The Future Of Technologies in Planning

July 2019

Bathroom Singer
Urban Farmer
Architect
Urbanist
Cyclist
Tree Hugger
Accident Prone
Film Maker
Transportation Planner
Potter
Graphic Designer
Naysayer
Traveler
Introvert
Optimist
Rebel
Football Coach
Workaholic
Photographer
Cross Fitter
Cricket Fanatic
Urban Designer
Ethical
Obsessive
Rail Enthusiast
Nerd
Dedicated
Social Worker

StudioPeopleOrientedDesign

TU Delft · Columbia University · USC University of Southern California · Purdue University · Newcastle University · Berkeley University of California · University of Michigan · Illinois University of Illinois at Urbana-Champaign · DYP Padmashree Dr. D.Y. Patil College of Architecture · Rizvi College · Sir JJ College of Architecture · UCL The Bartlett School of Architecture

TRENDS OF INDIAN CITIES

Urban Population Growth

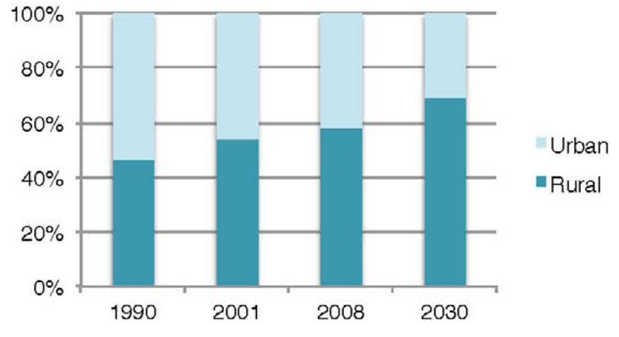
With a population of 1.2 Billion in 2014, India is projected to be the world's most populous country by 2025. By 2030, it is projected that the urban population will comprise of more than 40% of the total population. [1]

2030: 1.47 Billion; 41% urban [1]

2015: 1.28 Billion; 31% urban [1]

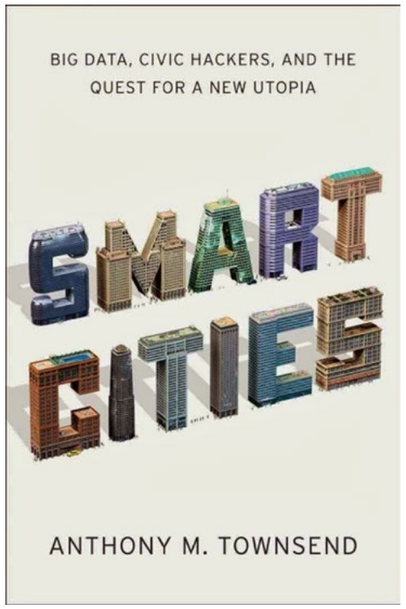
1961: 430 Million; 18% urban [1]

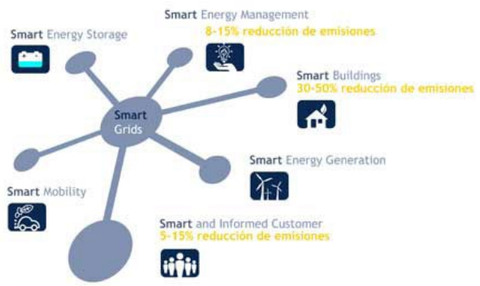
Cities will account for nearly 70 percent of India's GDP by 2030 [1]



Data Source:

1. India Urbanisation Econometric Model; McKinsey Global Institute analysis





बसेंगे स्मार्ट शहर
बरसेंगी नौकरियां

आने वाले वर्षों में देश में ऐसे शहर बसने वाले हैं जहां हर तरह की अत्याधुनिक सुविधाओं के साथ रोजगार के अवसर भी होंगे। इसके लिए दिल्ली से मुंबई तक एक औद्योगिक गलियारा बनने जा रहा है। सरकार इस महत्वाकांक्षी परियोजना के लिए पांच साल में 18,500 करोड़ रुपये खर्च करेगी। इस प्रोजेक्ट पर पेश है हरिकिशन शर्मा की रिपोर्ट

पिछले कुछ सालों में दिल्ली से मुंबई के बीच बनने वाले औद्योगिक गलियारे में स्मार्ट शहर बसने लगेंगे। इसमें लगने वाले उद्योगों से लाखों नौकरियां भी बरसेंगी। इसे हकीकत बनाने के लिए केंद्र सरकार ने कदम उठाने शुरू कर दिए हैं।

वित्त मंत्री प्रणव मुखर्जी ने आम बजट 2012-13 में ऐलान किया है कि 12वीं पंचवर्षीय ढांचागत क्षेत्र के विकास पर 50 लाख करोड़ रुपये का निवेश किया जाएगा। इससे मौजूदा शहरों में अत्याधुनिक ट्रांसपोर्ट सिस्टम, सीवरेज, सड़कें, एयरपोर्ट और बिजलीघर बनाए जाएंगे जबकि दर्जनों नए शहर भी बसेंगे। इसके साथ विनिर्माण नीति भी लागू होगी जिसके तहत राष्ट्रीय निवेश और विनिर्माण जोन बनेंगे। इनमें 10 लाख नई नौकरियां मिलेंगी। इन सब परियोजनाओं का केंद्र बिंदु दिल्ली-मुंबई औद्योगिक कॉरिडोर परियोजना (डीएमआईसी) ही होगी।

वित्त मंत्री ने बजट में घोषणा की है कि सरकार डीएमआईसी पर अगले पांच वर्ष में 18,500 करोड़ रुपये खर्च करेगी, जबकि जापान भी 450 करोड़ डॉलर की धनराशि खर्च करेगा। वैसे वित्त मंत्री ने चालू वित्त वर्ष के लिए 456 करोड़ रुपये डीएमआईसी के लिए आवंटित भी कर दिए गए हैं। जापान की वित्तीय और तकनीकी मदद से पांच लाख करोड़ रुपये की लागत से पश्चिमी रेल मार्ग के दोनों ओर इस परियोजना के तहत 24 नए औद्योगिक शहर बसेंगे। इनमें सीवरेज सिस्टम से लेकर यातायात प्रणाली, स्ट्रीट लाइट आदि सबकुछ कंप्यूटर से नियंत्रित होगा।

छह राज्यों से गुजरने वाले डीएमआईसी के शहर खूबसूरत आर्किटेक्ट, बेजोड़ इंजीनियरिंग और अत्याधुनिक सूचना प्रौद्योगिकी से सुसज्जित होंगे। इन शहरों में एम्सटरडम (हॉलैंड) की तरह अत्याधुनिक सार्वजनिक बस परिवहन व्यवस्था होगी, वहीं जापान की तरह मेट्रो भी दौड़ेगी। प्रदूषणमुक्त इन विश्वस्तरीय शहरों में सौर ऊर्जा और गैस चालित बिजलीघर होंगे।

डीएमआईसी के कई शहर वर्ष 2018 तक बनकर तैयार हो जाएंगे। इनमें सबसे पहले निर्माण, खासकर सिविल इंजीनियरिंग के क्षेत्र की नौकरियां आएंगी। इसके बाद ऑटो, पेट्रो केमिकल्स, विनिर्माण, आईटी के पेशेवरों की जरूरत होगी। अकेले एक निवेश क्षेत्र धौलेरा से ही आठ लाख लोगों को नौकरियां मिलने का अनुमान है।

ऐसे होंगे स्मार्ट शहर

ट्रैफिक
पूरे शहर का ट्रैफिक प्लान एक अत्याधुनिक सॉफ्टवेयर के जरिये बनेगा। ट्रैफिक लाइट का संचालन भी एक केंद्रीयकृत कंट्रोल रूम से किया जा सकेगा। मोबाइल और लैपटॉप पर रीयल टाइम ट्रैफिक की जानकारी मिल सकेगी। स्लोबल पोजिशनिंग सिस्टम से लैस वाहन पहले से निर्धारित रास्ते पर ही चलेंगे।

स्ट्रीट लाइट
रात के वक्त पूरा शहर रंग बिरंगी रोशनी में डूबा दिखेगा। कहीं दूधिया प्रकाश तो कहीं सतरंगी। इसे एक अत्याधुनिक कंट्रोल रूम से नियंत्रित किया जाएगा। शहर की लाइटिंग कंप्यूटर आधारित व्यवस्था से संचालित होगी। हर मौसम और खास आयोजन के हिसाब से इसमें बदलाव होगा।

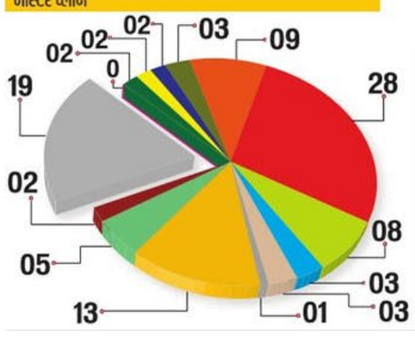
मार्केट/कियोस्क
सड़कों के किनारे, पब्लिक प्लेस और रेलवे स्टेशन तथा बस स्टैंड पर ऑटोमेटिक कियोस्क लगे होंगे जिनमें रुपये डालकर कोई भी व्यक्ति स्नैक्स, कोल्ड ड्रिंक्स जैसे सामान चौबीस घंटे खरीद सकेगा। इसके अलावा बड़े सुपर मार्केट होंगे जहां वीकएंड में जरूरी खरीदारी की जा सकेगी।

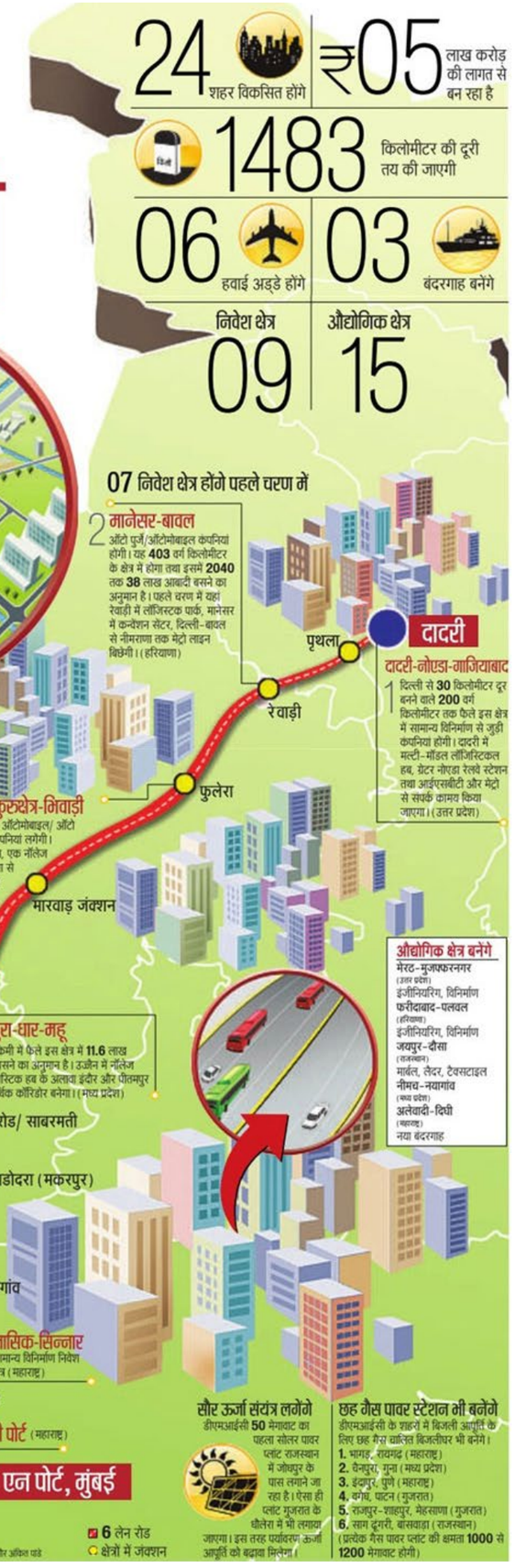
जल आपूर्ति
शहर में पानी सप्लाई की व्यवस्था भी कंप्यूटर आधारित प्रणाली से नियंत्रित होगी। पाइपलाइन लीक होने पर उसकी जानकारी तत्काल कंट्रोल रूम को मिल जाएगी। वह एसएमएस के जरिये निर्धारित कर्मचारियों को यह काम करने का निर्देश दे देगा। इसके तहत पानी की गुणवत्ता भी जांची जा सकेगी।

सार्वजनिक परिवहन
इन शहरों में मास रैपिड ट्रांजिट सिस्टम होगा। इसमें बस और मेट्रो ट्रेन की इंटीग्रेटेड व्यवस्था होगी। एक ही टिकट से बस और मेट्रो ट्रेन से सफर किया जा सकेगा। प्रदूषण रहित यह व्यवस्था शहर के एक छोर को दूसरे छोर से जोड़ेगी। सड़कों पर साइकिल सवारों और पैदल यात्रियों के लिए अलग लेन होगी।

बिजली
ये शहर स्मार्ट ग्रिड से जुड़े होंगे। इसका मतलब कि यहां बिजली कटौती से मुक्ति मिल जाएगी। 24 घंटे बिजली तो मिलेगी लेकिन मीटर से लेकर ट्रांसफार्मर तक सब कुछ अत्याधुनिक तकनीक से बने होंगे। इनसे बिजली चोरी करने की गुंजाइश भी नहीं होगी।

मास्टर प्लान






The first movie from the family that's truly ahead of its time!
JETSONS
The Movie
U
UNIVERSAL PICTURES PRESENTS
A HANNA-BARBERA PRODUCTION "JETSONS: THE MOVIE"
FEATURING VOICES OF GEORGE O'HANLON AS GEORGE JETSON MEL BLANC AS SPACELY AND TIFFANY AS JUDY JETSON
MUSIC SCORE BY JOHN DEBNEY
ORIGINAL SONGS PERFORMED BY TIFFANY
SUPERVISING DIRECTOR IWAO TAKAMOTO
SUPERVISING ANIMATION DIRECTOR DAVID MICHENER
SUPERVISING PRODUCER BRUCE DAVID JOHNSON
WRITTEN BY DENNIS MARKS
PRODUCED & DIRECTED BY WILLIAM HANNA & JOSEPH BARBERA
ORIGINAL SOUNDTRACK ON MCA RECORDS CASSETTES AND CDS
A UNIVERSAL RELEASE
UNIVERSAL

Where to Build ?

For Public and Private ....

Our Smart City Mantra

Respond Contextually

Connect Efficiently

Develop Equally

Build Intelligently

Invest Strategically

Collaborate Actively

JODHPUR, RAJASTHAN

JODHPUR, RAJASTHAN

The Hidden Water Crisis

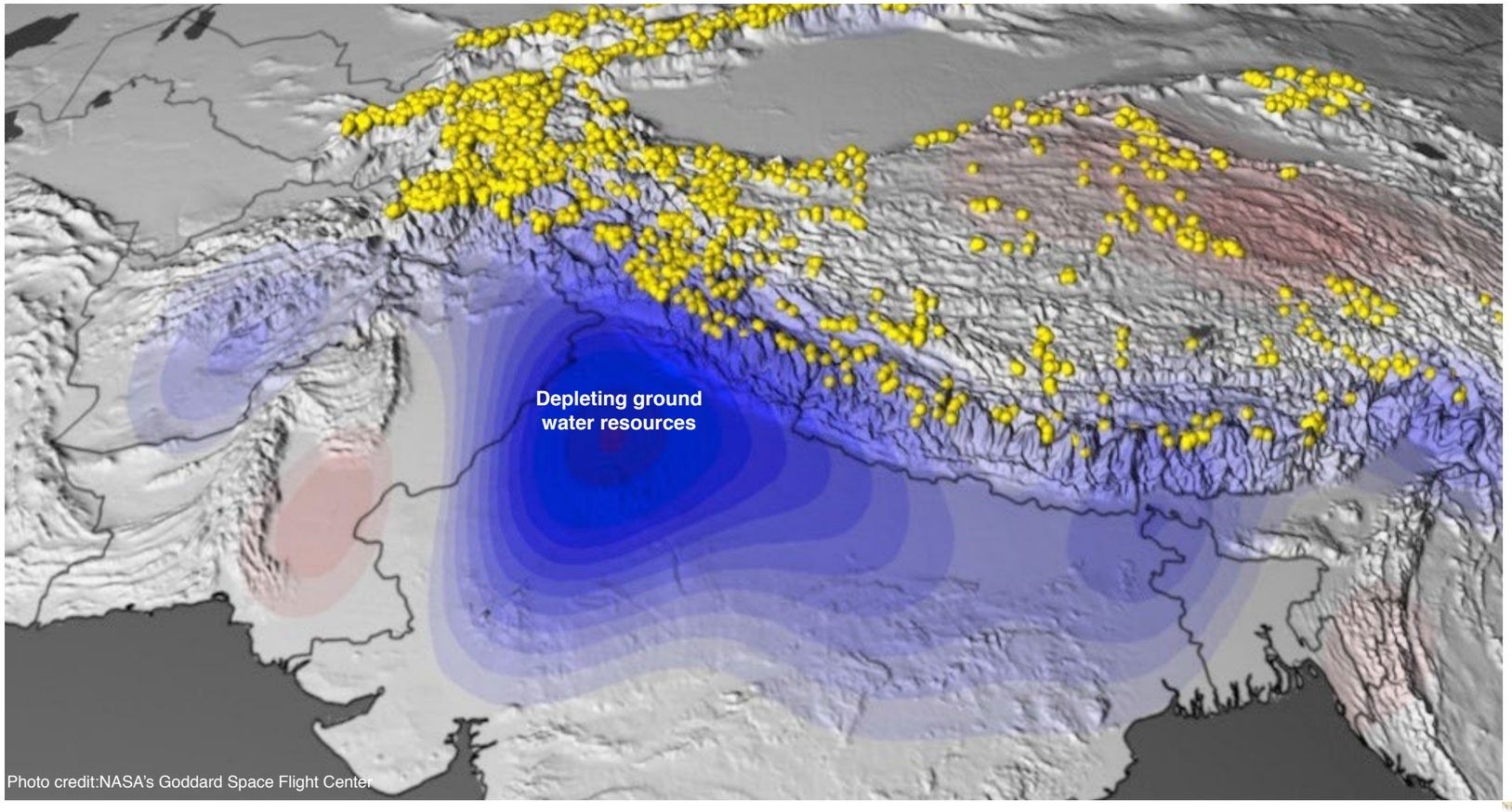


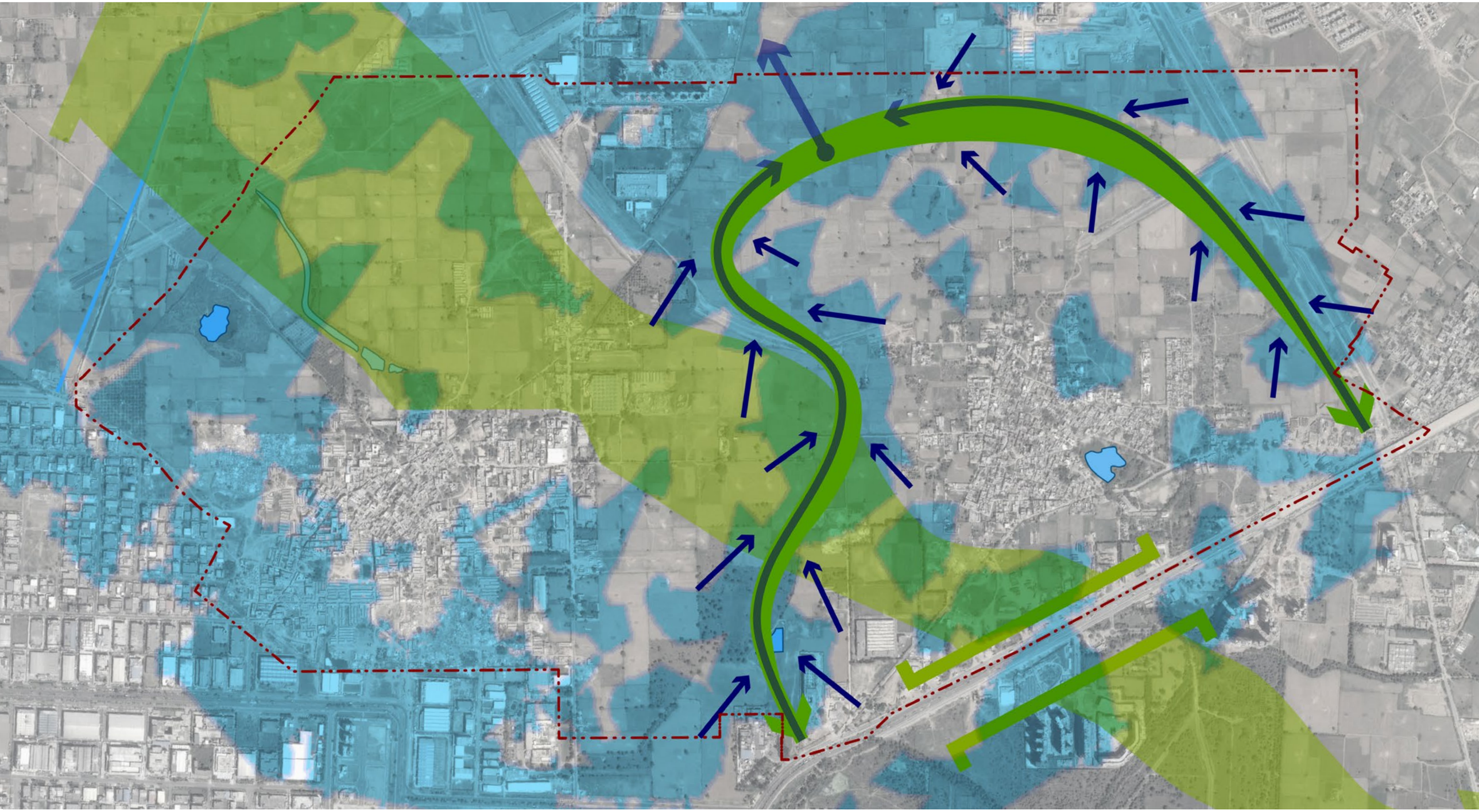
Photo credit:NASA's Goddard Space Flight Center

"The ground water levels in Gurgaon dropped at the rate of 1m / year in 2012 and 0.65m / year in 2013[2]"

India is the largest user of ground water in the world[1].

