

Karnophuli River Front Development, Chittagong, Bangladesh

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ABSTRACT: In Bangladesh there are so many rivers. Every river has some specialty and historical background. That is why the river can be an attractive place for recreation and social interaction. The Karnophuli riverfront development project has taken to develop the condition along the river bank and to increase the natural beauties of the river as well as the surrounding areas. Though Chittagong has various natural resources and it is naturally a beautiful city but it has lack of planning orders which gradually make this beautiful city so much hazy, inconvenient and intolerable. The unplanned situation of the Patenga-Sadarghat-kalurghat has been reducing the beauty of the river as well as the city. This study is prepared to provide some recommendation and some design to enrich and beautify the bank of the Karnophuli River (west side) so that the people of the Chittagong city can go there and can enjoy the beautiful scenario of the river.

KEYWORD: River front, Development, Karnophuli, Recreation, Social interaction

I. INTRODUCTION

Background of the study : Bangladesh is a riverine country. The total area of this country is 147,998 sq km. among which 13,830 sq km water land. About 800 rivers including tributaries flow through the country constituting 24,140 km of water way. Most of the country's land is formed through silt brought by the rivers. Some important rivers in Bangladesh are Padma, Meghna, Jamuna, Brahmaputra, etc. Karnophuli is one of the most important rivers in this country. Chittagong which is the main port and second largest city of Bangladesh is located on the banks of Karnophuli. With the increased urbanization in city, the river is also experiencing various developments and needs emergency attention for controlled development to project the haphazard construction and river pollution.^[1]

II. OBJECTIVE AND SCOPE OF THE STUDY

The goal of the study is to propose development activities in the front side the west of the Karnophuli river of Chittagong. Study focus on some development activities in the west side of the Karnophuli river of Chittagong such as potential and pedestrian site beautification. This approach may convince the west side to tourist spots in Chittagong.

III. METHODOLOGY

Topic Selection: The selected project name is "Redevelopment plan for Karnophuli river front" under the course "Urban Planning Techniques Studio".

Selection of the Study Area: After selecting the topic a study area is needed for the study. The project area is the western bank of the Karnophuli River starting from Kalurghat Bridge to Potenga.

Analyzing existing situation: By analyzing the existing situation, the condition of the study area is learned along with the position of building and their uses (commercial, industrial, residential), area of port, open space and aesthetic beauty of the river.

Problem identification and scope of the studies: After analyzing the study area we select the problem and scope of study area are identified. What problem it is facing today and what are the scopes that are destroying day by day. Then the goal and objective of the work is decided.

Settling of goal

After analyzing the project the goal are settled the goal of this work is to prepare a suitable redevelopment plan for Karnaphuli river front in Chittagong

Literature review: A literature review is a body of text that determines the aims to review the critical points of current knowledge including substantive findings as well as theoretical and methodological contributions to a particular topic. Literature reviews are secondary sources, and as such, do not report any new or original experimental work.

Data Collection

There are two types of data collection process. They are

- [1] Primary Data Collection
- [2] Secondary Data Collection

Primary Data Collection: Primary Data is collected through visual survey. Data are also collected by photographic survey. Primary data also collected from discussion with local people. Then data has been analyzed.

Secondary Data Collection: Secondary data have been collected from CDA (Chittagong development authority), CCC (Chittagong City Corporation), and AUTOCAD map and port authority.

Data analysis: After collecting the primary and secondary data one should have performed the data analysis process...

Recommendation: After analyzing data some plan will be prepared including ample car parking facilities, boat club, landing facilities, toilet, dressing & sitting arrangements, and others.

Conclusion: Finally prepared a report is prepared on this topic which helps to understand this base map and the overall work.

