

Eyes on the Canal - Reimagining Chennai's Buckingham Canal
Generating Collective Ownership through Participatory Planning

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Project

The Cities Fit for Climate Change (CFCC) project is part of the International Climate Initiative (IKI). The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) supports this initiative on the basis of a decision adopted by the German Bundestag. The project also cooperates with the Federal Ministry of the Interior, Building and Community (BMI).

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Disclaimer

The 'Eyes on the Canal' initiative for participatory planning to make the Buckingham Canal a liveable place for the residents of Chennai (India) was supported by the global project Cities Fit for Climate Change (CFCC) of GIZ from June 1, 2018 to May 31, 2019. Within this initiative, the global project CFCC launched an 'Open Ideas Competition on Reimagining Chennai's Buckingham Canal'.

The 28 shortlisted entries to the competition are presented in this publication as well as a summary of the refined versions of the three winning teams. The 28 shortlisted competition teams take complete responsibility for the content and views expressed in their competition contributions. GIZ will not be held responsible for the content and views expressed in the competition contributions of the shortlisted competition teams.

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Introduction of Cities Fit for Climate Change (CFCC)

The global project Cities Fit for Climate Change (CFCC) is implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) on behalf of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU). It forms part of the International Climate Initiative (IKI). The project also cooperates with the German Federal Ministry of the Interior, Building and Community (BMI). The duration of the project is from November 2015 to June 2019.

CFCC aims to strengthen cities as key actors in sustainable development and collaborates mainly with its three partner cities, Santiago in Chile, Chennai in India and Durban in South Africa. Besides supporting the implementation of climate-proofing activities in its partner cities and strengthening global exchange on low-carbon and resilient urban development the project is developing a climate-proof urban development approach. The work of CFCC can be divided into three main areas:

Compilation of Good Practices on Climate-Proof Urban Development

As part of this work area, CFCC has collected good practices on climate-proof urban development in developing and developed countries and made these accessible to urban practitioners and decision-makers at the local level. The collection and compilation of good practices has been undertaken as desk research as well as through onsite visits. The most important output of this area of work is the de-

velopment of the Climate-Proof Urban Development Approach (ClimPUDA) which is presented in a comprehensive sourcebook. Furthermore, CFCC has published a number of knowledge products on different themes such as the state of urban climate finance in the CFCC partner cities. A great part of the studies had a specific focus on issues related to the project's partner countries.

Implementation in Partner Cities

The second area focuses on the work in the CFCC partner cities. As part of this the cities are given advice on climate-proof urban strategies through GIZ technical advisors who are located in the partner cities. These advisors are supported by the international CFCC team and through local and international consultants. The aim of the technical support given to the cities is to assist each city in developing

its own strategies and approaches to making climate change aspects an integrated and strategic element of urban development. As a result, plans, programmes and strategies in the cities and investments based on them should make them more resilient to climate risks and take into account the need to take action to mitigate climate change by reducing GHG emissions.

Global Exchange and Networking

Another very important work area of the project is international knowledge exchange and networking. As part of this work, knowledge gained through the project is used to influence and facilitate relevant international processes such as implementing the New Urban Agenda, and the decisions of the annual Conferences of the Parties (COP) under the United Nations Framework Convention on Climate Change process and of the German Federal Congress on National Urban Development Policy. The project's partner cities have

been given the opportunity to actively contribute their experiences in these international processes and conferences. Furthermore, the partner cities also regularly exchange knowledge with each other, for example, through hosting three International Dialogue Forums. As part of its advisory role to the commissioning party (BMU) and cooperation partner (BMI) the project also feeds insights back into German policy



CFCC in Chennai

In Chennai, CFCC pursued a twofold strategy: during the first year of the project, the main focus was on detailed stocktaking that looked at the existence of climate related aspects within existing strategies and masterplans. Furthermore, the specific areas of intervention of future CFCC activities were discussed with the Greater Chennai Corporation (GCC) and a Memorandum of Understanding was signed. Based on the stocktaking exercise as well as a baseline study on the general understanding of climate change aspects and urban development within the governmental agencies, capacity building measures such as training and workshops were conducted in order to create a shared basis of understanding. This foundation of knowledge about the current and future effects of climate change within an urban environment was essential for the subsequent second line

of interventions: the promotion of projects supporting climate-proof urban development approaches. In order to tackle one of the greatest urban planning challenges within the city, the heavily polluted Buckingham Canal, a former navigation channel, GIZ initiated an urban design ideas competition to rethink the canal. The Urban Ideas Competition for a selected 3.5 km stretch of the Buckingham Canal pursued the goal of adding to and strengthening the current processes, approaches and strategies of the municipal government as well as highlighting the potential of the innovative ideas collected. This well-received and highly visible initiative was used to encourage further multi-stakeholder and multi-level climate-proof urban development interventions to make Chennai fit for climate change.





Buckingham Canal Ideas Competition

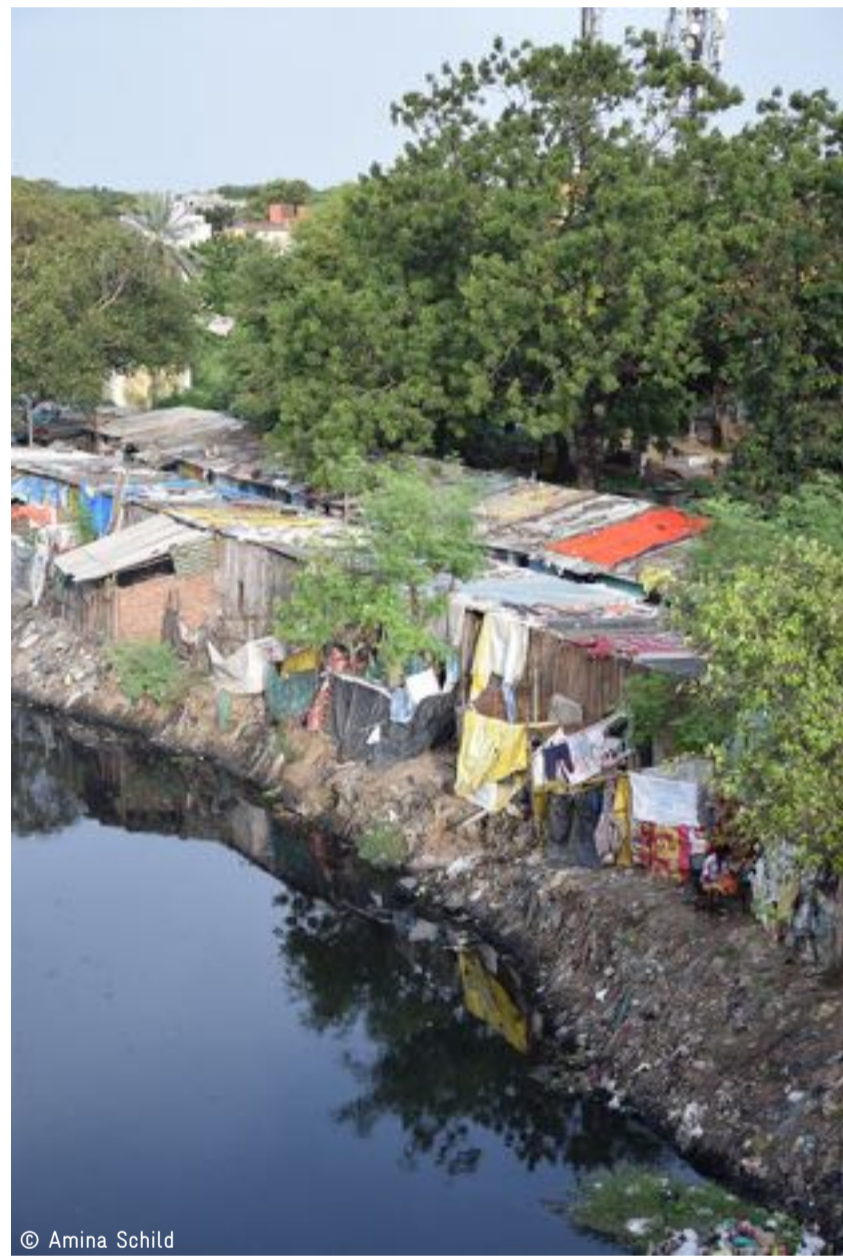
The Buckingham Canal

The Buckingham Canal is a manmade, saltwater navigation canal that runs parallel to the Coromandel Coast in the north-south direction. It was built in phases from 1800 until 1882 and measures approximately 800 km in length from Vijayawada to Marakkanam. Within the Chennai metropolitan area, the canal connects the three rivers – Kosasthalaiyar, Cooum and Adyar – that cut across Chennai. Though primarily constructed to transport goods from Vijayawada to Madras, the canal also helps to manage floodwaters. Today, the Buckingham Canal is subject to severe pollution due to solid and liquid waste disposal. In addition, numerous business buildings and unplanned residential settlements encroach on its banks.

This reduces the width of the canal and decreases its capacity as flood management infrastructure to retain floodwater in case of heavy precipitation or storm surges. Moreover, the canal’s former functions offering a trading space on its waters where the local population developed their livelihood, as well as a place for recreation and belonging have been lost. The neighbourhood located next to the selected stretch of the canal is highly diverse in terms of social composition and land use. It features informal residential and business buildings in a poor area, a mixed middle-class area and larger IT office buildings. In short, it creates a particular context that requires tailor-made solutions.



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'Eyes on the Canal' – An Open Ideas Competition on Reimagining Chennai's Buckingham Canal

Against this backdrop, the initiative 'Eyes on the Canal' was born with support from the global project Cities Fit for Climate Change (CFCC). 'Eyes on the Canal' is an initiative for participatory planning to make the Buckingham Canal a liveable place for the residents of Chennai. The initiative involves various activities such as the development of urban design proposals, including engagement activities such as awareness walks and community engagement meetings to generate interest and ownership for the canal, which has suffered from collective abandonment.

Within this initiative, the global project CFCC launched an 'Open Ideas Competition on Reimagining Chennai's Buckingham Canal' in order to generate urban design proposals. This process was supported by various local non-governmental organisations (NGOs): namely the Urban Design Collective (UDC) and Agam Sei. The UDC implemented the initiative, being actively involved in all its phases. Addressing the local community, organising and documenting the competition and its follow up were the key aspects of their involvement. Agam Sei, another Chennai based NGO supported the project in research, data collection and awareness raising measures (for example river walks). The competition was implemented in collaboration with the Greater Chennai Corporation (GCC), the municipal administration. Key to the success of the initiative was the participation of local communities alongside the Buckingham Canal. They were the main target group of the initiative. Without their involvement in the preparation of the competition brief, their feedback on its results and their continuous willingness to be involved, the Eyes on the Canal – Reimagining Chennai's Buckingham Canal – initiative would not have been possible.

The Open Ideas Competition aimed to find solutions to improve the environmental situation of the Buckingham Canal in the south of Chennai. Feasible and creative urban design solutions to tackle climate change and upgrade local livelihoods were sought for a 3.5 km stretch of the canal. The competition took a holistic view of the canal and was designed as an integrated exercise, which was influenced by and targeted experts as well as citizens from a multitude of backgrounds. The ideas competition opened new ways of discussing and working on urban development issues in Chennai, promoting participatory planning to enhance public engagement.

Buckingham Canal in Chennai with focus on the competition area







Project Timeline

2018

April	<p>Project initiation</p> <ul style="list-style-type: none"> • Dialogue with various stakeholders • Defining project goals • Branding and identity building
May	<p>Community Engagement</p> <ul style="list-style-type: none"> • Awareness walks • Community meetings • Household perception surveys • Awareness videos
June	<p>Urban documentation</p> <ul style="list-style-type: none"> • Generating spatial maps and drawings <p>Research</p> <ul style="list-style-type: none"> • Interviews with experts • Research on development history of the canal
23 rd July	National – level Open Ideas Competition announced
23 rd September	Competition submission deadline
8 th October	Announcement of 28 shortlisted entries
21 st October	Announcement of top 3 winning entries
21–25 October	Public exhibition of 28 shortlisted entries including 3 winning entries
16–17 November	International Symposium “Reimagining Inclusive Cities” supported by GIZ
29 November	Meeting the experts from the Indian Institute of Technology Madras
30 November	Introductory meeting with government officials
1 December	Visit to Rain Centre in Gandhi Nagar Introductory meeting with the community

Project timeline from
April 2018 to April 2019



2019

4–10 January	Exhibition at Kasturibai Nagar Station
19 January	Canal ride
21–25 January	Exhibition at Thiruvanmiyur Station
26 January	Canal mapping with the citizens
30 January–1 February	Exhibition at School of Architecture & Planning, Anna University
11–15 February	Exhibition at School of Architecture, Hindustan University
20 February	Presentation at Hindustan University Survey & meeting with residents of Kotturpuram
21 February	Meeting with residents of Kasturibai Nagar
26 February–6 March	Rapid assessment of solid waste situation in Kotturpuram and Kasturibai nagar
16 March	Team meeting
17 March	Final community meeting at Kasturibai Nagar
18 March	Meeting with the government officials
18 March–30 April	Completion of report production



Opportunity Areas

The competition seeks a wide range of solutions focused on the many issues plaguing the canal at various levels. Four levels have been identified for intervention:

Intervention level 1 – The canal itself

Intervention level 2 – The banks/ edges of the canal

Intervention level 3 – City fabric abutting the canal

Intervention level 4 – Socio-cultural and socio-economic concerns pertaining to the canal

Participants in the competition were encouraged to view the various issues as opportunities for reimagining the canal across the 4 levels of intervention:

A) Rejuvenating the canal

The canal in its original state was a saltwater man-made tidal canal. Its ebbs and flows were governed by the tides from the Bay of Bengal as well as the flows of the three rivers that intersect it. This tidal movement kept the canal alive, clean and navigable. As the city densified and developed along the canal, the flows were blocked/ altered. Today there is hardly any movement of water.

B) Managing liquid waste pollution

Across the entire length of the canal, the land uses along its edge change from industrial in the north to institutional in the middle and residential in the south. From industrial effluents to untreated sewage, corresponding to the land use, the nature of liquid waste that is dumped into the canal also changes along its length. If one were to take a walk along the canal, various points of discharge can be spotted in plain sight.

C) Managing solid waste pollution

From plastic waste to bones to glass bottles to construction waste, field visits reveal that nearly every type of solid waste finds its way into the canal.

D) Reclaiming the canal as part of the city's public realm and urban commons

Perception surveys conducted among residents who live along the canal indicate that there is a desire to reclaim the canal for leisure and recreational purposes. The canal's status as the urban commons needs to be reinstated for the benefit of all the city's residents and not just those living along it.

E) Improving health for residents of the city

Residents who live near the canal suffer from the consequences of mosquitoes breeding in the stagnant waters of the canal as well as open defecation and solid waste dumping in the canal.

F) Protecting livelihoods in the context of housing and resettlement along the canal

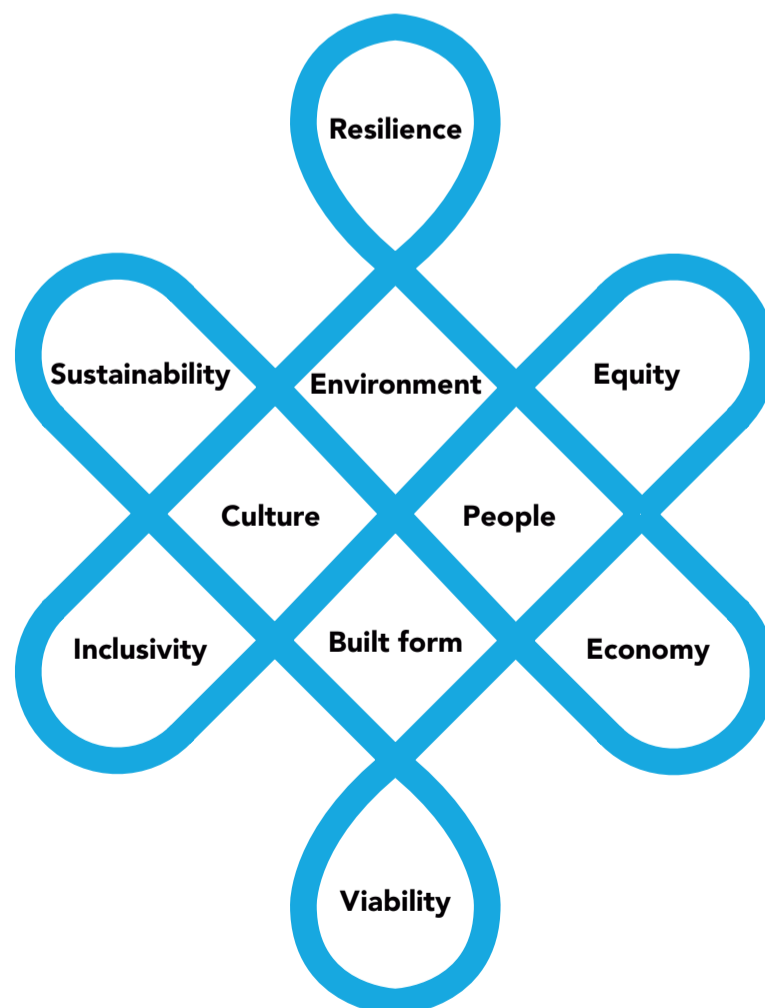
From the very beginning, the canal has drawn people from different strata of the society because of its ecology. Through its time, it has supported many different livelihoods along its banks such as firewood trading, dhobi kanas, cattle grazing, farming and the plying of boats for transportation. Today, informal settlements along the canal are constantly under threat of resettlement and displacement of their livelihoods. An inclusive development strategy will ensure a safety net for such urban dwellers and reshape the stakes along the canal for the people of the city.



Evaluation Criteria

The following Evaluation Criteria were applied:

1. clear articulation of a solution to the challenge
2. is innovative and early stage but related to the core competencies of the team
3. strong focus on rejuvenation of the canal
4. environmental soundness, especially from a climate adaptation and mitigation perspective
5. inclusiveness in impact and participation in its approach with the community
6. demonstration of a sound understanding of the needs of intended beneficiaries
7. adherence to all existing norms and regulations of development (Master Plan, Coastal Regulation Zone norms, National Green Tribunal rules, etc.)
8. demonstration of multi-disciplinary approach to the challenge
9. takes a new approach to the challenge or uses an existing approach in a new way
10. effectively tackles 3 or more of the listed opportunity areas
11. demonstrates a deep understanding of the vulnerabilities and the planning context of the city through the proposed solution
12. identifies any potential risks and shows how these will be managed
13. includes youth and gender balance in the proposal's approach
14. is considered desirable by experts in the sector
15. will benefit from the funding and support offered by CFCC



© Urban Design Collective: Diagram showing the interconnected nature of the various relevant aspects for climate-proofing the Buckingham Canal



Jury

Srivathsan A., Ahmedabad, India

Dr. Srivathsan is an architectural scholar and the Academic Director for CEPT University. He is a nationally recognized architectural critic and has worked as a senior journalist for eight years.

Karen Coelho, Chennai, India

Dr. Karen Coelho is an urban anthropologist working as Assistant Professor at the Madras Institute of Development Studies (MIDS), Chennai, focusing on reforms in municipal governance, informal labour, urban ecologies, and urban civil society.



© Iris Gleichmann
Jury Members from left to right: Klaus Illigmann, Karen Coelho, Sujatha Byravan, Srivathsan, Georg Jahnsen

Sujatha Byravan, Chennai, India

Dr. Sujatha Byravan is a scientist who studies science, technology and development policy. She was, until recently, Principal Research Scientist at the Centre for Jury Study of Science, Technology and Policy in Bangalore.

She has a number of publications to her credit and also writes regularly on science and technology policy in leading national newspapers.

Georg Jahnsen, GIZ India

Georg Jahnsen is an urban and land use planning expert. He has worked as Chief Town Planner for the City of Heide (northern Germany), teacher at the University of Brunswick and as Program Manager for Raffles Design International University, Mumbai, India.

Klaus Illigmann, Munich, Germany

Klaus Illigmann is the Head of Section in the Department of Urban Planning and Building Regulations of the City of Munich in Germany.

He is a member of the dialogue platform “Smart Cities” of the Federal Ministry for the Environment.



Jury Statement

Overall the responses to the open ideas competition titled 'Reimagining Chennai's Buckingham Canal' have been impressive, and all the short-listed entries have made a good effort to address the pressing issues listed out as the criteria of evaluation, in particular the idea of promoting climate proof urban development. Of the shortlisted 28 entries, the

following two entries EOTC208 and EOTC109 stand out by their vision, innovative ideas, detailed proposals, ecological and climate concerns and social inclusivity.

The jurors found the following points commendable in the respective entries and awarded the joint first prize to them.

Entry No. 208 – The Canal Collaborative

This solution is a good example of how a combination of multiple simple solutions can produce a long lasting impact. What makes this proposal stand out is that it places the community as the custodian of the process. This is also one of the proposals that the jury found to be imminently implementable.

It emphasises the creation of public space as well as linking places and buildings for better effect. It also speaks about how to brand this project and make it widely acceptable. The approach also works at multiple scales and finds trans-

formative opportunities in what already exists on the ground. The solutions are also supported by good visual content in the presentation.

The jury makes the following suggestions:

- to prioritise up to five fields of intervention and detailing this out.
- to concentrate on local collaboration and look for more buy-in

Entry No. 109 – Protect, Delay, Store, Release!

The key idea that makes this entry stand out is the sponge concept and how it applies it in both the neighbourhood and infrastructure design. If this idea were to be implemented, it would be the first one of its kind, to our knowledge, in the country. Through the idea of Sponge city, this proposal addresses many different facets of concern for the canal. It is a simple, elegant and crucial principle for integrating social, economic and ecological resilience into urban space design, thereby preparing the city for future shocks. Its proposal for mixed income and mixed use neighbourhoods along the canal stretch calls out to an inclusive vision for development. The proposals that flow out of an impressive larger vision are solid and accommodate everyday

activities that relate meaningfully to the neighbourhood scale. The solutions position the canal as a transformative corridor in the larger ecological context of the city.

The jury makes the following suggestions:

- to arrange consultations with the Corporation and institutions in order to identify areas that can be formed into sponge models.
- to analyse what you can do on a small level and how to generate quick wins.
- to ensure that effects need to be visible to get buy-in.

Entry No. 195 – Leveraging Buckingham Canal to be Chennai's Shock Absorber

The jury did not find any entry that merits second prize. It awards the following entry the third prize for these reasons: The entry takes a kit of interventions approach and offers tools to make many of its ideas applicable. This toolkit approach is innovatively applied to the proposal and demonstrates how to transform the canal into being Chennai's shock absorber.

The entry offers multiple proposals that cater to different sections and target groups and its detailed design for the demonstration stretch is sensitive to the different land use patterns along the canal. Further, the proposal enhances the ability of the demonstration stretch to respond to extreme events (cloudburst, storm surge, etc.)



This is achieved by connecting the solutions for the canal with the larger canal system. In addition, it explores the possibility of increasing affordable housing stock at suitable selected areas.

The jury makes the following suggestions:

- to make target groups clearer and frame interventions more specifically for the respective target groups.
- to take care of implementation (more modular) and to develop the idea in more detail in one section for feasible implementation.

Amidst the many entries the jury found the following entry unique and decided to cite it with a Jury Special Mention. Though it may not be possible to implement and it falls short of addressing multiple issues, it takes up an important aspect of city life and proposes a highly innovative idea.

Jury Special Mention Entry no. 193 – Occupy the Canal

This entry is a bold imagination of what Chennai needs currently – an unhindered space for public gatherings, social protest and political mobilisation.

It is highly strategic in its approach, where it tries to animate spaces using mobile carts which work both as urban art installations and functional kiosks. Additionally, its highly impressive graphic is consistent with the radical idea it puts forward.



EOTC101 – Urban Stitch

Commended for an effective visual representation of eight distinct interventions on one stretch, subsequently integrated into one masterplan.

EOTC119 – H2O listic

Commended for the detailed plan and visualisation of the reimagined Mass Rapid Transit System (MRTS) stations.

EOTC105 – Thalir and EOC150 – A Biophilic Approach

Commended for spelling out how the interventions create pathways to achievement of specific Sustainable Development Goals.

EOTC179 – People’s Eco Corridor

Commended for attractive, simple and effective proposals for public space interventions and improvements.

EOTC240 – Chennai Water Project

Commended for the Design Guidelines it provides as practical universal tools to transform urban water bodies, as well as for its scalability and replicability.

Head of the Jury

A. Srivathsan



Process of Competition After Selection of Winning Teams

With the identification of the top three contributions within the 'Open Ideas Competition on Reimagining Chennai's Buckingham Canal', the first activities of 'Eyes on the Canal' came to a conclusion. The winning teams were then supported to develop the winning ideas into detailed proposals and plans in order to raise interest in the actual implementation of the plans.

As a first step, a shared vision was jointly developed in line with the 'Climate-Proof Urban Development Approach' (ClimPUDA) of the global project Cities Fit for Climate Change (CFCC). The vision guided the winning teams in the process of developing an implementable plan. As the winning teams come from different geographies and backgrounds, they were familiarised with the local intervention sites, social dynamics and culture through site visits to the entire 3.5 km stretch of the canal. With the critical inputs on hydrology, waste, wastewater and ecology by various local technical experts from the Indian Institute of Technology 'Madras', the Indian Institute of Housing and Settlements (IIHS) and The Rain Centre the winning teams were able to understand the feasibility of their ideas, possible ways of explorations and their implications.

It became obvious that the government plays a key role in rejuvenating the canal as the primary ownership of the canal and its immediate surroundings lies with them. Building on that a series of consultations and department level meetings with government stakeholders was conducted. The first consultation was on November 30, 2019 where the winning teams had an opportunity to present their ideas to senior government officials at the Secretariat and to discuss the feasibility of integrating the projects into the proposed government plans for the Buckingham Canal. The officials gave the teams constructive criticism and helped to channel their ideas in the right direction to facilitate their implementation. The meeting was chaired by the Principal Secretary of the Public Works Department with representation from the Greater Chennai Corporation, Chennai Rivers Restoration Trust, Chennai Metro Water Supply and Sewerage Board.

Subsequent to the meetings with government agencies, a meeting with corporate bodies and social entrepreneurs

helped to understand the process of involving corporate organisations in civic projects and how to package a larger vision into smaller projects (namely for pitches to the private sector to leverage corporate social responsibility (CSR) funding). From the beginning, it was also very important, that the local community became a key stakeholder in the process. For that reason, an introductory meeting was organised to let the local Resident Welfare Associations (RWAs) and Civil Society Organisations (CSOs) appraise the winning ideas. Through group discussions, inputs were sought to make the projects implementable and to determine the level of support and investment required from the community for the upkeep of the project after its completion.

To keep the local public engaged, a series of engagement activities and updates were offered through social media, such as an exhibition of the ideas at the local railway stations or showcasing events in community halls and educational institutions closer to the canal. Furthermore, the project team offered walks engaging the citizens, initiated community mapping events to map the garbage hotspots inside and outside the canal, identified illegal sewage outflow points along the canal and assessed the vegetation around the canal. The data mapped by the residents was later digitised and circulated in the community. As an extension of the project, local residents were also encouraged to conduct a rapid assessment of the solid waste practices in the area. The report was used to initiate conversations with the government.

With the community engagement activities going on in parallel, the teams had developed their ideas into detailed plans with all the inputs received from multiple stakeholders. The detailed plans were presented back to all the stakeholders at a stakeholder meeting on March 17 and 18, 2019.

By April 2019, a summary document along with the three detailed reports from the winning teams were submitted to all relevant stakeholders with a list of recommendations as a guiding document to rejuvenate the Buckingham Canal and its surrounding areas.



Summary of Each Final Proposal

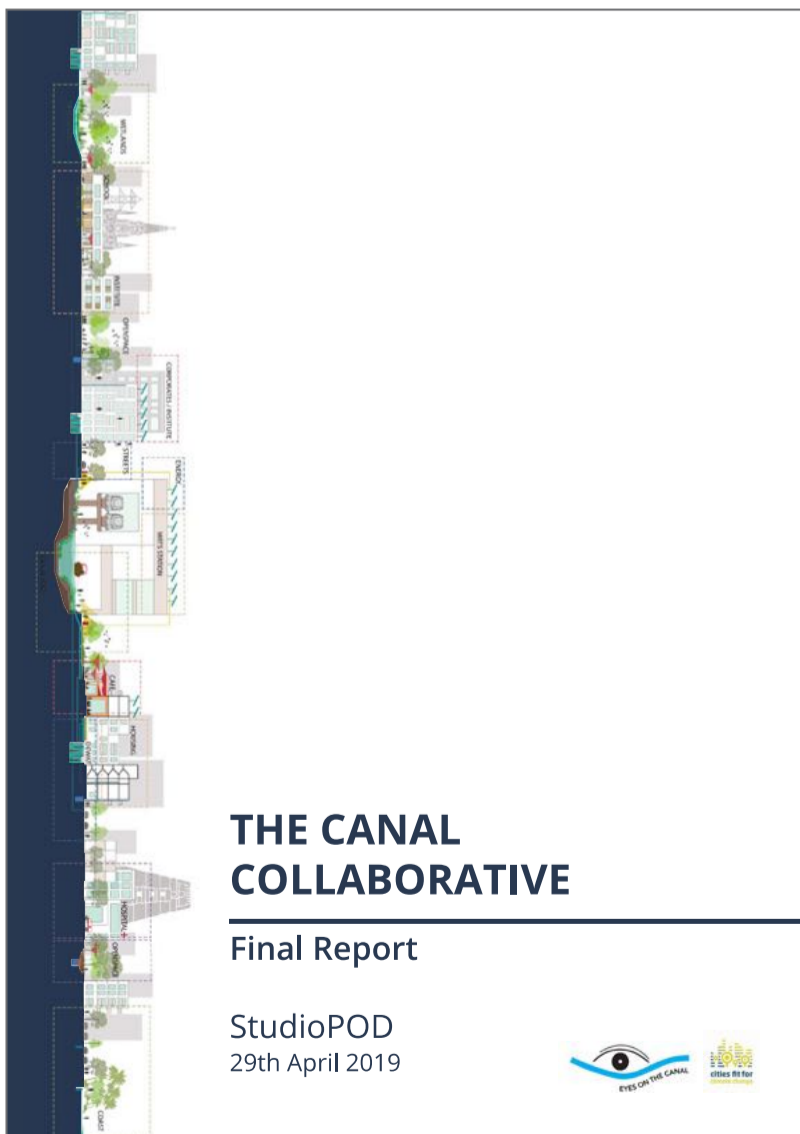
The Canal Collaborative*

The Canal Collaborative starts with acknowledging the existing social capital of the city of Chennai. There are multiple agencies, private and public, individual and collective, corporates and non-profit, who are already working in their own capacities towards a better future for Chennai. However, often these interests and efforts do not go beyond a certain social circle. The visions are short-lived and do not last over a longer period of time. The Canal Collaborative aims at making use of the social capital of the city to work towards improving the natural and the built capital, resulting in a holistic effort towards a resilient city.

The Canal Collaborative's idea revolves around strengthening the existing social capital of Chennai to achieve a more resilient future. It hinges on the strength of partnerships between various stakeholders of the city such as the local authorities, civic bodies, non-governmental organisations and individual citizens. The proposal is a toolkit for the stakeholders to identify, implement, operate and maintain a variety of projects that are identified by the stakeholders.

There lies a value in combining the efforts of these stakeholders to find meaningful solutions that can last over time to give visible results. Through a common vision, the toolkit attempts to bring together all the small and large intentions towards a City Fit for Climate Change. It intends to enable the stakeholders to identify a common vision and work towards it as a team. It helps to identify the strength of each of the stakeholders and optimise their impact in projects of various scales and natures. It facilitates the process of urban interventions centred around the climate readiness of the city of Chennai through a participatory and collaborative mechanism.

It aims to facilitate forming new connections and communities working towards a resilient future. Through the toolkit, the local authorities, the resident communities and the corporate sector of the city are provided with a guide to engage with each other at various scales and in multiple ways in order to achieve the vision for a City Fit for Climate Change.



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The Canal Collaborative

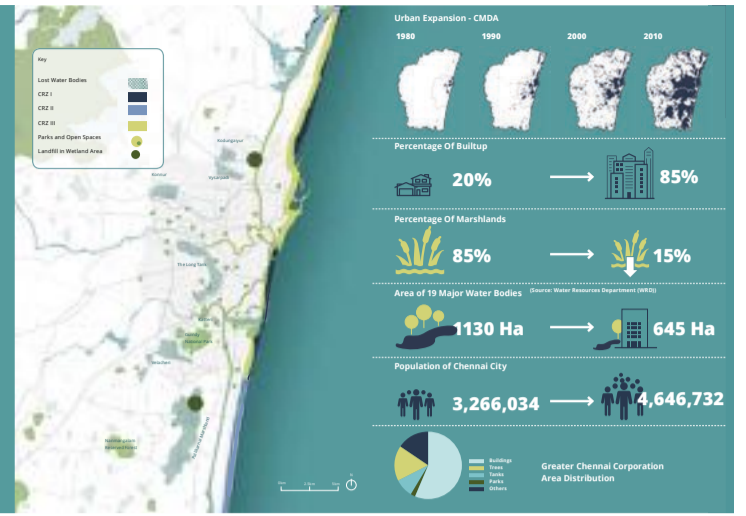
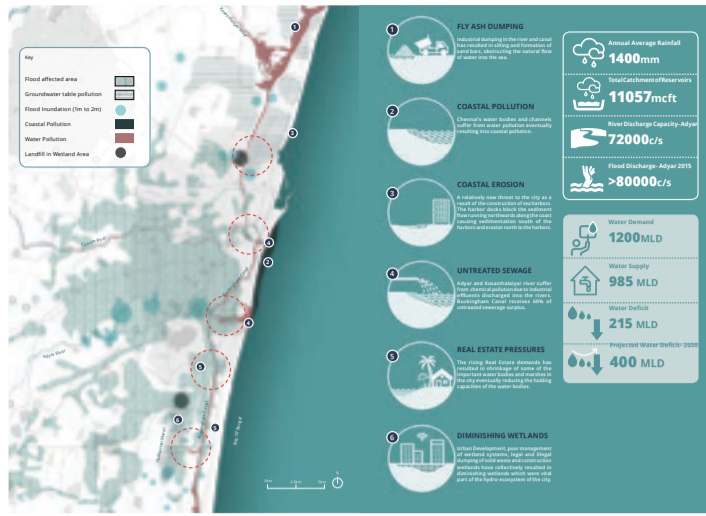
Chennai is a city that thrives on the determination and rigour of its Citizens, it has withstood and sprung back quickly from every challenge it has faced. The goal is to prepare the city and its residents for a better future, where they are well equipped to face the challenges of Climate Change through awareness and education and also to prepare the city for future events through a system of Climate Responsive built and natural environments.

Leveraging Chennai's Social Capital to make the City Fit for Climate Change -

The Canal collaborative is a commitment to work in collaboration with all the stakeholders to ensure a resilient future, develop a vibrant social and economic environment and to enrich the natural habitat.

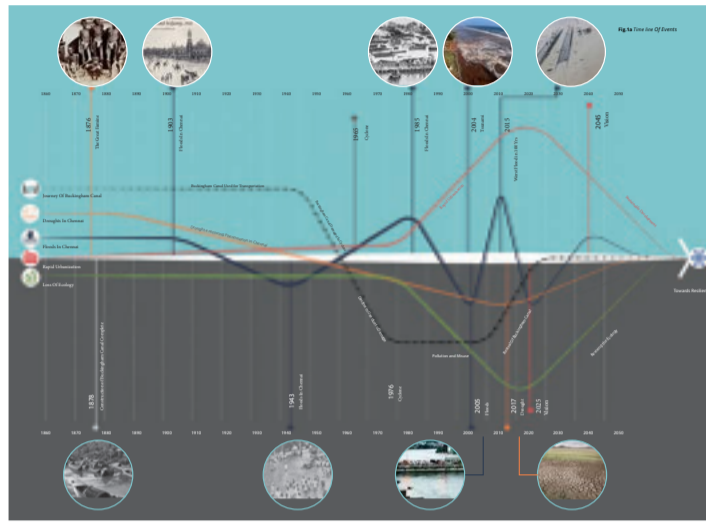
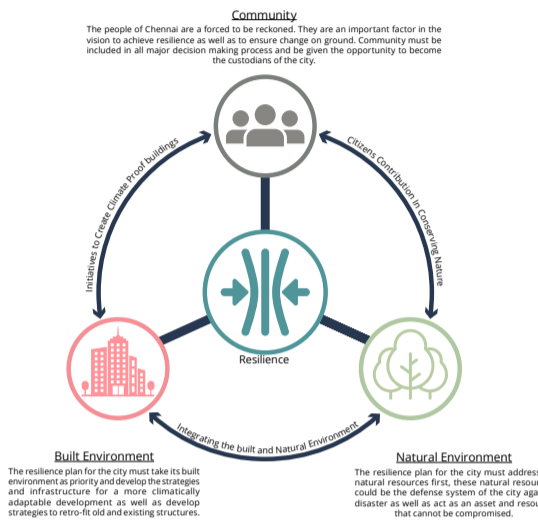
Vision for Buckingham Canal

- **Reinstate, Reclaim and Celebrate** the canal as a public space for the residents of Chennai
- **Provide Integrated Climate Proof Solutions** to restore the canal's function as a flood mitigator.
- **Revive the ecology** and enhance the habitat of the canal and plan for sustainable development.
- **Management of solid and liquid waste disposal** allowing improvement of health of the canal and the citizens.
- **An effort to be a model for a project that is collaborative in its process and inclusive in its ownership and responsibility**

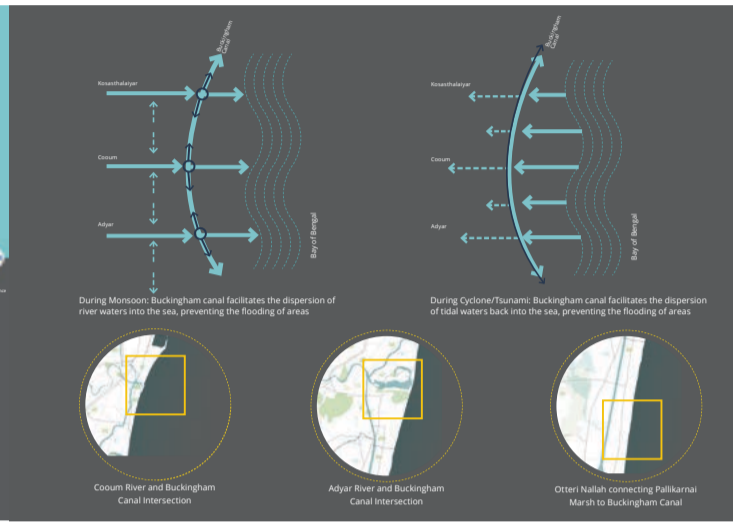


Water in Chennai

Ecology in Chennai

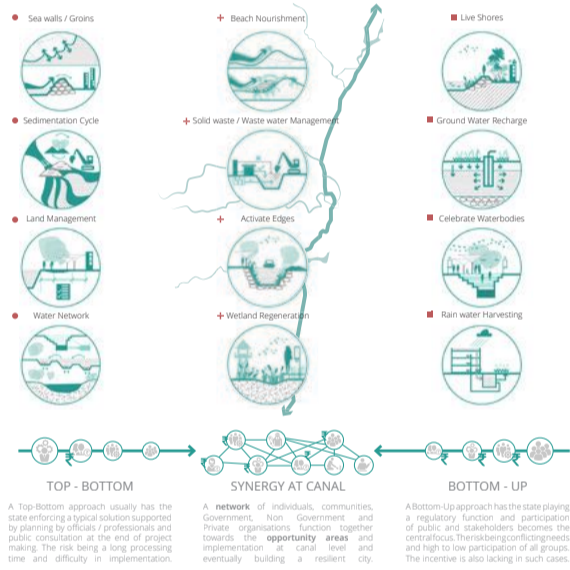


Time-line of events in Chennai

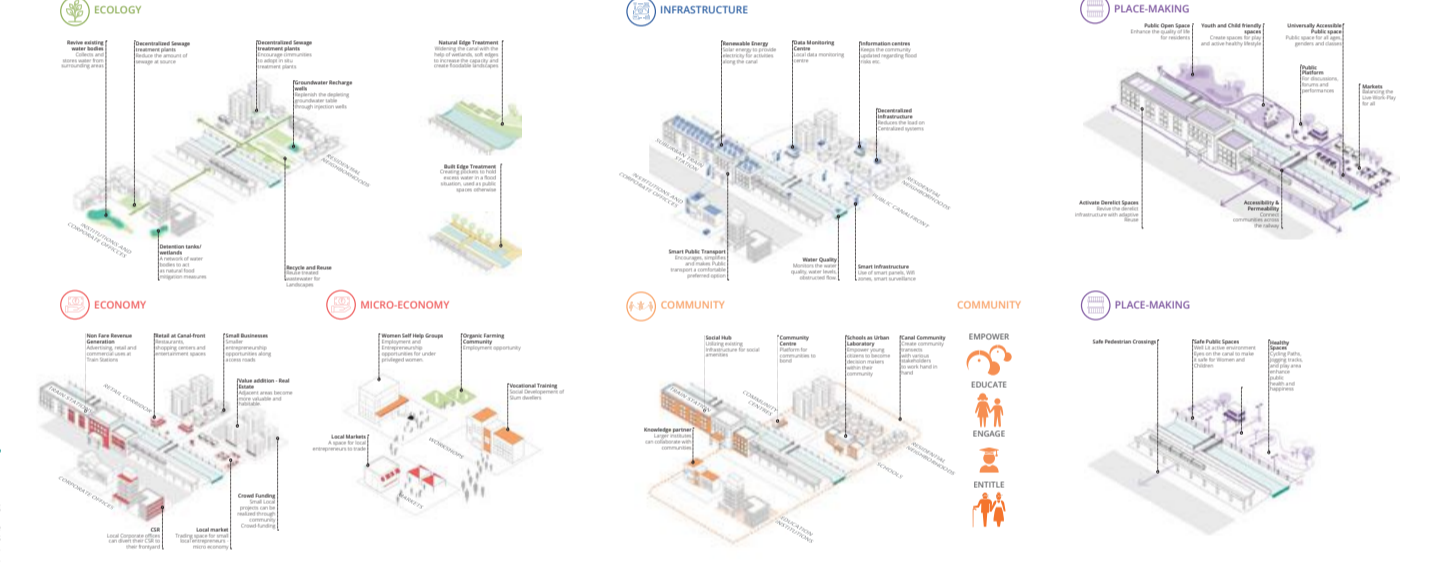


Role of Buckingham canal in Chennai

SYNERGY AT CANAL



OPPORTUNITY AREAS



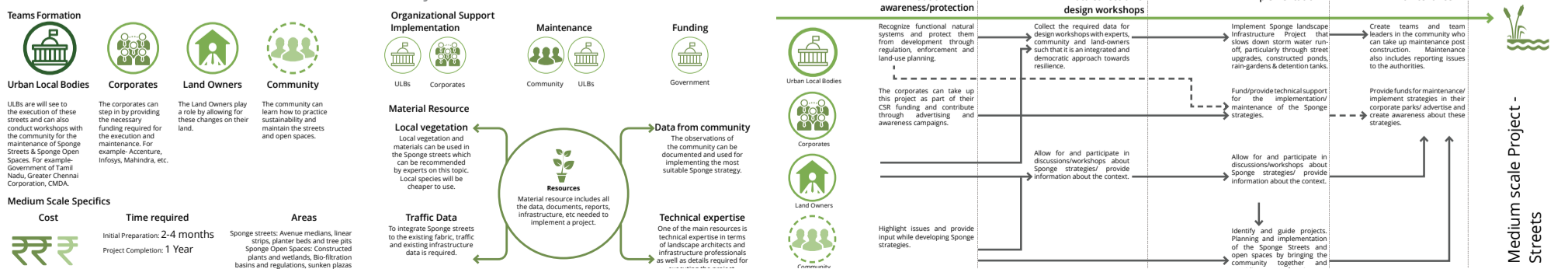
FORMING SYNERGIES TO FACILITATE THE IMPLEMENTATION

Multiple Non hierarchical, Non coercive human networks within the different communities are encouraged to work towards the vision through the five opportunity areas and creating a framework for a resilient system.



WETLANDS (Ecology)	SCHOOLS (Social Equity)	CORPORATES/PRIVATE (Economy)	STREETS / ENERGY (Infrastructure)	CANAL EDGE / WATER (Ecology)	RETAIL / BUSINESS (Economy)	PUBLIC HOUSING (Social Equity)	DEWATS / COMPOSTING (Infra)	OPEN SPACE (Place Making)
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.	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, etc.	Project Champion: Private Org. Worker; Funds: Private Org. (CSR); Impact: Parks and Gardens at canal, Land value appreciation; Beneficiary: Community around the intervention, city, Private organisations	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, Land value appreciation; Beneficiary: Resilient City, Residents, Southern Railway (MRTS)	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	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	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	Project Champion: Residents; Funds: Govt.Depts, AMRUT scheme, Smart City Mission, Developers; Impact: Water Management, Healthy and clean environment; Beneficiary: Residents, Resilient city, Canal	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

WORKING OF NETWORKS FOR A MEDIUM SCALE PROJECT - STREETS



The Blank Slate*

Strip 1.0 details a community-centred road-map for creating an implementable, sustainable and maintainable plan to initiate the reversal of the damage caused to Buckingham Canal due to continued ignorance and neglect. The aim is to re-establish the canal as the resilient backbone of the city of Chennai. The project demonstrates alternative water management techniques through embedded mini-projects aimed at rejuvenating a section of the canal. Furthermore, it creates an activated public space by transforming the selected pilot stretch of Buckingham Canal into a liveable space.

Increasing Chennai’s resilience and rejuvenating the Buckingham Canal are long term and capital-intensive projects. The project focuses on what is possible now through limited means to start a larger momentum required to transform the canal into an asset that not only prevents flooding events but also becomes an integral part of the public life of the city. The project aims at reimagining the public realm, restoring ecology, prioritising environmental sustainability and fostering community participation.

The short-term action plan detailed in the project aims at activating a chosen site on the banks of Buckingham Canal to create interest in the site within the community. This is done through the use of temporary interventions and pop-up urbanism that can be implemented immediately with

limited funding. Through seasonal events and multi-purpose spaces that can be programmed into a dynamic public space throughout the year, the plan intends to attract more people to the site. Through a menu of programming which has been developed while working with the residents of the area, the Strip 1.0, becomes a new public space in an existing urban wasteland. Embedded within this public space are a set of green infrastructure scalable projects that intend to restore the ecology of Buckingham Canal. A network of integrated wetlands consisting of constructed wetlands, vertical wetlands and floating treatment islands work together to treat the sewage currently being dumped into the canal in this pilot stretch. Green infrastructure projects such as a rain garden and bioswale are integrated into this public space, demonstrating and promoting alternative water management techniques to the users.

Strip 1.0 offers the possibility to create a 10 km long public space in the city by channelling the underutilised space under the mass rapid transit system (MRTS) along the banks of Buckingham Canal when scaled. The project envisions the creation of a new invigorating public space that is focused on the canal’s wellbeing, connecting and bringing various communities of the city together in order to harness interest and foster resilience within the city.



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STRIP 1.0

KICKSTARTING RESILIENCE AT BUCKINGHAM CANAL

PROMOTING ALTERNATE WATER MANAGEMENT STRATEGIES WHILE ACTIVATING UNUSED URBAN SPACE



Strip 1.0 details a community-centric roadmap of creating an implementable, sustainable and maintainable plan to initiate the reversal of the damage caused to Buckingham Canal due to continued neglect and to re-establish the canal as the resilient backbone of Chennai. The project demonstrates alternative water management techniques through embedded mini-projects aimed at rejuvenating the canal and creates an activated public space in the process transforming the edge into a livable space. The project re-imagines Buckingham Canal as a means of making the city of Chennai climate proof. The holistic aim of the project is to showcase alternate water management micro solutions that can be applied at various urban scale to reduce the sewage and pollutants from entering the canal. Through the use of macro, local and community strategies, the toolkit of water sensitive interventions can be applied as a comprehensive urban-landscape strategy. Proposed strategies like natural berms and planted mangroves along Adyar river to neighborhood level constructed wetlands, bio-filtration islands and flood proof public spaces strive to create a refined balance maximizing the closing of local water cycles. Strip 1.0 is the first step working at the amalgamation of public realm and ecological sustainability and marks the foundation stone for a larger, well connected and invigorating public space with an ecological goal at the core. The project envisions the creation of a new invigorating public space that is focused on the canal's well being, connecting and bringing various communities of the city together in order to harness interest and foster resiliency within the city.



TOOLKIT OF WATER SENSITIVE MANAGEMENT STRATEGIES

CITY LEVEL INTERVENTION

- Berm
- Limit Urbanization
- No Infrastructural Waste
- Constructed Wetlands
- Waste Water Treatment
- Reduction of Paved Areas
- Expansion Of Flood Area
- Helophytes
- Water Based Densification

NEIGHBORHOOD LEVEL INTERVENTION

- Re-naturalization of Banks
- Retention-ponds
- Natural Filters for Water Purification
- Adding green zones
- Water Retention Infrastructure
- Artificial Urban Wetlands

STREET LEVEL INTERVENTION

- Infiltration fields and strips with above ground storage
- Visibility of Asset
- Rain garden
- Bioswales
- Floating Filtration Islands
- Water Squares
- Raising The Ground Water Level
- Natural filters
- Raising The Ground Floor Level

BLOCK LEVEL INTERVENTION

- Rain water harvesting
- Green Roof
- Use of Ground Cover and Shrubbery

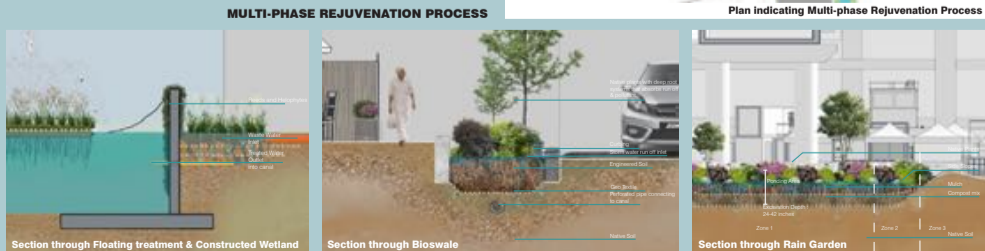
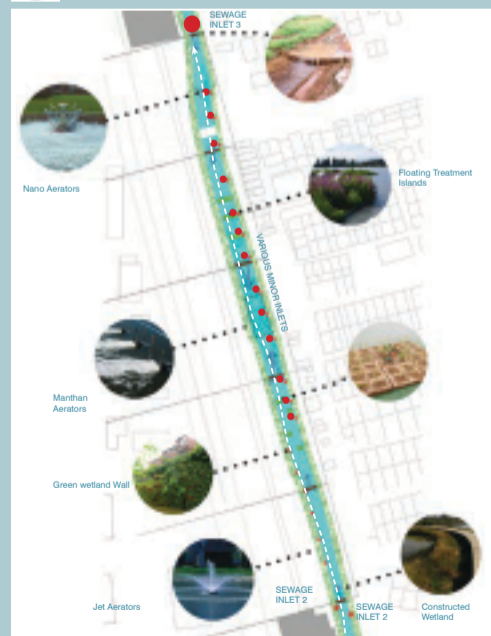
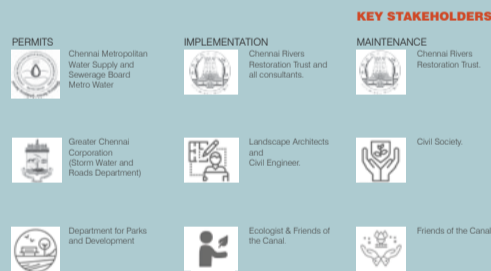
CURRENT AND PROJECTED INUNDATION MAP

LEGEND

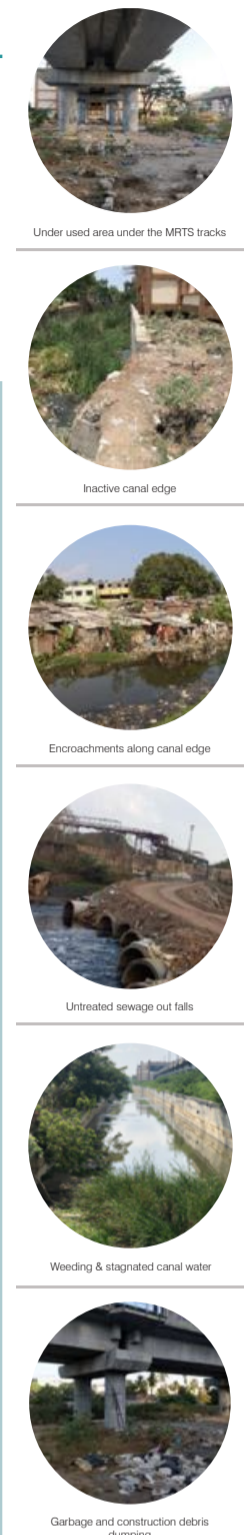
- Coastal areas under threat by sea level rise due to 2" rise in global temperatures
- Coastal areas under threat by sea level rise due to 4" rise in global temperatures
- Areas flooded in 2015
- CRZ line
- Roads flooded in 2015
- 2" Water level rise
- 4" Water level rise

PROPOSED INTEGRATED WATER MANAGEMENT SYSTEM

The proposed Integrated Water Management system for restoring Buckingham canal includes creating a network of small scale resilient green infrastructure projects that treats run off along the edges of the canal as well as a robust system that treats the existing effluents and sewage being dumped into the canal to restore the quality of the water flowing into the canal. A raingarden, bioswale, a strip of constructed wetlands on either banks and a system of floating treatment wetlands and aerators have been used to begin the process of restoring the canal edge at Strip 1.0. They work in tandem to create a holistic system to strengthen the canal and manage the storm water drainage into the canal. The proposed canal rejuvenation treatment system works on the biological process of Phytoremediation. The term "Phytoremediation Technique" encompasses the life interactions of bacteria, the roots of the wetland plants, soil, air, sun and water. Phytoremediation is the direct use of living plants for in situ remediation of contaminated soil, sludge, sediments, and ground water through contaminant removal, degradation, or containment. These pilot projects can then be adapted and scaled throughout the length of the canal.



