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Urban development at Dibyashwori land pooled area: An urban design approach

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5.1 Introduction

Land pooling is a potential self-sustainable land development practice to solve the urban problems. It assembles irregular cadastral parcels into a well-planned regular parcel formatting the ownership of land for infrastructure according to land area invested from the initial plot by certain percentage called contribution ratios. Thus, the basic notion of land pooling is adequate, planned and spacious layout of plots for long-term development by redrawing the site boundary with precise parcel placement, addition of various services and infrastructure. Here the government and the landowners share the development cost. Eventually, the land price increases according to market demand and the owners gets the benefit. The sites of land pooling are usually urban fringes as a proper and steady method of urban expansion.

Land pooling has been practiced in the Kathmandu valley from 1988. Since then, more than two dozen of land pooling projects have been implemented either by Kathmandu valley development authority (KVDA) or municipalities in the valley. However, they have been carried out in the same fashion, irrespective of local context and present day needs. Moreover, they are limited to small scale, developing only residential neighbourhood through reconfiguring the irregular plots into regular one with vehicular access to each plot. In other words, they are limited to land development along with provisions of minimum infrastructure only. The use of building along with density and other parameters are determined by prevailing building byelaws. Against such a background, this study intends to explore an urban design approach for master layout plan of the planned land pooling area called Dibyashwori land pooling project. It has three specific objectives. First, it studies urban design parameters for land development and layout plan preparation. Second, it critically analyze the site context of Dibyashwori land pooling area and proposed land pooling layout plan by KVDA. Third and last, it proposes an alternative layout plan for the same site.

5.2 Urban design parameters for land pooling technique

The layout plan should allow mixing of different activities (except polluting uses) so that each of them complements others and makes the whole are lively and safer. A mixed-use building or blocks with flexibility between land uses may spread the risk of emptiness in design. It is a common practice to have convenience shops on ground floor and residents and non-residents on floor above. These blocks should be placed in the center or the focal points of the land pooling area; especially at the street corner to highlight a sense of arrival and

significance. They could complement open spaces that are connected through reasonable pedestrian network. Not only semi-commercials and commercials, but if possible schools and institutional areas should also be allotted a place in the mixed-use block. This should be done to maintain the spill out area during rush hour. Despite of the vibrancy of these places within the development, their scale and activity must be limited concerning with sensitivity of the adjoining decent residential area. In this way of incorporating different uses into an area while reducing the potential for negative or bad neighbor effects. Land use can be done by creating commercial or non-residential activities on periphery of the neighborhood intermediate zoning in the middle residential on second half and open space in the core giving social interaction of the resident throughout.

Urban grain is essentially a description of the pattern of plots in an urban block. It can be either fine grain or coarse grain (Fig. 5.1). Fine grain is used to describe an urban environment where the elements are typically smaller and highly varied in size. Fine grained urbanism is preferable because it implies diverse ownership. It provides many opportunities to go from one place and another, besides taking less money to build a shop or house in the small plots. Coarse grain urban fabric allows large scale development. It attracts people from other areas too thereby requiring large area for parking. Moreover, most of the activities in such a large scale building take place inside the structure with parking lots on the peripheral areas.



(a) Fine grain

(b) Coarse grain

Fig. 5.1 Urban grain in master layout plan

Streets are the portion of the urban space that develops accessibility between urban blocks. They are used for networking purpose. In street design, permeability is an important character. Permeability means the freedom of selection of routes through and within the environment. This choice of freedom gives an opportunity of movement. Visual permeability means the capability to see the routes through surroundings, while physical permeability means capability to move through the environment thereby improving the people's awareness of the available spaces. In fewer cases only one form of permeability exists. A smaller block offers selection of routes and generally creates a more permeability than that one with larger blocks.

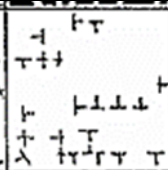
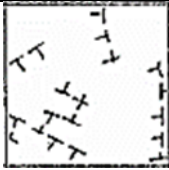
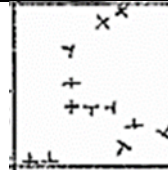
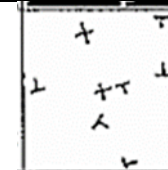
Hierarchy of the streets and its functions and control over intersections are important in master layout planning in the land pooled areas. Streets within residential neighborhood are also to be seen from place making perspective. It is associated with local culture, identity, linkage of traditional organic roads pattern, legibility, permeability, human scale, street enclosure, and designed street patterns. It also looks forward to site responsiveness, energy efficiency, street orientation, walkable community with high quality

public spaces as focal points, space requirements and built forms, and the adjacent mental behavior of people regarding land use.

Yet, to come to common grounds with both the styles and blend one is still unsatisfying. Street design has suffered this consequence from a very long time as one sometimes gets in the way of the other. For example, creating a wider designed road may withdraw more amount of land in terms of contribution ratio. If some roads are pedestrianized only for urban design approach, then the land value may fluctuate from the plots having wider vehicular streets, which may take time to convince the landowners in context of Nepal. People are emotionally attached with their land so sometimes placement of the plot is interchanged or moved or completely removed in design approach and other factors and creating tension between the project-developing agency and the local resident causing delay in land developing process. Street pattern can have different forms: grid iron pattern, curvilinear pattern or combination of both. Street patterns not only defines the local character and regulates the movement but it also has implications of area consumed by the streets. Residential street grids in the USA over the past century have lost the connectivity and walkability with transformation of street layout pattern (Table 5.1).

Table 5.1 Residential street grids in the USA losing connectivity and walkability over the past century

<i>Particulars</i>	<i>Grid iron (C 1900)</i>	<i>Fragmente d parallel (c 1950)</i>	<i>Warped parallel (c 1960)</i>	<i>Loops and lollipops (c 1970)</i>	<i>Lollipops on a stick (c 1980)</i>
Streets					

Intersections					
Lineal feet of streets	20,800	19,000	16,500	15,300	15,600
No. of blocks	28	19	14	12	8
No. of intersections	26	22	14	12	8
No. of access points	19	10	7	6	4
No. of loops and cul-de-sacs	0	1	2	8	24

Source: Michael Southworth and Peter Owens

For streets with mixed-use blocks, it must be wider with pavement on both sides. They should focus on linkage between the front elevation and the street but discourage shop front parking and use of sidewalks for their commercial activities such as settings kiosk, signage and exaggerated landscapes. Parklets can be added to address this misuse. Special consideration should be given to disabled people. Residential Street have low traffic with vehicle, bike lane and pedestrian can be shared. Children can be seen playing in such roads thus; cul-de-sac can be designed here with 25 dwellings where there is one point of access and up to 50 dwellings where there are two access points. The road should be wide enough to aid in case of any emergency. The minimum national demarcation of width roads differs from countries to countries and are guided by the Byelaws of the required country. The area available for circulation, in a good proportion is 30 to 40 percent of the total neighborhood area which road plus all the urban amenities. If this percentage reduced below 30%, the resident chose additional routes and if it increased above 40%, the area seemed unnecessary. According to Urban Street Guidelines Pune, 2016 the recommended width for the residential

mixed-use road would be 6m wide for carriage way with adequate footpath and plantation on both sides (Fig. 5.2).

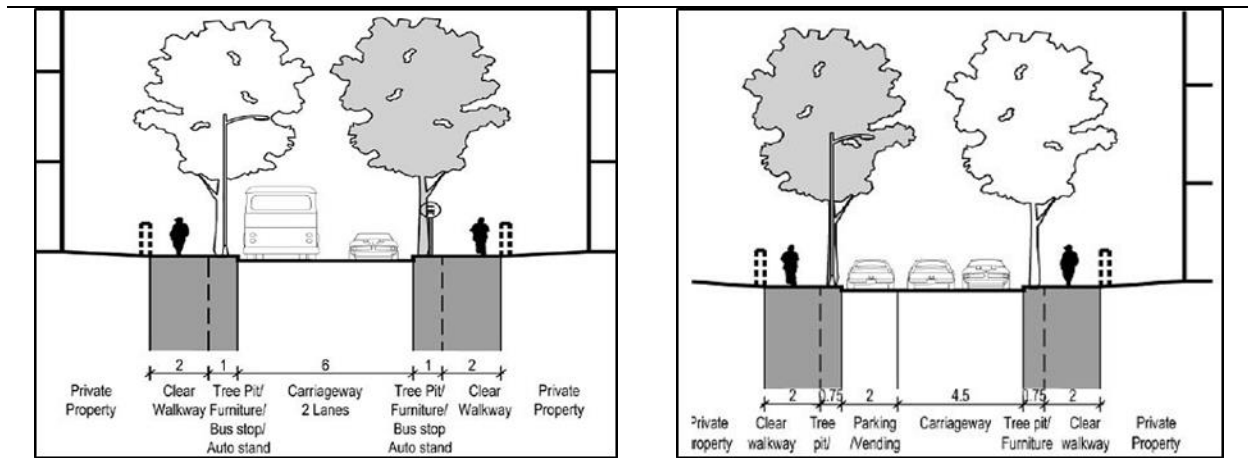


Fig. 5.2 Street design with different combination for carriage way, footpath and plantation

Source: Urban street design, Pune, 2016

A building height (aligning on both sides of the street) to street width ratio of 1:4 or above make sky more visible than buildings thereby losing the sense of enclosure for pedestrians (Fig. 5.3). Height-to-width ratio between 1:2 and 1:2.5 means the portion of sky and buildings visible are about equal leading to a reasonable sense of enclosure. A height-to-width ratio of 1:1 or below means it is not possible to have a comprehensive view of the buildings without looking up. This reduces natural lighting and it can induce feelings of claustrophobia. A ratio of 1:1 is often considered the minimum for comfortable urban street.

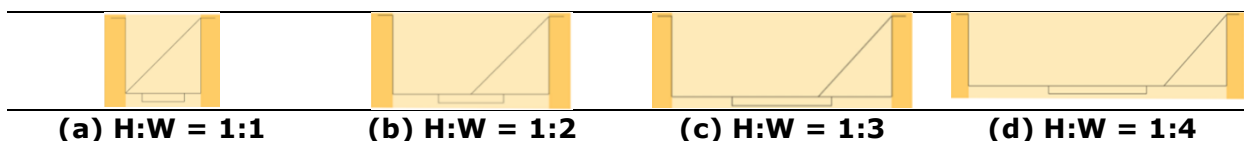


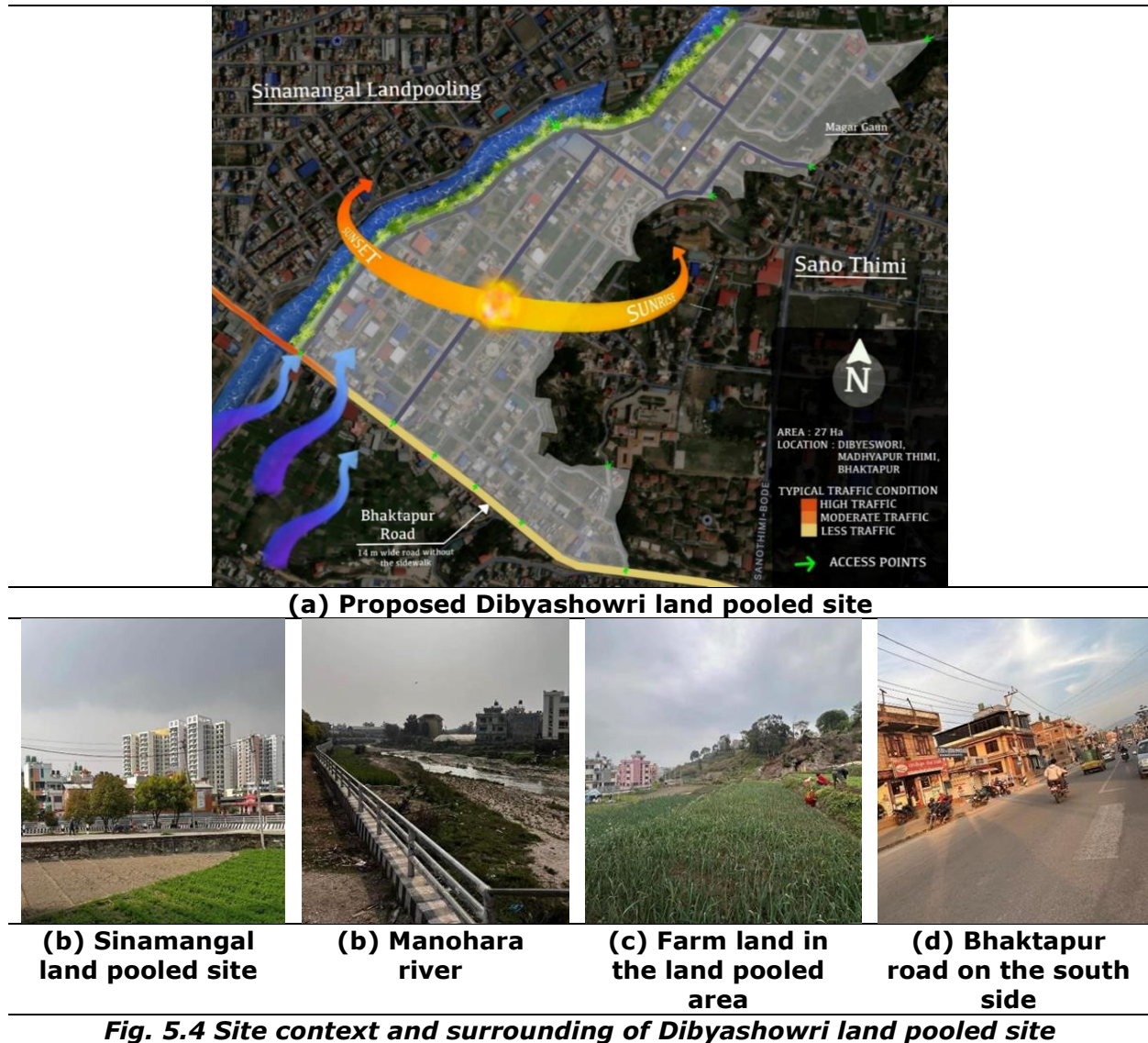
Fig. 5.3 Various street building height to street width and their implications

Public open space in an essentially undisturbed natural state or enhanced for the purpose of resource preservation, conservation, or recreation uses and shall be protected from any future re-development. Land designated as open space may include any or a combination of the characteristics: ridges, hillside slopes, streams, natural shorelines, wetlands, scenic buffer areas, agricultural land, developed parks, linear connection and areas conducive to passive and recreational use. Public open spaces are integral components of urban design, contributing to the quality of life, social interaction and environmental sustainability within the communities. Open space should be easily accessible and connected; there should be variety and diversity, functionality and flexibility, safety and security, comfort and amenities, identity and characters, besides the sustainability and resilience and community engagement. The primary purpose of a public open space is to provide a meeting area for the public, fostering social interaction through touch, shielding them from careless traffic, and relieving them of the stress of navigating the intricate network of streets. It symbolizes a psychological parking space within the community. The open space's ability to serve both functional and psychological purposes is independent of its dimensions. The geometry of the open space may not be rigid as many neighborhoods planning has a square and rectangle shape matching the grid pattern and few have organic. However, it is desired for an open space to be at maximum of 400-meter radius reach of 90% of the resident.

5.3 Dibyashwori land pooling site analysis and earlier master layout plan

Dibyashwori land pooling site is located in Madhyapur Thimi municipality in Bhaktapur. It has a total site area of 26.7 ha. It is around 7.2 km from

Bhaktapiur durbar square and 6km away from Tribhuvan International Airport. It is surrounded by Sinamangal land pooling and Manohara river on the north-west side, Sano Thimi and Barka hill on the east, 'Magar gaun' on the north and Bhaktapur road on the south (Fig. 5.4).



This land pooling was implemented by Kathmandu valley development authority. It took 10 years for implementation. The total developed plots were 588 numbers and the contribution ratio from the land owners varied from minimum of 6.00% to maximum of 44.50%. The

road layout consumed around 21.98% of total area whereas areas allocated for open space and green belt were 3.73% and 3.20% respectively (Fig. 5.5 and Table 5.2). about 7.62% was allocated for the sales plots. The layout plan has three different types of road network: 11m wide road along the riverbanks on the north-west, 8m and 6m.

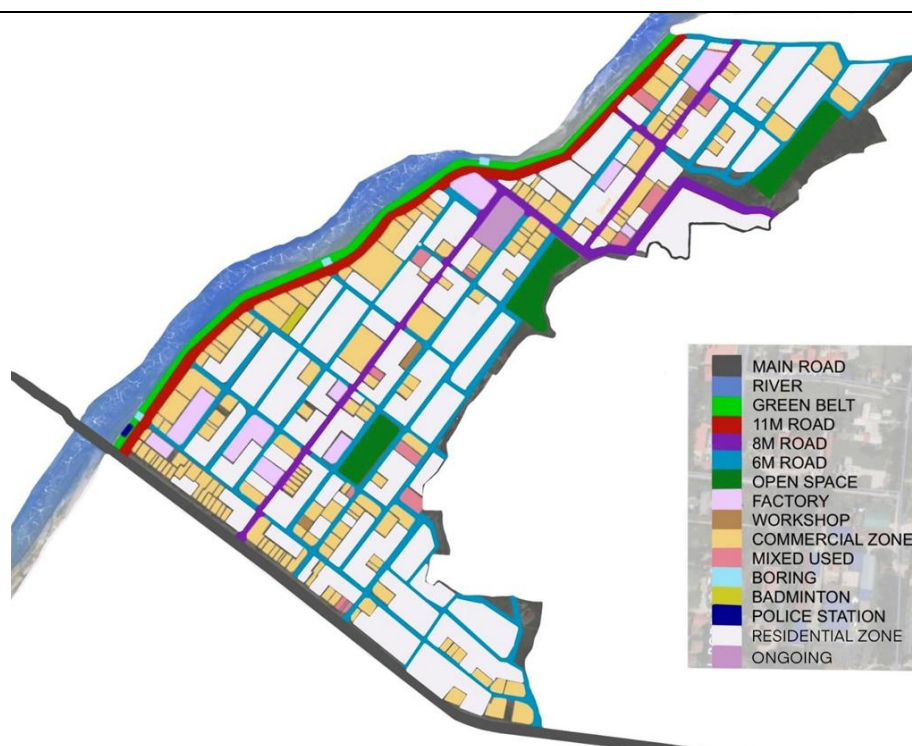


Fig. 5.5 Proposed master layout plan for Dibyashowri land pooling site

Table 5.2 Land use area distribution and road network in Dibyashowri land pooling project

S. N.	Particular	Area		%
		Ropani	Sqm.	
Land area distribution				
1	Developed plots	324-11-2-0	165197.18	61.78%
2	Road	115-9-0-2	58794.04	21.98%
3	Green belt	16-13-0-1	8555.17	3.20%
4	Open area	19-9-3-3	9983.42	3.73%
5	Government land	8-14-0-3	4521.57	1.69%
6	Sales plots	40-0-3-0	20372.96	7.62%
7	Total project area	525-10-2-1	267424.35	100.0%

Road network (right of way)				
1	11m	19-8-2-0	9938.83	903.53 m
2	8 m	20-10-0-3	10499.44	1312.43 m
3	6 m	75-6-1-1	38355.77	6392.62 m

Source: KVDA, no date

There are some buildings already built in the planned land pooled site (Fig. 5.6). Numerous buildings and physical infrastructure within the land pooled area and surrounding areas demonstrated that the area is gradually developing with coming up of new houses.



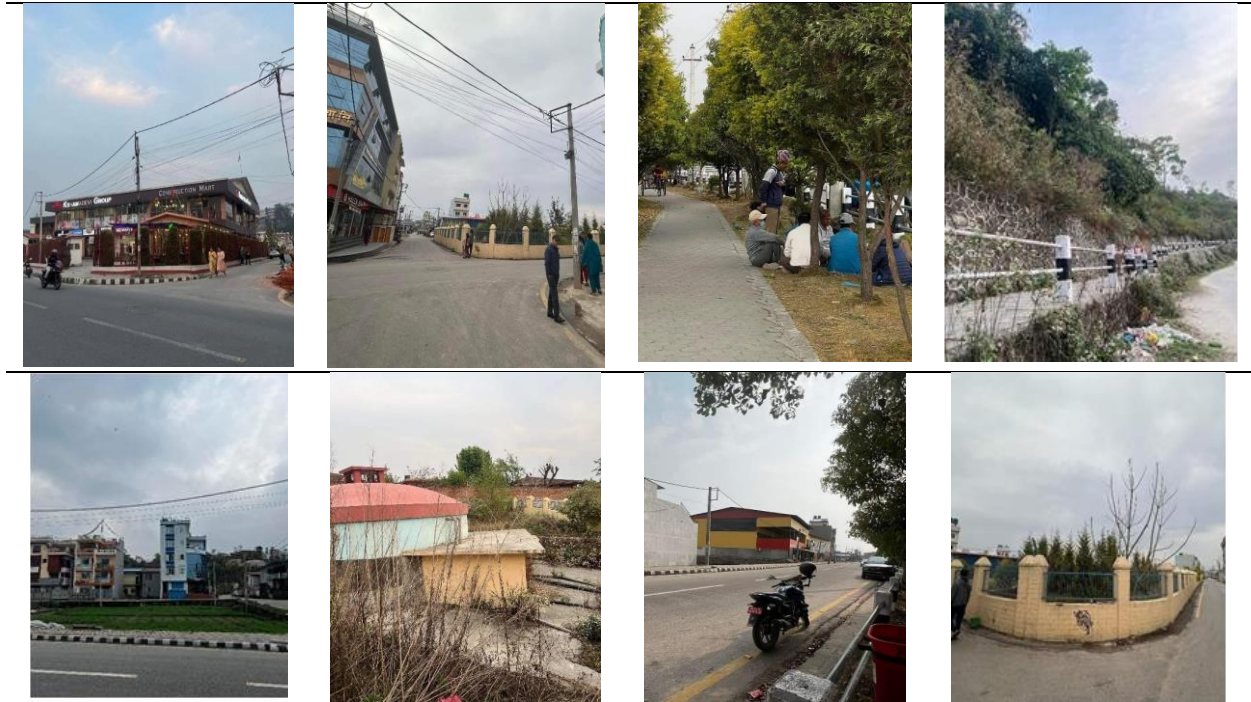


Fig. 5.6 Existing elements within the site and surrounding areas

5.4 Proposed urban design approach for master layout plan for Dibyashwori land pooled site

The alternate layout plan is proposed for the same site of Dibyashwori land pooled area (Fig. 5.7). The proposed layout plan is radial pattern with the combination with rectilinear form. It helps easy navigation. Recreational facilities are proposed along the riverfront with 20 m of setback. There will be combination of commercial uses, institutional and industrial uses along with mixed use buildings (retail or commercial on the ground and lower floors with residential use on upper floors in a single building), besides residential use, which dominates the whole use.

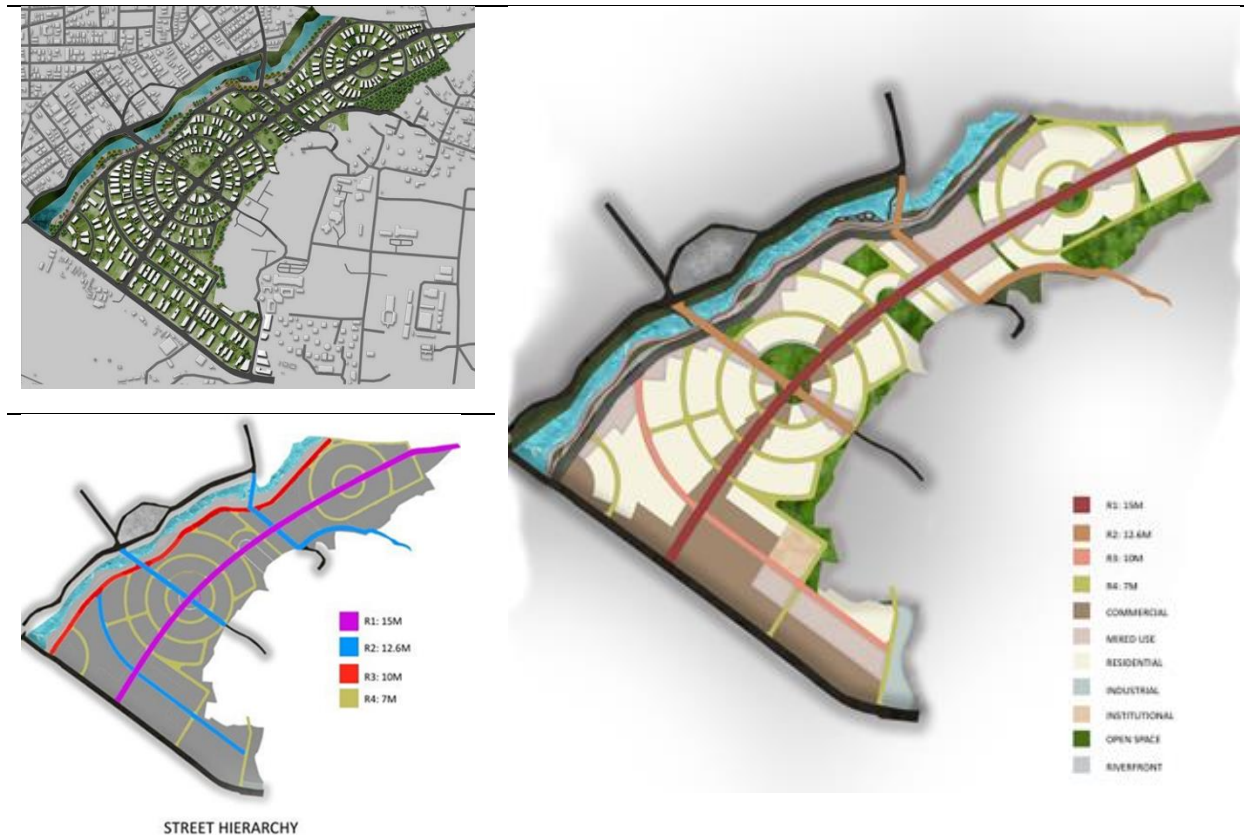


Fig. 5.7 Proposed layout plan for the Dibyashowri land pooled site

Four different hierarchy of streets are proposed. The main road 'R1' will have 15 m of right of way and is proposed for commercial uses whereas R2 (ROW -12.6 m) and R3 (ROW - 10 m) are suggested in the location with mixed use building (Fig. 5.8). The R4 with ROW of 7m basically leads to the residential areas. Except for 7 m road, the rest of three types will have also adequate footpath on both sides.

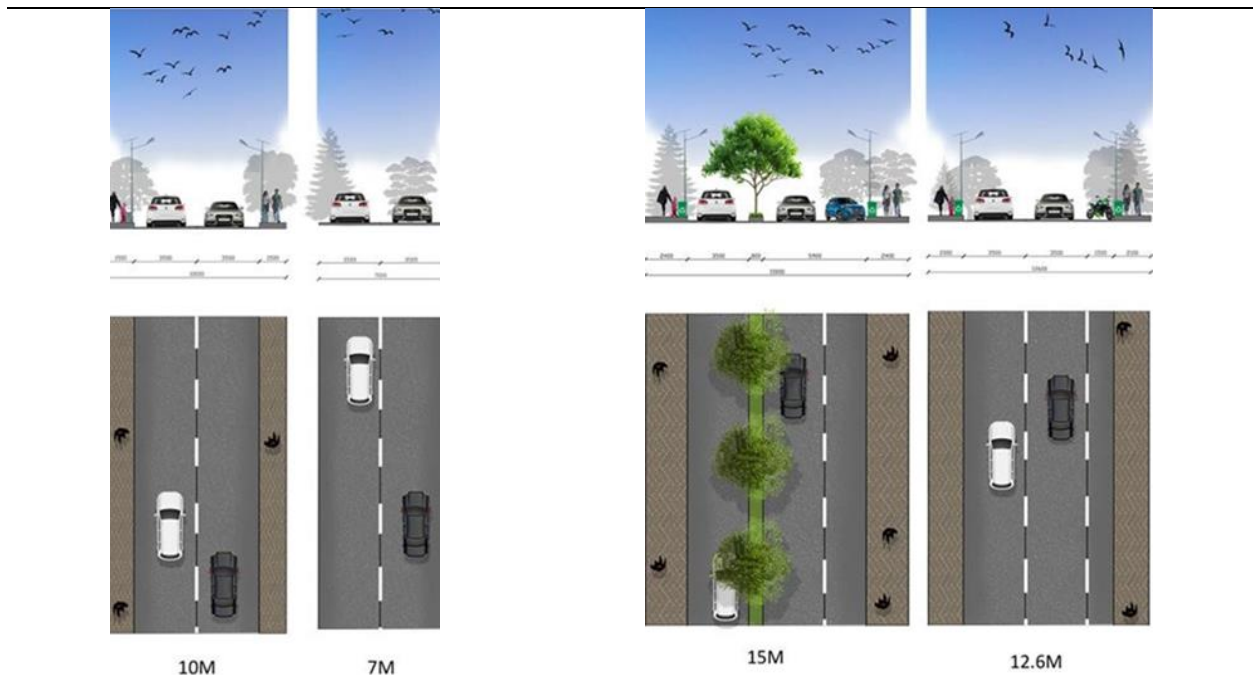


Fig. 5.8 Proposed street typology with detailing

Cross section (longitudinal and traverse) along with views of various buildings in different locations are also proposed (Fig, 5.9 and Fig. 5.10). While proposing the buildings, street enclosure and other detailing are also considered so that pedestrians can feel safe and the streets itself act as a community spaces.





Fig. 5.9 Proposed cross sections with different views





Fig.5.10 Proposed layout with landscaping