URBAN REGENERATION OF PARKS OF PHOOLBAGH AREA, GWALIOR

MASTER OF ARCHITECTURE (LANDSCAPE)

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1 INTRODUCTION

1.1 Urban open and green spaces

Urban open and green spaces can take place in a variety of shapes, forms, functions and purposes; they can be totally different from community to community; they can vary from simple playgrounds to natural landscapes or highly preserved environments, and mostly offer open access to the public, although they may be private. Green areas consist of open spaces, usually covered with vegetation that is natural or planted. The most famous open and green urban spaces are associated with comfortable green spaces, with high quality landscape design and maintenance, but no single example of open space typifies what this term is. There are a variety of different terms and definitions of open and green urban spaces, depending on how they are used. The most common of these terms that are further discussed: urban environment, urban space, public space, open space, open space reserve, urban landscape, green space and green infrastructure.

1.1.1 Urban Environment

An urban environment is a city's environment; typically characterized in a limited amount of space by many buildings. In close proximity to each other, most living spaces, work spaces, shopping areas, educational facilities, services etc. are grouped. It is usually characterized by limited open spaces in specifically planned areas or sites abandoned due to the higher value of urban real estate.

1.1.2 Urban Space

The region surrounding a city is an urban space. Most urban residents have non-agricultural jobs. Urban areas are highly developed, meaning that human structures such as houses, commercial buildings, roads, bridges and railways are densely populated. Urban space is characterized by what is called a "city;" a city is a collection of individuals and institutional structures that promote effective interaction between individuals and the place.

1.1.3 Public Spaces

In the context of social, political, relationships and interpersonal contacts developed through inclusive processes, public space is a space in a city or any other publicly accessible physical place (Madanipour). It is the appearance space, in the broadest sense of the word, that is, the space where I appear to others as others appear to me (Kratochvíl, 2013). The public space is also referred to as an area of participation and social behaviors that are friendly (D Pojani, 2015). The specificity of 'potentially public' spaces lies within metropolitan areas and their episodic and fragmented character in their peripheral position (A Maahsen-Milan, The Place and the City: Trends in the Construction of the Public Space, 2014). This space is a space for sport, religion, trade and politics, as well as a space for peaceful coexistence and impersonal meeting. character can express and condition our civic culture and public life. It can therefore be defined as the space open to everyone, owned by everyone and used by all members of the public.

1.1.4 Open Space

Open space is often described as any piece of land that is undeveloped and has no building structure on it. But since it is believed that, plazas, playing fields and urban squares are contributing to improving public health and environmental quality of the neighborhood, they are often included in the definition as well (P Merriman, 2012). It has a vast significance and encompasses green space and civic space. Another definition that emphasizes the aspects of greenery indicates: it is usually publicly owned land primarily reserved for, conservation of nature, agriculture, forest, green buffers, passive outdoor enjoyment, recreation, public gatherings. On the other hand, open space that includes not only land but also water bodies such as: lakes, canals, reservoirs and rivers that improve visual amenities and opportunities for recreation and sport.

1.1.5 Urban Landscape

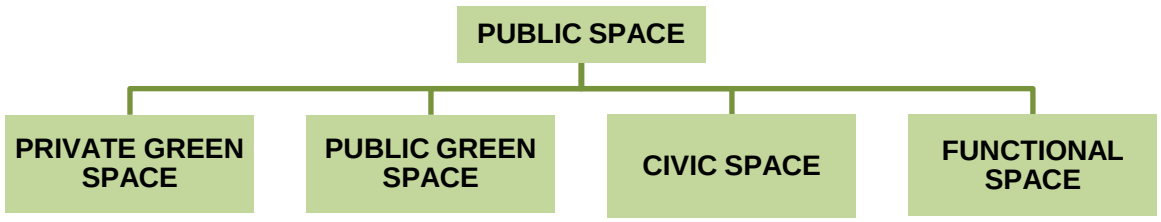
Urban landscape is formed in an urban environment by open and green space, whereas it is not independent of surrounding buildings and structures. Typically, urban landscapes are a complex combination of buildings, roads, grass, trees, soil, water, etc. (Weng, 2004). It contributes to the cityscape through function and aesthetics, thus enhancing a city's sense of location and identity. Landscapes are becoming increasingly important for urban residents as they offer tangible evidence of continuity and sense of place in the changing urban environment.

1.1.6 Green Space

Green space literally covers all public and private open spaces in urban areas, mostly covered by plants, including trees, shrubs and grasses (naturally or artificially). Green space refers to open spaces with green elements that are accessible to the public. It is a term commonly used to refer to any vegetated land or structure such as parkland, greenways, open space, lands of natural heritage or environment, vacant lands, lands of conservation or green infrastructure such as drainage ditches. Green spaces encompass a wide range of sites and uses.

Green spaces include a wide variety of sites and uses ; they are the park where children play in the neighborhood, the garden-side bench, the playgrounds where recreational and competitive sports leagues play their games, the community garden that donates food to the food bank, the geological feature in and around the settlements, the trail that offers a pleasant walk or an easy route, habitat for indigenous flora and fauna and natural services forests.

Green spaces play an important role in the lives of all residents, regardless of their age, lifestyle or lifestyle. Water systems such as open water, wetlands, floodplains, rivers and streams are usually included in green space and are also called the "blue structure" in urban and regional planning (Mehdi Rakhshandehroo).



1.2 Meanings and values of Open Spaces in the city

Growing populations and rapid urbanization around the world are recognized as one of the world's most complex processes, raising concerns about cities ' sustainability. Growing empirical evidence suggests that the presence of natural areas contributes in many ways to a better quality of life. Urban green spaces serve as places of identity, memory and belonging; enrich human life with meaning and emotions by delivering significant social and psychological benefits; and enhance citizens ' quality of life, which is a key component of sustainability.

Historical gardens as physical components can weave together many parts of cities of any city while at the same time providing places for public congregation and attracting a variety of local economic activities.

Arranged greenery has different functions and generates a wide variety of benefits, both from the point of view of local residents and local businesses, as well as the city and its authorities. These benefits are diverse; they can be achieved by direct income, increased wealth, and direct savings as well. Functions performed by urban green areas can be classified into one of three groups, i.e. economic, social and ecological, as well as the benefits generated by them.

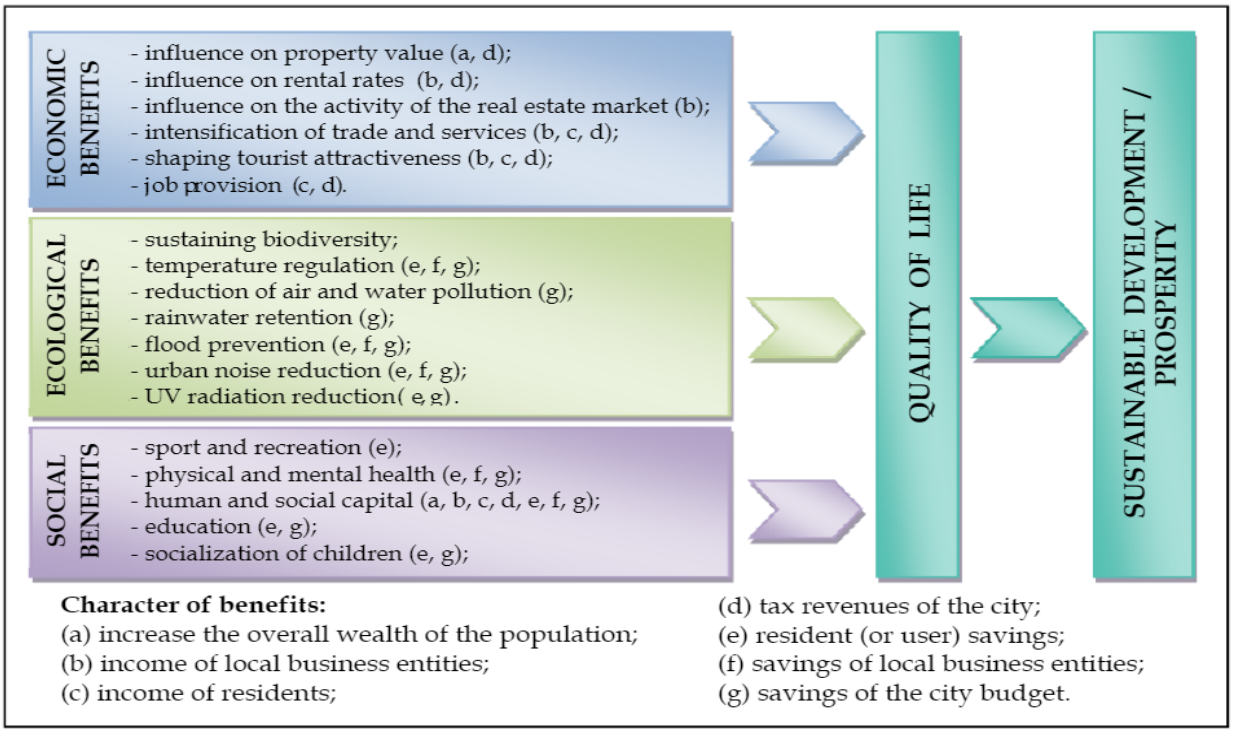


Figure 1: Benefits of Urban Open Space

1.2.1 Urban open spaces of 21st century

The social and spatial implications of new lifestyles, values, attitudes towards nature and sustainability, and future city life models and patterns of urban open space that could accommodate these have changed over time and addressing needs. One vital role played by urban parks is to provide space for both personal and cultural diversity expression; this raises issues of democratic provision and access to public open space. It suggests, among other things, that it may be necessary to rethink the role of the urban park as a public space.

Open space's social and cultural values include attitudes towards nature and the desire for contact with it; contemporary ecological understandings offer new insights into ways of serving both human needs and the broader ecological framework of open space structures in urban areas. It has been suggested that the urbanity of public open space is threatened by the increase in' virtual' transactions, avoiding the need for real, social interaction, but there is also evidence that the use of new communications technology can increase and enhance the use of public open space; this may include engagement in the productive aspect of our landscape.

A more flexible approach to open space definition and usage is proposed, recognizing 'loose-fit' landscapes which allow opportunities for the socially marginalized and the ecologically shifting within a dynamic framework of urban structures and networks.

1.3 Urban open space and Landscape Architecture

The process of urbanization around the world has dramatically transformed natural landscapes. In urban environments, resource consumption is highest, resulting in negative impacts on the physical environment. Due to urbanization, traffic, air, water and soil pollution, unsuitable land use and greenhouse gas emissions are some of the major problems. Not only are the effects of the urbanization process limited to environmental damage, but changing socio-cultural and economic structure also affects the quality of the physical environment by influencing human behaviors and lifestyles.

Landscape architecture is the art and science of creating and preserving outdoor environments in terms of cultural values and environmental sustainability. Because each landscape is unique, a universal guideline for the design process is difficult to define. Designing sustainable and sustainable environments nevertheless requires understanding some basic principles that guides the designer. A landscape is shaped by natural as well as cultural dynamics that also affect the styles of human life. An urban

landscape is therefore not just about green spaces in an urban setting. It consists of various uses of land such as streets and squares, playgrounds, corridors for railways and canals, cemeteries, bicycle and pedestrian paths, and water fronts.

Principles	Principle basics	Design and practice implications
Cities are ecosystems	Cities are ecosystems by virtue of having interacting biological and physical complexes. Urban ecosystems include four components: organisms, a physical setting and conditions, social structures, and the built environment.	Design affects all four components of human ecosystems.
Cities are heterogeneous	Heterogeneity in urban landscapes can be caused by both biophysical and social structures and processes. In turn, biophysical and social processes respond to urban spatial heterogeneity.	Design should enhance heterogeneity, and its ecological functions.
Cities are dynamic	Change in the structures and flows within cities, and between cities and other ecosystems lend a dynamic element to urban form and morphology (Decker et al. 2000; Kaika 2005; Shane 2005)	Design must accommodate internal and external changes projects can experience.
Human and natural processes interact in cities	All landscape designs and management schemes should be judged for their ability to contribute to both social and ecological goods and services, and to reduce both social and ecological risks and vulnerabilities (Steiner 2002; Grove et al. 2007).	Design should recognize and plan for feedbacks between social and natural processes.
Ecological processes remain important in cities	Concepts and approaches basic to ecological research can be applied to urban areas in an effort to understand how the city itself functions as an ecosystem (Alberti et al. 2003).	Remnant ecological processes yielding ecological services should be maintained or restored.

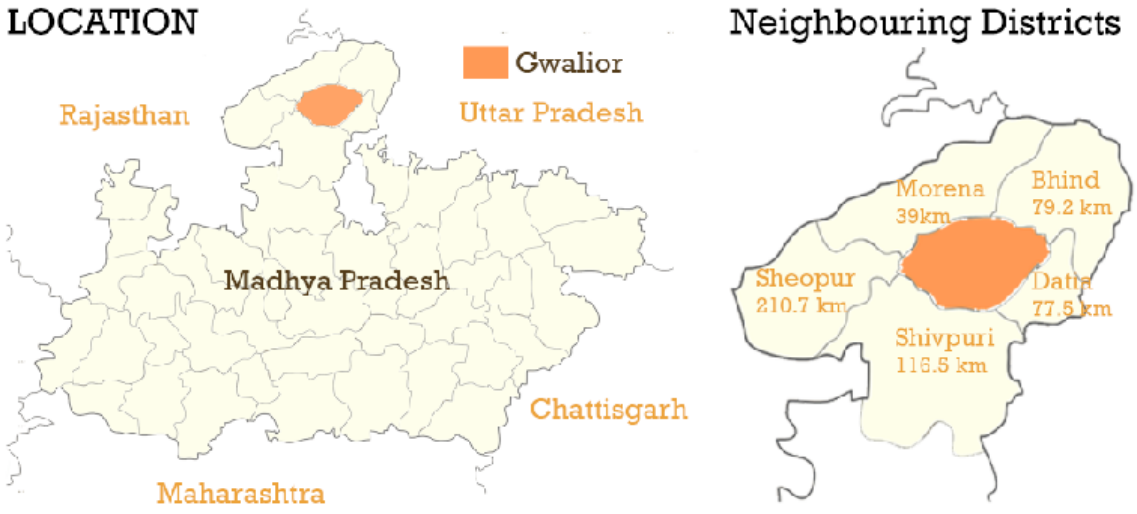
Ecological principles and design applications (adapted from Cadenasso and Pickett, 2008).

2 CONTEXTUAL BACKGROUND

2.1 Gwalior city

Gwalior city is a complex matrix fabricated by various components of location, legacy, cultures, industries, politics and many more. The matrix is layered, intertwining various parameters, impacting one another and reacting vividly to new inserts. The matrix is different for all the cities, the extent of distinction varies depending on the components included and so are the issues and concerns and therefore their solutions.

A counter magnet urban community now, the city dates back to 520 AD. It displays intangible, tangible and living heritage at various levels. Gwalior is a cultural, political and industrial centre. The city's enormous past can be regarded looking at its music legacy, its outstanding architecture and most importantly its strategic geographic location. High rocky hills surround the city from all sides and these hills are part of Madhya Bharat Plateau. This plateau came into existence due to the prolongation of Vindhyanchal mountain range and by soil brought by the river Chambal.



Map 1 : Location of Gwalior and neighboring districts on the Map of Madhya Pradesh

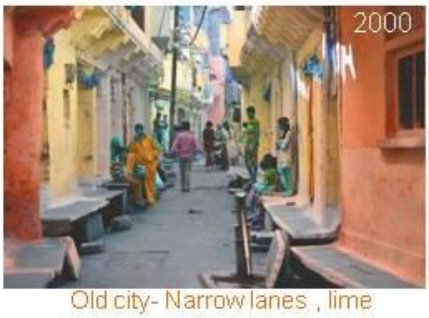
The city has always flourished commercially. Industries of footwear, pottery, biscuits (cookies), cigarettes, textiles, carpets, plastics, rayon, glass, and matches; cotton, flour, sugar, and oilseed milling; and stone carving have thrived over years. A market place, the city is surrounded by more than 300 villages providing materials like agricultural produce, building stone, and iron ore for the distribution.

Picture gallery of Gwalior over the years

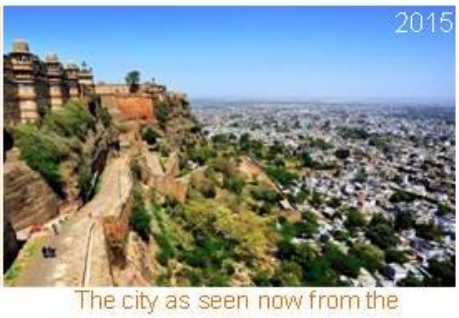
'Haat'- A trading market of livestock is still a weekday ritual.

