



INFRASTRUCTURE PLANNING STUDIO (2018)- SEMESTER IV

PORTFOLIO
GAUTAMEE BAVISKAR | 16BPL008



BACKGROUND STUDY OF पुणे

HOUSING

Key Findings:

Migration led to an increase in demand for housing for all sections of society. Lack of affordable housing for the lower income has led to the growth of slums.

Total no. of census house- 7,33,990

82% census houses are occupied.

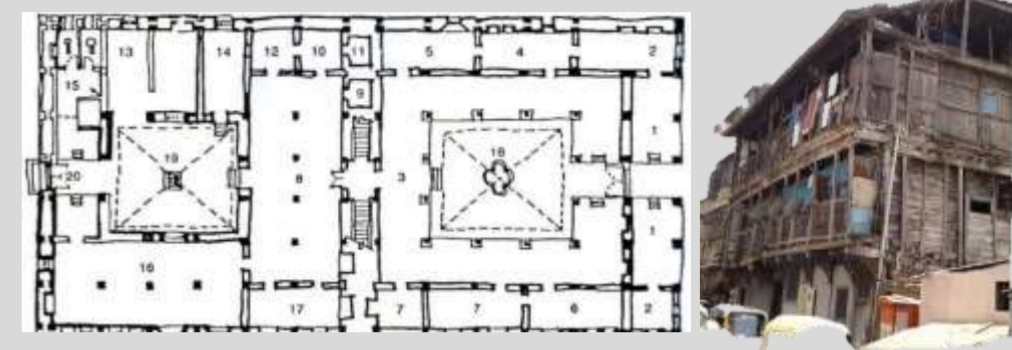
Majority of the houses are in good condition.

4 is maximum household size.

Majority of the houses are owned.

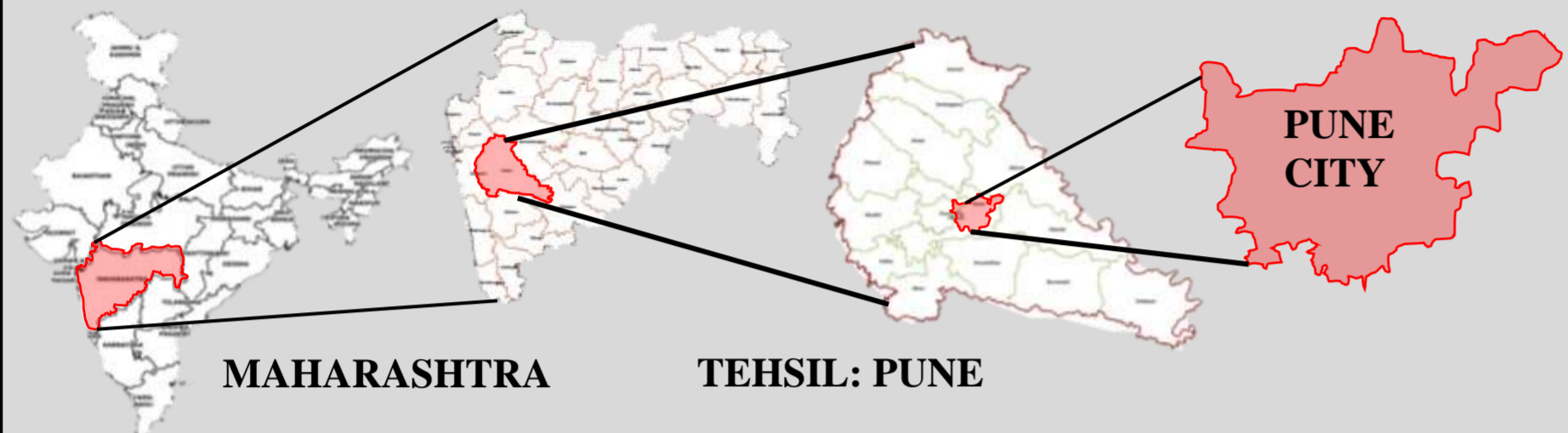
According to the dwelling rooms data majority can afford one room dwelling unit.

Data source: CDP OF PUNE city -2041 under JNNURM, Development control promotion regulations for PMC 2017, H-SERIES Census TABLE 2011

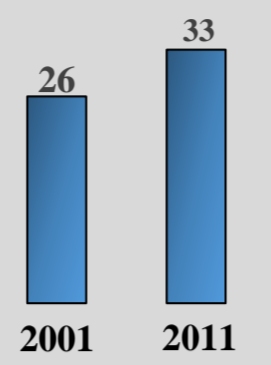


Introduction

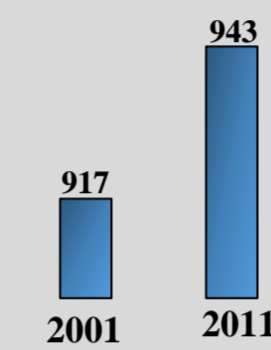
Pune is the 9th most populous city (33 lacs) of India, and has 2nd largest area (457 sq.km) after Mumbai. It has 144 wards and 14 zones. It is the cultural centre of Maharashtra. It is one of the Best governed city. It is also selected among 100 resilient cities in the world by US based Rockefeller foundation.



POPULATION(In lacs)



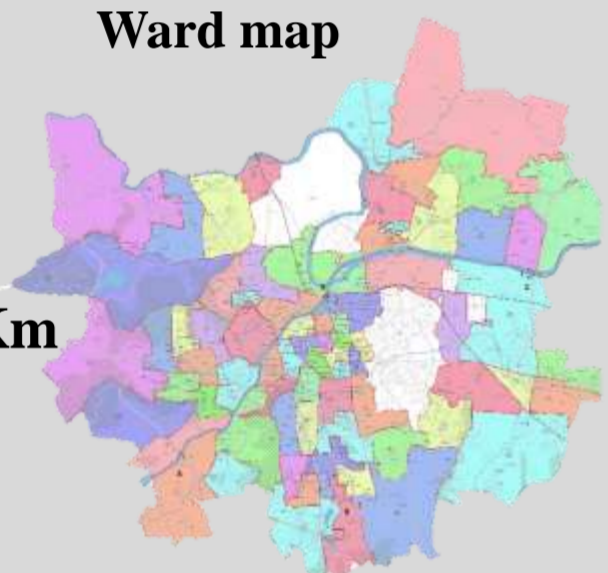
SEX RATIO



For background study of pune, I was assign to study related Landuse, housing scenario in pune and Electricity :

LANDUSE

Present scenario:
PMRDA area-7256.46 sq. Km
Old pune limits-143 sq.Km
PMC area-243.83 sq. Km
PCMC-177.3 sq. Km

