

SEMINAR 2

ARC 502

TRANSITIONAL RENDEZVOUS, SADARGHAT

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August 2015

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CHAPTER 01

1.1 Project Brief: Dhaka is celebrating its 400th anniversary as the capital of Bengal proclaimed by the Mughal's in the early 17th century. It is a strategic decision by the Mughal's considering the economic, navigation and security potentials of the perennial river Buriganga which surrounded parts of Dhaka. Since then the civilization of Dhaka City has been developed by the bank of the Buriganga River. The history, livelihood, culture and heritage of Dhaka City have been largely shaped by this small but important river. Four hundred years later the river continues to play a very important role, since according to officials an average of 1,50,000 people use the Sadarghat launch terminal every day, one of the largest river ports in the world, for departure and arrival every day. But for hundreds of years the Buriganga has been continuously abused by unplanned urbanization and unsupervised industrialization. The onslaught of the resultant pollution has virtually killed the Buriganga. A proper riverfront and a new version of Sadarghat which is a demand for the city dwellers can also be a place for Dhaka to breathe.

1.2 Project Introduction: Like many great cities, the historic core of Dhaka is inextricably related with rivers. The city is virtually like an island framed by four rivers and it will not be an exaggeration to say that it is located amidst of the most dynamic hydrological system of the world. Our glorious past had a strong association with the river Buriganga, the dominant lifeline of Dhaka. During the 19th century and even during the beginning decades of the 20th century, the Buckland Bund was an attractive place for recreation and social gathering. People used to come here to enjoy the enchanting view of the river and relaxed ambience of the place. It was the most favorite venue for hundreds of morning walkers. Steel benches were placed at regular interval where one could sit and enjoy the cool breeze from the river. In fact, the riverfront with clean water enhanced the image of our past glorious city. The Nawab Bari (Ahsan Manjil), Rupial House, red bricked Northbrook Hall -- all these elegant structures added pride to the riverfront scenario.

But it goes without saying that once the mighty Buriganga today has lost its entire splendour.

Illegal encroachments in the shape of industries, shops and markets have choked up the precious riverfront. River water has become polluted, stinky and filthy spreading obnoxious odor. The city of Dhaka discharges about 4,500 tons of solid waste every day and most of it is released into the Buriganga. According to the Department of the Environment, 22,000 liters of toxic waste are released into the river by the tanneries every day. Experts identified nine industrial areas in and around the capital city as the primary sources of river pollution: Tongi, Tejgaon, Hazaribagh, Tarabo, Narayanganj, Savar, Gazipur, Dhaka Export Processing Zone and Ghorashal. Most of the industrial units of these areas have no sewage treatment or effluent treatment plants of their own.

More than 60,000 cubic meters of toxic waste, including textile dyeing, printing, washing and pharmaceuticals, are released into the main water bodies of Dhaka every day. According to the Dhaka Water and Sewerage Authority (WASA), about 12,000 cubic meters of untreated waste are released into the lake. The waste mostly comes from garment washing and dyeing plants. Textile industries annually discharge as much as 56 million tonnes of waste and 0.5 million tonnes of sludge. Sewage is also released into the Buriganga. A newspaper article from 2004[4] indicated that up to 80% of Dhaka's sewage was untreated.

The most unfortunate thing is that the riverfront has become completely inaccessible. No more people come here to breathe fresh air and spend some delightful hours in the late afternoon.

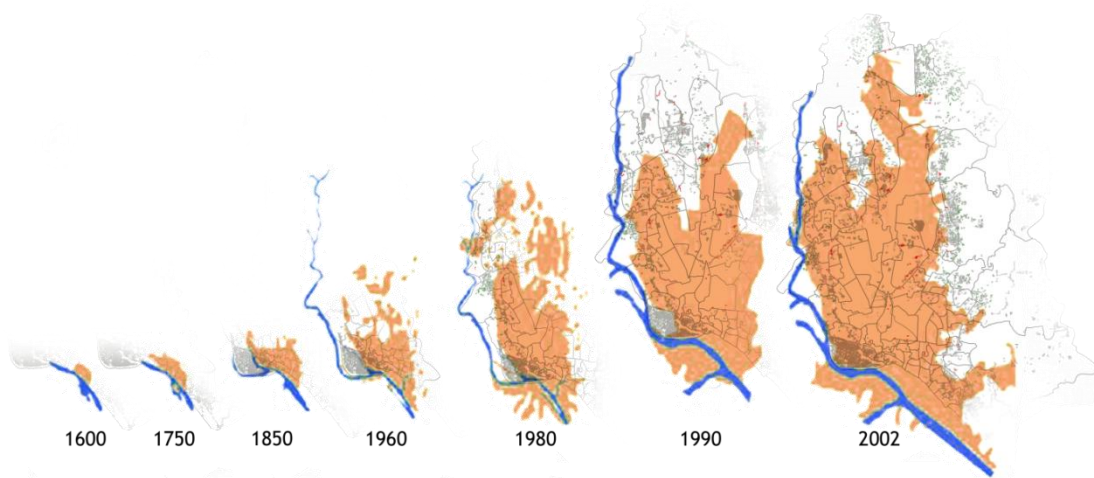


FIG: Dhaka urban growth

Rapid urbanization of Dhaka has seen the demise of open spaces. Scarcity of recreational

facilities, ever increasing haphazard economic activities, chronic urban problems like traffic congestion have made the life here more and more hard and hectic day by day. Isolation of inhabitants from nature has limited the desire and capability to take care of their mental and social development as well. In this circumstance, when Dhaka is desperately seeking natural environment, revival of riverfronts can bring an array of benefits for us to improve the quality of urban life. People always feel strong ties to rivers.

Rivers span around 110 km of our capital city. But most the places are presently inaccessible. Riverfront should be physically, visually, conceptually made accessible. Initiatives have to be taken to create pedestrian and bi-cycle friendly communities and to develop the places as outdoor recreation destinations. We have opportunities to create social and cultural attraction along the riverfront. There are still some dominant historic buildings along the riverfront of the Buriganga. Most of them are dilapidated and in poor physical state. But not gone forever. Still today, these edifices bear the sign of the identity and heritage of our city. Conservation of these buildings can be a way how we can create both attractive and historic community spaces along the riverfront.

And again Sadarghat River Boat Terminal is one of the largest river ports in the world. About 300 large and small passenger river boats (motorized) depart and arrive with an average of 500 passengers every hour at the terminal every day. 1,50,000 people, in average, use the terminal every day. So naturally, causing such population to the site, Sadarghat has a great impact on the site. Redesigning the current terminal is another aim as it is interrelated with the riverfront and the river.

1.3: Aims and Objectives of the Project:

- Create a breathing space for the people of Dhaka
- Redesign the terminal 'sadarghat' with its proper connection to the main city
- Save the river Buriganga environmentally, visually by the design itself
- Create some entertainment area and some green chunks within the riverfront as they both lack there.
- Create a common ground for the people to enjoy and celebrate

1.4: Programme: The following programmes have been derived by studying the demand

of the people and relating with other existing riverfront projects around the world considering our culture, people and context:

- Redesign sadarghat launch terminal
- Reorganize the traffic system of the surrounding area
- Community gathering area alongside the river, like: public plaza, walkways, seating arrangements, amphitheatres etc.
- Entertainment and recreational zones
- Small green parks

Chapter 2:

Site Appraisal:

Sadarghat Port the Dhaka City River Front, located in the southern part of Dhaka, on the river Buriganga, is one of the most dynamic places in Dhaka. Here, the Sadarghat River Boat Terminal is one of the largest river ports in the world. About 300 large and small passenger river boats (motorized) depart and arrive with an average of 500 passengers every hour at the terminal every day. According to the officials at the terminal, 1, 50,000 people, in average, use the terminal for departure and arrival every day. At this place hundreds of country boats laden with passengers and merchandise cross the river.

Sadarghat port formally or informally has always been throughout the evolution of Dhaka as a city. It always has been playing a very important role in connecting the city with the whole country. Till now it's a place where thousands of people come not only for transition through it but also it has become a source of countless socio economic activities which directly or indirectly influenced the urban morpho sis old dhaka has. Its impact in the urban fabric is not only as an transitional hub but a center of various activities generated from or linked with Sadqarghat. Specially the Arot's or warehouses, markets, hotels, retail shops, and many more around the riverfront.

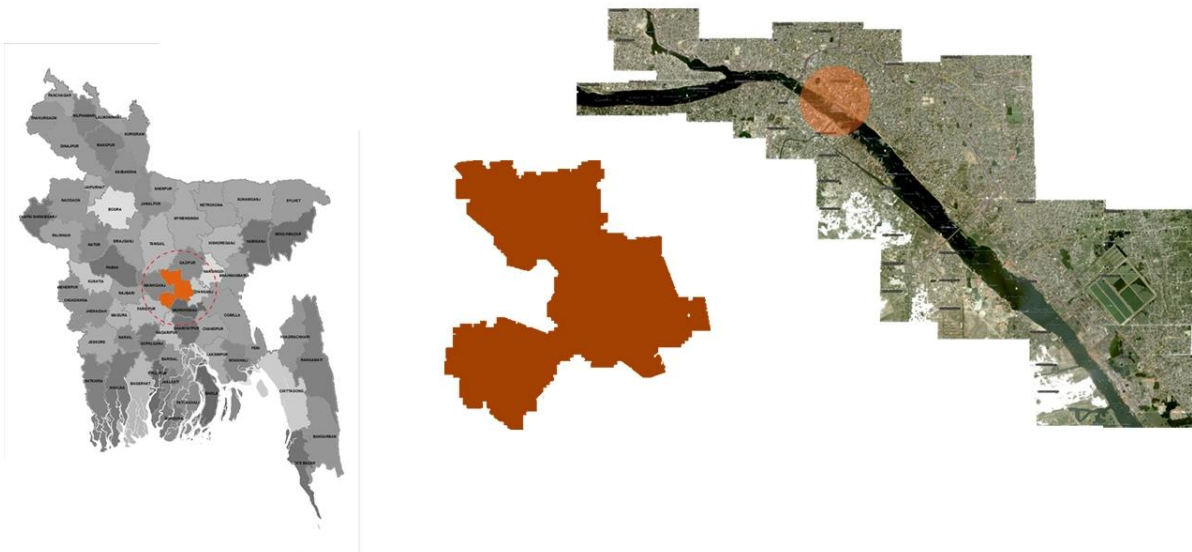


fig: Site Location

2.2. Existing Site Analysis (Macro):

There are many important and influential structures around the site, some of them historically built along the riverfront and some of them were added later. But every single structure has its impact on the site and Sadarghat has its impact on them too.

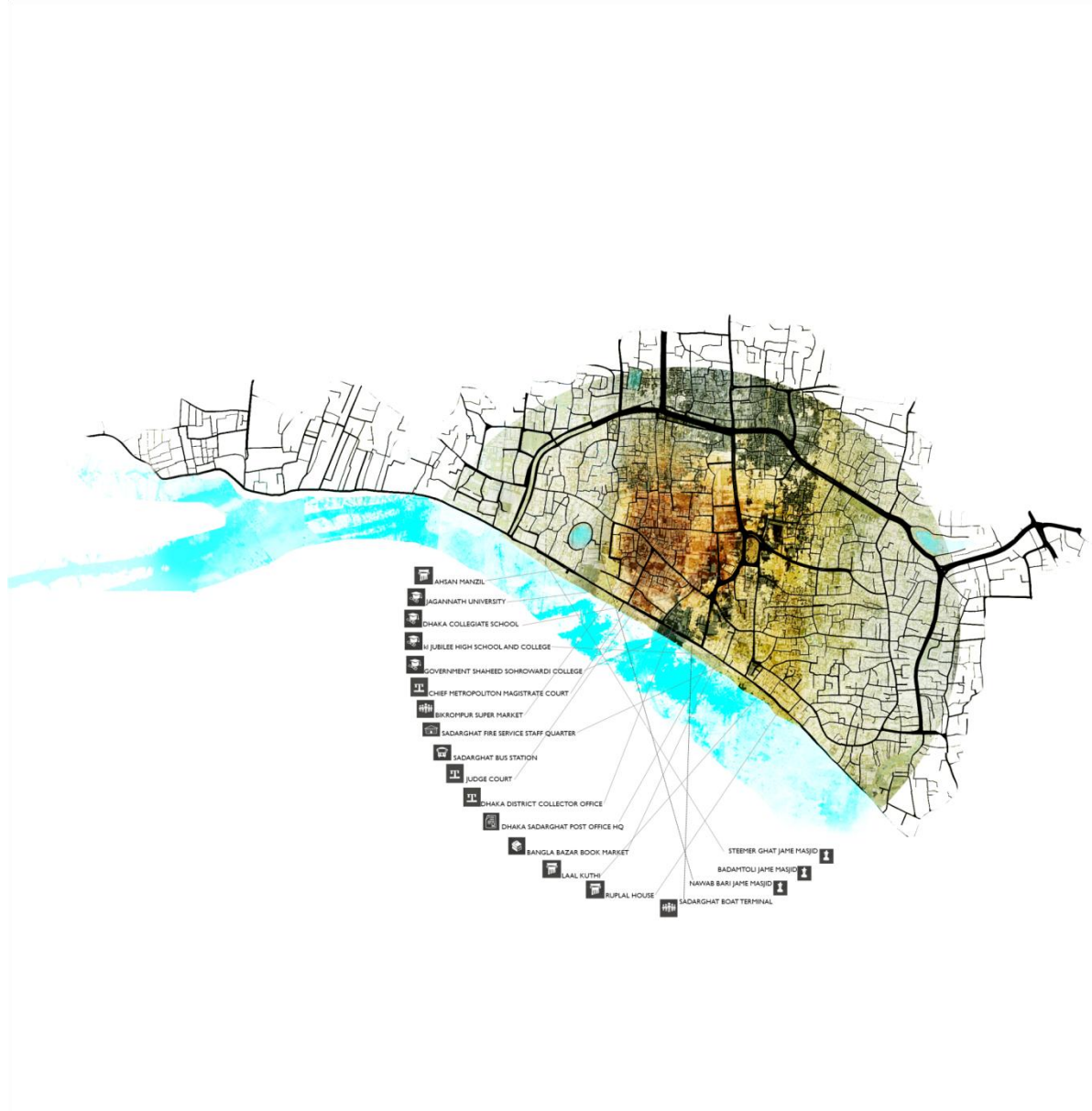


fig: Important structures surrounding the site

Solid Void Land use pattern: There is a dense development surrounding the riverfront, a lot of commercial structure and a very few open space