A NEGLECTED CANAL



FRAME A: ADYAR RIVER

KEY STRATEGIES

- Develop resilient public space
- Improve access to waterfront from residential areas
- Improve connectivity to canal
- Increase permeable areas & build water retention infrastructure in flood-prone areas
- Earmark land in higher areas for affordable housing
- Increase FSI in higher lands to promote rehabilitation efforts from flood-prone area

FRAME B: RESIDENTIAL ZONE

KEY STRATEGIES

- Increase permeable area & build water retention system in flood-prone area
- Improve access to water front from residential areas
- Provide biofiltration zones in canal near residential areas for constant purification
- Sparsely low lying flood-prone areas in Adyar
- Develop building regulations for construction in flood-prone area
- Acquire land near canal for expansions
- Build retention ponds & water storage facility in low-lying areas

FRAME C: INSTITUTIONAL ZONE

KEY STRATEGIES

- Improve access from institutional & residential areas to parks
- Provide low income housing in government owned lands
- Invest in natural on-site storm water systems to reduce load on sewer lines
- Densification of in high-lying areas
- Vacant government owned land to be used for slum rehabilitation
- Reserve unbuilt land for creation of public space to cater to increased density

LEGEND

- Soft landscape
- Station plaza
- Area flooded in 2015
- 2" Water level rise
- 4" Water level rise
- Initial development
- Water retention infrastructure
- Station plaza
- Activity Node
- Improved Access to waterfront
- Bioswales
- Flood protection
- Proprietary
- Easy Access to waterfront
- Bioswales
- Boardwalk & bike-way
- New regulated construction
- Retention pond
- Rain garden and permeable infrastructure
- Waterfront edge
- Filtration islands
- Constructed wetlands
- Public garden
- Bioswales
- New low income housing
- Rain gardens & permeable infrastructure

PROJECT FOCUS

01 Re-imagine the Public Realm

Creating more inclusive and interactive public spaces

02 Restore Ecology

Promoting diverse ecology within the region

03 Foster Community Participation

Including the community in decision making and creating a platform to express their aspirations

04 Prioritize Environmental Sustainability

Making Chennai more resilient and establishing a sustainable system for future projects

PLACE-MAKING AT THE CANAL EDGE

Our vision is to create a vibrant public space that contributes to the fabric of the city physically, ecologically and culturally out of an otherwise under used urban pocket by harnessing a connection between the community and the banks of the canal. The plan aims at activating a pilot site on the banks of the Canal to create energy and dynamism and generate interest amongst the community through the use of temporary interventions and pop-up urbanism that can be implemented now with limited funding. Kickstarting a relationship between the users and the canal edge. Through a Menu of Programming, the Strip 1.0 becomes a new public space in an existing urban wasteland.

- 01 Create a new identity for the canal banks as public spaces.
- 02 Encourage a diverse set of activities that involve all strata of the society.
- 03 Revitalize existing unused urban spaces.
- 04 Develop a bio-diverse and native ecosystem to make the canal more resilient and sustainable.
- 05 Enhance comfort and safety of the users through appropriate amenities, lighting and security.
- 06 Increase community interaction with the site.





Team Sponge*

‘The Sponge Handbook Chennai’ is a guiding document to help align regional planning priorities and neighbourhood planning processes with the hydrological flows in the Chennai region. The handbook adopts the landscape approach to integrate infrastructure with ecology in order to make the city more resilient.

Chennai Metropolitan Area is home to more than 10 million people. Within the last two decades, Chennai has grown at a considerable pace. The city’s built-up area has indiscriminately expanded into marshes, farmlands, and forests, transforming a largely wet and permeable landscape into impervious concrete. As a result, Chennai is unprepared to face the regular stresses of the monsoons and unprecedented shocks from extreme rainfall or cloudbursts. At the other extreme, Chennai will face unprecedented water scarcity in the coming decades. Chennai’s water risks will continue to exacerbate over time unless the natural hydrological flows that sustain the region’s water bodies and aquifers are restored.

The handbook promotes four sponge basin principles of protect, delay, store and release to holistically manage water by leveraging existing natural landscapes and implementing a network of landscape infrastructures within the city’s fabric. The handbook comprehensively addresses the actions required at multiple scales and the timeline of implementation to realise these principles.

The 160-page handbook is divided into five parts to communicate the following:

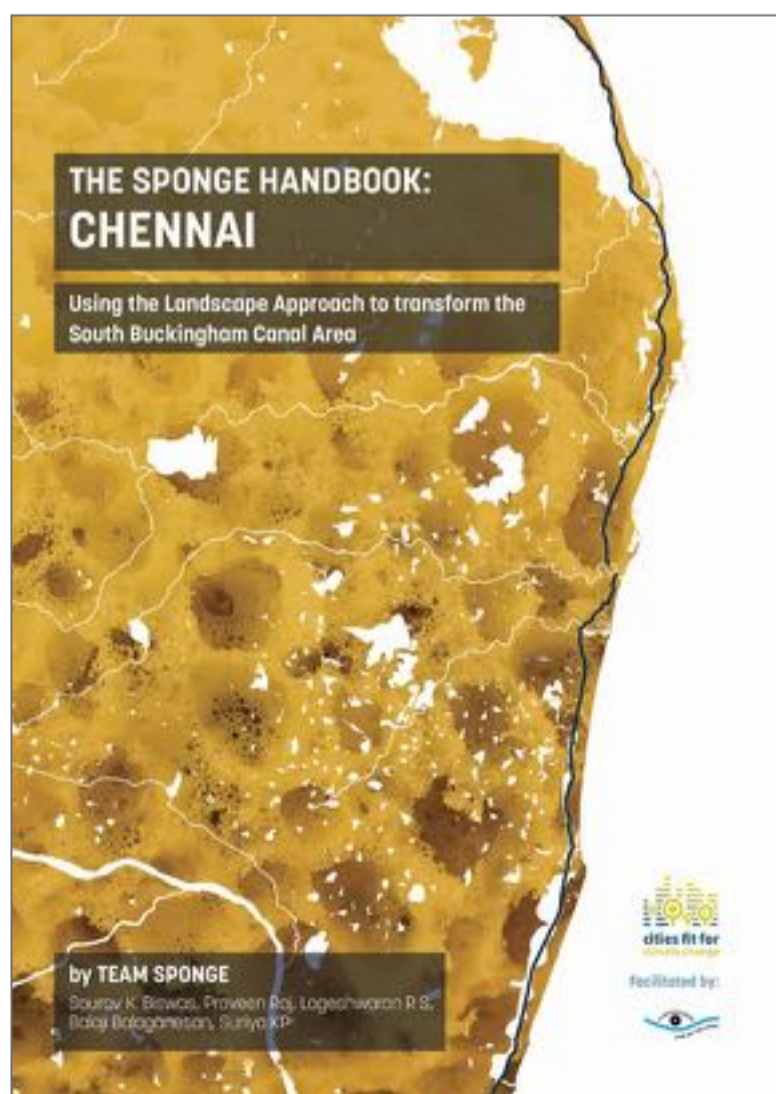
Part 1: Sponge Basin Concepts introduces the four key principles and describes why Chennai needs a landscape approach to guide urban development

Part 2: Sponge Landscape Infrastructure Toolkit uses descriptive drawings and guidelines to catalogue sponge landscape infrastructure projects that can be taken up to upgrade the city’s streets, open spaces, and buildings

Part 3: South Buckingham Canal Framework demonstrates how the sponge basin concept can be implemented in a neighbourhood by using the case of the South Buckingham Canal area

Part 4: Sponge Demonstration Project showcases how the Sponge Basin Framework and Sponge Landscape Infrastructure toolkits come together on a site next to the Buckingham Canal

Part 5: Visions for south Buckingham Canal offers inspiring and evocative imagery of fully realised sponge neighbourhoods and a holistically rejuvenated Buckingham Canal. The vision describes how the implementation of the Sponge Basin framework can lead to the creation of highly liveable neighbourhoods with resilient transit stations, open spaces, streets, and multi-functional infrastructures like the canal itself.



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THE SPONGE LANDSCAPE

THE SPONGE LANDSCAPE CONCEPT IS A STRATEGY FOR URBAN INFRASTRUCTURE THAT ENHANCES THE CITY'S ABILITY TO ABSORB AND STORE WATER, REDUCING FLOODING AND IMPROVING WATER QUALITY. IT IS A HOLISTIC APPROACH THAT INTEGRATES NATURE INTO URBAN PLANNING AND DESIGN.

HOW IT WORKS

THE SPONGE LANDSCAPE CONCEPT IS A STRATEGY FOR URBAN INFRASTRUCTURE THAT ENHANCES THE CITY'S ABILITY TO ABSORB AND STORE WATER, REDUCING FLOODING AND IMPROVING WATER QUALITY. IT IS A HOLISTIC APPROACH THAT INTEGRATES NATURE INTO URBAN PLANNING AND DESIGN.



THE SPONGE LANDSCAPE: CHENNAI

ANALYSIS OF URBAN INFRASTRUCTURE & PROPOSALS FOR URBAN INFRASTRUCTURE IMPROVEMENT

OBJECTIVES

- 1. Enhance water absorption and storage capacity of the city.
- 2. Reduce flooding and improve water quality.
- 3. Integrate nature into urban planning and design.

KEY FEATURES

- 1. Green roofs and walls.
- 2. Permeable pavements.
- 3. Rainwater harvesting systems.
- 4. Urban forests and parks.
- 5. Stormwater management systems.

Realizing Sponge Landscapes: From the Region to the Street

THE SPONGE LANDSCAPE CONCEPT IS A STRATEGY FOR URBAN INFRASTRUCTURE THAT ENHANCES THE CITY'S ABILITY TO ABSORB AND STORE WATER, REDUCING FLOODING AND IMPROVING WATER QUALITY. IT IS A HOLISTIC APPROACH THAT INTEGRATES NATURE INTO URBAN PLANNING AND DESIGN.



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SPONGE LANDSCAPE INFRASTRUCTURE TYPE TOOLKIT

ROOFS

- 1. Green roof
- 2. Blue roof
- 3. Rainwater harvesting
- 4. Permeable pavement

WALLS

- 1. Green wall
- 2. Blue wall
- 3. Rainwater harvesting
- 4. Permeable pavement

STREETS

- 1. Green street
- 2. Blue street
- 3. Rainwater harvesting
- 4. Permeable pavement

PARKS

- 1. Green park
- 2. Blue park
- 3. Rainwater harvesting
- 4. Permeable pavement

Feasibility Matrix for Sponge Landscape Infrastructures: Techniques

IMPLEMENTATION COST

PERFORMANCE RATING

Technique	Green	Blue	Grey
Green roof	High	Medium	Low
Blue roof	Medium	High	Low
Rainwater harvesting	Low	Medium	High
Permeable pavement	Low	Medium	High

Feasibility Matrix for Sponge Landscape Infrastructures: Techniques

IMPLEMENTATION COST

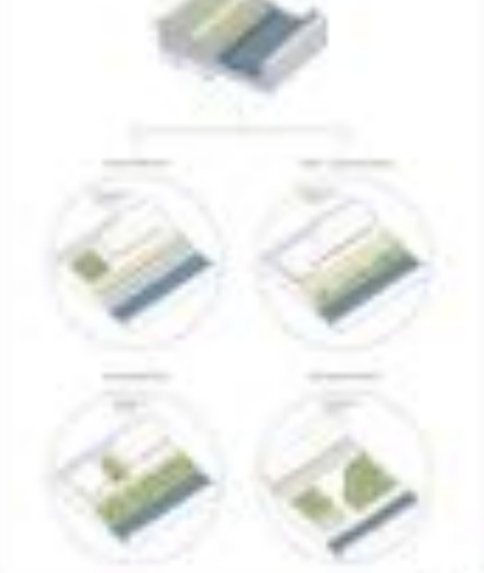
PERFORMANCE RATING

Technique	Green	Blue	Grey
Green roof	High	Medium	Low
Blue roof	Medium	High	Low
Rainwater harvesting	Low	Medium	High
Permeable pavement	Low	Medium	High

Development Scenario



Development Scenario



Sponge Street Enhancements

THE SPONGE LANDSCAPE CONCEPT IS A STRATEGY FOR URBAN INFRASTRUCTURE THAT ENHANCES THE CITY'S ABILITY TO ABSORB AND STORE WATER, REDUCING FLOODING AND IMPROVING WATER QUALITY. IT IS A HOLISTIC APPROACH THAT INTEGRATES NATURE INTO URBAN PLANNING AND DESIGN.



Sponge Street Drained Redevelopment for South West



Sponge Street Drained Redevelopment for South West





Summary and Key Recommendations for the Buckingham Canal

One key objective of the ideas competition was to collectively come up with a greater vision for the Buckingham Canal. The following key points can be considered as corner stones of that vision. However, it needs to be stated that

they are not exhaustive but a first proposal in the process of improving the condition of the canal and its surroundings.

Points to be considered in developing a Common Vision for the Buckingham Canal:

- Reinststate, reclaim and celebrate the canal as a public space for the residents of Chennai.
- Provide integrated climate-proof solutions to restore the canal’s function as flood mitigator.
- Revive the ecology, enhance the habitat of the canal and plan for sustainable development.
- Manage solid and liquid waste disposal better thereby enabling an improvement of the canal’s and the citizen’s health.
- Make an effort to be a model project that is collaborative in its process and inclusive in its ownership and responsibility.

Out of the competition process and the entries that were submitted the project team derived some recommendations. Some of these recommendations reflect a very specific approach which has been promoted by the participating competition teams. Therefore, they are not targeted at a specific institution nor do they follow a single logic but rather provide starting points for re-imagining the canal from different perspectives.

Key Recommendations for the Buckingham Canal:

1. Prioritise Buckingham Canal as a key flood mitigation channel to protect the city of Chennai from major climate events like the floods of 2015.
2. Develop a common vision for the entire stretch of Buckingham Canal and its surroundings not just through a homogenous engineering plan but through smaller site-specific projects with the involvement of local communities.
3. Initiate sustainable urban water management and planning; according to sponge city concepts, which basically promote the enhancement and adaptation of urban infrastructure systems to collect, store and treat (excess) rainwater. Measures that can be taken range from:
 - a) protecting green-blue systems from development, encroachment, and pollution
 - b) delaying storm water runoff by increasing green cover and implementing Sponge Landscape Infrastructure, which allows more effective management of excess rainwater
 - c) storing rainwater within the urban fabric through harvesting & storage structures
 - d) releasing water into the aquifers.
4. The Canal is in its current condition because of collective abandonment. Immediate and quick-win interventions need to be planned and implemented to draw the public’s interest towards the canal. This process can be initiated by a multi-stakeholder approach, with the approval coming from the government and funds coming from private corporate social responsibility (CSR) initiatives. The implementation can take place through local community organisations or resident welfare associations. The ongoing national missions (governmental programmes on national level) like the Smart Cities mission, can prioritise such projects along the Buckingham Canal.
5. The twin issues of sewage inflow into the canal and clogging of the canal due to dumping and mismanagement of solid waste need to be addressed immediately:
 - a) with the involvement of local communities and providing necessary education and infrastructure
 - b) through floating treatment islands which not only add to the beautification of the site but also clean the water
 - c) through solid waste management systems that can be developed and maintained in collaboration with the community.



Annex





Winning Entries of the Competition

PROTECT, DELAY, STORE, RELEASE!

A landscape framework for turning the Buckingham Canal area into a sponge



Members of the Team

Sasaki Associates, Inc. (Boston)

- Praveen Raj
- Sourav Kumar Biswas
- Hyunsik Mun

RADIX (Tiruppur)

- Logeshwaran Subramanian

School of Architecture and Planning
Anna University (Chennai)

- Balaji Balaganesan

Jury Statement

The key idea that makes this entry stand out is the sponge concept and how it applies it in both the neighbourhood and infrastructure design. If this idea were to be implemented, it would be the first one of its kind, to our knowledge, in the country. Through the idea of Sponge city, this proposal addresses many different facets of concern for the canal. It is a simple, elegant and crucial principle for integrating social, economic and ecological resilience into urban space design, thereby preparing the city for future shocks. Its proposal for mixed income and mixed use neighbourhoods along the canal stretch calls out to an inclusive vision for development. The proposals that flow out of an impressive larger vision are solid and accommodate every day activities that relate meaningfully to the neighbourhood scale. The solutions position the canal as a transformative corridor in the larger ecological context of the city.

The next steps suggested by the jury are:

- * to arrange consultations with the Corporation and institutions in order to identify areas that can be formed into sponge models.
- * to analyse what you can do on a small level and how to generate quick wins.
- * to ensure that effects need to be visible to get buy-in.

PROTECT, DELAY, STORE, RELEASE!

A landscape framework for turning the buckingham canal area into a sponge

Chennai began its urban growth trajectory at the mouth of the Cooum River. Today, the city rapidly expands beyond Adyar River into marshes, farmlands, and forests - indiscriminately turning a largely wet and permeable landscape into concrete. As rivers, canals, and other hydrological networks are disrupted, Chennai is unprepared to face the regular stresses of the monsoons and unprecedented shocks from extreme rainfall or cloudbursts. The city faces multiple water-related risks — from flooding to sea level rise to aquifer depletion. Yet, the urban typologies and planning paradigms of the city are indifferent to the region's ecological realities and challenges. **PROTECT, DELAY, STORE, RELEASE** is a four-step water management approach that aligns regional planning priorities and neighbourhood plans with the hydrological cycle of Chennai's basins.

The Buckingham canal traverses multiple basins including the Adyar River basin and the Buckingham canal Chennai sub-basin. The canal's ability to withstand cloudbursts is inevitably linked to the preservation of upstream blue-green systems and a network of infrastructures within the city that can slow down runoff, store rainwater, and release into the aquifer. As such, we propose a **SPONGE BASIN** framework that is regional in scope but requires landscape-based interventions at various scales. The project uses the Buckingham canal area to demonstrate how the Sponge Basin framework can lead to the re-imagination of urban neighbourhoods, transit stations, open spaces, streets, and the rejuvenation of multi-functional infrastructures like the canal itself.

Two sites along the canal stretch are identified to test the opportunities in more detail.

Site 1: SPONGE NEIGHBOURHOOD envisions a resilient, transit-oriented, mixed income, residential and institutional district around the Kotturpuram MRTS. The design demonstrates how dense urban areas can also contribute to the capacity of Buckingham Canal by delaying, storing, and releasing runoff within multi-functional 'holding ponds'. The housing typologies ensure socio-economic diversity as market rate apartment towers are stacked over podiums with affordable and resettlement housing. Unlocking new development potential with incentive-based zoning for developers will help fund the Sponge Basin network through PPP modules involving all local stakeholders.

Site 2: SPONGE INFRASTRUCTURE depicts how landscape-driven approaches can be applied to existing infrastructure through the insertion of best stormwater management practices along strategic streets, modifying open spaces, and opening up the edge of a restored canal in order to turn the Buckingham Canal area into a Sponge Basin. The design showcases architectural and landscape innovations that transform the canal into a civic, ecological, and infrastructural asset for the city. By replacing the concrete wall with ghats and natural slopes, and naturalizing the section as whole, the canal is protected as a natural waterway rather than a conduit. Existing parks are modified within the Sponge Basin framework and strategic streets are upgraded with landscape interventions along medians and sidewalks. Together, the interventions within the canal edge, the parks and streets are prepared to delay, store, and release rainwater during cloudburst.

Thus, the project creates a compelling vision of how landscape-based approaches to new development and existing infrastructures can lead to a more livable and resilient Chennai.

PROTECT, DELAY, STORE, RELEASE!

A LANDSCAPE FRAMEWORK FOR TURNING THE BUCKINGHAM CANAL AREA INTO A SPONGE

1. PROTECT

The city's blue-green systems from development



2. DELAY

Stormwater runoff from reaching rivers or canals



3. STORE

Rainwater in holding ponds and tanks



4. RELEASE

Rainwater into the aquifer to recharge groundwater



Chennai began its urban growth trajectory at the mouth of the Cooum River. Today, the city rapidly expands beyond Adyar River into marshes, farmlands, and forests - indiscriminately turning a largely wet and permeable landscape into concrete. As rivers, canals, and other hydrological networks are disrupted, Chennai has become a low-lying city that is unprepared to face the regular stresses of the monsoons and unprecedented shocks from extreme rainfall or cloudbursts. The city faces multiple water-related risks - from flooding to sea level rise to aquifer depletion. Yet, the urban typologies and planning paradigms of the city are indifferent to the region's ecological realities and challenges.

the hydrological cycle of Chennai's basins.

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PROTECT, DELAY, STORE, RELEASE is a four-step water management approach that aligns regional planning priorities and neighbourhood plans with

REGIONAL ANALYSIS

LINKING BUCKINGHAM CANAL TO THE LARGER BASINS OF CHENNAI



BASIN DEVELOPMENT SCENARIOS

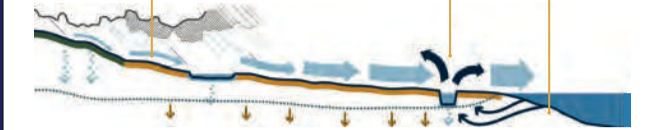
Do-Nothing Scenario

- No planning regulations to limit sprawl & protecting green-blue ecological systems
- No upgrades to stormwater infrastructure
- No restoration efforts towards Adyar River or Buckingham Canal

Loss of upstream wetlands & green cover increases runoff and chances of flooding during cloudbursts

Stormwater infrastructure, canals, & rivers are overwhelmed as water rushes through impervious surfaces

Excessive extraction & lack of aquifer recharge leads to saltwater infiltration



Sponge Basin Scenario

- PROTECT** upstream green-blue assets through regulations. Minimize sprawl through transit-oriented development
- DELAY** stormwater runoff by increasing green cover to reduce peak flows from overwhelming canals & rivers
- STORE** rainwater within the urban fabric through harvesting & storage structures, parks & open spaces, and holding ponds or detention basins
- RELEASE** water into the aquifer by ensuring most rainwater drains underground instead of out to the sea

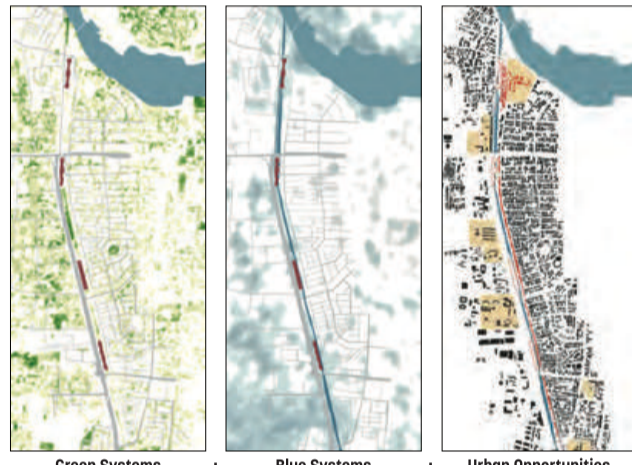
Protected wetlands & green cover in upstream areas absorb & slow down water

Pockets of green spaces, holding ponds, & green streets delay or stop stormwater from rushing into canals & rivers

Slow release & infiltration of rainwater after storm events increases aquifer levels



SITE ANALYSIS



= BUCKINGHAM CANAL AREA AS A SPONGE

Our analysis reveals existing parks, green cover, low elevations along the canal stretch that can be made to work together as a **SPONGE BASIN**. Two sites are identified to test the opportunities in more detail. **Site 1: SPONGE Neighbourhood** demonstrates the potential of new development typologies with a public realm that is well adapted to delay, store, release during cloudbursts. **Site 2: SPONGE INFRASTRUCTURE** depicts how the Sponge Basin framework can be realized within the constraints of existing infrastructure through the insertion of best stormwater management practices along strategic streets and opening up the edge of a restored canal.

VISIONS OF A RESILIENT BUCKINGHAM CANAL

HOW CAN TRANSIT STATIONS BECOME HUBS OF ACTIVITY THAT STRENGTHEN THE RESILIENCE OF THE CANAL?

Site 1 - Kotturpuram MRTS Transit Plaza



HOW CAN AREAS ALONG CANALS AND RIVERS GROW AS ACTIVE, DIVERSE, AND RESILIENT NEIGHBOURHOODS?

Site 1 - Mixed-Housing Courtyard and Neighbourhood Spine

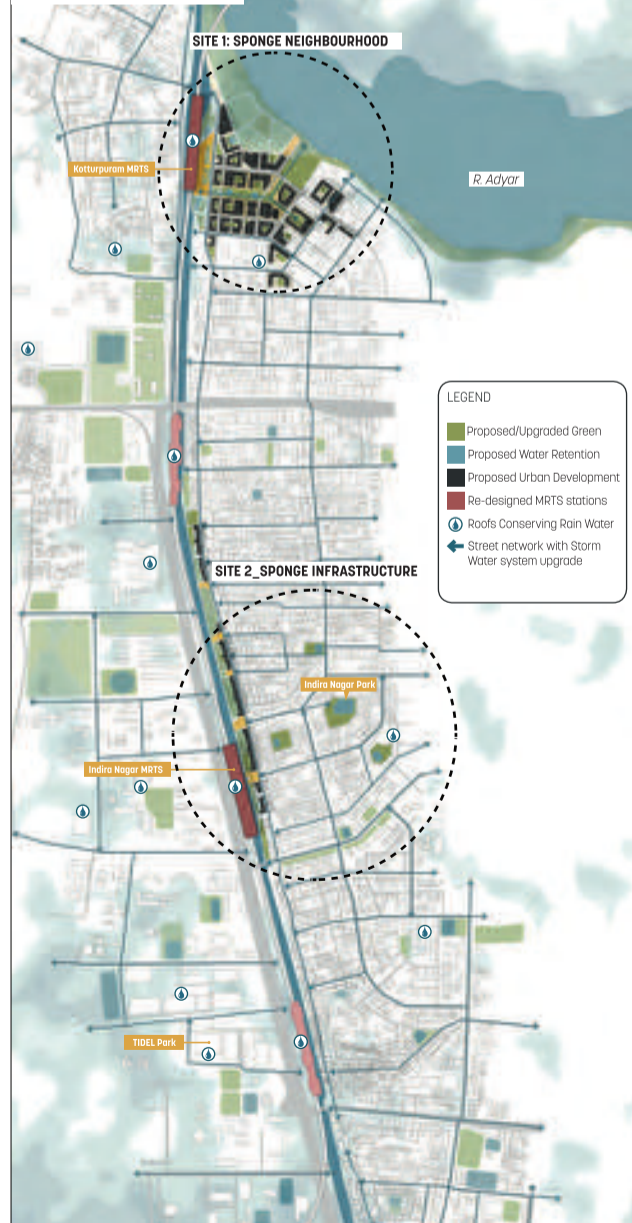


HOW CAN THE CANAL EDGE BE OPENED UP TO MAKE ROOM FOR WATER, ECOLOGY, AND PUBLIC LIFE?

Site 2 - Linear Relocation housing and Retail street



FRAMEWORK PLAN



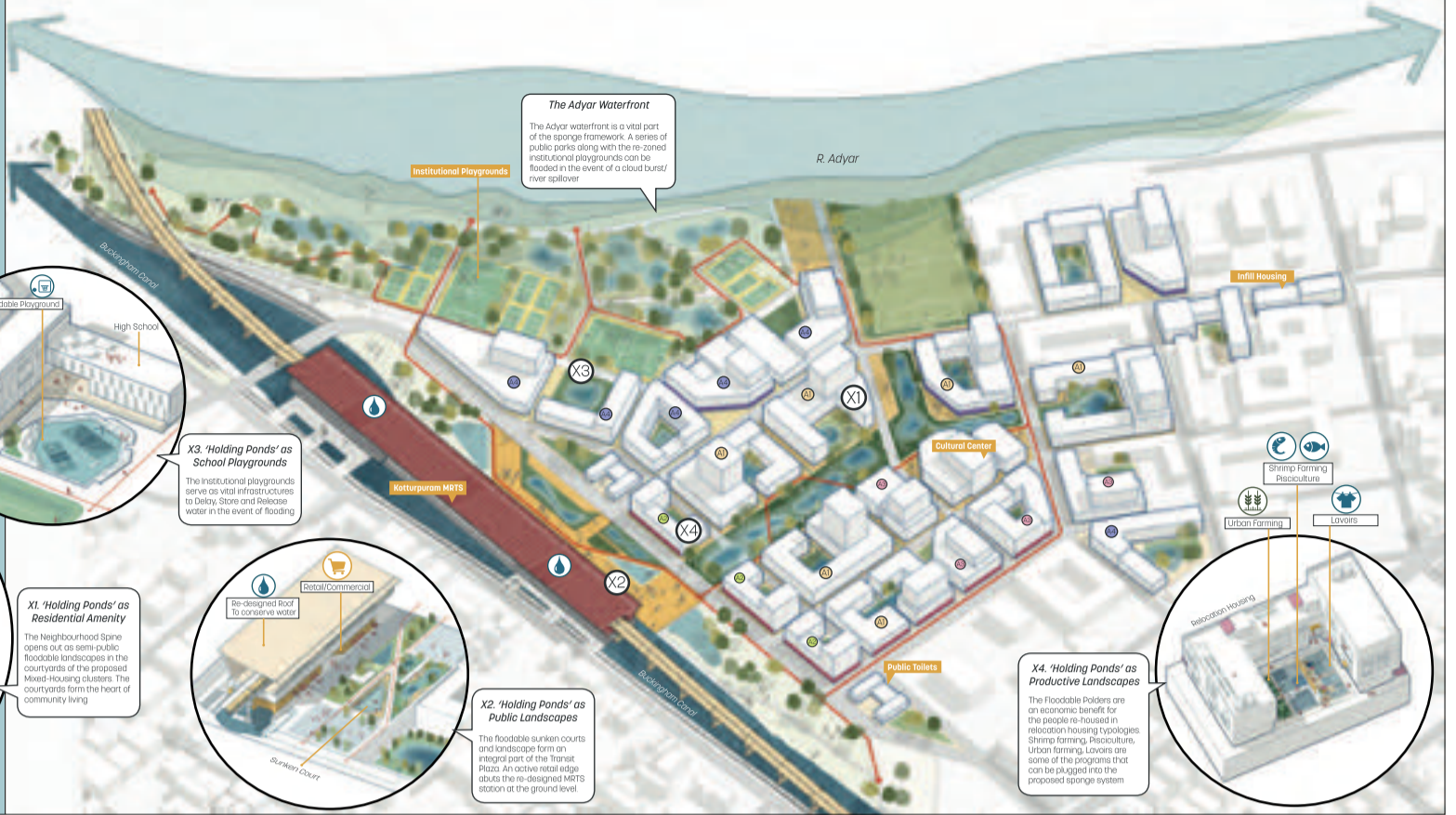
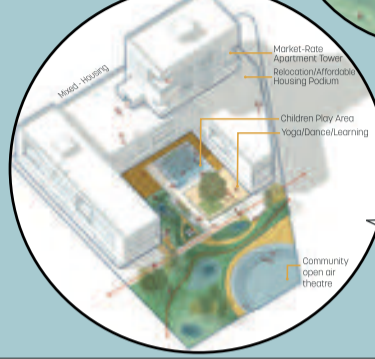
SITE 1: SPONGE NEIGHBOURHOOD

HOW THE SPONGE BASIN FRAMEWORK CAN CREATE DENSE, HIGHLY LIVABLE AND RESILIENT NEIGHBOURHOODS

This scenario envisions a transit-oriented, mixed income, residential and institutional district around the Kotturupam MRTS. The Adyar riverfront is rezoned and **protected** as a recreational water edge that acts as a buffer for schools and residences during flood events. The design demonstrates the dense urban areas can also contribute to the capacity of Buckingham Canal by **delaying, storing, and releasing** runoff within multi-functional 'holding ponds'. Courtyards, plazas, and linear parks are creatively designed to serve as public spaces as well as flood-management infrastructure during a cloudburst. The housing typologies ensure social inclusion as market rate apartment towers are stacked over podiums with affordable and resettlement housing. Unlocking new development potential with incentive-based zoning for developers will help fund the resilient sponge system through a PPP module by involving all the stakeholders.

LEGEND

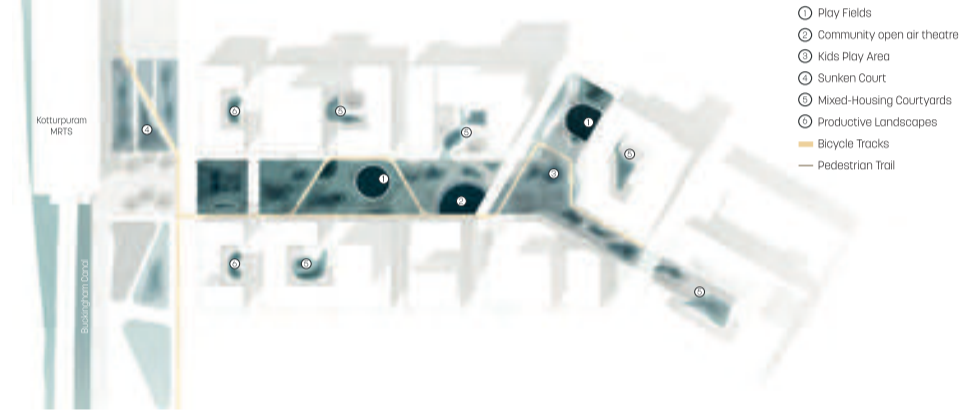
- Mixed Housing - Affordable Housing Podium (400 units) + Market Rate Apartment Tower (170 units)
- Relocation Housing - 125 units
- Market Rate Apartments - 500 units
- Institutional Buildings - 30,000 sq m
- Ground Retail - 15,000 sq m
- Roofs Harvesting Rain Water
- Bicycle Routes



NEIGHBOURHOOD SPINE AS A HIGHLY PROGRAMMED PUBLIC SPACE



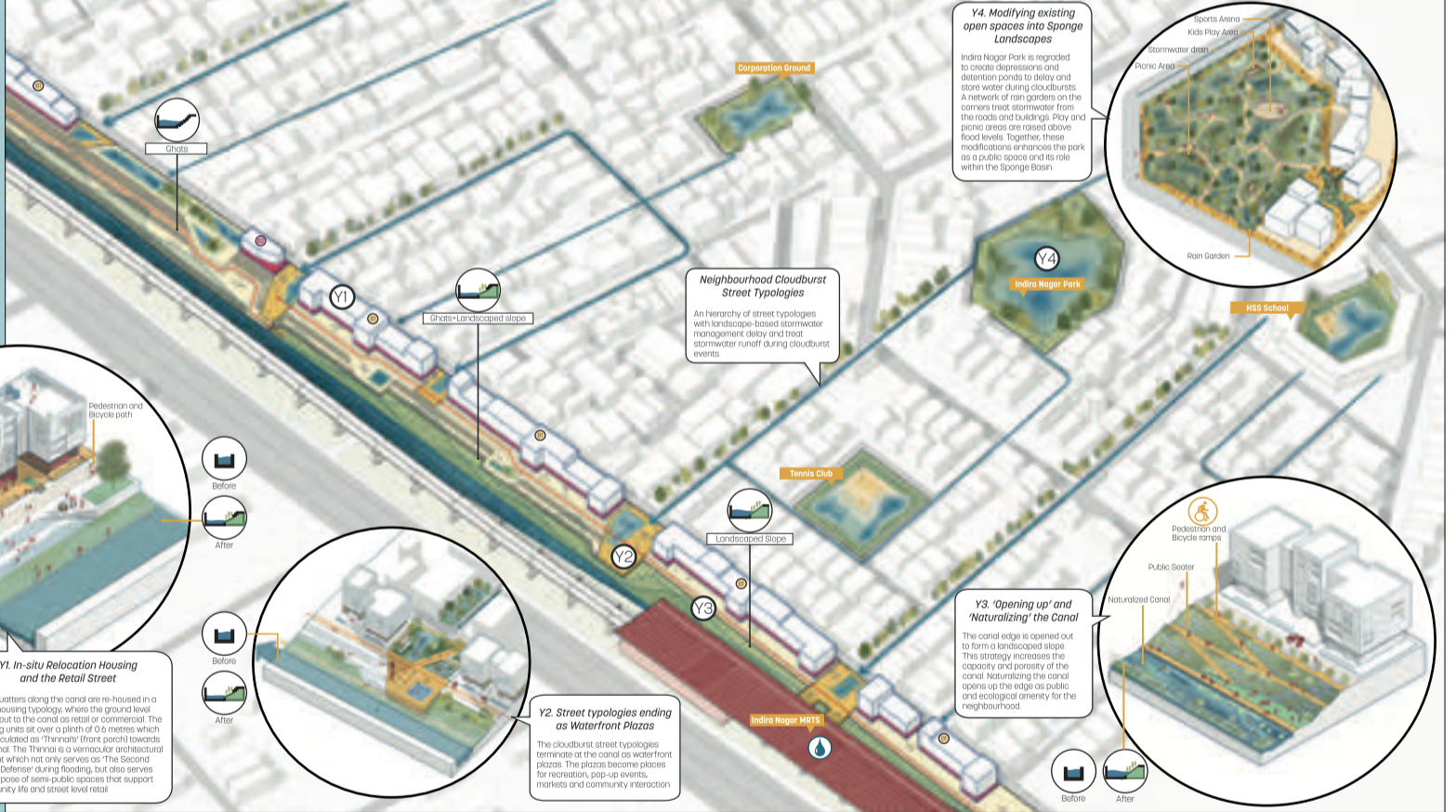
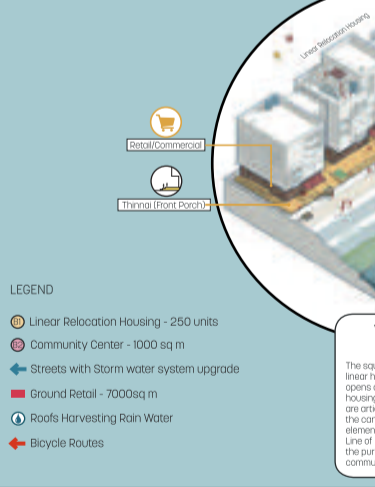
NEIGHBOURHOOD SPINE AS A SPONGE DURING CLOUDBURST EVENTS



SITE 2: SPONGE INFRASTRUCTURE

HOW THE SPONGE BASIN FRAMEWORK CAN INFORM THE REDESIGN OF THE CANAL AND THE STREETS DRAINING INTO IT

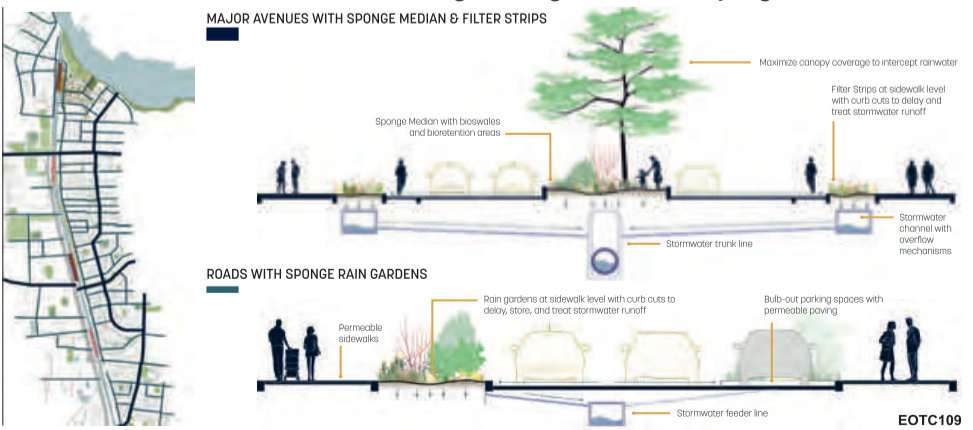
This scenario uses landscape-driven approaches to transform existing infrastructures like the canal, open spaces, and streets into a network that turns the Buckingham Canal area into a Sponge Basin. Today, the Buckingham Canal area is constrained physically, by concrete walls and the encroachment on the edges, and systemically by infrastructural networks that dump waste into the canal. The design showcases architectural and landscape innovations that can follow concerted clean-up efforts to transform the canal into a civic, ecological, and infrastructural asset for the city. By replacing the concrete wall with ghats and natural slopes, and naturalizing the section as whole, the canal is **protected** as a natural waterway rather than a conduit. A linear mixed-use typology accommodates existing squatters in-situ, and creates an active retail base that opens up to visually connect the neighbourhood to the canal. Existing parks are modified within the Sponge Basin framework and strategic streets are upgraded with landscape interventions along medians and sidewalks. Together, the interventions within the canal edge, the parks and streets are prepared to **delay, store, and release** rainwater during cloudburst.



REJUVENATING THE CANAL FROM A CONDUIT TO A PUBLIC AMENITY & ECOLOGICAL HABITAT



CLOUDBURST STREET TYPOLOGIES: Turning existing roads into a sponge basin network



Praveen Raj, Sourav Kumar Biswas, Hyunsik Mun, Sasaki Associates, Inc. (Boston); Logeshwaran Subramanian, RADIX (Tiruppur) and Balaji Balaganesan, School of Architecture and Planning - Anna University (Chennai)

THE CANAL COLLABORATIVE

An inclusive multi-purpose approach to create an integrated resilient system



Members of the Team

Studio POD (Mumbai)

- Pallavi Deore
- Anuja Joshi
- Satish Chandran
- Shagun Sharma
- Simran Arora

Jury Statement

This solution is a good example of how a combination of multiple simple solutions can produce a long lasting impact. What makes this proposal stand out is that it places the community as the custodian of the process. This is also one of the proposals that the jury found to be imminently implementable.

It emphasises the creation of public space as well as linking places and buildings for better effect. It also speaks about how to brand this project and make it widely acceptable. The approach also works at multiple scales and finds transformative opportunities in what already exists on the ground. The solutions are also supported by good visual content in the presentation.

The next steps suggested by the jury are:

- to prioritize up to five fields of intervention and detailing this out.
- to concentrate on local collaboration and look for more buy-in.

THE CANAL COLLABORATIVE

An inclusive multi-purpose 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, Corporate Social Responsibility, 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.

The Canal Collaborative

An Inclusive, Multifunctional approach to create an integrated resilient system

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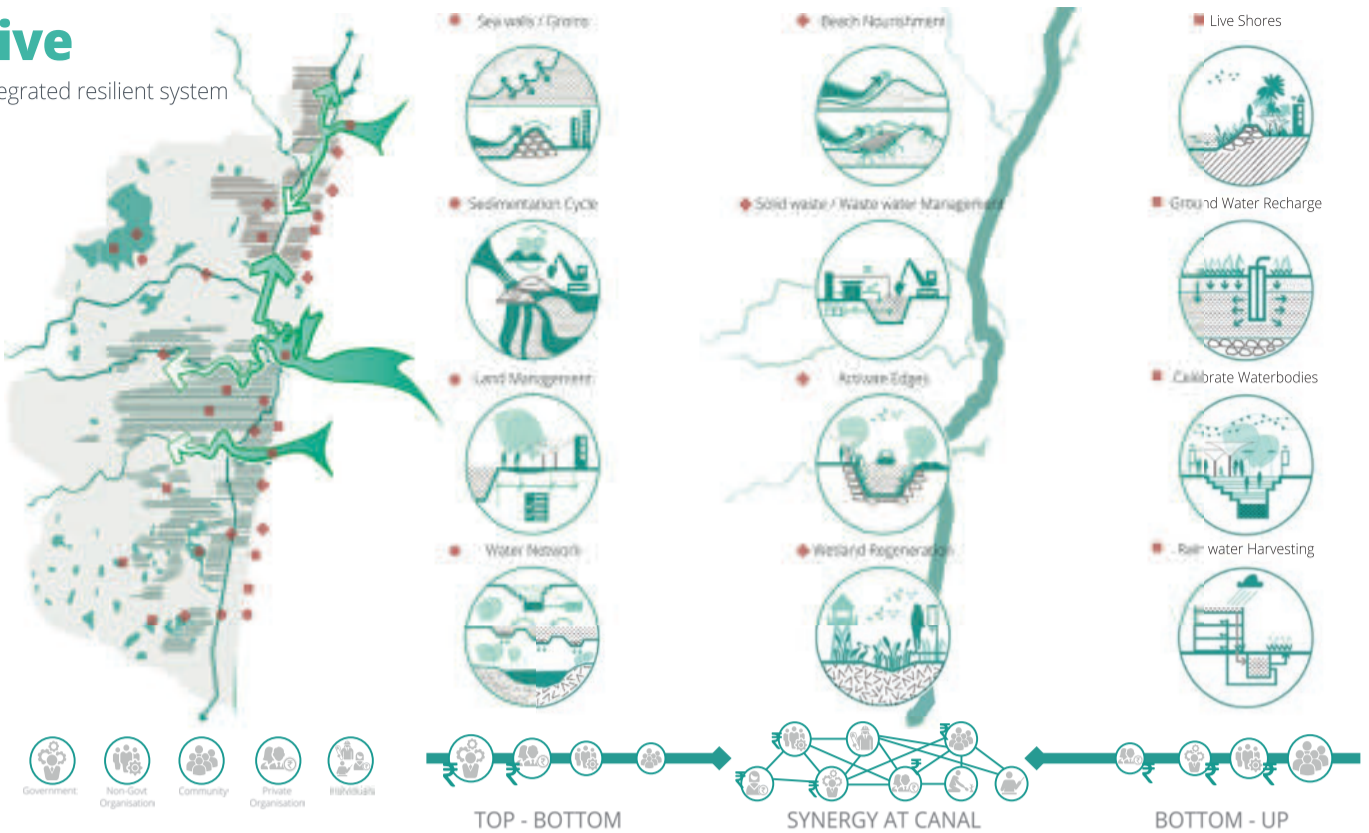
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TOP - BOTTOM

SYNERGY AT CANAL

BOTTOM - UP

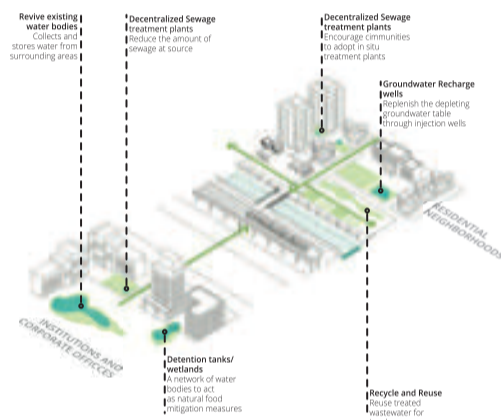
A Top-bottom approach usually has the state enforcing a typical solution supported by planning by officials / professionals and public consultation at the end of project making. The risk being a long processing time and difficulty in implementation.

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

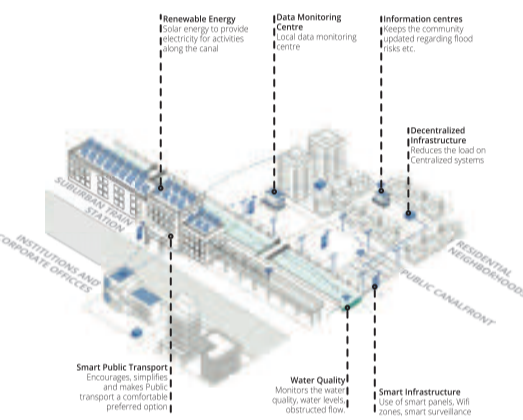
A Bottom-Up approach has the state playing a regulatory function and participation of public and stakeholders becomes the central focus. The risk being conflicting needs and high to low participation of all groups. The incentive is also lacking in such cases.