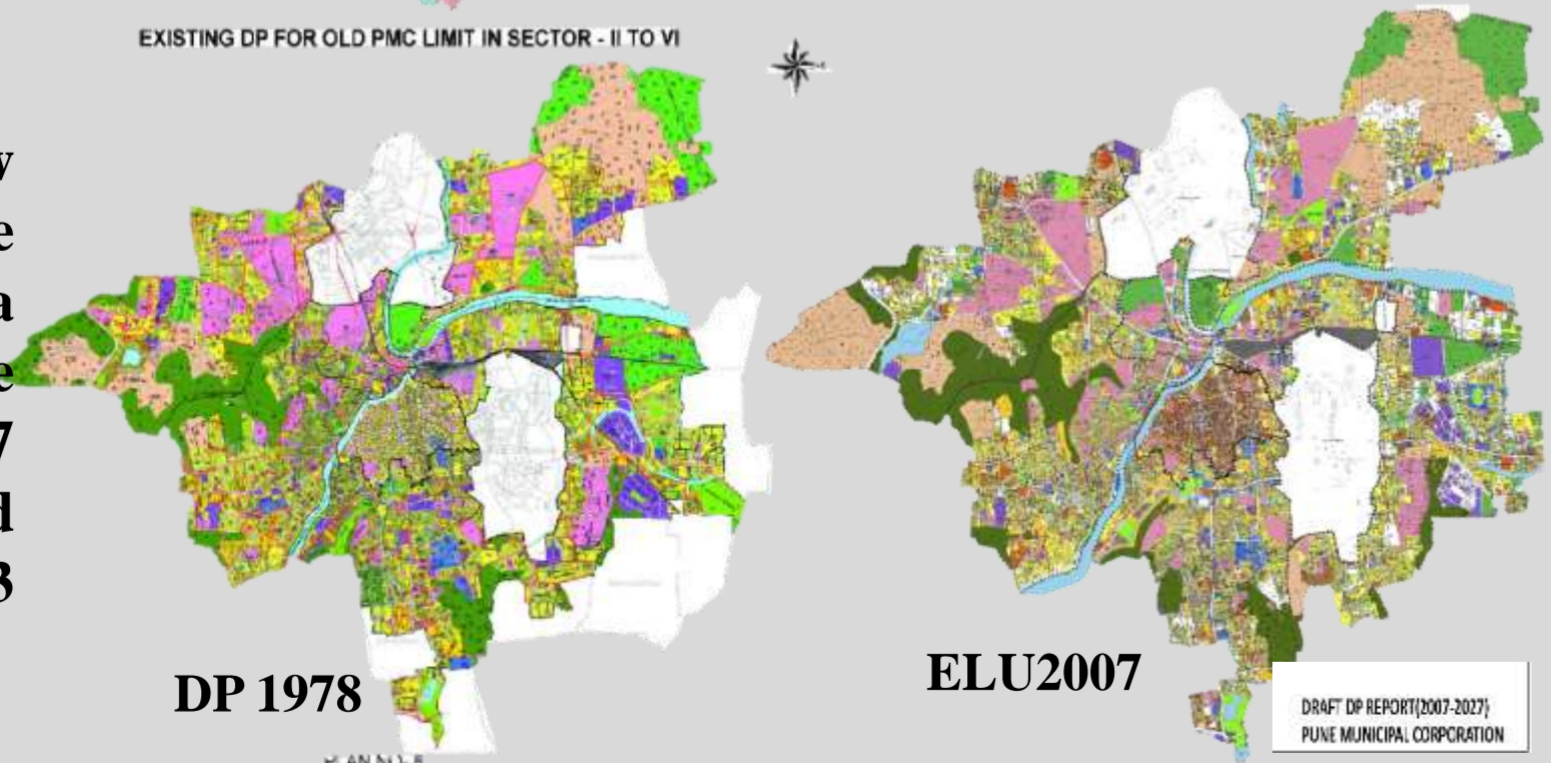


CONNECTIVITY AND LINKAGES:



Key findings:

It is observed that few activities which were not permissible in a Land Use Zone according to the 1987 DCR are being allowed according to the 2013 DDCR.



Documents referred:

- COMPARATIVE ANALYSIS OF DEVELOPMENT PLANS, PUNE Sanctioned DP-1987, Existing Land Use –2007Proposed Land Use (2007-2027) by Centre for Development Studies and Activities, Pune
- MASHAL and PMC

ELECTRICITY

Key findings:

Electricity is supplied by Maharashtra state Electricity Distribution Co. Ltd. (MSEDCL), a public sector undertaking by the state government.

MW: 886 and Peak MV: 1,173

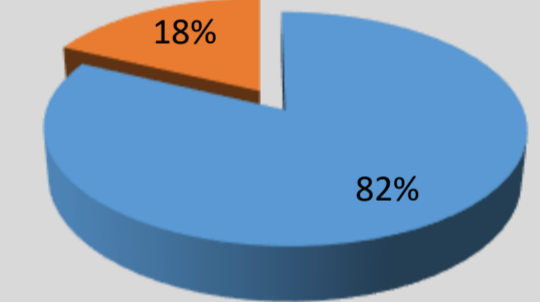
Alternative source of energy:
Pune is the second-largest market in terms of solar manufacturers and users in the country.

Data source:
POSOCO: Power maps regional and states (national load despatch centre-2013). MSEDCL



Housing distribution by occupancy

- Total number of occupied census houses
- Total number of vacant census houses



INTRODUCTION: Pune is the 9th most populous city (33 lacs) of India, and has 2nd largest area (457 sq.km) after Mumbai. It has 144 wards and 14 zones. It is the cultural centre of Maharashtra. Marathi is widely spoken language. It is also selected among 100 resilient cities in the world by US based Rockefeller foundation. It is one of the Best governed city.

DEMOGRAPHY: 33 Lacs, Area (PMRDA-PCB) 457 sq.km, Density (pp/sq.km) 7230

EVOLUTION: 1820-1890, 1890-1950, 1950-1980, 1980-2001

CLIMATE: Hot semi-arid climate bordering with tropical wet and dry. Pune comes under transitional zone 1. Warmest month is May. The nights are cool in the rest of the year.

TOPOGRAPHY: Pune city is surrounded by hills on the east and the south. 50 kms from the Sahyadri or the Western Ghats. The southern boundary of the urban area is along the Sinhagad-Katraj-Dive ghat range

HOUSING: Due to migration there is an increase in demand for housing for all sections of society. Lack of affordable housing for the lower income has led to the growth of slums all over the city.

INFRASTRUCTURE: ROADS: The roads passing through old city are mostly congested. Outer roads are considerably better for free flow of traffic (BRTS included), being recently constructed with inclusion of cycle tracks and pedestrian crossings.

WATER SUPPLY: Avg. per capita water supply- 184 LPCD. Total 9 Waste Treatment Plants with the combining capacity of 1,263 MLD. House service connection or Tap connection - 94%

ELECTRICITY: Provider Maharashtra State Electricity Distribution Co. Ltd. Average MW: 886 and Peak MV: 1,173

SEWERAGE AND SANITATION: 744 MLD sewage is generated. Currently there are 9 STP: and 6 IPS. Treated water is discharge in Mada-Mada river. 297 Public toilet blocks and 98 Urinals within the city limits of which, 74% are maintained by PMC.

SOLID WASTE MANAGEMENT: Total waste generated: 1,500 to 1,600 tons per day (450 to 500 gm per capita). Collection is done by 148 trucks: from households and hotels(hotel waste). PMC works in collaboration with a private organization Adar Poonawala to collect this waste.

SITE ANALYSIS AND CASE STUDY OF BHUBANESHWAR

LOCATION

An area of around 39 square kms around Waked, towards the South of Hinjewadi and to the North of Aundh