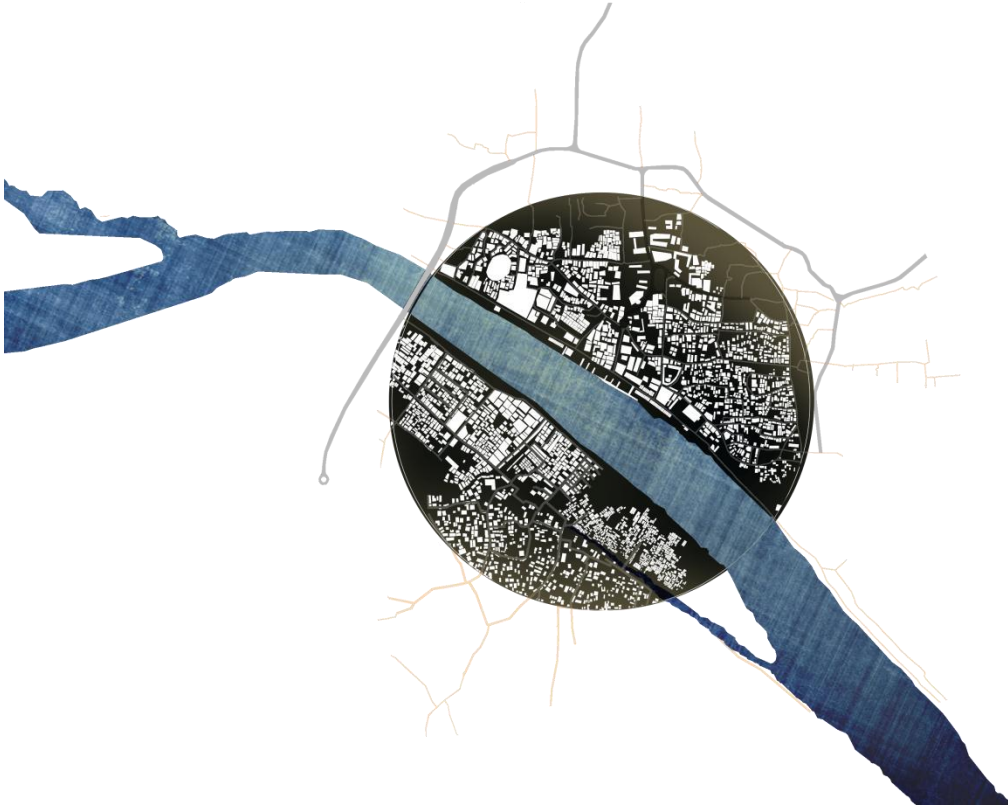


fig: Solid Void map

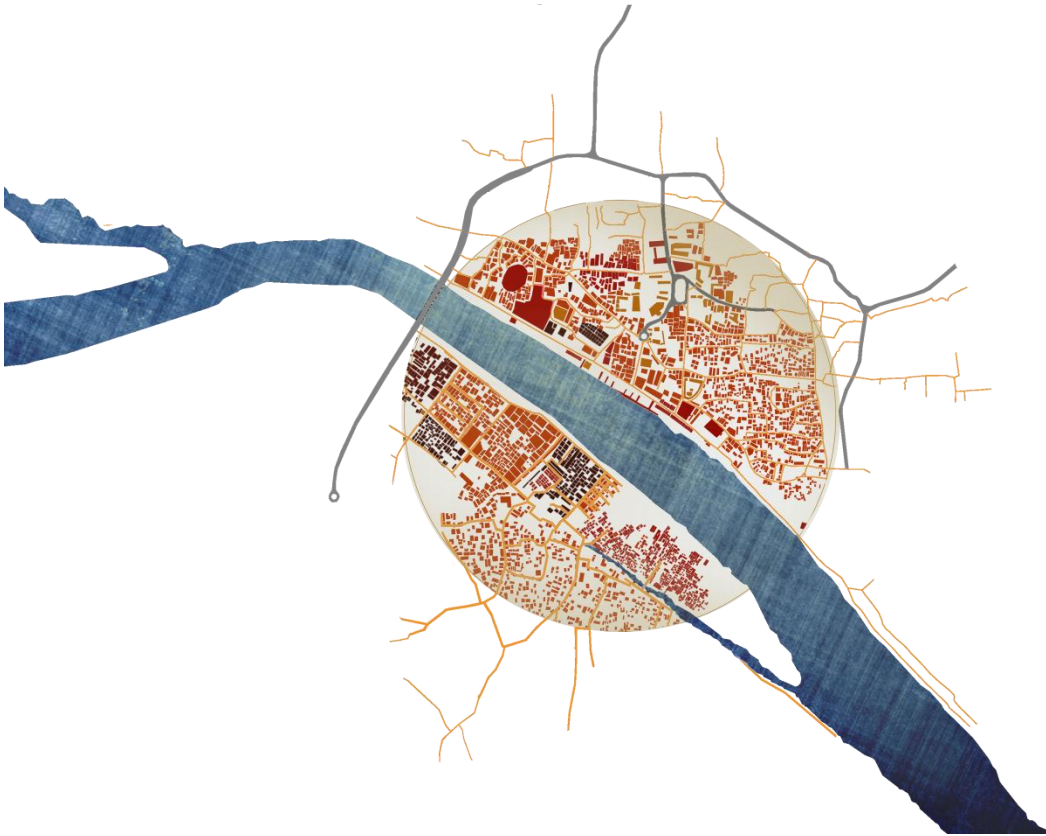


fig: Land use Pattern

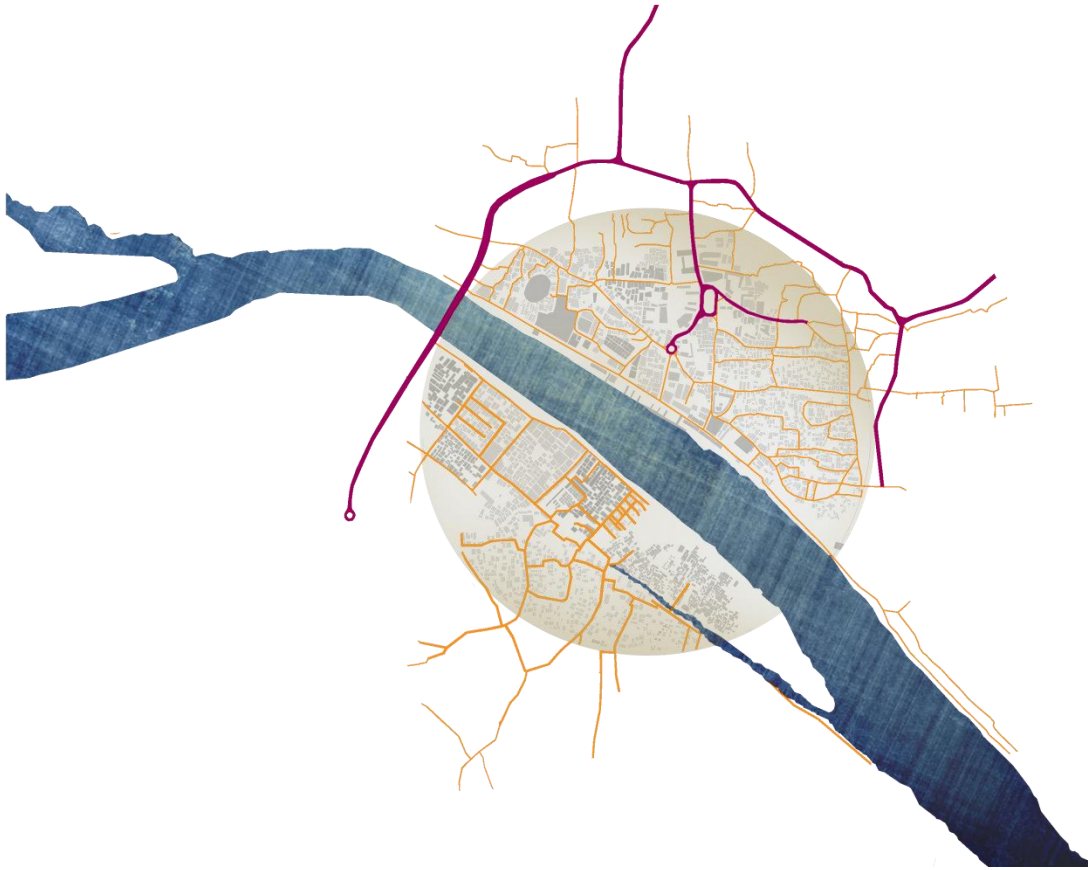


fig: road network

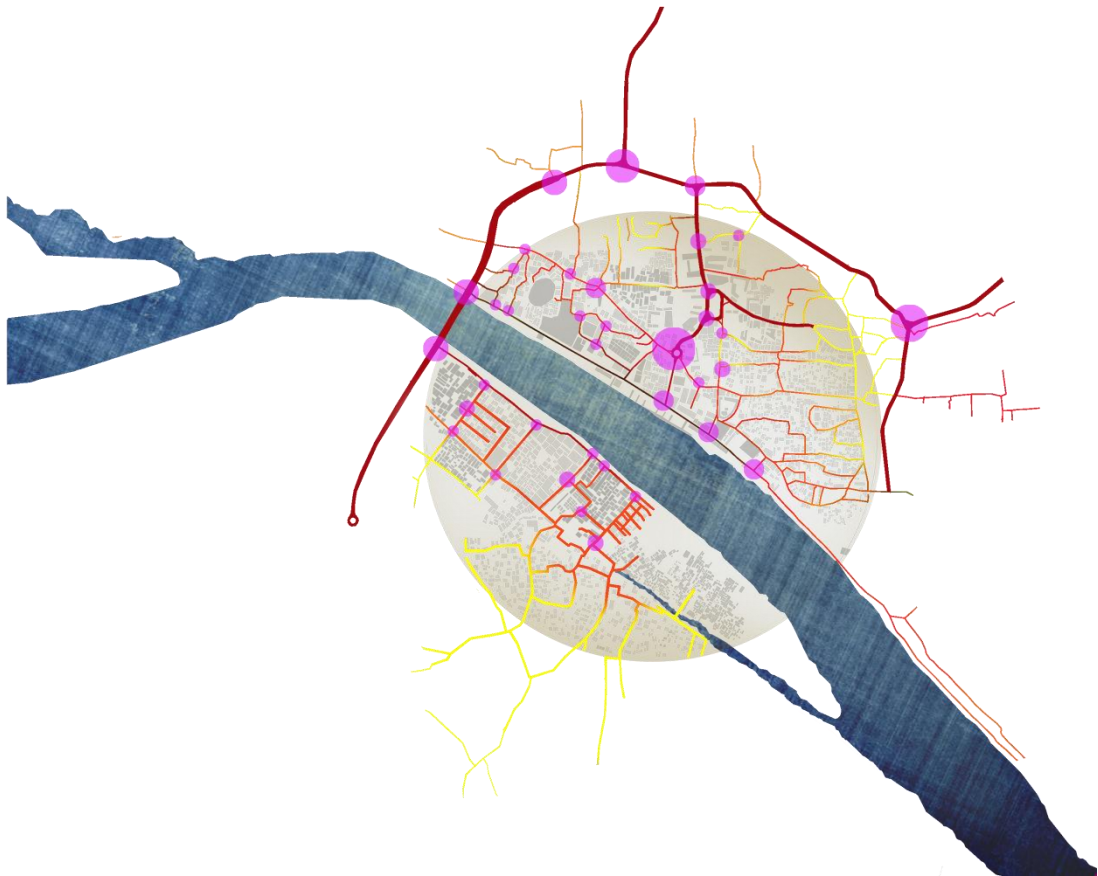


fig: Traffic congestion and road pressur

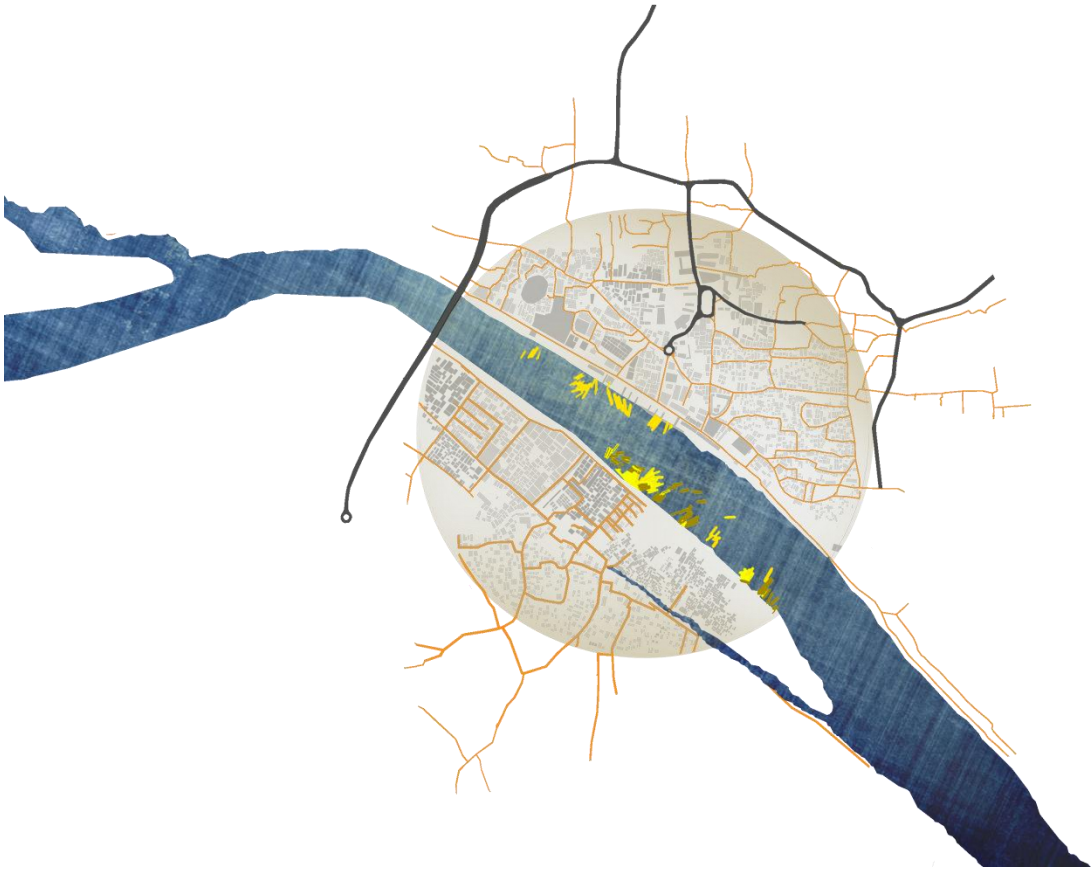


fig: water vessel pattern



fig: Water congestion Pattern



fig: open/ green space

The site and its surrounding has a very few amount of open/ green space, much less than required. The highly dense area does rarely have any open/ recreational space or even a place to breathe. Which was once a recreational or breathing destination of Dhaka.

2.3. Site analysis (Micro):



fig: Figure- ground map

Focusing on sadarghat and its surroundings which has direct impact on sadarghat and the area there are a lot of issues to be considered.



fig: View of the riverfront and Sadarghat Launch Terminal from Keraniganj



fig: Both sides of the riverbanks



fig: Sadarghat Launch Terminal pontun



fig: Babubazar Bridge connecting old Dhaka with Keraniganj



fig: View from top of the bridge



fig: Loading unloading along the riverfront blocking the road



fig: Terminal pontun when off pick hours



fig: Country boats around Sadarghat landing on informal ghats



fig: Road in front of Sadarghat heavily occupied with Arots and bazaars



fig: Loading unloading, And selling on the Sadarghat terminal road

2.4. Environmental and Climatic considerations:

The most influencing physical object in the site is the River Buriganga. However it is also the major reason behind the establishment of these settlements. Mobilization on this area is mainly occurring through the river. So settlement of the both side highly depend on this river.

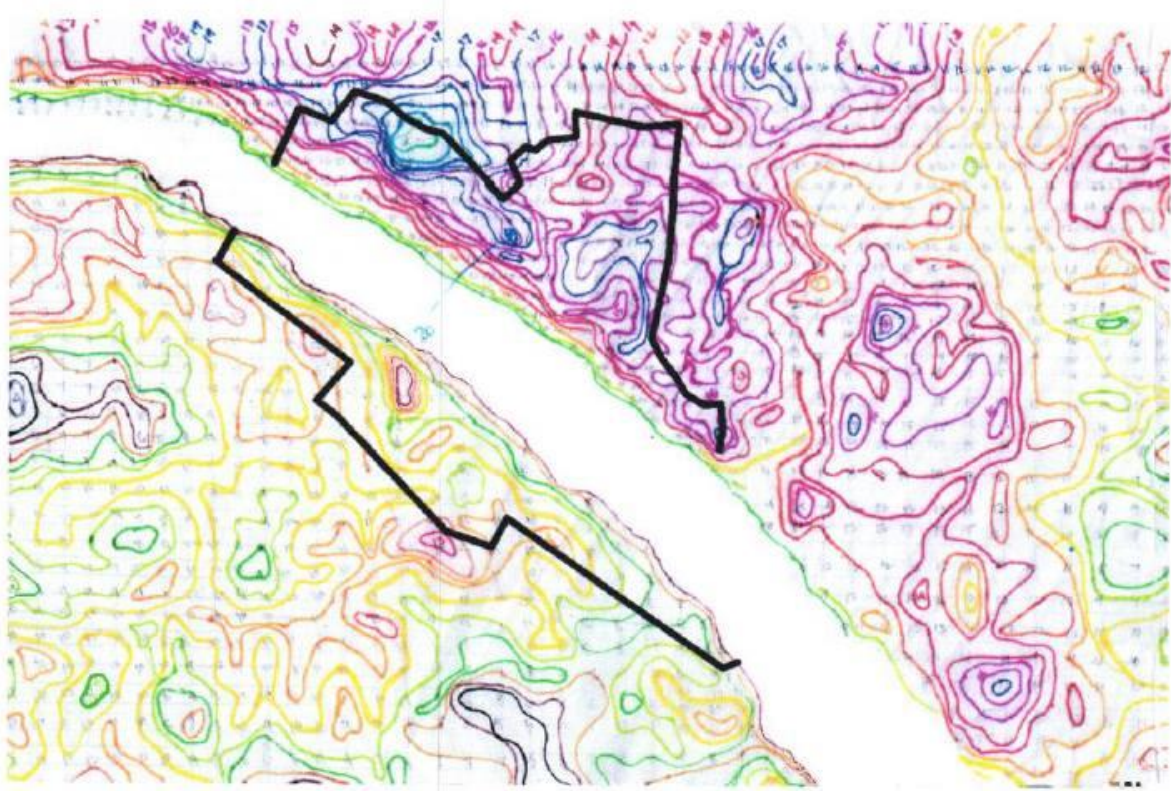


fig: Contour map

In the distant past, a course of the Ganges river used to reach the Bay of Bengal through the Dhaleshwari river. When this course gradually shifted and ultimately lost its link with the main channel of the Ganges it was renamed the Buriganga. It is said that the water levels during high and very high tides in this river astonished the Mughals. In the 20th century the water table and river became polluted by polythenes and other hazardous substances from demolished buildings near the river banks. The course of the Padma, as the main course of the Ganges is known in Bangladesh, changed considerably during the period 1600 to 2000 AD. It is difficult to trace accurately the various channels through which it flowed, but the probability is that it flowed past Rampur Boalia, through Chalan Beel, the Dhaleshwari and Buriganga rivers, past Dhaka into the Meghna estuary. In the 18th century, the lower course of the river flowed further south. About the middle of the 19th century the main volume of the channel flowed through this southern channel, which came to be known as Kirtinasa.

Gradually the Padma adopted its present course.

Pollution Data of Buriganga:

Severe pollution has reduced the river Buriganga into a 'dumping drain' of toxic refuse, threatening millions of people living on its banks with serious health hazards and a loss of their livelihoods. That the river is dying is clearly evident from its stench. The highly toxic waters release a 'gas' that starts irritating the nostrils and throat as soon as humans breathe it. Its foul odors can be smelled from as far away as half a kilometer.

All industrial, municipal (700-1100 tonnes daily) and urban wastes of Dhaka city (population 1989 about 6.5 million and expected to grow in year 2000 to 11.1 million) are flushed into the Buriganga River. It is estimated that total organic waste load discharged into the river will be around 250 metric tonnes per day (Reazuddin, 1994). The following description of Hazaribagh leather industry explains the present status of industrial pollution in Bangladesh:

- pH , 4-10
- Total alkalinity as CaCO₃ , mg/l670-1850
- Electrical conductivity..... 670-2200 (Micromhos/cms)
- Chloride, mg/l1300-5000
- Chromium, mg/l3-36
- COD, mg/l3200-21000
- BOD,mg/l.....200-650
- DO,mg/l.....0.8-5
- Ammonia nitrogen, mg/l..... 12-1970

2.5. SWOT analysis:

2.5.1 Strength

- The site is already a very vibrant space connecting people throughout the country and collecting goods from throughout the country.
- Hub of transportation facility
- Significant Historical structures surrounding the site
- A mixture of multidimensional and dynamic activities
- several forces already working on the site
- multi use of space in different times

2.5.2. Weakness

- already over crowded
- high pressure on every space , much more than it's capability
- Multiple functions overlapping one another and disturbing each others functionality
- Narrow roads insufficient for such heavy multimodal transportation hub and other commercial activities
- Heavily polluted Environment

2.5.3: Opportunities:

- Opportunity to have a multifunctional vibrant space or a meeting place
- to get a breathing space addressing the riverfront as well with the terminal as both of them are interrelated
- to incorporate other related public functions to serve the city dwellers

2.5.4 Threat:

- Managing the huge traffic load on Pick hours through the narrow roads
- dealing with the extremely polluted riverfront

Chapter 3: Literature Review

3.1. Transition – an in between state, in Architecture defined as the connecting space between two confined spaces. Transitional spaces are defined as spaces located in-between outdoor and indoor environments acting as both buffer space and physical link.

There is hierarchy of transition spaces in any urban planning like City level, Town level, District level, Local level. The entire road network is a transition mode. Then interaction spaces, gathering spaces, urban corridors, plazas standstill again as transition spaces in their own way. Urban nodes can also be referred as transition space at macro level.

Transition spaces play a vital role in Environmental Behavior. It is the study that covers relationship between human behavior and properties of urban places, the study of the mutual interactions among people, social groups, culture and the physical environment at all scales from interior architecture to regional planning, with applications to improve the quality of life through improved environmental policy, planning and design.

All urban situations have conditions where the buildings create planned or unplanned in-between spaces which eventually become a part of the civic landscape. The quality of life in these spaces is directly affected by the way it is designed, conceived, constructed and used. The way a space is used cannot be controlled as it mutates socially over time however the architecture of the space remains in its elements, form, material, details, joints and colors. When an urban transition occurs, there is a formation of a threshold. These thresholds span various urban scales. When residential and commercial uses combine and coincide, there are several transitions and resultant thresholds which are naturally and artificially formed. A THRESHOLD: “The floor or ground at the bottom of a doorway, considered as the entrance to a building or room” . “A transitional interval beyond which some new action or different state of affairs is likely to begin or occur.” A doorsill. The place or point of beginning; the outset. The built space can have blurred ambiguous contours, random and vague forms, inside and outside forms could merge and new flexible thresholds can occur. These spaces between the built, have evolved over time, often into an integral part of the city’s urban space. In effect, these in betweens can be seen as thresholds spanning urban transitions. The way a space is used cannot be controlled as it socially mutates and changes over time however the architecture of a space can help the way it is used in its elements, form, material, details, joints and colors.

Rendezvous- Rendezvous is a meeting or appointment to meet at a specified time and place

It's a place where people meet. It defines A meeting at an agreed time and place:

Rendezvous is an architecture for creating synchronous multi-user applications. It consists of two parts: a run-time architecture for managing the multi-user session and a start-up architecture for managing the network connectivity. The run-time architecture is based on a User Interface Management System called MEL, which is a language extension to Common Lisp providing support for graphics operations, object-oriented programming, and constraints. Constraints are used to manage three dimensions of sharing: sharing of underlying information, sharing of views, and sharing of access. The start-up architecture decouples invoking and joining an application so that not all users need be known when the application is started.

So Transitional Rendezvous refers to a meeting place in between. , a place where people meet and go through but which has a lot to offer for the people going through

3.2. Waterfront and Breathing space:

"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 of its aspects - economic, social, and cultural". Remaking the Urban Waterfront, the Urban Land Institute (Seattle Department of Planning and Design, 2012)

Water is a defining force that fundamentally shapes the character of each place it touches. The role of water in transport, industry, sanitation and nourishment made it the raison d'etre of human settlement. It is a feature to be honored and celebrated – not to be treated merely as cosmetic or as just a commodity.

Waterfronts, the unique places where land and water meet, are a finite resource embodying

the special history and character of each community. Urban waterfronts, like the cities they help define, are dynamic places. The last three decades have witnessed profound changes along abandoned or underused waterfronts. The trend is accelerating in cities around the globe. It applies to canals, lakes and rivers as well as coasts.

With this growing popularity comes a tendency by some to look for the quick solution, to adopt a formula that may have worked somewhere else. In the 1980's it was the "festival marketplace" fad. In the 1990's, it is the "urban entertainment district" and/or stadiums. In a time of pervading sameness and homogenization worldwide this is particularly dismaying because waterfronts above all factors give each community a chance to express its individuality and help distinguish it from others.

We, the undersigned, urge careful consideration of the following principles. They are offered in the spirit of encouraging communities to aim for distinctiveness as they undertake the challenge of converting or conserving their waterfront resources.

3.3. Waterfronts and urban waterfronts definitions:

The word meaning of waterfront get through as "the part of a town or city adjoining a river, lake, harbour, etc." in the Oxford American Dictionary of Current English in English Dictionaries and Thesauruses (Dong, 2004). Moretti (2008), the word "waterfront" means "the urban area in direct contact with water". According to the author, waterfront areas usually is occupied by port infrastructures and port activities. Yasin et al. (2010) indicated that waterfront is defined generally as the area of interaction between urban development and the water. Hou (2009), described the waterfront area as the conflux area of water and land. Although the vocable of waterfront is clear, also it has been met using some different words instead of the term waterfront in the literature. Hoyle (2002), Hussein (2006); Mann (1973), Tunbridge and Ashworth, (1992), Vallentine (1991) and Watson (1986), these words are a city port, harbourfront, riverside, river edge, water edge and riverfront (Dong, 2004; Yassin et al., 2012). Breen and Rigby (1994), Sairinen and Kumpulainen (2006) and Morena (2012) imply the same thing with waterfront and urban waterfront. According to these, waterfront identifies the water's edge in cities and towns or urban area of all sizes. The water body may be "a river, lake, ocean, bay, creek or canal" or (e.g. in Shaziman et al., 2010) artificial.