The fort hill as seen from the plains.

The palace as seen from the fort.



Old city- Narrow lanes , lime painted, double storey houses..



The city as seen now from the fort.

Urban open spaces of Gwalior as we see now

Gwalior Mela Ground
Gwalior mela- A 110 year old city ritual

Maharani Lakshmi Bai statue
Places that reminds you of major historic event

Tansen Mausoleum
A legacy carried forward

Mahatma Gandhi Park
Sometimes when you need to be seen and heard

SAF Ground
Maidan changes its looks with the festivity

When roads become jogging track every morning.

2.2 Types of Open Spaces of Gwalior

The city of Gwalior has a number of open spaces of varied size. According to a report the city is 27% green which is only 3 less than 30 (the required) to make the city habitable. Do the open spaces contribute 100% in making the city green or is it the individual trees, maintained by community for its belief that's contributing to the greening of the city?

There can be multiple ways of understanding the city for its open spaces. Discussed below are two approaches-

The growth of the city- The city of Gwalior has grown over the years maintaining the historic legacy and managing in response to local requirements. The old Gwalior is densely populated and has compact settlements whereas the extensions of Gwalior or the New Gwalior are not so compact. This had led to different types of open spaces in the city. The old part of the city has public grounds or "*Maidans*" at the periphery with almost negligible privately owned open spaces or parks. However the New Gwalior (Thatipur area) has open spaces of larger size and numbers meant for the use on daily basis.

Ownership of Open spaces- When one sees the development plan of Gwalior a number of large green open spaces can be seen marked as for residential land use or public-semi public area. The huge green spaces marked for residential land use are owned by the Scindia family and are located right in the core of the city. The one being marked as for public- semipublic use are either institutes or hospitals which to an extent has restricted entry. The other fact that should be understood is that in Gwalior the land for residences in owned by people. Most of the people in the New city have used 100% area for construction as they have neighborhood parks in the vicinity of their homes and don't need open spaces.

The Urban Open Green Areas of Gwalior can be categorized in the below mentioned 5 types-

3 MaidanGARDENS

•Botanical Garden and Italian Garden

PARKS

•Almost 25 Parks including Neighbourhood Parks

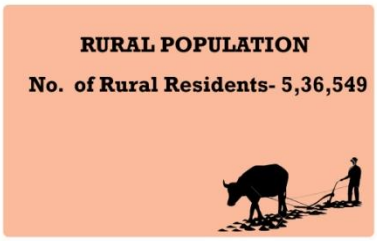
NEIGHBOURHOOD PARKS

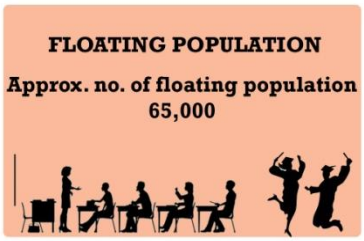
NEIGHBOUHOOD URBAN OPEN AREAS

MAIDAN

3 including Mela Ground, other two being Phoobagh maidan and Dusshera Maidan

2.3 Stakeholders of Urban Open Spaces of Gwalior





Urban population

Out of total population 802,391 are males while 693,096 are females. According to age groups the population can be divided in 3 categories-

Above 60 years- This age group uses open spaces when associated with some other activities like visiting a temple or with their grandchildren.

25-60 years- Middle aged working people use the open spaces like parks for their physical regime every morning and evening. In Gwalior people like to work out in the mornings.

Below 15 years- This part of population are accompanied by the above two. Possible usage times are morning and evening hours.

Rural population

Rural population visits the city for various purposes. Depending upon their purpose of visit the population can be divided in two categories-

People that travel for work- A large number of people from villages travel to the city on weekdays for work. The work can include visiting offices, hospitals, commercial complexes etc. These people use open space as waiting areas.
Some people who have found jobs in the city but prefer to stay in the village hardly use the open spaces.

People that travel for recreation- Gwalior for a rural dweller proposes a number of recreational activities. Visiting historic monuments, occasional exibitions, fairs, zoo, water parks are few of them.

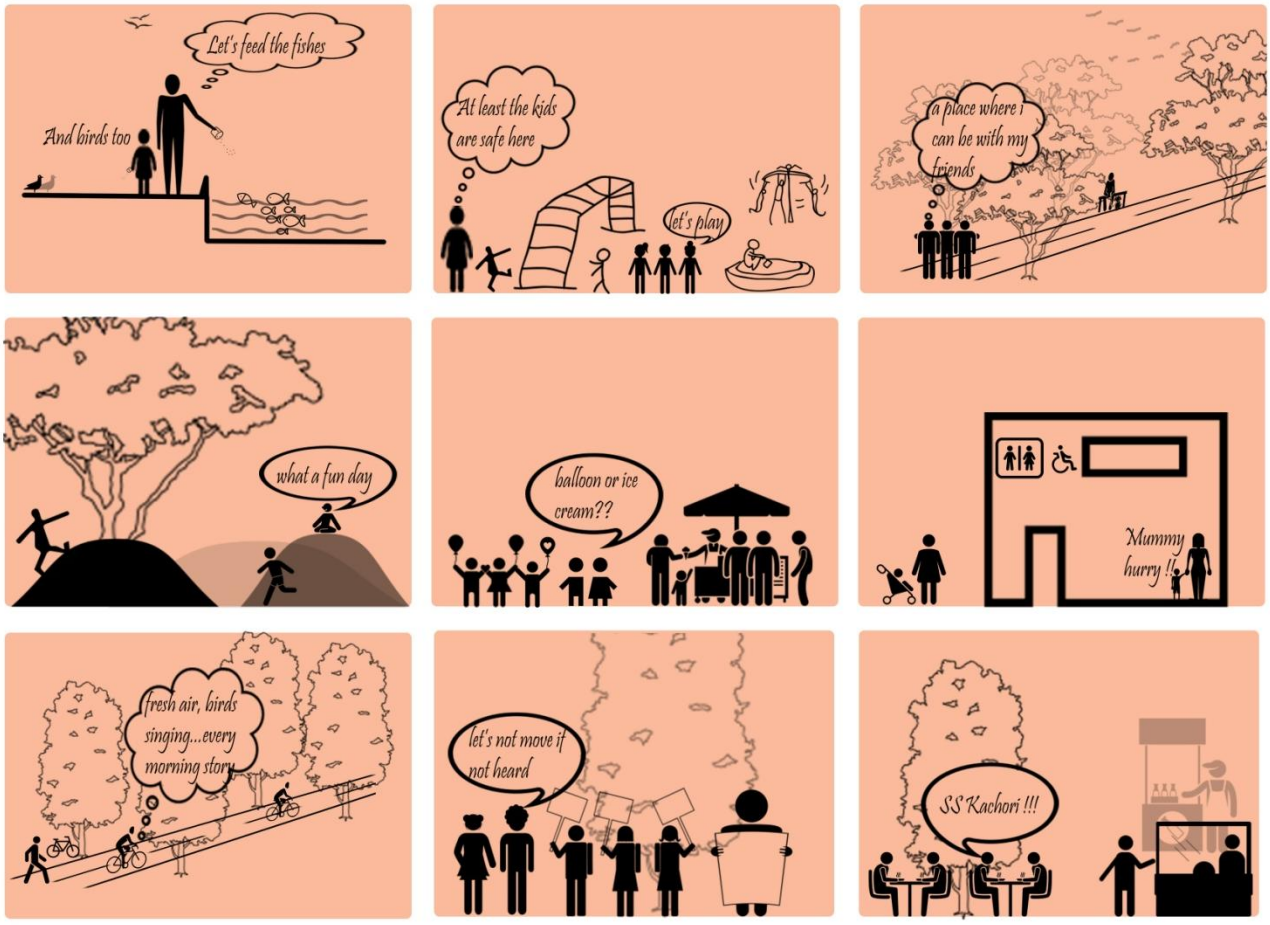
Floating population

The city is an education hub and has a number of higher education institutions, coaching centers and some of the best schools of India. This has lead to a large number of floating populations in the city.

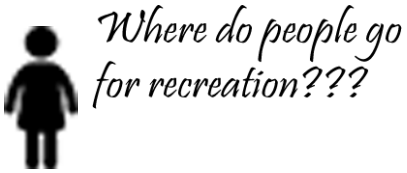
The city has more than 180 colleges, few dating back to 1964, and a large number of coaching institutes preparing children for a number of entrance exams. The age group of floating population is 18-30 years.

They are the most potential users of urban open spaces after children.

2.3.1 Stakeholders and their reactions in and to Open Urban Spaces



2.4 Thesis question



To understand the open space structure of Gwalior and how people perceive Open spaces. Given the age of the city there might be areas that are part of Urban dead. Are there any such areas, if yes, then how can they be regenerated to call in Urban population?

2.5 Aim

The aim of the study is to provide people of Gwalior with an Urban Open Green Space. A civic space that maintains a historic legacy and responds to present day requirements.

2.6 Objectives

- Preserving and repairing the natural and built heritage and conserving the original identity.
- Providing residents with public open space which has direct indirect impact on mental and physical health.
- Walkable environments for safe, convenient, affordable and accessible mobility.
- To generate economy and employment through tourism and local jobs.
- Developing outdoor educational trails.

2.7 Methodology

1. Literature study.
   - Understanding Urban Open Green Spaces.
   - Understanding the concept of Indian cities.
   - Understanding how wilderness impacts the life of human beings.
   - Understanding the impact of design of open spaces on kids of all age groups.
   - Gwalior as the case example. Determining the need of the city in terms of open space.
   - Understanding the Existing Urban Open Spaces of Gwalior
   - Understanding the Natural Layers on Regional level.

2. Primary Field Study
   - Analyzing Gwalior in terms of Open Spaces (case specific).
   - Issue identification on Urban level

- Relating the literature with other aspects of landscape design such as climate, topography, hydrology, vegetation, urban history, connectivity, cultural, visual and spatial associations.
- Reinforcing guidelines to design identified site as Urban Open Green Space.
- Site specific analysis which include preserving and enhancing its potential and resolving the issues.

2.8 Expected outcome

The idea is to integrate Greens on all scales into the lives of Gwalior people by creating inviolable green open space and repairing the stream that flows into the city's heart. Cultivating new and powerful ways of interacting with nature not just as a spectator, but also as a participant. In an urban context, the design will make room for other forms of life. It will offer outdoor play environments unstructured for citizens. Will reduce the resource ageing of cities. It will meet an individual's daily requirements and set goals for the country's developing cities.

2.9 Perceiving Urban Open Spaces

In shaping social life and the identity of the inhabiting community, open urban spaces play an important role. As a result of a sensory experience of that particular space, a human perceives these open spaces. A person senses, perceives, and navigates through the cities, the open space. The perception of urban space is based on different senses, context and memories.

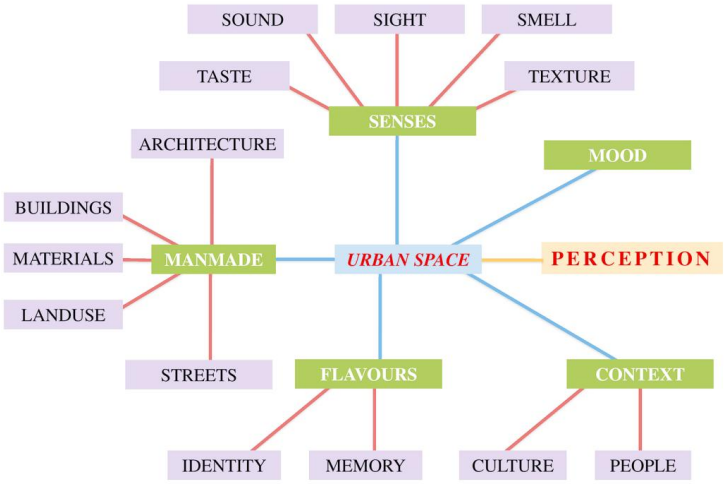


Figure 2: Systems approach to the sensory experience and Urban Open space

2.9.1 Methodology for perceiving Urban Open Spaces of Gwalior

To understand how people perceive spaces, what they relate to, what's that they associate with; a methodology was adopted. 10 Open spaces were studied. The key ingredients of which were-

1. Observation- A number of site visits to understand the behavioral pattern. 

2. Direct interaction through questionnaire and interviews. 

2.9.1.1 Understanding Behavioral Pattern 

"Environmental Psychology- The relationship between the environment and human behaviour has been recognised for a long time. In order to explain its significance, psychologist Kurt Lewin (1951) argued that behaviours (B) are not only a function (f) of personal factors (P), but also of the environment (E) in which they take place. Lewin expressed this relationship in the formula B = f (P, E)."

To understand the behavior three theories were studied-

AROUSAL THEORY

PERCEPTION OR COGNITION THEORY

ADAPTATION LEVEL THEORY

<u>Arousal theory and findings</u>

"For different people the arousal levels were different for the same co-ordinates, which included built structures or the environment they were in. However few elements (big or small) that aroused every individual to some extent were also observed." These few elements are –

- Historical structures
  (Scale, material and workmanship)

- Mature trees and seating below them

Findings- In almost all the parks the elements looked fragmented and similar. Lack of coherence lead to low arousal levels, which lead to spaces being underutilized.

Perception or cognition theory and findings

"Every space offer some level of enclosures, permeability (physical and visual), legibility, complexity, coherence and foci. And people perceive a space on these factors. Other than these people perceive the environment according to their learned experience, cultural differences and personality traits."

Despite the lack of good design people tend to find themselves associated to the nearest open space available to them. The most typical emotion being, having memories of that open space.

Findings- The association was with other humans and nature, the memory of any distinctive element however lacked.

Adaptation level theory and findings

"The adaptation level theory maintains that excessive environmental stimulation, or too little environmental stimulation, can have a detrimental effect on people's emotions and behaviors. People adapt or adjust with the environments to bring themself in equilibrium. This suggests that a moderate level of environmental stimulation is the most desirable."

Findings- Before saying an absolute no to any circumstance, people adapt or adjust. The poor condition of parks has led to reduced footfall. The only users are who have necessity and nowhere to go to.

This looks safe. I can wait here sometime !!!

2.9.1.2 Understanding the needs of people for an Green Urban Space

The interviews were conducted face to face, on weekends, weekday evenings, and other times when visitors were in large numbers.

The survey was conducted on site both in English and Hindi. The surveys were conducted both on weekdays and weekends, in the mornings between 8:30 a.m. and 10 a.m. to collect views of morning walkers and in the evenings from 5 p.m. to 6 p.m. for other respondents.

Findings

It was observed that people were least bothered about the site design or its aesthetics. The matter of concern was the basic amenities and their condition. People faced issues of cleaner and maintained facilities. The play equipments, seating, pathway material were also in a dilapidated state. Some people also showed concerns about the planting palette, saying the royal palms do not attract birds.

