Enabling Climate Resilient Water Reuse in Small Towns: The Reuse Readiness Framework

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Drivers of TUW Reuse: National and Global Context

- WHO Guidelines for the Safe Use of Wastewater, Excreta and Greywater (2006)
- World Bank-From Waste to Resource (2020)
- COP 28 – Global Goal on Adaptation (2023)
- Revised EU Wastewater Treatment Directive (2024)
- COP 29 – Declaration on Water for Climate Action
- Namami Gange Programme (2014)
- AMRUT 2.0 SBM 2.0 (2021)
- Water Vision @ 2047 (2023)
- National Framework for Safe Reuse of Treated Water (2023)
- Draft Liquid Waste Management Rules 2024 (2025)
- Economic Survey 2025 -2026

2025: 50% reuse ; 2050: 100% reuse

Small & Medium Towns : The Missing Link in India's Reuse Transition

Small Towns in the Urbanisation trajectory

*Source: United Nations Economic & Social Commission for Asia & the Pacific (2024)

India's Urban Used Water

Generation:
72,000+ MLD

Treatment:
28%

Reuse:
10%

The Treatment Capacity GAP

Class I (Metro cities): **67%**

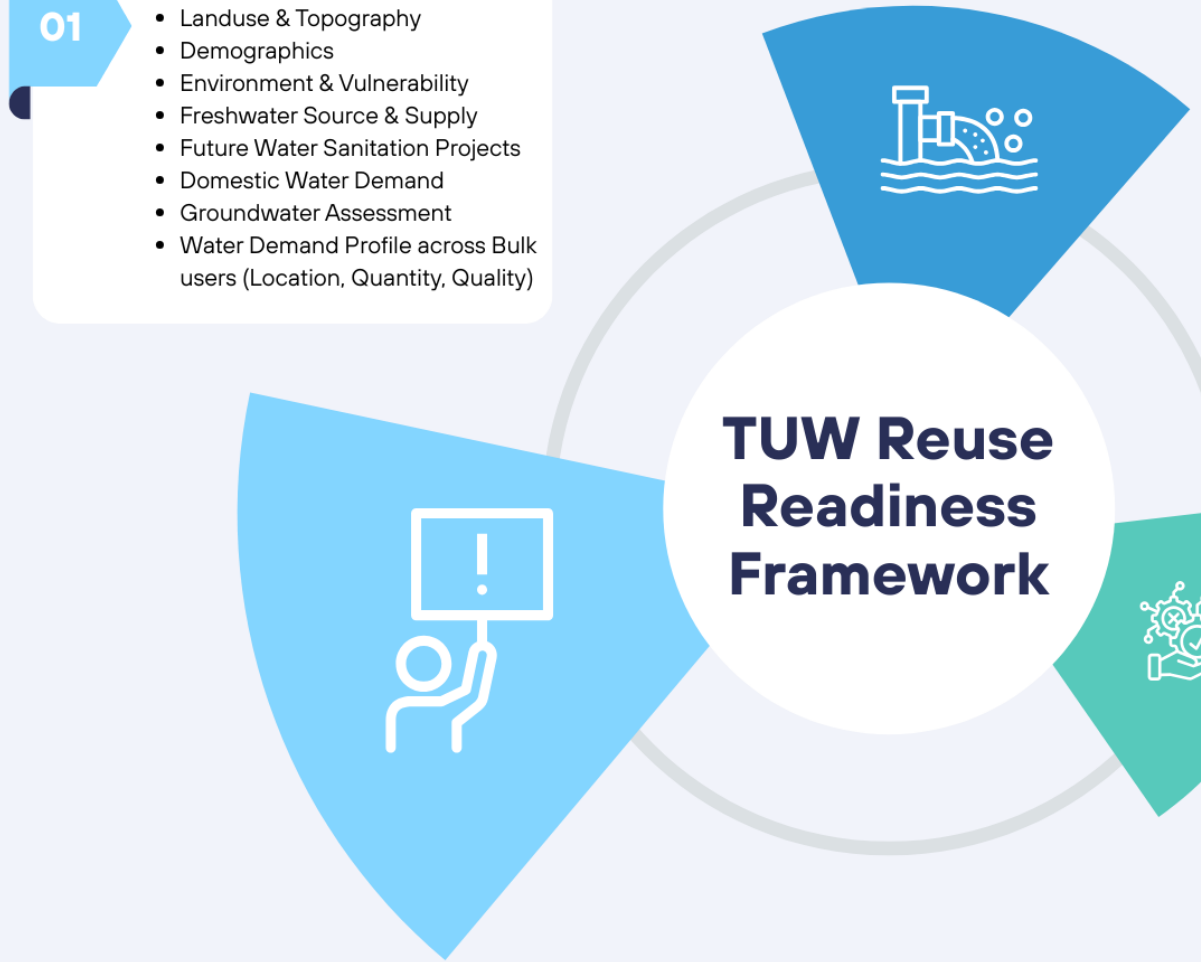
Class I (<10 lakh): **87%**

Class II (0.5 - 1 lakh): **95%**

*Source: CEEW 2023, Urban Wastewater Scenario in India, 2022- Niti Aayog

Despite the growing economic and demographic weight of Small Towns, these centres remain under-represented in the reuse conversation

The Reuse Readiness Framework



01 ESTABLISHING NEED

- Landuse & Topography
- Demographics
- Environment & Vulnerability
