A

Thesis Report

On

RETHINKING URBAN SPACES IN SUBURBAN HOUSING:

Housing development in Jodhpur

DEPARTMENT OF ARCHITECTURE AND PLANNING

MALAVIYA NATIONAL INSTITUTE OF TECHNOLOGY

JAIPUR-302017

SESSION 2016-2017

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CERTIFICATE

This is to certify that this report titled '**REVITALISING URBAN SPACES IN SUBURBAN HOUSING: Urban expansion in Jodhpur**' submitted by Lovejeet Gehlot (Student ID 2012UAR1538) of V year, B.Arch. (2016-2017) in partial fulfilment for the award of the degree of Bachelor of Architecture is satisfactory and approved for submission. This is a bona-fide work of the student and has not been submitted to any other university for award of any Degree/Diploma.

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DECLARATION

I, Lovejeet Gehlot, student of V year B.Arch. (Student ID: 2012UAR1538) Department of Architecture and Planning, Malaviya National Institute of Technology, Jaipur, hereby declare that my thesis preparatory report titled "**REVITALISING SUBURBAN HOUSING: Urban expansion in Jodhpur**" in partial fulfilment for the award of the degree of Bachelor of Architecture contains my original work supplemented by data from primary as well as secondary sources which have been duly acknowledged. This work has not been submitted to any other institution for the award of any Degree/Diploma.

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ACKNOWLEDGEMENT

For the timely completion of this report I owe my sincere gratitude to my thesis guides Ar. Tarush Chandra, Ar. Meenu Varshney and thesis coordinator Ar. Rajeev Shringi for their constructive criticism, suggestions and thorough guidance.

I would like to express my infallible gratitude to my colleague Rishabh Jain for sparing time to supplement my work with his valuable input. I would also like to thank my sister Vaishali Gandhi who supported me with work at all times in every condition.

I am most thankful to my mother for being there when needed and my grand uncle Poonam Chand Gehlot, who has been a constant source of encouragement and inspiration.