3 SITE DOCUMENTATION

Parks support the complementary and bilateral relationship between “the nature and culture” or “parks and the city”. Urban green spaces are so important that they are counted among the five significant urban uses. Site selection of public green spaces necessitates social requirements

3.1 Site Selection Criteria

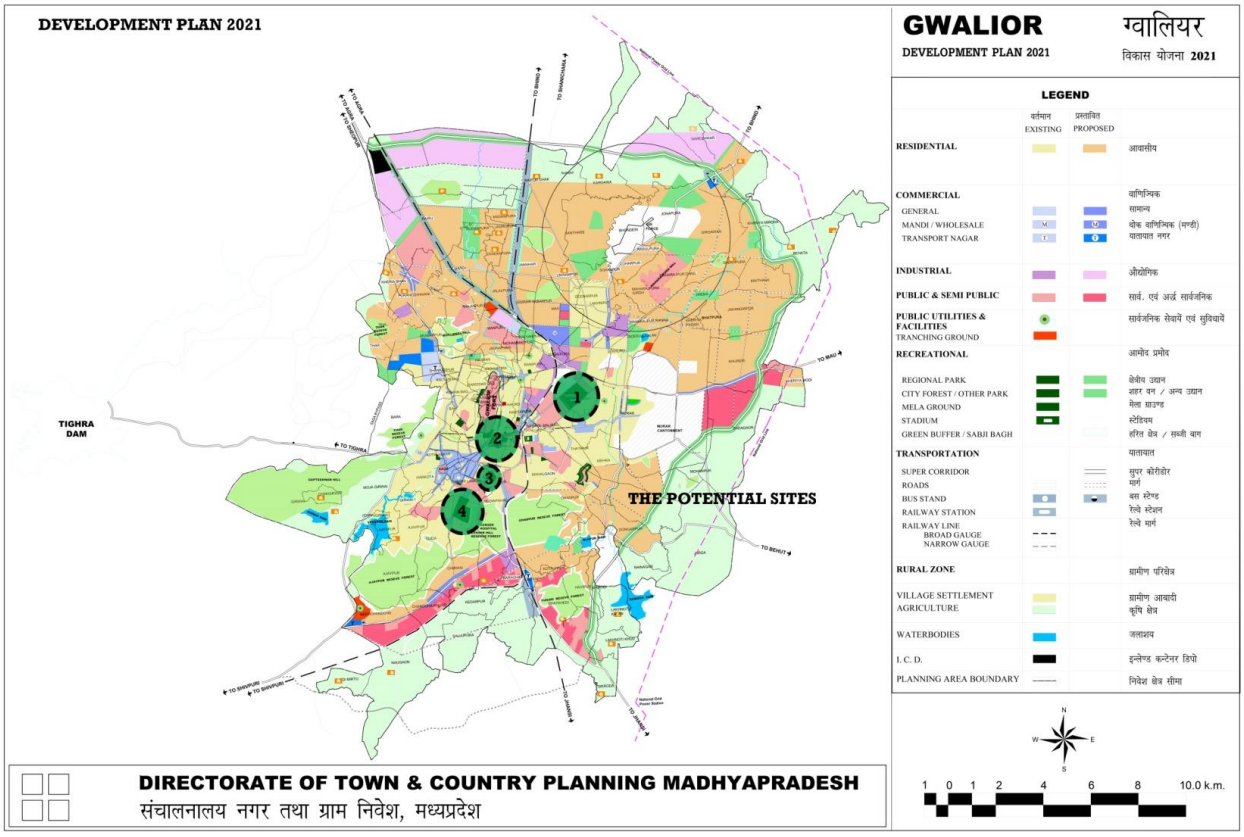
The site should be able to fulfill all its functions.
-Social functions
(proximity to residential areas, accessibility, proximity to other land uses)

-Ecological functions
(Environmental Values)

-Physical functions
(Areas greater than 20,000 sq. m, location on the larger scale)

-Economical functions
(Generate certain amount of money for its maintenance)

3.2 Potential Sites



The four sites focused above in the Development Plan 2021 of Gwalior are marked as sites for Regional Parks. Therefore the land use in these cases is not questionable. The area of sites selected is more than 20,000 sq. m in all cases.

The site selected are

1. Mela ground
2. Phoolbagh
3. Chatri
4. SIF ground

3.2.1 Mela Ground

The largest of all the open spaces marked, the area of Mela Ground is 152 acres.

Social functions- The park holds heighest value for its social function. Gwalior Mela is a living heritage, continued from past 110 years. The cattle trade fair is still an integral part of the Gwalior Trade fair with about 10,000 animals being sold or bought each year.

Ecological functions- Lack of vegetation has lead to lower value of ecological function.

Economic function- The trade fair generates revenue to maintain the space for all round the year. Livestock Haat happens every Thursday and this is also the place where politicians address the public.

Figure 3 : Gwalior Mela in full swing during the months of December and January

3.2.2 Phoolbagh

The oldest of all the open spaces marked, the area of Phoolbagh is 67.5 acres. As the name suggests this was the green extention of palace as was used by the kings for leisure. It has a large nuber of conserved historic monuments. Its only 20 meters away from the Fort hill.

Social functions- Phoolbagh area has 5 parks. The area is located in the heart of the city and has high proximity to transportation points.

Ecological functions- One of the most vegetated area of Gwalior city. The site has trees as mature as 100 years old and a water stream called as Swarnarekha river.

Economic function- Phoolbagh area has places like zoo and chaupati. Economy is also generated by vendors in the parks.

Figure 4: Italian Garden, Baradari and a mature Ficus benghalensis

3.2.3 Chatri

The open area whose purpose is very specific.The Chatri area of Gwalior has a dedicated complex for all the kings and queens who have given their lifes. The complex has beautiful structures and hass 40.3 acres area.

Social functions- Other than tourists it also serves another function of physical regime. For entering the complex a specific amount is charged. For daily visitors there are monthly and annual passes. It is easily accessible through public mode of transport.

Ecological functions- The area has a number of ornamental trees and lawns just outside the chatris. However the periphery has native trees with brings in large number of birds.

Economic function- The complex is maintained with the amount of money generated through ticketing.

Figure 5: A manicured landscape sits right in the center of the city

3.2.4 SIF Ground

SIF Ground is an area reserved for various specific activities. E.g. March past and other functions on the Republic Day and Independence Day. The field is also used by different colleges for inter college sports activities. On a everyday basis the field is used by Police academy for its physical regime.

Social functions- Phoolbagh area has 5 parks. The area is located in the heart of the city and has high proximity to transportation points.

Ecological functions- Lack of vegetation has lead to lower value of ecological function.

Economic function- This plays serves a amount very less to the economy.

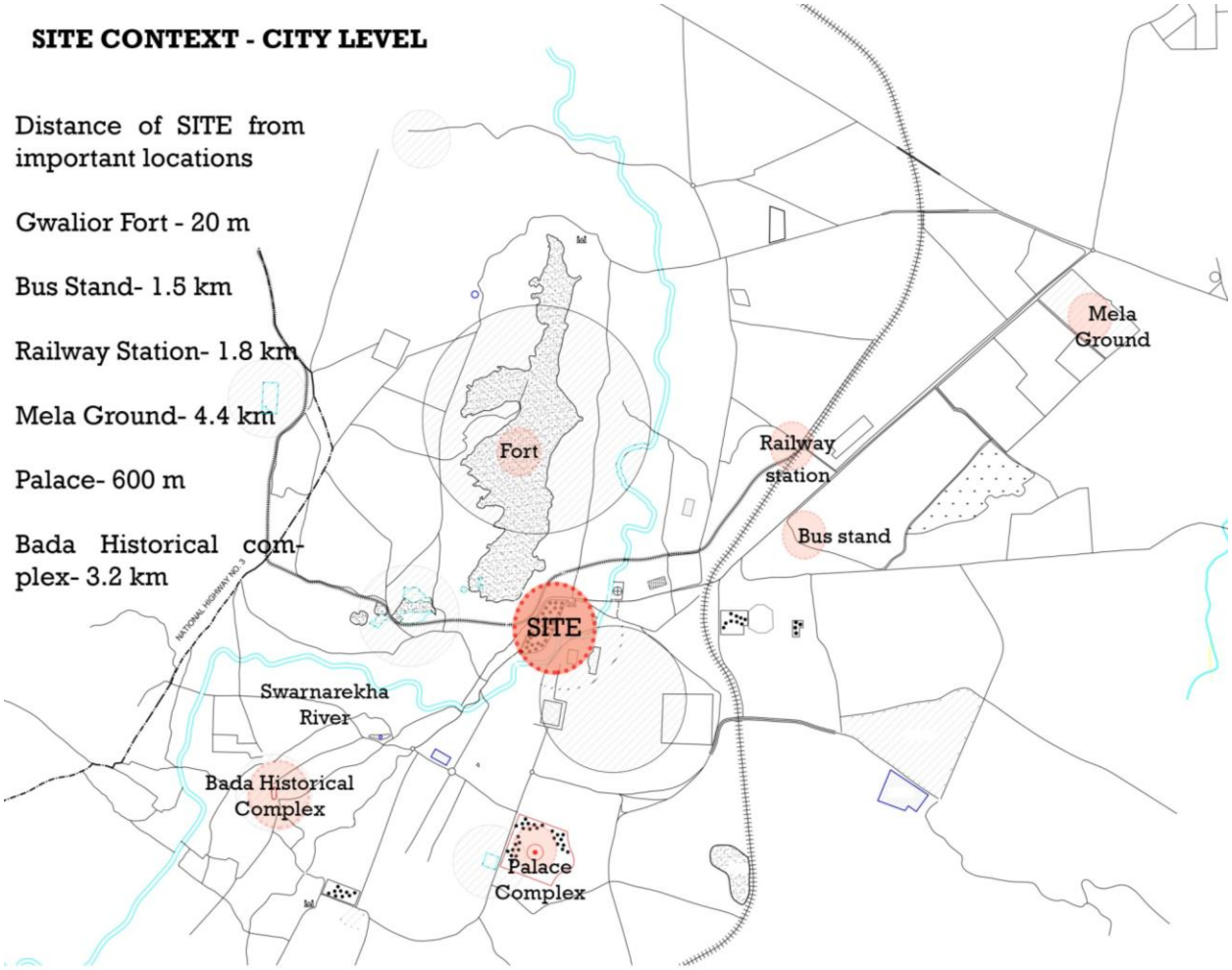
Figure 6: A multipurpose playground mostly used by policemen for practicing or by others for athletic competitions.

3.3 Site Selection

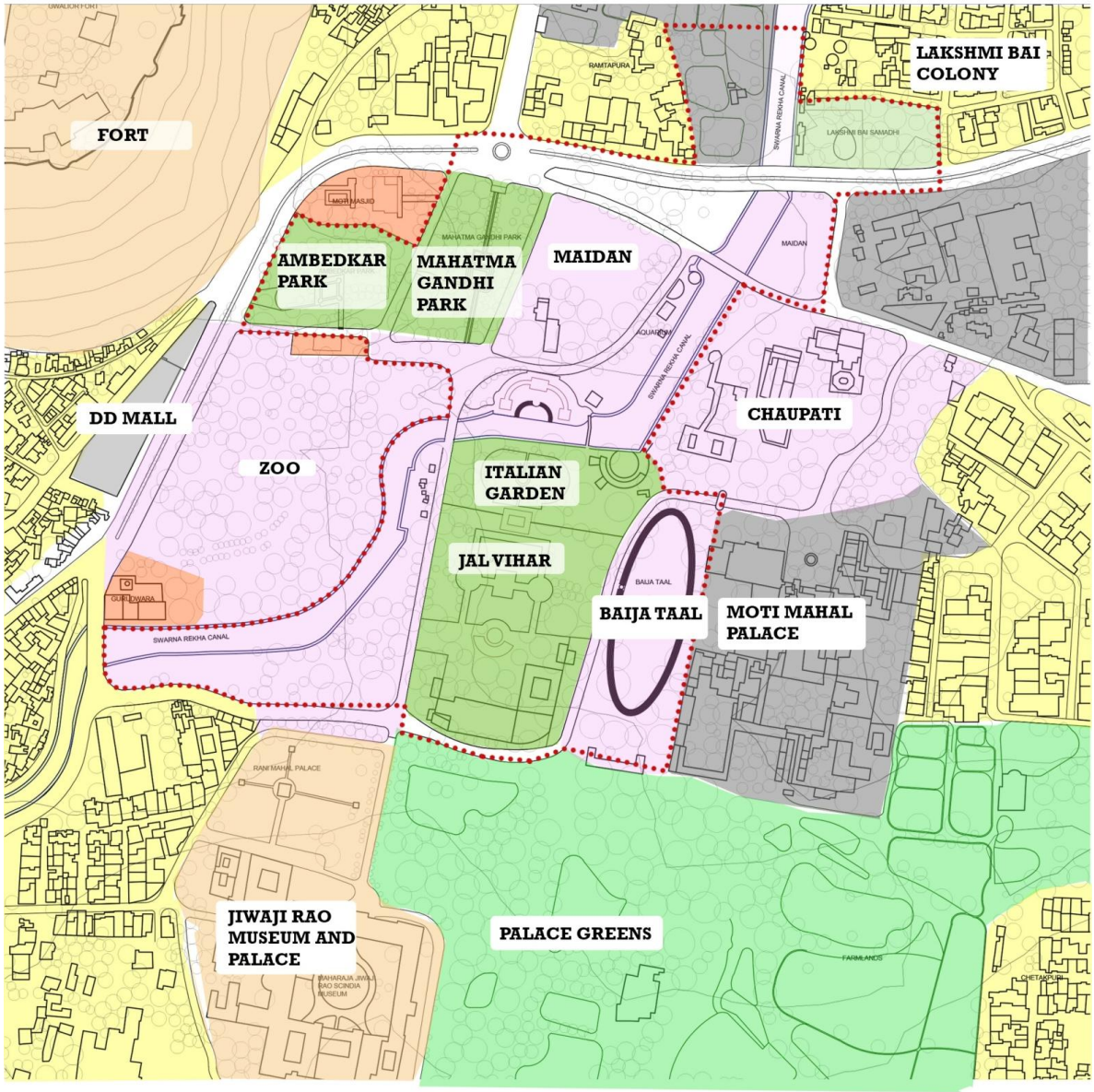
All the sites except the SIF Ground are very well connected by public mode of transport. The sites are in close proximity to residential areas, but the Phoolbagh area has varied land use in its surroundings and therefore can bring in a variety of users.

Phoolbagh area and Chatri area both have high environmental values in terms of vegetation and avifauna.Chatri serves a specific purpose and is owned by the Scindia family, despite being marked as Regional Park on Development Plan and can only be used for passive recreation. An urban park has all the components leading to active and passive recreation. Therefore Phoolbagh has been selected as a site for developing as an Urban Open Space.

3.4 Site Context



SITE CONTEXT - NEIGHBOURHOOD LEVEL



LEGEND

PARKS
- GANDHI PARK
- AMBEDKAR PARK
- LAKSHMI BAI PARK
- ITALIAN GARDEN
- JAL VIHAR

URBAN OPEN SPACE
- MAIDANS
- BAIJA TAAL
- ZOO
- SWARNAREKHA CONCRETE CANAL

RELIGIOUS COMPLEX
- MOTI MASJID
- RAM JANKI MANDIR
- GURUDWARA

PRIVATE GREEN
- FARMLANDS
- FRUIT ORCHARDS

HISTORICAL CORE
- GWALIOR FORT
- RANI MAHAL PALACE
- MAHARAJA JIWAJI RAO SCINDIA

COMMERCIAL ZONE
- OFFICES, MOTI MAHAL
- DB SHOPPING MALL
- FARMLANDS

SITE BOUNDARY

Site surroundings are mixed use. With commercial, residential, religious historic to privately owned palaces the site can cater to different types of users.

Historical core of the city - The selected site has views of Fort and Palaces. Fort dating back to 10th century and Palace dating back to 1874.

Religious complexes- The site invites people of various religions as oldest Mosque (Moti Masjid), temple (SatyaNarayan Temple) and Gurudwara are in part of site. This calls for daily users of these religious buildings.

Public- semi public complex- Moti Mahal complex is one of the oldest buildings of Gwalior. Once, this palace was the secretariat of Madhya Bharat Government. The building has more than 200 offices of various government departments.

The residential areas have a high density of population, with no room for private open spaces. And therefore the existing green areas are used for various purposes.
The residential zone of Rani Lakshmi Bai colony is mixed use. It has a large number of private coaching center and few hospitals. This leads to a large number of floating population consisting of age group 16-25 years passively use the parks as waiting areas.

Urban Open Space- These spaces consist of maidans used for playing cricket and parking everyday. The maidans also act as space for types of haats and exhibitions. Other urban open space is Baija Taal , which is suppose to have water but is currently dry because of scarcity of water. The place on regular days is occupied by children who play cricket and is occasionally used as amphitheater. Gwalior Zoo is well designed and caters to more than 750 visitors on weekends from near by villages and towns. Swarna Rekha Cannal is a concrete channel for the movement of water. But at present there is no water in the channel and a dry 30 meter wide channel runs through the spine of the city.

Site- The selected site has number of parks and dry concrete reservoirs and channel. The parks have trees as old as 80 years and also attract a large number of avifauna. All the parks serve different purpose. e.g. Jal vihar and Italian Garden are extensively used in the morning and evening hours as these are the only parks with maintained internal pathways. Mahatma Gandhi Park is used only because of its location, its direct entry from Lakshmi Bai marg , whereas Ambedkar Park is used by kids because of availability of play equipments.

4 SITE ANALYSIS

4.1 Natural layers

Gwalior District lies between North latitude 25° 43’ and 26° 21’ and East longitude 77°40’ and 78°39’ of Madhya Pradesh. The average elevation of the land of Gwalior is about 197 meters above the sea level. Spread over an area of 5214.00 sq km, in the Chambal river valley, the city of Gwalior is landlocked on all sides.