- Freshwater Source & Supply
- Future Water Sanitation Projects
- Domestic Water Demand
- Groundwater Assessment
- Water Demand Profile across Bulk users (Location, Quantity, Quality)

02 ASSESSING RESOURCE

- UW generation & collection
- Uncollected UW disposal location / quantity
- STP capacity - present & upcoming
- STP current utilisation & flow
- UW disposed from STP location / quantity
- STP treatment technology
- TUW quality & testing frequency
- TUW received beyond town limits
- STP operational details

03 ENSURING VIABILITY

- Technical gaps
- Demand commitments & willingness of bulk users
- Costs - CAPEX, OPEX costs of STP & UGD, augmentation costs for additional treatment, TUW Reuse costs
- Financing - ULB Budget, Incentives/Schemes, PPP Model, Others
- Revenues - Water tariffs for bulk users - existing & estimated tariff for TUW
- Business model & Project structuring
- Policy & Regulatory environment
- Environment & Social Safeguards

Why the Reuse Readiness Framework for Small Towns?

Helps small town municipalities
- Diagnose their current reuse readiness
- Identify realistic entry points
- Design phased, capacity aligned reuse pathways

Positions Reuse as a governance, financial, spatial and institutional transition – not just a technical intervention

Shifts focus from standalone infrastructure projects to **system – level readiness** for reuse

Aligns local planning processes with national policy objectives and long-term climate resilience goals

