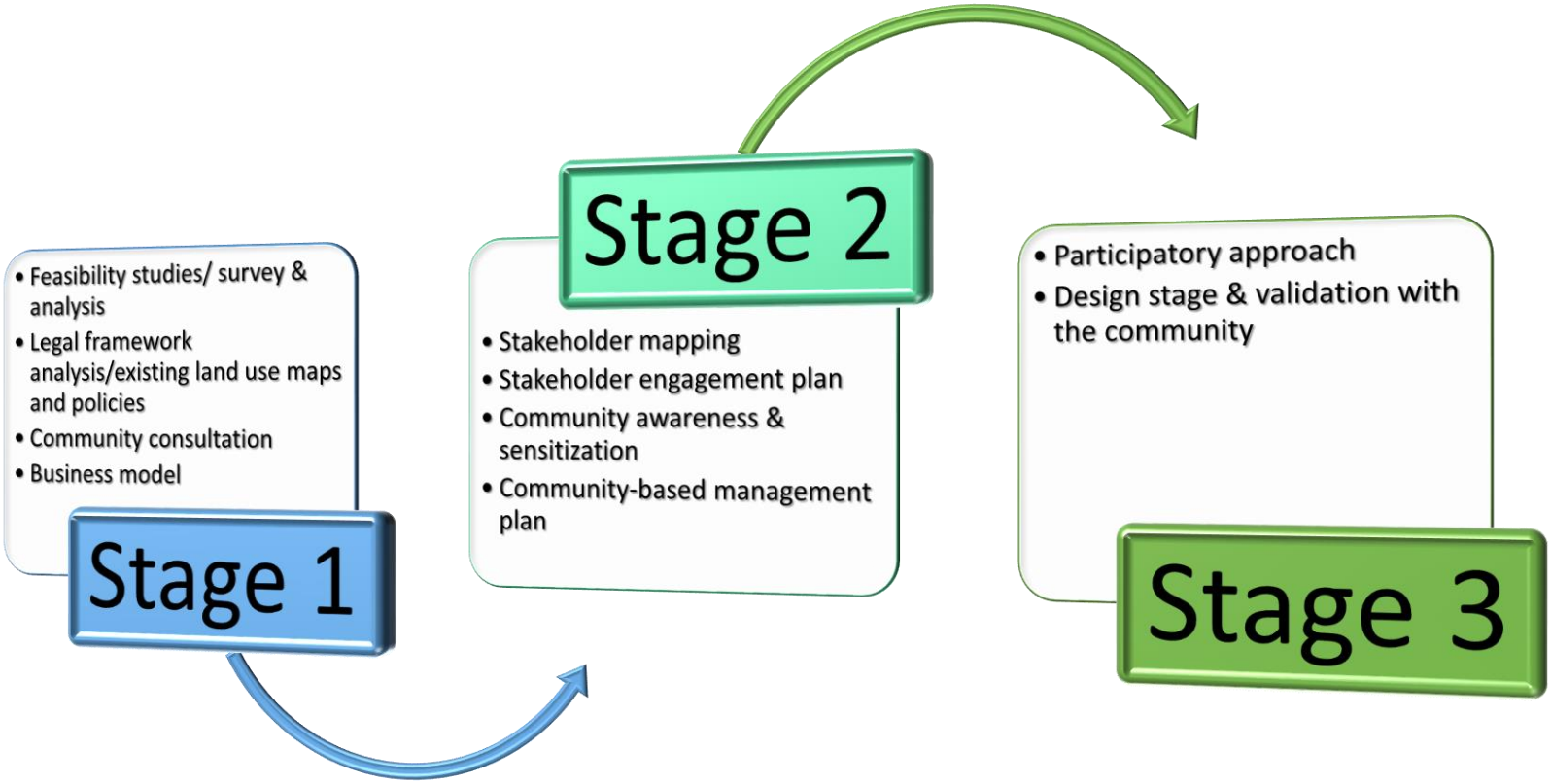
Consultants

groupehuit

PLANNING

Environment Strategy

Auji Creek Process Flow Diagram



Feedback from stakeholders (United Destiny Shapers-UDS)

- Need for demarcation of the Auji river to limit encroachment
- Need for stakeholder engagement/multi-stakeholder engagement
- Need for community awareness
- Need to incorporate farming livelihood with the conservation efforts
- The CBO has already adopted a section of the river for the conservation efforts (now used for recreational & fishing area)

Part of the pilot project in Kisumu Kenya.

Current state of Auji River

Thank you for listening

***Giorgi Maisuradze**- Head of the International relations and projects department, Tbilisi City Hall- Georgia*

Superblocks program in Tbilisi- Georgia

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TBILISI CITY HALL

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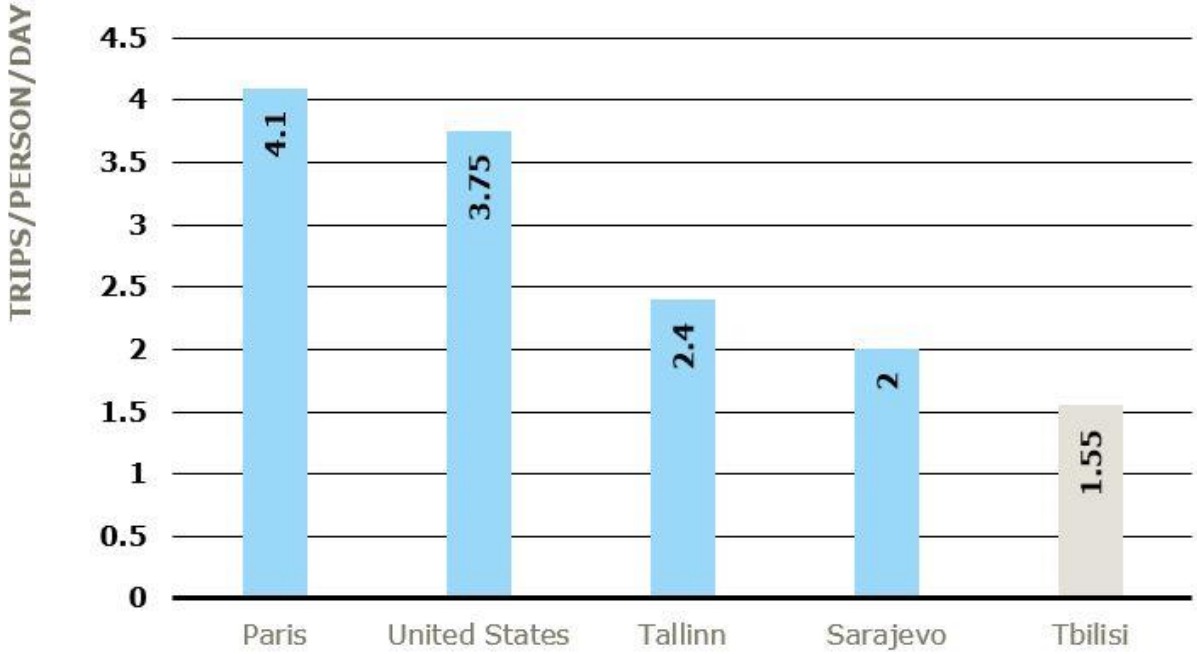

Figure 1 - Mobility rate in different cities
Source: Systra, 2016

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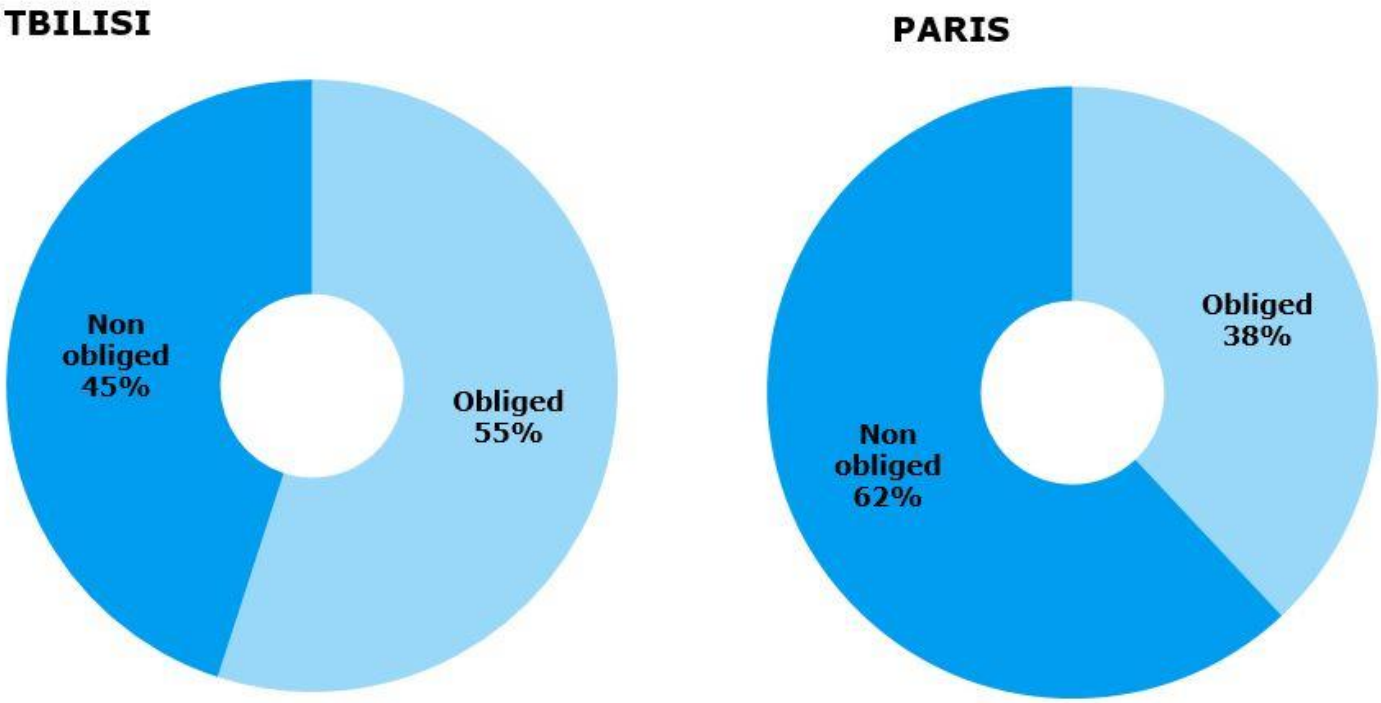

Figure 4 - Share of non-obliged trips, comparison between Paris and Tbilisi
Source: Systra