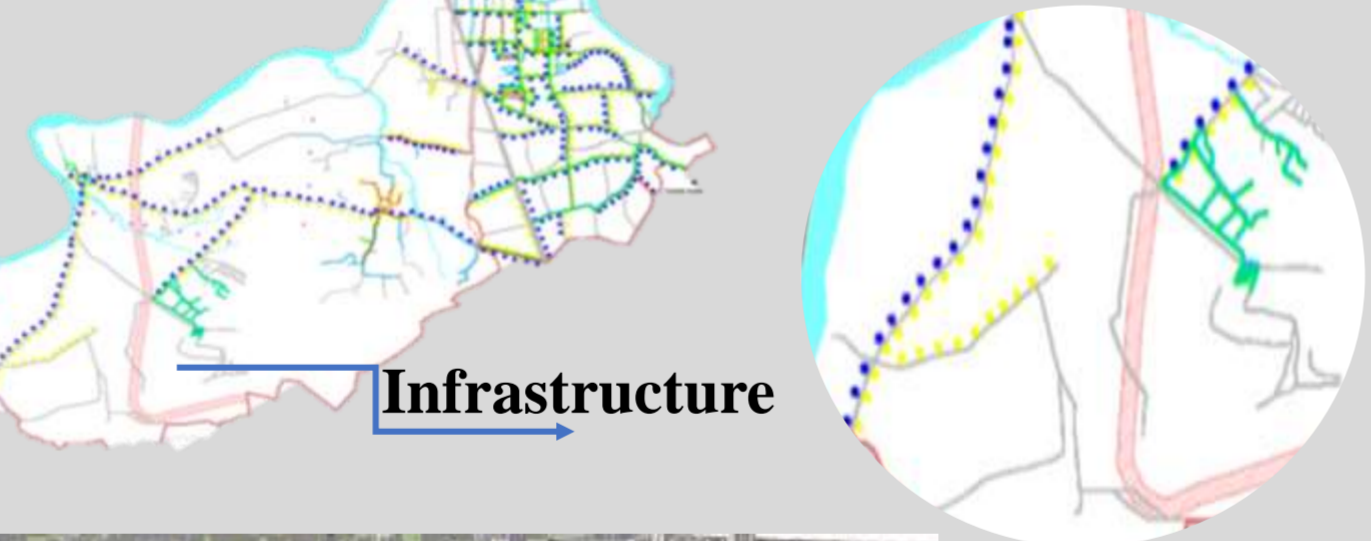
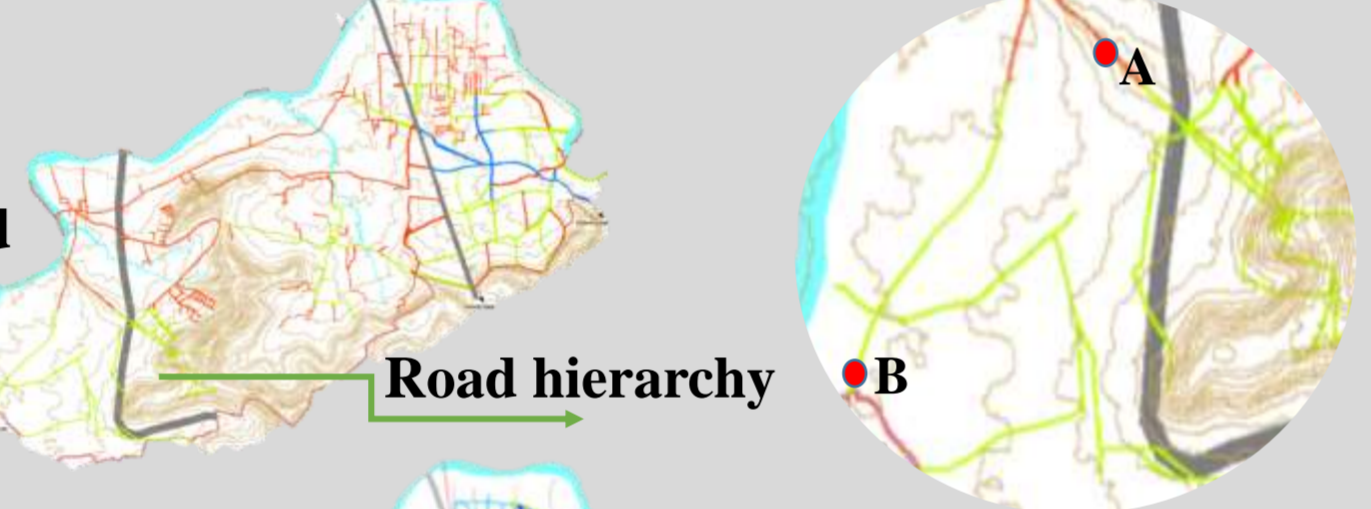
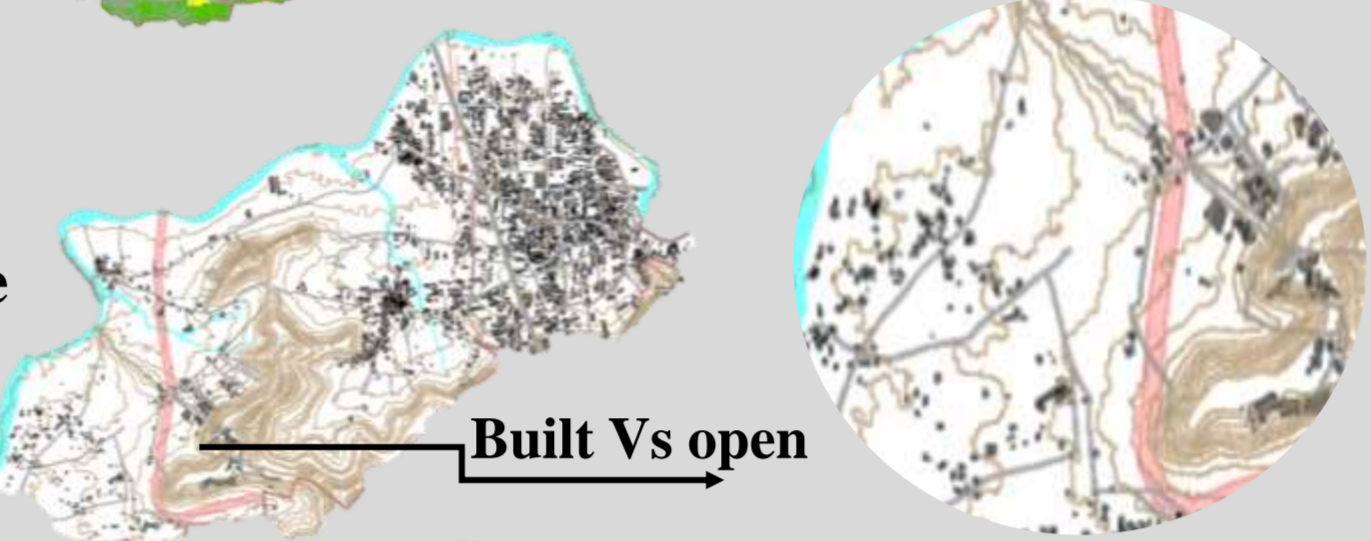
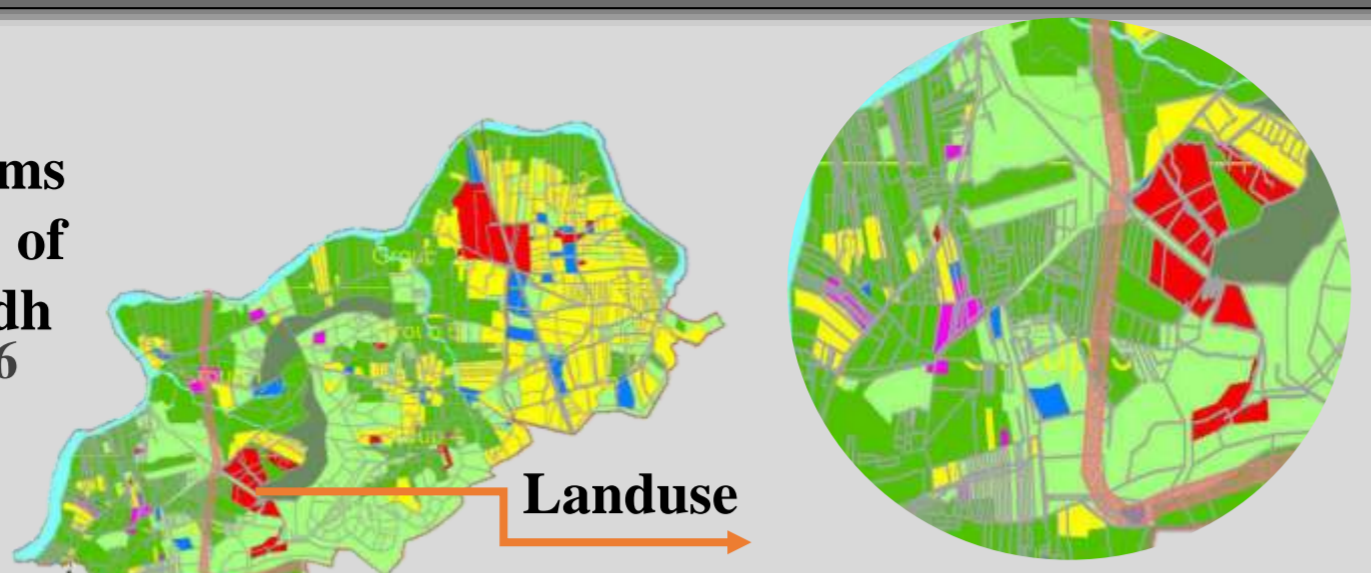


Primary data collected from site visit:

- Landuse survey
- Infrastructure mapping
- House hold survey
- Focus group discussion
- Traffic survey: Origin-destination survey and classified vehicle count
- Conducted 8 household survey and O-D survey
- Conducted 7 FGD: 2-youth, 1-men, 2-women, 2-old age

Key findings:

- No streetlights and narrow roads
- No closed drains
- No proper sewerage network and use of septic tanks
- Improper PMT service
- No BUS Connectivity
- lack of public toilets
- Improper solid waste management



Traffic survey:

TIME	VEHICLE CATEGORIES										TOTAL
	TRUCK	BUS	CYCLE	AUTO	RICK	TAXI	MOTORBIKE	PRIVATE CAR	PUBLIC BUS	SCOUTER	
08:00-09:00	0	0	10	5	0	0	15	0	0	0	30
09:00-10:00	0	0	15	10	0	0	25	0	0	0	50
10:00-11:00	0	0	20	15	0	0	35	0	0	0	70
11:00-12:00	0	0	25	20	0	0	45	0	0	0	90
12:00-13:00	0	0	30	25	0	0	55	0	0	0	110
13:00-14:00	0	0	35	30	0	0	65	0	0	0	130
14:00-15:00	0	0	40	35	0	0	75	0	0	0	150
15:00-16:00	0	0	45	40	0	0	85	0	0	0	170
16:00-17:00	0	0	50	45	0	0	95	0	0	0	190
17:00-18:00	0	0	55	50	0	0	105	0	0	0	210
18:00-19:00	0	0	60	55	0	0	115	0	0	0	230
19:00-20:00	0	0	65	60	0	0	125	0	0	0	250
20:00-21:00	0	0	70	65	0	0	135	0	0	0	270
21:00-22:00	0	0	75	70	0	0	145	0	0	0	290
22:00-23:00	0	0	80	75	0	0	155	0	0	0	310
23:00-24:00	0	0	85	80	0	0	165	0	0	0	330
TOTAL	0	0	1330	1070	0	0	2400	0	0	0	4800



CASE STUDY OF TAMANDO ,BHUBANESHWAR

Aim: to actively manage changes within BDPA limit to deliver a better quality of life and environment.

