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Riverfront Development for Rejuvenation of Morna River as a Public Realm, Akola

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Abstract: ***This abstract discusses riverfront development as a method of revitalizing the Morna River and transforming it into a lively public domain. The Morna River, which flows through Akola, Maharashtra has long been neglected and degraded, resulting in a decrease in its ecological health and potential as a recreational and cultural resource. The proposed riverside development intends to solve these issues by taking a comprehensive strategy that incorporates environmental, social, and economic factors. The project aims to create an engaging and sustainable public realm along the riverbanks, with a variety of services and activities for both inhabitants and tourists.***
Keywords: Morna river, urban development, Ecological preservation.

I. INTRODUCTION

Riverfront development has received a lot of attention in recent years as a potent technique for urban revitalization and transforming neglected bodies of water into dynamic public areas. This method not only improves the aesthetics of cities, but it also provides significant social, economic, and environmental benefits to the populations that live along the riverbanks. The Morna River at Akola, Maharashtra has long been neglected and degraded, resulting in a decrease in its ecological health and potential as a recreational and cultural resource. This research paper explains the concept of riverfront development as a means to rejuvenate the Morna River and establish it as a dynamic public realm. The essential aspects of the planned riverfront development plan are outlined in this article. The conversion of the Morna River into a lively public realm has the potential to rejuvenate the surrounding area, improve inhabitants' quality of life, and leave an impact for future generations to enjoy.

II. LITERATURE STUDY

The goal of a literature review is to increase a researcher's knowledge of the field of study, including fundamental concepts, theories, methodologies, and literature on current trends, cutting-edge advances, rules, and norms, among other things.

A. Waterfront Development

The word meaning of waterfront gets through as “the part of a town or city joining a river Lake harbor etc”. *(Source: Oxford American dictionary of current English in English)’*
Moretti (2008), The word “waterfront” means “the urban area in direct contact with water.
Yasinet al. (2010) Indicates that waterfront is defined generally as the area of interaction between urban development and the water.
Hou (2009) Describe the waterfront area as the conflux area of water and land
In the literature instead of the term water it has been referred to by many different words such as Riverside River is water age City port harbor front and river front extra.
Breen and Rigby (1994), Sairinen and Kumpulaine (2006) and Morena (2012) implies the same thing with waterfront and urban waterfront. According to these, the waterfront identifies the water edge in the cities and towns or urban areas of all sizes. The water body may be a river, lake. Ocean bay, creek or canal” or artificial.

B. Phases of Waterfront Development

As per history record water friends are the most ideal living space for human beings to be able to provide food transportation, settling, defense and learning etc. Therefore from the history of civilization to today many cities are established along the water edge. Riverfront cities have historically evolved through conditions generated by mutuality between water and landscape. Urban waterfront has historically been the hub of transportation, trade and commerce in the city.

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C. Emergence of Waterfront Cities

The city and the shoreline of the early colony were interconnected. Water played a significant role in both transportation and trade. The movement of people and goods is made possible by waterways. These towns were built on a safe harbor code. There are now just a few paths that converge at the jetty along the shore. after which a street plan was gradually put in. The growth of the streets was sped up by the new street plan. Even as the city expanded and changed, the community remained connected to the waterfront road.

D. Growth of Waterfronts

Due to a growth in commercial activity along the coast during the first port era, the village transformed into a city, and there was urban development. State and trade have increased the importance of the waterfront. A lively street is created along the seashore by the addition of several amenities, including office space and services for commercial activity.

Along the shoreline, several industries were built, and as a result, the water is now blocked from the streets. Rapid urbanization led to the introduction of railroads as a new form of transportation to meet demand. They needed space from the waterfront to build the new rail road network. As a result, the core city is no longer connected to the shoreline.

E. Deterioration of Waterfront

Up to World War II, all loading and unloading operations took place in the port area; however, as containerization technology advanced, the volume of cargo and the rate of loading and unloading increased. Following World War II, there has been an upsurge in marine sector expansion and a need for additional areas. As a result, port activities moved outside of the city. Because of the city's water and air pollution, many manufacturers started to depart. Old Port's transit function was therefore gone, and the waterfront field fell into neglect. People favored roads to railroads, which further widened the chasm between the people and the riverside. Rail lines beside the lake were not maintained. Due to the closure of industrial facilities and investors' decreased interest in the rail industry.