3.4. The effects of water as a planning element in urban area:

The balance is established between nature and social life for a sustainable development of cities. Urban natural water elements play an important role in the establishment of this balance. Water is the most important planning element which is comfort of human physical and psychological. In addition, it brings existing environment in a number of features in term of aesthetic and functional (Figure1) (Onen, 2007). One reason for the importance of natural water source in urban area is aesthetic effects whose creates on human. This effects are visual, auidal, tactual and psychological effects. The primarily power of attracted people on waterfronts is visual landscape effects of water on relaxation. Throughout, designs related to water takes over motion and serenity factors. Moving water (Figure 2a) (waterfall, cascade rivers and etc.) adds vibrancy and excitement to a space. Stagnant water (Figure 2b) creates the mirror effect in its space as a visual (Onen, 2007). Aksulu (2001), water is used commonly as reflection element by means of the optical properties. Wide and quiet water surfaces bring in serenity and deepness to its surroundingor a space. Beside deepness effect of water gives more widening feeling of in living area. Also, the various light games is formed on this surface (Hattapoglu, 2004).

3.5. Urban waterfronts categories: According to Wrenn et al. (1983), urban waterfronts have been distinguished five categories to location with water. Explained below the first two line symbolize coastal cities and the latter three line symbolize inland ones (Al Ansari, 2009). a. Urban area located on peninsula, b. Urban area located on a bay, c. Urban area located on banks of a river, d. Urban area located on banks of intersecting rivers, e. Urban area located on a large body of water. Wrenn et at. (1983), regardless of that separation, the shoreline shape is a major influence on how the location of the city in reference to the water impacts the city-water links. Cities which are located on peninsulas, headlands or small islands benefit from longer waterfronts at a short distance from the city centre. The same could be said of cities located on the banks of intersecting rivers, estuaries and deltas. They have many long waterfronts, which increases the chance of public spaces located on the waterfront and also of these being connected to other hinterland public spaces (Al Ansari 2009).

3.6. Urban waterfronts features:

Akkose (2007), three factors are more important in forming the cities. The first of these is the natural structure of the city, the second of these is physical structure of the city, and the other one is social structure of the city. These three factors constitute system of the city in interaction with each other. In the natural structure of the city, the water element of presence or absence influences the process and the image of the city. Water resources such as sea, river or lake are added value in different ways. According to Dong (2004), Yassin et al. (2010) and Seattle Department of Planning and Design (2012), certain features of waterfront are represented to below:

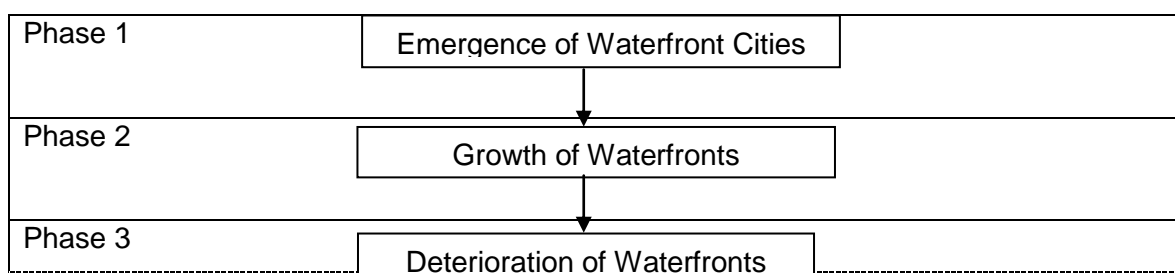
- 174 Advances in Landscape Architecture
- It is become an urbanized area, a important land,
- Water and land are the two essential elements of waterfront, so this area an aquatic and terrestrial features,
- The "water" may be a river, lake or sea,
- It has uncertain spatial boundaries and dimensions which change from place to place,
- The waterfront area may be a historical port area or urban area for other usages close to water,
- An essential structure of mixed land uses characterizes this essential area of the city,
- It supplies opportunity for interaction between human settlement and nature and water,
- As an edge environment, it is a dynamic place which changes biological, chemical and geological character,
- It is a special area because of being productive and biologically diverse ecosystems,
- It is a natural defense area for flooding, erosion with plant cover,
- The waterfront area is a pollution moderator.

3.7. Waterfront development:

Dong (2004), indicated that the meaning of the waterfront development has different in terms of understandings. Also he/she emphasized that the content of waterfront development varies greatly with respect to the characteristics of sites and cities. For example, in Japan urban waterfront development is one of the interrelated three water

related development concepts. Its location is between waterside and coastal development. Also, these development levels are comen up different field. In here, waterfront development is evaluated urban planning field. According to Morena (2011), "the urban waterfront development is widely regarded as a frontier on contemporary urban development, attracting investment and publicity. Sydney, London, Amsterdam, Hong Kong, Tokyo, Toronto, Osaka, Kobe and Dublin are examples of cities developed through the waterfront development process ", Yassin et al. (2012), defined ideally as "a development directly fronting on water for any purposes and the water components can include river delta, coastal plains, wetlands, beached and dunes, lagoon, and other water features". Beside, the boundary of where the water and land meet is difficult to determine and this boundary usually differ the laws and the administration of the countries. Wrenn (1983), the waterfront development stimulated modern development in the cities.

3.8. Typical pattern of waterfront development: Throughout history, waterfronts are the most ideal living area for human being to be able to provide food, settling, reproduction, defense and learning etc. So, the many cities or towns are established water's edge from the history of civilization to until today. Uruk, Erudu, Ur and Babylon are an examples for early settlement about 6000 years ago (Hamamcoglu, 2005; Morena 2011). In case nowadays, the many cities or towns in China, England, Italy and America can be given as an examples of waterfront settlement (Zhang, 2002). Urban waterfronts have historically been the hub of transportation, trade and commerce (Letourneur, 1993). Rafferty and Holst (2004), they are always connected with close by means of reflecting immediately any change in social, economic, industrial environmental. Historically, waterfronts aren't planed carefully and consistently. Growth had been increasing and disconnected as a result, synthesis of numerous enterprise, activities and decisions of political authority. Thus, every urban waterfront has its special history (Akkose, 2007). Figure 5. Adapted from Wrenn et al. (1983), typical pattern of waterfront development phases Wrenn et al. (1983), indicated the historical evolution of waterfront into four periods (Figure 5). These are explained briefly as follows:



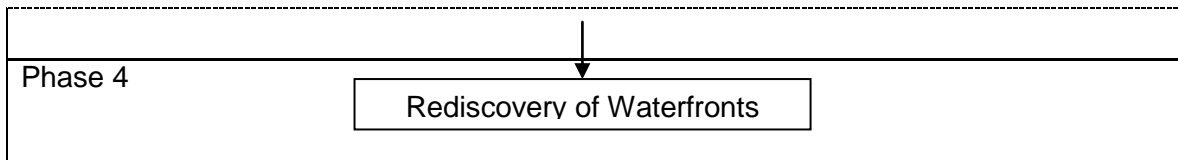


Figure. Adapted from Wrenn et al. (1983), typical pattern of waterfront development phases

3.8 Revitalizing the Waterfront: A thriving and active waterfront has been a common thread for great cities and urban centers, though the relationship of cities with their waterfront has undergone a series of transformations. In the industrial era, manufacturing and maritime activities such as shipyards, warehouses, and heavy industries dominated properties along the water, which served as an important transportation corridor. Today, in the post-industrial era, many cities are realizing the potential of reinventing waterfront properties.

In a webinar on January 10 hosted by the World Bank's South Asia Urbanization Flagship Project in collaboration with the East Asia and Pacific urban team, speakers and participants from around the globe discussed challenges, strategies, and successful practices in waterfront redevelopment through a series of case studies. Five essential ingredients emerged:

1. A strong vision generates a sustainable impetus for development. Urban development initiatives often stretch over decades. Therefore, it is important that the guiding vision is inspiring, adaptable, and dynamic to continue to sustain interest from the community, private sector, and political representatives. Richard Marshall of Perkins+Will emphasized reinforcing the power of place to reposition cities like Shanghai globally, along with a realistic development timeframe, often over two or three decades, as in the case of Abandoibarra, Spain, which took 30 years to develop the Guggenheim Museum.

2. Institutional autonomy, resilient to political changes, is vital for fruition of development initiatives. Project plans often get derailed due to uncertain political outlook or changes in bureaucratic institutions. Cities such as New York (Battery Park City Authority), Melbourne (Docklands Authority), and Sydney (Sydney Harbour Foreshore Authority), among many others, created separate entities which were given significant control over land, asset management, financing, and development programming. Bonnie Harken of Nautilus International Development Consulting illustrated advantages of an independent Battery Park City Authority (BPCA), a public benefit corporation, successful in undertaking development over five decades across changing administrations.

3. Land use planning with mixed-uses creates long-term viability and quality of place.

Inappropriate and incompatible land uses along waterfronts are missed opportunities leading to large revenue loss to any local municipality. Most renowned waterfront areas represent 24X7 uses -- a combination of office space, business centers, institutions, and community centers, which generate activity during the day, and retail, recreational and residential uses, which come to life in the evening. Waterfront developments also provide unique opportunity to showcase the maritime industrial past. In Gantry Plaza State Park of New York City, historic gantries have been incorporated into a four-hectare publicly accessible waterfront esplanade, which is part of a 30-hectare mixed-use development on a previously industrial site.

4. An inclusive stakeholder engagement in the development process is crucial.

One of the main challenges of waterfront development is displacement of existing population and businesses from the project area. It is imperative to include these stakeholders early on in the planning and design of the future proposal. Michael Grove of Sasaki Associates described outreach efforts, during the visioning process of Fuxing Island Development in Shanghai, with academic institutions, young professionals, industry experts, medical suppliers, private developers, and government. The discussions provided insights into the market demand, for instance, from university campuses seeking new land for expansion beyond the city core or young entrepreneurs needing business incubators. Early engagements with stakeholders allow practitioners to target relevant employment sectors and incorporate affordable housing in land use programming.

5. Public-private partnership has often paved the way for successful implementation.

Public institutions face limitations in terms of financial and institutional capacity, human resource constraints and competing priorities. The potential to transform waterfront properties from low-value real estate into highly visible profitable development venture tends to attract the private sector. Cities could effectively use the private sector to lead the way in multiple areas-market analysis, land use assessment, financing, or operations. For example, BPCA uses a private developer to operate and maintain leased parcels. This partnership generates annual profits to the tune of \$100 million.

In South Asia, reinventing and repurposing properties along waterfronts of rivers, canals, and bays presents enormous social and economic opportunities. Most countries in the

region have strong cultural, religious, and social ties to water. Improving urbanization and access along this natural asset through effective land management, strategic partnerships with stakeholders, and projects sensitive to local communities, could elevate these currently decrepit areas into regional and global growth nodes.

3.9. Benefits and risks of urban waterfront regeneration:

Urban waterfront regeneration, which is phenomenon in global dimension, have a social, economic and environmental benefits to the community. According to Papatheochari (2011), Jones (2007) and Goddard (2002), the most pronounced benefits urban waterfront regenerations are:

- The increase in real estate property values,
- The preservation historical and local heritage also re-use of historic building,
- The improvement of water quality and water ecology by means of the advanced management processes,
- Providing of opportunities for new uses and activities,
- Representing of new economic regeneration opportunities for declining inner city areas,
- Attracting tourists not only at the regional level, but also nationally and internationally,
- The provision of many new homes,
- Providing new jobs,
- The improvement of the environmental conditions,
- The advancement of better services of transport and social service,
- Providing of relationship between water and the city,
- Encoring of economic investment on degraded areas,
- With the improvement of the city's image which causes right marketing strategies.

3.10 Buriganga Riverfront as an urban waterfront:

History of Buriganga: In the distant past, a course of the Ganges river used to reach the Bay of Bengal through the Dhaleshwari river. This course gradually shifted and ultimately lost its link with the main channel of the Ganges and was renamed as the Buriganga. It is said that the water levels during high and low tides in this river astonished the Mughals. The

water tables even is very astonishing due to pollution of polythenes deposited beneath water. The materials from breaking of buildings of the river banks also add hazardous substances in the river. The course of the Padma has changed considerably during the period 1600 to 2000 AD. It is difficult to trace accurately the various channels through which it has flowed. The probability is that it flowed past Rampur Boalia, through ChalanBeel, the Dhaleshwari and Buriganga rivers, past Dhaka into the Meghna estuary. In the 18th century, the lower course of the river flowed further south. About the middle of the 19th century the main volume of the channel flowed through this southern channel which came to be known as Kirtinasa. Gradually the Padma adopted its present course

Economic significance of Buriganga: The Buriganga is economically very important to Dhaka. Launches and Country Boats provide connection to the other parts of Bangladesh, a largely riverine country. Due to siltation, large steamers can no longer go through the river channel in the dry season. In 1989, a bridge (the Bangladesh-China Friendship Bridge) was built over the river for vehicles and pedestrians. In 2001, a second bridge over the river was built at Babubazar for vehicles and pedestrians.

The Real Scenario of Pollution in Buriganga: If dissolved oxygen in water lessen below 6, it will be impossible for the aquatic animals and plants to survive. The study in the last January shows that at 4 among the total 9 points in Buriganga, the value of dissolved oxygen is 0 and at the rest 5, the average value of dissolved oxygen is 1.8. The Biological Oxygen Demand (BOD) also reflects the pollution rate of water. The capability of water to destroy germs in it signifies the value of the BOD. The lower the value of the BOD in water, the lower will be the pollution rate in it. The tolerance limit of BOD in water is 2-6. But the study by BUET Civil Department in January, 2007 shows that the BOD in Buriganga at Hazaribagh area is 28. The electric conductivity of the water of Buriganga is also higher than the tolerance limit that represents the presence of solid particles in water with high concentration. If the value of pH of water is greater than 7, it represents the basic characteristics of water which is harmful for skin. The average value of pH of Buriganga is 12. The value of dissolved chloride is also higher than the tolerance limit in Buriganga. Figure 01: Buriganga Pollution by (a) oil discharge of the water vehicles and (b) tannery and other industries' pollutants and (c) Connected Canals of Keraniganj to Buriganga 5. Reasons behind Pollution According to the experts, major reason of the pollution in Buriganga is the HazaribaghTannery. The Tannery is 46 years old but no treatment plant has been introduced

yet to neutralize the noxious materials it produces. That's why it continuously pollutes the water of Buriganga. The industrial and the seepage wastes of riverside Textile Mills, Dying and other industries and Dhaka-Demra-Narayanganj Industrial Zone also pollutes river. The industries of Kamrangir Char area dump their wastes in Buriganga. Dhaka WASA is in lack of sufficient recycling plants and dump seepage wastes in river. More than 5 thousand tons of solid wastes are produced daily

Reasons behind Pollution: According to the experts, major reason of the pollution in Buriganga is the Hazaribagh Tannery. The Tannery is 46 years old but no treatment plant has been introduced yet to neutralize the noxious materials it produces. That's why it continuously pollutes the water of Buriganga. The industrial and the seepage wastes of riverside Textile Mills, Dying and other industries and Dhaka-Demra-Narayanganj Industrial Zone also pollutes river. The industries of Kamrangir Char area dump their wastes in Buriganga. Dhaka WASA is in lack of sufficient recycling plants and dump seepage wastes in river. More than 5 thousand tons of solid wastes are produced daily from domestic uses in Dhaka City and 63% of them are dumped in the river. As a result, Buriganga is now in serious trouble as well as the surrounding environment.

Hazaribagh Tannery: Tanneries are the oldest industries in Bangladesh of which 95 percent are concentrated mainly in Hazaribagh area of Dhaka city (Alam and Sultana, 1996). It is also a potentially rich manufacturing sector in terms of both financial return and social benefits (Rahman, 1997). Manufacturing includes those activities by which man changes the form of nature of raw materials (Miller, 1982). The first tannery industry in Dhaka was established a century ago. Chrome and bark tanning was practiced successfully, but the factory could not survive for long. A fresh move for the establishment of tanneries was made after the partition of the Indian subcontinent. Some large plots were made available to entrepreneurs in 1956. Initially about 20 tanneries were established, which have now grown to 196.2. The following statistics reflect current levels of activity: Table 1: Information about tanneries

Total number of tanneries established	196
Operating for the whole year	53
Ceased operation due to Government ban on wet blue leather	47
Operating only a few months of the year (after Eid-ul- Azha)	96

Source: Bangladesh Leather, 2004. Most of the tanneries were built on land either purchased or acquired by inheritance, mortgage and temporary lease or rented on a monthly basis. The land covered by these industrial enterprises ranges in size from small (around 29 decimal), through medium (around 48 decimal) to large (around 98 decimal). Apart from the tanneries there are two paint factories,

plus 70 manually operated glue factories and one mechanized glue factory in the industrial area. The Hazaribagh tannery complex and other industries, primarily the glue and paint industries located in the same general area, have affected water and air quality in a large poorly drained area locked behind a 9 meters high flood control embankment constructed in 1989-1990 in southwest Dhaka City. Up until the time of embankment construction, the contaminants were washed to the Buriganga River by annual flooding. At present, the existing sewage outfalls, the sewage lift operations consisting of 16 pumps and local residential drains are not adequate to properly and efficiently remove all the waste products generated by the factories and population of the affected area. This is partly a maintenance problem but an environmental problem was created by the discharging of wastewater with excessively high solids content and a dangerous level of chromium among other heavy metals and toxic materials.

The Toxic Chemicals used in the Tanneries of Hazaribagh Hazaribagh, an area of 25 hector located on the southern periphery of Dhaka City, is the nerve center of the entire leather industry of Bangladesh. There are 17 tanneries owned by Bangladesh Tanneries Corporation and 131 tanneries owned by private enterprises. About 53 tanneries are operating round the year. Nearly 10,000 people rely directly on the tanneries for their source of income. These tanneries use two types of tanning processes are used in manufacturing: Chrome Tanneries: using chromium sulphate, CaO, Na₂S, NH₄Cl, Oropan bate, NaCl, H₂S₀₄, chromosal B, soda to produce blue leather. Combined Chrome and Vegetable Tannery: using NaCl, CaO, NH₄Cl, Bate powder, H₂S₀₄, chromosal B, Soda ash, preventol, hydrobisulphide to produce soft blue leather. For dyeing, Nigrosine, violet, COD oil, TRC oil, Pigme-t, black, glycerine is used. For polishing slug, Casin, Ammonia liquid, Nirtobenzine, Formaldehyde, Soliside are used to produce finished leather. Daily discharge of wastes from these tanneries is about 18000 liters of liquid wastes, 115 tones of solid wastes during peak time and 75 tones during off-peak time. In summer when the rate of decomposition of the waste is higher, serious air pollution is caused in the whole of Hazaribagh area by producing intolerable, obnoxious odor. Tannery wastes include liquid arsenic, soft sodium sulfate, lime, ammonium sulfate, chromium sulfate and colored pigments. Especially hexavalent chromium is carcinogenic. The hides absorb only 30% of the chromium while the remaining 70% is discharged into as effluent. The maximum concentration of chromium in the Buriganga River is about 4 mg per liter. Liquid wastes are mostly dumped into the river Buriganga while part of these wastes is trapped inside the Dhaka Flood Control Embankment. Solid wastes from fleshing and shaving are dumped on the streets or in and around garbage bins when available. Currently, local shoemakers use

about 90% of the finished trimming wastes. Fifty percent of the tanneries reuse part of the solid waste. Health impact from disposal of wastes from the tanneries are either death or increased probabilities of death and sufferings by illness including skin diseases, fevers, headaches, respiratory diseases etc. It has been found that on average the incidence of illness among the people living in Hazaribagh is 16% higher than the people living in the control area. Cost of human health impact from the tanneries varies from \$26 to \$150 per annum per person. Two options have been proposed to address the pollution caused by the tanneries in Hazaribagh. One is to relocate the entire industry from Dhaka to Savar. Another is to provide a suitable treatment plant for pollution reduction of tannery waste before final disposal. Stabilization ponds (lagoons) are widely used method of waste treatment in hot and tropical climates. It is difficult to bear the cost individually. However, if it is shared by the proportion of production of all the tanneries, it may become cost-effective (Islam, 2003).

Tanneries Discharge 21,600 Liters of Liquid Wastes Daily Tanneries in the city's Hazaribagh area discharge some 21,600 liters of liquid wastes everyday. "These harmful wastes, including chromium, lead, sulphur, ammonium, salt and other materials, are severely polluting the capital city and the river Buriganga," State Minister for Environment and Forest Jafrul Islam Chowdhury said this while he was visiting the Hazaribagh industrial area yesterday (UNB, 2003).

