A Thesis Entitled

URBAN OPEN SPACE

CREATING URBAN GREENWAYS

THE CASE OF PATAN CITY

A thesis submitted to

Gijubhai Chhaganbhai Patel Institute of Architecture,

Interior Design and Fine Arts,

Veer Narmad South Gujarat University, Surat

for partial completion of the requirement for the award of the degree of

Master of Architecture

[Landscape Architecture]

by

ROSHAN VISHNUBHAI PATEL

Enrollment No . R19120030020210008

Under the supervision of

Prof. NIRAV SHAH

DECEMBER-JUNE 2021

DECLARATION

I declare that the thesis entitled **URBAN OPEN SPACE - CREATING URBAN GREENWAYS (The Case of Patan City)** submitted by me for the partial completion of Master of Architecture [Landscape Architecture] is the record of research work carried out by me during the period from December 2020 to June 2021 under the supervision **Prof. NIRAV SHAH** and this has not formed the basis for award of any degree, diploma, associateship, fellowship, titles in this and any other university or other institute of higher learning.

I further declare that the material obtained from other sources has been duly acknowledged in the thesis. I shall be solely responsible for any plagiarism or other irregularities, if noticed in the thesis.

Signature of the Research Scholar: ……Date: …….

Name of the Research Scholar: **Mr. Roshan Vishnubhai Patel**

Place: Surat, Gujarat, India

CERTIFICATE

I certify that the work incorporated in the dissertation ***URBAN OPEN SPACE – CREATING URBAN GREENWAYS (THE CASE OF PATAN CITY)*** submitted by **Patel Roshan Vishnubhai** was carried out by the candidate under my supervision. To the best of my knowledge:

I. The candidate has not submitted the same research work to any other institute for any degree/diploma, associateship, fellowship, or other similar titles
II. The thesis submitted is a record of original research work done by the Research Scholar during the period of study under my supervision, and
III. The thesis represents independent research work on the part of the student

Date:

Prof. Nirav Shah
P.G. Research Supervisor (Guide)

Prof. Dr. Dharmesh Juremalani
Professor & Program Coordinator
Masters of Architecture
(Landscape Architecture)

Prof. Ar. Rajesh Mehta
Principal

Place: DEPARTMENT OF ARCHITECTURE
SHREE GIJUBHAI CHHAGANBHAI PATEL INSTITUTE OF ARCHITECTURE, INTERIOR DESIGN & FINE ARTS.
VEER NARMAD SOUTH GUJARAT UNIVERSITY,
SURAT, GUJARAT, INDIA – 395007

ABSTRACT

Roshan Vishnubhai Patel Synopsis Report for the topic entitled on the **"URBAN OPEN SPACE – CREATING URBAN GREENWAYS (The Case of Patan City)"** has been review from the research articles, papers, and design work carried out of the published work. The manifest form of any given city is a function of human efforts to find meaning in life, and to satiate the other innate impulses. It is the understanding of those impulses that determines the meaning of human existence and the form of a city. Rational thought with legitimate beginnings would always lead one away from the neurotic clinging to the city as a source of existential security. The thesis proposes that the city of Patan survives on and supports the irrational and ignorant pursuits of its citizens.

Landscape has been used as a metaphor or conceptual reference for an increasing amount of excellent architectural projects in the last two decades. The phenomenon seems to be a substantial innovation of architecture with an interesting potential for artistic, social and ecological gains. To be able to better understand and critically review these projects, it is important to better understand the notion of landscape. How can we better understand the idea of landscape and its design methods for application in architecture? To answer this central question, we try to find a working definition of relevant landscape design methods in this paper. Only thereafter may we ask how these landscape methods are applied to the theory and practice of architecture, and what knowledge can be derived from built examples for future practical and theoretical use in the field.

So, This describes The Creek Revitalization for the Patan city is the project that has the opportunity to become one of the major ecological public landscape and major public destination for the city.

Creek will enrich the livability of the habitants. The green way and the enhancement of the project site will make it worth visiting. The intention behind this project's study is to safeguard, preserve, and restore the Creek through by controlling the soil sedimentation and the soil erosion. The outcome will eventually help in maintain the public health and safety along with the improvised water quality and prevention of pollution.

ACKNOWLEDGEMENT

With great pleasure and a deep sense of gratitude, I would like to extend my sincere thanks to almighty GOD for his blessings for granting me the chance and the ability to successfully complete this study. I would also like to thanks My Parents and family members for their everlasting love and endless support throughout my numerous academic years. Without this, I would not have been able to accomplish my dreams.

1 consider it an opportunity to be associated with the G.C.PATEL ISTITUTE OF ARCHITECTURE, INTERIOR DESIGN AND FINE ARTS Surat in our academic endeavor. I express my heartfelt thanks to my guide Prof. NIRAV SHAH, in Architecture Department, for their precious guidance, continued interest and encouragement towards the completion of this study. Their critical inputs and sound guidance have enriched the value of the study.

I would also like to thank Ar. Hardik patel and Ar. Abhi shah, Prof. of Institute of Architecture, HNGU, PATAN, and The librarian Mr. Chintan Raval of Architecture department of HNGU, Patan for always providing me with necessary information during dissertation.

I specially thank Patan city municipal corporation for giving me the support and needed primary data in Pandemic Situation.

ROSHAN PATEL

LIST OF FIGURES

Figure 1 Open Space Typologies 2
Figure 2 The Case Of Patan City 5
Figure 3 History Timeline of Patan City 5
Figure 4 Urbanization Of Patan City 6
Figure 5 A Case Of Kukrail,Lucknow 12
Figure 6 Concept Of Planning 13
Figure 7 Geographical Context Of Kukrailnala 14
Figure 8 Zoning and Design Intervention 16
Figure 9 Different Tributaries of Cheonggyecheon 18
Figure 10 Polluted Stream in 1950s 19
Figure 11 Elevated Freeway built in 1967 on the stream 19
Figure 12 Bridges on stream 20
Figure 13 Methodology 25
Figure 14 Evoluation Of Patan Ciy 26
Figure 15Regional Setting Map 27
Figure 16 Temperature Analysis 28
Figure 17 Rainfall analysis 28
Figure 18 Ward Wise Demography 32
Figure 19 Landmarks 40
Figure 20 Institutional 40
Figure 21 Existing Site Features 45
Figure 22 Site Sections 45
Figure 23 Site Isuues(Existing) 46
Figure 24 Concerns For Design Proposal 47
Figure 25 Strategies 48
Figure 26 Vision 48
Figure 27 Proposed Water Network at regional level 48
Figure 28 Important Bridges 49
Figure 29 Conceptual Proposal 50
Figure 30 Master Plan 51
Figure 31 Detailed Plan of Zone A 53
Figure 32 Detailed Plan of Zone B 53

Figure 33 Detailed Plan of Zone C.....54
Figure 34 Detailed Plan of Zone D 54
Figure 35 Proposed Shrub List 55
Figure 36 Proposed Tree List.....56

List of Maps

Map 1 Regional Map Of Patan City 7
Map 2 Potential Area For Urban Greenways in Patan City 8
Map 3 Potential Area 1 9
Map 4 Potential Area 2 10
Map 5 Potential Area 3 11
Map 6 Elevation Map 33
Map 7 Contour Map 33
Map 8 Road Hierarchy 34
Map 9 Community Ma 35
Map 10 Land Use Map 36
Map 11 Building Height Map 37
Map 12 Built Vs Open Map 38
Map 13 Infrastructure Map 39
Map 14 Elevation Map 41
Map 15 Contour Map With Rain Water Drain 42
Map 16 Road Network(Site Level) 43
Map 17 Building Height (Site Level) 43
Map 18 Commuity Map(Site Level) 44
Map 19 Land Use Map (Site Level) 44

Contents

CERTIFICATE ii

ABSTRACT iii

ACKNOWLEDGEMENT iv

LIST OF FIGURES v

List of Maps vii

Chapter 1 Introduction 1

1.1 General 1

1.1.1 Urbanization in India 1

1.1.2 Benefits Of Urban Green Spaces at city level: 1

1.2 Urban Open space 2

1.2.1 Urban Open Space Typologies 2

1.2.2 Linear greenways and its scope : 3

1.3 The Case of Patan City 5

1.3.1 Urbanization of Patan city: 6

1.3.2 Analysing the potential area for Urban greenways in Patan city: 8

Chapter 2 CASE STUDY 12

2.1 A case of Kukrail nala, Lucknow 12

2.1.1 Introduction 12

2.1.2 Concept of planning 13

2.1.3 Study area and issues 14

2.1.4 Conclusion 16

2.2 Cheonggyecheon stream Restoration, Seoul-South Korea 17

2.2.1 Introduction 17

2.2.2 Cheonggyecheon History: 18

2.2.3 Design Concerns 20

2.2.4 Challenges and Solutions 21

2.2.5 Current Scenario After Restoration of Cheonggyecheon stream: 23
2.2.6 Concusion: 23
Chapter 3.....24
3.1 AIM 24
3.2 OBJECTIVE 24
3.3 METHODOLOGY 25
Chapter 4 REGIONAL ANALYSIS 26
4.1 HISTORY 26
4.2 PHYSICAL LINKAGES OF PATAN 27
4.3 DEMOGRAPHICS 28
4.4 The modern city. 29
4.5 Tourist attractions.....30
4.6 DEMOGRAPHY 31
4.7 WARD WISE DEMOGRAPHY 32
4.7.1 Literacy Rate:.....32
4.8 ELEVATION MAP.....33
4.9 CONTOUR MAP.....33
4.10 ROAD HIERARCHY 34
4.11 COMMUNITY MA.....35
4.12 LAND USE MAP 36
4.13 BUILDING HEIGHT MAP 37
.....37
4.14 BUILT VS OPEN MAP.....38
4.15 INFRASTRUCTURE MAP.....39
4.16 LANDMARKS.....40
4.17 INSTITUTIONAL.....40
Chapter 5 ANALYSIS OF SELECTED SITE AREA.....41

5.1 ELEVATION MAP....41
5.2 CONTOUR MAP WITH RAIN WATER DRAIN....42
5.3 ROAD NETWORK(SITE LEVEL)....43
5.4 BUILDING HEIGHT (SITE LEVEL)....43
5.5 COMMUNITY MAP (SITE LEVEL)....44
....44
5.6 LAND USE MAP (SITE LEVEL)....44
5.7 EXISTING SITE FEATURES....45
5.8 SITE ISSUES (EXISTING)....46
Chapter 6 DESIGN PROPOSAL....47
6.1 CONCERNS FOR DESIGN PROPOSAL....47
6.2 STRATEGIES....47
6.3 VISION....48
6.4 IMPORTANT BRIDGES....49
6.5 CONCEPTUALPROPOSAL....50
6.6 MASTER PLAN....51
6.7 ACTIVITIES MAPING ACCORDING TO ZONING....52
6.8 DETAILED PLAN LAYOUT OF DIFFERENT ZONE....53
6.9 PROPOSED SHRUB FOR INTERVANTION....55
6.10 PROPOSED TREES FOR INTERVANTION....56
....56
REFERENCES....57
Bibliography....58

Chapter 1 Introduction

1.1 General

1.1.1 Urbanization in India

- Population and economic growth has fostered urbanization in the country and the number of urban towns and cities have drastically increased.
- There are several factors at play that have led to the urbanization in India – population growth and migration as one of the 2 major factors.
- Recently, a third factor has been seen as a huge contributor to the urbanization growth: the expansion of towns and cities.
- Currently, there are nine major cities in India: New Delhi, Mumbai, Bangalore, Hyderabad, Ahmedabad, Chennai, Kolkata, Surat and Pune.
- Rapid rise in urban population, in India, is leading to many problems like increasing slums, decrease in standard of living in urban areas, also causing environmental damage, pollution, etc.

1.1.2 Benefits Of Urban Green Spaces at city level:

- Green spaces provide linkage between people and nature. Urban green spaces are important as functions and meanings for:
- Urban climate, noise moderation, air cleaning and handle of surface water
- As an indicator of environmental changes
- Biodiversity: to save valuable urban species, as refuges for species from rural biotopes and as spreading corridors.
- Social and cultural values: for health, recovering and rehabilitation, to give beauty and comfort, to give room for passivity and activity, as a cultural heritage, as an arena for citizenship, for education.
- Gardening and allotments; as history of urban landscapes, as a social function, for life quality and beauty, providing a reserve.
- Urban design; to give the city an understandable structure, to connect different scales and parts of the urban landscape.

1.2 Urban Open space

- Urban Open Spaces are – open areas for public use that are situated within the urban fabric of a city.
- Traditionally, public places are thought to include city squares, sidewalks, markets, parks, garden, water bodies and transportation hubs.
- The three dimensions of access, control, and ownership are what truly determine the distinction between private and public space.

1.2.1 Urban Open Space Typologies

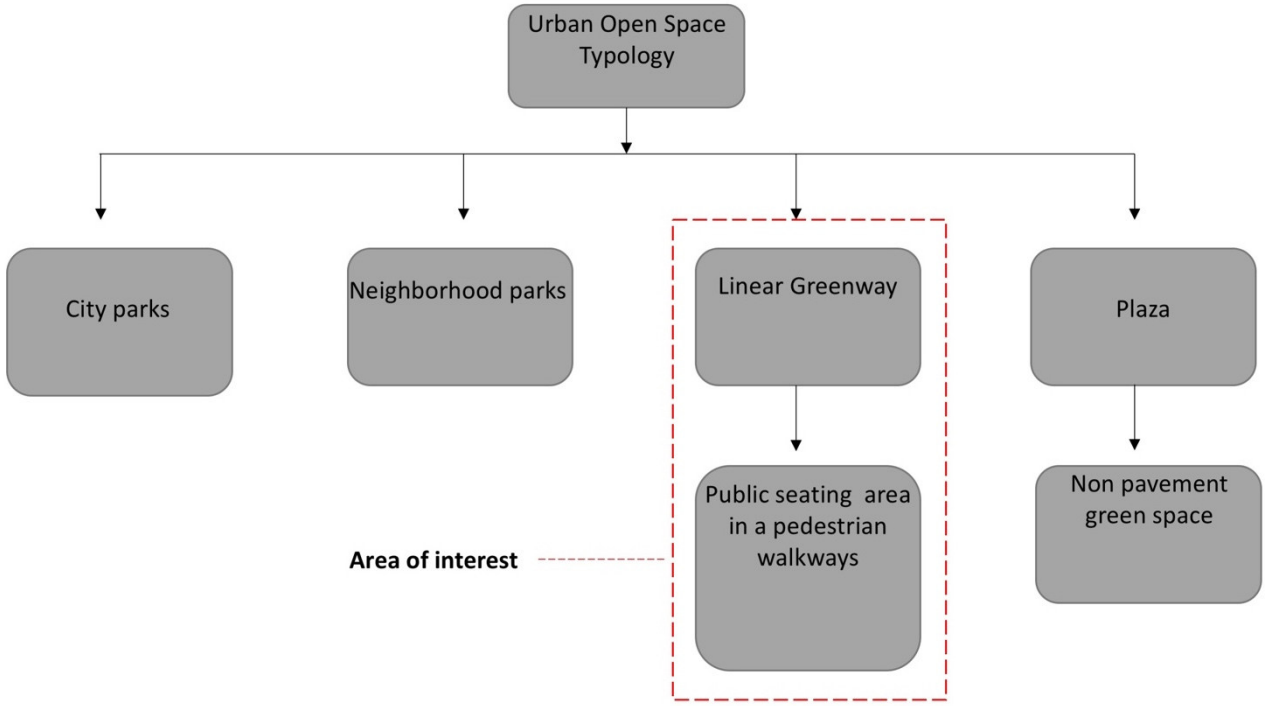


Figure 1 Open Space Typologies

1.2.2 Linear greenways and its scope :

1.2.2.1 Environmental benefits:

- Ecological Benefits

1. Maintenance of biodiversity to the regulation of urban climate.
2. Greenspaces that feature good connectivity with nature.

- Pollution Control

1. Dynamic form of urban expanding to manage effective urban green spaces which will contribute to reduce the overall CO2 by maintaining or even increasing the ability of CO2 absorption via natural eco-system.

- Biodiversity and nature conservation
- Green spaces function as protection center for reproduction of species and conservation of plants, soil and water quality. They provide visual relief, seasonal change and link with natural world.
- Maintenance of ecological aspects of sustainable urban landscape, with greenways and use of plant species adapted to the local condition with low maintenance cost, self-sufficient and sustainable.

1.2.2.2 Economic and aesthetic benefits

- Energy Savings

1. Using vegetation to reduce the energy costs of cooling buildings has been increasingly recognized as a cost effective reason for increasing green space and tree planting in temperate climate cities.
2. Plants improve air circulation, provide shade and they transpire. This provides a cooling effect and contributes to lower air temperatures.
3. Increasing tree cover in the city by 10% may reduce total energy for heating and cooling by 5 to 10%.

- Property Value

1. Areas of the city with enough greenery are aesthetically pleasing and attractive to both residents and investors.

1.2.2.3 Social and psychological benefits

- Recreation and Well-being- Urban green spaces serve as a near resource for relaxation; provide emotional warmth
- Human Health- People exposed to natural environment, the level of stress decreased rapidly as compared to people who were exposed to urban environment. Improvements in air quality due to vegetation have a positive impact on physical health such as decrease in respiratory illnesses.

1.3 The Case of Patan City

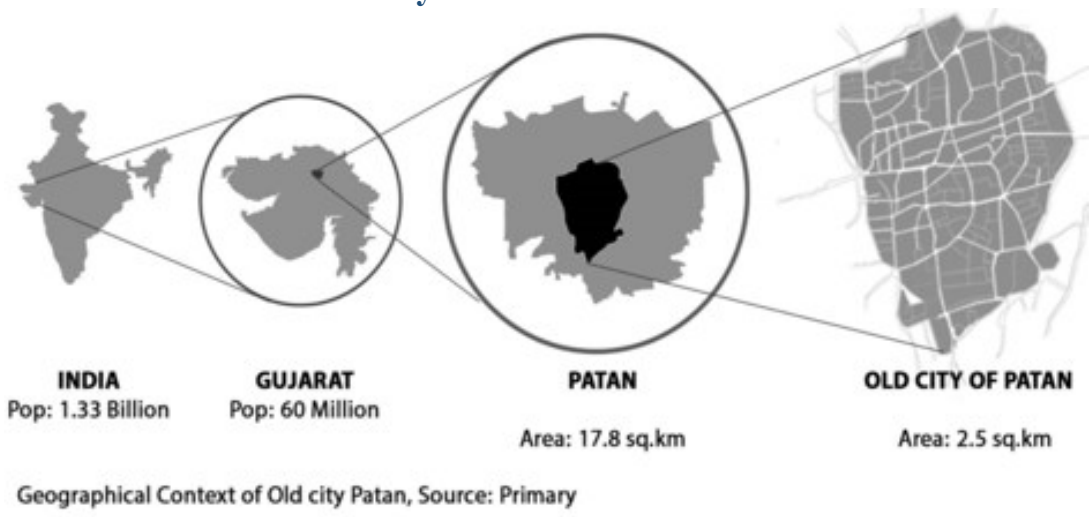


Figure 2 The Case Of Patan City

- Patan is an ancient fortified town, in North Gujarat situated on the banks of the sacred Sarasvati river.
- It was administratively important since earliest time as it was the capital of the Gujarat and had attained prosperity under Chavda and Solanki period.
- The urban structure of the town is made of several places known as pols. These towns contain old beautiful houses with carved wooden facades in traditional Guajarati architectural style.
- The fortified wall and gates were built by siddhraj jaysinh in 11th centaury.
- Existing patan city has Municipals Limits.