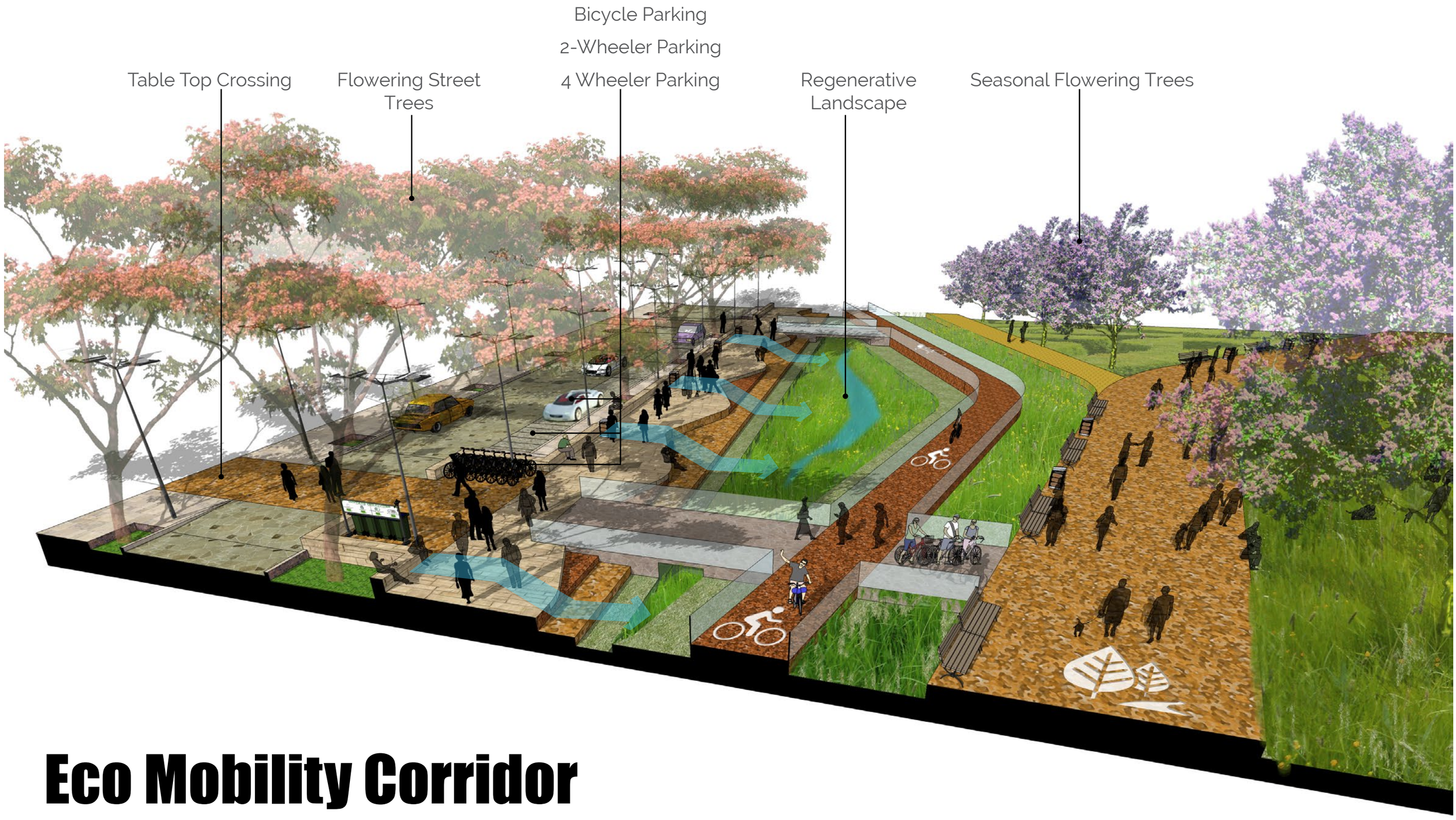
Hence water is the key area to be addressed before planning for new cities or expansion of existing ones.


Photo: Mustafa/Associated Press



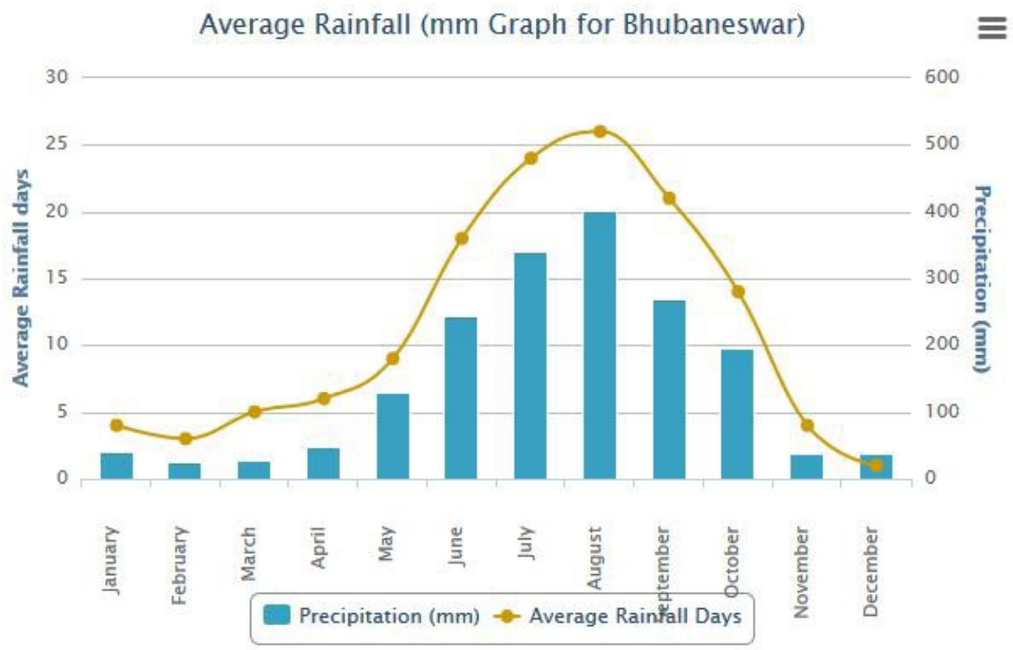
Mapping the Non Buildable

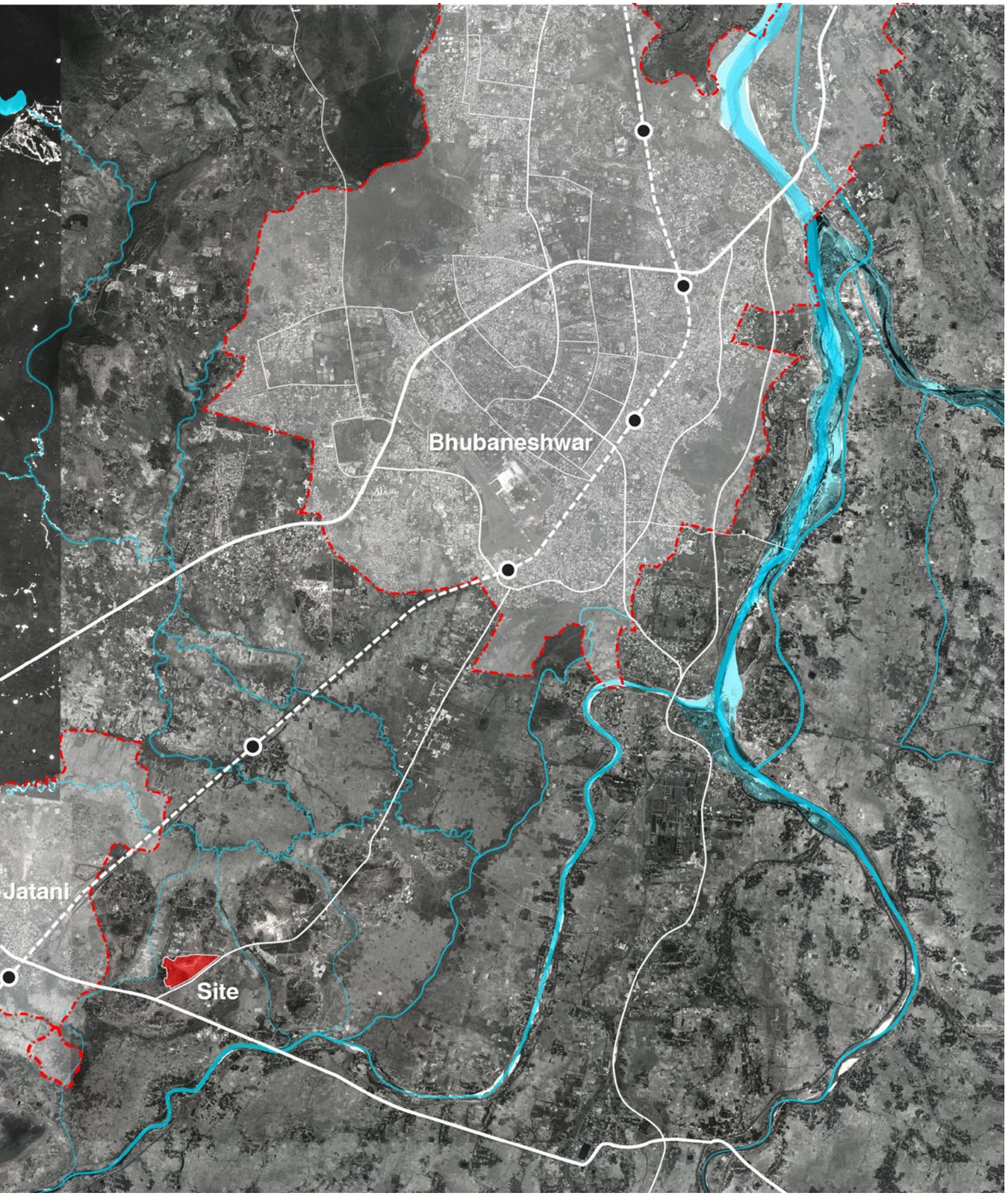
Eco-Responsive Planning

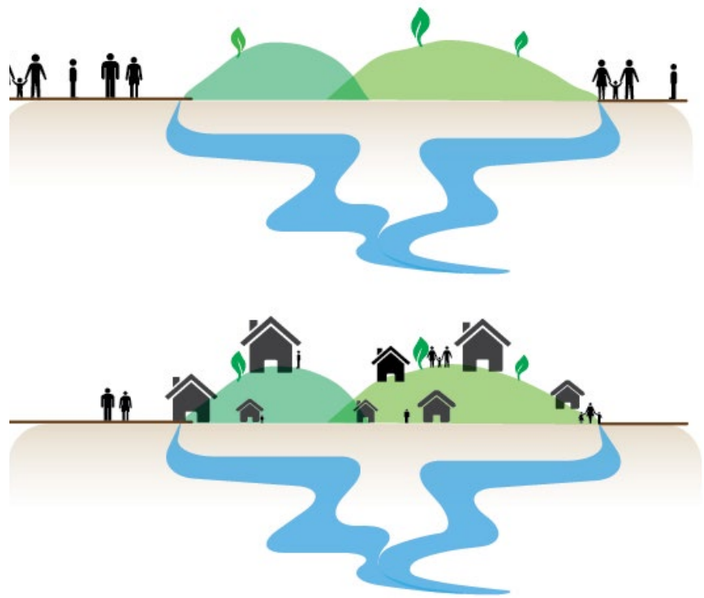


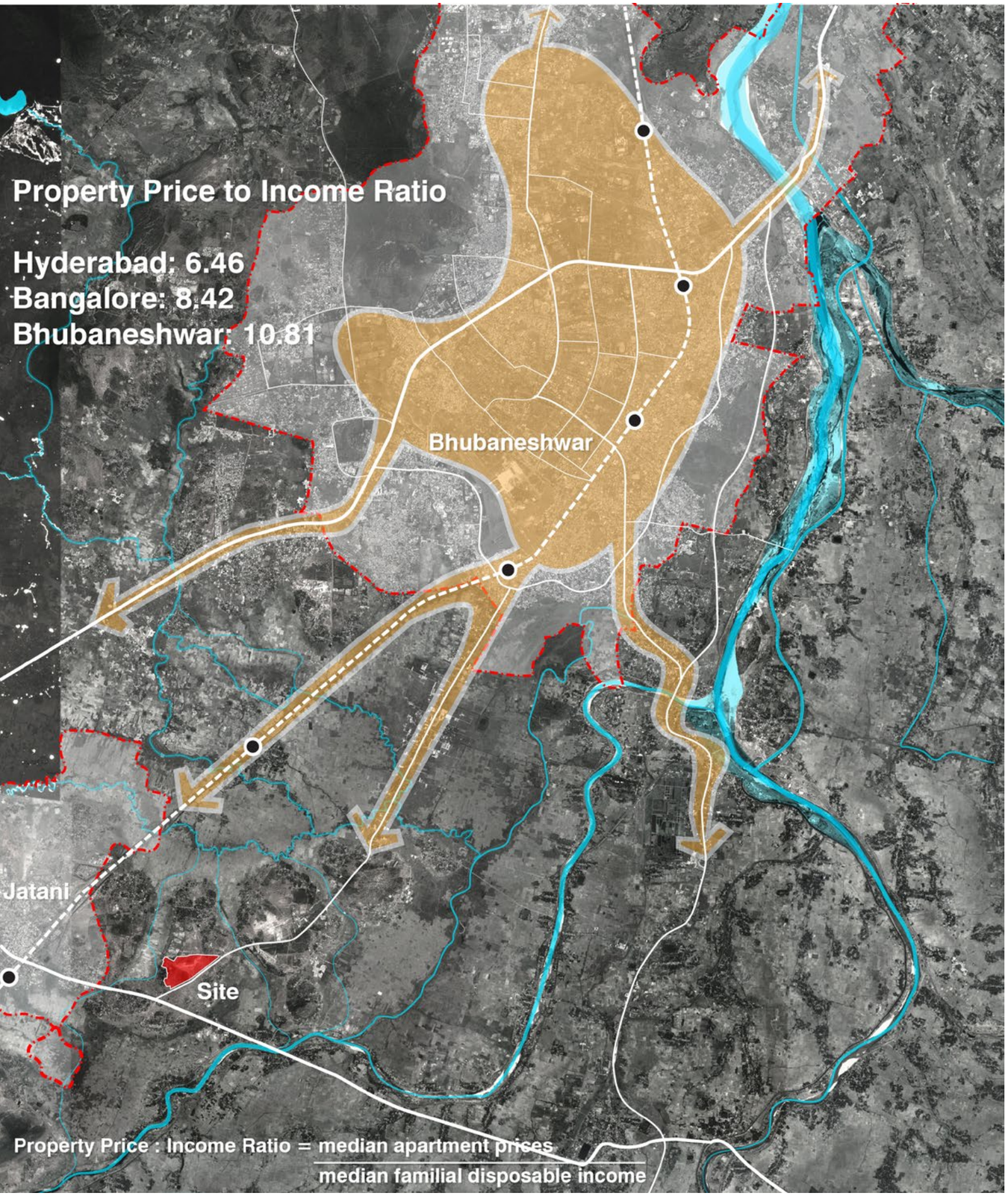
Eco Mobility Corridor

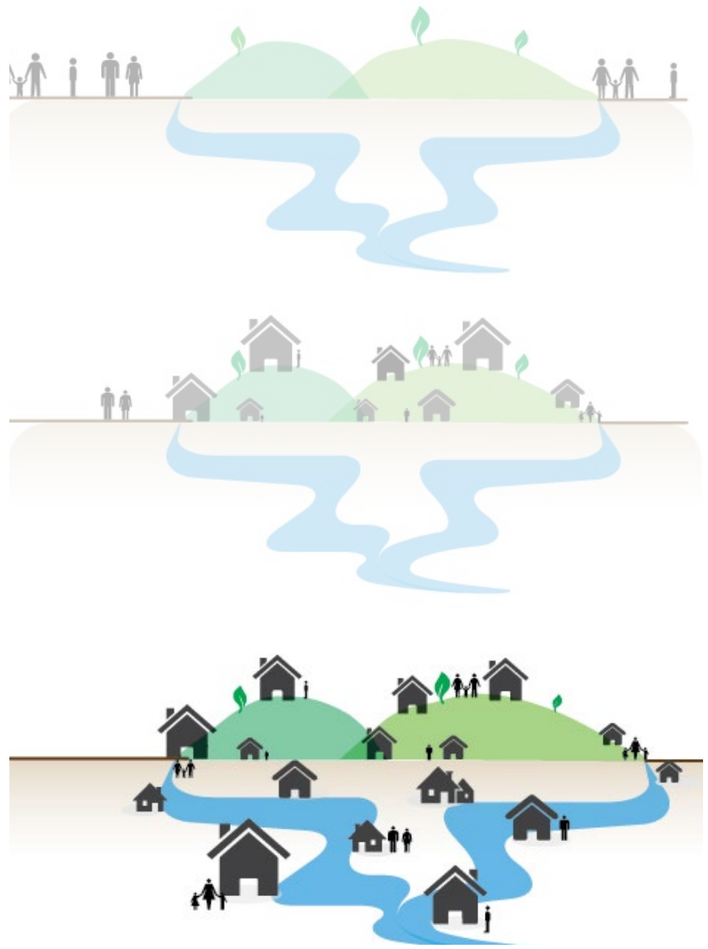
The Contrary Water Crisis- Bhubaneswar

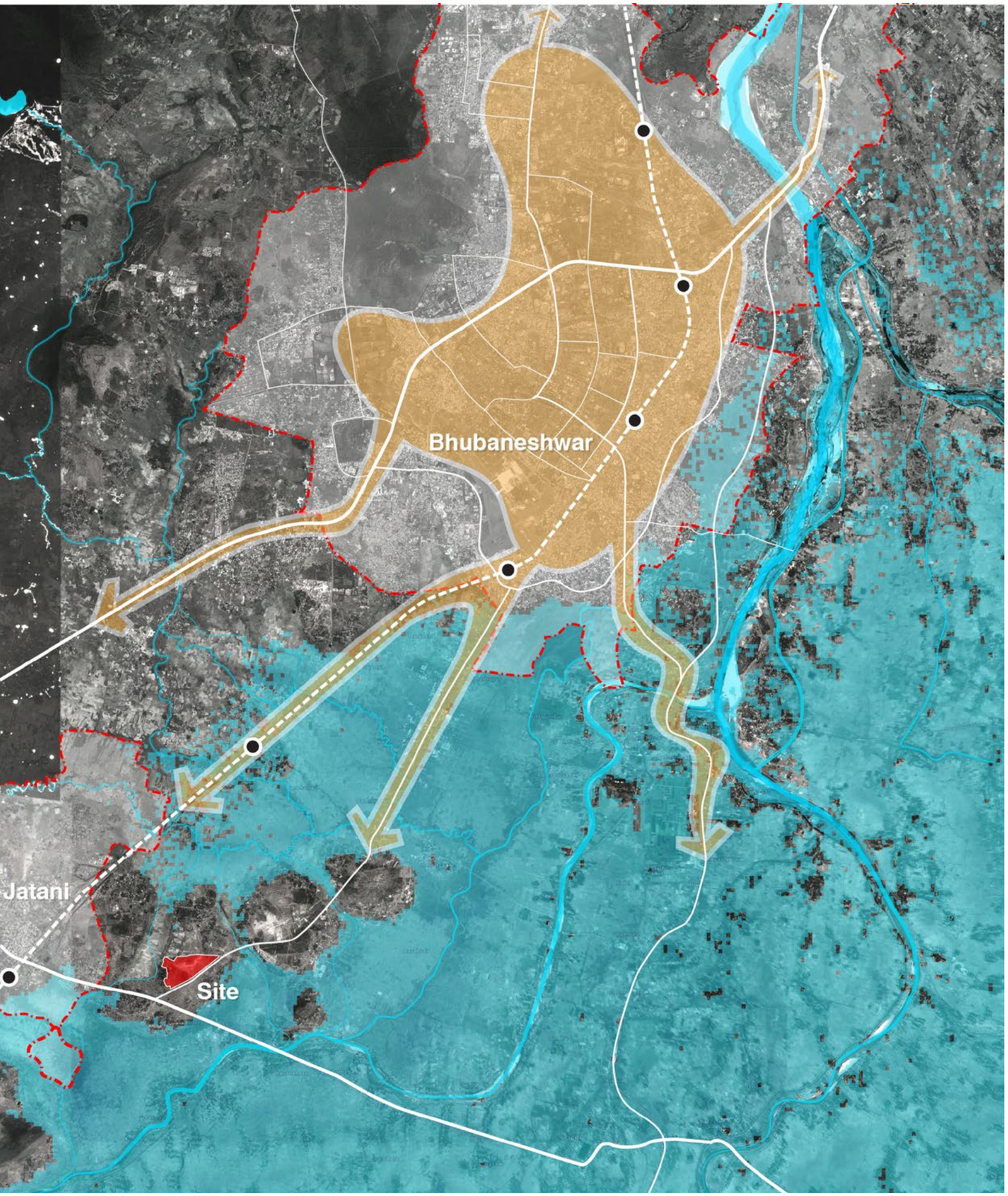



Bhubaneshwar
Jatani
Site




Property Price to Income Ratio
Hyderabad: 6.46
Bangalore: 8.42
Bhubaneshwar: 10.81
Bhubaneshwar
Jatani
Site
Property Price : Income Ratio = median apartment prices / median familial disposable income