Application of the Framework in Small & Medium Towns

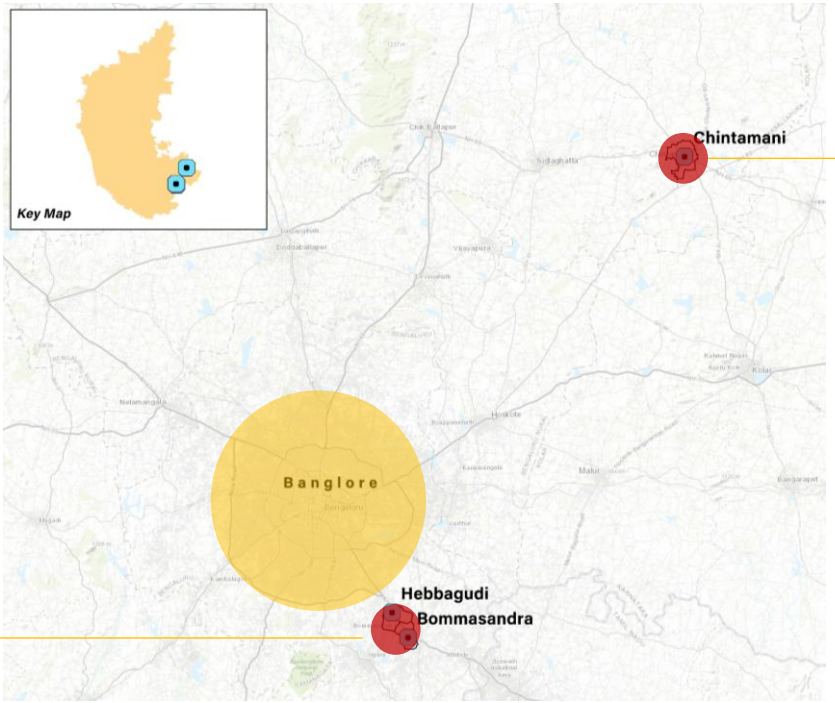
Hebbagudi –Bommasandra, Karnataka

Population: 1,79,940

Land use: Industries, high-density residential

Climate Impact: Localized flooding, seasonal water scarcity

Water Supply: 96% from critically overexploited groundwater (90lpcd)



Chintamani, Karnataka

Population: 1,02,568

Land use: Residential and Agriculture

Climate Impact: Droughts, fluctuating precipitation

Water Supply: 75% from overexploited groundwater (75-100lpcd)