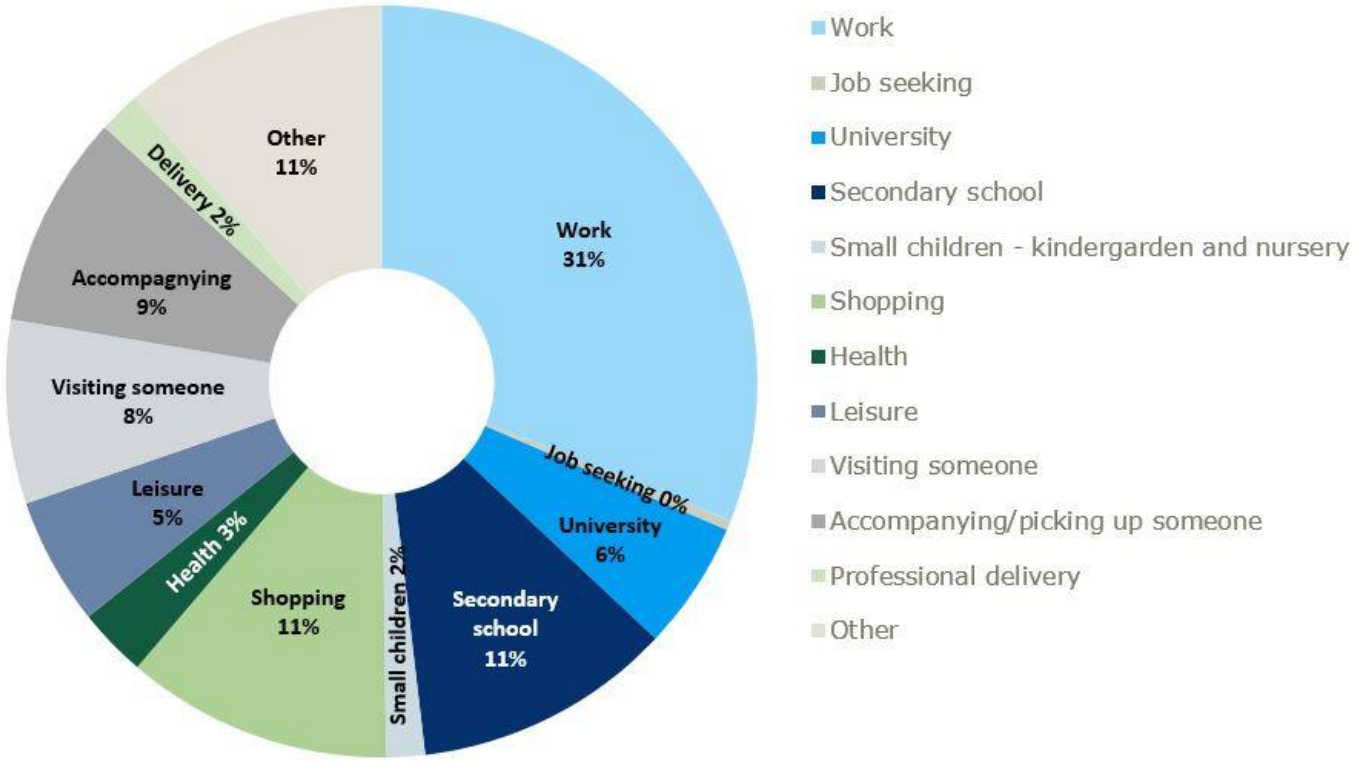

Figure 5 - Detailed trip motives, 2016 HHS
Source: Systra

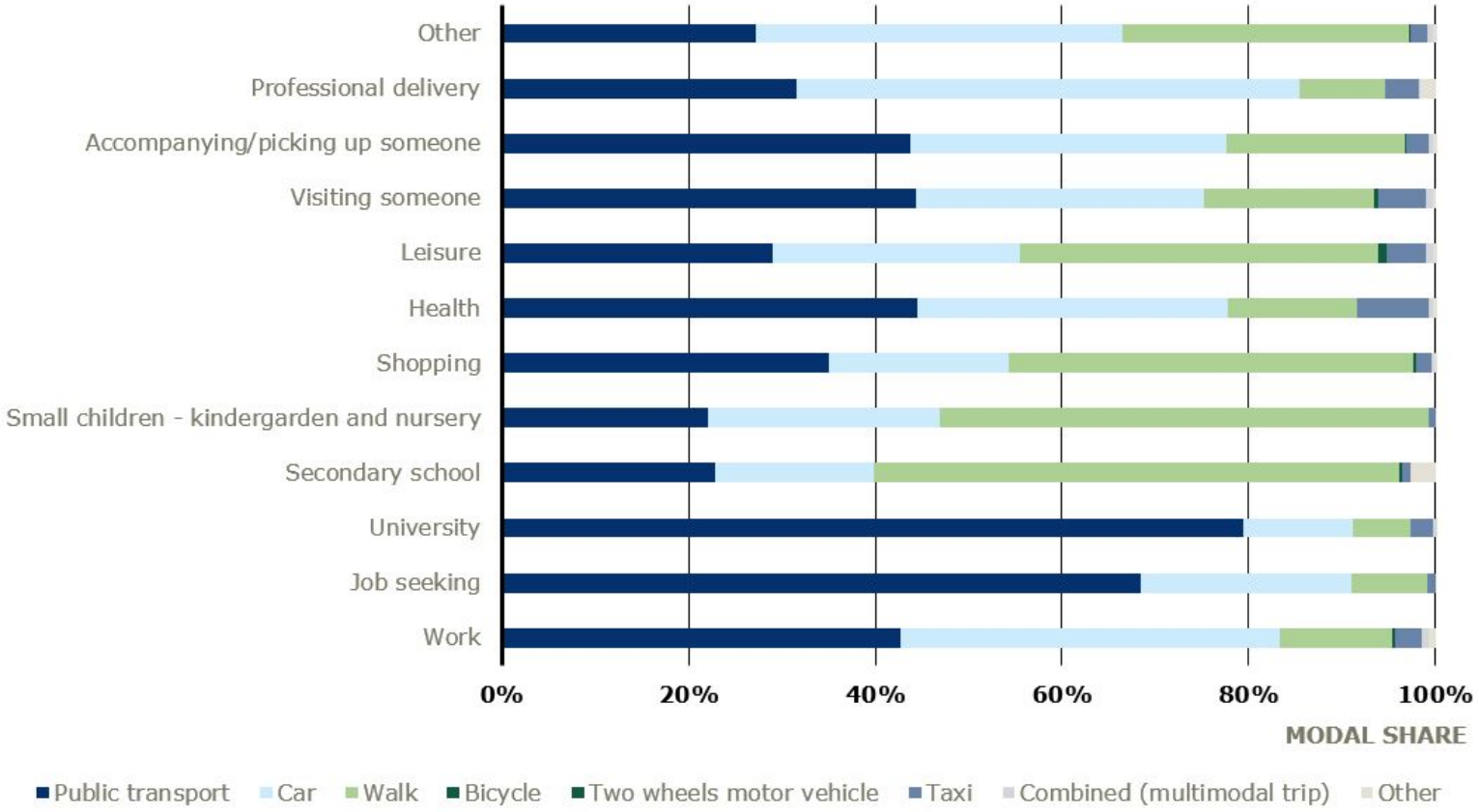

Figure 6 - Mode used for different trip purposes
Source: Systra

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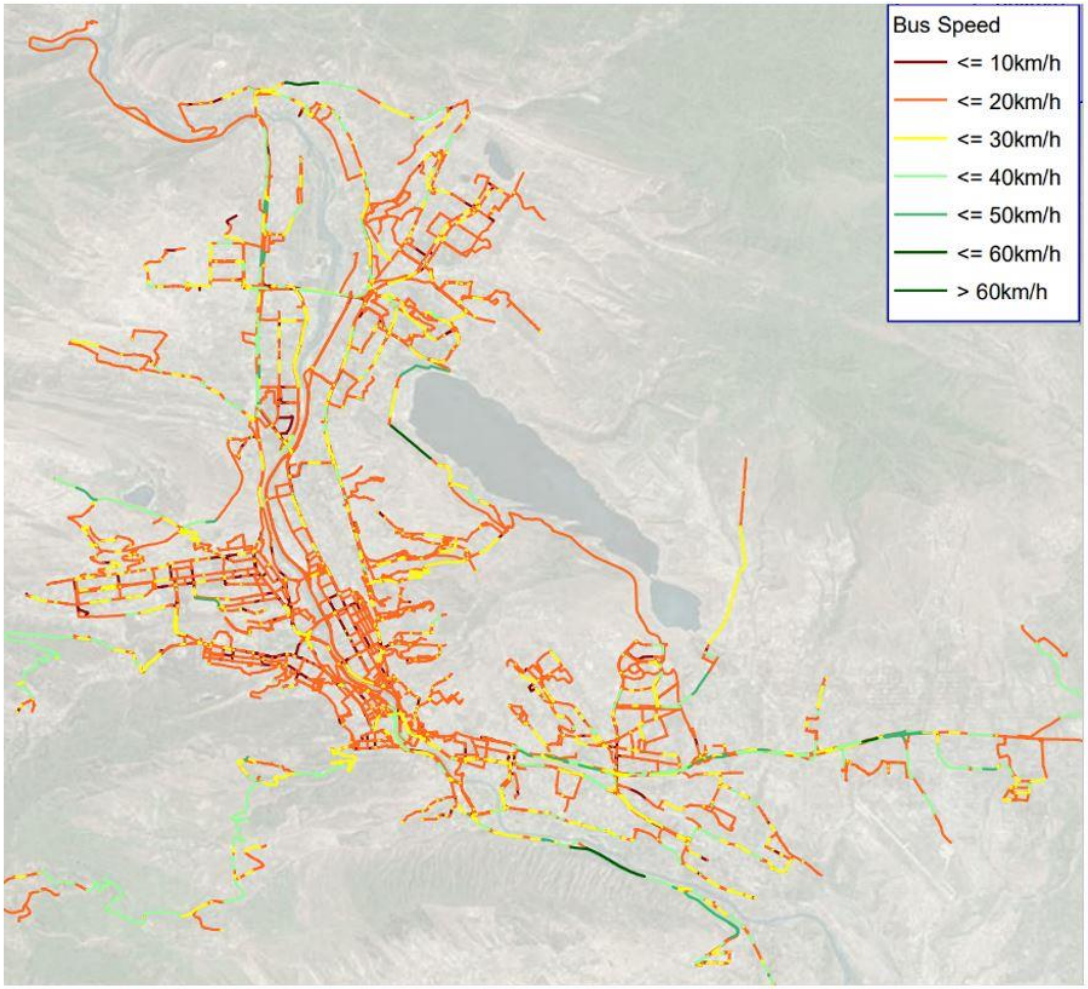
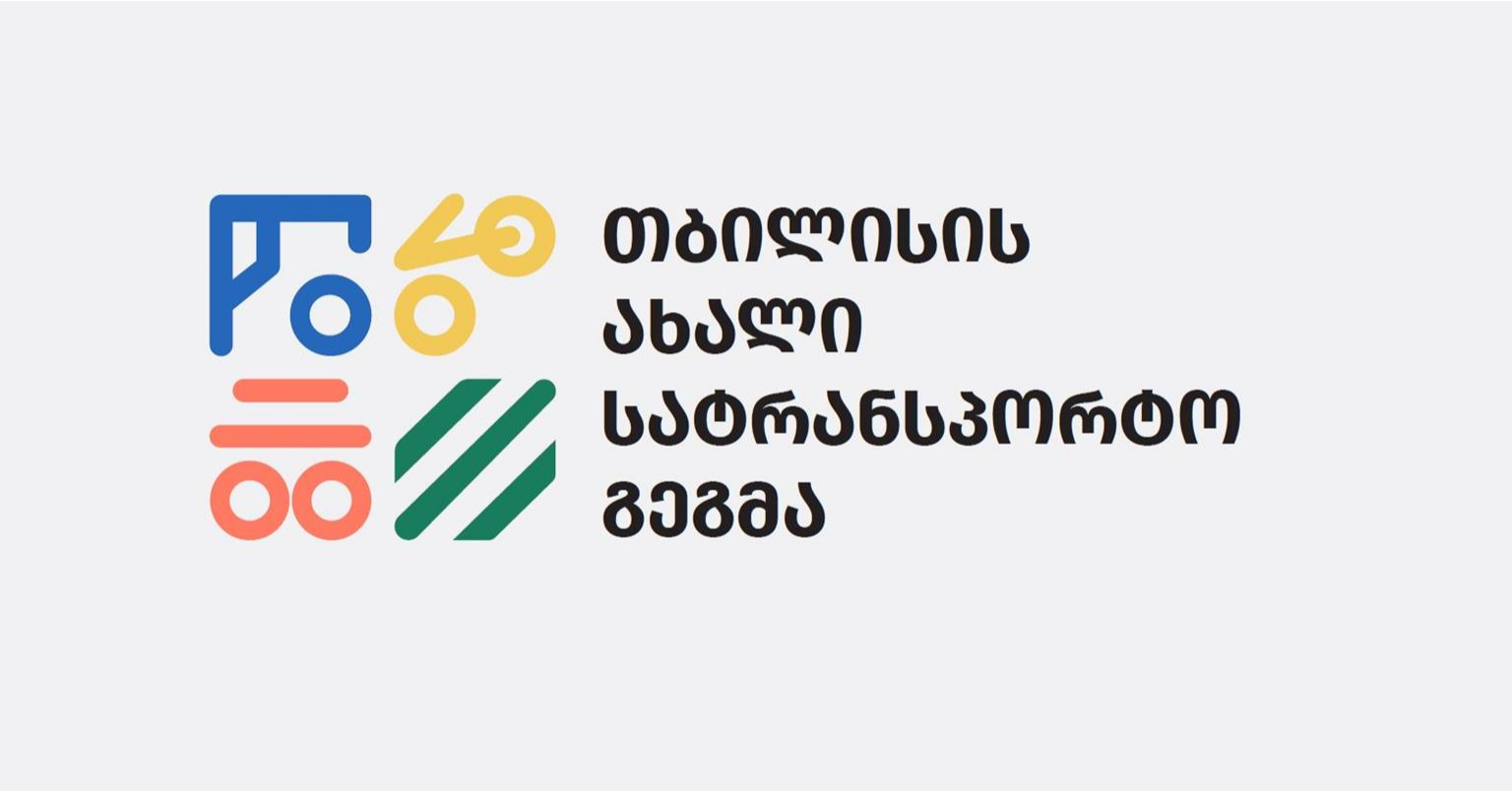
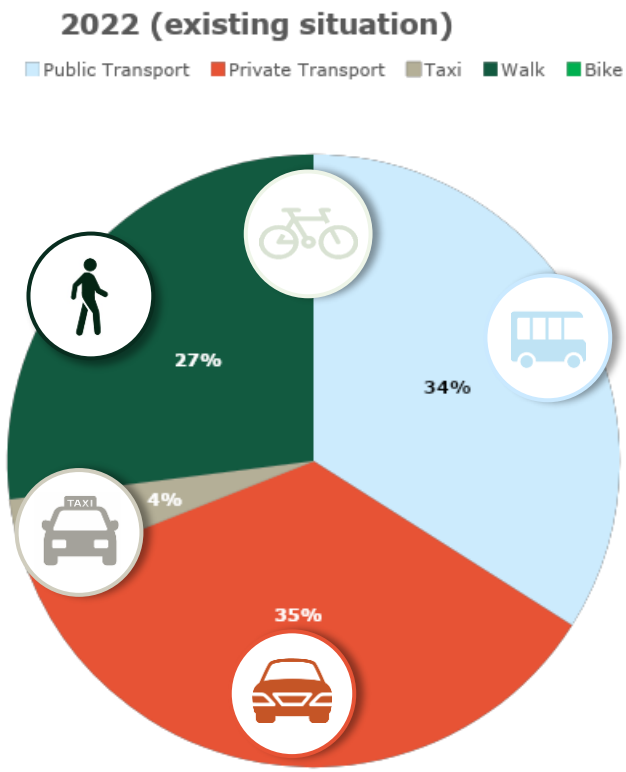