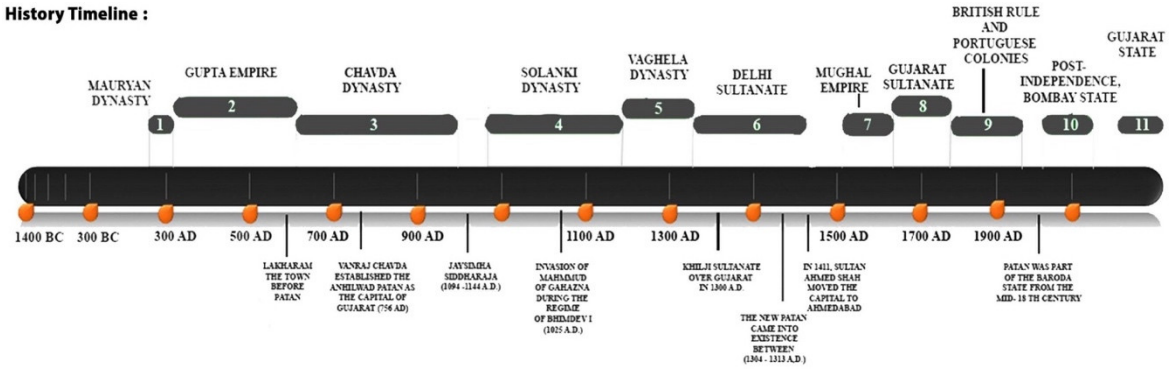


Figure 3 History Timeline of Patan City

1.3.1 Urbanization of Patan city:



Figure 4 Urbanization Of Patan City

Patan City Development:

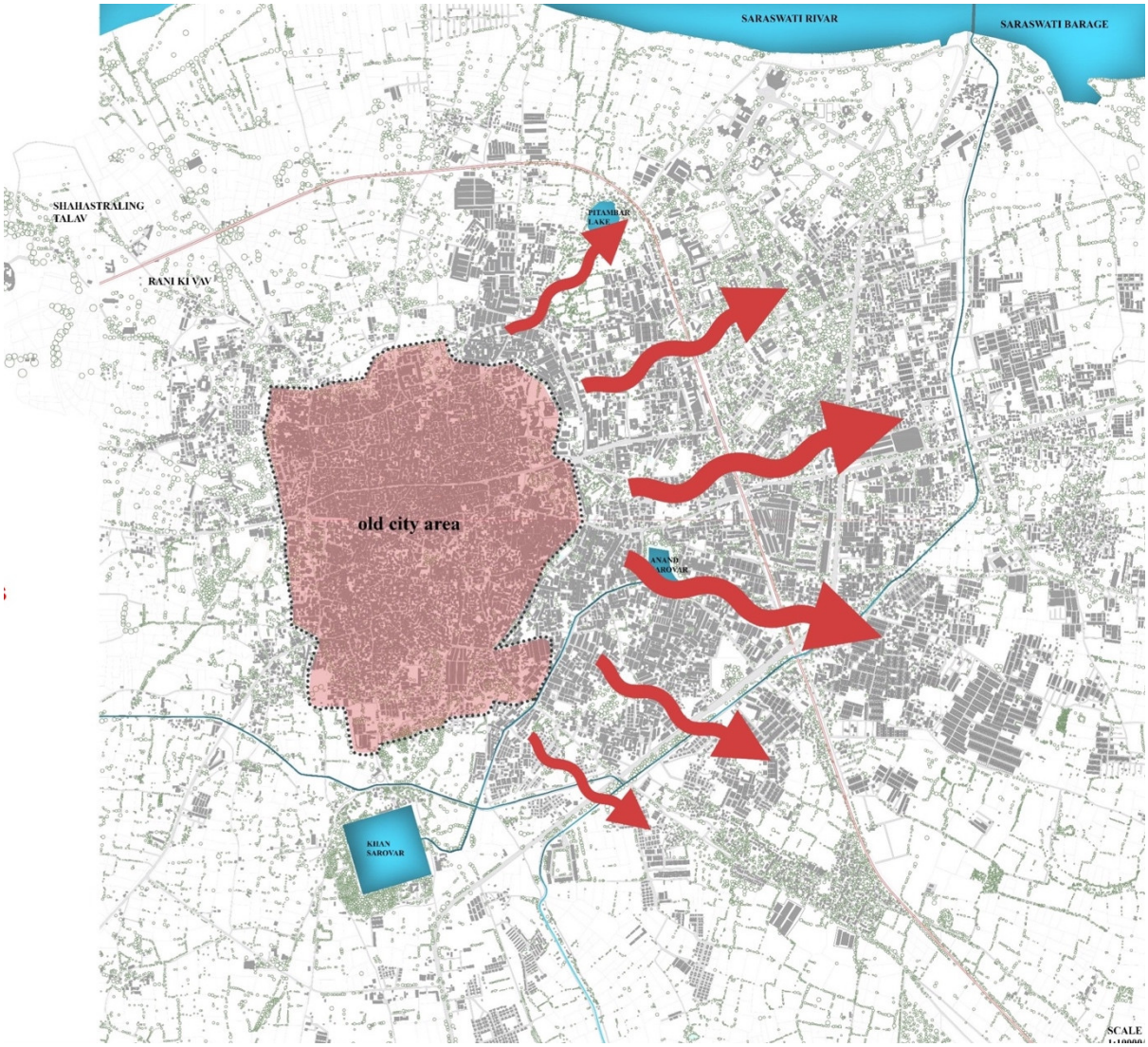
- **9TH CENTURY, CHAVADA DYNASTY: BUILDER_VANARAJ CHAVADA:** Patan was founded by king Vanraj Chavada in 748 A.D. The settlement was built on the banks of river saraswati.
- **10TH CENTURY, SOLANKI DYNASTY: BUILDER_BHIMDEV-1** Bhimdev-1 built the fort city in 10th century. The palace was built on the hill overlooking the city and the saraswati rivar



- **11TH CENTURY, SOLANKI DYNASTY: BUILDER SIDDHARAJ JAYSIGH-** Siddhraj jaysigh built the city towards the east because of the floods in the river.He also built lakes on each side of the city to provide water away from the river for the public. The fort wall has thirteen gates, the west-east road connecting two gates is the main axis of the city.



(Prajapati, 2009)



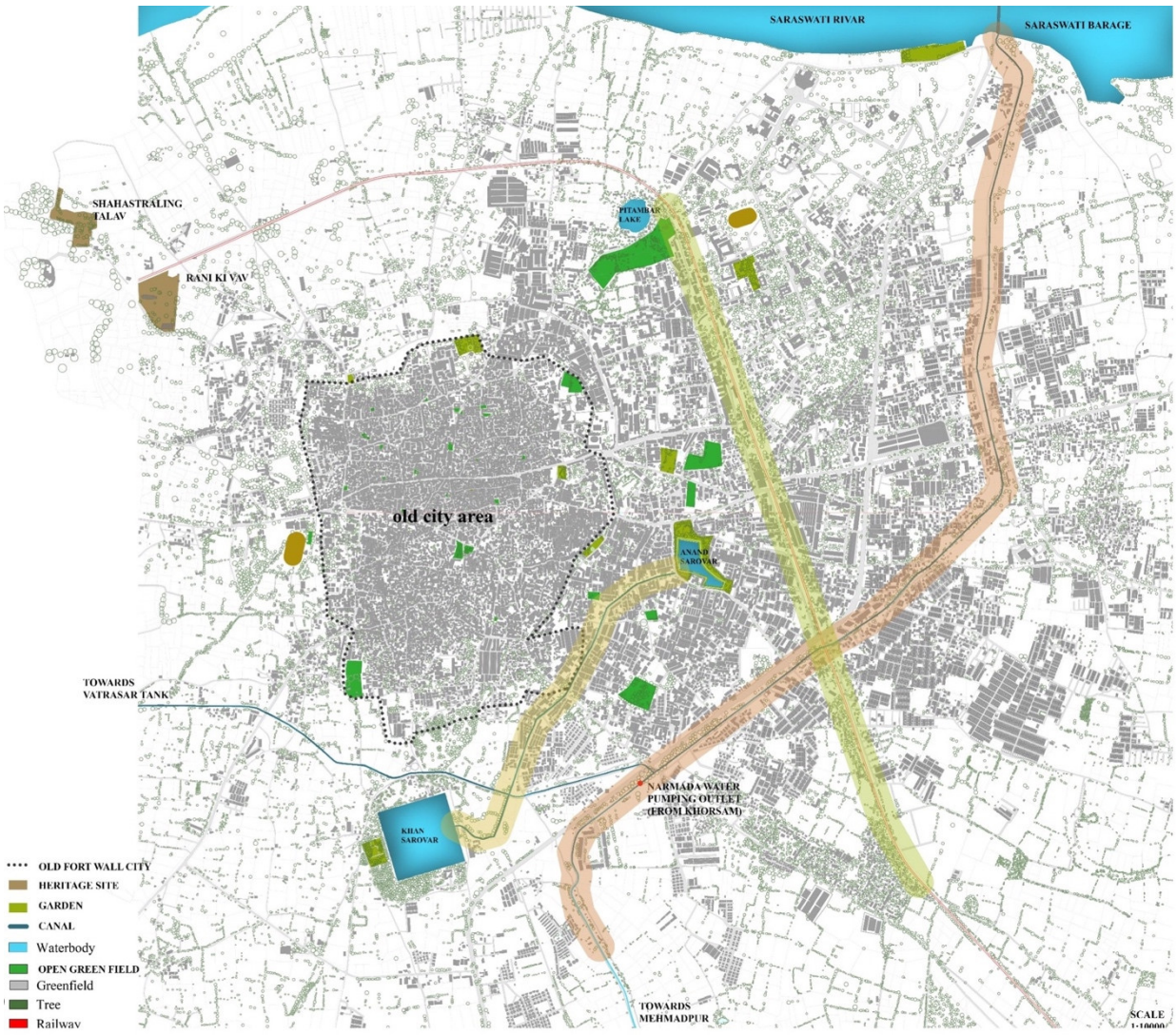
Map 1 Regional Map Of Patan City

- Map showing the current scenario of patan city.
- Patan city divided into 2 parts

1. **Old fort wall city**
2. **New urban area**

- City urbanization is also happening in patan city.
- As map is showing the evolution of city and expansion of urban area is in the eastern side of the old city.
- Major reason of eastern side expansion is railway station and state highways.
- The old city area of patan has very dense urban fabric and the outer urban area has potential for development of urban open spaces.

1.3.2 Analysing the potential area for Urban greenways in Patan city:



Map 2 Potential Area For Urban Greenways in Patan City

- Dense urban fabric
- Limited open spaces & public places
- Water bodies as an important public space & a spot of recreation.
- With increasing urbanization there is lake of open & public spaces.

1 RAILWAY TRACK AND SURROUNDINGS AREA

2 SARASWATI BARAGE MAIN CANAL

3 LINKAGE BETWEEN KHAN AND ANAND SAROVAR

1.3.2.1 Analysis Outcome (POTENTIAL AREA 1)



Map 3 Potential Area 1

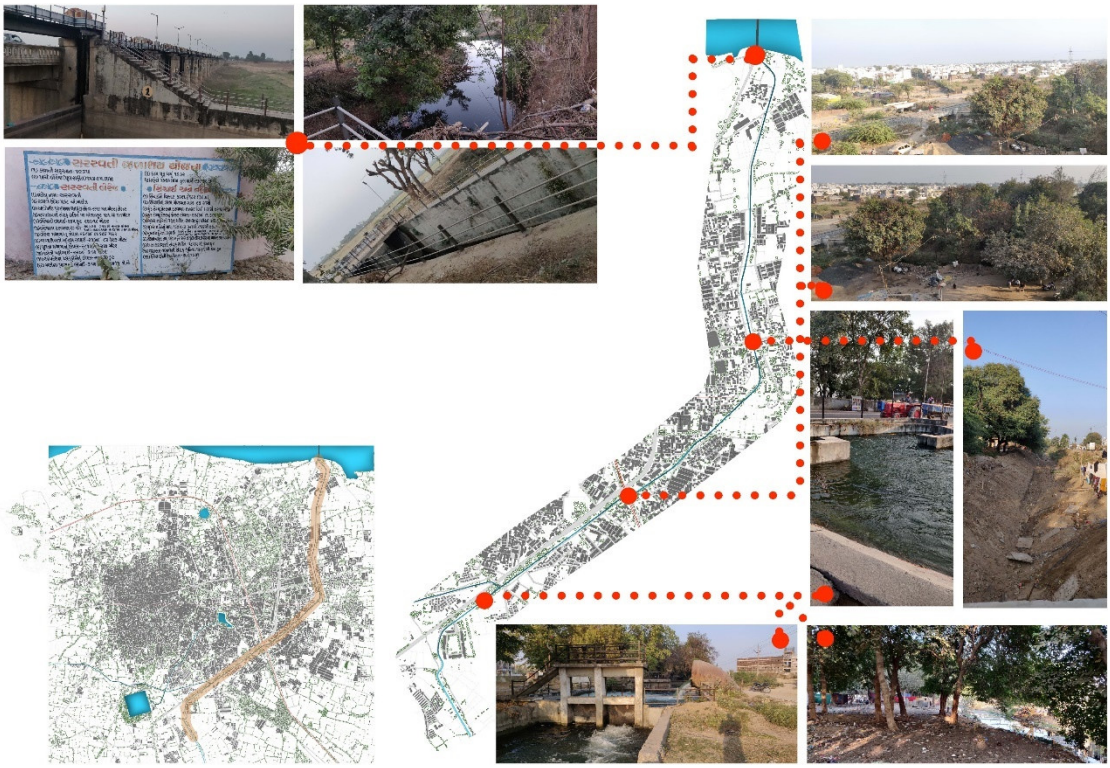
- Patan has rail junction in the core of the city.
- Railway track is passing throughout the city area.
- Railway track is covered by residential area.

Issue and potential : This stretch has limitation like no public activities around it, but it is good open space has potential like vegetation and green corridor for ecological and environment aspects like noise pollution barrier, air pollution, control bio-diversity.

Linear green ways :

- Enhance the nearest habitat. Create its own bio-diversity.
- Enhance the quality of life around the area.
- Noise barrier
- Pollution control barrier.

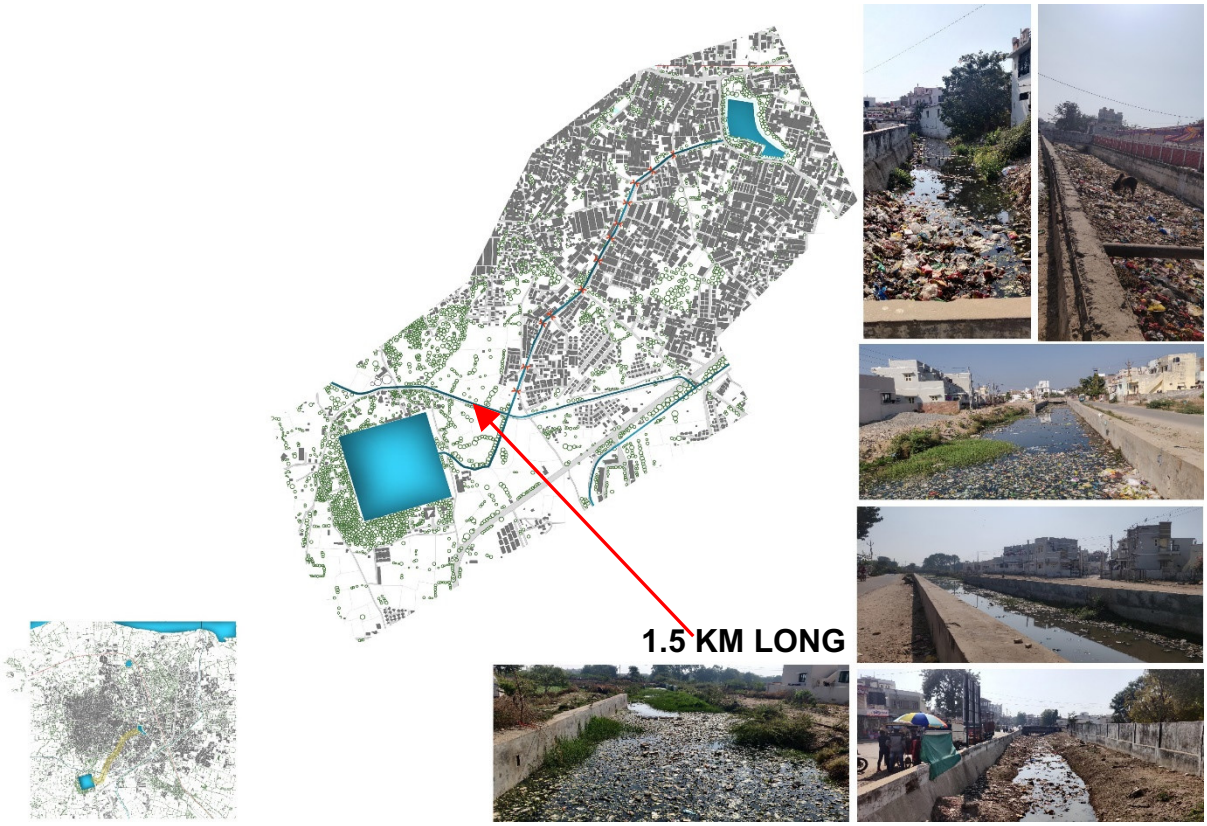
1.3.2.2 Analysis Outcome (POTENTIAL AREA 2)



Map 4 Potential Area 2

- To create Recreational activities like pedestrian walkways, cycling track, small public plaza, etc.
- Enhance the nearest habitat.
- Noise barrier
- Pollution control barrier.

1.3.2.3 Analysis Outcome (POTENTIAL AREA 3)



Map 5 Potential Area 3

Patan has 4 major waterbodies such as

1. khan sarovar (sidhhi sarovar)
2. anand sarovar(gugdi talav)
3. pitamber lake
4. sahastraling lake.

3 of them are in city area,

But major 2 public attractions are khan sarovar and anand sarovar, anand sarovar in the core area of city and khan sarovar on the city edge. Anand sarovar in the core area has flood issues during the monsoon for which one linkage has been made connecting both the lakes(khan sarovar) to maintain the flood level in core area. This linkage is facing several issues like polluted edge, garbage dumping, etc. which affects the micro climate and health of the neighborhood settlements.

Chapter 2 CASE STUDY

2.1 A case of Kukrail nala, Lucknow

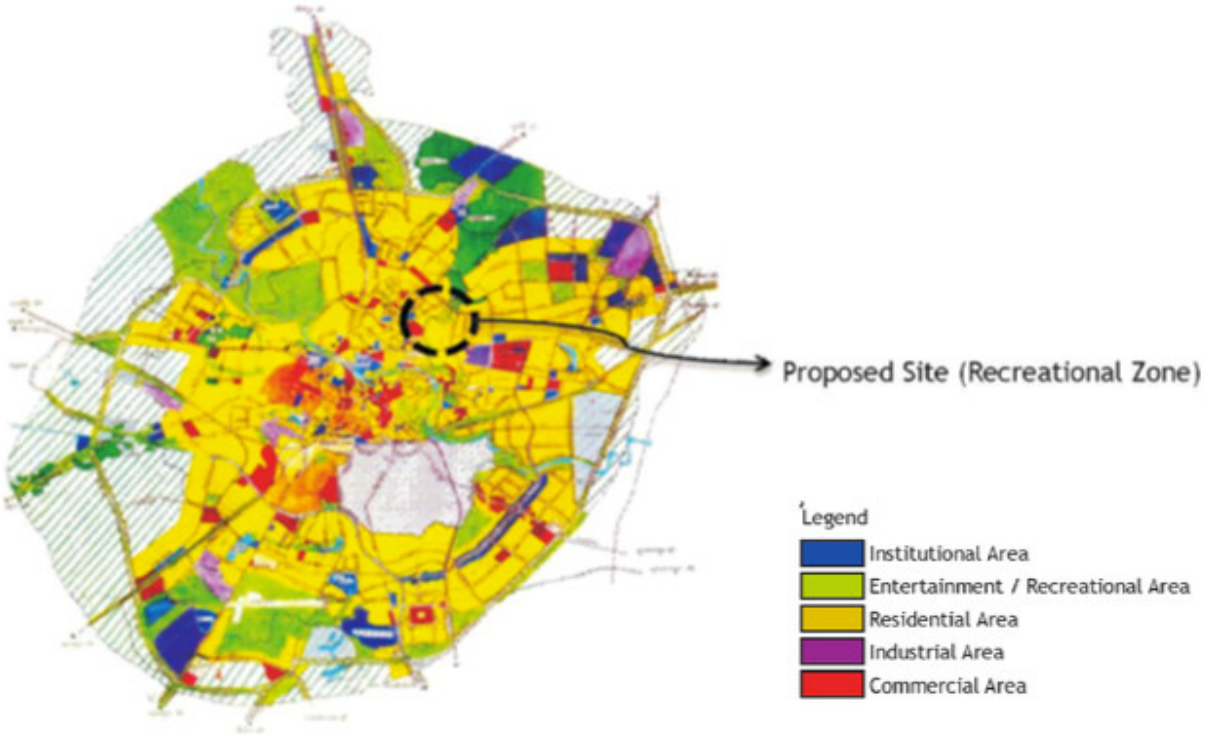


Figure 5 A Case Of Kukrail,Lucknow

2.1.1 Introduction

The study concerns the development of partial stretch of Kukrail Nala starting from the bridge on the Nala on Faizabad Road to a culvert on the Nala on Ring Road in Lucknow. The main access to the site is from a 40 meter wide Ring Road on the northern side. The site has positive potential for development as it is enclosed with residential areas. A 7.5 meter wide embankment runs along the eastern periphery of the site. This landform is slightly contoured with a slope towards the southern side. Wild vegetation, bushes and scanty grasslands without many trees is present on the site. The total site area available for development is 125 acres. The site is surrounded by unplanned residential zone, basically of lower middle income group. Residences comprise of two

to three floor structures. he area lacks major commercial space for the residents, except for one unplanned road which resultsi n traffic congestion and creates pollution.