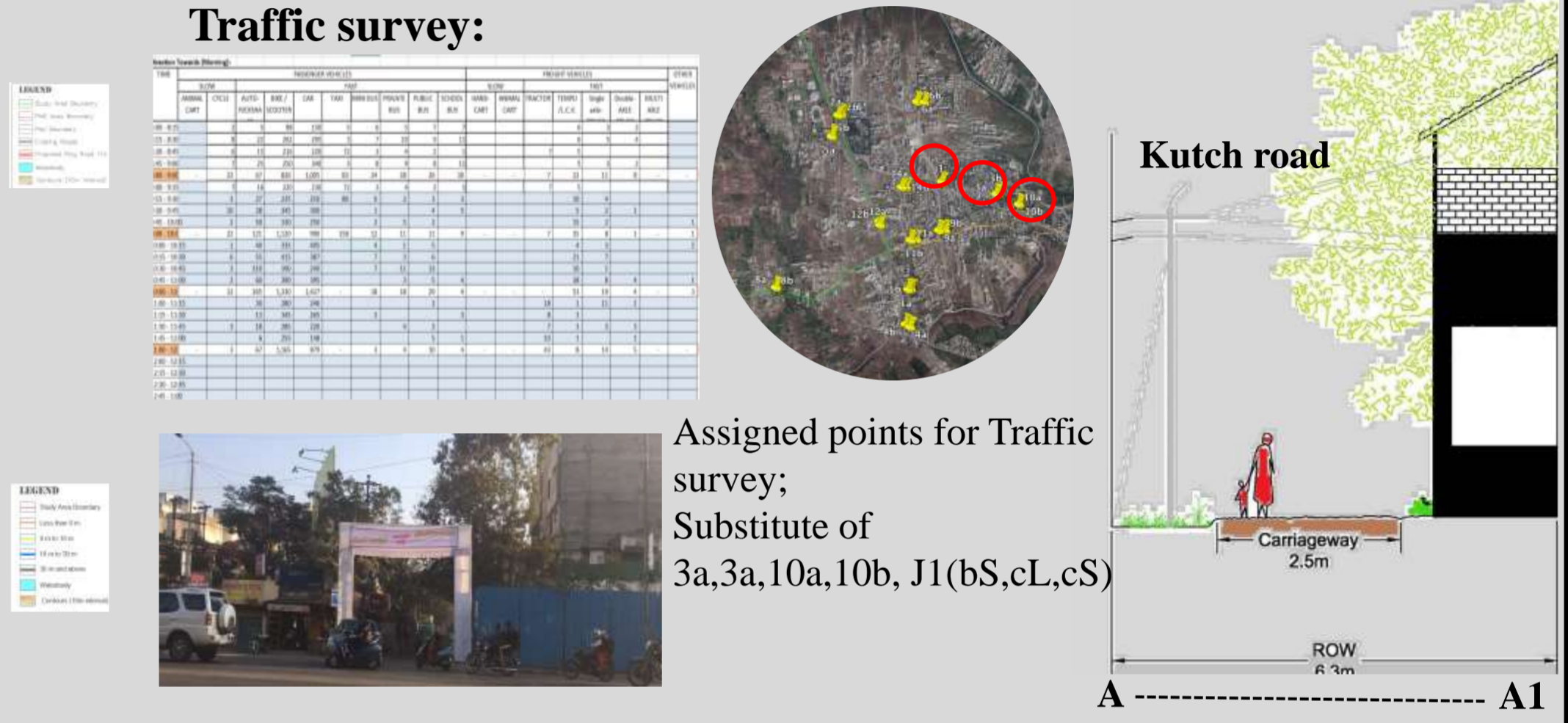
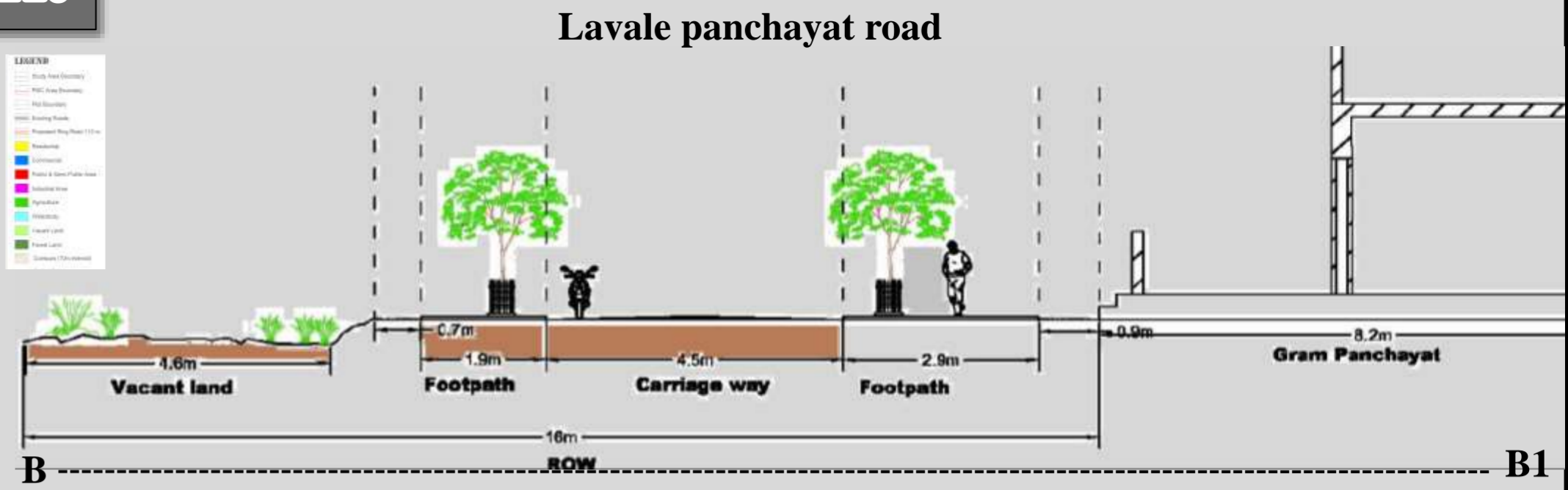
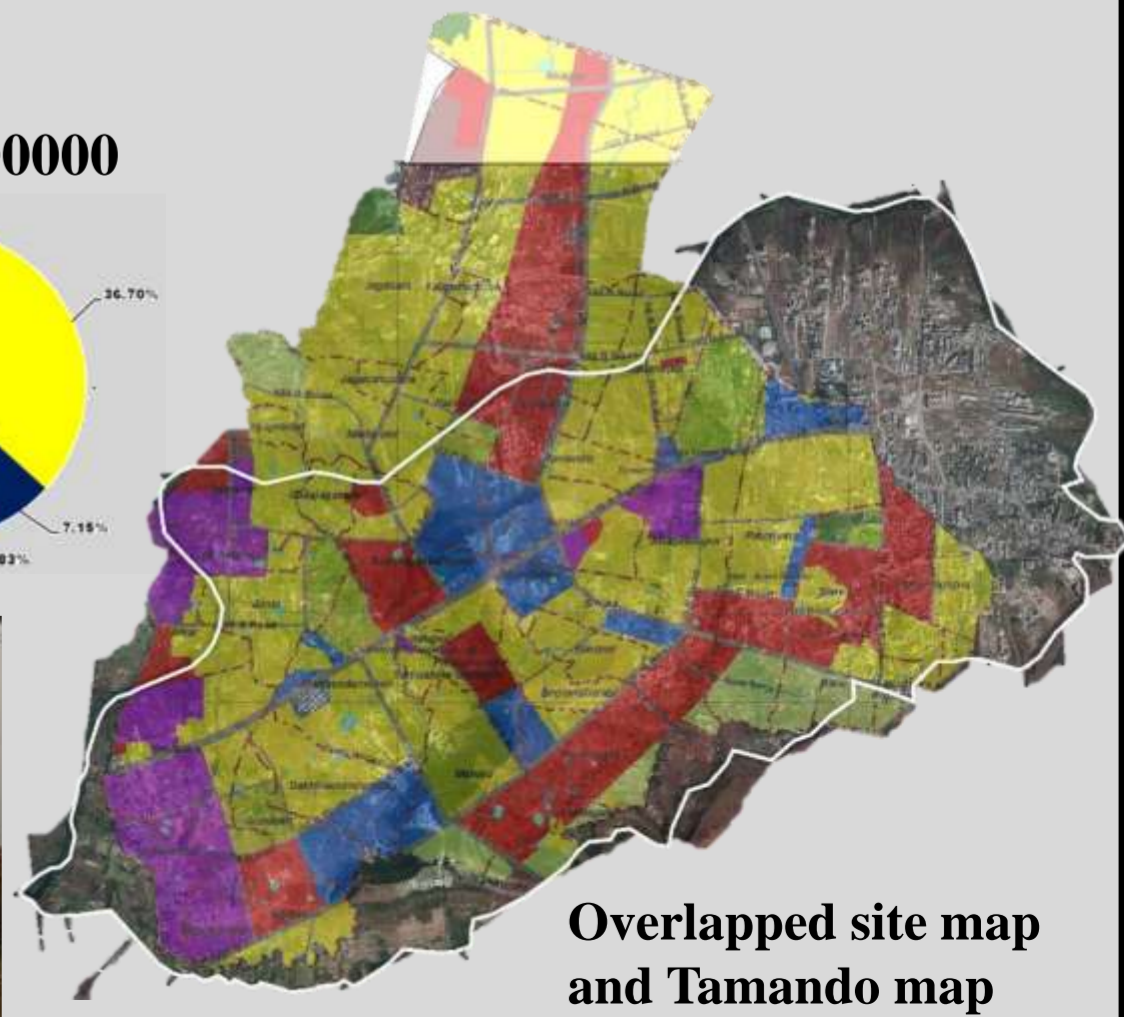
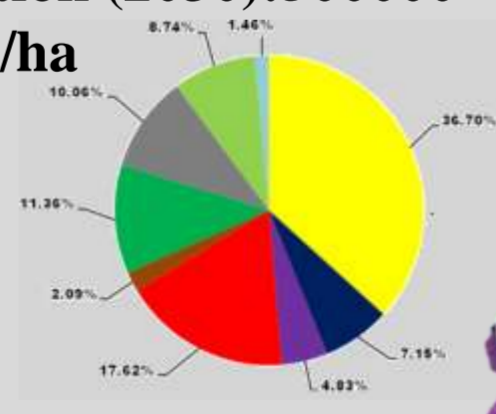
Theme: satellite city, health city, IT city, diplomatic enclave and central park.