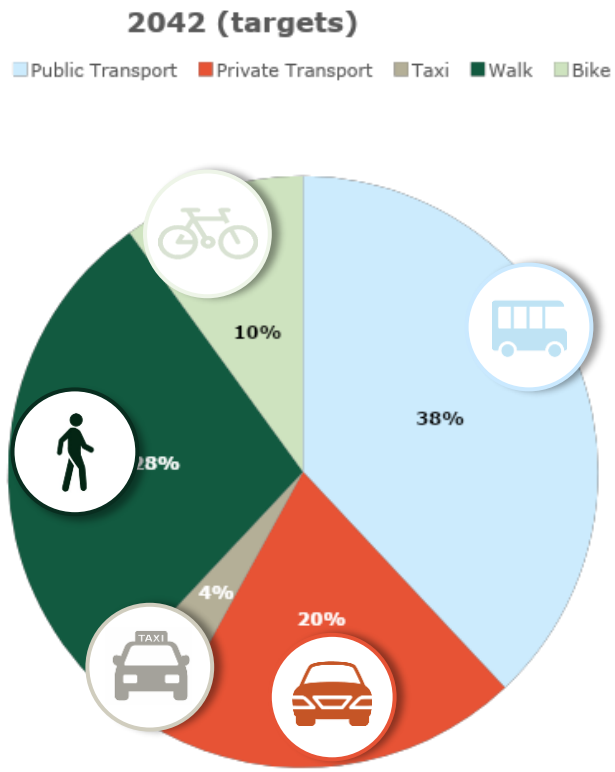
Figure 47 - Bus network, existing peak hour bus speeds (morning peak – 8h30-9h30), Model Base year 2022

Tbilisi Strategies and Targets



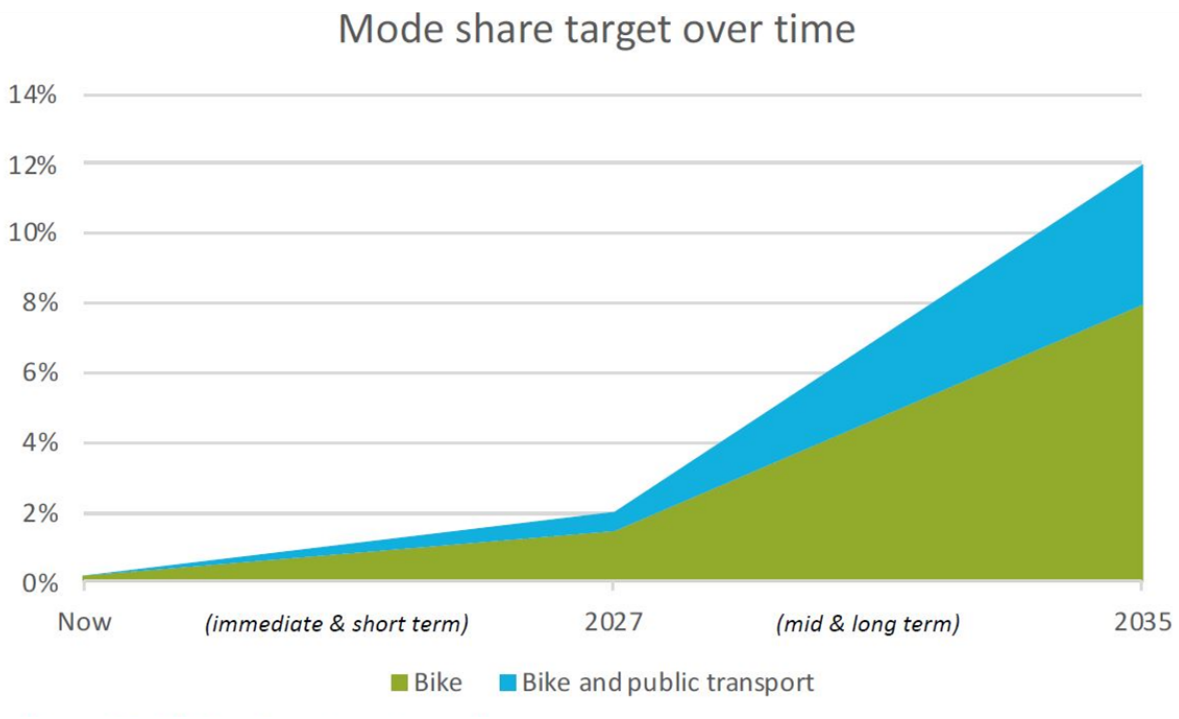
FROM A CAR-ORIENTED PARADIGM TO A SUSTAINABLE MOBILITY PARADIGM





Progressive modal shift in time

It is expected that 1,5% off all trips will be done by bicycle in 2027 and 0,5% of all trips will be done by a combination of cycling and public transport.



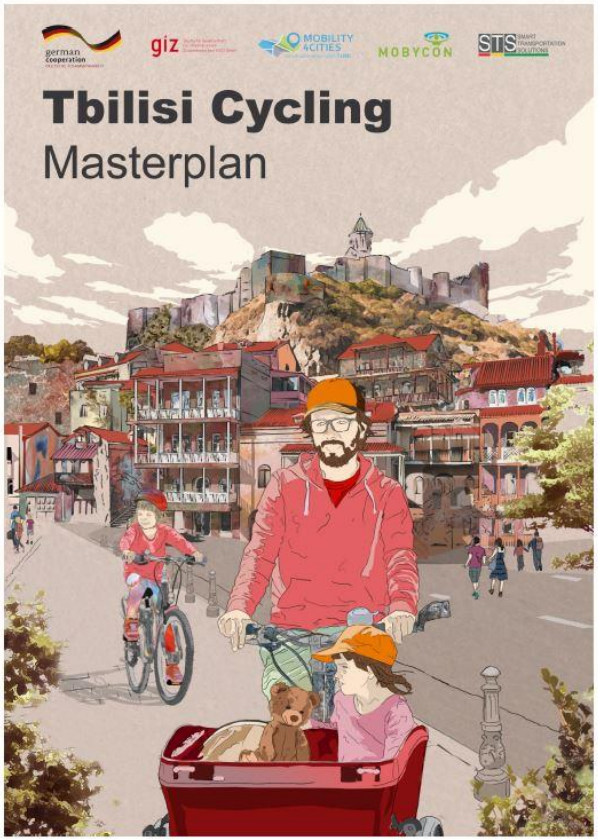


Illustration by Ana Dolidze (for illustrative purposes only)

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City or Region	Country	Current Modal Share	Target Modal Share	Cycling Increase
Baden-Württemberg	Germany	10% in 2015	20% by 2025	x 2
Batumi[16]	Georgia	0,5% in 2015	8% by 2030	x 16
Berlin	Germany	13% in 2014	20% by 2025	x 1,5
Bratislava	Slovakia	2% in 2012	10% by 2020	x 5
Budapest	Hungary	2% in 2010	10% in 2020	x 5
Calgary	Canada	0,8% in 2001	2% in 2020	x 2,5
Córdoba	Argentina	1,6% in 2011	15% by 2020	x 9,2
Dublin[17]	Ireland	6% in 2011	13% by 2028	x 2
Edinburgh	United Kingdom	2% in 2010	10% by 2020	x 5
Granada	Spain	0,4% in 2011	15% by 2020	x 37,5
Groningen	Netherlands	47% in 2003	65% by 2020	x 1,3
Lima	Peru	0,03% in 2015	2% by 2018	x 66,7
Ljubljana	Slovenia	10% in 2010	15% by 2020	x 1,5
Madrid	Spain	1% in 2012	3% by 2016	x 3
Medellín	Colombia	0,5% in 2015	10% by 2030	x 20
Paris	France	5% in 2015	15% by 2020	x 3
Prague	Czech Republic	1% in 2009	7% by 2020	x 7
Rio De Janeiro	Brazil	3% in 2015	6% by 2025	x 2
Rome	Italy	0,6% by 2012	4% by 2019	x 6,7
Tbilisi	**Georgia**	**0,15% in 2016**[18]	**8% by 2035**	**x 53.3**
Vancouver	Canada	3,8% in 2013	12% by 2040	x 3,2
Vienna	Austria	7% in 2014	12% by 2020	x 1,7
Zurich	Switzerland	7% in 2011	14% by 2025	x 2

This Chart demonstrates how the long-term ambition weighs against targets of other cities across the globe. The chart offers a snapshot of the timelines that each city set as a goal and demonstrates that those who are in the early stages of introducing cycling as a transport option must often set high ambitions to realize change.

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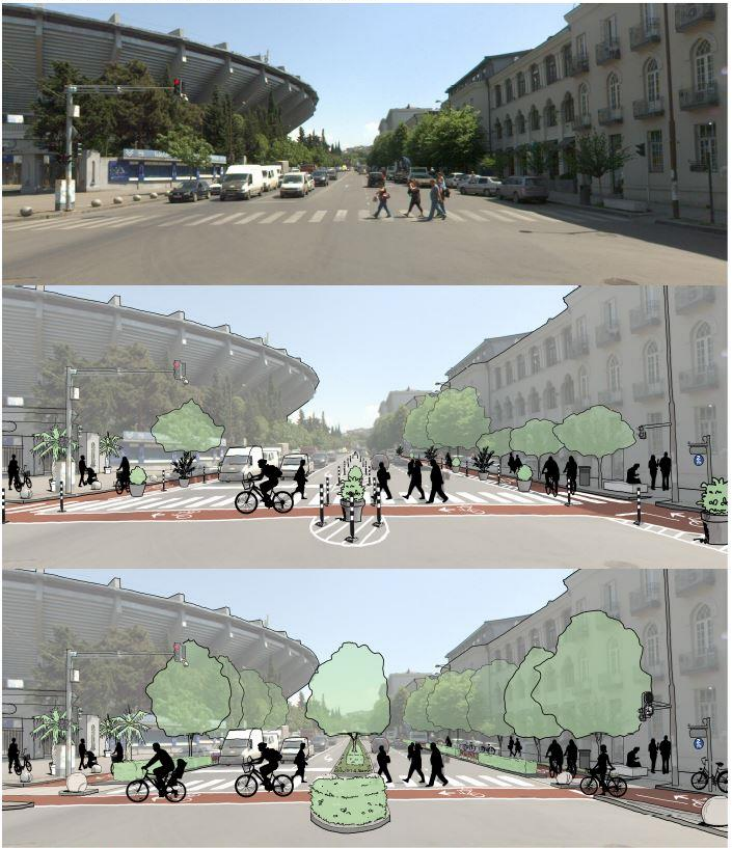
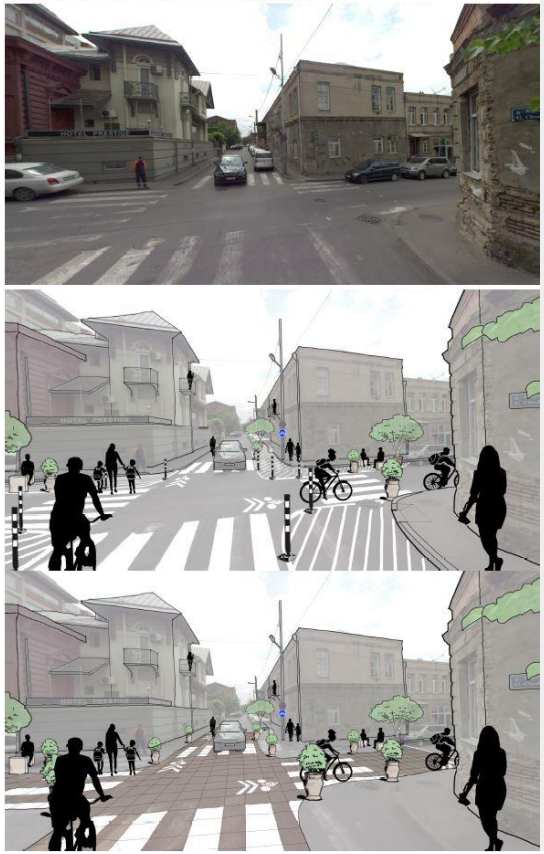
Giorgi Tsabadze St and Davit Agmashenebeli St.



Kote Marjanishvili St and Giorgi Chubinashvili St.



Evolution of cycling infrastructure over time looking east at the intersection of Giorgi Tsabadze St and Davit Agmashenebeli St. (top) Present conditions, (middle) temporary cycle infrastructure, and (bottom) future permanent cycling infrastructure.

Evolution of cycling infrastructure over time looking east at the intersection of Kote Marjanishvili St and Giorgi Chubinashvili St. (top) Present conditions, (middle) temporary cycle infrastructure, and (bottom) future permanent cycling infrastructure.