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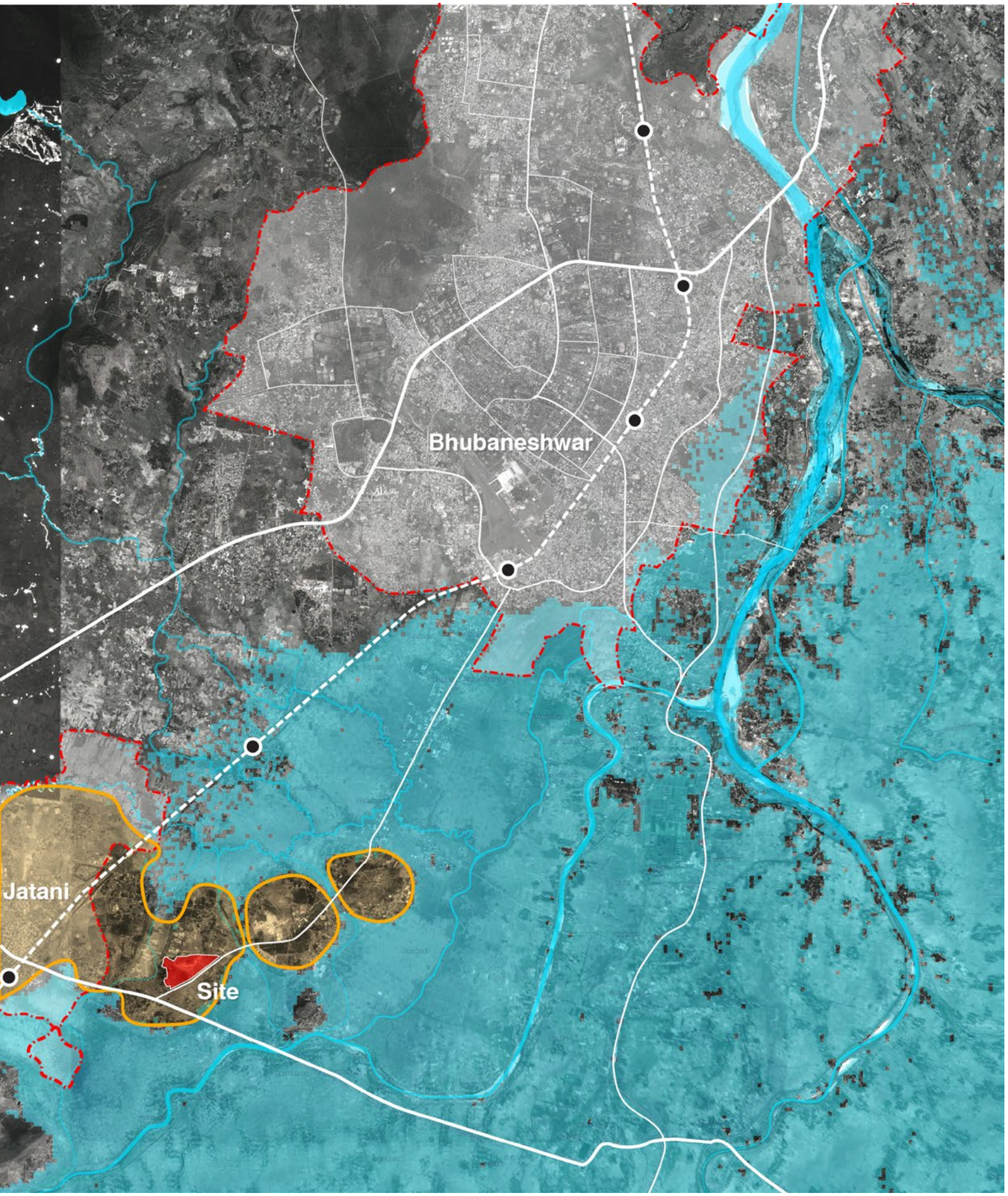
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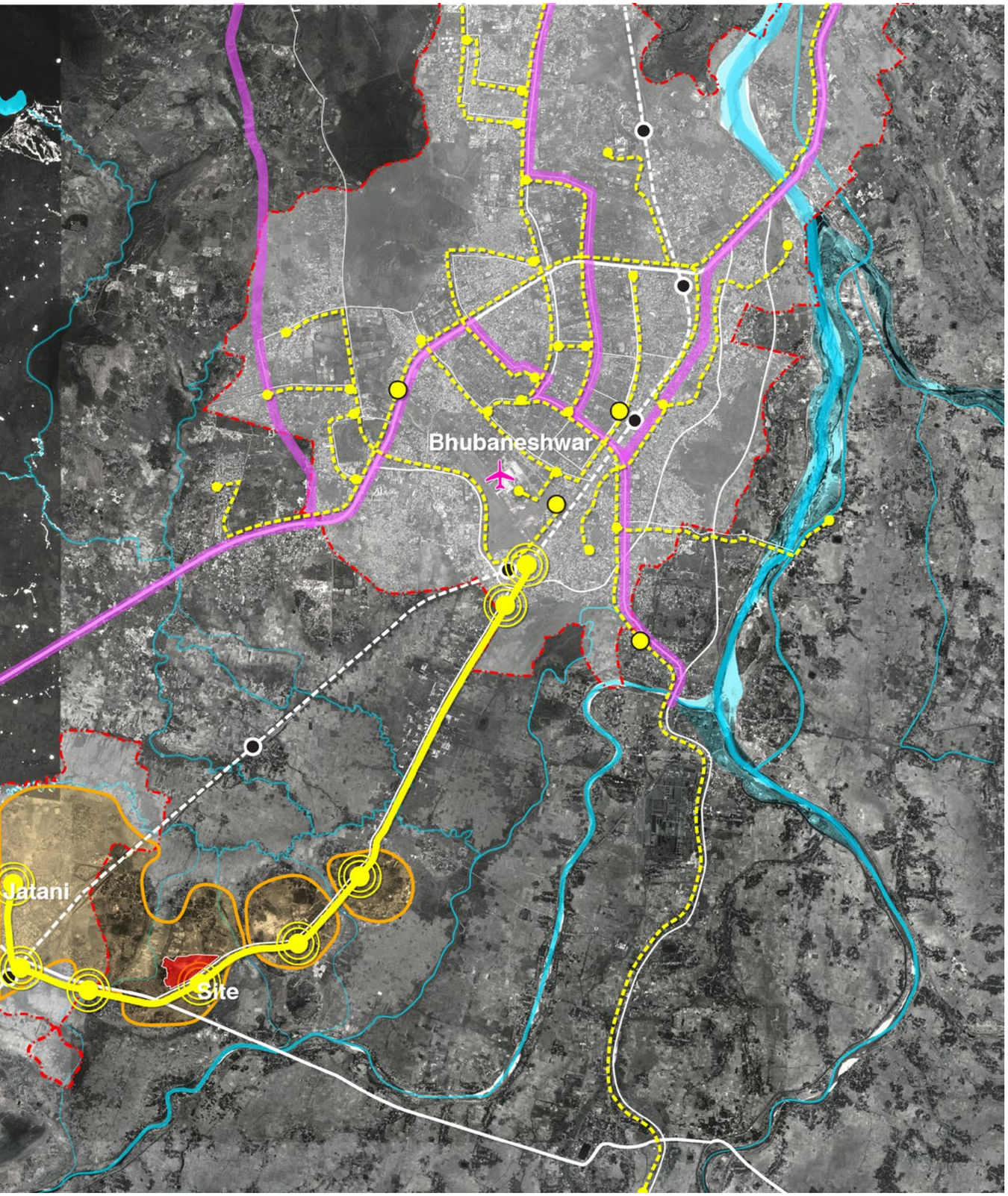

Bhubaneshwar
Jatani
Site

Our Technology Wishlist...

Aquifer Mapping

Estuary Mapping

Water Shed Data for rivers prone to flooding

Ecological Development Plan for Each city

Where Not to Build ?

Bhavani Islands 2030

Urban and Rural Population Distribution: Amaravati Capital Region

2051 (13.8 million)

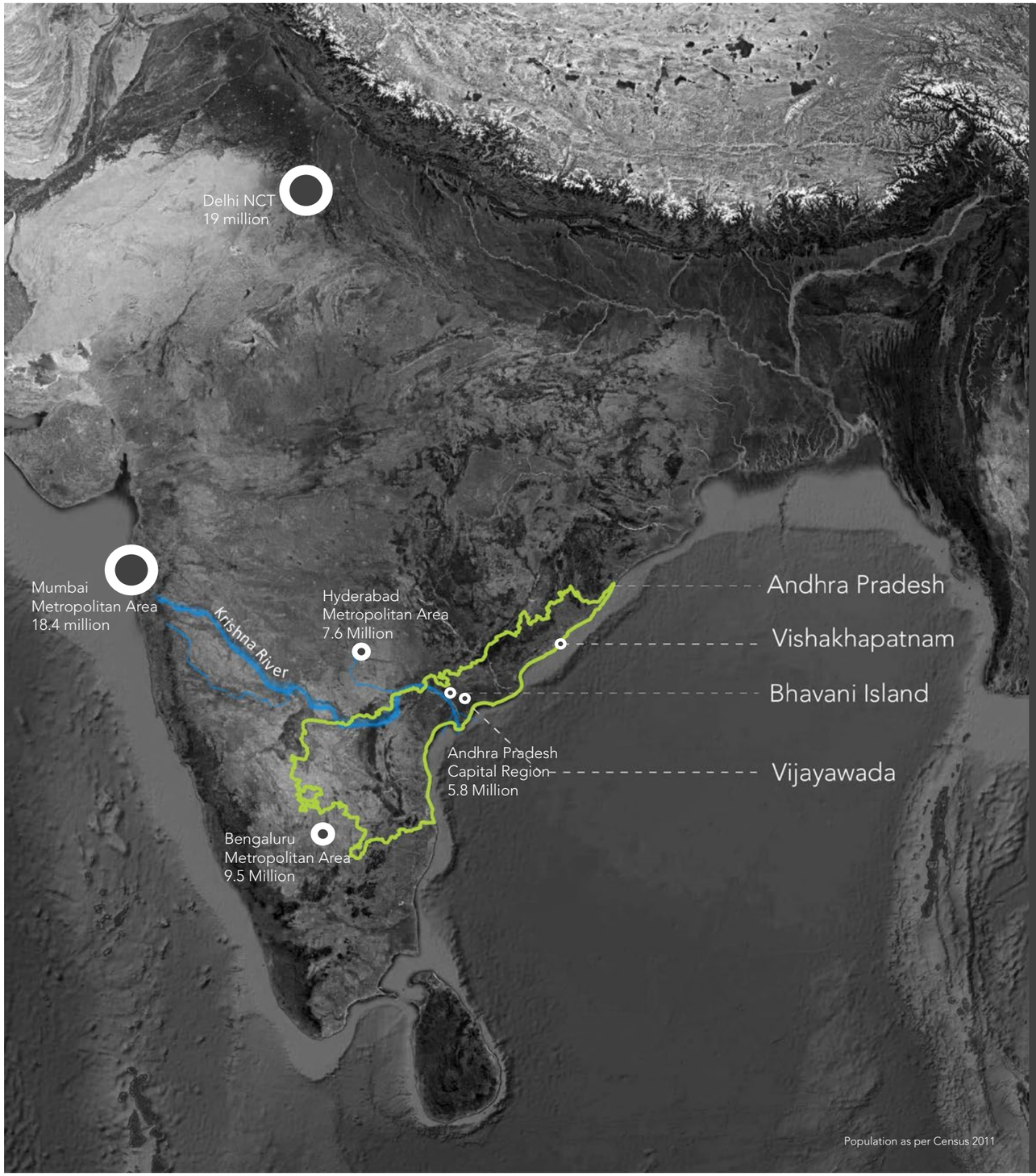
2031 (11.2 million)

2011 (5.8 million)

1991 (4.6 million)

1981 (3.8 million)

Urban Population Rural Population



A New City for a Rapidly Urbanizing India

Urbanization and India

India is experiencing an urban transformation on a scale and speed only a handful of countries have witnessed. It is estimated that 11 new cities of the size of New Delhi will have to be built over the next two decades to house India's rapidly urbanizing population. Recent studies estimate that by 2030, cities will generate 70% of net new jobs and generate more than 70% of the nation's GDP. The emerging cities of India are the crucibles of future growth and shall play a critical role in making India a leading world economy.

Andhra Pradesh Capital Region

In 2014, the development of Amaravati, a new state-of-the-art capital city for India's youngest state of Andhra Pradesh, was announced. The planned city is located across from Vijayawada on the banks of the Krishna River, which grouped with neighboring areas forms the Andhra Pradesh Capital Region (APCR). The development vision for the region is to become one of the most liveable and happy cities in the world.

Rich Ecological Context

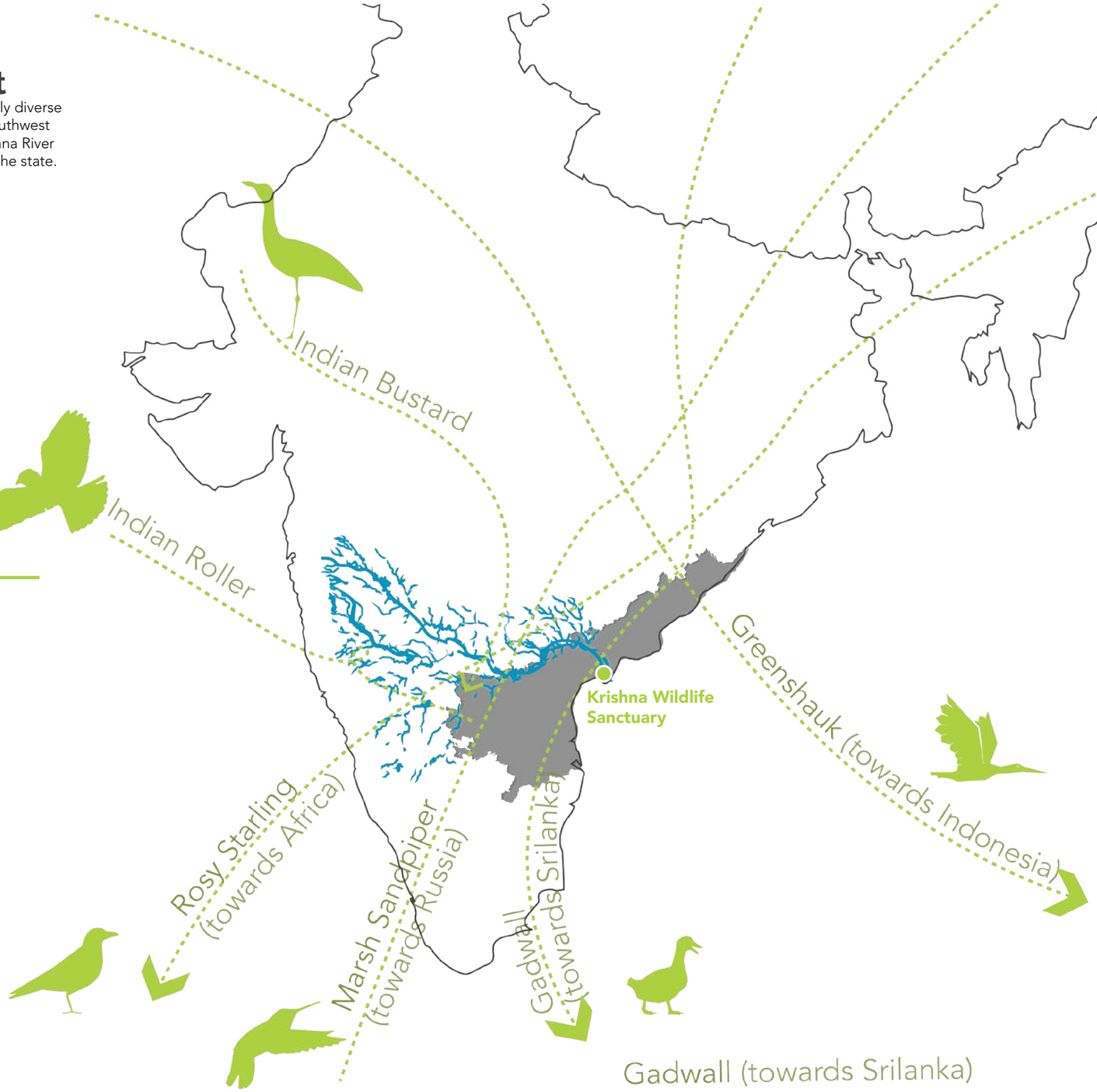
The state of Andhra Pradesh has a rich and ecologically diverse ecosystem supported by three major rivers flowing southwest towards the Bay of Bengal: Godavari to the north, Penna River to the south, and Krishna River through the center of the state.

Ecosystem

27,661
hectares of mangrove forests located in the Krishna River delta

51
fish species recorded in the Krishna River system

126
species of resident and migratory birds



The lands abutting the Krishna River have a rich variety of flora and fauna. The Krishna River basin is home to a large number of resident and migratory birds, contributing significantly to the state's rich biodiversity. The Krishna River estuary is home to a large mangrove forest, which is protected and has been declared a wildlife sanctuary.
The Krishna River has a large number of islands located within it. These islands tend to be low lying and are characterized with riparian edge vegetation. This vegetation plays a dual role of being a habitat for birds and minimizing the erosive forces of the river's flow.

Krishna River

1,300 km
long and 4th biggest river in India

258,948 km²
covered by Krishna's braided river basin

Vision for the Seven Islands

The master planning process was devised as a series of smaller parts that together add up to a compelling larger vision. This strategy will enable sustainable and controlled development of the islands based on market demand and urban growth. Considering the scale of the project the project the concept master plan was broken into two major components:

1. Vijayawada Water Front Nodes

2. Detailed Master Plan for the Island 1: Bhavani Island

Island 7:
Forest Park

Island 6:
Heritage Island

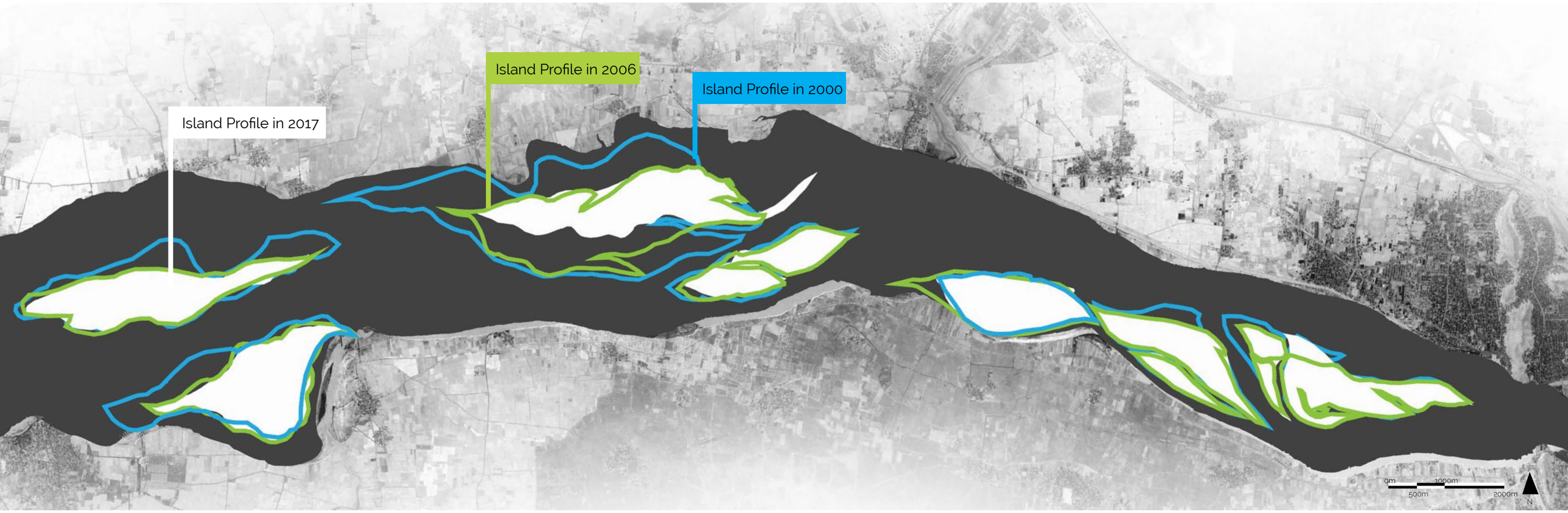
Island 5:
Entertainment Island

Island 4:
Cultural Island

Island 3:
Civic Center

Island 2:
Eco Park

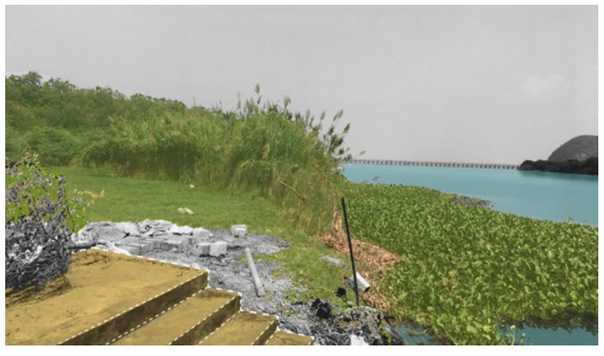
Island 1:
Bhavani Island



Dynamic Island Profiles

The profile and size of the seven islands is heavily influenced by the flow of the Krishna River. The islands are constantly evolving due to the dynamic flow of the river causing erosion in some areas and excessive sedimentation in others.
Soft edges along the islands are dynamic in nature and have evolved over the years based on the flow of the river and reverse drought. Edges along Island 1 are reinforced by the authorities with steel sheet piling to prevent erosion.

