



CHRISTOPHER BENNINGER

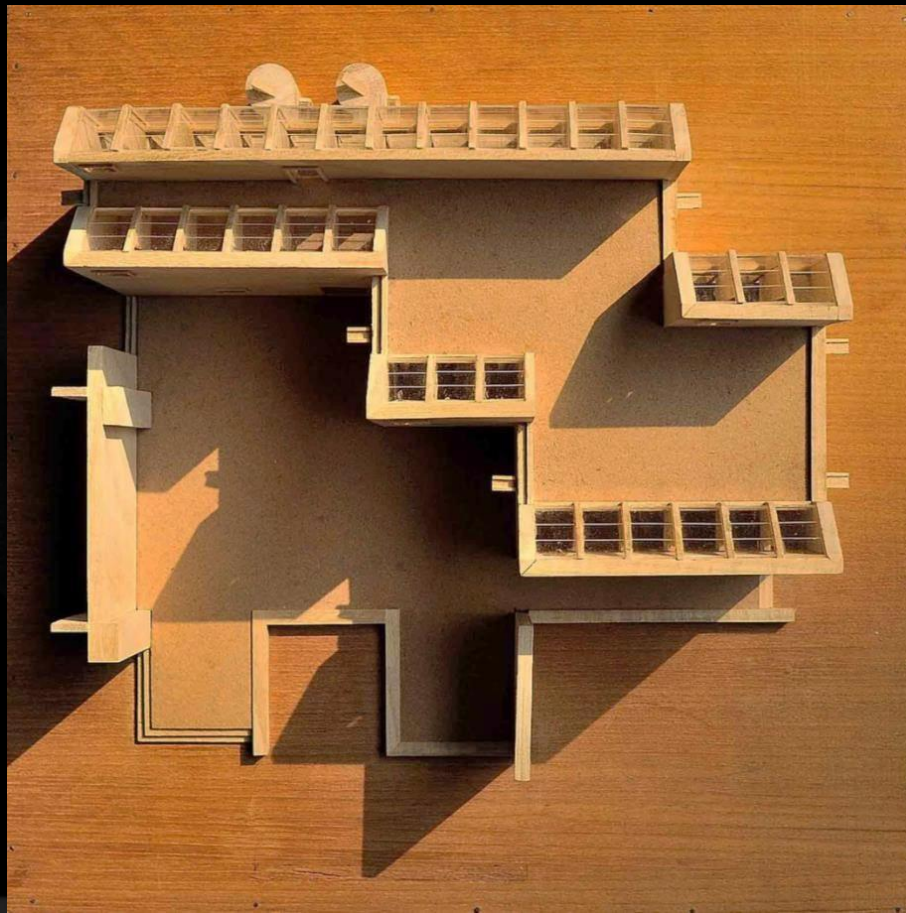
GREEN BUILDINGS

GREEN CITIES

GREEN PEOPLE

GREEN BUILDINGS
GREEN BY NATURE

ALLIANCE FRANCAISE, AHMEDABAD, INDIA



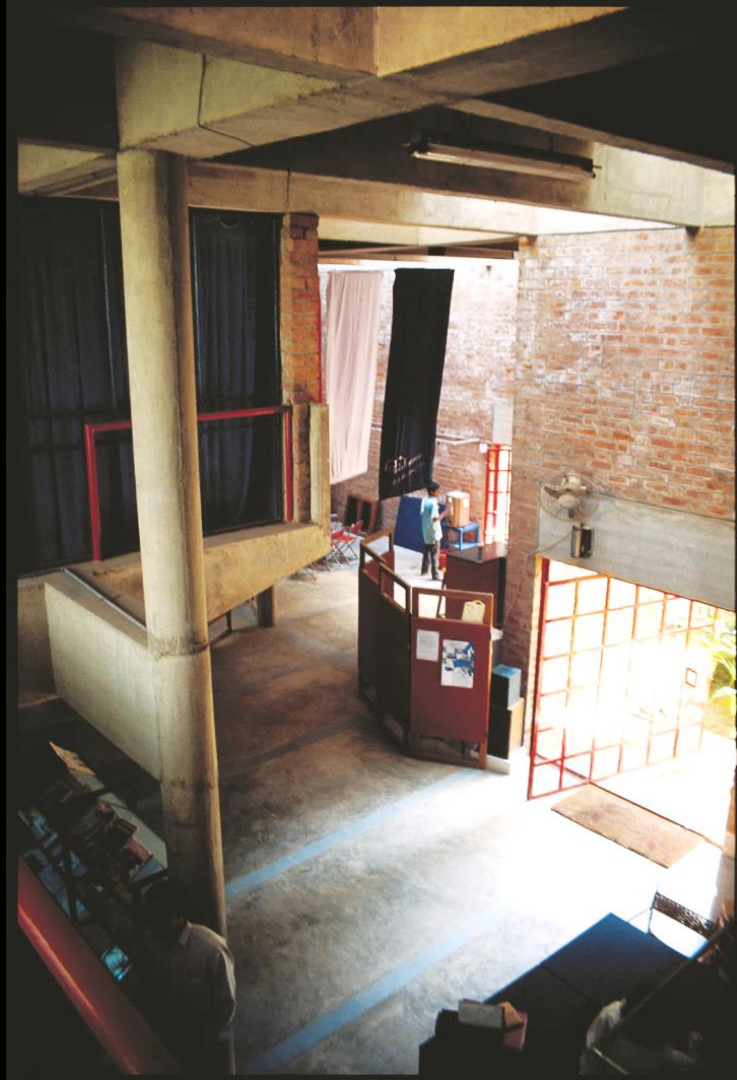
Alliance Française, Ahmedabad
1973













CENTRE FOR DEVELOPMENT STUDIES AND ACTIVITIES,
PUNE, INDIA





Centre for Development Studies and Activities, Pune
1984







GREEN BUILDINGS
GREEN BY SCIENCE

KOCHI REFINERIES LIMITED HEADQUARTERS, KOCHI



Kochi Refineries Limited Headquarters, Kochi
1997

SAMUNDRA INSTITUTE OF MARITIME STUDIES, LONAVLA,
INDIA



Samundra Institute of Maritime Studies, Lonavala
2004



FORBES MARSHALL FACTORY, PUNE, INDIA





TORRENT RESEARCH CENTRE, AHMEDABAD, INDIA

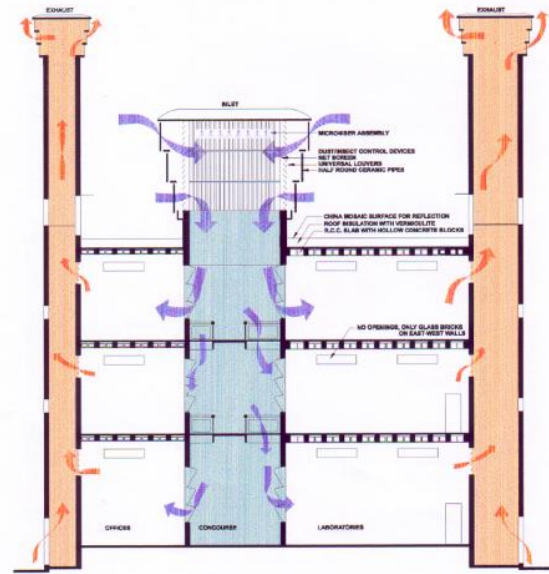
PASSIVE DOWNDRAFT EVAPORATIVE COOLING(PDEC) SYSTEM







FIRST FLOOR PLAN
TYPICAL LABORATORY BLOCK



SECTION
TYPICAL LABORATORY BLOCK

The design of the typical laboratory block was evolved jointly by Abhikram and Short & Ford Associates (SFA) with Brian Ford of SFA, contributing to all the scientific and simulative aspects of the design, Nimish Patel & Gautam Patel of Abhikram contributing to the aspects covering the architectural design, the materials and technologies, construction detailing, internal and external finishes as well as the final built-form, and Dr.C.L.Gupta, of Solar Agni International, Pondicherry, vetting all the designs.

THE SIGNIFICANT CONSEQUENCES OF PDEC SYSTEM

- 200 Metric Tonnes of Air-conditioning load saved.
- Summers' Temperatures remain at 28°- 32°C.
- 6 to 9 Air changes/hour in Summer, including in a chemical laboratory.
- The Temperature fluctuations inside, 3°- 4 °C, in any 24 hour period, when outside variations are 14°- 17° C.
- Humidity 65 - 70% in summer and Air Movement Velocity, 1.5 feet / second.
- The building designed for 175 occupants in 1997, accommodated more than 600 users in 2005

GREEN BUILDINGS

GREEN BY NUMBERS

Sections	Criterion No.	Criterion Name	Max. Points
Site Planning	1	Site Selection	1
	2	Low-impact design	4
	3	Design to mitigate UHIE	2
	4	Site Imperviousness Factor	1
Construction Management	5	Air and water pollution control	1
	6	Preserve and protect landscape during construction	4
	7	Construction Management Practices	4
Energy	8	Energy efficiency	13
	9	Renewable energy utilization	7
	10	Zero ODP materials	0
Occupant Comfort and Well Being	11	Achieving indoor comfort requirements (visual/thermal/acoustic)	6
	12	Maintaining good IAQ	4
	13	Use of low-VOC paints and other compounds in building interiors	2
Water	14	Use of low-flow fixtures and systems	4
	15	Reducing landscape water demand	4
	16	Water Quality	2
	17	On-site water reuse	5
	18	Rainwater Recharge	2
Sustainable Building Materials	19	Utilization of BIS recommended waste materials in building structure	6
	20	Reduction in embodied energy of building structure	4
	21	Use of low-environmental impact materials in building interiors	4
Solid Waste Management	22	Avoided post-construction landfill	4
	23	Treat organic waste on site	2
Socio-Economic Strategies	24	Labour safety and sanitation	1
	25	Design for Universal Accessibility	2
	26	Dedicated facilities for service staff	2
Performance Monitoring and Validation	27	Increase in environmental awareness	1
	28	Smart metering and monitoring	8
	29	Operation, Maintenance Protocols	0
	30	Performance Assessment for Final Rating	0
	31	Innovation	4
Total			100