Supply: 12.5 MLD

Gap: **10 MLD**

Demand: 22.5 MLD

Supply: 5.75 MLD

Gap: **4.51 MLD**

Demand: 10.26 MLD

Reuse Readiness Assessment in Chintamani

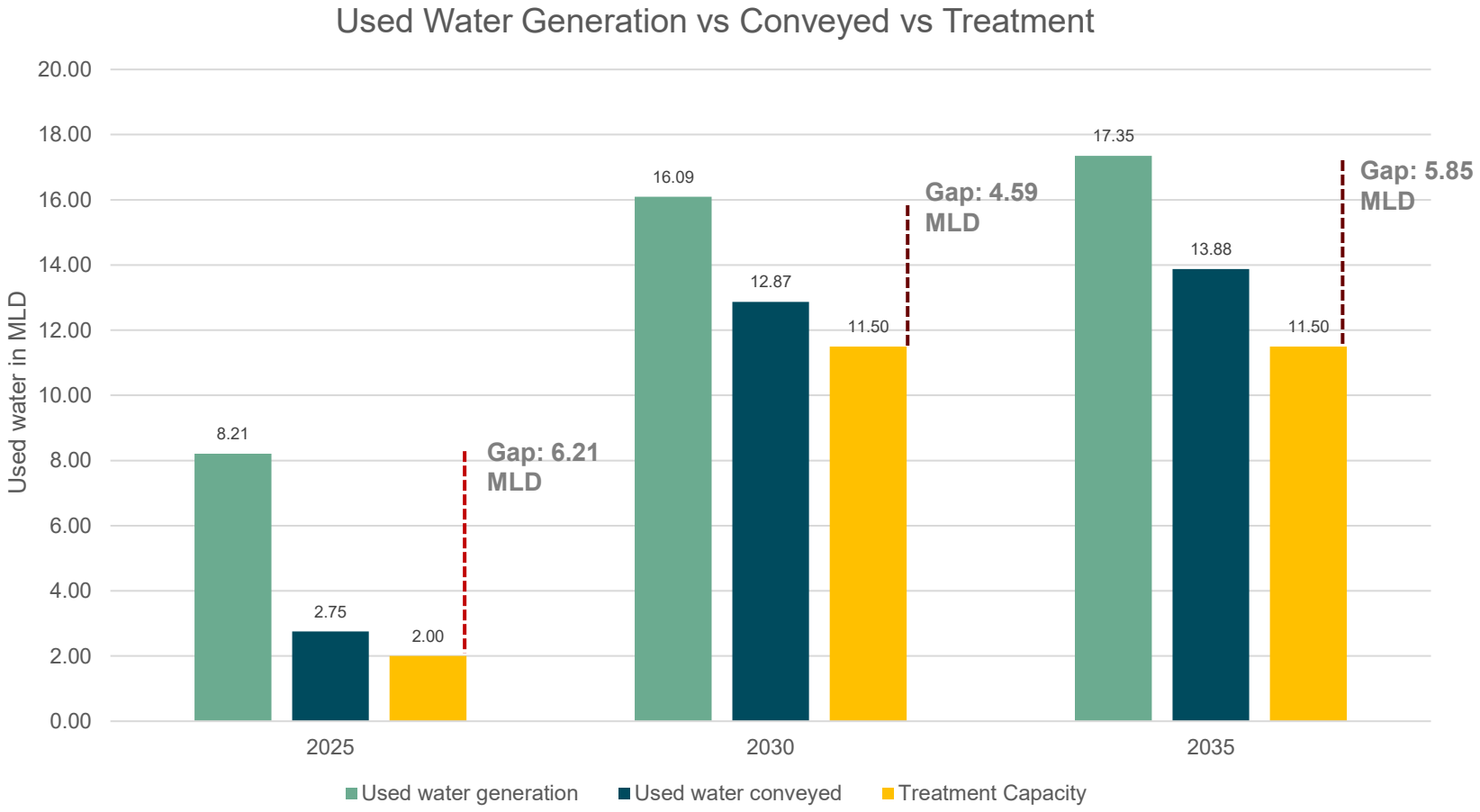
Key Gaps to Reuse Readiness

70% HH without Sewerage Connection

6.2MLD Treatment Gap

Low Quality TUW - High TDS and Faecal Coliform

TUW storage infrastructure Absent



The Potential

- **40+km** sewerage network proposed under SBM 2.0 and NGT and **9.5 MLD** increment in treatment capacity

Reuse Readiness Assessment in Chintamani

Reuse Avenues

Short Term (0-2 years)

- Augmentation of water security through Shallow Aquifer Management (SAM) – as a pilot already ongoing
- Municipal: road washing, drain cleaning, firefighting

Medium Term (2-5 years)