OPPORTUNITY AREAS

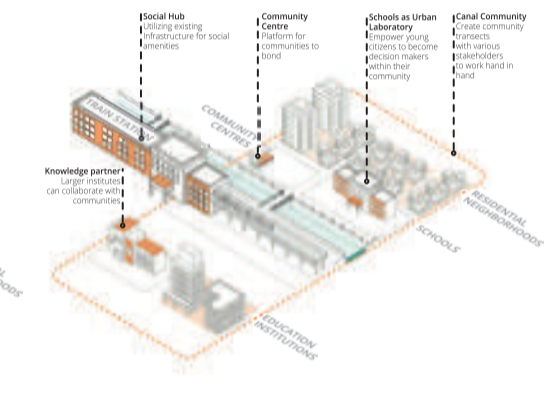
ECOLOGY



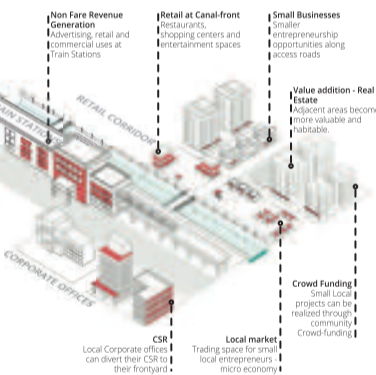
INFRASTRUCTURE



COMMUNITY



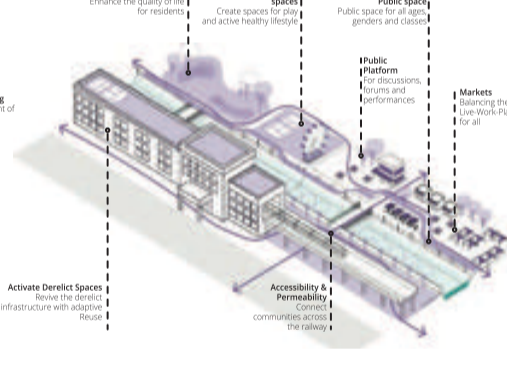
ECONOMY



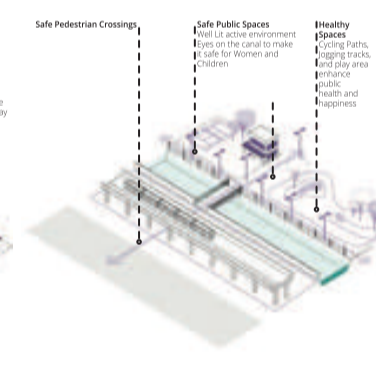
MICRO-ECONOMY



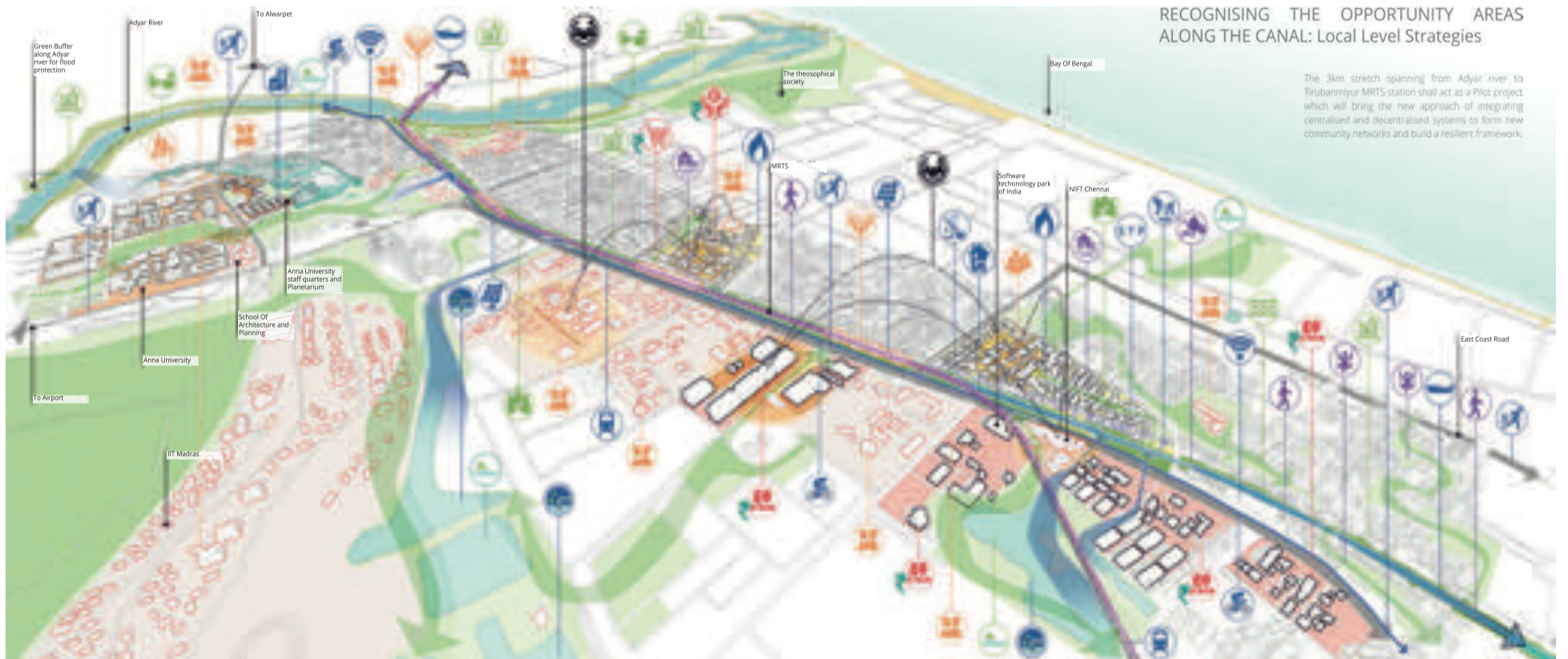
PLACE-MAKING



PLACE-MAKING



COMMUNITY



RECOGNISING THE OPPORTUNITY AREAS ALONG THE CANAL: Local Level Strategies

The 3km stretch spanning from Adyar river to Tirubanniyur MRTS station shall act as a Pilot project which will bring the new approach of integrating centralised and decentralised systems to form new community networks and build a resilient framework.

- Ecology:** Wetlands, Naturalised Canal & River edges, Developing new retention ponds, Urban Farming, Retaining water in canal for transport.
- Infrastructure:** Emergency evacuation route, Rainwater collection/Storage, Waterways in canal, Dedicated Cycle path, Data Monitoring station, Denatification through, Emergency refuge camp, Graduate volunteers, Community participation, Community space, Revenue generation vis retail.
- Social Infrastructure:** Groundwater recharge system, Deep shaft Aquifers, Sewage Treatment Plant, Smart transit system, Organic composting unit, Harvesting solar energy.
- Funding:** CSR funding, Self sufficient micro.
- Place Making:** Canal front re-development, Walking and jogging tracks, Parks and gardens, Playgrounds.
- Stakeholders:** Consortium between stakeholders.

Team Code Name: EOTC208

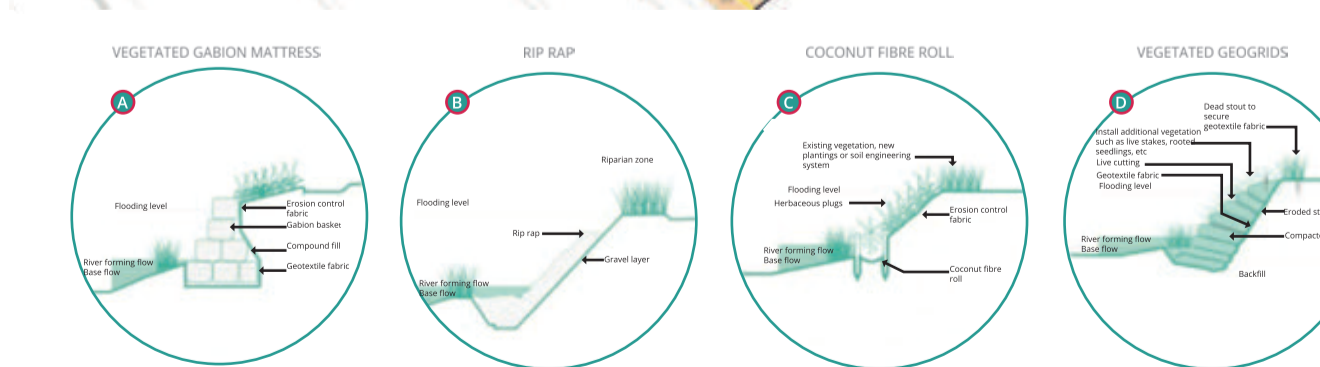
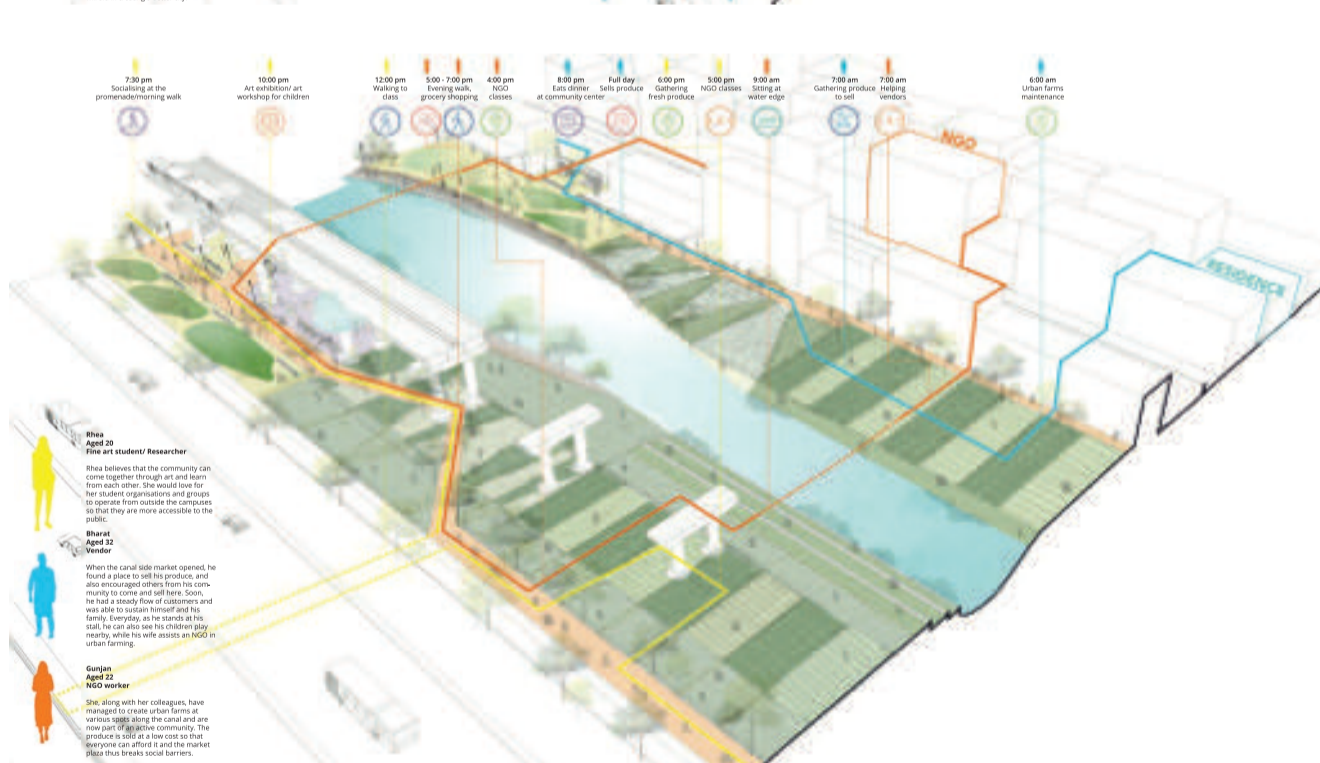
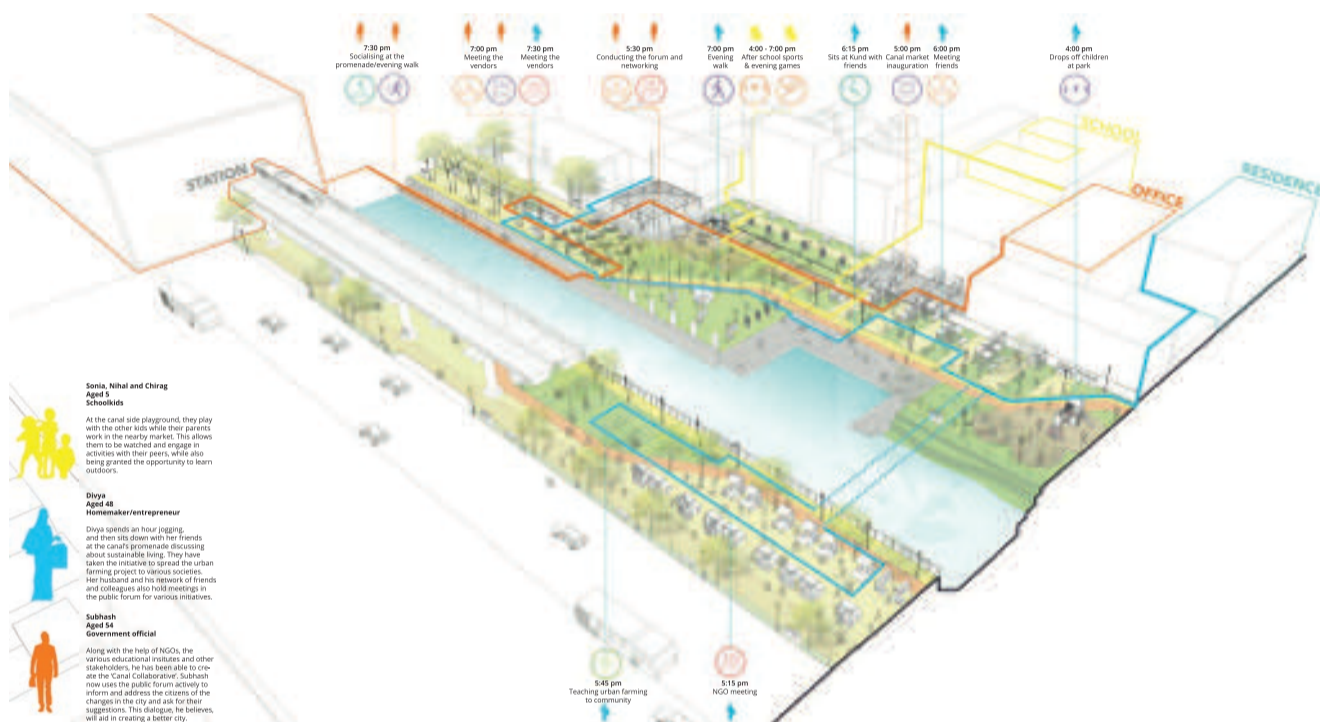
The Canal Collaborative

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: Ecologists/ 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/NGOs
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

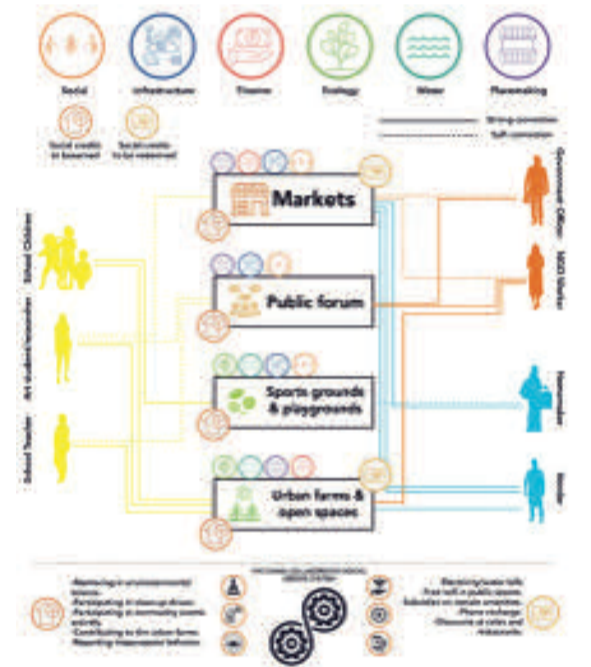


CANAL TRANSECTS

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.



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

Pallavi Deore, Anuja Joshi, Satish Chandran, Shagun Sharma, Simran Arora, StudioPOD (Mumbai)

LEVERAGING BUCKINGHAM CANAL TO BE CHENNAI'S SHOCK ABSORBER

A Toolkit of Water Sensitive Interventions



Members of the Team

The Blank Slate (Mumbai)

- Pratik Daulat
- Bina Bhatia
- Vini Shah

Jury Statement

The entry takes a kit of interventions approach and offers tools to make many of its ideas applicable. This toolkit approach is innovatively applied to the proposal and demonstrates how to transform the canal into being Chennai's shock absorber.

The entry offers multiple proposals that cater to different sections and target groups and its detailed design for the demonstration stretch is sensitive to the different land use patterns along the canal. Further, the proposal enhances the ability of the demonstration stretch to respond to extreme events (cloudburst, storm surge, etc.)

This is achieved by connecting the solutions for the canal with the larger canal system. In addition, it explores the possibility of increasing affordable housing stock at suitable selected areas.

The jury makes the following suggestions:

- ★ to make target groups more clear and frame intervention more specific for the respective target groups.
- ★ to take care of implementation (more modular) and to develop the idea in more detail in one section for feasible implementation.

LEVERAGING BUCKINGHAM CANAL TO BE CHENNAI'S SHOCK ABSORBER

A Toolkit of Water Sensitive Interventions

Our proposal is to re-imagine the Buckingham Canal as a means of making the city of Chennai climate proof and an example of the kind of pro-active and collaborative steps that are urgently needed to address the challenges arising out of unpredictable climate, rising sea levels, future storm surges and possible inundation of the coastal areas of Chennai.

The proposal broadly looks at the different industrial, residential and ecological landscapes that the canal runs through in Chennai and based on land use suggests strategies to combat the perils of climate change at a regional level including Protecting Critical Infrastructure, Flood proofing vulnerable communities and Planned water sensitive future development. If maintained well, desilted and widened Buckingham canal has tremendous potential to protect Chennai from excessive flooding. The project studies future shocks and stresses that could affect the city and identifies Buckingham Canal as an asset that has already providing resilience and is need of of strengthening to future-proof Chennai.

The proposal offers a series of strategies and a kit of interventions that are to be applied based on the existing local conditions instead of an over-arching broad master plan. Rather, through the use of macro, local and community strategies we propose various interventions that can be understood in themselves or applied as a comprehensive urban / landscape strategy.

At a local scale we look at three frames - At Adhyar River, a Residential and an Institutional frame and suggest how a cohesive approach of developing the canal and

surrounding area can help protect the vulnerable low lying coastal area. The canal is revitalised on the strategy of 'Delay, retain, store and reuse, drain when necessary' approach. There is a toolbox of physical measures that have been illustrated below; these display the water sensitive intervention measures that respond to the varying challenges arising in the three frames selected along the canal. Proposed strategies like natural berms and planted mangroves along Adhyar river to neighbourhood level constructed wetlands for local sewage treatment, bio filtration islands in the canal, retention ponds and flood proof public spaces capable of transforming into storage areas strive to create a refined balance maximizing the closing of local water cycles and optimizing two flows of public money into one integral investment. Along with water sensitive strategies, we propose land use regulations, increasing Floor Space Index (FSI) in higher lying areas to help shifting of vulnerable communities as well as building guidelines with which we can begin to mitigate and protect communities of Chennai. By integrating Chennai's different urban layers and land-uses, this proposal enhances and broadens the relevance of the historical and social values present there, and at the same time raising the quality and attractiveness of the canal by converting it into an adaptive waterfront development. The innovative and inclusive urban solutions offered here convert a current liability for the city to which it has turned its back on into a social asset which not only protects the ecology, but honours the cultural traditions, local identity and also enhances the economic returns for the city, thereby providing a comprehensive resilience from nature and man induced challenges of the future.

Leveraging Buckingham Canal to be Chennai's Shock Absorber

REBUILDING BUCKINGHAM CANAL TO BE CHENNAI'S SHOCK ABSORBER

Our proposal is to re-imagine the Buckingham Canal as a means of making the city of Chennai climate proof and an example of the kind of pro-active and collaborative steps that are urgently needed to address the challenges arising out of unpredictable climate, rising sea levels, future storm surges and possible inundation of the coastal areas of Chennai.

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CITY LEVEL INTERVENTION

Dyke
A berm wall will help in blocking the water from overflowing in the city during a period of floods or disaster.

Limit urbanization
By limiting urbanization the green spaces are retained and they help in controlling the climate.

No Infrastructural Waste
By provision of proper management for disposal of heavy infrastructural waste, the water is avoided from being polluted.

Construction wetlands
A berm wall will help in blocking the water from overflowing in the city during a period of floods or disaster.

WASTE WATER TREATMENT PLANT
This Plant can help convert waste water from industries and residential area to an effluent that can be returned to the cycle.

Reduction of paved areas
Reduced Pavement will help in reduction of surface water runoff. Thus there will be a lower risk of flood.

EXPANSION OF FLOOD AREA
Expansion of Flood Area will decrease the risk of flooding by increasing the capacity of water to be conveyed.

HELOPHYTES
Helophyte Filters has a large quantity of biomass & living surface for micro-organisms. This helps in purification.

WATER BASED DENSIFICATION
Water based densification helps in deducing FSI for structures according to their stationing on land.

AREA LEVEL INTERVENTION

Re-naturalization of Banks
Natural Vegetation Buffer helps protect the quality of water & also stabilize the shoreline & reduce erosion.

Retention-ponds
Rainwater Catchment areas helps in harvesting water for the longer period of year.

Natural Filters for Water Purification
Mangrove enclosure near the river will protect the shoreline from being damaged by tsunami and storm.

Adding green zones
Green Buffer Zone will engage in reducing the temperatures and improving the quality of air and life in the city.

Water Retention Infrastructure
Rainwater collected from roofs and man-made hard surface would help in using the rain water for daily household use.

Artificial Urban Wetlands
wet lands function as water retention basins, sediment traps & waste water treatment areas by filtration and immobilizing harmful micro-organisms.

Rain garden
Rain gardens are a garden of native shrubs and perennials that are planted in a small depression. They will temporarily hold and soak water from roofs and

STREET LEVEL INTERVENTION

Infiltration fields and strips
With above ground storage

Visibility of Asset
Employing water as a functional aspect to heritage or prominent buildings helps in creating awareness.

Rain garden
Rain gardens are a garden of native shrubs and perennials that are planted in a small depression. They will temporarily hold and soak water from roofs and

Floating Filtration Islands
Floating filtration island help in up taking nutrients in aquatic systems making them unavailable for algae or aquatic weeds.

WaterSquares
Water Squares are a combination of water storage with an improvement of the quality of urban spaces. It also gives an identity to spaces in the city.

Raising The Ground water Level
Bioswales are a depression that retain water from roof and streets. This way clean water is infiltrated into soil.

Natural filters
These filters help in trapping waste from water and help improving the quality of water.

Raising The Ground Floor Level
Constructing buildings on stilts will help in preventing flooding in buildings.

Porous Pavements
Porous Pavements are created with a range of sustainable materials that allow the movement of water through the surface.

Rain forest harvesting
Rainwater collected from roofs and man-made hard surface would help in storing water for the dry periods.

BLOCK LEVEL INTERVENTION

Green Roof
Green roofing systems will cater to solving problems like temperature increase and reduced habitat. It will help mitigate the heat island effect.

Use of Ground Cover and Shrubbery
It is an advantage to have a greater percentage of soft scape in comparison to built scape since it increases ground

NORTH CHENNAI

This zone houses Chennai's critical infrastructure and industries that keep it running. Almost all of Chennai's power plants, water treatment facilities, industries, dumping yards, water supply and ports are located here. With sea levels rising in the coming decades, unless steps are taken to protect critical infrastructure now, Chennai will come to a stand still.

STRATEGIES:

- Absolute stop to illegal fly-ash dumping in the canal
- Promote wastewater and sewage reuse in industries
- Heavy investment in flood proofing critical infrastructure
- Extensive purification and dredging of canal

CENTRAL CHENNAI

As Buckingham canal cuts through the heart of the city, it can help in climate proofing low lying area near rivers and neighborhoods that constantly suffer from flooding during heavy rains as well as which are at a risk from increasing sea levels due to polluted water channels and insufficient sewage systems

STRATEGIES:

- Create Neighborhood level flood defense plans
- Build decentralized natural wastewater treatment systems such as constructed wetlands
- Soft flood protection edges along rivers
- Develop micro water management solutions for informal settlements
- Develop building regulations for construction in flood prone areas
- Increase FSI in high lying areas to promote sparsification from vulnerable neighborhoods
- Constant biofiltration in canal
- Rethink flood infrastructure as social infrastructure

2050 SLR

1 MTR SLR ESTIMATED IN CHENNAI
144 SQ KM LAND INNUNDATED
7,01,790 CRORE EXPECTED LOSSES
4.35 - 6.85 FUTURE STORM SURGE

2017 FLOODS

GENGU REDDY SUBWAY, LB ROAD, TARAMANI LINK ROAD AND VELACHER SEVERELY FLOODED

2015 FLOODS

INR 14,630 CRORES LOSSES
400 PEOPLE DEAD
1000,000 STRUCTURES DAMAGED
WORST FLOOD IN 100 YEARS
8 MOST EXPENSIVE NATURAL DISASTER

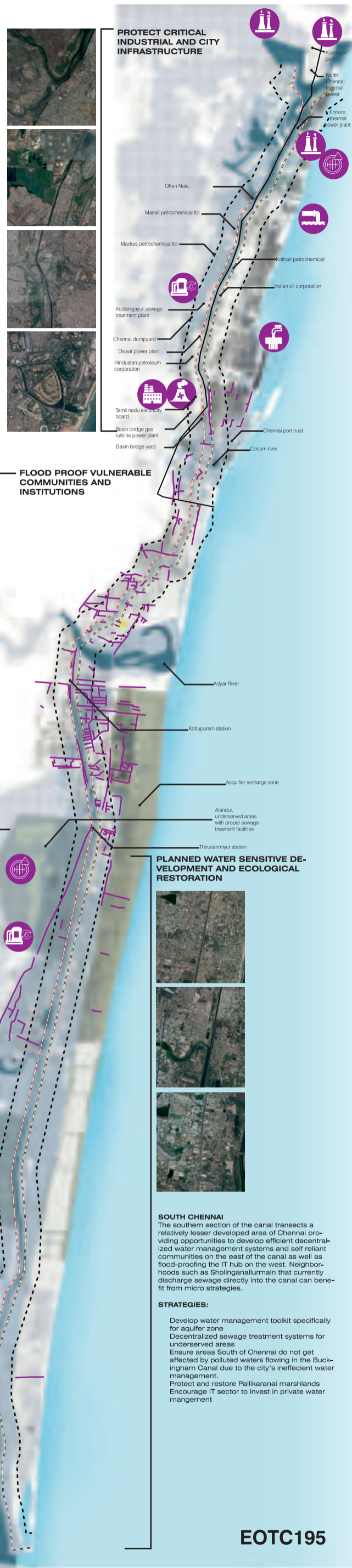
2005 FLOODS

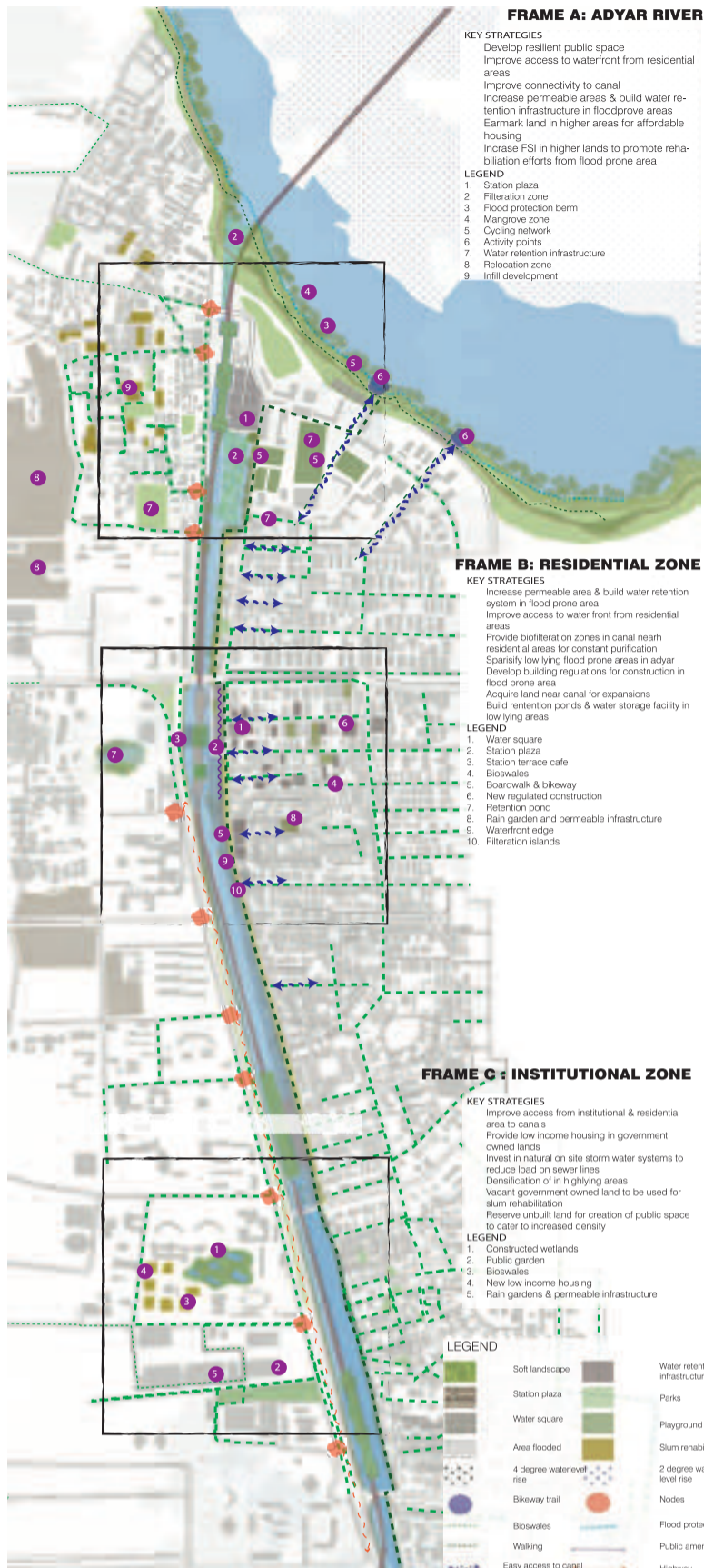
48 PEOPLE DEAD
47 INJURED

- Low Lying Area
- 2015 Floods Waterlogged Roads
- 500 m CRZ line
- Original Canal Width
- Sea Level Rise - 2 C
- Sea Level Rise - 4 C
- Aquifer Zone
- Area lacking Sewage connections
- Sewage Treatment Plant
- Sewer Outfall
- Water Treatment Plant

WaterSquares

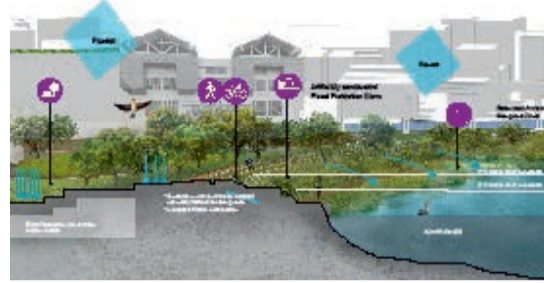
Perungudi, underserved with proper sewage treatment facilities





FRAME A

A flood protection berm at the canal where it meets Adyar river will help in keeping the water out of the city while providing a vertical protection from future storm surge and rising sea levels. The Berm also offers pleasant, accessible routes into the park, with many programmed spots for resting, socializing, and enjoying views of the park and river. The berm is planted with a dense vegetation and mangroves for ecological protection. The filtration zone at the mouth of the canal constantly purifies the water as it flows down from an industrial zone. The Frame also demonstrates how relocation zones in higher lying areas can clear the encroachments near the canal and provide needed land for its widening. Cycling networks connect the landscaped berm with the canal.



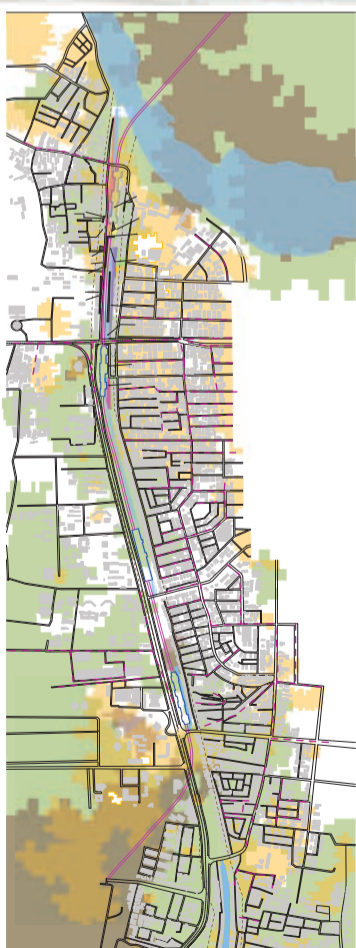
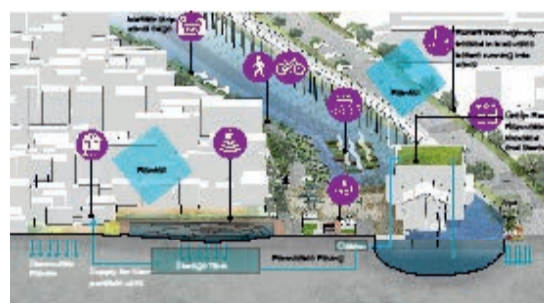
FRAME B

Residential areas can be retrofitted with water resilient infrastructure and strive to close water cycles. Bioswales on roads most frequently flooded, retention ponds, water squares which store water during rainfall along with micro rainwater harvesting and on-site sewage treatment help reduce the load on Chennai's overworked treatment plants. Boardwalk and Bikeway increase connectivity and provide residents with access to the canal which emerges as a new public space. A retrofitted station plaza with green roof strives to reduce the damage done to the canal due to the construction of the metro and provides space for relaxing, socializing and helps reduce runoff.



FRAME C

Institutions with large chunks of unbuilt land can densify to create room for new development on high grounds. Constructed Wetlands on vacant government and institutional lands can begin to treat sewage currently being dumped in the Buckingham Canal. By increasing FSI in this area space can be generated for rehabilitation of vulnerable communities affected by floods. Public gardens, rain gardens etc need to be built to cater to increased projected densities and provide permeable areas. Land needs to be reserved for affordable housing on high lying lands to protect the needs of low income communities in the future.



ASSESSMENT OF EXISTING SITUATION



EOTC195

Pratik Daulat, Bina Bhatia, Vini Shah, The Blank Slate (Mumbai)





Shortlisted Entries of the Competition

BUCKINGHAM THERU



THE NEW STANDARD

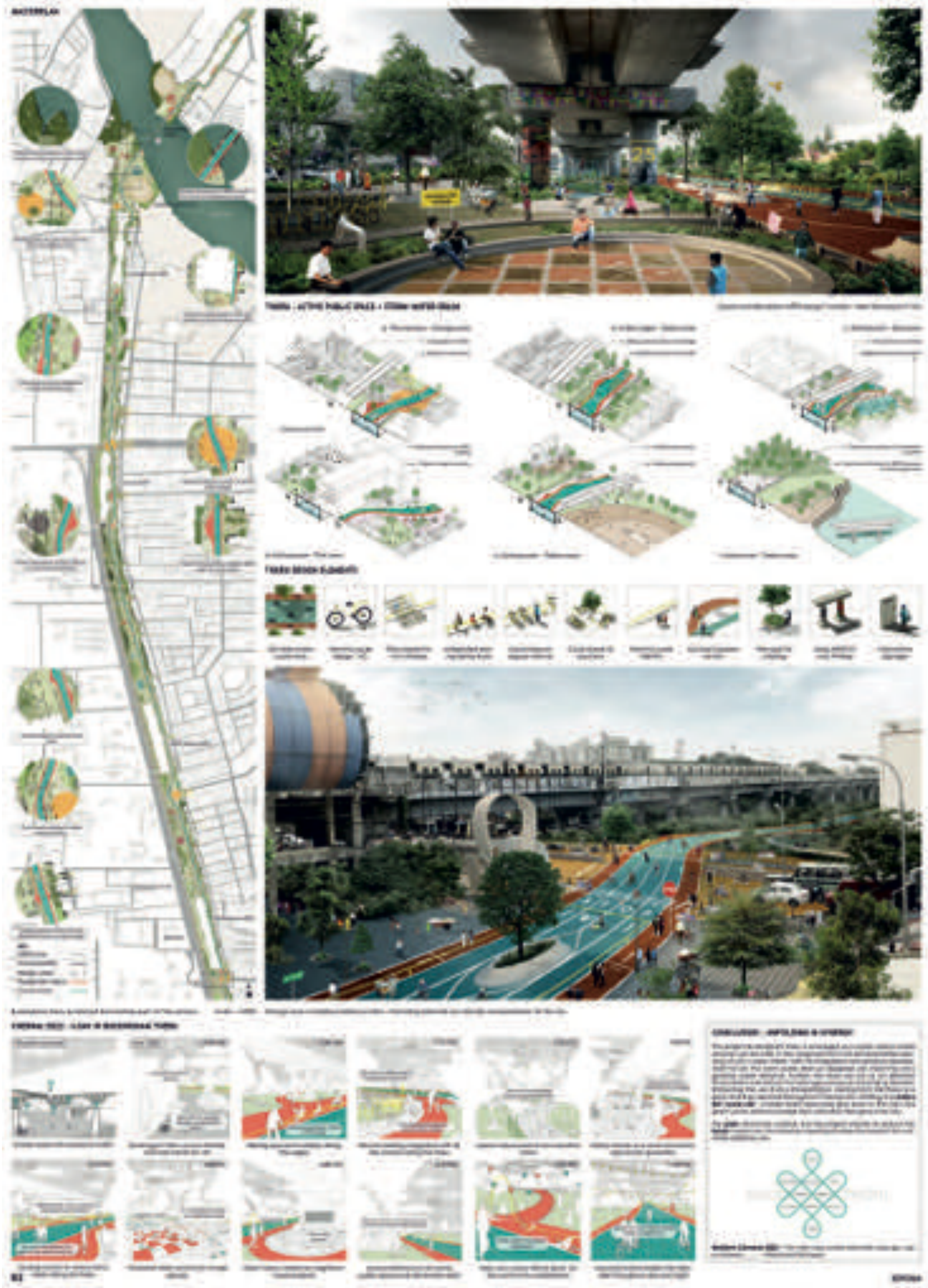
Introducing a new standard for multi-use paths in the region. The new standard is a multi-use path that is designed to be a safe, comfortable, and enjoyable space for all users. It is designed to be a space that is accessible to all, including people with disabilities, and that is safe for all users, including children and the elderly. The new standard is designed to be a space that is safe, comfortable, and enjoyable for all users, and that is accessible to all, including people with disabilities, and that is safe for all users, including children and the elderly.

ROAD - MULTI-USE CORRIDOR

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How many? How often?





Mona Jain, T.R. Radhakrishnan, Lushvin Kummar, Nivedhana.B (Chennai)

REIMAGINING BUCKINGHAM CANAL

ଆଲିଙ୍ଗଣ An Engaged Journey

Multiple perspectives allow us to see the world around us in new ways. This together with a new perspective is essential to us.

The canal is a shared space for the community and a valuable resource for the city. It is a place where people can connect, play, and learn. The canal is a place where people can see the world around them in a new way.

1. A place to play and learn - The canal is a place where people can play and learn. It is a place where people can see the world around them in a new way.

2. A place to connect - The canal is a place where people can connect. It is a place where people can see the world around them in a new way.

3. A place to see the world - The canal is a place where people can see the world around them in a new way.

4. A place to be part of the community - The canal is a place where people can be part of the community.

5. A place to be part of the city - The canal is a place where people can be part of the city.

6. A place to be part of the future - The canal is a place where people can be part of the future.

7. A place to be part of the world - The canal is a place where people can be part of the world.

8. A place to be part of the city - The canal is a place where people can be part of the city.

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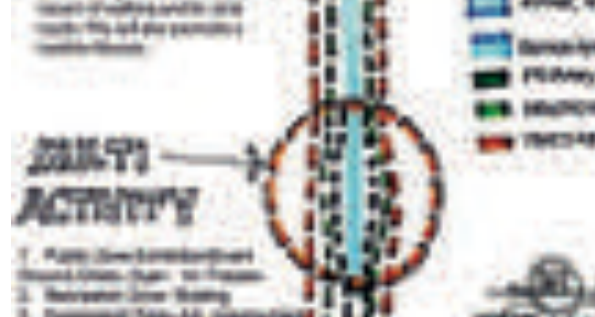
26. A place to be part of the city - The canal is a place where people can be part of the city.

27. A place to be part of the future - The canal is a place where people can be part of the future.

28. A place to be part of the world - The canal is a place where people can be part of the world.



Change is a very hard concept to understand as a child. It is a process that takes time and effort. It is a process that is often difficult to understand. It is a process that is often difficult to understand.



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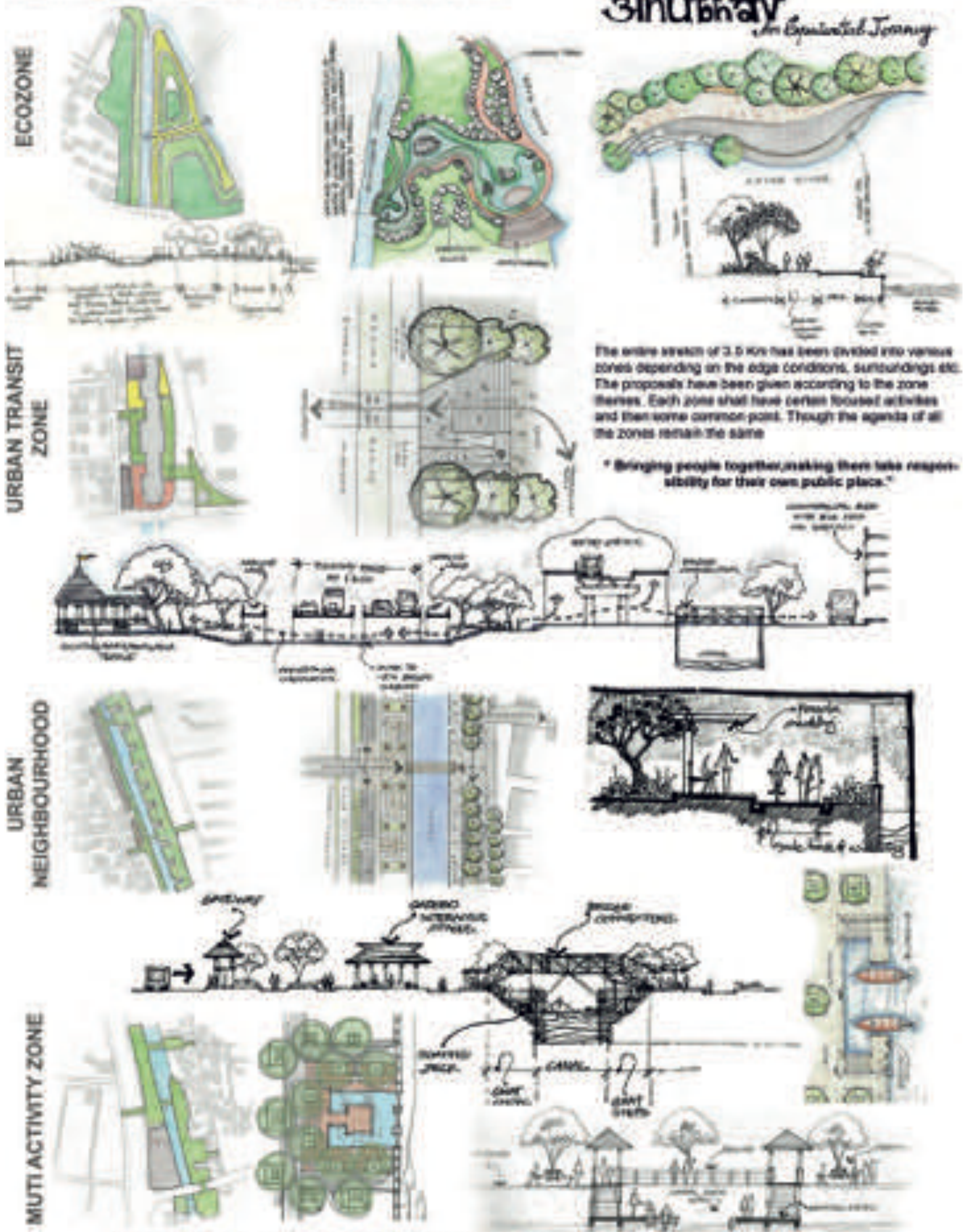
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REIMAGINING BUCKINGHAM CANAL

अनुभव *An Experiential Journey*



The entire stretch of 3.5 Km has been divided into various zones depending on the edge conditions, surroundings etc. The proposals have been given according to the zone themes. Each zone shall have certain focused activities and then some common point. Though the agenda of all the zones remain the same

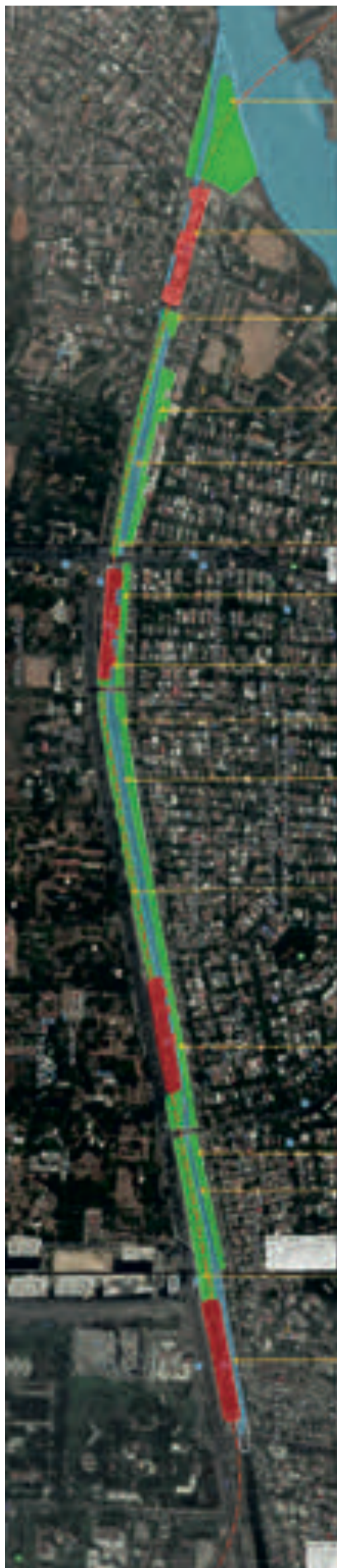
"Bringing people together, making them take responsibility for their own public places."

We are realising that if you have people walk and bicycle more, you have a more lively, more liveable, more attractive, more safe, more sustainable and more healthy city. - Jan Gehl!

SO.....WHAT ARE WE WAITING FOR?

Prajakta Chakravarty, Aditya Mandgaonkar, Meghana Patel, Rajvardhan Jadhav,
Council of Architecture (Pune)

RESILIENT ECOSYSTEM FOR BUCKINGHAM CANAL

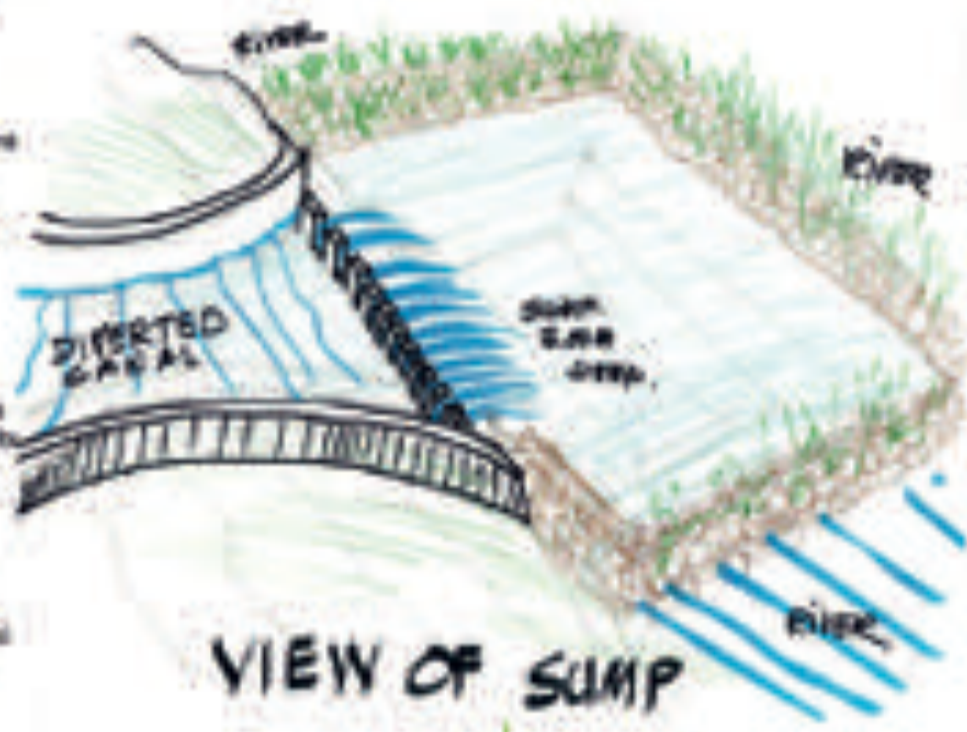


- A** - Raising the level from the institutional playground. To provide fishing & jogging club with Jigger's track and Hawker's zone with street parking for revenue generation.
- B** - Introducing Microtunneling to cross the existing wall to reduce canal size below the MRTS station.
- C₁** - Riprap Slopeprotection to close the bottom hole formed due to deterioration. Excavated land to be used for street parking.
- C₂** - Creating street zone, pathway and street space with vegetational buffer.
- C₃** - Canal integrating Excesswater for Duck and Tilapia fish cultivation. Pump station for aeration to reduce BOD COD levels.
- C₄** - Mangrove island for bird feeding.
- D₁** - Road used for connectivity and street parking along the MRTS and landscaping.
- D₂** - ramp station for aeration to reduce BOD COD levels.
- E₁** - Cycling path & jogging track for a pedestrian pathway.
- E₂** - Canal - Aquaculture activities to be introduced to Slow Eutrophic growth Connecting bridges to be introduced.
- E₃** - Street using trees planted for bird feeding and water viewing zone.
- F₁** - Aquatic zone partly used for street parking and partly as a garden.
- G₁** - Landscaping zone with landscaping.
- G₂** - Canal piling with introducing 2 percolation bridges to connect both sides with duck breeding and Tilapia.
- G₃** - Hawker's Zone below MRTS and gathering space.
- H** - Piling of the canal wall and introducing street walk for duck farming fishing/farming at regular intervals.



REDIRECTING CANAL

PLAN OF 'A' OF SUMP IN ADYAR RIVER



VIEW OF SUMP



SECTION THRU SUMP

DETAILS AT 'A' OF SUMP IN ADYAR RIVER



SECTION OF MICROTUNNELING AT MRTS

DETAIL AT 'B' & 'C1'

RESILIENT ECOSYSTEM FOR BUCKINGHAM CANAL



LANDSCAPE BUFFER ZONE
DETAILS AT 'C2 - E1 - E2 - G1'



SECTION FOR EDGE SHAVING
DETAILS AT 'C2 - E3 - G1'



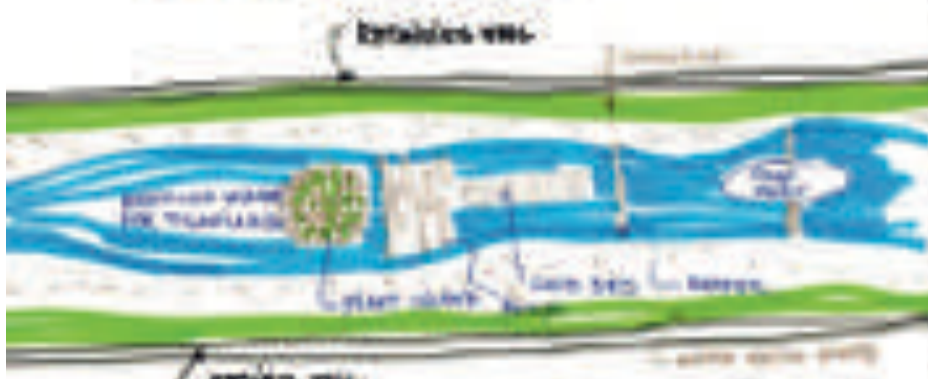
ENLIVENING THE EDGES
DETAILS AT 'E2 - G1'



SECTION FOR HUMPS IN CANAL
DETAILS AT 'C1 - D2 - H'



DETAIL OF MANGROVE ISLAND
DETAILS AT 'C4'



TILAPIA FISH AQUACULTURE
DETAILS AT 'C3 - E2'

RESILIENT ECOSYSTEM FOR BUCKINGHAM CANAL

Buckingham Canal, once a vibrant and significant navigational Canal has suffered severe neglect over the years through poor regulation. Next GEN/2040 suggests a four pillar strategy including Engineering, Ecological, Architectural and Socio Economic activities.