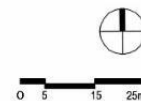
SUZLON ONE EARTH CORPORATE HEADQUARTER, PUNE,
INDIA





Legend

1. Sun Lounge
2. Sky Lounge
3. Tree Lounge
4. Aqua Lounge
5. Waterbody / Cafeteria
6. Sky Cylinder
7. Suzlon Excellene Academy
8. Welcome Lounge
9. Electrical Service Yard
10. Entry / Exit







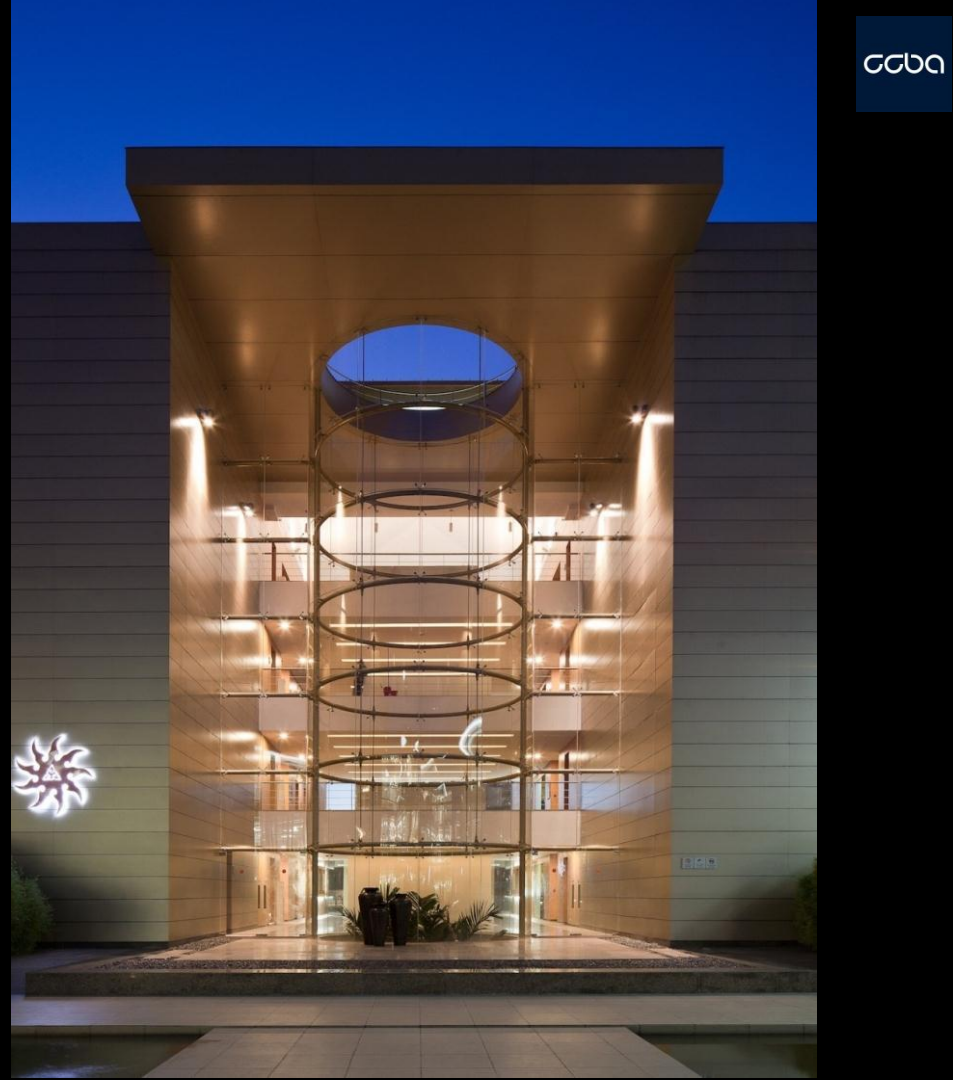














Confederation of Indian Industry
CII-Sohrabji Godrej Green Business Centre



Indian Green Building Council

Indian Green Building Council (IGBC)

hereby certifies that

Suzlon One Earth

Pune

has successfully achieved the Green Building Standards required for
the following level of certification under the Leadership in Energy and Environment Design
(LEED) India Green Building Rating System

LEED India for New Construction Platinum
March 2010

C N Raghavendran
Chairman, LEED India

Dr Prem C Jain
Chairman, IGBC

Jamshyd N Godrej
Chairman, CII-Godrej GBC

ĀD a R S H

Association for Development and Research of Sustainable Habitats
Registration No. S/67831/2009, Registered in India under societies registration act XXI of 1860
Plot No. 10, Institutional Area, Vasant Kunj, New Delhi, India - PIN 110070

Date: 03rd February, 2010

Letter No. ADaRSH/CERT/SUZLON/ANNOUNCEMENT/2010/001

Mr. Tulsi R Tanti
Chairman & Managing Director
Suzlon Energy Limited
One Earth, The Academy
Opp. Magarpatta City, Hadaspur
Pune, Maharashtra
PIN 411028

Dear Mr. Tanti,

It is my proud privilege to inform you that the 'Suzlon One Earth' Office Campus at Pune has been awarded the Five Star GRIHA rating (provisional). Please accept my heartiest congratulations on this achievement.

The evaluation committee has awarded a final score of 96 / 100 to the project. The Certification Plaque along with a provisional rating certificate shall be sent to you soon by the GRIHA Secretariat (ADaRSH). Kindly note that the final rating shall be awarded after the building is fully commissioned as per the design intent and operational for at least 12 months and an energy audit report by an energy auditor accredited by the Bureau of Energy Efficiency is submitted to ADaRSH.

Five Star GRIHA rating qualifies the project for MNRE incentives. MNRE shall release the incentives upon validation of the provisional rating with the 12 month post-occupancy energy audit report. The rating shall be valid for a period of five years from the date of issue of final rating. ADaRSH reserves the right to undertake a random audit of any of the criteria at site, for which points have been awarded.

My congratulations once again to Suzlon for achieving the "Five Star" rating.

With kind regards,

Yours sincerely,

R. K. Pachauri, Ph.D

GREEN CITIES

SMART AND LIVABLE CITIES

FORMAL CITY vs. INFORMAL CITY

PUNE SMART CITY PROGRAMME

- Green building strategies;
- A strategy to intelligently light city streets;
- Sustainable transport initiatives;
- A potable water supply strategy;
- An approach to overcome storm drainage problems;
- A river conservation project;
- A solid waste management strategy;
- A Pune cycle path plan;
- Vehicle movement tracking project;
- Converting waste to energy;
- Bio-gas from food wastes;
- A mobile application for mass transit information;
- Maximize solar energy project; and,
- The Quantified Cities Movement.

LIVABILITY INDEX

- Institutional Category (30% weightage),
- Social Category (20% weightage),
- Economic Category (5% weightage) and
- Physical Category (45% weightage)

COMPONENT INDICATORS

- Under the Institutional Theme (30%) is a **Governance Index** ;
- Under the Social Theme (20%) are a **Health Index, Education Index, Identity and Culture Index and a Security Index** ;
- Under the Economic Theme (5%) is the **Economic Index** ;
- Under the Physical Theme (45%) are the **Compact Development Index, Water Index, Energy Index, Waste Water Index, Solid Waste Index, Housing Index, Open Space Index, Mobility Index, and Pollution Index.**

Quantified Cities Movement (QCM) Planning Framework

iNagrik facilitates coordination between the various urban stakeholders.

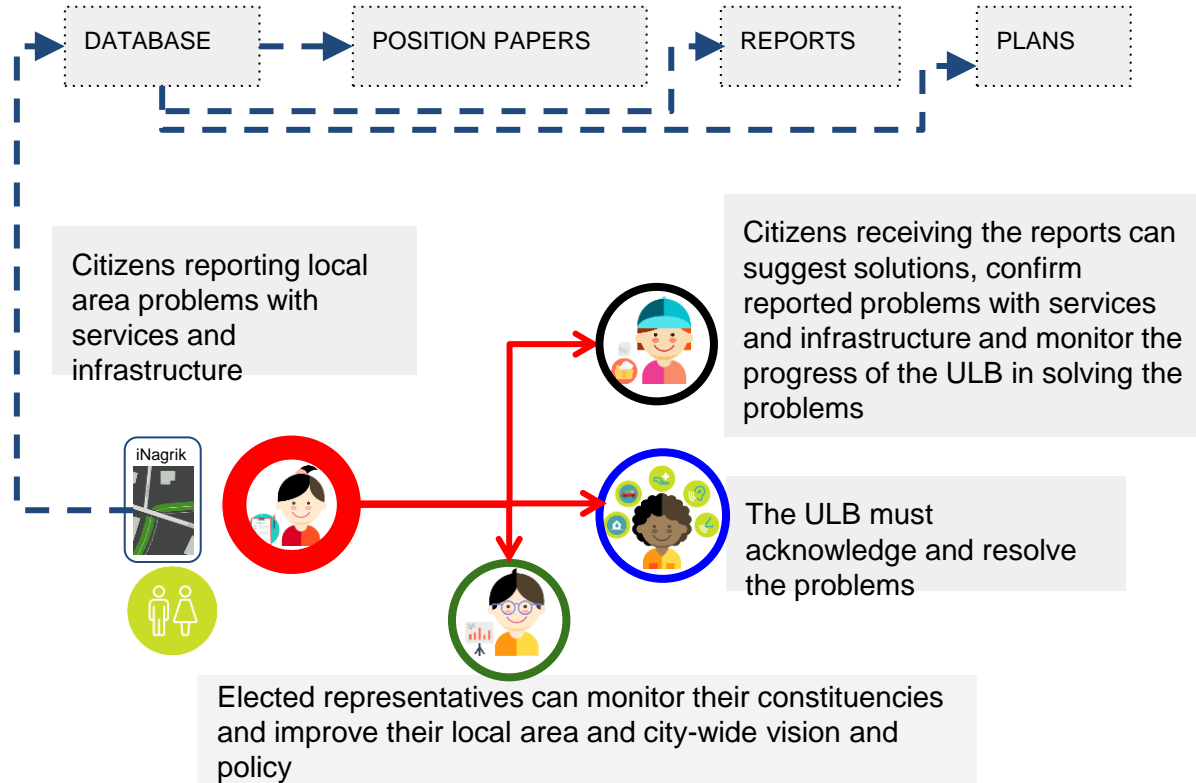
The system enables cooperative action based on evidence collected by the key stakeholder - the citizen.