2.1.2 Concept of planning

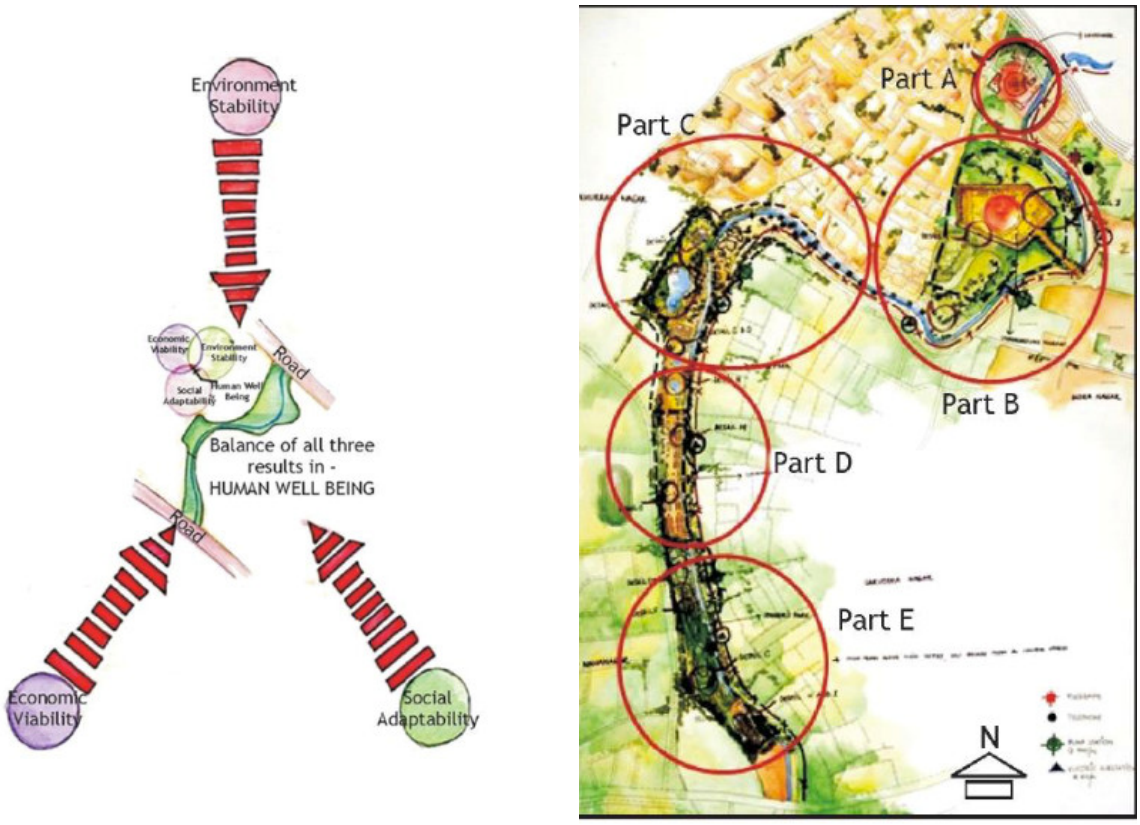


Figure 6 Concept Of Planning

The concept of urban sustainability is kept in mind while preparing the conceptual proposal for development of Kukrail Nala stretch. The three triads considered for achieving urban sustainability are environmental stability, social adaptability, and economic viability. Site will serve as a breathing space for surrounding residential areas as a majority of it is developed as green. This will enhance micro-climate of adjoining areas. Theme park, sports complex and an underground Substrata market will act as major revenue generators as well as providing residents and shoppers enjoyable recreational facilities.Sports complex, jogging track and yoga center attracts residents and find unique opportunities for them to relax.

Zoning has been done as per the UDPFI Guidelines, Ministry of Urban Affairs and Employment, Government of India. The site is divided into three parts .

- Part A: Office Zone: It is located near the ring road. It has good economic viability as it is in close proximity to main road.
- Part B and Part D: Commercial Zone: This zone will serve as major shopping hub for the nearby surrounding areas. This zone combines all scattered shopping areas into one zone. It will serve as major means of revenue generator for the site.
- Part C and Part E: Recreational Zone: This area will serve as the breathing space for the surrounding residential areas. Absence of any major park and green areas justifies its location. It will also help in maintaining overall micro-climate of the site and nearby area.

2.1.3 Study area and issues

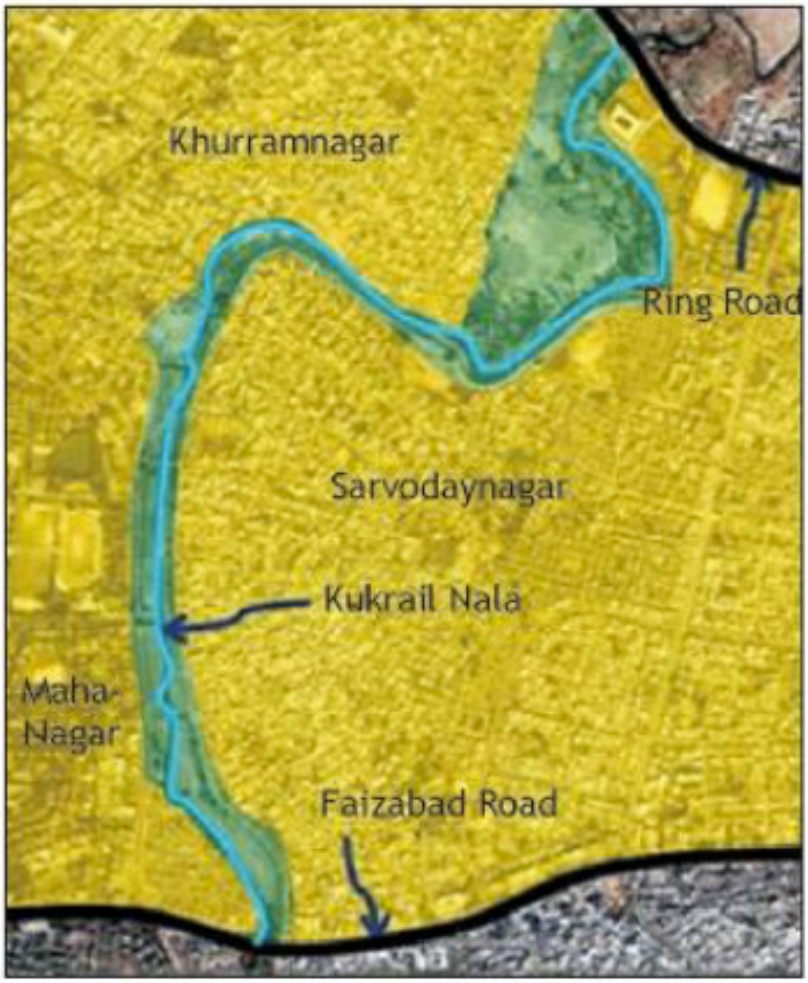


Figure 7 Geographical Context Of Kukrailnala

Issues

- The key issues to be considered while developing the site are: to develop the site as a breathing space for highly dense residential zone.
- proposing environment friendly landscape, which makes the scheme more viable. - maintaining the existing topography and natural environment of site.
- to harvest rainwater and use the same for landscaping.
- As per the given program, the proposal meets the criteria on the following grounds:

  the embankment on the site periphery connects the faizabad road with ring road. Besides, it also provides very soothing and natural atmosphere for the pedestrian movement.
- the proposal includes all types of developments viz. Commercial, residential and recreational without disturbing the natural topography and environment of the area.'
- The northern portion of the site has more built-up area as compared with the southern portion.
- there is already a park (breathing space) for indiranagar adjacent to ring road, but plan of part c (amusement park our surveys and requirements of the residents, there is no commercial shopping center located in that area.
- the southern portion of the site has theme based parks, jogger's park and weekly bazaar. They all commensurate with the natural topography and runoff the nala stretch to give the development an organic character and suitable for pedestrian movement.

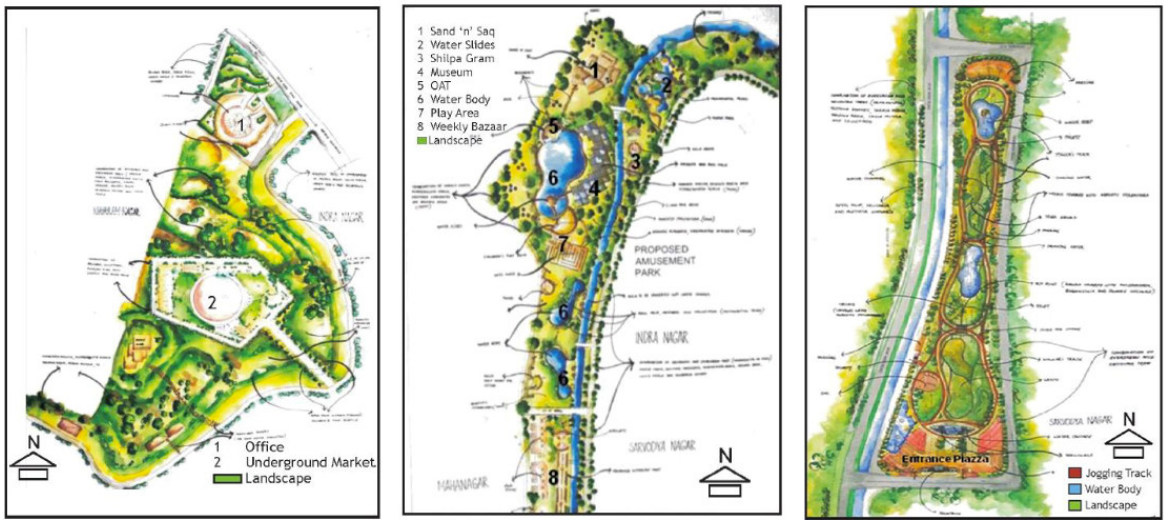


Figure 8 Zoning and Design Intervention

- All private sector players will get attracted to the site, as it is located in the heart of the city with very dense population and attractive economic feasibility.
- On the extreme southern portion of the site, which is adjacent to Faizabad road, the rehabilitation clusters for the slum population are proposed.

2.1.4 Conclusion

Demand for urban spaces will grow with the passage of time, which is likely to result in encroachment of open spaces. Hence there is an urgent need to develop green breathing spaces in between high density areas thereby providing healthy environment to urban dwellers.

The proposal tries to create hale and hearty environment for the highly dense residential areas surrounding Kukrail Nala. The project will also generate revenue from commercial and recreational activities, which makes it economically viable.

(Nisar & Ashraf, 2011)

2.2 Cheonggyecheon stream Restoration, Seoul-South Korea

2.2.1 Introduction



Architects: Mikyoung Kim Design

Area: 91000 m²

Year: 2007

Cheonggyecheon is an 8.4 km (5.2 miles) long, modern public recreation space in downtown Seoul, South Korea. The massive urban renewal project is on the site of a stream that flowed before the rapid post-war economic development required it to be covered by transportation infrastructure. The $900 million project initially attracted much public criticism but, after opening in 2005, has become popular among city residents and tourists. In the 1970s, it was considered a symbol of progress when the Cheonggyecheon River in Seoul, Korea, was covered and a road and elevated freeway were built above it. But by the year 2000, the Cheonggye area was considered the most congested and noisy part of Seoul, badly in need of revitalization, and people agreed that nothing could be done to improve the area as long as the road and freeway remained. When Lee Myung-bak was elected Mayor of Seoul in 2001, one of his key campaign promises was to remove this freeway and restore the Cheonggyecheon River. He developed a dramatic plan to remove Seoul's mone major freeway and to

accommodate the displaced traffic by building a Bus Rapid Transit system and by cutting automobile use in half. The project earned Lee the nick name of "Mr. Bulldozer" and made him a leading contender to become president of South Korea.

2.2.2 Cheonggyecheon History:

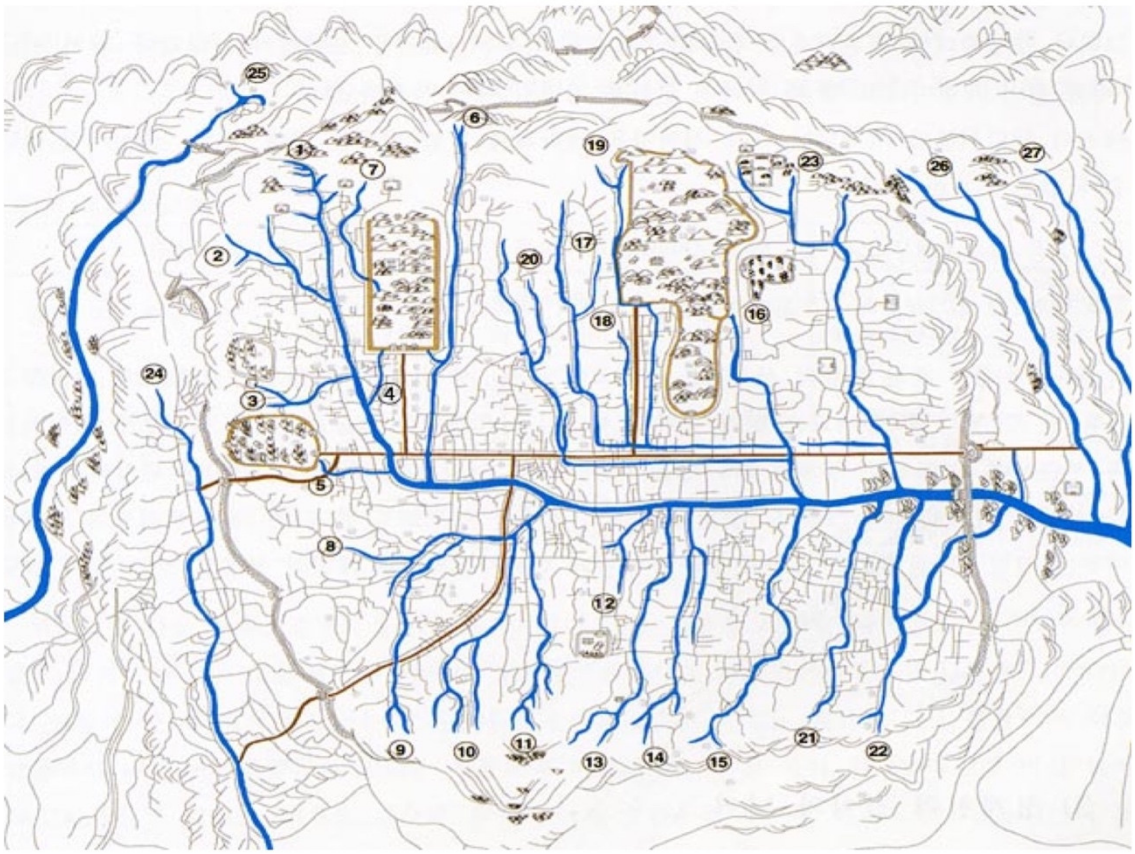


Figure 9 Different Tributaries of Cheonggyecheon

Seoul grew around the Cheonggyecheon, which divided the northern from the southern half of the city. The river was fed by tributaries flowing down from the mountains around the city – twenty-three tributaries, according to the early maps. The city's major east-west road was along the Cheonggyecheon, its north-south roads along the tributaries, and its boundaries were the fortress walls connected the mountains around it. These rivers were often dry in the spring and fall, when there is little rain, and they tended to flood during the summer rainy season.

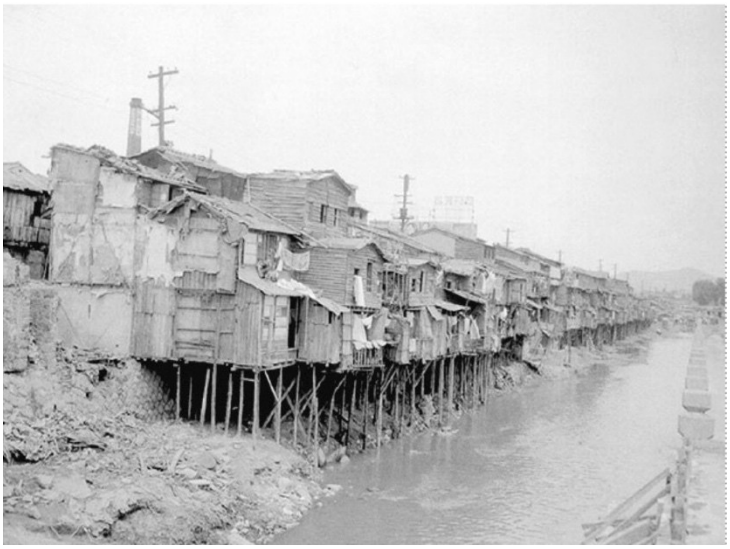


Figure 10 Polluted Stream in 1950s

- In the mid 1950s, the Cheonggyecheon was considered a symbol of the poverty and filth that were the legacy of a half-century of colonialism and war.
- The open sewer in the centre of the city was also a major obstacle to the redevelopment of Seoul. At a time of extreme economic hardship, the only way of dealing with this problem was to put the stream underground. The stream was undergrounded in a four-stage construction project, beginning in 1955 and ending in 1977.



Figure 11 Elevated Freeway built in 1967 on the stream

An elevated freeway was built above most of the underground stream between 1967 and 1971; this freeway was four-lanes wide and over three miles (5,864 meters) long, and it ran above a conventional roadway.

2.2.3 Design Concerns

Zone 1: History

Underground waterways were redirected to create a new stream bed with landscaped banks, and the foundations and stones of earlier bridges were included as decorative elements. National and imperial motifs highlight this zone's emphasis on history. There is seating throughout to encourage the public to use the space.

Zone 2: Urban + culture

The middle zone has recreation areas, waterfront decks, and stepping stones that bridge the two banks. Its design focused on using environmentally friendly materials. The stream's flow is intermittent, so water levels are supplemented by the Hangang River and treated wastewater. Other features include fountains and waterfalls - during the summer months, people often cool off by swimming in the shallows. Maps are embedded into the embankment walls at regular intervals, and prominent signage links nearby streets with the stream. The north and south sides are connected at street level by 22 bridges, each reflecting the theme of its respective zone.

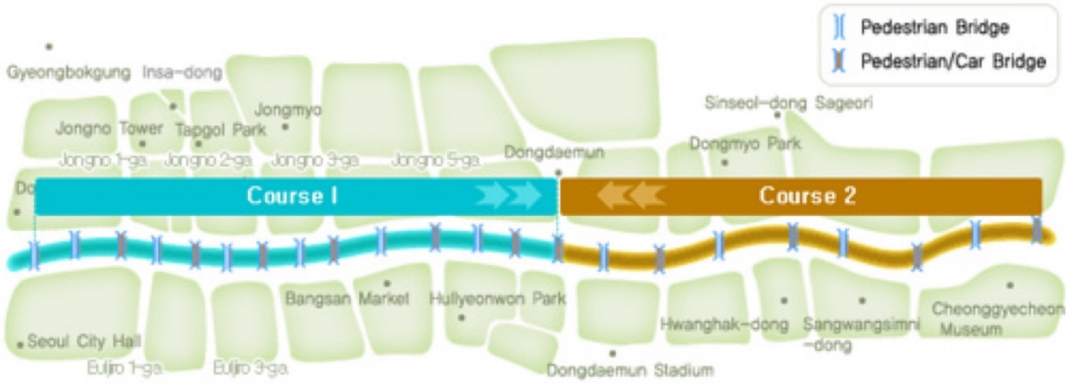


Figure 12 Bridges on stream

Zone 3: Nature

- The wetlands at their meeting point are designated as an ecological conservation area.
- There were citywide concerns that removing the overpass, which had carried up to 170,000 vehicles daily, would create congestion. Traffic flow was reassessed and modified, a campaign to discourage car use in the city centre was begun, and public transport was improved with extra buses and bus-only lanes.
- Ecological considerations in the design process were matched by an emphasis on minimising pollution and disturbance during the dismantling of the overpass. Particular attention was also paid to reducing sewage, drainage and flooding problems.