ENGINEERING - OPTIMIZING THE HYDROLOGY

The present capacity of the Canal is 10,000 cfs (350 M³/s) x 11 (m) x 2000 (m) capacity, mostly comprising of old masonry and concrete walls. The engineering intervention plan includes the water flow, filtering and retaining the silt and mud at the edge of the Canal. The wall will be made of concrete and will be designed to last for 100 years. The wall will be provided with water filtering mechanism. Removing the water filtering mechanism in canal bed at E2/G1 and H2/G1 and installing water filtering mechanism in canal bed at E2/G1 and H2/G1. Installation of 'humps' at regular intervals, creating turbulence in flow, and thereby purifying, oxygenating the water, reducing silt and mud, and holding sediments.

ECOLOGICAL - BEYOND LIFE MASK

For long neglected water 'Body' to revitalize life, the following measures are proposed. Introducing native tree species like Shishu, Ashoka, etc. will be considered for maintaining 'Green water' 1000 ft. It will help clean the water and also attract vegetation birds. Mangrove islands for bird nesting in regular chain will be constructed in the middle of the Canal using local material. These will serve as nesting place for aquatic and vegetation birds. Introducing of water plants along the length of the Canal by using plants such as Bamboo, Lotus, and Giris. The plants will be built with concrete pillars at 20' with mangroves planted on top. Introducing of Duckweed to decompose the water and decomposed matter.

ARCHITECTURAL - ENLIVENING THE EDGE

The edge of the Canal is generally a concrete wall dividing the Canal from the city. The following architectural interventions are suggested to enliven the edge. Soft Edges Having raised bed along the existing vertical wall with vegetation such as Bougainvillea and Thunbergia. Introducing vertical slats comprising wood, bamboo, jaggery, brick, drying racks, and lighting spots. Amphitheatre along the canal using the edge of the Canal. Introducing feeding and angling spots across canal along the edge of the Canal.

SOCIO ECONOMIC - OWNERSHIP OF THE CANAL

The canal pattern remained same to use to use of community-driven, low-cost, and other interventions will not only generate jobs but also bring sense of ownership of canal who own their facilities. Socio-economic promoting further development. Introducing sustainable opportunities through aquaculture activities such as duck farming, grass fish, catfish, etc. through fish ponds. Making water along canal with opportunities for water management through fish ponds and recreational activities. Boating and Angling will be necessary for treatment of canal systems. Boat ramp and path will be introduced to bring boating, fishing and recreational activities.

People of Chennai and their Canal



The canal is a lifeline for the city of Chennai. It provides water for drinking, irrigation, and industrial use. The canal is also a source of recreation and tourism. The canal is a part of the city's heritage and identity. The canal is a source of pride for the people of Chennai. The canal is a source of life for the people of Chennai.

Revitalize the existing water

Revitalize the existing water by improving the water quality and quantity. This can be done by implementing various water conservation measures and water treatment technologies. This will ensure that the water is clean and safe for drinking and other uses.

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Engage Communities / City Responsibility

Engage communities and city officials in the water conservation and management process. This can be done by implementing various community-based water conservation programs and water management initiatives. This will ensure that everyone is responsible for the water.

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Outcome

The outcome of the water conservation and management process is a clean and safe water supply for the people of Chennai. This will ensure that everyone has access to water and that the water is used responsibly.

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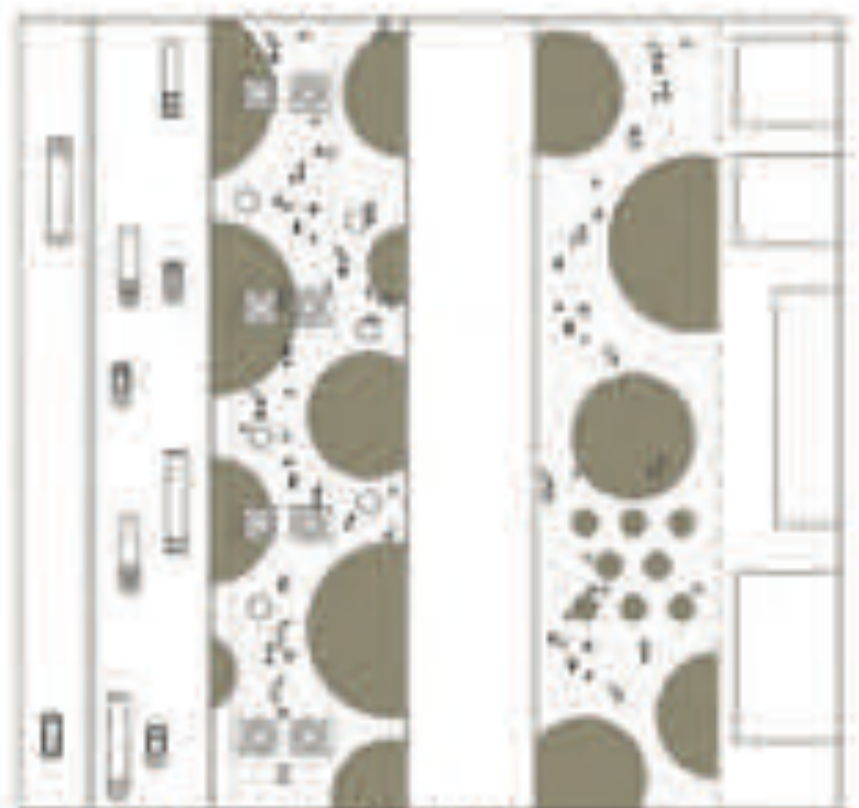
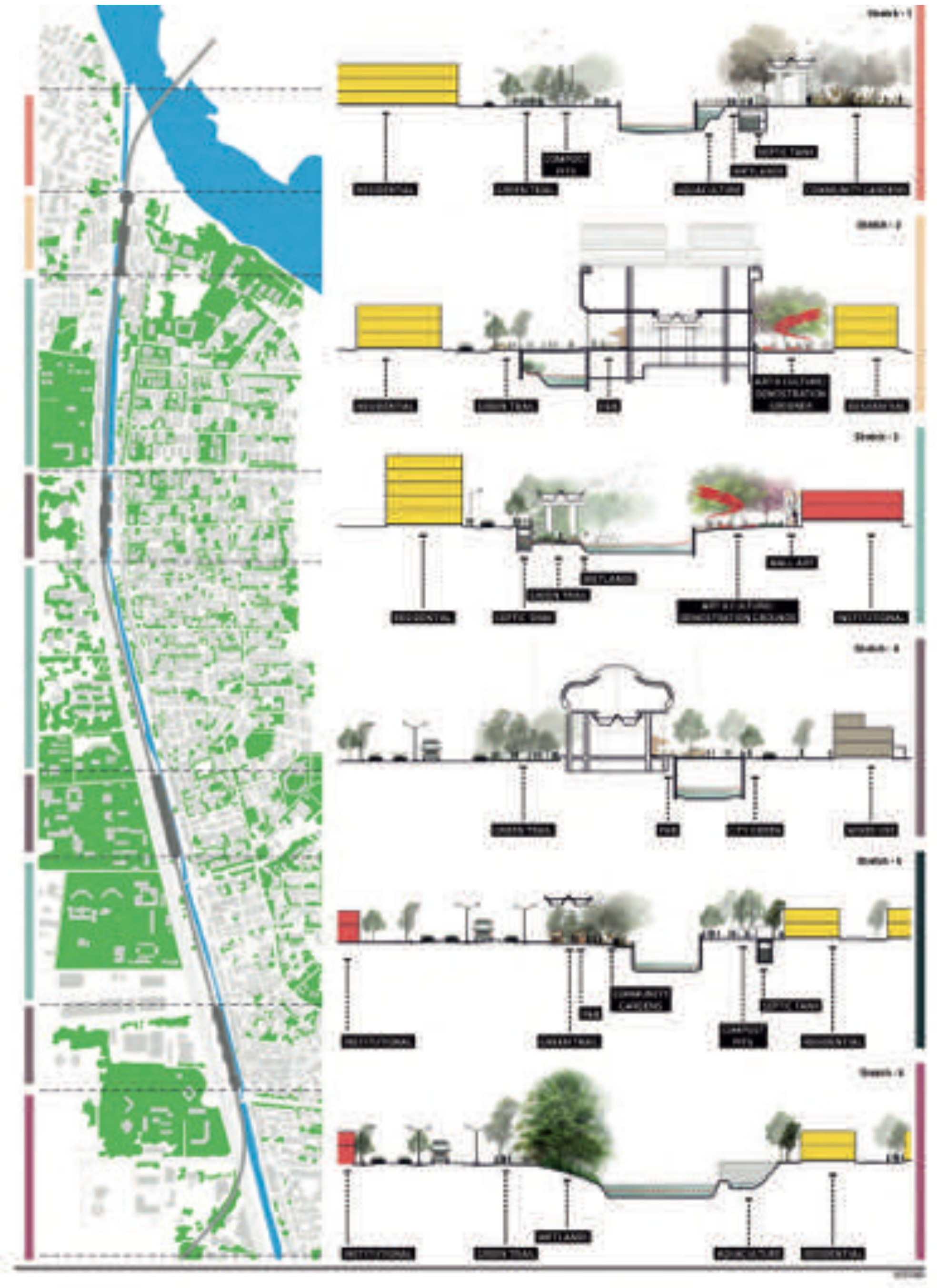


Diagram illustrating the canal structure and water flow. The canal is lined with concrete and has a water flow direction indicated. The diagram shows the canal's cross-section and the surrounding environment.



Depanshu Gola, New Delhi and Abhimanyu Singhal (Gurugram)



RESILIENCY - Reimagining Buckingham canal

The idea underpinning this project is the transformation of the Buckingham canal into a **flood resilient green corridor** in Chennai that would grow as a vital public and recreational space. The proposed four-fold intervention includes:

- **Pollution control**
- **Ecological recovery**
- **Green urban infrastructure**
- **Community participation & inclusivity**

Pollution control and waste management:

Many areas along the canal stretch are treated as garbage dumps. These are cleaned up with the help of local community members & NGOs and the freed up pockets of land are used to develop infrastructure like:

- Public toilets
- STP for the local EWS communities
- Plastic waste recycling facilities
- Urban green pockets / Green infrastructure

Garbage traps are installed in several locations along the canal to keep solid waste pollution in check and to locate its source.

Ecological recovery and Flood control:

The area near the mouth of the canal and along the Adyar River bank plays a pivotal role in the revival of local flora

and fauna through the development of an Ecological park – which would also serve as a local attraction and a community gathering space.

Due to the river bank, the canal mouth and Kotturpuram being under high flood risk, the eco-park is divided into 3 zones:

- 1) **The mangrove zone** – That would help stabilize and define the river bank
- 2) **A tree buffer zone** filled with native species – that would enhance water percolation and prevent erosion.
- 3) **A public park** with various amenities open to the community. This includes a large central pond filled with plant species that remove miasma and pollutants. The pond acts as a spillover zone in case the river rises during monsoon.

Green urban infrastructure:

The treatment of canal edge follows a continuous linear green infrastructure that acts as a sponge. This offers a physical buffer yet visual continuity.

- **Bio-swales** - First level of run-off water percolation and recharge.
- **Rain gardens** - Visually pleasing green strips that offer the second level of rainwater recharge and comprise species of plants that remove soil contaminants.

- **Reed beds grown along the canal** purify the water through a continuous process of Rhizofiltration. The excess water from the canal during monsoons is allowed to spill over, be contained within and absorbed by these 'sponges'.

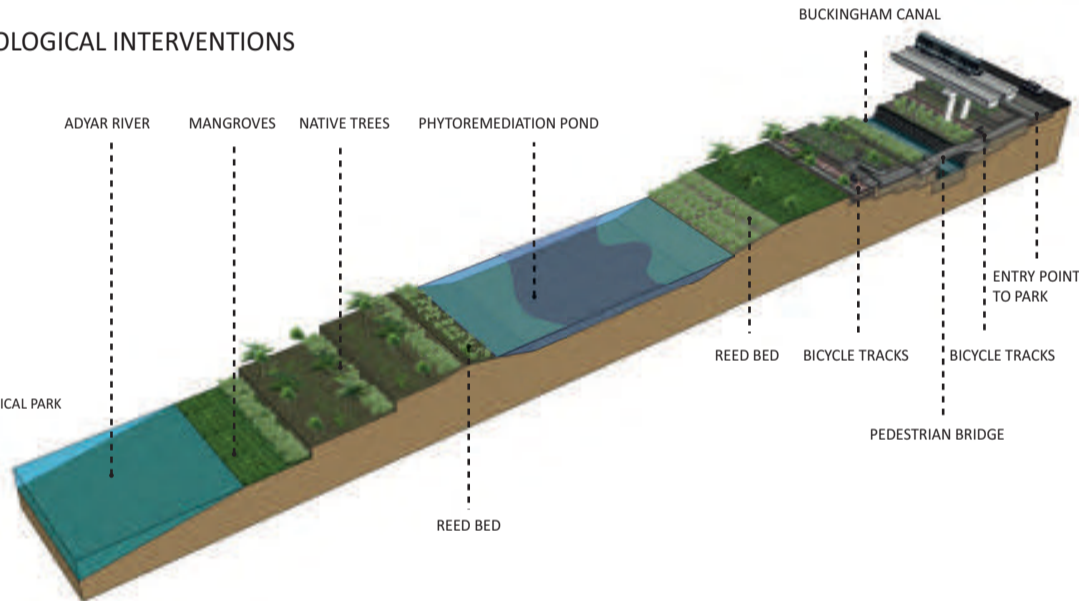
Community participation & inclusivity: Participatory planning process with involvement of communities adjoining the canal in its rehabilitation and maintenance.

Upgrading/ phased relocation of economically weaker families from informal settlements located in high flood risk zones encroaching the canal, into mid-rise flood resilient walk up apartments.

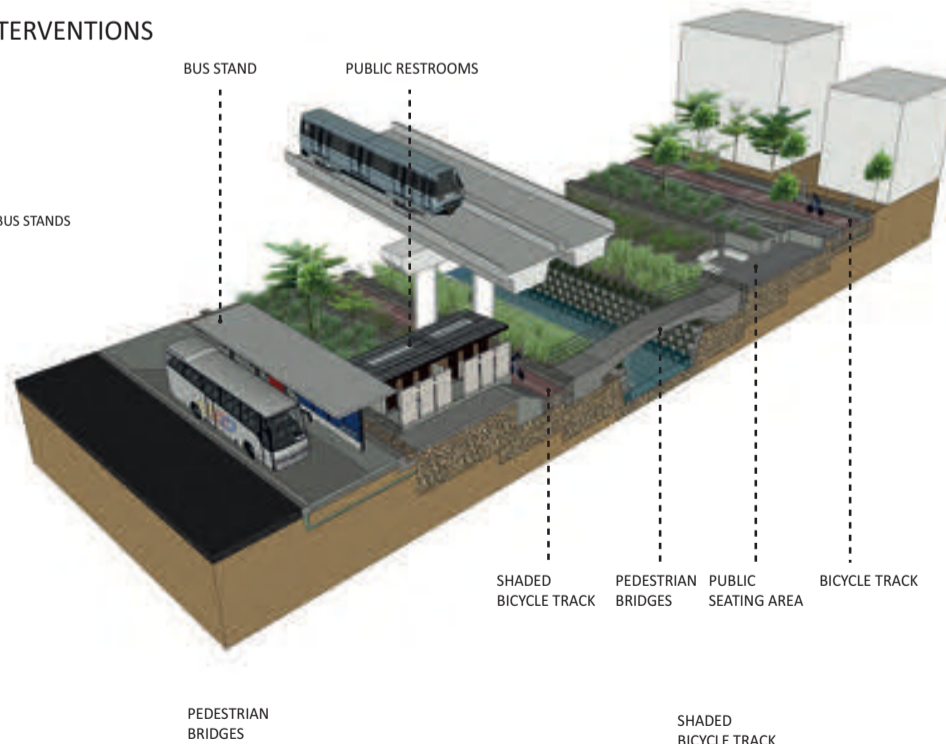
Provision of community facilities like children's play area, jogging track and open air theatre. Collaborative creation of art in public spaces to foster community participation and a sense of ownership.

Development of vacant areas near the MRTS stations and along the canal into amenities which include green cover, seating spaces, walkways, access ramps and bicycle tracks shaded by the overhead MRTS line. Encouraging local businesses to set up stalls to develop the areas adjoining the canal.

ECOLOGICAL INTERVENTIONS



CIVIC INTERVENTIONS



- 1 KOTTURPURAM MRTS STATION
- 2 KASTURIBAI NAGAR MRTS STATION
- 3 INDIRA NAGAR MRTS STATION
- 4 THIRUVANMIYUR MRTS STATION
- 1 ECOLOGICAL PARK
- 2 KOTTURPURAM PLAZA
- 3 ECO-REGENERATION ZONE KOTTURPURAM
- 4 MADHYAKAILASH SQUARE
- 5 ECO-REGENERATION ZONE INDIRANAGAR
- 6 THIRUVANMIYUR STEPPED PLAZA
- 7 ECO-REGENERATION ZONE THIRUVANMIYUR

BUS STAND



PEDESTRIAN BRIDGES



SHADED BICYCLE TRACK



THE BANYAN - A TIMELINE

BANYAN TREES ARE RESILIENT 'MONOCULTURE' THAT CAN LIVE FOR AN EXTENSIVE NUMBER OF YEARS AND ADAPT THEMSELVES THROUGH THEIR AIRING ROOTS - A PERFECT METAPHOR FOR RESILIENCE.

ADAPTING THESE TREES AS A TRADITIONAL GATHERING PLACE FOR LOCAL COMMUNITIES, THE TREE 'WORKS' FOR A BANYAN SAFARI PLAZA AT THE MOUTH OF THE CANAL TO ENJOY NATURE AND REACH ITS MAXIMUM HEIGHT (25-30 METERS) CAN BE CORRELATED WITH THE OVERALL TIMELINE OF THE PROJECT.

2019-2020

NEEDS IDENTIFIED:
SOCIAL MEDIA-CENTRIC PROMOTIONS AND MARKETING, DESIGNED FOR PROJECT

INTERMEDIATE PLANNING:
GARAGE TRAP (GATED) ALONG THE CANAL, CLEANED UP WITH HELP FROM COMMUNITY

2021-2022

ENVIRONMENTAL IMPROVEMENTS:
REMOVAL, REHABILITATION AND REPLANTING OF POLLUTED PLANTS AND COLLECTION OF GOVERNMENT FUNDS

2023-2024

IMPLEMENTATION OF BIODEVELOPMENT COMPONENTS:
PLANNED CLEARANCE OF CANAL ENCROACHMENTS IN PHASE 1

2025-2026

UPGRADING PHASED RELOCATION OF INFORMAL SETTLEMENTS:
INFORMAL SETTLEMENTS LOCATED IN HIGH FLOOD RISK ZONES ENROUCHING THE CANAL, INTO MID-RISE FLOOD RESILIENT WALK UP APARTMENTS.

2027-2028

IMPLEMENTATION OF BIODEVELOPMENT COMPONENTS:
ADAPTATION AND PHASED RELOCATION OF LOCAL BUSINESSES

2029-2030

CONSTRUCTION OF CONSTRUCTION OF THE LARGEST PLAZA:
PLAZA NEAR THE MOUTH OF THE CANAL FOR PUBLIC GATHERING AND THE ECOLOGICAL PARK.

2031-2032

CONSTRUCTION OF CONSTRUCTION OF THE LARGEST PLAZA:
LARGE SCALE PLANTING OF NATIVE TREES IN ZONE 1 WITH THE HELP OF LOCAL COMMUNITY VOLUNTEERS AND ARTISTS.

2033-2035

PHASED PUBLIC PARTICIPATION:
STALLS ARE SET UP THROUGHOUT THE CANAL WITH LOCAL VENDORS, CAFE AND SMALL SHOPPING OUTLETS. THE CANAL FRONT AREAS AND PLAZA BECOME A TRAVEL HUB AND OUTLET FOR THE LOCAL COMMUNITY.

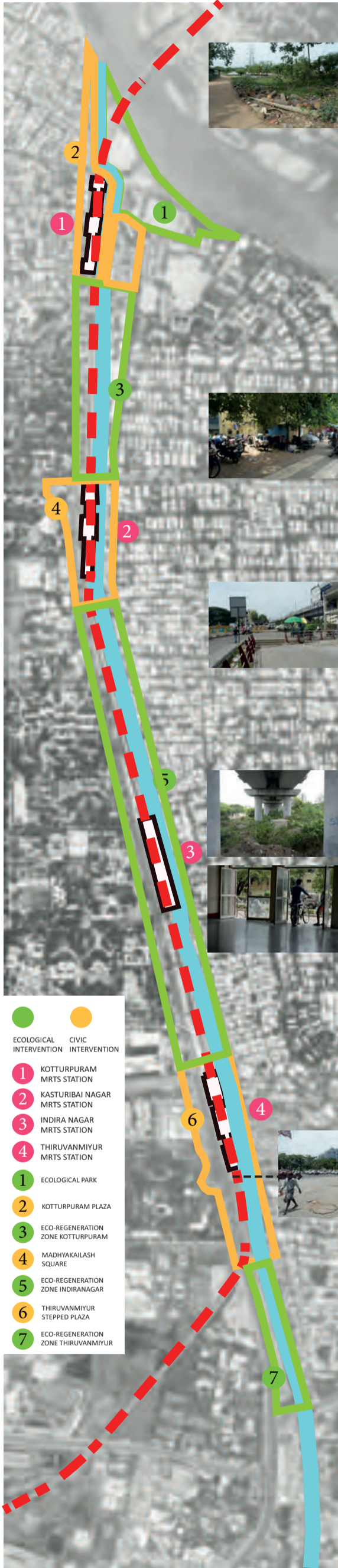
2036-2038

THE BANYAN PLAZA IS LAUNCHED:
PLAZA, WITH ITS OPEN-ROOFED, OFFER GARAGE WITH PARKING FOR MOTORCYCLES AND BIKES, IS LOGICALLY REDESIGNED.

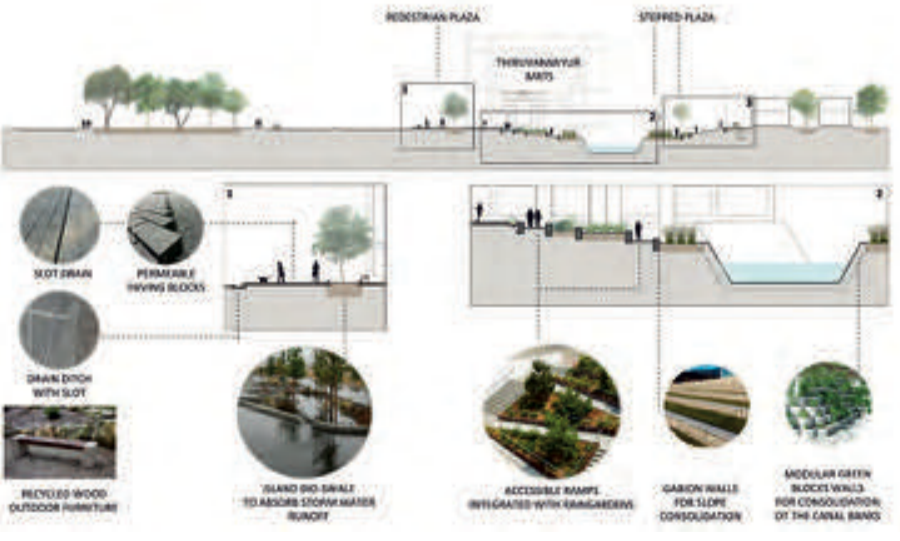
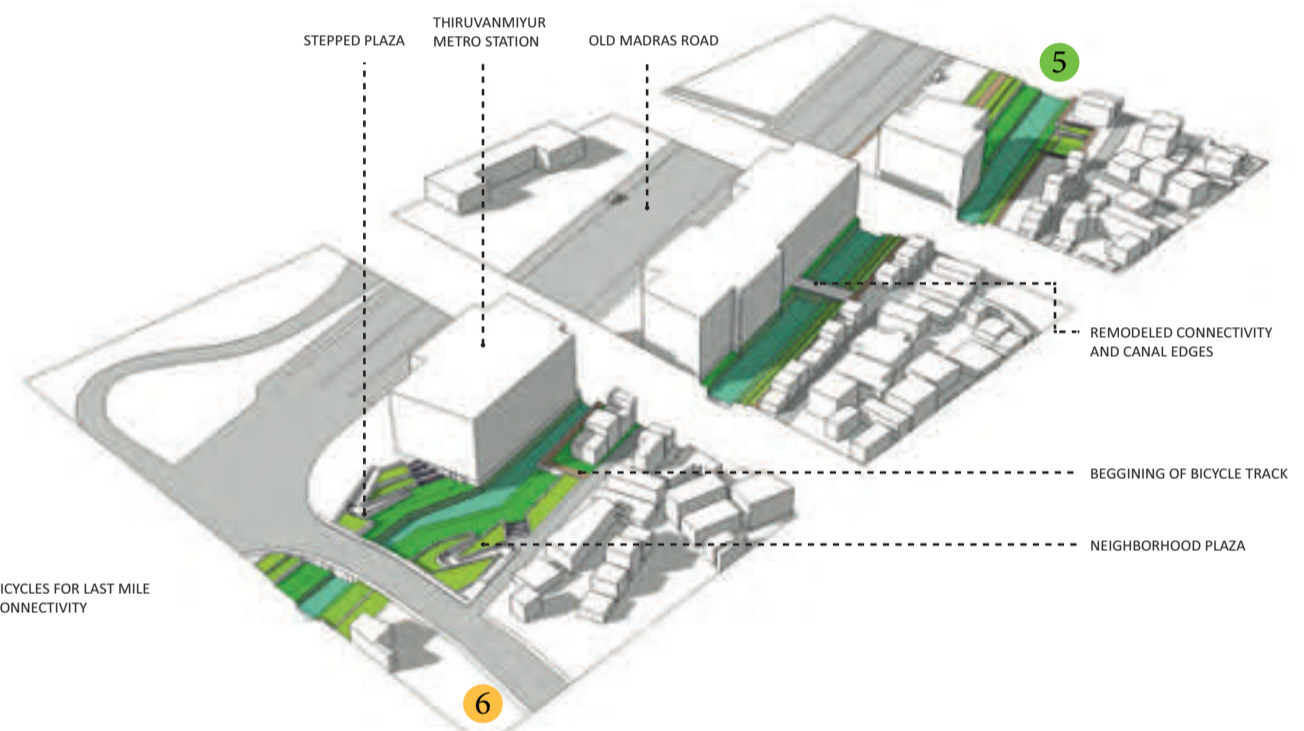
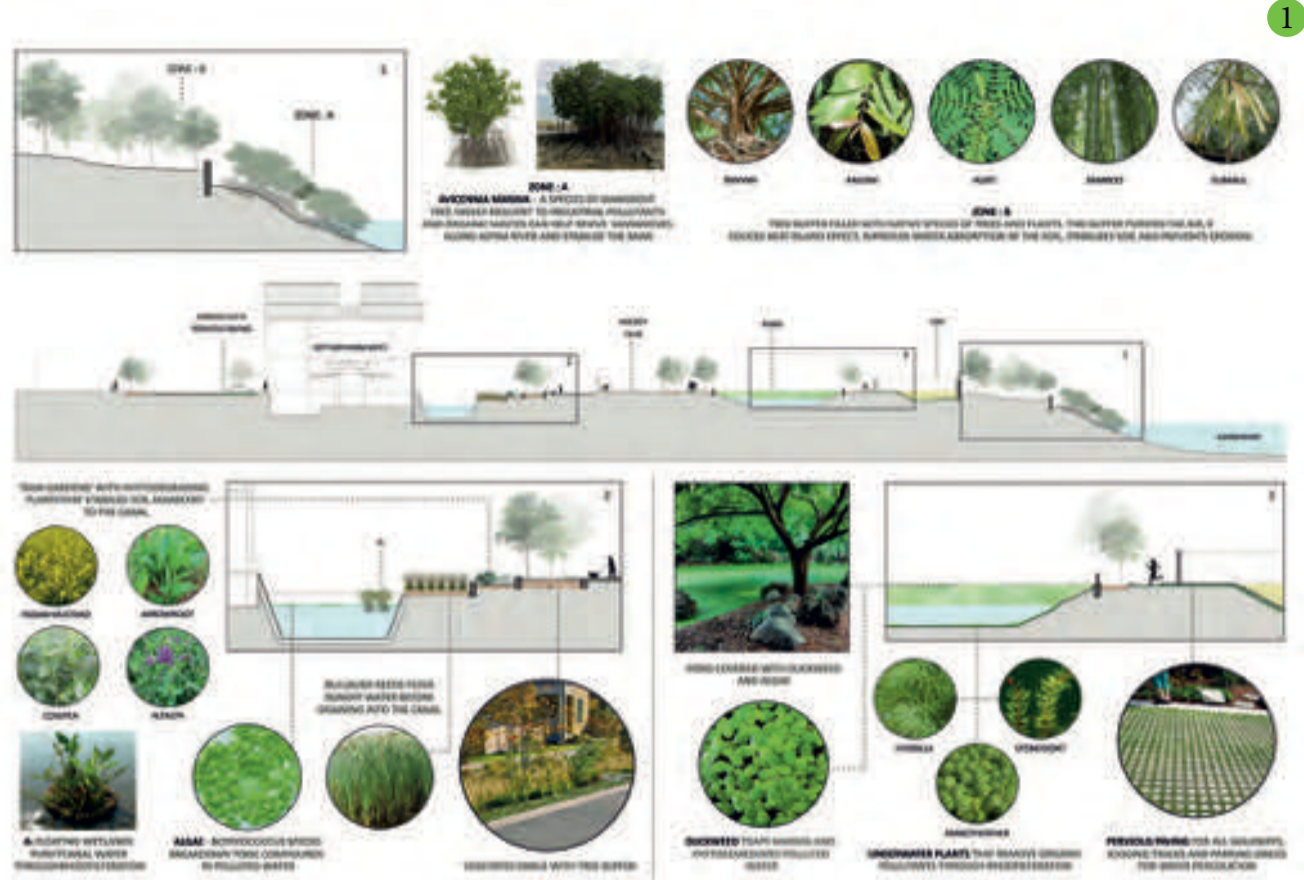
2039-2040

IMPLEMENTATION OF BIODEVELOPMENT COMPONENTS:
ADAPTATION AND PHASED RELOCATION OF LOCAL BUSINESSES TO SET UP STALLS TO DEVELOP THE AREAS ADJOINING THE CANAL.

RESILIENCY - Reimagining Buckingham canal



- ECOLOGICAL INTERVENTION
 - CIVIC INTERVENTION
- 1 KOTTURPURAM MRTS STATION
 - 2 KASTURIBAI NAGAR MRTS STATION
 - 3 INDIRA NAGAR MRTS STATION
 - 4 THIRUVANNIYUR MRTS STATION
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 - 6 THIRUVANNIYUR STEPPED PLAZA
 - 7 ECO-REGENERATION ZONE THIRUVANNIYUR



Chiara Chiodero, Virsingh Kawarchhatri, Nous Studio, Bangalore and Srinidhi Srinivasan, Anna University (Chennai)

Context of programming

Background

Location & location

History & evolution

Ecological context

Socio-economic



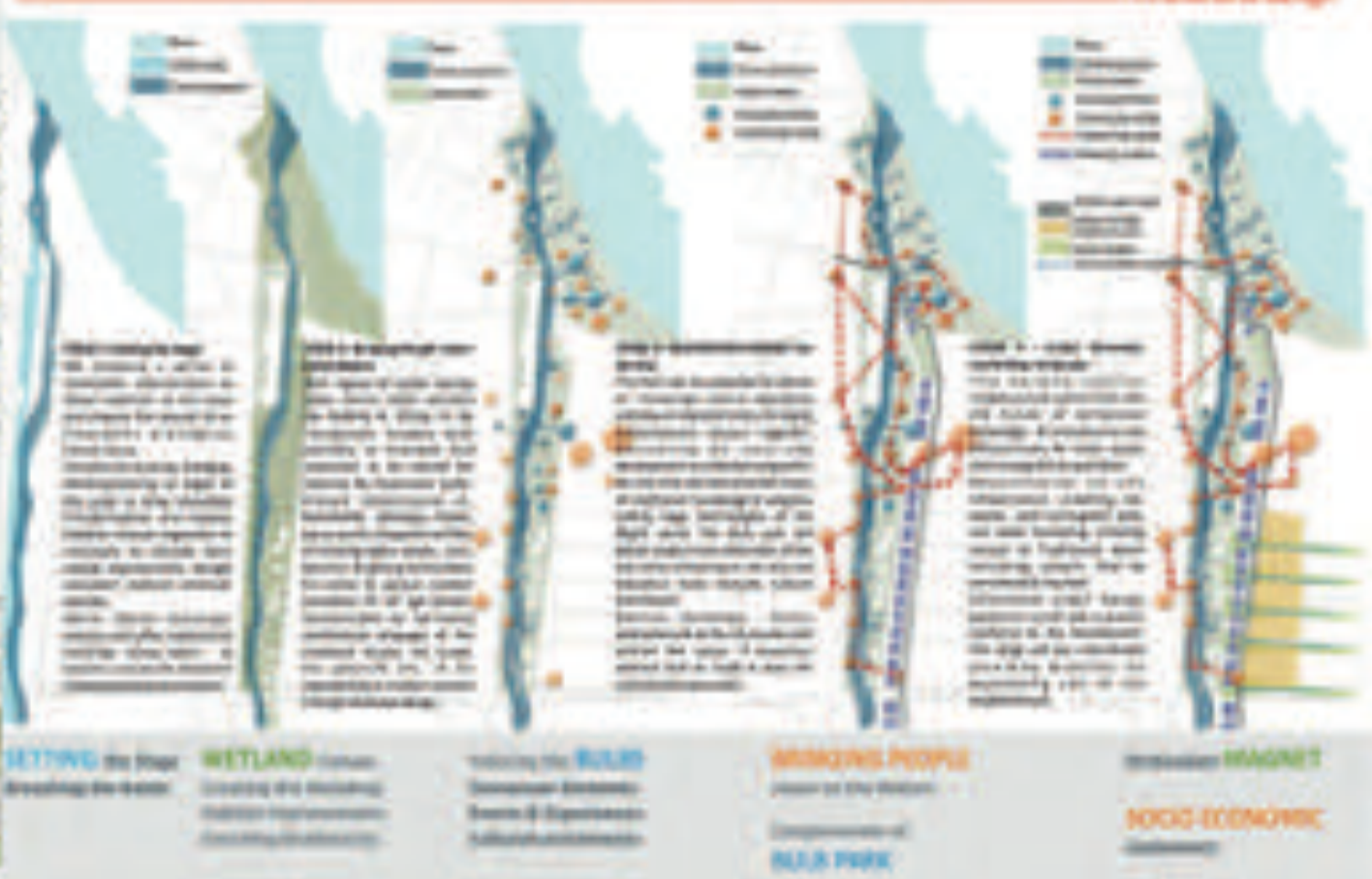
CRITERIA



STRATEGIES

IDEA

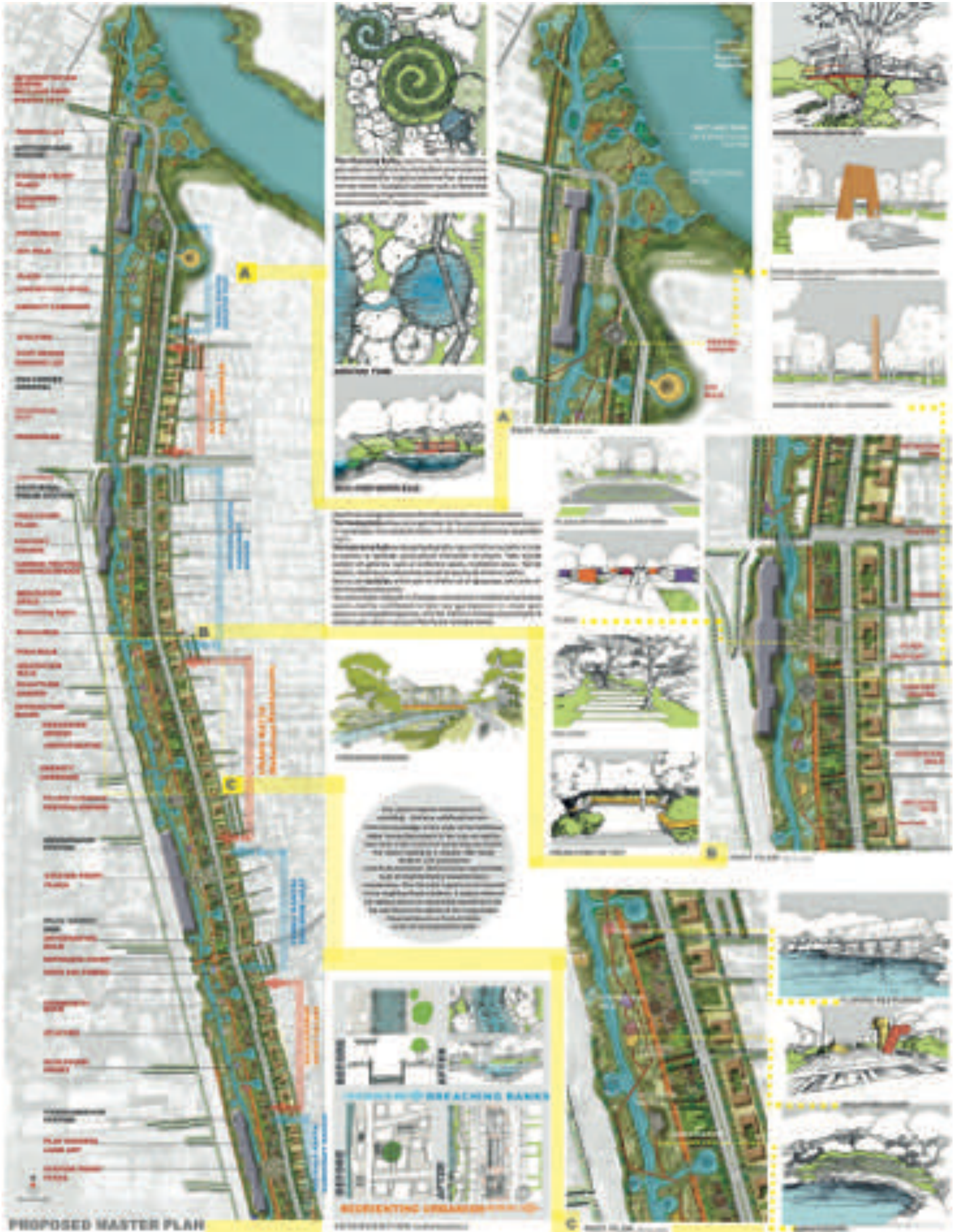
APPROACH



Eyes on the small: in search of new meanings.

THE CONGLOMERATE OF BULB PARK

01



Umesh Wakaley, Prachi Wakaley, Mrunmayee Pande, Meghana Hegde, Roots Landscape (Pune)

Weaving of the Blue & the Green

CONCEPTUAL ANALYSIS OF BUCKINGHAM CANAL | OEDMAU

The Buckingham Canal
 The Buckingham Canal is a 1.5 km long waterway in the heart of the city of Oxford, connecting the city to the River Thames. It is a key element of the city's water infrastructure and is a focus of the current landscape urbanism project.

The project aims to improve the canal's water quality, enhance its ecological value, and create a vibrant public space for the community. The project is a collaboration between the City of Oxford, the Environment Agency, and the Buckingham Canal Trust.

VISION
 A vibrant, multi-functional waterway that connects the city to the River Thames, enhancing the city's water infrastructure and creating a vibrant public space for the community.

OBJECTIVES

1. Improve the canal's water quality and ecological value.
2. Create a vibrant public space for the community.
3. Enhance the canal's connection to the River Thames.

STRATEGIES

1. Create a vibrant public space for the community.
2. Enhance the canal's connection to the River Thames.
3. Improve the canal's water quality and ecological value.

IMPLEMENTATION

1. Create a vibrant public space for the community.
2. Enhance the canal's connection to the River Thames.
3. Improve the canal's water quality and ecological value.

MONITORING & EVALUATION

1. Create a vibrant public space for the community.
2. Enhance the canal's connection to the River Thames.
3. Improve the canal's water quality and ecological value.

CONCLUSION

The project aims to improve the canal's water quality, enhance its ecological value, and create a vibrant public space for the community. The project is a collaboration between the City of Oxford, the Environment Agency, and the Buckingham Canal Trust.

ACKNOWLEDGEMENTS

The project is a collaboration between the City of Oxford, the Environment Agency, and the Buckingham Canal Trust.

CONTACT INFORMATION

OEDMAU
 123 Street Name
 City, State, Zip

REFERENCES

City of Oxford. (2020). Buckingham Canal Strategy. Oxford: City of Oxford.

APPENDICES

Appendix A: Site Plan
 Appendix B: Water Quality Data
 Appendix C: Community Survey Results



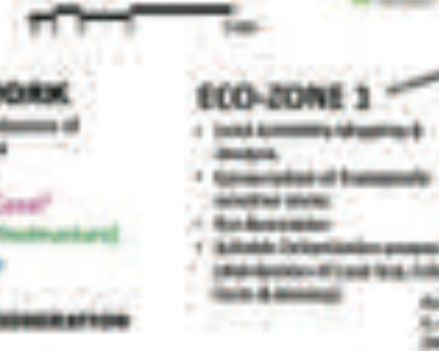
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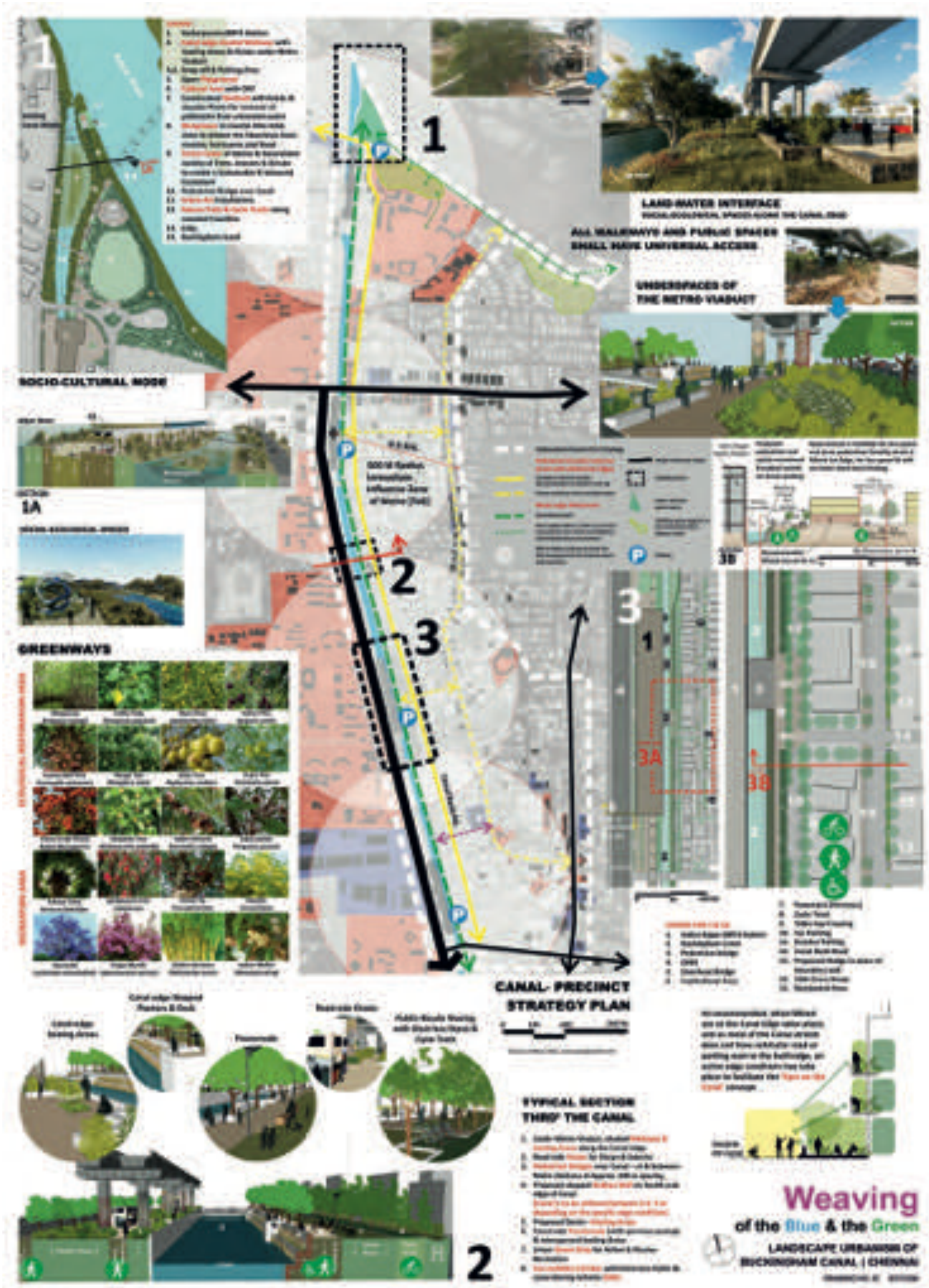
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Weaving of the Blue & the Green
 LANDSCAPE URBANISM OF BUCKINGHAM CANAL | OEDMAU



Dr. Suptendu P. Biswas, Vina Verghese Biswas, Saurabh Singh, Shayan Rashid, VSPB Associates (New Delhi)

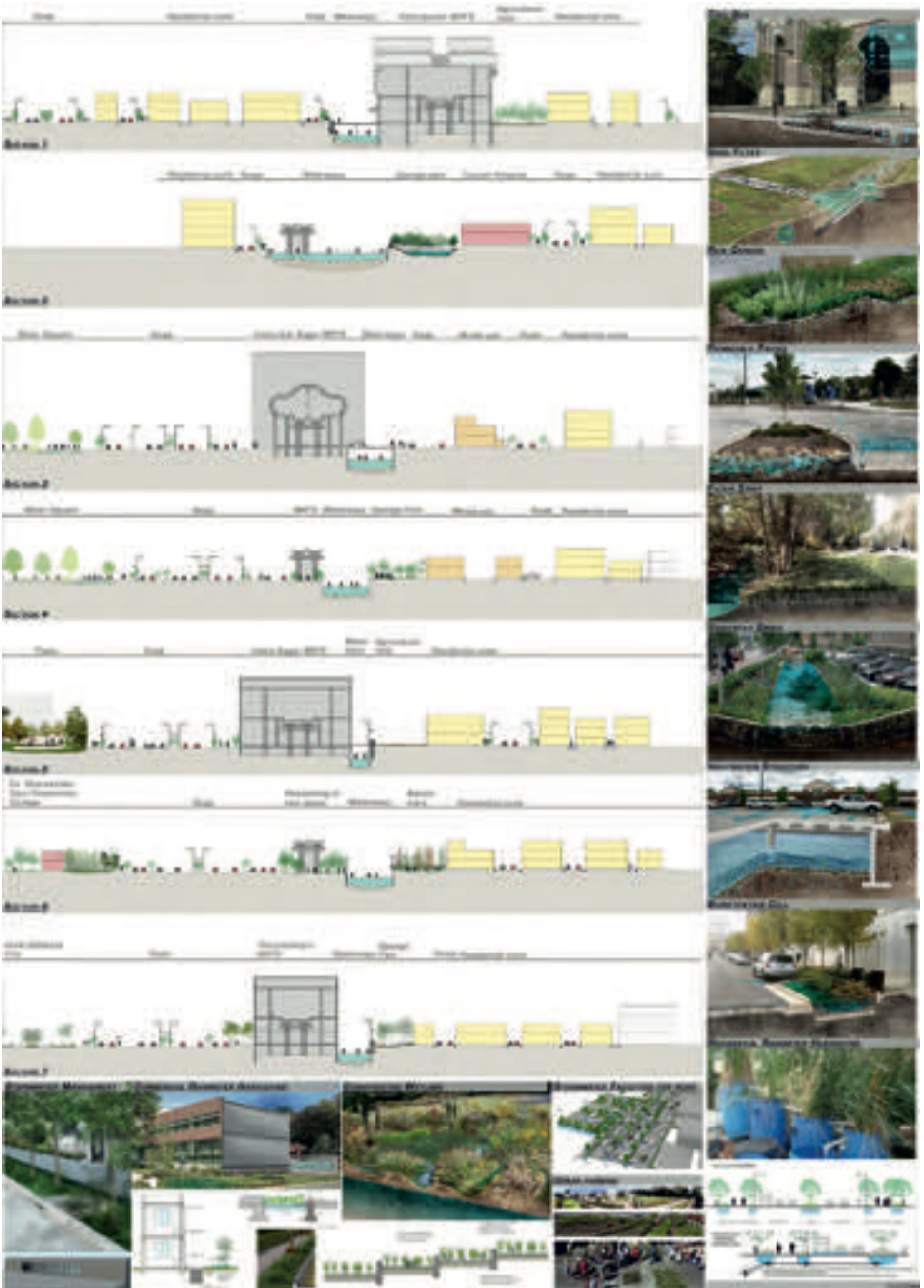
OF THE PEOPLE, BY THE PEOPLE, FOR THE PEOPLE: BUCKINGHAM CANAL CHENNAI



The strategy comprises three levels: Level 1 with green spaces along from the right for an independent walkway and cyclist (Bike Lane). For making Chennai a more green urban environment, the city should have increased capacity to absorb rain water and storm water for urban drainage in green belts and urban drainage systems, leveling gardens and landscaping interventions, permeable paving systems, bio-retention systems, water-efficient drainage systems, efficient drainage and treatment systems and connectivity with water saving systems. The proposed interventions at Level 1, the canal itself, Level 2, the bank-vegetation, Level 3, any future building on canal and Level 4, urban culture and social systems centered primarily to the water under the banner of Community Prosperity (Water Landscapes (WPL)). The concept of WPL is applicable to urban environment. It works by integrating existing assets of land and space, along with bio-retention sites, waterway green spaces, water gardens and open spaces, through a non-commercial lens. The focus will be active and passive recreation, walking, jogging, cycling, fishing, boating, sports and recreational skating, fishing, canoe, kayak, polo, sailing, rowing, water-skiing, swimming, fitness, playing, playing, playground, fitness, swimming, walking, fishing etc. The proposed design allows social, religious and recreational activities with privacy with each other and open space. The strategy allows a multitude of occupations, work professional and leisure for all age groups, social events, gardens to be a part of it. It creates opportunity for education spaces which are often excluded from conventional school systems. It is comprehensive and system value retaining the ecology and sustainability of the proposal. The continuous landscape is not just an urban space with 100 meters based on the linear view of retained city via WPL and continuous urban development in approach 4444. Instead of the conventional usage of roads, the proposed route leads to a more productive landscape growing food, flowers and vegetables for the city. Another use (recreation) Agriculture based on the soil, community and globally, sharing economic and social value. The proposal focuses on retaining the canal as a part of the city landscape, bringing back water gardens and open spaces garden to develop the canal for improving health for treatment of the city and retaining the canal as part of the city public realm and urban network. Canal design like canal development according to Royal Institution for the garden, providing for existing permeability along waterway but not the water retention. It has been reduced. Improved drainage from and use of it. Water quality treatment, community gardens, water gardens, improved flows, wind shelter and blue sky.

The water system of Chennai will define the city, connecting a river network, agricultural gardens and existing urban landscape through the canal, providing and related hydrological processes. The proposed water management and retention, water and greenery an additional planning design and development framework to urban flow, growth, drainage and storage systems, quality and quality system.