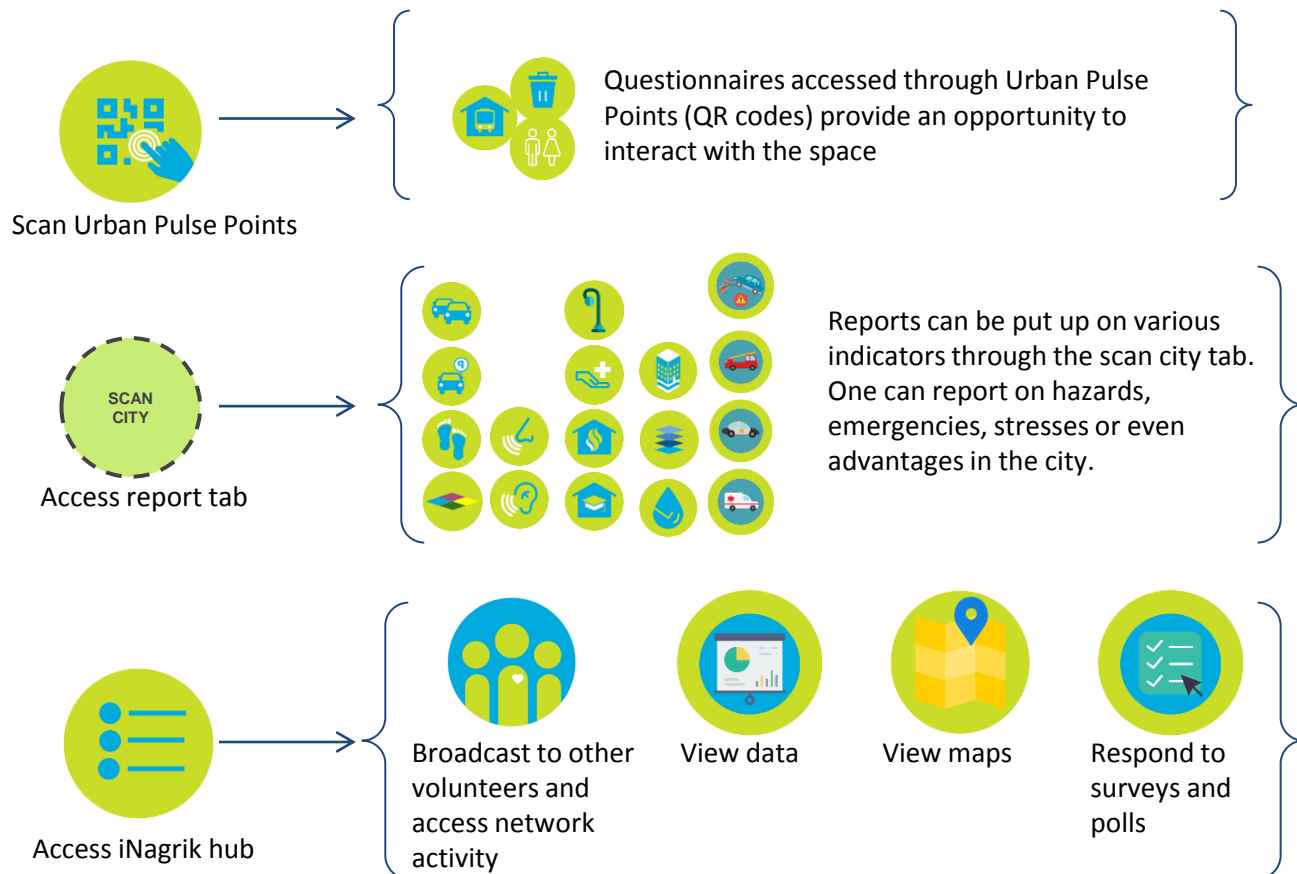
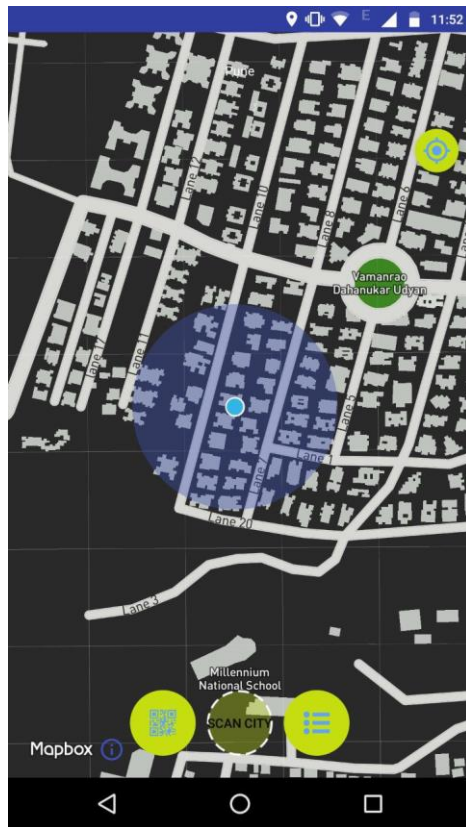
It encourages a culture of evidence based **consensus building** and the **identification of action areas** through citizens' participation.

It facilitates transparent and accountable **governance** as all the interfaces between stakeholders can be monitored.

It enables “**high-resolution**” analysis in time and space ensuring better adaptive capacities in urban planning and management.

It is a **continuous iterative system** in which all stakeholders participate together.





LIVABILITY AS INTEGRATING THE FIRST AND THE SECOND SOCIETIES

If this system is based on enumerated households of all types, legal and illegal, it will indeed be a major achievement in employing the formal system to objectify the informal system, and bring poor and low-income settlements within the ambit of formal governance.

If all slums, urbanized villages, labour camps, over-crowded city centre houses and illegal layouts are brought within the Livability Index purview, this will indeed be a milestone in integrating the first and the second societies of Pune into a cohesive urban management system.