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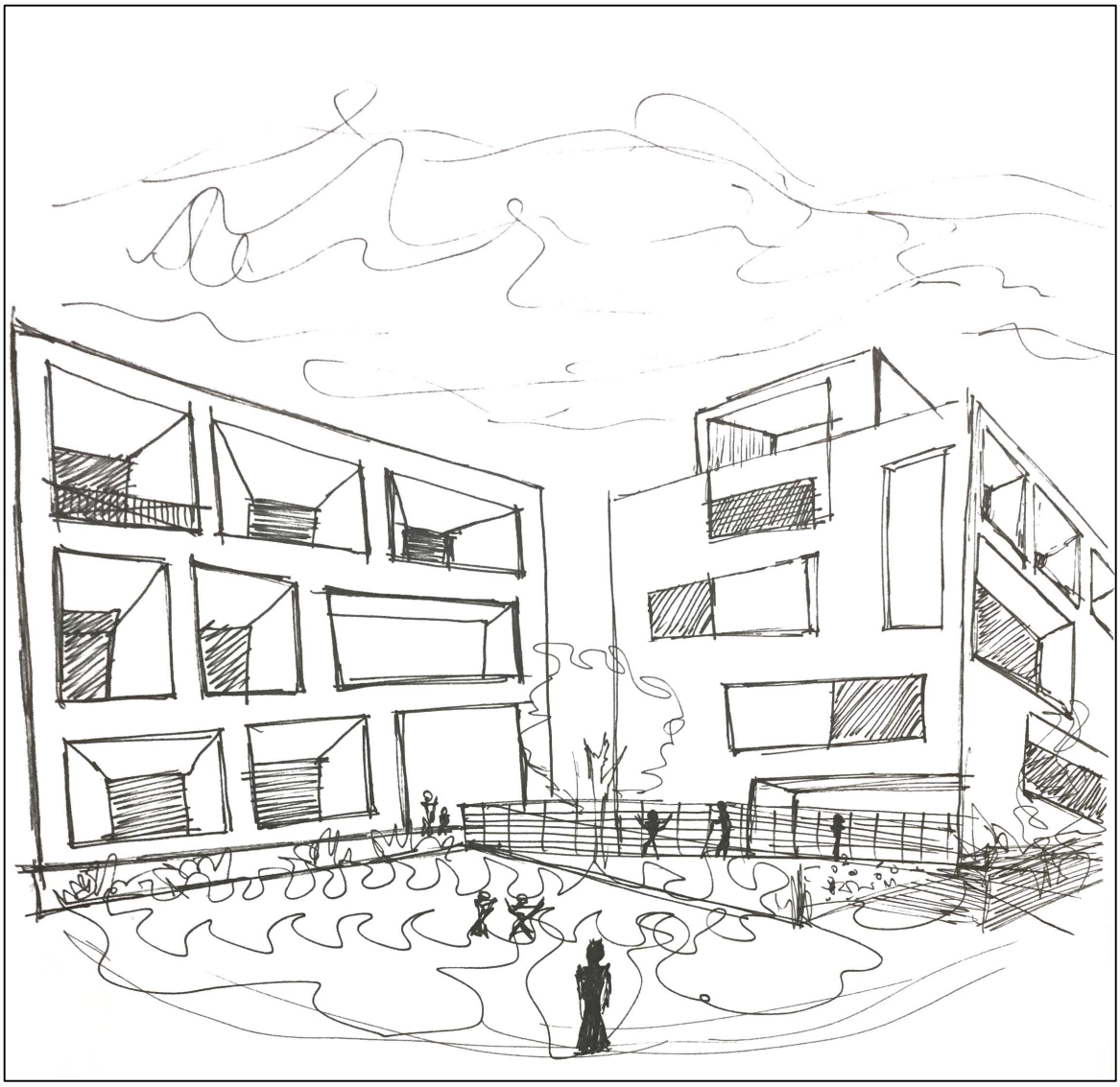
1. INTRODUCTION

1. 1. IMPACT OF HOUSING DESIGN ON SOCIAL BEHAVIOUR

How do spaces effect social interaction?
The purpose of this study is to investigate the effects of individual and housing characteristics on social interactions in one's residential neighbourhood.



Housing is a composite commodity that fulfils several human needs.
The major need is dwelling, but we can also argue that having a social space to interact and socialize with family and friends, or to be able to reach a desired social status, might be some reasons for which individuals demand some housing services.
Thus, from a social point of view, housing is more than a dwelling unit and its objective characteristics, since it also provides security, privacy, neighbourhood and social relations, status, community facilities and services and control over the environment.

1.2.HOUSING SATISFACTION AND SOCIAL INTERACTIONS

Housing satisfaction is a complex cognitive construct, and several attempts have been made to conceptualize it from disciplines like Economics, Sociology, Psychology, Planning, or Geography.

Individuals make judgments about residential conditions based on their needs and aspirations. Individuals' satisfaction with a given behaviour will also depend on what one compared to other individuals. This results in conspicuous consumption, as serving to impress other people (Galster 1987).

Other types of non-functional demands include the "bandwagon effect" (Figure 2), when individuals consume a good because a large proportion of the society does it. In these cases, the good serves the purpose of social belonging or status defining (Veblen, 1993, pg.53).