F. Redevelopment of Waterfront

The dilapidated ancient port's waterfront sections have a number of issues. The pollution brought on by the industrial activity around the port was the initial issue. The second issue was the industrial area's infrastructure, which was bordered by abandoned port buildings. Highways and railroads severed the connection between the waterfront and the City once warehouses were moved outside of the city. There is less contact between the city and the shoreline. People started to care more about the environment and natural resources after independence. People intended to restore the riverfront's visual attractiveness, which had been ignored for a year. As a result, the local government and private developers started restoring and developing riverfronts. The possibility to revitalize the existing waterfronts and create public spaces is presented by redevelopment.

III. CASE STUDY

A. Sabarmati Riverfront Development

One of the top consultancy companies in the world, KPMG (Klynveld Peat Marwick Goerdeler), listed the Sabarmati Riverfront Development Project as one of the "100 Most Innovative Projects" in the field of urban regeneration that make cities sustainable and livable in 2012. HUDCO National Award 2012 for innovative infrastructure development for the riverside project was given to Ahmedabad Municipal Corporation (AMC).

The project involves reclaiming about 202 hectares of land over a 10.5 kilometer length of both Sabarmati banks. A water management system is in place to reduce floods and clean the river with modern sewage treatment facilities. In order to enhance the city's waterfront, the Sabarmati River Front Development Corporation Limited (SRFDCL) was founded. For planning and execution, SRFDCL contacted a variety of NGOs and citizen organizations. Construction, upkeep, operation, and transfer were the steps in the implementation process. Contractors from the private sector who were chosen based on a set time and rate were under the supervision of Independent Third Parties appointed by SRFDCL. The project's funding is allocated from a variety of sources, including equity investment, loan funds, and land sale earnings.

B. Objectives

1) *Flood Mitigation:* The primary objective of the project was to control flooding in the city by constructing a network of retaining walls, embankments, and sluice gates along the riverfront.

2) *Environmental Restoration:* The project focused on improving the river's water quality, restoring the natural ecosystem, and enhancing biodiversity.
3) *Social Infrastructure:* Creating public spaces, gardens, parks, promenades, cultural centers, and sports facilities for citizens to enhance their quality of life.
4) *Economic Development:* Facilitating investment opportunities, attracting tourism, and promoting economic activities along the riverfront.
5) *Project Implementation:* The project involved several phases, including land acquisition, construction of retaining walls and embankments, river channelization, and development of public spaces. The construction of walkways, cycle tracks, and bridges improved connectivity and accessibility along the riverfront.
6) *Environmental Sustainability:* To improve the ecological health of the river, wastewater treatment plants were established to prevent untreated sewage from entering the river. Additionally, the project involved extensive tree plantation, landscaping, and biodiversity conservation measures, enhancing the riverfront's ecological balance.
7) *Social Impact:* The creation of public spaces and recreational areas along the riverfront has provided residents with accessible and aesthetically pleasing environments. The riverfront promenade has become a popular gathering spot, hosting cultural events, festivals, and public gatherings. The project has also contributed to community development by creating employment opportunities and enhancing social interaction.
8) *Economic Development:* The Sabarmati Riverfront has attracted significant private investment, leading to the development of commercial and residential complexes, hotels, and shopping centers along its banks. The project has stimulated economic growth, generating employment opportunities and increasing revenue for local businesses.
9) *Challenges and Lessons Learned:* The Sabarmati Riverfront Project faced challenges such as land acquisition, resettlement of affected communities, and maintaining a balance between commercial development and environmental sustainability. The project's success can be attributed to strong governance, stakeholder engagement, and a holistic approach to urban planning.

C. Conclusion

The Sabarmati Riverfront Development Project has been a remarkable urban transformation initiative, rejuvenating the Sabarmati riverfront and revitalizing the city of Ahmedabad.
It has become a model for sustainable urban development, showcasing the successful integration of flood mitigation, environmental restoration, social infrastructure, and economic growth. The project has enhanced the city's livability, attracting national and international recognition as a landmark urban rejuvenation project.

IV. METHODOLOGY

Riverfront development is a comprehensive process that involves various aspects, including planning, design, infrastructure development, environmental considerations, and community engagement. Here is a general methodology for riverfront development:

A. Research and Assessment

Conduct a thorough assessment of the riverfront area, including its ecological, cultural, historical, and recreational significance. Identify existing land uses, natural features, and potential development constraints. Study the local regulations, zoning requirements, and environmental regulations governing riverfront development.

B. Stakeholder Engagement

Engage with local communities, government agencies, environmental organizations, and other stakeholders to understand their needs, aspirations, and concerns. Conduct public meetings, workshops, and surveys to gather input and feedback on the desired riverfront development outcomes.

C. Vision and Goal Setting

Establish a shared vision for riverfront development that aligns with the community's aspirations and the project's objectives. Define clear goals and objectives, such as enhancing public access, improving ecological sustainability, promoting economic development, and preserving cultural heritage.