River Pollution The major pollution aspects of Hazaribagh are tannery wastewater, solid wastes, sludge, bad odor, narrow zigzag roads and lanes/bilanes, unplanned drainage system, over flow of drains, stack of garbage from tannery and municipal by the side of road, transportation of raw and semi processed hides, unplanned construction of residential buildings, slum dwellings, densely populated area etc. It is to be noted that a total of about more than 15 thousand cubic meter liquid tannery waste is discharged everyday from the Hazaribagh area (Ahmed, 2005). At present wastes can't be discharged into the River Buriganga due to obstruction created by Dhaka flood control embankment. As a result it seeps through the embankment and wastes accumulate in the low land lying between Hazaribagh and Dhaka embankment (western by pass). This causes inconvenience for the local community and passer by. The pollution rate is most terrible in the North Gajmahal and Sonatangor in the study area. The condition of Moneshwor West, Gajmahal and Hazaribagh Road are better than the previous two. But the pollution rate is not severe in Jigatola, Moneshwor East, Tallabagh, Ganaktuli Lane and Jigatola Govt. Quarter as like the other

zones of the study area. Common pollutants released from the tanneries with their proper sources and associated health effects are illustrated below by a table:

Table 2: Common pollutants, their sources and associated health effects on human

<i>Pollutant</i>	<i>Sources</i>	<i>Health effects</i>
1. Salt, Dust, Hair, Soot	Fleshing, Dehairing, Soaking Washing process.	Can cause cancer, aggravates respiratory and heart diseases, is toxic at high level causes coughing, irritates throat and causes chest discomfort.
2. Hydrogen Sulfide (H ₂ S)	Decomposition wastes, Liming, Pickling.	Has pleasant odor, nausea, irritates and throat, if toxic at high level.
3. Chromium (Cr)	Chrome tanning.	Mainly effect on skin and respiratory system, including mucous membrane irritation, sensitization, erosion, dermatitis and chrome ulceration, can also cause cancer.
4. Ammonia	Mainly deliming, Bating.	Inflame upper respiratory passages.
5. Sulfuric Acid	Pickling process, Chrome tanning.	Aggravates respiratory diseases, impairs breathing, irritates eyes and respiratory tract.
6. Arsine (Arsenio)	Tanning process.	Breakdown red cells in blood, damage kidneys, causes jaundice.
7. Nitrogen Oxides	Tanning, Polishing, Finishing.	Aggravates respiratory and heart diseases, irritates lungs, injures respiratory systems.
8. Nitric Acid	-Do-	Same as Nitrogen oxides.

Source: 1- Miller (1982), 2. Jorgensen and Fath (2008)

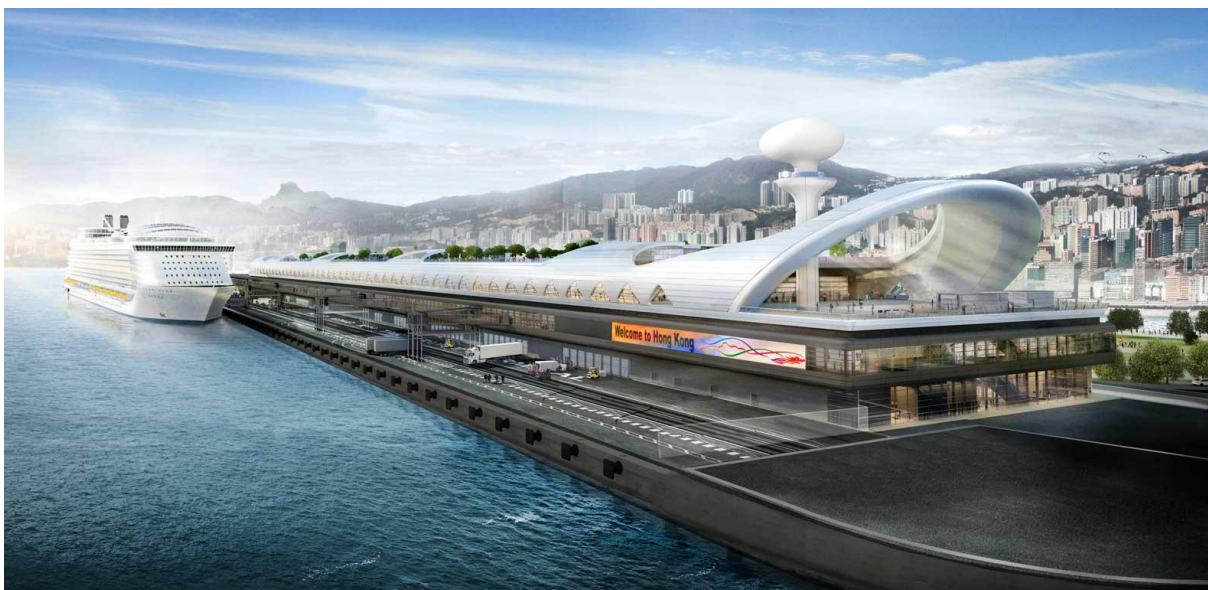
For this toxic discharge of tannery industries different components of environment such as soil, air, water are being contaminated. But the contamination level is not equal in all the surrounding zones.

Chapter 5: Case Study:

5.1. Kai Tak Cruise Terminal in Hong Kong by Foster Partners

The new Kai Tak Cruise Terminal is being constructed on the site of Hong Kong's former airport, at the tip of the old runway. Establishing Hong Kong as the preeminent regional hub for cruise liners, the terminal will have capacity to berth two large 360-metre-long vessels, each with more than 4,000 passengers and over 2,000 crew, as well as anticipating the demands of a next generation of larger ships. Reinventing the site of the former Kai Tak airport as one of the world's foremost cruise terminals, the project will create a sustainable new gateway to the city and a major entertainment destination for residents.

The site on the south-western tip of the old runway has dramatic unobstructed views of the eastern entrance to Hong Kong harbor, framing both Hong Kong Island and Kowloon. The terminal has a large, rectangular footprint and is arranged over three main levels, punctuated by four atria that draw daylight deep inside the building. A pedestrian promenade rises up through the terminal and opens onto a large public roof garden, with open and sheltered spaces for picnics, outdoor dining and more formal events such as wedding banquets, all set against the stunning backdrop of the city.



The linear arrangement of light-filled passenger areas is characterised by its clarity and ease of use. The terminal has a generous, rectangular footprint and is arranged over three main

levels, encased by a lattice of large white 'fins' that allow daylight to filter through to the passenger waiting spaces.



The terminal will have the capacity to disembark a total of 8,400 passengers and 1,200 crew and its design also anticipates the demands of a new generation of larger cruise liners currently being designed. The spacious interior, which spans 70 meters, is highly flexible - the concourse areas can be converted into a venue for performances, events and exhibitions, supported by the terminal's wide variety of restaurants and shops - this ensures that the building will be used all year round and can fully utilize down time. The sustainable design combines a number of energy saving measures and will generate power from renewable sources, as well as making use of recycled rain water for cooling.

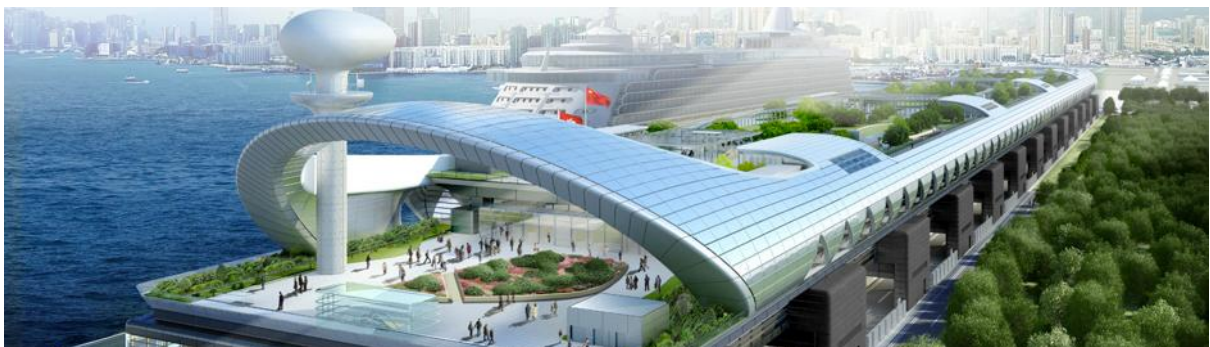


Services are integrated with the structure and the different levels are fused with the surrounding pedestrian walkways. The baggage handling area, customs hall, back office functions and the passenger arrival area are placed at ground level, with the passenger drop-off area on the level above. The second floor incorporates the check-in and waiting areas, as well as a public colonnade, shops and cafes. A pedestrian route starting from the waterfront promenade progresses up through the building and opens onto a large public roof

garden, with open and sheltered spaces for informal picnics and outdoor dining, set against the stunning backdrop of the city. The site on the south-western tip of the former runway has unobstructed views of the eastern entrance to the harbour, framing both Hong Kong Island and Kowloon.



The design is highly flexible, incorporating spaces that are suitable for alternative functions and enabling the building to be used all year round, fully utilising 'down time'. The spacious interior spans just over 42 metres and the waiting areas can be converted into a venue for performances, events and exhibitions, supported by a variety of restaurants and shops. The sustainable design also combines a number of energy saving measures, as well as generating power from renewable sources and making use of recycled rain water for cooling.



5.2. Yokohama Ferry Terminal:

Tokyo, Japan

2002

Design: Foreign Office Architects

The brief of the Yokohama International Port Terminal asked for the articulation of a passenger cruise terminal and a mix of civic facilities for the use of citizens in one building. The site had a pivotal role along the city's water front that, if declared a public space, would present Yokohama City with a continuous structure of open public spaces along the waterfront.

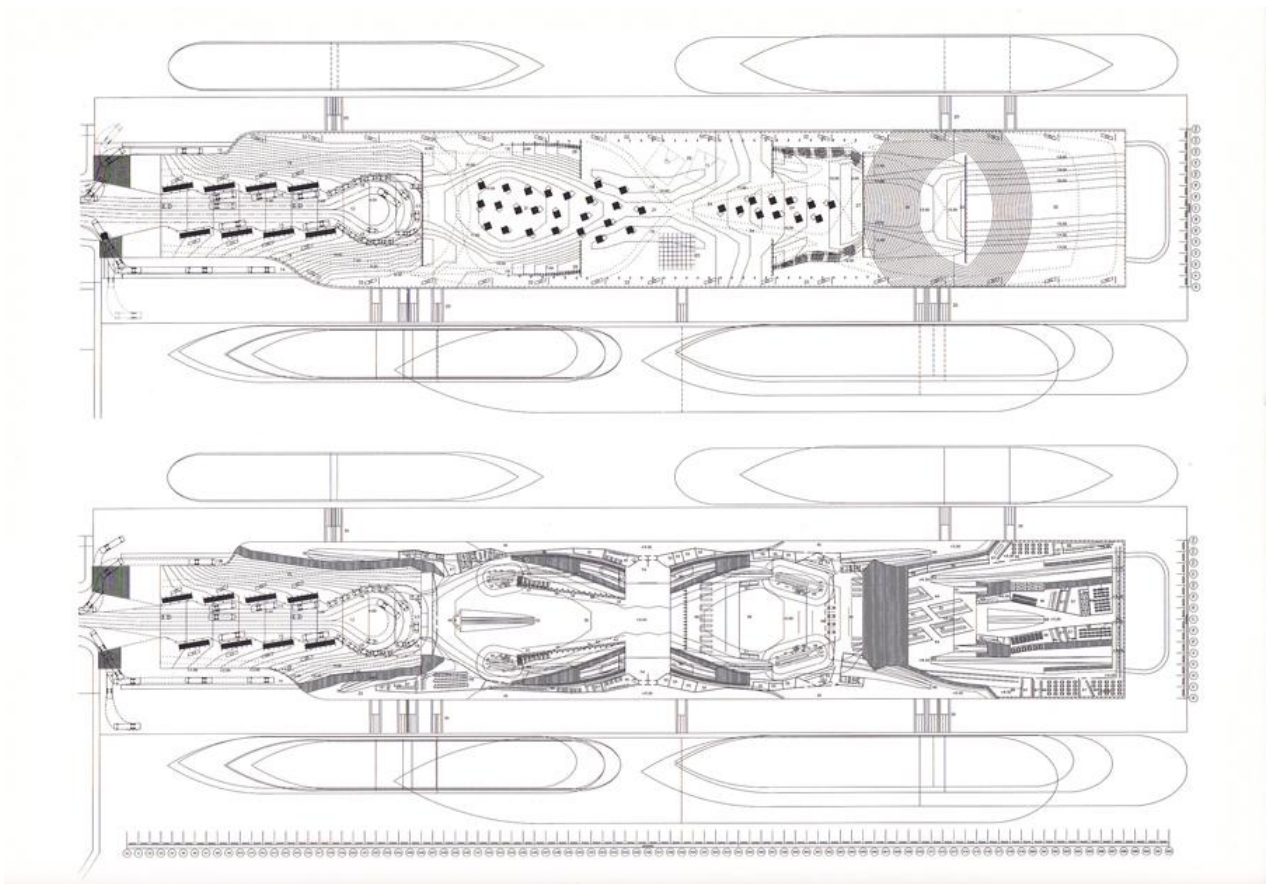


Proposal for the project started by declaring the site as an open public space and proposes to have the roof of the building as an open plaza, continuous with the surface of Yamashita Park as well as Akaranega Park. The project is generated from a circulation diagram that aspires to eliminate the linear structure characteristic of piers, and the directionality of the circulation.

The project starts with what the architects have named as the "no-return pier", with the ambition to structure the precinct of the pier as a fluid, uninterrupted and multi-directional space, rather than a gateway to flows of fixed orientation. A series of programmatically specific interlocking circulation loops allow the architects to subvert the traditional linear and branching structure characteristic of the building.

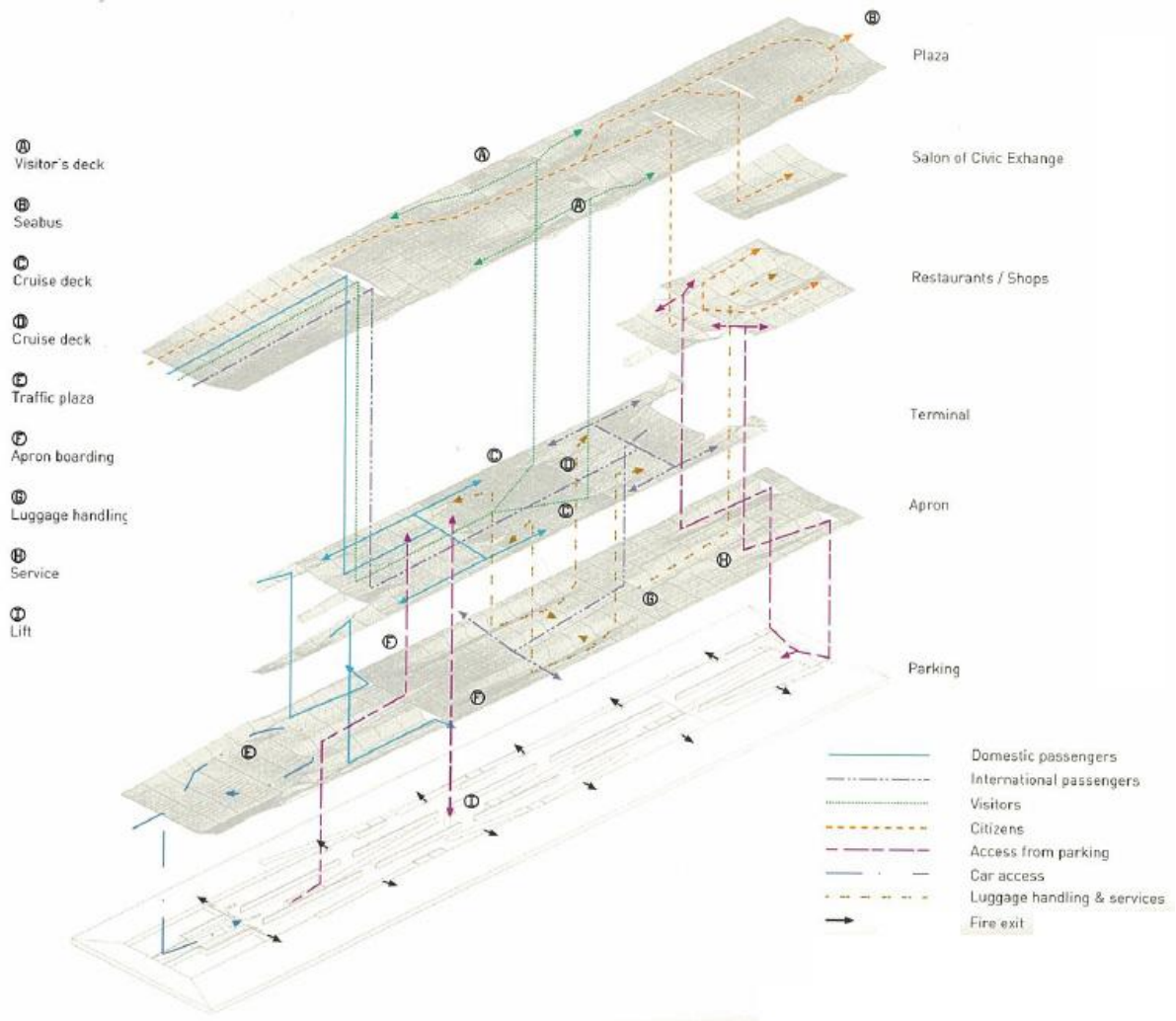


Rather than developing the building as an object or figure on the pier, the project is produced as an extension of the urban ground, constructed as a systematic transformation of the lines of the circulation diagram into a folded and bifurcated surface. These folds produce covered surfaces where the different parts of the program can be hosted.



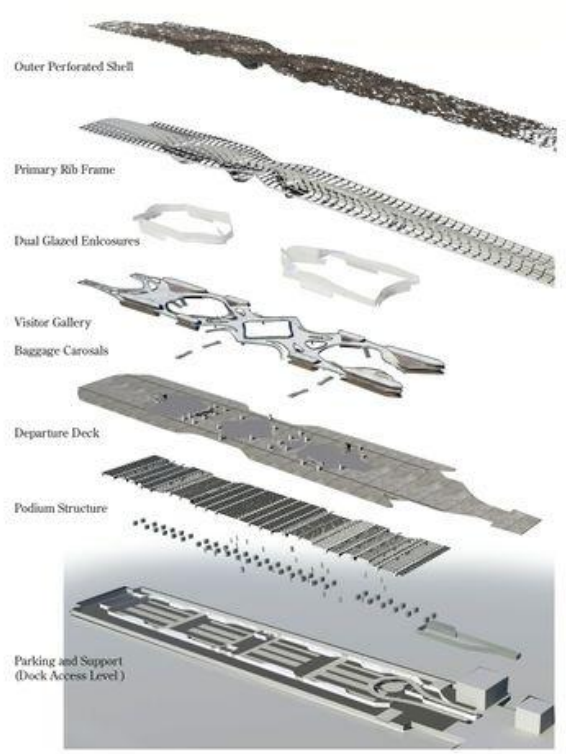
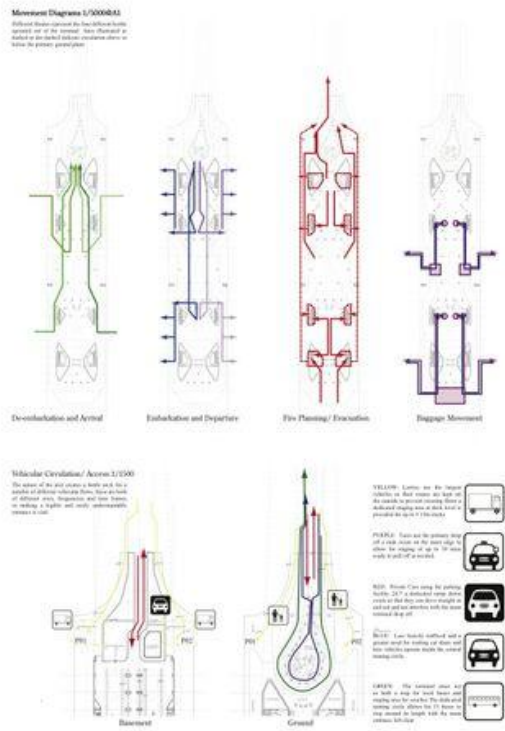
The relation between the skin and the areas established by the structural folds of the surface is one of the most important arguments of the project in that the folded ground distributes the loads through the surfaces themselves, moving them diagonally to the ground. This structure is also especially adequate in coping with the lateral forces generated by seismic movements that affect the Japanese topography.