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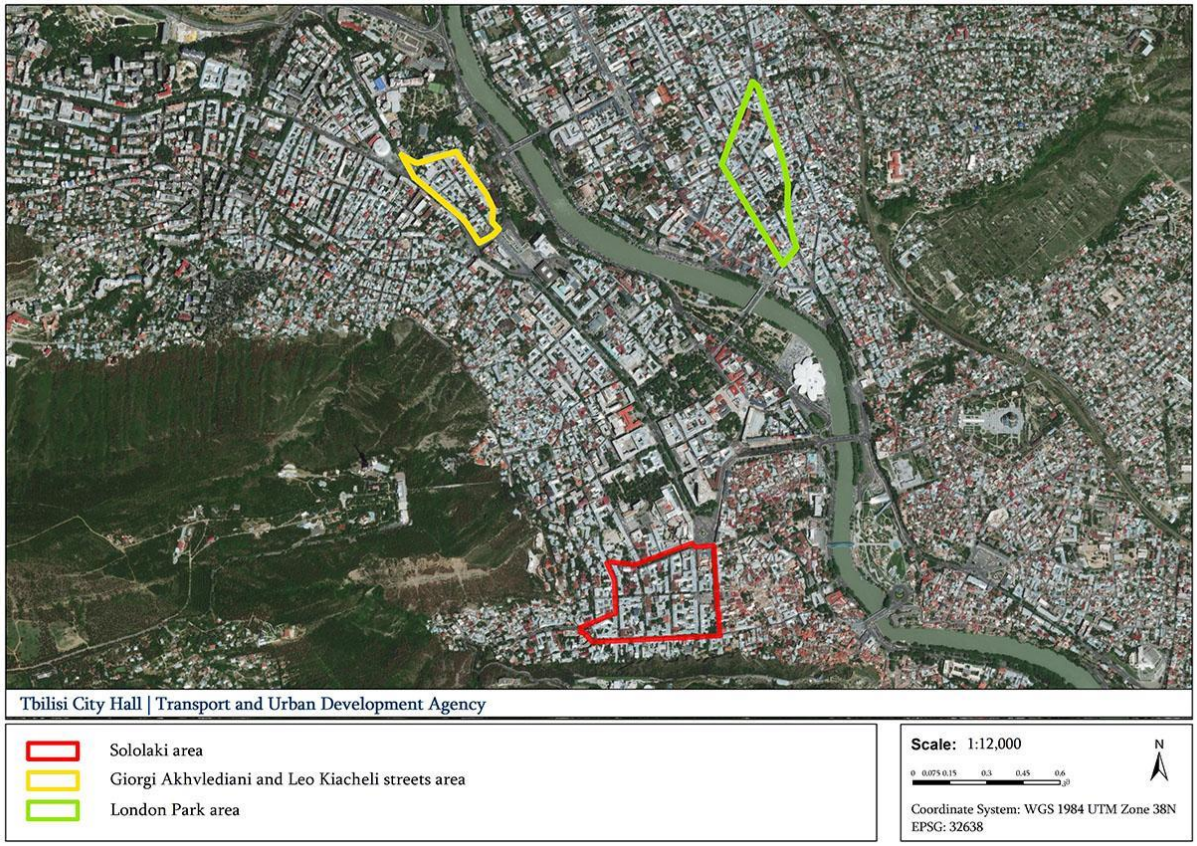

ADB Supports the Feasbility and Concept design of the pilot 3 area within the City.

Consultant is expected to start works in Summer 2022

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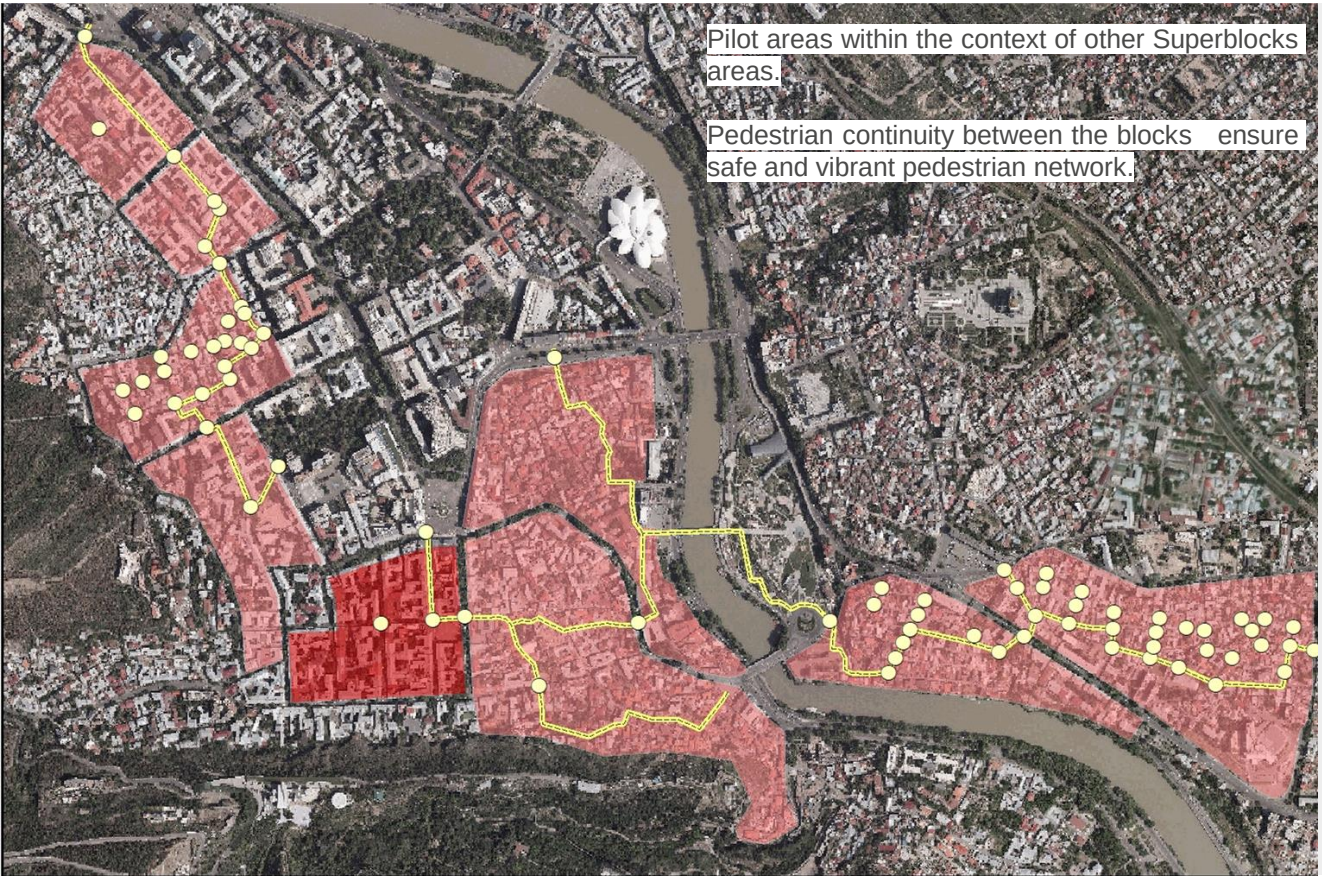

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Actions

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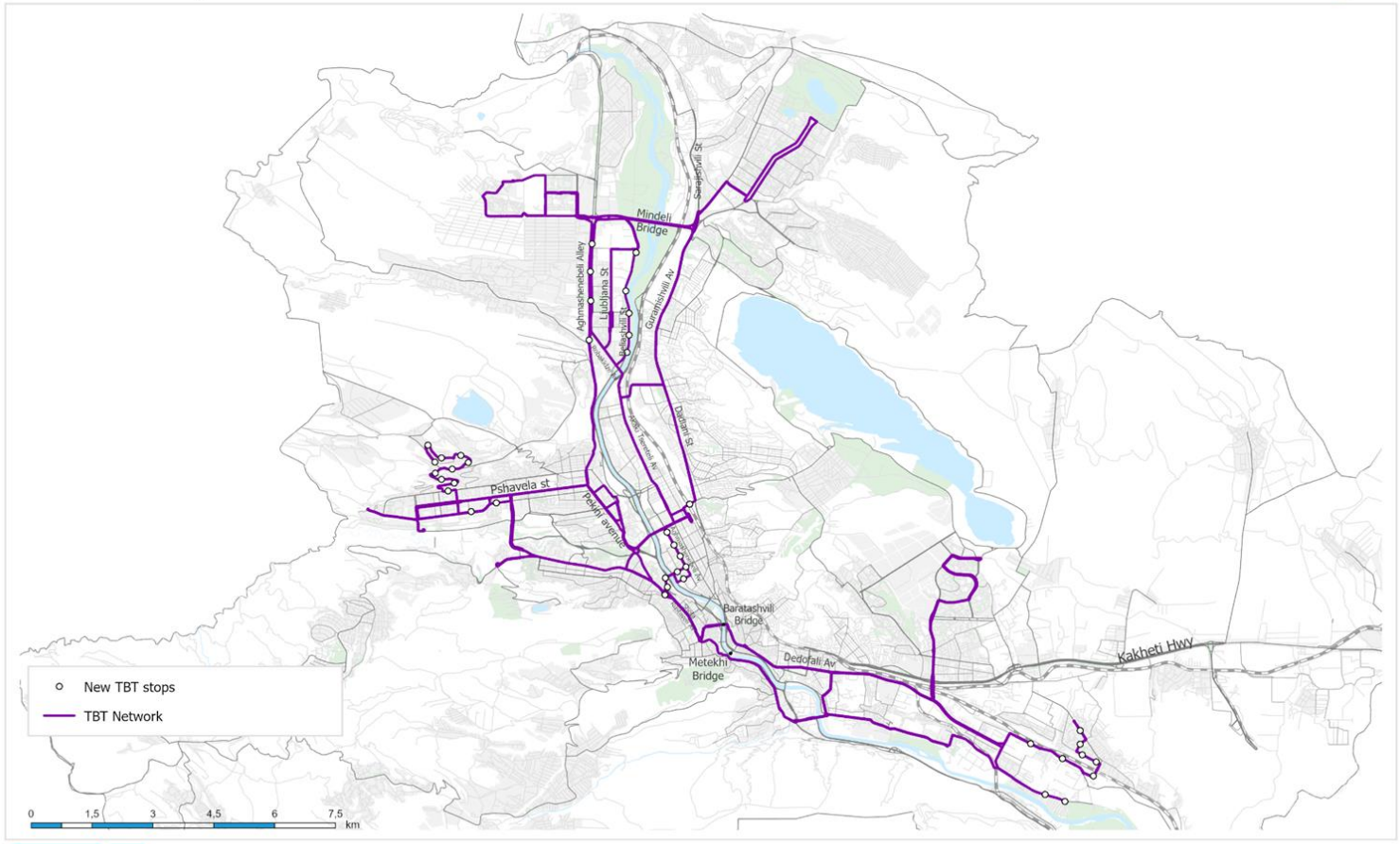
TBT network - Using Kote Afkhazi street as a TBT corridor



RAMBOLL

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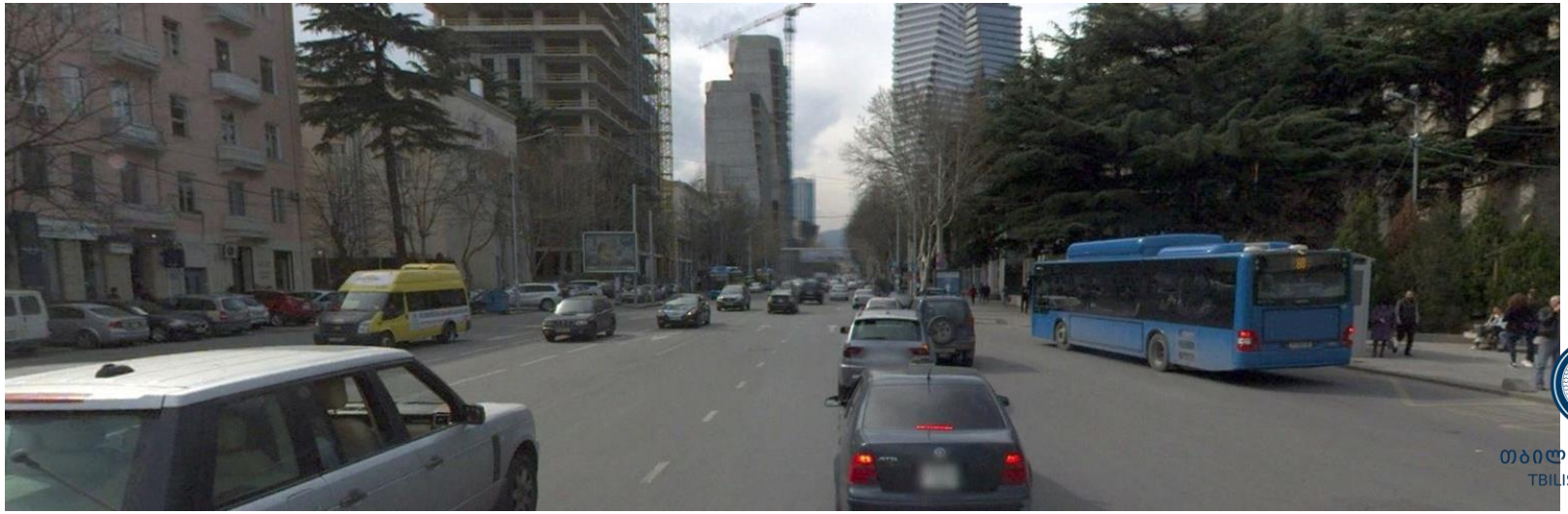
TBILISI CITY HALL