Rahul Shinde, Rahul Shinde and Associates (Kolhapur)

URBAN STITCH

REPAIR THE URBAN FABRIC NOT JUST THE CANAL

The Buckingham canal that we see today, is not the real problem but rather the symptom of unsustainable & exploitative land use development in the area over the last 50 years. The core problem is threefold –

- a) **Torn Urban Fabric:** North: South lanes of Chennai metro, Canal, and OMR road have torn the urban fabric geographically, into institutional West zone, and Housing East Zone, making the canal into 'rear-side' making it an easy dump yard.
- b) **Poor Community Development:** Dichotomous zones of rich vs poor, intellectual vs illiterate, hyper-clean vs unhygienic, hospital vs unhealthy have created fragments in the community, and hence people lack ownership over the public land. Poor community health has further worsened the problem.
- c) **Lack of growth opportunities:** The canal once provided economic opportunities for the locals, and since it has stopped providing those opportunities, the canal is neglected by the locals. Further, many of the locals deteriorated to be slums.

Comprehensive development plan with 8 Development Areas:

i) **Pedestrian Strategy:** Programmatically connect the East & West, create a need for people to cross the canal banks. Create pedestrian crossing at every 200m interval to encourage exchange of people across. Over time, it would stitch the barrier between the geography and the community.

ii) **Canal Strategy:** Clean and re-engineer the canal to be deeper and wider, to ensure constant flow. Access from bank to water is limited to selected promenades to prevent misuse.

iii) **Waste Management Strategy:** Incinerate the solid waste using 'Blackhole' Technology by TESLA (No power, no smoke) to create ash that is used to make bricks, which are used to build buildings on site. Liquid waste is treated and safely disposed.

iv) **Climate & Environment:** Rainwater harvest and Floodwater drains are linked to the canal, both to reduce stagnation of water on streets, as well as maintain canal volume for flow. Further, 'Warka Tower' (technology to passively transform humidity to drinking water) is used to generate potable water, and dehumidify for comfort.

v) **Community Health:** Apply 4 Level Prevention strategy, to rapidly improve the health of the community, and to ensure healthy community in long term.

vi) **Economic Strategy:** The activities on canal-boating, tourism, etc and public spaces created on banks – Pavilions and Centers, create ample job opportunities that provide economic opportunities for all skill levels – from illiterate to intellectuals.

vii) **Cultural Strategy:** Cultural activities set up the canal and bank, sets up an identity and sense of ownership for the community to celebrate and maintain the canal for the future. The also generate revenue to maintain the canal.

viii) **Civic Strategy:** Set up institutions that respond to specific needs of diverse users from the neighborhood – ensures repeated users, and continued footfall round the year, who use the other programs as well.

Torn Urban Fabric



8 User types and 8 Opportunity areas are identified

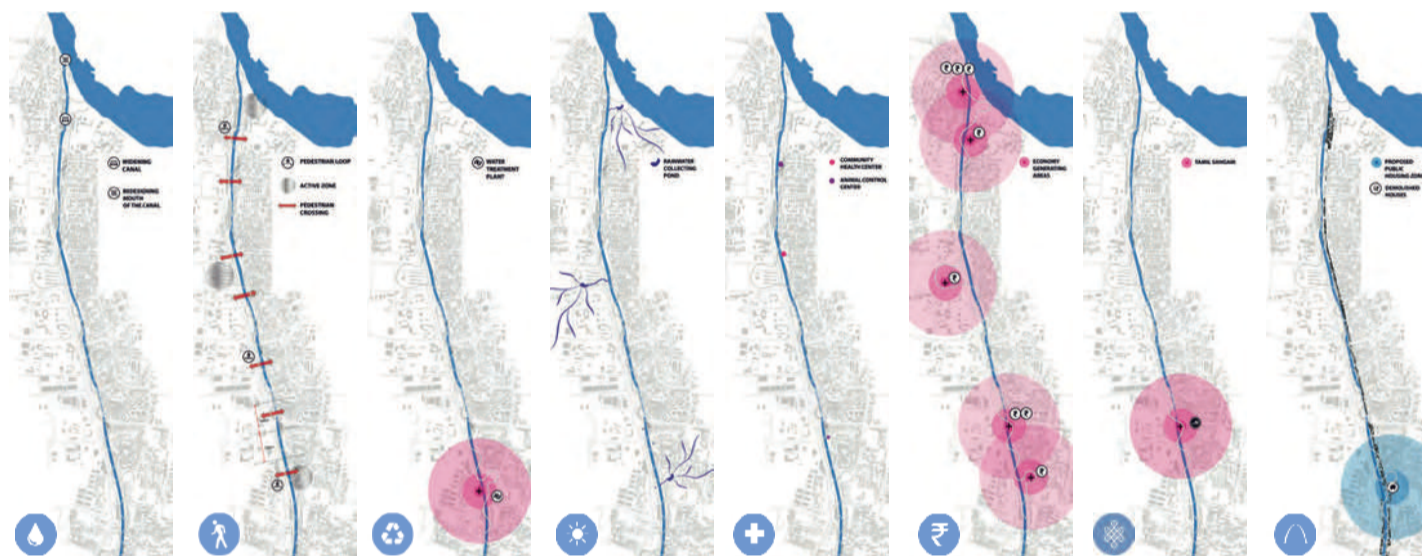
II. USER ANALYSIS / BENEFICIARY

- Low income Residents
- Medium income Residents
- High income Residents
- Students
- Office Employees
- Metro Passengers
- Tourists
- Shop owners

III. DEVELOPMENT AREAS

- Water
- Pedestrian
- Pollution
- Climate
- Health
- Economic Opportunity
- Culture
- Development

IV. PROPOSED DEVELOPMENT



- CANAL STRATEGY: ENGINEER THE FLOW**
 - Canal is widened to 20m (15m along metro stations), and made deeper to support perennial flow.
 - Banks are made in 3 variations: a) Park: Canal water is visible but not accessible to user. b) Promenade: Canal water is accessible. c) Metro: Acts as a pier to load, unload boats.
- PEDESTRIAN STRATEGY: STITCH URBAN FABRIC**
 - Pedestrian crossings are provided every 200m walking radius
 - The full loop acts as a fitness track for jogging and casual walking.
 - Ensures regular footfall.
- WASTE MANAGEMENT: WASTE TO SOURCE**
 - Black hole technology (Developed by TESLA-GREEN) incinerates solid waste without energy and smoke, to create a special fly ash that is used to make Bricks to build all the structures in the project.
- CLIMATE & ENVIRONMENT: RAIN WATER HARVEST**
 - Rainwater harvest & Flood water lines are connected to the canal.
 - Warka Trees (converts humidity to Drinking water - used in Africa) are placed periodically to de-humidify & generate drinking water.
- COMMUNITY HEALTH: 4 LEVEL PREVENTION**
 - CHC (Community Health Centre) is designed for affordable care to locals.
 - Strategic 4 Level Prevention is implemented to reduce contagious diseases.
 - Overall health awareness and early diagnosis
- ECONOMIC STRATEGY: SELF SUSTAINABLE**
 - Recreating the economic vitality is key in developing the local community.
 - Revenue generating programs also ensures the canal development is economically self sustainable.
- CULTURAL STRATEGY: TAMIL SANGAM**
 - Cultural spaces are designed to create a sense of ownership of land with community.
 - Institutions ensure cleanliness is maintained over time.
- CIVIC & HOUSING: ASPIRATIONAL HOUSING**
 - 2 Aspirational Housing complexes are set up to provide housing to those displaced in canal program.
 - Civic Spaces create a sense of identity to city.

V. MASTERPLAN



VI. MASTERPLAN ASSETS

PUBLIC HOUSING
Community housing at affordable cost for localities displaced from canal banks

WATER TREATMENT PLANT
Facility to test water quality (audit) and treat periodically

BLACK HOLE TECHNOLOGY

TAMIL CULTURE CENTER
Center to celebrate and organize culture events, that develop pride & responsibility.

COMMUNITY HEALTH CENTER
Center for Health Awareness, vaccination, diagnosis and labs.

4 LEVEL HEALTHCARE

TEAM: EOTC 101



CANAL GATE
A symbolic gate that provides visibility and iconic value to the Canal.

USERS:

DEVP:

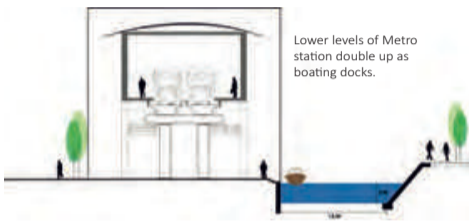


TOURIST BOATING
Metro stations double up as Boating stops, creating interesting recreational activity.

USERS:

DEVP:

METRO STATION - BOATING



Lower levels of Metro station double up as boating docks.



LUNCH HANGOUT
Hangout areas for locals mainly for lunch, evenings and weekends.

USERS:

DEVP:



PEDESTRIAN LOOP
Pedestrian bridges at every 200m interval provides seamless circulation.

USERS:

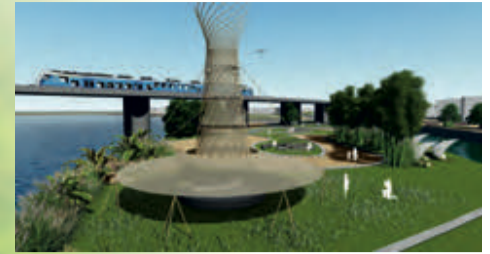
DEVP:



SCIENCE PAVILION
Event space for intellectual & awareness events, to cater to students and localities.

USERS:

DEVP:



NATURE PAVILION
A Technology that passively converts air humidity to drinking water.

USERS:

DEVP:

WARKA TOWER



ART PAVILION
Gallery that presents various Art works of Local artists, and provides a learning opportunity.

USERS:

DEVP:



PUBLIC TOILETS
Restrooms and other amenities to ensure clean maintenance of area.

USERS:

DEVP:



PROMENADE & TRACK
Landscaped park for localities to enjoy, and maintain fitness. Adds to green footprint.

USERS:

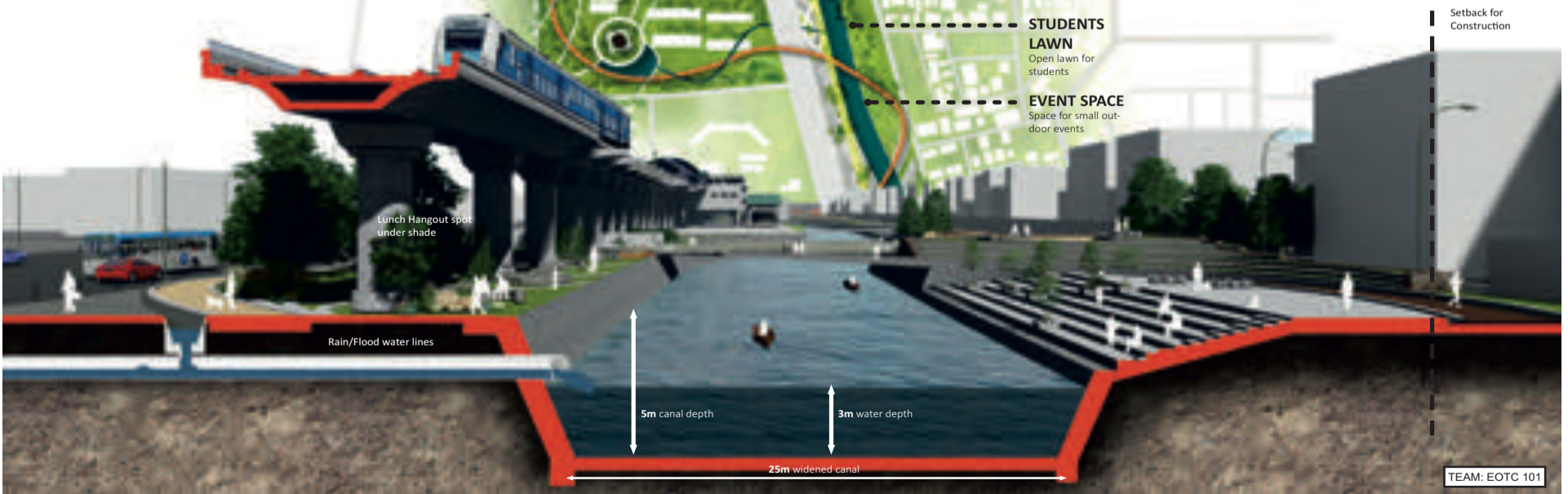
DEVP:



OPEN AIR THEATRE
OAT for 200 users to gather around for casual events and awareness campaigns.

USERS:

DEVP:



TEAM: EOTC 101

Sriram Ramakrishnan (Hyderabad, Chennai); Dr.Maithreyi Swaminathan (Bangalore); Pranap S (Hyderabad, Theni) and Diviya Kaarthick (Chennai)

THALIR

to sprout, to bloom into a new beginning.

MAIN IDEA

The main idea of the project is to create a sustainable water management system that addresses the needs of the community and the environment. The project aims to provide a reliable source of water for the community while also protecting the natural resources that provide the water.

METHODOLOGY

The methodology of the project involves a series of steps that include research, design, and implementation. The project team conducted extensive research into the local water resources and the needs of the community. They then designed a system that would collect and treat water in a sustainable way. Finally, they implemented the system and monitored its performance over time.

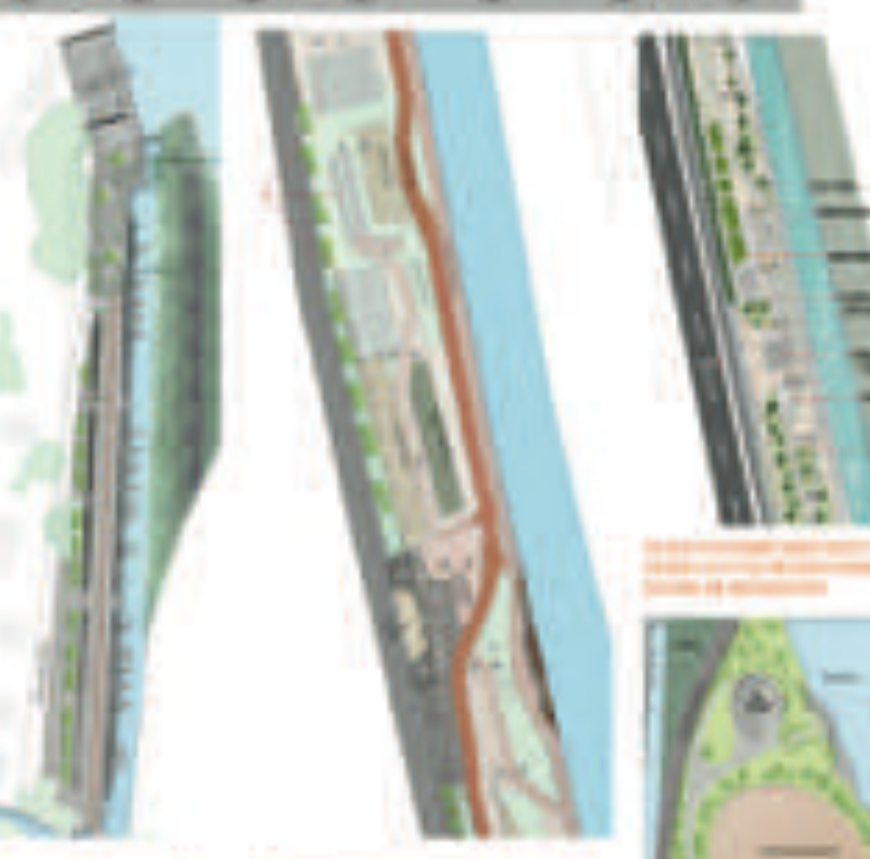


Diagram labels and descriptions for the cross-sections.



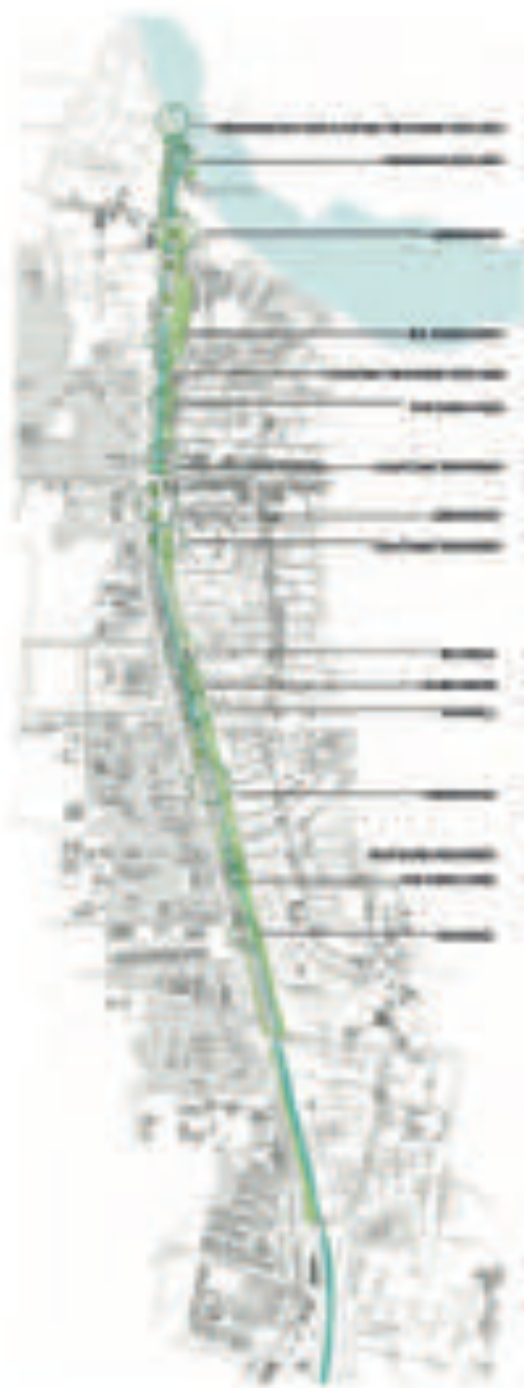
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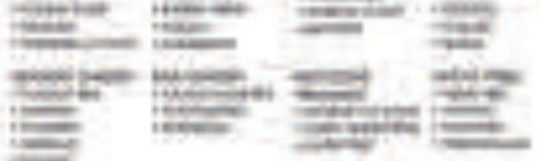
CONCEPTUAL PLAN
 1. GREEN CORRIDOR
 2. PUBLIC SPACE
 3. COMMUNITY CENTRE
 4. CULTURAL CENTRE
 5. COMMERCIAL CENTRE
 6. RESIDENTIAL CENTRE
 7. EDUCATIONAL CENTRE
 8. HEALTH CENTRE
 9. SPORTS CENTRE
 10. ARTS CENTRE
 11. MUSIC CENTRE
 12. THEATRE CENTRE
 13. CINEMA CENTRE
 14. GALLERY CENTRE
 15. MUSEUM CENTRE
 16. LIBRARY CENTRE
 17. ARCHIVE CENTRE
 18. RECORDS CENTRE
 19. DATA CENTRE
 20. SERVER CENTRE
 21. NETWORK CENTRE
 22. SECURITY CENTRE
 23. BACKUP CENTRE
 24. RECOVERY CENTRE
 25. DISASTER CENTRE
 26. CONTINGENCY CENTRE
 27. EMERGENCY CENTRE
 28. FIRST AID CENTRE
 29. FIRE CENTRE
 30. POLICE CENTRE
 31. FIRE DEPARTMENT CENTRE
 32. POLICE DEPARTMENT CENTRE
 33. AMBULANCE CENTRE
 34. HOSPITAL CENTRE
 35. CLINIC CENTRE
 36. PHARMACY CENTRE
 37. LABORATORY CENTRE
 38. X-RAY CENTRE
 39. MRI CENTRE
 40. CT SCAN CENTRE
 41. ULTRASOUND CENTRE
 42. DENTAL CENTRE
 43. OPTIC CENTRE
 44. HEARING CENTRE
 45. SPEECH CENTRE
 46. PHYSIOLOGY CENTRE
 47. MASSAGE CENTRE
 48. YOGA CENTRE
 49. PILATES CENTRE
 50. GYM CENTRE
 51. SWIMMING CENTRE
 52. TENNIS CENTRE
 53. BASKETBALL CENTRE
 54. VOLLEYBALL CENTRE
 55. TABLE TENNIS CENTRE
 56. BILLIARDS CENTRE
 57. CAROM CENTRE
 58. CHESS CENTRE
 59. GO CENTRE
 60. SHOGI CENTRE
 61. HANGAR CENTRE
 62. STABLE CENTRE
 63. RING CENTRE
 64. BOXING CENTRE
 65. JUDO CENTRE
 66. KARATE CENTRE
 67. KUNG FU CENTRE
 68. TAI CHI CENTRE
 69. MARTIAL ARTS CENTRE
 70. MOUNTAIN CLIMBING CENTRE
 71. ROCK CLIMBING CENTRE
 72. CANOEING CENTRE
 73. KAYAKING CENTRE
 74. RUGBY CENTRE
 75. HOCKEY CENTRE
 76. SOCCER CENTRE
 77. BASKETBALL COURT CENTRE
 78. VOLLEYBALL COURT CENTRE
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 100. GOLF CENTRE

THE LEVELS

The levels are designed to provide a multi-layered experience, from the ground level to the sky level. The levels are designed to provide a multi-layered experience, from the ground level to the sky level. The levels are designed to provide a multi-layered experience, from the ground level to the sky level.



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INTERVENTIONS

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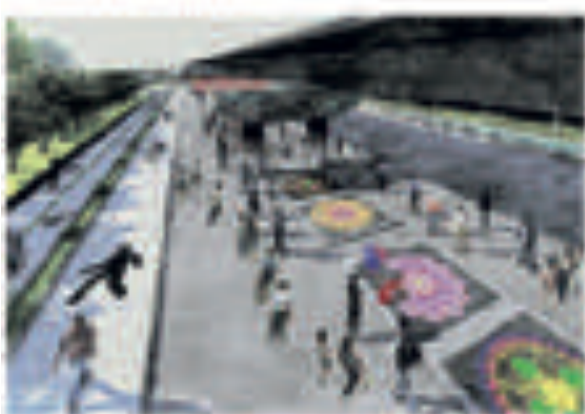
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VARIOUS PERSPECTIVES OF THE PROPOSED DEVELOPMENT ALONG THE CANAL



PERFORMANCE INDICATORS



MAIN FOCUS AND CONCEPT

"Give a man a fish and you feed him for a day. Teach a man to fish and you feed him for a lifetime"



MAIN CONCEPT

The strategy is to create sustainable environment in and around the area with an overall objective of the development of various projects and also to create a green space for the community.

Key features include:

- Create a green space for the community.
- Create a green space for the community.
- Create a green space for the community.
- Create a green space for the community.
- Create a green space for the community.
- Create a green space for the community.

LEVEL OF INTERVENTION

The intervention is focused on the community and educational aspects and also to create a green space for the community.

The strategy is to create a sustainable environment in and around the area with an overall objective of the development of various projects and also to create a green space for the community.

TARGET GROUPS AND BENEFICIARIES

The target groups are the community and educational aspects and also to create a green space for the community.

The strategy is to create a sustainable environment in and around the area with an overall objective of the development of various projects and also to create a green space for the community.

OPPORTUNITY AREAS

The opportunity areas are the community and educational aspects and also to create a green space for the community.

The strategy is to create a sustainable environment in and around the area with an overall objective of the development of various projects and also to create a green space for the community.

SOLUTIONS

PRECIOUS PLASTIC

- Create a green space for the community.
- Create a green space for the community.
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- Create a green space for the community.

JUNK ART GALLERY

- Create a green space for the community.
- Create a green space for the community.
- Create a green space for the community.
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- Create a green space for the community.

FOOD TRUCK PARK



VERTICAL AXIS WIND TURBINE

- Create a green space for the community.
- Create a green space for the community.
- Create a green space for the community.
- Create a green space for the community.
- Create a green space for the community.
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GREEN COLUMNS

- Create a green space for the community.
- Create a green space for the community.
- Create a green space for the community.
- Create a green space for the community.
- Create a green space for the community.
- Create a green space for the community.

IMPLEMENTATION



GORY TO GLORY!

EOTC106

H₂OLISTIC

RECLAIMING THE CANAL THROUGH TECHNOLOGY AND A GOOD DESIGN

The canal is a vital part of the city's infrastructure, providing a natural water source and a means of transportation. However, over time, the canal has become increasingly polluted and neglected, posing a significant threat to the city's health and environment.

The proposed solution is a comprehensive plan that combines modern technology with traditional design principles. This approach aims to restore the canal to its original state, while also enhancing the surrounding urban environment.

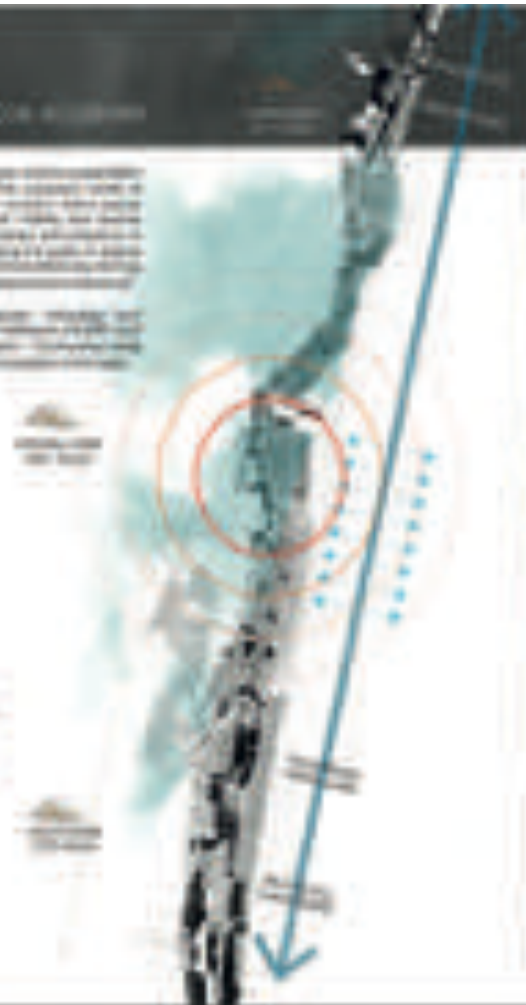
The plan includes several key components, including the installation of advanced water filtration systems, the creation of green spaces along the canal banks, and the implementation of strict regulations to prevent further pollution.

By adopting this holistic approach, the city can ensure the long-term sustainability of its water resources and create a more vibrant, livable community. The canal will not only provide clean water for drinking and irrigation, but also serve as a beautiful public space for recreation and social interaction.

The project is a testament to the power of innovative thinking and collaborative effort. It demonstrates how we can address complex urban challenges by looking at the big picture and considering all the interconnected factors that affect our lives.

With your support, we can make a real difference in our city and create a brighter future for everyone.

- Water Treatment Plant
- Green Spaces
- Canal Banks
- Public Spaces
- Regulations



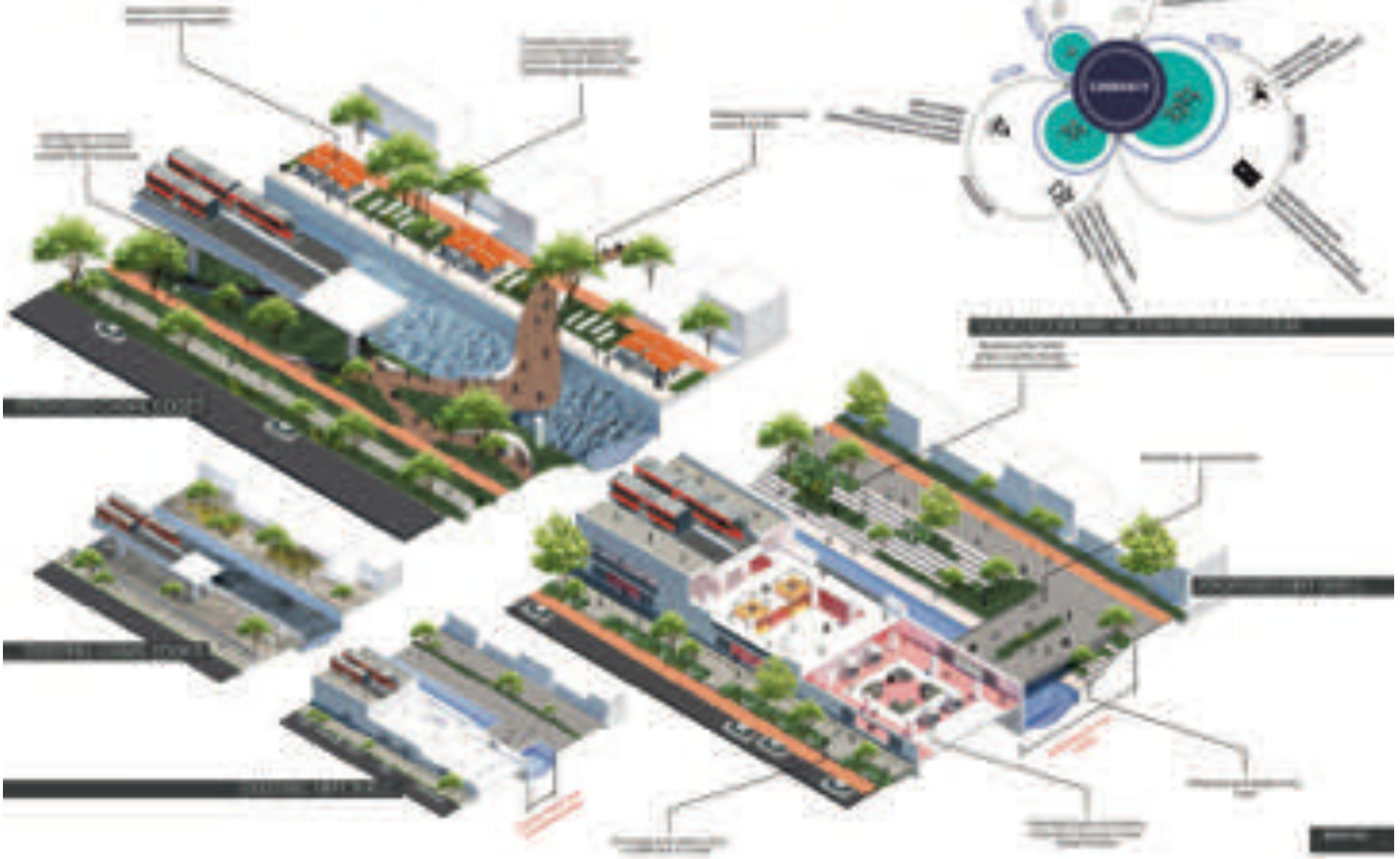
MASTERPLAN | ZONING | PROGRAMS | ROAD NETWORK

Masterplan | Zoning | Programs | Road Network

Zone	Program	Road Network
Residential	Urban Renewal	Highway
Commercial	Public Housing	Expressway
Industrial	Community Centers	Arterial Road
Public Space	Green Spaces	Local Road
Water Treatment	Parks and Recreation	Service Road
Canal	Public Art	Access Road
Green Spaces	Community Gardens	Driveway
Canal Banks	Urban Agriculture	Private Road
Public Spaces	Urban Farming	Private Lane
Regulations	Urban Forestry	Private Alley
	Urban Landscaping	Private Court
	Urban Design	Private Drive
	Urban Planning	Private Street
	Urban Policy	Private Lane
	Urban Strategy	Private Road
	Urban Vision	Private Way
	Urban Future	Private Path
	Urban Legacy	Private Trail
	Urban Heritage	Private Walkway
	Urban Identity	Private Footpath
	Urban Character	Private Staircase
	Urban Soul	Private Ramp
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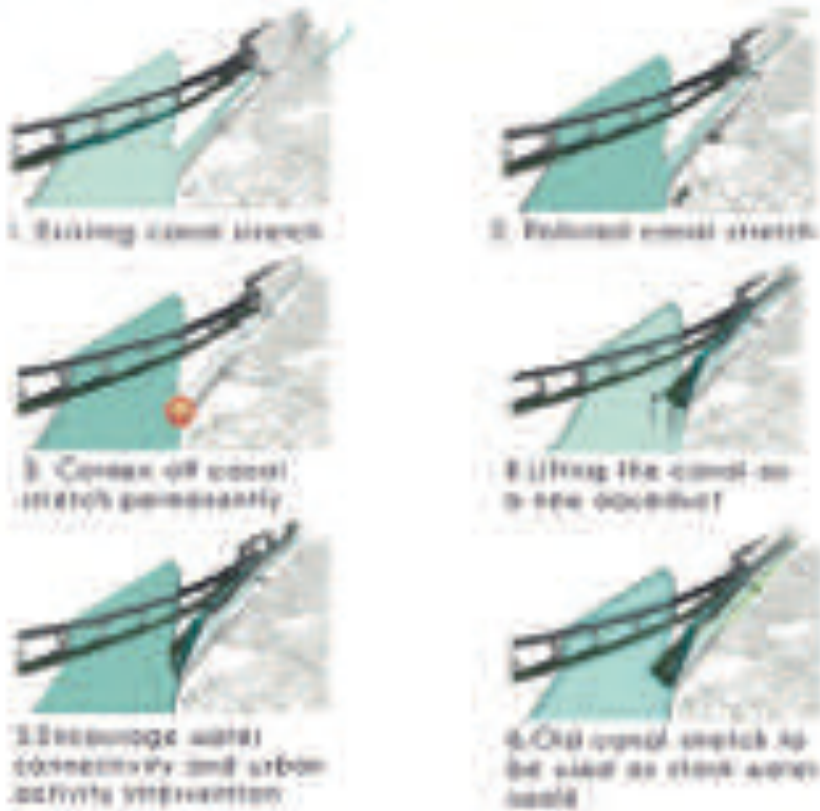


Through the Sustainable Living Process, the team is able to understand the needs and desires of the community. The team works with the community to create a vision for the future of the city. This vision is then used to guide the design and construction of the city. The team also works with the community to create a plan for the future of the city. This plan is then used to guide the design and construction of the city. The team also works with the community to create a plan for the future of the city. This plan is then used to guide the design and construction of the city.

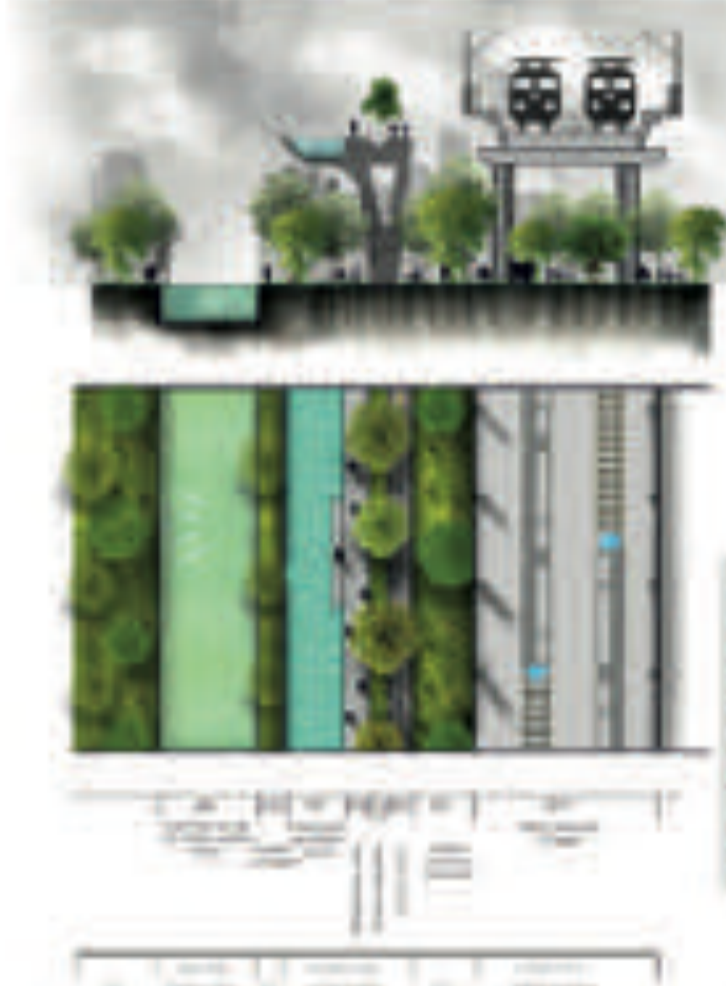


Sunjana Thirumala Sridhar, Nasim Amini, Design office of global cities (New York) and Tahaer Zoyab, Triple O Studio (Chennai)

EVOLUTION OF DESIGN CONCEPT



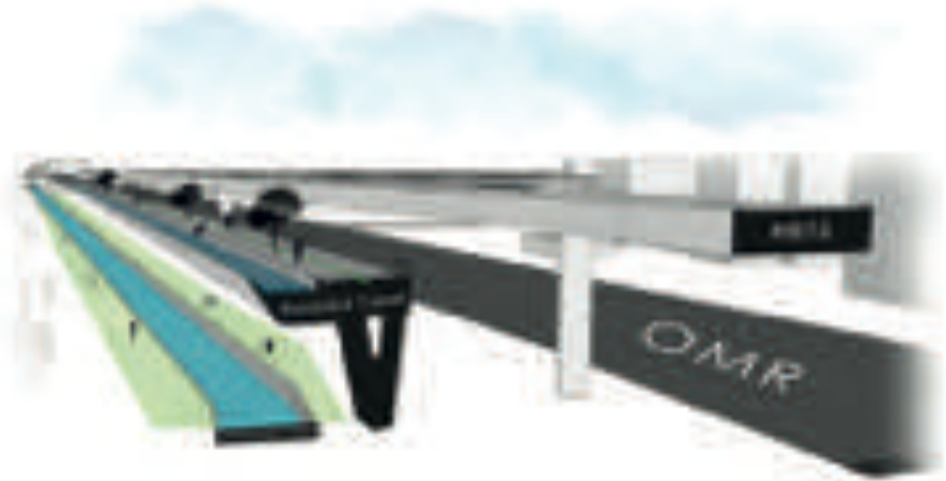
NEW PROPOSED DESIGN SECTION



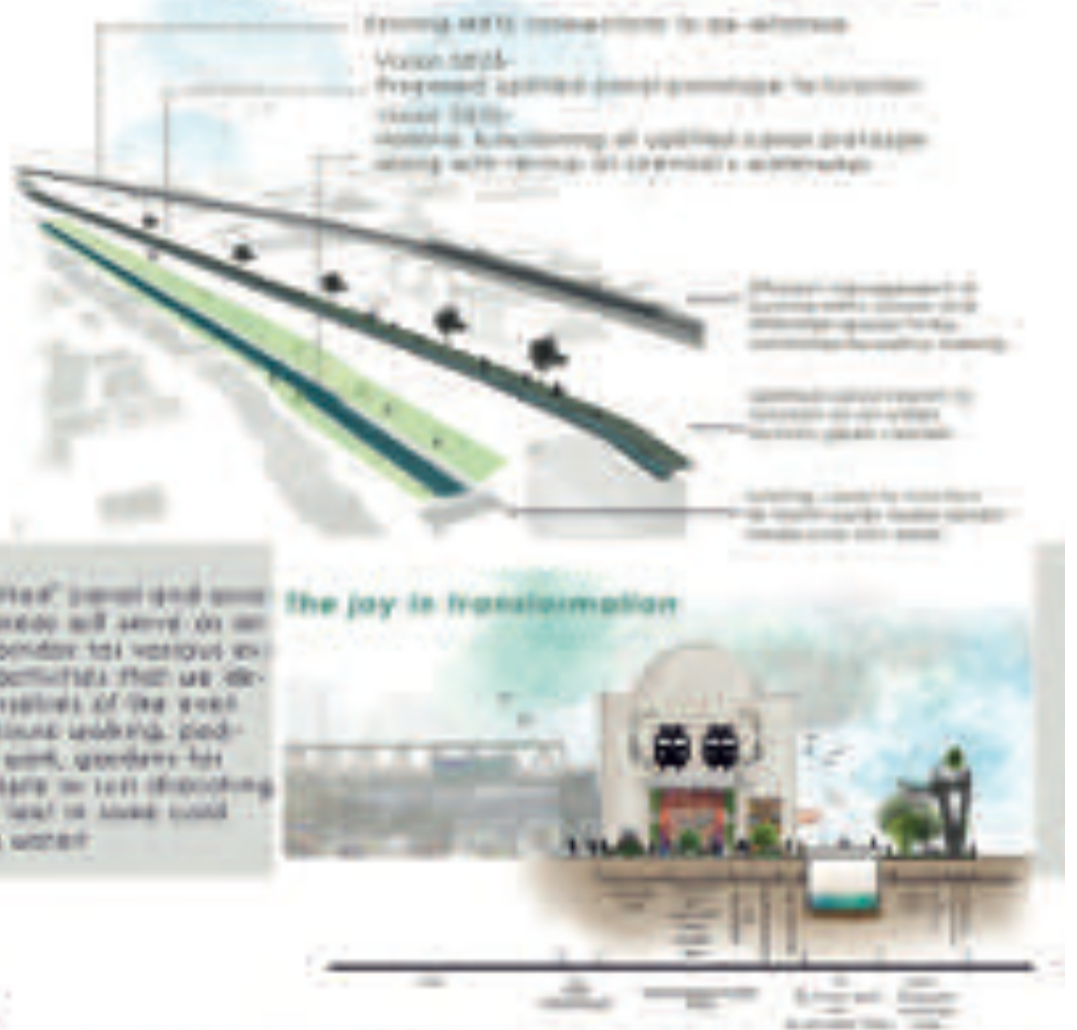
The "uplifted" canal and new canal walls will serve as an urban corridor for various everyday activities that we desire besides of the ever staple leisure walking, peddling to work, gardens for little people or just drinking tea and watching our kids play with their water.

CONCEPTUAL SCHEME *bringing back life*

The "uplifted" canal will serve as an urban corridor for various everyday activities that we desire besides of the ever staple leisure walking, peddling to work, gardens for little people or just drinking tea and watching our kids play with their water.



FUTURISTIC DEVELOPMENT PLAN



NEW PROPOSED DESIGN STRATEGY

PROJECT VISION

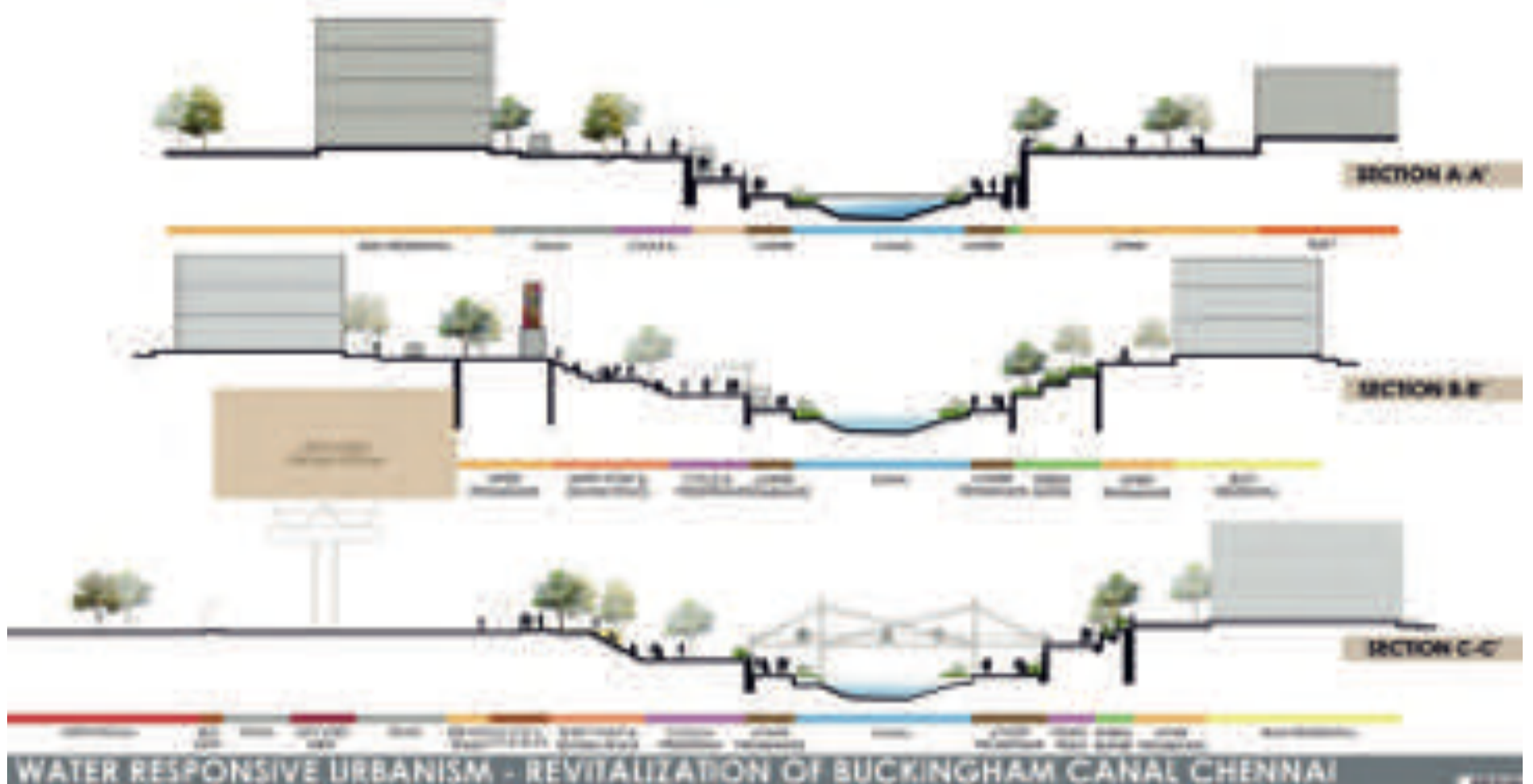
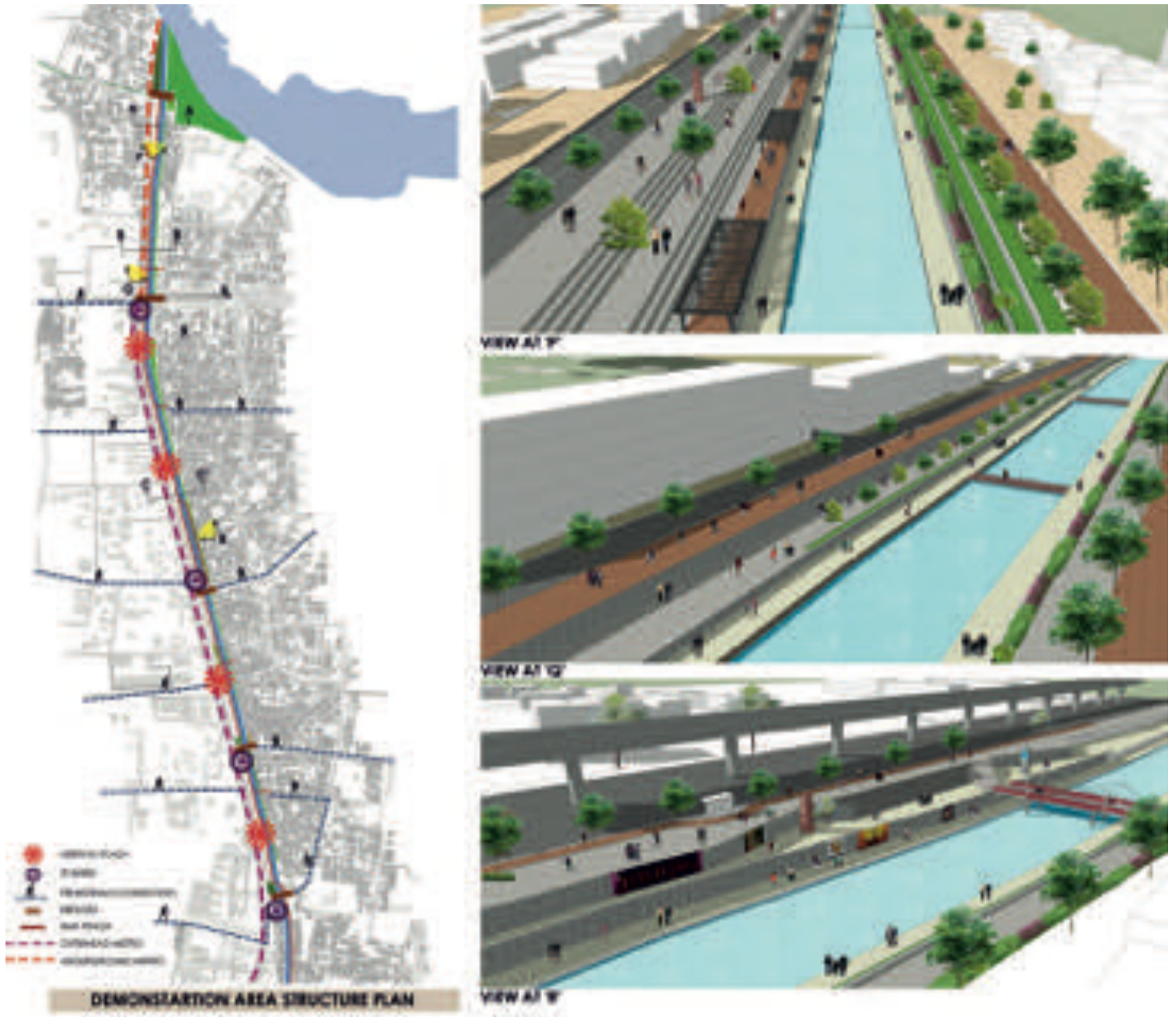
The existing canal project should work as a catalyst for urban regeneration. It is always good to design with the assistance of data, but we must understand that we live in the interface between land and water which controls the way we live. Whenever we do an urban project, we must understand the existing canal project and its role in the urban fabric. The design strategies that encompass the protection of the edge of the canal, this can be done in a way that is not only in the future, but in the present. We must understand the strengths, weaknesses, opportunities and threats of all our stakeholders.

PROPOSED STRATEGIC DESIGN VISION - SHEET TWO

No boundaries yet everything in between



UP LIFTING THE CANAL



Rohit Salunke, Sonu Salunke, Yogita Kaswa, Ashwattha Design Studio (Navi Mumbai)

Proposed Treatment process



Angle Grinder Dewatering Machine

OMSA has obtained a dewatering machine that can be used for dewatering the waste by increasing the size of water and this is retained in the oil and water fuel has pulled in the sand bed. This waste shall be disposed, segregated and cleaned as appropriate.

Source: Streamline



Wet/Dry Vac

A wet/dry vacuum that reaches through moist surfaces clearing up flooding waste on the surface. It is equipped with a GFI to track its movements. The RipMaster Technology has created devices that can learn and collect their own bodies of water to help clean up the system. The technology has already been tested in various ways in the field.