2.2.4 Challenges and Solutions

Challenges:

1. **Transport:**

- Cheonggye road & highway

1. Urban backbone corridor
2. 170000 vehicles/day

- Traffic disaster warned

1. Media, interest grouos
2. Traffic simulation demanded

3. **Neighbouring Merchants**

- Worried business decline

1. Access difficulty due to traffic congestion
2. Worse environment : noise & dust during construction

Solutions:

1. **Transport:**

- Discourage driving cars in the city centre

1. Leave cars at home one out of 10 days
2. Raise the parking fee in the city centre

- Improve road network

1. Develop detour route

- Public transport reform

1. Changes in bus operation system
2. Bus-only lanes, one-way streets
3. Downtown shuttle buses

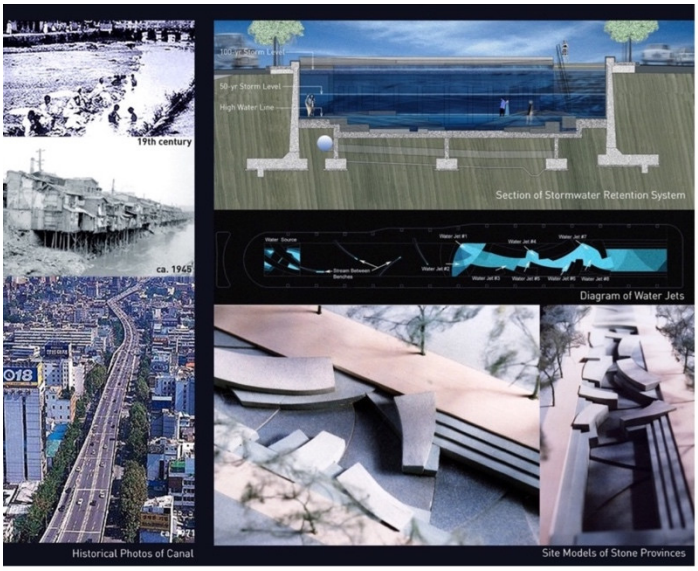
2. **Neighbouring Merchants**

- survey on the markets and continuous meetings and interviews

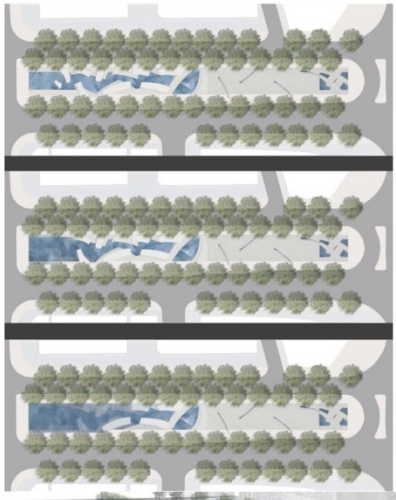
1. Consultation offices at the markets
2. Regular meeting on the project (over 4,200 meetings)

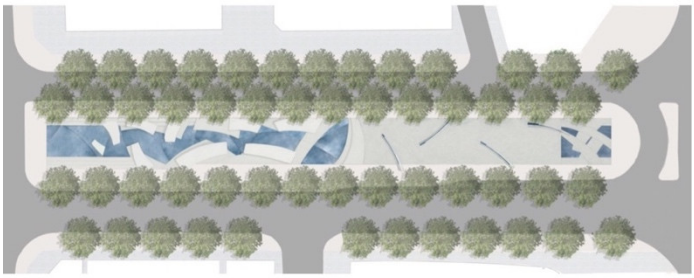
- Minimize inconvenience for business activity

1. State-of-the-art technology



Design Elements and ideas for stream

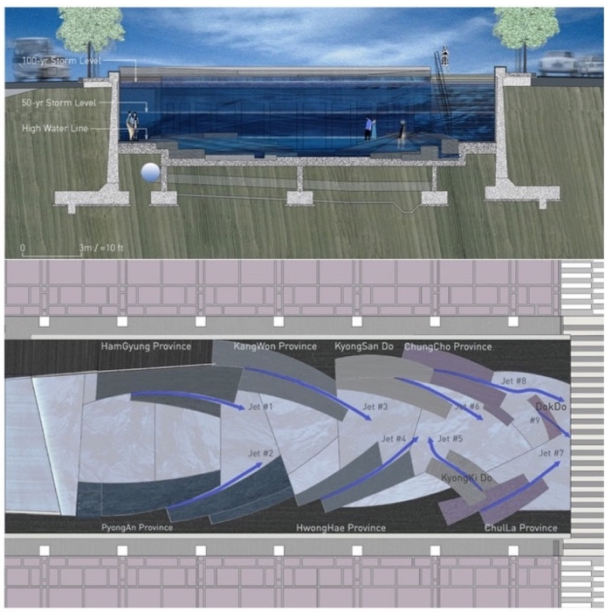












Recreational and Gathering spaces(public Plaza)

2.2.5 Current Scenario After Restoration of Cheonggyecheon stream:

- **The Environment:**
- **Air**

1. No_2: 69.7(02) → 46.0(05) → 43.0(07) ppb (-38%)
2. PM10 : 74.0(02) → 60.0(05) → 48.0(07) µg/m³ (-35%)

- **Water quality.**

1. BOD : 100-250 → 1.2-2.4(08) ppm

- **Noise level reduced**
- **Heat island effect relieved**
- **Wind corridor created**

- **Ecology:**

	Species before	After 6 months	After 9 months
Fish	4	23	27
Bird	6	33	34
Insect	15	46	206

- **Land prices increase after Restoration of the stream**

2.2.6 Concusion:

- After Studding and analysing the restoration of Cheonggyecheon Stream reflects the good Project in city urban centre area.
- The Projects gives a more benefits to the city area like healthy environment, ecological sustainability, good air quality, reduce pollution, and creating good habitat for animals.
- The Projects giving good recreation space and public plaza through out the city area.
- Creating Good pedestrian gateway with green cover around it.

(mathur, 2013)

Chapter 3

3.1 AIM

- Aim of the thesis is to create green corridor in the urban area to enhance ecological and social life and recreational experience for neighborhood settlements.

3.2 OBJECTIVE

- To learn about evolution of the city and need of the urban open space at city level.
- To improve public space functionality and its use.
- To increase access to green spaces for nearest neighborhood settlements.
- Creation of larger open space corridors could contribute to neighborhood habitat.
- To enhance livable environment for nearest residential stretch.
- to learn in detail about the varying behavioral pattern of the canal through out the year.
- To learn about the linear greenways and its benefit towards the city context.
- To revive the cultural factor of long lost Patan city.
- To redevelop and uplift the old lakes of Patan city and integrate them with the the project.

3.3 METHODOLOGY

- Identifying the open space of the city and its character.
- Analyzing the layers of urban open greens and coherent social parameters.
- Identifying the issue based on analysis and current site condition.
- Finding the opportunity and propose probable site area.
- Literature study(case study) to identify the program formation.

STAGE	APPROCH/METHOD	EXPECTED OUTCOME
STAGE 1: UNDERSTANGING ABOUT OPEN SPACE AND METHODOLOGIES	LITERATURE STUDY ABOUT OPEN SPACES AND ITS BENEFITS	FIND THE AREA OF INETREST FOR THE THESIS.
STAGE 2: THE POTENTIAL AREA FOR URBAN GREEN WAYS	REGIONAL LEVEL OPEN SPACE IDENTIFY-NEED OF OPEN SPACE-FINDING CURRENT ISSUES	FINDING POTENTIAL AREA FOR URBAN GREEN WAYS -HELPING FOR FINALIZED THE SITE
STAGE 3: SITE ANALYSIS	REGIONAL LEVEL LAND USE MAP,SOIL MAP, CLIMATE MAP, TOPOGRAPHY, HYDROLOGY, SOCIAL LAYERS, DEMOGRAPHICS, NODES OF THE AREA.	-SITE CONNECTION TO THE REGIONAL LEVEL -HOW PROPOSAL WILL IMPECT ON THE CITY LEVEL
STAGE 4- DESIGN PROPOSAL	DIFFERENT GREEN WAYS STATERGY STUDYING BYLAWS, RULES AND REGULATIONS, DESIGN CONCEPT	IT WILL GUIDE ME TO DESIGN APPROCH

Figure 13 Methodology

Chapter 4 REGIONAL ANALYSIS

4.1 HISTORY

- The 1951 administrative units consisted of three states viz;

1. Bombay state,
2. Saurashtra state;
3. Kutch state.

- Gujarat came into existence as a separate state from may 1960.
- Gujarat was divided into 17 districts and185 talukas.
- Gujarat was divided into 25 districts and 226 talukas.
- And Patan district came as a separate district.

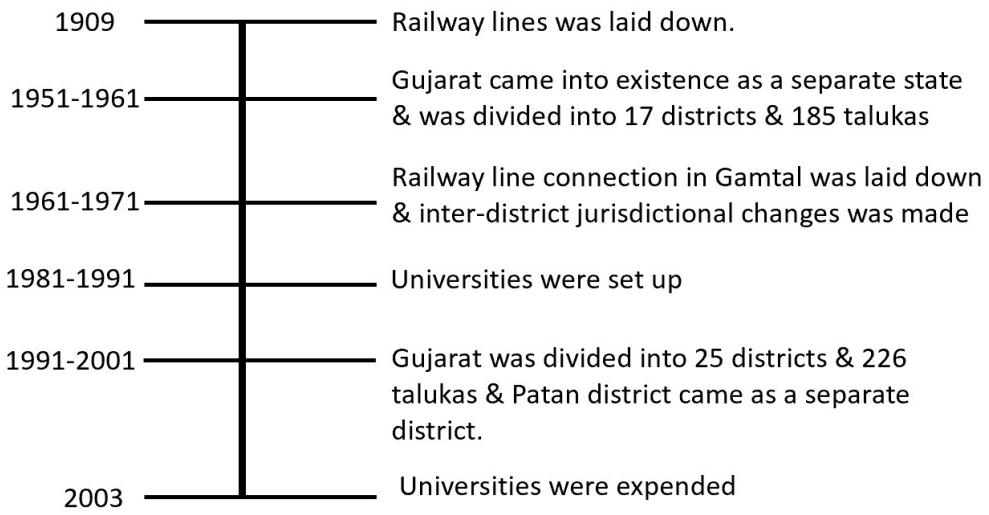


Figure 14 Evoluation Of Patan Ciy

4.2 PHYSICAL LINKAGES OF PATAN

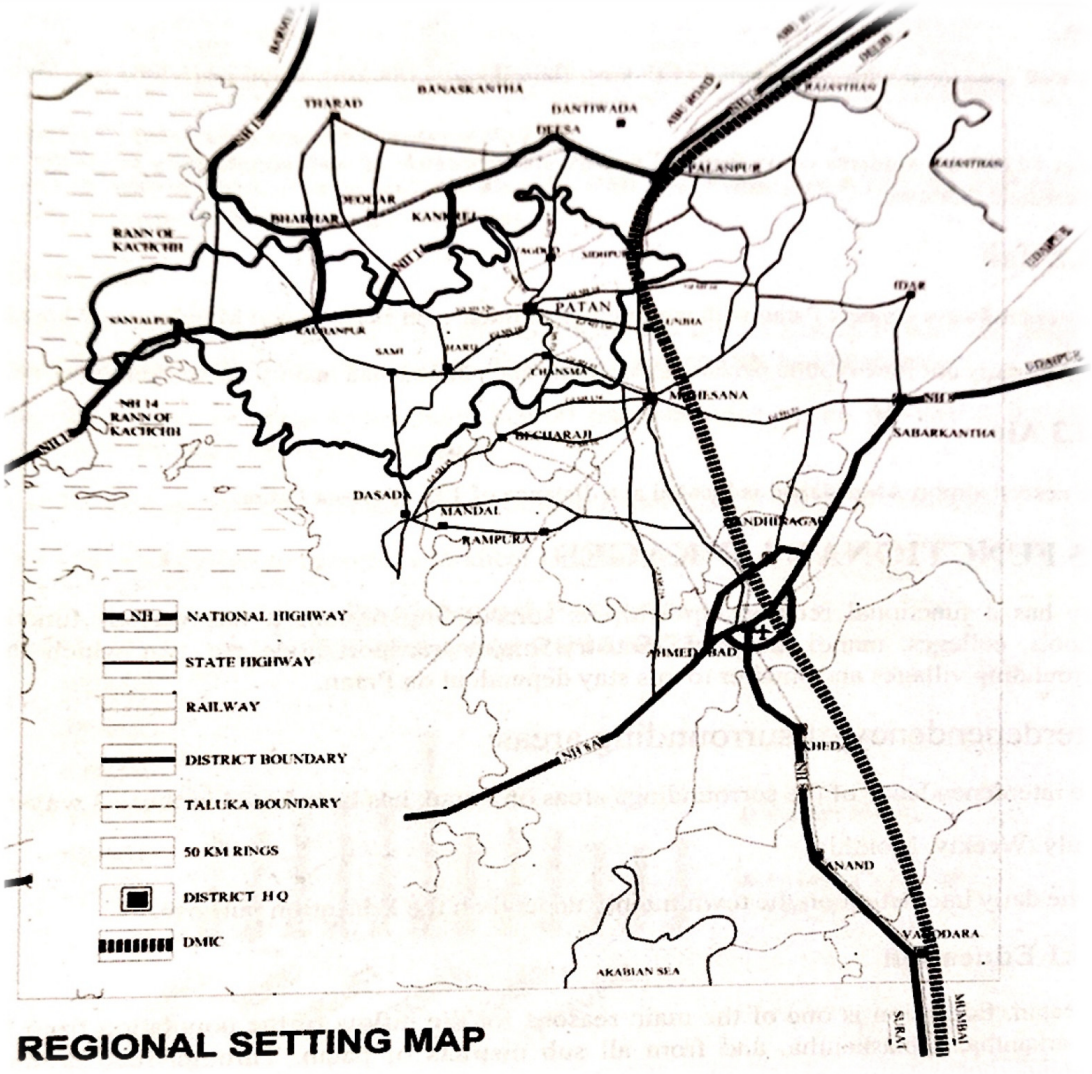


Figure 15Regional Setting Map

CONNECTIVITY WITH PATAN CITY:

Rail:

Patan is 108 km from Ahmedabad Railway Station. Ahmedabad -Bhagat Ki Kothi (Jodhpur) Main line. It is also connected by rail to Mehsana,

Ahmedabad and Okha by BG Line. Patan railway station is now connected with Bhildi Railway Station with New BG Line. New train will start from Bandra to Bhagat Ki Kothi and connectivity to Rajasthan, Delhi, Mumbai.

Road

It is approximately 110 km away from Ahmedabad.

Air

The nearest airport is Sardar Vallabhbhai Patel International Airport at Ahmedabad.

4.3 DEMOGRAPHICS

GEOGRAPHICAL CONTEXT

Patan city lies in the North Gujarat Region of the State which is a semi-arid region.

Climate

Arid and dry climate, with a little bit of rain during the monsoons.

Temperature

Average maximum temperature: 42 C.

Average minimum temperature: 11.3 C

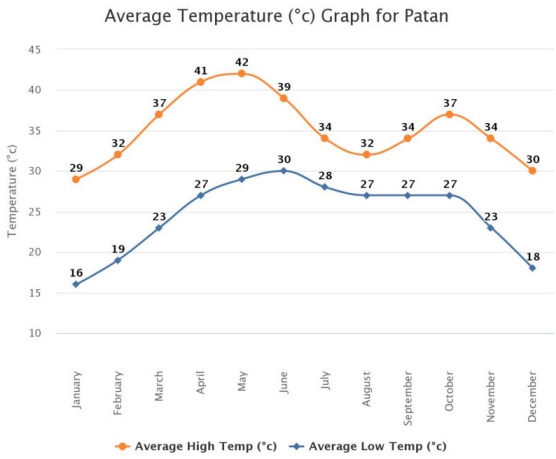


Figure 16 Temperature Analysis

Rainfall

In Patan, Annual Rainfall is 500 mm, receives precipitation through the South-west monsoon.

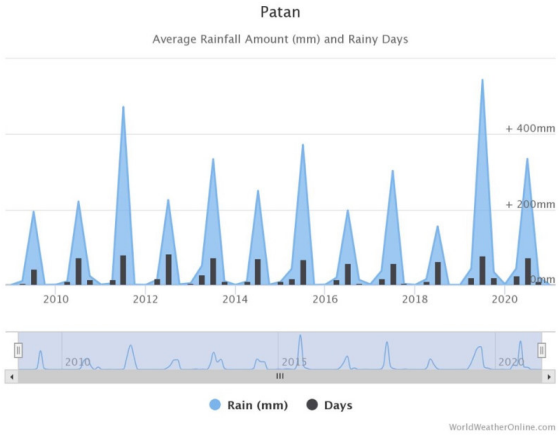


Figure 17 Rainfall analysis

Humidity

In Monsoon season – Generally Above 70% and during Summer – Driest.

Soil – Alluvial Soil

Seismic Zone – Zone IV.

(patel)

4.4 The modern city.

Education

Patan is home to the Hemchandracharya North Gujarat University named after the famous polymath Acharya Hemachandra. It was previously known as North Gujarat University. There are many schools and colleges in Patan.

Medical

Patan is a prominent medical Centre in North Gujarat with almost 200 practicing medical professionals. It has a medical college named GMERS Medical College and Hospital, Dharpur-Patan at Dharpur on Unjha Highway.

Major multi- specialty hospitals include General Hospital, Janta Hospital, Doctor House and other Clinics in Patan.

Entertainment

City Point Multiplex and Time Cinema provides Entertainment facilities.
Siddhhem Water Park & Resort is developing on Sariyad Highway near Rani Ki Vav.

Industries

Patan has a **GIDC** and the small and medium size industries and a new **GIDC** in Charup, Ta Saraswati District, Patan.

Market

Auction of agricultural product done here between farmers and buyers through commission agent is called **APMC**. Patan has a Vegetable Market on Chanasma Highway.

4.5 Tourist attractions

There are many tourist attractions including forts, vavs (step wells), talabs (lakes) and places of worship. The main tourist attractions are the Rani Ki vav (World Heritage Site) and patola saris.

The remains of Old City of Patan are a very small portion of Old Fort near Kalka on the outskirts of the New City is of historical and archeological importance. So is the case with the remains of the walls of new fort and the Darwajas (gates) of the new fort which are fast disappearing. The administration and a majority of local people show little interest in preserving these heritage places which are shrinking at a rapid pace. The inner fort of Bhadra with its Darwajas is preserved well.

Step wells include Rani Ki vav and Trikam Barot ni Vav. Lakes include historically and archaeologically important Sahastralinga Tank, Anand Sarovar (Gungadi Talav) and Khan Sarovar.

Two famous architectural monuments have gain the status of national monuments. One of them is Sahastralinga tank and other one is Rani Ki vav stepwell. Rani Ki vav is an intricately constructed stepwell situated in the town of Patan in Gujarat, India. It is located on the banks of Saraswati River.



Sahasralinga Talav



Inside Rani ki vav



Water Inlets

4.6 DEMOGRAPHY

DEMOGRAPHY

Description	YEAR 2011
City	**Patan**
Government	**Municipality**
Urban Agglomeration	**Patan Metropolitan**
State	**Gujarat**

Patan City	Total	Male	Female
City + Out Growths	**133,737**	69,898	63,839
City Population	**125,497**	65,535	59,962
Literates	**96,835**	53,862	42,973
Children (0-6)	**12,887**	6,919	5,968
Average Literacy (%)	**85.99 %**	91.89 %	79.59 %
Sexratio	**915**		
Child Sexratio	**863**		

Source: https://www.census2011.co.in/census/city/321-patan.html

4.7 WARD WISE DEMOGRAPHY

4.7.1 Literacy Rate:

Literacy, being one of the important sector of social development, affects the demographic characteristics and participation in labor. As per census 2011, average literacy rate of Patan town has been increased to 61.43% from 51.9% in 2011 Census. The male literacy rate as per 2011 Census is high as 62.49% while female literacy rate is significant at 40.62%.

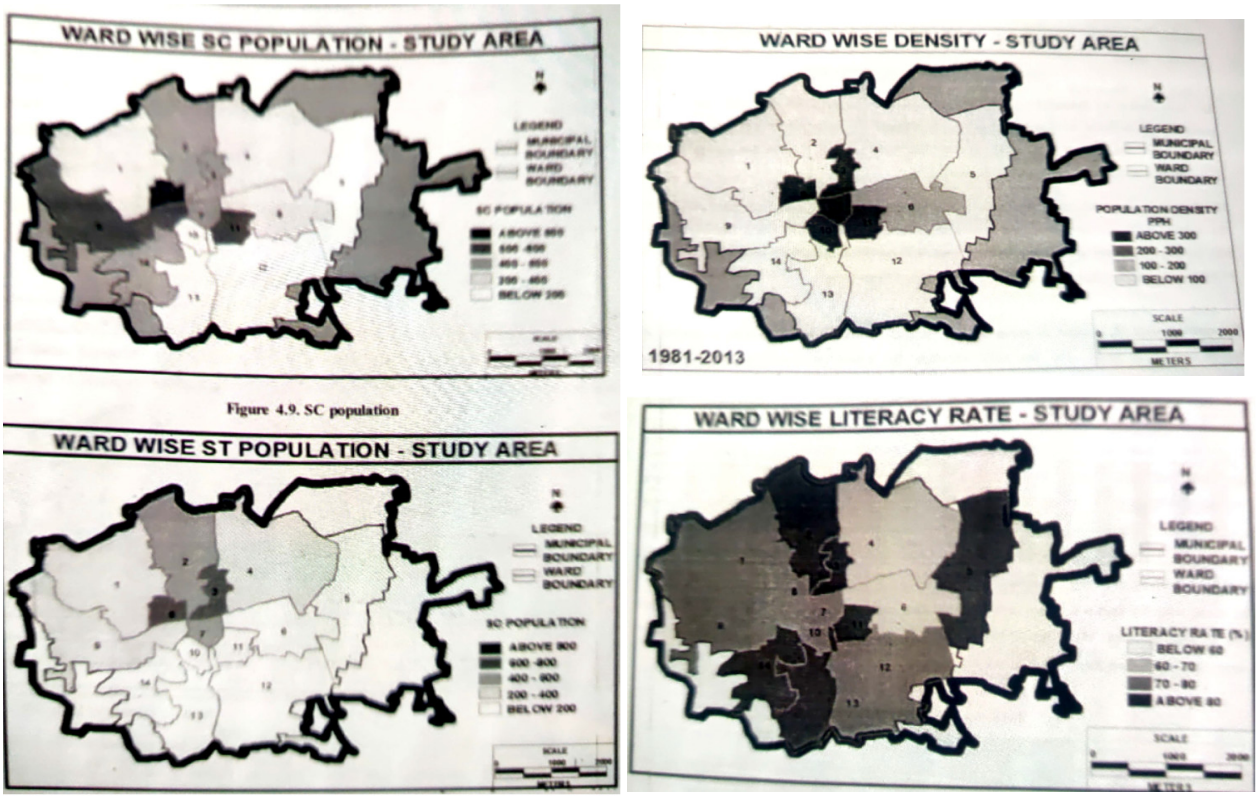
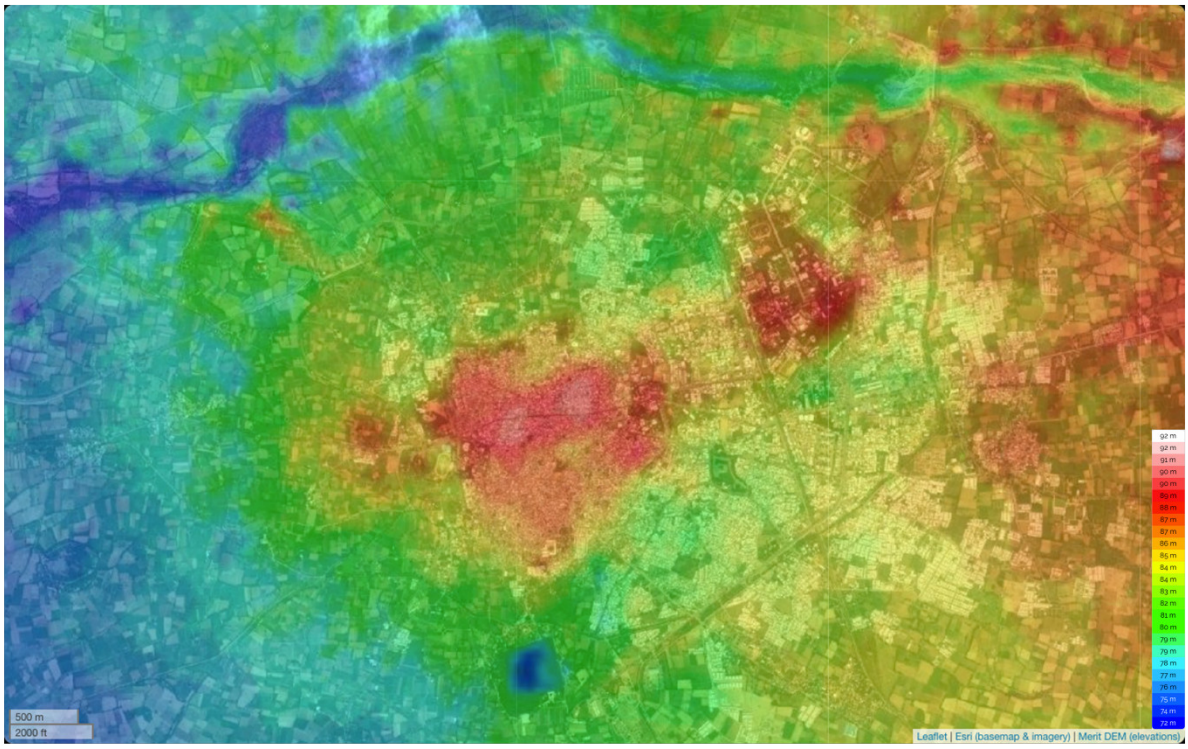