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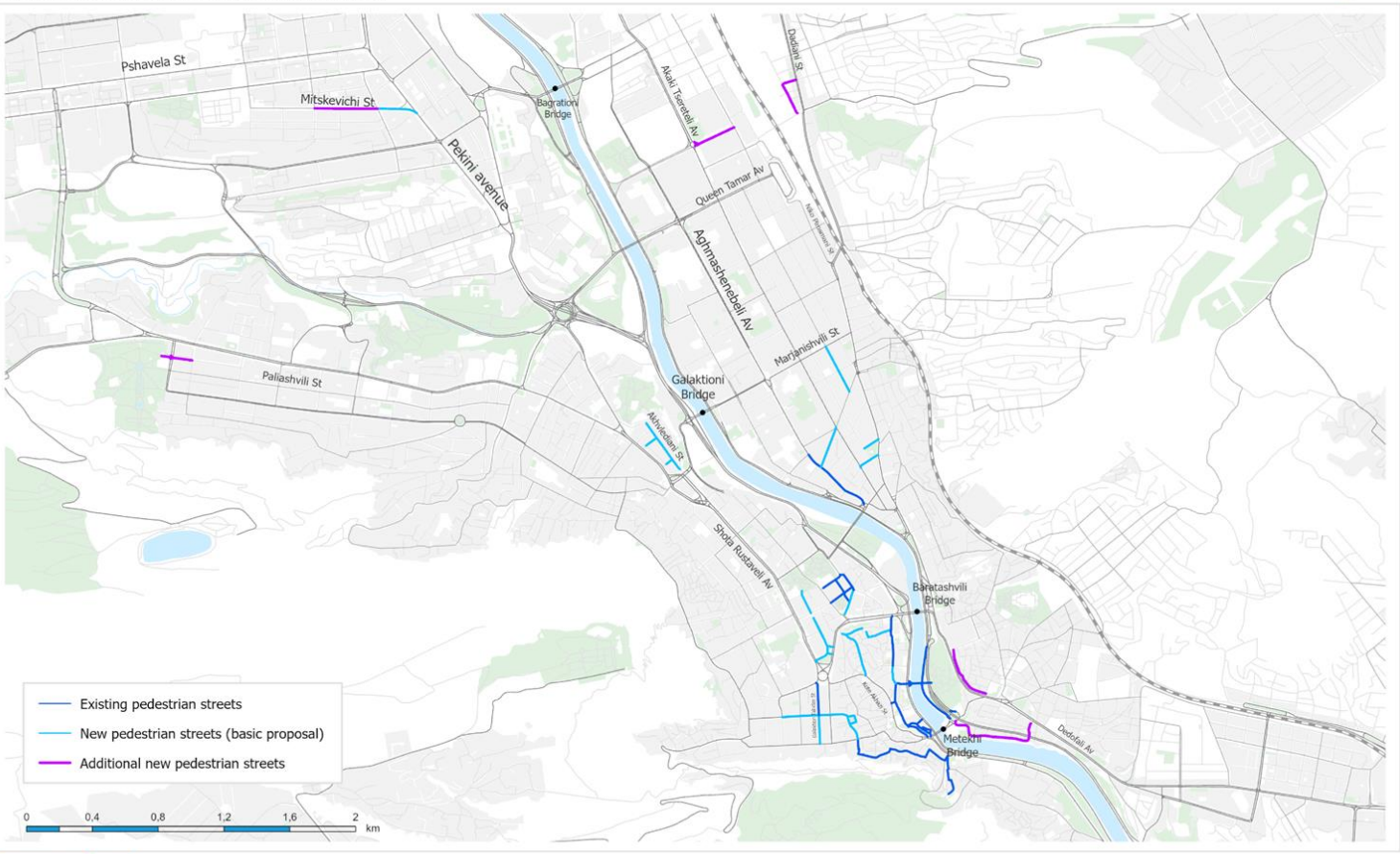
Pedestrian streets - Retained scenario



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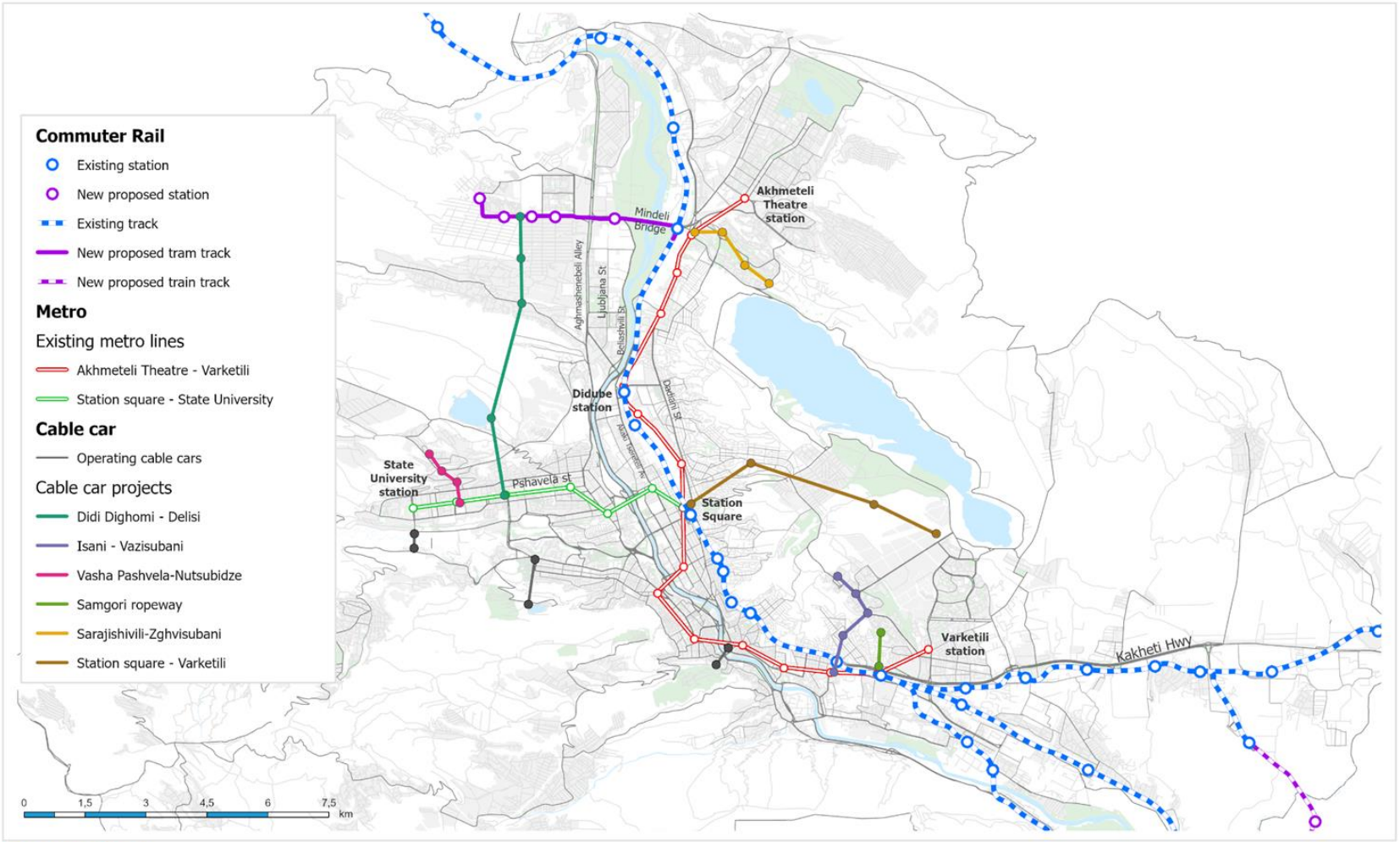

RAMBOLL

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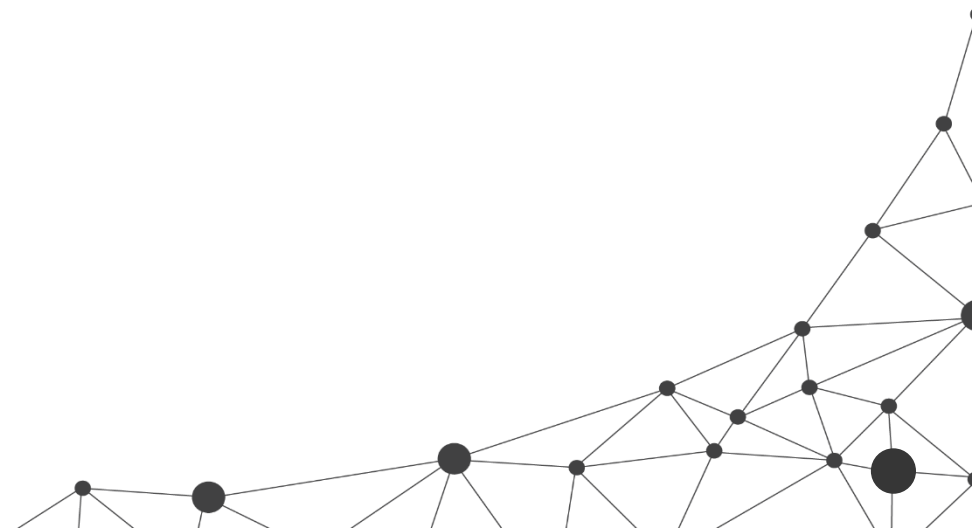
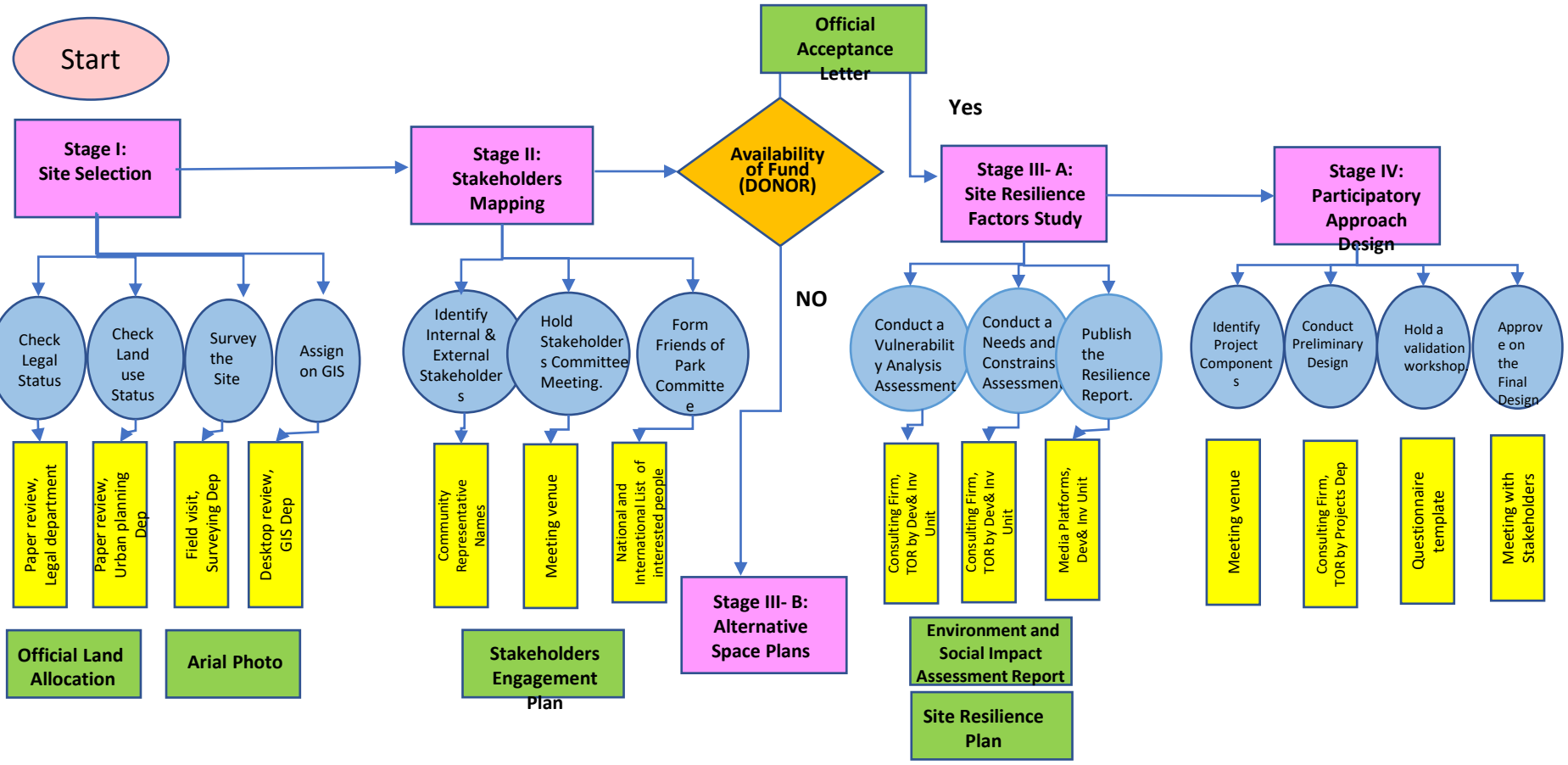
Haya Al-Agha- *director of investment and economic unit, Khan Younis municipality, Palestine*