Area: 58.6452 sq.km

Proposed population (2030):500000

DENSITY:85 ppl/ha

Average grid size :0.8x0.8 km



ZONAL PLAN AND DETAIL POCKET

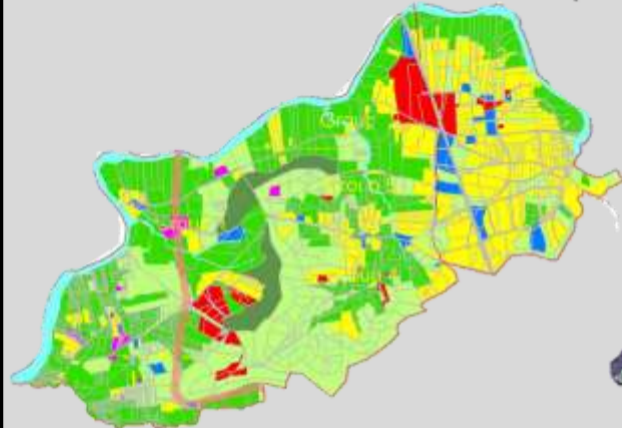
Individual zonal plan

Aim: to actively manage existing issues to deliver a better quality of life and environment.

1. Connectivity
- 2 Institutional core
3. Safety and security
- 4 Amenities within 1km
5. Renewable energy use
- 6 walkable

EXISTING LANDUSE(2018)

PROPOSED LANDUSE



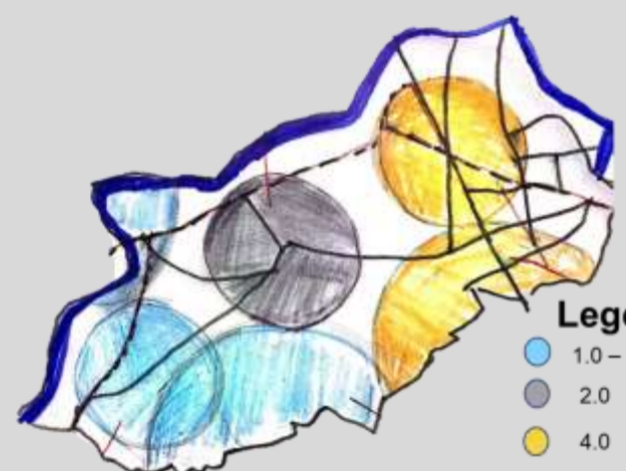
Legend

- Water body
- Forest area
- Agricultural zone
- Renewable energy park
- Open spaces
- Residential zone
- Commercial zone
- Institutional Zone
- Industrial zone
- Mix-Landuse Zone

ROAD NETWORK



SCHEMATIC FSI MAP



Legend

- 1.0 - 1.8
- 2.0
- 4.0

Theme: Synergy between environment and landuse

Vision:

- Balance between landuse and environment.
- Providing employment opportunities
- Self sufficient with respect to environment.
- Connectivity.
- Provision of adequate housing.
- Safety and security.

Present population(2011):44927

Total area: 39sqkm

Total population: 4 Lakh

Gross density: 100pph

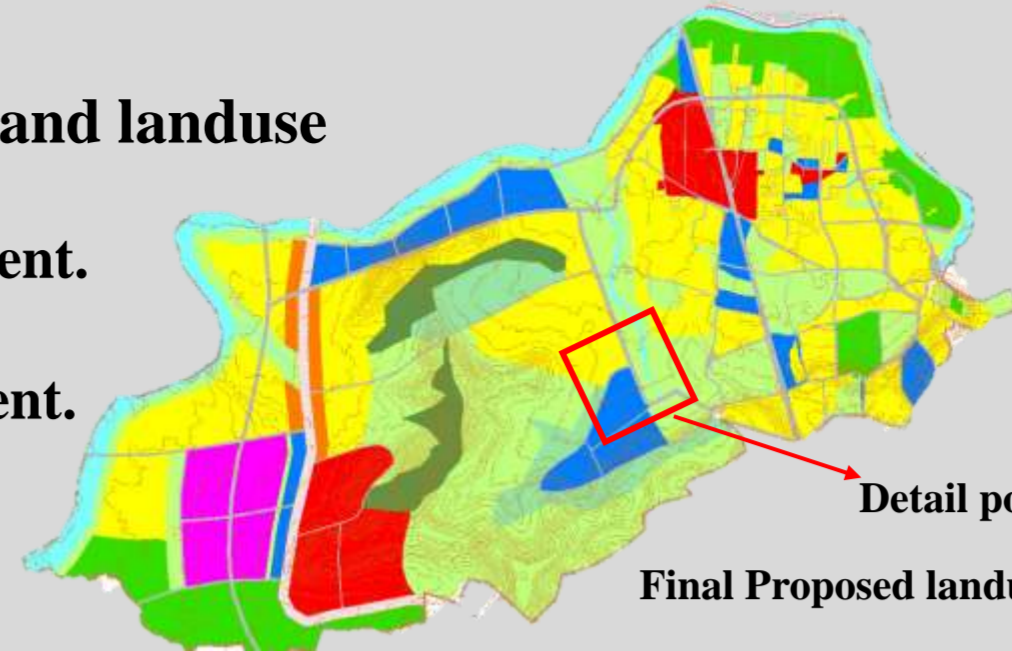
Net density: 309pph

Residential area: 1247ha

Mix landuse: 48ha

Infrastructure projections:

	Present Requirement (2011)	Per Capita Generation/ Generation (present)	Future Requirement	Required/ Generated
Solid Waste Management	22463.5 kg	0.5Kg	200000 kg	177536.5 kg
Sewage And Drainage	5391240 litres	120LPCD	48000000 litres	42608760 litres
Water Supply	6739050 litres	150LPCD	60000000 litres	53260950 litres