Figure 4.9. SC population

Figure 18 Ward Wise Demography

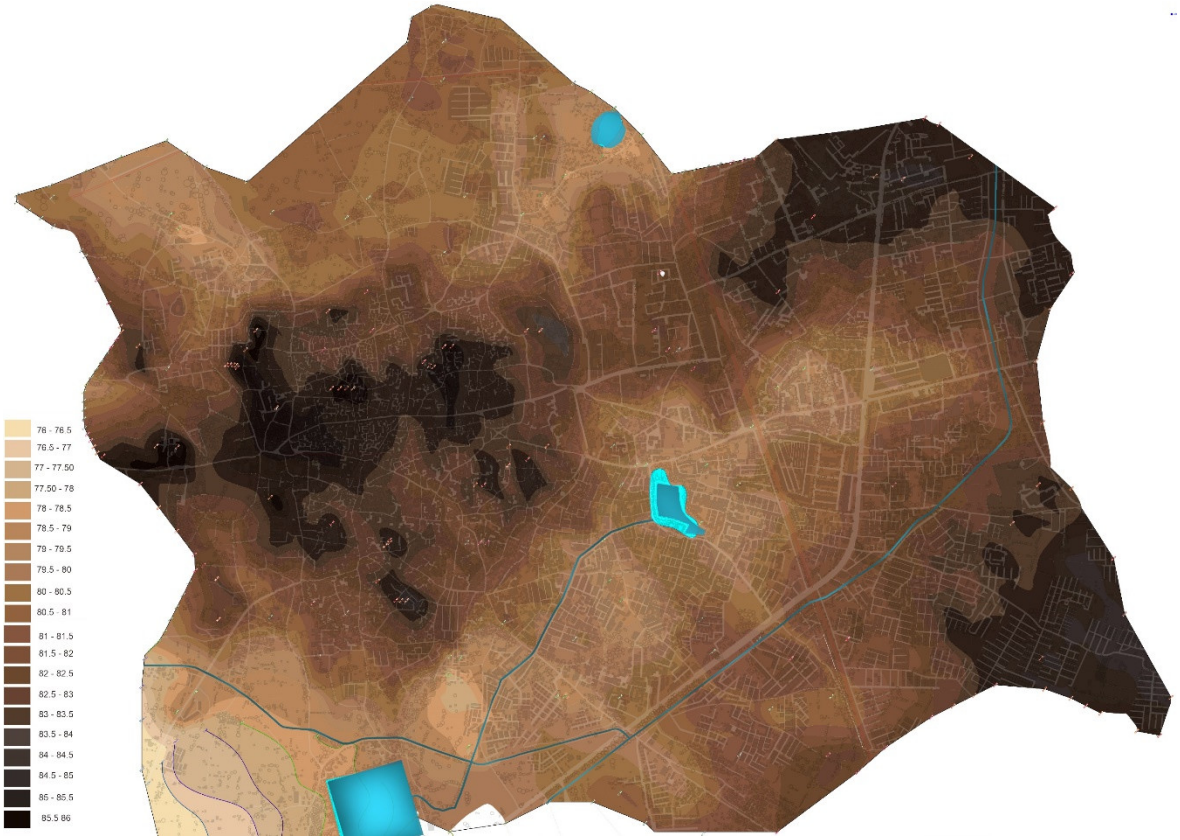
(patel)

4.8 ELEVATION MAP



Map 6 Elevation Map

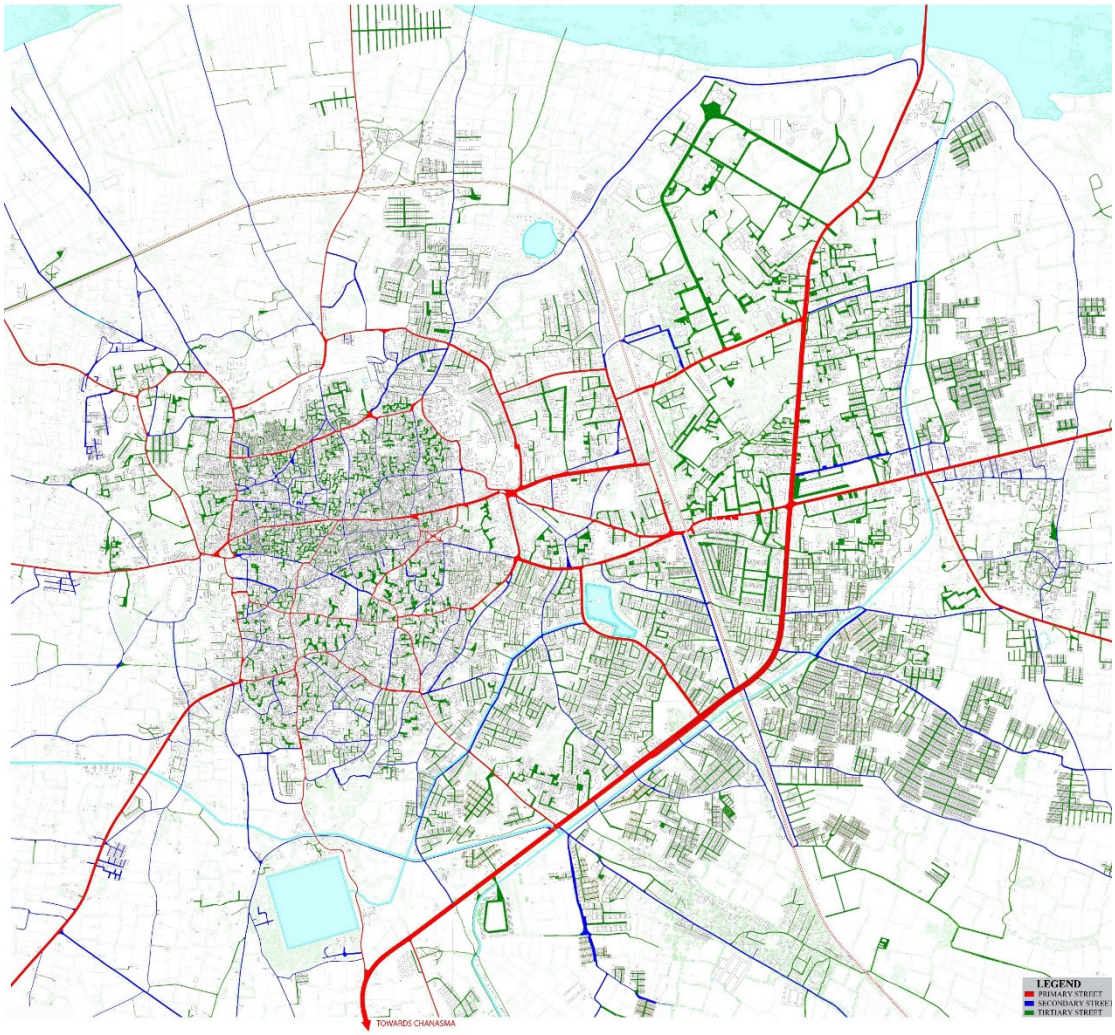
4.9 CONTOUR MAP



Map 7 Contour Map

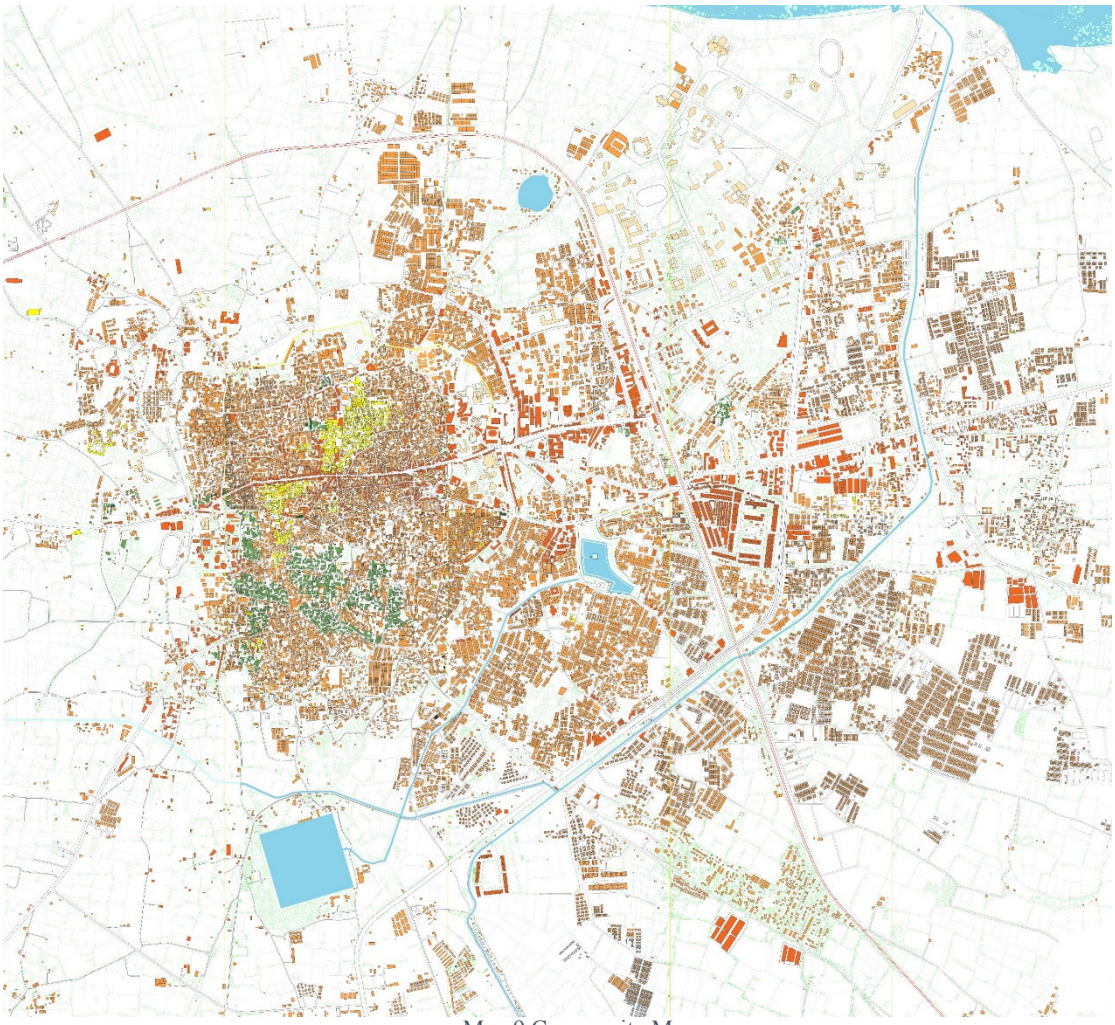
The central area of the city which is old part of the city is on the higher level.

4.10 ROAD HIERARCHY



Map 8 Road Hierarchy

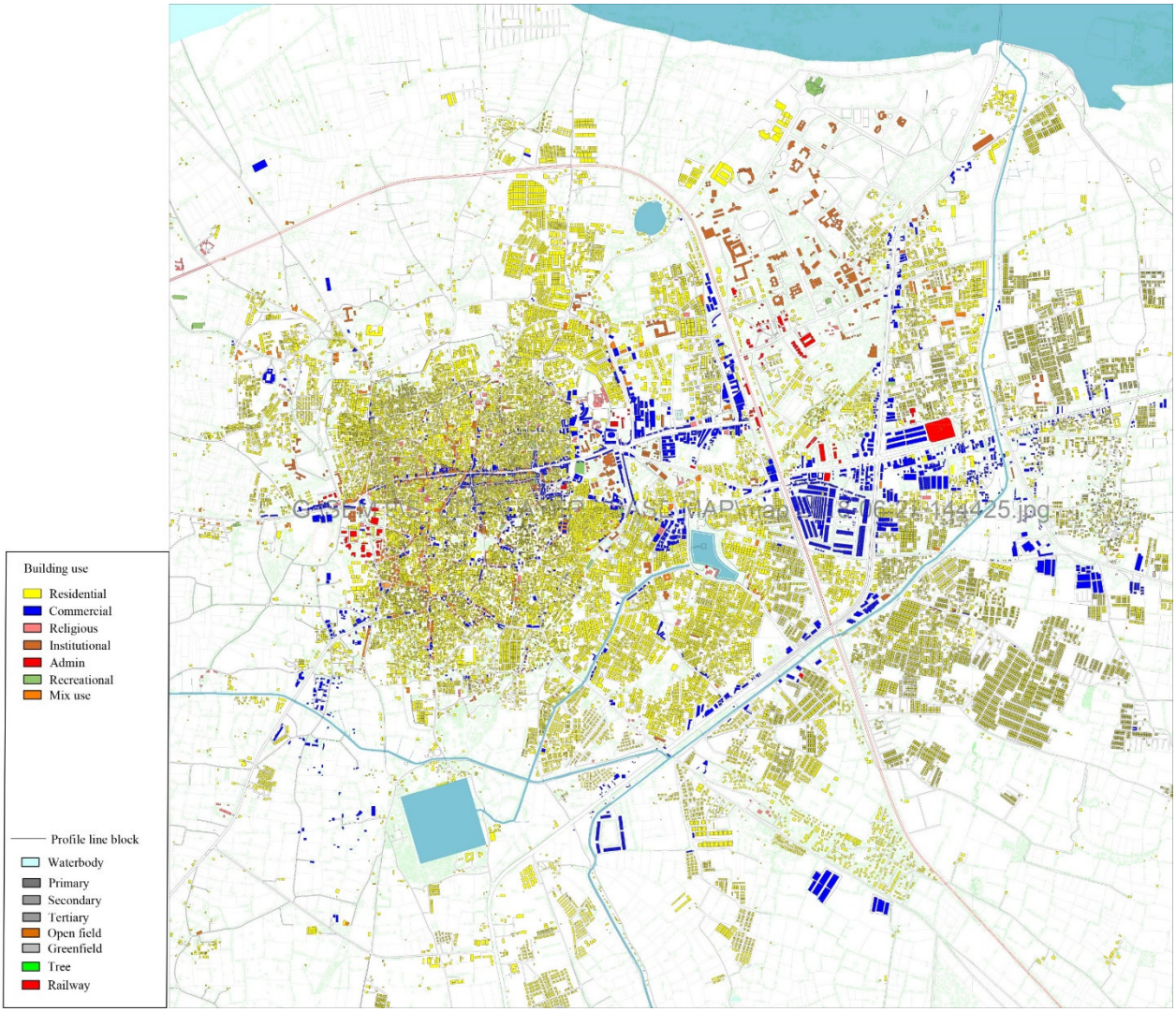
4.11 COMMUNITY MA



Map 9 Community Ma

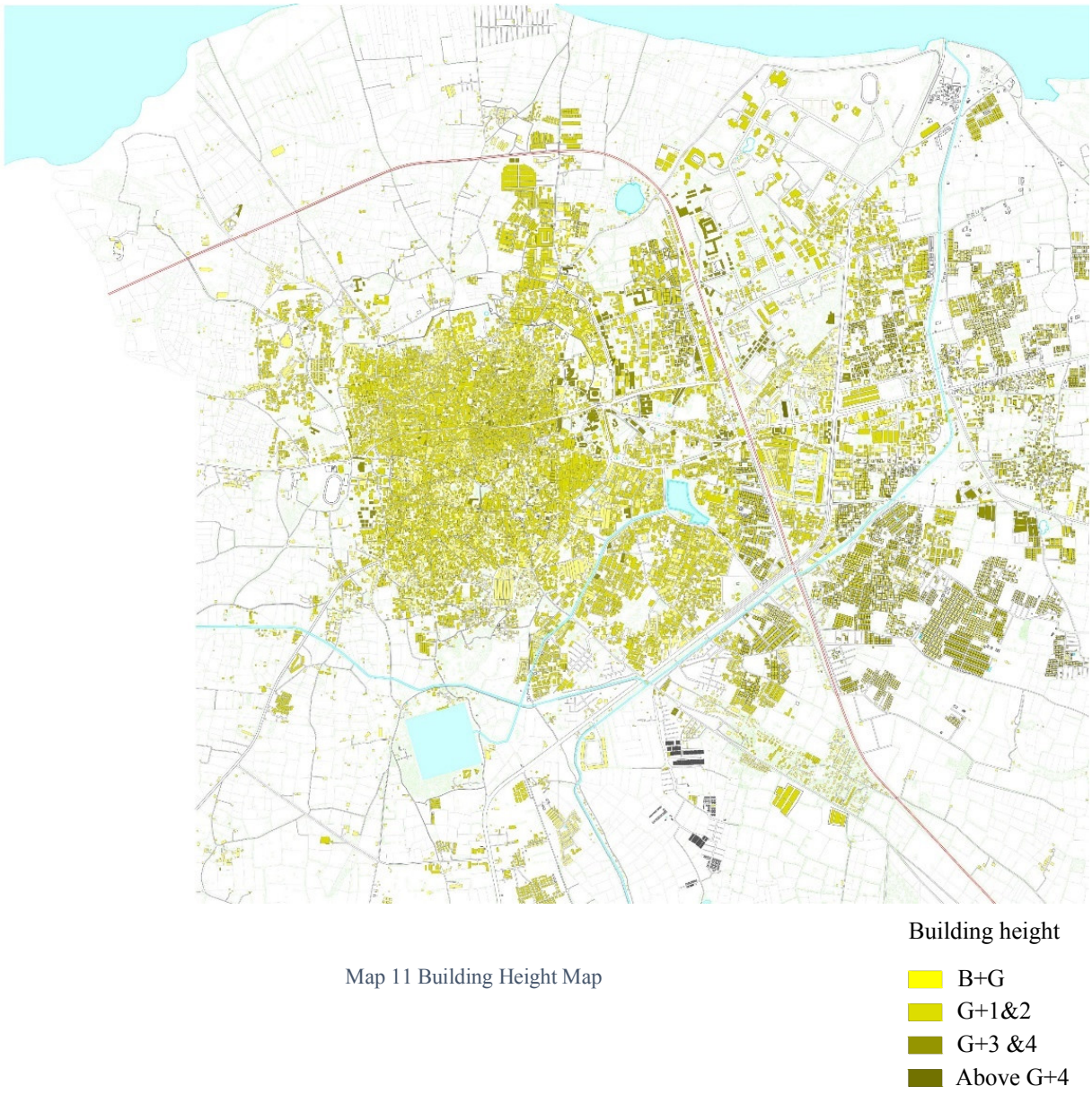
- Hindus are the largest religious community of the city. other minority religious communities includes Muslims, Christians, Sikhs and Jains. About 90% of the population is Hindu.
- The history of Patan indicates that it was one of Jainism influenced state.