Need for study- The Abiotic and Biotic parameters of climate, geology, landform, hydrology, soil, flora and fauna needs to be studied to take a decision which is informed. The design should be sustainable and in harmony with the abiotic and biotic elements to reduce negative impact on the environment. A better understanding can lead to a decision which will cater to enhanced services directly or indirectly.

The uneven elevation has given rise to a number of water catchments

Acacia forest is a common site on the hills of Gwalior. In summers the outcrops of acacia can be seen when all the other vegetation dries out.

Shallow depressions in the hard strata where the rain water holds itself.

THE CHANGING LANDSCAPE OF THE REGION AROUND GWALIOR

20 km away from the selected site, a variety of fauna and flora can be seen

The plains turn yellow every winters as this region is the height supplier of mustard oil in India

4.1.1 Climate

Gwalior has a sub-tropical climate.A humid subtropical climate is a zone of climate characterized by hot and humid summers, and cool to mild wi nters.

Summer season begins at the end of March and ends at the beginning of July. The scorching heat dominates the climate during these months, and the level of humidity is also on the rise. The temperature rises to 45-47 degrees Celsius.

The Monsoon season begins in mid-July and finishes in October. Gwalior receives on average 700 mm of rain per year. August is the wettest month with approximately 310 mm of rain.

Winter starts showing in late October and remains until mid-February. Gwalior's climate steepens down to a chilling temperature as low as 1-2 degrees centigrade in the winter season.

From late February to mid-March, Spring continues. Temperature ranges between 8-15 degrees Celsius.

The predominant wind direction being East to West.

4.1.1.1 Seasonality and landscape architecture

Seasonality is the interface that really interacts with humans and nature. Seasonality is expressed both in the landscape's natural rhythms and in the lifestyles of humans. Seasonality creates different usage patterns and appears in spatial practices, paintings, human behavior.

When new leaves begin to pop, when it blooms, with fruits and without leaves, the same tree will look different. Shallow depressions filled with rains, lilies popping just after rain, the hardscape showered with Amaltas petals, kukoo bird call in the spring, seasonal fluttering patters created by butterflies all these events are seasonal.

The seasonality turns the landscape into a living entity as it breathes and changes in a rhythm constantly. The change makes it directly and indirectly interesting to the space user.

It instigates perception, symbolism, awareness, use, sense of identity, reflection, and so much more. Emotions that are important to young people's development.

4.1.2 Geomorphology and Soil types

Rocks attributed to Gwalior 'System' are seen, scattered in a number of isolated outcrops of varying sizes, overlying the older rocks. Physiographically Granite rocks of Gwalior formation and Vindhyan system forms the Hillocks and Alluvial plain forming the flat terrain. In Gwalior district 8 groups of geomorphic units have been classified on the basis of differential erosion and deposition of rock material.

Gwalior's soil is alluvial. The Chambal river brought the soil. Alluvial soil is considered the most fertile soil. It is made up of sand, silt and clay. It is rich in potash, phosphoric acid, and lime. Alluvial soil has moderate percolation velocities of between 0.1 and 1 inch per hour. This is the "Goldilocks" situation, where a soil holds water and nutrients long enough to absorb plant roots, but the soil doesn't get waterlogged easily.

Figure 7 : In most areas the depth of the soil is negligible

S.No.	Geomorphic unit	Lithology
1	Younger Alluvial Plain	Unconsolidated material consisting of gravel, sand, silt and clay.
2	Older Alluvial Plain	Gravel, sand, silt and clay.
3	Inter mountain valley	Fluvial deposits of varying grain size.
4	Mesa	Flat top hill of Vindhyan sandstone.
5	Ridges (sedimentary)	Shales & sand stones.
6	Denudational Hills	Sandstone, limestone and shale of Vindhyan group.
7	Plateau	Composed of Vindhyan sandstone.
8	Pediment	Granite dominating as underlying lithology

Present day condition of soil of Urban open space is deteriorated due to lack of vegetation. Maidans and other open spaces soils are exposed to direct impact of climate. Therefore it is also losing its fertility.

4.1.2.1 Soil and Design

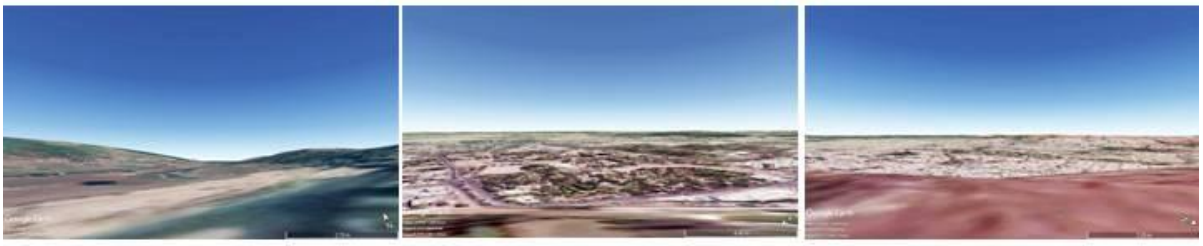
Important decisions regarding the planting palette, slopes in the landscape area to drain the water and if required any other bioengineering methods can be made after knowing the soil type.

The soil food web is the community of organisms living all or part of their lives in the soil. It describes a complex living system in the soil and how it interacts with the environment, plants, and animals.

The soil food web needs to be maintained not only for the other dependent communities but also for the soil to remain fertile.
Other benefits when the quality of soil is good are-
- Protect the water quality
- Support the micro-organisms
- Produce healthy plants

4.1.3 Landforms

The city slopes down from south west to north east with an avg. slope of 1:500. However the isolated outcrops can be seen throughout the city. One such outcrop is the Gwalior Fort offering ‘n’ number of views. The city was settled in the plains and therefore the urbanscape looks flat.



The changing landforms due to hillocks.

4.1.4 Vegetation

Vegetation of this region encompasses mainly two types of forests viz. Southern dry mixed deciduous forest and Tropical ravine thorn forest. Distribution: Northern India wherever rainfall is between 500 and 1000mm (Gwalior rainfall ranges between 500-750 mm).

Typology: Ravine Thorn forest

Description: It consists of a mixture of small thorny trees in which Acacia is conspicuous, standing fairly close together where not subjected to maltreatment, with a more or less complete grass cover between.

Figure 8: Extension of Chambal Ravines can be seen in some parts of Gwalior

Floristic

Trees: Acacia leucophloea, Prosopis spicigera, Azadirachta indica, Holoptelea integrifolia, Acacia arabica, Salvadora oleoides, Balanites aegyptiaca, Flacourtica indica Capparis decidua, C. sepiaria, C. zeylancia, Carissa opaca, Zizyphus spp., Dichrostachys cinerea, Calotropis procera, Adhatoda vasica

Shrubs: Tephrosia purpurea, Cassia tora, Echinops echinatus, Xanthium strumarium, Argemone mexicana, Solanum xanthocarpum, Grewia sp.

Grasses: Desmostachya bipinnata, Heteropogon contortus, Apluda mutica, Cenchrus ciliaris, Bothriochloa pertusa, Aristida spp., Dichanthium annulatum, Eremopogon fovelatus, Eragrotis tenella, Cloris virgata

Typology: Southern dry mixed deciduous forest

Description: Boswellia is conspicuous. Thorny plants occur and tend to increase in proportion with the heavy grazing, etc. to which most of the area is subjected. Grass is conspicuous till it is grazed down

Figure 9: A southern dry mix deciduous forest with Boswellia dominating

or burnt.

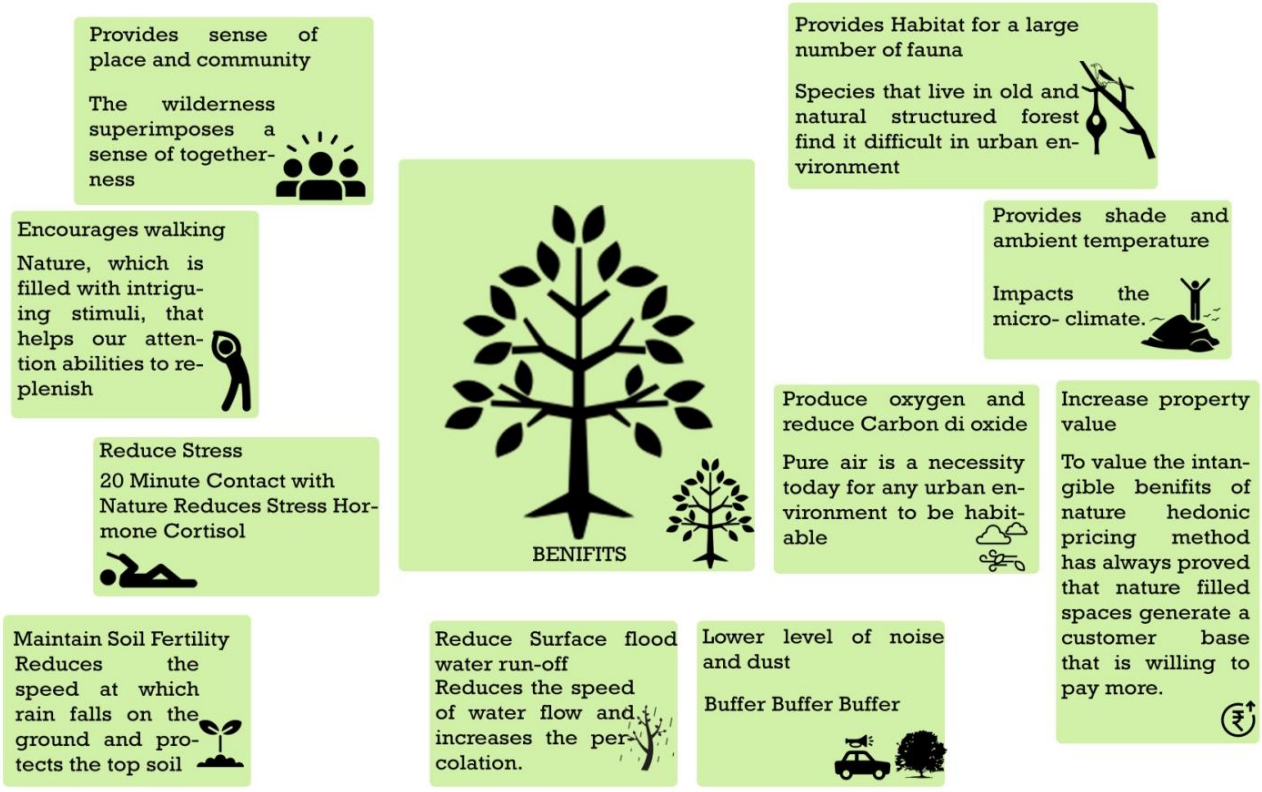
Floristics

Trees: Terminalia tomentosa, Anogeissus latifolia, Mitragyna parvifolia, Schrebera swietenioides, Madhuca indica, Diospyros tomentosa, Buchanania lanzan, Lagerstroemia parviflora, Emblica officinalis, Cassia fistula, Aegle marmelos, Butea monosperma, Santalum Album, Boswellia serrata, Chloroxylon swietenia, Syzygium cumini, Hardwickia binata

Small trees/ Large Shrubs: Nyctanthes arbor-tristis, Zizyphus spp. Helicteres isora, Vitex negundo, Adhatoda vasica, Gymnosporia spinosa, Randia dumetorum, Flacourtia indica, Woodfordia fruticosa, Balanites aegyptiaca, Carrisa spp.

Grasses: Apluda mutica, Aristida, Chloris inflata, Eragrostiella spp, Iseilema laxum, Heterophogon contortus, Themeda quadrivalvis, Dichanthium annulatum

4.1.4.1 Urban forest, cities and Landscape Architecture



4.1.4.1 Biophilia achieved through Wilderness

Biophilia

Humans have an innate need to be in contact with nature and natural surroundings for a healthy lifestyle. Nature is not optional but an absolutely essential part of Urban lives which should be easily affordable by every townsman. "Biophilia" is a term coined by German social psychologist E.O. Wilson who defines it as "the innately emotional affiliation of human beings to other living organisms". To achieve urban qualities cities need to be dense and compact and bringing nature in high density urban area is the challenge. Contact with nature provides a wide range of positive mental and physical benefits which if not considered will have stressed environments.

How it helps?

Biophilia in an urban environment can be attained by conserving natural heritage of the city and by blending in more nature. Nature can work wonders and can reduce the health hazards by providing better environments infested with pure air and sufficient water. It not only improves the physical health of citizens but has a direct impact on human psychology. Urban scale issues like crime and traffic congestion can lessen by the affordability of more walking environments. Walkable cities are safe, convenient, affordable, accessible and defiantly reduce the carbon footprint of the city

Can Urban Forest bring Biophilia?

Yes, Urban Forests can bring in Biophila till the time that humans can perceive it physically and visually.

4.2 Timeline

Gwalior as the name suggests was originally called Gopadri or Gopagiri- the shepherd's hill. These hill systems and associated natural resources were formed almost 1 billion years ago. Some elements of landscapes were changed and some had witness the change. These changes which are inherited from past generations, maintained in the present, and bestowed to future generations is the heritage.

Natural heritage refers to the sum total of the elements of biodiversity, ecosystems and geological structures. All that is passed on has certain values associated. The UNESCO addresses cultural sites of outstanding universal value, from a historical, aesthetic, scientific, ethnological or anthropological perspective, and highlights the need for authenticity.

The water catchments formed are seasonal and also give rise to seasonal water streams. One such arrangement is found in Gwalior city. The reservoir is called Raipur reservoir and the water stream as Swarnarekha River.
The reservoir and the water stream have seen many human induced changes over the years which have been mapped in the table below. Humans have changed the physical appearance of the environment as per their needs. In the process of modification they have also adapted to the surroundings.

Need for study

"The values embodied in cultural heritage are identified in order to assess significance, prioritize resources, and inform conservation decision-making. It is recognised that values may compete and change over time, and that heritage may have different meanings for different stakeholders."

It is important to understand the values of certain elements existing on site and then take conscious decisions while designing a space. To understand what can be regenerated, revived, restored and repaired and why should it be considered. The study done is site specific and had been done taking references from the available texts. It has been restricted to natural resources and human induced impacts on site.

Elements studied are- Hillock, Water Stream, Vegetation, Settlement type, Human needs

4.2.1 Before 3ce - The beginning

Figure 10: Rainy season

Figure 11: During Summers

- Hillock- Hillock is a part of Kaimur Hills, also called Kaimur Range, eastern portion of the Vindhya Range. The word Gwalior is derived from one of the Hindu words for saint, Gwalipa. The hill was used by shepherds for grazing and was habitated by monks. It is an outcrop of Vindhyan sandstone on a solitary rocky hill called Gopachal. The geology of the Gwalior range rock formations is ochre colored sandstone covered with basalt.
- Water Stream- A seasonal water stream flowed on the east just below the hillock. The stream starts from a reservoir in the south of Gwalior city and meanders in the hills, flowing through a tortuous course. Average slope being 1:500. The water stream would have been the reason for human settlement.
-Vegetation- Vegetation would have been largely of deciduous trees and shrubs, many of which flower when leafless, or nearly so in the hot season. Major reason being extreme climatic conditions and lack of availability of water.
- Settlement type- Small huts were made from thatch and sandstone.
- Human needs- Safe environment which protects one from wild animals and availability of water and food.

4.2.2 3CE- 1873 (the time fortification started)

Figure 12: During Rainy season

Figure 13: During Summers

-Hillock- Hillock was now named as Gwalior Fort and was ruled by a number of rulers beginning from Suraj Sen Pal to Chandelas to Muslim dynasties to Tomars to Mughals to Marathas. All the rulers have contributed to the architecture of the Fort.

- Water Stream- The seasonal water stream continued to provide water for various human needs for the people settled in the foothills of fort and was named Swarnarekha during this stage. The river got its name as it shined bright like a golden line in the morning as the sun rays fell on it when seen from the fort.

-Vegetation- The forests were converted to farmlands and grew crop just after the rains. Gwalior faced issues of famines during this stage. Only a thorny forest with scrub like vegetation with trees of height not more than 10m meters survived.

Settlement type- Stucco (chunamed) and sandstone flats were used as building materials. A large number of settlement happened all along the Swarnarekha.

Human needs- A constant need to protect oneself from the wars happening and water was the major requirements in this stage.