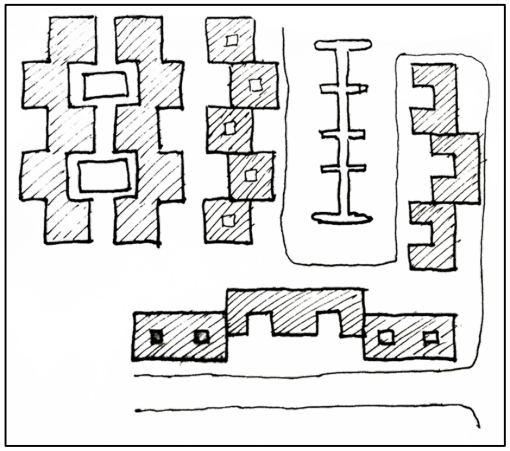


Figure 1: Housing layout

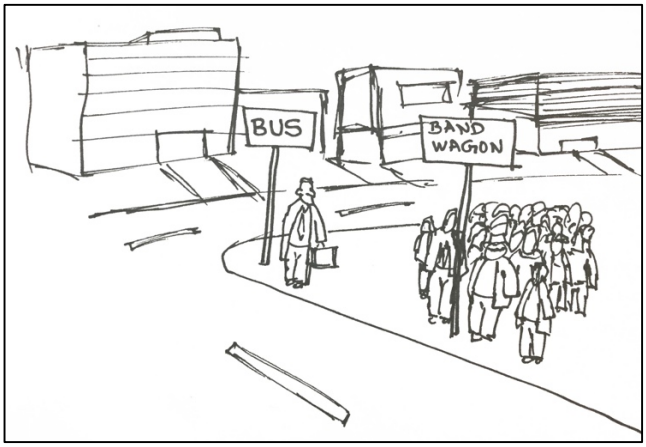


Figure 2: Bandwagon effect

HENCE A PREFERABLE OPTION TO AVOID THIS COMPLEX WOULD BE TO SEGREGATE THESE GROUPS BY ARRANGING THEM AROUND DIFFERENT SEMI PRIVATE AREAS (Figure 1), NOT COMPLETELY CUTTING THEM OFF SOCIALLY BY PROVIDING A LARGER COMMON GROUND FOR INTERACTION.

Some variables have been included to control whether individuals perceive something bothersome about their neighbourhood, which may include such problems as noise, crime, traffic, or litter.

Locational and neighbourhood characteristics also have some explanatory power when studying housing satisfaction. Thus, rural residents are more satisfied with their housing than the urban residents.

The effect of bothersome factors about neighbourhood on individuals' assessment of their housing is inconclusive, with only a couple of coefficient being significant (i.e., crime problems in the neighbourhood brings individual dissatisfaction while the presence of green areas around the house causes more individual satisfaction).

2. BUILDING STRUCTURE

The attempt is to provide answers to three questions about housing structure (Glaeser and Sacerdote, 2001).

First, is there a connection between housing structure and citizenship? One possible reason for this connection is that individuals in single-family homes are directly connected with the area that surrounds them; individuals in large apartment buildings are separated physically from public infrastructure (Figure 3).

Second question is whether apartments lead to more social connection or more anonymity. Individuals in multi-unit dwellings are physically more proximated to their neighbours. As physical distance tends to deter interaction, one might expect therefore that apartment-dwellers are more connected with their neighbours.

Third question is whether building structure influences crime. There are potential reasons why multi-unit dwellings might be associated with more crime: density and distance from the street. Higher density in large dwellings might lead to greater returns from criminal activity, or perhaps residents tend to free ride and not take care of security (Jacobs, 1961).