4.12 LAND USE MAP



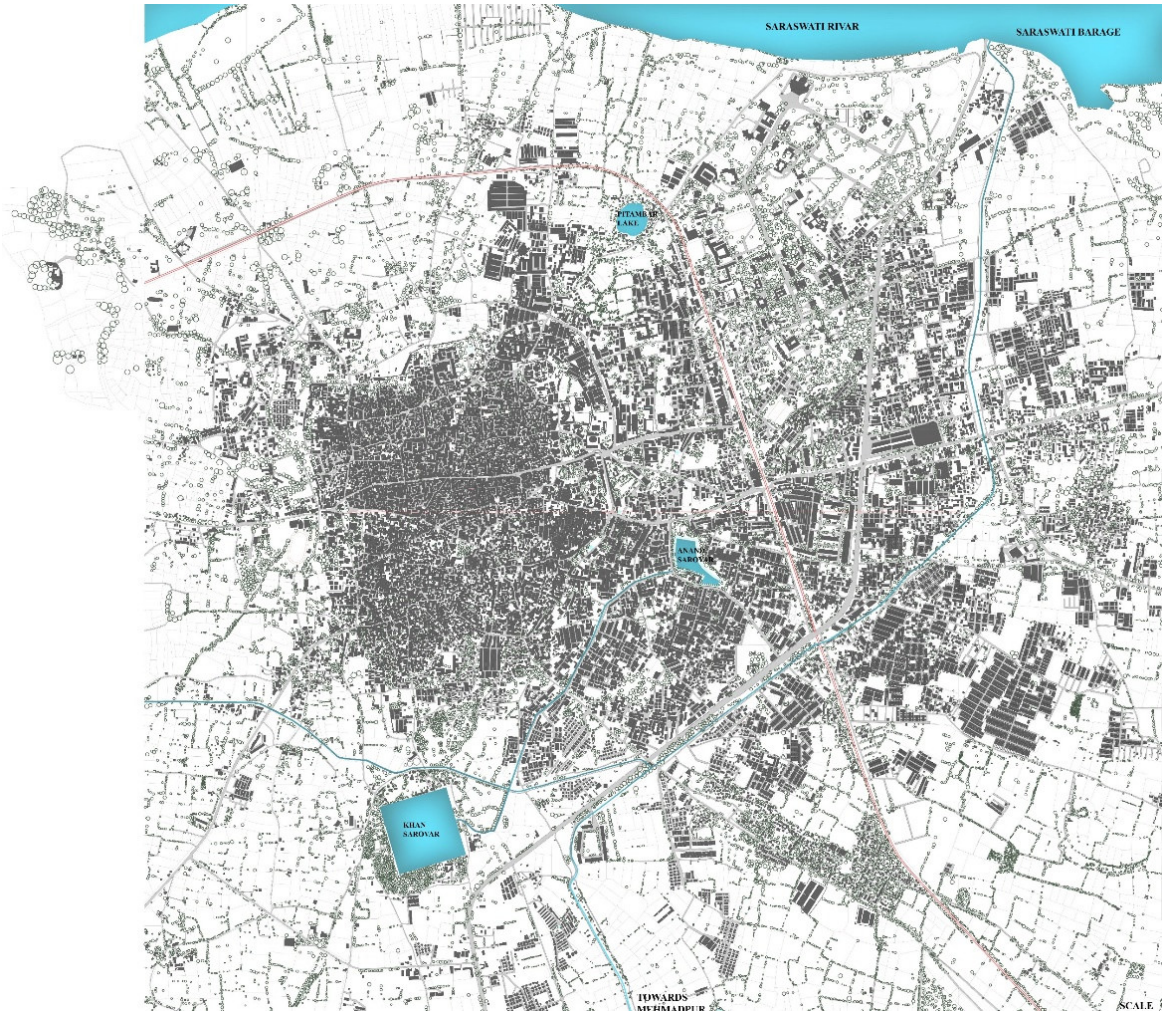
Map 10 Land Use Map

4.13 BUILDING HEIGHT MAP



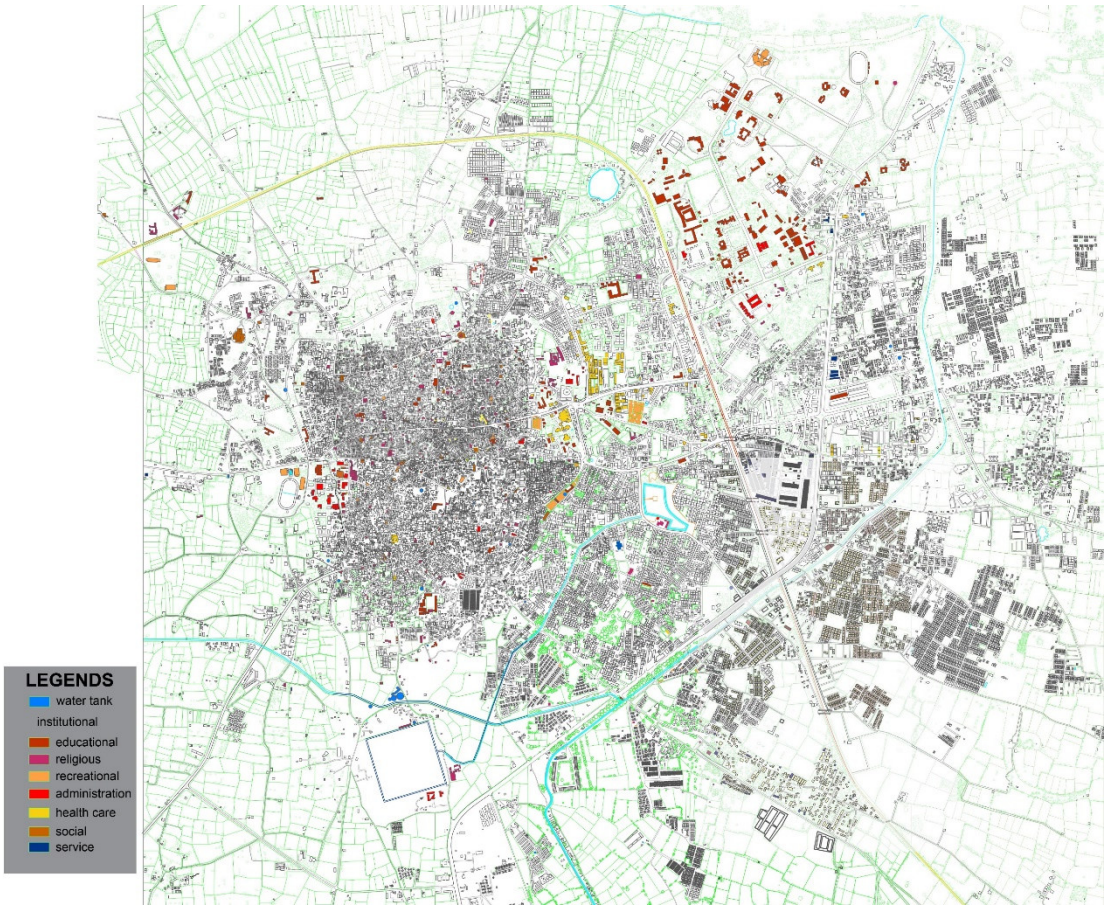
Map 11 Building Height Map

4.14 BUILT VS OPEN MAP

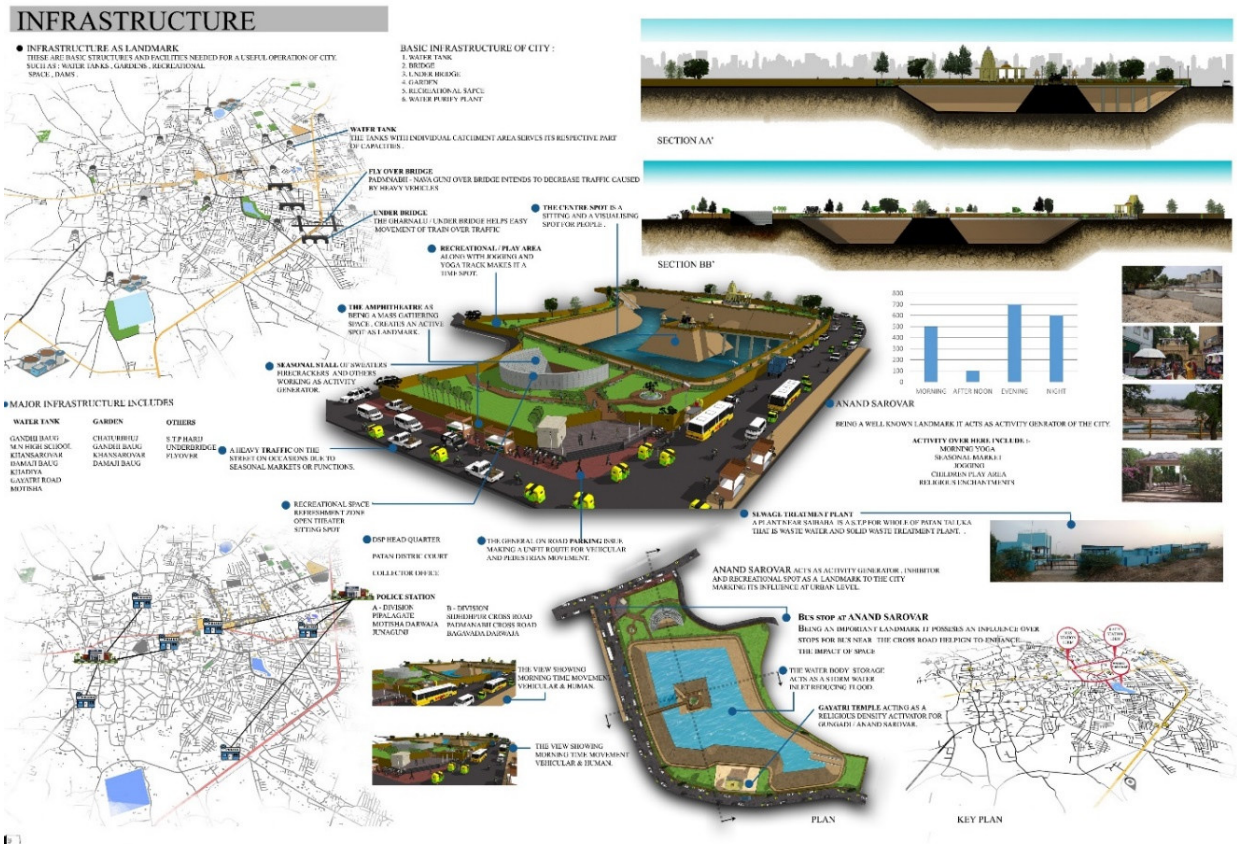


Map 12 Built Vs Open Map

4.15 INFRASTRUCTURE MAP



Map 13 Infrastructure Map



4.16 LANDMARKS

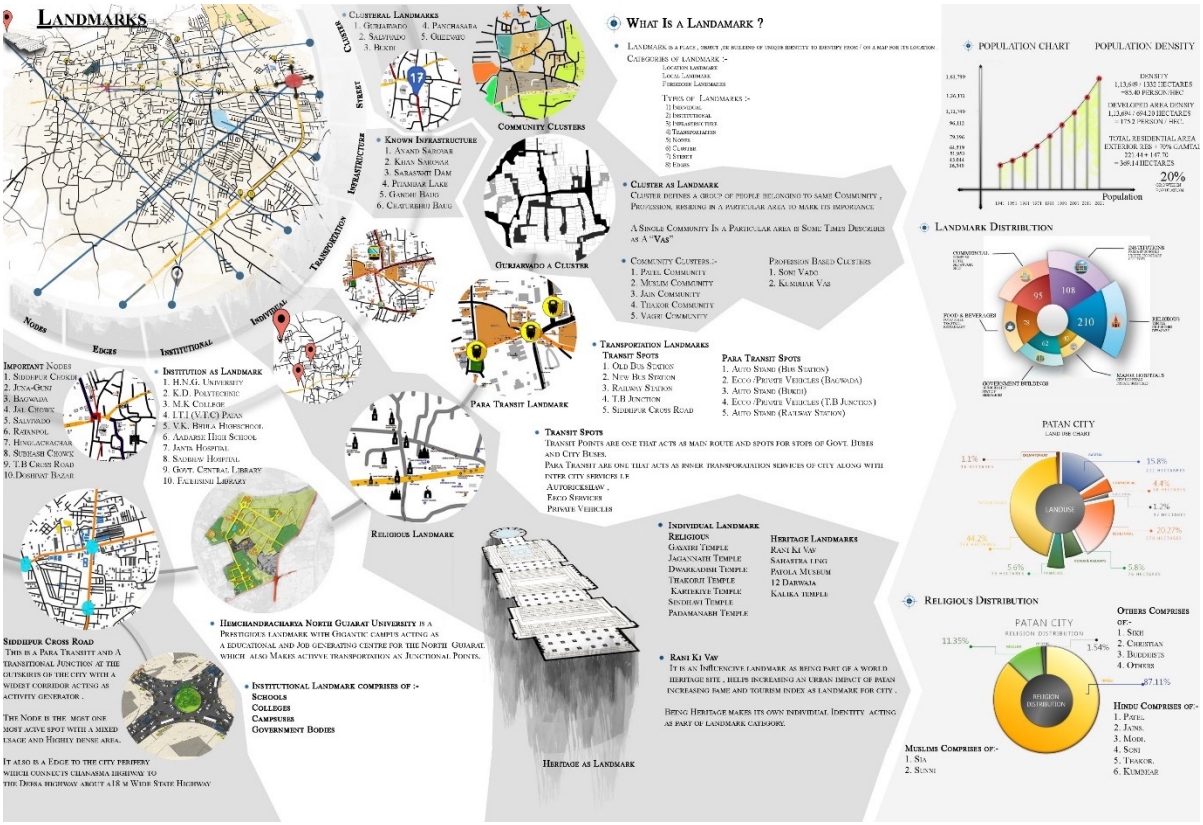


Figure 19 Landmarks

4.17 INSTITUTIONAL

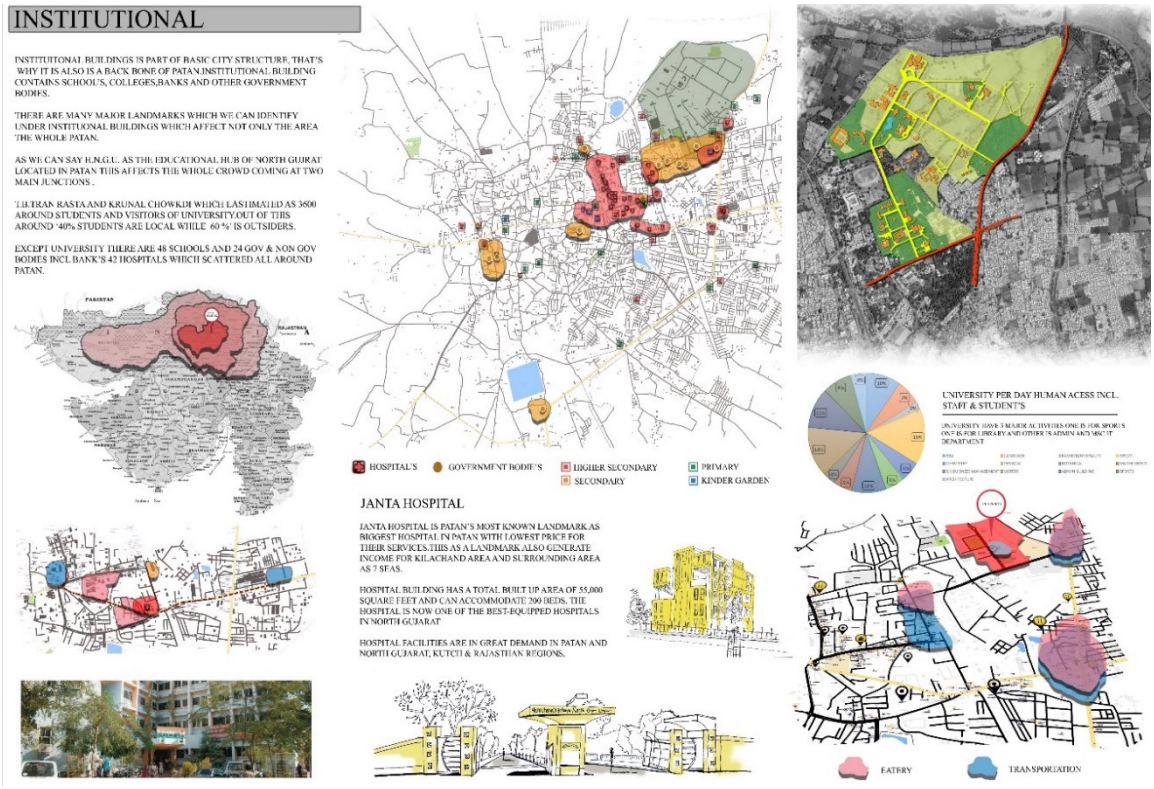
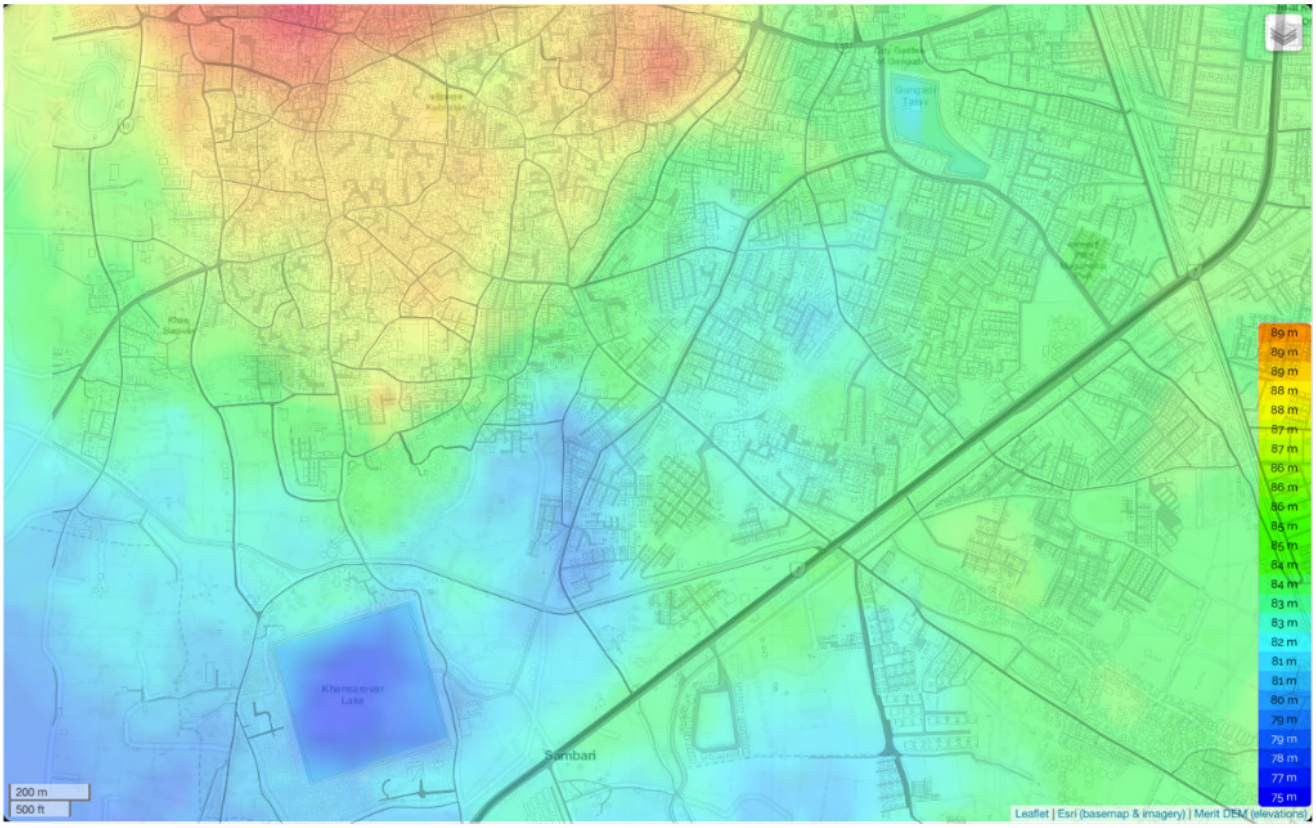