D. Planning and Design

Develop a master plan that integrates various elements of riverfront development, such as parks, trails, recreational facilities, public spaces, commercial zones, and residential areas. Design the layout and spatial organization of the riverfront, considering factors such as floodplain management, access points, transportation, and connectivity. Ensure the design incorporates principles of sustainability, including green infrastructure, water management, and preservation of natural habitats.

E. Infrastructure Development

Develop or upgrade necessary infrastructure, such as roads, bridges, utilities, and stormwater management systems. Consider the installation of amenities like lighting, seating, signage, and public facilities (restrooms, picnic areas, etc.) to enhance the riverfront experience. Implement measures for flood protection and erosion control, if applicable.

F. Environmental Considerations

Conduct environmental impact assessments and ensure compliance with local regulations and environmental standards. Implement measures to protect and enhance the ecological health of the river, such as shoreline restoration, wetland creation, and habitat preservation. Promote sustainable practices, including green building standards, energy efficiency, and waste management.

G. Implementation and Management

Create a phasing plan to guide the implementation of riverfront development projects over time. Seek funding through public-private partnerships, grants, and other financing mechanisms. Establish a management framework to oversee the ongoing maintenance, programming, and operation of the riverfront, involving both public and private entities.

H. Monitoring and Evaluation

Continuously monitor the implementation progress and evaluate the outcomes against the established goals and objectives. Seek feedback from users and stakeholders to identify areas for improvement and make necessary adjustments to the development plans.
Remember that riverfront development should be context-specific and tailored to the unique characteristics of the area. Local regulations, cultural heritage, and environmental considerations should always be taken into account to ensure a sustainable and inclusive riverfront development.

V. STRATEGIES AND ACTION PLAN

TABLE I. STRATEGIES AND ACTION PLAN

Phase	*Strategies*		*Action Plan*	*Agencies / Organization*
1.	Restoration	Restoration of asadgarh fort Restoration of Ghats. Restoration of temple areas Restoration of river	Cleaning the premises of asadgarh fort. Providing strength to the fort. Cleaning of ghats among the river. Removing the unnecessary plantation from the river.	Municipal Corporation of Akola, Local Bodies, NGO's

Phase	*Strategies*		*Action Plan*	*Agencies / Organization*
2	Waste management	Domestic Waste water management. Installation of solid disposal system. Stormwater management installation of garbage disposal bins.	Provide STP for treatment of sewage generation from Akola city to avoid contamination of rivers. To stop bathing in river water & open defecation at bank of river. Proper disposal of human excreta and sewage. To stop garbage disposal into river drainage. Installation of in-situ nallah treatment so as to stop sewage entering into the river	Municipal Corporation of Akola Water resource department Local body & police department.
3	Encroachment	Resettlement of the encroachment areas. Rebuilt ghat along the rivers.	Relocate the settlement along the river bed.	Municipal Corporation of Akola
4	Ecology	Construction of buffer zones where necessary. Promotion of urban agriculture	Plantation of trees Organize awareness programs about promotion of organic	Agricultural Department Forest department. Water Resource Departme

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Phase	*Strategies*		*Action Plan*	*Agencies / Organization*
			farming on the river bank of villages. Restriction of chemical pesticide, insecticide, fertilizer etc.	nt
5	Culture	Reconstruction of the temple premises along the river. Re-constriction of Ghats.	Reconstruction of old Ghats. Rebuilt the Rajrajeshwar Setu.	Municipal Corporation of Akola
6	Festivals	Access toward the river Kavad yatra Ganpati mirvnuk, visarjan	Provide proper access to the temple. Proper management to the kavad yartra. Proper management for the visarjan festival	Local body & police department.

Fig. 1. STRATEGIES AND ACTION PLAN

Source - Report on action plan for clean-up of polluted stretch of morna river march, 2019

VI.CONCLUSION

In conclusion, the research paper on riverfront development has provided valuable insights into the significance and potential benefits of transforming riverfront areas into vibrant and sustainable spaces. The study has explored various aspects related to urban planning, environmental considerations, economic impacts, and social well-being associated with riverfront development.