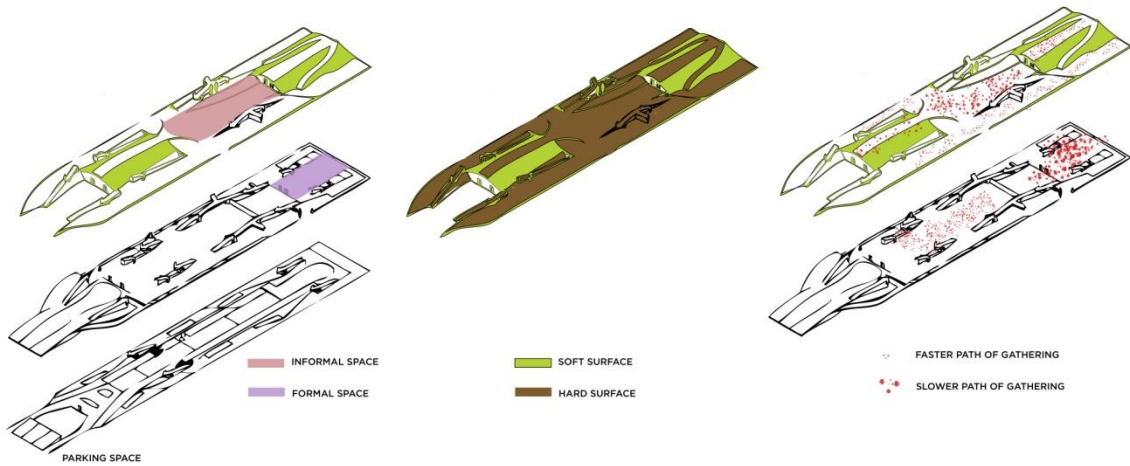


The articulation of the circulation system with the constructive system through this folded organisation produced two distinct spatial qualities; the continuity of the exterior and the interior spaces and the continuity between the different levels of the building.

The architects have used a very reduced palette of materials and details in order to explore further the continuity produced by the topography. Single finishes extend on the upper or lower side of the topography regardless of exterior or interior condition.



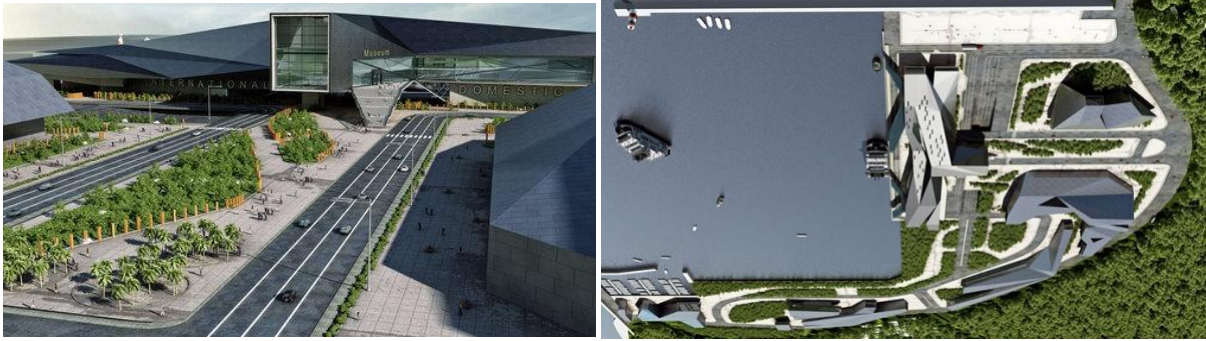
Instead of a typical post-and-beam structure of the kind that is easily repeatable in a long building, the terminal is constructed as a long-span, arched steel structure. The result is a flexible, column-free space with a seamless transition between the interior and the exterior. This allows it to be used as a covered public space and for a variety of purposes beyond that of travel. In this multi-use space, all mechanical plant and luggage-handling units are designed to be concealed within the structure and the raised wood-flooring system. The kiosks function as immigration “borders” and are assembled as mobile units on wheels, inverting the typical rigidity of border control arrangements and enabling the terminal to act beyond its usual functions. To further enhance the continuity between interior and exterior, only three material finishes are used throughout the entire building. As a result of this assemblage of structure, circulation, mechanical services and material finishes, the terminal transmits the affects of flatness, openness, axiality and efficiency in the parking areas; arching, pleating, diagonality, asymmetry and purposefulness in the terminal floor; and undulation, smoothness, landscape, valley, mountain, and perambulation in the plaza. All secondary system that are applied to the steel topography, mainly wood-deck flooring system, glazing system and fencing/handrail system use a single detail along the length of the building and only vary to explore the geometrical variation across spaces. The ambition was to construct continuous but differentiated spaces along the length of the pier.



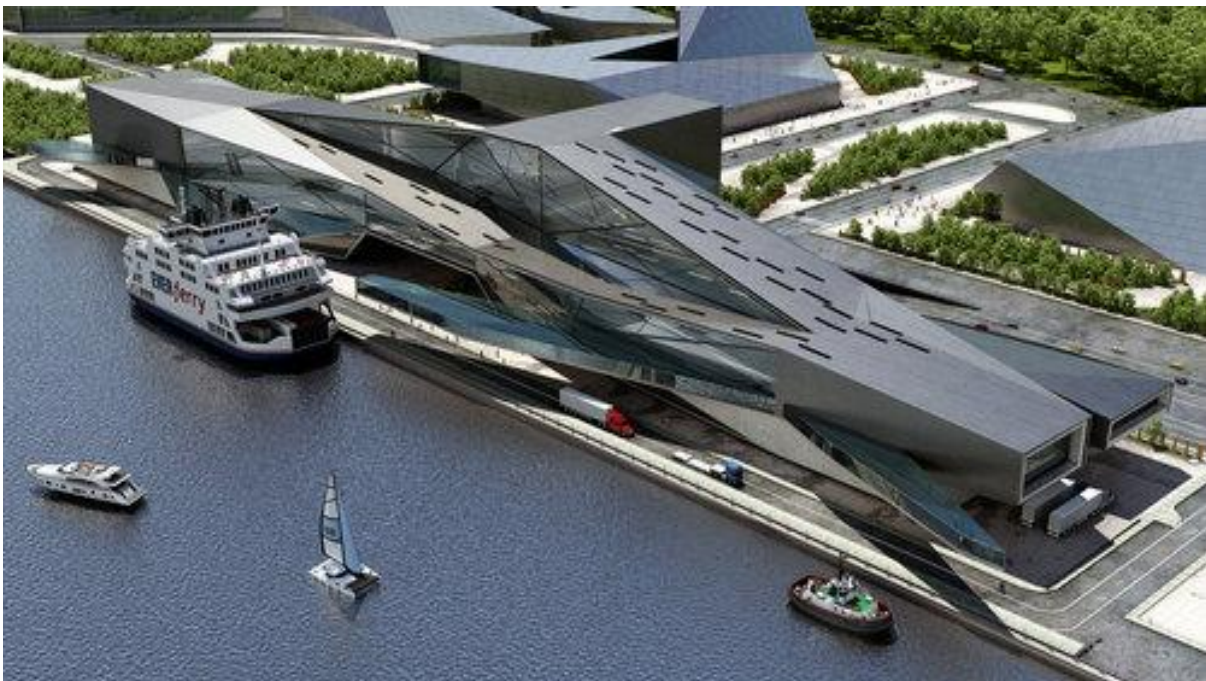
Rather than developing the building as an object or figure on the pier, the project is produced as an extension of the urban ground, constructed as a systematic transformation of the lines of the circulation diagram into a folded and bifurcated surface. These folds produce covered surfaces where the different parts of the program can be hosted.

5.3. Kinmen Ferry Terminal

The Architectural Concept for the Kinmen Passenger Services Terminal is that of a Gate into the city. The Building ARCHES over the Park and lets it extend it underneath so that the City and the Sea are connected through the Terminal building. From the Park, citizens can see the water and Marine activities. From the boats, passengers glimpse into the city. This creates a lively and "porous" interaction between the Terminal Building and the larger Master Plan.



As a portal, the Building integrates into the waterfront landscape and green spaces, rather than acting as a blocking element between the land and the water. The vehicles' TRAFFIC pattern is thus re-routed into an UNDERPASS that let's cars arrive to a large parking area under the building, alleviating heavy circulation on the ground floor. The underpass also proposes covered access to the adjacent Shopping and Duty Free Building and the Hotel and Convention center building. From the lower parking area visitors can take escalators to the main COVERED PIAZZA underneath the building or elevators directly to the Domestic or International Wings. The covered Piazza becomes essentially a public space, a gathering space for visitors and citizens alike. It could for instance become an ideal place for a Night Market or informal outdoor performing space.



Access to the Domestic and International Wings is also allowed at the ground floor via drop off for cars, taxis and buses, as well as pedestrian access. Each Wing is located to each side of the Central Covered Piazza, forming a more distinct and organized flow of passengers. Arrivals are located at the ground level for both Domestic and International

wings. Departures are located on the second level (level +12m) for both Domestic and International wings.

Direct access to the Departures occurs via the Covered Piazza through escalators or Elevators, or via each wing through elevators. The third Main Architectural element is the Kinmen Maritime Museum and Gallery Center. The Museum is an extension of the Terminal itself and extends as large Volume "hovering" over the park. It contains exhibition and gallery spaces as well as a cafe and an auditorium looking out to the park. The Museum provides entertainment for the Passengers and education about the city of Kinmen both Past and Future, via ongoing shows and lectures/ films/ documentaries.



ARCHITECTURAL DESIGN The Building Design is driven by the "arching" movement of the volume over the extended Park/Piazza, whose wave reverberates through the exterior skin and shapes the exterior volumes and internal programmatic requirements. The idea of duality (Left and Right, Domestic and International Wings, Park side/Sea side, Arrivals/Departures) is carried through the building form as it shapes the interior spaces. In particular the building is split by a longitudinal "spine" which organizes a north and south section. The

north areas favor the Sea side and host the waiting areas and departures gates, the south areas host all public functions (shopping, retail, offices) and access to the Museum component. The longitudinal spine is created by a "Glass Canyon", which brings natural diffuse light to all levels of the building, yet emphasizes the tall space of the Arrival Halls. Conceived as an environmentally friendly building the Terminal has large glass openings to the north side and a smaller amount of glass on the south side. This will increase the amount of diffuse light within the space (thus reducing lighting and cooling consumption) and limit the amount of overheating from direct southern exposure. The Glass Canyon and Covered Piazza also allow for natural air circulation and intense heat and humidity dispersion, while also providing natural shade and glare protection for arriving passengers, and providing a better energy flow in and around the Building.

The Building program is organized into three main sections: 1) Passenger Access Spaces 2) Waiting and Commercial Spaces 3) Cultural and Exhibition Areas 1) The Passenger Access areas are functionally organized over the first two levels. The ground floor on each side of the Central Piazza has the Arrivals, the Second level the Departures. Ancillary cafes and retail spaces are built around these areas to promote a culture of comfort and ease especially for short term and direct transfer travelers are located the VIP and long term waiting areas, which offer passengers in transit and waiting for a few hours the comfort necessary to enjoy their stay. These areas include larger shopping and store areas, cafes, high end restaurants, lounges, resting and bathing areas, exercise rooms and business lounges. 3) Lastly, the Exhibition spaces, located within the Museum volume extending over the park are also accessible for the Passengers and will host several different "curated" shows. This will be a unique opportunity for International and Foreign Passengers to learn about the history, culture, heritage and art of Kinmen and bring this knowledge and information to other countries and cities around the world.

5.4. Sabarmati Riverfront Development project:

Ahmedabad, India

Site Area: 203 hectares

Sabarmati river has been an integral part in the life of Ahmedabad since the time the city was founded in 1411 along the river banks. Besides being an important source of water, it provided a backdrop to cultural and recreational activities. During the dry seasons, the river bed became a place for farming. With time it also offered place for various informal economic activities, and the river banks were used by informal squatter settlements.



Gradually, however, the intensive uses took their toll on the river. Untreated sewage flowed into the river through storm water outfalls and dumping of industrial waste posed a major health and environmental hazard. The river bank settlements were disastrously prone to floods and lacked basic infrastructure facilities. Lacklustre development took shape along the riverfront. Such conditions made the river inaccessible and it became a virtual divide between the two parts of the city. Slowly, the city turned its back towards the river.



An inaccessible and polluted riverfront demanding public intervention



Inaccessible riverfront



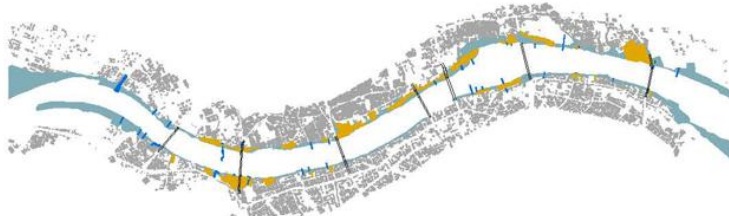
Polluted Water



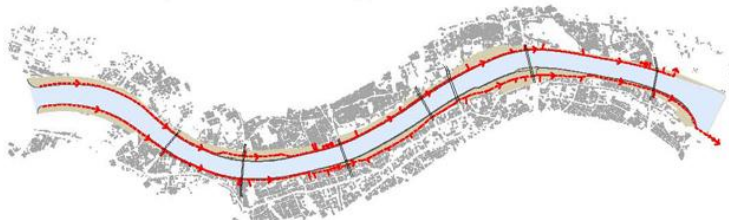
An inaccessible and polluted riverfront demanding public intervention

There had been a long-standing acknowledgement that the riverfront could be turned into a major urban asset from its undesirable state. Proposals to achieve the same have been made since the 1960s and it was finally in 1998 that this multi-dimensional project was envisioned and undertaken by the city.

SABARMATI RIVERFRONT DEVELOPMENT PROJECT



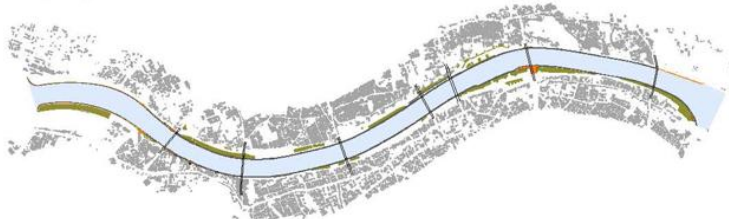
1. An inaccessible and polluted riverfront demanding public intervention



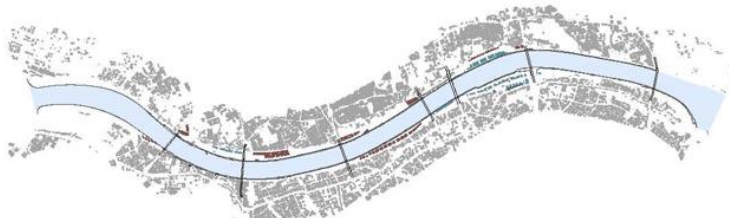
2. Reclaiming land, building flood protection walls, laying sewage interceptors



3. Improving access to the river



4. Building public promenades, gardens and playfields



5. Building public facilities, financing the project

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.

The objectives of this multidimensional project is categorized under three topics-

Environmental Improvement: reduction in erosion and flood to safeguard the city; sewage diversion to clean the river; water retention and recharge.

Social Infrastructure: rehabilitation and resettlement of riverbed dwellers and activities; creation of parks and public spaces; provision of socio-cultural amenities for the city.

Sustainable Development: generation of resources, revitalization of neighborhoods.

The Riverfront project presents a great opportunity to create a public edge to the river on the eastern and western sides of Ahmedabad. By channeling the river to a constant width of 263m, riverbed land has been reclaimed to create 11.25 kms of public riverfront on both the banks. The total land reclamation is 202.79 hectares.

The main considerations in allocating land uses for the reclaimed portions were: existing land uses along the river; extent, location and configuration of reclaimed land available; potential for development; the structural road network and form of the city; bridges proposed in the Ahmedabad Development Plan, and the possibility of providing adequate infrastructure.

Land use

The main considerations in allocating land uses for the reclaimed portions were: existing land uses along the river; extent, location and configuration of reclaimed land available; potential for development; the structural road network and form of the city; bridges proposed in the Ahmedabad Development Plan, and the possibility of providing adequate infrastructure.

Street network

The project aims at making Ahmedabad's riverfront a public asset by reclaiming land and improving its overall accessibility. The provision of north-south linkages would strengthen the existing transportation network of the city. To better access the riverfront and facilities built along it, a number of streets leading up to the river are shall be strengthened and some new streets will be developed. Most of the proposed streets are under construction. The new streets are designed with wide footpaths and designated cycle tracks to improve and encourage pedestrian access to the river

Recreation

The project aims to create a thriving, people-centric network of parks, waterside promenades, markets, cultural and recreational facilities in the heart of Ahmedabad, making the city's riverfront a public asset.



The key feature of this project is a two-level, continuous promenade at the water's edge along each bank of the river. Together, these promenades provide Ahmedabad with a 11.5-km long pedestrian walkway in the heart of the city. Ghats punctuate the lower level promenade at planned intervals to provide access to the water. Boating Stations at the lower level enable water recreation and offer a water-based mode of public transport in the future.



In addition, many new parks, gardens and sports facilities are being built on the reclaimed land. The parks shall enhance livability in the area that they are located in and strengthen the city's green network.

5.5. The Dryline, BIG's proposal for the Rebuild by Design Competition

Location: Lower Manhattan

Size: 1000000m²

The Big U is a protective system that encircles Manhattan, responding to the needs and concerns of the island's diverse communities. Stretching from West 57th Street south to The Battery and up to East 42nd Street, the Big U protects 10 continuous miles of low-lying geography that comprise an incredibly dense, vibrant, and vulnerable urban area. The team's approach is rooted in the two concepts of social infrastructure and hedonistic sustainability. The Big U not only shields the city against floods and storm water; it provides social and environmental benefits to the community, and fosters an improved public realm. The team envisions three compartments that function independently to provide flood protection. Each compartment comprises a physically discrete flood-protection zone that can be isolated from flooding in adjacent zones. At the same time, each presents opportunities for integrated social and community planning. The compartments work in unison to protect and enhance the city, yet each compartment's proposal is designed to stand on its own.



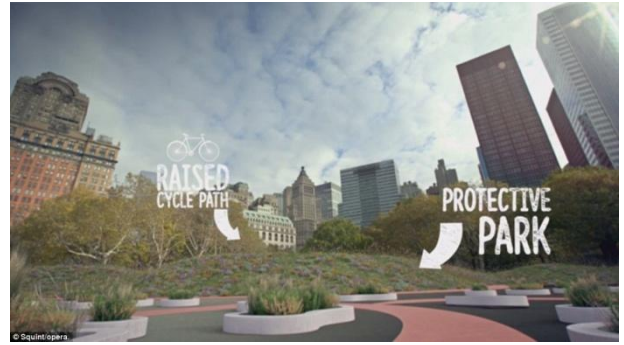
The proposal consists of separate but coordinated plans for three contiguous regions of the waterfront and associated communities, regions dubbed compartments. Each compartment comprises a physically separate flood-protection zone, isolated from flooding in the other

zones, but each equally a field for integrated social and community planning. The compartments work in concert to protect and enhance the city, but each compartment's proposal is designed to stand on its own. Each compartment was designed in close consultation with the associated communities and many local, municipal, state and federal stakeholders; each has a benefit-cost ratio greater than one; and each is flexible, easily phasable, and can be integrated with in- progress developments along the City's waterfront.