Figure 20 Institutional

Chapter 5 ANALYSIS OF SELECTED SITE AREA

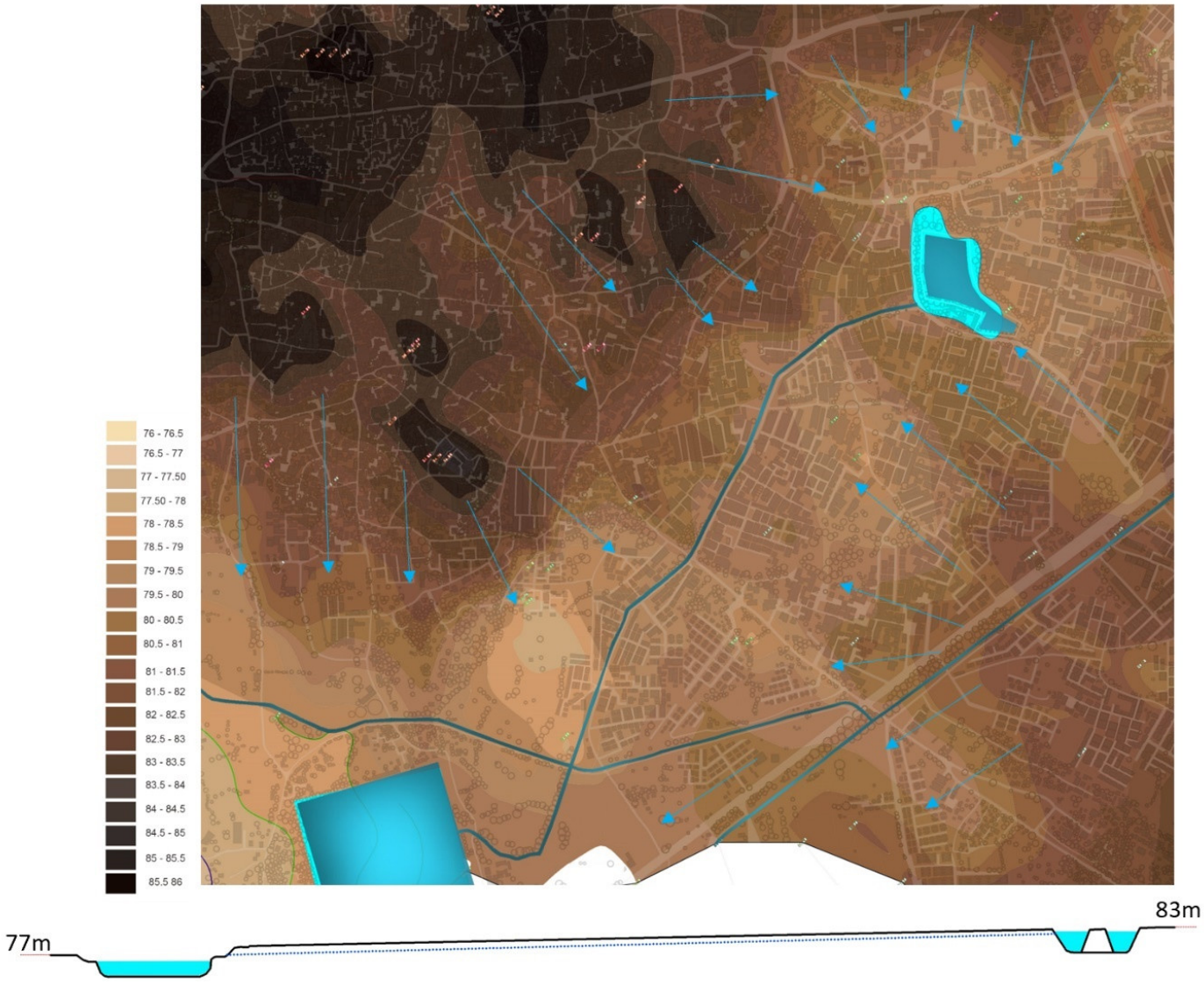
5.1 ELEVATION MAP





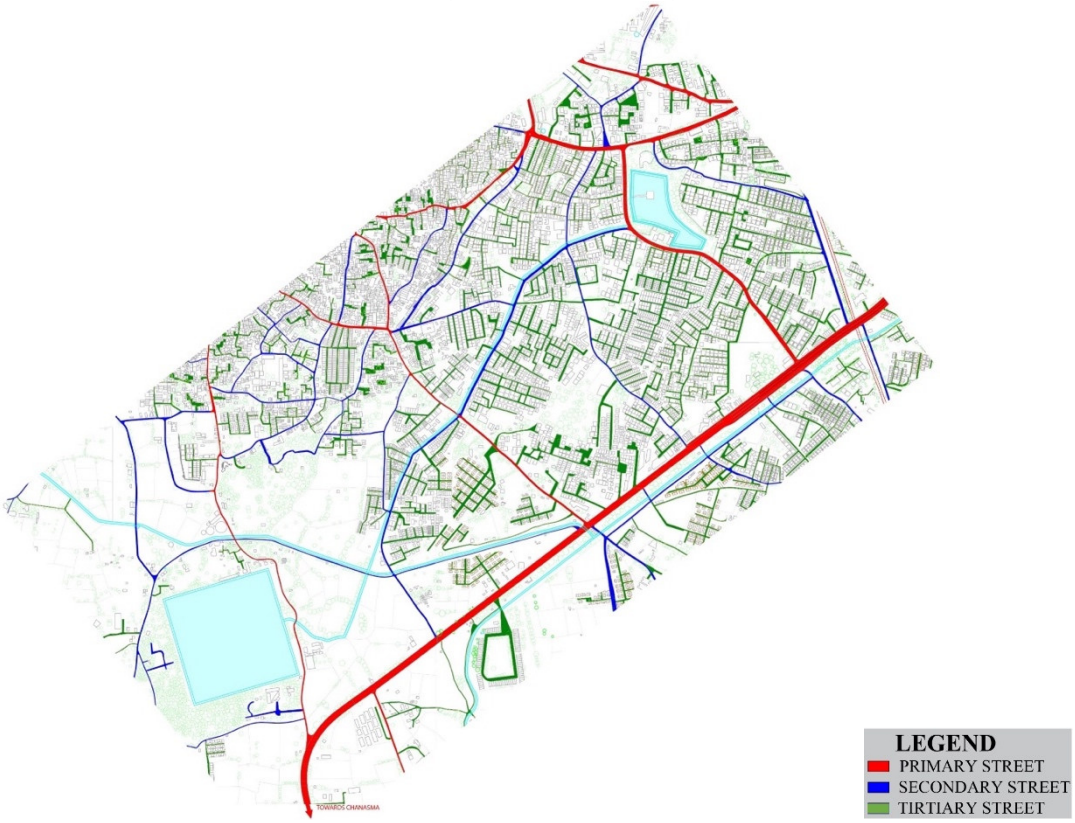
Map 14 Elevation Map

5.2 CONTOUR MAP WITH RAIN WATER DRAIN



Map 15 Contour Map With Rain Water Drain

5.3 ROAD NETWORK(SITE LEVEL)



Map 16 Road Network(Site Level)

5.4 BUILDING HEIGHT (SITE LEVEL)



Map 17 Building Height (Site Level)

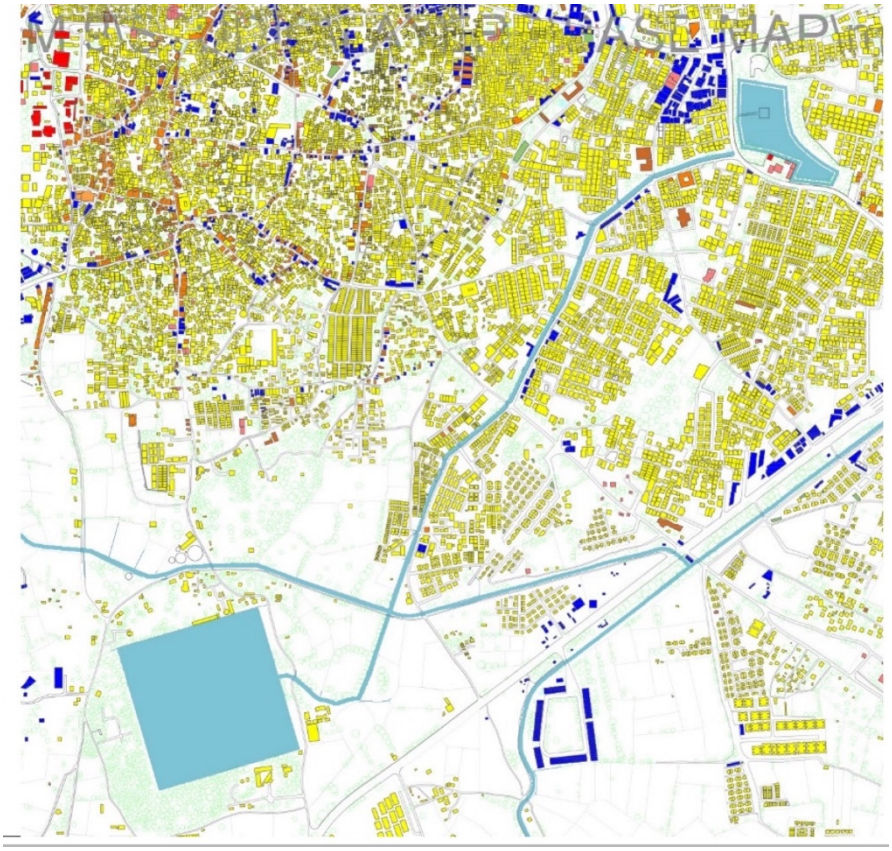
5.5 COMMUNITY MAP (SITE LEVEL)



Map 18

Commuity Map(Site Level)

5.6 LAND USE MAP (SITE LEVEL)



Map 19 Land Use Map (Site Level)

5.7 EXISTING SITE FEATURES

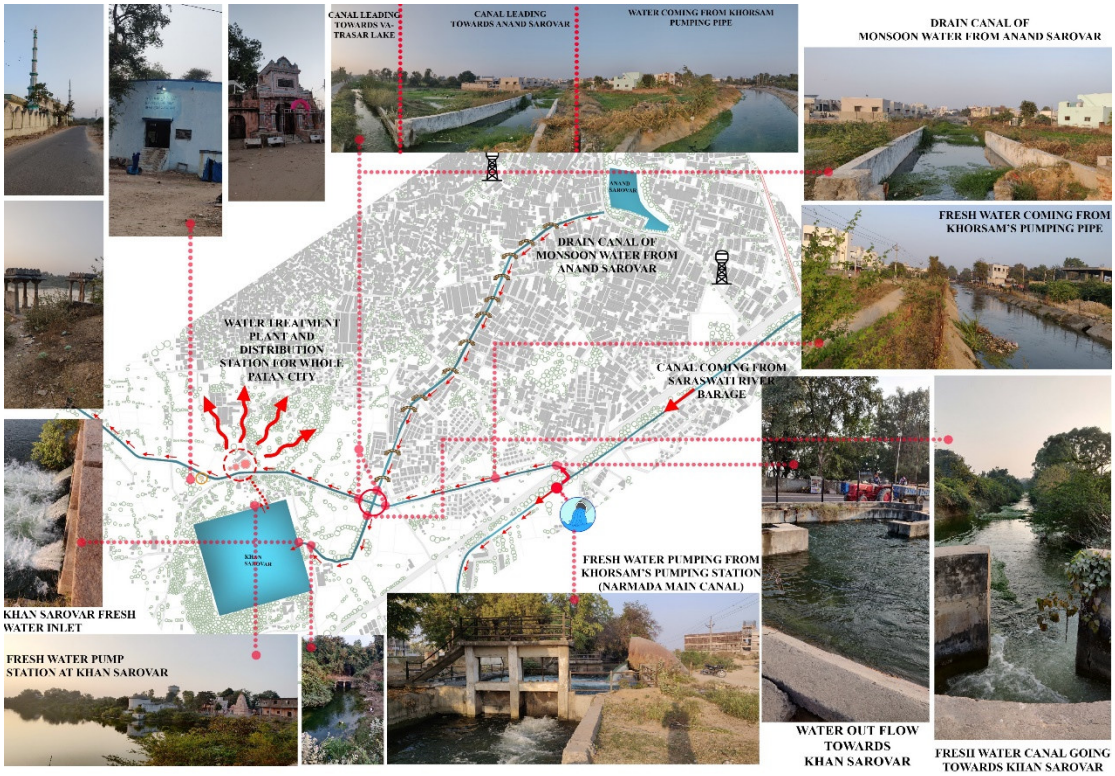


Figure 21 Existing Site Features



Figure 22 Site Sections

5.8 SITE ISSUES (EXISTING)

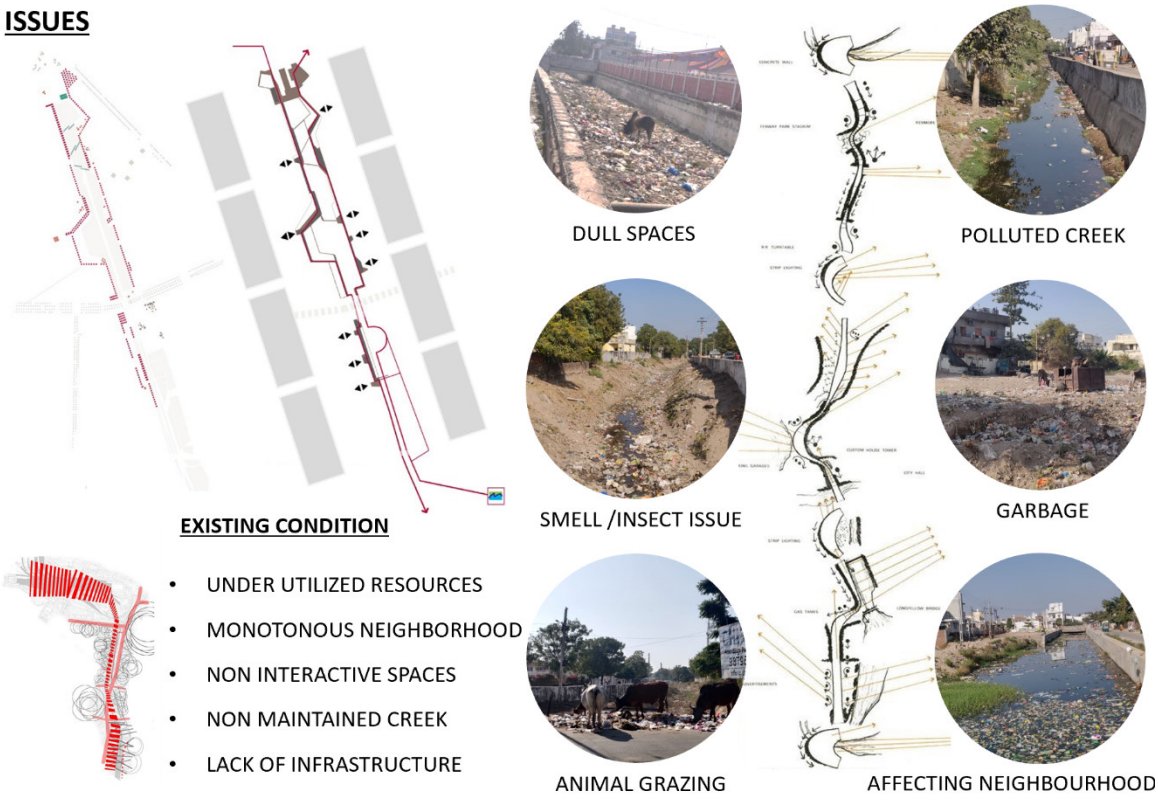


Figure 23 Site Isuues(Existing)