Existing natural edge



Edges facing erosion and growth of water hyacinth

Edges treated with sheet piling to prevent erosion

Adaptive Waterfront Edges

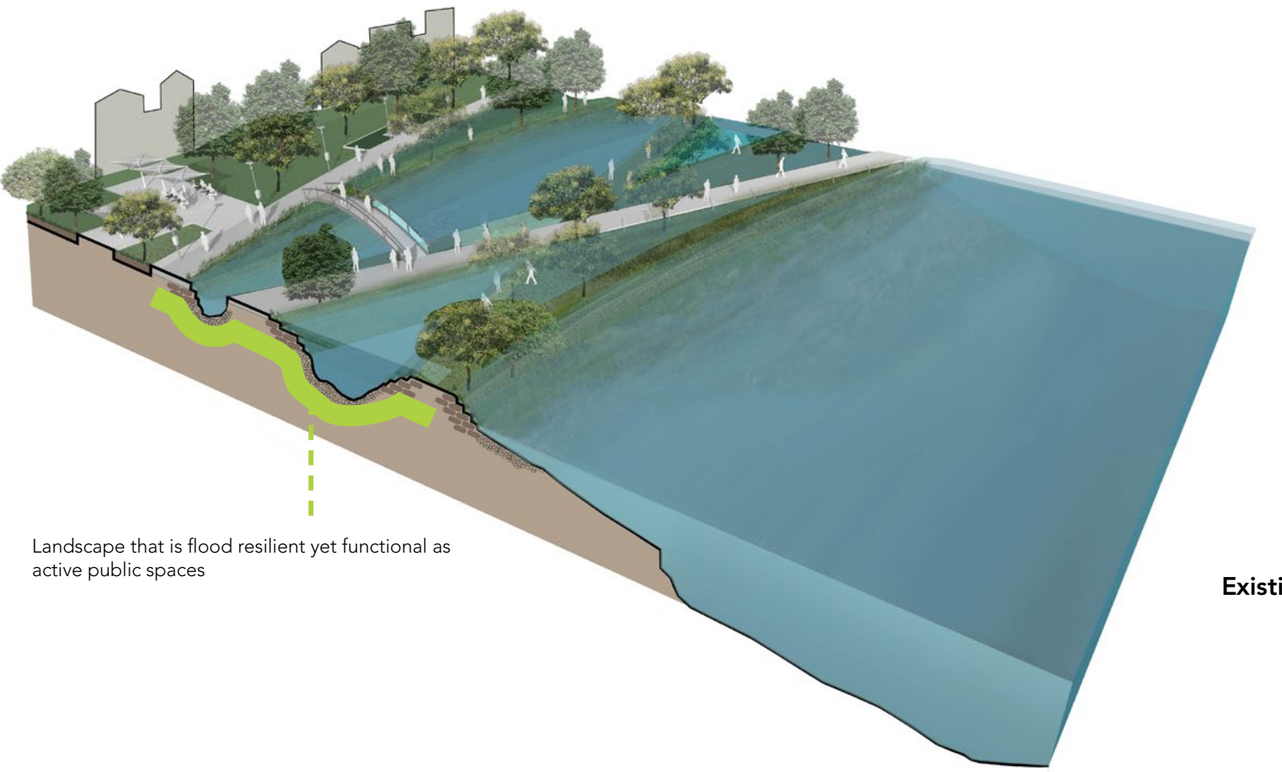
Create a flexible landscape that evolves with the river

Considering the diverse edge conditions present along the rivers banks, the master plan recommends a series of natural and built edge typologies to the diverse conditions.

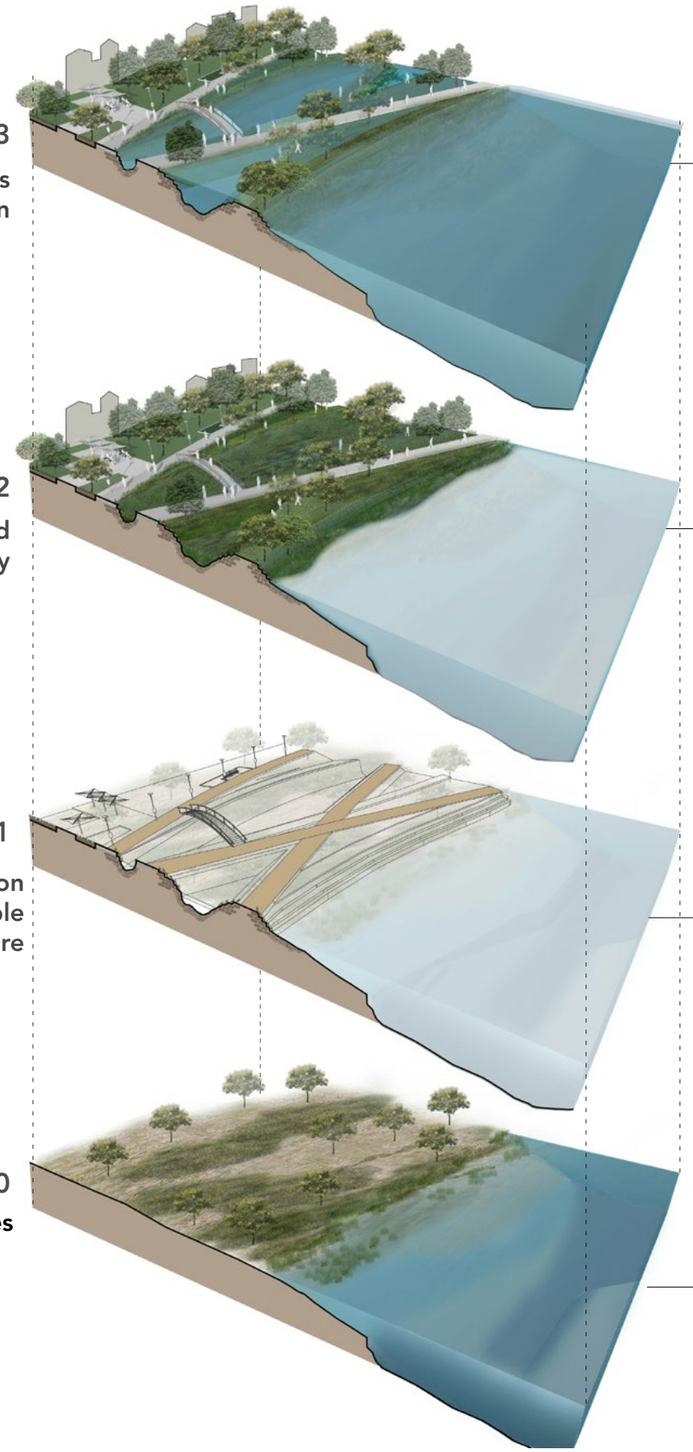
The edge protection strategy attempts to mimic nature by reconstructing a river bank with floodable, constructed wetland parks that will provide structural integrity to the edges while creating a rich habitat for flora and fauna. A network of depressions and earthen berms is designed to collect and store water during storm events, minimizing the impact of flooding on the islands. A detailed native planting palette has been developed that will enhance the bio-diversity and will be capable of withstanding strong winds typical during the monsoon storm events.

Along stretches more prone to erosion, harder edge strategies like rip-rap and gabion terraced walls are proposed. These walls can accomodate a series of social programs that will provide an engaging and vibrant public space.

The reinvigorated waterfront experience will provide the city with ecologically strengthened, healthy and vibrant open spaces along the river, improving the overall quality of life for the people of Vijayawada and Amaravati.



Landscape that is flood resilient yet functional as active public spaces



3

Floodable landscapes with resilient vegetation

Heavy rain

Light rain

No rain

2

Program elements and enriching ecology

Bird watching, canopy walks and wetland parks

Activity kiosks

Yoga pavilions

Planting different species of trees on the banks to enhance biodiversity

Introducing riparian vegetation along the edges

1

Edge protection and sustainable infrastructure

Edge Details - Creating river bank with jute bags filled with compacted earth

Edge Details - Using stakes to improve structural stability

Treating surface storm water run-off and sewage

Boardwalks and pathways
Street furniture

0

Existing island edges

Minimal edge vegetation
Water hyacinth

High degree of erosion

Limited vegetation diversity
Lack of ground cover

Bhavani Island

2,742,566 km²

total area of Island 1

56%
Natural forest area

32%
Programmed open space

12%
maximum allowable development

Resort
MICE
Marina
Jetty Connection
Wetland Park
Jetty Connection
Dense Forest
Solar Park
Krishna District
ur District
Forest Area Camping And log Cabins
Jetty Connection
Promenade
Jetty Connection
Jetty Connection
Vijayawada Waterfront Park
Forest Park
Train Station
Vijayawada
Retail and F&B Hub
Train Station
Sea Lion show & Birds Arena
F&B Zone Outdoor Food court
Marina
Robotics Park
Punnami Ghat
Light & Sound Show
Train Station
Resort
Camping and Loghouses
Train Station
BITC Resort
Marina Node
Amaravati Waterfront park
Botanical Garden
Jetty Connection
Promenade
Public Park
Cultural hub
Train Station
Agro Tourism Center
Jetty Connection
Tree house resort
Jetty Connection
Wetland And Boardwalk Park / Migratory Birds Conservatory Park
Entertainment/ Game Zone
Wave Pool & Water Park
ew Amravati

Dense Natural Forests

130 Acres

The islands will provide much needed green spaces, parks, and dense forest zones for the residents of the urban areas surrounding these islands. Large forest areas will provide the a natural oasis from the noise and chaotic life of the cities. These forests will also be a home for migratory and local birds and amphibians.

Since the islands are free of vehicles, various transit systems (like toy train, cycles, golf carts) will allow for mobility within the island.

The observation deck provides panoramic views of the islands, cities, and the forest canopy

Elevated forest walkway will spiral up and around forest trees, bringing the visitors above the ground to provide a bird's eye view of the river, islands, creeks, wetlands, and the cities of Amaravati and Vijayawada

Multi-use pathways connect the islands' many attractions and can be used by cyclists and pedestrians

New habitat for migratory birds locking in Krishna river basin

Wetland Park

The island edges have unique wetland vegetation that plays a critical role in protecting the island from flooding and also serves as a habitat for many birds and animals. The wetlands shall be protected and developed as a park to not only enhance the ecology of the island but to also serve as a great public space, world-class conservation, and an education and tourism facility.

Reconstructed natural ponds on the islands to have suitability as potential breeding sites for amphibians

Boardwalks form a trail through the wetlands allowing one to view and enjoy the rich biodiversity of the area

Stepped seating along the water edge that creates an intimate connection with the water

Native wetland vegetation which serves as a habitat for birds and enhances the ecology of the island

Our Technology Wishlist...

Codes for RIver Edges - Preventing rivers from becoming canals

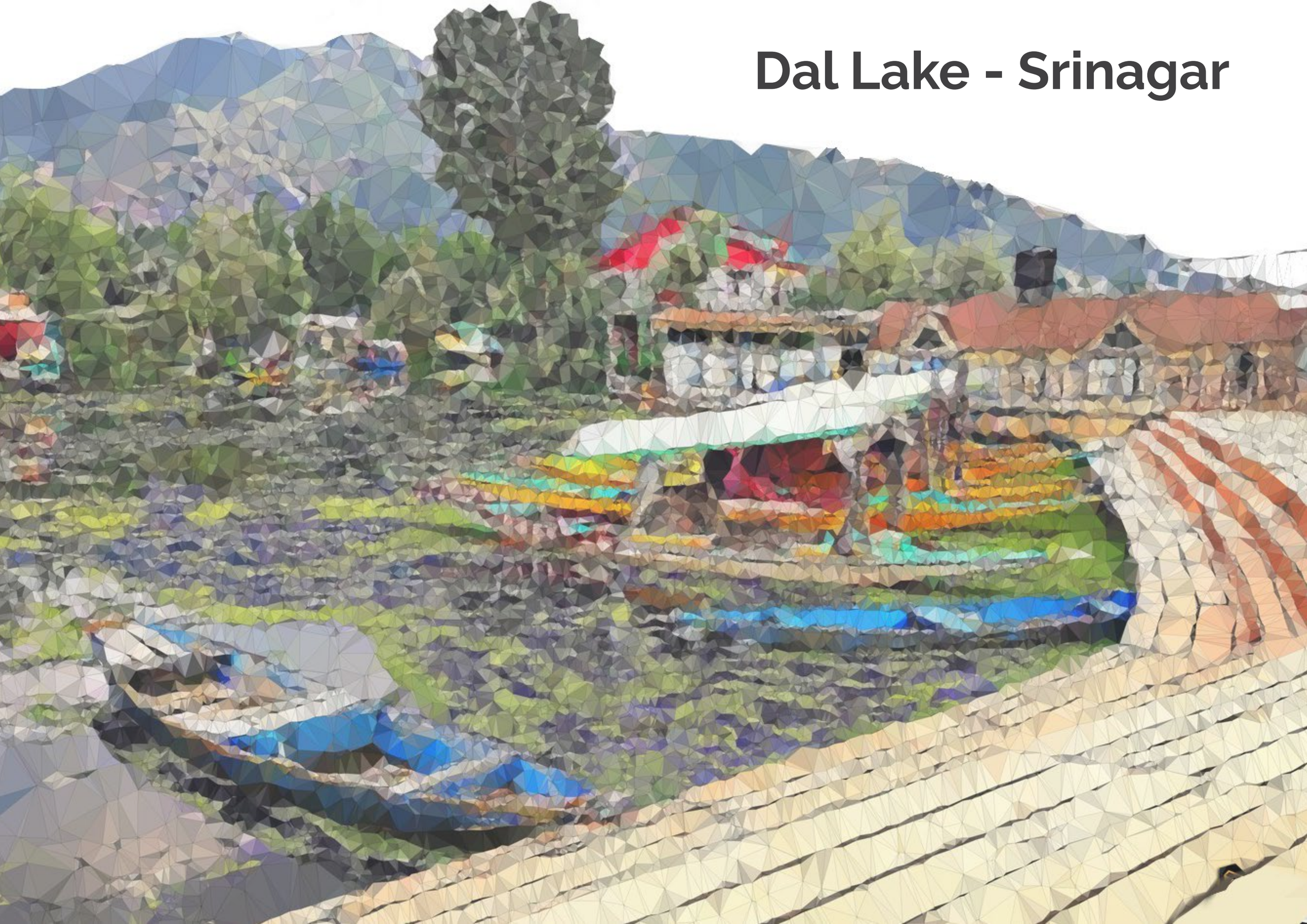
Biodiversity Mapping

Estuary Plan (National,Regional)

Bathymetric Data

Creating a Balance

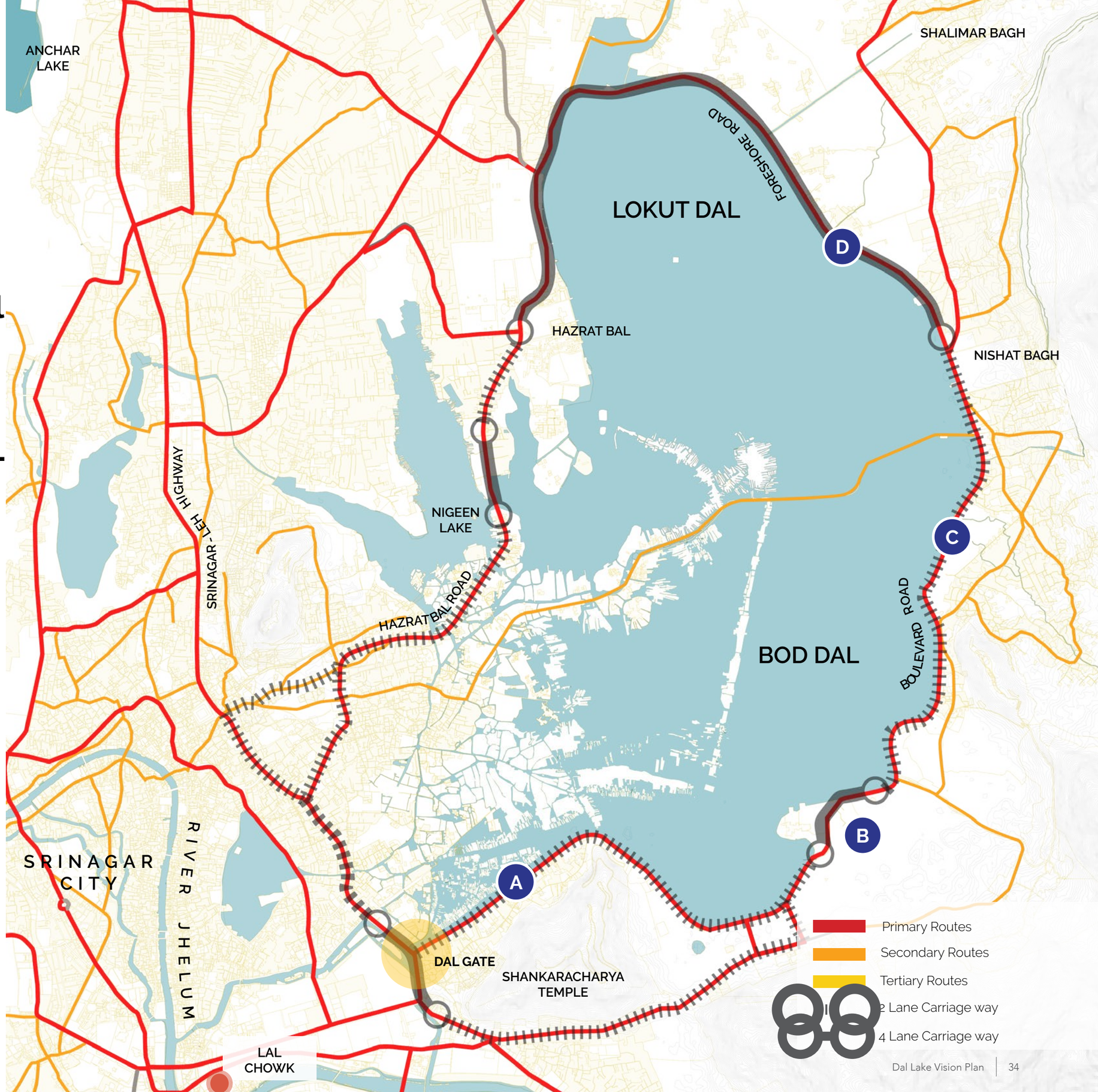
Dal Lake - Srinagar



Transport Network

The Boulevard road connects the residential areas to the north-east of the Dal Lake with the city centre in the south - west

Major tourist attractions located along the lake edge



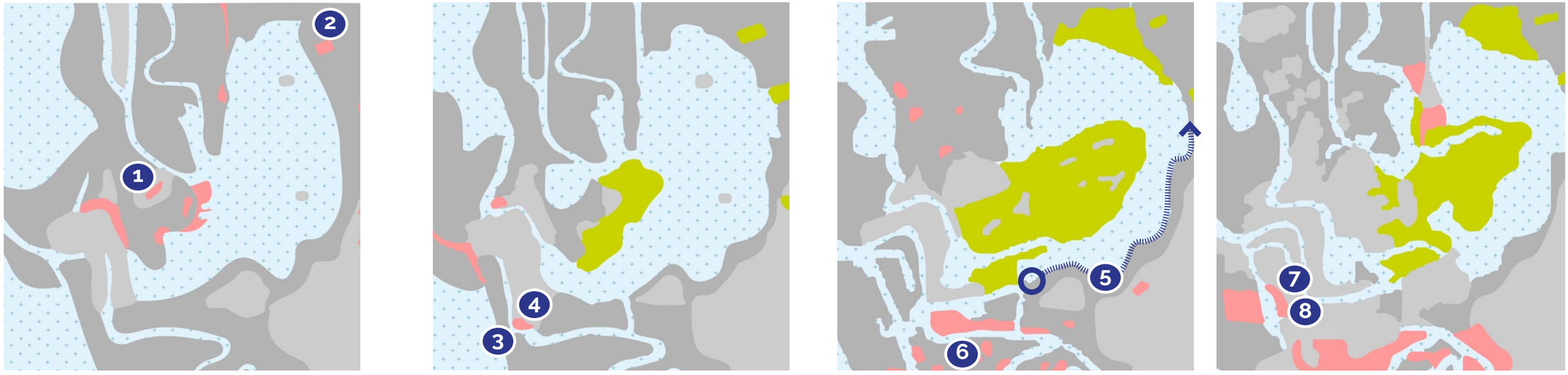
Transport Scenario

Vehicular traffic increasing every year

Building wider roads is not an option

It is a must to increase the public transport share and reduce dependence on private vehicles

The extents of Dal Lake have changed significantly due to changes in the patterns of streams and rivers that meet the lake and human activities along the lake edges.