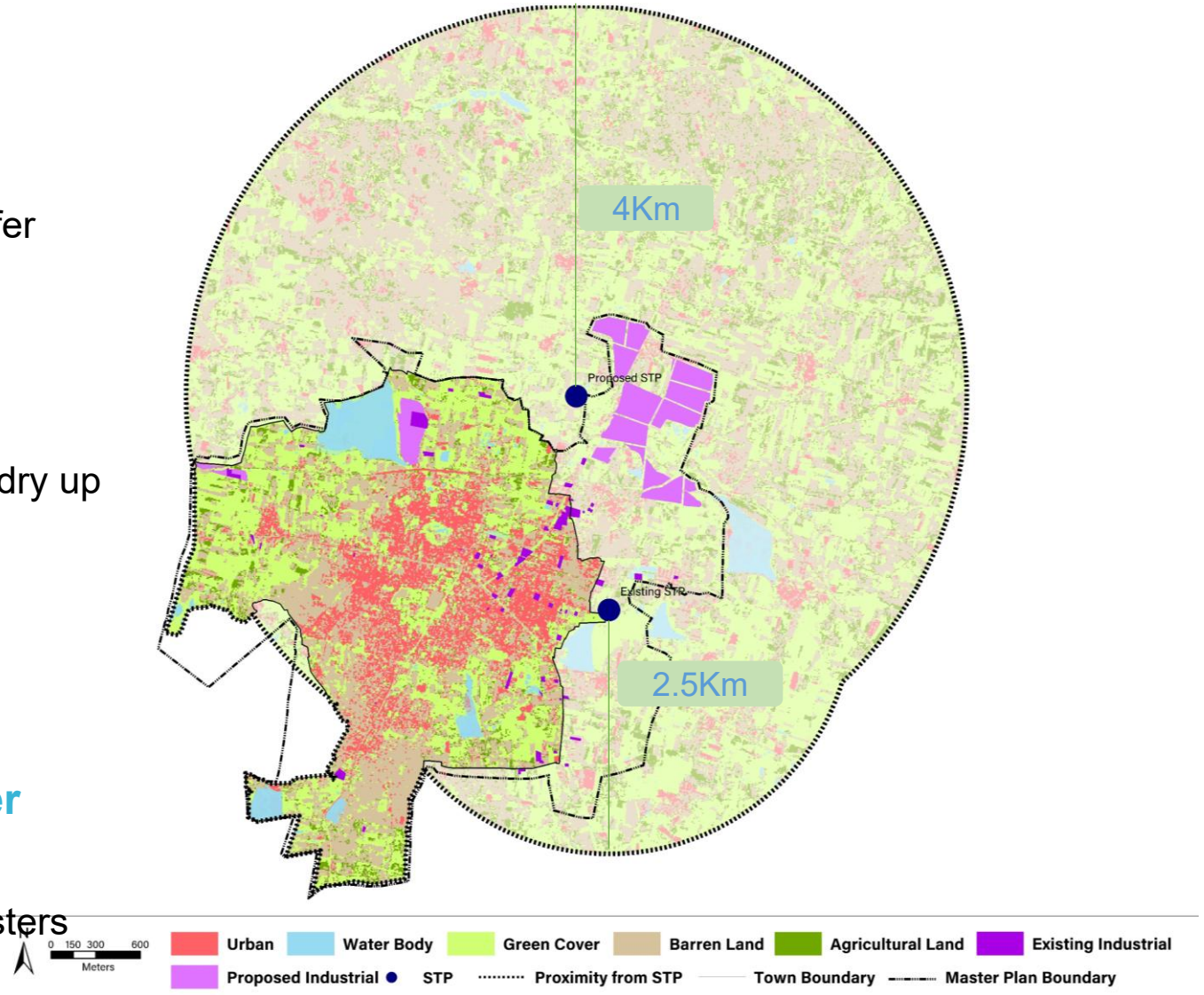
- Floriculture-Agriculture
- Lake recharge - 2 out of 4 major lakes in Chintamani dry up by summer months

Long Term (>5 years)

- Planned upcoming industrial area: 7 acres
- Expanding SAM pilot to larger area

Formal / Informal Interest in Treated Used Water

- Intake of raw sewage mixed lake water by farmers
- Political drive for reuse in the upcoming industrial clusters



