National Institute of Urban Affairs

WATER & ENVIRONMENT VERTICAL

Thesis Competition — Re-imagining Urban Rivers

NAMAMI GANGE

Season -2

Sponsored Thesis Project Competition on *"Re-imagining Urban Rivers"*

Blue-Green Infrastructure Planning for Sustainable Development - Tirunelveli

Student Name : Karpagavalli S
Course Discipline: Master of City Planning, IITKGP

STUDY AREA DETAILS

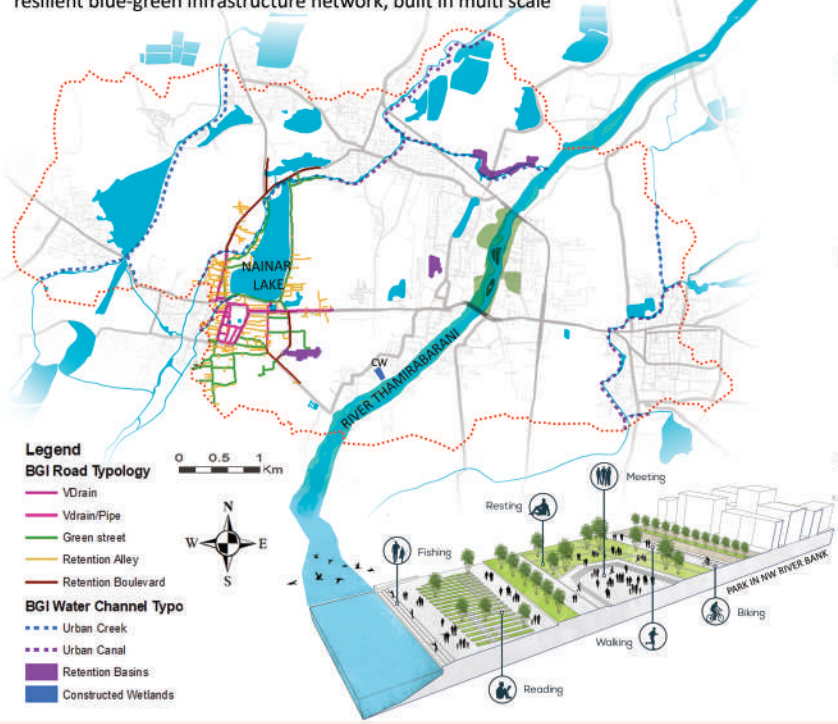
Location	: Tirunelveli, Tamil Nadu
M.Corp Population	: 473637
Name of the River	: Thamirabarani River
Origin of the river	: Western Ghats -Pothigai Hills
Confluence Point	: Bay of Bengal -Gulf of Mannar.
River Basin	: L.Thamirabarani River Basin
Site Study Area	: 29.18 Sq.km
River stretch studied	: 4.66 km
Flood Plain	: 120m to 250 m

CONCEPT:

The blue-green Infrastructure planning is a strategic planning approach that aims to develop network of green and blue spaces in urban areas, designed and managed to deliver wide ranges of ecosystem services and benefits of environmental, economical and social aspects

AIM:

To contribute & protect hydrologic and ecological values of tirunelveli city, through resilient blue-green infrastructure network, built in multi scale



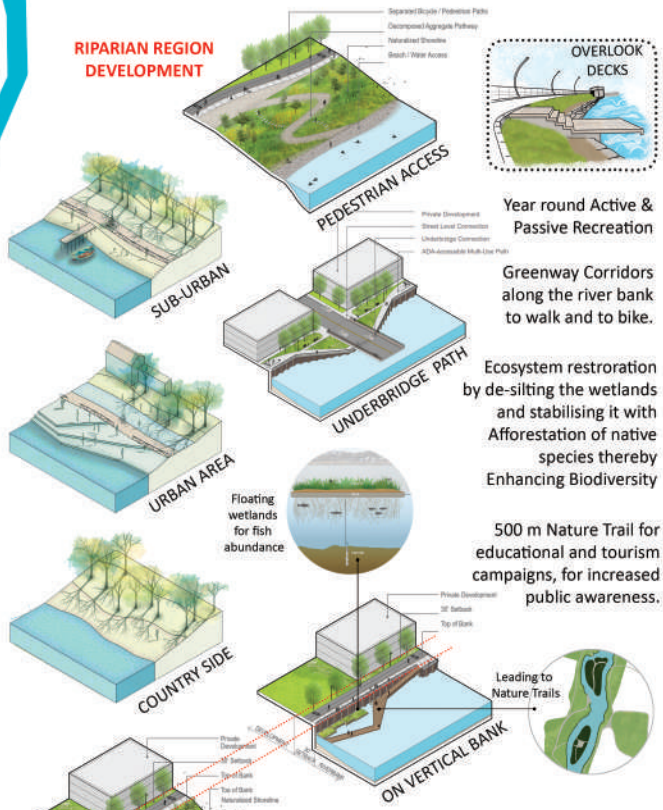
RIVERBANK DESIGN GUIDLINES:

Checklist Design Guidelines for River bank development is given

NATIVE SPECIES INVENTORY

Riparian Native species Inventory for 150+ flora has been derived suitabe for Thramirabarani

RIPARIAN REGION DEVELOPMENT



REDESIGN OF THE BRIDGES with overview deck for social connectivity

POLICY INTERVENTIONS:

1. Zero Tolerance Policy for combined sewer overflows
2. River bank Protection Policy, from -encroachment, -foreign species, -unnaturalised shorelines, -direct waste discharge -dumping of wastes.
3. Zero Plastic Pollution Policy
4. Promotion of green roof with FSI & Tax incentives
5. Mandatory rainwater harvesting
6. Green proofing Govt Buildings
7. Permeable streets Policy
8. Water quality Milestones
9. Overflow Action Days Ordinance
10. Alignment with "Blue-Green Policy of Delhi 2041"

INTERVENTION 1: INFRASTRUCTURE IMPROVISATION

Proposal of Road Improvisation, Channel Improvisation and Water front corridors with blue green interactions; Detail implementation in pilot project

Intervention 1	Pilot Project	Total in study area
V-Drain Roads	1.346 km	4.30 km
V Drain pipe Roads	3.928 km	6.73 km
Retention Boulevards	3.385 km	22.3 km
Green Streets	10.02 km	105.7 km
Retention Alley	16.62 km	112.9 km
Urban Canal	1.194 km	8.35 km
Urban Creek	1.773 km	9.14 km
Water Front Corridor	4.285 km	9.13 km

INTERVENTION 2: CONSTRUTED WETLANDS

Proposal of 6 units of Constructed Wetlands is given to treat the sewage treatment gap of 7.77 MLD exisiting in M.Corp.

Total Area of the CWs= ~ 111000 Sq.m
Area of all Vertical Beds = ~ 95500 sq.m
A signle CW unit treats 600 MLD
Phase 1= 2 CWs; Phase 2= 4 CWs
Total Cost Estimated 24 Crores
Use of Napier Grass for native species usage

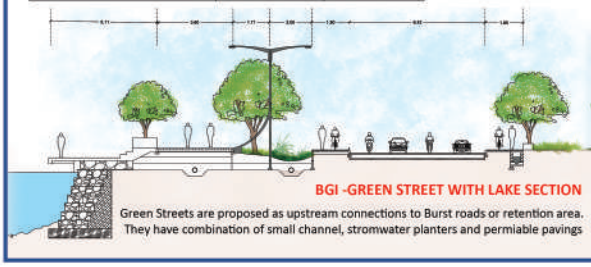
INTERVENTION 3: RETENTION BASINS

Basin	Capacity	Area	Depth
1	191436 Cu.m	31906 Sq.m	~ 6.0 m
2	143577 Cu.m	93508 Sq.m	~4.5 m
3	191660 Cu.m	38332 Sq.m	~5.0 m

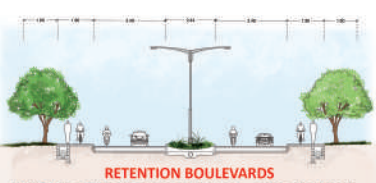
Proposal of 3 Retention Basins are given from the discovery of three disapperared waterbodies using the LULC Change detection analysis. Cost 20 Crores.

URBAN CANALS
Canals are in large scale within dense urban areas

URBAN CREEK
Creeks are streams, smaller in scale create neighbourhoods character and enhances biodiversity

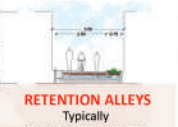


BGI -GREEN STREET WITH LAKE SECTION
Green Streets are proposed as upstream connections to Burst roads or retention area. They have combination of small channel, stromwater planters and permiable pavings



RETENTION BOULEVARDS
Retention Boulevards incorporate large, green depressed medians that detain and retain stromwater while allowing regular street traffic. They require more space in the ROW and are recomentded in underutilised arterial roads

BURST ROADS
V-Drain Roads with and without pipes, ensure water will flow in middle of road and drain them into rentention area



RETENTION ALLEYS
Typically located in upstream or vulnerable low-lying areas detention with Bioswales, planters, permiable pavings

View showing Urban Social Oasis in the Urban Canal Improvisation