4.2.3 1874- 1922- 1946 (the time when the kings moved from fort to plains)

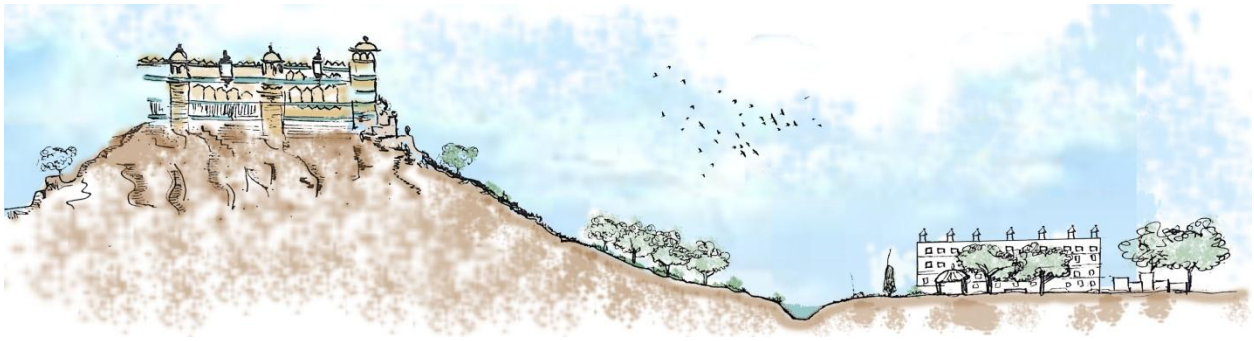


Figure 14: Throughout the year

-Fort- The fort had number of monuments but was no more habitated by the Scindias. Construction of Jai Vilas Palace in 1874 had brought the king down from the fort to reside in the new palace.

- Swarnarekha River- The seasonal water stream was now a perennial water stream with the construction of dam at the reservoir and both its edges were stone pitched. The stream now fulfilled the need of water for the palace as well as the residents. Tigra Dam which still supplies water to Gwalior city was constructed during 1916 and the dependency on the stream reduced.

-Vegetation- The number of farmlands increased and the local flora was reduced. Availability of water made it possible to farm crops throughout the year. In 1922 Phoolbagh area was designated as gardens for the rulers. One such garden was Italian Garden which was the extension of palace and had Swarnarekha flowing on one end. The gardens had extensive water fountain systems speaking of grandeur of the ruling dynasty.

Settlement type- Stucco (chunamed) and sandstone was extensively used as building material. Rich had ornamented buildings whereas others other buildings were shapeless, coarse and without any air of ornament. The other type of settlement was of the army and one could see a interspersed many tents and palls, flags and pennons.

Human needs- The need of water throughout the year was fullfilled which led to the growth of the city. This stage saw the riots and movements for independence.

4.2.4 1947- 2007- till date (the time when Swarnarekha was concretized)

Figure 15: Throughout the year

-Fort- No more changes were allowed to be made on fort. It is now visited by large number of tourists.

-Swarnarekha River- With reduced dependency, the stream was polluted and its natural drainage was used to take the grey water of the city away from it. Fresh water was majorly tapped by farmlands and there was very little fresh water available in the canal. In 2007 the river was concretized from all the three sides and a sewer line was laid just below the concrete Swarnarekha canal. Now there is absolutely no water in the canal and the concrete channel almost 30 meter wide runs through the city.

-Vegetation- The native vegetation has been cut down with the increase in need of land. The only mature trees that have survived are neem, peepal and bargad that have religious importance. The palette now consists of majorly ornamental trees that do not support the dependent fauna. Phoolbagh is still one of the greenest areas of Gwalior. After independence the park was made accessible for public.

Settlement type- The city expanded with fort as its nucleus with major building material being cement and bricks.

Human needs- Need for reviving the Phoolbagh area and Swarnarekha River.

4.3 Movement Corridor Study

The study of movement corridors of vehicle users and pedestrian, in and around site help us understand the space better. Various factors like physical permeability, visual permeability, associational quality, the extent of sound (noise), the ease of walkability can be understood through detailed analysis.

With the expansion of Urban boundaries of the city, there is an increased need to commute through vehicles.

The registered number of vehicles have gone up from 25,000 in 2001 to 1,75,000 in 2011.

In this case, it is important to understand the various types of load bear by the site, how multiple roads have raised the physical permeability and how the arrangement of buildings in space has increased visual permeability for pedestrians.

It is important to discuss the various factors that have impact on the site and then balancing the result for both the pedestrians and car users, as one of the most important road passes through the chosen area for design intervention.

The study will help us take decisions on critical zones, intended pedestrian links and road amenities.

Parameters for Studying

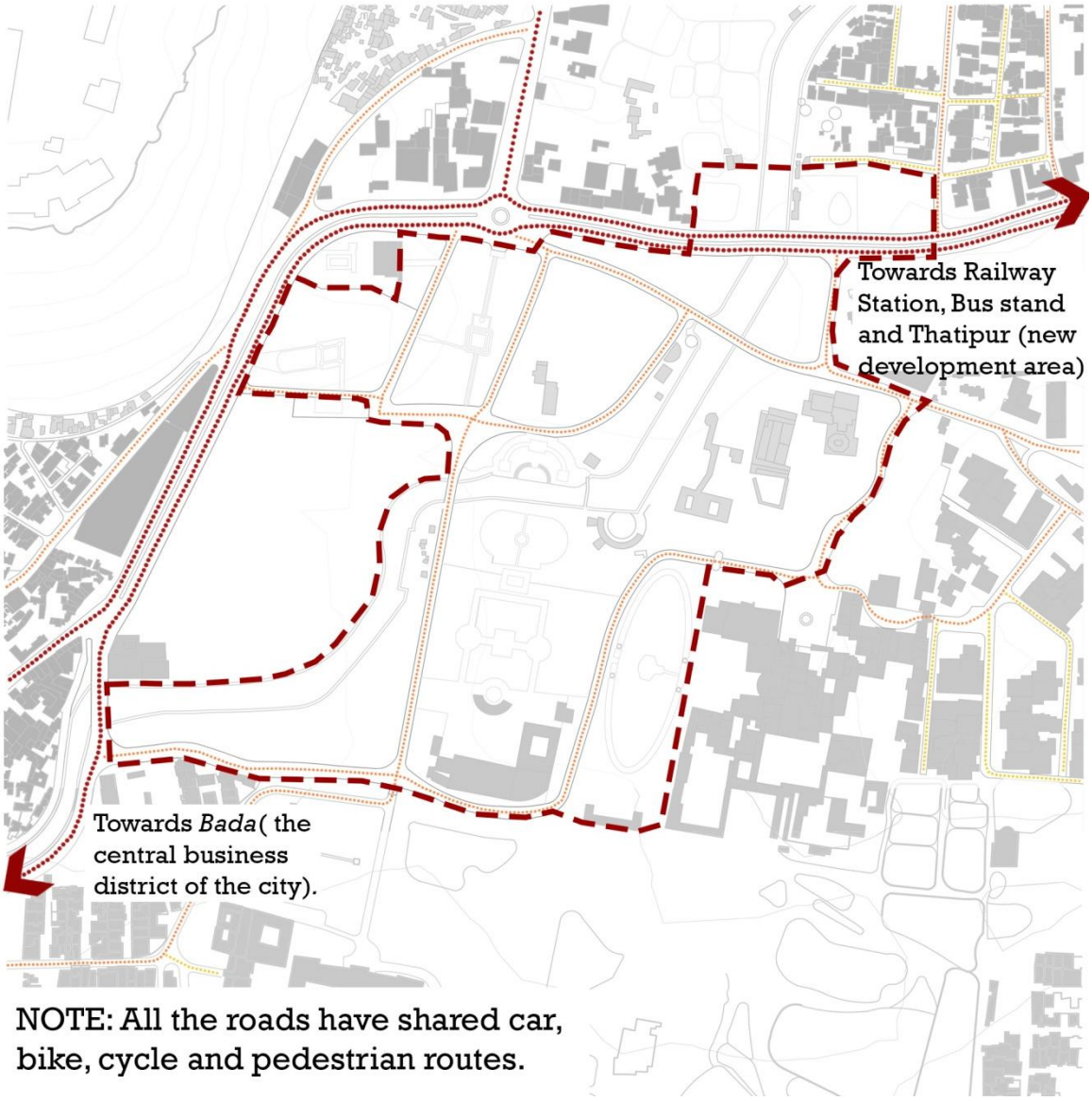
Function based

Road Typology, Road Elements, Safety Elements, Vehicular intensity, Pedestrian Intensity, Walkability

Spatial atmosphere based

Visual permeability, Soundscapes

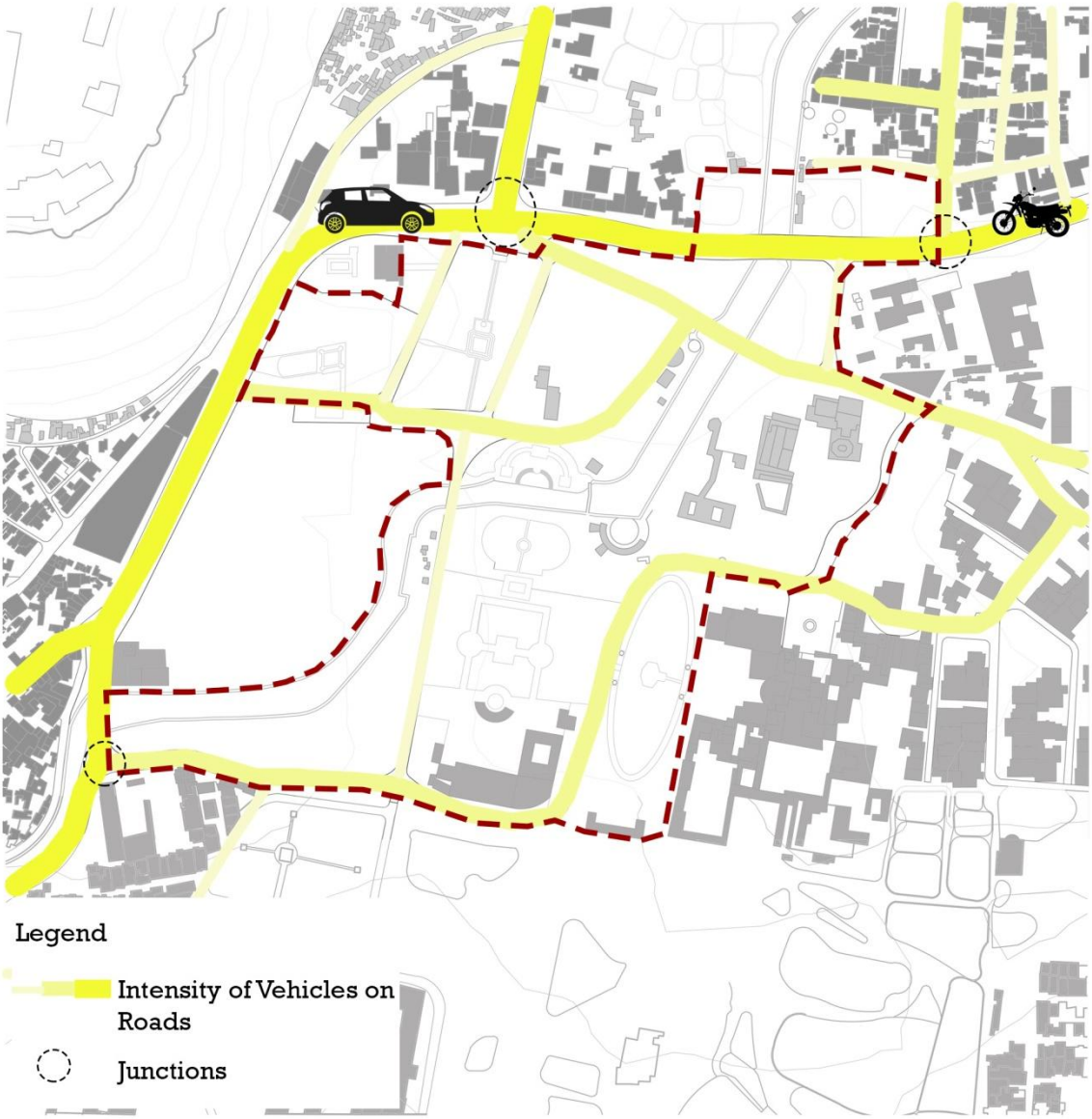
4.3.1 Road Typology



Legend	Road Type
	Primary road- The road connects the old city to the new city.
	Secondary road- Road connecting primary roads to other roads
	Tertiary Road- Internal roads of residential areas

Observation	Inference	Implication
7 secondary roads connect to the primary road with in a distance	Multiple route choices	Increased possibility of using public spaces.
Lower traffic intensity on secondary roads on south that conects to the primary road.	Multiple secondary routes (for the movement of vehicles) to a common destination	Fragmentation of Open Urban Public Space
Pedestrians cross the road despite heavy traffic.	The social places are divided by roads	Accident prone zones.

4.3.2 Vehicular Intensity



FACTS

Registered Motor Vehicles

Categories	Gwalior	Madhya Pradesh
Goods Vehicles		
- Four- Wheeler	12157	197770
- Three-Wheeler	3678	45041
Passenger Vehicles		
- Transport Corp.	4105	6926
- Other-Private	906	17582
- Mini Bus	7485	120301
- Motor Cab	2293	36084
- Tempo	2589	12176
- Auto-Rickshaw	8257	84641
Two-Wheeler		
- Moped	40818	727559
- Scooter/Motor	375588	6150122
Car	36347	493412
Jeep	6316	52784
Tractor	19743	577703
Trailer	6761	214897
Other Vehicles	2710	23041
Total Vehicles	529753	8760039
Registered Vehicles per '000 Population	260.70	5100.47

In Nos. (As on 31st March, 2013)

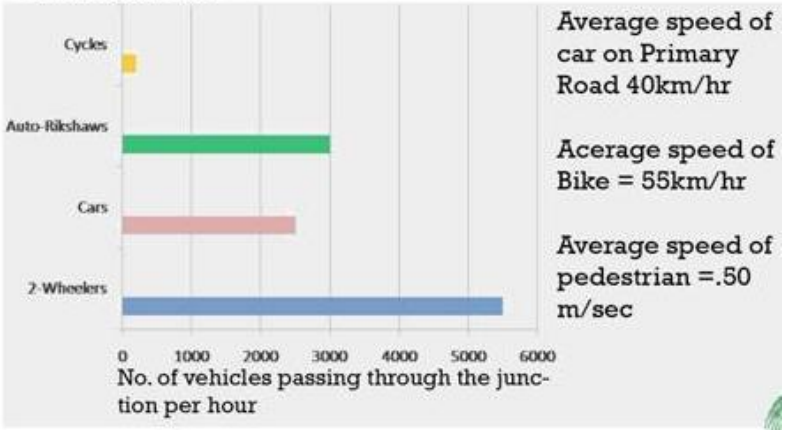
Inference

Scooters and motor bikes are the most bought among all the other category of vehicles. Bikes and scooters have higher speed and are least blocked by 4 wheeler traffic.