Source: Home Depot Technology Network



Desals

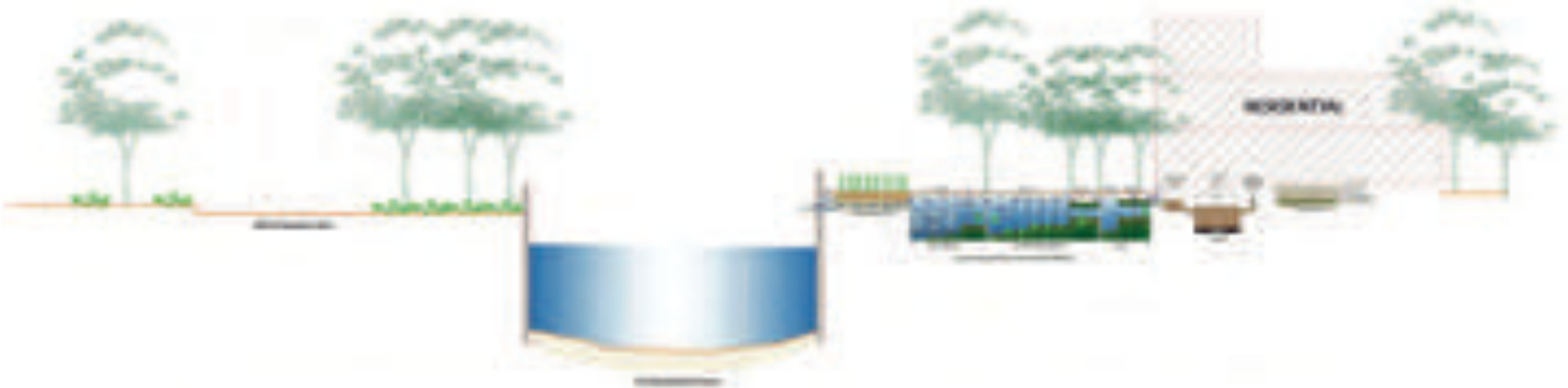
Decentralized wastewater systems treat, reuse or dispose the effluent in a locally water vicinity in its source of generation. This reduces the burden on the municipal sewage treatment plants as waste water can be treated locally and reused for irrigation. The treated water passes through 4 filter stages and gets treated by a plant based system before it is discharged into the canal.

Connecting Biophilic to the UN Sustainable Development Goals

Many green concepts often possible go to nature.



Section of the Canal River Inlets Nagar MTR station showing the wastewater and sewage water treatment systems for the community



PROPOSED STATION AESTHETICS

Necessities to bring in traditional but or modern look pattern, materials like and coloring

PROPOSED VISION OF STATION INTERIOR

An exciting vision that blends in cultural elements with functional needs

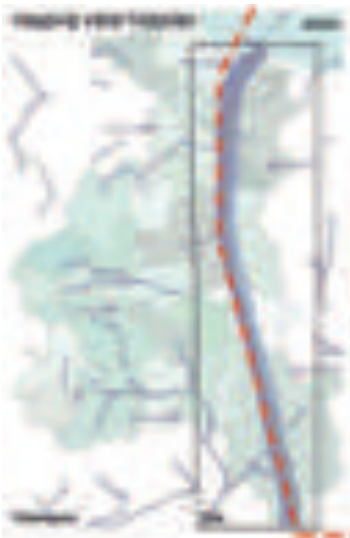


A Biophilic Approach To Rejuvenating The Buckingham Canal



Anupama Mohanram, Jaideep Vivekanand, M.S.Venkatesan, Akshitha Kareti, Srinidhi Bharadwaj Santhanakrishnan, Green Evolution (Chennai)

hyperconnected tissues



The study area is defined as a 2.5 km long urban river section in the city of Berlin, Germany. The study area is a hyperconnected urban fabric with a high density of buildings and a high density of green spaces. The urban fabric is characterized by a high density of buildings and a high density of green spaces.

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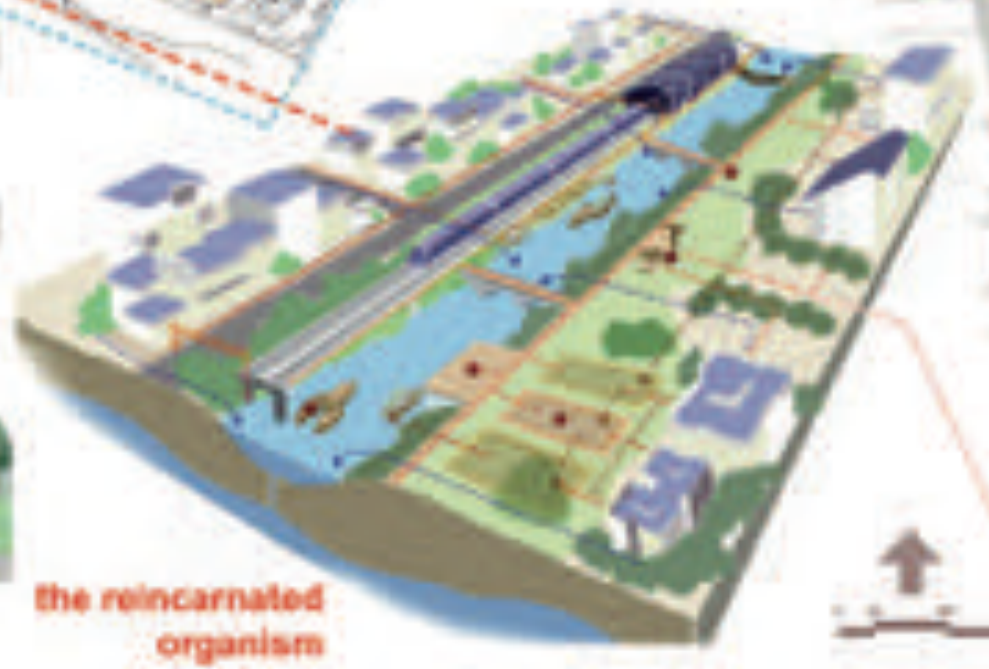
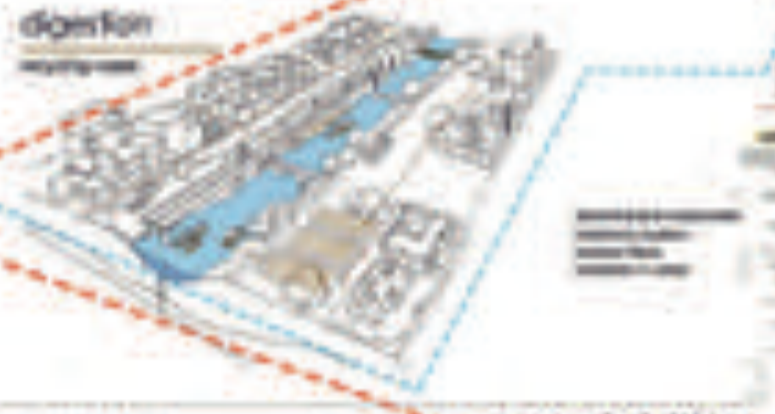
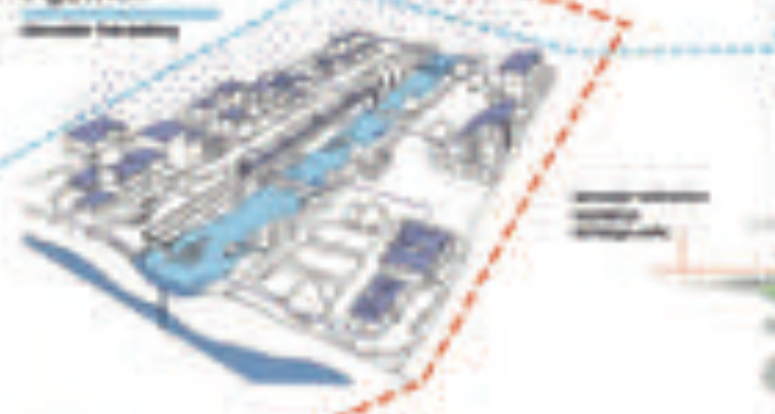
The urban fabric is characterized by a high density of buildings and a high density of green spaces. The urban fabric is characterized by a high density of buildings and a high density of green spaces.

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sustenance



Rainwater captured 500k

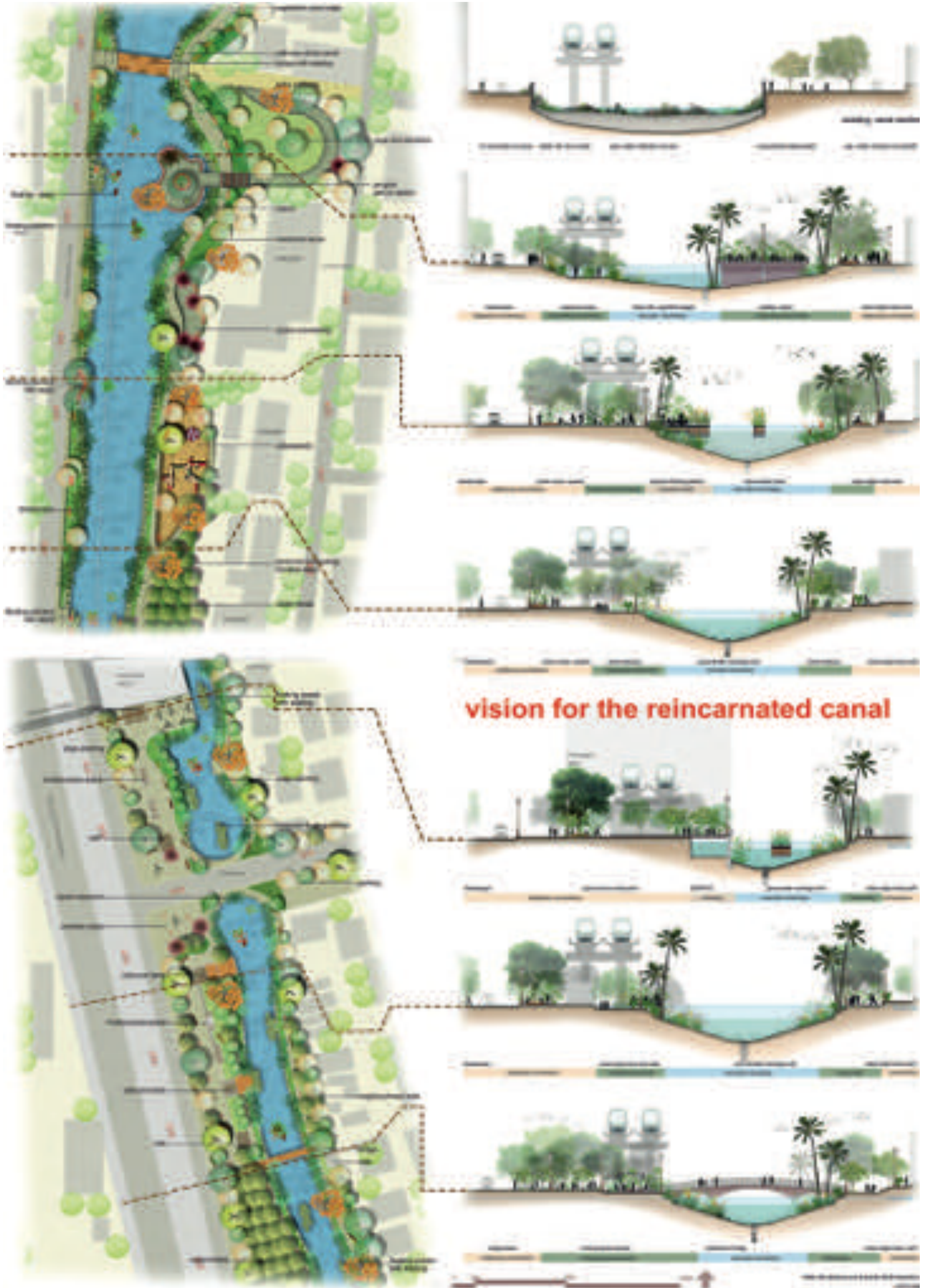
Recycled Water 10 TWh

Biomass 13,000 tons

O₂ 1000 tons

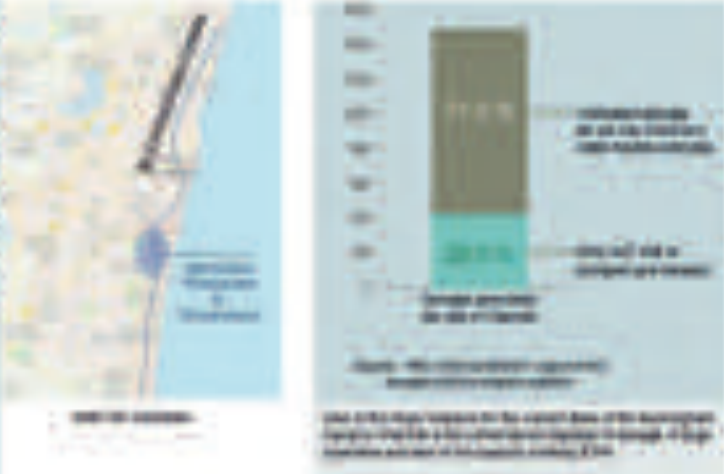
CO₂ 100 tons

Green space 8 Ha



Sandip Patil, Tapan Modi, Janki Gonawala, Dipti Sharma,
 Earthscapes Consultancy Pvt Ltd (Ahmedabad and Mumbai)

introduction



Detailed presentation of your project. Can I see it in the next chapter? It will be all the way to the end of the book. It will be all the way to the end of the book. It will be all the way to the end of the book.

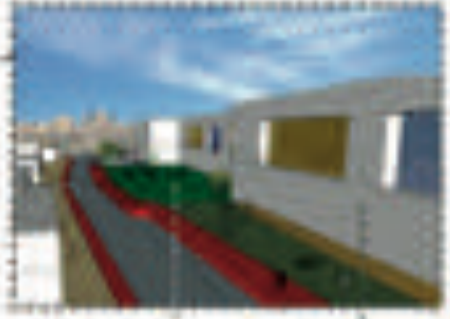
concept

The idea of the project is to create a community that can be operated using the water of the community canal. Our mission is to provide a high quality, sustainable, and affordable living environment for the community. The project is to create a community that can be operated using the water of the community canal. Our mission is to provide a high quality, sustainable, and affordable living environment for the community.

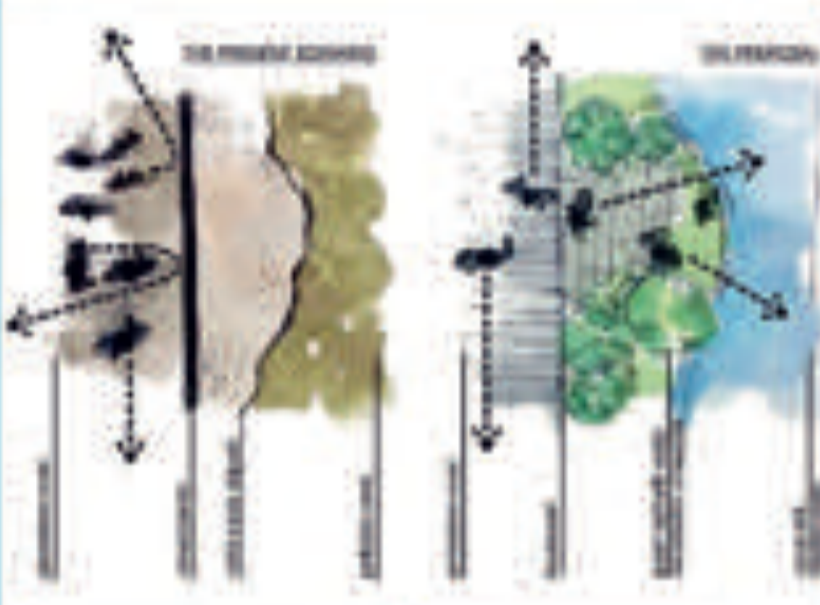
the community canal.



TOGETHERNESS



Redesign of the walkway area. Integrating built and natural spaces. Water features. The goal is to create a sustainable, affordable, and high-quality living environment for the community.



Water

Working with the water is the key to creating a sustainable, affordable, and high-quality living environment for the community. The project is to create a community that can be operated using the water of the community canal. Our mission is to provide a high quality, sustainable, and affordable living environment for the community.

WATERBY

ST+ART

GREENWAVE

WATERBY

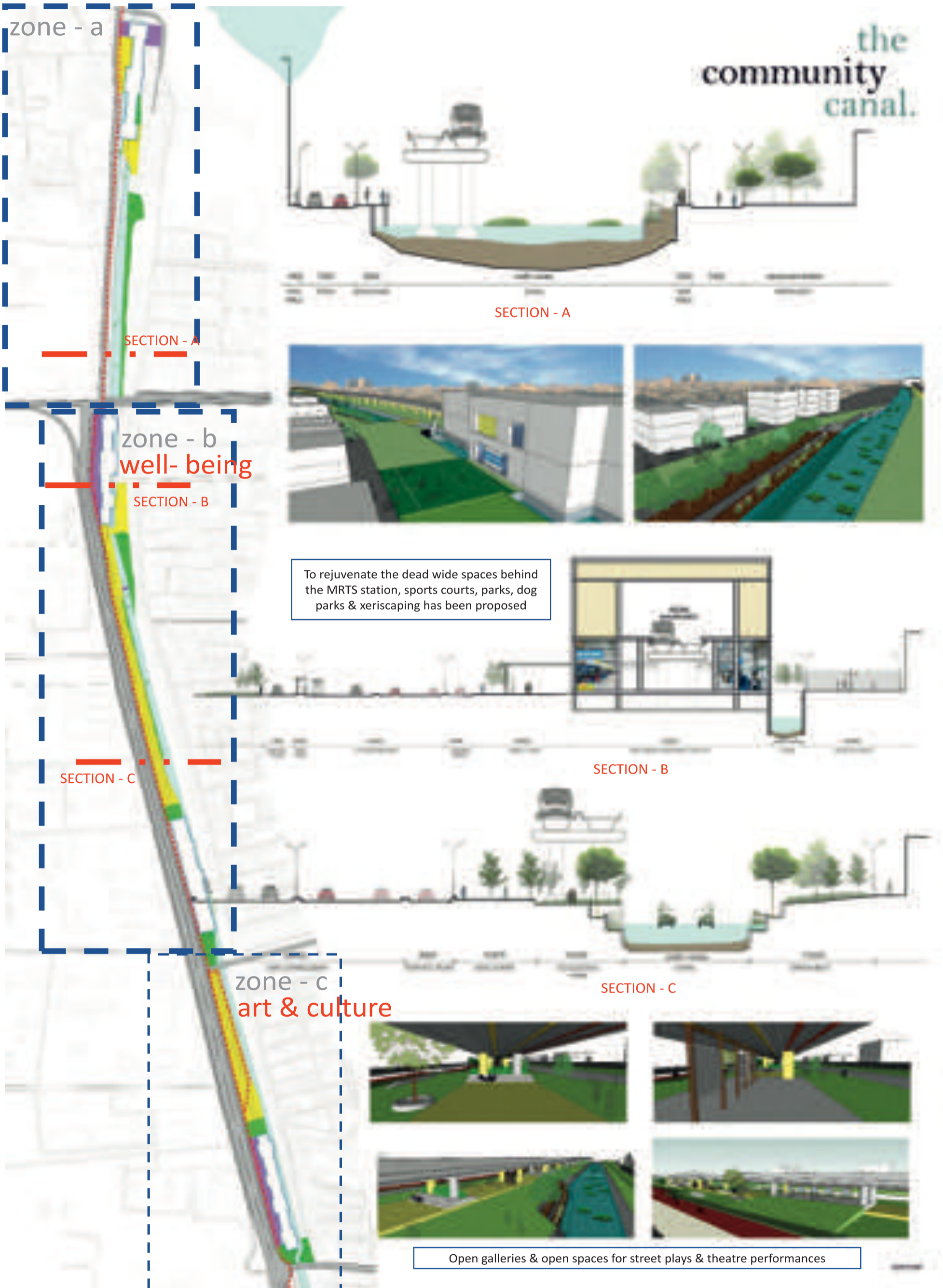
ST+ART

GREENWAVE



Existing rocky area near the canal.

the community canal.



Arpita Kothari, Chennai and Merlin Noronha, Melani Almeida (Bangalore)

City-making is a social process. Leaning towards the significance of 'social production of space', conceptualized by Lefebvre, the proposal of Buckingham Canal as 'People's Eco Corridor' focuses on personalizing the canal to its local neighbourhoods by adopting human-centric approach and resilient systems. The canal's edge is predominantly inhabited by lower-income and middle income households, besides few government and private institutions. Allowing people to rightfully build a connection with the canal through utilitarian practices will support in addressing the immediate urban problems. This approach will not only provide a respite to the dense urban fabric, but will also support in the upkeep of the canal.

The absence of visual and physical connection with the canal has made it a backyard for dumping liquid and solid waste, leading to the risk of health hazards and flooding. *Using water as a design element, canal as resilient infrastructure, waste as awareness strategy and residents as key actors, the proposal addresses the canal in sections to provide localized solutions for enhancing quality of life.* The proposal is a toolkit of micro-solutions that can be scaled up to the entire stretch of the canal.

The first step is to clean the canal and its water by desilting, dredging, and bioremediation respectively. Some sections are done through 'cleaning drives' involving residents and encouraging corporate initiatives. The entry and exit gates of the canal are made functional and additional gates are considered to support localized actions. The canal is then rejuvenated by following solutions from the toolkit, detailed below-

THRESHOLD

Canal as Resilient Infrastructure, Water as Design Element
The canal edge is redesigned to collect rain water through wetlands and permeable surfaces. This doubles up in absorbing water during floods. Interceptor drains collect and drain sewage to DEWAT systems. Such pockets play a dual role of public spaces for the city and the neighbourhood. The columns of MRTS, blot on the landscape is converted into green infrastructure.

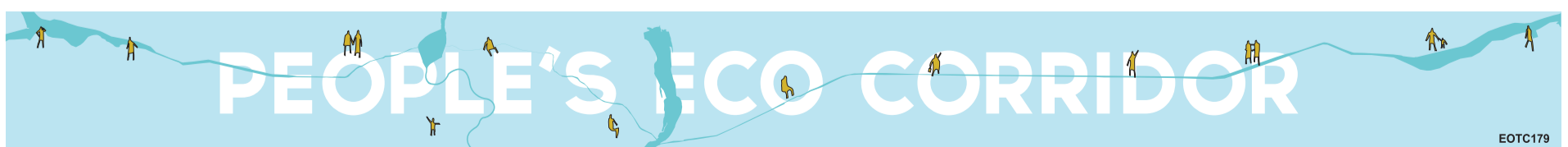
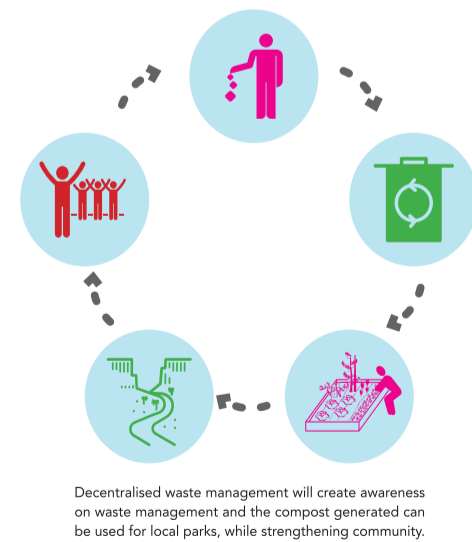
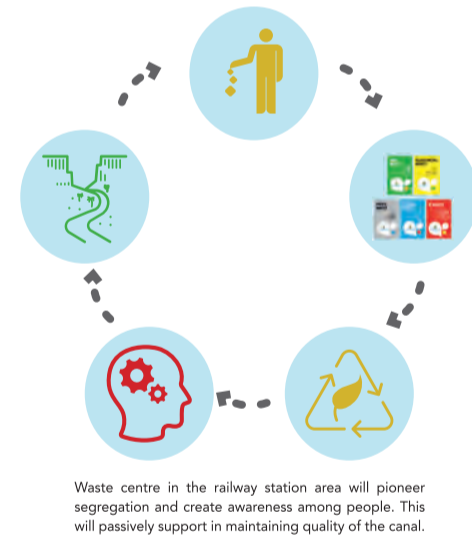
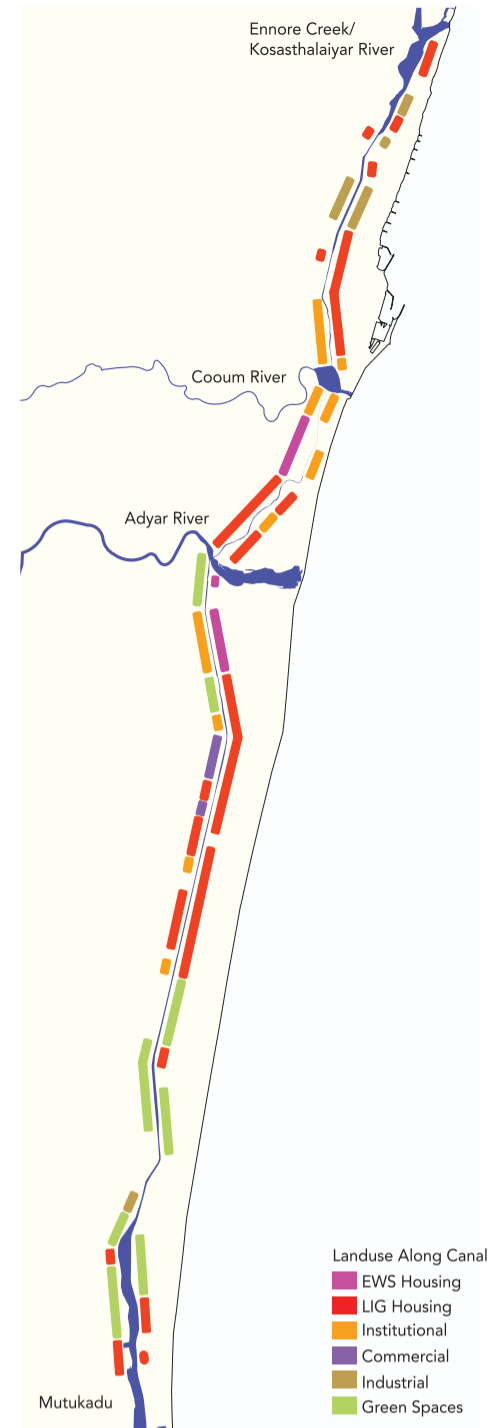
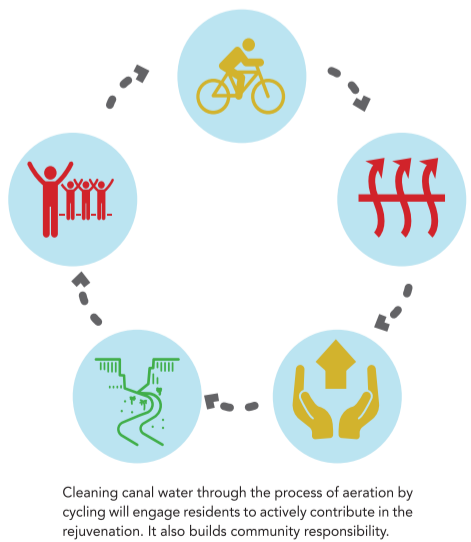
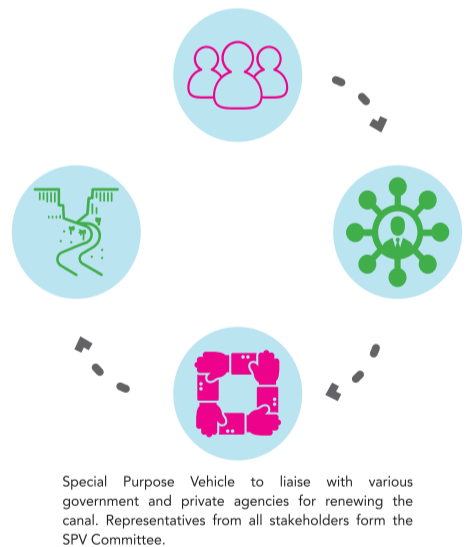
**COMMON GROUND
Residents as Key Actors**

Common ground is where local residents come together to maintain the canal and enjoy the fruits of their effort. Community cum individual water metering systems and aeration cycles are proposed to create awareness on water consumption and actively involve the residents in cleaning the water. This will also house decentralized solid waste management units.

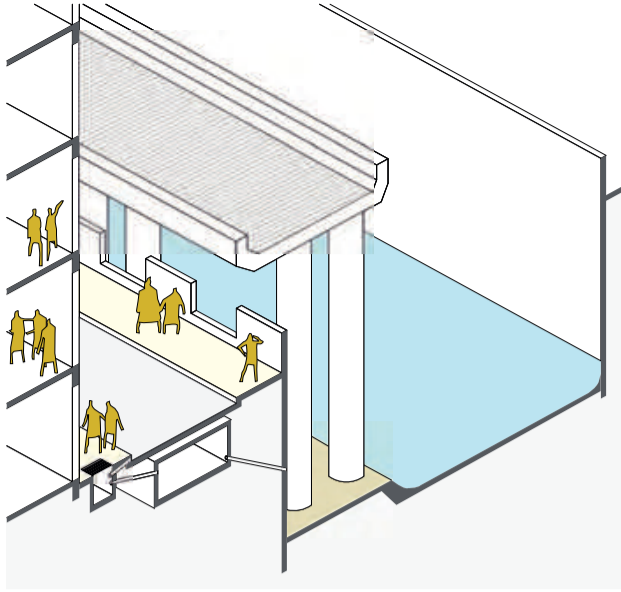
**LEVERAGING EXISTING CONDITIONS
Waste as an Awareness Strategy**

Spaces in and around the MRTS stations have the potential to be converted into city/local need based activity centres, such as co-working space, sports facility etc.,. The MRTS stations in the pilot stretch are proposed to house 5-factor waste segregation and recycling units, supporting existing livelihoods. This is intended to pioneer waste management in the city.

Through micro solutions, the Buckingham Canal is envisioned to become resilient and the social engagement strengthening social network builds the community resilience. The rejuvenated canal with utility cum public spaces will allow people to own the canal, making it their eco-corridor. Extended to the entire stretch, the backyard canal will transform into a backbone for Chennai city.



Permeable road surfaces that absorb water, and storm water storage chambers housed beneath road surface help collect and store rain water



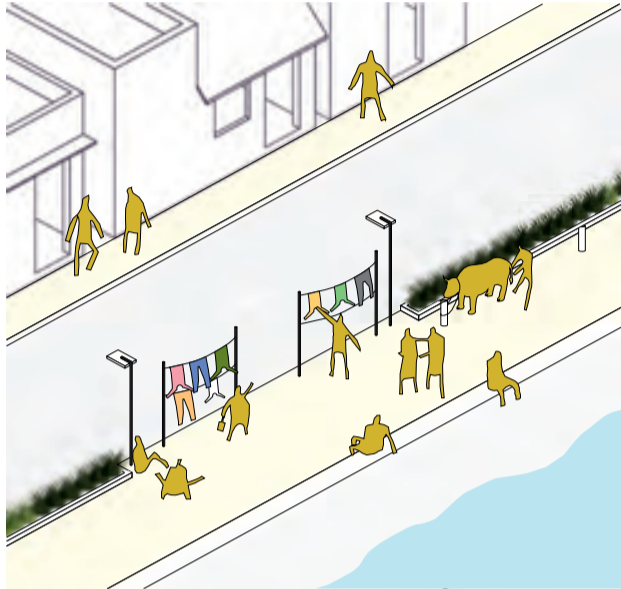
Adaptation Strategy- Substitutes reduction of canal width through secondary water channel

Resilience Strategy- Increase in water retention capacity aids in flood prevention

Stakeholders- Public Works Department, Greater Chennai Corporation



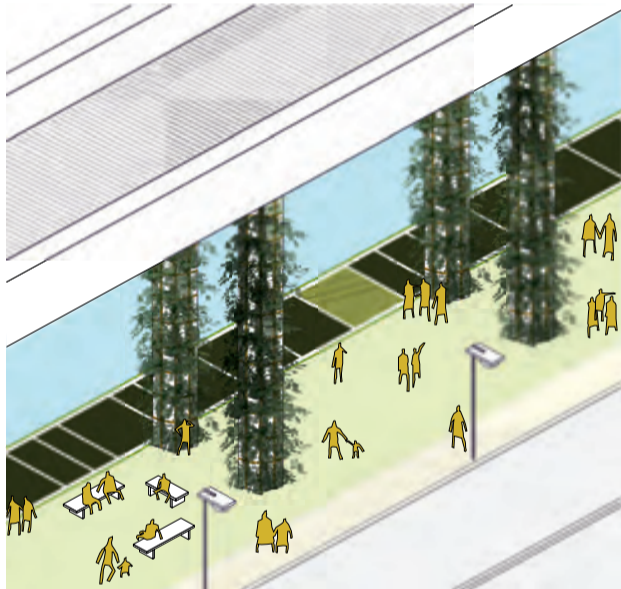
Threshold conditions near LIG and EWS housing, accommodates spaces catering to the domestic lifestyles of the community



Stakeholders- Public Works Department, Greater Chennai Corporation, TN Housing Board



Surface level wetlands are introduced to provide natural sponged edges; MRTS columns are converted into green infrastructure

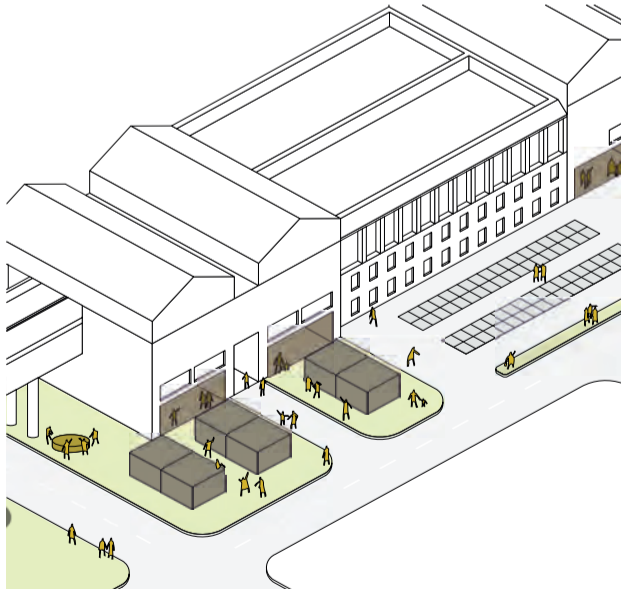


Resilience Strategy- Wetlands form urban sponges, capable of retaining water from the canal

Stakeholders- Greater Chennai Corporation, Urban Forestry Wing



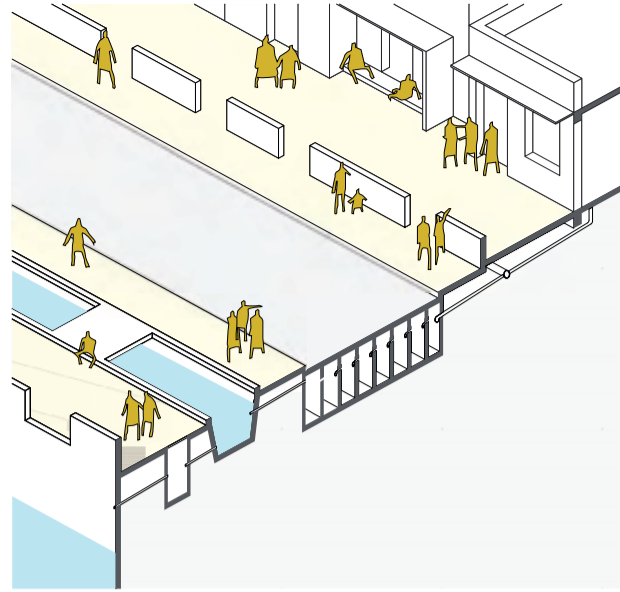
Station Area Planning- allocating green spaces with community composting and parking provisions; ground level of MRTS stations to house local businesses and 5-factor community recycling units



Mitigation Strategy- Prevention of health hazards through effective waste management

Stakeholders- Greater Chennai Corporation, Southern Railways, Land and Estate Cell

Community- Local businesses and livelihoods are accommodated, community composting introduced



Dewats systems installed beneath the road surface, form a natural sewage treatment process through baffle reactors and constructed wetlands.

Adaptation Strategy- Dewats system receives existing sewage inflow through interceptor drains

Resilience Strategy- Improves water quality, reduces health risk from stagnation

Stakeholders- Chennai Metrowater Supply and Sewage Board

Community- Assist in aerating water through aeration cycles

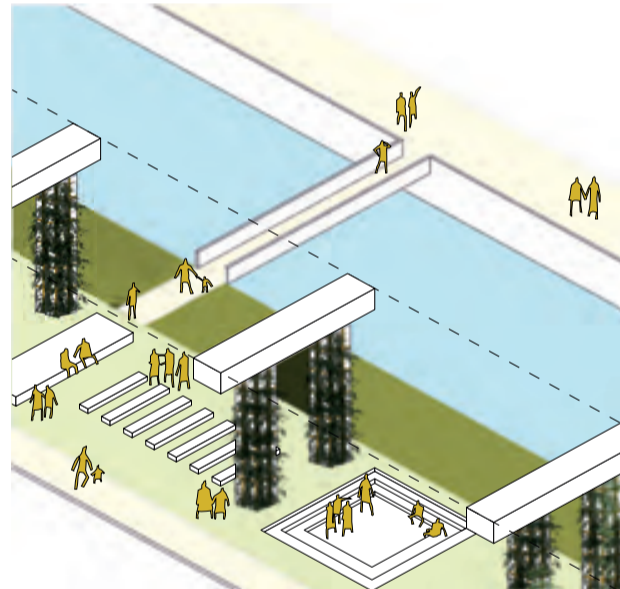


Threshold conditions near providing public spaces for congregation, commerce and play, based on everyday use of street spaces by the locals

Resilience Strategy- Self closing flood barriers, allow visual access and protect in the event of floods

Stakeholders- Public Works Department, Greater Chennai Corporation, TN Housing Board

Community- Street-commerce and vending fosters livelihood of the local community

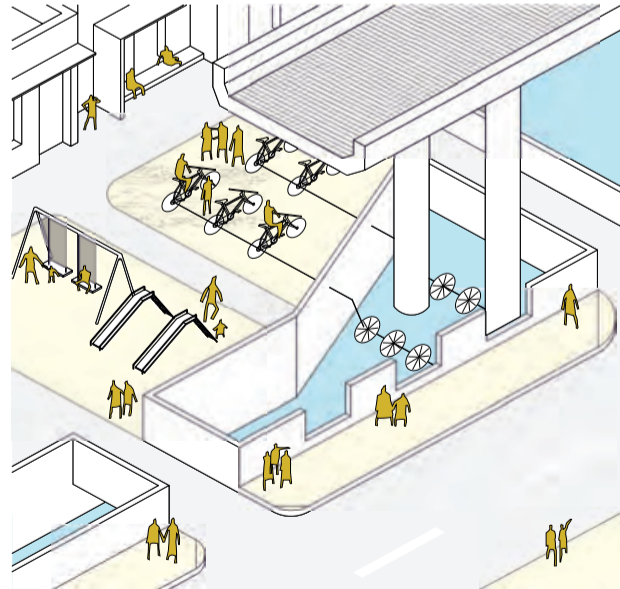


Spaces under the MRTS columns fosters public life and congregation, East-West canal links are aided through additional cross-over bridges

Adaptation Strategy- Green columns use water from the cleaned canal

Resilience Strategy- Soft edge of constructed wetlands instead of walling canal

Stakeholders- Greater Chennai Corporation, Urban Forestry Wing

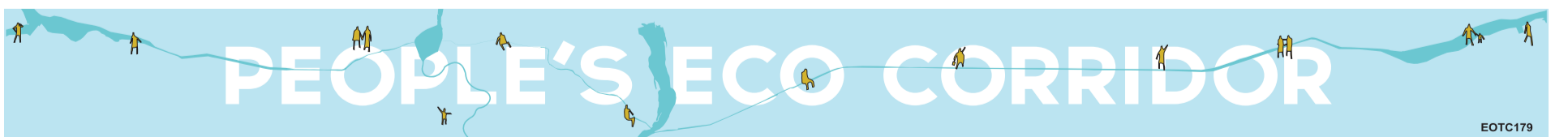


Community spaces based on local needs provided; local aeration mechanisms involved for community to participate in bioremediation process

Resilience Strategy- Improves water quality, reduces health risk from stagnation

Stakeholders- Greater Chennai Corporation, Urban Forestry Wing

Community- Assist in aerating water through aeration cycles



EOTC179

Ravi Anand Loknath, Sagar Mehta, Urban Circle (Chennai and Mumbai) and Vaishnavi TG Shankar, National Institute of Urban Affairs (New Delhi)



THE BUCKINGHAM CANAL

RESTORATION OF BUCKINGHAM CANAL

USTRALIAN INFRASTRUCTURE RESPONSE

CITY RIVER CONNECTION

NATIONAL WATERWAYS

PROBLEMS

FLOOD PROTECTION

SO, WHAT DO WE DO?

HEVENTSIC

URBAN PEDAGOGY

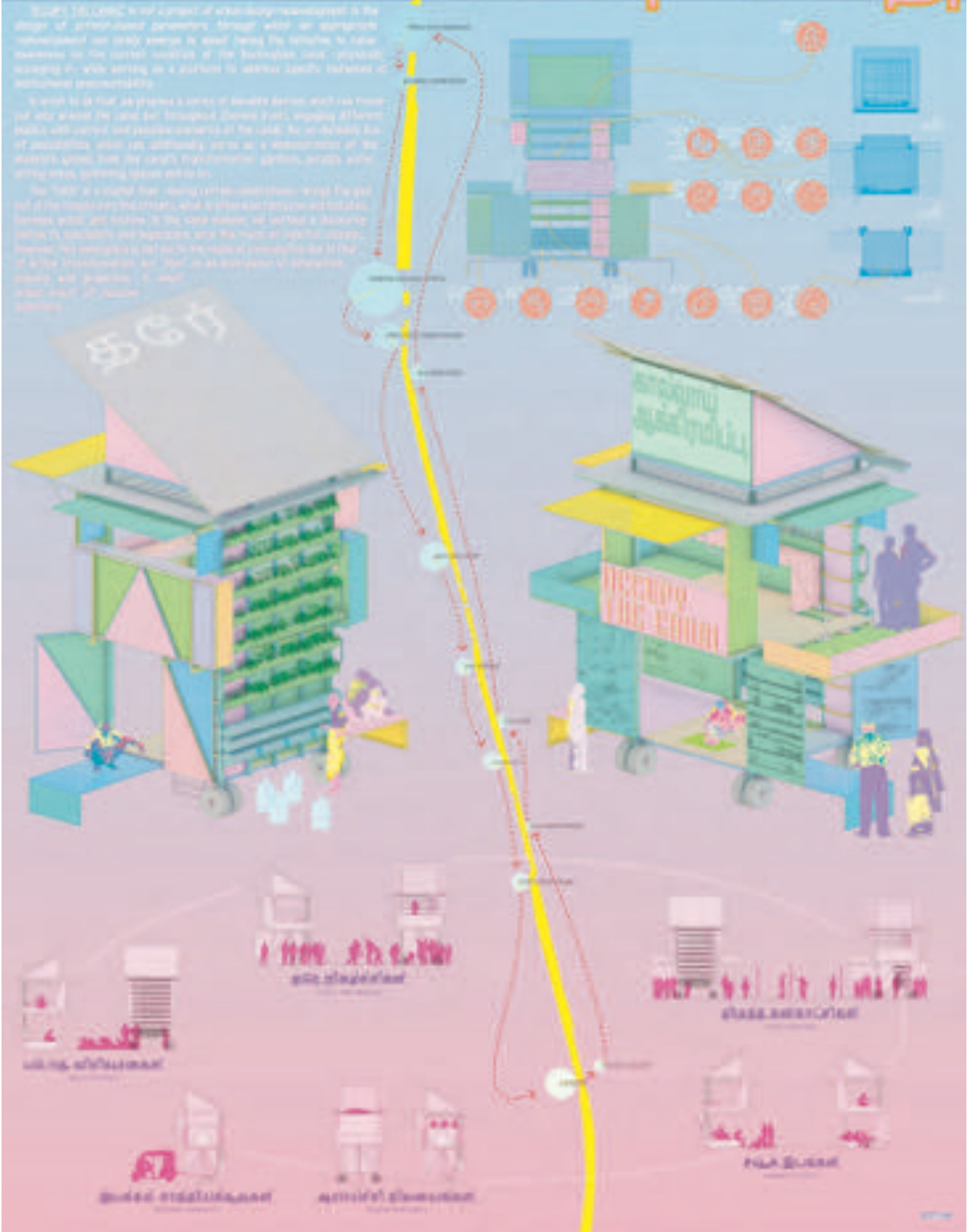
#OCCUPY THE CANAL

கால்வாயில் கட்டியதே

Water Pollution is not a concept of environmental awareness is the design of urban-based parameters through which an appropriate infrastructure can be developed to avoid having the citizens to have awareness on the current condition of the freshwater level especially during the rainy season as a solution to address specific problems of waterway productivity.

It is not to be that as progress a series of benefits derived which can flow out into almost the same but throughout diverse levels, involving different public with current and possible scenarios of the water. An individual has a responsibility which can ultimately serve as a representation of the citizens' power. But the concept of transformation process, which will bring about positive impact will be as:

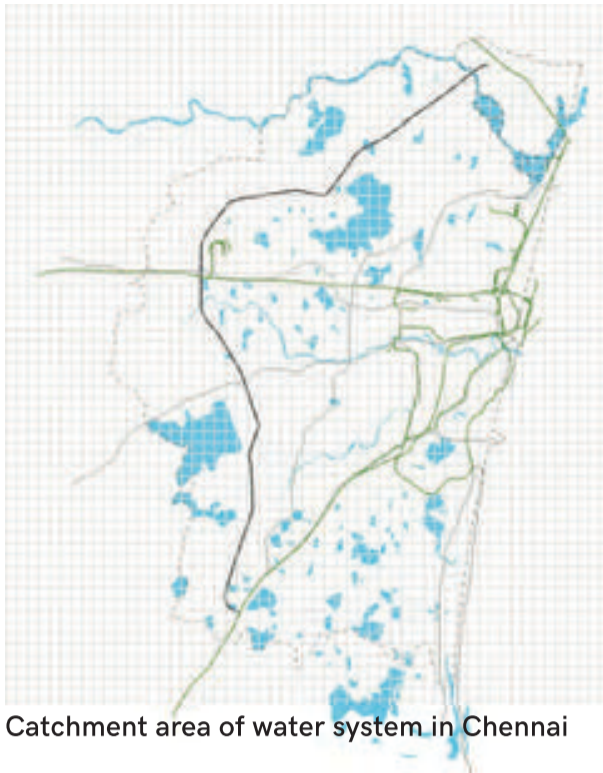
The first is a model for using urban infrastructure which is part of the infrastructure that citizens, who is often a common and isolated, become public and private. In the case of water, we will have a dynamic network of facilities and resources with the help of digital devices. However, the emphasis is not on the results of construction but the role of urban infrastructure for that is an indicator of innovation. Water will provide a new urban model of water pollution.



Kruti Shah, Sebastian Trujillo, CEPT University (Ahmedabad)

RETHINKING BUCKINGHAM

A clean and resilient canalfront for the people



Catchment area of water system in Chennai

The Buckingham Canal is a significant part of the water system that connects 3 rivers in Tamil Nadu. It is a manmade, saltwater navigation canal that runs in the north-south direction along the Chennai Metropolitan Area. Historically the canal was used for transportation facilities, however with years of human neglect, the canal has considerably degraded, no more serving any purpose. The canal edges are heavily encroached, reducing its water carrying capacity, thus making it extremely prone to floods. It has overtime collected huge amounts of debris and sewage, rendering it unusable for any waterway services. As the canal runs through the industrial areas, it collects effluents which go untreated. The Buckingham Canal holds great potential as part of a greater water based ecosystem, instrumental in flood mitigation and providing a basis for an inclusive, culturally ingrained public space.

The proposal envisions the Buckingham Canal as a resilient water based development that puts the waterbody into forefront, while being inclusive of various stakeholders. The strategic plan is divided into 4 components - Clarify, Capture, Catalyze and Continue.

The Clarify model proposes a smart waste management process that processes solid and liquid waste in a very short period of time and generates bio fuel and purified water as the byproducts. These can be reused as drinking water and power that can cater to the entire city. A waste buyback scheme is proposed to create awareness among the public about waste management to reduce and eventually mitigate pollution into the Canal.

The Capture model strengthens the canal edge and increases the water carrying capacity (with proper understanding of the past flood scenarios and possible flood projections) of the Canal to help proof the city from floods. The canal width shall be increased to accommodate more water into its channel. Check dams can be installed to maintain a constant reservoir of water.

The Catalyze model further accentuates the Canal edge by linking the canal to the city, introducing place-making along the canal and connecting it to city's urban fabric as a potential public space. The canal edge is used to provide a continuous landscape buffer and a walkway, with various public facilities for people to enjoy the canal edge as a point of recreation.

The Continue model takes the development further by strategizing to protect the Buckingham canal from future neglect. The plan aims to put the canal as a driver of urban development in the region by proposing a transit oriented development along the MRTS line.

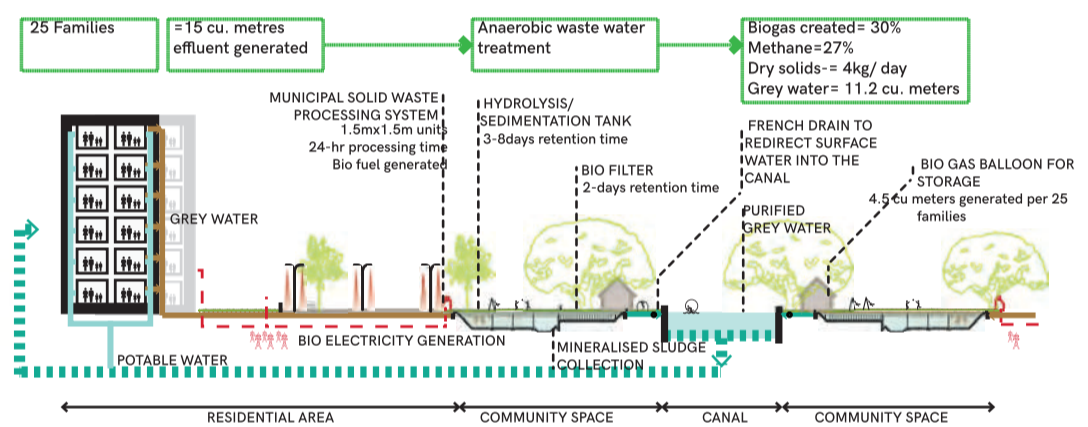
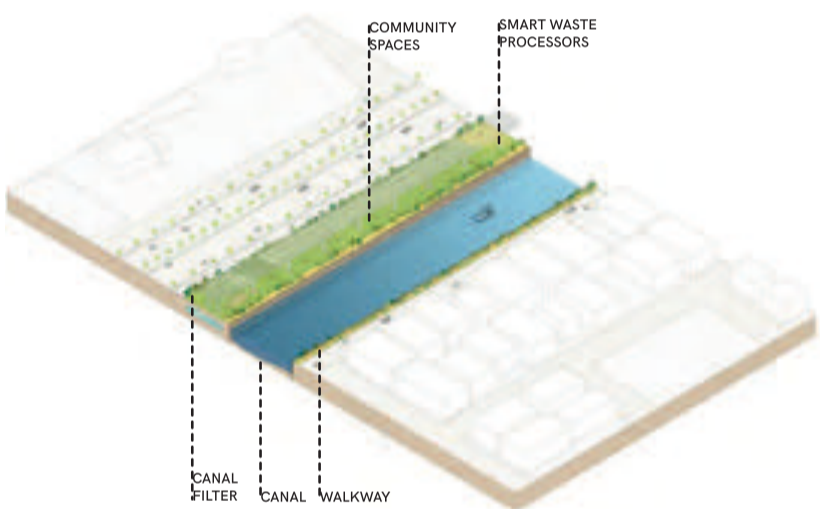
The proposal develops the Buckingham canal as an all-inclusive, equitable model, establishing its connection to the city of Chennai. It starts to build up a holistic network of various stakeholders - the Development Authority, people of the city, farmers and gardeners, waste collectors and anaerobic plant workers, industries, local vendors. The Buckingham canalfront thus will be an integrated development which shall put back the canal into the urban realm taking into consideration the various aspects pivotal to the development of a sustainable development.