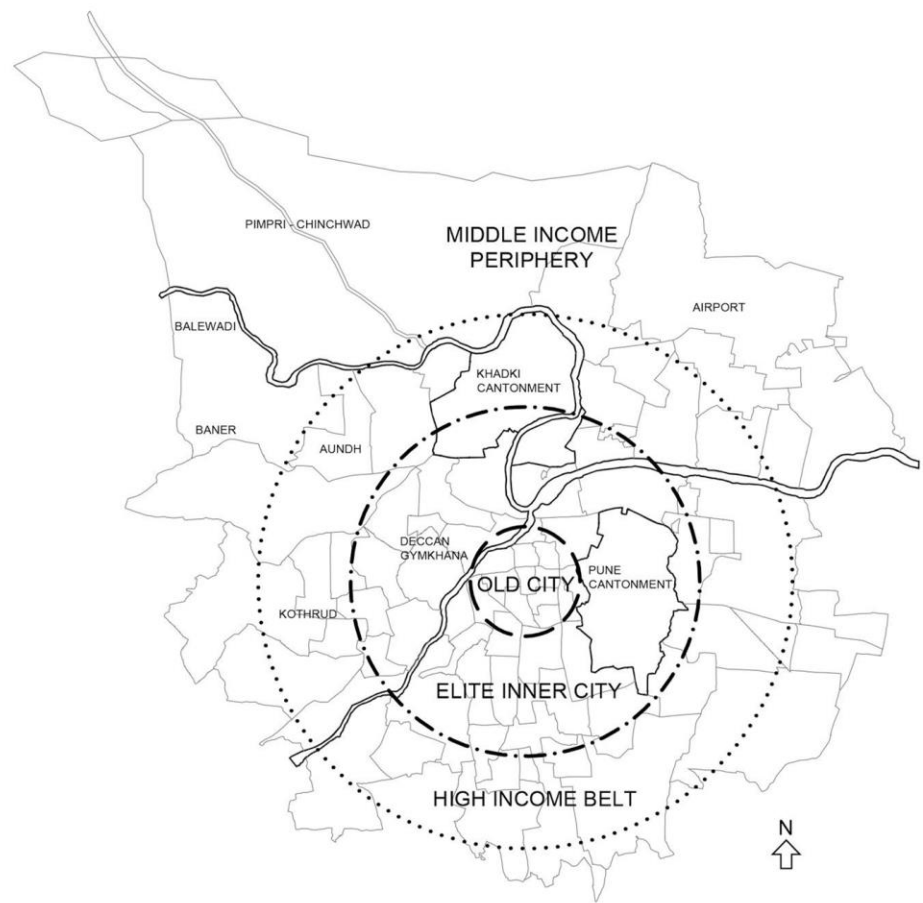
शनिवार वाडा



Balewadi High Street, Pune



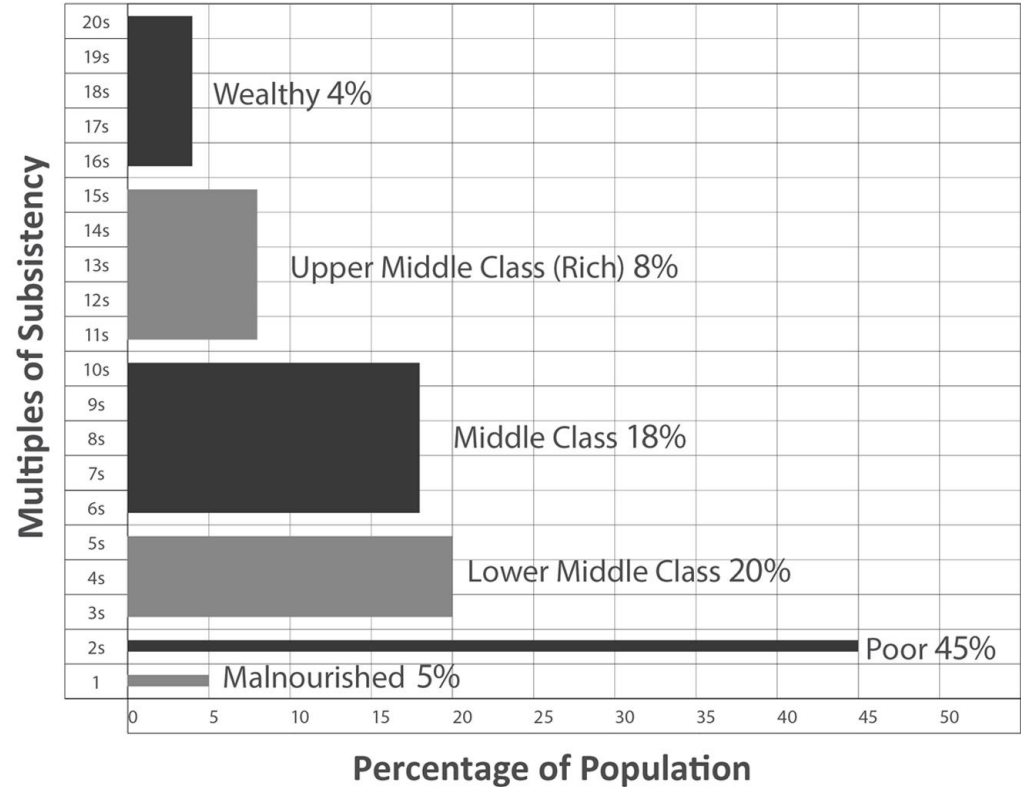
Slum on Parvati Hill, Pune



PUNE METROPOLITAN REGION

Consumption Distribution by Multiples of Subsistency

Subsistency means a level of expenditure where 85% of expendible income is consumed on food and the fuel to cook it.



Percentage of Income Expended on Basic Needs (%).

Food %	Clothes %	Shelter %	Transport %	Health %	Education %	Research %	Saving/ Debt %	Total %	Target Groups
35	10	22	12	7	4	7	3	100	Lower Middle Class
50	12	14	8	5	2	6	3	100	Poor
85	5	3	5	5	1	6	-10	100	Subsistence

SLUM UPGRADATION

- Storm Drainage
- Potable Water
- Foot paths
- Street Lights
- Solid Waste Management
- Women's Bathing and Toilets
- Men's Bathing and Toilets
- Community Hall
- Electricity Connection

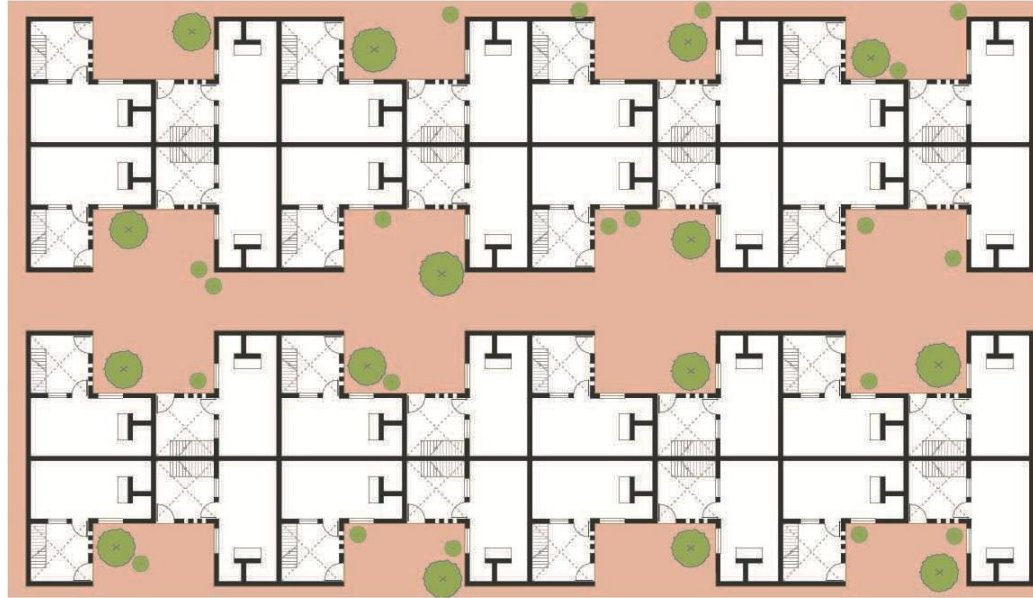
SPECIAL ECONOMIC ZONES (SEZs)

SPECIAL HABITAT ZONES (SHZs)

EWS Shelter Scheme, Jamnagar, 1972



Cluster Plan of EWS Shelter Scheme, Jamnagar, 1972



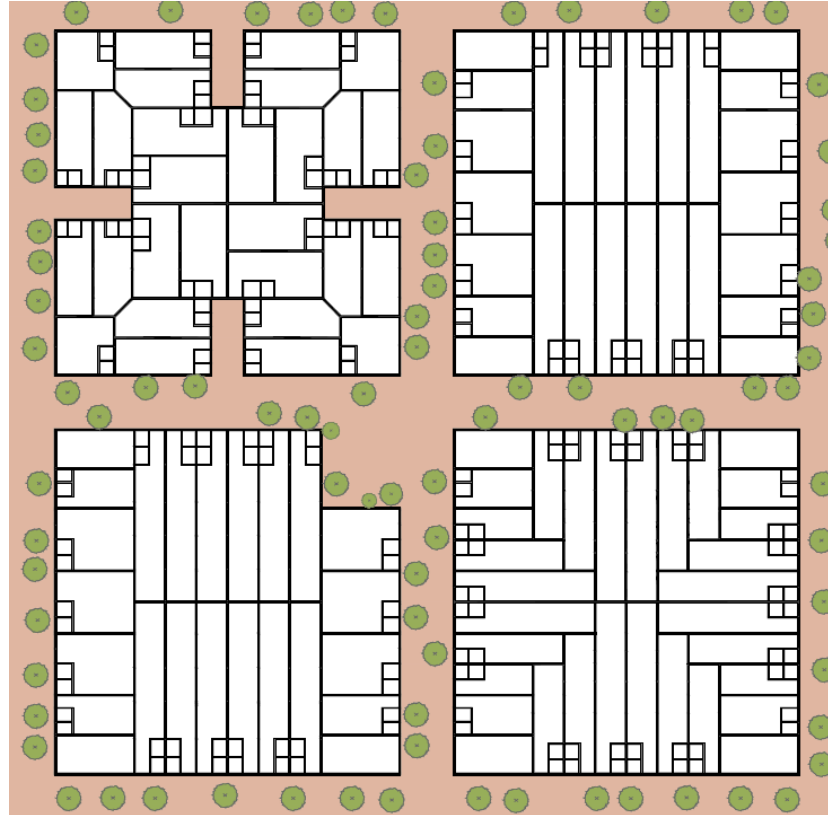
Cluster Plan of Site and Services Scheme, Chennai, 1973 onwards



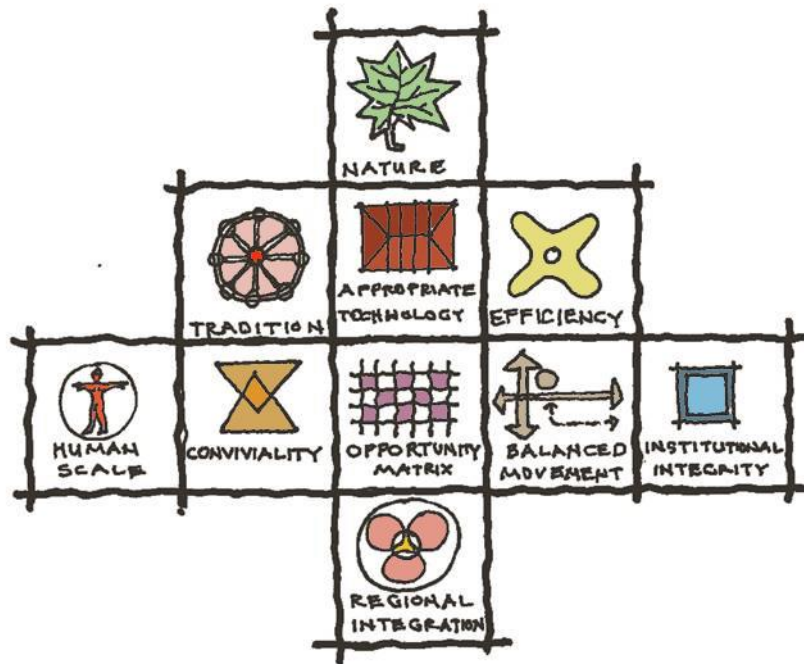
Site and Services Scheme, Chennai, 1973 onwards



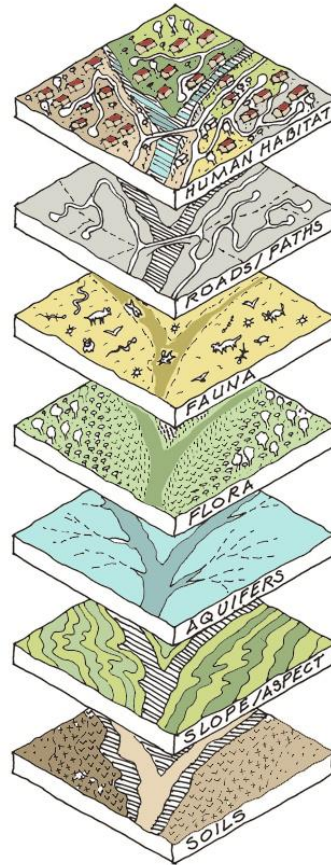
Typical Block Plan of Incremental Housing, Yousufguda, Hyderabad 1976 -1980