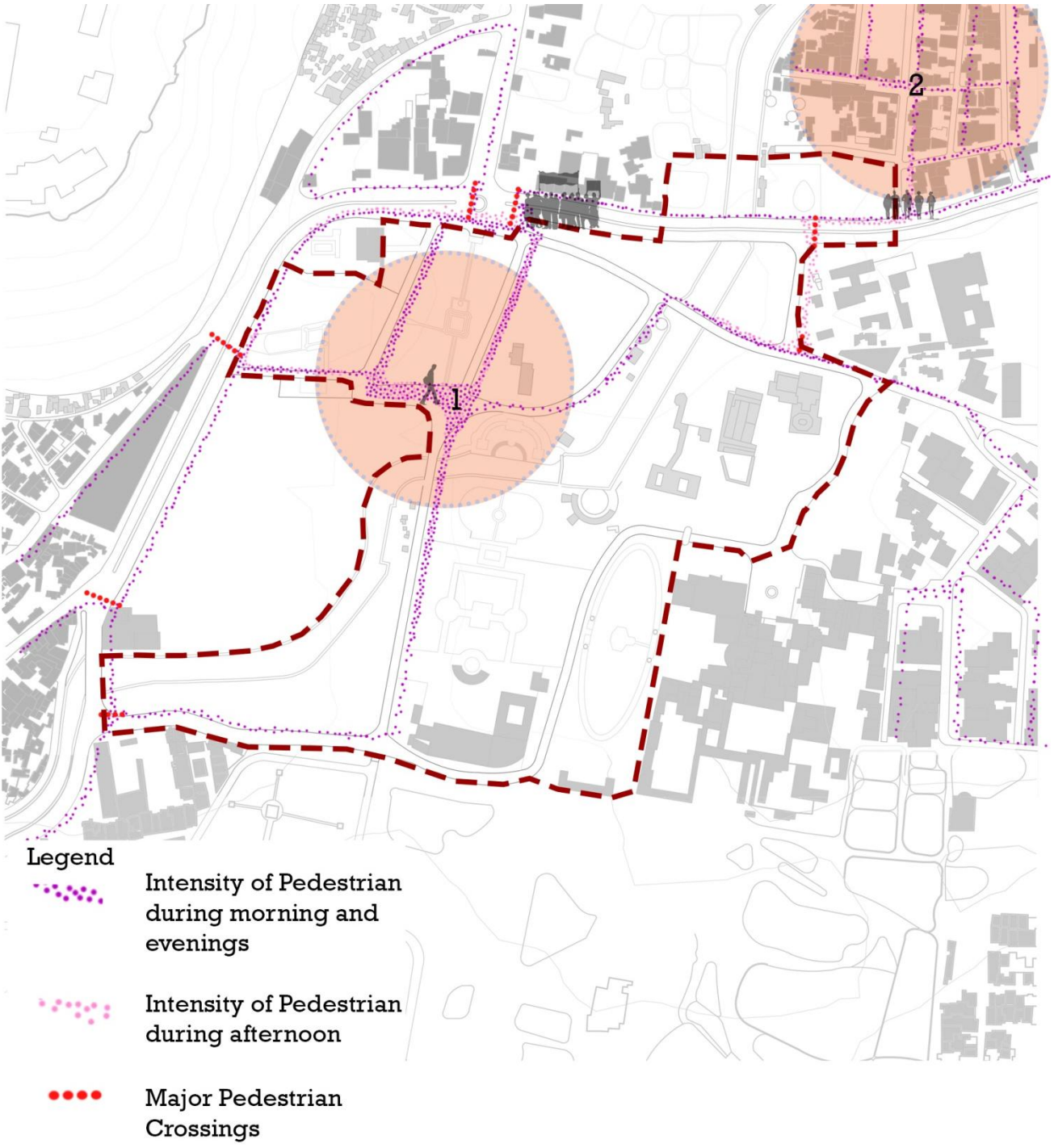
Implication

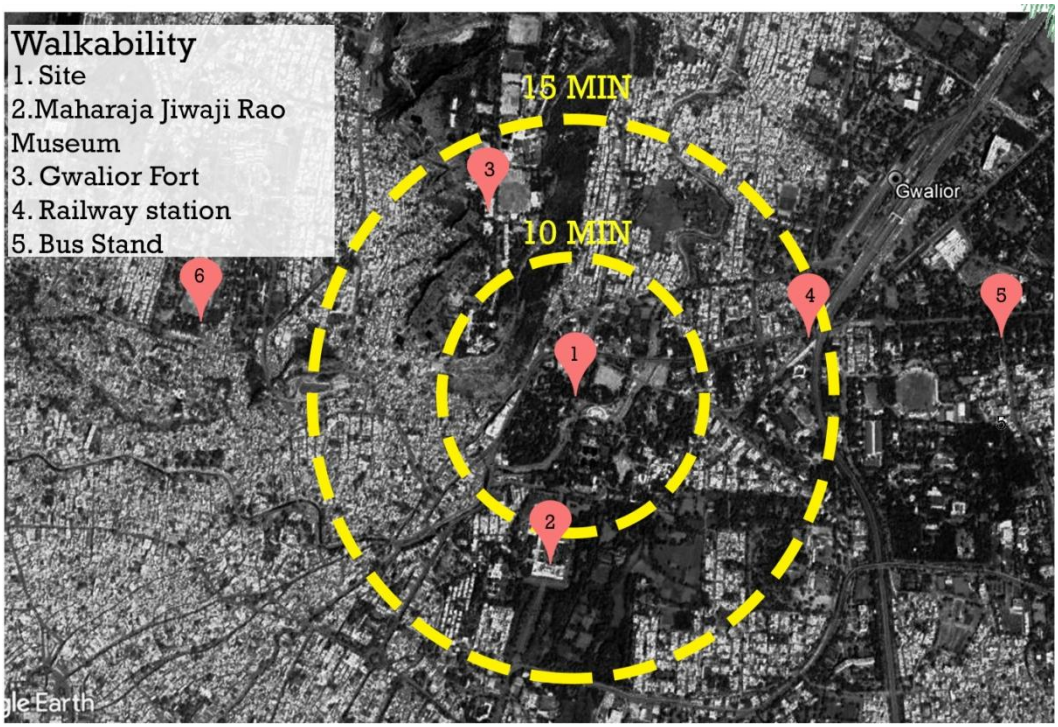
More chances of accidents by motorized 2 wheelers.

OBSERVATIONS



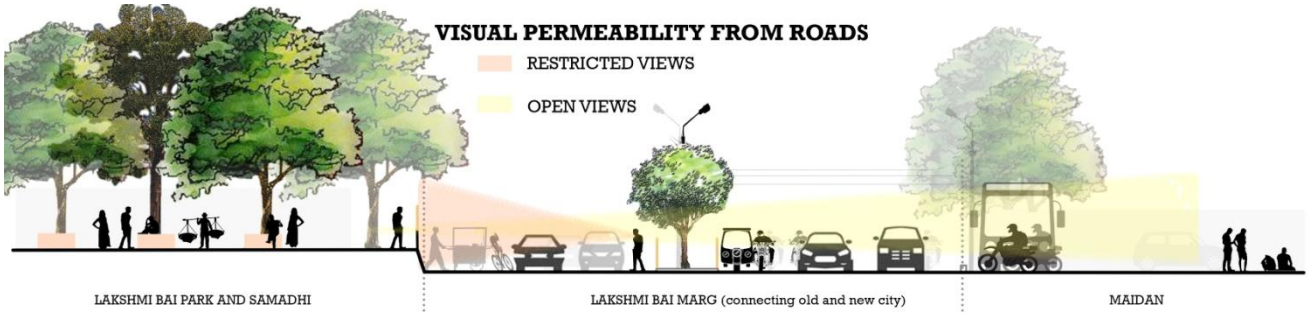
4.3.3 Pedestrian Intensity





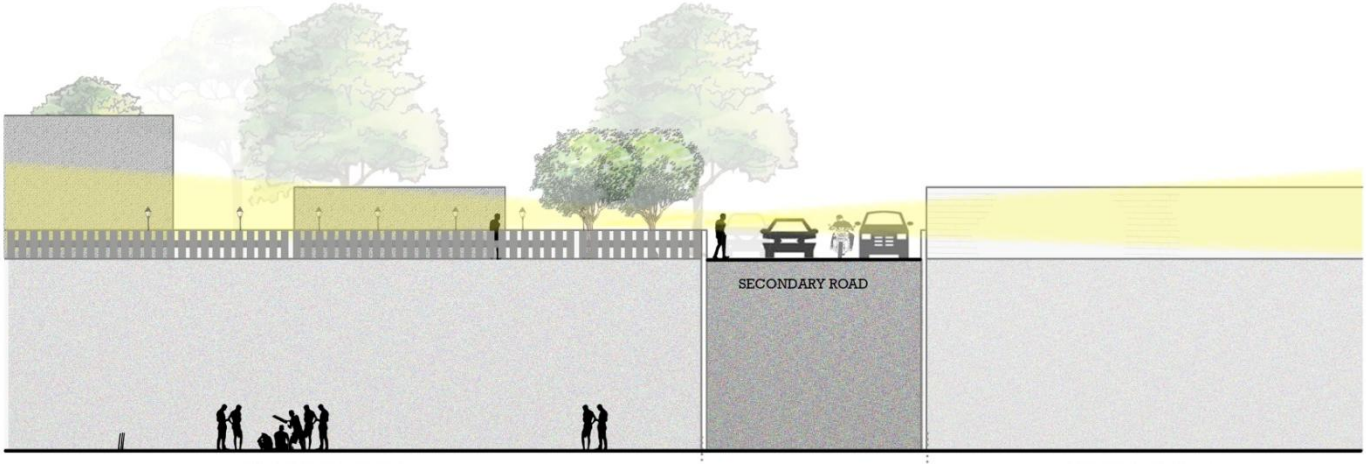
Observation	Inference	Implication
More than 500 people come for morning fitness regime (area 1)	The green areas are well used despite poor amenities. No other greener areas in the vicinity.	People walk all over the roads and are prone to accidents. If designed appropriately, the area has potential to cater people on a larger scale.
Approximately 300 students cross the junction every 1 hour	The area is extensively used by students in the afternoon hours. Lack of infrastructure for pedestrians, and division of social spaces.	People walk all over the roads and are prone to accidents. If designed appropriately, the area has potential to cater people on a larger scale.
A sense of openness around primary road.	Buildings are sparsely located in the space of this urban space system, leading to higher visual permeability despite a lower physical permeability.	Movement of vehicles and pedestrian on the same horizontal plane leads to disorganized movement patterns, leading to traffic congestion every now and then.

4.3.4 Visual Permeability

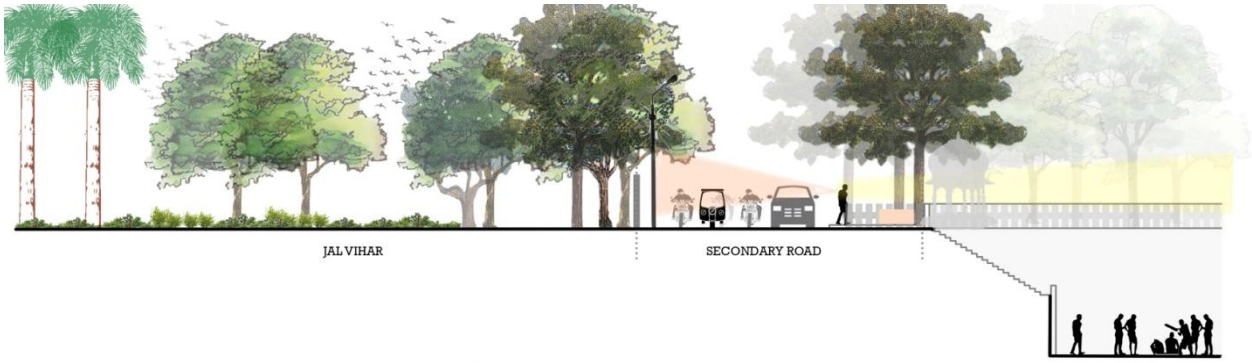


Section 1: A-A'

Section 2 : B-B'

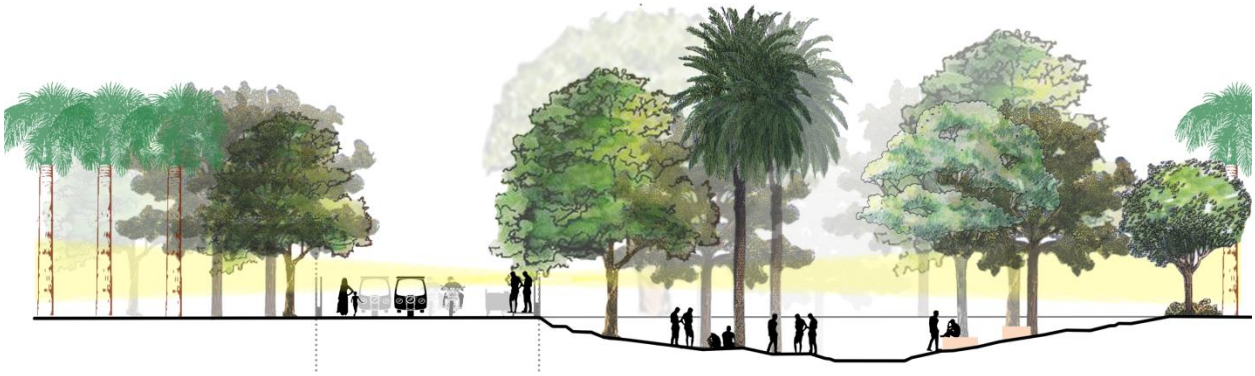


Section 3: C-C'



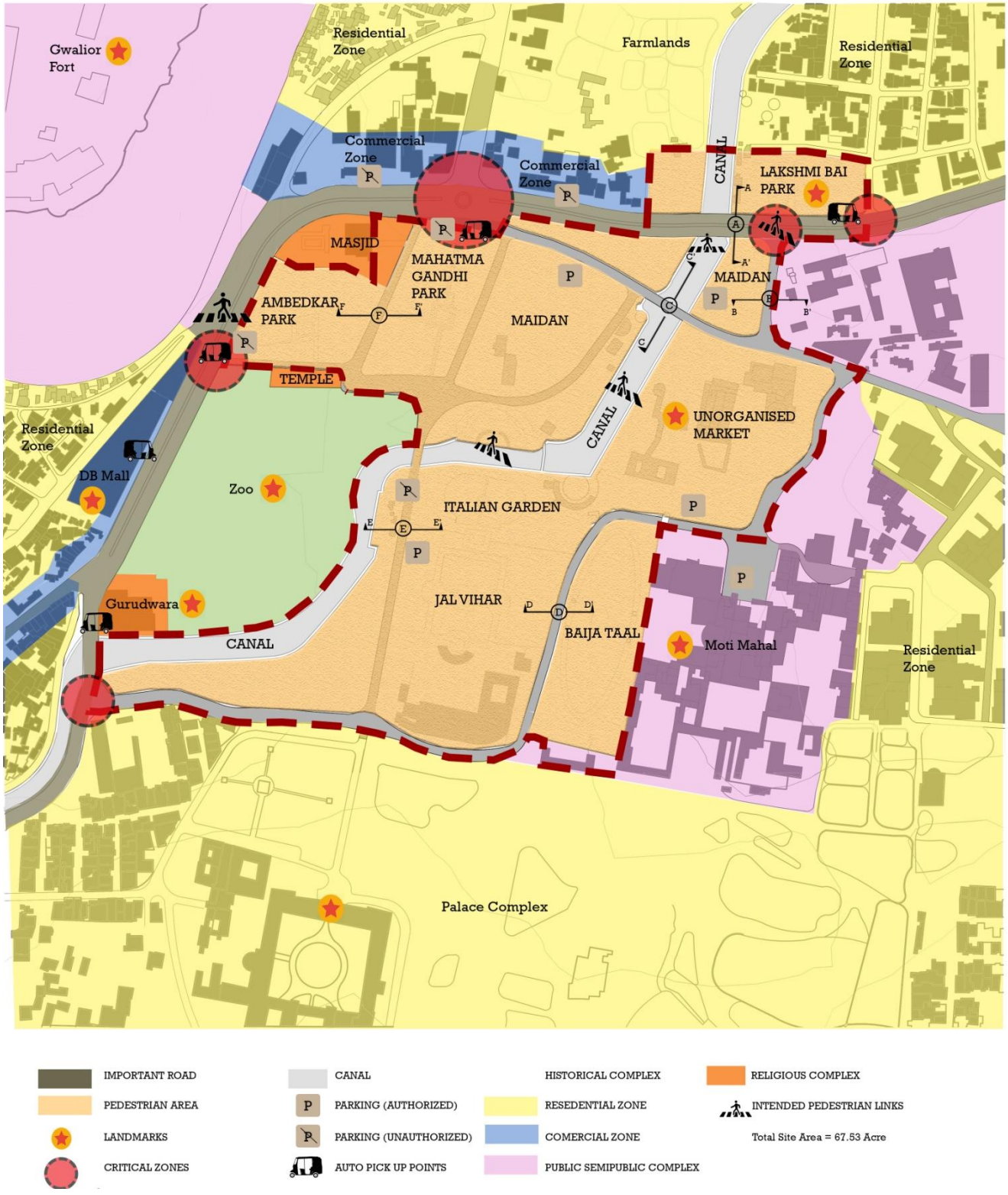
Section 4: D-D'

Section 5: E-E'



Section 6: F-F'

4.3.5 Connecting the disconnects



4.4 Mapping activities

As successful places support and facilitate the activities of people, their design should be informed by an awareness of how people use them.

Synthesizing research and ideas on the use and design of public space, as well as meaningful-allowing people to make stronger connections between the place, their personal lives, and the larger world- and democratic protecting the rights of user groups, being accessible to all groups and providing for freedom of action- public spaces should be responsive- that is, designed and managed to serve the needs of their user.