Source : Draft Masteplan for SDA

16th - 17th century

Mosques , Mughal gardens , fort ramparts, repaired bridges across Jhelum, Nallah Mar, Zaina Kadal, Sona and Rupa Lank

18th century

Sherghari Fort ,Amira Kadal bridge , Gurudwara, Sonti Khul, Sri Pratap college, piped water to the city of Srinagar

Early 20th century

Silk factory, Barbershah bridge, Boulevard, Convent

1940's onwards

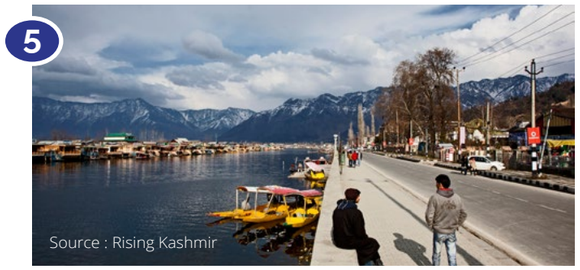
Housing colonies, Kashmir university, Nehru Park, Tourist reception centre, New secretariat, hospital, medical college, stadium

Ramparts of the Hari Parbat fort

Shalimar Mughal garden

Amira Kadal

Sri Pratap College

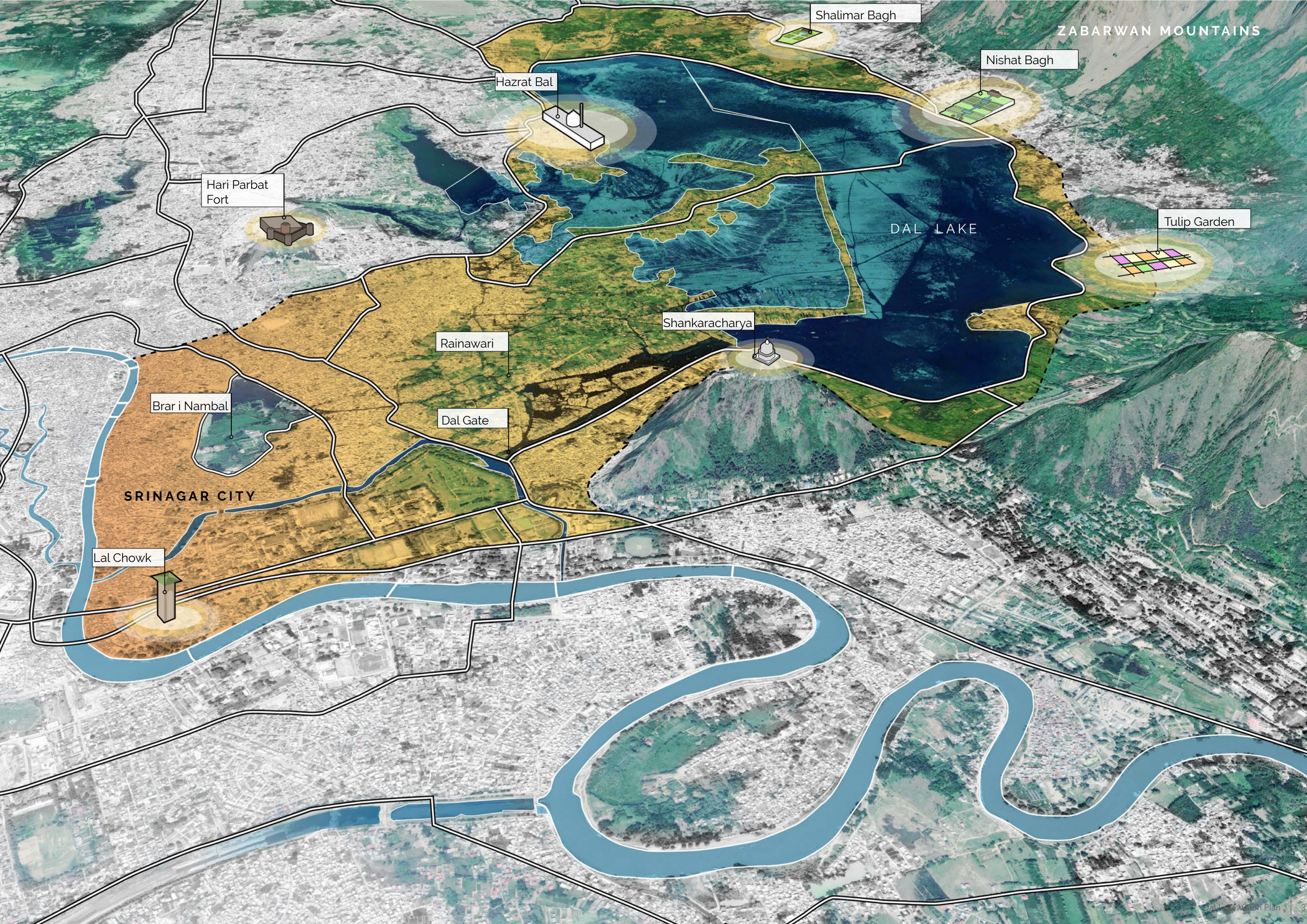


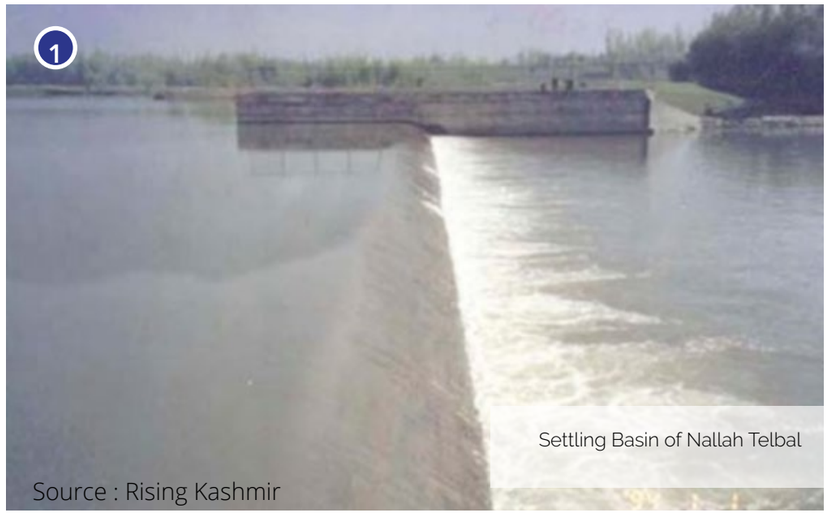
Boulevard Road

Srinagar silk Factory

Srinagar Secretariat

Indoor Stadium


Shalimar Bagh
ZABARWAN MOUNTAINS
Nishat Bagh
Hazrat Bal
Hari Parbat Fort
DAL LAKE
Tulip Garden
Shankaracharya
Rainawari
Brar i Nambal
Dal Gate
SRINAGAR CITY
Lal Chowk

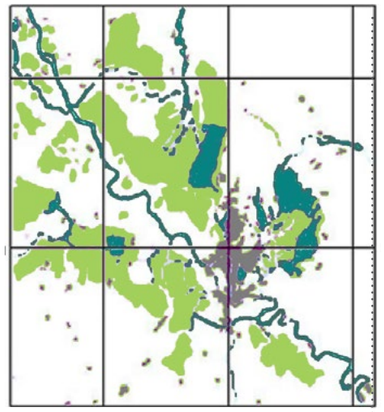

1
Settling Basin of Nallah Telbal
Source : Rising Kashmir


2
Nallah Amir Khan
Source : GreaterKashmir.com


3
Hokarsar Wetlands
Source : Kashmirreader.com


BOUTKAL
TELBAL NAL-
LAH
1
PESHPAW
FORESHORE ROAD
WETLANDS
MEERAKSHAW
MAJOR
INLETS
CHAR CHI-
NAR
MAJOR
INLETS
LOKUT DAL
ZABARWAN
MOUNTAINS
2
NALLAH
AMIR KHAN
NIGEEN
LAKE
BOULEVARD ROAD
FLOATING
GARDENS
BOD DAL
NALLAH MAR
RIVER JHELUM
SRINAGAR
CITY
BRARI NAM-
BAL
SHANKARACHARYA
HILL
MAJOR
OUTLETS
LAL
CHOWK

Early 1900's



Class	Area (ha)
Open water surface	4,000.50
Wetland	13,425.90
Built-up land	1,745.73
Others	50,505.90

1900's : Dal as a means of livelihood ; spearfishing in the Dal lake

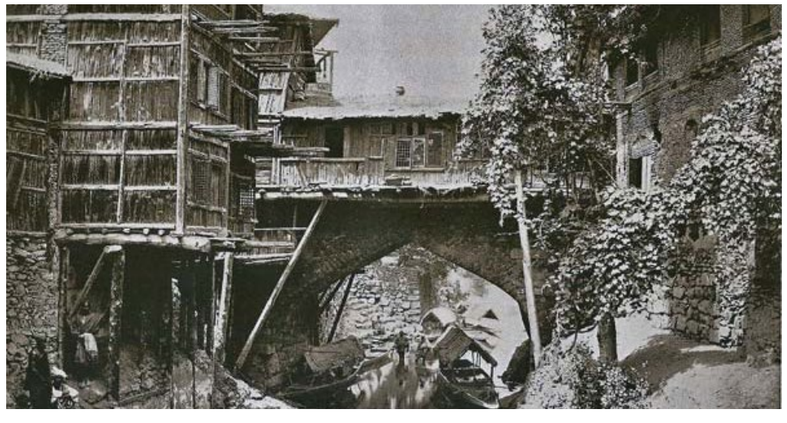
1900's : Dal as a means of transit ; seen here transporting kids to school

1920 : Dal as a means of transporting and selling items of everyday need

DAL AS A PART OF EVERYDAY LIFE

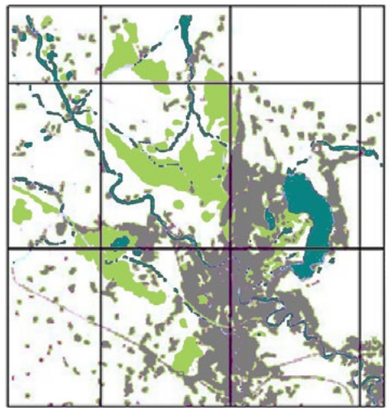
Houseboats were initially used as residences by the Hanjis

Canals connected the urban fabric to the Dal Lake and was used by residents to reach places



These canals were flanked by bridges for people to cross over waterways

Early 2000's



Class	Area (ha)
Open water surface	4,000.50
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Built-up land	1,745.73
Others	50,505.90

Early 2000's

Dal continues to be a means of transporting and selling items of everyday need

However, it is used today primarily for joyrides by tourists

Fish production in Dal has shown sharp decline over the past few decades due to encroachment of water bodies, siltation and pollution.

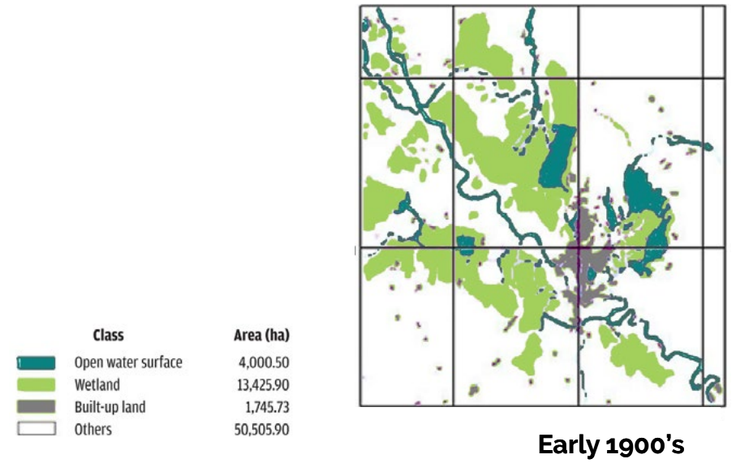
DAL AS A PART OF EVERYDAY LIFE

Encroachments , unchecked construction as well heavy dependence on motorised transit has diminished use of waterways

Direct discharge of effluents from homes into these canals make them less desirable for use

The role of water in Srinagar has changed drastically.From being a part of people's everyday life , a means of transport as well as a means of livelihood to the backyard of the city,Srinagar's waterbodies have faced a lot of abuse.

It is this weakened relation with water that needs to be rejuvenated in order to bring back the lost glory of Srinagar's famed lake , canals and the Jhelum which together gave it the title of "Venice of the East".

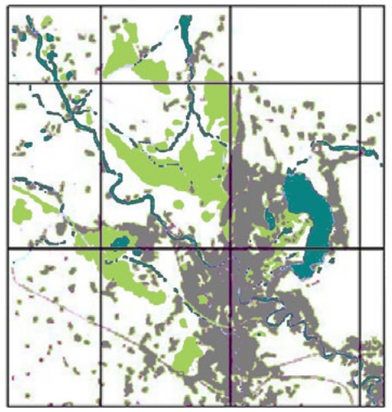


Early 1900's

Shikaras were used extensively to arrive at destinations like Hazrat Bal during festivities

The unobstructed ghats near Hazrat Bal shrine acted as an extended public realm

Early 2000's

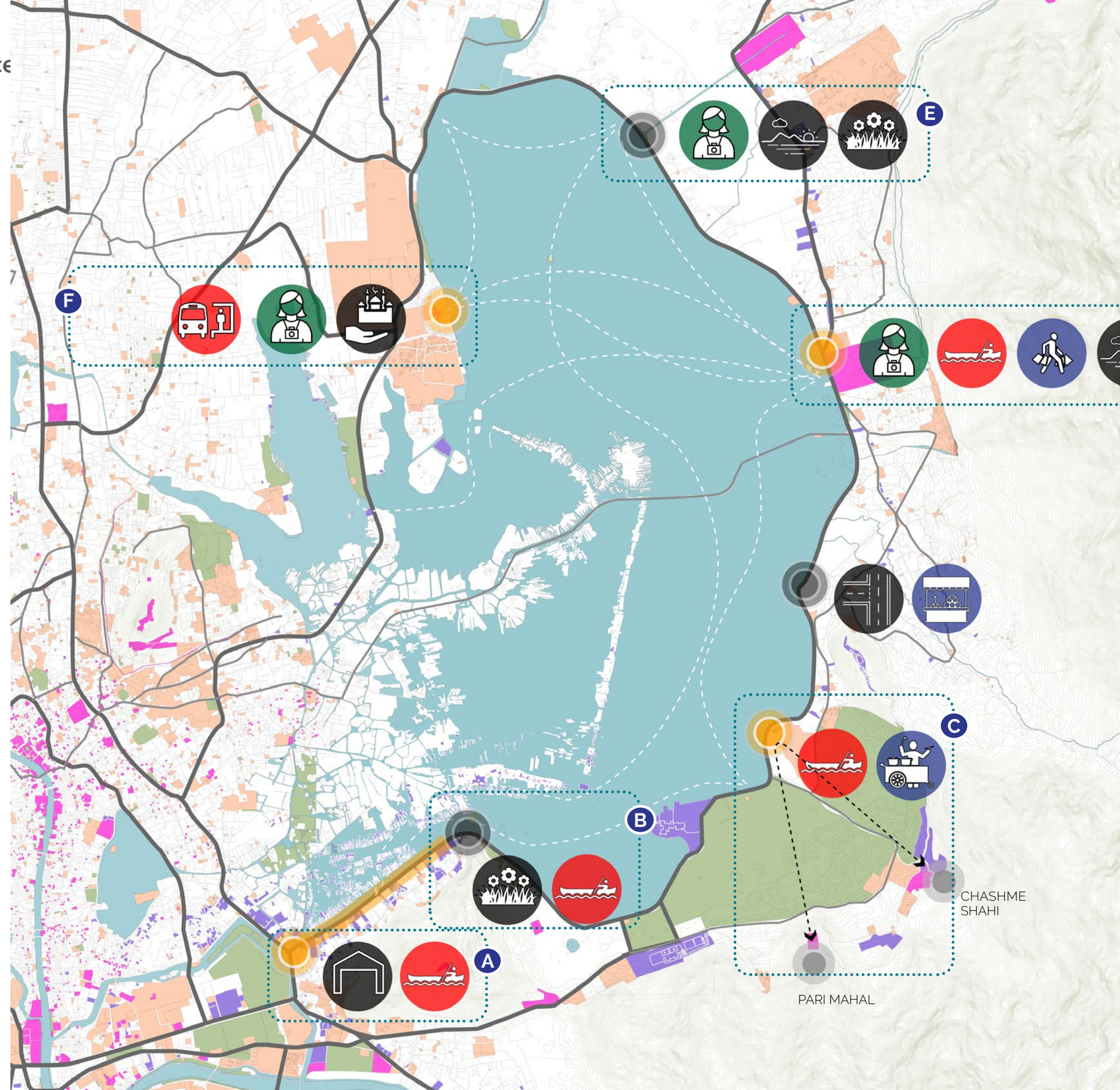


Many ghats are baricaded from the surroundings and in severe disrepair

People donot use the lake extensively to arrive at destinations such as the Hazrat Bal

Enhancing places of importance developing nodes

- **A** DAL GATE
- **B** NEHRU PARK
- **C** MAKAI PARK
- **D** NISHAT BAGH
- **E** SHALIMAR BAGH
- **F** HAZRAT BAL



- A DAL GATE
- B NEHRU PARK
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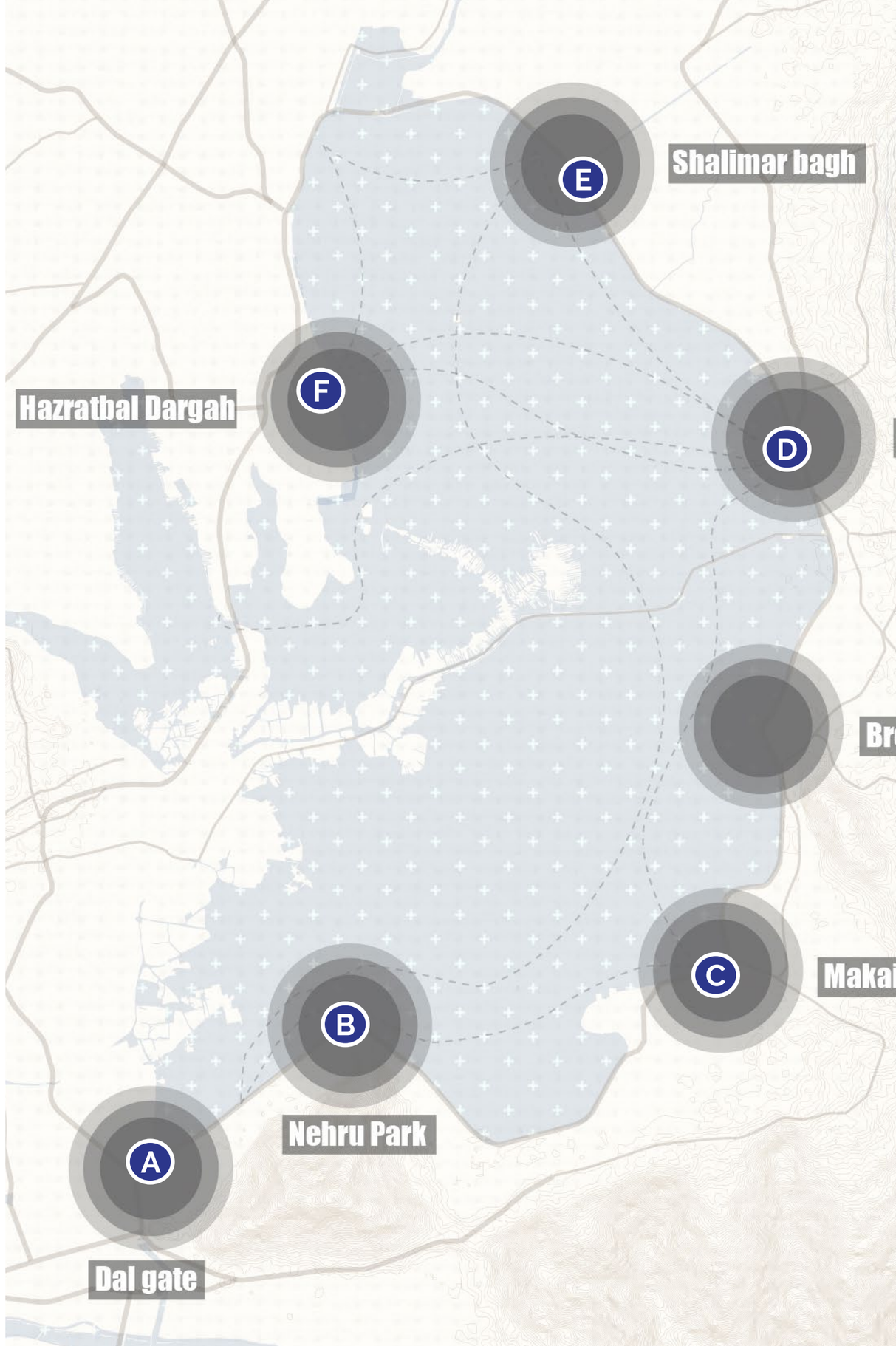
- E SHALIMAR BAGH
- F HAZRAT BAL