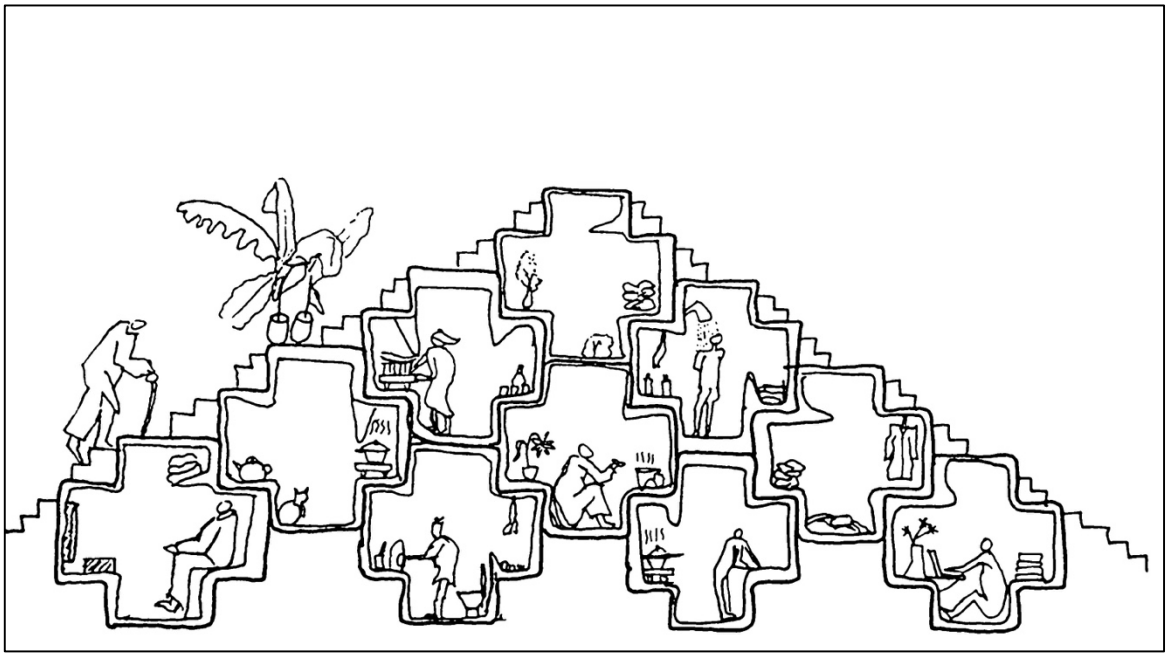


Figure 3: Building blocks act as a barrier, separating individuals from each other's

2.1. BUILDING STRUCTURE AND CITIZENSHIP

In this case, we discuss why we might expect building structure to affect social capital.

The connections between building structure and community quality are more elusive[1]. One possible theory is that high-rise apartments provide more of a cocoon from the outside world than single-family homes. Thus, actions in the street (i.e. the presence of trees or construction) might be more directly relevant to a person in a detached home than to a person on the fifth floor of an apartment building (Figure 4).

The same argument applies to the actions of neighbors. If a neighbor changes a third floor roof into a deck, this will not matter to someone who lives on the fifth floor of an apartment building. However, the new deck would influence someone who lives in a three story home because of the lost privacy in the house and the yard and because of any visual externalities which might come from the deck. If the neighbors of single-family homeowners create more externalities, then it is natural to expect that single-family homeowners will be more likely to act politically to attempt to correct these externalities.

A second, perhaps more important, reason why single family homeowners might be more involved in local politics is that in large apartments the division of labour begins to operate and political functions are taken over by apartment managers. Few residents of large apartment building are directly involved with problems relating to sewage or flood conditions during storms. If the apartment building is effected by these concerns, then there will be a professional who handles the problem. Single-family homeowners do not hire professionals because the fixed costs of having a specialized outsider to handle sewage relations for a particular house would exceed any possible gains from specialization[2].

Thus there are two reasons why single-family homeowners might be expected to be more involved in local politics. First, they have more connection to surrounding public services and the actions of neighbours. This connection to things that are governed by local politics means that the returns to local political activity should rise.