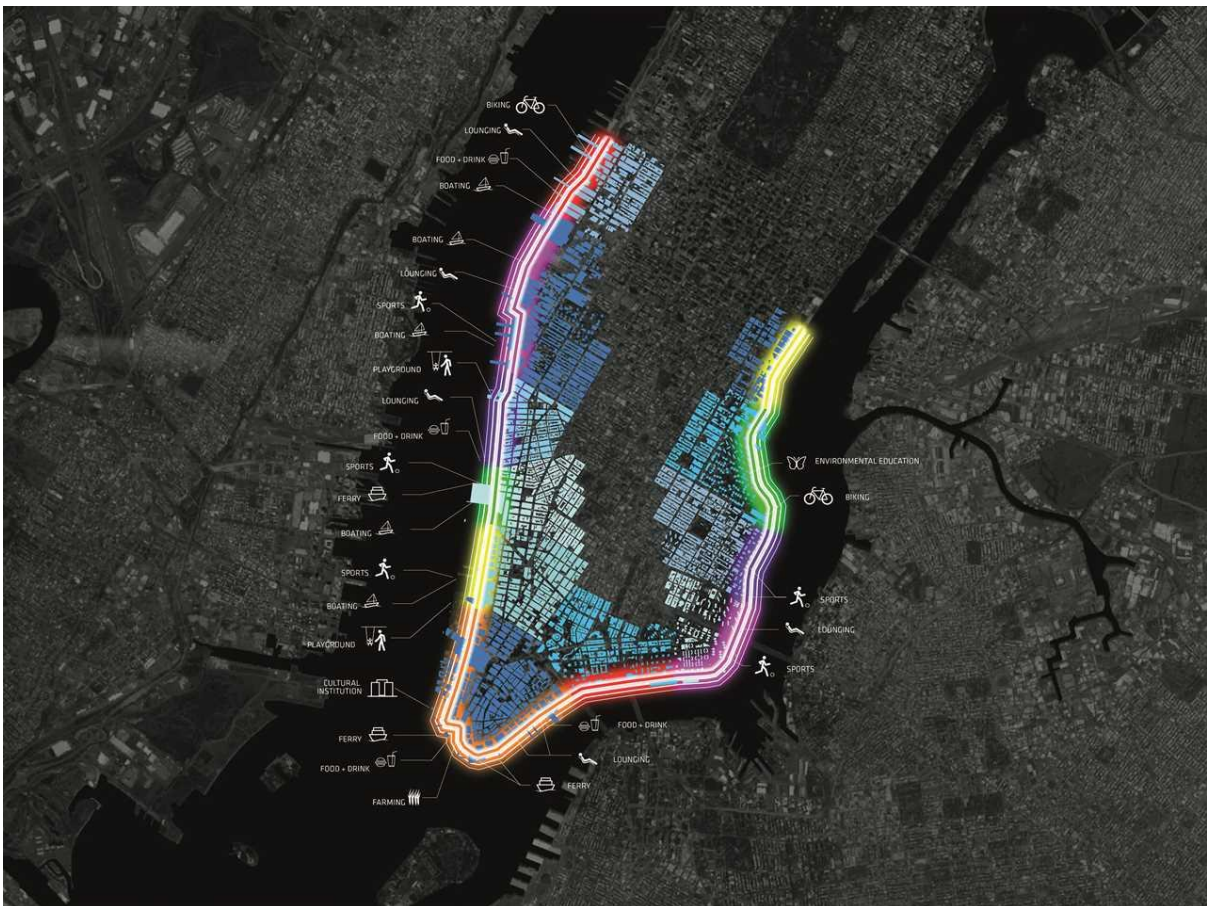


Bridging Bear provides robust vertical protection for the Lower East Side from future storm surge and rising sea levels. The Berm also offers pleasant, accessible routes into the park, with many unprogrammed spots for resting, socializing, and enjoying views of the park and river. Both beams and bridges are wide and planted with a diverse selection of salt tolerant trees, shrubs and perennials, providing a resilient urban habitat.

Between the Manhattan Bridge and Montgomery Street, deployable walls are attached to the underside of the FOR Drive; ready to flip down to prepare for flood events. Decorated by neighborhood artists, the panels when not in use create an inviting ceiling above the East River Esplanade. At night, lighting integrated into the panels transforms a currently menacing area into a safe destination. Panels can also be flipped down to protect from the elements, creating a seasonal market during the winter.



The east and west boundaries of the Battery were key inlets during Hurricane Sandy, allowing floodwaters to rush into Lower Manhattan and shut down the nation's - and the world's - premier financial district. Enhancing the public realm while protecting the Financial District and critical transportation infrastructure beyond, the Battery Berm weaves an elevated path through the park. Along this berm, a series of upland knolls form unique landscapes where people farm, sunbathe, eat and engage with world class gardens.



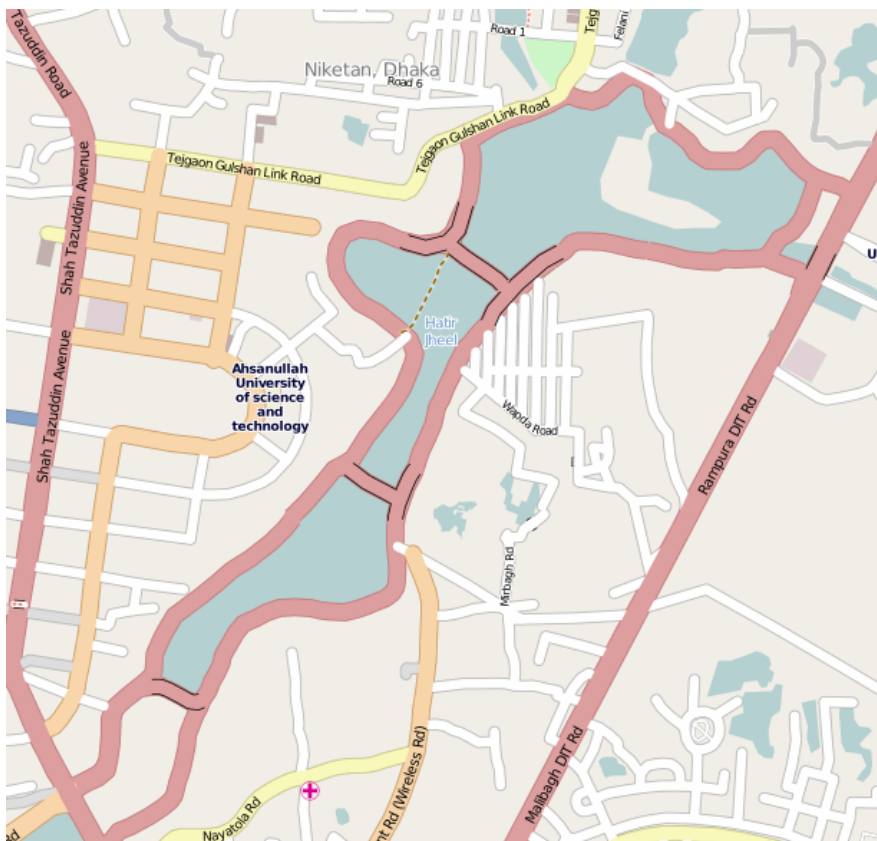


Render for the BIG U, "The Reverse Aquarium," part of a maritime museum or environmental education facility, whose form is derived from the flood protection at the water-facing ground floor. Image Courtesy of rebuildbydesign.org Render for The BIG U, "The Harbor Berm," an elevated path through the park. Image Courtesy of rebuildbydesign.org

In place of the existing Coast Guard building, the plan envisions a new building programmed as a maritime museum or environmental education facility, whose form is derived from the flood protection at the water-facing ground floor. This signature building features a "Reverse Aquarium" which enables visitors to observe tidal variations and sea level rise while providing a flood barrier.

5.6. Hatirjheel Begunbari Development Project, Dhaka

While the city is becoming more and more suffocating, while open spaces are shrinking rapidly, Hatirjheel comes as a breath of fresh air. It is the last hope of the city dwellers for some respite and recreation. It is being hailed as the breathing space of the city. Dr. Abu Sayeed M Ahmed, Chairman of the Architecture Department of the University of Asia Pacific, says, 'If the Hatirjheel project can be implemented according to the plan and design, then not only will the appearance



The entire Hatirjheel is meticulously designed with about four main and four minor bridges (viaducts) and several overpasses for pedestrians. There are also many sitting arrangements for pedestrians by the river-side. A lake flows through the heart of the project with a 16 km road beside the lake for traffic. Besides, it has a picturesque view, and people from all over the Bangladesh come to see this amazing place. Boat rides are available and facilities are there for small scale family picnics. At night, lights of different colors illuminate the entire Hatirjheel, especially on the bridges.

The area has been delightfully decorated with flowering shrubs and colourful flags. Once completed, the project became a place for the pleasure-seekers. As Dhaka is densely populated, and is occupied with numerous congested buildings, resulting a suffocating environment due to the shortage of fresh air, but conveniently Hatirjheel has lots of spaces to contain fresh air, as a result the people could visit and feel the fresh air. Furthermore, Hatirjheel is considered to be one of the most notable places in Dhaka. of this area change; the entire city will have a facelift. It will increase the beauty of the city.



The plan is for a water retention body -- in other words, a lake -- to stretch from behind Sonargaon Hotel for four kilometers up till Rampura bridge. An amphitheatre will be constructed on the banks of the lake at the back of Tejgaon Industrial Area. The people can watch performances at the theatre sitting in the open air by the waters of the lake. Then there will be a water deck at Magh Bazar, an open platform for entertainment upon the lake.

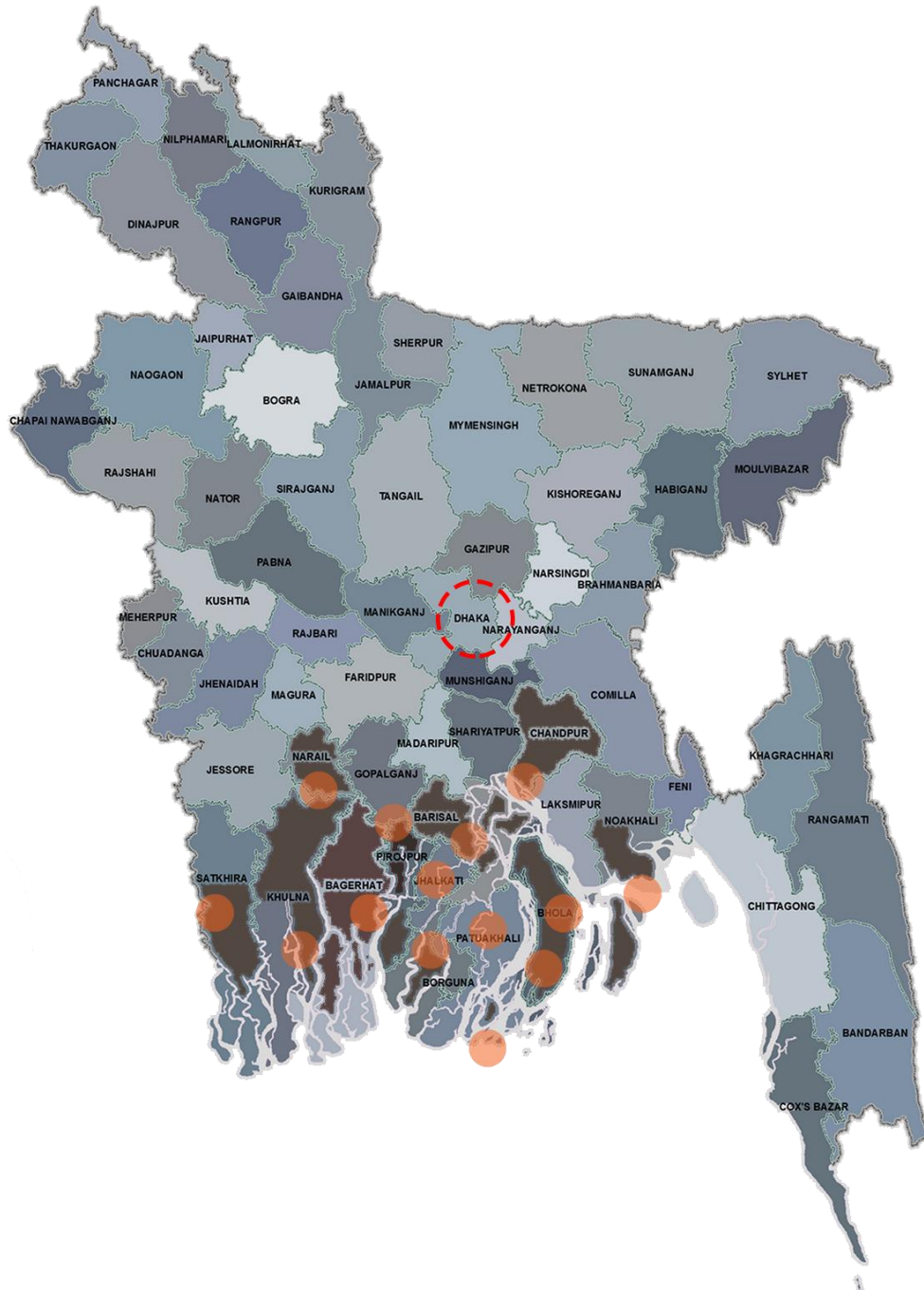
In the middle of the lake near Badda and West Rampura will be a forested island called Eco-Centre. It will be a haven for all sorts of flora and fauna. People can travel by boat around the island but will not be permitted on it.

There will be water taxies to transport people down the lake. It will take people up till the lake at Gulshan-1. Later this service will be extended up till the lake in Gulshan 2 and Banani. There will be two water taxi terminals, one at Badda and one at Magh Bazar.

Chapter 06: Programme and Development:

6.1. Programme Rationale: The programme of the project is a combination of the existing Sadarghat Terminal programmes and additional public facilities. Also programmes are added from the stretched riverfront fabric and incorporated and blended within.

Firstly studying the routes from Sadarghat :



6.2. Rethinking the programme:

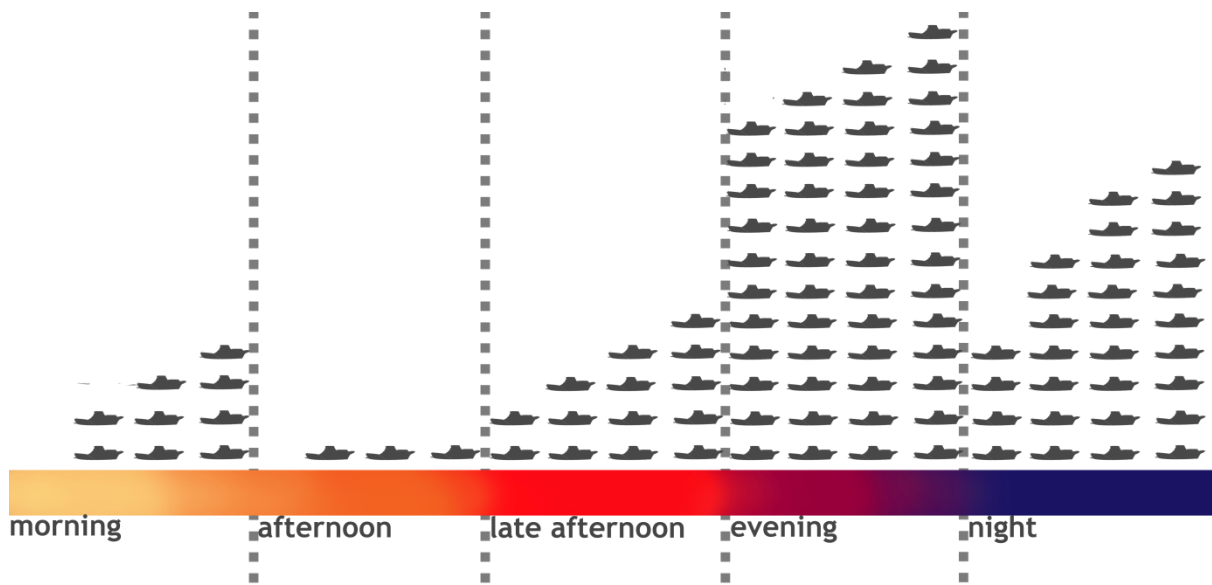
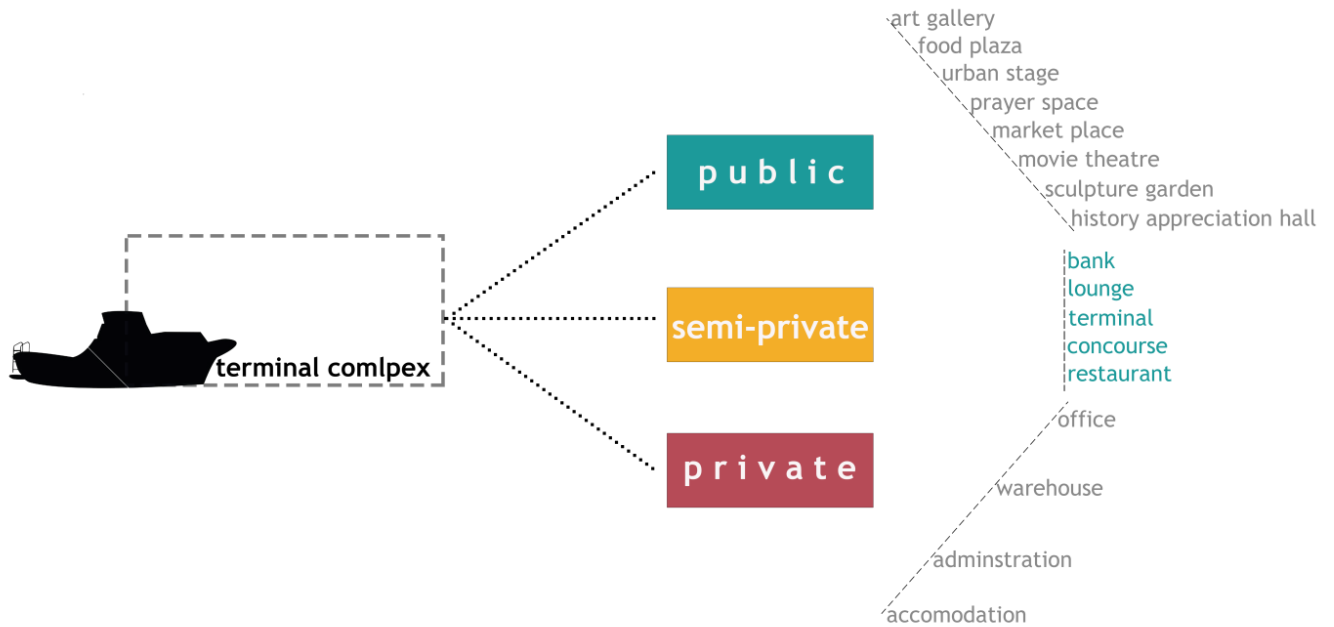


fig: analysis of the number of launches arrive and depart on separate times of a day

The number of pontuns and other facilities were derived from this analysis. Alternate use of the spaces when free was also considered from this.





The existing terminal which is very inadequate for such a huge number of passengers to handle, many more functions are added, most importantly capacity is extended according to passenger number. Different events and activities are incorporated within the building, for example: warehouses, Mosque, school etc.

Public functions are added with the Terminal function which's accessibility is controlled but the public layers are open to all. They are dedicated to the passengers(specially long time waiting passengers) and to general public also. The terminal will not be a terminal only but also a meeting place and a recreational space for all.

The roof of the whole structure will work as a urban stage dedicated to the public, connected to the riverfront directly through ramps so it ensures maximum access for the public.

