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# KAHN - SARASVATI RIVERFRONT DEVELOPMENT, INDORE, MADHYA PRADESH

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**Abstract**

*Fig.1 Built components and open spaces at theriverfront forming a balanced urban weave.*

As much as the built fabric is important for a successfulurban weave, so are the open spaces. While designing these built components, we often tend to forget about the open spaces in and around them, which not only areimportant breathing spaces, but also enhance and add value to the built fabric around them. These open spaces can be strategically created by the urban designers and developers or are also existent naturally around us. Such spaces set a certain character to their surroundings and those characters are laid out through some key elements. Planning out such spaces requires conscious thought of not only what is happening insidethe space, but also around it. This thesis specifically focuses on the open spaces available on the Kahn
– Sarasvati riverfront and to come up with a more inviting and engaging public open space at the riverfront in an urban setup while catering to the developmental requirements of the immediate neighborhood.

**Keywords:** Khan River, Development

## Introduction

Rivers have always been the source of life. All the settlements that came into existence all around the world, have their roots linked to a river bank. This shows us how deeply humans have been connectedto rivers. This point of connection for the humans and the rivers is a role played by the riverbanks. Somehow over the time, the relation between the humans and these rivers has deteriorated. A river which is worshipped on one hand, is also being exploited on the other. The devasting treatment of mankind towards a river has not only destroyed its ability to sustain life in and through itself, but has also led to the loss of its identity and even existence, in many cases. The river and the connection it shared with the settlements along it, need to be

rekindled and rejuvenated, failing to which, could lead to worsened quality of life and resources.

Indore is the cleanest city in India as per Swatchata Sarvekshan and yet the historical precinct which also houses Rajbada and, is the most central region of the city, set on the banks of the inline river of Indore – Kahn, still remains a neglected area. The River Kahn itself has turned into a sewage stream due to the rapid industrialization and growth of the adjoining areas. This has resulted in large scale exploitation of its natural resources.

*Fig.2 Condition of Kahn River on Site.*

**Depletion of the Kahn River**

Indore being the largest and most populous city of the Indian state of Madhya Pradesh is the commercialcapital for exchange of goods and services, and recently many big and small-scale industries have set up their operations in the city. Since the mid-19th century, Indore has seen rapid industrial and population growth, which no doubt increased sewerage flow in the Kahn River, affecting the condition

of the river drastically. More than 100 industrial units have been polluting Kahn River since decades.Also, setting up of slum areas beside the river has affected the perquisite habitat.

**Expectations from a developed Riverfront**

With the proposal of developing the riverfronts of Kahn River, the project is expected to level up thesituation in many ways. Some of the same are as follows:

- If seen from the tourism point of view, the project has a potential of becoming a must visit place for tourists as well as the locals as the city loves the Rajwada Fort, and will surely visits its banks if cleaned and maintained for recreational activities.
- If thinking socially, it would be the city's pride as a only few metro's have a dedicated river front and will set an example before all other metropolitans who have a waterfront.
- If seen strategically, apart from being just a tourist place, it would be a new location for local businesses, and will create market revenue as well as opportunities, like in the cases of Lucknow and Ahmedabad, which had a market at the river front, thus, the visitors uplift their sales while visiting the riverfront.
- If seen from the urban planning's view, this site has the potential of becoming the breathing spacefor the congested settlements in the precinct.

**Scope of the Project**

The riverfront development work of Kahn River which is a key initiative of the city in making Indore aSmart City and the scope of work includes:

- Development of landscaping and open spaces
- Development of City-level recreational space

- Development of Fruits & Vegetables Market to accommodate shops/ hawkers in the area
- Development of adequate parking areas

**Benefits to the City**

This project carries the potential to turn out to be very beneficial to the city. Once the constructionworks are completed, the following are benefits are expected:

- Restoration/ visual improvement of the riverfront
- Preventing entry of sewerage into the river
- Creation of a city-level recreational area
- The enhanced opportunity of the riverfront for tourism purpose

*Fig.3 Expectations from the project.*

**Background**

In developed countries, there is a tendency to avoid building residences right on the riverfront, owing to the changes being wrought by climate change. There are greater incidences of rivers bursting their banks after excessive rainfall, despite the government's best efforts to put in place flood defences to prevent it. Riverfront development is used as an additional buffer, creating a non-residential zone between the river and homes in the area around it. Planners create public spaces to let residents enjoy the riverfront and its surrounds. These include parks, walkways, and spaces to host festivals, and othercommunity gatherings.
In developing countries with emerging economies, people have, for centuries, resided alongside the river. It is often their only source of freshwater. Overcrowding also forces residents to settle right by the riverbanks for lack of any alternative, which end up getting flooded every time the river bursts its banks causing large amount of damage to the people and the settlements.
Events such as these across the world have led urban planners to review the urban management in developing countries and look towards more sustainable riverfront development models, which protect the river and its environment as well as the people who live near to it. Decades, if not centuries, of neglect, have made many rivers unsanitary and their water unsafe for human consumption.

**The Riverfront then and now**

Long ago, transporting goods by boats and ships, was the most expedient way of trading commodities. Traveling overland using horses and carts on tracks was the norm before the advent of the combustion engine and the materials used to construct permanent roads. As a result, the riverfront was monopolized by warehouses where goods were stored awaiting riparian transportation.

As time passed, some factories also set up their operations near to the river, so that they could pump waste directly into the water. Harmful chemicals were introduced to the waterways as a consequence. Large bodies of water were polluted this way and contributed largely to the pollution menace in cities. As road construction intensified, the need for boats to transport goods declined rapidly. Factories and warehouses began moving to central hubs along the highways, allowing them to get their products on the road quickly. The old buildings fell into disuse and disrepair, and little was done over subsequent years to utilize the commercial space entities that were left behind.

**A new era**

Modern urban developers recognized the potential of the disused riverfronts. They realized that repurposing this land could lead to a series of benefits for cities, including:

- Creation of green belts in the city
- Escalation in developments beyond the riparian buffer
- Enhanced community culture and quality of life
- Environmental conservation
- Creation of jobs for infrastructural development and maintenance
- Increased revenue from tourism

To this end, riverfront development and rejuvenation began in several cities around the world, withurban planners aiming to restore the rivers as a vital part of each city.

**Riverfronts in India**

The concept of riverfront development in our country goes way back in the history, evidence of which are the ghats in several cities that are settled at the banks of river Ganga and its tributaries. It was a common practice as all the settlements that came into existence all around the world, have their roots linked to a riverbank. Over the time, these buffers started depleting due to excessive invasive treatment by the settlements and negligence towards their maintenance.

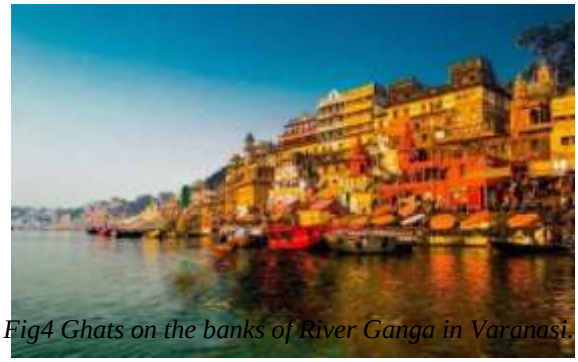

*Fig4 Ghats on the banks of River Ganga in Varanasi.*

When the repercussions of these started reflecting in the form of frequent flooding, choking of water channels, depletion of quality of river water, etc., riverfront development was reintroduced with addedqualities and features.

**Indore and its development along Kahn and Sarasvati River**

Indore initially was a small riverside village whose origin was marked by the presence of Indreshwar Temple on the bank of River Saraswati near the point where Sarasvati and Kahn River converge into one and moves ahead as Kahn River. It was constructed by the Marathas and was titled as the capital city of the Holkar Dynasty. The Holkars dynasty then took initiative for developing the precinct and thus constructed many important built structures like Gopal Mandir (Ann kshetra) in 1832, Jain Mandir(1834-1843), Krishnapura Chhatri (1849) near the Krishnapura bridge.

History of urbanization of Indore began with the construction of Rajbada. What was earlier surrounded by agricultural fields, witnessed favourable conditions for commercial activity and became a commercial city. Soon enough, the area witnessed small settlements coming up in place of agricultural land as people shifted their occupation to trading from agriculture, which led to the establishment of Adda Bazaar (1853) and Shiv Vilas Palace (1894) which further strengthened the importance of the

precinct. This further added to emergence of other bazaars like Sarafa gali, Shakkar Bazaar, Imli Bazaar took place to enjoy benefits of security being in the close proximity to the Royal palace. Construction of Imli Saheb Gurudwara (1880) and Imambada (1893) just next to the royal temple Gopal Mandir by Holkar rulers was to give equal status to Muslim and Sikh community imparting Rajwada Precinct a unique character of possessing religious structures of multiple communities.

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It was year 1918 when then Holkar ruler realized that the precinct is growing haphazardly around the palace and invited Sir Patrick Geddes who prepared multiple development plans and development schemes for the city. It was after his initiation that the precinct got well linked by means of Price Yeshwant road, Mahatma Gandhi Road and Jawahar Marg with the precinct and also connected the oldcity with the new Indore.

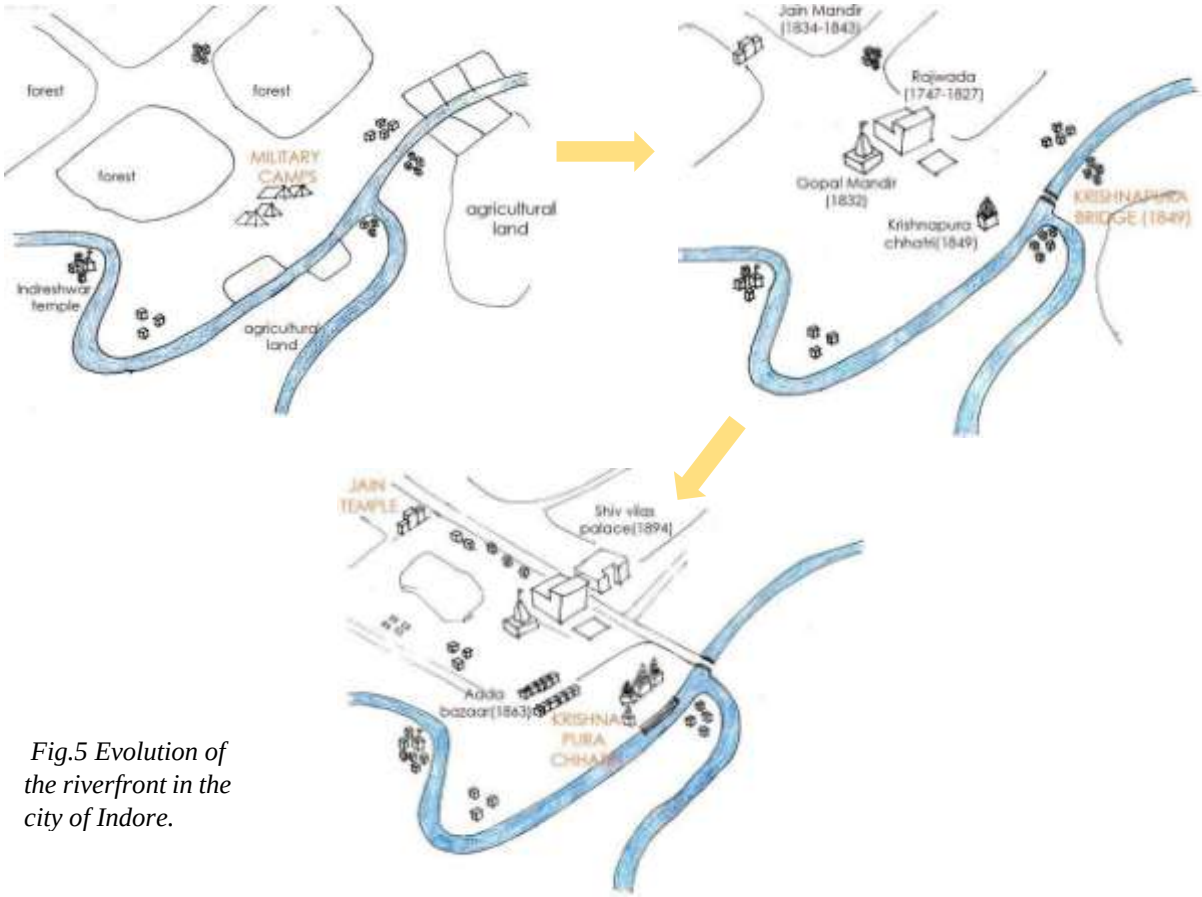


*Fig.5 Evolution of the riverfront in the city of Indore.*

## Literature Reviews

- **A guide to Riverfront Development – Connecting Communities to the Water**

River life "**A Guide to Riverfront Development – Connecting communities to the water**", Publishedonline in 2014; riverlifepgh.org

While planning a development on the riverfront, the following principles should lead the thoughts:

• Featuring the riverfront as a front door.

• Showcase the history on the river.

• Activate the riverfront.

• Limit the obstacles and connect to the river.

• Let the community engage with the water.

• Seamlessly connect the riverfront to its surrounding neighborhoods.

• Repair and enhance the environment in and around the river.

• Employ high quality architectural materials and sustainable engineering practices while developingthe riverfront.

- **Principles of Ecological Riverfront Design Redefined**

Nabilah Redzuan and Nurul Syala Abdul Latip (2016), "**Principles of Ecological Riverfront DesignRedefined**", December 11, 2015; Revised: January 14, 2016; Accepted: January 22, 2016;
Published online: July 04, 2016. Article is published with open access at www.chitkara.edu.in/publications

Channelization of rivers, along with beautification and structured designated landscape design along the riverbanks, are parts of the development that occur in the urban centres around the world. Such developments are often taken up to prevent natural catastrophes such as floods, without considering the nature of the river itself. Realizing this mistake and its adverse effects towards the environment, many countries have started to ecologically reorganize riverfront designs to ensure that rivers are restored to their natural condition.
The ecological improvement of riverfronts can be divided into two types, that is, River Restoration andRiver Rehabilitation. Restoration has been referred to projects that have a high potential of meeting thenatural condition of the river, while River Rehabilitation was specific to the river that had been urbanized to the extent that there was limited land available to achieve ecological improvements. This indicates that the implementation of River Restoration and Rehabilitation depends on the current condition of the riverfront. Riverfront development does not necessarily aim for restoring the natural setting of the riverbank. Improving its ecological setting would be sufficient if processes for full restoration cannot be conducted.

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## Case study conclusions

To identify and understand the issues related to a project of this nature and to derive long-term solutionsfor it, a number of case studies were done, namely as follows:

- Sabarmati Riverfront, Ahmedabad
- Godavari Riverfront Development, Nanded city
- Devi Ahilya Bai Holkar Fruit and Vegetable Market, Indore

Following are the conclusions that were derived from the above-mentioned case studies.

*Fig.6 Sabarmati Riverfront,Ahmedabad*

### Recreational spaces in Riverfront Development projects

- Riverfront development projects that include recreational spaceshelp in the character enhancement of urban setups to a certain level.
- They also promote cultural participations and trades and upliftsocial institutions.
- It creates spaces for city level recreational activities.
- It also has the potential to become a tourist attraction.
- The continuous green coverage along the river corridor acts as
  a safety buffer that protects the settlements near the river edgefrom flooding thus eliminating hazards due to floods.
- It creates vibrant urban neighborhoods and is a step towardsthe beautification of the city.
- Key components of any development of the recreational type ona riverfront are:
  i. Ghats, walking paths and promenades
  ii. Buildings for social infrastructure
  iii. Revival of natural drainage systems
  iv. Revenue generation systems
  v. Parks, gardens, street planting and eco systems
  vi. Lighting
  vii. Street furniture, art, sculptures
  viii. Solid waste management

*Fig.7 Godavari Riverfront,Nanded city*

*Fig.8 Devi Ahilya Bai HolkarFruit and Vegetable Market, Indore*

### Fruit and vegetable markets

- Site planning plays a major role while planning any market place. Movement and circulation of people and commodities should be free of any congestion.
- Working schedule of a fruit and vegetable market becomes the driving factor for deciding the flow of traffic inside and outside the site.
- The sizes and number of stalls or shops for selling the goods would be decided on what kind of goods are being sold and at what scale.
- A lot of waste is generated at such market places. This waste thus needs to be dealt with in the most sustainable way possible.

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## Architectural Interventions

This project aims to come up with a development that promotes the rejuvenation of the river and its banks and build a thoughtful connection between the settlement and the river while preserving their natural character, which benefits both, the society and the environment. This project is expected to improve the visual aspect of the surrounding areas, clearance of encroachment, urban rejuvenation andenvironmental improvement of the city.

The design intends to come up with a sustainable riverfront development that

- helps in rejuvenation of the river.
- reconnects the city to the river and create urban public spaces around it.
- strengthens the green & blue harmony and revitalizing the riverfront by city level green recreationalspaces along the river.
- rehabilitates the existing informal fruits & vegetable shops to an on-site formal market to help inpromoting the local business in a more systematic and decluttered manner.
- thoughtful plans the traffic flow in this densely populated area to facilitate the construction ofMaster Plan Road which aims to ease the traffic movement throughout the city.

## The Site

Being located in the historically popular part of the city, the site itself is a hotspot for not only the local inhabitants, but also for tourists. The Rajwada Palace, the Sarafa bazaar and the Krishnapura Chhatris on the site, are major historical landmarks of the city. This heritage precinct in despair, if developed with careful thought, could help the area regain its lost identity. Since the site already holdsa strong potential of holding a fruit and vegetable market, a formalized setup for the same can help in promoting the local business in a more systematic and decluttered manner.
The site is located in the densely populated and historically popular precinct which is now also a part of the ABD area of the city, and has an area of 27600sq.m. in total, with mixed land-use proposed on it. The proposed land-uses on site according to the land-use plan issued by the Indore Development Authority (IDA) and Indore Municipal Corporation (IMC) include: Area under Urban Heritage Zone (UH) (5000 sq.m.), Area under Recreational Green Zone (G) (9000 sq.m.), Area under Commercial Zone (C) (11000 sq.m.) and Area under Conserved Greens (CG) (2600 sq.m.).


*Fig.9 Google map showing location of the site*

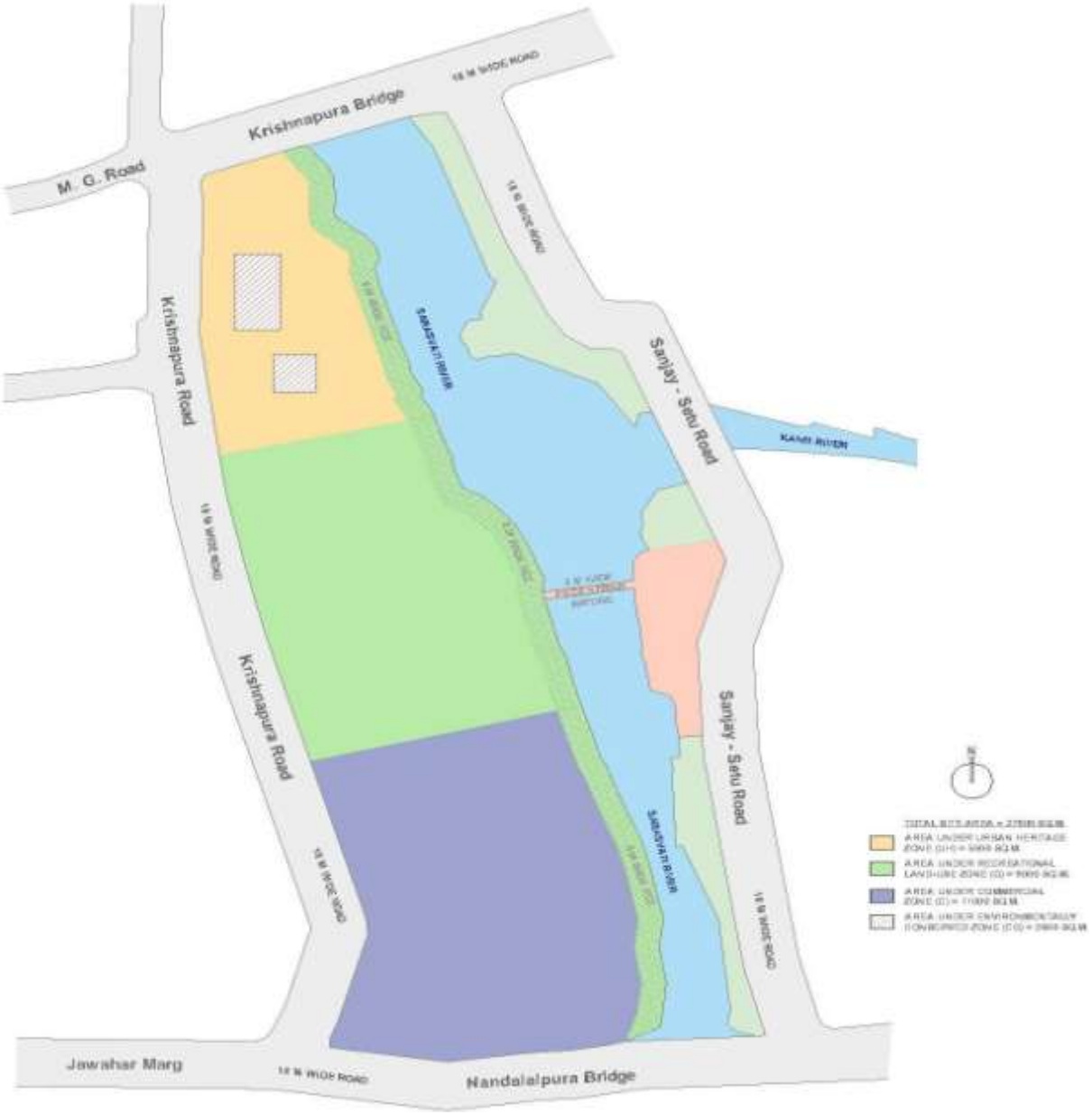


*Fig 10 Site Plan*

Since the site itself is divided into four different zones, different regulations are to be followed basedon which part is being developed.

Since the site is abutting a 18m wide road, a maximum permissible building height of 24m and a baseFAR of 1.5 with additional FAR (50% TDR + 50% premium) of 1.5, is permitted in the Commercial

(C) zone. A maximum permissible FSI of 0.05 has been given in the Recreational Green (RG) Zone. A maximum of 50% of the plot area under Recreational Green (RG) and the entire plot area under theCommercial (C) zone, can be utilized for underground parking of a maximum of 2 basement levels.

Following elements are already proposed in the project by the Local authorities and are a compulsoryin the development:

- Landscaped gardens with pedestrian pathways. (Urban Heritage zone)
- Underground parking for 250 cars and 800 two-wheelers in an area of 8000sq.m. (Recreationalgreens zone)

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- Landscaped gardens with pedestrian pathways. (Recreational greens zone)
- Multi-level car park for 500 cars. (Commercial zone)
- Fruit and vegetable market occupying 230 hawker shops and 135 fruit shops.

(Commercial zone) Following are the additional elements now added in the development scheme to make use of the site'sfull potential:

- Ghats on river edge. (Urban Heritage zone)
- Integration of Greenways in the environmentally conserved area. (Recreational greens zone)
- Children's play area. (Recreational greens zone)
- Small kiosks, temporary in nature. (Recreational greens zone)
- Public utility blocks. (Recreational greens zone)
- Clubhouse of 450 sq.m. (Recreational greens zone)
- Amphitheatre with a seating capacity of 500 people in an area of 750 sq.m. (Recreational greenszone)
- Integration of Greenways in the environmentally conserved area. (Commercial zone)
- Shifting of Multi-level car park for 500 cars to basement parking to maintain the site aesthetics.(Commercial zone)

| ZONE | SPACE | | NO. OF UNITS | AREA PER UNIT (in sq.m.) | TOTAL AREA (in sq.m.) |
|---|---|---|---|---|---|
| COMMERCIAL ZONE [11000 SQ.M. PLOT AREA @ 1.5 BASE FAR + 50% TDR = 2.25 FAR (24750 SQ.M.)] | Hawker shops | | 230 | 9 | 2070 |
| | Fruit shops | | 135 | 9 | 1215 |
| | Multipurpose hall | | 1 (450 seats) | 1.1 sq.m./person | 500 |
| | Art Gallery | | 1 (250 people) | 3 sq.m./person | 750 |
| | Cafeteria | | 1 (100 people) | 2 sq.m./person | 200 |
| | Food Court | | 1 (500 people) | 1.2 sq.m./person | 600 |
| | Restaurant | Normal, full service | 2 (50 people) | 1.2 sq.m./person | 120 |
| | | Fine dine | 1 (40 people) | 1.8 sq.m./person | 72 |
| | Retail shops | | 55 | 140 sq.m./unit | 7700 |
| | Heritage Plaza | | 1 | 750 | 750 |
| | TOTAL | | | | 15,627 |
| | Minimum area required for circulation @ 25% | | | | 3906.75 |
| | GRAND TOTAL | | | | 19533.75 |
| Remaining area of 5216.25 sq.m. to be consumed in public utility spaces, entrance lobbies, service areas and miscellaneous spaces. | | | | | |

*Table 1. Design Brief for Commercial Zone*

**Material pallet**

The material pallet for this project is highly sustainable in nature and is easily available in the localmarket as it is a native to the region.

- Use of baked earth, clay tiles and Sandstone slabs of sub-standard quality for elevation treatment,feature elements and intricate details.
- Due to fly-ash availability in high amounts from the 5 major power plants in the state, fly-ashbricks are the right choice for construction.
- Madhya Pradesh being the largest producer of cement in the country with 7 major cement manufacturing plants and 40 million tonnes of cement production annually, it is a right choice forlast lasting, durable and strong construction and can also be used in combination with the fly-ash for increased strength.
- Brunt clay bricks are also easily available in the region and can be used for elevation treatmentsor external façade of the structure to resemble the regional architectural style and appearance.

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