THE PRINCIPLES OF INTELLIGENT URBANISM



THE PRINCIPLES OF ECO PLANNING

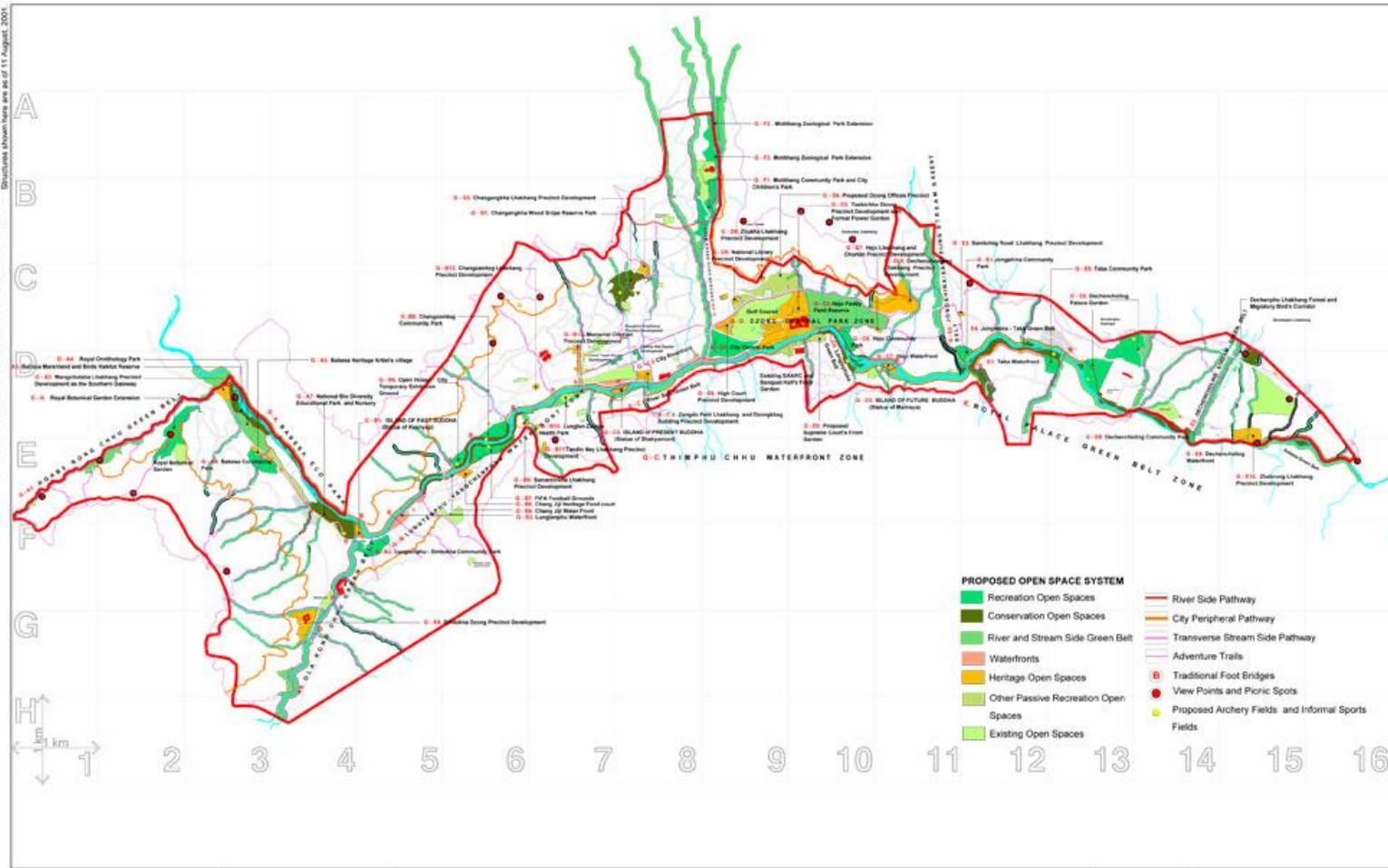


THIMPHU STRUCTURE PLAN, BHUTAN





This is not a measured graphic representation. For detailed dimensions, refer to Thimphu City Corporation total station surveys. Structures shown here are as of 11 August, 2001.



Sources

* Thimphu City Map interpreted from aerial photography 1987.
Urban GIS Unit, DUCAN, MoC, RGOB
* Total Station Surveys of select areas, 2000-2001, Thimphu City Corporation
* Ground Verification, July-August 2001, Christopher Charles Benninger Architects, DUCAN, MoC & Thimphu City Corporation

Legend

City Corporation Boundary
Roads
River, Stream and Waterbody
Neighborhood Node
Urban Hub

PROPOSED OPEN SPACE SYSTEM Thimphu Structure Plan

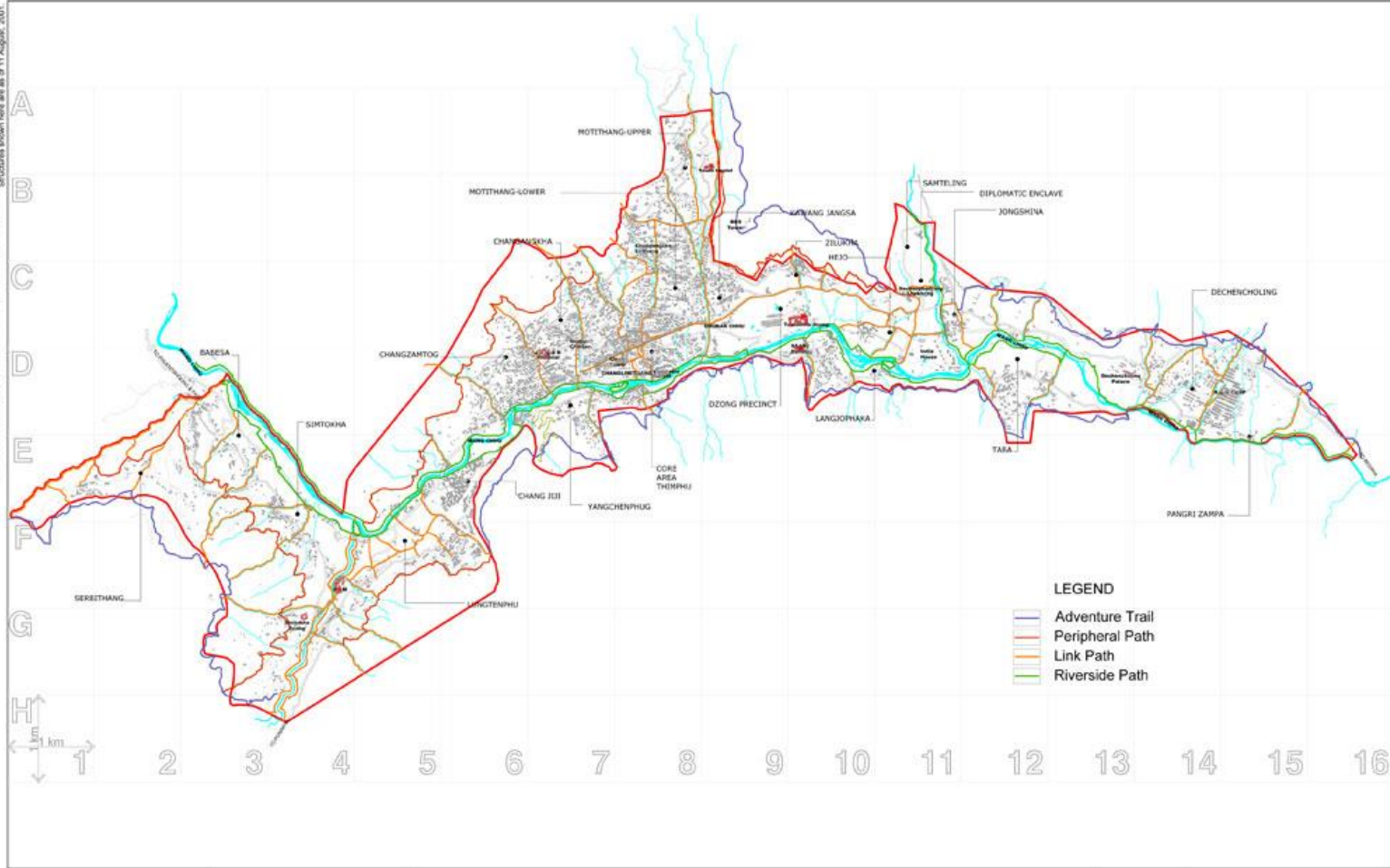
Christopher Charles Benninger Architects
with the Department of Urban Development and Housing, MoC, RGOB and Thimphu Municipal Corporation

Scale: 1:40000



November, 2002

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Sources

* Thimphu City Map, integrated from aerial photography 1997.
 Urban GIS Unit, CCDB, MoC, RGoB
 * Total Station Surveys of select areas, 2000 - 2001, Thimphu City Corporation

* Ground verification, July-August 2001, Christopher Charles Benninger Architects, CCBA, MoC & Thimphu City Corporation