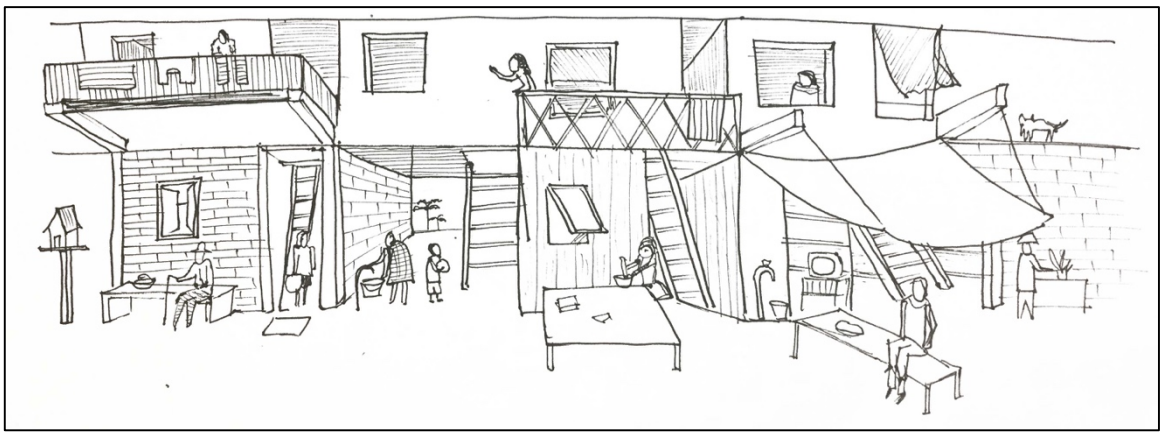


Figure 4: Relationship between building structure and community.

Second, residents of large apartment buildings hire specialists who handle their political involvement for them. These specialists do not work for residents of single-family homes because it would not pay to have a specialist work on the political needs of a single home.

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[1] The theories that we discuss are all tied to simple economics. More complicated theories also connect housing choice and political behavior, such as ideas about how crowding can alter preferences. The research on crowding (for example Freeman et al., 1972) has basically failed to find a significant connection between crowding and political behavior.

[2] There is a question about why groups of single-family home owners don't get together and hire a specialized consultant. The natural explanation for this is that because of lower densities for these individuals, any large group has so much heterogeneity that there is not the same benefit from having a single specialized professional.

2.2. BUILDINGS AND SOCIAL CONNECTION

In this section, we discuss the connection between building structure and various forms of social connection.

The basic theory about why building type might effect social connection is extremely simple. Large buildings have less physical space between residents. Even if each housing unit is the same size, and if there is the same amount of land area per person, when individuals are in a large apartment building there will be less distance between them than if the same people lived in single family detached dwellings that are each surrounded by their own plot. The simplest theories of social connection suggest that social connection declines as the costs of that connection increase and that distance will increase the costs of that connection.

Indeed, there is a wide range of evidence supporting the point that even modest distances seriously decrease social interaction (Baldassare, 1979 and Festinger et al., 1950). The General Social Survey asks how often you see your closest friend and how far the trip is to that friend. The correlation between these variables is ~64 percent. The correlation between distance to your closest relative and frequency of visiting that relative is ~73 percent. Reductions in physical distance between neighbours in apartment buildings could very well drive up social interaction between neighbours. This effect will be augmented by the fact that people in apartment buildings are likely to use common spaces such as entryways and elevators.

Alternatively, there are arguments about single-family homes creating more connection between neighbours. Most of these arguments tend to focus on other attributes of the residents detached houses (i.e. their tenure in the community) rather than housing structure itself. However, in principle it is still possible that the common areas surrounding detached homes lead to high levels of interaction and more neighbourliness.