- A DAL GATE
- B NEHRU PARK
- C MAKAI PARK
- D NISHAT BAGH
- E SHALIMAR BAGH
- F HAZRAT BAL

Nishat Baug Node

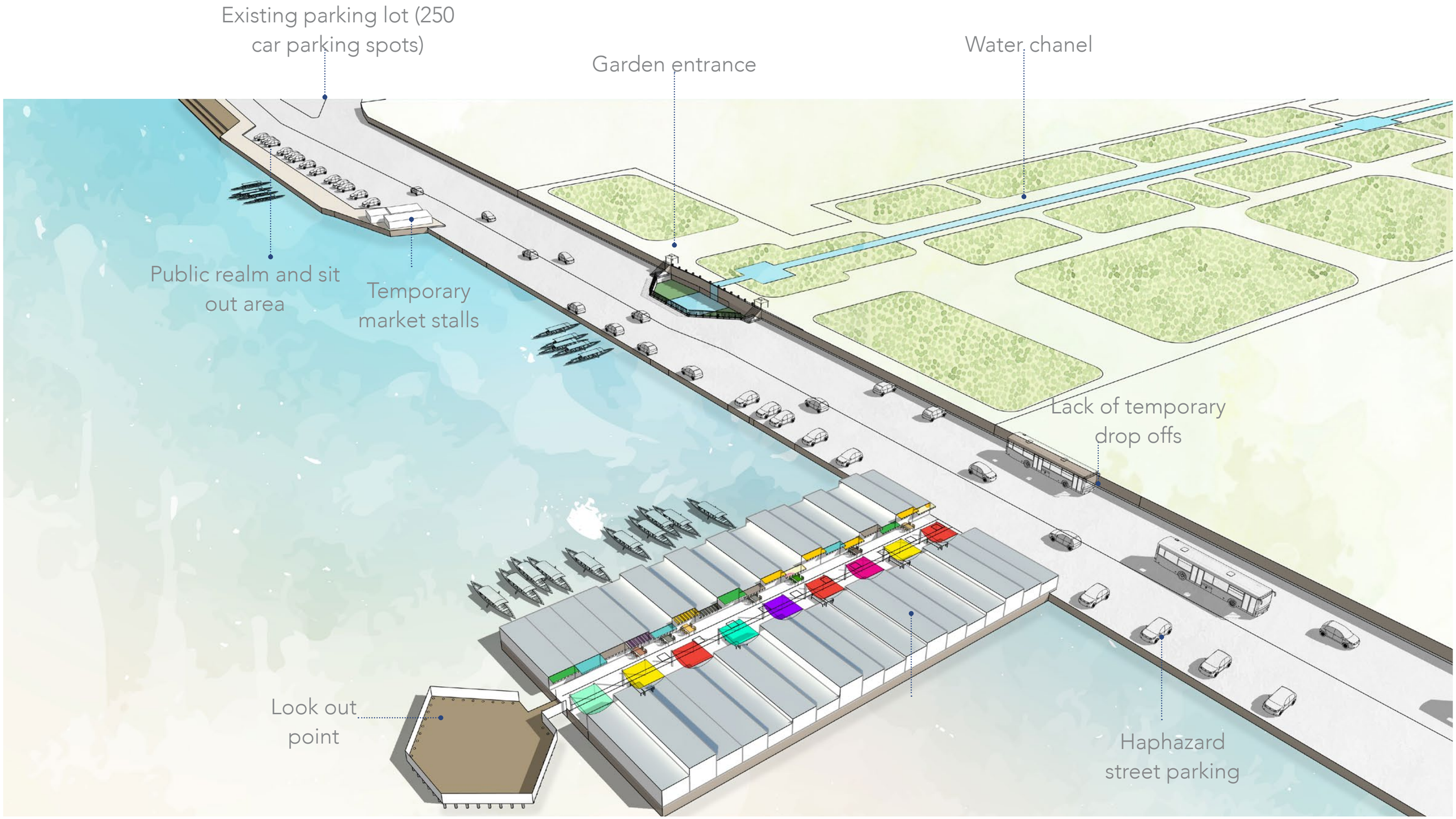
Moutain ranges as the backdrop for the gardens

The now destroyed baaradari

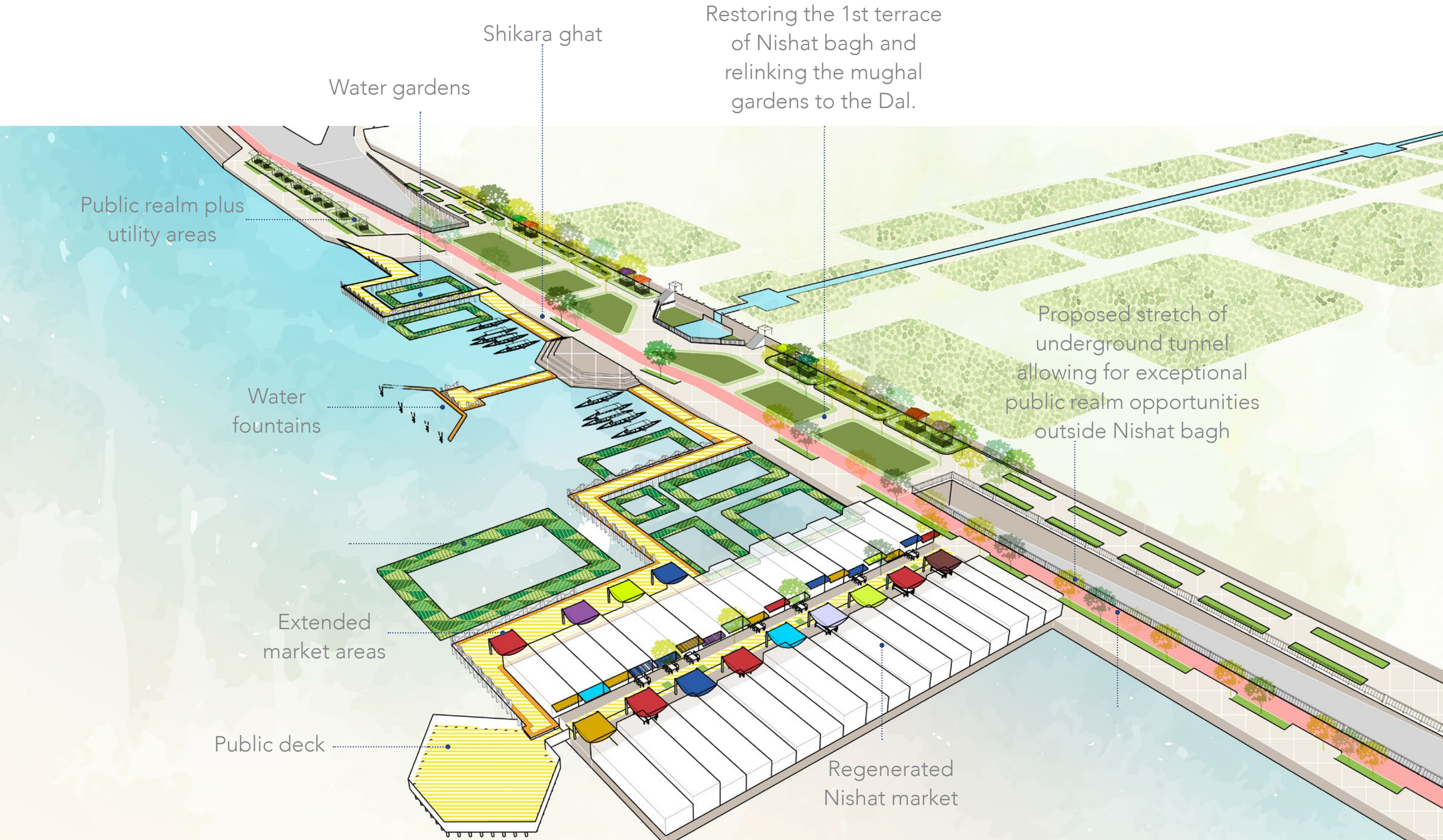
Existing street as the 1st ‘terrace’ of the gardens

Shikara ghat. Water transport as primary mode of access

Nishat bagh existing



Proposed Extension

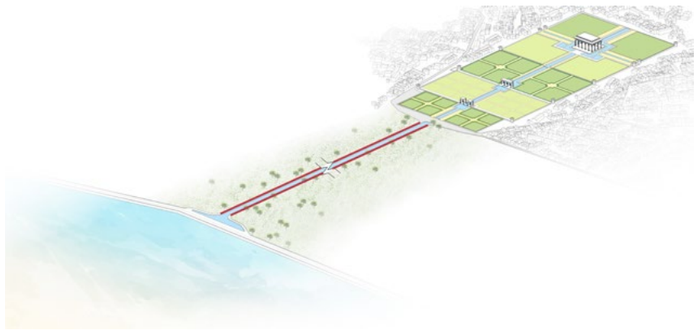


Nishat bagh

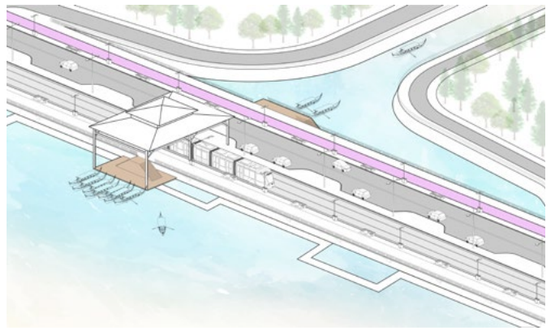
1. Hazratbal dargah
2. Ablution pool
3. Shikara ghat
4. Water gardens
5. Pedestrian pathway
6. Extended public realm
7. Hazratbal lower bus terminal
8. Proposed ferry terminal
9. Existing parking lot

Shalimar Baug

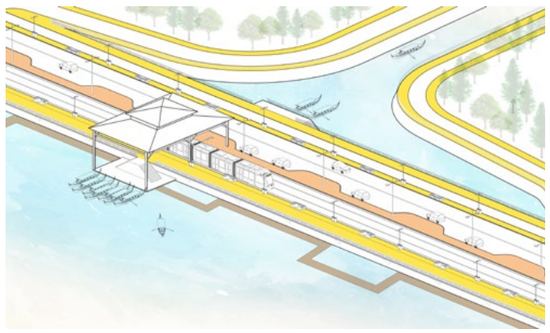
LINKING THE DESTINATION BACK TO DAL LAKE



The addition of shikara ghats along the water channel allow fo
access to Shalimar Bagh via water transport. This provides th
opportunity for extending the public realm on either side of th
channel along its entire length



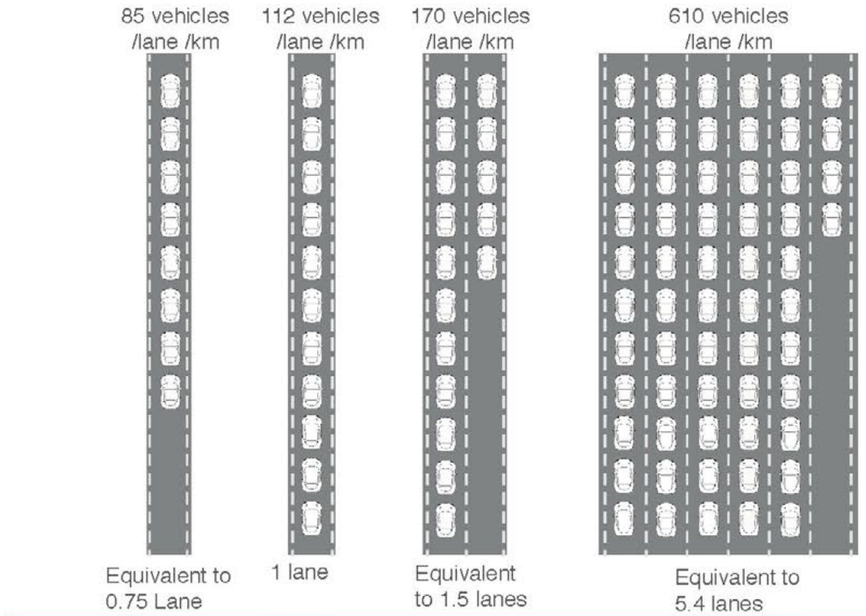
The cart is elevated to the promenade level by using a mechanised system of pulleys



The contents of the cart are emptied onto a pick up vehicle and removed from site

Vehicle Congestion

“The solution to mitigating traffic congestion is not planning for more cars, but but to increase reliability and preference of public transit systems and non motorized transportation modes.”



Trends in Traffic Congestion: Peak Vehicles per Lane[2]

Our Technology Wishlist...

Natural Heritage Conservation

Comprehensive Modal Split

People Mobility Patterns

Ecological Development Plan for Each city

Accepting the Realities of Each City

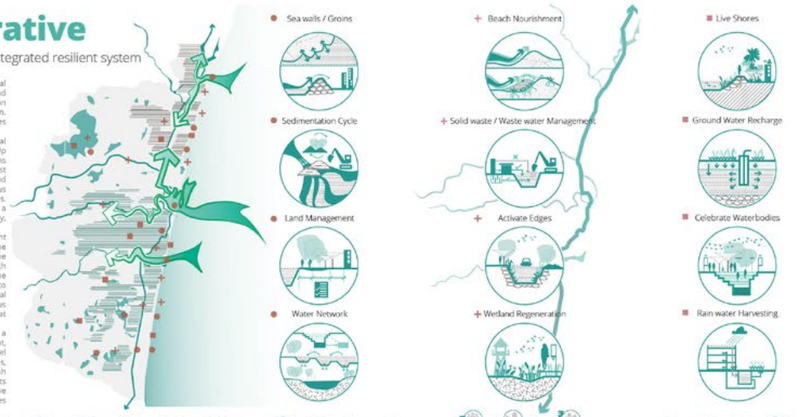
Planning for Resiliency

India has witnessed widespread droughts in four of the past five years, and the government forecasts that per head availability of water will fall by 35% next year from 2001 levels. (AP)

Chennai water crisis is forcing doctors to buy water for surgery

The Canal Collaborative

An Inclusive, Multifunctional approach to create an integrated resilient system



Introduction: Water has a dynamic relationship with Social, economic, political and environmental risks. This proposal understands these complexities and challenges to work towards a Sustainable and Integrated solution. Through an integrated and inclusive approach it strives towards a long term resilient solution. It perceives the canal as a unifying element to tackle with multiple risks and issues and creates a synergy between local and central systems.

Interdependency of centralised and decentralised approach: This proposal acknowledges the risks involved in a Top-Down approach or only a Bottom-Up Approach and proposes a collaborative approach wherein the local systems work in collaboration with centralized systems, resulting in resilient and robust solutions. These localized systems are contextual and sensitive to the ground realities. It builds on the community strength and engagement. Use of various 'hard' and soft interventions at various scales to create comprehensive solutions.

Opportunity Areas / Resources: The proposal projects the canal as a multifunctional infrastructure that positively impacts the ecology, local economy, and social equations along the length of the canal.

Through decentralized solutions for waste management and sewage treatment it addresses the issue of pollution. It engages the community as not just the user but also as a custodian. It focuses on improving the quality of life of the most vulnerable social groups such as children, women and senior citizens. With the help of smart infrastructure and data monitoring it attempts to prepare the communities for a potential natural disaster. Through placemaking, it tries to transform locally undesirable land into a valuable community asset. The social Infrastructure helps create connected communities that benefit from various activities and tasks. The proposal also works to create a Micro-economy that benefits the vulnerable community.

Human Network: To realise the over arching goal of building a resilient city, a non coercive and non hierarchical network of individuals, experts, government, non government and private organisations shall be formed to work on a local level along the canal. Based on the opportunity areas, beneficiaries, funding agencies, project specific teams shall be formed. A champion can lead and establish dialogue between these forces and strategically work together to identify projects and implement them. Thus primarily organised by the community, collaborative knowledge and work is brought in from different sectors which again encourages and builds communities together.

Implementation: These networks and partnerships work to build community trust, awareness of and engagement by the community and different bodies in the project. Interdependency of centralised and non centralised approach acts as an advantage to unlock resources within the network. Funding can be brought in from various sources like various government schemes, crowd funding, CSR's, beneficiary communities etc. Incentives to implement projects at micro level, social credit systems shall be introduced. Incentives such as grants in exchange of knowledge and time, increased FSI in exchange of public housing etc. can be looked upon.

Through these interdependencies, the canal acts as a pertinent platform to weave together these networks and build a resilient water infrastructure.

Sea walls / Groins
Sedimentation Cycle
Land Management
Water Network
Beach Nourishment
Solid waste / Waste water Management
Activate Edges
Wetland Regeneration
Live Shores
Ground Water Recharge
Celebrate Waterbodies
Rain water Harvesting

Government · Non-Govt Organisation · Community · Private Organisation · Individuals

TOP - BOTTOM

A Top-Bottom approach usually has the state enforcing a typical solution supported by planning by officials / professionals and public consultation at the end of project making. The risk being a long processing time and difficulty in implementation.

SYNERGY AT CANAL

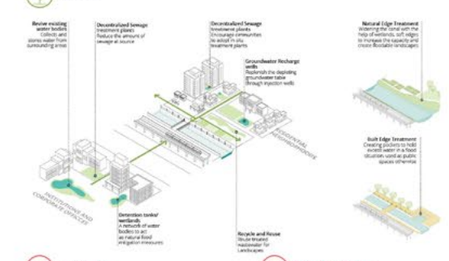
A**network**ofIndividuals,communities,Government,Non Government and Private organisations function together towards the **opportunity areas** and implementation at canal level and eventually building a resilient city.

BOTTOM - UP

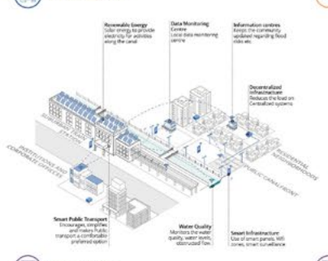
A Bottom-Up approach has the state playing a regulatory function and participation of public and stakeholders becomes the central focus. The risk being conflicting needs and high to low participation of all groups. The incentive is also lacking in such cases.

OPPORTUNITY AREAS

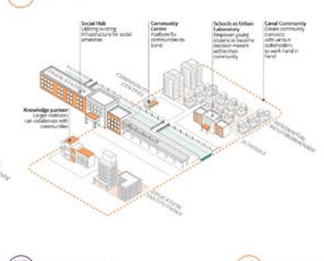
ECOLOGY



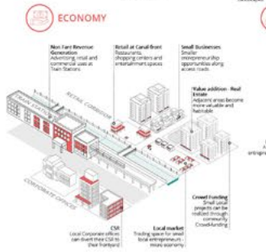
INFRASTRUCTURE



COMMUNITY

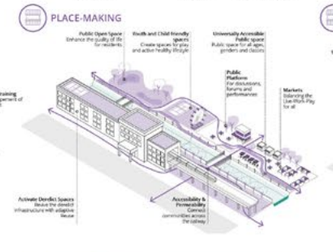


ECONOMY

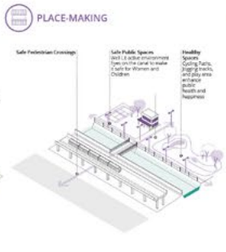


MICRO-ECONOMY

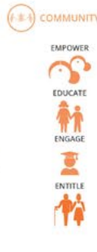
PLACE-MAKING

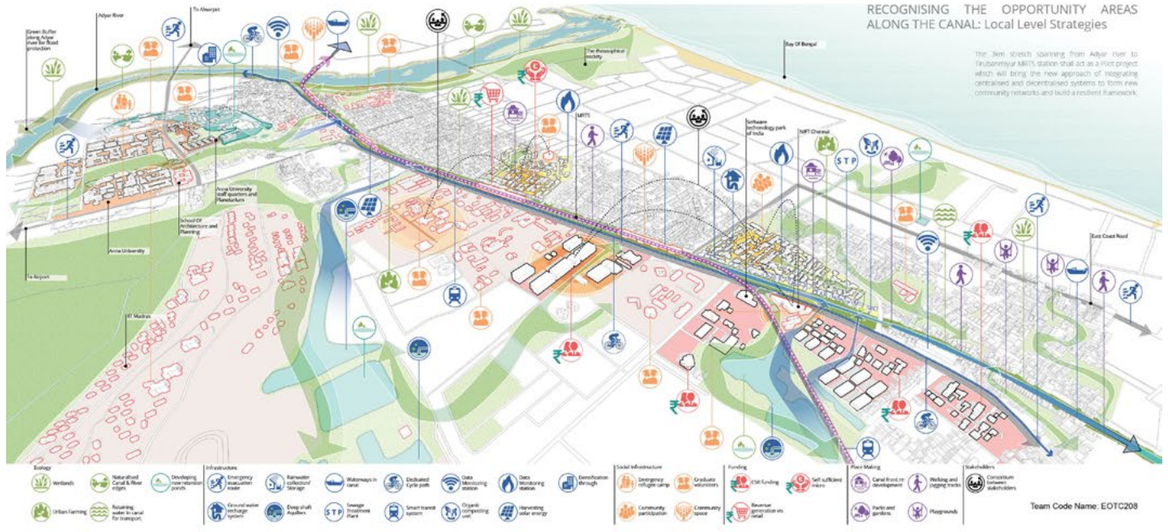


PLACE-MAKING



COMMUNITY



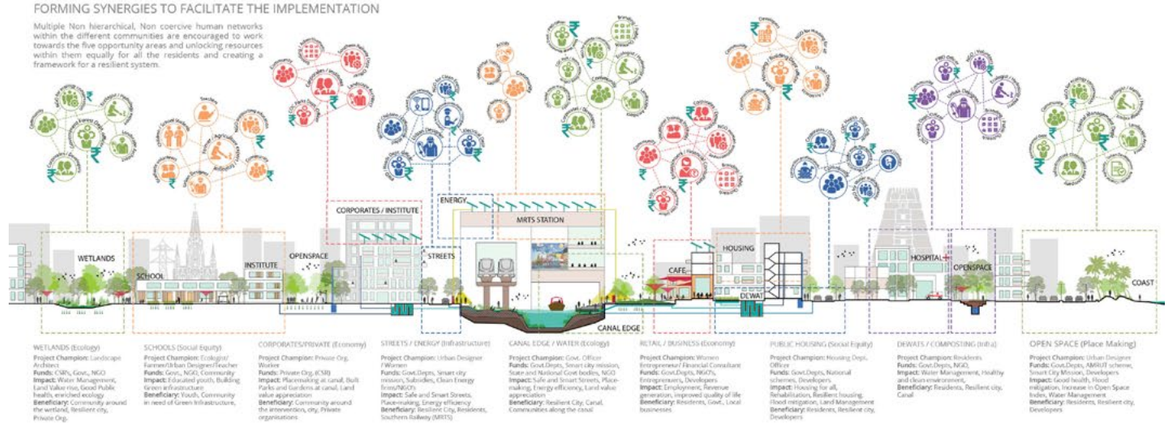


Team Code Name: EOTC208

The Canal Collaborative

FORMING SYNERGIES TO FACILITATE THE IMPLEMENTATION

Multiple Non hierarchical, Non coercive human networks within the different communities are encouraged to work towards the five opportunity areas and unlocking resources within them equally for all the residents and creating a framework for a resilient system.



WETLANDS (Ecology)
Project Champion: Landscape Architect
Funds: CSR's, Govt., NGO
Impact: Water Management, Land Value rise, Good Public health, enriched ecology
Beneficiary: Community around the wetland, Resilient city, Private Org.