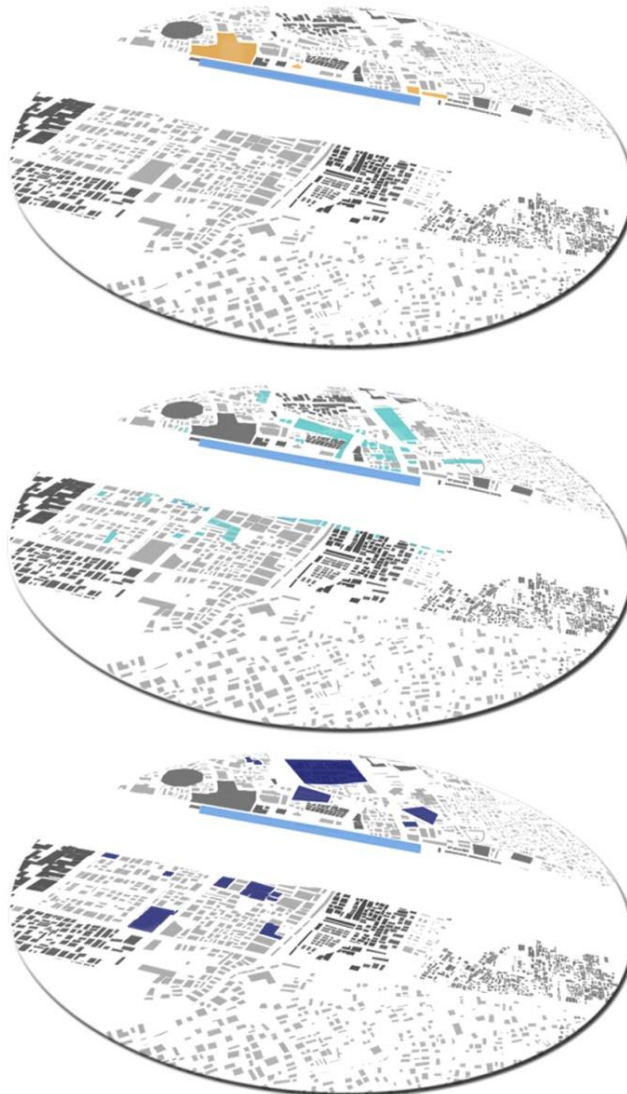


fig: analysis of the existing shopping destinations, food places that are incorporated within the programme

Chapter 7: Design development:

7.1. conceptual diagram:

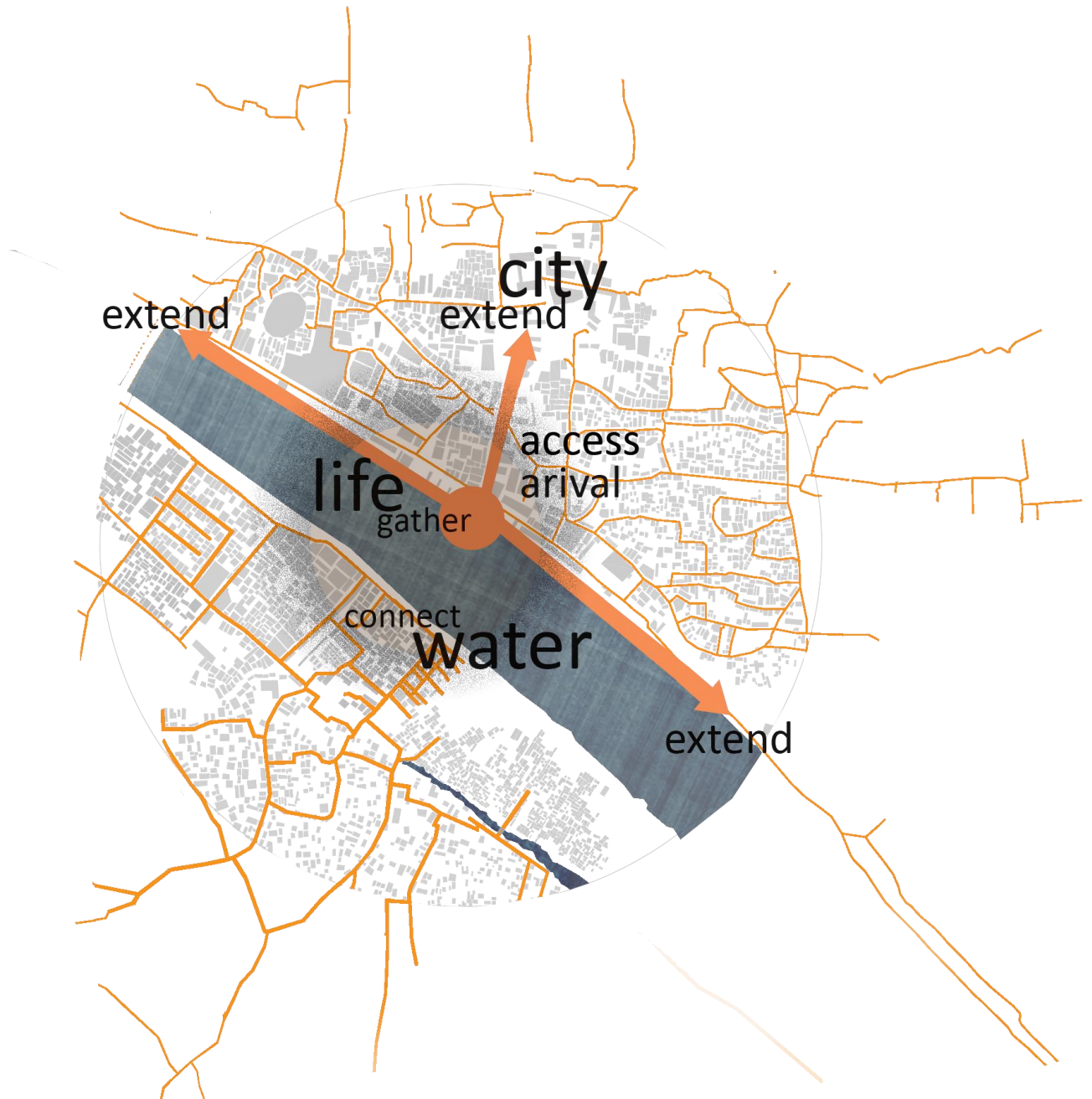
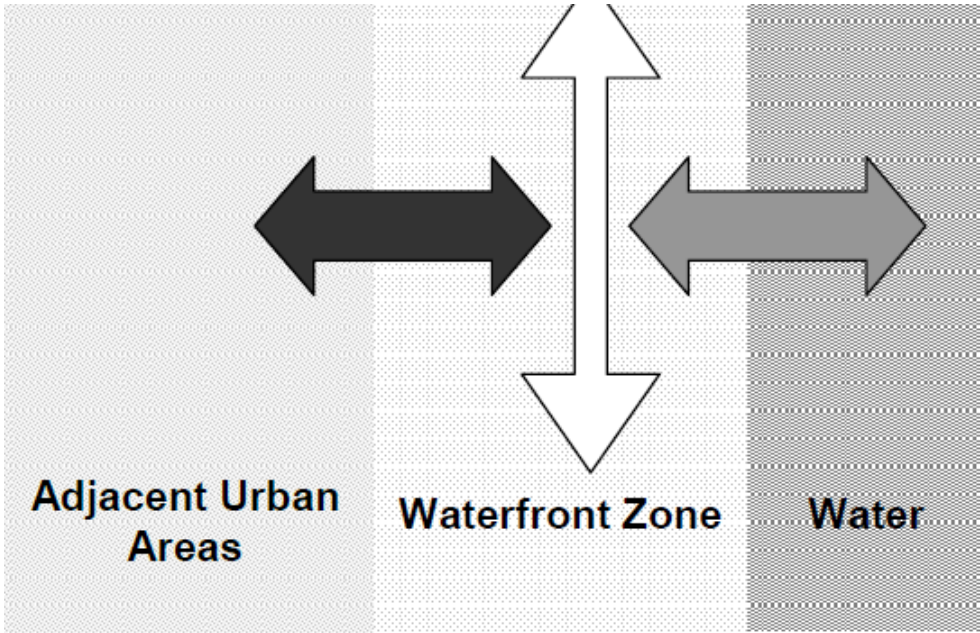


fig: cite and water edge connctin through activity



The first thinking which influenced throughout the design process was to make the terminal work as a part of the whole riverfront, not as a separate structure. To blend in with the riverfront activities and spaces and to invite those people and activities inside.

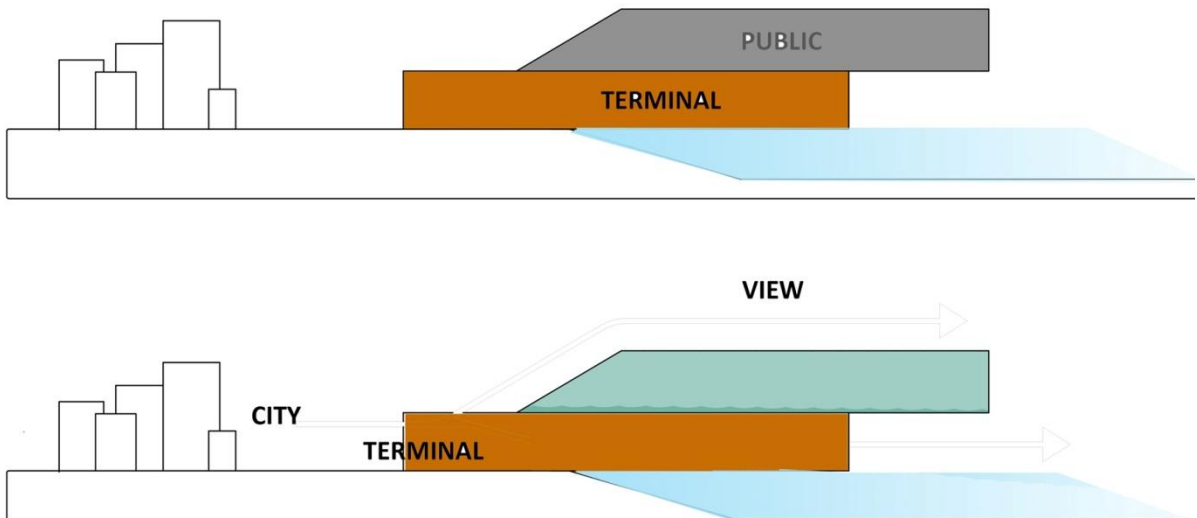
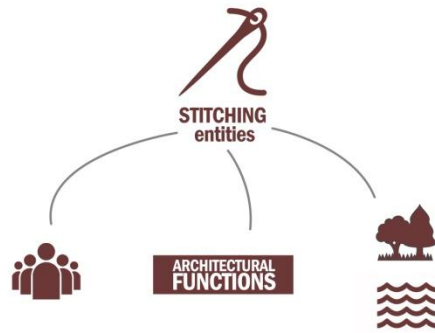
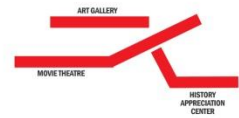


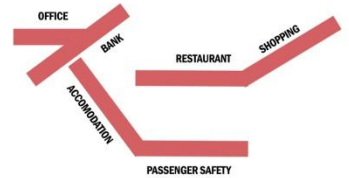
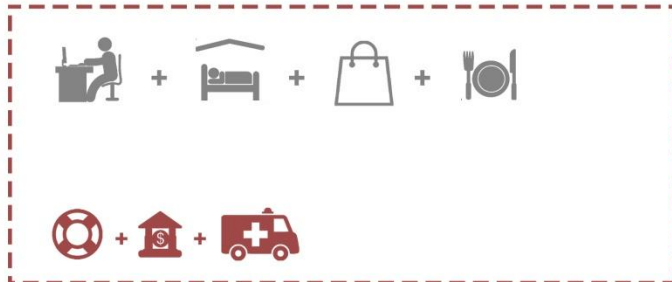
fig: terminal connecting with the water and city



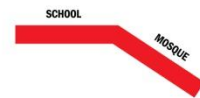
CULTURAL STITCHING



core functional STITCHING



MISCELLANEOUS STITCHING



GEOGRAPHIC STITCHING

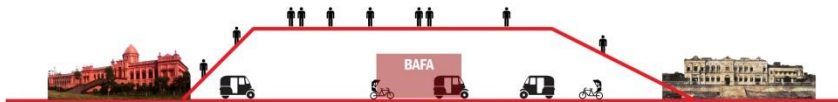


fig : conceptual diagram

Old Dhaka has its own Urban fabric, its pattern of growth, its connectivity and activity pattern. On the other hand Buriganga has its own fabric with dynamic movement patterns and connectivity with the lands at different points. My concept is to stitch both the fabrics, its elements, its activities and functions to mere both rather than separating them.

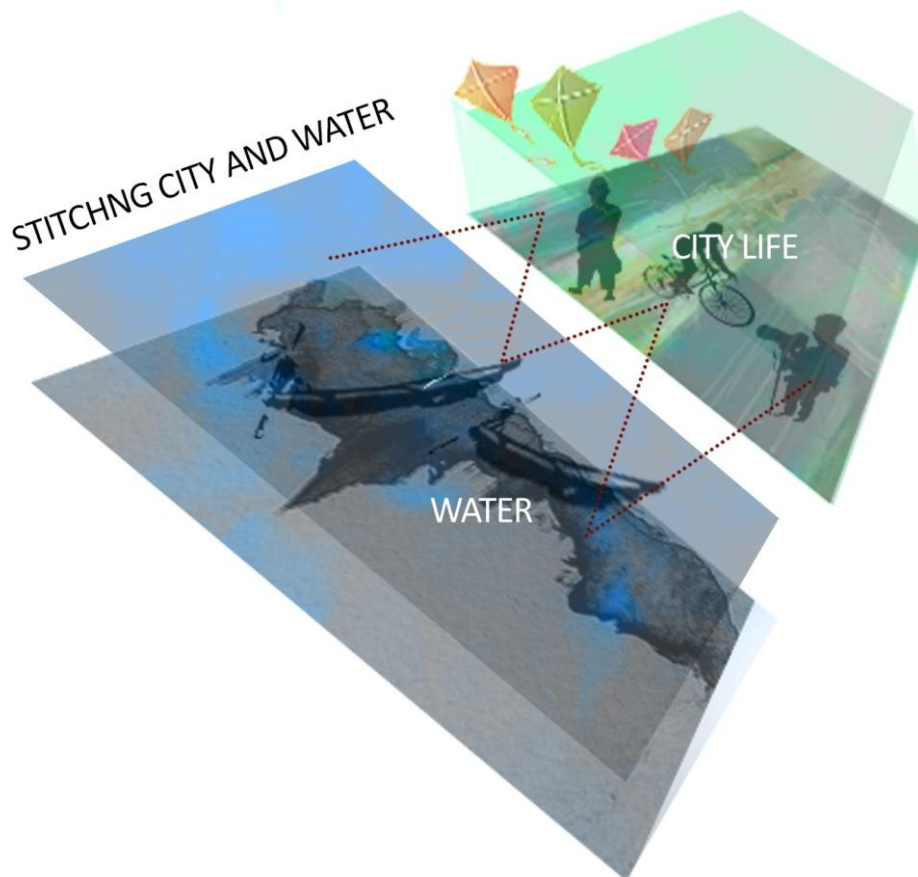


fig: stitching land and water

7.2. Design development:

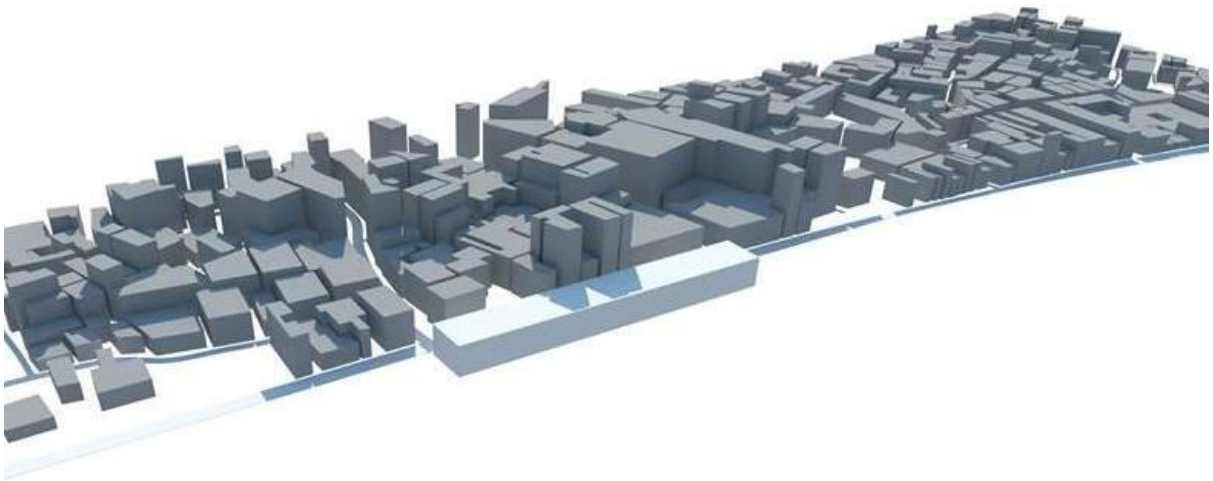


fig: Linear mass along the site considering the site alignment

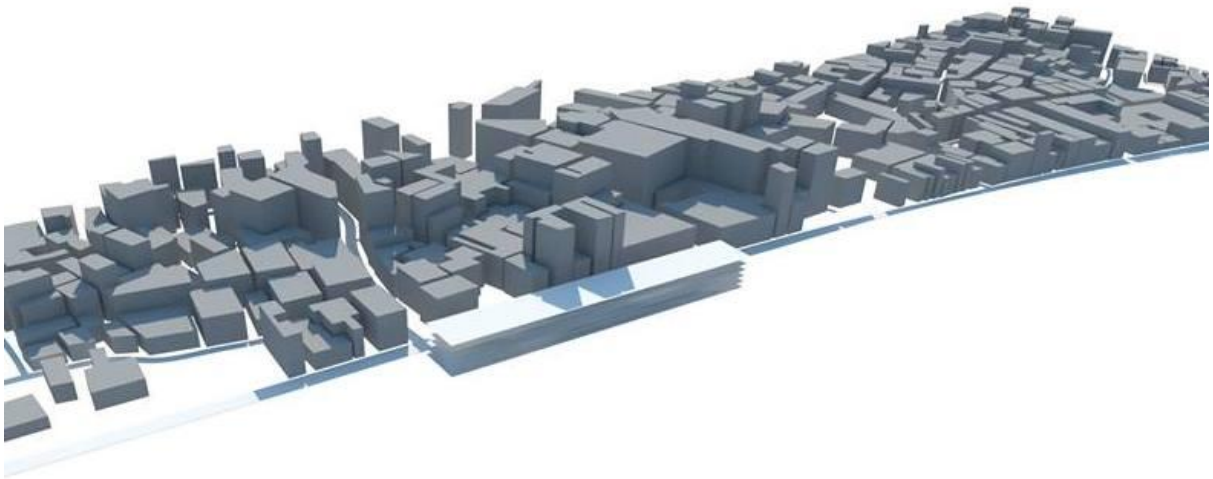


fig: transparency created by adding multiple layers to ensure porosity and vista towards the water instead of blocking



fig: form cut considering the site forces, force from water, from the city

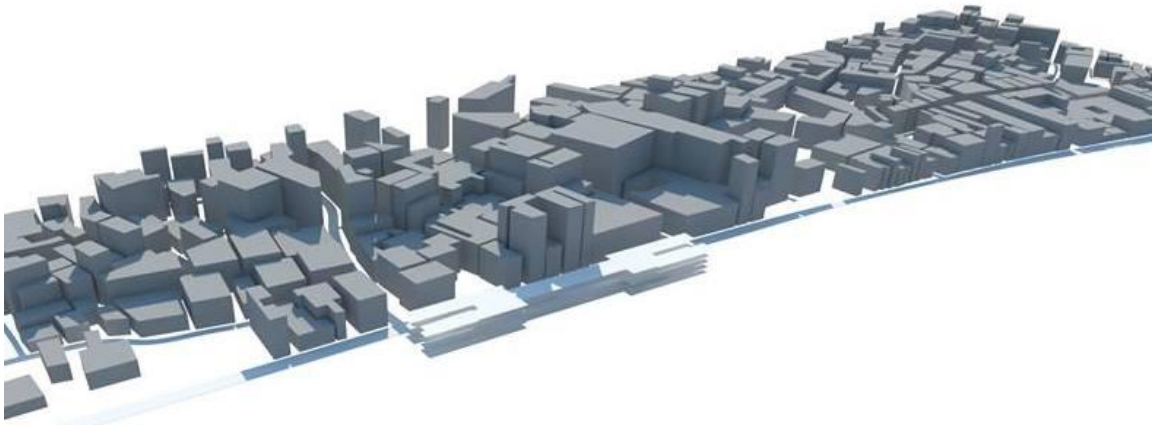


fig:form inviting both the riverfronts to incorporate the riverfronts and activities with the form