IV. LITERATURE REVIEW

Riverfront (Re) development: In general, a riverfront is the zone of interaction between urban development's and the River and a riverfront area is considered as a unique and irreplaceable resource where it is the interface between land, water, air, sun and productive plants. Moreover, the riverfront is a place integrating land with water and having a natural attraction to people. Waterfront development refers to any development in front of water and a water body; a river, lake, ocean, bay, creek or canal. In the development area, considered that a waterfront development may not necessarily need to be directly fronting water but may only need to look attached to the water. They believe that commanding a view of water can still be considered as a waterfront property. [2]

Riverfront Development practice in Bangladesh



Photo1-Hatirjheel-Begunbari project

In Bangladesh the Government has introduced some important projects. For Example Hatirjheel-Begunbari project, Padma river front development in Rajshahi city, Bongobondhu Eco-park project in the bank of Jamuna River etc. Hatirjheel-Begunbari project area included 46 acres of Rajuk’s land, 34 acres of other government agencies, and 81 acres of Court of Wards and 141 acres of private land. Hatirjheel-Begunbari project to be opened on Dec 15 Rajuk’s, assisted by the Local Government and Engineering Department (LGED), Dhaka Wasa, Special Work Organization of Bangladesh Army, is implementing the project costing over Taka 1971 crore. [3]



Photo 2: River front besides the Bongobondhu Bridge

3.4. Guideline for the development related to rivers and river reserves

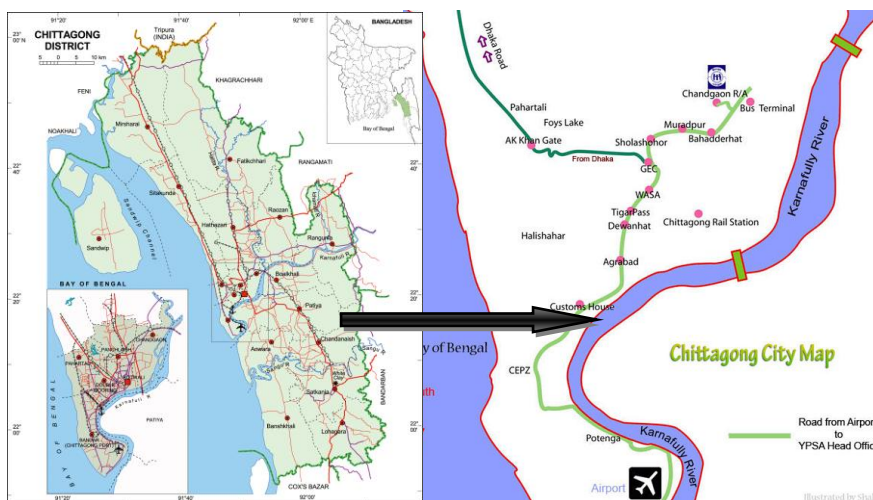
Specifically, the guideline for riverfront development concept aims four objectives, as follows:

- [1] To explain and encourage the implementation of guideline in the development planning of riverfront areas.
- [2] To be a reference and a guideline for any development near to the river areas.
- [3] To provide uniform guidelines for all parties involved in the riverfront development process.
- [4] To control all types of riverfront developments.

IV. EXISTING CONDITION

Introduction: Karnophuli River the largest and most important river in Chittagong and the Chittagong hill tracts. In Chittagong the Karnophuli made a most significant change in its course from Kalurghat downwards... This fact is of much historical importance in so far as it helps locate the eastern bounds of the town during the Mughal and early British period.

Location: Karnophuli is the largest and most important river in Chittagong and the Chittagong Hill Tracts. It is 667 meters (2,188 ft)-wider river in the south-eastern part of Bangladesh which is originate from the Lushai hills in Mizoram, India.. It flows 270 km (170 mi) southwest through Chittagong Hill Tracts and Chittagong into the Bay of Bengal. The mouth of the river hosts Chittagong’s sea port, the main port of Bangladesh. [4]



Map3: Location map of Karnophuli River

Project Area: The project area is the western bank of the Karnophuli River stretching from Kalurghat Bridge to potenga.

Karnophuli River pollution : The polluting industries of Chittagong, the second largest city of Bangladesh, such as 19 tanneries, 26 textile mills, 1 oil refinery, 1 TSP plant, 1 DDT plant, 2 chemical complexes, 5 fish processing units, 1 urea fertilizer factory, 1 asphalt bitumen plant, 1 steel mill, 1 paper mill (solid waste disposal hourly 1450 m³), 1 rayon mill complex, 2 cement factories, 2 pesticide manufacturing plants, 4 paint and dye manufacturing plants, several soap and detergent factories and a number of light industrial units directly discharge untreated toxic effluent into Karnophuli river. From the survey of effluents from different industries, it has been found that the discharge is generally composed of organic and inorganic wastes.