Chapter 6 DESIGN PROPOSAL

6.1 CONCERNS FOR DESIGN PROPOSAL

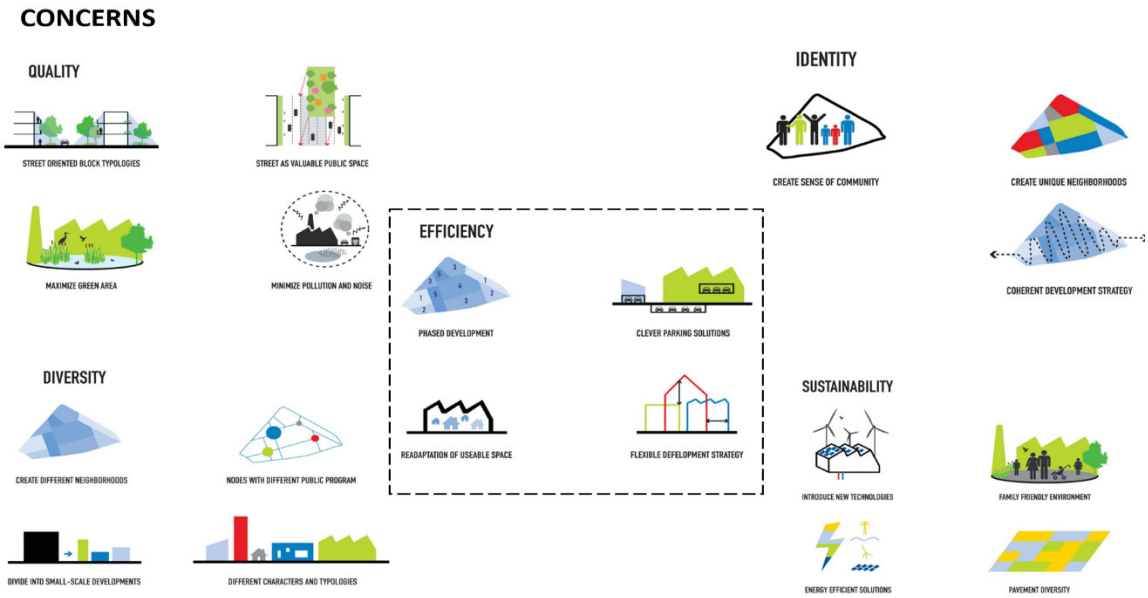


Figure 24 Concerns For Design Proposal

6.2 STRATEGIES

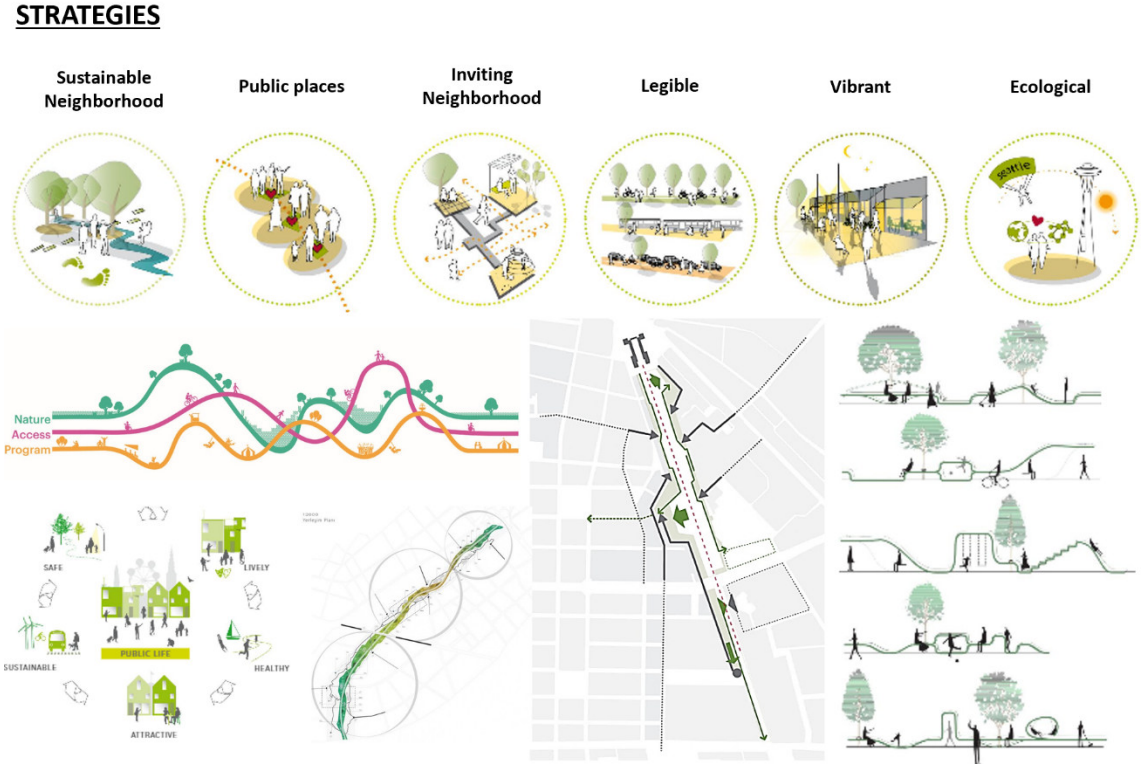


Figure 25 Strategies

6.3 VISION



Figure 26 Vision

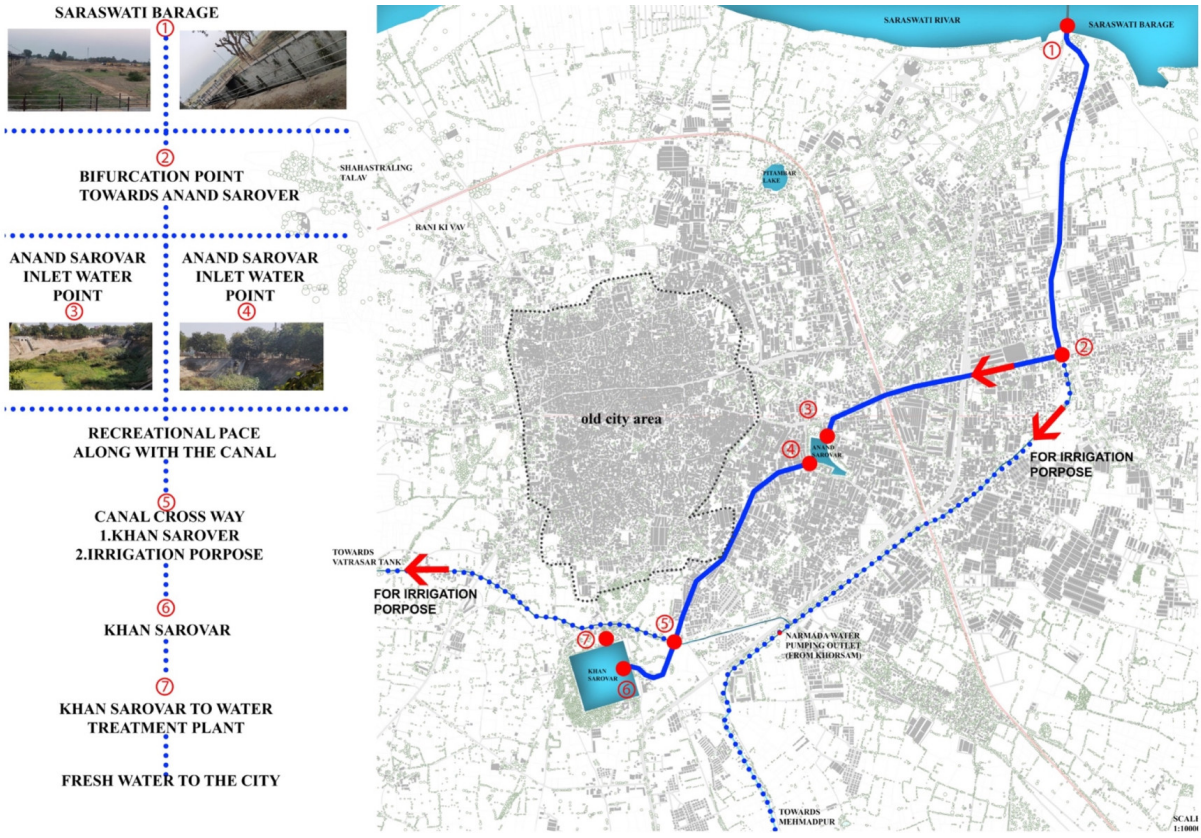


Figure 27 Proposed Water Network at regional level

6.4 IMPORTANT BRIDGES

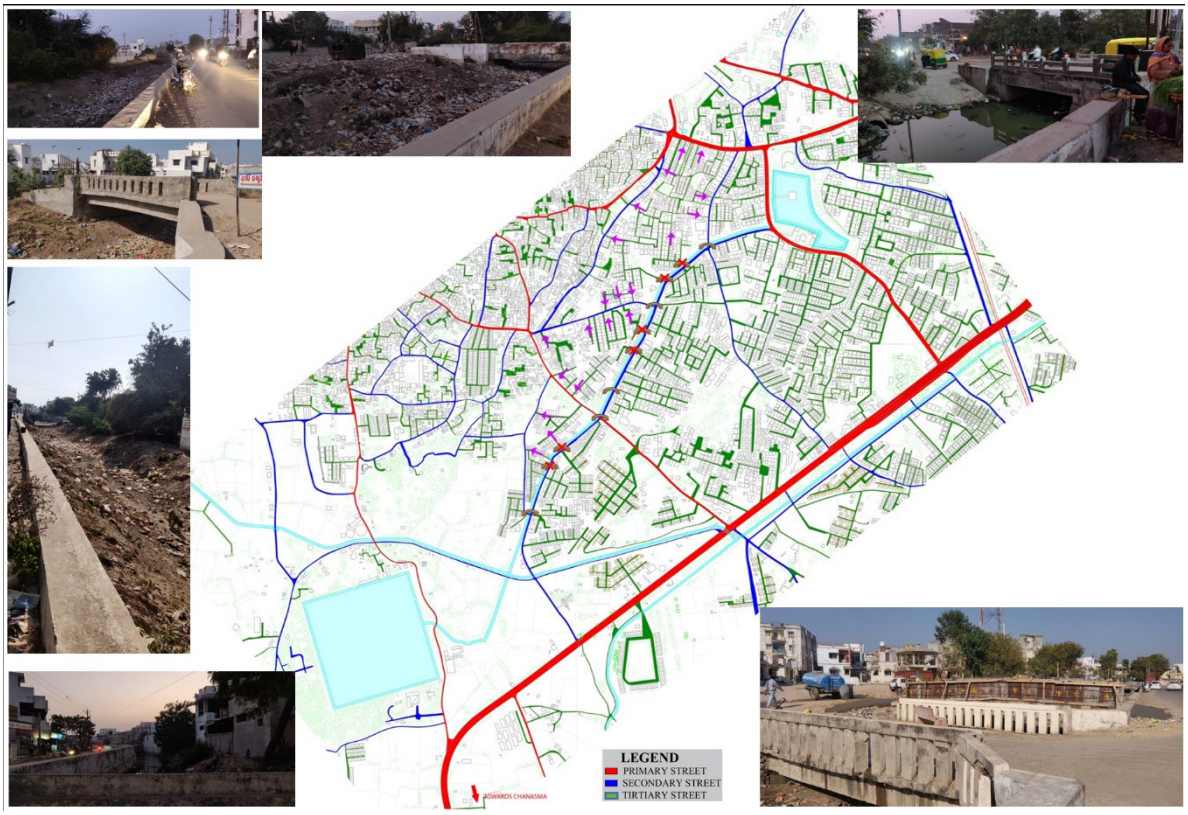


Figure 28 Important Bridges

6.5 CONCEPTUALPROPOSAL

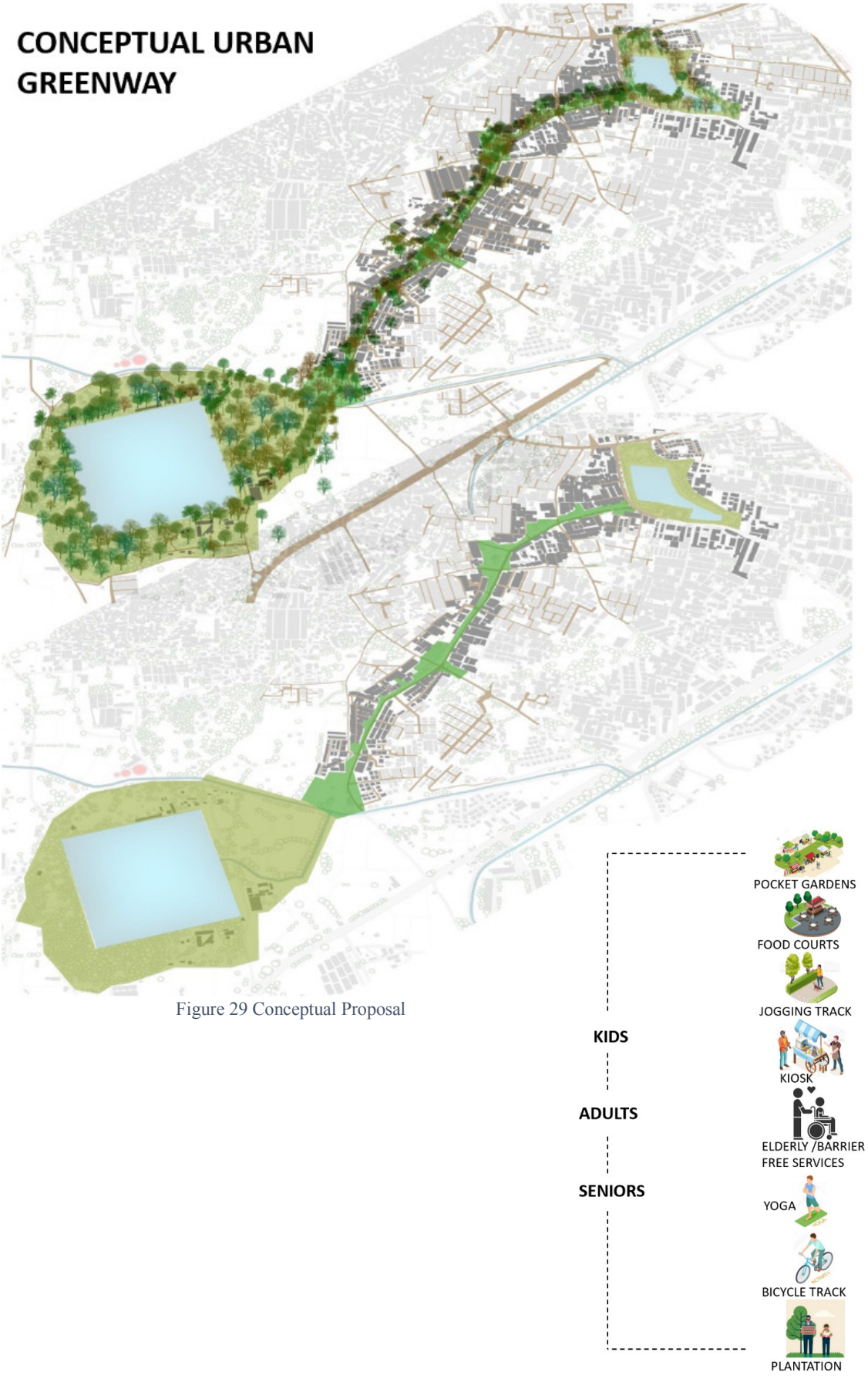


Figure 29 Conceptual Proposal

6.6 MASTER PLAN

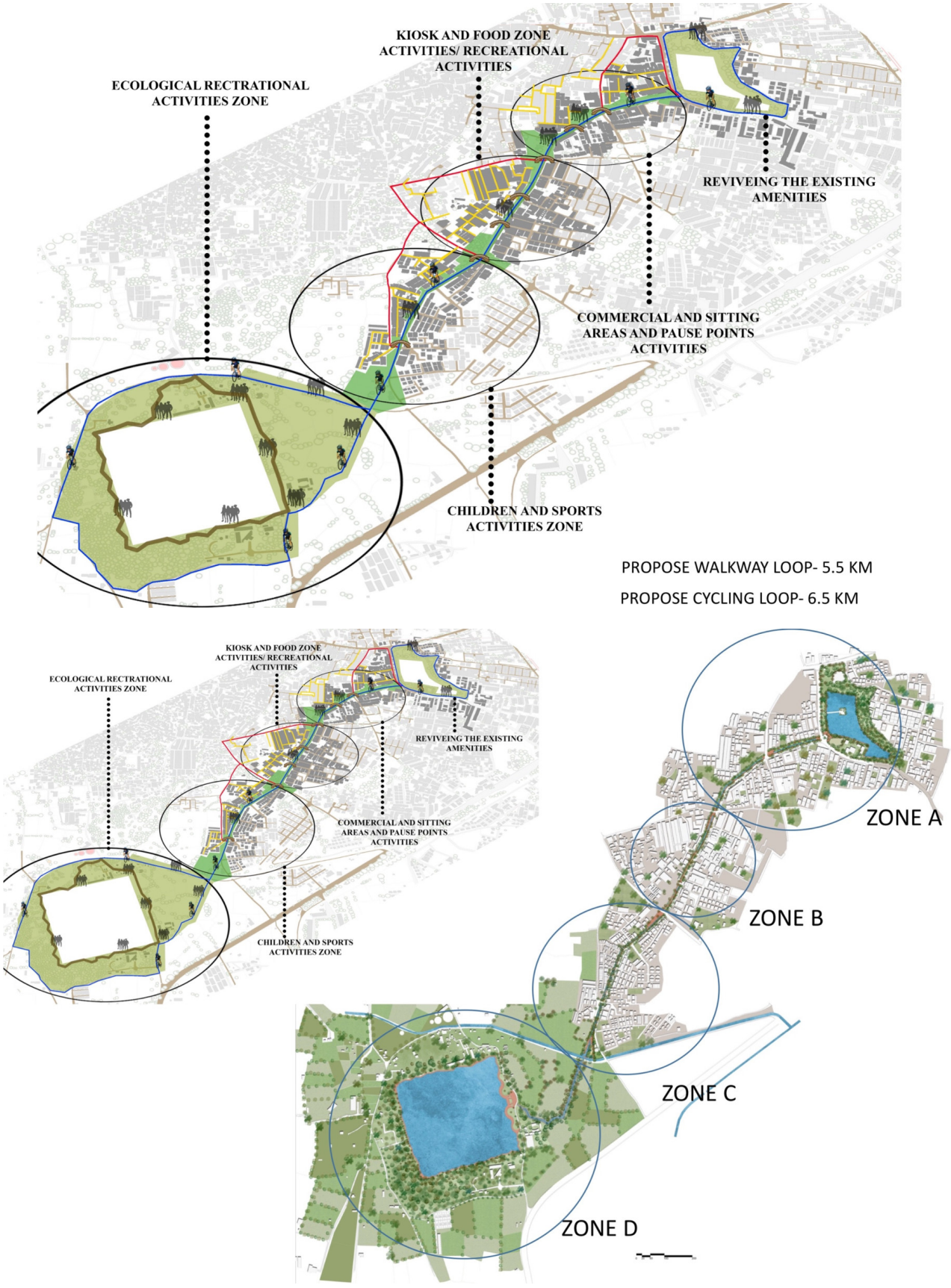


Figure 30 Master Plan

6.7 ACTIVITIES MAPING ACCORDING TO ZONING



6.8 DETAILED PLAN LAYOUT OF DIFFERENT ZONE

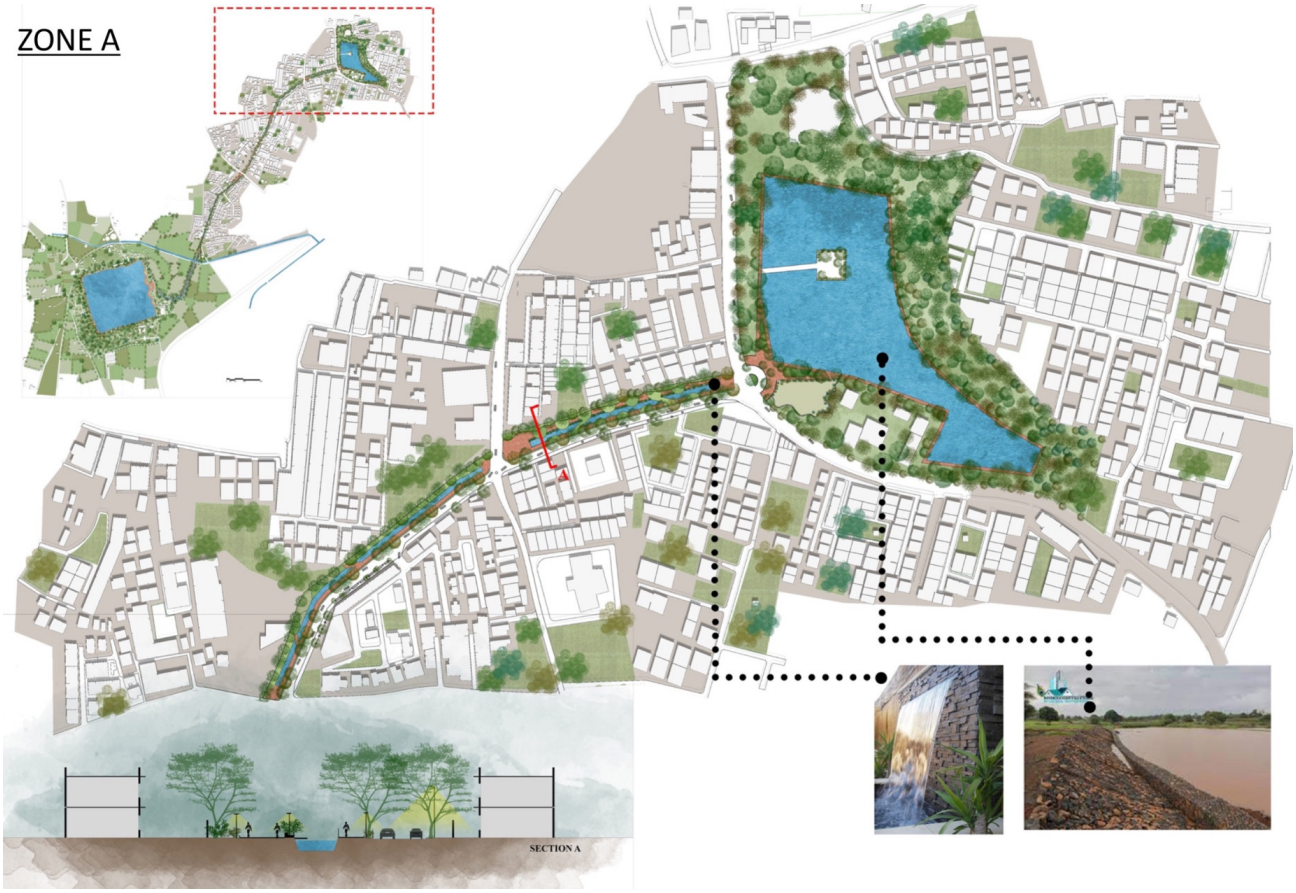


Figure 31 Detailed Plan of Zone A

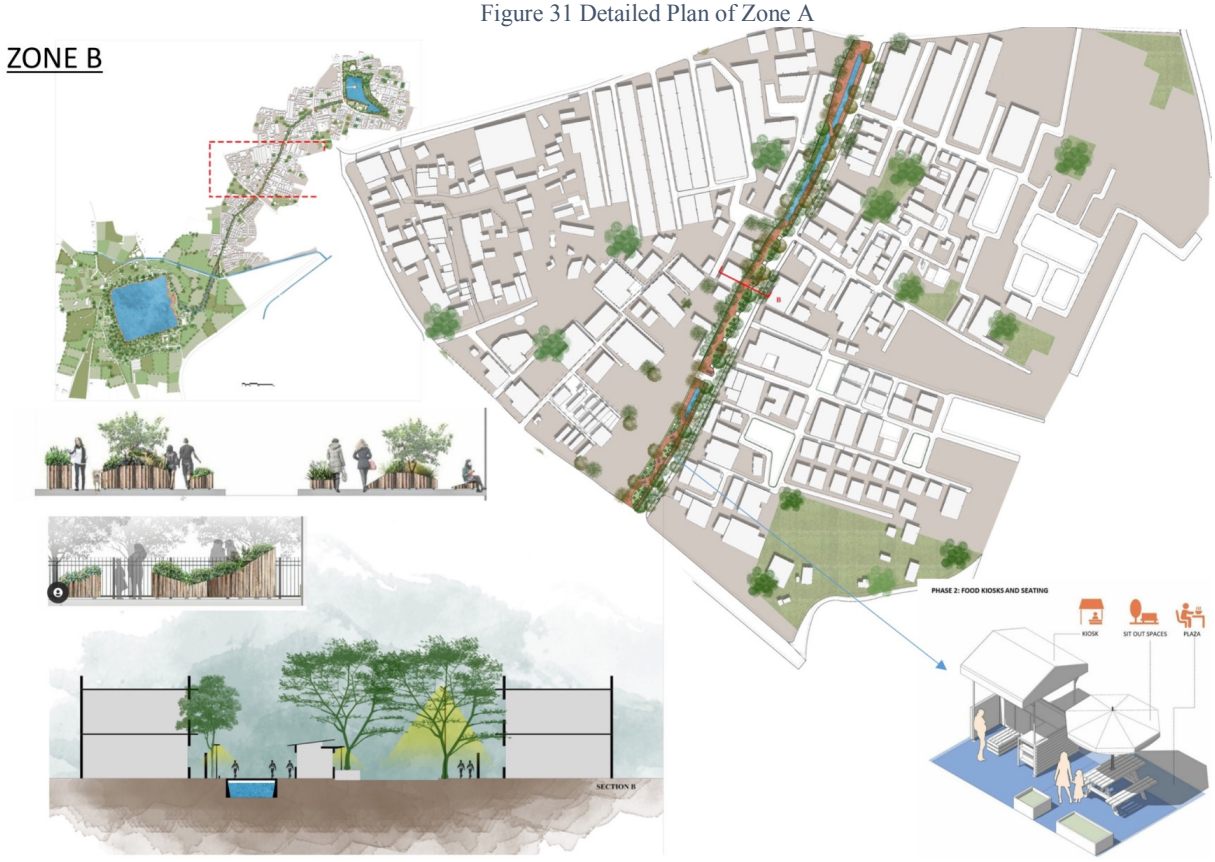


Figure 32 Detailed Plan of Zone B



Figure 33 Detailed Plan of Zone C



Figure 34 Detailed Plan of Zone D

6.9 PROPOSED SHRUB FOR INTERVANTION

	Plant name	Plant photo		Plant name	Plant photo
1	Golden cypress (xanthocyparis vietnamensis)		10	Areca palm	
2	Roheo (tradescantia spathacea)		11	Schefflera variegated	
3	Ophiopogon japonicus		12	peace lily (spathiphyllum)	
4	Hibiscus red		13	Plumbago	
5	Fountain grass (pennisetum setaceum)		14	pantas	
6	Dwarf Ixora		15	Acalypha	
7	Canna Variegated		16	Dracaena	
8	Zephyranthes lily (Rain lily)		17	Croton	
9	Rhapis palm		18	Umbrella palm	

Figure 35 Proposed Shrub List

6.10 PROPOSED TREES FOR INTERVANTION

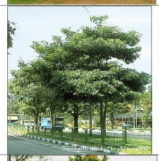
	Tree name	Tree photo
1	Azadirachta indica	
2	Alstonia scholaris	
3	Saraca asoca	
4	Pongamia pinnata-karanj	
5	Terminalia arjuna	
6	minusops elengi-bakul	
7	tabubia Rosea	

Figure 36 Proposed Tree List

REFERENCES

https://en.wikipedia.org/wiki/Patan,_Gujarat

https://www.archdaily.com/174242/chongae-canal-restoration-project-mikyoung-kim-design

https://youtu.be/BdU3zkFckKM

https://www.slideshare.net/ravtejsingh16/hierarchy-of-open-spaces

https://www.slideshare.net/PrakashAryal1/open-spaces-29485007

https://www.census2011.co.in/census/district/184-patan.html

https://www.academia.edu/2837170/Landscape_design_methods_in_architecture

https://bhuvan.nrsc.gov.in/home/index.php

Bibliography

Nisar, Z., & Ashraf, K. (2011). *A Conceptual Approach for Development of Kukrail Nala, Lucknow.* Intergral University, Architecture, lacknow.

patel, h. (n.d.). *Outline devlopment plan 2033.* thesis report, School of Planning and Architecture,Delhi, Architecture, delhi.

Prajapati, M. k. (2009). *The Glorious History and Culture of Anhilwad Patan(gujarat): Prof. mukundbhai p. brahmakshatriya felicitation volume.* patan: Prof. Mukundbhai p. Bramhmakshatriya sanman samiti, 2009.

mathur, p. (2013). *Cheonggyecheon River.* cept, architecture, ahemdabad.