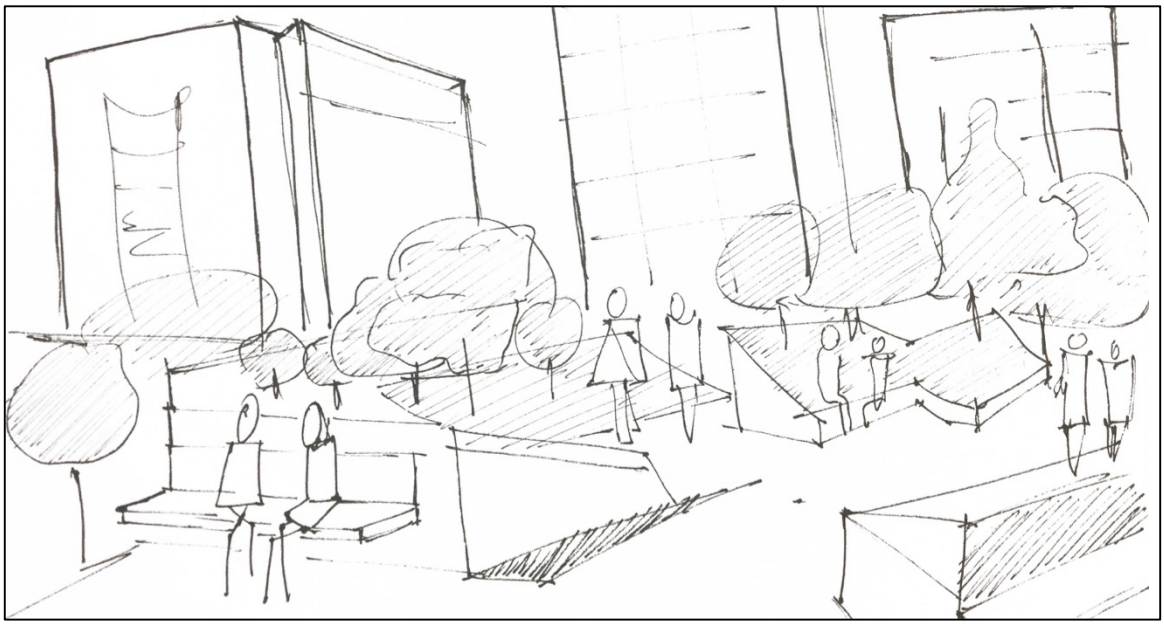


Figure 5: Common outdoor space as a medium for social connection.

A second effect of apartments comes from the lack of space in smaller building units. In

smaller living units, using public spaces outside of the home will become more desirable. For example, it will be more attractive to go out to eat or drink or recreate, if the individual has less space inside the home. It may be that recreating outside of the home leads to more social interactions with neighbours. Homeowners may have more successful children, because greater interior space leads to these people spending more time at home.

Of course, if either detached houses or apartments lead to more socializing with near neighbours (Figure 6), this may crowd out socializing along other fronts. As such we should expect that whichever group socializes more in their own area should do less socializing elsewhere. This may have positive or negative social effects depending on whether socializing with neighbours is more beneficial for the community as a whole, than socializing with others.

Figure 6: Outdoor spaces as a recreational space for better neighborhood.

2.3. BUILDINGS AND CRIME

Finally, we address the connection between building structure and crime.

Perhaps the most natural theory about why building structure, and in particular, large apartments might affect the crime rate is that building structure determines the access to living space. According to different versions of this theory, either apartments or single-family homes are more accessible to potential burglars. Apartments may be more accessible if the building itself is not well defended. Alternatively, if apartment buildings have doormen or solidly locked external doors, it may be that apartment buildings are harder to enter. Both versions of this theory suggest that building structure should be particularly important in creating crimes against the home.

A second reason that building structure might effect crime is that densities are higher with apartment buildings. Crime is an activity where 'transport' costs are very high. In other words, criminals do not appear to travel far away from their place of residence even when the financial inducements would appear to be quite strong. Criminals will have greater access to victims in dense areas, because transport costs, to victims will be lower and more crimes will occur. Big apartment buildings will be associated with a steady stream of people over a particular area and as such present an easy target for criminals who want to engage in crime against people.