Reuse Readiness in Hebbagudi-Bommasandra

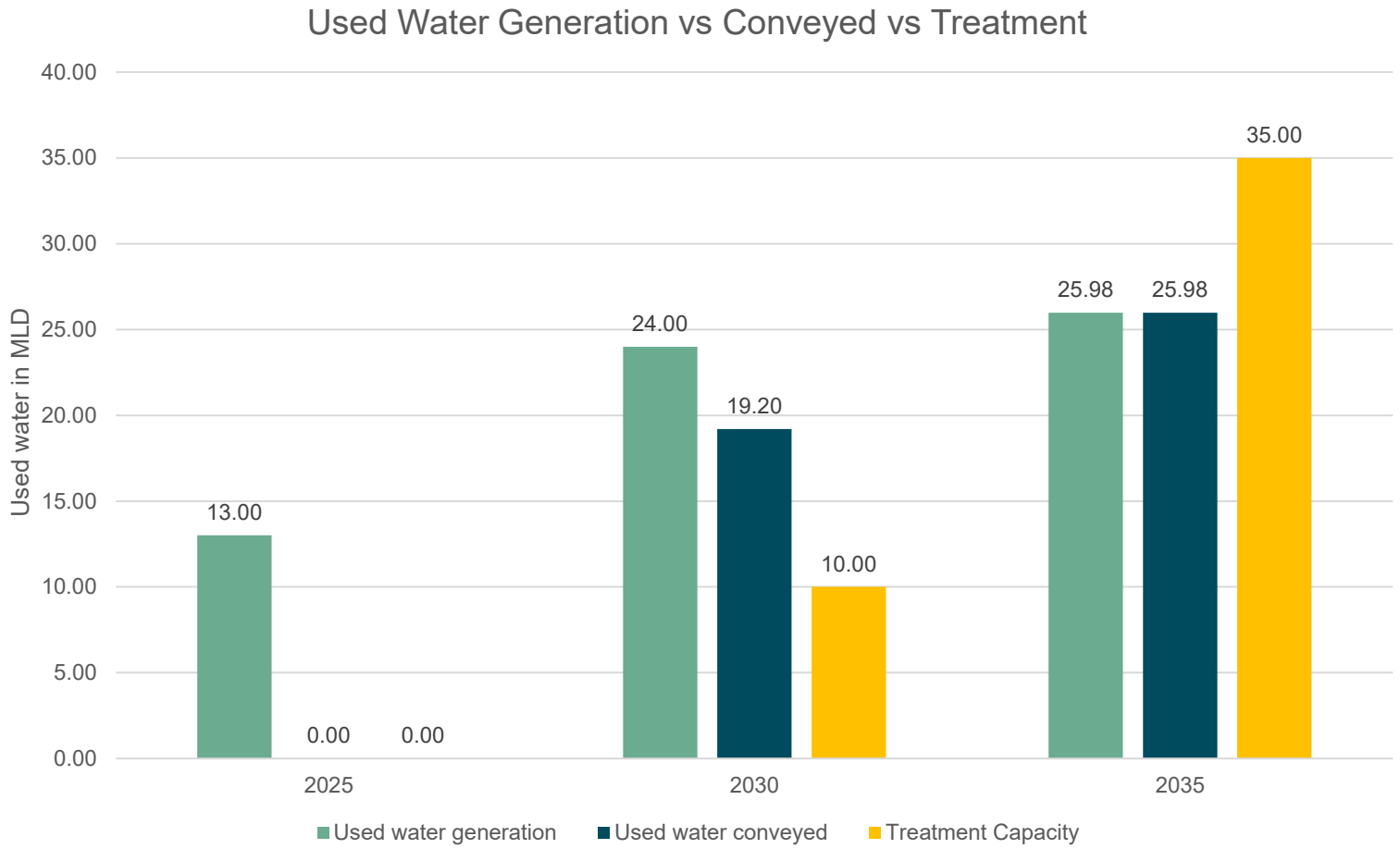
Key Gaps to Reuse Readiness

>70% HH without Sewerage Connection in Hebbagudi

No Sewerage Connection in Bommsandra

0 MLD Treatment

Mixing of wastewater in the stormwater drain and lake



The Potential

- **100%** sewerage network coverage by 2026 and **35 MLD** proposed treatment capacity (land acquisition in process)

Reuse Readiness in Hebbagudi-Bommasandra

Reuse Avenues

Short Term (0-2 years)