In this case, the activities are mapped to understand the usability of space, to explain what's happening and why is it happening? How the activities of surrounding areas have impact on Urban open spaces.

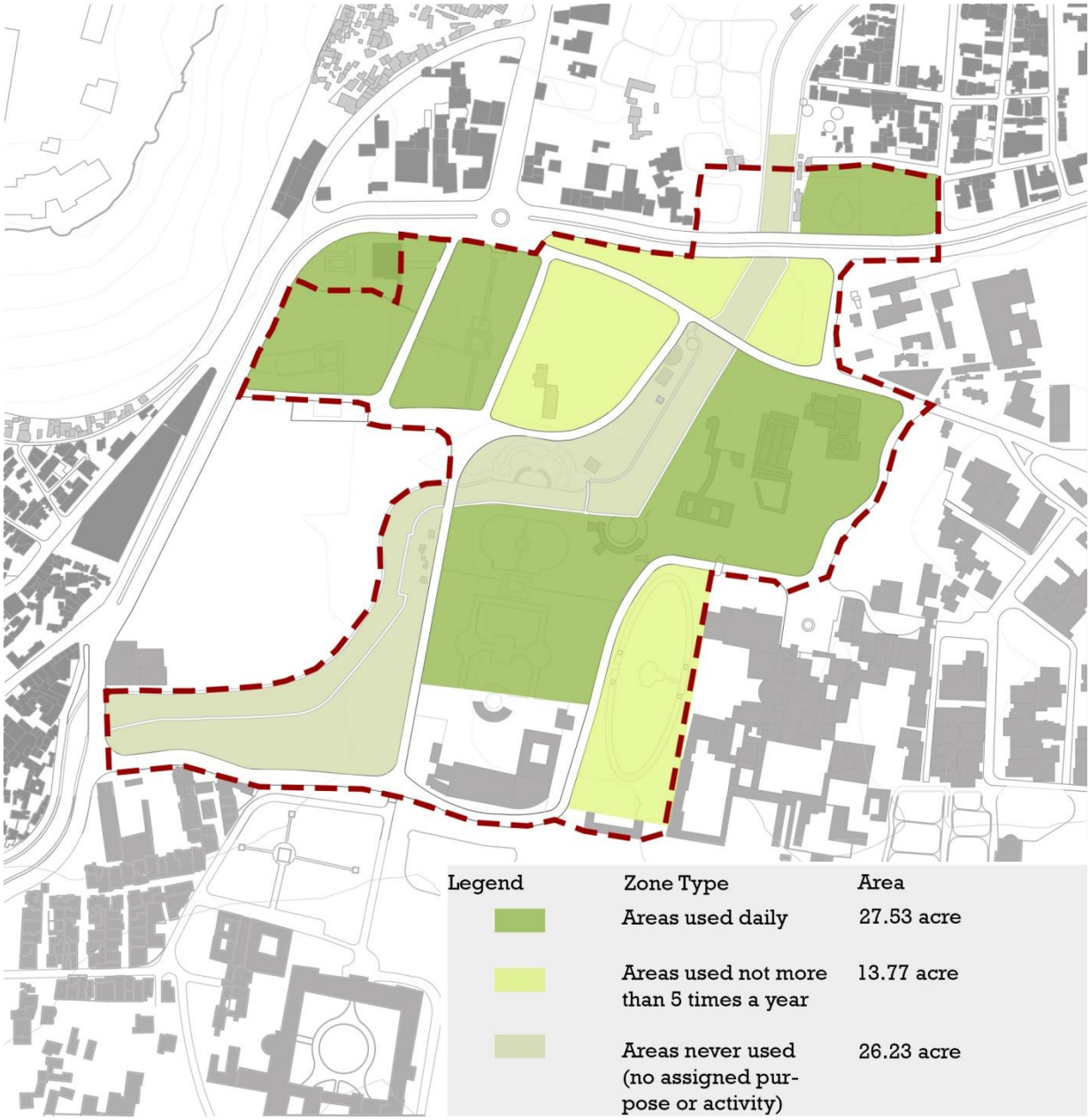
It is important to recognize the pattern of activities and its implications. In this case, surroundings offer a number of different types of activities, which in turn create possibilities for n number of optional activities. Despite its surroundings there are areas which do not permit any kind of passive or active recreation like Swarnarekha channel.

Parameters for studying-

Primary needs people seek to satisfy in public space-
Comfort, Relaxation, Passive engagement, Active engagement, Discovery, Display

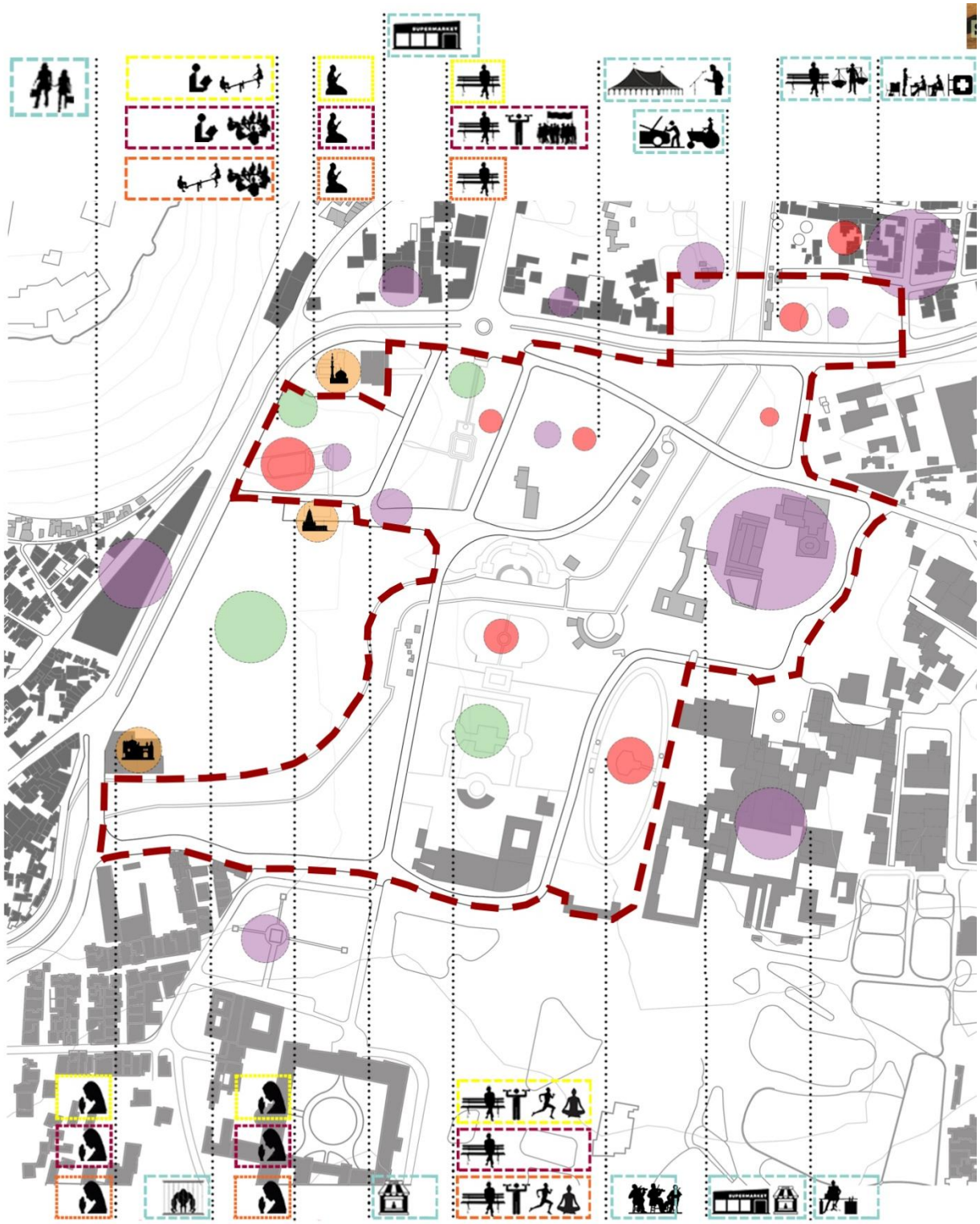
Figure 16: Various activities on Site

4.4.1 Active/ Inactive zones on Site



Observation	Inference	Implication
The area marked as areas never used runs in the spine and the areas marked as not used frequently are also centrally located in the delineated site.	Break in the flow of functions; almost 68% of site is hardly put to any use.	Fragmentation of space physically and visually.

4.4.2 Activities throughout the day



Legend	Typology of activities and time of the day	Areas
	Recreational	Parks and zoo
	Religious	Mosque, Temple, Gurudwara
	Social	Few Parks
	Economic	Surroundings and on street

	9am to 5pm
	6am to 9am
	12pm to 3pm
	4pm to 6pm

Observation	Inference	Implication
There are more than 15 different activities taking place on site and surrounding areas.	Different activities bring in people from a wide range of areas from the city and its surroundings. The people involve themselves and use the public open spaces in divergent ways.	A space with no specific function can cater to multiple uses but at the same time a large number of such spaces can lead to an unorganized design.
No diversity in the activities happening in the park and the number of types of activities is few.	The deficiency in design and allotment of spaces for various activities has made the space monotonous.	There are only very few visitors that come to visit park as their primary goal; all the visitors visiting at present are using it as an optional space.
13.77 acres of land is used only 5 times a year either for exhibition, fares or political speeches.	These areas in the center of the city are left to be used unsuitably, either by boys to play cricket and is sometimes occupied by construction site workers.	These areas are voids and restrict the space to become whole. Fragmentation in terms of activities happen.

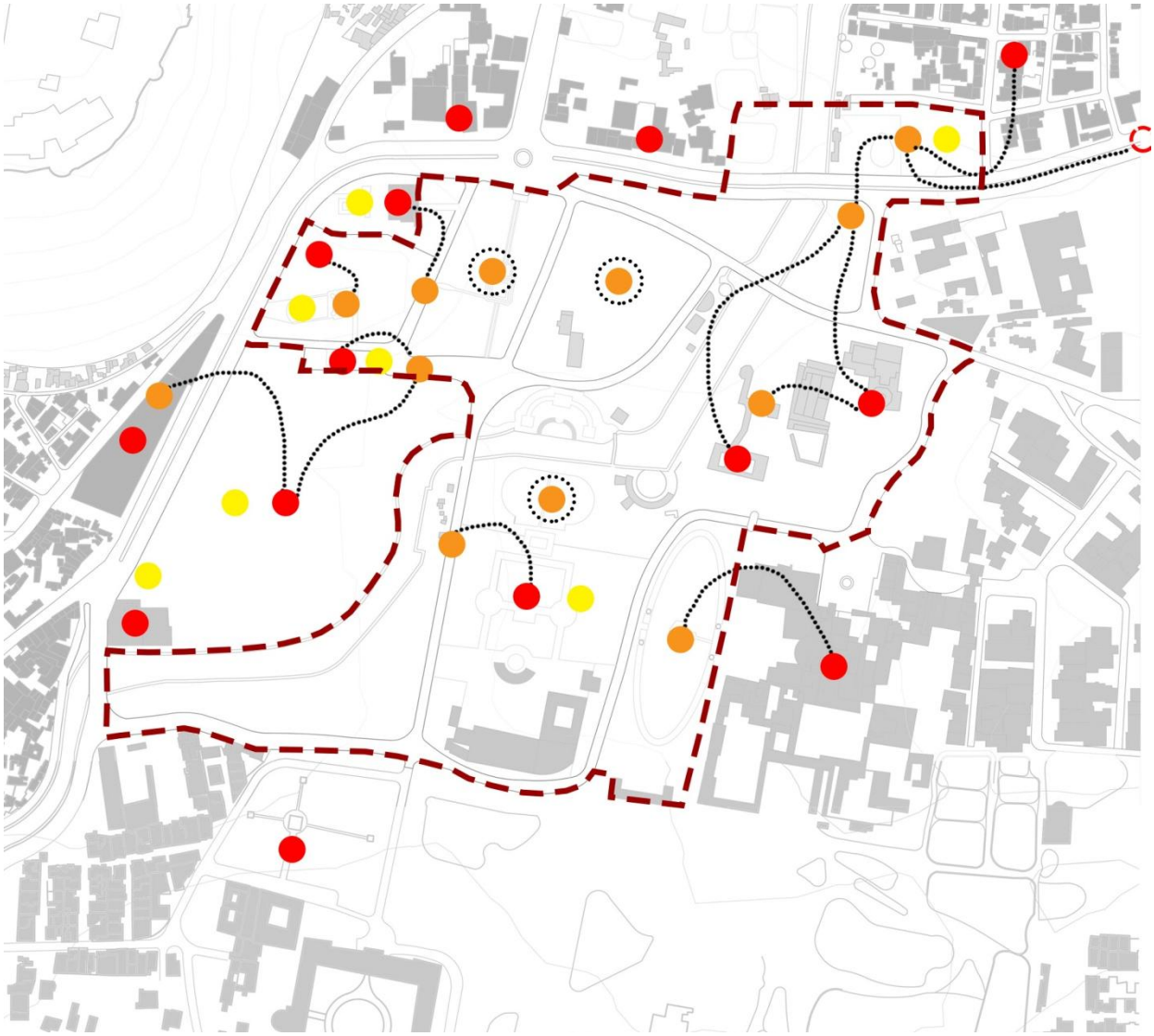
Few other Activities


Worshipping Tree


Feeding Birds


Feeding Fishes

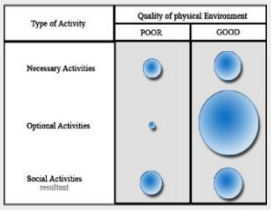
4.4.3 Nature of Activities



Legend	Type of Activity	Areas generating activities
●	**Necessary Activity** Activities that are compulsory as the participants have no choice.	Coaching centers, hospitals, government offices, religional complex, mall, parks for fitness regime,zoo, children in the park, commercial complex
●	**Optional Activity** Activities are participated if there is a wish to do so and if time and place makes it possible.	Parks, Roads, other urban open areas like Baija Taal.

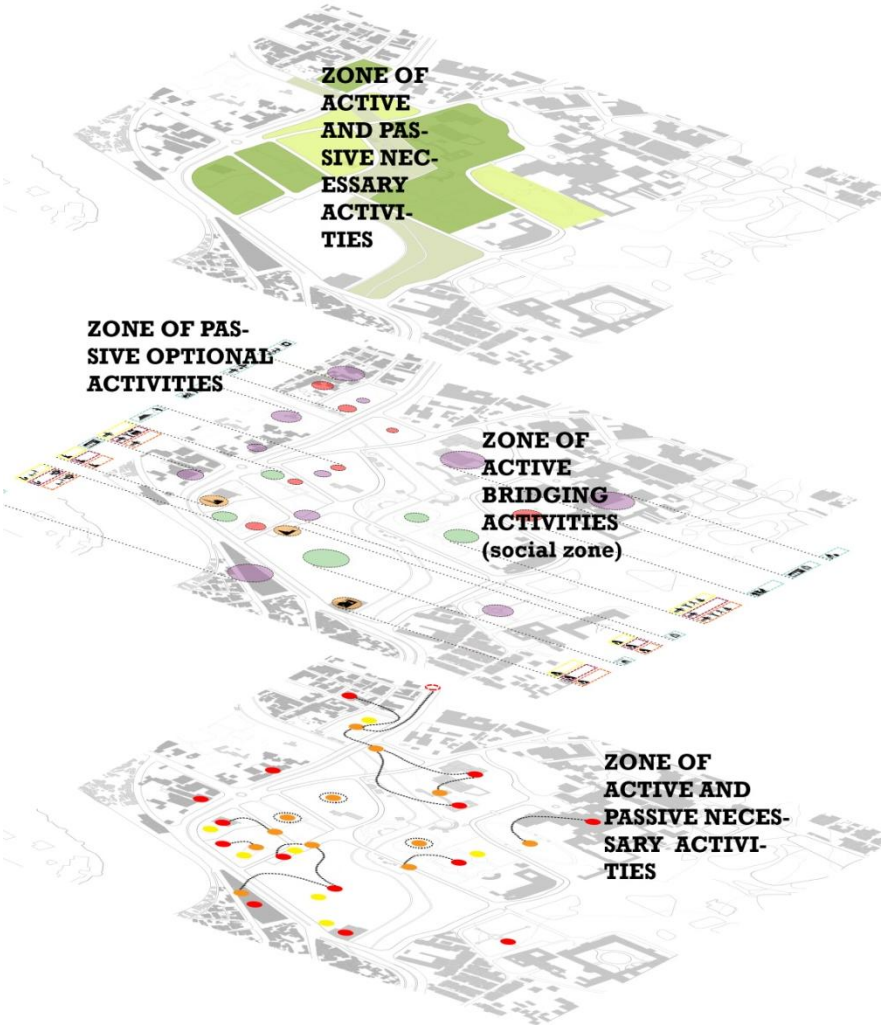
Legend	Type of Activity
●	**Social Activity** Activities that depend on the presence of others in public space making passive contacts.
◉	Optional activities due to necessary activities not in the immediate surrounding.