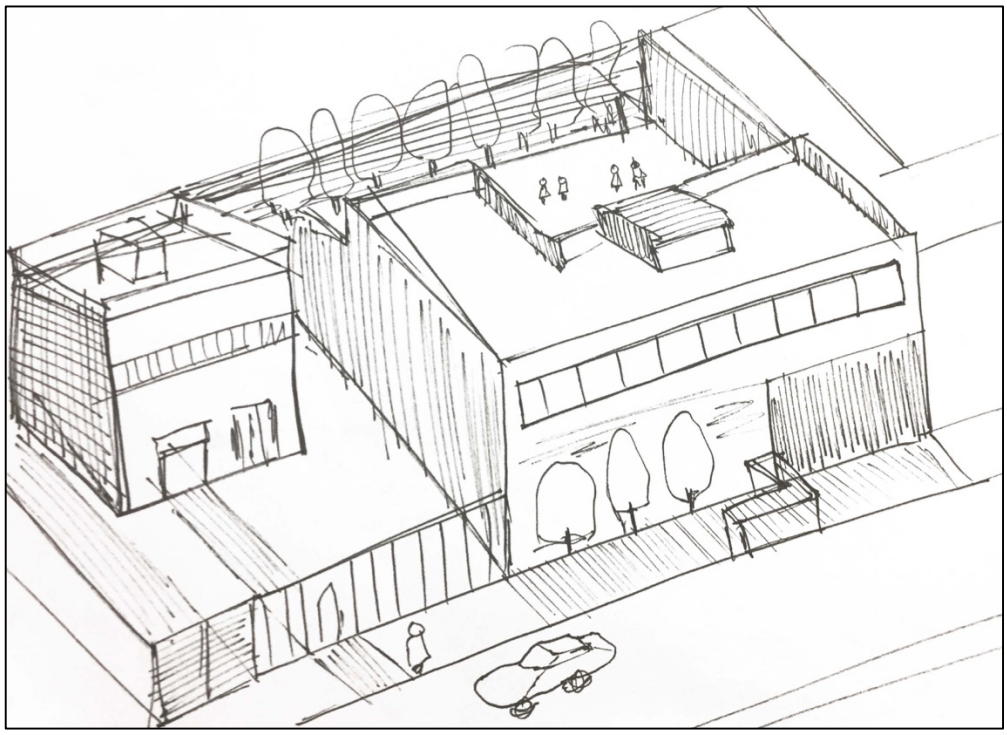


Figure 7: Buildings with more physical distance from the streets are prone to crime.

Jacob (1961) emphasizes the connection between citizens and the streets. She argues that density is not a problem, and indeed high density areas might be safer. However, she emphasizes the important role that private monitoring can play in stopping crime. One major effect of tall apartment buildings is that it greatly increases the physical distance between the average apartment and the street below (Figure 7). If people themselves are the most important policing force, then distance between residential quarters and public space may lead to much less policing and much more crime. This theory predicts that it is height rather than building size, which will lead to more crime.

3. HOW CAN SPACE FACILITATE SOCIAL INTERACTION?

Studies suggest that outdoor spaces can enhance social interaction. People go to outdoor spaces because of their need for social interaction (Cooper Marcus and Francis, 1998). Outdoor spaces are places for chance encounters and potential interactions with other people (Drucker and Gumpert, 1998). These spaces provide opportunities for individuals to engage in high-level social interaction. In large apartment buildings, individuals socialize in common outdoor spaces to increase recreation opportunities outside the home (Glaeser and Sacerdote, 2000).

The factors that influence social interaction in housing estates are classified into two general types: **social variables** and **physical elements** of communal outdoor spaces. These are described in detail in the following:

3.1. SOCIAL VARIABLES

The socio demographic characteristics of a neighbourhood affect how neighbours interact with others, and how they use shared outdoor spaces (Figure 8).

Factors such as respondents' age, marital status, and presence of children at home, owner-renter status, length of residence, educational attainment and annual income are relevant socio-demographic characteristics associated with social interaction (Haggerty, 1982).