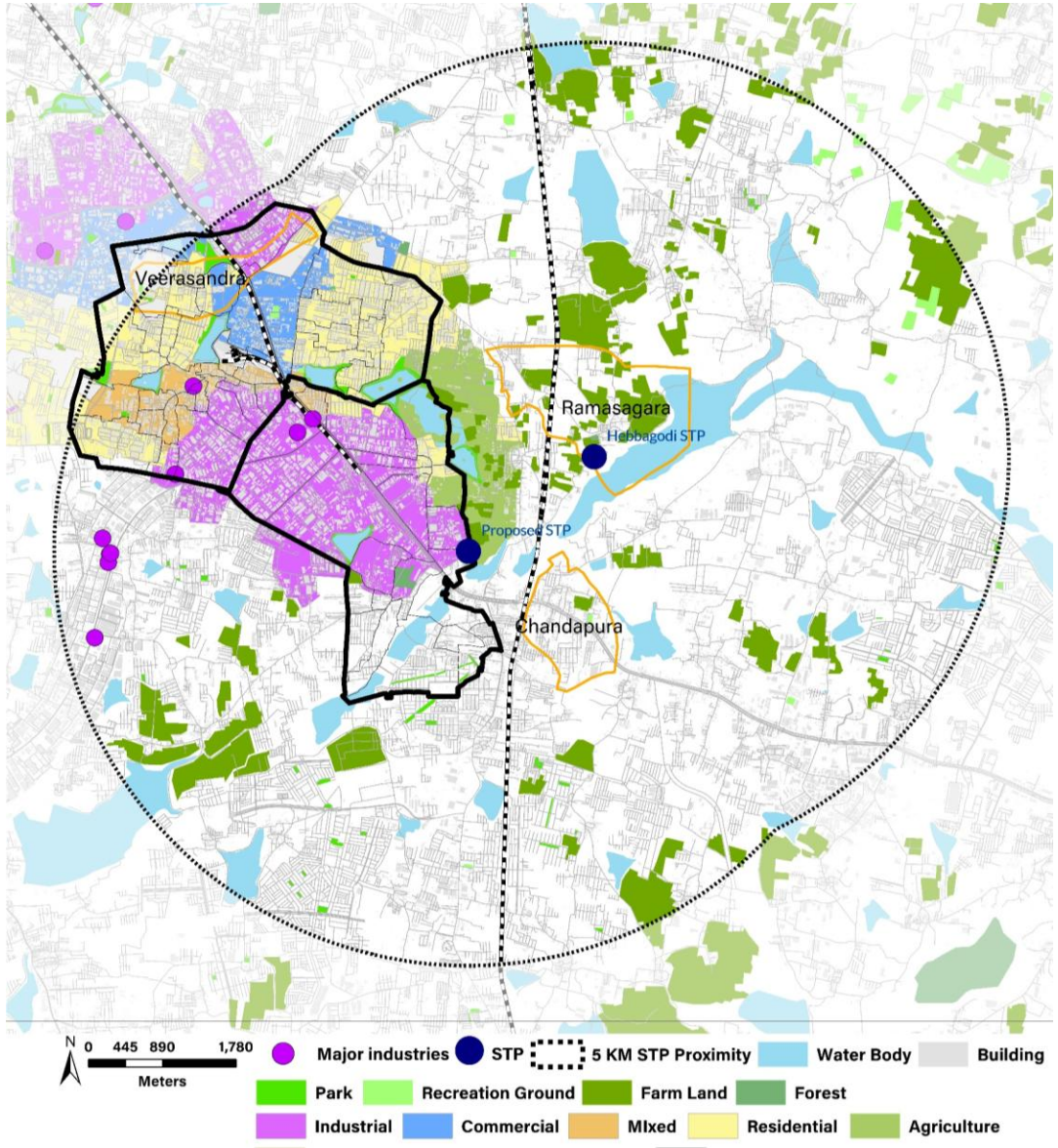
- Construction sector: (curing, dust suppression)
- Municipal: metro washing, road washing, drain cleaning, firefighting
- Open grounds & recreation: cricket grounds, campuses, large open spaces

Medium Term (2-5 years)

- Industrial reuse (priority): cooling, washing, utilities
- Open grounds & recreation: cricket grounds, campuses, large open spaces
- Lake Recharge & improve groundwater levels

Long Term (>5 years)

- Industrial-scale TUW substitution across the industrial corridor
- Lake Recharge & improve groundwater levels
- Augmentation of water security through Shallow Aquifer Management (SAM)



Thank You

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