Regional park in Khan Younis-Palestine



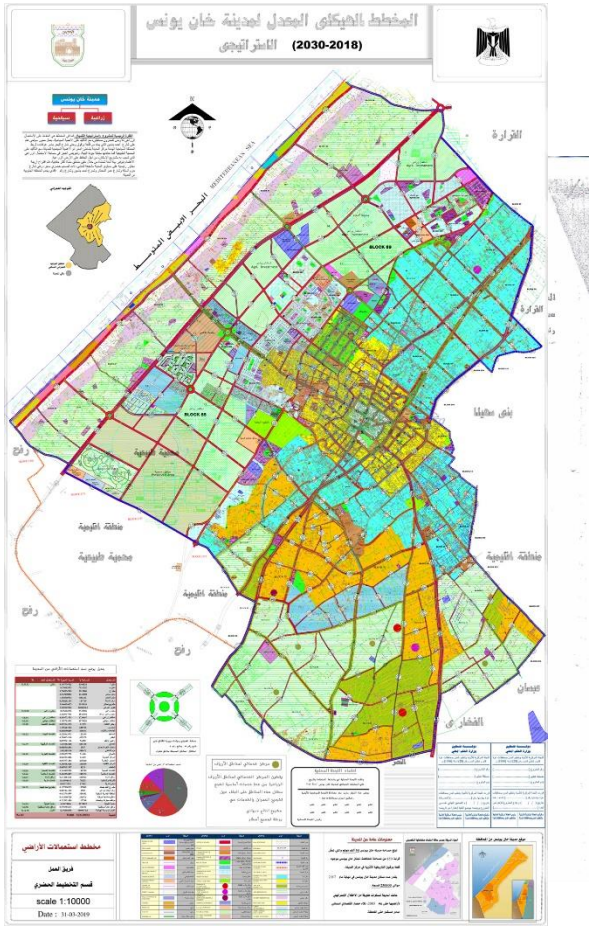
Process Flow Diagram

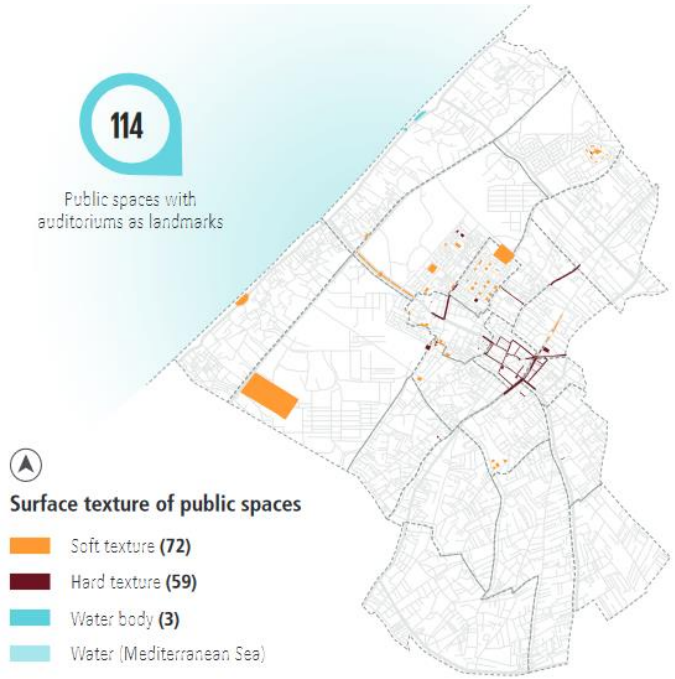
Intervention Idea:
A Transition to Climate-resilient Green Public Space



Stage I: Site Selection

- An official correspondence of Land Authority for allocation of (400,000 m2).
- It is in line with the general orientation of the Gaza Strip as a natural protected area.
- Located on a regional street between Rafah and Khan Younis Governorates.

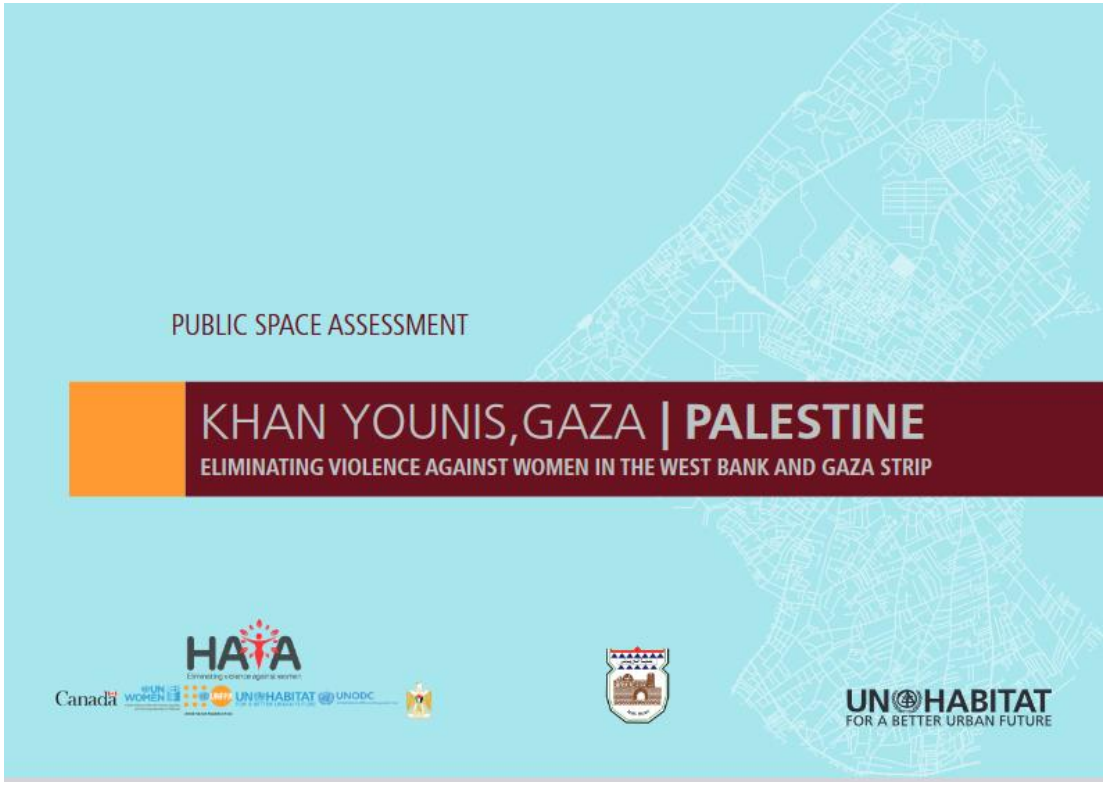




- It has **soft texture**; better infiltration for underground reservoir so it can recharge the reservoir and reduce the sea water intrusion.
- **Climate Considerations**: A general municipal orientation of not using water-wasting landscape like the grass and use durable trees instead.

Stage II: Stakeholders mapping

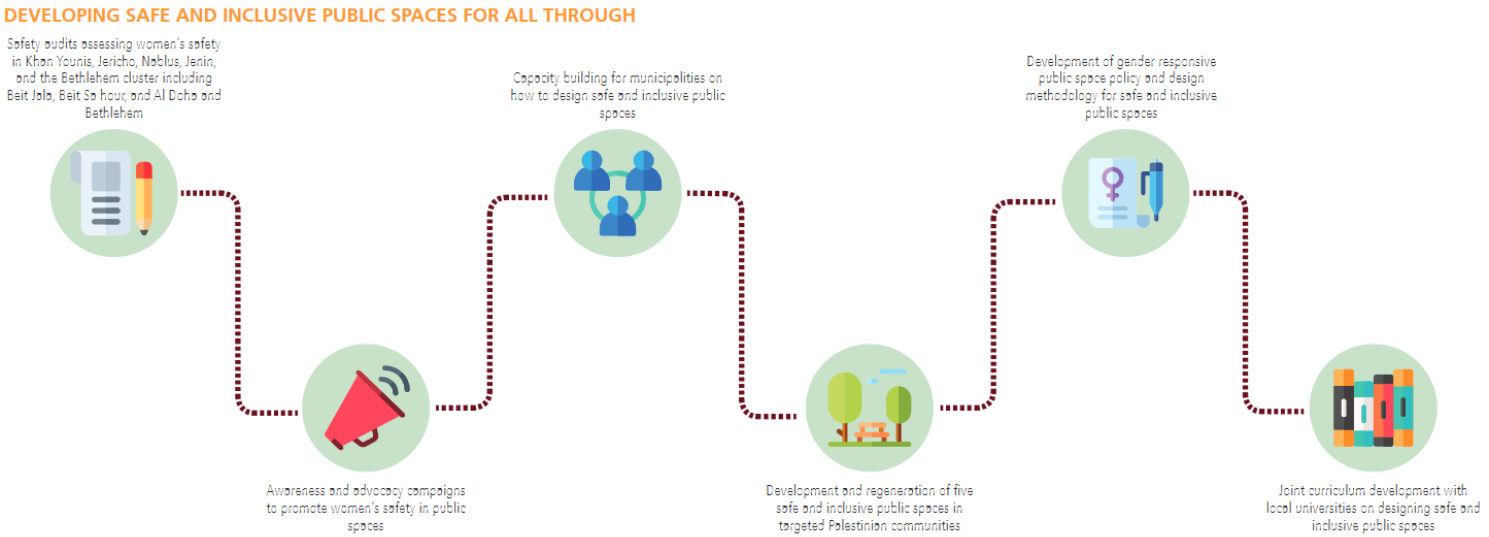
- Assessment of Khan Younis Public Space using participatory planning approach in analyzing the current situation and using the indicators of safety, comfort, accessibility and use.



Needs based assessment

Using the following steps

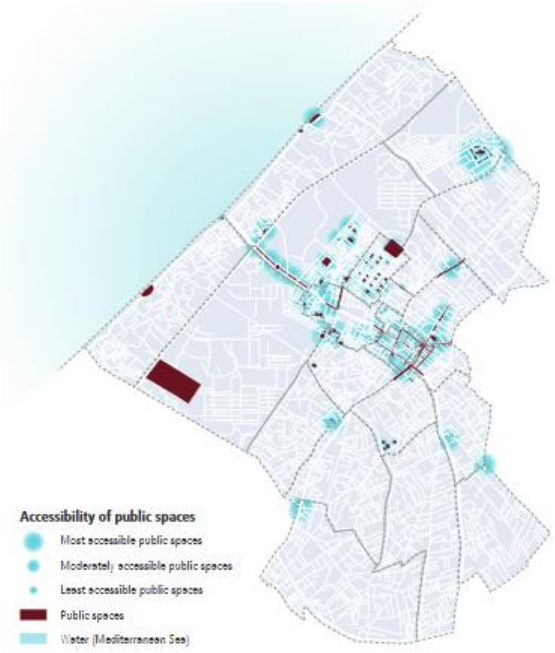
- Pre field work preparation “Developing assessment tools; preparation of GIS base maps, mobilizing the assessment team, training sessions”.
- Data collection quality check and data cleaning “Data collection, challenges and mitigation measures, Data cleaning, Updating the GIS maps”



Stage III: Site Resilience Factors

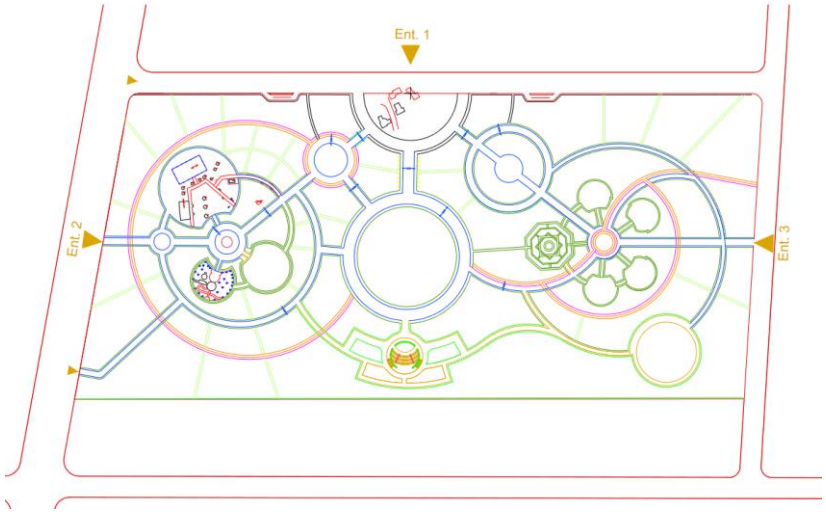
- To ensure the impact of the project and its effect on the community the following aspects should be assessed very well:

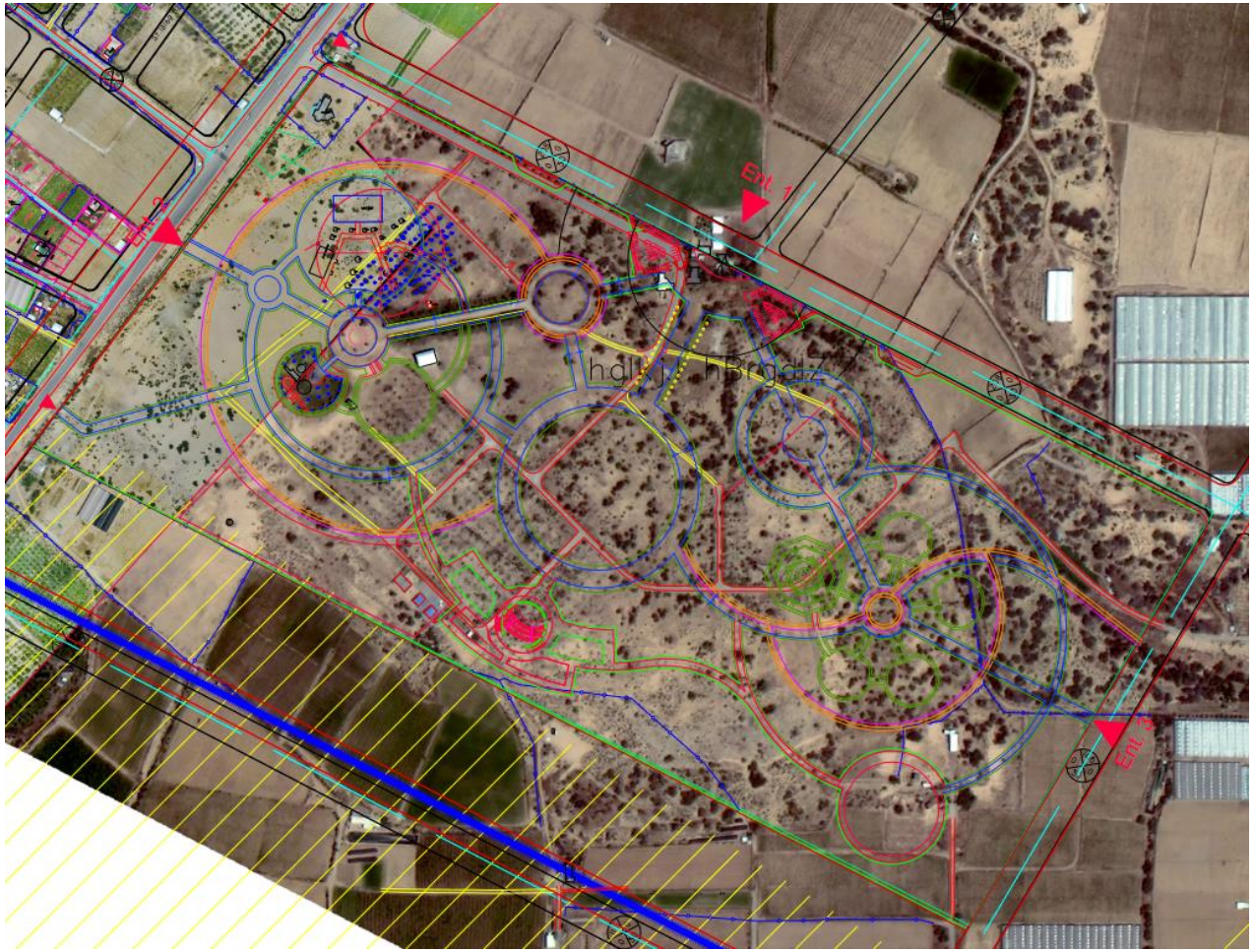
- **Vulnerability groups** and their accessibility to the green space.
- **Target groups** and beneficiaries of the green space.
- **Environment and social impact** assessment