Final Proposed landuse

LANDUSE	AREA (HA)	PERCENTAGE
Roads	378.8	9.5%
Residential	1315	32.9%
Commercial	187.3	4.7%
Industrial	139.68	3.5%
Public and semi-public Mix	271	6.8%
Open space	948.9	23.8%
Agriculture	374.6	9.3%
Forest area	119.6	3%
Water body	199.3	5%
Total	3987	100%

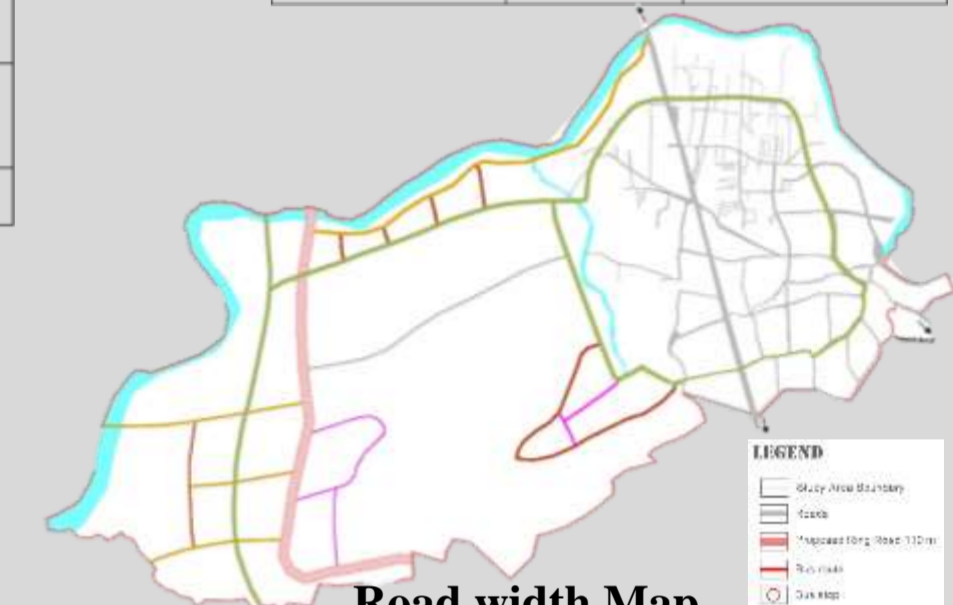
	Area(ha)	Population	Density(pph)
High density	132	79,200	600
Medium density	740	2,58,000	350
Low density	423	63,500	150

Employment projections

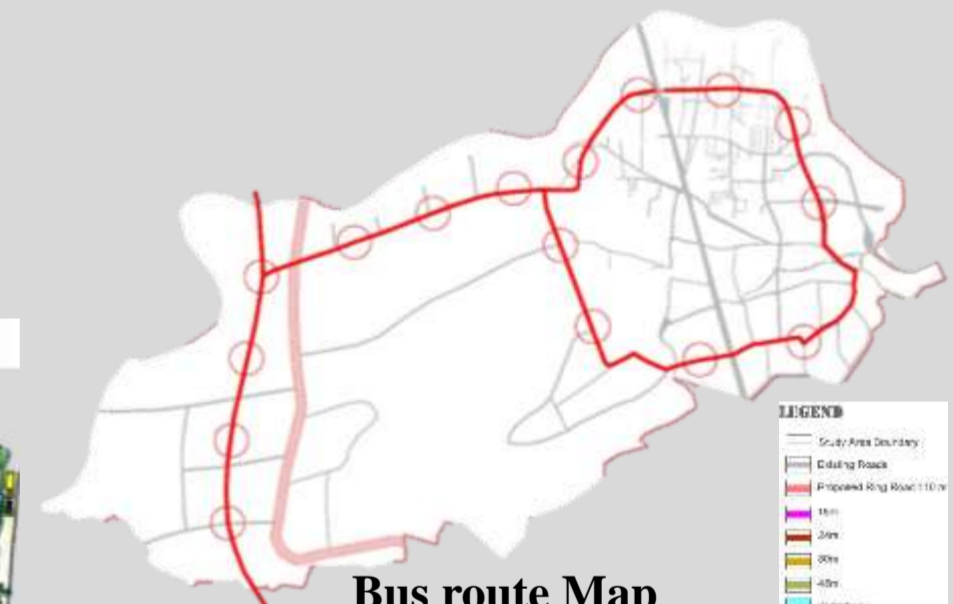
WPR (%): 32%

Total working population: 1,28,000

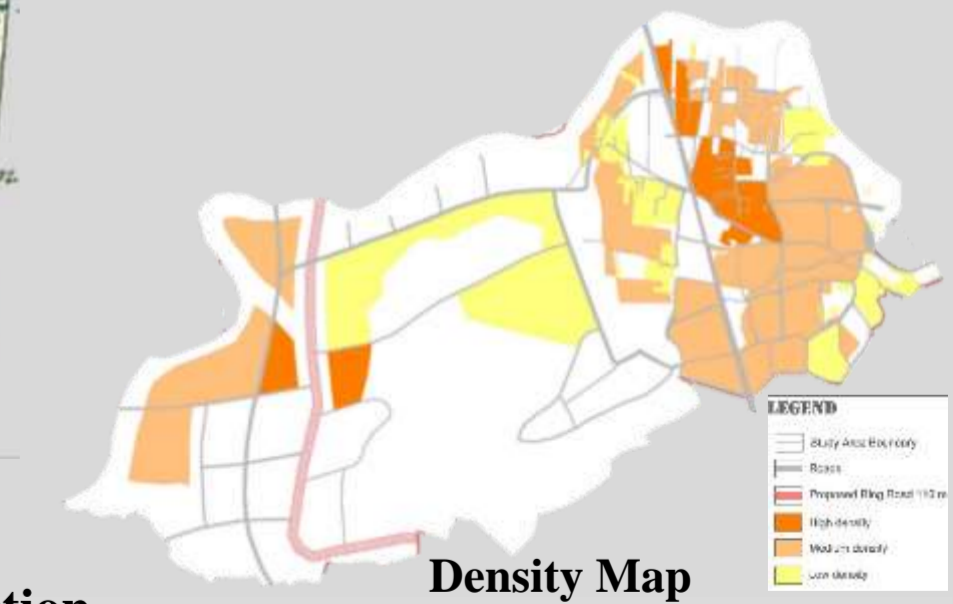
Primary sector(agriculture) (5% of total working population)	6,400
Secondary Sector (Industries) (20% of total working population)	25,600
Tertiary Sector (Office, Shops, Hotels, Entertainment, Education & Health) (75% of total working population)	96,000



Road width Map



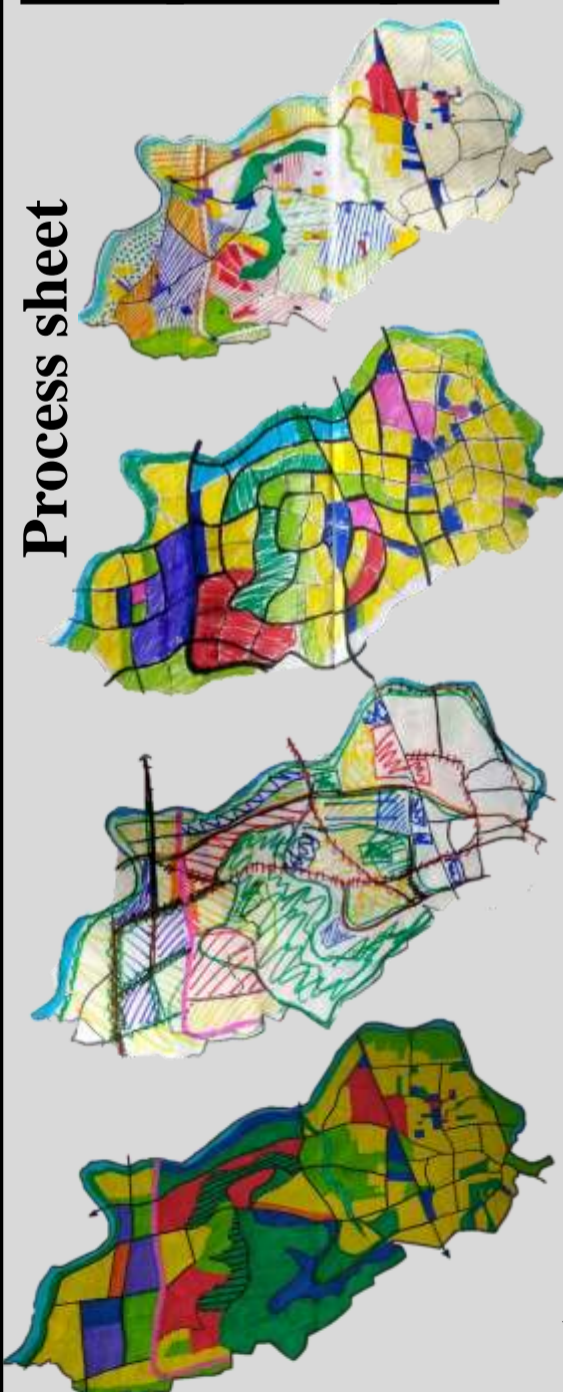
Bus route Map



Density Map

Group zonal plan

Process sheet



SWOT Analysis

various layers of plans were made

Projections, Area calculation

Detail pocket:



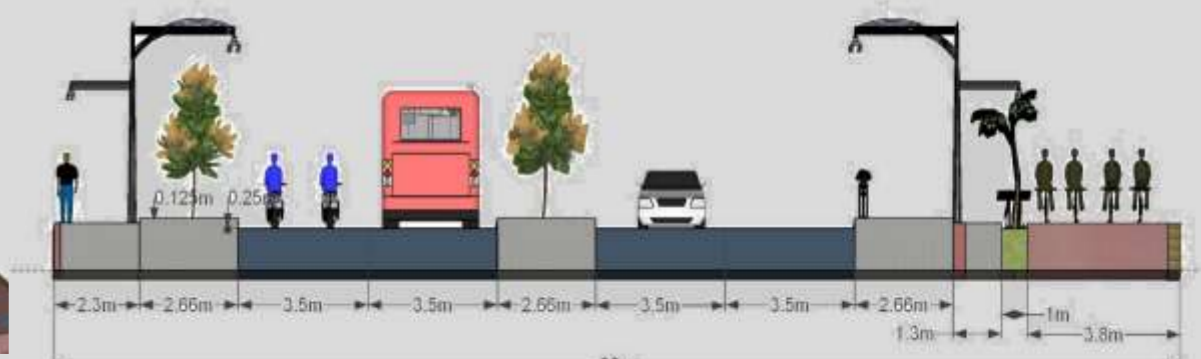
Corporate park



Residential area



30m road plan and section



COMMERCIAL

Corporate Park:

- commercial real estate project
- Office space, multinational companies, Banks and financial institutions and companies like: Tata, Reliance, MIDC, siemens, Crompton, L&T etc.

Bubble diagram

- The corporate park is being planned to accommodate employed and includes floating population, 75,000 (approx.).
- The concept of global FSI will be used to design the park.
- The central area having the tallest structures pyramid-like design.
- Central Park and Food courts.

INDUSTRIAL

- Non-polluting industries would be permitted.
- Green Category industries-pollution index score : 21-40.
- White Category industries - pollution index score: score including & up to 20

Green Category Industries:

- Ayurvedic medicines.
- Puffed rice (muri) (gas or electrical heating).
- Spice Blending and Spice grinding (upto-20 HP motor).
- Homeopathic medicines (without boiler).
- D.G. Sets more than 10 KVA

White Category Industries:

- Bio fertilizer and bio-pesticides without using inorganic chemicals.
- Assembly of bicycles ,baby carriages and other small non motorizing vehicles.
- Packing of powdered milk.
- Organic manure

CONSERVATION OF NATURAL FEATURES

ADVENTURE PARK AND RENEWABLE ENERGY

- The hillock in our site can be utilize for this purpose.
- The park would have activities like hiking, jogging pathway, camping site, cycling route. and exercising equipment.
- Can serve as smart and sustainable assets for areas with surplus industrial property, contributed to eco-tourism and served as an educational resource to local schools, universities and business groups. Solar car rides

LAKE NEUTRAL ECOLOGICAL & WATER CYCLE RESTORATION

The Nalas are not in a good condition so to conserve it we can use this concept. In this a green belt around it would create a buffer and water recycling would be done.

- Integrated Water management(rain water harvesting)
- Landscaping and use renewable resources
- Public Toilet Facility
- Drinking Water

TOWN PLANNING SCHEME

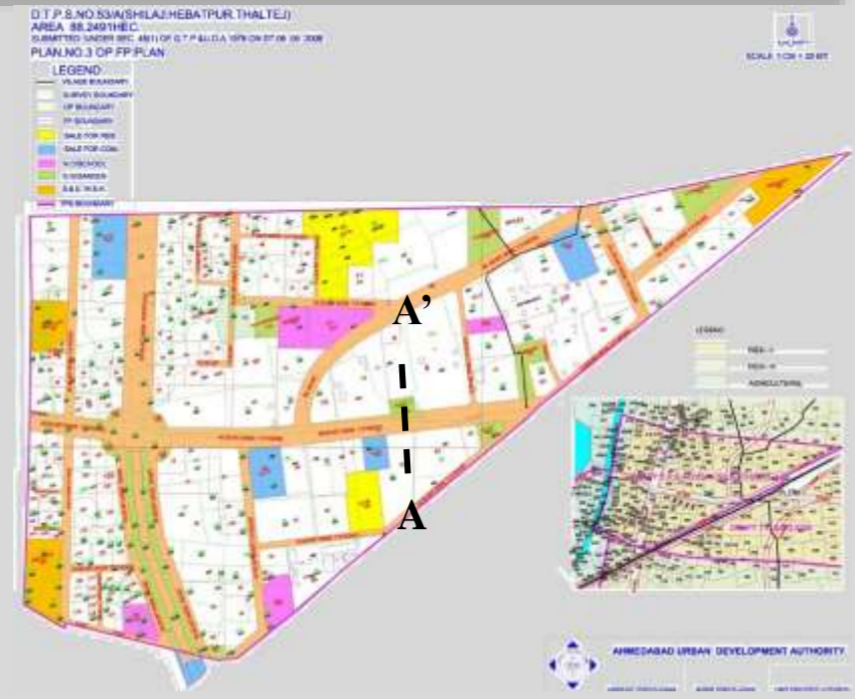
Ahmedabad case study (Thaltej TP no. 53A)

TP Scheme is the process enables the local authority to develop land without fully acquiring it (**land pooling and land redistribution**) and gives it a positive control (**landuse**) over the design and the timing of the urban growth.

Near by tp scheme-53b
Area-0.88kmsq
Date of submission-6/6/2008

TIMELINE OF LEGAL FORMALITIES:

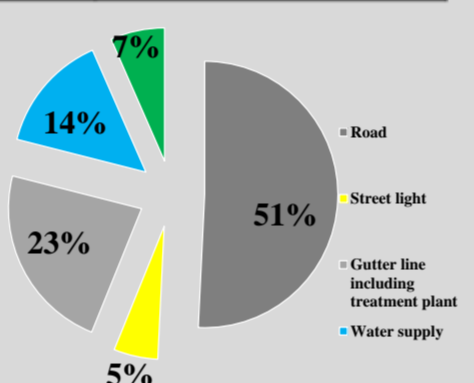
03-03-07	Date of chief town planner's consultation
29-03-07	Date of declaration of intention by state government
13-04-07	Date of publication of declaration of intention in government gazettee
27-04-07	Date of publication of declaration of intention in local newspaper
20-11-07	Date of owners meeting
07-03-08	Date of publication of draft town planning scheme
14-03-08	Date of publication in local newspaper
06-06-08	Date of approval and submission of draft town planning scheme by AUDA board for submission to state government



