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A THESIS  
ON  
**Riverfront Development**

*“The voices of site”*

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**Submitted To:**

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This is to certify that this Thesis Report entitled RIVERFRONT DEVELOPMENT “The voices of site”, at Butwal submitted by Shankar Panthi, CRN: 074-BAE-233 has been examined and it has been declared successful for the partial fulfillment of the academic requirement towards the completion of the degree of “Bachelor of Architecture”.

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## **ABSTRACT**

Rivers are very close to human life. Human civilizations have originated and flourished from the banks of rivers. Many famous cities all over the world are generally located at the junctions of rivers and the sea. Riverfront development can be an opportunity for developing the city. Developed cities without proper waterfront cannot be imagined. Proper waterfront development adds beauty to the urban city and connects humans with water. But due to overpopulation and unmanaged urbanization, rivers today have become highly polluted. They have become places for dumping. Waterfronts are highly neglected, and they have lost connection with the cities and humans. Riverfront development in the present context is a very common term to us. The urban community receives various characteristics from the development of waterfronts. Waterfront development is totally a public asset. Riverfront development not only increases the beauty of the river but also its surroundings and increases the aesthetics of the city. It also helps to attract activities in the riverside areas and helps to grow the economy of the place. This research has studied the urban waterfront along the Tinnai River, Butwal discussing the connection between the river, people, and the city for its improvement and sustainable development.

### **Keywords:**

River, riverfront, unmanaged urbanization, aesthetics, economy, connection

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# RIVERFRONT DEVELOPMENT

## *“The voices of site”*

### 1.0 INTRODUCTION

Many civilizations have originated and flourished on the banks of rivers. Major cities all around the world are located at junctions of rivers and sea. Walking through the urban spaces and built environment, one certainly feels the ecosystem which is the product of our past. The environment has been serving humans for decades. The relationship between man nature and the built environment has been established in the past. But the various degrees of intervention in the course of time have threatened the life of people living in the same built environment. Improper land use, corrupted planning, and development guidelines, and irresponsible approach to dealing with the built environment has resulted in the separation of human society from the natural ecosystem. Rivers, being the representation factor for any city, have been highly polluted these days. The areas around the river have lost the attention of the public. Public spaces around rivers are now being exploited and encroached on. This era lacks platforms for self-expression, exchange, and experience, which could easily be designed in the waterfront development.

### 1.1 Background

Rapid population growth and unmanaged urbanization are the major problems that most cities are facing. This has resulted in a lot of problems from minor to severe. The open spaces in the city areas are very few and are on the verge of extinction. The problems like pollution in different places through different media have become one of the major concerning factors today. This has also caused a lack of clean and green spaces. Air pollution, water pollution, visual pollution, sound pollution, etc. have adversely affected the health of people residing in the city. Water pollution mainly has caused the decay of urban rivers. The decay of urban rivers not only affects the quality of the water itself but also affects the quality of air, energy resources, and the connection with human life. (Singh & Shrestha, 2019). The study is conducted as a part of the curriculum for the 5th year of the Bachelor of Architecture. This research will also look for solutions for making a better environment on the waterfronts.

Due to rapid population growth and unmanaged urbanization, the haphazard use of water resources, consumption styles, living standards, economic activities, and industrialization in major cities have caused threats like water scarcity, pollution, solid waste, and effect on biodiversity. Water shapes the physical character of the places that it touches. (Mostafa, 2017)

*“It is a feature to be honored and celebrated, and not to be treated merely as cosmetic or as just a commodity, as defined by The Waterfront Center.” (Mostafa, 2017)*

Waterfronts are the special places where land and water meet and where the history and character of communities develop. But in the past few decades, waterfronts are highly neglected. The banks of river and land in the surrounding is used as a dumping site and the problems are arising due to land encroachment, and unplanned settlements. This trend is highly growing in major cities around the country. Urban waterfronts can be the places connecting man, river, and nature. (Mostafa, 2017)

*“ Public open spaces on the waterfront can transform the neighborhood, turning previously inaccessible lands into vibrant community gathering areas that foster economic growth.” (Mostafa, 2017)*

According to the authors, the term riverfront is defined as “the land or property along a river, the section of city or town along a river.” This development has been proven to uplift the economic status of the city. The higher quality of life in the city is attained by waterfront development. Riverfront development involves various major steps. It is very important to know the orientation of the riverwalk, the attracting agents for people, and the beautifying agents in waterfront development. Riverfront development is not only restricted to river sides but also holds an important role in shaping the urban environment and riverscapes. (KUSHWAH & MEHMOOD, 2017)

Riverfront development has become the source of economic and cultural growth and has become a very good place for public recreation. Riverfront development is very closely attached to the aspects like economic, social, and ecological. Riverfront development has become an issue of concern in developing countries like Nepal. There is a huge challenge to keep areas of the river clean, green, and inviting and to re-establish the lost connection between man and river. (VRIDDHI, 2017)

Water has the power, as a dominant element, to affect the physical form of the city, while the physical structure and social aspects of the city affect the shaping of the water. Waterfronts are dynamic. Waterfronts have not only provided means of sustaining life through water edges, but they also have a significant role in the urban context through forming the city, and on people’s physical, physiological, and psychological health. People have always celebrated water and waterfronts. Connection with water makes people relaxed and calmer and more capable of awe. (Othman, Hasan, & Al-Hagla, 2020)

## 1.2 Project Justification

Many rivers of towns in our country flow right through the town centers and are influential in giving character to the townscapes of the cities. Rivers are one of the key elements that have played an important role in the life of people, their activities, and in the development of human settlement. Most of the urban rivers of our country, including Bagmati have been polluted to an extreme level. It is mainly because of polluting industries, developers, and individuals. Rivers today have lost connection with people and nature unlike before. Previously rivers were the place where cultures developed. Today, many grow to adulthood without seeing the river in its full glory. Urban waterfronts are the interface between cities and water bodies. River-city-people are very closely interconnected with one another and play a vital role in any kind of waterfront development of any place. There are many problems found around waterfronts in Kathmandu valley. Major problems within those areas are lack of green spaces, solid waste deposits, lack of social spaces, and river encroachment. (Singh & Shrestha, 2019)

Rivers are being polluted and mistreated these days. There is a lack of recreational spaces on the periphery of the river and other water bodies. Even river corridors are considered touristic areas but due to many problems, rivers are highly polluted and mismanaged. They have become places for dumping. This has lowered aesthetic and economic values. This has also highly affected the scenic beauty of the riverscape. The connection between humans and rivers is on the verge of extinction. Some solutions:

- Restoring the natural appearance of the river by solid waste management, squatter rehabilitation, sewage, and drainage management, and using it as a mode of transportation.
- Beautification of the river and riverbanks by open space planning and design as urban green public space.
- Community-based developments such as awareness programs regarding the importance of the river, solid waste management, and many more. (Singh & Shrestha, 2019)

## 1.3 Importance of Research

River corridors can be the most important natural element to connect human beings, the city, and nature together and play an important role in the promotion of the city’s natural qualities. This research will talk about and explore the actual relationship between rivers, waterfronts, and open spaces. This research will also talk about the required programs or amenities for the project and will provide the optimum areas and activities required for the development of the waterfront. Also, it will talk about the orientation of landscapes, built structures, different hard and soft surfaces their response to the ecosystem and how can we integrate the spaces with them for creating a better recreational environment, playing environment, and gathering environment with some glimpse of cultural influence.



## 1.4 Research Questions

1. Is it necessary to revive/restore/redevelop the waterfronts?
2. How can people from different backgrounds have common interaction spaces?
3. Should this thesis reflect the local identity and the fabric of the town?
4. Will this research be able to incorporate the daily activities of people?

## 1.5 Problem Statement

The riverfronts in most of the major cities of Nepal are not being used in a proper way. They are used as dumping sites within the land. There are many unmanaged buildings, open spaces, shops on the periphery of riverfronts. This has created a huge problem not only to the people directly but also to the built environment we are living. The problem is also due to the presence of unmanaged squatter settlements. The discharge of sewage and dumping of the solid waste directly to the river source has affected the life of people, animals, and aquatic animals as well. The transformation of cities has resulted in a reduction of green spaces which has been the major reason behind the loss of connection between man and water. This has also affected water, air, and energy resources.

## 1.6 Objectives of Study

The objectives of this research are:

- To understand the built structures, built environment, and human activities around the banks of river Tinau.
- To identify major factors that are degrading the waterfront.
- To identify the required public spaces and infrastructures in waterfront areas.
- To recommend design spaces like parks, walkways, restaurants, etc. which can be a commonplace for people to gather and share their daily stories.
- To design open as well as built spaces demanded by the site.

## 1.7 Methodology

The successful execution of any research follows certain methodologies that become the backbone of the whole project. First, the prevailing problems in society or the country are identified. The problems identified are solvable through architectural solutions. According to the problem identified, the topic for the thesis is selected. After the determination of the thesis topic, the objectives and the scope of the study are determined, based on which the study is conducted.

The first step in the research is literature review. Based on the objectives and scope of the study, literature review was done. Various scholarly articles and reports related to the waterfront and its development were studied and reviewed. After the literature review, framework for the case study was prepared. The framework acts as a guideline for conducting the case study and can help to look for exactly the amount of information that is required from the case studies, not more, not less. The case study was done to complement and support the literature review whilst filling the gap that the literature review alone is not able to fill.

Cases of different natures and functions were selected to understand the overall working of the project. Cases like Yangtze riverfront, Sabarmati riverfront were studied. Along with the case visits, different architects and intellectuals were interviewed to gain a deeper understanding of the project. Additional national and international cases were studied to understand the educational and promotional aspects of the project.

Based on the literature review and case study and prevailing conditions, a site for the project was selected. Multiple site options were considered at the beginning. Basic features and conditions of those sites were analyzed, and the most suitable site was selected. Detailed analysis of the site was done through site visits, maps, websites, documents and so on. The documentation of the information is done in terms of photographs, graphics, and sketches. During the site analysis, physical, climatic, socio-cultural, economic conditions, accessibility, and services available in the site were studied.

Inferences were drawn after the study of literature, cases, and the site. These inferences act as the base and provide guidelines in the further processes. Based on previous studies, programs required in the waterfront development were formulated which again acted as a guideline for the further design process.

The design of the project was developed based on literature review, case studies, site and self-experiences. The design process started with conceptual development followed by zoning, planning, 3D development, detailing and finally conceptual services planning and structural design.

Finally, conclusions and recommendations were prepared based on the research.

## 2.0 Literature Review

### 2.1 Importance of Urban Development

Urbanization is defined as an “increase in the proportion of a population living in urban areas.” This phenomenon has become a rapidly growing force over the course of the past century, as an increasing number of people have begun to move to towns and cities. By 2030, 60% of the global population is anticipated to reside in cities. While there are many advantages to urbanization, such as more efficient use of resources, there are also numerous challenges and threats associated with rapid urbanization and poor urban planning. (HABITAT, 2022)

By getting urban development right, cities can create jobs and offer better livelihoods; increase economic growth; improve social inclusion; promote the decoupling of living standards and economic growth from environmental resource use; protect local and regional ecosystems; reduce both urban and rural poverty; and drastically reduce pollution. Sound urban development will accelerate progress towards achieving SDGs, including the end of extreme poverty. It is necessary to have urban development in context with designs and physical infrastructure developments. Urban Development helps cities create sustainable mechanisms for future growth.

Communication and social interaction among large numbers of people occur in development area. Their main role is being loci of socialization in the city and also, they are the stages where alternative cultures perform in the public realm of the city. They are dynamic urban spaces which are always subjected to transformations of the city and its inhabitants. Space created for use where people can enter for individual or public interests without social discrimination. If well organized, it will help to enhance cohesion of community life, positively change the public behavior, and increase the community awareness, promote individual identity and have a certain degree of local cultural meanings.

On the other hand, mistakes made in managing urban growth are very hard to undo. Infrastructure investments, urban land-use systems, and layouts are literally cast in stone – with impacts that may be difficult to alter for many decades. Without adequate management and investments, slums may expand, and cities may fail to generate the jobs necessary to improve livelihoods. Countries may fail to decouple economic development from resource use, and cities may fail to provide economic opportunities to surrounding rural areas and become vulnerable to climate and other environmental changes.

Urban development is often deemed a practice of expansion when cities spread into new areas. However, within a city itself, urban development takes on a different meaning. Urban communities can appear to be the most developed in terms of commercial and business developments, open spaces, accessibility, city image and faster access to the latest technology.

## 2.2 River and Riverfronts

Water is one of the most important of all the natural resources necessary to ensure human health and civilization. Nepal is fortunate to be able to call itself a water rich nation and possesses a number of rivers with great potential for recreation. Settlements have historically sprung up along riverbanks, hence, many urban cities in Nepal are on river edges or in river valleys. As a consequence, many cities and zones were named after the rivers that run through them. Most of the daily life of people were dependent upon rivers directly or indirectly. Waterfronts have become place of recreation and so many people are attracted towards them.

**Be home before dark and stay away from the rivers.** This was/is the common advice given to Nepalese children by their parents as their children ventured out to play on holidays. The warning is telling in several ways, offering a glimpse into the hostile conditions along most of the Nepalese rivers and the public attitudes surrounding them. Various alterations to rivers became more widespread and damaging. These alterations include straightening natural river meanders, building hydropower and water supply dams; squeezing rivers into narrower channels with dikes, levees, and concrete and steel walls; and separating rivers from their floodplains to manage floods, build highways, and capture more land for farming and development. These alterations are often promoted as economic progress, but together they have had, and continue to have, enormous impacts on river ecosystems.

And yet, people were drawn to the rivers. They never gave up their dreams for the riverfronts, for walking, swimming, cycling and playing sports and spending some quality time along the rivers. From sharing daily stories to spending quality time alone, waterfronts have attracted people with different backgrounds in their own way. today have the quality to reflect the whole city.

Cities are rediscovering their rivers. For the past years, cities and towns have been turning back to their rivers, transforming industrial and derelict land into new parks, residences, and commercial space. The trend appears to be continuing and perhaps even accelerating, with major planning and construction efforts underway in cities around the country. After abusing urban rivers through years of hard use and neglect, we have come to realize they are valuable economic and community assets.

Successful waterfront development doesn't have to start on a grand scale. Sometimes the smallest projects are the most potent. A small park, food stalls, walking trails, boat launch, stormwater landscape or fishing pier, created at the right time and embraced by the community, can have a catalytic effect and lead to bigger things down the road. A building with windows, pathways and terraces that connect to and celebrate the riverfront is a source of pleasure and pride, indoors and out. As the new “front yard” for the community, riverfronts must now accommodate the routines of runners, strollers, anglers, local people, tourists, and people of all the ages with different backgrounds.

## 2.2.1 Definition

### DEFINITION OF WATERFRONT

The word meaning of waterfront get through as “*the part of a town or city adjoining a river, lake, harbor, etc.*” in the Oxford American Dictionary. It is also

- the urban area in direct contact with water
- Land on edge of the body of water.
- Can also be the street or land that is next to an area of water.
- Section of city or town along a river.

### Riverfront

- The riverfront area is the confluence area of water and land.
- It is not only the edge of the land but also the edge of the water, and the land should cover some areas.
- The waterfront is a boundary between the stable striations of the city and the smooth flows of the water. (Hou, 2009)

Waterfronts are dynamic places by nature. As an edge environment, the overlap of different communities of users and dramatically different conditions make for enormous amounts of complexity and energy. In the non-human realm, waterfronts are the interface of the aquatic and the terrestrial, the site of complex intertidal communities, the point of release for wave action, and the vehicle for many dispersal patterns. As related to human history and use, waterfronts have a long history of changing types and levels of uses and are now coming back into potentially thriving and layered public use. Once the site of first settlements and exploration, they have long served as transportation corridors and ports, hubs of trade, travel centers, recreation venues, and much, much more. Waterfronts have been extensively used by humans for their utility in travel, trade, recreation, and general enjoyment, and have also suffered cycles of abuse and neglect from these very use patterns.

*“Cities seek a waterfront that is a place of public enjoyment. They want a waterfront where there is ample visual and physical public access – all day, all year - to both the water and the land. Cities also want a waterfront that serves more than one purpose: they want it to be a place to work and to live, as well as a place to play. In other words, they want a place that contributes to the quality of life in all its aspects - economic, social, and cultural.”*

-Remaking the Urban Waterfront, the Urban Land Institute

### 2.2.1.1 Types of RIVERFRONTS

**Natural riverfront:**

The natural riverfront comprises beaches, wetlands, wildlife habitats, sensitive ecosystems and the water itself.

**Public riverfront:**

The public riverfront includes parks, esplanades, piers, street ends, vistas and waterways that offer public open spaces and waterfront views.

**Working riverfront:**

The working waterfronts, where water-dependent, maritime and industrial uses cluster or where various transportation and municipal facilities are dispersed.

**Redeveloping riverfront:**

The redeveloping waterfronts, where land uses have recently changed or where vacant and underutilized properties suggest the potential for beneficial change.

### 2.2.1.2 Characteristics of riverfront:

**Dynamic area:**

Waterfront zone is a dynamic area with frequently changing biological chemical and geological attributes.

**Habitat:**

Waterfront zones include highly productive and biologically diverse ecosystems that offer crucial nursery habitats for many species.

**Nature defense:**

Waterfront zone features such as mangrove forests serves as a critical natural defense against natural hazards like flooding, erosion and storms.

**Pollution moderator:**

Water ecosystems may act to reduce the impacts of pollution originating from land such as, wetlands absorbing excess nutrient sediments and human

## 2.2.2 History

The concept of the riverfront began with the Mississippi River. Fort Snelling was established in 1819, at the confluence of the Mississippi and Minnesota rivers and soldiers began using the falls for waterpower. Water played an essential role in trade activity and water transportation. For much of the time between Western settlement and the early 1900s, waterfronts were the economic centers of major cities in North America. Due to the relative ease and efficiency of water-borne transportation, many goods were shipped via water. In response, urban waterfronts became home to a succession of a wide variety of industrial uses, from logging and mining to food grain processing, heavy industry manufacturing, and so on. (Cloutier, 2012)

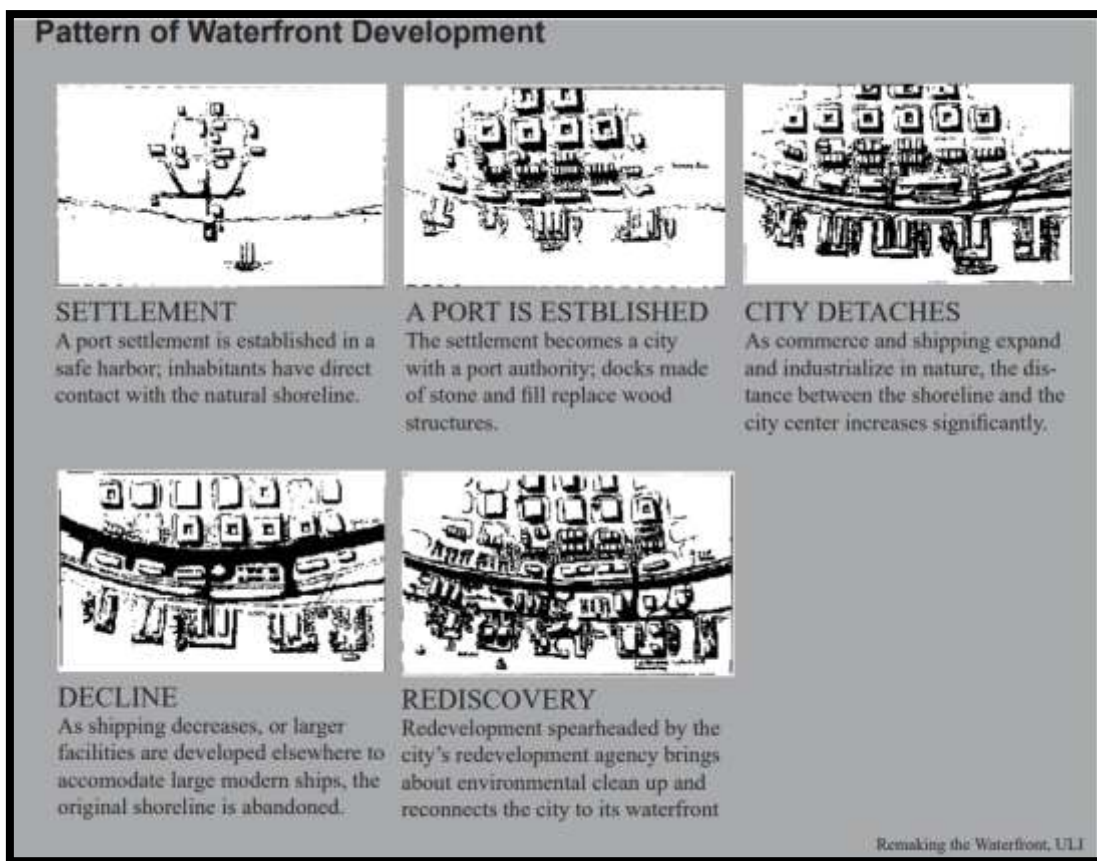


Figure 2.1 Remaking Waterfront

Soon after World War II, due to various reasons waterfront areas underwent a period where they were virtually ignored and polluted with toxic chemicals. However, beginning in force in the late 1970s, cities began to recognize that these waterfront brownfield sites held the potential to become tremendous civic assets. Since the cities had initially grown around industrial uses on these waterfront sites, the sites are typically located in the economic and political hearts of cities.