Marine pollution: All kinds of waste either in solid or liquid form are dumped into the water, resulting in the deterioration of the aquatic environment. Most of the pollutants are in sediment form, municipal and industrial wastes, agrochemical residues and pollutant discharges from ships and boats although this pollution has existed over the years, information regarding the nature of pollutants and the damage. They cause to marine fisheries and other resources are very scant.



Photo 4: Pollution of water from ship discharge

Bangladesh is not an industrialized country. The considerable discharge of untreated industrial effluents has led to the degrading of the aquatic and marine ecosystems of Bangladesh and has had an impact on fisheries. The second largest urea plant in the country has recently been established on the south bank of the Karnophuli River. It has provision for treatment facilities, but the plant is reported to still contribute to river pollution

Pollution by waste disposal: There is no proper waste disposal system in the bank of the Karnophuli River. Different types of waste like human waste, Residential waste, unused products, fertilizer, Bags, oil etc is thrown into river. There is also many hanging latrine in the bank of the river. While using the toilet, the filth goes to the river and pollutes water. Again the people of the area bath in the river though the latrine is situated beside the bath and swimming places. This is very harmful for their health.



Photo 5: Pollution by waste disposal



Photo 6: Illegal encroachments

Illegal activities: In Sadarghat area, different illegal activities increase day by day in river side. Many people playing card with money. Sometimes they playing card in different illegal way. Local people have no safety way in this area by these illegal activities. Tin-shed and concrete structure builds after filling up a vast stretch of Karnophuli River at Bakolia in Chittagong, Bangladesh. Encroachment still continues on the bank of

Karnophuli River posing a threat to the River upstream towards the fourth bridge on it. After encroachment of a vast stretch of river bank in Char Bakolia illegal occupants' in a latest move are now constructing concrete structures and filling up the water bodies of Karnophuli river..



Erosion: Another problem in this area is erosion in river bank of the Sadarghat is increasing day by day. Crease causes of erosion, there is no embankment of the river side. There is no enough deck for good loading and unloading. Though existing deck is made of wood this deck is destroyed any time which create a great lose in economics field. For this reason the existing situation of the deck can have vulnerable in any time.

V. ANALYSIS

Karnophuli River Front Development Project and Detailed Area Plan: The River Karnophuli is the pride of Chittagong. Virtually the whole Chittagong is laced and crisscrossed by the river Karnophuli. Communities large and small along the Karnophuli River have started discovering their river heritage, turning back to their riverfront and recognizing them as tremendous community and economic assets. People with more close to their home recreation facilities, including riverfront trails, boating and nature viewing are included here. In view of mass demand Chittagong Development Authority (CDA) has decided to develop a project on uplifting of the bank of the Karnophuli by involving the communities and all other stakeholders involved in the process

Karnophuli River Front Development Project and other countries

We read some project in water front development and which principle they emphasized most. In Malaysia they select ten principles for sustainable water development. They emphasized on

- ✓ 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.
- ✓ Planning in public-private partnerships speeds the process.
- ✓ Public participation is an element of sustainability.
- ✓ Waterfronts are long term projects.
- ✓ Revitalization is an ongoing process.
- ✓ Waterfronts profit from international networking. ^[12]

Expected End of Project Situation

Economic Benefit

- Improved Link within City
- Creation of jobs
- Increase the quality of life style
- Enhance property values
- Expand local business
- Increase local tax revenues
- Attract or relocating businesses
- Promote local community

Environmental Quality Impact

- Ecological functions of the Karnophuli River will be maintained / improved.

Social Impact

- The Development will increase social interaction amongst people.
- It will encourage people to visit the riverbank.
- Participatory planning process will encourage community ownership of the project.

Target Beneficiaries

- People of Chittagong; and
- Tourists

Preliminary Planning Concept

- The bank will be developed with a sense of belonging of Chittagong people;
- River-side drive will be a pleasant experience to all visitors which will be connected to City Road Network as well as trails and different activities;
- Basic concept of beautification is to bring the river back to the front of the city's landscape;
- Cyclone/ Tidal flow will be considered in the planning process;
- Beautification will be with manicured gardens and tasteful illuminations;
- There will be something for each age group and community;
- Ample car parking facilities;
- The entire stretch will be dotted with several floating restaurants;
- Open-air theatre will be developed in natural environment;
- Water based recreational facilities will be developed in the project.
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VI. PROPOSAL

River Network: A large number of economic activities take place along the Karnophuli River using the numerous Ghats situated along the river. These Ghats play an important role in fish supply to the local and national market, provide riverine communication through trawlers and small ships between Chittagong city and its surrounding districts. There should be a wide pedestrian footpath (at least 30' to 40') along the river side so that people can walk easily and they can sit and gossip freely with the other people.