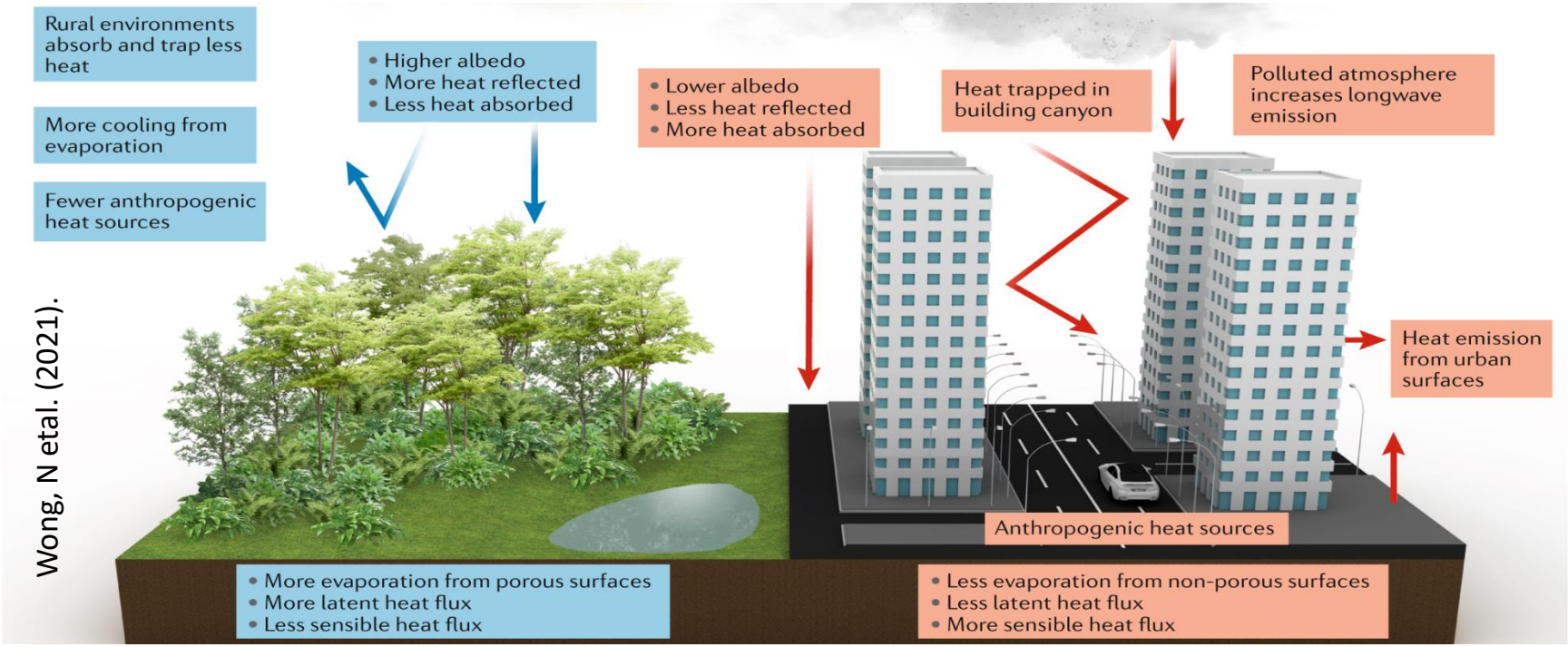
Stage IV: Participatory Approach Design

- **Project components**
- **Validation workshop**
- **Exit Strategy**: ensure the flow of funds for repaying the investment as well as restoration and regeneration, public-private partnership.




Ent. 1
Ent. 2
Ent. 3

Cool Cities: Carbon reduction in buildings and improvement of outdoor thermal comfort



Wong, N etal. (2021).

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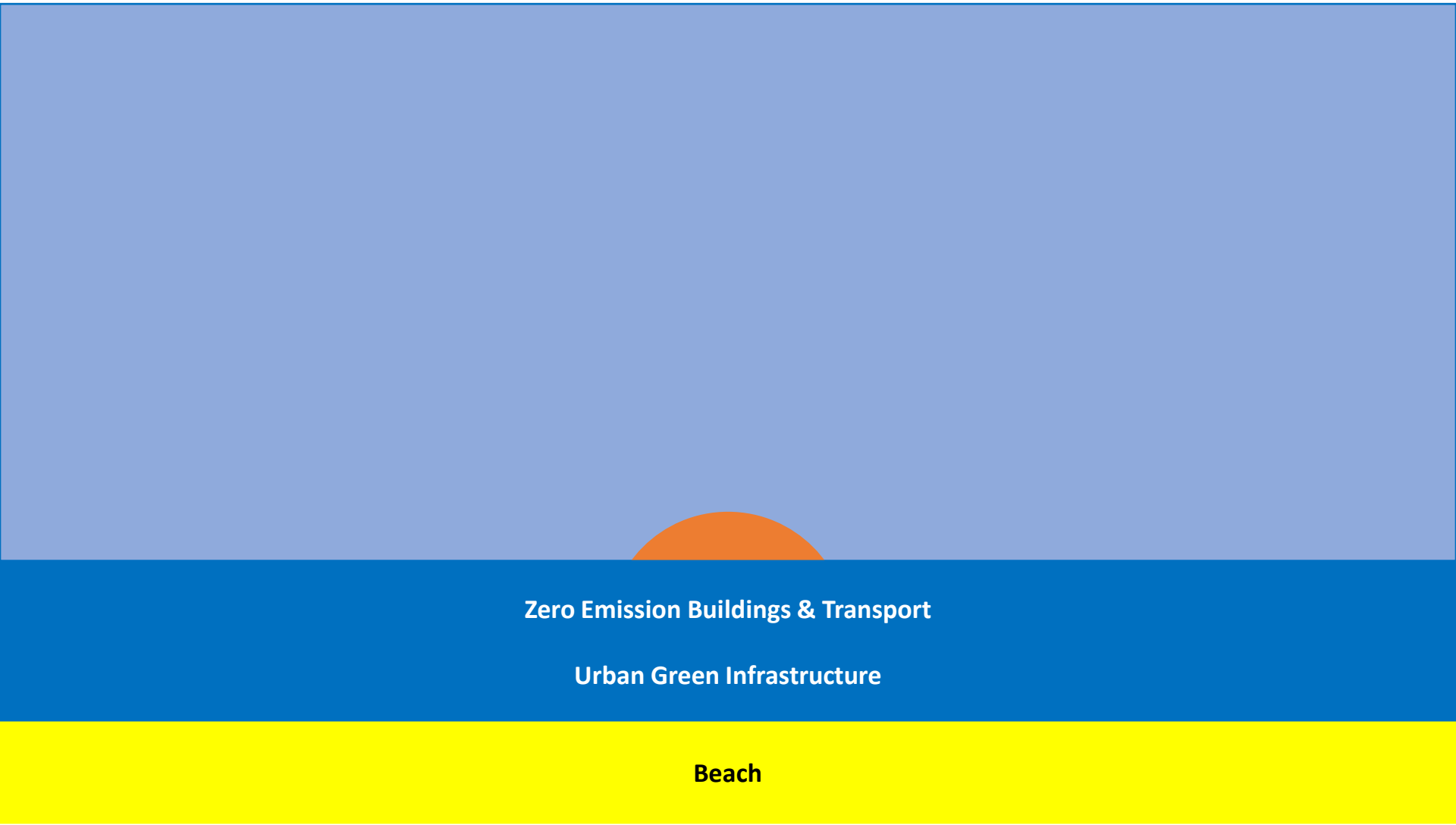
Zero Emission Buildings & Transport
Urban Green Infrastructure
Beach

Pathways and Implementation Strategy

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Vision and Strategy

1. **Integrated overarching city strategy**
2. **Participation strategy for all relevant actors**
3. **Prioritize nature and biodiversity over competing land use**

1. **Key Performance Indicators**
2. **Links to existing and potential funding options**
3. **Potential of co-benefits and revenue generation**

Temperature variation between night and day

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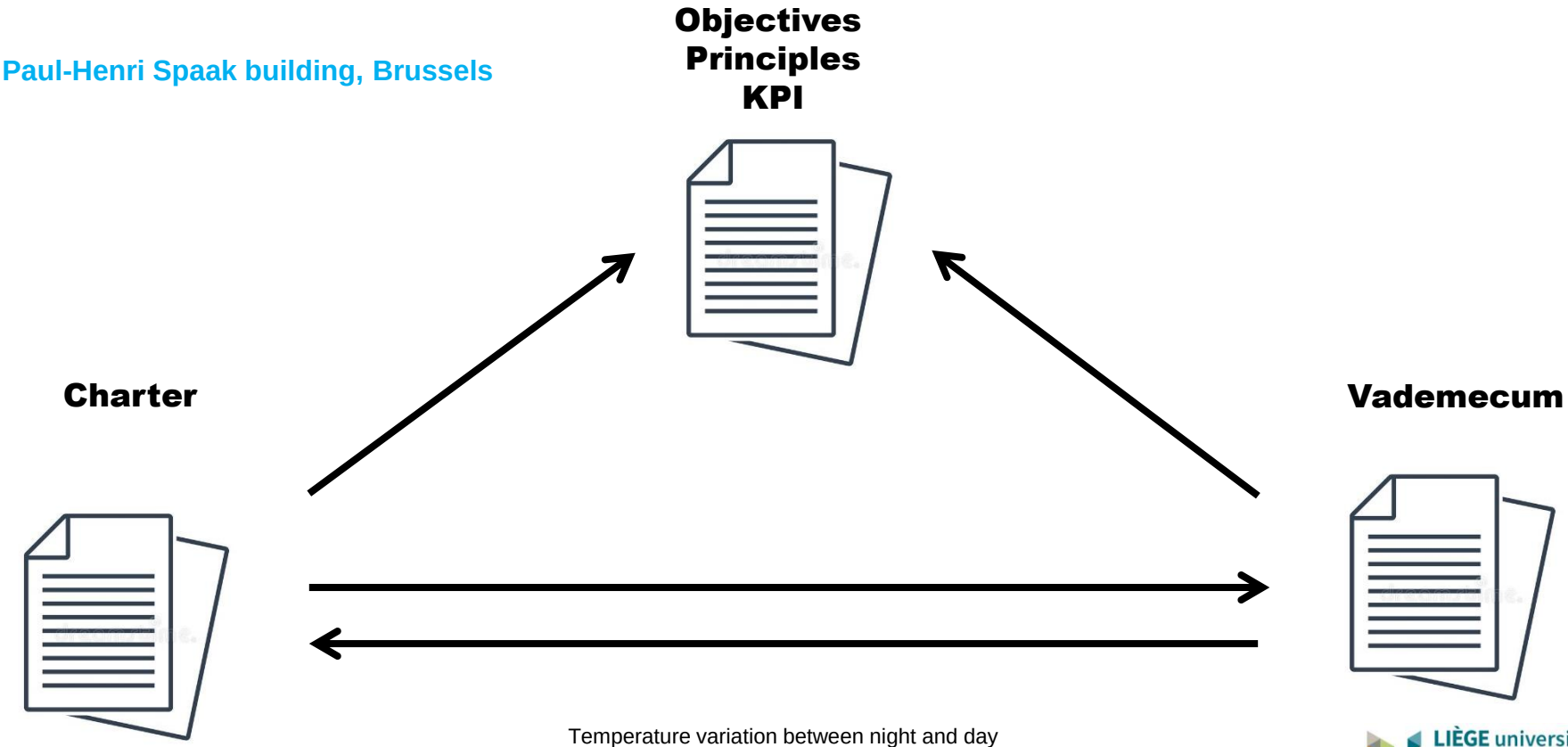
Project Charter as a Basis

Paul-Henri Spaak building, Brussels



Temperature variation between night and day

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Generate a Tailored Portfolio of Key Performance Indicators