Legend

City Corporation Boundary
 Existing Road
 River, Stream and Waterbody

PROPOSED PATHWAYS SYSTEM Thimphu Structure Plan

Christopher Charles Benninger Architects

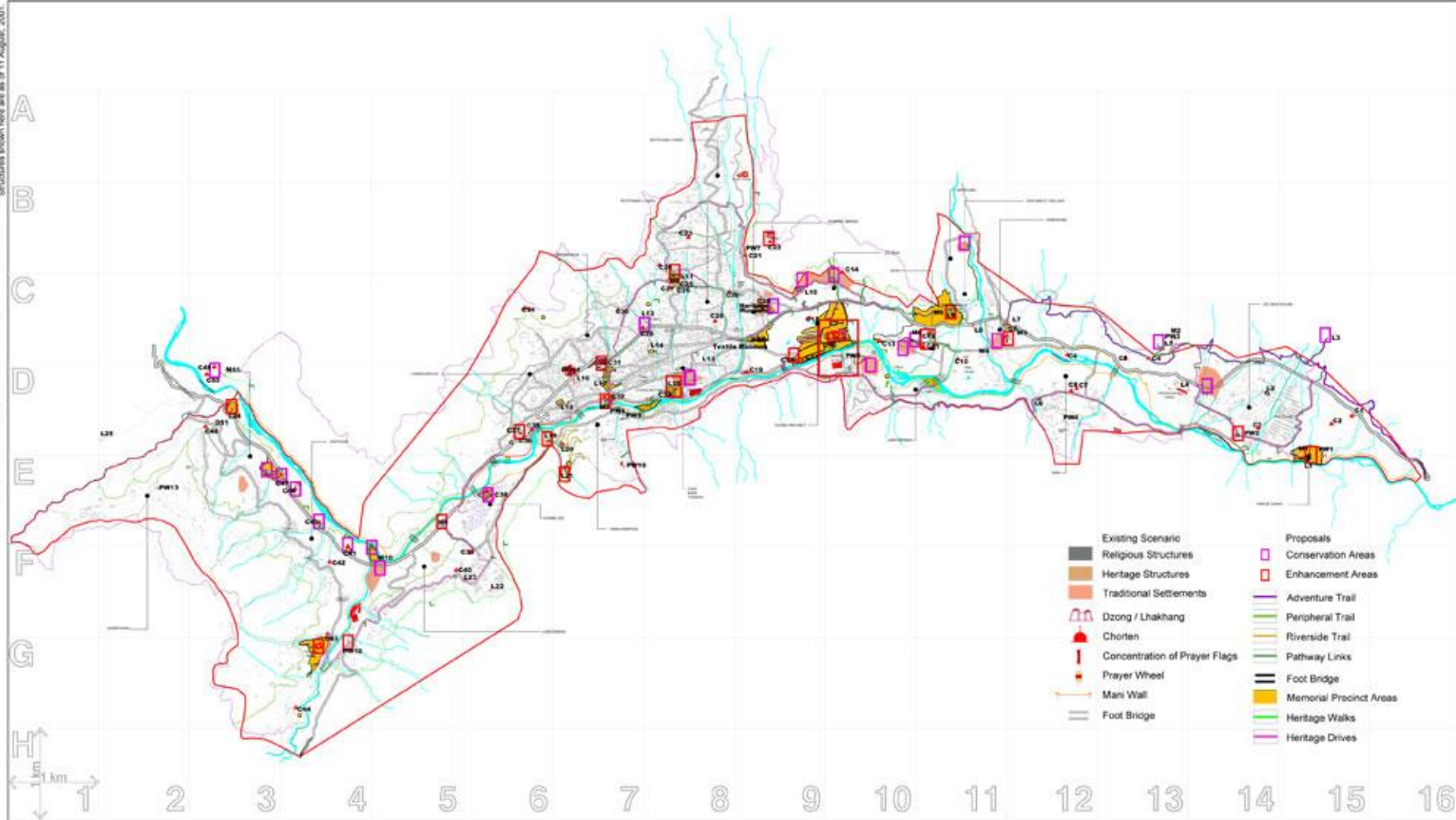
With the Department of Urban Development and Housing, MoC, RGoB and Thimphu Municipal Corporation

Scale: 1:40000



November, 2002

This is not a measured graphic representation. For detailed dimensions, refer to Thimphu City Corporation table station surveys. Structures shown here are as of 11 August 2001.



Note: This map is to be referred along with the Project Details Table 4.9

Sources

* National Commissioner for Cultural Affairs, Thimphu
 ** Ground verification, July-August 2001, Christopher Charles Benninger Architects, DUSMM, MoC & Thimphu City Corporation

Legend

City Corporation Boundary
 Existing Road
 River, Stream and Waterbody

PROPOSED HERITAGE PRECINCTS Thimphu Structure Plan

Christopher Charles Benninger Architects

With the Department of Urban Development and Housing, MoC, RGoB and Thimphu Municipal Corporation

Scale: 1:40000



November, 2002

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Sources

* Thimphu City Map interpreted from aerial photography 1997.
Urban GIS Unit, CUDEH, MoC, RGoB
* Total Station Surveys of select areas, 2000 - 2001, Thimphu City Corporation
* Ground Verification, July-August 2001, Christopher Charles Benninger Architects, CUDEH, MoC & Thimphu City Corporation

Legend

— City Corporation Boundary
— Existing Road (Asphalt)
— Existing Road (Non-asphalt)
— Existing Sewerage Treatment Plant
— River, Stream and Waterbody

PROPOSED PRECINCTS PLAN Thimphu Structure Plan

Christopher Charles Benninger Architects

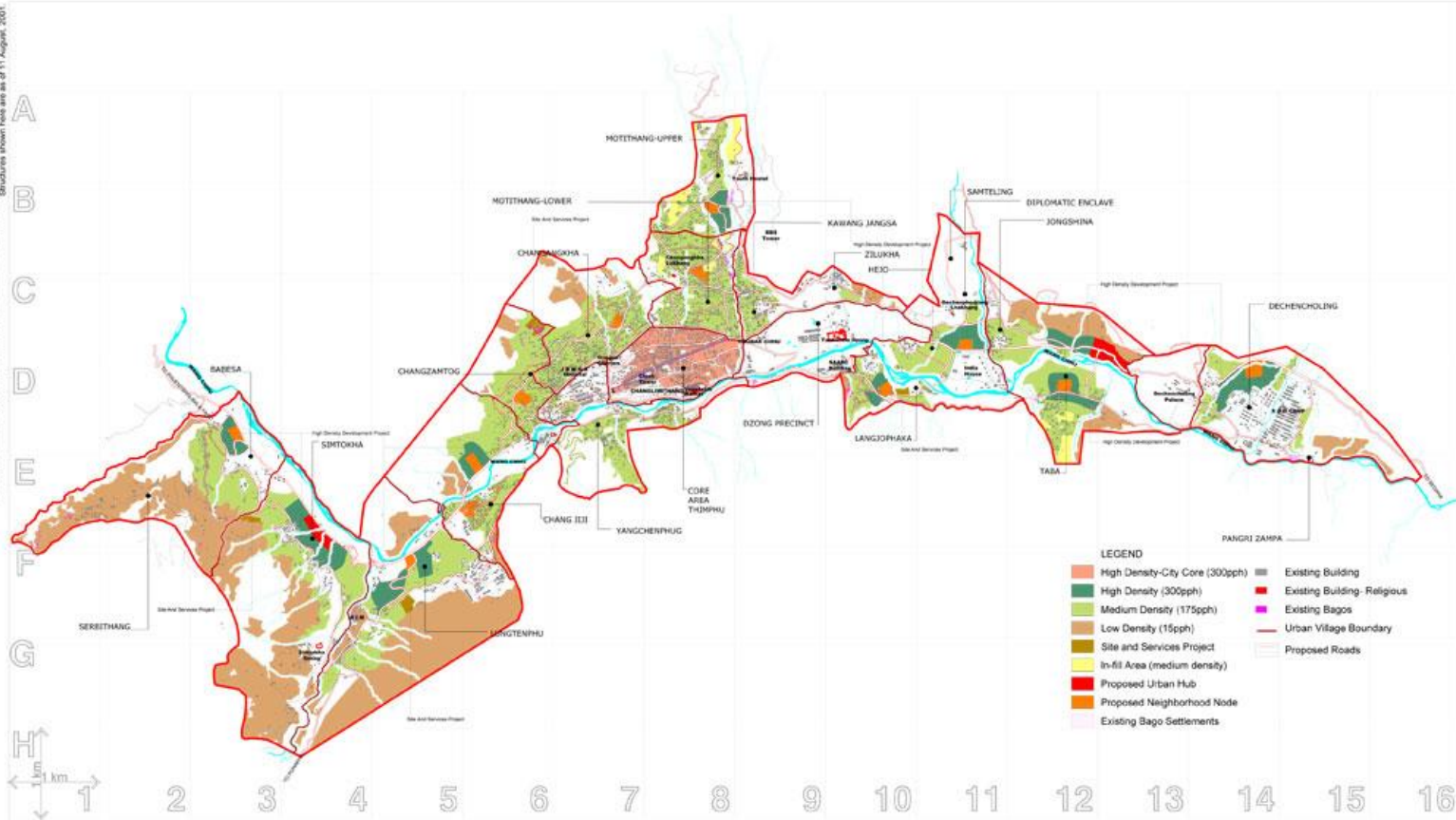
with the Department of Urban Development and Housing, MoC, RGoB and Thimphu Municipal Corporation

Scale: 1:40000



November, 2002

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Sources

* Thimphu City Map interpreted from aerial photography 1987.
 Urban GIS Unit, CUDEMT, MoC, RGoB
 * Total Station Surveys of select areas, 2000 - 2001, Thimphu City Corporation
 * Ground Verification, July-August 2001, Christopher Charles Benninger Architects, CCBA, MoC & Thimphu City Corporation

Legend

City Corporation Boundary
 Existing Road (Asphalt)
 Existing Road (Non-asphalt)
 River, Stream and Waterbody