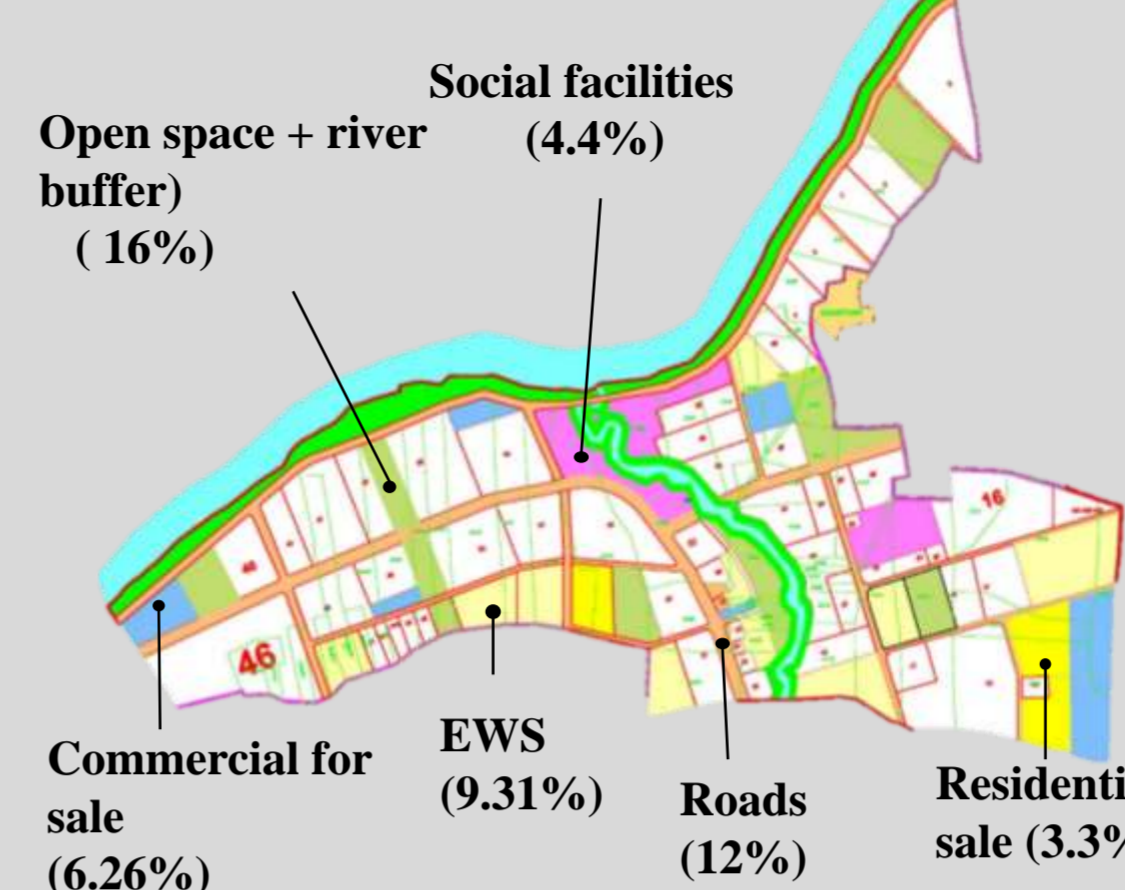
ESTIMATE COST OF WORK:

SR.NO	NAME OF WORK	TOTAL COST(RS)
1.	Road	9.3 crore
2.	Street light	0.98 crore
3.	Gutter line including treatment plant	4.1 crore
4.	Water supply	2.6 crore
5.	garden	1.2 crore
Total		183,110,449(18.31 cr)

SR. NO	Road width in mt.	Length of road in mt.	No. of lanes	Carpet width	Rate per	Total cost	
1	6.00	180.67	One lane	3.75	3750.00	677512.50	
2	7.50	674.69	One lane	3.75	3750.00	253087.50	
3	9.00	377.09	One lane	3.75	3750.00	341806.75	
4	12.00	1013.67	One lane	5.50	5500.00	5575185.00	
5	18.00	2883.20	Two lane	7.50	7500.00	21624000.00	
6	24.00	649.35	Four lane	15.00	15000.00	9740250.00	
7	30.00	794.02	Four lane	15.00	15000.00	11910300.00	
8	40.00	1019.74	Four lane	15.00	15000.00	15296100.00	
9	60.00	442.00	Four lane	15.00	15000.00	6630000.00	
Total length					4044.43	Total cost Rs.	75847922.50
						Add 7% for contingency and work charge	5288326.58
						Total cost Rs.	80835849.08
						Add 25% for price escalation Rs.	221253177
						Total cost Rs.	92961226.00

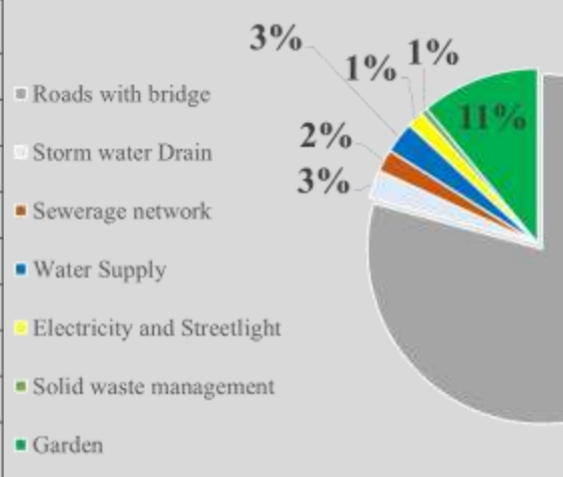


Mahalunge TP scheme, pune



Infrastructure estimates

Sr. No.	Particular	Cost in Cr.
1	Roads with bridge	226.2
2	Storm water Drain	7.5
3	Sewerage network	5.9
4	Water Supply	8.37
5	Electricity and Streetlight	4.34
6	Solid waste management	1.87
7	Garden	31.4
SUB TOTAL A		285.58
Escalation Cost : 5% every year for 3 years *@15%		42.837
SUB TOTAL B		328.417
10	Misc. Expenses in 3 years *@7%	22.98919
TOTAL COST OF TP SCHEME		351.40619



TP scheme area= 374.00 ha
Net TP Area Available = 369.00 ha

For this TP scheme Survey Number are taken as original plot

Road hierarchy and road network are decided (zonal level roads are taken into consideration)

The Land is pooled for 50% for roads, open spaces, public amenities, EWS housing and 5-10% for sale. Remaining 50% is returned with access to roads and other infrastructure

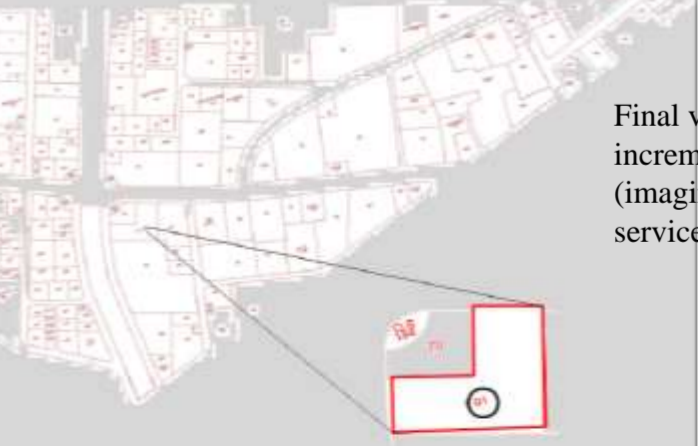
Process

OP - ORIGINAL PLOT



Each survey no. is given a separate orginal plot no.(op.no) value of op is assessed on the basis of recent sales transaction.
OP value has been derived from last 5 years sales records from the date of declaration of intention

FP plot



Final value incremental value (imaginary value of serviced plot)

Site visit:



Storm water drains



Water Supply
Population density = 100 pph
Total Area of TPS = 374.00 ha
Total Population for TPS= 40,000
Water Supply = 220LPCD
Requirement = 8.8 MLD
Overhead tank capacity = 9MLD
Diameter = 100-250 mm
Fire water requirement= 3600/min/ 50,000 population for 2hr duration(according to IS1990, reaffirmed 2010)
Rain water harvesting on roof top.
Rate=17.82 Lakh per km
Overhead tank = 156.91 L per unit

Solid waste management
• 3R (Reducing, Reusing and Recycling) method of waste management
• 5-way segregation method at source
• Zero landfill site
Solid Waste Generation = 62 Tons per day
No. of trucks required = 2
No. of segregation point = 2
composting unit = 1 (75 lakh)
INR 365 per year as sanitary fee from every household for SWM and 300-10.00 from commercial



Sewerage and Drainage
Sewerage generation = 7.04 MLD
Rate = Per Km 38.4 L
Diameter of Sewer = 200-450mm

Storm water drains
Diameter of drains = 900mm
Rate= 47.93 L per km

Electricity and Street light:
Rate-
ELECTRICITY: 13 L per km
SUB STATION :250 L per unit
Street light: 0.3 L per unit

Road:
Roads Without Utility but with BT surface & all structures
Area(sq.m) = 440414.00
Km= 15.405
Rate (Rs / sq.m) = 5125
Culvert cost (box type) (2 nos.)=25cr



SR. NO	Description	Garden Area in sq.mtr	Unit rate per sq.mtr	Amount
1	Development of garden	305907.80	400.00	122363118.60
Add 7% physical contingencies + work charges				8565418.30
Total				130928536.90
Add for 50% price escalation for 10yrs				61181559.30
Total cost				31.4 cr



Final TP