Embankment and Road along Karnophuli River : In order to provide protection to the riverbank and to enhance traffic circulation in the southern part of this zone, an embankment has been proposed by CDA in DAP between Strand Road and intersection of the Karnophuli Approach Road at Shah Amanat Bridge. A road should be within Shah Amanat Bridge to Kalurghat Bridge. The road should be located 300ft opposite from the river bank. Beside this road 5 ft road curve should be given and then landscaping should be started.

Improvement of River Ghats: Considering that inland water transport along Karnophuli River will continue to play an important role in the future, it is proposed that all the river Ghats and areas surrounding these should be improved and modernized to better serve the traffic which uses them.

Leisure, Recreation: About 1705 acres of the land of the Parkir Char area are proposed for the Beach related some of the water bodies need to be improved by plantation on bank sides. Such pond can be used for community used. There is no sufficient facility for recreation activities in this area. For better mental and health improvement of the local people it is mandatory to provide land for different types of recreation activities like parks, play ground, green and sports complex. Taking into consideration this demand for recreational purpose the present study of DAP recommends a certain amount land in the study area. An area eastern side of CDA Kalpalok Residential area up to Karnophuli River bank, may be developed as a river side amusement such as sport, leisure centre etc. The triangular area south of the industrial area and near to Karnophuli River may be reserved for an urban park. A butterfly park may be incorporated which may operate as a commercial venture.



Photo 7: Sitting arrangement



Photo 8: Road along the river side

Parks and Open Spaces: To enhance the city environment and make it habitable, it is necessary to build some parks and new Urban Green blocks in this zone. Some such locations are at Chandgaon crossing, near Kalpalok residential area, and south of Noa khal mouth. This green park should be kept open for public visit and leisure. There will be a park beside the Karnophuli Bridge which will be the recreational place for people. The areas of this park will be 2.5 Acres. Another park will be in the side of Kalpalok residential area. This will be 7.5 Acres.

Shops: There should be some small shops. For example-clamps necklace, shops of *fuchka*, *Chotpoti*, various types of flowers shops should be available along the river side. But there should not be any large shops or departmental shops in the river side.

Vehicles: Motor vehicles are not allowed in the footpath regions. If anyone wants to go with motor vehicles then he/she must park it in the parking lot.

Picnic spot: The river side can be turned into an attractive place if any picnic spot are available in this side. The potenga sea beach and the parker char is the most attractive and beautiful place for picnic spots. Some special project should be taken to develop this place.

Boat cruise: There are no facilities to travel with boat along the river side. So there should be some option to travel with boat. This will create an employment of the people in this region.

Bus and Truck Terminal: There are two sites that have been recommended for transport related use. The site located at Tack and another site located on the north of Silver Crossing has been designated for inter district bus terminal and truck terminal respectively. The terminals are to be developed taking into account environmental enhancement and proper traffic circulation. It is mandatory to design a green buffer of trees surrounding the terminals.

Illegal encroachment: Any illegal development, infrastructures are allowed to the river side. Some special rules should be made to protect illegal encroachment along the river side.

Green belt along River and Khal sides: The south bank of the Karnophuli River needs to be protected from saline water intrusion and storm surges by polders. A green belt is recommendation along the embankment. All major khals, such as Shikolbaha khal should be rehabilitated; backlines should be marked and fixed. Along the backline there should be a buffer zone of green belt, up to 100 ft. wide on both sides.

The east bank of the Karnophuli River needs to be protected by embankment from saline water intrusion. A green belt is recommendation along the embankment. All major khals should be rehabilitated; back lines should be marked and fixed. Along the back line there should be a buffer zone of green belt, up to 100 ft wide on both sides.