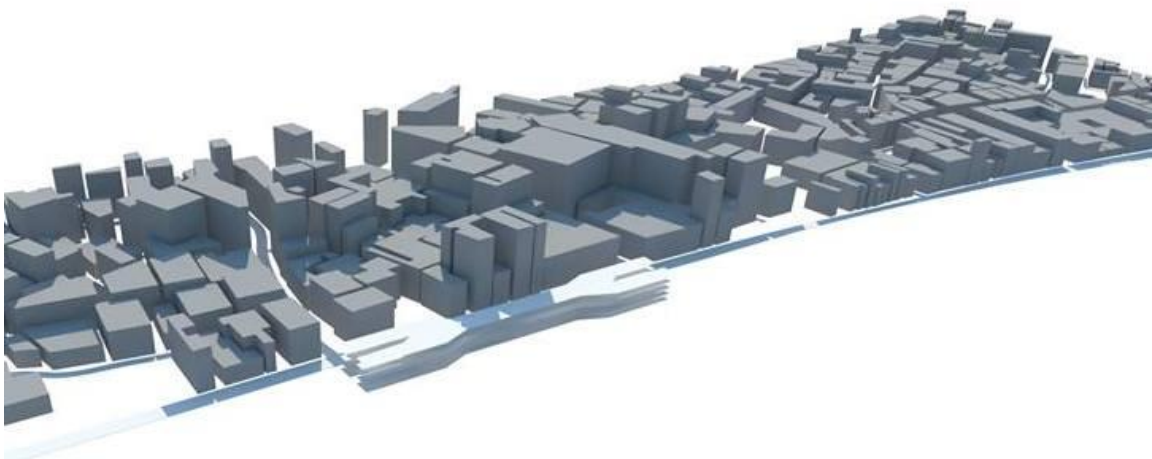


fig :Form cut in angles from different site forces and programmatic solutions

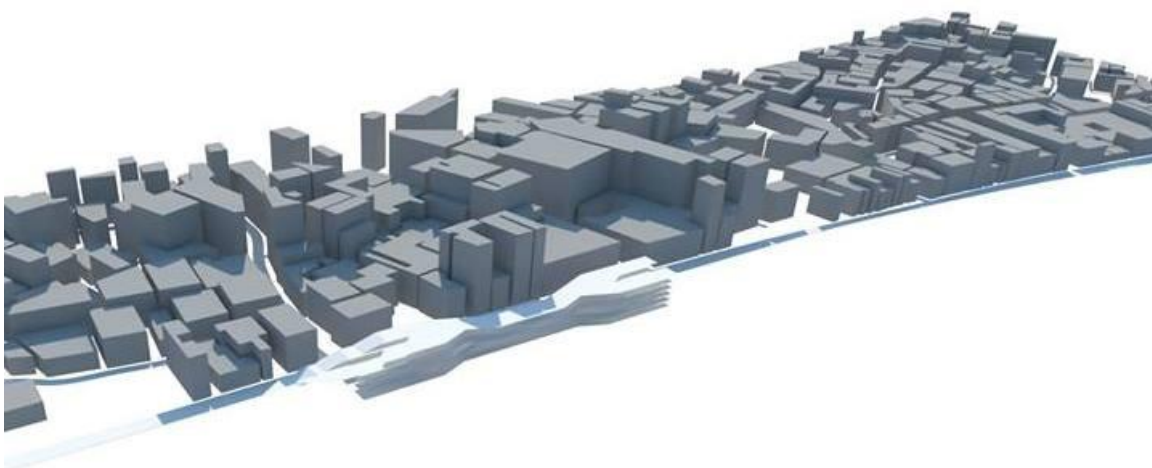


fig: exterior circulations added to merge the form with the riverfront and to ensure public gathering

7.3. Masterplan:



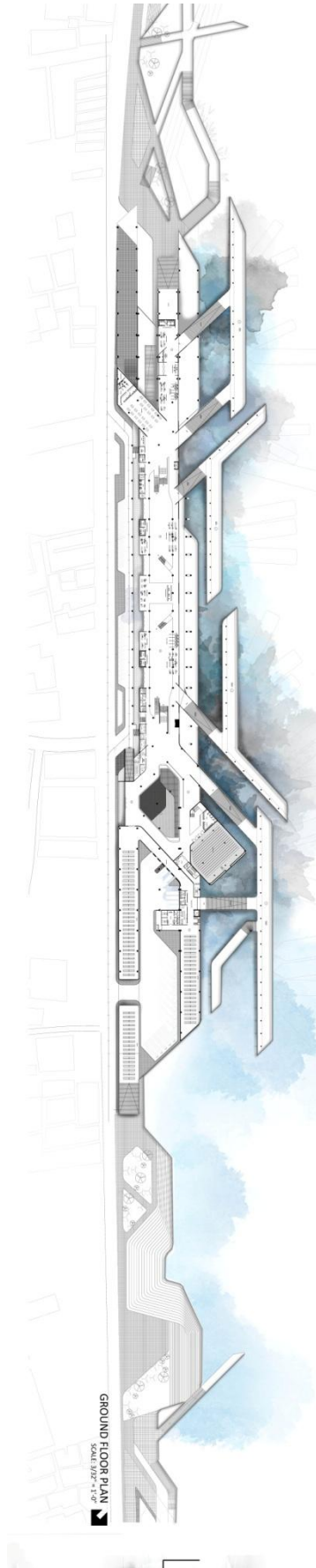


fig: Ground Floor plan

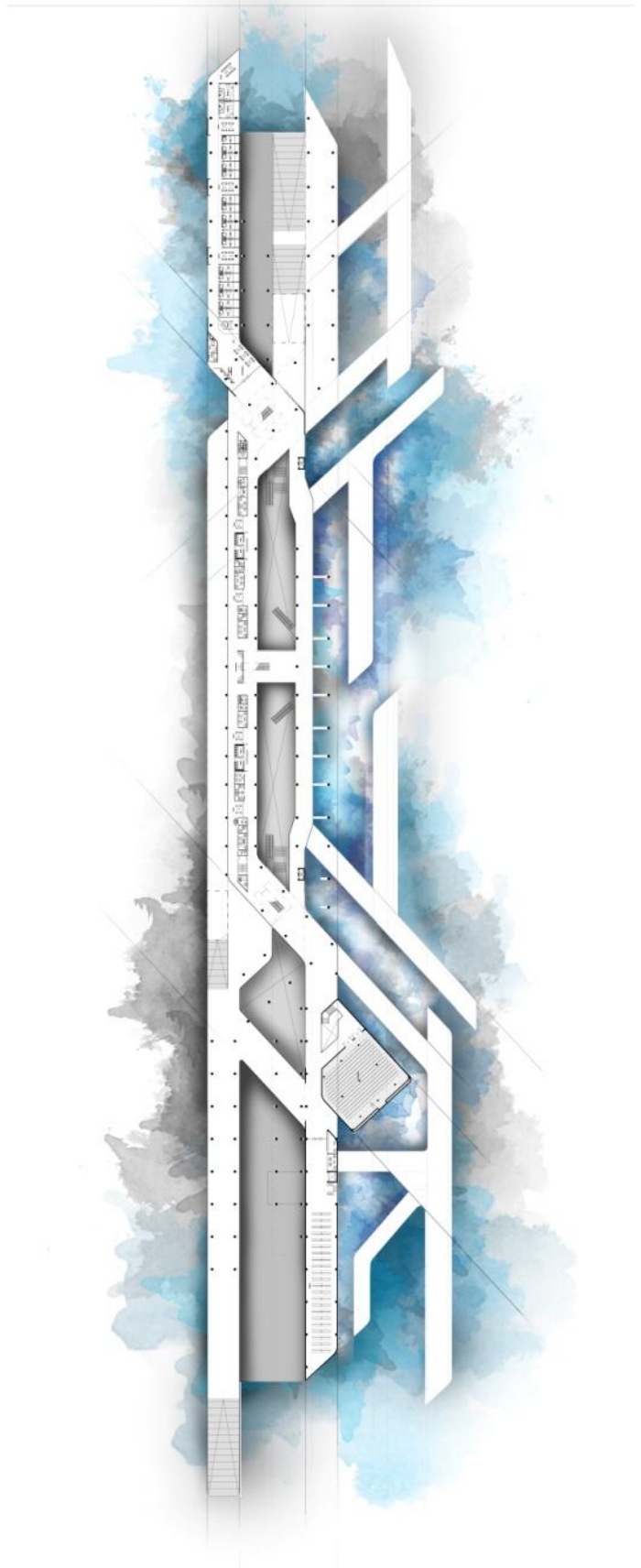


fig: plan at +17'

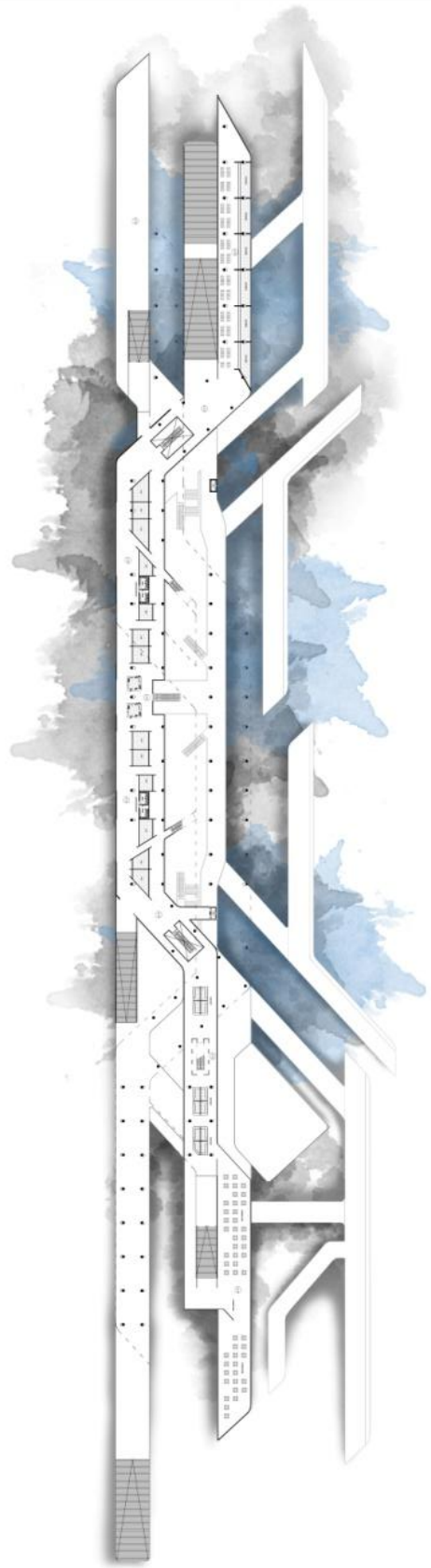


fig: Plan at + 29'

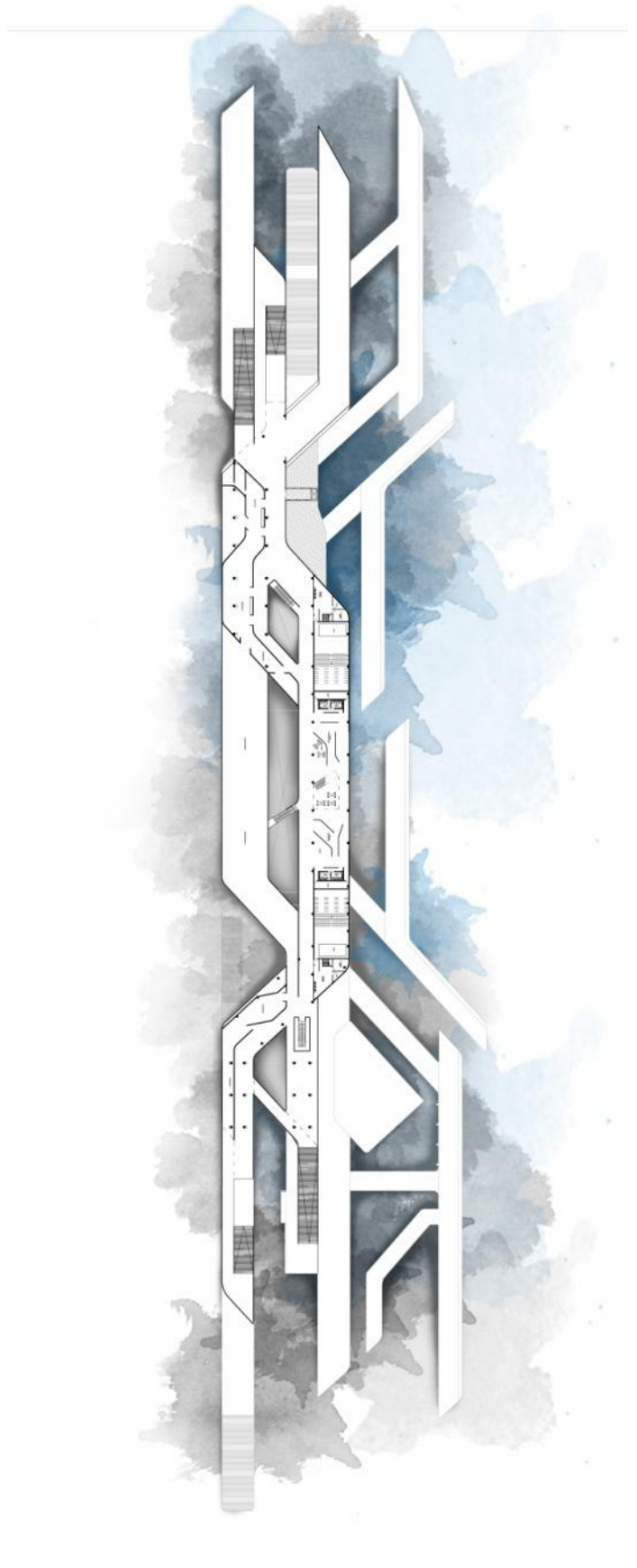


fig: Plan at +41'

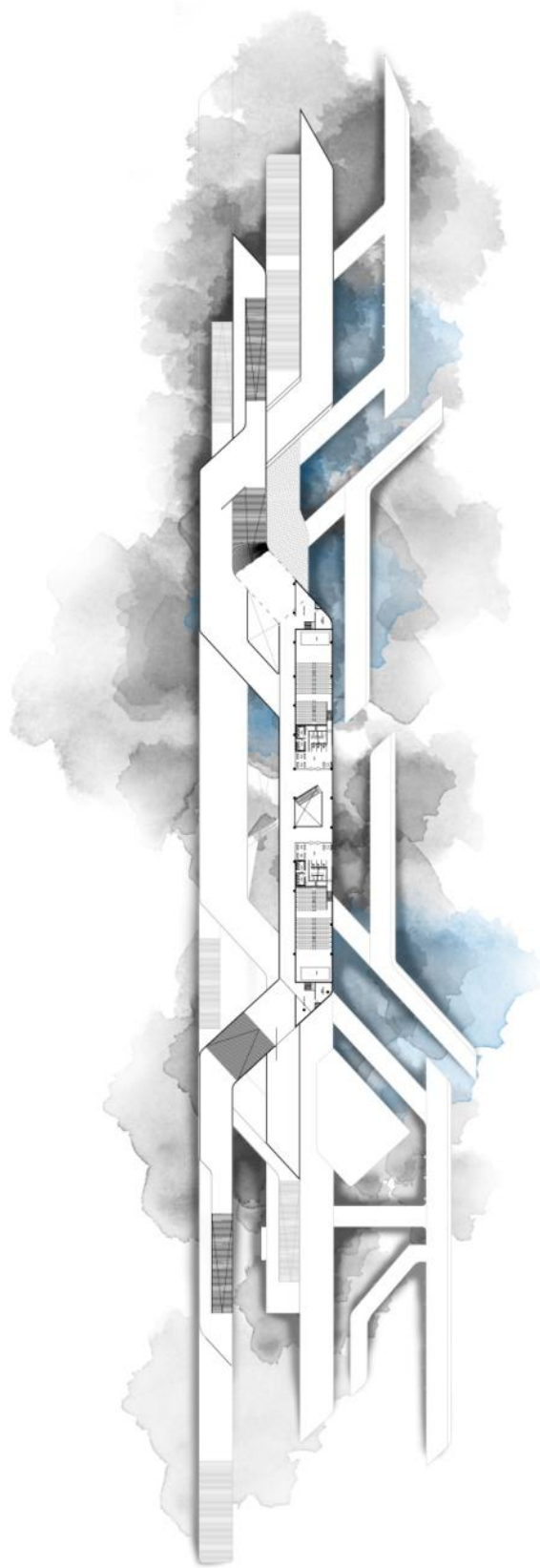


fig: plan at +53'

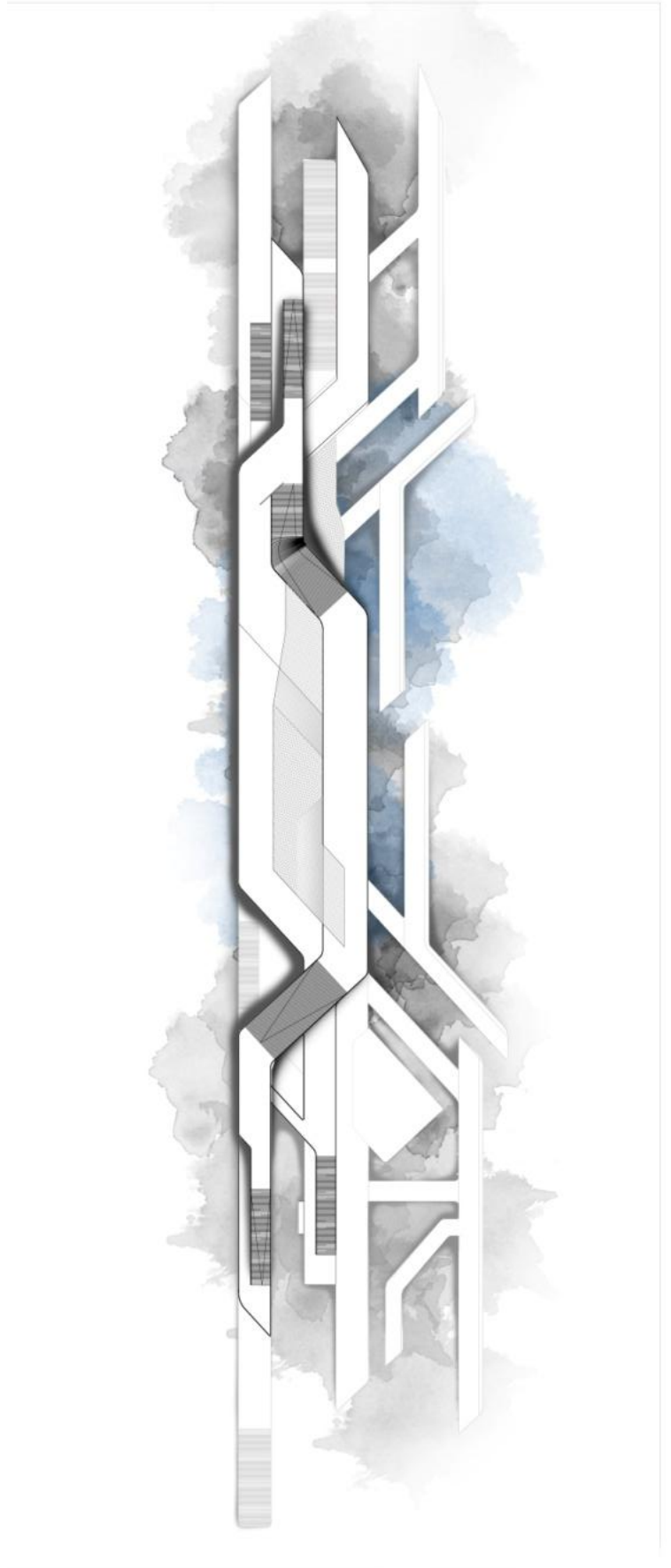
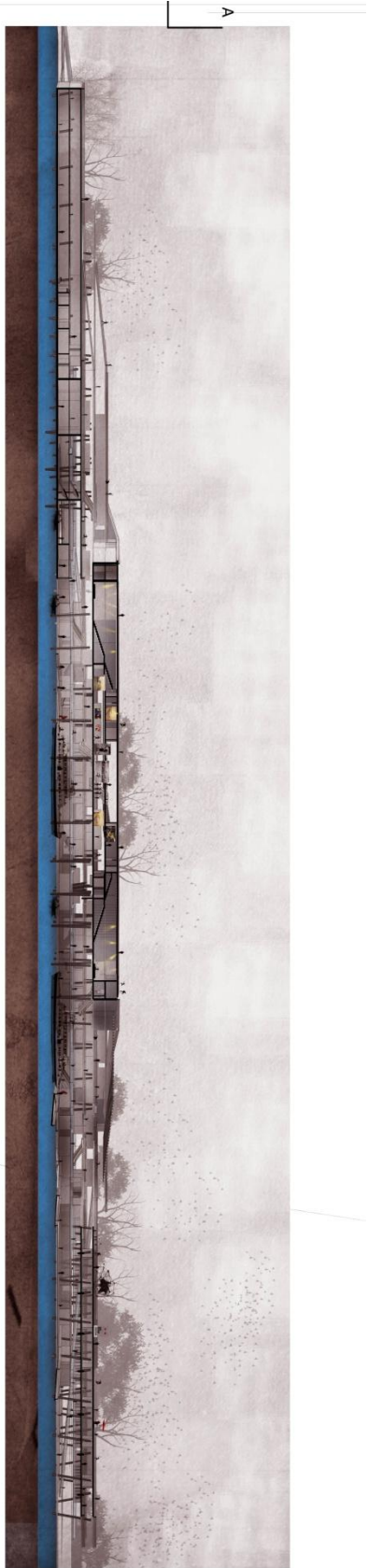


fig: Root Plan

7.4. Sections:



7.5. exploded exono:

