

# LANDSCAPE AS URBAN INFRASTRUCTURE

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## ABSTRACT:

In ancient time the reasons for settlers to choose any place for settlement were the basic natural features of the place i.e. the fertility of soil, availability of water body, lush green trees, hillocks to protect and wild life; however, landscape used to serve as basic and utmost infrastructure and was treated with a great reverence. Overtime, the constructed infrastructure disrupted the natural landscape and used it as a resource to fulfill the increasing needs of people. As soon as the industrial revolution came, the population expanded and more sophisticated infrastructure (for example; improved waterways, railways, roadways and electricity) were required, and so people started neglecting the nature by hunting in hinterlands. The general construction practices have so much increased and encroached the natural environment that ill effects of it can be clearly seen. Therefore, now a day it is an urge to look after and revive the past natural glory.

The main objective of paper was to analyze and understand the working of landscape with urban form and also how the natural landscape which has been neglected consequently, can be enhanced by using the available infrastructure. This paper explains the glory, denial and revival of nature in two parts; the first part i.e. **“landscape as urban infrastructure”** explains about the natural heritage of a place, how it used to function as infrastructure of city and how it functions as an artifact; it also includes the criticism on denial of the natural system and how it is being used presently. The next part i.e. **“urban as infrastructural landscape”** deals with the rejuvenation of the disrupted nature and how it can work well and utilize the constructed infrastructure as its potential. Concluding that both infrastructure and landscape are integral part of the city and both are equally important; if infrastructure leads to the development of the city, then nature was the first reason to develop. The concept of paper has been supported through case study of Bhopal city.

## KEYWORDS:

Urban, Landscape, Infrastructure, Infrastructural landscape.

## RESEARCH QUESTIONS:

How can an urban environment integrate both the infrastructure and natural landscape?  
Can infrastructure act as a boon for existing landscape?

## INTRODUCTION:

Cities were once a beautiful integration of nature and basic infrastructure, rather nature served as an infrastructure and reason for the development. Landscape used to serve as an artifact of the city; it had beautiful vistas and scenic beauty of its natural heritage. But with the advent of industrial revolution, the population increased and city started expanding; naturally then grew a need for more sophisticated infrastructural systems. So, ruthless construction practices were followed to fulfill the need; on the namesake of development and urbanization, the brutal tyranny of people on nature is evident. The forests have been encroached for holding highways and railway tracks, wild life is destroyed, streams and rivulets have been converted into nallas and rivers have been concretized or neglected.

The increasing demand of infrastructure and development cannot be questioned, but that cannot be fulfilled on the verge of nature. In hunt for urbanization and development the natural ecosystem was disturbed, the nature which was once catering to city is now facing back of the built forms or is getting neglected or encroached. The city is now left with fragmented natural spaces, with a jungle of infrastructural services. The architecture of city has evolved into a complex mechanical system; in which everything is remote controlled. The urbanization now is showcasing the shallow development strategies. There is a need to look into the development policies again and revive the existing available natural landscape.

Nature is the most beautiful and important treasure that a city can have. Destroying the existing wealth and hunting for another is not at all wise and affordable. Today a number of cities which were having resources earlier are now borrowing the same from other cities (for example: water is the highlight now days). If these effects were thought earlier and if the development strategies were sensitive towards nature, the situation would not have been the same. The infrastructural systems if developed in coordination with natural landscape have a tremendous potential of evolving in a great urban form. These can be used to connect the fragmented spaces via green corridor, green grid, pathway etc. in such a way that the sense of fragmentation is not there. The infrastructure should cater to landscape in a way that residents are connected to it and have a sense of belonging. Landscape and infrastructure should not be taken as two different fields; rather the planning of both must be done by assessing the impact of one on another. A number of cities for example: Los Angeles, North Texas, Philadelphia etc. are now adopting ways to enhance landscape through infrastructure and vice versa.

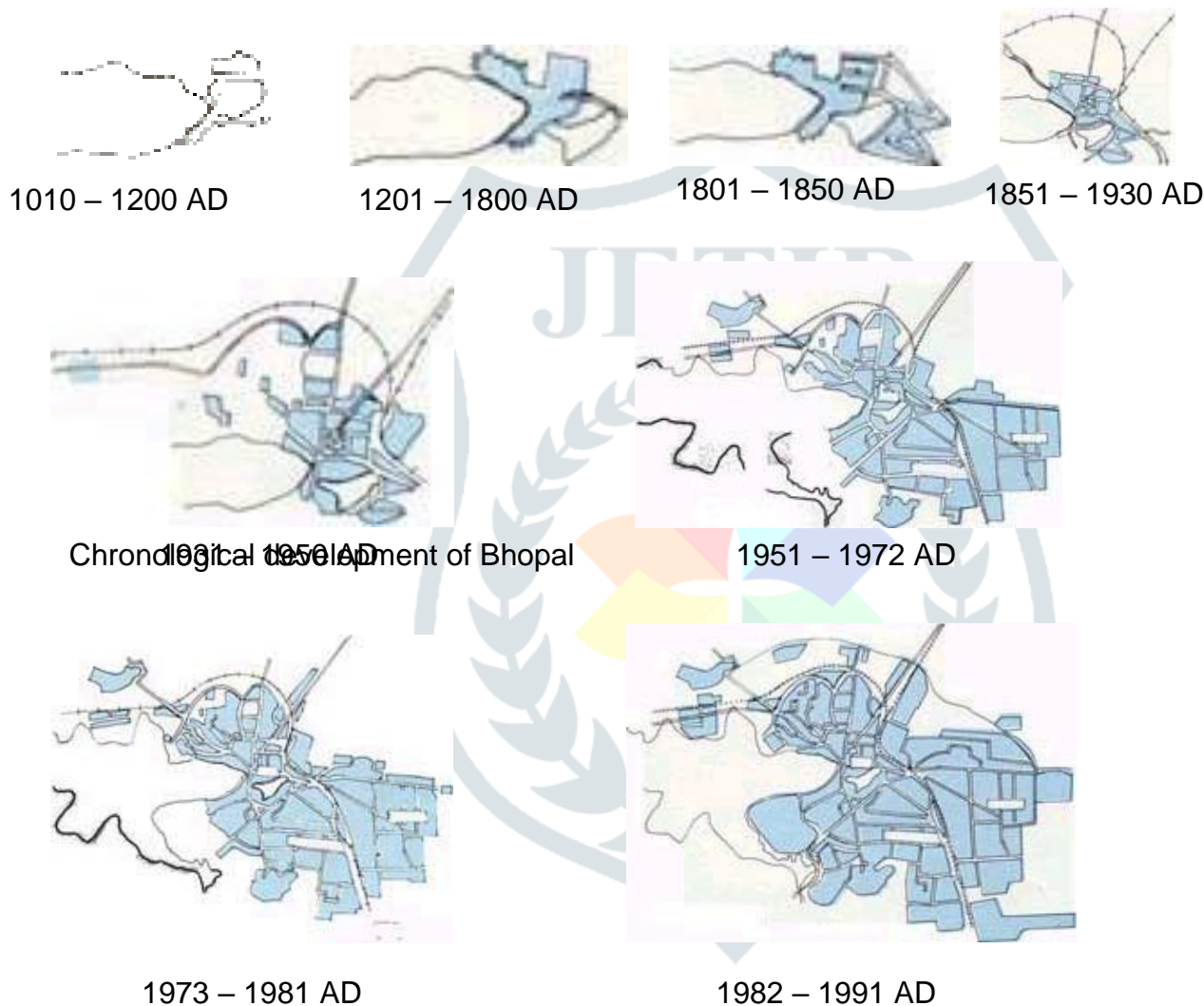
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### CASE STUDY: BHOPAL

Bhopal is one of the greenest cities of India; it is the only city which is having forest within its municipal boundaries. The city is rich in its natural features; it consists of uneven elevation with Idgah hills and Shyamala Hills as its main hills. Because of its topography it consists of huge wetlands (rivers, various natural and manmade lakes). The interconnection between the natural features works beautifully and can be revitalized. Upper lake is in a valley formed by two hills of Bhopal. It was made by Raja Bhoj in 11<sup>th</sup> century by 365 streams; it is dammed at two places one is at Kamala Park and another is Bhadabhada dam on Kaliasote River; Kaliasote is one of the tributary to Betwa River. At Kamala park the overflow of Upper Lake reaches lower lake, also in 1974, ruler Chote Shah created a dam on a small rivulet named Banganga to carry its water to lower lake; lower

lake then transfers its water into the Patra river. Upper lake and lower lake are jointly known as Bhoj wetlands, consisting of various flora and fauna. Van Vihar is located besides the upper lake and is a home for wild life, a tremendous example of ecosystem can be seen in Van Vihar. Along with Bhoj wetlands there are 18 water bodies in the city.

Besides the natural beauty of Bhopal there is filth of policies and policy makers who are ignoring such an immense treasure. The impact of urbanization and poor development schemes is clearly visible in the present situation of water bodies and their catchment areas.

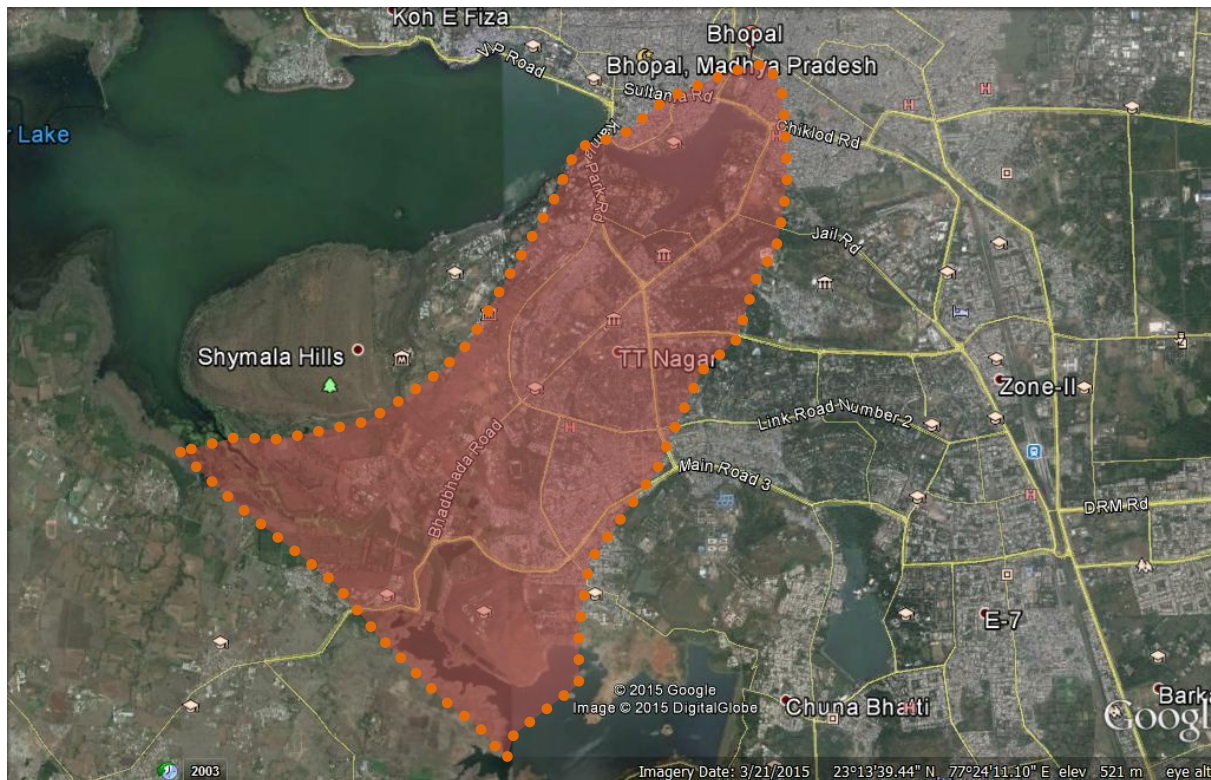


The population of Bhopal has grown rapidly since last decades, because of industries and factories migratory work forces have been increased. City is tremendously expanding since 1930. The worst part is that there is no control over this expansion and urbanization. To meet the increasing demand of people infrastructure is eating up the natural features, roads have destroyed the catchments of rivulets and lakes; moreover the city is throwing its sewage directly into the lakes and rivulets and river have been converted into nalas. The periphery of a number of water bodies has been encroached and is showing its back and throwing its sewage into it; most of the water bodies have become a huge septic tank for the city. Lower lake and Shahpura Lake have become eutrophic, and quality of water is deteriorating day by day.



Although the natural systems have been already disturbed by the general construction activities in Bhopal, the interrelationship between them still exists. Though the catchments have been modified they are still working, through certain policies and design interventions the nature can be brought back to the city; however not in the similar way as it was but retrofitting can be done to evoke the existence.

### AREA OF STUDY: SHYAMALA HILL TO RAJA BHOJ DAM



Shyamla hill is one of the major hills of Bhopal; having upper lake on its foothills and to complete the whole ecosystem Van Vihar brings its wild life to the edge of the upper lake. The area is rich in natural features and consists of biodiversity. From the edge of lower lake to the Raja Bhoj dam, the efficient natural drama of Bhopal gets revealed. A small rivulet called Banganga get its water from the surface run off of the valleys of two important hills of the city i.e. Shyamla hill and the hill of T.T.Nagar. The topography of the hill is such that the flow of the rivulet at one end is towards lower lake and at another end is towards Raja Bhoj Dam. It is said that ruler Chote Shah in 1974, built a dam on Banganga to draw its water to the lower lake. The addition of lower lake aided to the beauty of the city inviting a variety of flora and fauna.

Although the system is working but it is being polluted tremendously. Banganga which was a River once is now acting as nala and is being encroached on both the sides. The river bed are encroached by the slums facing their back to it, moreover they have open drainage from their toilets directly into the river; also the built forms around (Hotel Palaash, Youth hostel etc.) throw their garbage into the river.

The major problem with Banganga is that all the catchments of it are modified, either encroached or converted into nala. It used to get its water from two major hills i.e. Shyamla hills and T.T Nagar

hills, but due to the construction over these hills the water to the river is not reaching properly. The construction of Bhadbhada road has also aided to the destruction of catchment.



Other than Banganga, lower lake gets water in the form of seepage through upper lake, and then feeds the river Patra. The traces of whole ecosystem can be seen. It is evident that before 1950 (as shown in figure 1) the area was serving as a hinterland of the city. The whole system works beautifully and the strange part is even today the connections between the waterways and their catchments are working but are modified and demands special attention for their clearance.

The expansion of the city towards Shyamla hills started in 1950, as there was tremendous increase in population due to workforces. The city expanded without any regulations, disrupting the nature. The construction of science centre road around Shyamla hills and the building activities around T.T.Nagar hill disturbed and modified the catchments and valleys of Banganga turning the rivulet into a nala. The NTTR campus, Science centre and the Ayurvedic college built on the Shyamla hills, consists of no weep holes in their boundary



Natural drainage mapping of Shyamla hills  
Section showing flow of water



Section through both the hills



walls and hence the surface water don't reach to the rivulet. Since it became a nala, the flood bed of the rivulet was encroached by the slum. The slum houses show their back to the stream; moreover, their toilet drains directly into the Banganga. However, not only the slums, but the sophisticated built forms like Ravindra Natya Bhavan, Palaash Hotel, Science Centre and Youth hostel throws their waste into the rivulet. The water into the rivulet is flowing but is highly polluted.



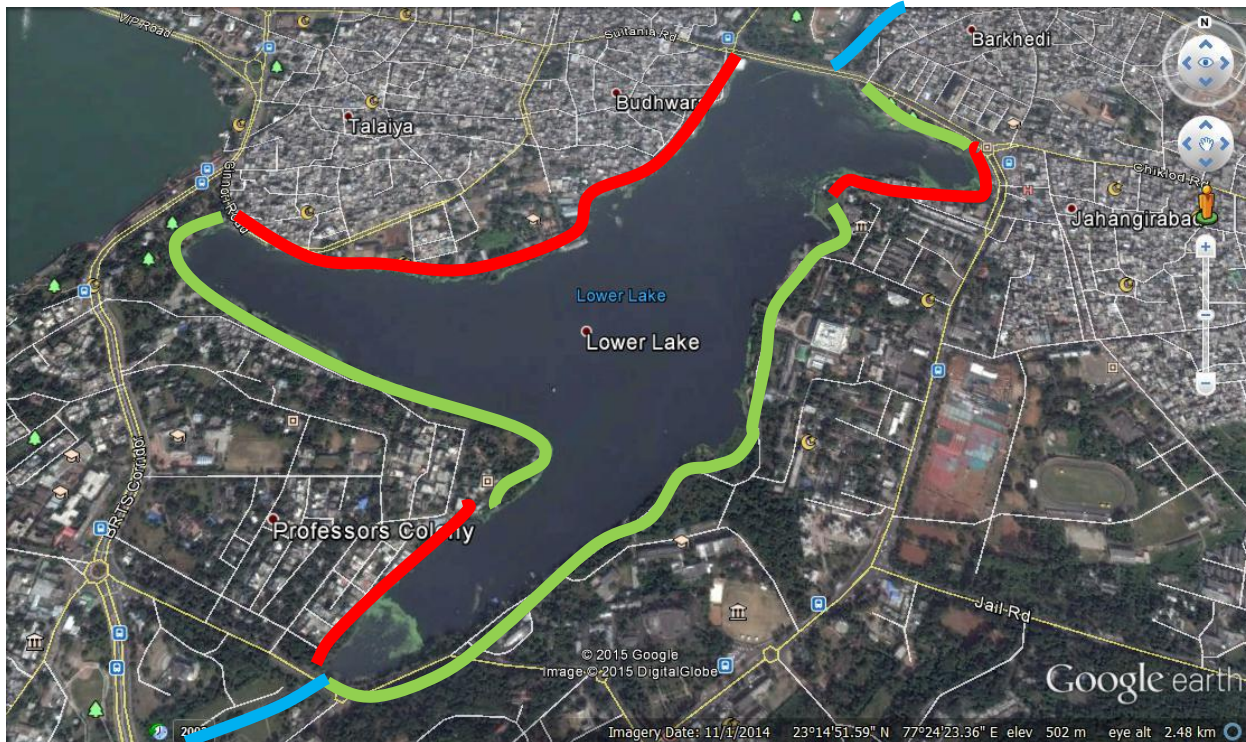
Open drainage from slums to the rivulet



Slum houses showing its back to the rivulet

This polluted water of Banganga now reaches to the lower lake through the campus of Ravindra Natya Bhavan; a sewage treatment plant has been set up at the Banganga Dam which is now a BRTS route. The sewage through 8 nallas reaches to lower lake making it more and more dirty day by day; however, before Bhoj wetland project the sewage through 32 nallas was reaching lower lake. The studies predict that water of lower lake is non potable and consists of fecal content and is eutrophic.





Periphery of lower lake ( red : Built form encroachment; green : parks at periphery)

Lower lake is surrounded by parks on three sides; starting from Kamala park which is on the dam between upper lake and lower lake and moving down towards kilol park which is running all along one side of its periphery. But, this park is introvert in nature bounded by a boundary wall, rather than attracting people it actually acts as a place for antisocial activities as it remains empty all the time, also, if it has been made for recharging the ground water nearby lake then too it is not solving the purpose; as sewage line is going through the park. People living around this periphery throw their garbage into the lake; moreover this periphery acts as dhobi ghat.



Condition of lower lake around Kilol Park

The periphery around Raj Bhavan is enclosed at 1/3 part by fencing and by putting a cloth around it and the scenario after peeping inside that cloth is breath taking; as sewerage line opening directly into the lakes and filth on the shore can be clearly seen. There is a walkway all along the road, which is separating the lake via a walkway along the lake shore and then a boundary wall between road and the pedestrian. Why is it needed to have a boundary wall between the road and the pedestrian? The connectivity between people and lake should be such that they have some sense of belonging to



it. Also, the landuse around this periphery is such that, either administrative buildings or institutional buildings are there in the area showing their backyard and blank boundary wall to the road.



Banganga meeting lower lake, drainage into lower lake, sewage treatment plant



Sewage disposal, encroachment and Dead Street around Raj Bhavan

Along the Sultania road the lake is encroached near some parts and is surrounded by park along 1/3 of its periphery. Along with the park, there is encroachment of sulabh shochalya, showing its back to the lake; however, presence of a public toilet hardly matters when a city have such a huge septic tank for urinating in open. The banks of lake are so dirty that people urinate directly into the lake. It is through this periphery the lake meets Patra river. There is a sewage treatment plant along the bank



of the river.

The whole periphery of lower lake around the Budhwara and Talaiya is encroached by built forms, Condition of lower lake around sultania road showing its back to the lake. While walking along the road one cannot see the periphery of lake.



Encroachment around periphery of lower lake (Budhwara and tatlaiya)





Encroachment around periphery of lower lake (Budhwara and tatlaiya)

Both the water bodies i.e. Banganga and Lower lake are surrounded by physical infrastructure; which means the physical approach is there but the permeability and sensitivity towards development around is missing. The encroachments and decline of water bodies are affecting the biodiversity around them and also depleting the positive aspects of water bodies turning them into a mere pit of dirty water. The sewerage line should meet the sewage treatment plants and not the lakes.

There should be certain development control regulations around lake to control the land use; urban design principles should be applied to enhance its visual and physical permeability. There should be no boundary walls around water body, rather they should be accessible and visible from every point so that the residents can connect themselves with the water body. If the landscape is the part of daily life of the people then it will be conserved by itself. In achieving this, infrastructure plays a much important role, the periphery of the lake is surrounded by road all around, the interface of road and water body also water body and built form can be enhanced to achieve coherence between landscape and infrastructure.

## CONCLUSION

The planning practices of treating landscape as a buffer or residual or left over spaces are hindering the functioning of a city. Infrastructure and development cannot sustain alone without landscape; and vice versa. As the urbanization is increasing the rules of landscaping have been changed. It has to be merged with the infrastructure in form of public urban open spaces, on an inter-city scale, as a social or urban infrastructure composed of facilities and alternative connections. Thus, it can be concluded that if landscape go along with infrastructure then it may become acquire some of the characteristics of infrastructure.