Plan of Action



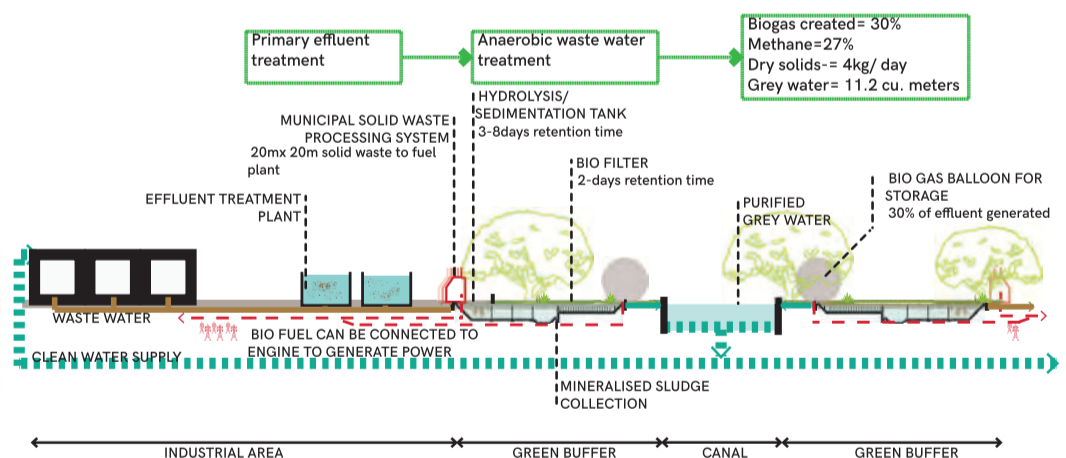
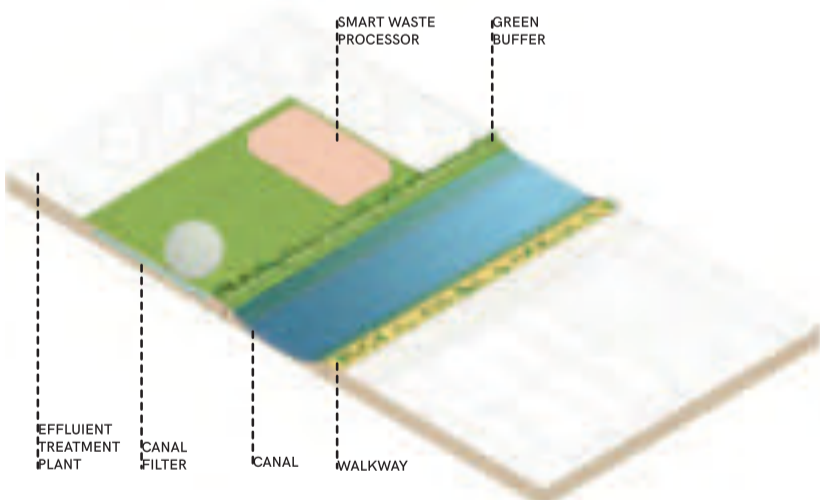
Clarify

Site 1- Residential, near MRT Filmcity



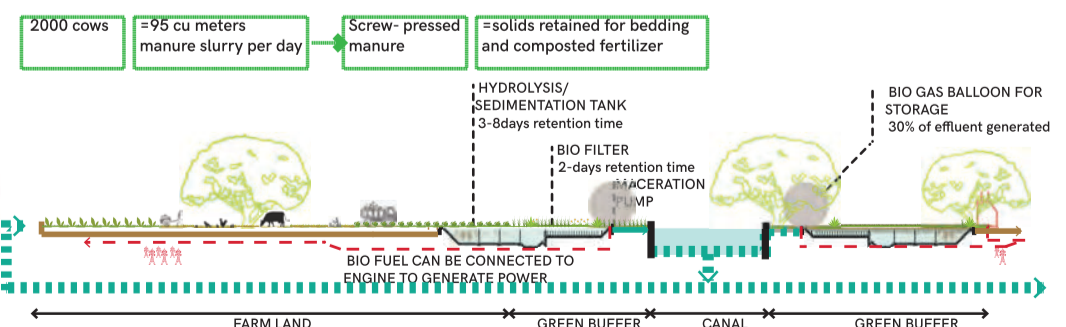
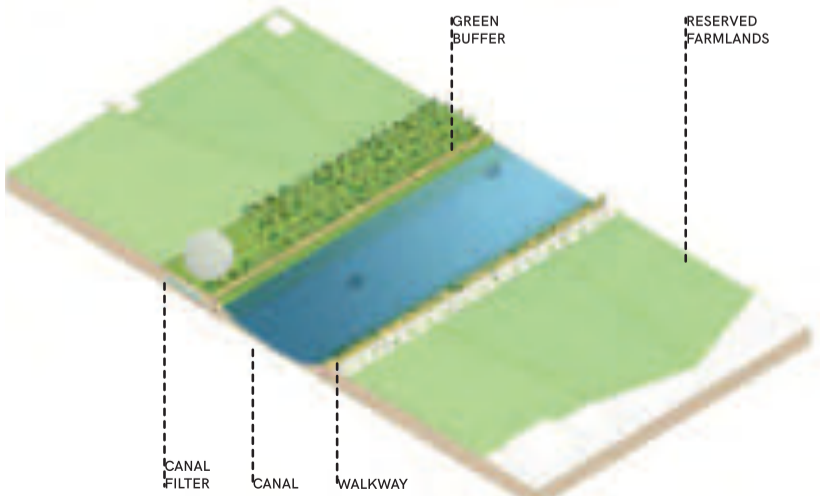
In the areas along the canal, the technology proposed for solid waste management converts any kind of waste material into petroleum using a novel catalyst based conversion process. This is a versatile process the processes mixed waste on the same day the waste is generated, with zero discharge, eliminating the need for landfills.

Site 2- Industrial, near Kodungaiyur Landfill



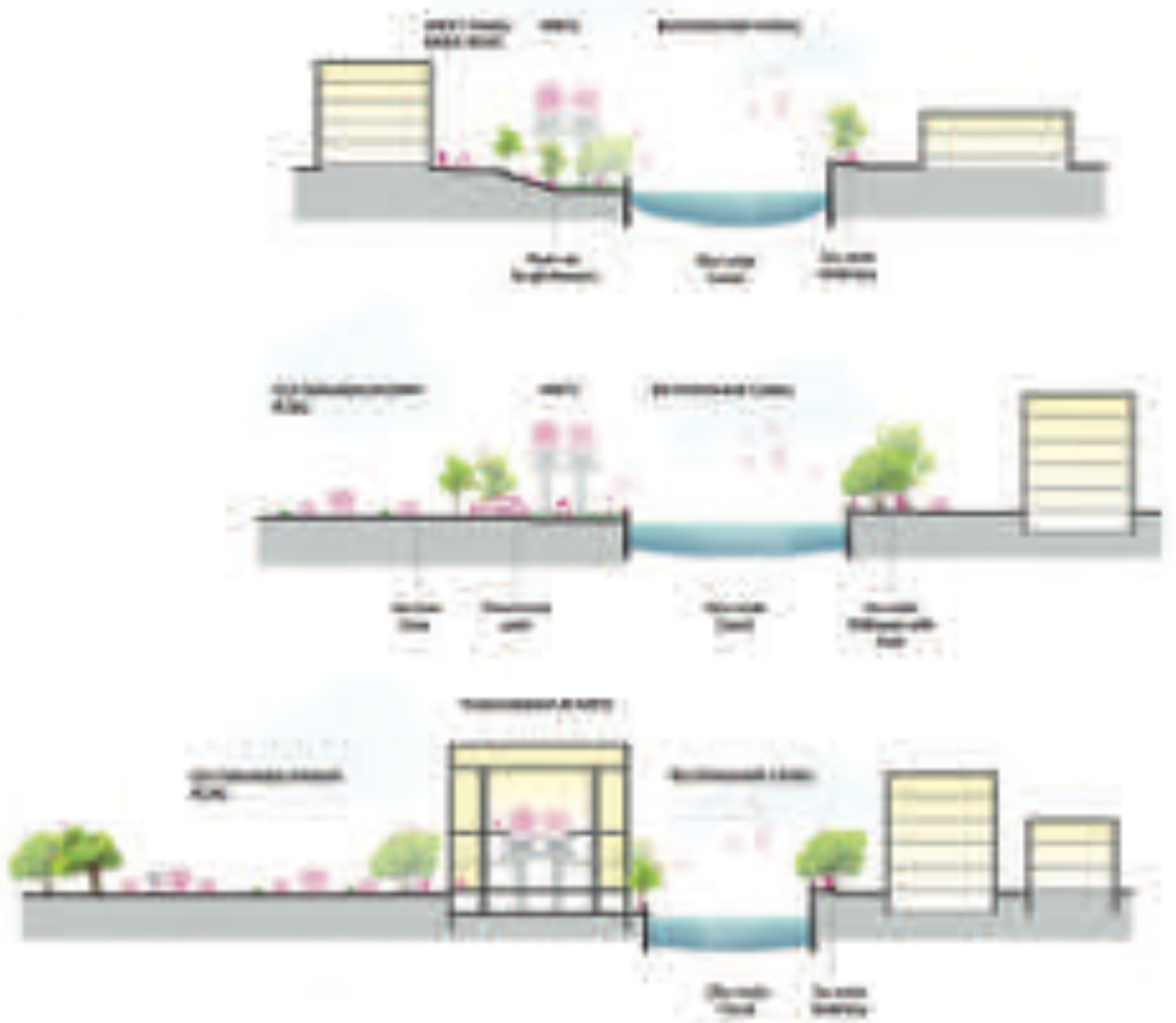
The Waste water management process is a microbe based decomposition that produces bio fuels based on feedstocks. There needs to be strict policy that states that all industries need to run and maintain their own effluent treatment plant. The clean water from is then taken to the centralised waste water treatment setup. The output of this setup that is let out into the canal is free of all bacteria and coliform.

Site 3- Farms, near Muttukadu



The biofuel produced in the farm area is dependent on the feedstock. All biogas generated and collected are stored in a double membrane biogas balloon. The water released from the anaerobic digester can be reused for irrigation.

Capture & Catalyze



Network of stakeholders, connecting the canal to the city



A clean and resilient Buckingham canalfront

Prera Vaishnav, Lohita Turlapati, Niyati Mannari, Arunima Sen (Ahmedabad)

TIMELINE



SKYLINE

Text describing the skyline and its features.

Vertical text column on the right side of the skyline image.



GREEN INFRASTRUCTURE
WATER SENSITIVE DESIGN
SUSTAINABLE DESIGN

ENVIRONMENTAL SUSTAINABILITY

Text describing environmental sustainability.



SOCIAL SUSTAINABILITY

Text describing social sustainability.



ECONOMIC SUSTAINABILITY

Text describing economic sustainability.



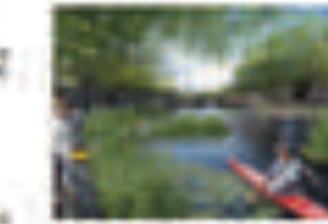
Vertical text column on the right side of the SWOT diagram.

Concept 77

- Sustainable
- Climate Proofing
- Biodiversity
- Revival
- Conservation
- Triangulation
- Eco city
- Livelihood
- Ethnicity

FEATURES ALONG THE STRETCH

- CITY TREE BUFFERS IN THE CONCRETE JUNGLE**
- REINSTATE THE REMOVED PLANT**
- SMART PLANTING**
- FOODScape**
- DEEP PLANT ROOTS FOR FIGHTING CLIMATE CHANGE**
- WELLIGHT STREETWAYS**
- URBAN GENTLE LANE**



- VIEWER LIGHTS**
- SMART ART**
- COMMUNITY STREET FURNITURE AND HIGHWAYS**

RENAISSANCE



Canal Precinct Development



Physical Interventions

We have found that the Canal's problems are much larger than canal itself. The source of the pollution problem is the management of the municipal catchments, tributary rivers and communities beyond the canal. In addressing these root issues, the canal will begin to normalise. This physical intervention will not only boost health and safety for those who interact with the canal, but also make it an attractive place of beauty. Many urban waterways around the world, such as iconic rivers in Paris, London and South Korea, face similar pollution problems, and rejuvenating them has proved a tough but worthwhile exercise for example.

The largest scale of work required was supposed to be done under the National Waterways programme – the dredging and widening of the canal. This will allow flow through the canal and removal many pollutants from the canal. It is unclear what the purpose of the canal needs to be and that has to be known to propose congruent solutions. Will the canal be used as a transport route and need to be widened or will it be more of a social, heritage and environmental feature and not have any widening? Whatever solutions are chosen, dredging will be required on the canal for maintenance reasons. Further solutions are presented below.

Sewage treatment solutions

One of the most complex issues the Buckingham Canal faces is the large amount of sewage which seem to find its way into the canal. A few solutions are proposed

Industrial Wastewater

- Policy and municipal authority should strengthen against the discharge of industrial waste into the canal.
- Pre-treatment of industrial wastewater should be the responsibility of the industrial entity, treating water to irrigation quality before discharging it
- Containerised Package Treatment Plants are proposed for this as they are compact, relatively cheap, low maintenance, easy to install and efficient
- Industry in the area should be given a 5 year transition period to adjust to the new policy
- The Municipal Management Application suggested will assist in tracking industrial discharge as all industries will have to register and report on effluent discharge to the municipality

Residential wastewater

- It must be noted that the CMWSSB has committed to conserving waterways through improved sewage management, however this seems to be a slow process
- A 'small bore' treatment system is proposed for residential areas which seem to drain into the canal.
- In this system, reticulated residential areas will drain sewage to a single large septic tank, from which the treated effluent (basic treatment) will then be discharged either into a vegetated area or into the canal
- Further proposed is a simple treatment septic tank which has a simple intermediate aeration tank, leading to a final effluent which is treated to irrigation quality.
- This system is cheap, compact, has low electrical use, low maintenance and can be strategically installed in low lying residential areas to ensure no residential sewage is discharged into waterways
- This system will also take the load off the city's wastewater treatment plants.

Wastewater reuse

- There are few agricultural areas in the city limits, if so, sewage could be cheaply pumped to these areas for re-use as fertilizer, improving the water economy

Treatment of sewage in canal and from other polluted rivers

- Each of the intersecting waterways need to be thoroughly treated in themselves. We suggest temporary solutions below, but these are more akin to pre-treatment and some nutrient removal
- It is proposed that through a sliding lock mechanism, large scale filtration takes place at confluence of the rivers. Labour (see social inclusivity) will need to be hired to remove debris from the 'lock-filters.' Sliding locks are proposed as the canal might be used as a transport route again one day.
- Labour can also be hired to net and collect solid waste debris from within the canal for disposal
- Siltation of the canal occurs at a high rate due to the sewerage which flows into it. If budget allows, a sand trap and sand pumping line are proposed at the confluence of the rivers to lessen the silt which enter the canal
- Within the canal, a Floating Wetland solution can be used, using aquaponic plants which retain nutrients and hard metals - treating water through their root structure. It is suggested that floating plantations be placed along the centre of the canal to allow minimal treatment of water. These plants will have to be harvested by labour and the harvestings will have to be burned.
- If the Canal owners would like it so, an extreme solution would entail blocking off the canal from the other polluted rivers and treating it as a treatment pond, lagoon or lake system

Solid waste (also see Social Inclusion)

- Bins will be spaced along the perimeter of the canal for normal day to day rubbish
- Dumping is seen to be done by contractors – this will have to be addressed through policy and liability. Or, dumping is done by residents – this is also addressed by policy and liability but also giving the community more pride and ownership should assist in easing these problems.
- Collection by the municipality can be monitored and improved through the Municipal Management Application we have suggested
- If this is to become a transport route, ship docking stations will be required for ships to empty our rubbish and waste at the correct collection points

The Metro

- The Metro is seen as an eyesore and is an encroachment. However, we aim to see how we can turn this obstacle into an **ADVANTAGE**
- 3 major transport lines running side by side is a huge plus for the community and also leads to improved development and investment in the area. Prime property is available in the area and the multiple transport modes make it a scenic area too.
- Some suggestions:
 - Parts of it could be masked to blend in to certain areas
 - The community and school children could be assigned sections on which to paint community art. This would strengthen the meaning and value of the infrastructure and also preserve some history and identity of the area.
 - After consultation with an environmentalist, bird feeders and spaces for nesting could be set up
 - Hanging plants can be used in some areas
 - Hanging lights can be used in some areas, especially around festivals
 - In a small number of sections, advertising space can be sold to make a little income.

Landscaping/grading

- One of the easiest solutions and biggest wins for the project is to grade, shape and landscape the surrounding banks, after clearing them of rubble.
- More or less the whole canal can have the feel of a park (see more below)
- Vegetation and shaping will also provide engineering benefits in that it will intercept stormwater and lessen soil erosion
- It is proposed that the canal also be fenced with regular passageways to ensure that a canal servitude is maintained, no more encroachments occur and to preserve the canal rehabilitation efforts.

Slums

- It was stated that up to 15 000 people live in the slums along the canal. This is unsafe for these residents as they lie in flood prone areas
- Although slums are seen as a drawback of urbanisation, again, this can be turned into an **ADVANTAGE**
- As seen below, migrant slum workers can be recruited to solve the very problems of urbanisation and help build and maintain a sustainable city.
- The ideal resolution of informal housing is to relocate the dwellers. Temporarily, the slum areas can be fenced off from the canal to reduce encroachment and improve safety. Containerised toilets (with septic tanks) and water points can be provided for the communities as proper water and sanitation facilities

Canal Precinct

- It is proposed that the canal's servitude be transformed into a 'Canal Precinct' – with the development of simple features to attract and entertain the community
- Furnished, grassed and paved parks on the bank of the canal will allow residents and workers to have picnics, social get-togethers, general meetings, play sports, run, cycle etc. (See more in Social Interventions)
- The rich heritage of the area can be shared with residents and tourists by placing plaques along the canal.
- Statues of notable achievers of Chennai can be constructed as a park
- Outdoor gyms are very popular, functional and a great community connection tool
- Playgrounds and activity centres for children (e.g. a miniature ecological park) can increase their activity and teach them about aspects of the canal. However, these children's parks will have to be fenced off for safety.
- Eventually, if the waterways are clean enough, boating and canoeing can take place in the canal – not only as a leisure activity, but as part of a tourist attraction and transportation method.
- Food vendors who strictly abide by waste disposal rules can set up food stalls in certain areas.
- These ideas can be used through other sections of the canal.

It must not be forgotten that maintenance of the canal and its infrastructure is important to ensure its long-term livelihood. A canal typically has a lifespan of 40 years after which it needs major rehabilitation, this is a normal process in the asset life cycle. The Municipality Management Application we have suggested will assist in maintaining the canal. While studying the demonstration section, it was noted that there are two direct catchments around the canal (delineated though topography). There are a number of temples, schools and institutions around this section of the canal.

Climate change & Sustainability



Various pictures and renderings obtained from the Creative Commons for re-use for non-commercial ventured (License: CC BY-SA 2.0)

Canal Feature/project	Climate change and sustainable development advantage
Open green space	It has been known that open spaces in cities act as buffer zones for natural hazards. This can be seen as happened during the 2004 Indian Ocean tsunami as well as the 2015 Chennai floods.
Stormwater and Ocean level management	Apart from natural hazards, canals and waterways do not only act as outlets for city stormwater, but also attenuate and calm stormwater during periods of rain, controlling outflow naturally. Canals and rivers are known to absorb high water levels from oceans and withstand surges
Temperature control/Break in development	Urban waterways are known to cool their surroundings and they also break up 'concrete jungles' and hard areas of development
Ecological space	A well functioning canal can attract various species of flora and fauna creating a natural and healthy ecological circle. These kind of spaces can allow mixing and recycling of soil nutrients. Currently there seem to be no fish in the canal due to the large amount of pollutants
Community unity	With the proposed development of social services around the canal, community relationships and teamwork will be strengthened meaning communities can communicate quickly and act together during either sudden or prolonged natural disaster. Open spaces and urban waterways also improve the quality of life of residents.
Using Digital programmes to manage the canal	Collecting, sorting and using data on the canal assists in Climate Change planning as well as in finding appropriate solutions for Climate related Changes
Improved handling of urban migrants	Better handling of slums, relocation, creating employment reduces risk, helps develop the city and deals with urbanisation head on.
Raising awareness on city operations	Raising and involving the community in service delivery – e.g. water, wastewater, stormwater management means a more water cycle conscious community
Integrative Planning	Integrative and inclusive planning and operations leads to a more efficient and thus more sustainable city. The city also becomes more adaptable and more flexible
Circular Economy Creation	Reducing, Recycling and Reusing Solid Waste will ensure utilisation of a circular solid waste economy
Overall Risk Reduction	All these elements lead to better risk mitigation, better planning and better handling of problems

EOTC230



Chennai Management Information System

Rationale

At the root of the pollution is the performance of the municipal services. They must be equipped to deal with the unceasing problem of external environment pollution

Solution & Motivation

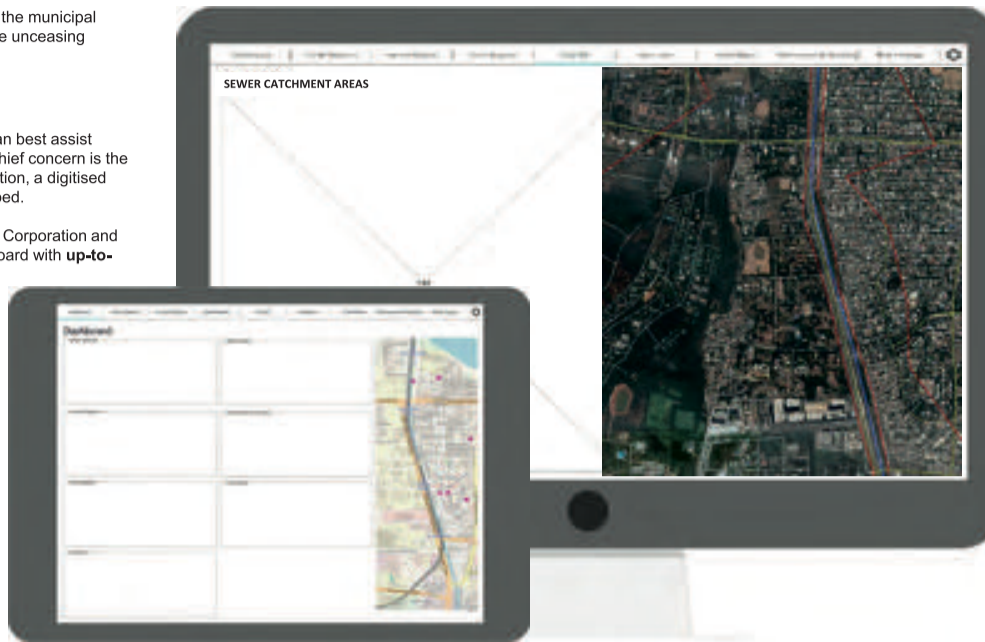
The city must be equipped with the tools that can best assist them in the formidable task set before them. A chief concern is the availability of information. To supply this information, a digitised management information system will be developed.

The system will serve both the Greater Chennai Corporation and the Chennai MetroWater Supply and Sewage Board with up-to-date data on the canal.

Such solutions have been trialled in various municipalities around the world. These are the first steps in building a smart city driven by big data analytics.

Benefits

- Improved service management benefits both the city and its residents
- Digitised information will make it easier to store and back-up historical data, allowing city planners to plan in the long term more effectively
- Maximised automation will reduce human workload
- Increased transparency within the municipality



Features

- A central, integrated database
- Logging of measured data related to the canal, such as water levels, pollution, and sedimentation
- Automated data collection through use of a sensor network where possible
- Geo-spatial representation of all data collected
- Registry of all canal-related assets, tracking costs, status, and maintenance schedules
 - Mapping of city waterways and catchment areas
 - Mapping of city pipework and infrastructure
- High-level summaries of relevant information – a "score" will be assigned to each part of the canal and surrounding neighbourhood based on questionnaire responses
 - Desktop application for detailed analysis
 - Mobile application for easy on-site availability

Roadmap

The application will be developed in co-operation with the GCC officials.

The first stage of development will involve an audit of the existing information and data collected on the canal.

The system will be designed with extensibility in mind. Should it prove a success, the door shall be left open for further integration with the city's operations, and features such as water supply management and fault report handling.

Design

The system will present information in a manner that is logically grouped according to the different areas of management of the canal. Within each categorization, information and data will be available at multiple levels, depending on the depth of detail to which the operator wishes to drill down to.

	Dashboard	City Waterways	Current Projects	Sanitation	Solid Waste	Stormwater & Flooding	Water Supply
SUMMARY	A high-level summary of the information in the following tabs.	Mapping of relevant waterways. Vitals rating based on collected data. Outstanding high-priority complaints.	Overview of projects that are currently running, and upcoming maintenance deadlines.	Map of pipe infrastructure, catchment areas. Sanitation status scores for each neighbourhood surrounding the canal.	Map of solid waste collection points. Solid waste management scores for each neighbourhood surrounding the canal.	Map of key infrastructure, culverts, inlets & outlets. Stormwater handling scores for each neighbourhood surrounding the canal.	Map of pipework and infrastructure. Water availability and purity scores for each neighbourhood surrounding the canal.
ANALYSIS		Key parameters relating to the canal operation, such as water levels and pollution. Complaint backlogs.	Meeting schedules and accountable personnel for each project, Gantt charts and project delays.	Key calculations and parameters, including pump stations status, treatment plant effluent status, and service backlogs.	Latest solid waste collection reports and updates from ground staff, landfill status, recycling status.	Raw rainfall data at various sites, bulk flow meter readings, rainfall harvesting status.	Key calculations and parameters, including status of all reservoirs, pump stations, distribution lines, and treatment plants.
DATA		Raw measurement data, including historical views, of water levels, quality tests, sedimentation, solid waste, and vegetation obstructions.	Detailed project management information, including budget details and project histories.	Detailed raw data, both current and historical, on the above parameters.	Detailed raw data, both current and historical, on the above parameters.	Detailed raw data, both current and historical, on the above parameters.	Detailed raw data, both current and historical, on the above parameters.

Social Ownership – Chennai (Buckingham) Canal

Community App - CCCA

Something which clearly shone through the research and surveys of the Eyes on the Canal team was the willingness of the community to use the canal as well as the integral part it played in their daily lives. Looking at successful case studies on canal rehabilitation in the UK, Australia and Korea, it is evident that community ownership, correct stakeholder engagement and social inclusion are a key element to the success of urban waterways.

Up to 26000 families along whole canal and in the demonstration section, there are a number of temples, schools and institutions around this section of the canal. For our proposal, we suggest integrating all community participation projects under one mobile app. In time and as per interaction, some projects might be better suited to social media. An app will assist in quick, direct and efficient communication however. The custodian of the app should be the City and their marketing team.

One way of reclaiming ownership would be to RENAME the canal from 'Buckingham Canal' to 'Chennai Canal,' or something more suited to the local culture. Although a tedious process, this will immediately add to the identity of the local community. Much of the solutions proposed required time, money and other resources. However, the community is a resource in its own and can be developed in return for rewards (a functioning canal) and incentives (see below)

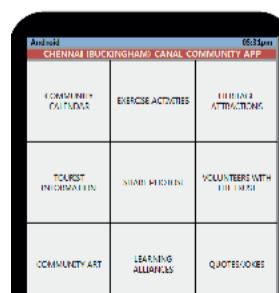
CHENNAI (BUCKINGHAM) CANAL COMMUNITY APP – CCCA Features

As mentioned earlier, with a Canal Precinct (Parks, sporting paths, heritage features, playground, outdoor gym, heritage plaques and statues, interactive exhibition for children) a number of activities will arise in the neighbourhood. A calendar of community events can be put onto the CCCA where all can upload relevant events. Picnics, festivals etc can be shared. It must be noted that these events could be a breath of fresh air for the elderly in the community.

- Exercise activities will pop up as there will be walking and cycling paths. International programmes such as Park Run®, a weekly community run and other community fitness groups will be encouraged. At least one or two big annual races could be held along the canal and these can be sponsored by nearby corporate. If clean enough, canoeing/kayaking can also start up on the canal
- Heritage attractions and heritage walks will have a place on the application giving the community and tourists direction on where to go to find out more about the heritage. The information plaques will be tied to different areas on the canal, sometimes with before/after photos so participants can clearly visualise the canal. Once the canal is pollution free, maybe a heritage boat ride can be organised along the canal
- Urban waterways, if managed well, become valuable attractions to the nearby community as well as visitors from all over the world – bringing more vibrance to the identity of the urban area. The CCCA will be accessible to tourists so that they can also understand the nearby sights and events. There will be Tourist Tab especially for tourists to advise them on information that locals might already know.
- A space will be created for Volunteers (probably through the Canal Trust we have proposed) to contribute to community projects around the canal on an annual bases
 - This could attract a lot of school children through the schools in the area as well as retired individuals
 - Incentives will be given in the form of recognition certificates as well as giving volunteers a supportive environment in which to engage
 - As the movement gets bigger, the volunteers will be encouraged to talk to other urban areas – nationally or internationally to discuss similar problems and challenges. If possible, volunteers could even conduct information sharing visits to similar projects
 - It must be noted that the energy and ideas of the youth must be harnessed to turn this project around and inject new life into the canal
- Similar to above, there will be a section for Learning Alliances where academics and professionals can discuss their projects and ideas around the canal. As mentioned, this is a common problem in urban areas and there are a lot of new solutions to be discovered yet. In time, interns can also be recruited within the learning alliance who will then be able to use this experience on their CVs
- There will be a section on the App for Community Art. As mentioned earlier, items like the Metro and concrete river banks should be used to our advantage and sections of these should be allocated to community members and school children to tell their stories around the canal.
- Lastly, the App will allow community members to share content - Photos of their events etc to the app as well as social media. There will also be a space for reporting safety incidents within the community to other community members (reducing risk and increasing safety). There could also be a space to share quotes/jokes. The app will have details of suicide and depression telephone line as this is becoming an increasing problem in cities these days

Other notes on Community Involvement

- In line with the touristic and community activities presented above, it is suggested that once the canal starts shaping up that it is marketed as a TV and film location. This will not only allow residents to see their city on the screen but will increase pride in the canal. Having a more developed canal on a show like "The Amazing Race®" will sky rocket the canal into an international attraction
- It must be noted that the demonstration section is in a prime urban location. The revival agencies should take advantage of this and encourage corporations near the canal to invest in and spend time at the canal. Parks/benches can be sponsored by certain companies/banks in return for their branding being displayed. The employees of the corporate will also enjoy using this space for socialising and team building.
- It must be noted that although there will be large capital costs in such revival and maintenance projects, this sort of development can be seen in a much broader economic manner as they will cause a ripple effect of upliftment, development and growth. In many developing countries, projects are being prioritised due to their larger economic impact rather than their immediate investment. This canal is indeed not only an infrastructure asset, but a social and economic asset too. In time hopefully small (and larger) businesses can also mushroom around the canal from sporting activities, to food stalls to shops to maintenance businesses.
- It must be noted that the canal revival projects can play a large role in empowering overlooked people such as slum dwellers, the youth, women and the elderly
- If possible, this project should be tied into the Swachh Bharat project to give it more exposure and a boost



Mock-up of Community App

Water and Spirituality

In India, water is regarded as a holy resource. Through the ages, mystics have recognised how connection this is to our lives, wellbeing and happiness. It is a pity that with such a rich cultural background, waterways face such harsh conditions. It is desired that through revival of the waterways, spiritual groups are encouraged to invest in the canal and also have events on the canal banks from time to time, in conjunction with the community. This could revive the community and municipality's respect for this precious resource

- Tourists should one day be able to explore major temples, prominent attractions of Chennai, using a boat tour for transport.
- Lastly, it is suggested that in a spiritual but not strictly religious way, the old locks along the canal be painted with spiritual/divine images to bring back some of the of the mystic power and spiritual energy of the waterway.

Stakeholder engagement

The Greater Chennai Corporation & CWSSB

Naturally, the key participant in the renovation of the canal is the City itself. Previous attempts at improving the state of the canal have all been hamstrung possibly by a lack of political will and accountability.

- It is desired that as the community below, the Municipality takes ownership of their Canal. Civil Engineers and other consultants can offer a wide variety of "Change Management" guidelines to assist municipalities with financial accounting, people management, strategic planning, maintenance of equipment, improving of systems and procedures and is recommended that this takes place within the municipality.
- If possible, it is suggested that political figureheads be assigned to see the projects through as far as possible.
- It is also suggested that the City and National Government look at protecting the Canal as a Heritage or Environmental Site to give it more respect and reverence.

Public Participation

As expected, the standard Public participation procedures should be followed. Stakeholders should be identified; Planning should be done in conjunction with the community through the design phases; relevant committees should be formed and there should be clear communication. A good public participation allows more efficient service delivery

The Buckingham Canal Trust

To unite all interests surrounding the canal, a foundation should be established for the canal. This will present a single point contact for any interested parties, as well as a unified brand that will increase awareness of and positive sentiment for the renovation campaign. This Trust can act as a 'watchdog' and keep municipal branches and residents alike accountable. This Trust will also have a reporting line for anonymous tip-offs regarding unfavourable activities around the Canal.

Integration across Disciplines

Key to the functioning of all cities these days is Integrated Infrastructure Planning. A working group between the different Disciplines in the GCC and CWSSB is advised to ensure that the Disciplines do not work in silos. This group can further develop their agenda to produce an Integrated Infrastructure Master Plan. Although tedious in the beginning, this can reduce minor conflicts and lead to large savings of time and money.

Social Inclusion to Combat Urbanisation

Some can argue that the source of the pollution and congestion in cities is the large amount of migrants who set up informal housing. Rural-urban migration is at its highest rate ever and it is estimated that over the next few years more people will stay in cities than in rural areas. Again, we propose that the city should take ADVANTAGE of this problem and use the eager workers to address the problems of urbanisation. Social inclusion should be available at every level of community and slum dwellers are a useful asset to maintain the city and canal.

It is proposed that programmes with Slum dwellers be put in place which allow them to collect and separate solid waste for recycling and re-use. This will not only empower, uplift and engage the immigrants, but give them more ownership of the city. It will also make the city more sustainable in reducing the amount of waste which enters the landfill sites.

Slum dwellers can also be used in cleaning of the canal, solids filtration, trimming of floating wetlands etc.

Shilpi Jain (Johannesburg) and Shitesh Arihunta (Cape Town)

REMEMBER, REVIVE AND CELEBRATE

Restoring the legacy of Chennai's Buckingham Canal



Then



Now

REMEMBER

Remembering the history of the canal as a green corridor and as a means of livelihood - by rejuvenating the canal as a space for exhibition and public interaction. The metro corridor running along the canal can provide a canvas to display the history and relevance of the canal to the people of the city.

REVIVE

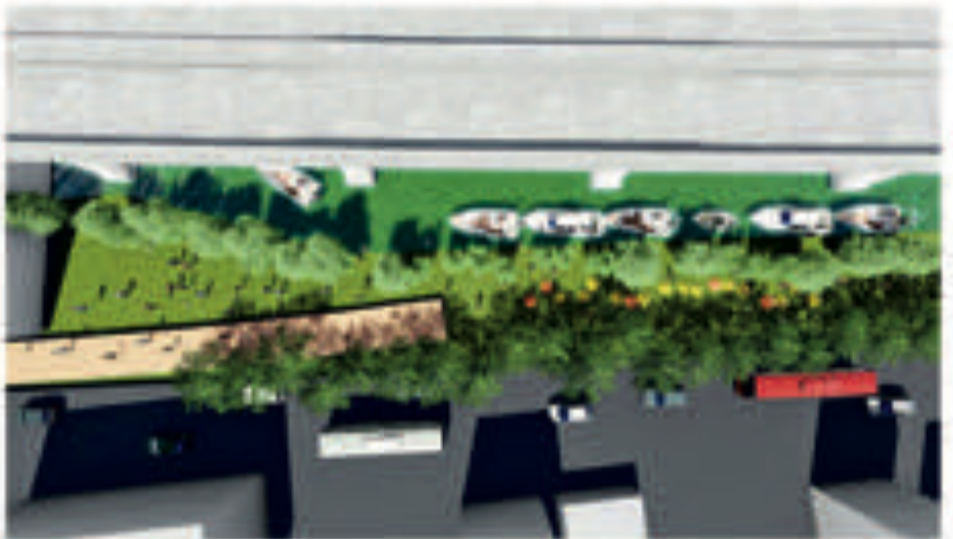
Reviving the life of the canal by means of wetlands, Decentralised Sewage Treatment Systems and Solid Waste Management - to make it a healthy stream - that provides livelihood, public gathering and connectivity to the people of the city.

CELEBRATE

Reviving the life of the canal by means of wetlands, Decentralised Sewage Treatment Systems and Solid Waste Management - to make it a healthy stream - that provides livelihood, public gathering and connectivity to the people of the city.



THE PROPOSED PUBLIC PLAZAS NOT ONLY CONNECT THE CANAL WITH THE CITY BUT ALSO PROVIDE SPACE FOR PLACE-MAKING THROUGH OPEN EXHIBITIONS AND EVENTS



THE HISTORIC RELEVANCE OF BOATING ALONG THE CANAL IS REVIVED TO ACTIVATE IT AS WELL AS PROVIDE MEANS OF LIVELIHOOD TO THE COMMUNITY



THE JUNCTION WHERE THE CANAL MEETS THE RIVER IS ARTICULATED AS A WETLAND TO ALLOW FOR CONTINUOUS REJUVENATION AND TREATMENT OF THE WATER.

PEDESTRIAN AND CYCLING TRAILS CONNECT THROUGH THE CANAL, BRINGING PEOPLE IN INTERFACE WITH THE LIFE OF THE CANAL.



OPEN SPACE NEAR THE METRO STATIONS ARE ACTIVATED ARE GREEN BUFFER ZONES AND CHILDREN'S PLAY AREA. THE COLUMNS FOR THE ELEVATED METRO PROVIDE A CANVAS FOR PUBLIC ART AND ARE LIT AT NIGHT, MAKING THE SPACE ACTIVE THROUGHOUT THE DAY.



SEWAGE TREATMENT SYSTEM

Decentralise Wastewater Treatment System (DEWATS) is introduced where sewage wastepipes (Naalas) meet the canal.



WATER TREATMENT SYSTEM

Constructed Wetlands provide for water treatment where the river meets the canal.



STORMWATER MANAGEMENT

Retention Ponds and Groundwater Recharge Trenches are proposed at multiple places to absorb stormwater during flooding or high tides.



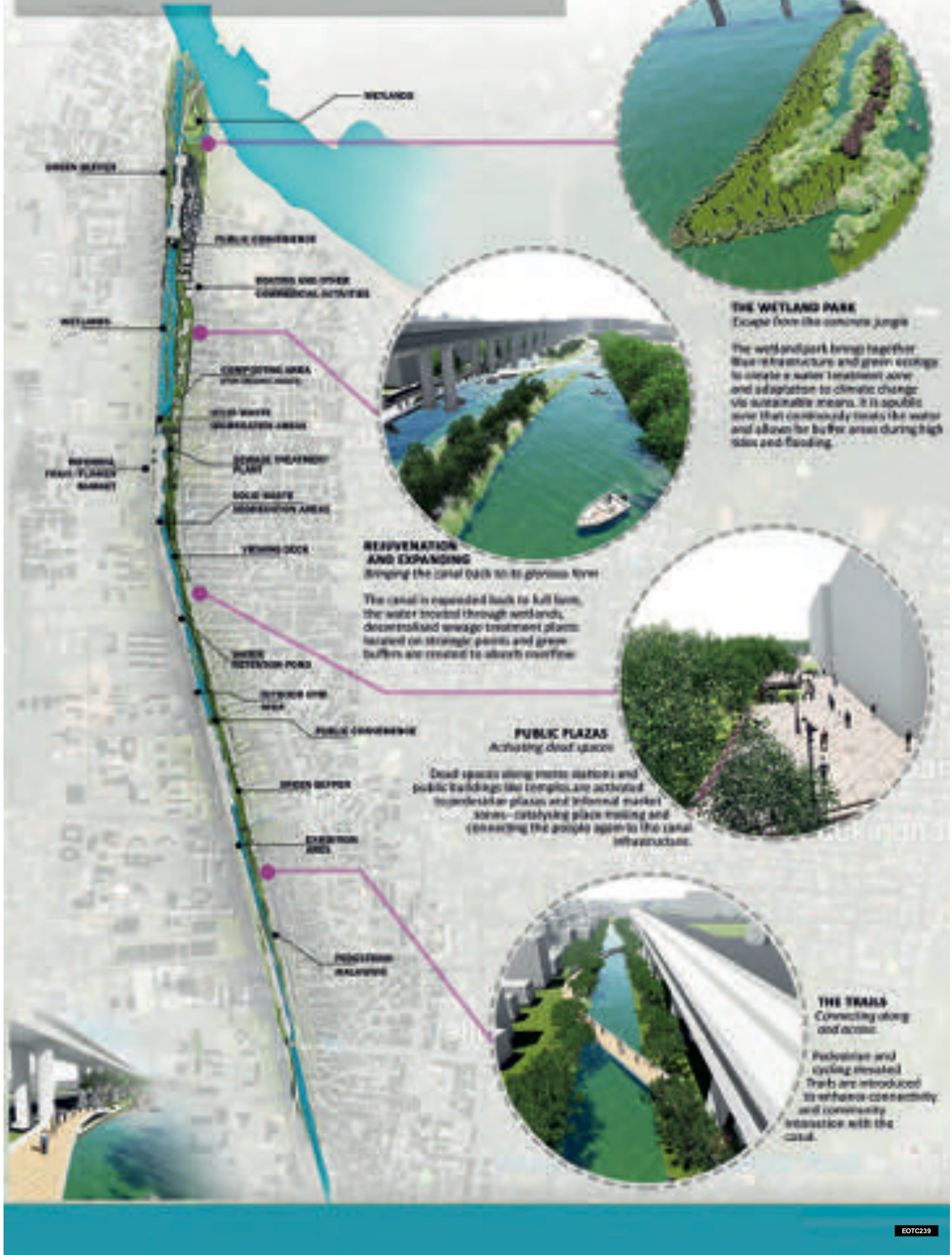
SOLID WASTE MANAGEMENT

Along the metro stations are proposed solid waste segregation zones and composting sheds for organic waste.



REMEMBER, REVIVE AND CELEBRATE

Restoring the legacy of Chennai's Buckingham Canal



EOTC239

S.K. Das, SK Das Associated Architects, New Delhi; Girisha Sethi, Habitat UT Lab (New Delhi) and Moulshri Joshi, Suditya Sinha, Amritha Ballal, Space Matters (New Delhi)

The Chennai Water Project - Road to the Future

Our relationship with the natural world is a broken one. Most of us have never known any better; making this proposal a brave way to imagine the future. The regional scale intervention addresses this tension that exists between 'nature' and 'culture' in the urban condition. Our references: historic maps and images, where waterways were the City's arteries. The proposal seeks to unearth these prosaic pathways.

The Phase 1 strategies show the primary connections established between the city's infrastructure nodes to nature using the waterways that skim the former. Imagine taking a boat in October from the airport to the new city park enveloping the demonstration stretch of old colonial vestige, the Buckingham Canal. Chennai, one of the most visited cities in the country, is the ideal place to embark on such a vision.

Detailed representations of the canal on Board 2 showcase the adaptive Phase 1 interventions for the demonstration stretch.

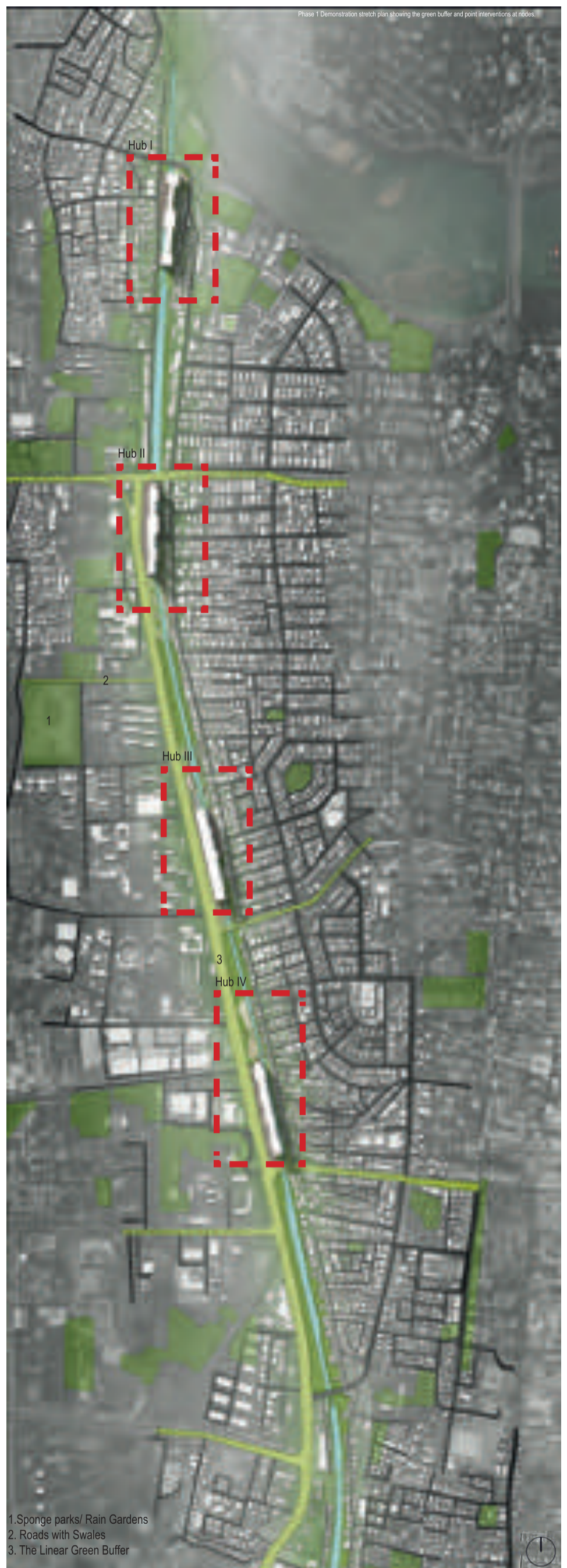
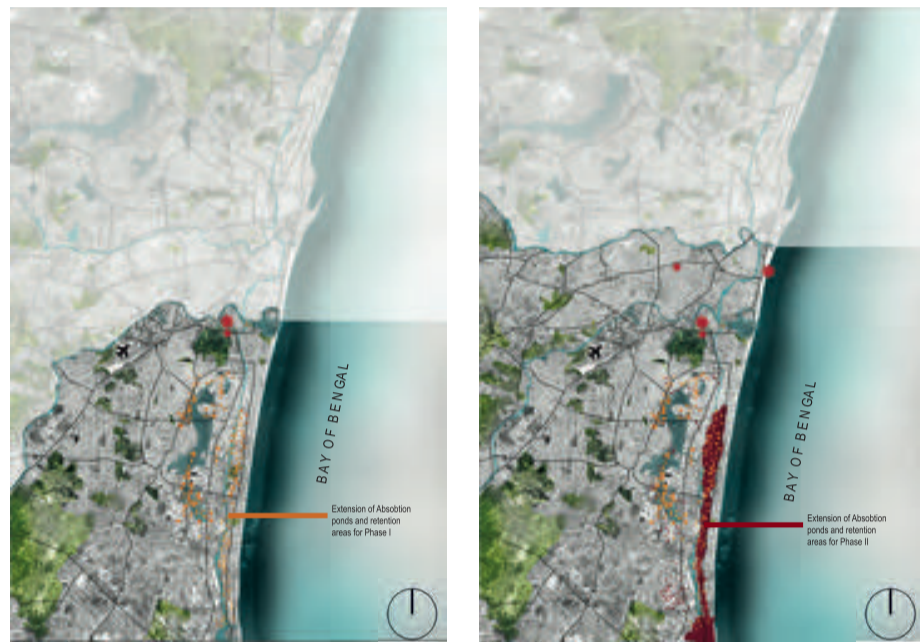
The main issues surrounding the Canal are: a. Pollution, b. Extensive urbanisation on the banks, c. flooding during excessive rain, d. The Metro line. These have left the canal divorced from the city.

Our strategies to remediate and revitalise the canal are: 1. Isolate and incubate the demonstration stretch of the canal. 2. Clean the canal stretch, 3. Propose programs at key points on its edge that ensure its use and upkeep.

The mechanisms proposed: 1. **Re-naturalise the edges** of the canal, slowing the pace of water during floods and retaining water during dry seasons. 2. **A Green Buffer**, also termed as the linear park along the channel's edges. The buffer is the primary system of protecting the canal, much like the warm blanket- shielding it from the erratic urbanisation around. Embedded in the buffer are sub mechanisms that clean the canal water. At its narrowest point, the buffer is 5-7m functioning as a green pathway. At its widest, it addresses the most flood vulnerable points on the canal edge where it swells to become a wetland. 3. **Within the linear park, we propose hubs**- attached to either metro stations or nodes identified along the stretch. Responding to the surrounding land use, these become places where the abutters, city residents and visitors can enjoy and revel in the newly created public space. 4. Lastly, we also propose a **larger role be played by the abutters**. It is imperative to mandate larger storm water management principles, where rain gardens to detain or retain water become part of developments. The overflow can then be directed to the public infrastructure.

While looking into aspects of climate change, we have been careful to think beyond past events. In the range of possibilities, drought events are as much a part of a volatile future as floods. Fortunately, good storm water policies can bridge both these extreme climate events. When embraced and proliferated, these policies and strategies will not only renew the Buckingham canal but create new sets of integrated cultural and natural ecologies. The phase 2 & 3 diagrams showcase such alternative futures.

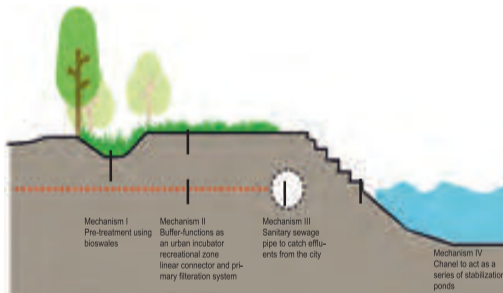
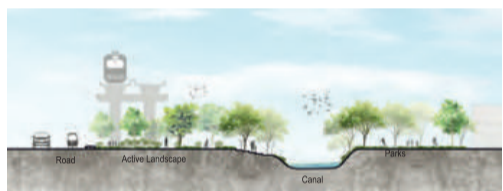
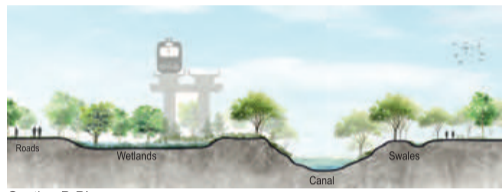
Regional Strategy



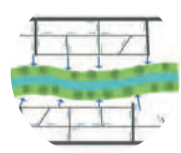
Master Plan of Buckingham Canal

EOTC240

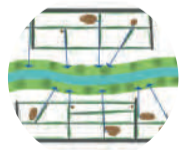
The Chennai Water Project - Road to the Future



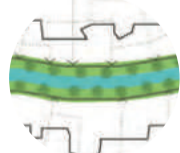
Design Guidelines for Canal-Front Development



Surface & Storm water run-off to be directed towards the Canal



Flood & Drought Control measures to be taken by implementation of Retention & Detention Areas



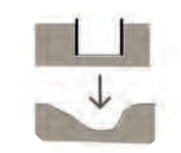
Decentralize STP at neighborhood level for 200 tenements to be provided



Existing water bodies to be ultimately retrofitted to its original form



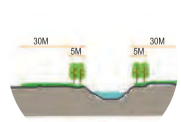
Native flowering, fruit trees to be planted along the canal



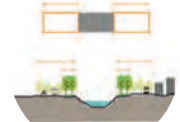
Hard embankments along the river edge to be replaced with soft edges



Certain public spaces to be made accessible to the water body



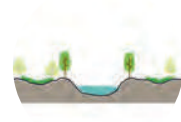
Porous landscape strategies to be adopted



Active landscape zones permissible upto 200-250M and no permanent structures to be constructed



Porous material utilization along canal for public spaces



The canal being the carrier of surface and storm water needs treatment for filtration hence bioswales to be planned along the canal for filtration



Maintenance of the public spaces to be managed professionally under CSR activity

Gandhari Tipnis, Vaibhav Abhang, Resham Makhija, Priyanka Kapoor, Edifice Consultants Pvt. Ltd. (Mumbai and New Delhi) and Neha Mungekar, IHE Delft Institute for Water Education in partnership with UNESCO (Westvest, The Netherlands)



the gap:

Challenges to the development of the area:

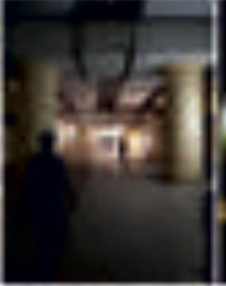
- 1. Limited resources - (Water, electricity, roads, etc.)
- 2. High unemployment
- 3. Poor infrastructure
- 4. Lack of investment and infrastructure



"The government is not doing enough to help us. We need more jobs and better infrastructure. It is a big challenge to live in a city like this."