PROPOSED SHELTER DENSITIES Thimphu Structure Plan

Christopher Charles Benninger Architects

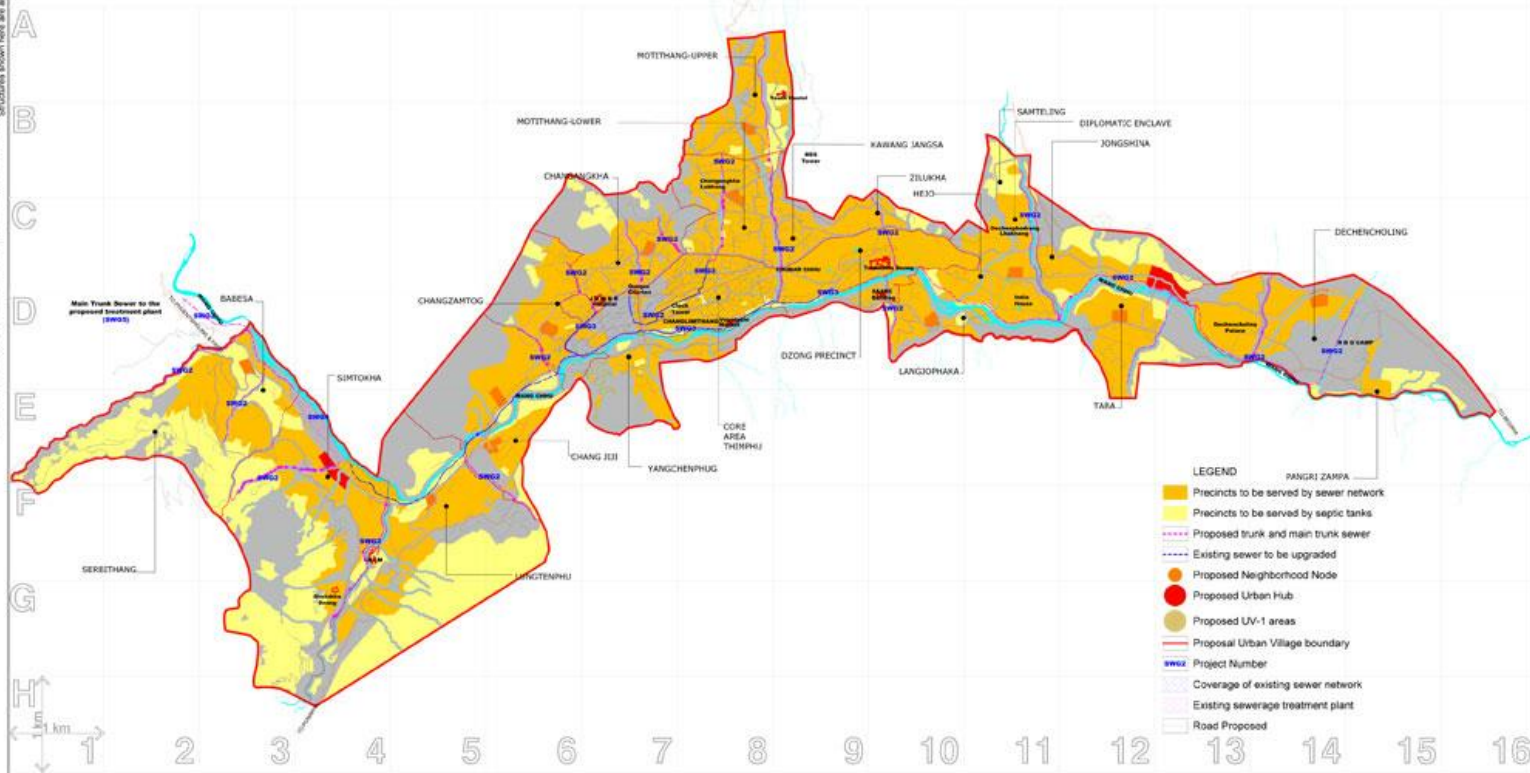
with the Department of Urban Development and Housing, MoC, RGoB and Thimphu Municipal Corporation

Scale: 1:40000



November, 2002

This is not a measured graphic representation. For detailed dimensions, refer to Thimphu City Corporation table station surveys. Structures shown here are as of 11 August 2021.



Note: This map is to be referred along with the Project Details Table 5.20

Sources

* Thimphu City Map integrated from aerial photography 1987.
 Urban GIS Unit, CCDB, MoC, RGoB
 * Sewerage Network Plan, Thimphu City Corporation
 * Ground verification, July-August 2021, Christopher Charles Benninger Architects, CCDB, MoC & Thimphu City Corporation

Legend

City Corporation Boundary
 River, Stream and Waterbody

PROPOSED SEWERAGE MANAGEMENT SYSTEM Thimphu Structure Plan

Christopher Charles Benninger Architects

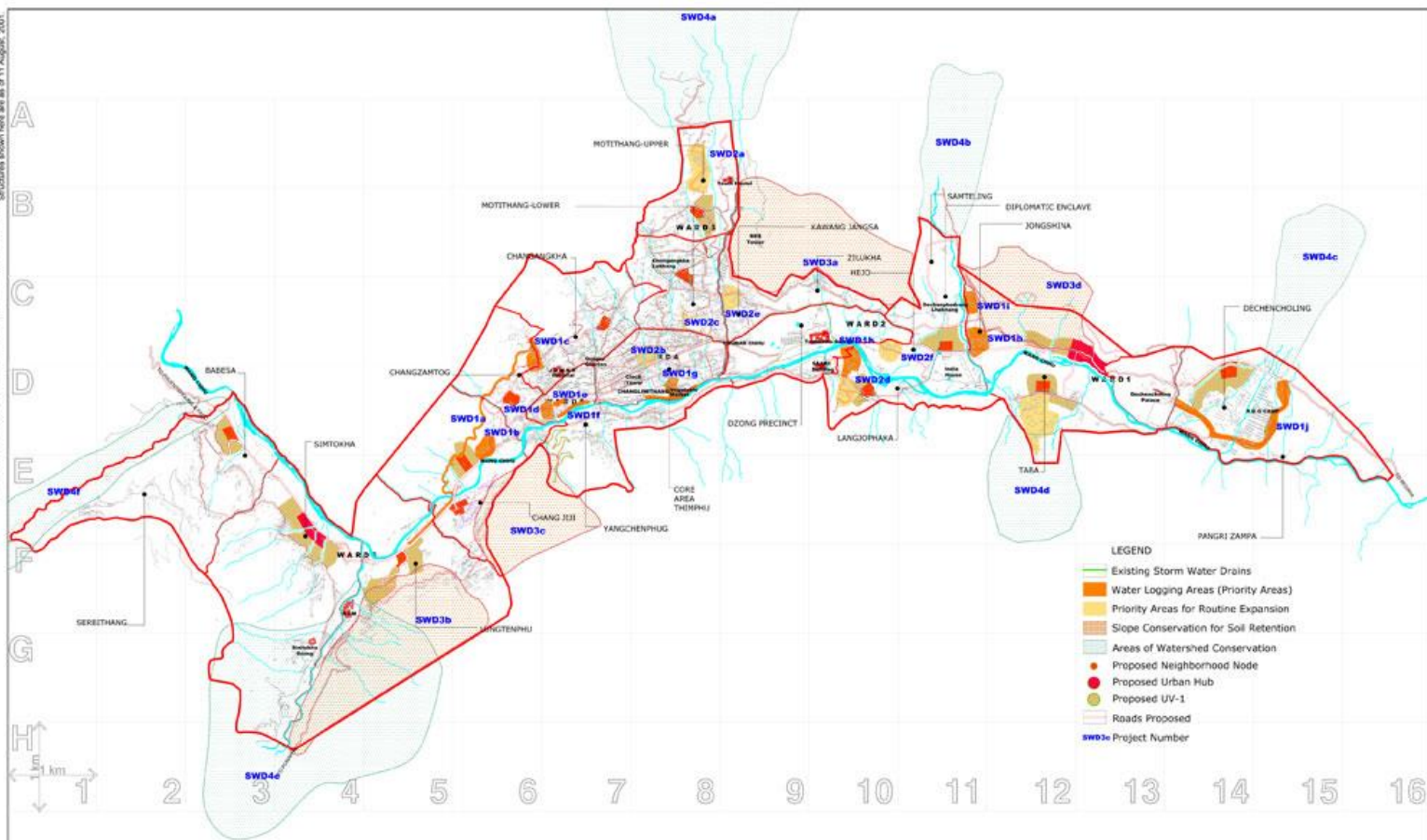
With the Department of Urban Development and Housing, MoC, RGoB and Thimphu Municipal Corporation

Scale: 1:40000



November, 2022

This is not a measured graphic representation. For detailed dimensions, refer to Thimphu City Corporation's station survey. Structures shown here are as of 11 August 2001.



Note: This map is to be referred along with the Project Details Table 5.21

Sources

* Thimphu City Map integrated from aerial photography 1987.
Urban - GIS Unit (2015) & MUC (2015)
* Total Station Surveys of select areas, 2000 - 2001, Thimphu City Corporation
* Ground verification, July-August 2001, Christopher Charles Benninger Architects, CCBA, MUC & Thimphu City Corporation

Legend

City Corporation Boundary
Proposed Urban Village Boundary
Existing Road (Asphalt)
Existing Road (Non-asphalt)
River, Stream and Waterbody

PROPOSED STORMWATER AND WATERSHED MANAGEMENT SYSTEM

Thimphu Structure Plan

Christopher Charles Benninger Architects

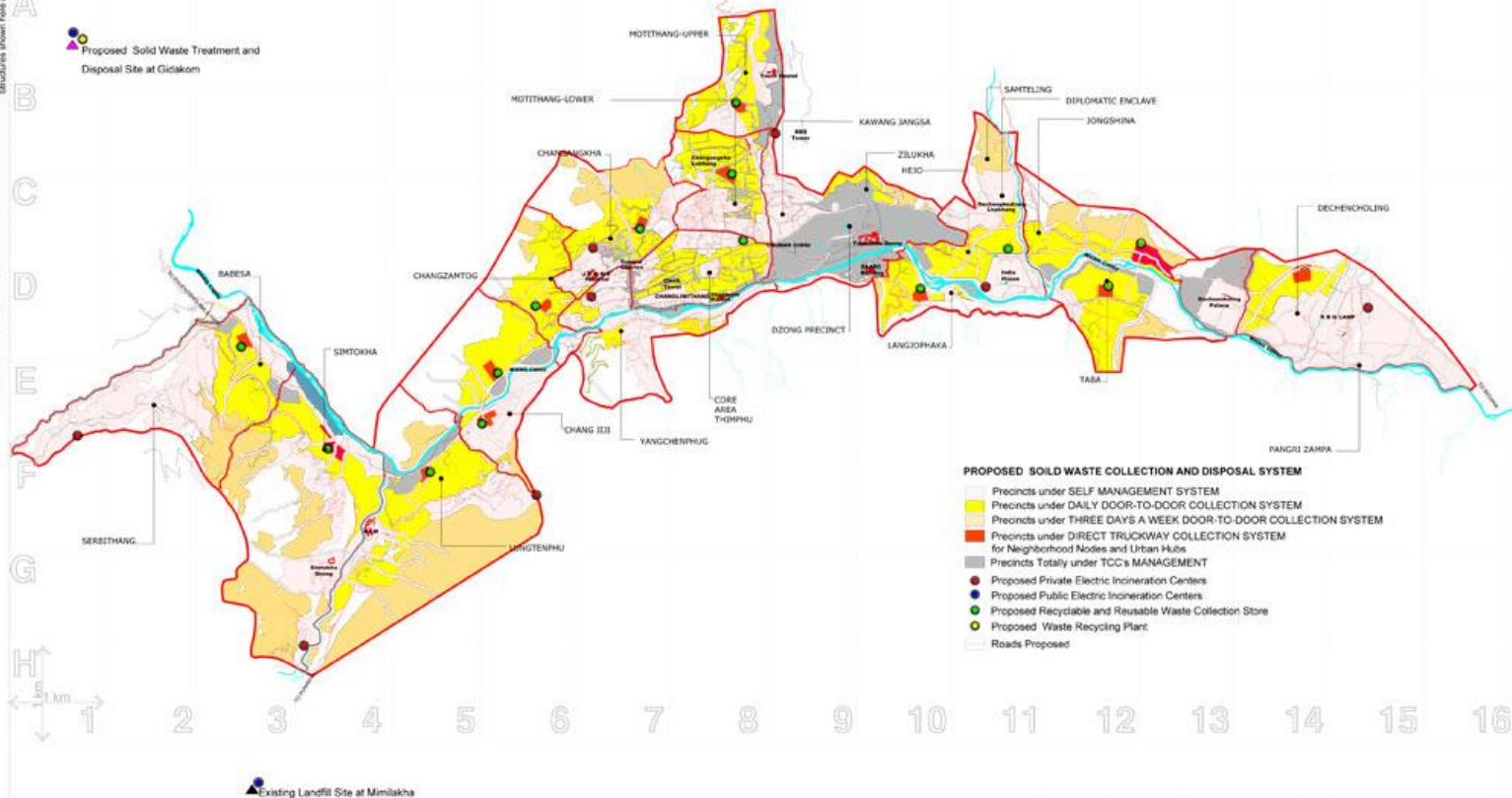
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November, 2002

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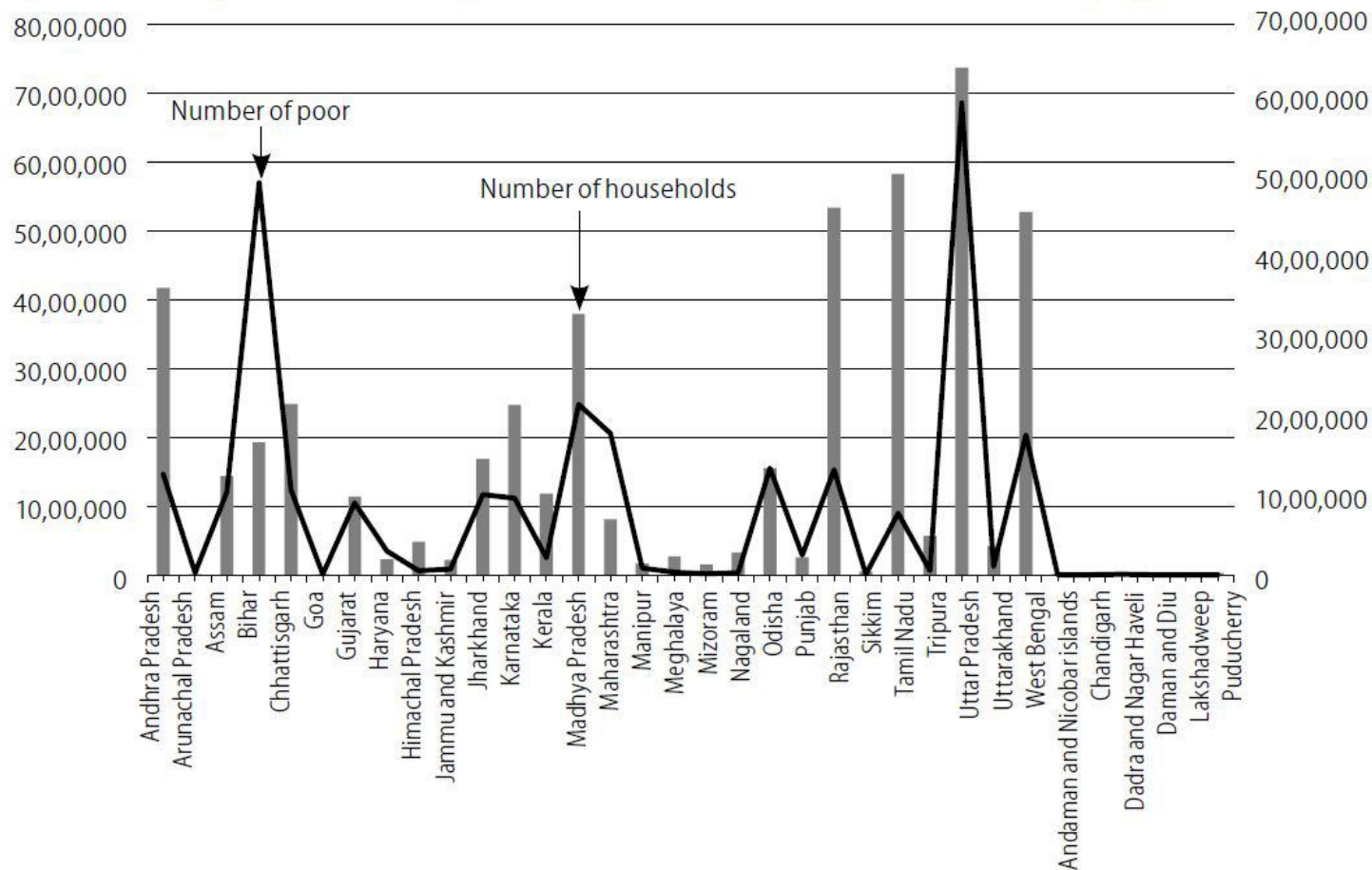
Note: This map is to be referred along with the Project Details Table 5.22

GREEN PEOPLE

MGNREGA

(MAHATMA GANDHI NATIONAL RURAL EMPLOYMENT GUARANTEE
ACT)

Poverty Levels and Average Annual Number of Households Provided Employment in States



Source: Report No-6 of 2013—Union Government (Ministry of Rural Development).

WATERSHED MANAGEMENT

WATERSHED MANAGEMENT

- Micro level Watershed Management
- Theoretical Model: Whatever rain falls within a watershed stays within the watershed
- Equitable distribution of water with watershed households
- Self consumption cultivation versus cash crops
- Rebuilding local ecologies (water, land, flora, fauna and air)

NO TUBE WELL

AFFORESTATION

CONTOUR BUNDING

NALA BUNDING

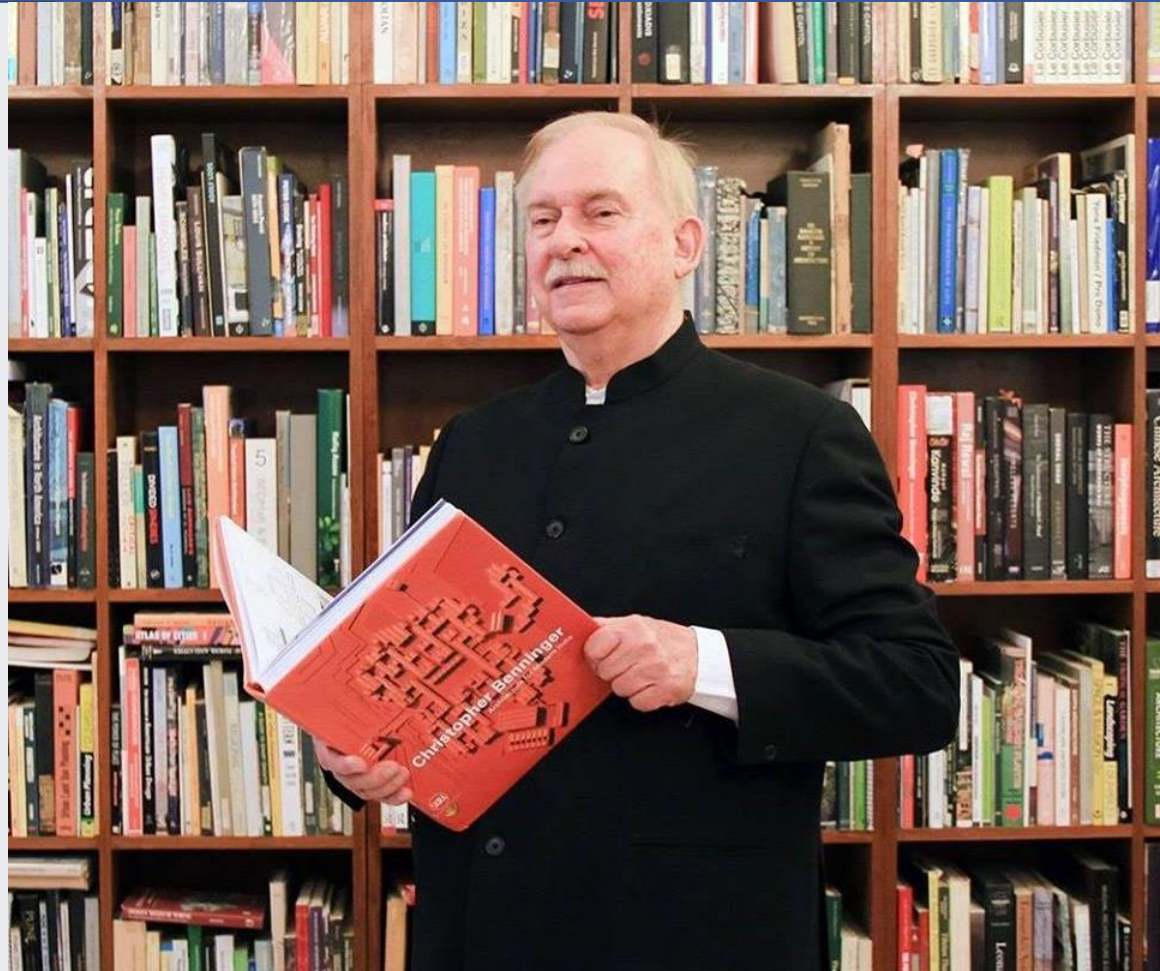
PERCOLATION TANKS

LIFT IRRIGATION

PANI PANCHAYAT



Christopher Charles
Benninger
[@christopher.benninger.3](#)





www.ccba.in

**THANK
YOU**