····· Co relation between necessary activities and optional activities.



Jan Gelh's diagram of relation between quality and use

Observation	Inference	Implication
Necessary activities are taking place in the periphery of selected site, which brings optional activities in the surrounding areas.	There is no certainty to the extent of use of site, as there are less necessary activities designated.	The people have disconnected from the greens of Phoolbagh area; primarily use of which was to provide public open space. There is lack of surveillance and maintenance.
The number of optional activities is very few, most areas are used as waiting areas and the only activity that can be seen is few food vendors.	Quality of physical environment is poor and do not bring a large number of user to the space.	As there is a disconnect amongst citizens, no social space is generated in the site selected.



<u>Considerations while designing</u>

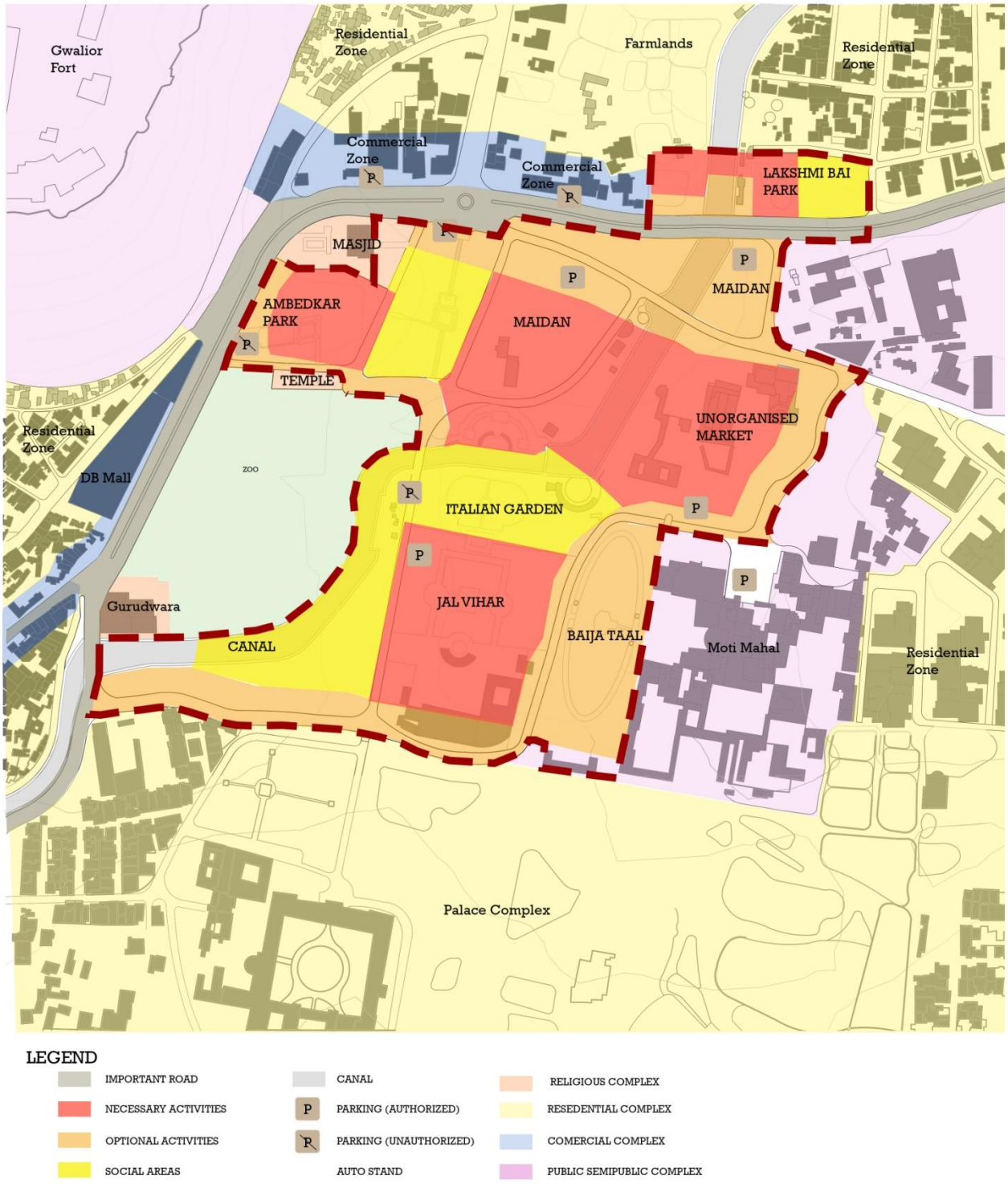
There are few activities that are happening from last 100 years in that area, one of them being feeding fishes and birds. While redesigning all the factors that lead to these associations should be studied thoroughly and considered.

Eg. People come and feed parrots, but parrots are directly associated to the vegetation. i .e. there are trees that are more than 80 years old and the parrots use them for their habitat as well as for food.

Activities should be evenly distributed on the selected site depending upon its location.

At present the transition zones are fragmenting the space, the design should be done to make the experience more fluid.

4.4.4 Balancing the Activities



4.5 Vegetation activities

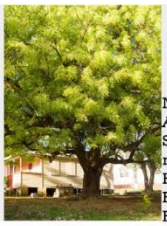
Phoolbagh area has a large number of mature trees, few being older than 100 years with trunk sizes nearly 2 meters and crown sizes 20 meters. Mapping and preservation of these large mature trees is of great significance as these trees provide a large number of ecosystem services. The services have their ecological and environmental benefits, and social and cultural benefits.

Ecological benefits- Large old trees store more carbon and support a diversity of birds. This is because large older trees provide critical structural complexity that is beneficial to a variety of bird species, particularly habitat specialists that have co-evolved with mature forests (e.g., cavity nesters).Older trees can also benefit surrounding trees by fostering a higher diversity of mycorrhizal fungi, which can facilitate nutrient transfer among trees of different age classes and species. Social and Cultural benefits- Large trees offer a variety of associations. Recreation, traditional recourse use and spirituality being the most prominent ones. Individuals have emotions associated with these trees.

Vegetation analysis will include 1. Mapping of trees on site 2. Shadow Analysis 3. Site lines demarcation

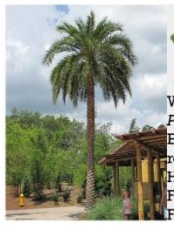
4.5.1 Existing Tree Palette

Royal Palm
Roystonea regia
Evergreen- leaves constantly renewed
Height- 18m
Flowering- May June
Fruiting- Oct Dec



Neem
Azadirachta indica
Semi Evergreen-leaves fall in mid March renewed by April
Height- 12m
Flowering- April
Fruiting- June July

Karanj
Pongamia pinnata
Deciduous-leaves fall in mid March April
Height- 12m
Flowering- April May
Fruiting- April May



Wild Date Palm
Phoenix sylvestris
Evergreen- leaves constantly renewed
Height- 15m
Flowering- March April
Fruiting- June August

Peepal
Ficus religiosa
Deciduous- leaves fall from Jan March
Height- 18m
Flowering-
Fruiting- April

Saptaparni
Alstonia scholaris
Evergreen- new leaves in March April
Height- 14m
Flowering-Oct Dec
Fruiting- March April

Chinese Fan Palm
Livistona chinesis
Evergreen- leaves constantly renewed
Height- 5m
Flowering- March April
Fruiting- Aug Sept

Gulmohur
Delonix Regia
Deciduous- tree is bare through Feb March
Height- 10m
Flowering- April May
Fruiting- July March

Kassod
Cassia siamea
Deciduous- leaves fall from Feb to March
Height- 14m
Flowering- July Dec
Fruiting- Feb

Ashok
Polyathia longifolia
Near Evergreen- leaves re-newed March April
Height- 12m
Flowering- March April
Fruiting- June Aug

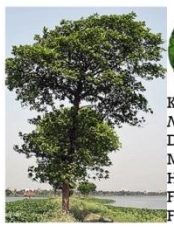
Maulsari
Mimusops elengi
Near Evergreen- leaves re-newed March April
Height- 12m
Flowering- May June
Fruiting- Feb June

Cherol
Holoptelea integrifolia
Deciduous- leaves shed in March, renewed in April May
Height- 12m
Flowering- March
Fruiting- April May

Katthal
Artocarpus heterophyllus
Evergreen- leaves constantly renewed
Height- 6m
Flowering- Dec March
Fruiting- July Aug

Champa
Plumeria rubra
Deciduous- tree is bare from Jan to March
Height- 6m
Flowering- May July
Fruiting-

Safed Siris
Albizia procera
Deciduous- tree is bare from Jan to April
Height- 12m
Flowering- July Sept
Fruiting- Dec



Kadamb
Neolamarckia cadamba
Deciduous- leaves drop in March renewed in April
Height- 10m
Flowering- August Sept
Fruiting- Jan Feb

Bottle Brush
Calluistemon viminalis
Near Evergreen- leaf shedding in Jan
Height- 5m
Flowering- Feb March
Fruiting- July Aug

Kaniar
Bauhinia purpurea
Nearly Evergreen- leaves turn Khakhi and shed in April
Height- 9m
Flowering- Oct- Dec
Fruiting- March April

Amaltas
Cassia fistula
Deciduous- leaves shed in April renewed in May
Height- 10m
Flowering- April May
Fruiting- March April

Bargad
Ficus benghalensis
Near Evergreen- new flush in March April
Height- 12m
Flowering-
Fruiting- April May

Goolar
Ficus racemosa
Deciduous- leaves shed in Jan
Height- 12m
Flowering-
Fruiting- March April, Aug Sept

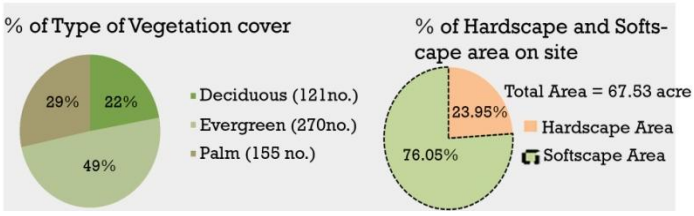
4.5.2 Mapping trees on Site

4.5.3 Effect of leaf litter on Soil

The litter of evergreen is often deeper, taking longer to decompose into humus, than the litter of deciduous trees. This layer of litter conserves soil moisture by slowing evaporation into the air. The litter also protects the surface soil from erosion by absorbing raindrops as they fall. (When raindrops fall on bare soil, they break down the small crumbly lumps of soil into tiny particles. These particles quickly wash away into streams or clog the pores in the soil, compacting it.) A bare soil more readily allowed melting snow drain more quickly into the subsoil.

The surface soil is also teeming with myriads of microscopic life—bacteria and fungi—which decompose the dead plant material (leaves, twigs, and roots), dead animals, insects, etc., making it all part of the soil. Important nutrients are thereby added to the soil. This organic matter is eventually broken down to the basic substances—such as carbon dioxide, water, minerals, and nitrogen—used by trees and other plants.

4.5.4 Location of Evergreen and Deciduous Trees on Site



Of 121 deciduous trees 43trees shed their litter on hardscape area and 19 of 43 trees only 5 years old.

Observation	Inference	Implication
The site as a whole has a mix of deciduous and evergreen trees. Of both the categories, there are more number of evergreens. The trees on the major site lines are evergreen. There is dominance of one type in few areas but no area on site has just one category.	The site looks green throughout the year. A similar visual character appears in the major site lines all round the year. The site has high biodiversity due to mix vegetation.	Good soil condition, natural sustainability of all life forms, resilient site and surroundings, high number of ecosystem services, social benefits such as research, education, monitoring, tourism and other cultural benefits.

4.5.5 Sight Lines

Observation	Inference
The site offers a large number of potential view points, appreciating the landscape and historical monuments, but only to an extent. At some places the views are restricted by vegetation and at some place there is no space allocated (pause points) for appreciating the views.	These points need to be redesigned to appreciate the views better.

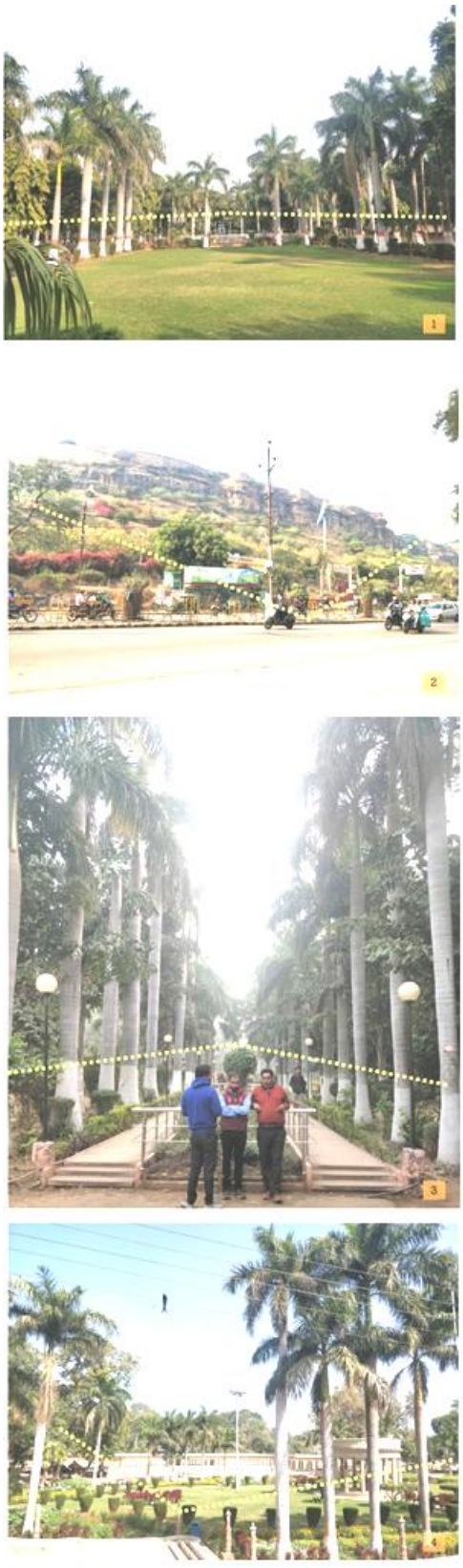


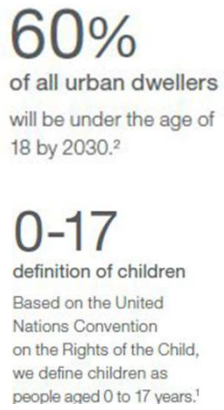
Figure 17 Sight Lines

5 DESIGN INTERVENTION

5.1 Concepts

Re-create Regeneration
History
"Bringing people back to parks"

Integrate:



a. Age: Cater to all users especially young kids (ages of 2 years to 12 years).

We should not prevent children and young people from doing things they enjoy because of risks that can be managed. Children and young people themselves recognize that you can't make everything safe' and that a balance is needed between risks and fun.

Children recognize that knowing about risks and how to manage them is an essential part of growing up.
(DCSF: 2007b)

b. Historical context: Important historical buildings connected by trails

Creating the cultural construct: Critical difference is that landscape has given architecture new frameworks to select and edit attributes of its site or region, and to create a more meaningful dialogue with the broader cultural construct of landscape—as an evolving idealized space. (Elizabeth Meyes, James Corner)

Enhance:

Enhancing the existing green of by connecting evenly and cohesively.

Because ecosystem services (in general) and cultural services (in particular) are not evenly distributed across urban landscapes, differential access to and use of green space can exacerbate health disparities. Enhanced understanding of cultural ecosystem services and the benefits they generate across diverse urban landscapes could therefore help to inform health-related policy and decision making.
(Source: International Journal of Environmental research and public health, 2015)

Promote:
Promote the activities existing on site and around.

Promoting small scale businesses that create the landscape within the public spaces to improve the economic status and livelihood of the locals involved. In turn, the promotion of positive open spaces and reduction of social evils.

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