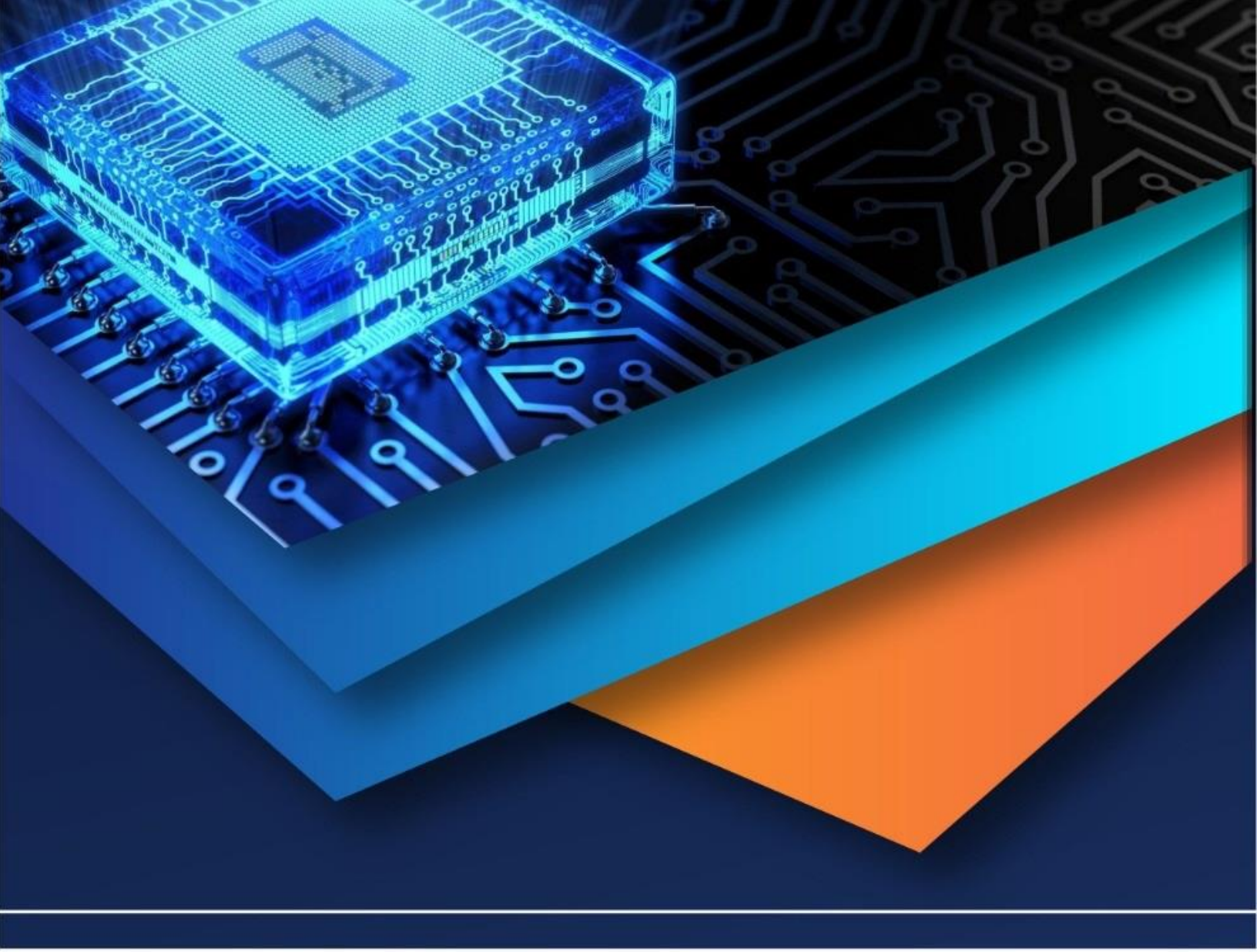
Through the examination of case studies, it has become evident that well-planned riverfront development projects can rejuvenate underutilized areas, enhance the quality of life for residents, attract tourism and investment, and promote ecological sustainability. The integration of green spaces, recreational amenities, and cultural facilities along riverfronts has proven to be instrumental in fostering community engagement, promoting physical activity, and preserving natural ecosystems. Furthermore, the research highlights the importance of stakeholder collaboration and citizen engagement in the planning and implementation of riverfront projects. Inclusive decision-making processes that consider the needs and aspirations of local communities are crucial for ensuring the long-term success and sustainability of riverfront developments. While riverfront development offers numerous opportunities, it is essential to address potential challenges such as flood risk management, environmental conservation, and equitable access to the newly developed spaces. By adopting innovative design solutions, utilizing sustainable construction practices, and implementing effective management strategies, these challenges can be overcome.

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In conclusion, riverfront development has the potential to transform urban landscapes, revitalize communities, and create multifunctional spaces that balance economic, social, and environmental considerations. As cities continue to grow and evolve, investing in well-planned and sustainable riverfront projects can contribute significantly to the overall livability and resilience of urban areas.

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