### 2.2.2.1 History in Nepal

The riverfront was developed in Nepal by creating ghats in river embankments which also protected land from flooding. The Bagmati River is considered the source of Nepalese civilization and urbanization. Nepali culture is closely related to rivers and water. Most of the sacred places are located along the bank of the big rivers. (Dahal, 2021)

In the past decades, rivers in Nepal were so clean and neat, that they were used for drinking purposes. These places were used for bathing, washing clothes, irrigation, etc. Furthermore, most of the agricultural activities were dependent on rivers. Different places on waterfronts were also used for local markets. Major of the human activities were dependent upon rivers. But more than functional values, rivers in Nepal have traditional and cultural values. All the sacraments from birth to death event in Nepalese society are related to the river. Rivers and ponds are the living places of Nepali gods and goddesses. Most of the sacramental, religious, and cultural activities are done on riverfronts. Religious fairs and festivals are also organized in such places. (Dahal, 2021)

### 2.2.2.2 River culture in Nepal

Nepalese culture is based on river activities. Most of our religious centers are located on the riverbanks. Therefore, rivers are known as holy centers in our culture. The main cultural activities performed at the riverside are as follows. (Dahal, 2021)

- Organization of the festivals
- Management of Mela and jatras
- Centre of holy bath
- Beginning and ending of Bratas
- Kalpavasa and Ajivana Vasa
- Antesty Kriya

### 2.2.3 Typical pattern of riverfront development

- Emergence of riverfront cities.
- Growth of riverfront.
- Deterioration of riverfront
- Rediscovery of riverfronts. (Yang, 2006)



## 2.2.4 Needs of riverfront development

- To improve the current condition of the riverfront environment.
- To create various attractions and open spaces within the riverfront.
- Enhancing and reviving the culture and traditions of riverfronts through architecture.
- Uplifting the economic values of riverfronts.

*“Each new investment along the rivers encourages activity, unleashes vitality and increases land value, while providing places for people to enjoy.”*

## 2.2.5 Potentials of riverfront

- Transportation
- Economic potentials
- Leisure and recreation
- Historical values and a place for tourism
- Socio-cultural catalyst
- Enhancing the image of urban city (Yang, 2006)

## 2.2.6 Principles of riverfront

While planning waterfront, one must consider the following guidelines as principles for waterfront development. (Timur)

- Secure the quality of water and the environment.
- Waterfronts are part of the existing urban fabric
- The historic identity gives character
- Mixed use is a priority
- Public access is a prerequisite
- Make the waterfront a community priority
- Planning in public private partnerships speeds the process
- Secure strategic public investment and attract private resources
- Public participation is an element of sustainability
- Waterfronts are long term projects
- Regeneration is an ongoing process

*“Riverbanks, shorelines, riparian buffers, and river habitat are critically important when planning any riverfront project.”*

### 2.2.7 Concept of river, city people

The three-dimensional approach of river-city-people was inspired by the three worlds of Habermas. In this context, the river can be defined as the physical and biological world, the city can be viewed as the social and humanized world and the people can perform the place of individual emotions and perceptions. This concept states that the three dimensions are interconnected to each other and shall remain in harmony for a better tomorrow.

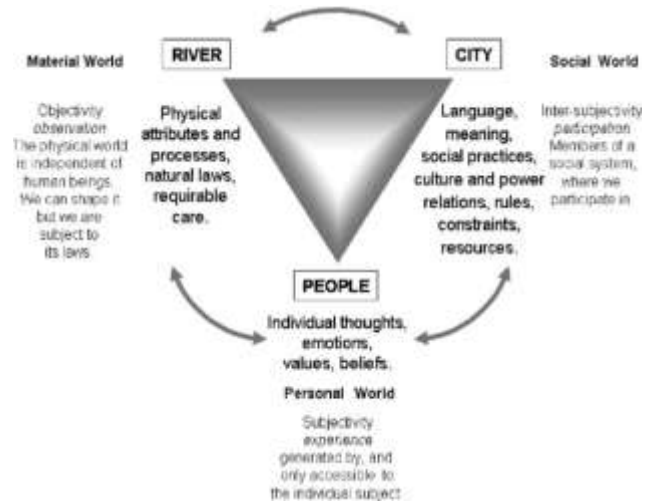


Figure 2.2 ‘River–City–People’ framework on ‘three worlds’ of Habermas (1984).

### 2.2.8 Connections of riverfront

**To the river:**

Perpendicular connections bring people to the riverfront. Sidewalks, public streets, pathways, and promenades provide safe and engaging passages and reinforce the riverfronts as the public realm.

**Key concepts:**

- Perpendicular connections will extend the grid of the community into the park and natural systems, linking the urban grid to the natural forms of the waterscape and landscape.
- Connections from buildings and districts to the rivers should be publicly accessible, even where they run along private development.
- Public activities and events, such as sidewalk cafes, street fairs and vendors will enliven the connections, both as temporary and permanent installations.
- Major perpendicular connections should be designed as a continuous place, with the building wall and landscaping defining the character of the street.

**Guidelines:**

**Major Perpendicular Connections:**

- Provide connections between a community and a riverfront destination.
- Should be wider than those on secondary streets, in order to fully accommodate the needs of pedestrians, bicyclists and green stormwater infrastructure, with the intent to elevate the public realm and create special spaces.

- Maintain established build-to lines along major perpendicular connections. Where retail and restaurant use will be located, provide for sidewalk café seating and arcaded ground floors where appropriate.
- Minimize curb-cuts, and do not locate service entrances along major perpendicular connections.

Perpendicular Connections along Private Uses:

- In many cases, connections to a riverfront will be provided along the edges of or pass-through private development that is not generally open to the public, such as residential and private office developments. In these cases, it is important to clearly define the connection as a public space.
- locate public amenities, such as seating, maps, etc., at the ends of the connection to serve as a focal point, drawing attention to the riverfront and encouraging movement along the trail connection.

Perpendicular Connections along Public Uses:

- In places where perpendicular connections cross development that includes public uses, such as retail, restaurant and entertainment occupancies, the connections provide opportunities to enhance the development, create additional public open space and engage those adjacent uses.
- Perpendicular connections along public uses can be designed to serve as public plazas and gateways to the riverfront.
- They are encouraged to be inhabited spaces, providing amenities to both users and business owners.

Perpendicular Connections across and Down to the River:

- Easily navigable pedestrian connections from the ends of the bridges to the riverfront trails, promenades and roadways are critical to the success of a riverfront.
- Bridges can provide unique experiences for a riverfront and may also provide many of the key views of a community and the riverfront.
- Access can be provided through a variety of vertical connections, including stairs, ramps, and paths.

**Along the river:**

Parallel connections along the river’s edge serve many different users and connect neighborhoods and development sites to the water, providing public access, opening up views, and re-engaging the rivers as part of the public realm. It relates to provide guidance for designing riverfront trails, promenades, roads, and scenic drives, each of which addresses a key issue of access along the rivers.

**Key concepts:**

- Connections should be accessible to the public even when they are adjacent to private development, should vary in character, providing both quiet, reflective threads and lively, inhabited promenades.
- Connections should be usable year-round on a variety of scales, encouraging activity. In the summer, they will provide tranquil shade along the riverfronts, while in the winter the sun will penetrate to warm the surface of the trails and promenades for recreational users and pedestrians alike.
- Riverfront trails should be simple and integrated with the landscape and defined by the vegetation of the park.

**Riverfront Trails:**

Trails are riverfront connections that place emphasis on moving along the river for longer distances as a pedestrian, runner, cyclist or rollerblader. Trails place emphasis on providing riverfront connections for recreational uses, and as such should be designed with those users in mind.

**Riverfront Promenades:**

Promenades are generally more pedestrian in character, rather than recreational. They provide opportunities to experience the river from a different vantage point. Promenades are places to see and to be seen. They can open up the views of the river and integrate the character of the community with the pastoral nature of a park. Promenades can occur where landings intersect connections along the riverfront park and where urban districts are adjacent to the riverfront.

**Riverfront Streets:**

Streets along a riverfront have the potential to be an exciting and different way to experience riverfront parks, and to create new opportunities for development adjacent to them. They can make the riverfront more public and open all areas of the park for improved public safety and for persons with limited mobility. At the same time, care must be taken in designing and locating riverfront streets to ensure that access to the riverfront is not restricted by the presence of vehicular streets, and with pedestrians

as a primary consideration. Riverfront streets should be perceived as an extension of the riverfront park.

**Scenic Drives:**

Scenic drives are riverfront streets, roads and parkways located along the riverfronts, which are primarily in a landscape setting, with views to the river and the surrounding landscape. These should be considered primary connections that preserve views of the river and scenic quality of the landscape and enhance the experience of driving, biking and walking along the riverfronts. Scenic drives have a special design quality that includes appropriately detailed cartways and features design elements such as signage, guardrails, lighting, plantings, bridges, elevated roads and other road features. Scenic drives can respond to the landscape vocabulary or setting where they are designed and can be either formal or natural in character.

**Landings:**

- Landings occur where two or more park connections come together and provide focal points for activity and connection at the water’s edge. Landings are intended to be the public places that people are drawn to for special events or activities and serve as destinations and landmarks. They can bring together transit systems and activity centers. They are places where people find distinctive experiences along the river’s edge. Landings are intended to provide opportunities for design and physical intervention. Landings on the water are an opportunity for unique places where people, land and water meet.
- Landings should be transitional and connective points between the river’s edge, the riverfront park and the community, with access to the trails, esplanades, promenades and transit connections.
- Landings should comprise a series of spaces that vary in size and purpose and serve those who use the riverfront park daily or for an occasional or onetime visit.
- Landings should be engaging and lively public places, with uniqueness and character. Should provide opportunities for gathering and meeting spaces for daily use or special events.

**Districts:**

- Waterfront districts will offer the greatest opportunity to renew and reinforce the quality of places to live, work, and play because of the added value of being adjacent to a riverfront park.
- The waterfront should serve as a front yard, with architecture-facing green space, pedestrian walkways, parks and water landings.

**Street and Grid patterns:**

- Establish street grids that respond to topography. For instance, grids should shift where necessary to open up views and change vantage points.
- Transportation Planning:
- Consider future plans for water transportation as opportunities to make connections to water landings.
- Provide secure bicycle storage, personal lockers, changing rooms, and showers to accommodate a minimum of 5 percent of the building’s occupants.
- Develop shared parking facilities with nearby development, located away from the riverfront.

#### **Site Planning:**

- Public entrances to retail and commercial uses along the riverfront facade of the building is a good idea.
- In order to activate open-space connections, locate pedestrian-oriented uses on the ground floor of buildings and provide pedestrian amenities.
- Utilizing landscaping, rather than walls and fences, to create semipublic/ private buffers.
- Locating buildings using traditional urban build-to lines, occupying the majority of street frontages, and activating sidewalks and other connections.
- Applying sustainable site planning practices, such as:
  - Erosion and sedimentation control,
  - Development densities that activate the environment,
  - Redevelopment of brownfields,
  - Stormwater best management practices,
  - Use of native plantings,
  - Use of locally sourced materials,
  - Minimization of light pollution.

#### **Open-Space Planning and Design:**

- Public open-space requirements should be met through the creation of riverfront promenades, additional perpendicular connections to the park and other spaces that complement the river park.
- Sidewalk cafés and similar uses are encouraged. Opening space accessible to the public 24 hours a day.
- Activating open spaces by locating publicly oriented uses in the ground floors of adjacent buildings. Providing pedestrian amenities, including seating.

#### **Buildings:**

Buildings located along the riverfront establish the edge of the public realm, becoming a “face” to the individual districts in which they are located. Viewed from the waterscape and other vantage points, they become landmarks that orient visitors and inhabitants. Added together, buildings compose a district with distinctive forms and landmarks.

**Key concepts:**

- Building and site development should incorporate elements of green-building design as far as possible.
- Designing buildings massing with consideration of maintaining views of rivers, key landmarks and architecture, and the vistas and spaces around them. Maximizing light and air to open spaces and minimize shadows on adjacent properties and open spaces as necessary.
- Activating the ground floor with different uses and make them adaptable overtime.
- Locating service entrances away from the riverfront and primary connections to the park.
- Where privacy is required, create screening through changes in floor height, landscaped setbacks, or other devices, rather than dark or reflective glazing.
- Incorporate roof terraces and balconies overlooking the riverfront, for both public and private uses, in buildings located along the riverfront. Where appropriate, provide publicly oriented uses, such as restaurants and cafes, in these locations.
- Create rooftop gardens to extend the landscape quality across new and unexpected places in the urban fabric.

**Strom water:**

Stormwater collected from street surfaces and parking lots must be treated prior to its release in order to remove contaminants (heavy metals, fuel, dust, toxic elements, etc.) collected during rainfall. This can be accomplished with integrated stormwater and green infrastructure techniques.

Every opportunity, no matter how small, should be taken to manage stormwater visibly. If possible, people should be able to see and remember the rainfall runoff in a positive way. Even water that comes off roofs can be seen and heard for a moment. Many small things add up to a bigger change.

**Landscapes:**

Landscape encompasses the natural and built forms that help to define riverfronts. From riparian zones to landscaped trails and streets to gardens and parks, the landscape element has a critical role in stabilizing riverbanks, providing habitat, and creating enhanced open space. Landscape also forms special places by linking the rivers to the network of streets and buildings, often providing the defining characteristics of a place. Landscape provides the contrast between the strong forms of the built environment and the natural forms of its setting that are most memorable and inspiring.

**Guidelines:**

- The landscape should provide a special and comfortable sense of place at the river’s edge, providing character and identity to the adjoining districts and neighborhoods.
- The landscape should be composed of the natural elements and built environment; each made more interesting because of their contrasting features.
- The landscape should provide erosion control, riverbank stabilization, storm water management, and relief from urban heat islands.
- The landscape should build on the identity and visibility of the region’s rivers and establish a coherent, recognizable system of places along the rivers throughout the region.
- River environments should remain dynamic by nature, evolving and reshaping to new forms.

**Public art:**

Public art has the power to connect people to the riverfront. Great public art enhances, energizes and defines its surroundings, generating civic pride and cultural identity. For public art to make a meaningful contribution, there must be a commitment to uncompromising standards of quality. The artwork must embody the vital identity and values of the riverfront, elevate the experience of the visitor, and bolster a distinctive sense of place.

Using a variety of media and textures, artists can create landmarks and visual experiences, distinguishing the viewpoints and drawing people to them. Public artwork should provide cohesiveness to the trails and pathways and expand opportunities for pedestrians to recognize, appreciate and celebrate the importance of the river.

**Lighting:**

Lighting has the power to ensure that the public realm remains safe, comfortable and engaging after dark. Night lighting can help transform a foreboding space or a dark building into effective markers, ensuring that people feel comfortable moving through the park. Effective lighting will clearly identify a destination as well as exit and entry points from the river.

**Brightness and Contrast:** Too much light is frequently projected onto buildings, destroying any appreciation of the architecture by washing out the details. Lower light levels can often be more revealing and sympathetic.

**Environmental Effects:** There are a number of environmental factors that can be positively impacted by exterior lighting with regard to direct energy use, visual impact, light spill and light pollution, and effects on flora and fauna.

**Visual Impact:** The appearance of lighting equipment during the daytime can be an unsightly obstacle and can have a significant impact on local views. Lighting equipment



mounted on building facades without due consideration of the architecture can be unsightly.

**Reducing Crime and Fear of Crime:** Carefully applied exterior lighting can have a positive actual and perceived effect on safety. Expenditure on good lighting in a public realm is a more effective means of increasing safety than an equal expenditure on electronic surveillance equipment.

**Scope of lighting:**

Lighting Bridges, Lighting Structures, Lighting Landscapes, Lighting Fountains and Water Features, Lighting Art Installations

## 2.3 Activities of public realm

"The inner-city parks provided refuge and shelter immediately after the earthquake and were used as a base for the international search and rescue operations", as mentioned by author about the learning from post-earthquake Christchurch, New Zealand (Brand & Nicholson, 2016). Similar is the modern-day Nepalese society; a living witness of 2015 Gorkha Earthquake and its impact on the nation. Lack of huge open spaces for evacuation and temporary refuge became a major issue while the remaining open spaces had been crowded. That event and time gave some clarity and fact to the general public of Nepal as to the need and reality of open spaces and that also enough and accessible in time of need and emergency.

In designing and perceiving any public space, designers get into a play of possibilities and imaginations with solid site and contextual references by the side for the practical references. Here exactly lies the defect in design and future of such public spaces i.e., imagination of the public realm. Imagining an ever-changing wave of public realm is not something one should try to do but at the same time, understanding and realizing the subject matter of identifying and assuming the public is very necessary. It is very necessary to distinguish the urban from the national, the real communities from the imagined communities. Also, common space, a property that is fundamental to a community's existence as a body, is therefore distinct from what we call public space (Lim, 2013).

**Common Space**-commons form a community, responsibility and identity of the community, responsible for the existence of community. Newari settlements within the Kathmandu valley represent this.

**Public Space** - under the authority of the state, when there are conflicts between citizens in public space, the state/government/concerned authorities take action.

**Urban Space**- a form comprising of public realm and common realm in a larger context.

"Expressing identity, recognizing heritage, gathering, shopping, meeting, cultivating, passing-by or avoiding, are all ways of being in public space which articulate citizen interests and matters of concern (Lim, 2013)." This is one common identity of public spaces that every urban design has somewhere at some level. Public exchange, expression and experiences of the patterns of society in a public space is what makes such places viable and relevant for the people. So, in order to move forward in design and propositions for various public spaces and related projects, it seems that the most appropriate thing to do is understanding the prospects, conditions and dimensions of the urban.

When outdoor areas are of poor quality, only strictly necessary activities occur. When outdoor areas are of high quality, necessary activities take place with approximately the same frequency - though they clearly tend to take a longer time, because the physical

conditions are better. In addition, however, a wide range of optional activities will also occur because place and situation now invite people to stop, sit, eat, play and so on. In streets and city spaces of poor quality, only the bare minimum of activity takes place. People hurry home. In a good environment, a completely different, broad spectrum of human activities is possible (GEHL, 1987). According to Jan Gehl, three different types of outdoor activities come in prevalence in any urban form:

**Necessary activities:** under all conditions (daily basis)

**Optional activities:** only under favorable exterior condition

**Social activities:** when necessary and when optional activities are given better conditions in public spaces

In city streets and city centers, social activity takes place every time two people are together in the same space. To see and hear each other, to meet, is in itself a form of contact, a social activity. The actual meeting, merely being present, is furthermore the seed for other, more comprehensive forms of social activity (GEHL, 1987). The physical dimension doesn't address or directly influence the quality, content and intensity of the social and intangible aspects. But architects and planners can contribute to the possibilities for meeting, seeing and hearing people, a common social activity. When it comes to architects and planners getting involved in public spaces, it becomes 'all about creating possible possibilities' and an opportunity for maintaining and sustaining of the established contacts.

For all the social activity to exist, there should be one prime component ie, being in the same space. Regardless of high density contact or low-density contact, a public space has to have presence of individuals, may it be elderly or children, in the same space. In context of Patan, a living traditional city.

- Moving from other parts of Lalitpur district and Kathmandu to the completely different yet identical pattern of urban fabric of Patan, one experiences life, culture, people and environment there.
- A place that breaks the monotonous and dull pattern creating new situations, contacts, inspirations and stimulations.
- A place that proves the fact that sensible planning of fabric, simple and yet repetitive patterns of built structures is far more interesting and sustainable than the use of rich dramatic architectural characters which the modern world is very proud of.
- Where interior spaces are supplemented with usable outdoor areas, thus allowing public squares, spaces and courtyards to function and sustain.
- Basically, an 'open museum'.

A public space should address diversity of lifestyles, preferences and needs amongst urban populations and that through the design of these public realm, there is the

opportunity for urban areas to offer something for everyone in the right locations although not necessarily everything for all everywhere (Carmona, 2021). (Carmona, 2021) highlights the character of successful public spaces as;

**Evolving** (whether formal or informal in nature)

**Diverse** (avoiding one-size-fits-all)

**Free** (securing rights and responsibilities)

**Delineated** (clearly public in their use)

**Engaging** (designing in active uses)

**Meaningful** (incorporating notable amenities and features)

**Social** (encouraging social engagement))

**Balanced** (between traffic and pedestrians)

**Comfortable** (feeling safe and relaxing)

**Robust** (adaptable and distinct in the face of change)

These are the compelling aspects any society or urban design should exhibit not only for the sake of public property and infrastructure but for the healthy and progressive future of individual communities.