SCHOOLS (Social Equity)
Project Champion: Ecologist/ Farmer/Urban Designer/Teacher
Funds: Govt., NGO, Community
Impact: Educated youth, Building Green Infrastructure
Beneficiary: Youth, Community in need of Green Infrastructure,

CORPORATES/PRIVATE (Economy)
Project Champion: Private Org, Worker
Funds: Private Org, (CSR)
Impact: Placemaking at canal, Built Parks and Gardens at canal, Land value appreciation
Beneficiary: Community around the intervention, city, Private organisations

STREETS / ENERGY (Infrastructure)
Project Champion: Urban Designer / Women
Funds: Govt.Depts, Smart city mission, Subsidies, Clean Energy firms/NGO's,
Impact: Safe and Smart Streets, Place-making, Energy efficiency
Beneficiary: Resilient City, Residents, Southern Railway (MRTS)

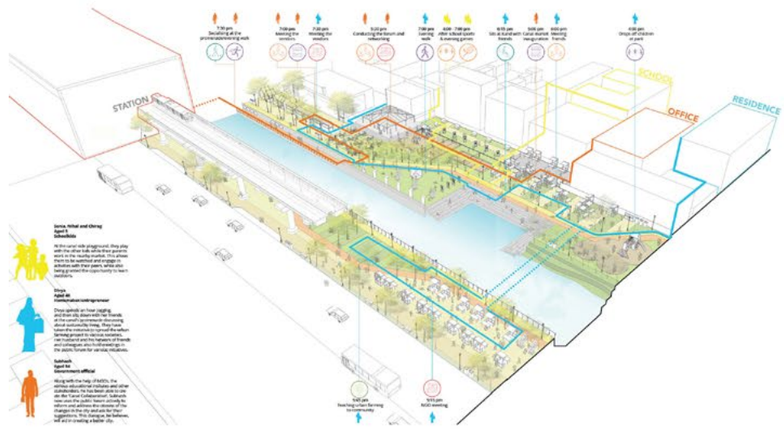
CANAL EDGE / WATER (Ecology)
Project Champion: Govt. Officer
Funds: Govt.Depts, Smart city mission, State and National Govt bodies, NGO
Impact: Safe and Smart Streets, Place-making, Energy efficiency, Land value appreciation
Beneficiary: Resilient City, Canal, Communities along the canal

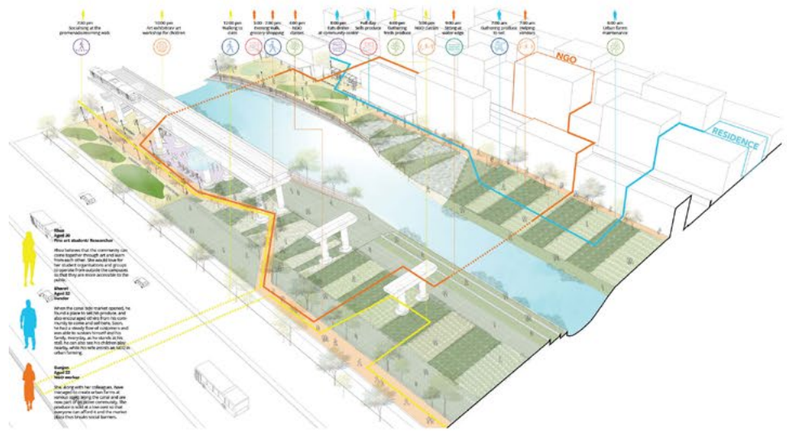
RETAIL / BUSINESS (Economy)
Project Champion: Women Entrepreneur/ Financial Consultant
Funds: Govt.Depts, NGO's, Entrepreneurs, Developers
Impact: Employment, Revenue generation, improved quality of life
Beneficiary: Residents, Govt., Local businesses

PUBLIC HOUSING (Social Equity)
Project Champion: Housing Dept. Officer
Funds: Govt.Depts, National schemes, Developers
Impact: Housing for all, Rehabilitation, Resilient housing, Flood mitigation, Land Management
Beneficiary: Residents, Resilient city, Developers

DEWATS / COMPOSTING (Infra)
Project Champion: Residents
Funds: Govt.Depts, NGO,
Impact: Water Management, Healthy and clean environment,
Beneficiary: Residents, Resilient city, Canal

OPEN SPACE (Place Making)
Project Champion: Urban Designer
Funds: Govt.Depts, AMRUT scheme, Smart City Mission, Developers
Impact: Good health, Flood mitigation, Increase in Open Space Index, Water Management
Beneficiary: Residents, Resilient city, Developers



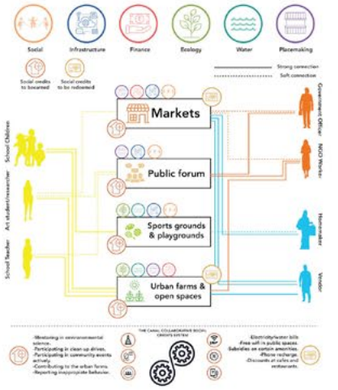


CANAL TRANSECTS

The teams/networks work towards the design and implementation of various projects within the community. The framework thus created helps and encourages people (stakeholders, community, beneficiaries, private and public bodies) from all walks of life to interact, engage and mutually benefit each other; all along the canal interface.

INCENTIVE MECHANISM

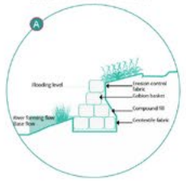
Social Credit Systems provide incentives for individuals and communities to work towards achieving a larger goal by taking small tasks/measures in their own capacity. The credits can be earned and redeemed within the community hence building a resilient eco-system.



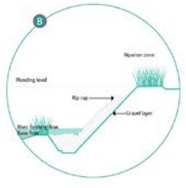
BRANDING / WAY-FINDING SIGNAGE

It is essential to have a branding / way-finding strategy to allow widespread public outreach, participation and engagement with the canal. As more and more individuals have access to personal devices, the branding strategy needs to be adaptable for these platforms.
The App shall function as a single platform to share and create awareness about the various activities and initiatives taking place along the canal.

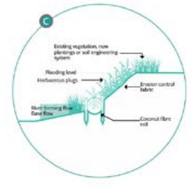
VEGETATED GABION MATTRESS



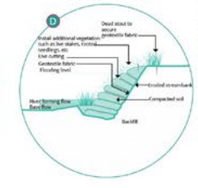
RIP RAP



COCONUT FIBRE ROLL



VEGETATED GEOGRIDS



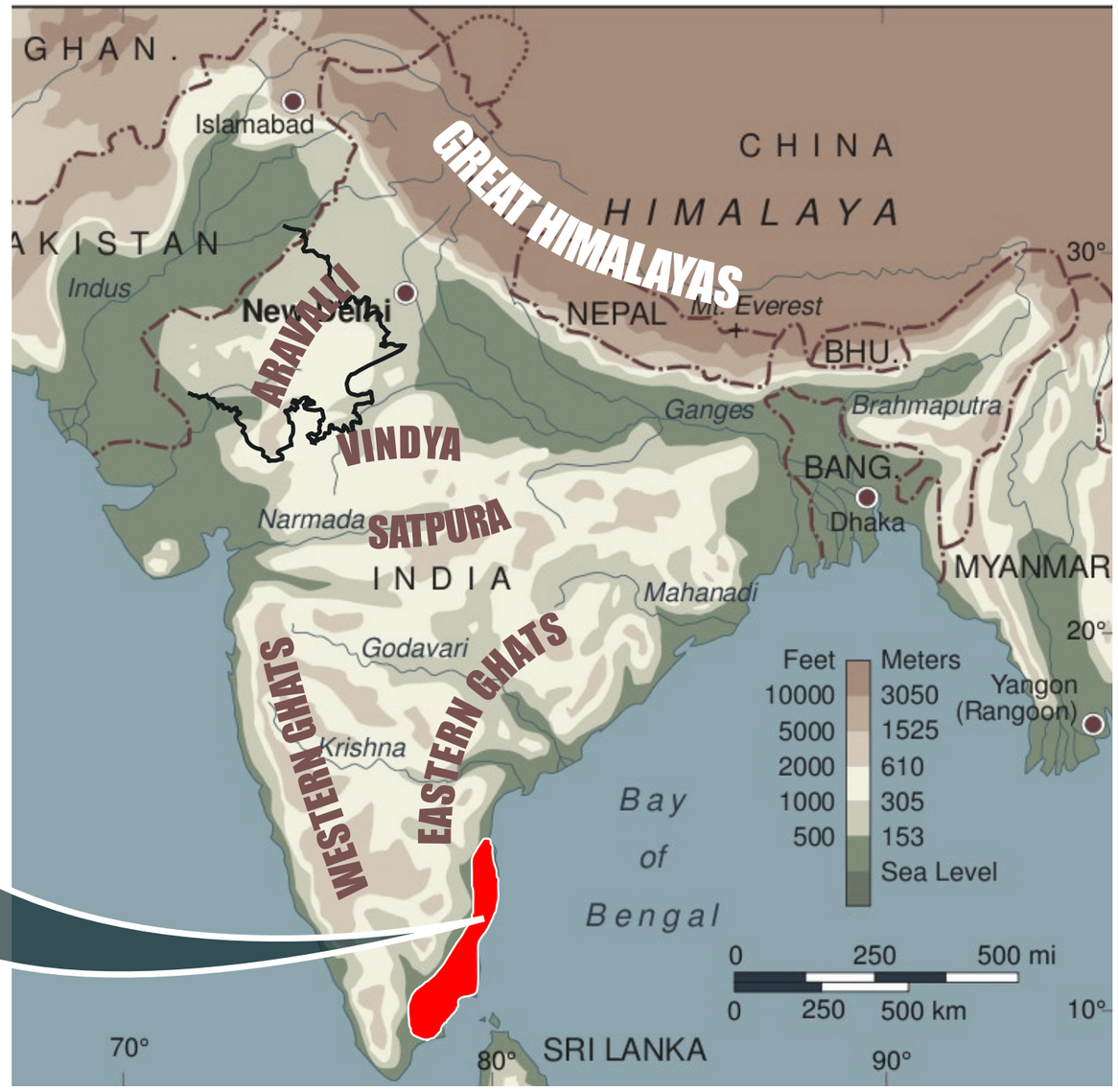
EDGE CONDITIONS

The networks, resources and synergies come together to manifest at a physical interface along the canal. At a micro scale, the treatment of the canal edge is critical for this as it affects the behavior of water and can also play an important role in flood mitigation and build a resilient system. These edges are not only environmentally sensitive areas, but also for people to interact, enjoy and explore the water body. It is thus essential that these edges are preserved and protected.

The edge treatment is broadly classified into two categories namely Built(Hard) and Natural (Soft). Numerous strategies can be employed within the two based on the condition, context and desired use of the edge. Among many, Four strategies are used here to display the possible edge conditions.
Built edge: Vegetated Gabion Mattress, Riprap
Natural Edge: Coconut Fibre roll, Vegetated Geogrids

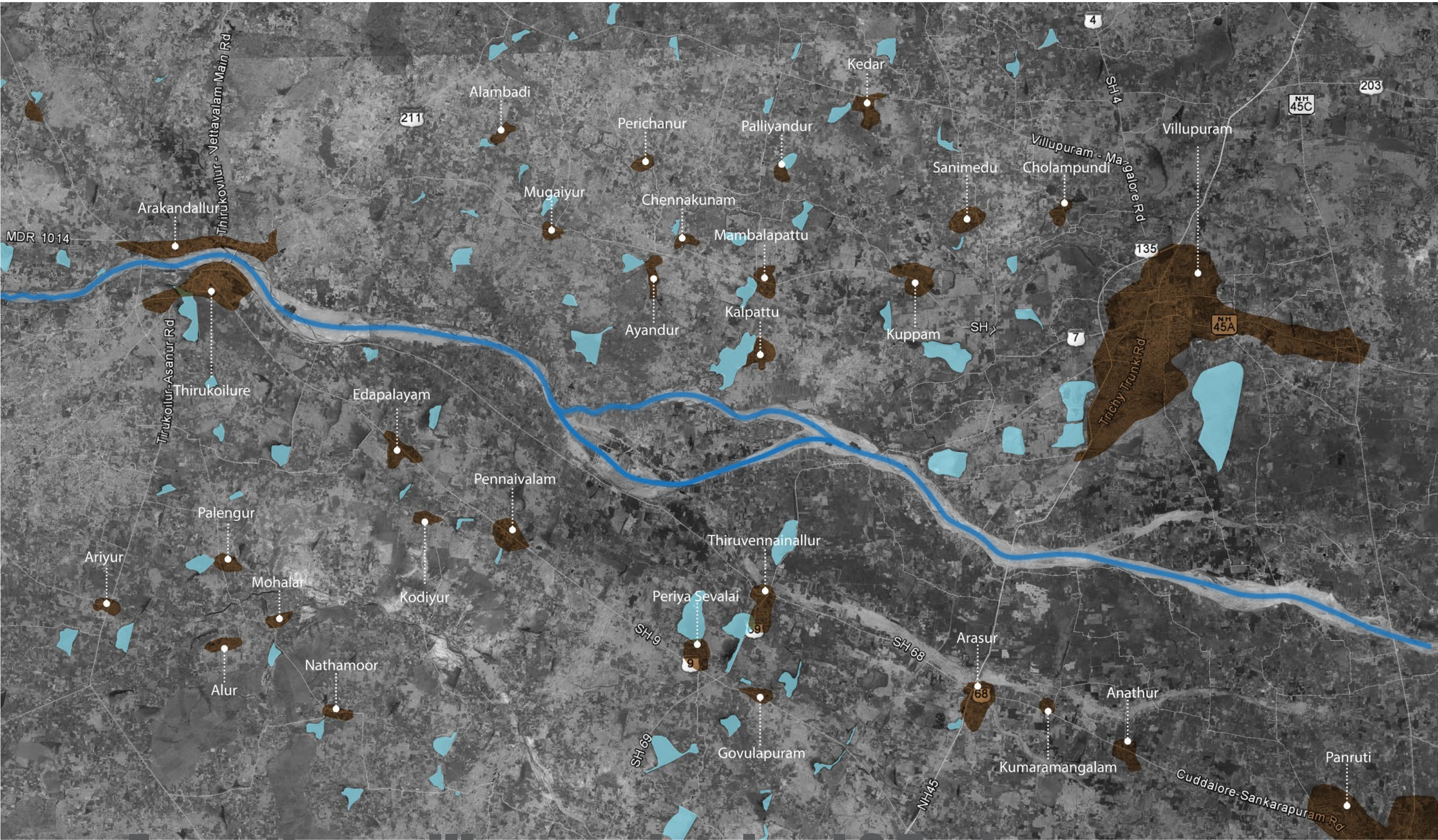
Team Code Name: EOTC208

The Story of Cascading Tanks



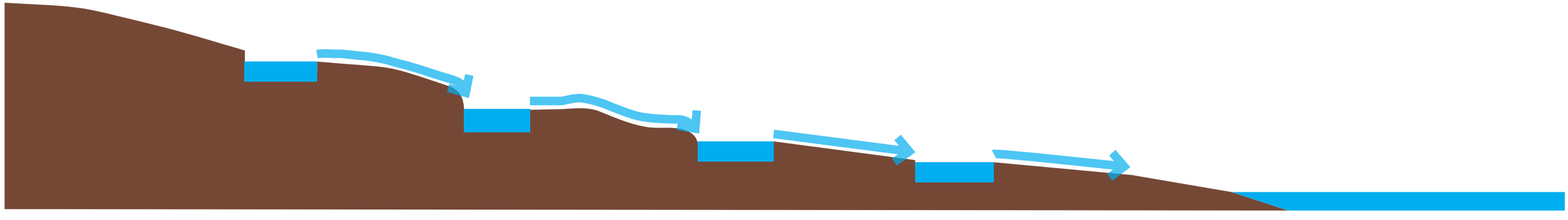
~2.5 to 3 lakh Tanks

The Story of Cascading Tanks - First Tank 2 BC

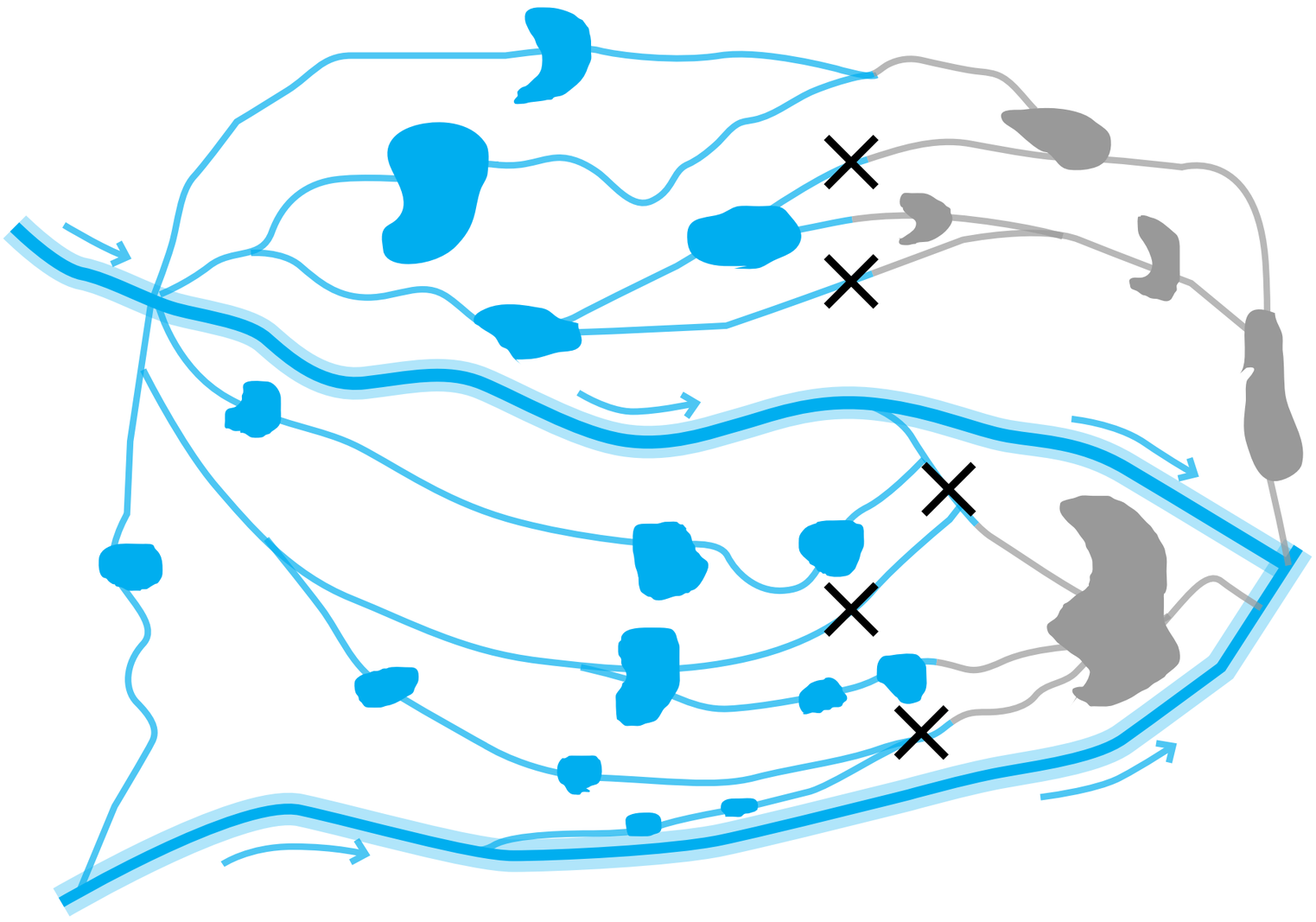


Every three village maintained 2 Tanks

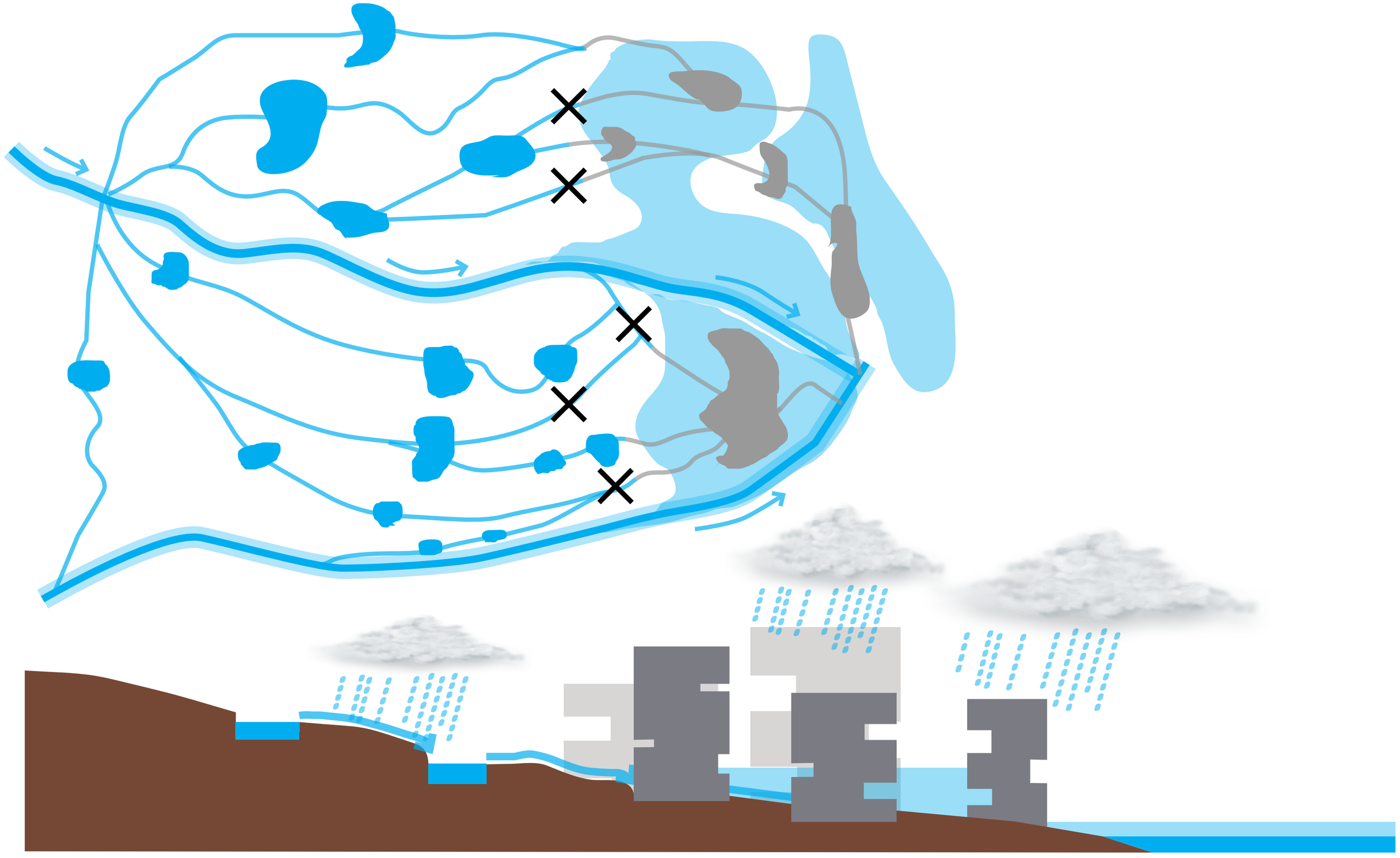
The Story of Cascading Tanks



Unchecked Development along Flood Plains



Induced Flooding During Storm Event



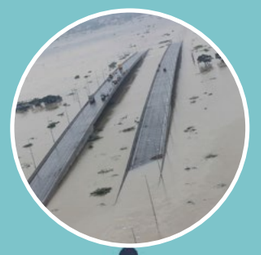
Floods in Tamil Nadu - 2015

Rs 25,000 Crores

The estimated cost of damage cause by the flood in Jan 2016

500 Deaths and 18,00,000 people displaced

Chennai & Its Challenges



1860 1870 1880 1890 1900 1910 1920 1930 1940 1950 1960 1970 1980 1990 2000 2010 2020 2030 2040 2050

1876 The Great Famine

1903 Floods In Chennai

1965 Cyclone

1985 Floods In Chennai

2004 Tsunami

2015 Worst Flood in 100 Yrs

2045 Vision

1860 1870 1880 1890 1900 1910 1920 1930 1940 1950 1960 1970 1980 1990 2000 2010 2020 2030 2040 2050

1878 Construction of Buckingham Canal Complete

1943 Floods In Chennai

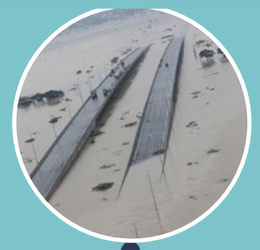
1976 Cyclone

2005 Floods

2017 Drought

2025 Vision

Timeline



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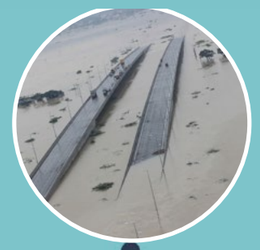

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Droughts In Chennai

Floods In Chennai

Drought a recurring Phenomenon In Chennai

Better Water Management

1860 1870 1880 1890 1900 1910 1920 1930 1940 1950 1960 1970 1980 1990 2000 2010 2020 2030 2040 2050

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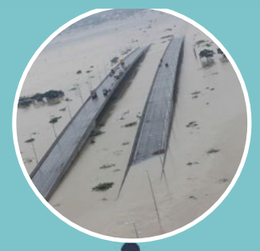

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Floods In Chennai

Rapid Urbanization

Drought a recurring Phenomenon In Chennai

Rapid Urbanisation

Sustainable Development

Better Water Management

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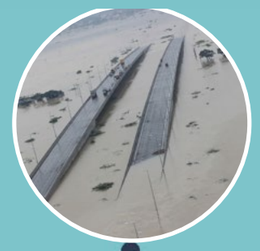
Timeline



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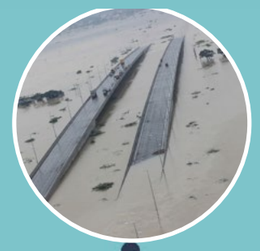

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Drought a recurring Phenomenon In Chennai

Floods In Chennai

Rapid Urbanization

Rapid Urbanisation

Sustainable Development

Loss Of Ecology

Loss of Ecology

Better Water Management

Reviving The Ecology

1860 1870 1880 1890 1900 1910 1920 1930 1940 1950 1960 1970 1980 1990 2000 2010 2020 2030 2040 2050

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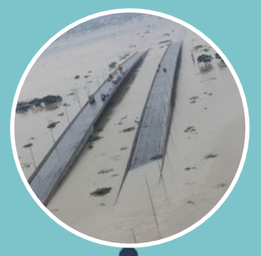

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2045 Vision

Journey Of Buckingham Canal

B. Canal Used for Transportation

B. Canal Damaged In Cyclone

Droughts In Chennai

Drought a recurring Phenomenon In Chennai

Floods In Chennai

Rapid Urbanisation

Sustainable Development

Rapid Urbanization

Loss Of Ecology

Decline in Use due to Damage

Pollution and Misuse

Loss of Ecology

Revival Of B. Canal

Better Water Management

Reviving The Ecology

Towards Resilience

1878 Construction of Buckingham Canal Complete

1943 Floods In Chennai

1976 Cyclone

2005 Floods

2017 Drought

2025 Vision

1860 1870 1880 1890 1900 1910 1920 1930 1940 1950 1960 1970 1980 1990 2000 2010 2020 2030 2040 2050

Water Issue

Key

- Flood affected area
- Groundwater table pollution
- Flood Inundation (1m to 2m)
- Coastal Pollution
- Water Pollution
- Landfill in Wetland Area

Kosasthaliyar River
Cooum River
Adyar River
Buckingham Canal
Pallikarnai Marsh
Buckingham Canal
Bay Of Bengal
0km 2.5km 5km
N

1 FLY ASH DUMPING

Industrial dumping in the River and Canal has resulted in silting and formation of sand bars, obstructing the natural flow of water into the Sea.

2 COASTAL POLLUTION

Chennai's water bodies and channels suffer from water pollution eventually resulting into coastal pollution.

3 COASTAL EROSION

A relatively new threat to the city as a result of the construction of sea harbours. The harbour docks block the sediment flow running northwards along the coast causing sedimentation south of the harbours and erosion north to the harbours

4 UNTREATED SEWAGE

Adyar and Kosasthalaiyar river suffer from chemical pollution due to industrial effluents discharged into the rivers. Buckingham Canal receives 60% of untreated sewerage surplus.

5 REAL ESTATE PRESSURES

The rising Real Estate demands has resulted in shrinkage of some of the important water bodies and marshes in the city eventually reducing the holding capacities of the water bodies.

6 DIMINISHING WETLANDS

Urban Development, poor management of wetland systems, legal and illegal dumping of solid waste and consstruction wetlands have collectively resulted in diminishing wetlands which were vital part of the hydro-ecosystem of the city.

Annual Average Rainfall
1400mm

Total Catchment of Reservoirs
11057mcft

River Discharge Capacity- Adyar
72000c/s

Flood Discharge- Adyar 2015
>80000c/s

Water Demand
1200MLD

Water Supply
985 MLD

Water Deficit
215 MLD

Projected Water Deficit- 2030
400 MLD

StudioPOD

Ecology

Key

Lost Water Bodies
CRZ I
CRZ II
CRZ III
Parks and Open Spaces
Landfill in Wetland Area

Kodungaiyur
Konnur
Vysarpadi
The Long Tank
Katteri
Guindy
National Park
Velacheri
Pallikarnai Marshland
Nanmangalam
Reserved Forest

0km 2.5km 5km N

Urban Expansion - CMDA

1980 1990 2000 2010

Percentage Of Builtup

20% → 85%

Percentage Of Marshlands

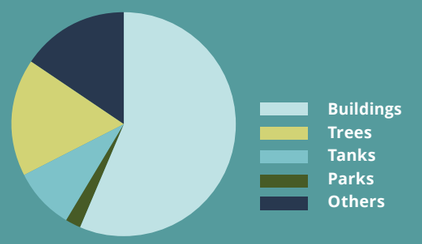
85% → 15%

Area of 19 Major Water Bodies (SourceWater Resources Department (WRD))

1130 Ha → 645 Ha

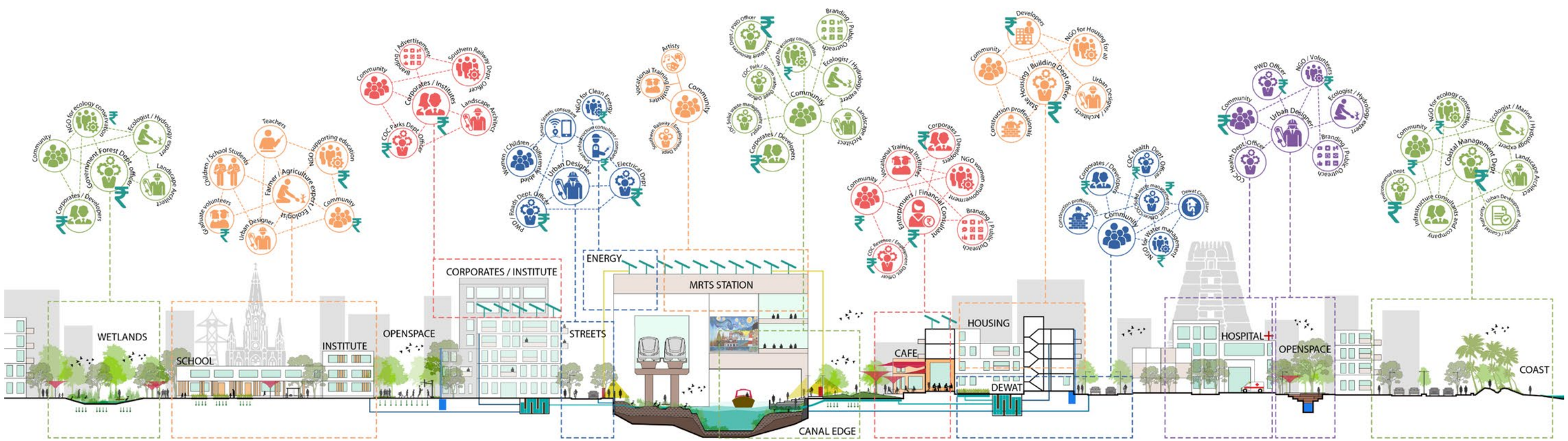
Population of Chennai City

3,266,034 → 4,646,732



Greater Chennai Corporation
Area Distribution

The Canal Collaborative

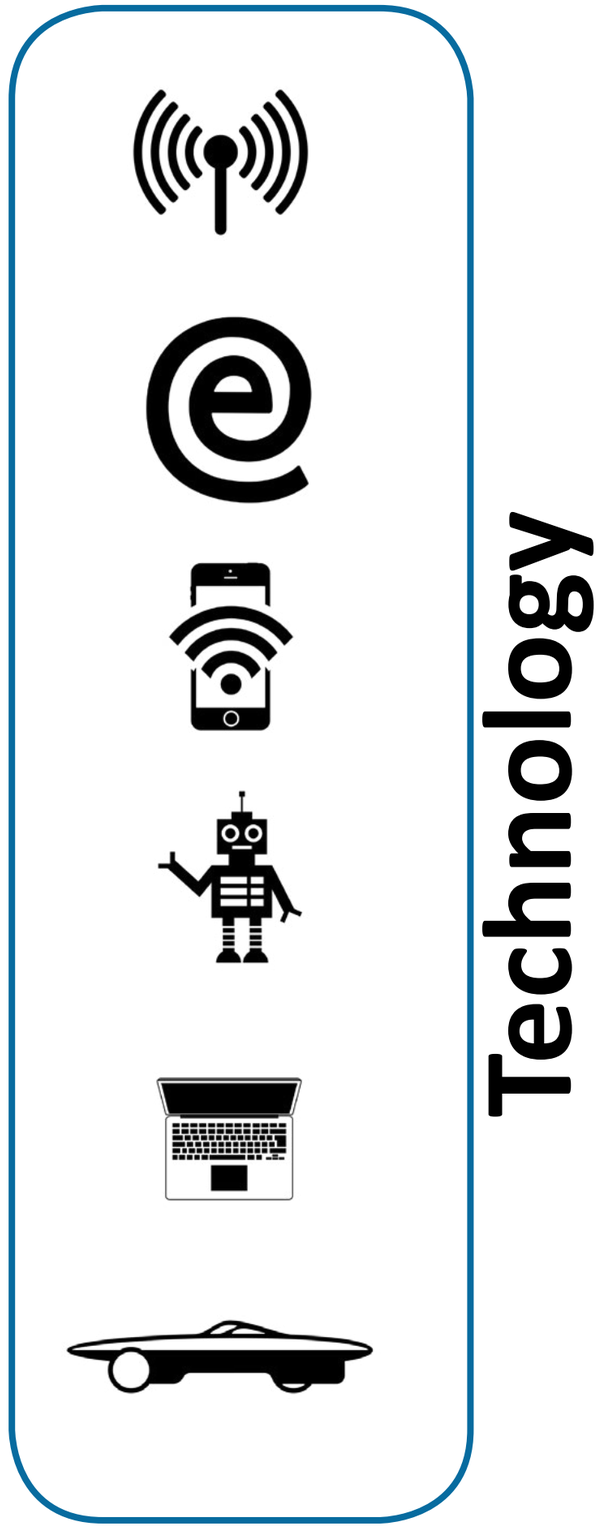


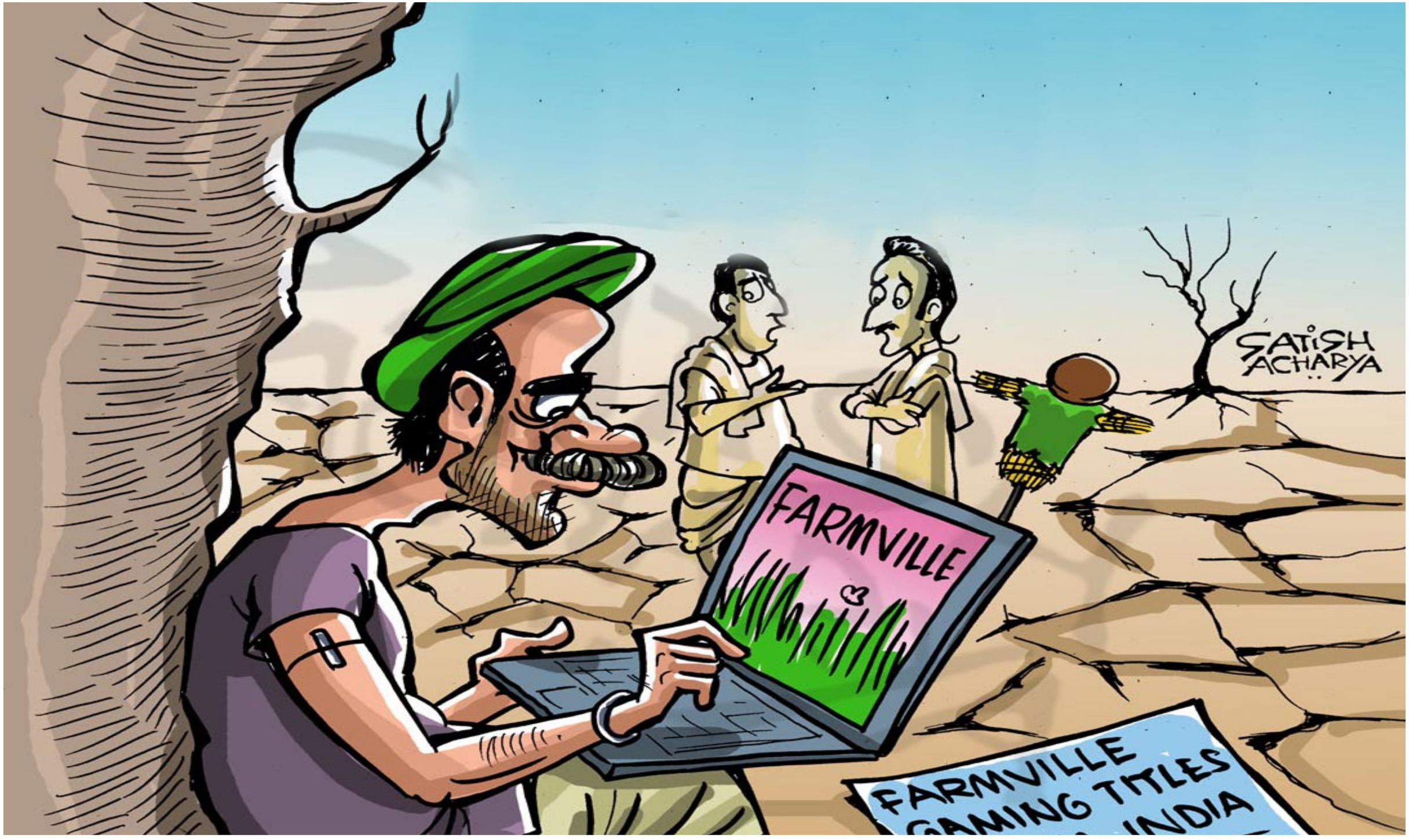
Our Technology Wishlist...

Resiliency Toolkits For City

Resiliency Toolkits For Communities

Resiliency Toolkits For Individuals





‘Smart City’ Must Be About its People First

Smart City Planning Tools

Planning

Respond Contextually

Connect Efficiently

Develop Equally

Build Intelligently

Invest Strategically

Collaborate Actively

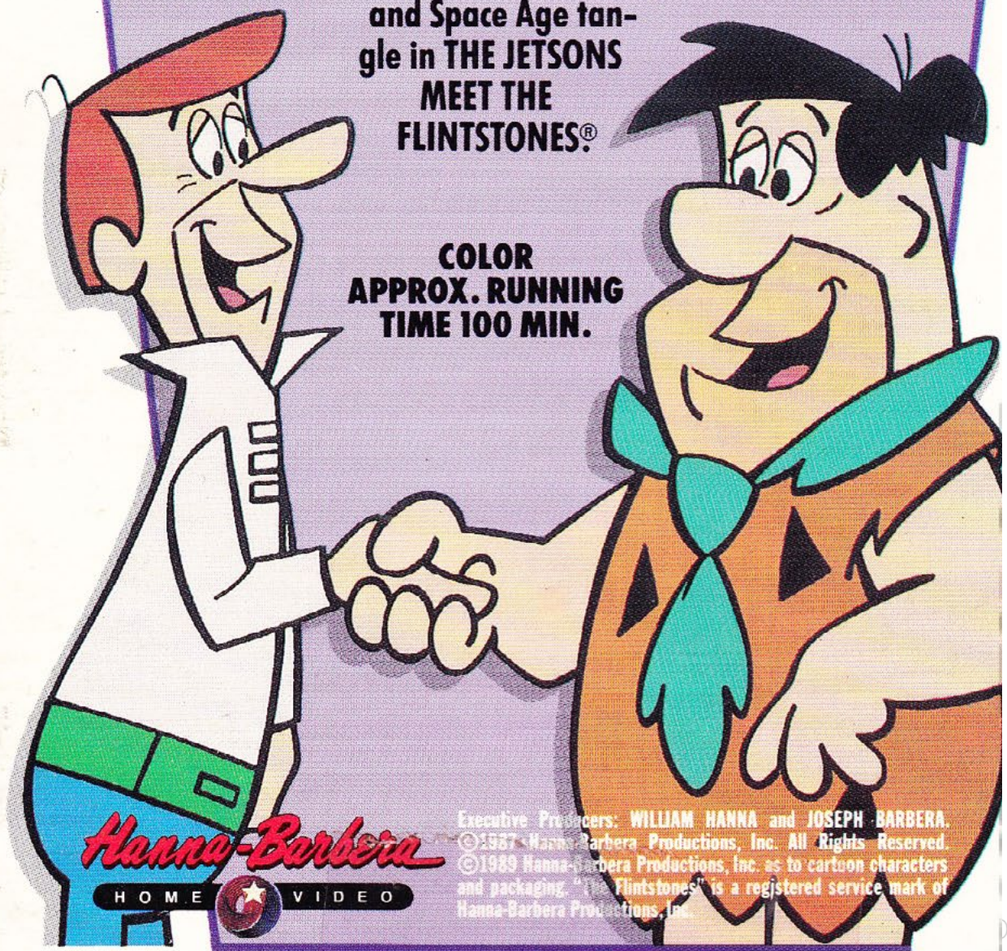
+

Technology

The JETSONS meet THE FLINTSTONES®

Here's cosmic comedy at its wackiest! Elroy's latest science project—a time machine—jams in reverse and lands the Jetsons 25 centuries back in Bedrock. They're befriended by Fred, Wilma, Barney and Betty who show them a great time in the prehistoric past until. . .ZAP! The machine goes haywire again and rockets everyone into a far-out future society. Will the Flintstones and Rubbles ever get home to Bedrock? Will Elroy's time machine blow up again? It's madcap mis-adventure galore as Stone Age and Space Age tangle in THE JETSONS MEET THE FLINTSTONES.®

COLOR
APPROX. RUNNING
TIME 100 MIN.



Hanna-Barbera
HOME VIDEO

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