Photo 9: Proposed Green belt along River



Photo 10: Proposed Landscaping

Treatment Plants:Major part of the area, particularly adjacent to the Karnophuli River, has been proposed to develop for industrial use. There is always a risk of pollution of the Karnophuli from the industrial units. All polluting industries must have treatment plant, and must not discharge into the river without treatment. In the Karnophuli river front development project we provide a treatment plant. This treatment plant project is situated in Chaktai Channel which total area 3 acres. In this project we provide these plants to purify the water of industrial waste.

Bus and Truck Terminal:Karnophuli bridge south side has been designated for inter district bus terminal and truck terminal respectively. The terminals are to be developed taking into account environmental enhancement and proper traffic circulation. It is mandatory to design a green buffer of trees surrounding the terminals. The area of the bus and Truck terminal is 5 acre.

Pedestrian walkway:In the whole area (Kalurghat to Sadarghat).There will be a pedestrian walkway. This walkway should be used for pedestrian purposes. No vehicles are allowed in this walkway. The wide of the pedestrian would be 16 ft. various types of landscaping and monument should be in side of this walkway. The walkway should not be straight. It should be curved so that it removes monotonous view.

Resort:In the Char area there will be two or more resort which will be connected with Cable Car or boat facilities. This area will create beauty as well as economic benefit.

Art gallery : An art gallery will be beside the kalpolok residential area. Area for art gallery will be 20000 sq. ft.

Open Theatre:An open theatre will be in the side of the river bank. And beside this theatre many public facilities will be given.

Parking:Parking is the safety place for the keeping cars. In the Karnophuli river front development project we provide parking facilities in the road side. In this project we provide place for the parking the cars in safety who will come here to visit. Parking is the act of stopping and leaving it unoccupied. Parking on one or both sides of a road is often permitted, though sometimes with restrictions. Parking facilities are constructed in combination with some buildings, to facilitate the coming and going of the buildings' users. Two parking lots are provided. One is situated only little distance from the proposed bus terminal and another is beside the Kalpolok residential area which will serve the vehicles of the commercial area and the people who will visit this area. Both parking will serve minimum 80-100 vehicles.

Archeology museum:Public institution dedicated to preserving and interpreting the primary tangible evidence of humans and their environment. Types of museums include general (multidisciplinary) museums, natural-history museums, science and technology museums, history museums, and art museums. In Roman times the word referred to a place devoted to scholarly occupation (Museum of Alexandria). The public museum as it is known today did not develop until the 17th-18th century. Museum is the place where people can know about the real historic background and monument of ancient Chittagong. In the Karnophuli river front development project we provide the Archeology museum where people can gather knowledge about the historic books and historic monument. On this project in Kalurghat area there is an Archeology museum which total area is 1 acre. In the

Archeology museum the ancient history and ancient monument should be presented of Chittagong region as well as whole Bangladesh.

Stadium and gymnasium:A stadium and gymnasium will be located beside the commercial place. The area for the Stadium 2 acres and the area for the gymnasium will be 1500sq. ft. the stadium will be used for indoor games purposes.

VII. CONCLUSION

This paper aimed to explore the effectiveness of Karnophuli riverfront development in Chittagong, Bangladesh. The analysis and the proposal part confirmed that the developer's level of awareness of the regulations, which directly or indirectly relate to the control of riverfront developments. The majority indicated that they were somewhat familiar with the regulations. Nevertheless, bear in mind, some regulations were designed specifically for certain areas, and some may be not necessary to others. Moreover, the results showed that Chittagong does not currently have sufficient regulations and guidelines to control riverfront development. Now there are some plans for the Chittagong to control the haphazard growth of buildings. For example there is a master plan for Chittagong city, there is structure plan, detail area plan etc. But in terms of riverfront development, there is no specific plan to control or to beautify the Karnophuli river front development. More than that, the failure of the Bangladesh government and the responsible institutions, specifically to enforce the regulations and guidelines, has resulted in unsuccessful riverfront developments in this country. Therefore, in order to strengthen regulations and guidelines for riverfront developments in Chittagong, the government and the policy makers are required to do more with the regulations in the future. In this paper, we also identified several components that should be included in riverfront development guidelines in an effort to practice riverfront developments in a good manner. Improvement is required in order to enhance and maintain sustainable riverfront developments in the future, in this country.

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