## 2.4 Placemaking

Placemaking is a multi-faceted approach to the planning, design and management of public spaces. Placemaking is a multi-faceted approach to the planning, design and management of public spaces. Placemaking capitalizes on a local community's assets, inspiration, and potential, with the intention of creating public spaces that promote people's health, happiness, and well-being. Placemaking is both a process and a philosophy that makes use of urban design principles. Good placemaking makes use of underutilized space to enhance the urban experience at the pedestrian scale to build habits of locals. (wikipedia, 2021)

*“What if we built our cities around places?”*

Placemaking inspires people to collectively reimagine and reinvent public spaces as the heart of every community. Strengthening the connection between people and the places they share, placemaking refers to a collaborative process by which we can shape our public realm in order to maximize shared value. More than just promoting better urban design, placemaking facilitates creative patterns of use, paying particular attention to the physical, cultural, and social identities that define a place and support its ongoing evolution. (PPS, 2017)

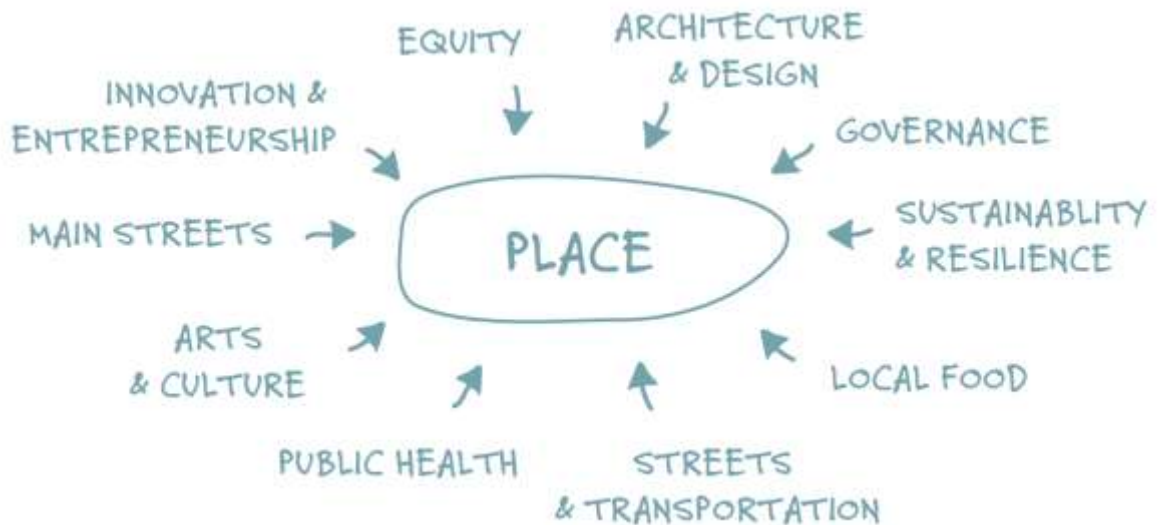


Figure 2.3 place and its features

Public space is inherently multidimensional. Successful and genuine public spaces are used by many different people for many different purposes at many different times of the day and the year. Public space is for negotiating the interface between our homes, our businesses, our institutions, and the broader world. Public space is how we get to work, how we do our errands, and how we get back home. Public space is where nearly half of violent crimes happen. Public space is where policing ensures safety for some but not others. Public space is for buying and selling, or for meeting, playing, and bumping into one another. Public space is for conveying our outrage and our highest aspirations,

as well as for laying the most mundane utilities and infrastructure. And when we let it, public space can be a medium for creativity, expression, and experimentation. (PPS, 2017)

Placemaking is both a process and a philosophy. It is centered around observing, listening to, and asking questions of the people who live, work, and play in a particular space in order to understand their needs and aspirations for that space and for their community.

In short, public space is where so many tragedies and triumphs of the commons play out. And that’s why getting it right matters. The ten issue areas where placemaking can have the most transformative impact are:

**equity & inclusion; streets as places; architecture of place; innovation hubs; market cities; place governance; sustainability & resilience; rural communities; creative placemaking; and health.** (PPS, 2017)

## What Makes a Great Place?

Project  
for Public  
Spaces



Figure 2.4 great place and its features

**Great places are:**

- accessible and well connected to other important places in the area.
- comfortable and project a good image.
- attract people to participate in activities there.
- They are sociable environments in which people want to gather and visit again and again. (PPS, 2017)

Effective public spaces are extremely difficult to accomplish because their complexity is rarely understood. As William (Holly) Whyte said, “It’s hard to design a space that will not attract people. What is remarkable is how often this has been accomplished.” PPS has identified 11 key principles for transforming public spaces into vibrant community places, whether they are parks, plazas, public squares, streets, sidewalks, or the myriad other outdoor and indoor spaces that have public uses in common. They are:

**Underlying ideas:**

1. The community is the expert.
2. Create place, not a design.
3. Look for partners.
4. They always say “It can’t be done”

**Planning and outreach techniques:**

5. Have a vision.
6. You can see a lot just by observing.

**Translating ideas into action:**

7. Form supports function.
8. Triangulate
9. Experiment: Lighter, Quicker, Cheaper

**Implementation:**

10. Money is not the issue.
11. You are never finished.

**Public Space in the context (Existence and accessibility):**

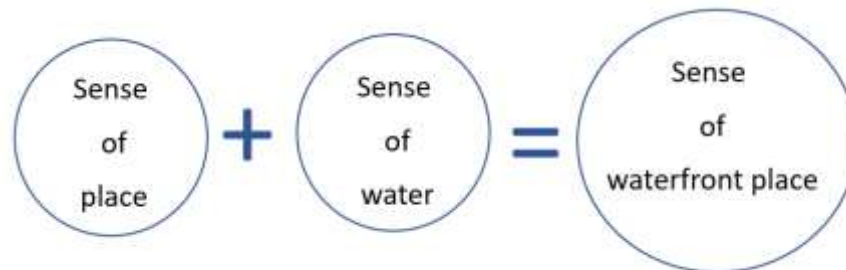
Human-scale urban fabric like that of Patan, Kathmandu and Bhaktapur have stronger cultural identity and the communities that share public spaces are equally vibrant alongside. A field-based observation and research gives an idea that in a place of growing demography and lacking open spaces for these all, the existence of public space seems to a myth which people realizing the facts that it is very difficult and near

impossible, still want to have and be ready to fight for that. And then comes the issue of 'accessible public open spaces' in our environment.

There are numerous public spaces that if made accessible to the general public, can serve thousands of people with equal benefits and facilities. For instance, the Ratna Park at Kathmandu and the UN Park at Shankhamul, Lalitpur. These open spaces have the capacity and capability to host such a large range of demography in the urban fabric along with the scope of activities that could be done there. But the privatization by the government and the authorities making them segregated from the public realm seems to be a tragedy in our built environment. Just imagine, to just even touch a big tree or a plant, people have to buy tickets and, in some cases, just lie around the premises of the facility along the giant so-called "transparent fences". All this dedication and time of your everyday life for being with nature for self-enjoyment. How problematic is that? And this is what is the context of the urban pattern in most part of the country

### **Waterfront place:**

Waterfront has great potential for creating unique townscapes, built forms, and landscapes. The existence of water creates additional physical characteristics of the built environment, the so-called waterscape. This creates a unique sense of place.



*Figure 2.5 Waterfront Place*

The reason why the waterfront has great potential to create a high-quality sense of place is the existence of the water, which brings about an additional quality- ‘the sense of water’ – as part of ‘the sense of place’. (Yang, 2006)



## 2.5 Organic architecture

Everything has a world of its own, even us, we have our own world built through our understanding of the environment outside and what we are subjected throughout our life. Mankind evolved to bring interventions in the existing natural environment. It is not a disgrace what we have and made around us, but a responsibility to make those interventions meaningful step by step for the entirety. It is also that we can bring improvements in the existing patterns to be a new example for coming interventions. This is how the cycle of development has progressed since ancient time and we must put our mind and soul in respecting those traditions. The poverty of current growth is the lack of pedestrian pathways and social interaction grounds which are completely neglected and overtaken by 'Automobile-centric development' and 'Modern Practices' in urban design.

Dating back to the most primitive times if mankind, major initial infrastructural developments have been with the evolution of bridges over the time. During those old periods, a bridge would be as simple as a wooden log fallen across a river or stream or the stones being used and then after the development of planks and more simple advancements with crossbeam arrangements and minimal functional approaches in design development. Now at the modern-day, the bridges are not only the crossing infrastructures but those that span continents and cities and, in some cases, even incorporate the public realm within. One of the earliest examples of bridges being the social condenser of our society can be found in China which is depicted in the masterpiece by an ancient Chinese painter. Zhang Zeduan, in which city scene of Song dynasty illustrates the role of bridges in the history of Chinese urban development. It not only serves the city via a special way but also incites the format development of river and the riparian zones of the river. This shows the blurred lines between bridge and architecture in social and public realm to become one existential infrastructure in the society. This shows how bridges had social relevance in the historical city than the modern day, where architecture turns into apart from the whole urban landscape, creating a vibrant social corridor between the river barrier (MANSOOR, 2016). This is what reflects the organic pattern of social and public realm with the architecture in our built environment. Bridges, thus show the connectivity of cities, people, culture and life in daily urban-built environment. There seems to be bright future for the scope of interventions in the existing bridges, urban flyovers and pedestrian patterns combined with socio-cultural grounds of Kathmandu and Patan Durbar squares for the contributions in public realm in cities like Kathmandu.

A term clearly famous because of the master architect, Frank Lloyd Wright, "Organic Architecture" is not that big of a new terminology to come into existence. This principle is what has been responsible for the history and development of architecture over the course of time in mankind history. Wright generalized and made the palate clear and

believable regarding the context of organic architecture, one of which his masterpiece clearly shows this is The Fallingwater. In context of Wright's philosophy, Britton Marketing and Design Group (BMDG, 2014) wrote, "Organic architecture is a belief that the natural life that exists in a space should flow into, peacefully coexist with and benefit from whatever is constructed there (BMDG, 2014)."

*“The land is the simplest form of architecture”*- Frank Lloyd Wright

"A building should be a product of its place and its time, intimately connected to a particular moment and site-never the result of an imposed style", Frank Lloyd Wright on his approach of organic architecture. The modern-day approaches of organic architecture are less concerned with integrating architecture within the surrounding environment as did Frank Lloyd Wright on his design approaches.

Early Concepts of Frank Lloyd Wright's Organic Architecture

**Simplicity and Repose** - the qualities that measure the true value of any work.

**Color** - should derive from the fields and woods to fit with these leaving.

**Material** - the nature of the materials from which a building is constructed should be expressed freely.

**Integrity** - buildings must be sincere, true, gracious, loving and filled with integrity.

**Grow from the Site** - building should appear to grow easily from its site, and be shaped as if it was itself created by nature for and from the landscape

Juhani Pallasmaa puts his opinions on the nature of materials and the relevance of organic architecture in principles of architectural determinism. Natural materials - stone, brick and wood - allow our vision to penetrate their surface and enable us to become convinced of the veracity of matter. Natural materials express their age and history, as well as the story of their origins and their history of human use (Pallasmaa, 2005). Temporal dimensions add value and layers of history in any built form when driven along with the other conventional dimensions of architecture.

## 3.0 Case Studies

### A. Case studies guided by literature:

#### Riverine:

As guided by the research and backgrounds of this thesis, riverine ecology and river, itself are a history in man's evolution. These are information generalized for the public. The truth is that river and riverine as a history of mankind still flowing and existing is our existential proof in this world. Civilizations started along the banks of rivers since the ancient times. Riverine has played a very important role in development and identity of societies around the world. The existential diversity in social paradigm has much more to do with the environment, upbringing and facilities that the individual rivers had contributed to individual civilization's growth.

The natural system of the riverine ecology remains similar as for the geographical patterns around the world. But the variation comes in the social standards, perception, value and the responsible public and cultural paradigms in individual societies. For example, the riverine of Eastern world hold more holistic, religious (Hindu, Buddhist) cultural and social value in the societies while the Western world hold more utilitarian and superficial value in their societies. Nevertheless, this ecological part has a common thing across all platforms, that being the common ground for public exchange and enjoyment.

The rural areas where the smallest to huge scale streams and rivers act as a retreat for villagers, farmers and the locals as a cultural, public and economic ground to the urban areas where the rivers and streams are the places of public open grounds for the urban fabric. Multiplicity in same platform runs across the various areas in the world. Either it be for a simple stare at the water and the riparian galleries or be it for socio-cultural activities like ritual ceremonies of Hindus and Buddhists on the riverbanks, these riparian systems hold every aspect of public realm in the urban space. The riparian zones of these riverine are the perfect example of public space architecture integrated with society and nature, all of which has a principal master designer, 'Nature'. (Koirala, 2019)

### 3.1 Wuhan Yangtze Riverfront Park

*“Where flooding is a way of life, planning and designing to welcome water is a natural next step for this Chinese riverfront park.”-SASAKI*

As the longest river in Asia, the Yangtze River Basin covers nearly 1/5 land areas of China. The Yangtze River is known as China’s “Mother River”. Wuhan is in the middle reaches of the Yangtze River, which creates a variety of ecosystems, including farmlands, forests, mudflats, wetlands, etc. Thus, the construction of waterfront area keeps playing a very important role in the urban development of Wuhan. (SASAKI, 2022)



Figure 3.1 Plan of Yangtze Riverfront

#### Project Introduction:

City: **Wuhan**

Area: **503 hectares**

Architects: **SASAKI**

Client: **Wuhan Land Resource and Planning Bureau.**

Idea: **To embrace flooding as an essential dynamic of the public realm.**

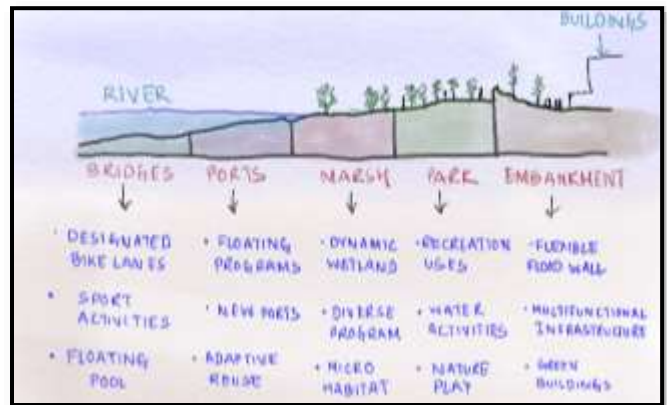


Figure 3.2 section of Yangtze

The master plan to improve and expand the Wuhan Yangtze Riverfront Park leverages the river’s dynamic forces to cultivate a rich regional ecology, and rethinks traditional approaches to coexisting with an ever-changing river.

Despite advancements in engineering that attempt to tame the Yangtze, damaging floods remain an annual occurrence. Wuhan, central China’s largest city, is re-

envisioning its waterfront park to not only accept floodwaters, but to embrace them as a driving force shaping its public realm.

### FORGED BY FLOODS

Dependent on the river for drinking water, trade, and farming in its fertile sediment, Wuhan and the Yangtze forged a symbiotic relationship until rapid urbanization and higher levees separated the river from the city. Interaction with the river is so deeply embedded in the culture of Wuhan,

**however, that people frequent the riverfront park even when it is flooded.**



Figure 3.3 view of Yangtze riverfront

The reimagined Yangtze Riverfront Park celebrates this strong heritage, redesigning spaces to celebrate the river’s spontaneity safely. Park programming adapts as water levels rise, providing a diversity of recreational experiences that are intimately tied to the seasonal rise and fall of the Yangtze’s waters.

### ENHANCING ECOLOGY

The river’s mudflats play a critical role in supporting biodiversity, providing feeding grounds for migratory birds and spawning habitats for fish. By strategically removing levees, the plan allows for frequent flooding to replenish nutrient-rich sediment and nurture hundreds of acres of mudflats in the heart of Wuhan.



Figure 3.4 Enhancing Ecology

Sinuuous secondary streams are graded to emerge during mid-high-water levels and provide passages for aquatic wildlife and safe corridors for kayaking, allowing for a tranquil experience amidst tall marsh grasses even when the Yangtze roars. In dry months, these streambeds function as informal pathways slicing through dense grasses and providing a sense of discovery.

### REPURPOSING INFRASTRUCTURE

Although most heavy industrial uses along the Yangtze have been relocated, 68 iconic piers and barges within the park remain. Despite the City’s initial strategy of removal, the plan repurposes them for a host of programmatic opportunities including community gardens, performance spaces, and a floating promenade which rises and falls with the river. Additional relics including abandoned bridge



Figure 3.5 Old structures

spans, ramparts, and other outdated infrastructure are reimagined as public art to recall the river’s industrial legacy.

**PUBLIC ENGAGEMENT & OUTREACH**

A comprehensive public process resulted in feedback from over 65,000 people throughout Wuhan who provided programming ideas and influenced design iterations. Open meetings, site tours, and a community arts program invited residents to convey their vision for the park. Built upon a strong consensus from sustained public outreach efforts, the reimagined Yangtze Riverfront Park strives to create a socially inclusive, culturally relevant, and ecologically meaningful waterfront that embraces the philosophy of living in harmony with the dynamic river.



Figure 3.6 Public Interaction



Figure 3.7 Different Attractions of Yangtze

**Inferences:**

- Designing without natural interference. Welcoming and celebrating flood.
- Public involvement.
- Reproposing old infrastructures in a unique way.
- Considering the daily activities of people.
- Dynamic designs according to changing water levels and changing seasons.
- Respecting the laws of nature and shaping a flexible activity space

### 3.2 Sabarmati Riverfront Project

...one of the most innovative projects towards urban regeneration in the world to make the city livable & sustainable (KPMG)

Ahmedabad is rethinking its riverfront at a scale unheard of in India. Though implementation will be challenging, the city hopes that this integrated environmental improvement project will be a model for the nation.

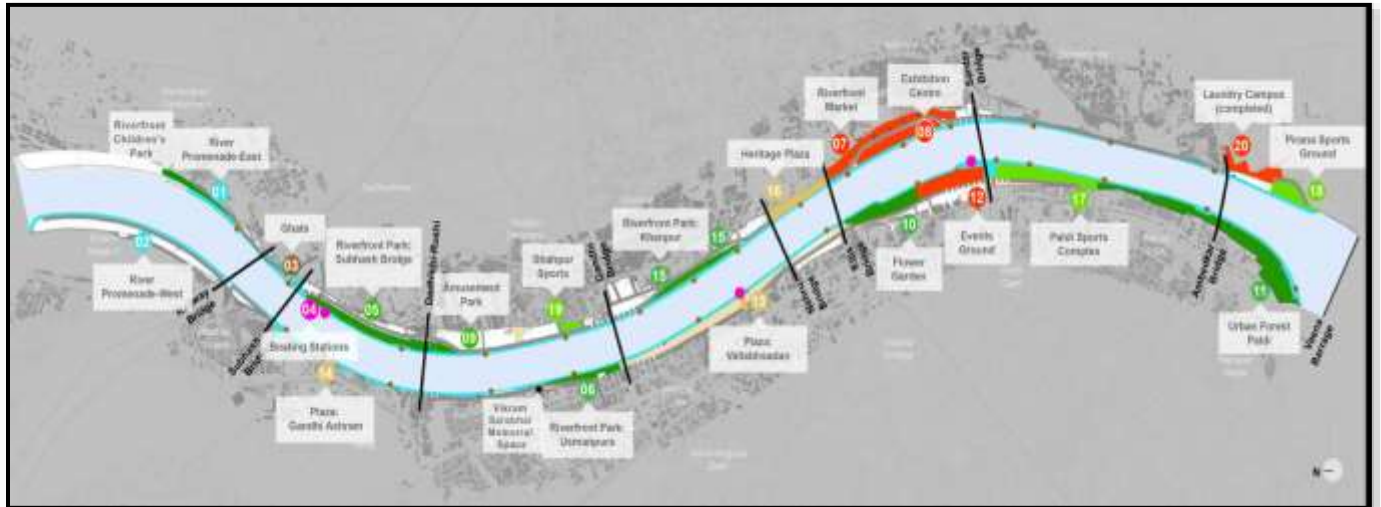


Figure 3.8 Plan of Sabarmati Riverfront

**Project Introduction:**

- City: **Ahmedabad**
- Area: **501.1 Acres** (Reclaimed land)
- Architect: **Bimal Patel**
- Client: **Sabarmati Riverfront Development Corporation (SRFDCL)**
- Status: **Under construction**

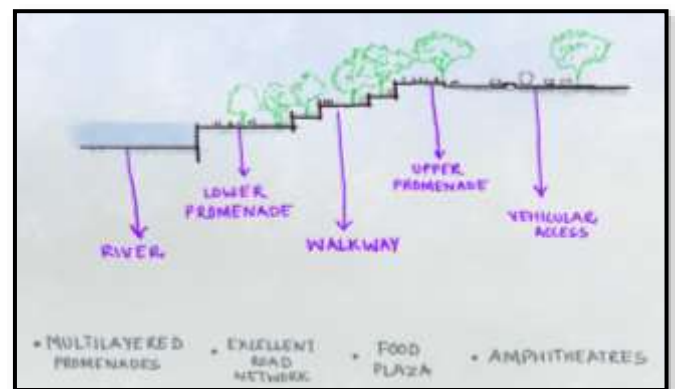


Figure 3.9 Tentative Section

**Project objectives:**

The project aims to provide Ahmedabad with a meaningful waterfront environment along the banks of the Sabarmati River and to redefine an identity of Ahmedabad around the river. The project looks to reconnect the city with the river and positively transform the neglected aspects of the riverfront. Objectives of this project can be categorized under.

- Environmental Improvement: Reduction in erosion and flood
- Social Upliftment: provision of socio-cultural amenities
- Sustainable Development: Generation of resources, revitalization (SRFDCL, 1997)

- ❖ It is conceived and being implemented as a pioneering multi-benefit project with significant urban transformation potential, is a city level intervention.
- ❖ This project is to transform the historic but neglected river Sabarmati into a vibrant and vital focus for Ahmedabad city to be returned to the citizens of Ahmedabad.
- ❖ The riverfront development is already turning the Sabarmati into a major asset, which will improve the efficiency of infrastructure and the quality life in Ahmedabad.
- ❖ Revitalize as vibrant urban space which in fact was carrying significant sewage flow and used as dumping yard for disposal of garbage.

**Development in different sectors:**



*Figure 3.10 Rehabilitation of Slums*



*Figure 3.11 Sunday Market: Guzari Bazaar*



*Figure 3.12 Laundry Campus*



*Figure 3.13 Event Figures*



**Attractions:**



Figure 3.14 Sports and Running Tracks



Figure 3.15 Garden, Promenades



Figure 3.16 Lower Promenade



Figure 3.17 Kids Zone and Trails

**Also,**

- Ghats
- Boating stations
- Amusement parks
- Flower gardens
- Urban forest
- Plazas
- Sports complex

**Inferences:**

To convert the abandoned land of riverbed and nuisance at center of city into:

- People’s attraction
- Tourist destination
- Infrastructural and recreational facilities
- Environmental improvement and inclusive development

**Criticism:**

The river is no longer freely and publicly accessible which has led to issues of social exclusion of some citizens (e.g., those unable to pay entry fees, forced relocation of slum dwellers).

It shows how easily we forget our existing local technology, our low cost & rich system of irrigation networks, our tanks, ponds and Ghats, which though traditional and a complete eco system by themselves, sadly are ill maintained and fast disappearing.

What is essential is to look at the entire river system as a whole, and not 'develop' an isolated stretch or frontage for any river. Designers need to recognize rivers, to understand them as a meandering, living entity, dynamic in nature, which cannot conveniently be straightened and designed on drafting boards. And then the river too would have the space and the time to and meander gracefully, following its eternal natural rhythm as she has been doing till date!

### 3.3 Shankhamul Park



Figure 3.18 shankhamul park

#### Project Details:

Location: **Patan, Lalitpur**

Area: **52 Ropanees(approx.)**

Established by: **Lalitpur Metropolitan**

Attraction: **Statue of big Shankha**

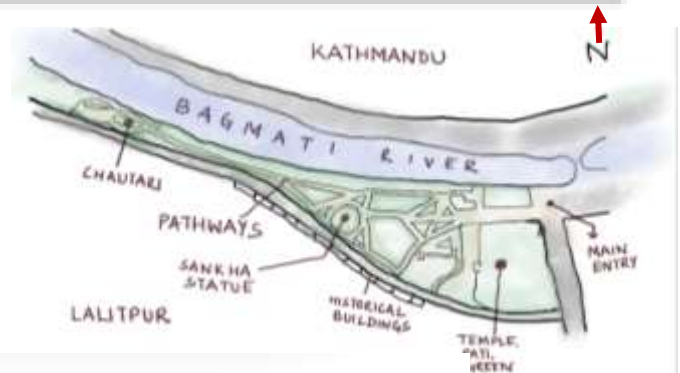


Figure 3.19 Plan of Park

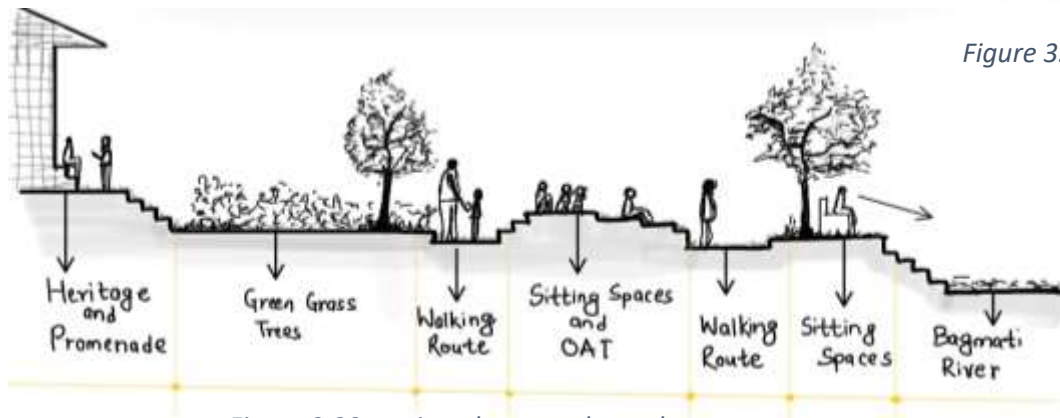


Figure 3.20 section along south-north

- It is the place is perfect for relaxation, meditation and jogging especially in the mornings and evenings.
- Exercise, walks, sports, movie and songs shoot, dry picnic etc. are the major activities.
- There are several temples, statues, patis and walking promenades.
- A common place of interaction for people of younger generations to older generations.
- A multipurpose park.

**Observations:**



Figure 3.21 sitting spaces



Figure 3.24 Chautari and Pergola



Figure 3.23 pool with seating



Figure 3.22 OAT



Figure 3.25 gazebo



Figure 3.27 Heritage and Promenade



Figure 3.26 Steps to River

**Inferences:**

- Open spaces can serve actively at the time of disasters like earthquakes.
- Parks can be multifunctional and be targeted at people of all ages.
- Traditional “chautaris” are still important elements in landscape.
- An open area in the core city area attracts a lot of people at different times.

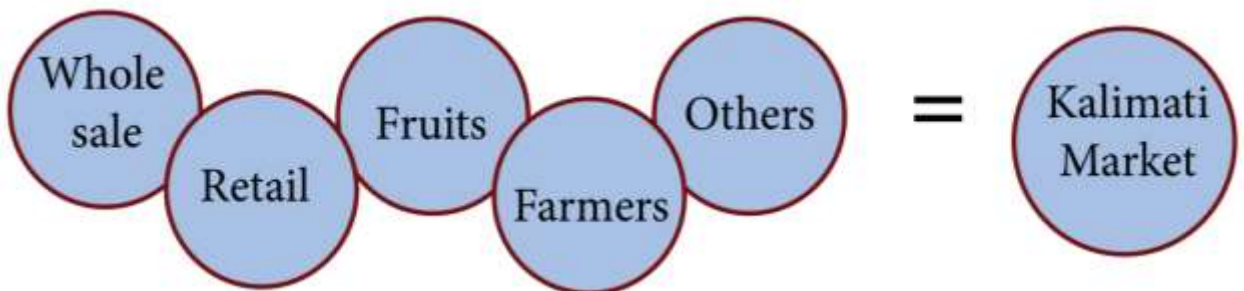
## B. Case studies guided by programs:

### 3.4 Kalimati Fruits and Vegetable Market:



Figure 3.28 Kalimati Market

- Kalimati market has been a major fruit and vegetable market for over 33 years. It started from 2033 BS.
- Started to function with small-scale infrastructures, the current market infrastructures are a result of aid from UNCDF in 1990.
- For efficient management of the market, “Kalimati fruits and vegetable wholesale market development board” was formed,
- Infrastructures such as market building, market sheds, multipurpose building, ice plant, cold room, admin building, restaurant, mesh/canteen etc. observed in market.
- Main customers of the markets are wholesale and retail traders of other markets, including cycle traders, cart traders, hotels, hostels, restaurant, and schools, while regular people are also being catered.
- Main customers of the wholesale markets are wholesale and retail traders of other markets, including cycle traders, cart traders, hotels, hostels, restaurant, and schools, while regular people are also being catered.



**Wholesale Market:**

The market is majorly a wholesale market, which functions in the building and sheds.

322 stalls are being allocated among which 26 stalls are allocated for famer groups/co-operatives, min 5kg to be traded.

The wholesale market is zoned into different sections.



Figure 3.29 Wholesale Market

**Retail Market:**

Retail market, in order to cater the people trading small quantity of produces.

Total 81 stalls, must take permits acc. to space.



Figure 3.30 Retail Market

**Farmer’s Market:**

Sell their fresh vegetable produces on daily basis in the Kalimati.

Two sheds ahead of entry gate, and hard paved open space, 75 to 150 farmers daily.

The market is allowed to open for two times a day, from early morning to 9 - 4 to late evening.



Figure 3.31 Farmers’ Market

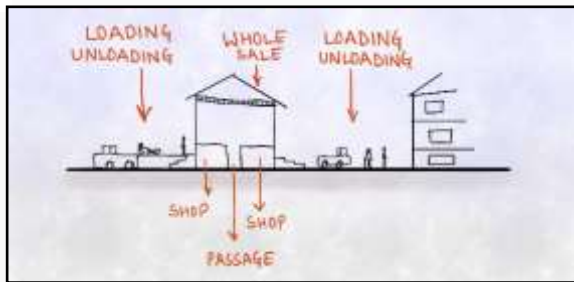


Figure 3.33 Section of Wholesale

**Inferences:**

Market areas; public go on daily basis.

Timings on market play an important role.

Spaces like loading unloading, storage must be

Thought while designing.



Figure 3.32 Fruits and loading



Figure 3.34 Auction and Parking

### 3.5 Narayani Riverfront Development Project:

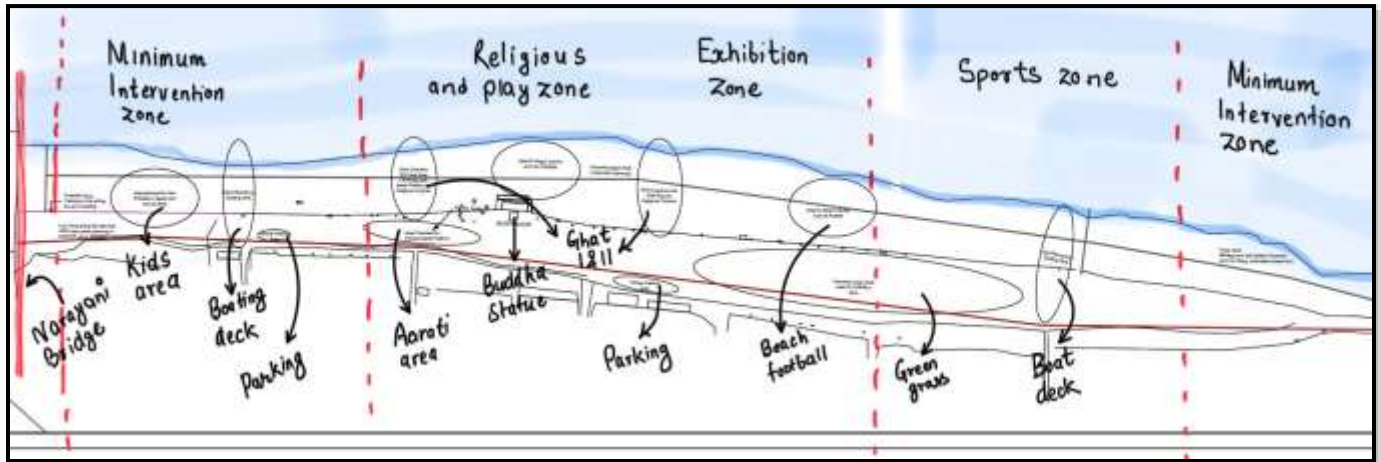


Figure 3.35 Plan of Narayani Waterfront

#### Project Details:

Location: Narayanghat, Chtiwan

Area: 3.4km long

State: Under construction

#### Amenities:

- Boating Area (Deck)
- Cultural Zone (Arati area and bathing area)
- Parking area
- Foot trail / cycle track / jogging track
- Multi – use ground (exhibition/program)
- Playing area for kids
- Playing area adults (football, volleyball)

#### Goals:

To enhance the aesthetic view from the Narayani bridge.

To activate the riverfront area and commercialize it.

Welcoming space for tourists and visitors.

To create a proper landmark.

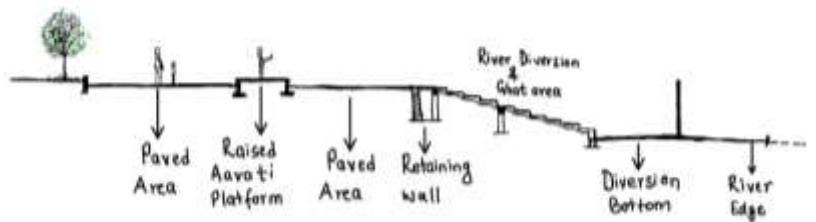
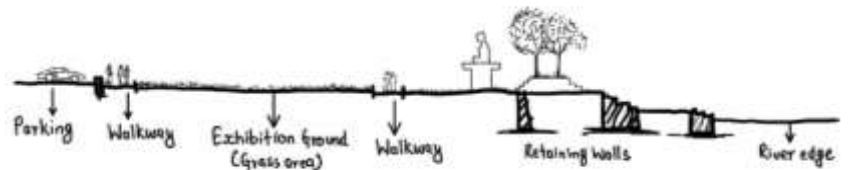


Figure 3.36 Sections



Figure 3.37 River Diversion and Steps

**Observations:**



Figure 3.39 Tea shops & Informal parking



Figure 3.40 Food Stalls



Figure 3.38 public taps and chautari



Figure 3.43 cycle lane



Figure 3.42 Open Space, Logs



Figure 3.41 Laundry



Figure 3.45 Buddha Statue



Figure 3.44 aarati space at day and evening



**Inferences:**

- Riverfronts feel lively when many people visit the place, sit and engage with them.
- Activities in public spaces must be multi functional attracting different people.
- Open spaces play important role in riverfront.
- These places must target for all kind of audiences irrespective of their background.
- traditional & cultural activities must be revived.

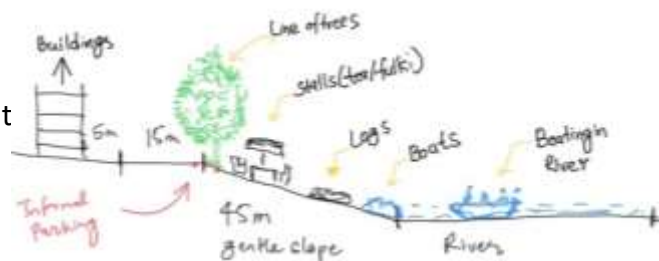


Figure 3.46 Section at next side

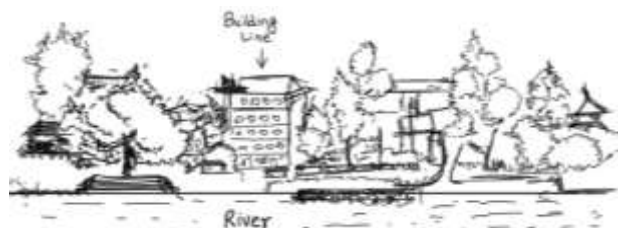


Figure 3.47 View from next side

### 3.6 Lakeside, Pokhara

**Project introduction:**

Location: **Pokhara, Lakeside**

Governed by: **Pokhara Metropolitan**

Land area: **1.9 km long**

Buildings: **80+**

Pokhara is the second largest city in Nepal, after Kathmandu. The city of Pokhara can be divided in two - the charming lakeside Pokhara, and the old city. The lakeside part offers many tourist attractions and beautiful views, while the old city is the commercial hub of Pokhara.

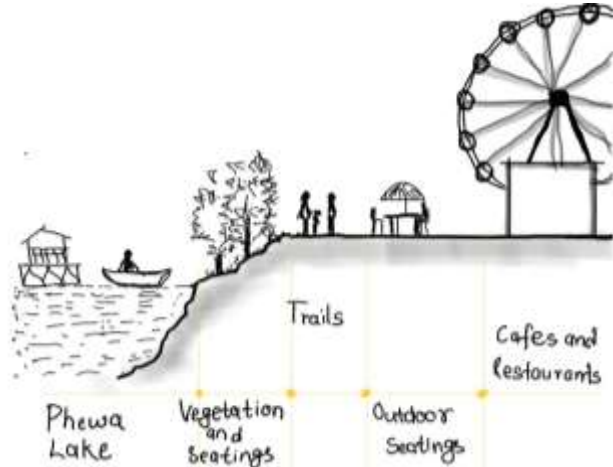


Figure 3.48 Section of Lakeside

#### Observations:



Figure 3.52 Boat Docks



Figure 3.51 Café and Trail



Figure 3.50 seating



Figure 3.49 Universal Friendly Entry



Figure 3.56 fishing



Figure 3.55 Seating of Cafe



Figure 3.54 Vendors along trail



Figure 3.53 Dustbin & Solar Light

#### Inferences:

Public places that are universally accessible.

Riverfront spaces having multiple functions and targeted to all kinds of audiences.

Spaces and activities that are lively even at the midnight.

Promenades and trails; major design elements.



Figure 3.57 Night view of the Street



### 3.7 San Wayao Community Sports Center

**Project introduction:**

Location: **chengdu, china**

Area: **11936 m<sup>2</sup>**

Architect: **CSWADI**

Year completed: **2015**



Figure 3.58 Exterior View

**Concept:**



Figure 3.59 concept

To make the building and site integrated for producing friendly sport space.

Created a sloping shape of the building by extruding and connecting the sport ground on east with walkable sloping roof leading to a stronger space perception of the building as a public facility.

Designed artificial hill to bring the pleasure of climbing a real mountain into the crowded town making it environment friendly.

**Facilities:**

**Indoor:** swimming pool, spa, table tennis, badminton court, gym, billiards table, squash, chess and cards

**Outdoor:** basketball court, gate ball court, café/staff dorm.



Figure 3.60 facilities

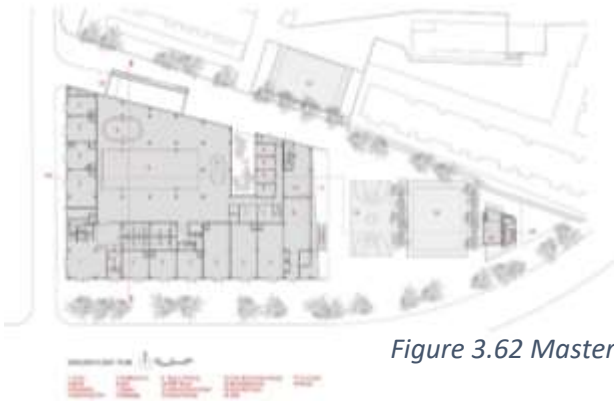


Figure 3.62 Master Plan

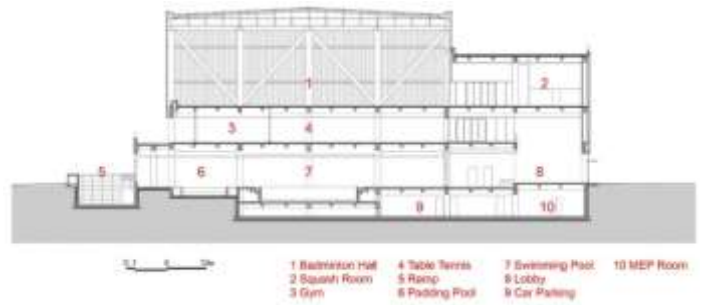


Figure 3.61 Section



Figure 3.65 Table Tennis Hall



Figure 3.63 open public space with big steps



Figure 3.64 Secondary stairs



Figure 3.66 Bridge connecting stairs and multifunctional area

**Materials used:**

Aluminum seaming roof with aluminum water drain.

260x60x7 channel glass and u-shapes semitransparent glass in external façade.

Aluminum louvers used for ventilations

Granite and artificial grass on lawn and sloped lawn respectively.

Wood flooring is done in table tennis hall and PVC in badminton hall.

**Inferences:**

- ❖ Entry exit route within every 30m distance.
- ❖ Public community space.
- ❖ Sport activities are oriented in north south direction minimizing the natural glare.

### 3.8 Foodmet Abattoir, Brussels

Location: **Brussels Belgium**

Architect: **ORG Permanent**

Project Year: **2015**

Category: **Supermarket**



*Figure 3.67 External View*

The major reason for the construction of a market hall is to organize the urban market which used to operate in the city square. Main idea was to create a multifunctional market building in the Anderlecht district of Brussels, historically the center of Belgium’s meat industry. The project includes industrial meat production facilities, various market stall types, logistics and parking spaces, and a large commercial roof farm (4000 m<sup>2</sup>, 43,000 ft<sup>2</sup>) with related retail programs including a farm-to-table restaurant. The new addition provides extra room for stalls in its arcaded hall, and on its roof a large commercial farm. There are also small-scale meat processing facilities and restaurants. (archello, 2022)

**Consists of:**

- Food shop
- Restaurants
- Urban Farming
- Community Land Trust housing



*Figure 3.68 Market Area*



*Figure 3.69 Different Interior Spaces*

**Features**

- segregation of livestock stall, fruit stall, and restaurant help organize similar activities and avoid interruption between each other
- consist of two large halls surrounded in the periphery by small shops.

- avoid disturbance between vendors
- prevent cross circulation and allows a more friendly approach for customers walking in from the flea market outside through the two major entrances
- market is only used for half of the week (mornings from Thursday to Sunday)

**STRUCTURE**

- Market hall uses the strategy to divide space into two major zones: a rigid space that houses small shops, and a more flexible space that would allow other activities to happen.
- zoning and grouping each type of stall together and placing them strategically to avoid collisions and interruptions.

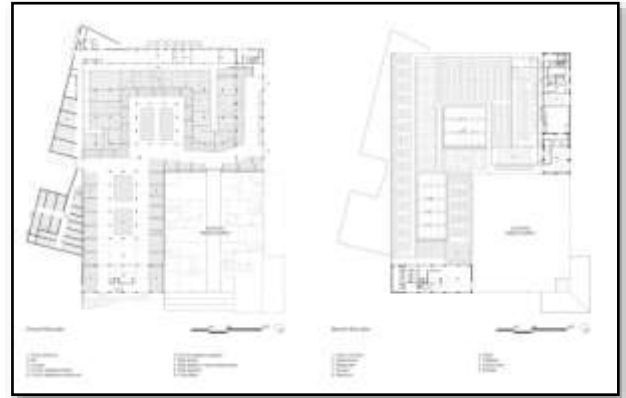


Figure 3.70 plan



Figure 3.71 Outdoor Market

The project includes industrial meat production facilities, various public market stall types, logistics, and parking spaces, and an active large-scale commercial urban farm for produce and fish on the roof, the largest in Europe (4000 m<sup>2</sup>, 43,000 ft<sup>2</sup>) with related retail programs including a farm-to-table restaurant

Stall design is the protagonist in achieving such a balance, by limiting the minimum provision of infrastructure that would be used by each type of vendors and leaving the space to be appropriated by the users

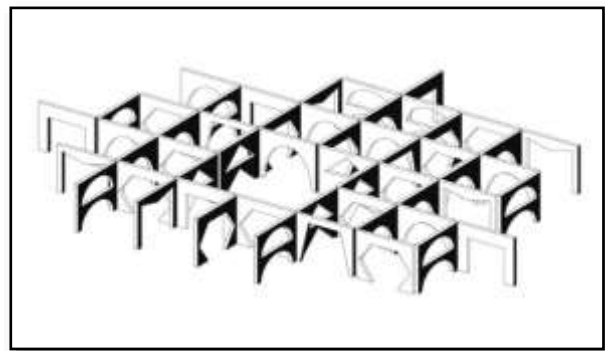


Figure 3.72 Structural Component

**Inferences:**

- Physical and visual through connections in the existing fabric, enhancing multiple links between the Abattoir site and the surrounding neighborhoods.
- Socio-cultural events alongside market activities.
- Specific concern of possible disturbance between wet area, and dry area.
- Balance between a rigid and flexible structure.
- market life is celebrated and given a civic presence.
- a building that is generous, flexible, and monumental.

### 3.9 Oodi Helsinki Central Library

#### Project introduction:

Location: Helsingfors, Finland

Area: 17250 m<sup>2</sup>

Architect: ALA architects

Year completed: 2018

Opening times

Monday - Friday **8-21**

Saturday - Sunday **10-20**



Figure 3.73 Exterior Views

Oodi Helsinki Central Library is a living meeting place at Kansalaistori square, right at the heart of Helsinki. It is one of **37** Helsinki City Library branches and part of the Helmet library network.

Urban space that is open to all.

Library of new era, a living and functional meeting place open for all.

Striking building with its glass and steel structures and wooden façade.

Three floors, three atmospheres.

#### Flooring

Ground floor extends the kansalaistori square into as interior public space. Its purpose is to make each of the facilities of the library apparent and accessible and provide a non-commercial interior space open to all, every day of the week

Middle floor known as attic space, consists of the flexible rooms arranged around the intimate nooks and corners that inhabit the spaces between the trusses of the bridge structure.

On the top floor “book heaven” is a vast open landscape topped with undulating cloud like white ceiling punctured by circular roof lights.

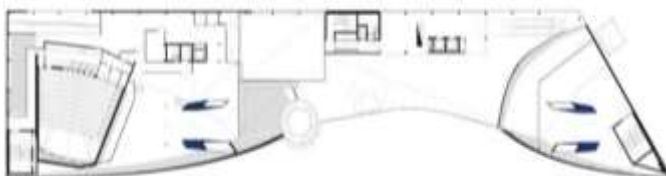


Figure 3.74 Plan

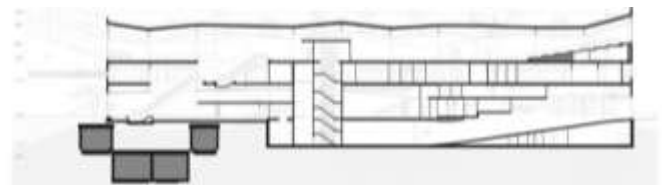


Figure 3.75 Section

## Facilities



Figure 3.76 Pop up Area

On first floor, possible to organize small-scale pop-up events; can serve as a brief temporary information point.



Figure 3.77 Kitchen

The small group kitchen for rent; suitable for 10 people. Kitchen can be used for cooking together or having meetings.



Figure 3.78 Kuutio

Kuutio on the **second floor** can be rented. Space is currently mainly used as a meeting room and training



Figure 3.82 Kino Regina

Kino Regina on the **first floor**; auditorium-style space; suitable for lectures, films & various events



Figure 3.81 Maijansali

Located on the **first floor**, Maijansali hall (240 m<sup>2</sup>) is well-suited for events, lectures and conferences.



Figure 3.80 Library

Space for social interaction.



Figure 3.79 Open Space

## INFERENCES:

- ❖ Principles for safe place

### Non-discrimination

Everyone has the right to be at the library. Idle hanging out is allowed, even encouraged. Racism and discrimination have no place at the library.

### Respect

Everyone has the right to visit the library without being harassed.

### Comfort and well-being

Everyone should respect the comfort and well-being of others.

- ❖ Wide opening hours and cozy space.
- ❖ Peaceful reading spaces, playground spaces for adults and children provides interaction.

## 4.0 Site Analysis



*District: Rupandehi*

*Province: Province No. 5*

*Area (city): 101.6 km<sup>2</sup>*

*Elevation: 150 m (490 ft)*

*Population: 91,733*

*Official Language: Nepali*

*Figure 4.1 Butwal City*

### 4.1 Site Information

Butwal, one of the fastest growing cities is the economic hub in Lumbini Province. The city is one of the tri-cities of rapidly growing Butwal-Tilottama-Bhairahawa urban agglomeration primarily based on the Siddhartha Highway in West Nepal with a total urban agglomerated population of 421,018. It is one of the fastest-growing cities in Nepal for health, education, construction, communication, trade, and banking sectors. It has highway connections to the Indian border at Sunauli and to the hilly towns in Tansen and Pokhara valley and holds the title of being "The Best City in Nepal" five times in a row. (wikipedia, 2022)

Geographically, Butwal is at the intersection of Nepal's two different National Highways, Mahendra Highway and Siddhartha Highway. It connects western Nepal with the capital Kathmandu through the highway and air links (via Gautam Buddha International Airport at Siddharthanagar). The city stands beside the bank of Tinau River, and at the northern edge of the Terai plain below the Siwalik Hills. Its name, Butwal was derived from

Batauli Bazaar, the town's oldest residential area which is located on the western bank of the Tinau River.

The Tinau is a Class- II category River originating from the Mahabharat Mountains and flowing through the Siwalik Hills and Terai Plain at Butwal, Nepal before joining the Ganges. The length of the Tinau is 95 km starting from Palpa to Indo-Nepal Border at Marchawar. The catchment area of the river is about 1081 sq. km up to the border.

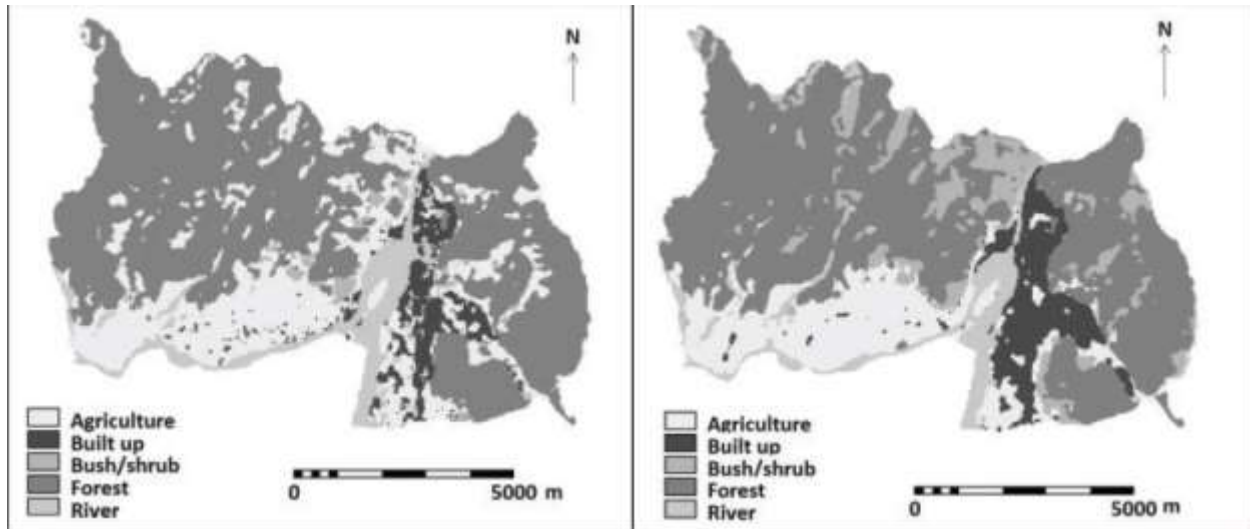


Figure 4.3 land use and Cover, 1999

Figure 4.2 land use and Cover, 2020

The site proposed for this thesis lies in the urban zone. The rate of urbanization is very high in this area and thus a very few vegetation exists. Water quality of Tinau river is in worst condition. Once the river was used by people for swimming and other purposes but now it is used as a dumping place. The river portrays its completely deteriorated condition of river ecosystem. Restoration of this river is a difficult task.

Rapid and unmanaged urbanization and urban pattern of Butwal has resulted in exploitation of natural resources along the riverbanks with introduction of slums, squatters and informal settlements. This has created problems by causing issues of land use, pollution of riverine ecology and exploitation of public spaces along with the encroachment and depletion of riparian zones along the river corridor. Slums and informal settlements are not just the reason of the of the exploitation state of river, but the improper planning and sewage link directly to the river, the urban settlements, negligence of resources and management in community levels and bad managerial pattern of existing amenities along the river also contribute to this hazardous state.

The site is a mixed zone with residences, slums and informal settlements, educational buildings, temples markets, rest spaces, riparian zones etc. It is the only open space that is at the closest distance with the center of the city. The corridor of this river connects to India and Lumbini, the birthplace of Lord Buddha. Lots of people visit this place for morning walks. Since this river section of Tinau River has huge feasibility, prospect and



visual linkage accompanied by the rich diversity of public and natural realm, the riverbank of this area is taken into consideration for re-establishment and proposition of urban public space and infrastructure. This thesis attempts to reestablish the connection between man, river and the environment with the positive intervention in the mentioned site.

## 4.2 Site boundaries and Neighborhood

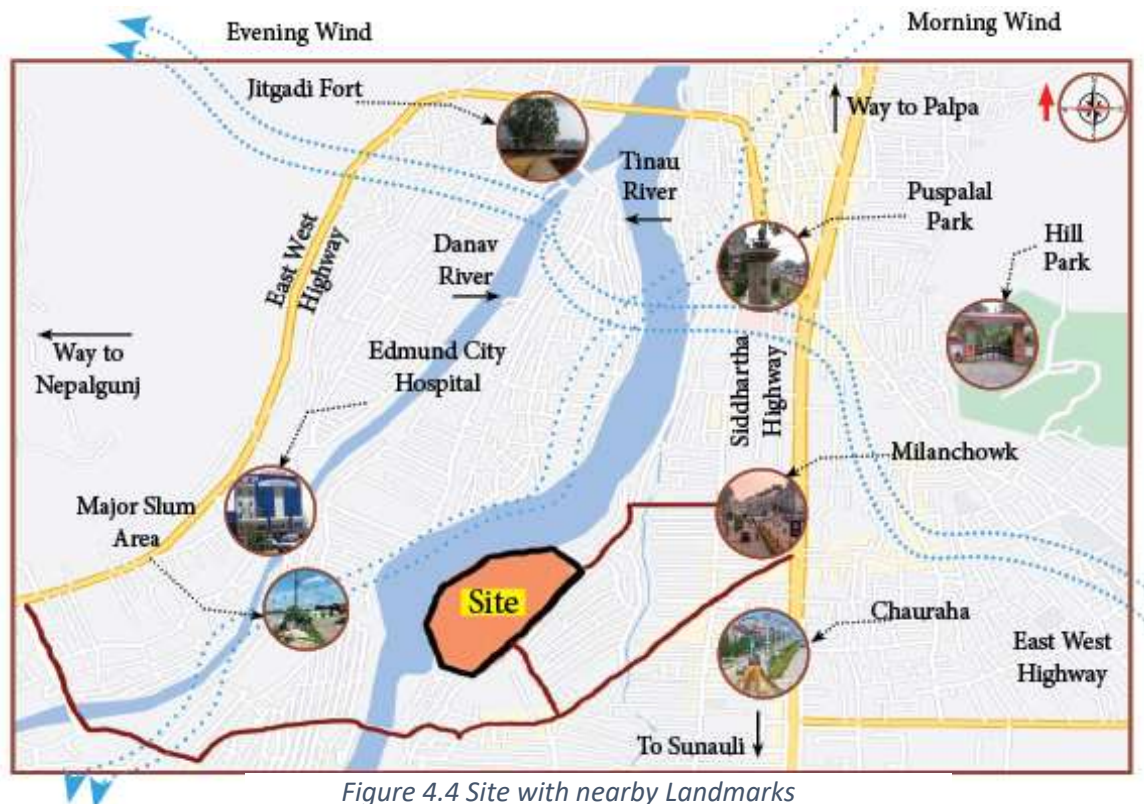


Figure 4.4 Site with nearby Landmarks

### Location:

The site of the waterfront development is located at Devinagar, Butwal. It is along the Tinau River that originates from Palpa. The site is proximity to places like Chauraha, Milanchowk, Jitgadi and Kalikanagar. The exact location is given below.

Latitude: 27<sup>o</sup>41'17.75" N      Longitude: 83<sup>o</sup>27'24.92" E

Site is surrounded by open spaces, residents, slum and informal settlement in the north, east and south while Tinau river is on the west of the site. It has a slope from east to west while it gives a mesmerizing view of the northern chure and riverfront itself. Along with open spaces, there are considerable amount of small vegetation on the site. The major problem is at the time of rainy season when people around site are afraid of heavy floods. Flooding occurs every rainy season and cause some casualties with time.

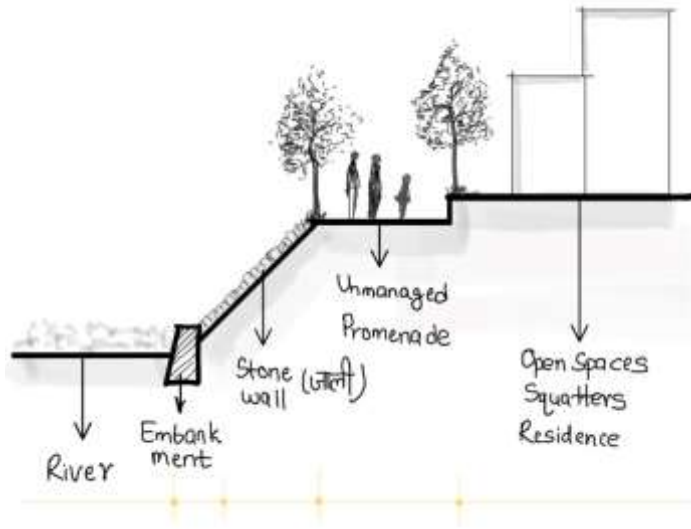
**Physical dimensions:**

Figure 4.5 Section along East West

**Site area:** 87064.3 Sq. m “171.14 Ropanees”

**Orientation:** North South

**Land Scenario:** open spaces, dumping area, informal settlements

**Access to site:**

There are multiple accesses to the site. The major roads to the site are from Jitgadi and Milanchowk as shown in the figure. These major roads are black topped.

- Access via roads for vehicles on the waterfront.
- Heavy traffic and bus stop on Jitgadi and Milanchowk.
- Pedestrian access along almost all the parts of Butwal via Devinagar, Kalikanagar, majhuwa, etc.

**Climate:**

The climate is warm and temperate in Butwal. When compared with winter, the summers have much more rainfall.

The average annual temperature is 22.0 °C | 71.6 °F (40<sup>0</sup>-12<sup>0</sup>; highest and lowest) in Butwal. In a year, the rainfall is 2085 mm | 82.1 inch.

The most humid months are July, August and September with an average humidity of around 88.71 %.

The best time to visit are April, May, September, October. (climate data, 2019)

**Land use analysis:**

There are mainly five types of land use activities near to the site. The immediate surrounding is mostly slums and residential. While other activities are recreational, mixed use, commercial.

The area around Devinagar is highly residential with educational institutes. Kalikanagar is growing to be referred as like Thamel of Kathmandu. Bus Park and traffic chowk areas are mostly commercial. Hospital line is full of hospitals and clinics with the important Province Hospital. Jitgadi area is mixed type area. Mainabagar area is popular for vehicles repairing and servicing.



*Figure 4.6 Current Land use Scenario*

Butwal city is occupied by most of the people from Gulmi, Arghakhanchi, Palpa, Syanjha, Parbat and Pyuthan. People from all these places came to Butwal for their better living conditions. This led Butwal to become one of the fastest growing cities of Nepal. This is also due to its connection to Indian border which is just 25km away. Most of the people from western Nepal travel this way from Butwal to go to Indian places.

**Socio – Cultural aspects:**

Demographics: Mixed used community

Religious entity: Mostly Hindu

Architectural Value: Mixed architecture

### 4.3 Transect walk and site stories:

2079/03/24

4pm

With the smell of fresh smell of soil, the site welcomed me. This smell is barely found in the core city area. Unmanaged urbanization which resulted in concretization has caused a major problem in the city. But as I went deep into my site, towards the river it smelled foul, with garbage scattered everywhere. The site was somewhat like a dumping area. Garbage was thrown in the rivers, starting from the riverbanks.

When I was looking at the river, it hurt me so much. The river where I went swimming in my childhood days with my friends was totally degraded. The bluish color of the water faded. The next side of the river was full of trees at that time but this time I could see very far on the river's next side. The lack of vegetation around banks has severely caused flooding problems on the site. The more and more bare area could be seen clearly. Some people were fishing in the river while some boys were enjoying swimming even at 5 pm. The river which used to be full of youths was not the same now. Only a few people were on the river.

As I walked towards the residential area (slums), the smell of local wine was the thing that I noticed very first while most of the place was an open dumping place. Most of the houses towards the river made local wines in their home while the houses towards the city had different types of shops like groceries. People had e-rickshaws, trippers (maybe they were drivers), carpentry, sekuwa stands, etc.

The leisure activity of people could be seen profoundly on the site. Few chautaris could be seen with 2-3 male aged people. While most people were coming to the river's edge in groups and enjoying the cool breeze with their never-ending chats. Kids were not only playing outside their houses, but some of them were also doing homework sitting openly outside. Aunties of 4-5 homes were having a discussion in groups, maybe they were having final discussions before returning home for cooking. Most of the young boys and girls whom I saw at their houses were busy with their gadgets. Games like guchha, wrestling cards, and seven stone made me miss my childhood.

When I moving towards the bridge, which was the final stretch of the site, I could see the vendors along the bridge and a crowded market. The market typically seems to be a bazaar which pulled me towards it. I saw different shops and a crowd of people, everyone struggling to get the best products for them. I wondered how an abandoned place situated at the bank of Tinau (having high risk) could be crowded and visited by lots of local people. I could clearly see that only big malls were not the future of shopping while bazaars could also be equally important places.



Figure 4.7 River



Figure 4.8 Peoples’ Activity near river



Figure 4.9 Random Waste Disposal



Figure 4.10 Site Stretch from West



Figure 4.11 Local Market



Figure 4.12 Crowd at Market



Figure 4.15 Transect Walk

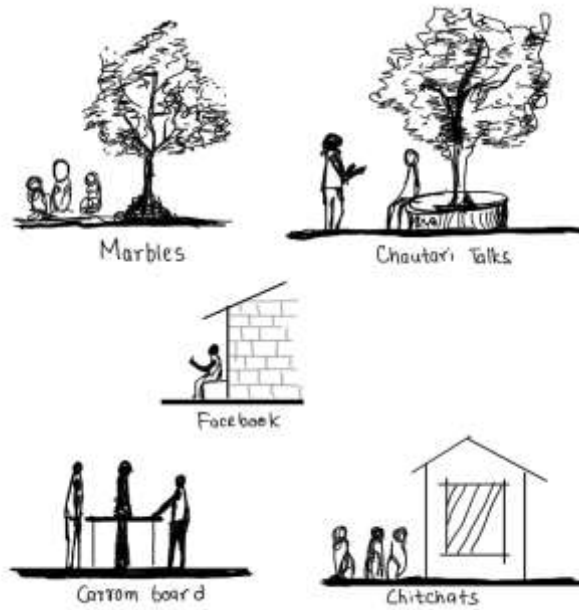


Figure 4.14 Site Story



Figure 4.13 Man crossing river



Figure 4.16 River and the View Around

2079/03/25

2 pm

The scorching sun and the site, some never-ending stories of architects. The streets were empty as it was very hot. Most of the people were in their houses despite it being Saturday. People were at the front verandah of their houses. Most of the houses were having a big verandah in the middle of the house passing from the front façade to the back façade. The circulation of air through this passage makes the indoor environment cool in summer. I saw a grandmother making cotton wicks while her daughter was studying for exams. I also saw people speaking in video calls while sitting at the passages. All these activities were clearly visible from the road. This made me think that the building design must be site and weather responsive and visibility of activities among houses could be an interesting thing. I noticed a temple that needed much attention and its surrounding area to be developed. Unlike Kathmandu, Butwal has very few temples and those too in critical condition.

While moving forward, I could listen to the sound of an old movie being played on the tv. This type of feel comes sometimes while being in the saloon. The economic activities in addition to yesterday were bags making, shoes slippers making, leather works, basketry, embroidery, small metal works, cycle shops, ceramics works etc. While walking more forward, I saw children playing on sheds of trees. A group of people was playing cards (male and female) under the chautaris with their jokes. At the river’s side, there were people busy fishing, even on this hot day. I wondered if the fishing was not done for fun but rather was their compulsion. The river was bigger than yesterday because of last night’s rain. This made me clearer about the daily activities of people. I could see that the designed community must support the daily lifestyle of people.

Throughout my walk, I could feel the cool breeze from the river even at this time of day. This made me think about considering of microclimate of the site. There was an absence of public spaces, toilets, and drinking water like boring. Finally, while moving towards the bridge, I saw abandoned structures. There used to be a suspension bridge, but it was swept away by the huge flood that occurred in 2016. The remains of the structure still make the incident’s memory fresh. I felt that such structures carrying some history must be preserved and passed on to the coming generations.



Figure 4.17 Silent Day Time



Figure 4.19 Old Structures



Figure 4.18 Existing temple area

## 4.4 Infrastructures

### Physical infrastructure:

S. No.	Infrastructure	Access and availability
1	Electricity	Available
2	Water	Available
3	Solid waste management	Municipal vehicle
4	Road access	Available

Table 4. 1 Physical Infrastructure

### Social Infrastructure:

S. No.	Infrastructure	Access and availability
1	Public transportation	Road connected to public vehicle route -Devinagar stop is the nearest one.
2	Markets	Local market on every Mondays and Thursdays. People even go for Haatbazaar.
3	Health care	Lumbini Province Hospital
4	Education	Nabin school Tinau boarding Lumbini Banijya Campus
5	Safety	Devinagar police station
6	Sports and recreation	Devinagar rangasala
7	Public spaces	In the periphery of river Devinagar rangasala
8	Restaurants and hotels	Plenty of restaurants and hotels within 2km distance.

Table 4. 2 Social Infrastructure



Figure 4.20 Site Skyline



### 4.5 SWOT Analysis

STRENGTH	WEAKNESS
Open Spaces Landmarks Location Easy access and transportation Wide screen Clear visibility at eye level	Waste disposal everywhere Bad smell from the river Poor maintenance of existing amenities Monsoon floods Encroachment by homeless people
OPPORTUNITY	THREAT
River for promenades High rental value Landscapes Maximizing pedestrian spaces Urban Proximity Road accessibility	River garbage disposal Flooding Unsafe and damaged sidewalks. Existing settlement Urban sprawl

Table 4. 3 SWOT Analysis



Figure 4.21 Damaged House due to Flood

## 4.6 Questionnaire Survey

Random Sampling Method was used for the questionnaire survey. The main objective was to know the views of people regarding Tinau River and its development and their concerns and preferences. People were asked different questions. Some of the questions and most common answers of the questionnaire survey are:

A. *How often do you go to riverbanks?*

*-Regularly, morning and evening walks.*

B. *Where do you spend your leisure time?*

*- Street and riverbank, talks with neighbors.*

C. *What is the major problem here?*

*-Flood*

D. *How often do you go to markets?*

*- Regularly*

E. *What are the missing open spaces?*

*- Playground, parks, gardens etc.*

F. *What are required infrastructures?*

*-sports area, community hall etc.*

G. *What is the worst thing here?*

*- waste disposal everywhere, improper settlement.*

H. *What is the best thing here?*

*- Fresh air and water (cool breeze).*

I. *Do you want this place to be touristic?*

*- Yes, it would help in development.*

j. *What additional lacking do you find?*

*- medical is far from here, social spaces are lacking.*



Figure 4.22 Questionnaire Survey

## 4.7 Inferences from the site:

Site analysis is an essential part of the design process, and it provides valuable insights that can inform the design process and help us to create a design that responds appropriately to the site's context, constraints, and opportunities. From the site analysis, it can be found that there are many different factors in the site which may play both positive as well as negative role in designing. However, the major conclusion that can be seen is the need to protect the fabric of the site. The lost connection between man river and the city must be revived as it was in the past. Establishing connection doesn't mean zero intervention to the site, it means the positive intervention to the site according to its need.

After and during the transect walk, some of the programs were already thought. The problems and difficulties of the site portrayed the required programs to the site. The site has immense possibilities in terms of location and development as it is near to various infrastructures. But it has suffered a lot. Problems of waste disposal and encroachment must be immediately solved. The site also lacked public amenities like public toilets and drinking water. To sum up, the site has demanded a well-managed environment where people can gather and share their daily stories, where children and youths play while old people sit and enjoy the activities happening in the site.

This thesis Riverfront Development “The voices of site” will try to solve all the major problems of site without disturbing the natural factors of the site and maintaining the urban fabric of the site.

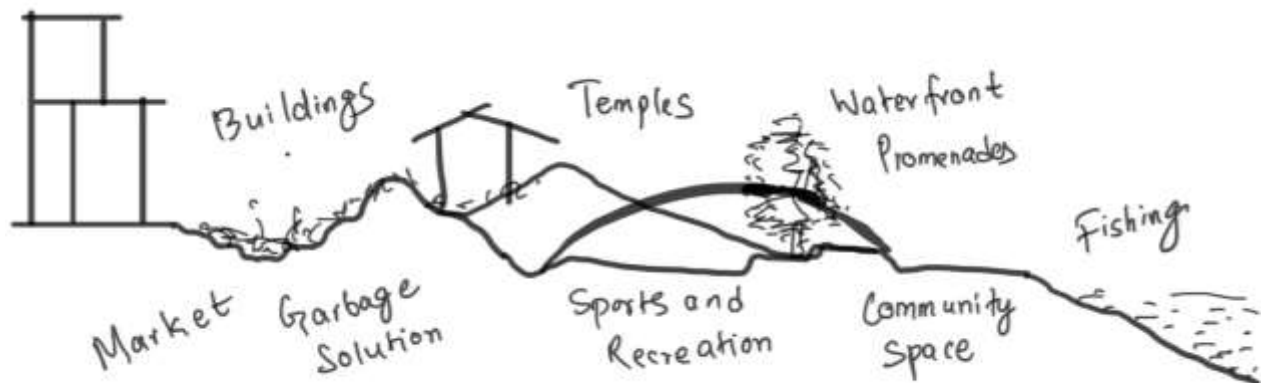


Figure 4.23 Amenities Demanded by site

## 5.0 Program Development

Program formulation is done based on literature review, case studies, site analysis and existing site conditions. From literature review, waterfront and its scopes are known. The case studies and site analysis reflected that the buildings and the spaces that we design must be site responsive and harmonize with the urban fabric of the place.

Based on site visit and case studies, the programs for this thesis developed in such a way that they solve the major problems of the site and revitalize the place. While programs are also for uplifting the living standards of the people around, connect people and places. Programs will not only solve problems of the site but also solve some of the major problems at city level too. The places and spaces designed will connect people, river and the city.

### 5.1 Programmatic Components

SN	DESCRIPTION	AREA (sq.m.)
1	SEASONAL FRUITS	4654.77
2	PLAZA	113
3	MARKET	2001.23
4	SEASONAL MARKET	709
5	STORE	112.5
6	FOOD STALL AND SEATING	1027.12
7	WATERPLAY	413.88
8	PAVILION TREES	1080.82
9	EATING AND MINI GATHERING	1297.22
10	SEATING AND WALKING DOWN	6482.96
11	BEACH GAMES	842.59
12	GAZEBOO	701.36
13	FUTSAL AND SEATING	1188.73
14	CHANGING	80.5
15	TENNIS COURT	562.05
16	PERGOLA	437.68
17	ADMIN BLOCK	531.35
18	CHILD PLAY, SEATING	2930.5
19	PARKING	1932.61
20	CHAUTARI AND SEATING	2100.87
21	POND AREA	1454.44
22	MULTIPURPOSE HALL	2099.83
23	RIVERSIDE PAVILION	414.08
24	AARATI AND CHHATH ACTIVITY	1297.22
25	KIOSKS	60
26	CYCLE RENTAL	190.4

27	RESTAURANT	1718.6
28	EVENT AREA	3190.45
29	TEMPLE AREA	2127.78
30	DABALI	487.49
31	PATI	160.4
32	MEDITATION ZONE	3200.4
33	TOILET & DRINKING WATER	401.91

*Figure 5.1 Programmatic Components*

## 5.2 Space Conclusion

BUILT UP AREA	21460	24.64845	%
WALKWAYS AND PROMENADE	15144.35	17.39444	%
RIVERFRONT RECREATION AND STEPS	9210.39	10.57884	%
PARKING	1932.61	2.21975	%
CENTRAL PLAZA	1980.6	2.27487	%
OPEN SPACES, PLAZA	37336.35	42.88365	%

*Figure 5.2 Space Conclusion*

## CONCEPT DEVELOPMENT

### 6.1 CONNECTION

By taking advantage of the area's location and the high socialization potential, the main intention is to connect and collect the users of different backgrounds. The priority in design is to transform the area from being a dead place into an area where people from different genders and age groups can gather for different activities and have quality time.

The major idea is to bring the lost **Connection** between **man, building** and the **surrounding** in which the man lives.

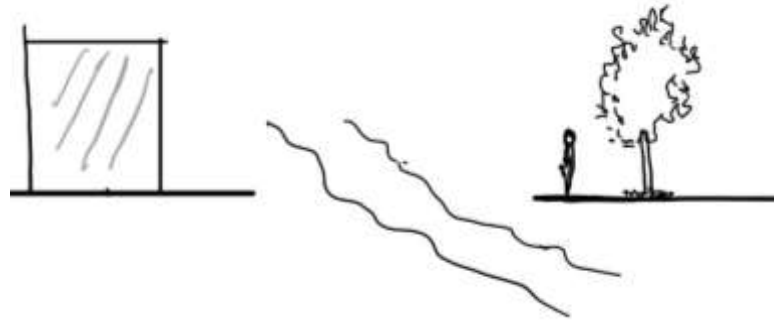
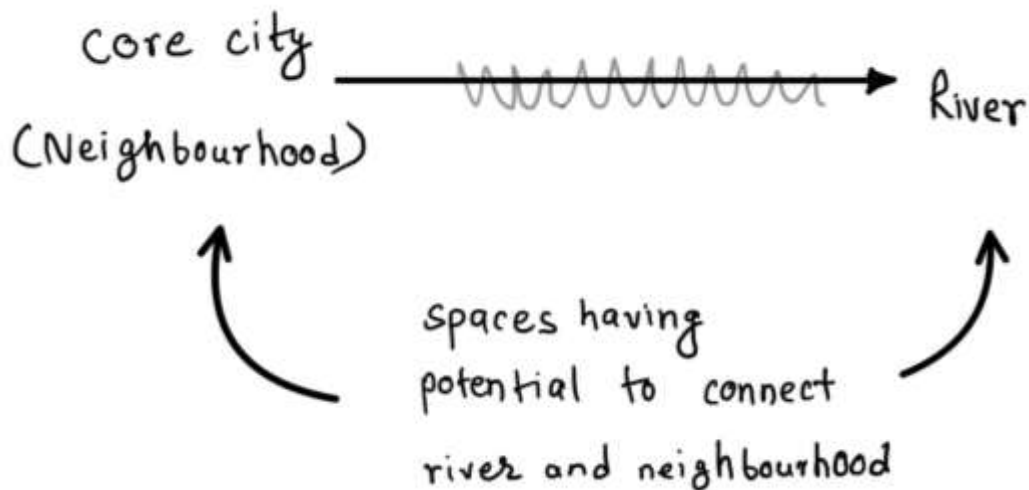


Figure 6.0.1 Human River and the city

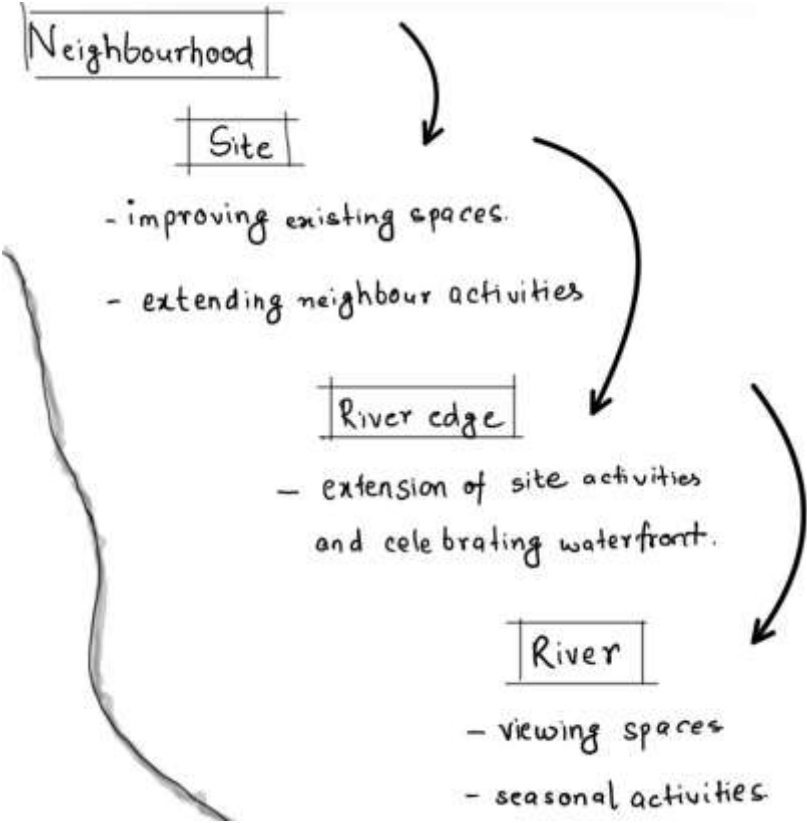
The relation between them which was seen in the past is in the verge of extinction. So the major idea of this thesis is to restore the connection between these three factors.

One of the main goals of riverfront development is to enhance public access and connectivity to the riverfront. This is achieved by creating a network of pedestrian and bike paths, boardwalks, and bridges that connect different areas of the riverfront to the surrounding neighborhoods.



It is understood that the connection is lost because the Tinnu River today does not have spaces which can connect river with the neighborhood. The spaces are not at all attracting people towards them because they are failing to fulfill the needs of people nearby.

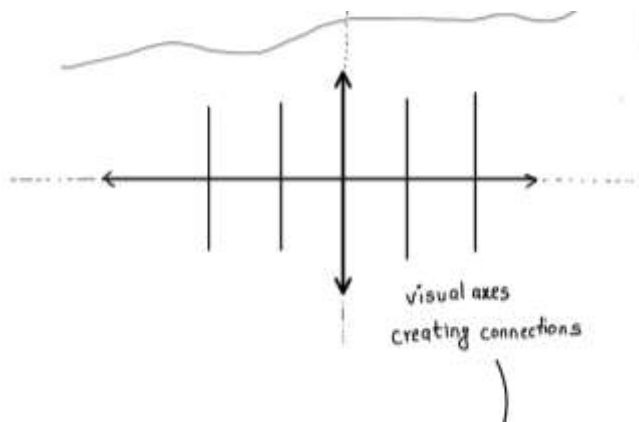
So the idea is to introduce spaces which have potential to connect river and the neighborhood. The introduced spaces will have potential to attract people in different ways and make the space lively.



The spaces are thought to be introduced in such a way that they are the extension of already existing spaces. The spaces have linkage with the nearby neighborhood. So, the idea is also to extend the neighborhood in the site. The lacking spaces and unmanaged spaces around the site could be introduced in the site in well and planned manner. The concept is to extend the neighborhood signifying the connection between the discussed factors.

## 6.2 PLANNING DEVELOPMENT

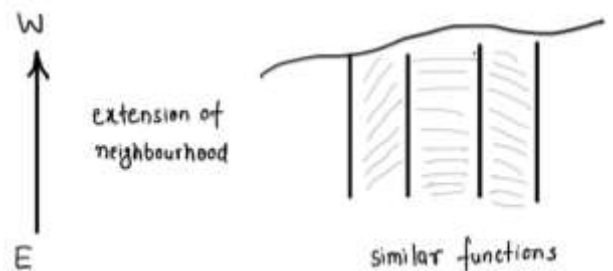
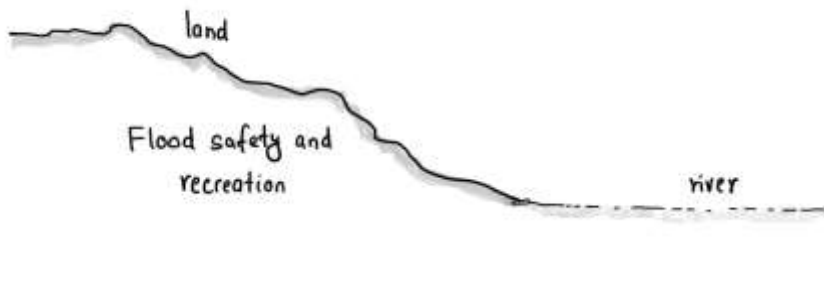
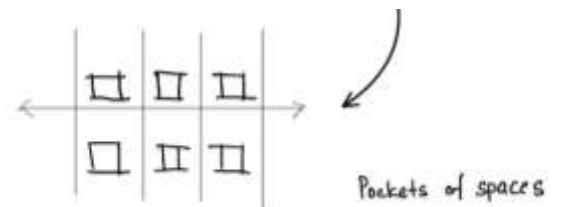
Creating connections through vertical and horizontal axes.



Planning is developed working on visual axes.

Main advantage of this pattern is that it gives direct connection between the spaces. Vertical axes show direct connection with the river while horizontal axes connect different spaces in the site.

This pattern resulted in the development of different pockets of space. These pockets of spaces are designed in such a way that pockets have similar functions.

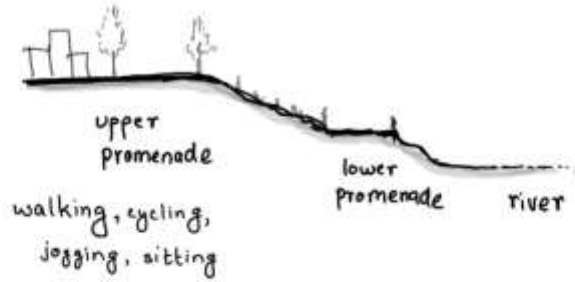


All the spaces and activities are introduced by keeping in mind about flood level and its safety measures.

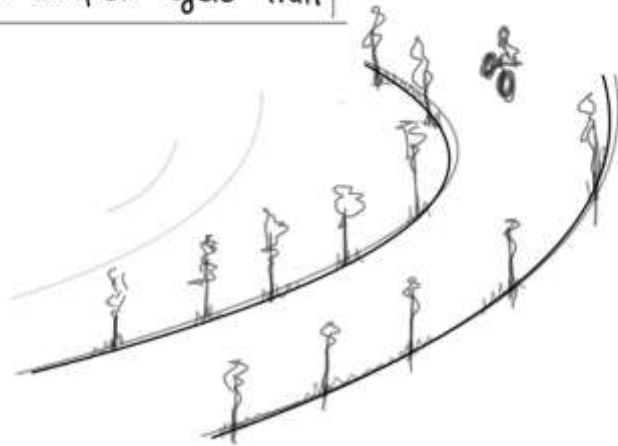


### 6.3 DESIGN ATTRactions

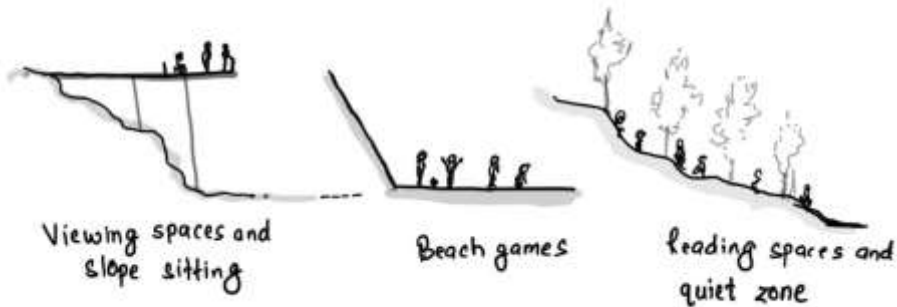
#### Pedestrian Friendly Promenades and routes



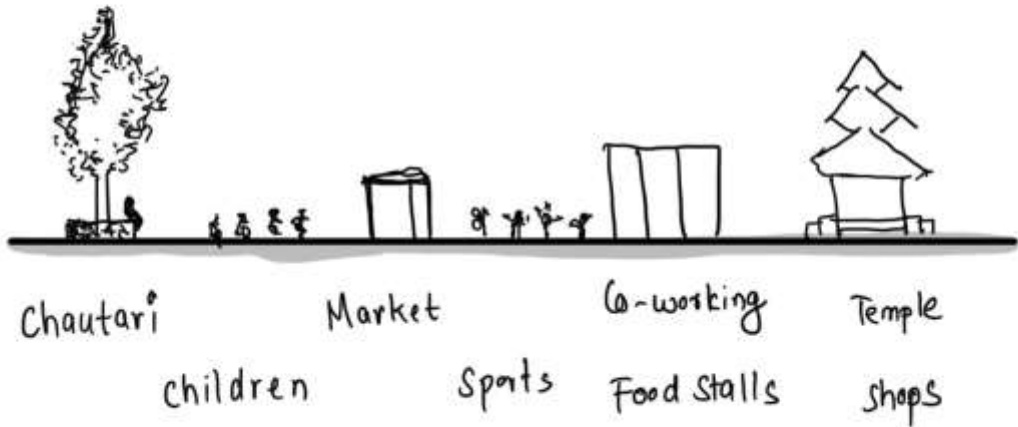
#### A Complete cycle Trail



#### Celebrating Waterfront



A Place for All



## 6.0 MATERPLAN



### 6.1 DESIGN DESCRIPTION

#### Riverfront and river edge:

The major element of this thesis is the river and its periphery. All the amenities and attractions of the design can only be feasible when the river is treated wisely. Treating the river wisely means designing by considering its flood level at different times of the year.

The highest recorded flood level of Tinau river till date is 3m (data, 2019). This level is carefully considered while moving forward with the thesis. The concrete stairs not only provide seating and walking but also work as embankment against the flood.



Figure 6.1 Riverfront Edge

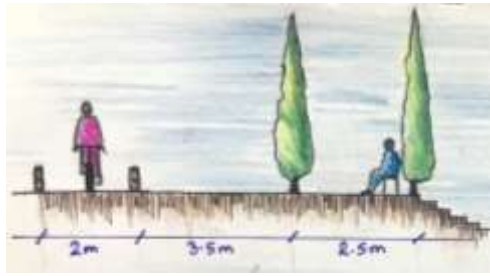


Figure 6.3 Upper Promenade

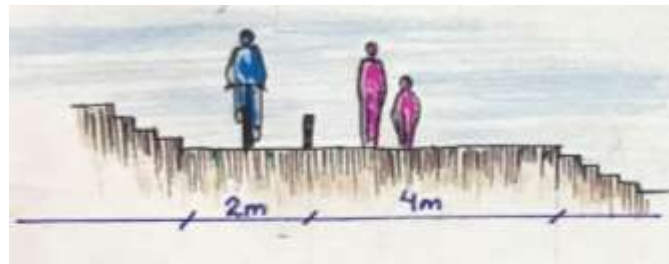


Figure 6.2 Lower Promenade

The two levels of promenades upper promenade and lower promenade play a vital role to connect people with the river and its surrounding. The promenades are universally accessible. The lower promenade is useful not only for normal days walking but also in the water related festival like chhath.



Figure 6.4 Gathering Space



Figure 6.5 Riverside Pavilion

Most of the parts towards the river are steps, sitting and recreational areas. The major attraction towards the river is the central riverside pavilion which plays an important role to gather people to share daily stories. This can also be used as performing rituals in occasional times.

**Entrance:**



Figure 6.6 Entrance Plaza

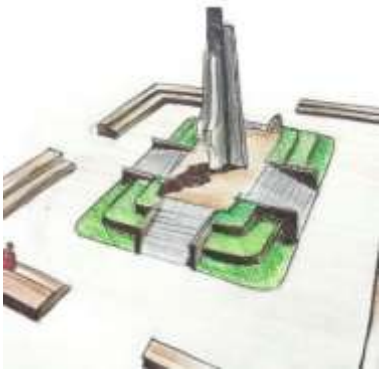


Figure 6.7 Central Plaza

The grand entrance pavilion is the attracting element of the riverfront. The raised platform with waterbodies guide visitors in the site. The central waterfront plaza becomes the meeting place for daily visitors. The waterfall at central Plaza is the one of the most attracting element of the design.

**Market and seasonal Market area:**



Figure 6.9 Existing Market

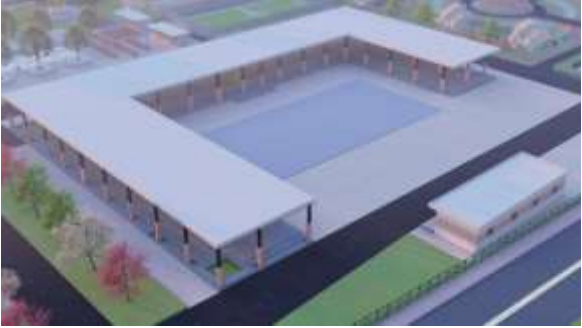


Figure 6.8 Proposed Market

Existing market is not being used in proper way. The infrastructures are also not in good condition. So, a well managed marketplace is built that has space for seasonal market. Store block, loading and unloading units are placed nearby the market for ease utility.

**Admin building:**



*Figure 6.10 Administration Block*

The designed riverfront need to be carefully monitored and maintained. These activities are regulated by administration block. This block consists of administration part, security office and infirmary.

**Sports area:**



*Figure 6.11 Sports Area*

Sports area consists of futsal and lawn tennis court. The idea is to connect 3 different age groups of people together. This is done by placing children’s play area (used by children), Futsal court( used by youngsters), Lawn tennis court( used by elders in context of Butwal) together.

**Food stalls, seating and waterplay:**



*Figure 6.12 Food Stalls*

Local and street food of Butwal is famous all over Nepal. Local people have daily routine of having fast food from the streets like fulkis and chats. Food stalls are designed to satisfy the hunger of locals and visitors of the surrounding communities. Waterbodies, waterplay and chautaras are placed so that people have interactions while having delicious food.



*Figure 6.13 Food Stall and Seating*

**Pergola , trees and seating:**



*Figure 6.14 Pergolas, Trees and Seating*

The high temperature of Butwal has always been disturbing factor for people to go outside of their houses. Design consists of green areas with pergolas, sitting (formal and informal) spaces that are cool and attraction in the scorching heat. This type of place can be multifunctional and be used by all the age groups.

**Pond and Multipurpose Hall:**



*Figure 6.15 Multipurpose Hall*

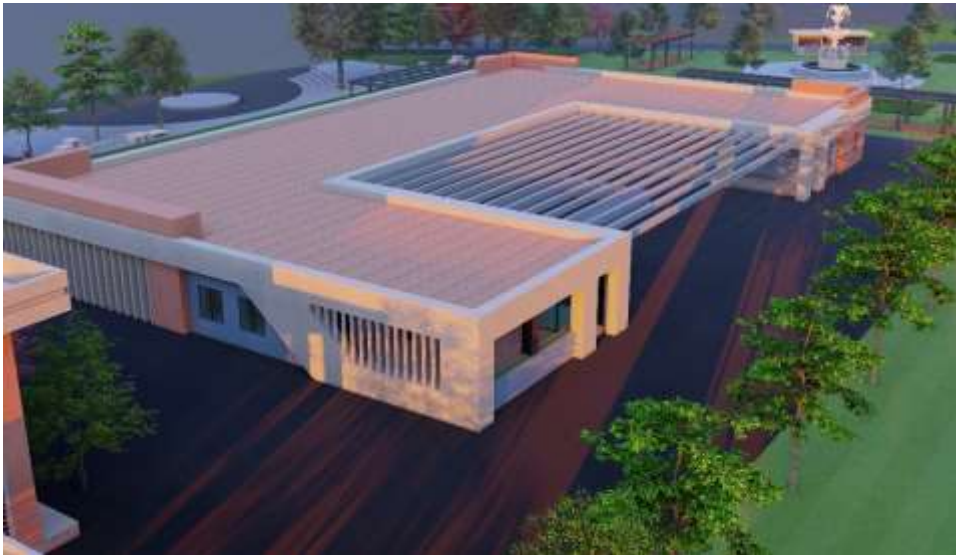


*Figure 6.16 Pond Area*



The lack of spaces for meetings and seminars clearly show the importance of multipurpose hall. This hall not only serves as a place for seminars but also becomes the place for indoor sports and cultural events. The pond area in front of multipurpose hall becomes a type of waiting and recreational space.

### **Restaurant:**



*Figure 6.17 Restaurant*

Restaurant not only serve as fine dining area but also serves in cultural activities happening around temple and cultural events happening at multipurpose hall. This place can also serve local Dal Bhat set and local wines and promote local businesses.

### **Cycle rental:**



*Figure 6.18 Cycle Rental*

Cycle friendly cities are the future of clean and green cities. This promotes a healthy lifestyle and encourages people to use more cycle than other means.

### Temple area:

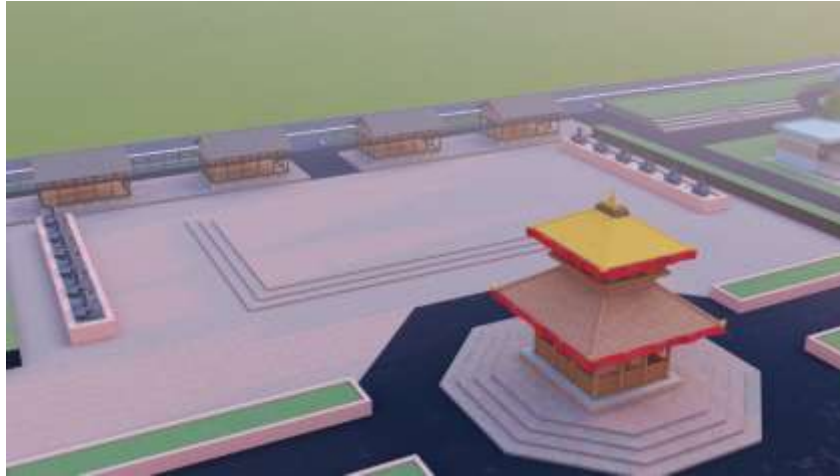


Figure 6.19 Temple Area

The existing temple area is improved and spaces like pati and dabali are added. These added spaces are multifunctional. Most of the cultural activities are lacking a good place. The presence of restaurant close to temple act as serving place .

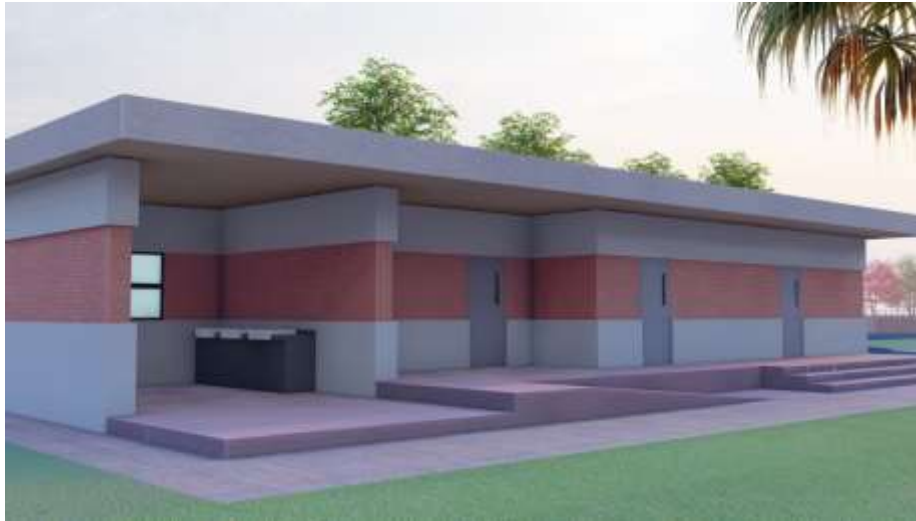
### Meditation area:



Figure 6.20 Meditation Area

Meditation zone is placed beside temple in a peaceful area surrounded by greeneries and a central fountain. This area can be vibrant space at mornings and evenings. At the time of rain and other unusual climatic conditions pergolas act as shade and protecting factor.

**Drinking water and toilet:**



*Figure 6.21 Drinking Water and Toilet*

For visitors ease and comfort, 3 similar blocks of toilet and drinking water are placed at walkable distance.

**Entrance Gate and Fencing:**



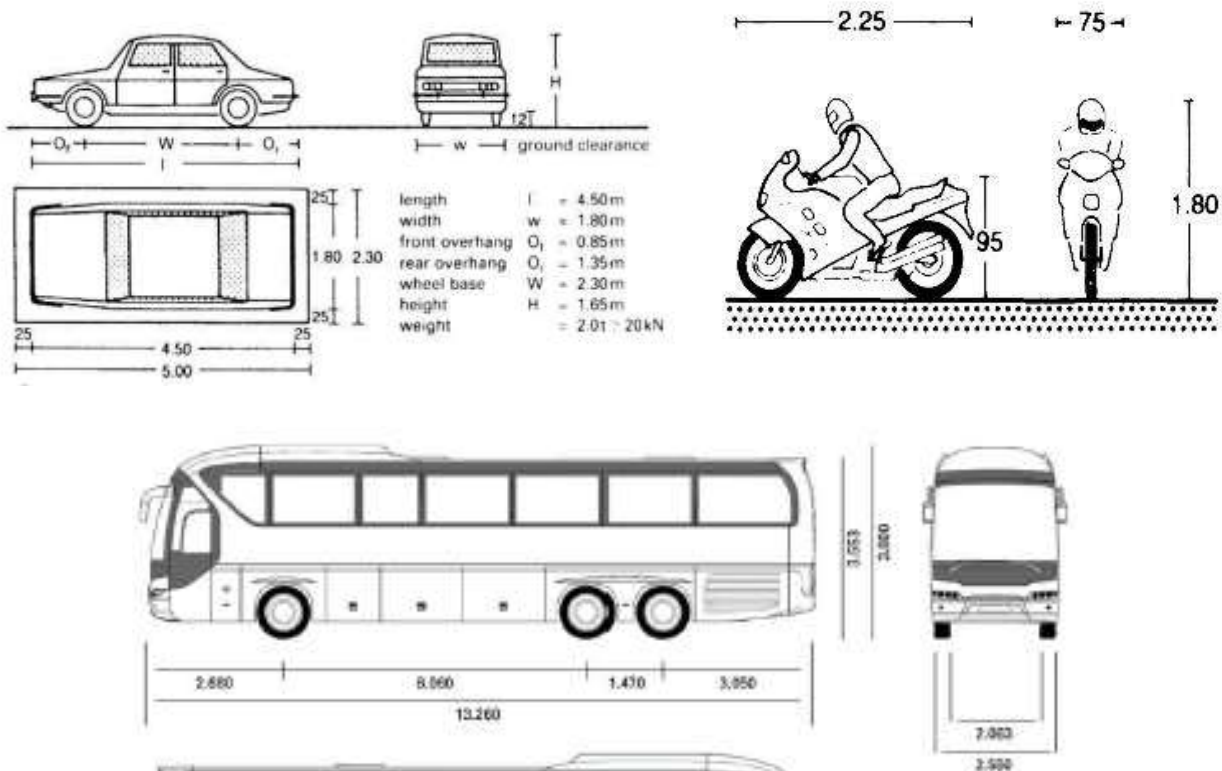
*Figure 6.22 Entrance Gate and Fencing*

## 7.0 Anthropometric and Design Standards

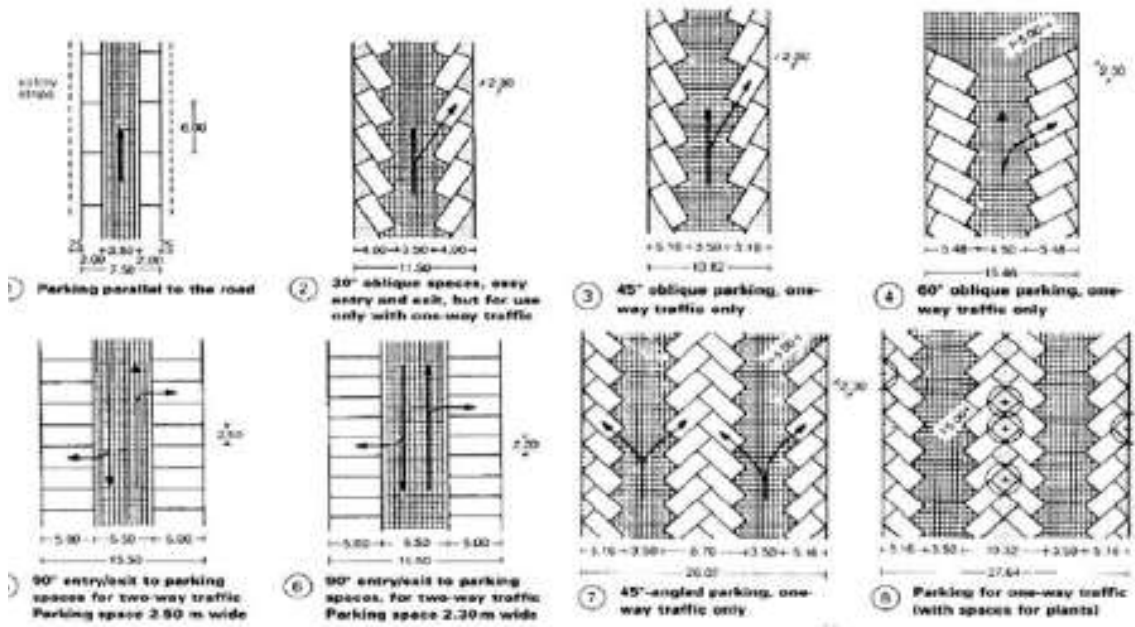
### Parking:

- The parking spaces acts as a place for the ceremonies of Arrival & Departure.
- The basic requirements for parking spaces should be taken from the vehicle dimensions whilst driving in a linear path, cornering and entering and driving out of the parking area.
- Parking can be done in various ways: inclined with various angles or perpendicular.
- Parking can also be done in basement or on surface outside the complex.
- Surface parking requires less space than the basement parking due to absence of columns.
- In case of basement parking, there should be enough provision to be economical in this view but for highly commercialized areas where the land value is very high, this can be feasible.
- In case of basement parking, a relatively narrow column grid pattern can be used, with careful planning and design, reduce building cost and height without any loss of function.

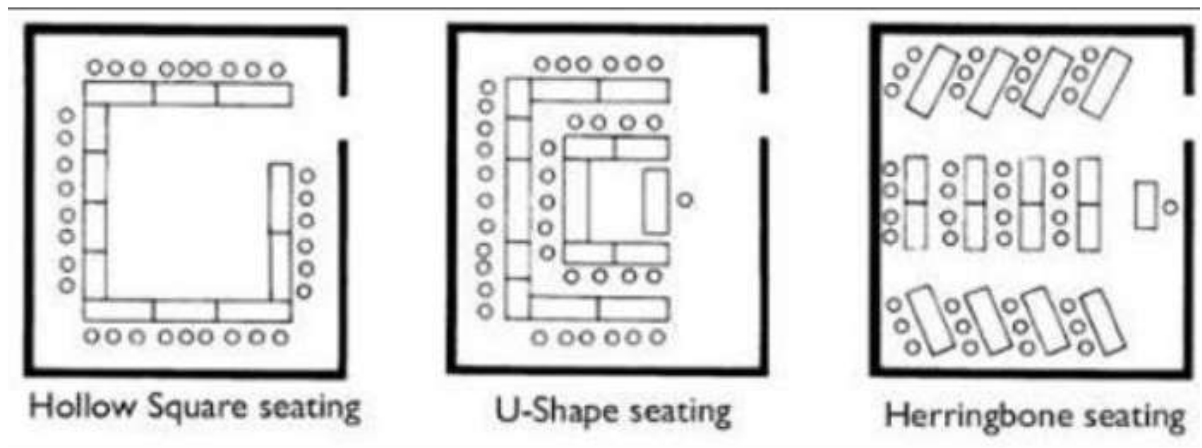
### Typical Vehicular Dimensions:



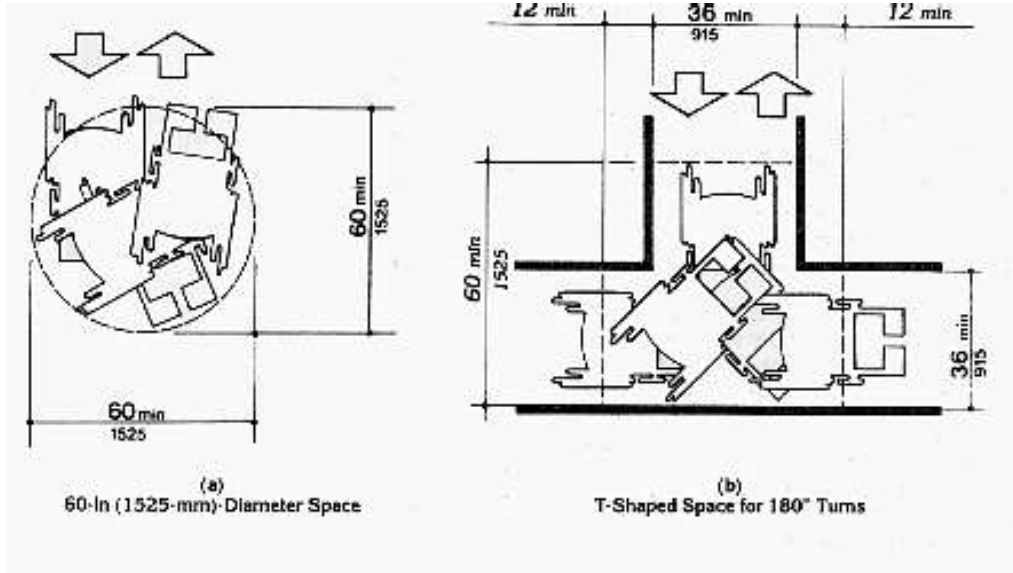
Typical parking Layout:



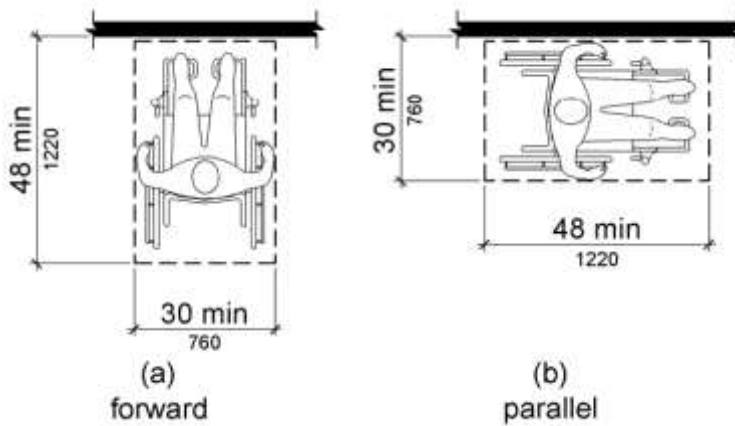
Multipurpose Hall:



**Universal Design Considerations:**



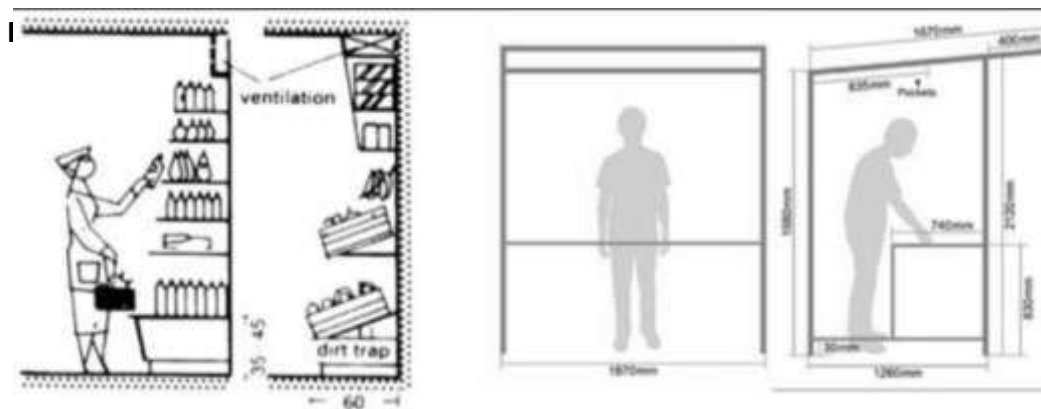
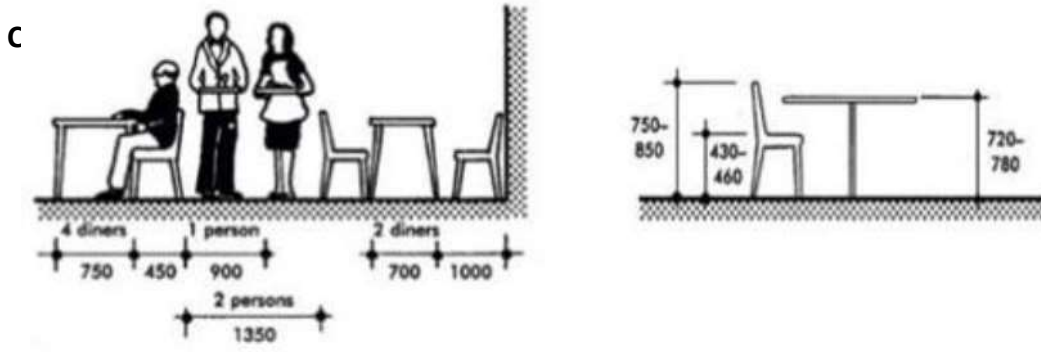
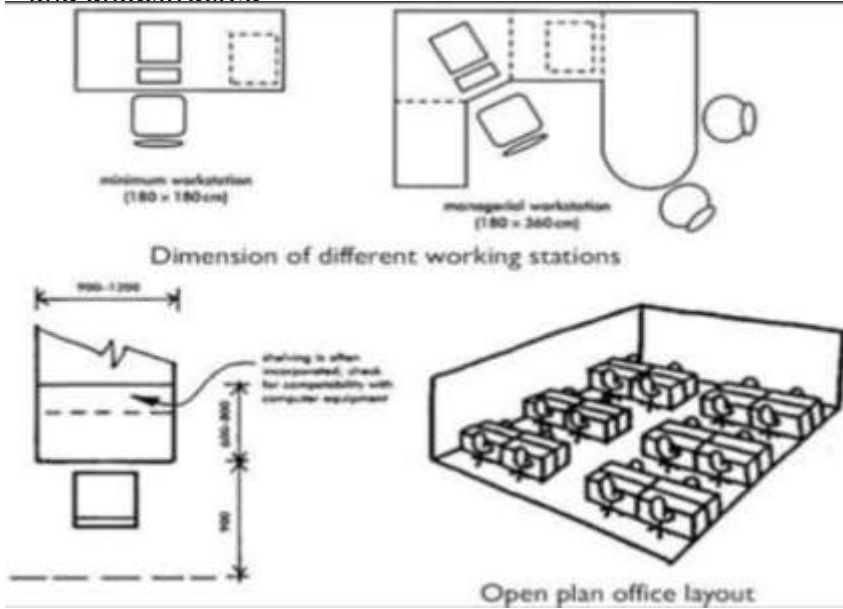
- Toe clearance: considered; space under an object 250 mm above the floor
- Knee clearance: space under an object between 250 mm – 750 mm above the floor

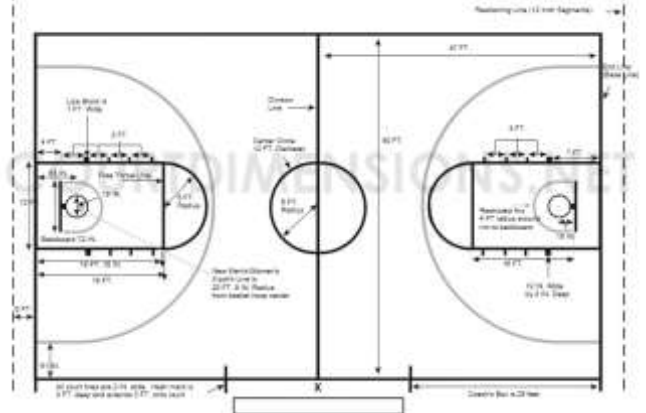
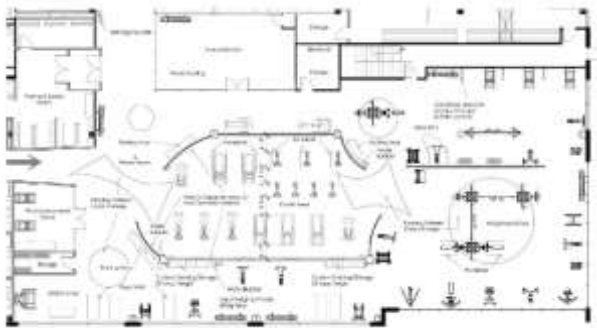
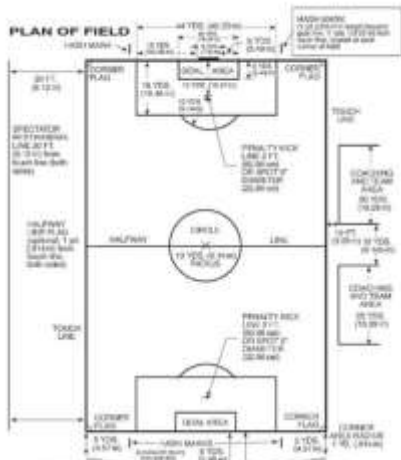
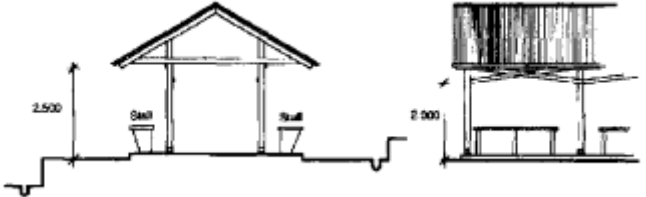
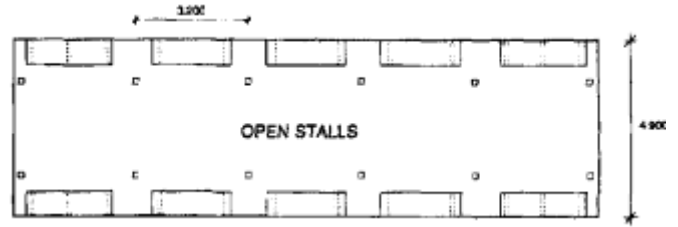
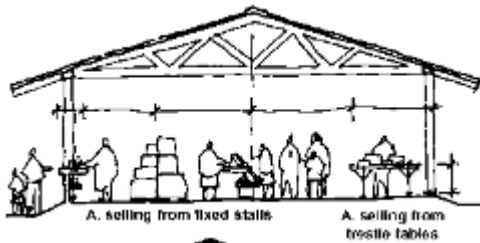


**Entrances:**

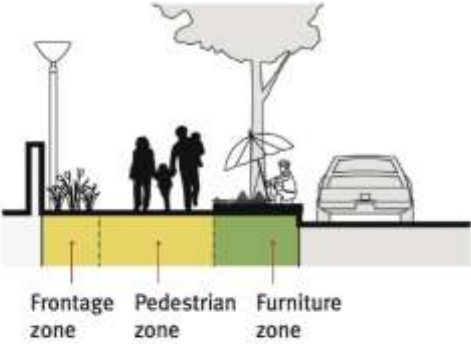
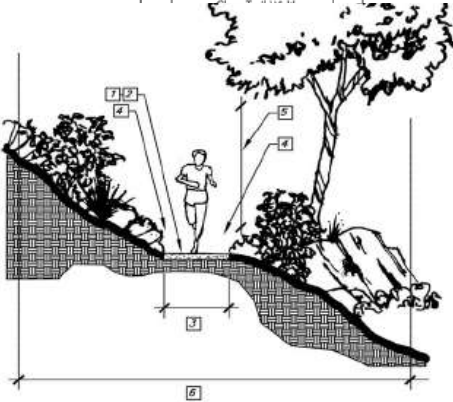
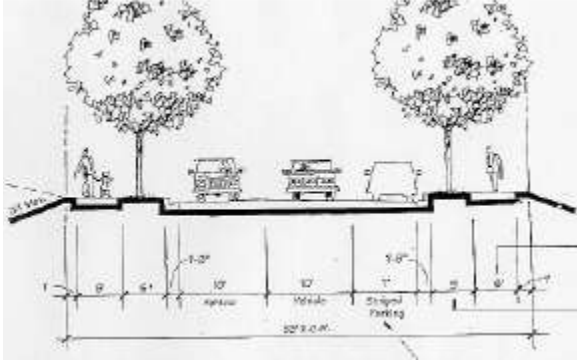
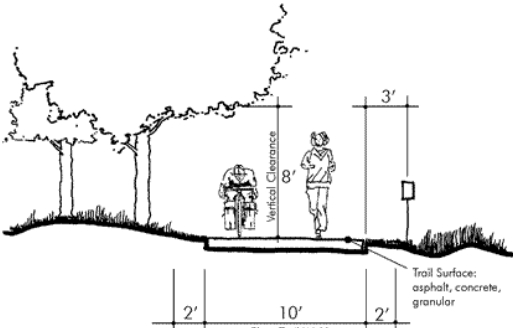
- Area immediately in front of accessible entrance at least 1500 mm x 1500 mm which did not impede wheelchairs

- Routes to reception counters, lifts, stairs and WCs should be easily visible clearly defined and unobstructed

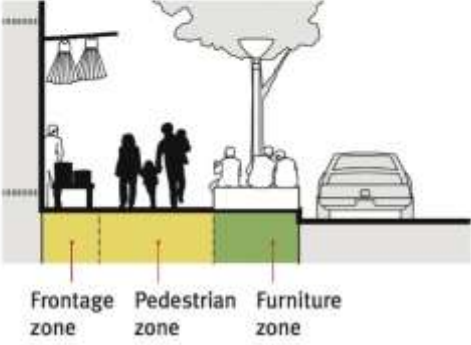
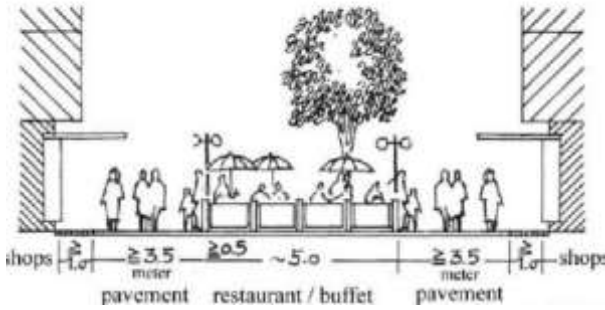








Cross Section



## 8.0 SERVICES

### Sanitary

S.N	Building	Min.Requirement (lpcd)	No. of people	Total demand
1.	Administration	45	20	900
2.	Multipurpose Hall	20	300	6000
3.	Restaurant	40	200	8000
4.	Seasonal Market	30	200	6000
5.	Public toilet	10	200	2000
	<b>Total</b>			<b>22900</b>

Table 8-1 Sanitary

#### Septic tank:

Quantity of waste water = 75-80% of water consumed = 18320 liters/day

No of septic tank= 2

Quantity of waste water in each septic tank = 18320/2 = 9160 l/day

Now,

Detention period = 3days

Total quantity of waste water in 3 days = 27480 liters = 27.48 cu. m

Volume of sludge = 125 x 0.03 x3 = 11.25 = 37.75 (for 3 years)

Required size of each septic tank = 27.48 +11.25 = 38.73 cu.m.

Let height of the septic tank be 2 meters

Area of each septic tank = 38.73/2 = 19.365 sq.m.

Tentative size of each septic tank is 4.5m x 4.5m x 2m

#### Soak Pit:

Soil Infiltration (I) = 60 l/hr./ sq.m.

Area = q/I = 326/60 = 130.73 sq.m.

Now,

A = 130.73 sq.m.

$2\pi rh = 130.73$

$d\pi h = 130.73$

let,

h = 2.5m

then,

d = 15.64 = 16m

free board = 0.5m

As 5m diameter is exceeded, the area has to be divided

4 soak pits of diameter = 16/4 = 4m

height = 2.5m

## Rainwater Harvesting

Rainwater harvesting is a technique of collection and storage of rainwater at surface or in sub-surface aquifers, before it is lost on surface run off. A system of harvesting rainwater from the roof has been proposed to meet the water demands even in dry seasons, for firefighting cleaning and landscaping. The system includes catchments, conveyance system and storage tanks.

The roofs of the building can be used as catchment area for rainwater harvesting.

Total quantity of rain water (Q)= CIA

Where,

C= runoff coefficient= 0.81 (for flat cement roof)

I= intensity of rainfall= 1.54

A= catchment area

S.N.	Building	Catchment area (sq.m.)
1	Seasonal Market	2002
2	Admin Block	504
3	M.P Hall	1773
4	Restaurant	1475
<b>Total</b>		<b>5754</b>

*Table 8-2 Rainwater Harvesting*

Catchment area of the roof = 5754 sq.m.

Annual Rainwater Harvesting Potential = 7325.98 cu.m.

The BS 8515 2009 states that, the capacity of the rainwater harvesting storage tank must be at least of 5% of the annual rainwater yield.

Thus, the tank capacity of the rainwater tank = 0.05 x 7325.98= 366.29 cu.m.

Therefore, 4 rainwater tanks of 90 cu.m. each are required to collect surface runoff.

### 9.0 Model Photos



Figure 9.1 Model Photos

## 10.0 Conclusion

In conclusion, this thesis project has demonstrated the transformative power of urban development and design. Through careful planning, collaboration, and innovative strategies, the project can revitalize the waterfront area, creating a vibrant and dynamic space that meets the needs and aspirations of the community.

One of the key achievements of the project can be integration of various elements that have enhanced the overall appeal and functionality of the waterfront. By incorporating green spaces, pedestrian-friendly pathways, recreational areas, and cultural amenities, the project has created a well-rounded environment that caters to diverse interests and activities.

The project's success can also be attributed to its sustainable approach. By implementing eco-friendly design principles, such as using renewable energy sources, promoting water conservation, and prioritizing use of bicycles, the waterfront has become an exemplary model of environmentally conscious development. This not only benefits the immediate community but also contributes to the larger goal of creating more sustainable and resilient cities.

Furthermore, the waterfront thesis project has fostered a sense of community and social cohesion. The inclusion of public gathering spaces, community centers, and opportunities for cultural expression has encouraged interaction and engagement among residents, fostering a sense of belonging and pride in the local area. This social aspect of the project has contributed to the overall well-being and quality of life for those living and visiting the waterfront.

Economically, the project has had a significant positive impact on the area. The revitalization of the waterfront has attracted new businesses, increased property values, and created job opportunities. The project has also become a major tourist attraction, drawing visitors from near and far, thereby generating revenue and supporting local businesses.

Overall, the success of the waterfront thesis project serves as a testament to the power of thoughtful urban design, community engagement, and sustainable practices. It stands as a shining example of how cities can transform neglected areas into vibrant, inclusive, and thriving spaces that benefit residents, visitors, and the environment alike. The project's achievements will continue to inspire future urban development efforts, ensuring that cities worldwide strive to create sustainable, people-centered spaces that enrich lives and promote a sense of belonging.

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ANNEX

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