"We have been trying to get the government to do more for us. But they are not doing enough."

"We have been trying to get the government to do more for us. But they are not doing enough."



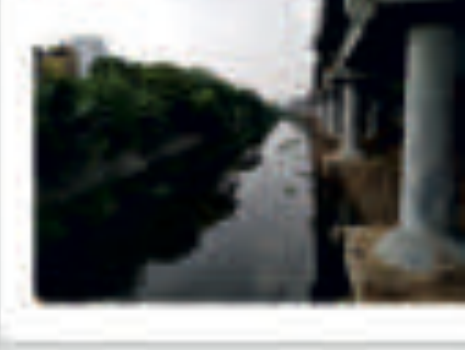
In April 2018,

The city council has approved a new plan to improve the infrastructure of the city. This plan includes the construction of a new bridge over the river, the improvement of the roads, and the construction of a new public square. The city council has also approved a new plan to improve the water supply of the city. This plan includes the construction of a new water treatment plant and the improvement of the water distribution network. The city council has also approved a new plan to improve the electricity supply of the city. This plan includes the construction of a new power plant and the improvement of the electricity distribution network.



The city council has also approved a new plan to improve the urban planning of the city. This plan includes the construction of a new public square and the improvement of the urban infrastructure. The city council has also approved a new plan to improve the urban infrastructure of the city. This plan includes the construction of a new public square and the improvement of the urban infrastructure.

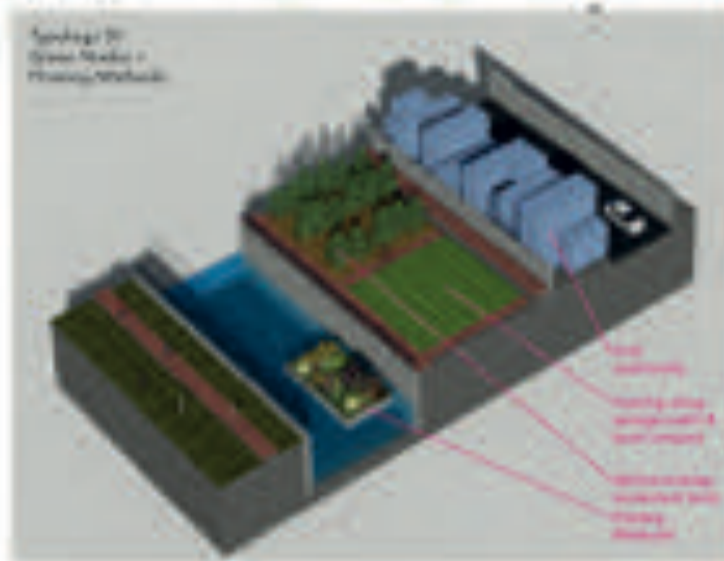
The poster features the logo of the Council of the City of Addis Ababa and text in Amharic and English. It includes contact information for the council and a list of services provided.



Social canalscape: an integral urbanism



Fig. 1



1. Close the Canal!

There are several interventions to be done.

1. Socio-ecological community participatory mapping of the Canal and its neighbourhoods

We started with a series of field visits to the canal and its neighbourhoods. The visits were organized by the community members themselves. The visits were organized by the community members themselves. The visits were organized by the community members themselves. The visits were organized by the community members themselves.

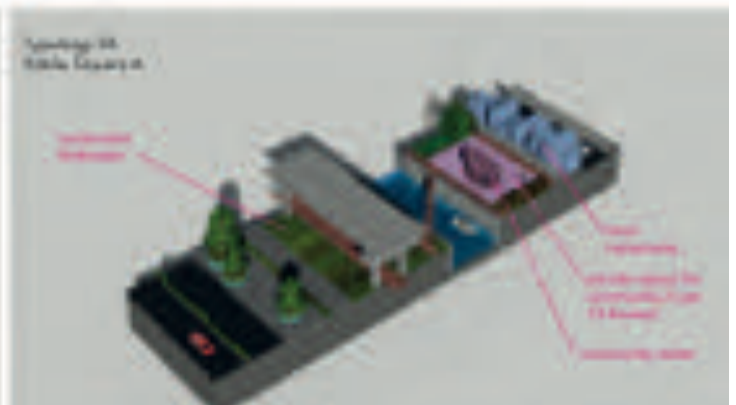
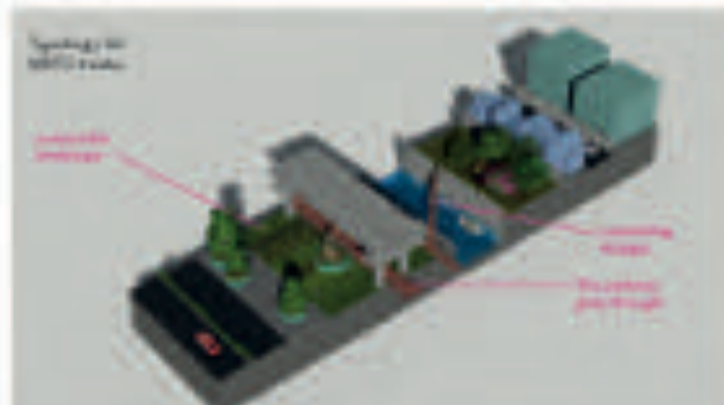
2. Physical interventions addressing local community aspirations

Physical interventions, which are essential for the canal and its neighbourhoods, were identified through a series of community meetings. The interventions were identified through a series of community meetings. The interventions were identified through a series of community meetings.

1. Enclosed green spaces
2. Walkways
3. Canal-side green spaces for public use
4. Canal-side green spaces for public use
5. Canal-side green spaces for public use

References

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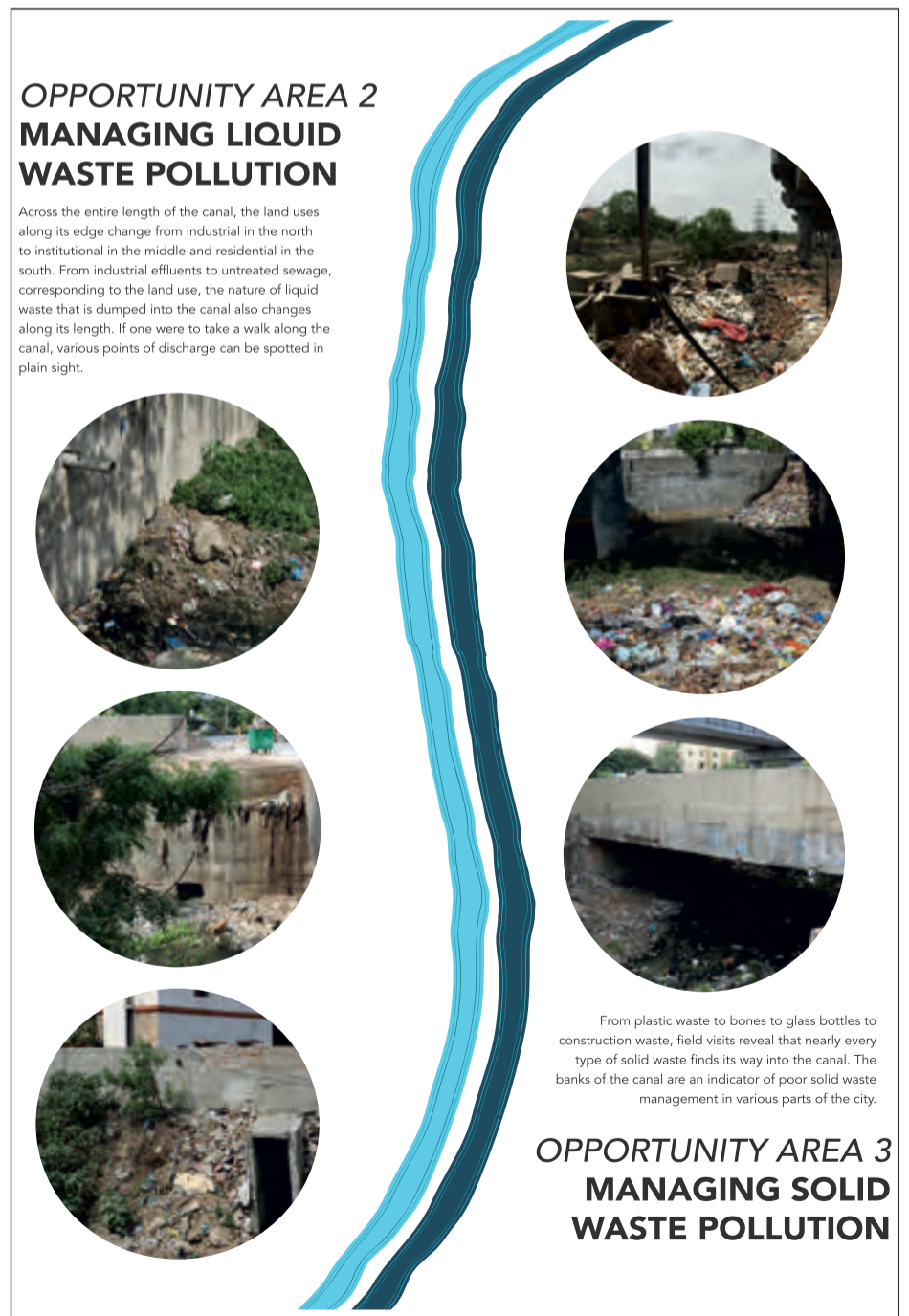
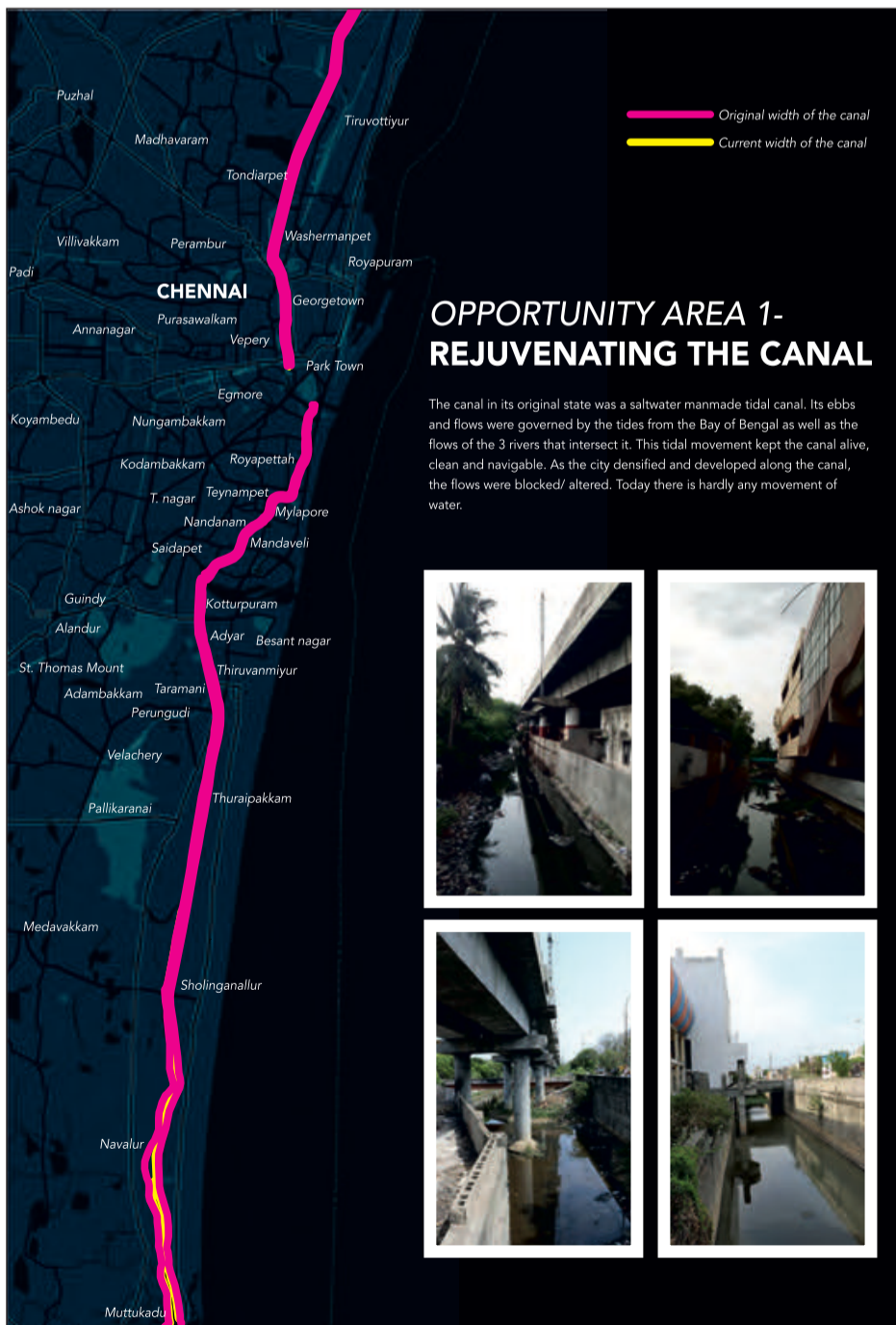
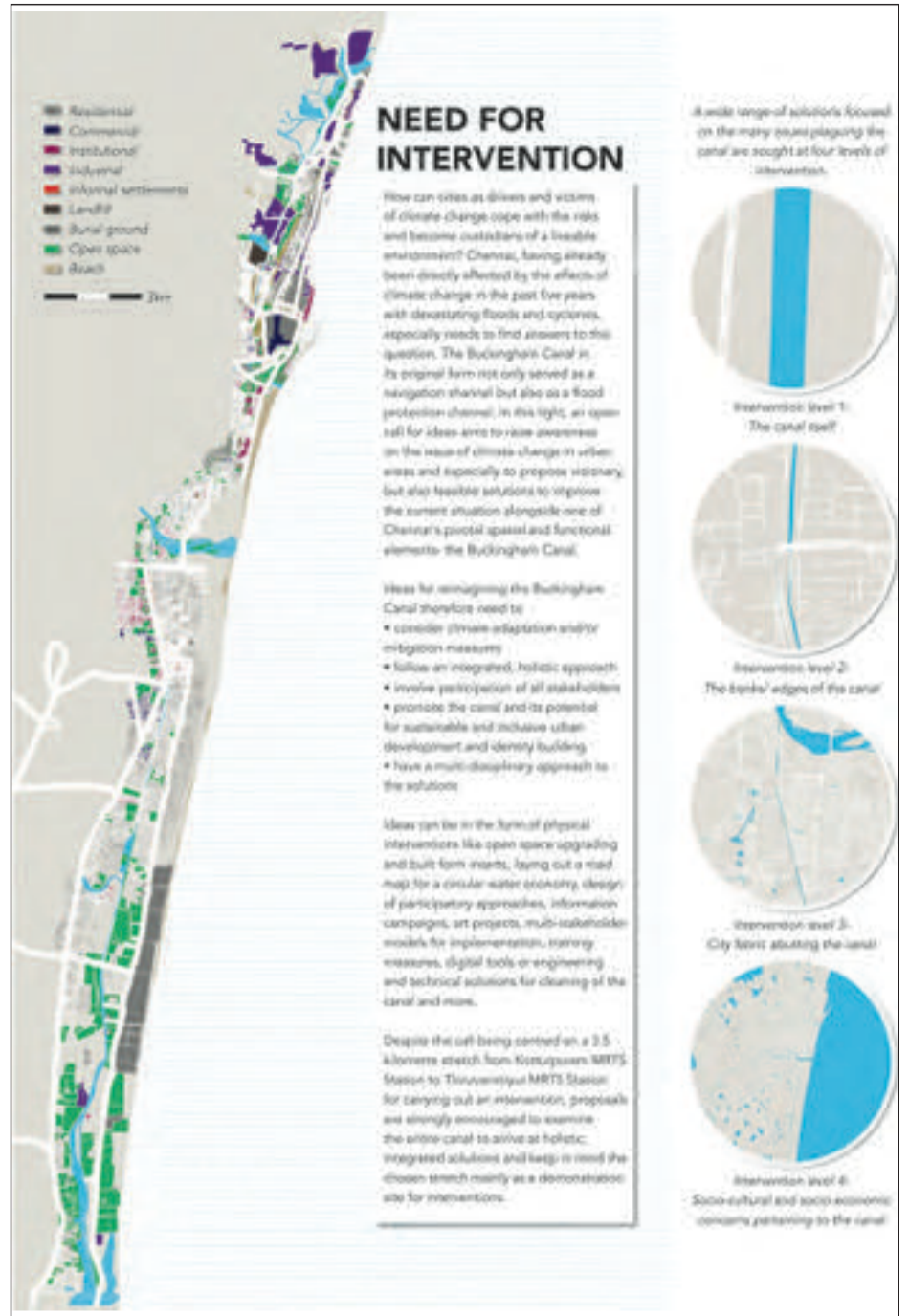
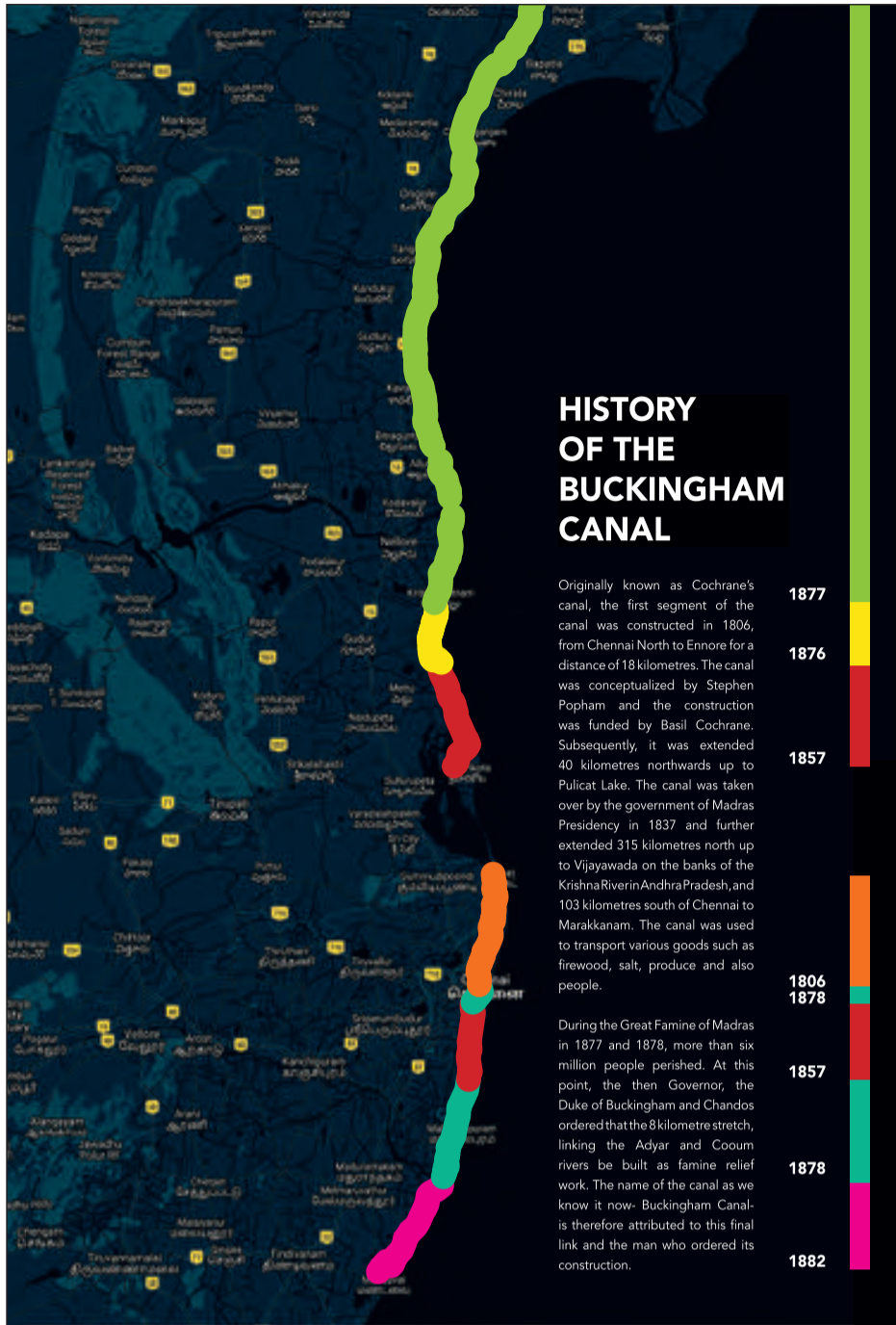


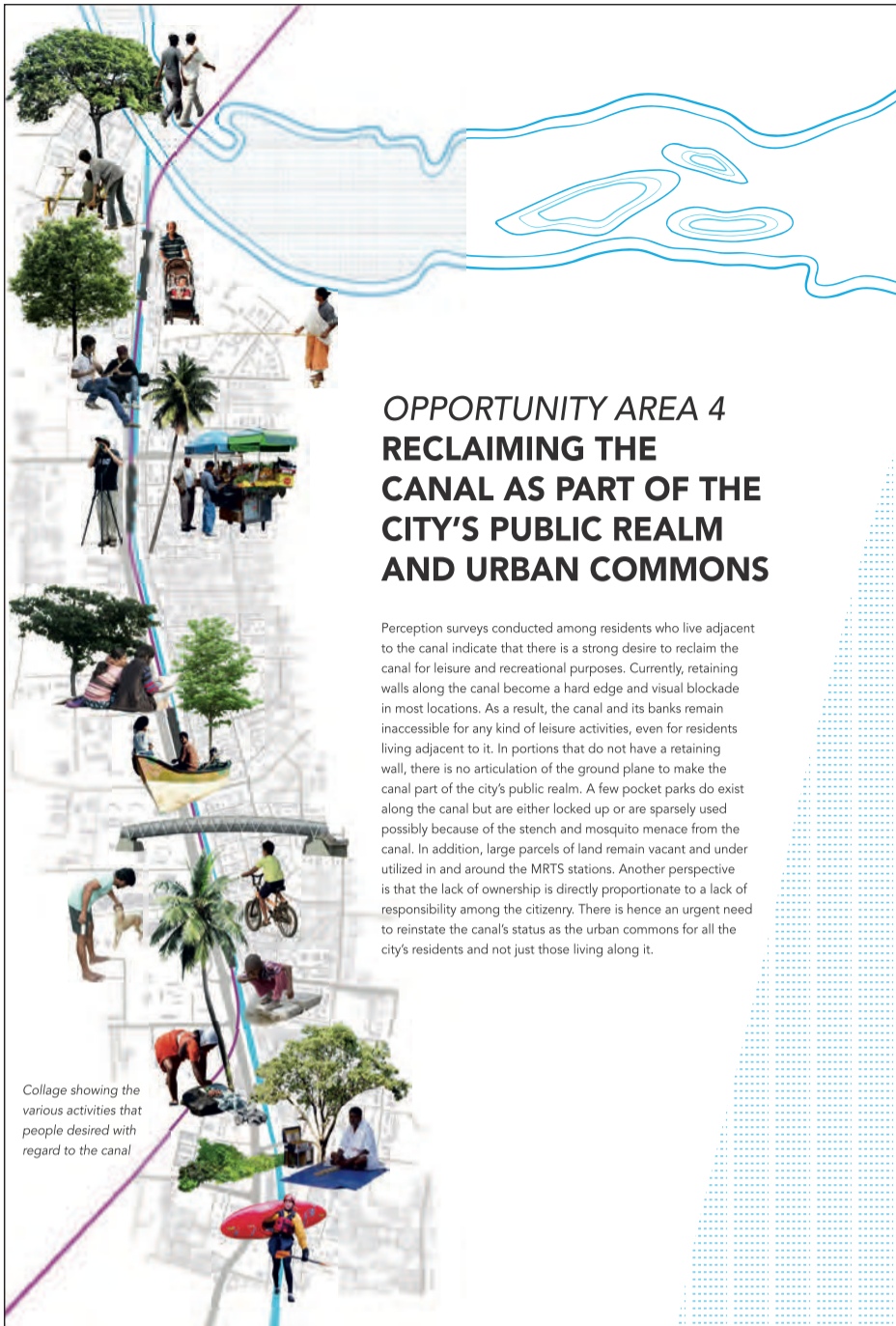
Rohini Raghavan, Harish Ramakrishnan, studio r+r (Chennai) and Vinod Ramanarayanan Civic Fulcrum (Chennai)





Documentation of the Eyes on the Canal Initiative





OPPORTUNITY AREA 4 RECLAIMING THE CANAL AS PART OF THE CITY'S PUBLIC REALM AND URBAN COMMONS

Perception surveys conducted among residents who live adjacent to the canal indicate that there is a strong desire to reclaim the canal for leisure and recreational purposes. Currently, retaining walls along the canal become a hard edge and visual blockade in most locations. As a result, the canal and its banks remain inaccessible for any kind of leisure activities, even for residents living adjacent to it. In portions that do not have a retaining wall, there is no articulation of the ground plane to make the canal part of the city's public realm. A few pocket parks do exist along the canal but are either locked up or are sparsely used possibly because of the stench and mosquito menace from the canal. In addition, large parcels of land remain vacant and under utilized in and around the MRTS stations. Another perspective is that the lack of ownership is directly proportionate to a lack of responsibility among the citizenry. There is hence an urgent need to reinstate the canal's status as the urban commons for all the city's residents and not just those living along it.

Collage showing the various activities that people desired with regard to the canal

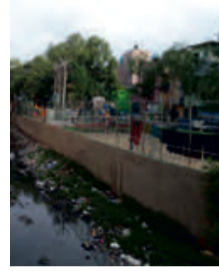
OPPORTUNITY AREA 5- IMPROVING HEALTH FOR RESIDENTS OF THE CITY

Residents who live near the canal suffer from the consequences of mosquito breeding in the stagnant waters of the canal as well as open defecation and solid waste dumping in the canal. As many as one-third respondents of the household surveys conducted for this research reported problems with mosquitoes and related diseases.

The main cause of mosquitoes breeding is because of the stagnating water in the canal.

Poor maintenance is also to blame for this condition apart from the lack of water flow.

Lot of people living in this neighborhood have suffered from malaria and most people have skin conditions to deal with too.



A kids play area along the canal.



Defunct toilets stand along the banks of the canal while residents defecate near it.

More than 55% of the survey respondents asked for parks, walking/ jogging tracks and nature trails along the canal and 10% specifically emphasized the need for play areas for kids. This indicates that the canal is a lost opportunity with regard to the per capita open space that Chennai can provide for its residents. Changing this equation will ensure better health and better liveability not just for those living near the canal but for all residents of the city.

OPPORTUNITY AREA 6- PROTECTING LIVELIHOODS IN THE CONTEXT OF HOUSING AND RESETTLEMENT ALONG THE CANAL

From the very beginning, the canal has drawn people from different strata of the society because of its ecology. Through its time, it has supported many different livelihoods along its banks such as firewood trading, dhobi kanas, cattle grazing, farming and the plying of boats for transportation. Today, informal settlements along the canal are constantly under threat of resettlement and displacement of their livelihoods. An inclusive development strategy will ensure a safety net for such urban dwellers and reshape the stakes along the canal for the people of the city.

I am concerned that my house might be taken away from me and torn down as these houses haven't been given patta boundary even though I have been here for 65 years.



A 'cow farm' as it exists today along the canal. In the past, the canal banks would serve as grazing grounds.



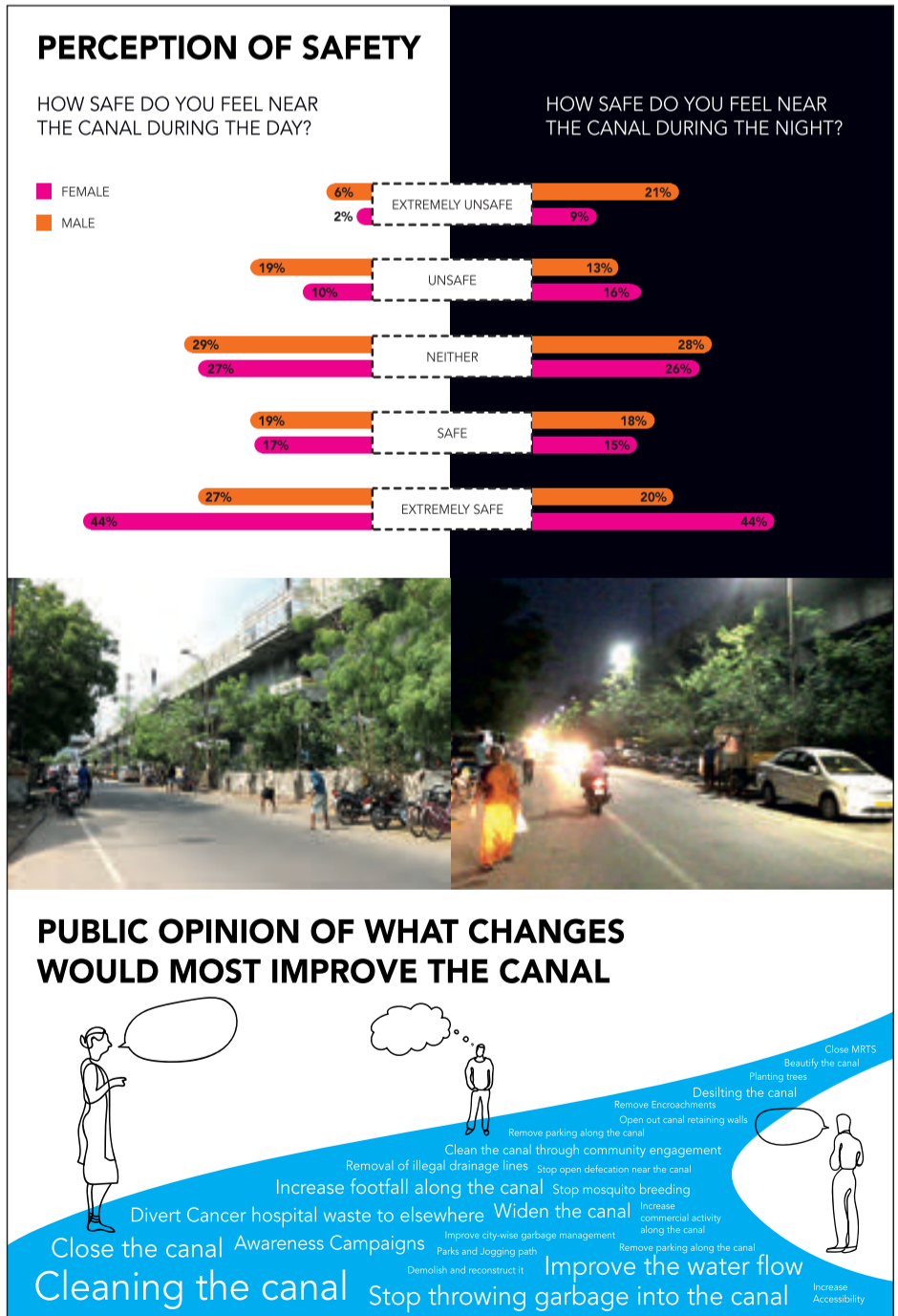
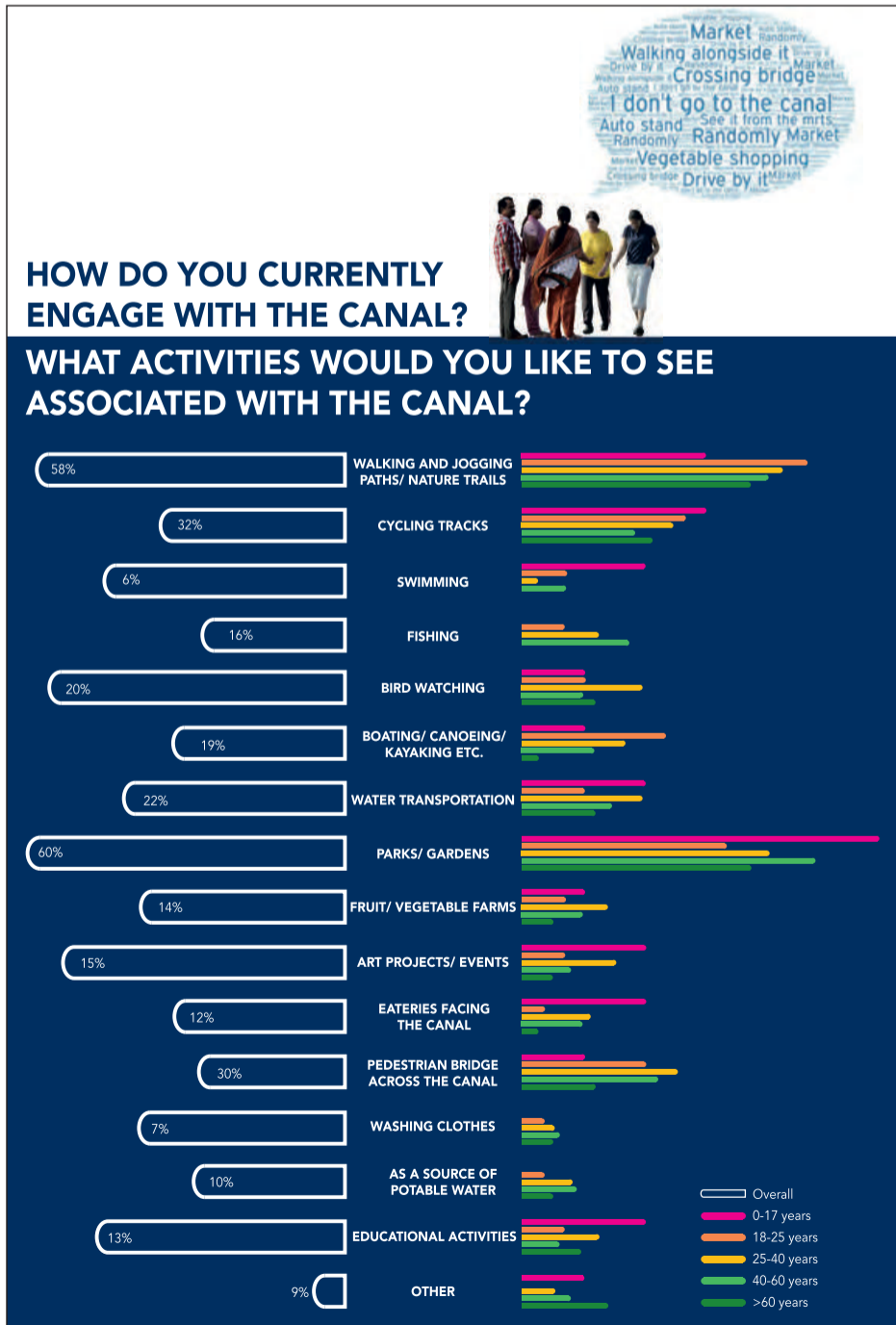
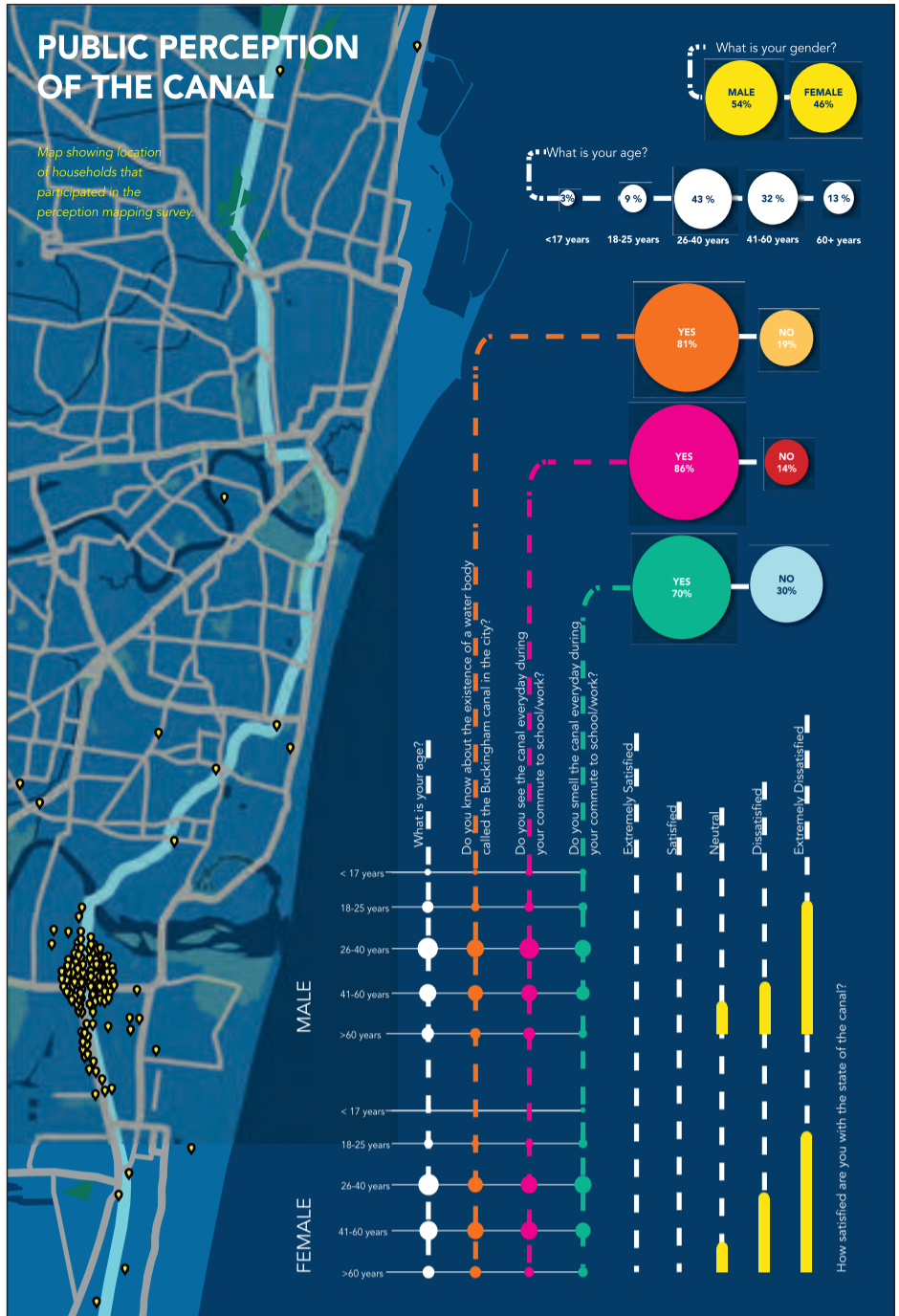
The canal banks have always served as pockets for informal settlements in the city.

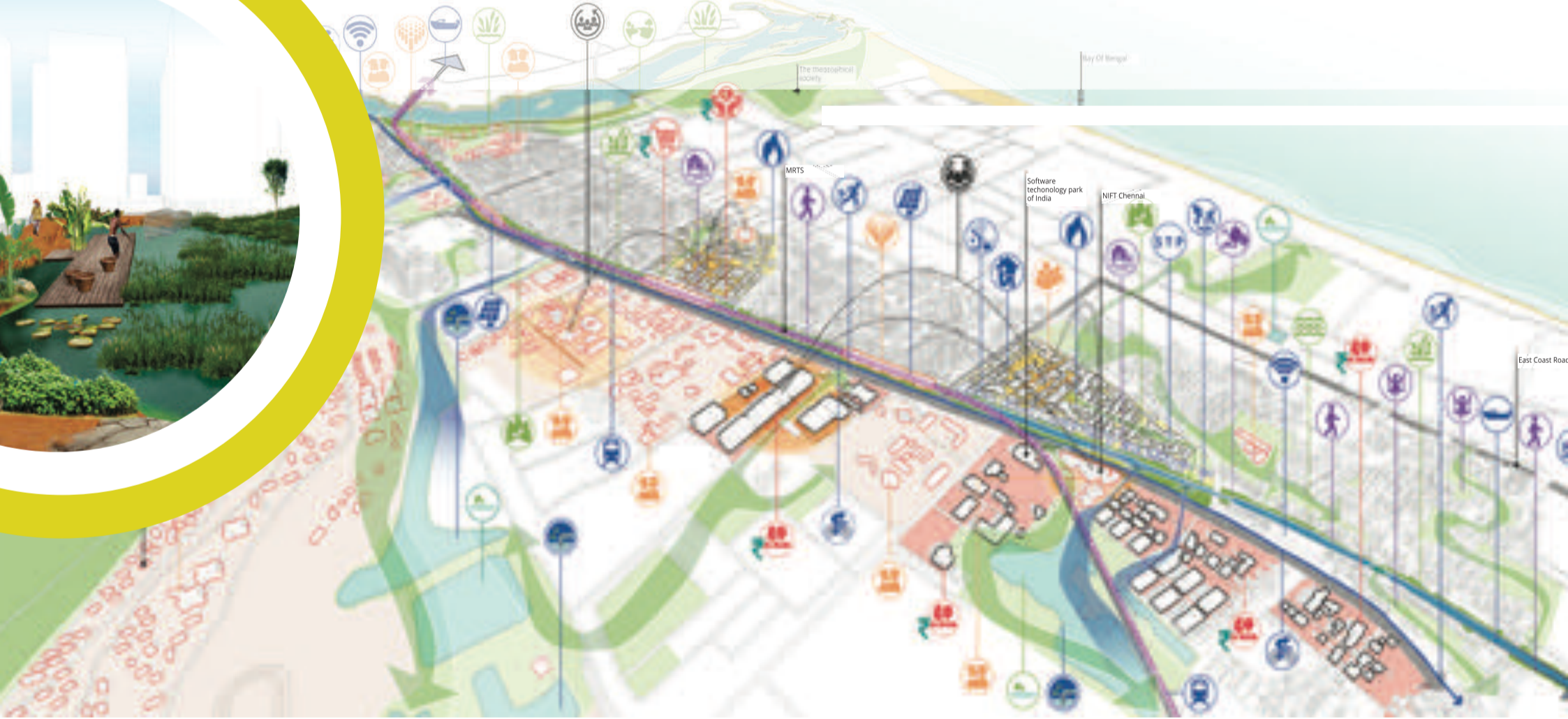
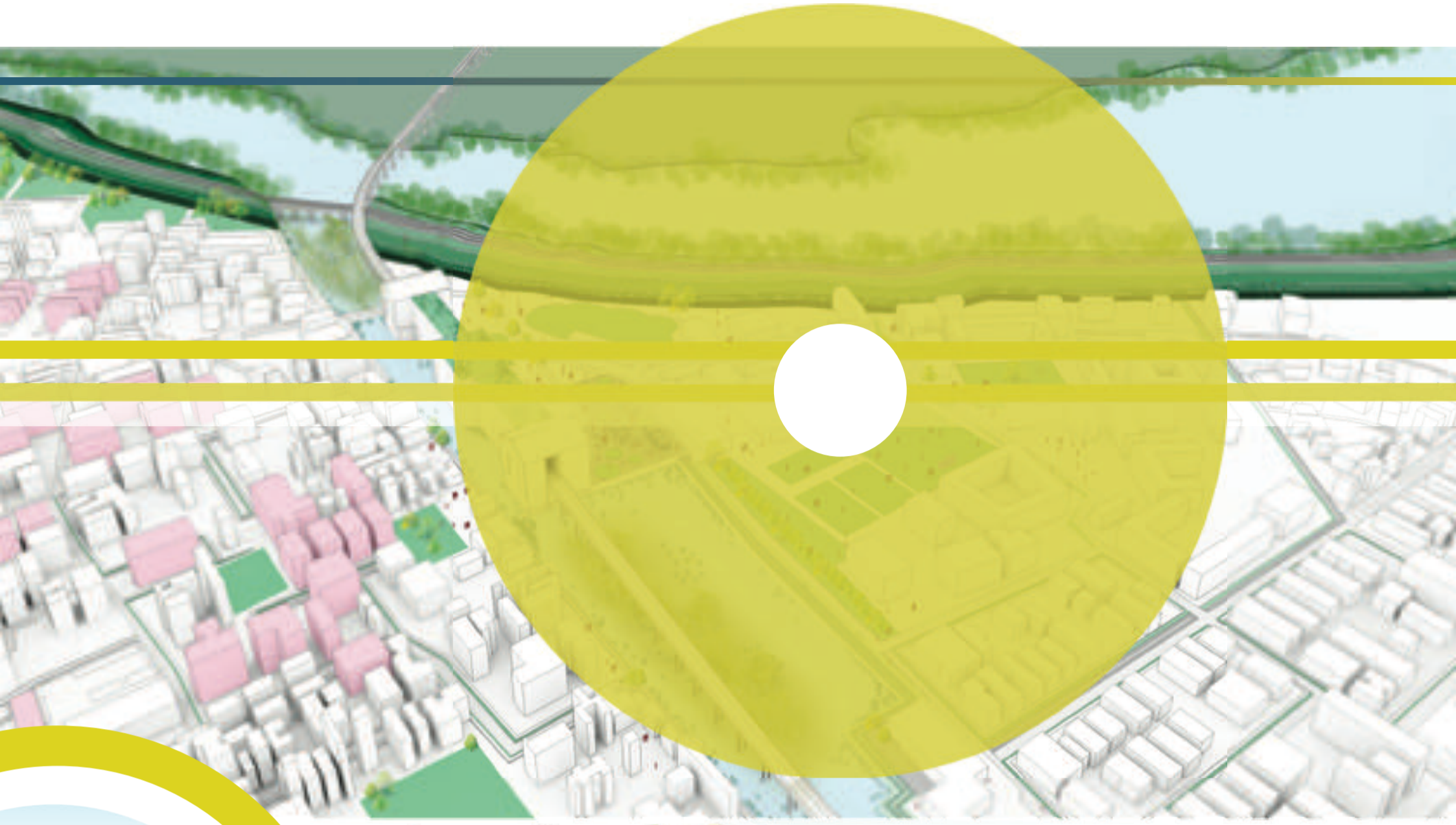
TIMELINE OF PROJECTS/ INITIATIVES BY VARIOUS GOVERNMENT AGENCIES INVOLVING THE BUCKINGHAM CANAL

AGENCY	PROJECT	DESCRIPTION	BUDGET	STATUS
1987 Southern Railway	Chennai Mass Rapid Transit System (MRTS)	Building MRTS line within the city, from Beach to Velachery on the South Canal	Unavailable	Completed
1992 Chennai Metropolitan Development Authority (CMDA)	Drainage Master Plan	• Building flood defences • Channel improvement	96 crore	No official update available
1998 Housing & Urban Development Department	Flood Alleviation and Improvement of Storm Water Drainage System	• Constructing 10 vents in North Buckingham Canal • Desilting South Buckingham Canal • Constructing retaining wall and jeep track along canal banks	Unavailable	Completed (Repairs to canal linings)
2001 Central Government	City River Conservation Project	• Achieving 100% effluent Standards of Sewage Treatment Plants as per Tamil Nadu Pollution Control Board norms • Increasing agro-forestry coverage • Building interceptor sewers along river banks and augmenting capacity of Sewage Pumping Stations by Chennai Metro Water Supply and Sewage Board (CMWSSB)	1,200 crore 750 crore (of total funds)	Funds diverted Completed
2002 Ministry of Shipping	National Waterway	Building 1,100 km long waterway system (NW-4) from Kakinada in Andhra Pradesh to Marakkanam in Tamil Nadu	Unavailable	No official update available
2008 Ministry of Shipping	National Waterway	• Desilting waterway • Dredging up two meters to make canal navigable • Introducing barges for transportation of goods	500 crore	No official update available
2009 JNNURM	Various projects along North, South, & Central Buckingham Canal	• 10 flood control projects along canal including » Constructing flood protection walls » Installing fencing at vulnerable locations along canal » Providing access ramps for maintenance • Widening waterways under bridges from Adyar South Lock to Muttukadu backwater • Building 533.32km of storm water drains (scope reduced to 335km)	1,448 crore 706 crore (of total funds)	Completed Incomplete
TN State Government	Flood Protection	Various projects along North, South, & Central Buckingham Canal	Unavailable	No official update available

TIMELINE OF PROJECTS/ INITIATIVES BY VARIOUS GOVERNMENT AGENCIES INVOLVING THE BUCKINGHAM CANAL

AGENCY	PROJECT	DESCRIPTION	BUDGET	STATUS
2010 JNNURM / PWD	Various projects along North, South, & Central Buckingham Canal	• North Buckingham Canal » Widening and deepening canal, and providing bed lining and retaining wall from Cooum confluence point to Elephant Gate Road Bridge up to Rs.1,300m • Central Buckingham Canal » Widening and deepening canal between Cooum River to Adyar River • South Buckingham Canal » Widening and deepening canal to original bed level from Adyar South Lock to Muttukadu • Constructing straight cut drainage channel across Buckingham Canal from Okkiyam Maduvu to sea	50 crore 8.76 crore 77.65 crore	Incomplete
Department of Highways	Roads along Buckingham Canal	• Building 16 elevated roads between Manali Oil Refinery Road and Central Light House along Buckingham Canal • Providing cycle tracks and footway along the banks of Adyar, Cooum, and Buckingham Canal • Widening some roads as envisaged under Second Master Plan (SMP)	800 crore	Incomplete
Tamil Nadu Slum Clearance Board (TNSCB)	Shelter Provision within Chennai Metropolitan Area (CMA)	Relocating 15,733 slum families living without basic amenities along Buckingham Canal and subjected to annual flooding	Unavailable	No official update available
2013 Chennai Rivers Restoration Trust (CRRT)	Restoration of Buckingham Canal	Cleaning city waterways	Unavailable	Ongoing (EoI from consultants solicited)
Water Resources Department	Road Laying	• Laying roads along North Buckingham Canal » 1.5 km between Bharathi Nagar and Korukkupet » 1.5 km between Nehru Nagar and IOC » 9 km between Kargil Nagar, Tiruvottiyur, and Ennore	Unavailable	No official update available
2014 Chennai Rivers Restoration Trust (CRRT)	Restoration of Buckingham Canal	Restoring canal within Chennai Metropolitan area from Ennore creek to Muttukadu backwaters	Unavailable	Ongoing (DPR from consultants solicited)
Ministry of Shipping, Inland Waterways Authority of India	Project for Development of National Waterway (NW-4)	Developing 1,078km of Buckingham Canal (NW-4) from Kakinada, Andhra Pradesh (AP) to Pudukkottai	3000 crore	Ongoing (Foundation stone laid in AP in 2017)
		Developing 37km of NW-4 between Sholinganallur and Kalpakkam on South Buckingham Canal	123 crore (of total funds)	





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