Objective: Cooling the Climate and City Center

1. Climate Neutrality & Resilience
2. Low Emission Buildings and Mobility
3. Water Management
4. Natural and Climate Hazards
5. Green Infrastructure & Spaces
6. Biodiversity Enhancement
7. Air Quality
8. Capacity Building for Sustainable Urban Transformation
9. Participatory Planning and Governance
10. Social Justice and Social Cohesion
11. Health and Wellbeing
12. New Economic Opportunities and Green Jobs

Key Performance Indicators

	Indicator	Units	Applicability
1	Total carbon reduced or stored in buildings	$kgCO_2em2/y$	Gas and Electric Meters, Smart Meters, Energy Performance Certificate, Audit, EPD
2	Avoided greenhouse gas emissions from sustainable modes of transport	$kgCO_2e./y$	Transport Fleet Inventories and modal transport
3	Tree canopy cover	%	GIS Maps or Google Maps
4	Monthly mean value of daily minimum temperature	^{O}C	City meteorological station or weather station
5	Heat wave incidence Days with temperature above 32 C	^{O}C	City meteorological station or weather station
6	Urban Heat Waves Incidence	#	City meteorological station or weather station
7	Green Space Accessibility	%	Number of park visitors Green Surface per citizen
8	Availability and equitable green space	map	GIS Maps, Green Network

Map GHG emissions reduction

Problem:

Unable to measure GHG emission reduction

Solution:

Smart Meter Dashboards

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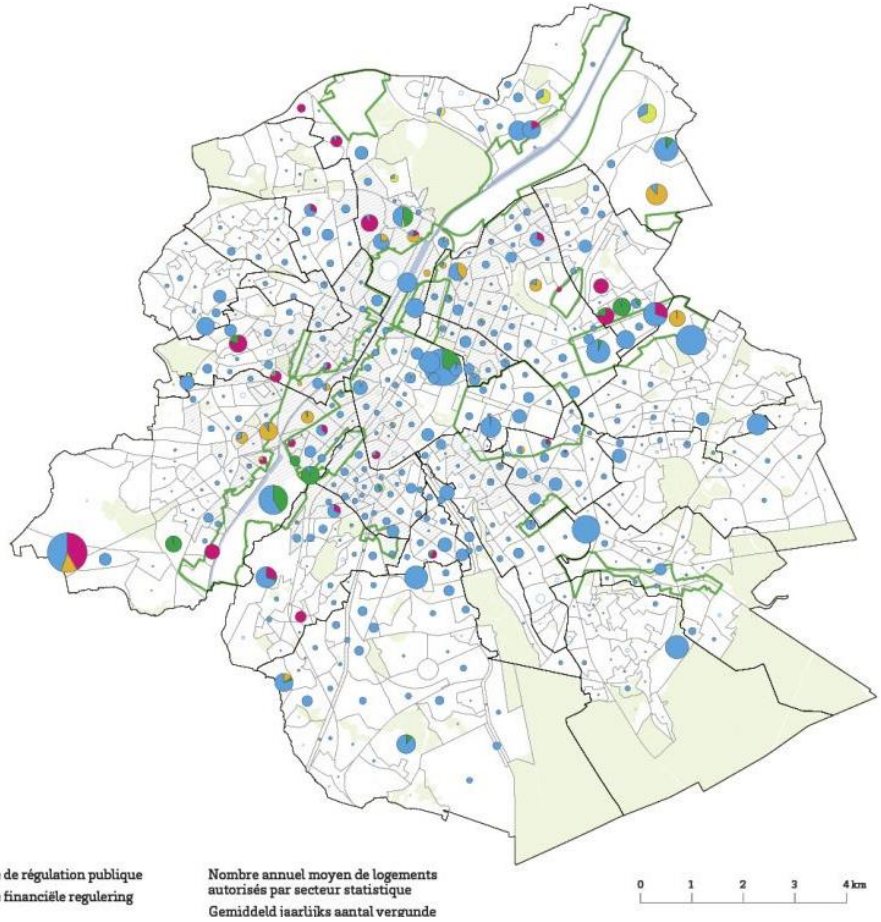
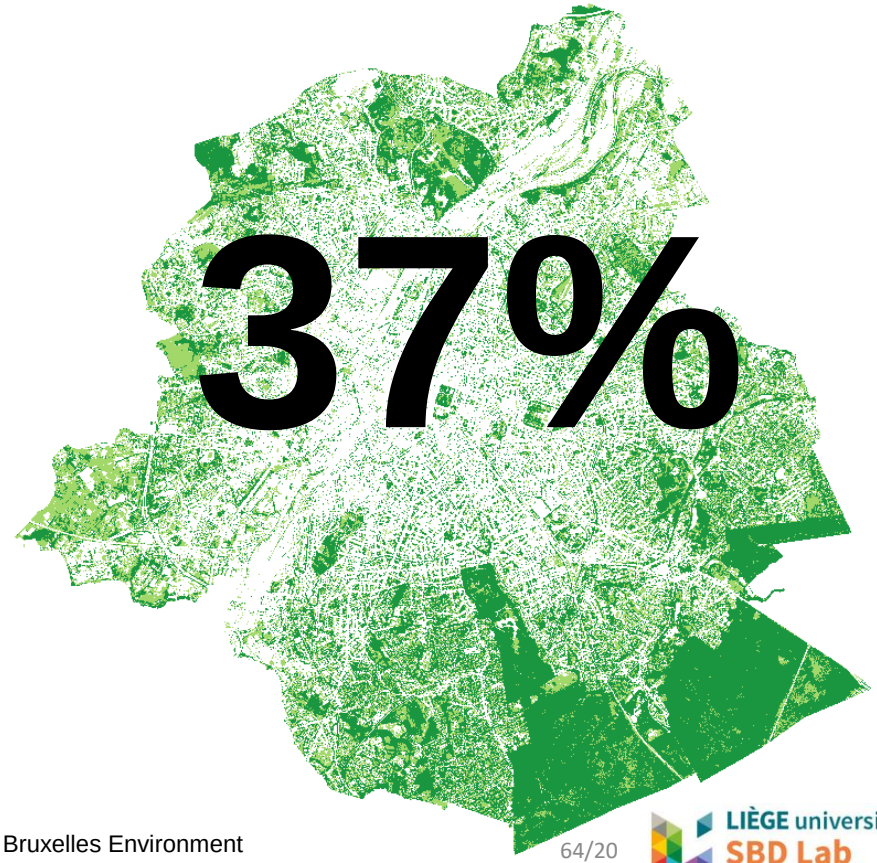
Housing against Trees vs 40% Target





Bruxelles Environment

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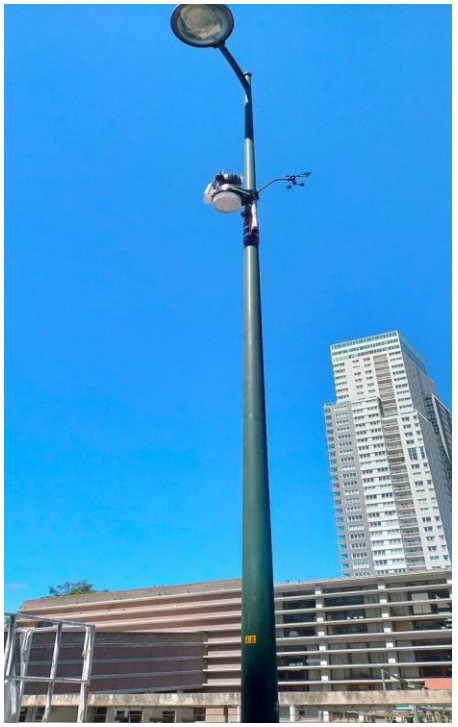
Weather Stations In-situ

WS_01_Reference

Installation with Loxam



WS_02_Héliport

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Planting Trees

Problem:

Expensive to plant Trees

200l/week for 2 years

Solution:

Private sector adopting 60% of new trees in the city

Insights

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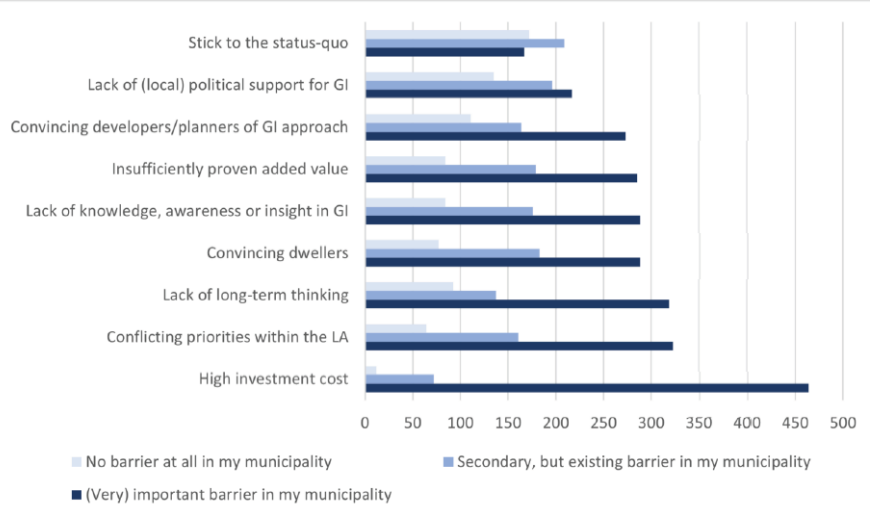
Insights

The politics of cool cities and local decision-makers

Attribute	Option 1	Option 2	Option 3
Investment cost	€ 500.000	€ 350.000	
Maintenance cost	€ 20.000 yearly	€ 20.000 yearly	
Deferred cost of sewage construction	€ 1,5 millions postponed with 20 years	€ 1,5 millions postponed with 10 years	*Everything remains as is*
Recreational value	25.000 yearly visits	10.000 yearly visits	
Climate impact	Yearly equivalent of CO_2 emissions of 15 families sequestrated	Yearly equivalent of CO_2 emissions of 15 families sequestrated	

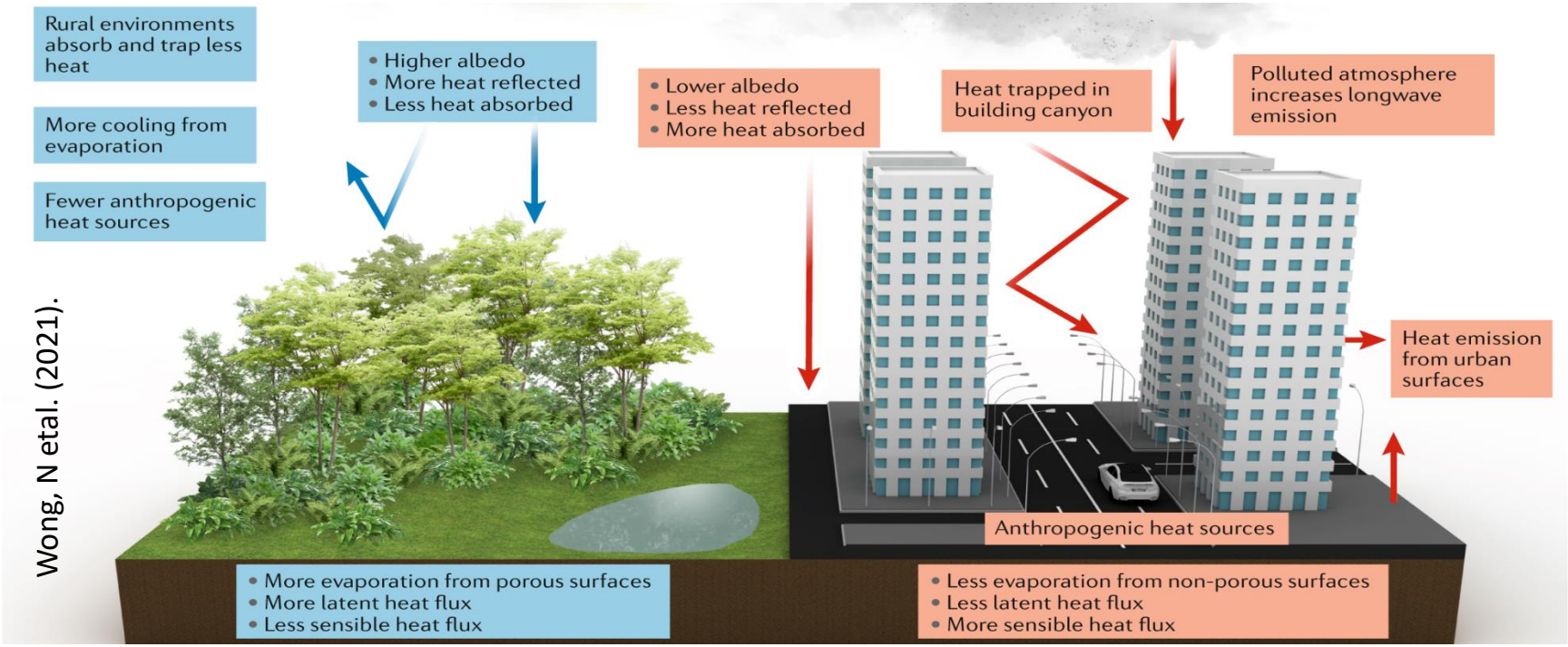
Option 1 Option 2 Option 3

Comparison of different design alternatives



The barriers to green infrastructure implementation at the local level.

Cool Cities: Carbon reduction in buildings and improvement of outdoor thermal comfort



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Panel discussion with the participants

Join CC platform!