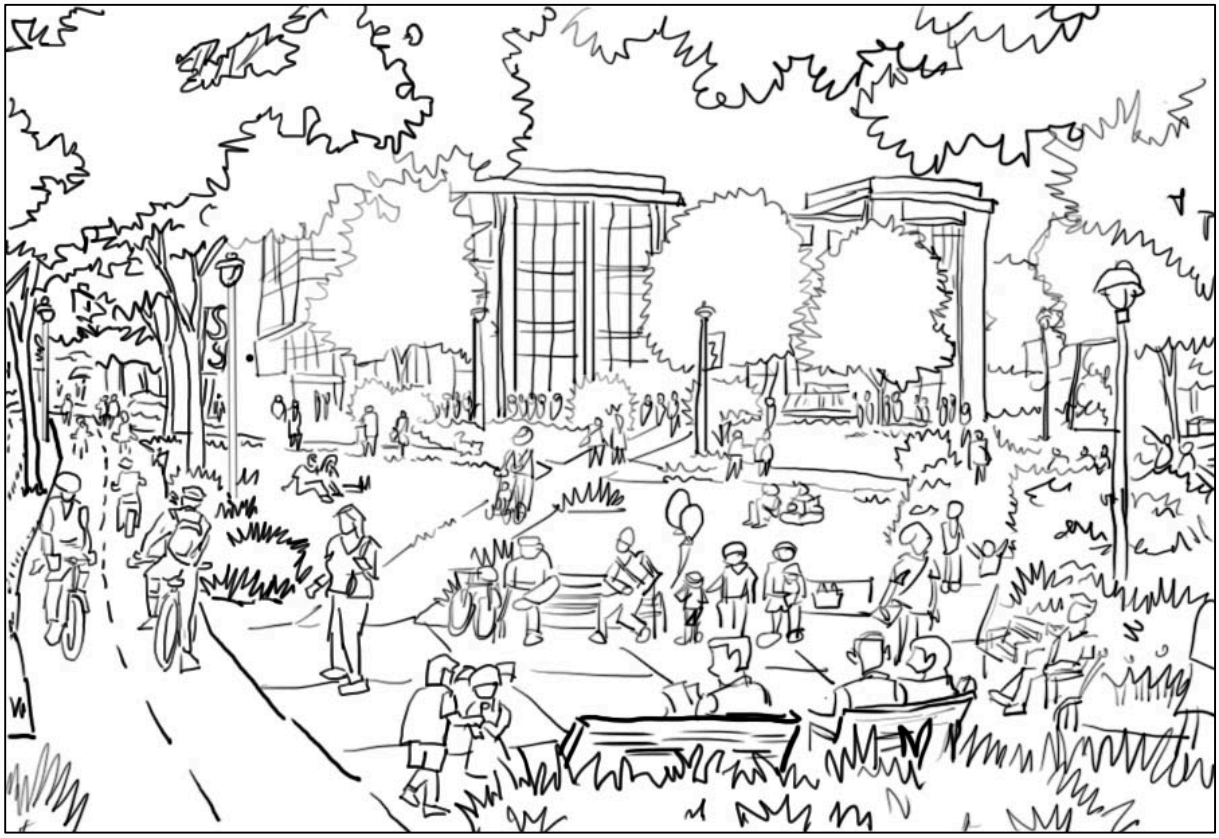


Figure 8: Common outdoor spaces for people different social variables,

3.2. PHYSICAL AND SPATIAL ELEMENTS

The physical elements that may affect the patterns of social contact among neighbours include layout pattern, site plan, scale and proportion, land use mix, and physical features.

3.2.1. LAYOUT PATTERN

A. The layout plan of housing estates can contribute to the interaction among residents and eventually to the formation of social relationships.

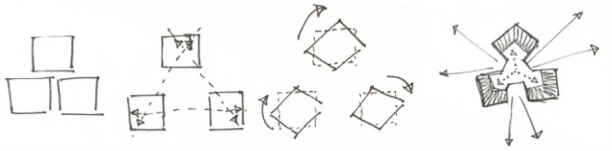


Figure 9: Developing layouts for better social connection.

B. The arrangement of traditional neighbourhoods (Figure 10) can enhance social life, with physical features, such as sidewalks, facilitating social activities (Jacobs, 1961).

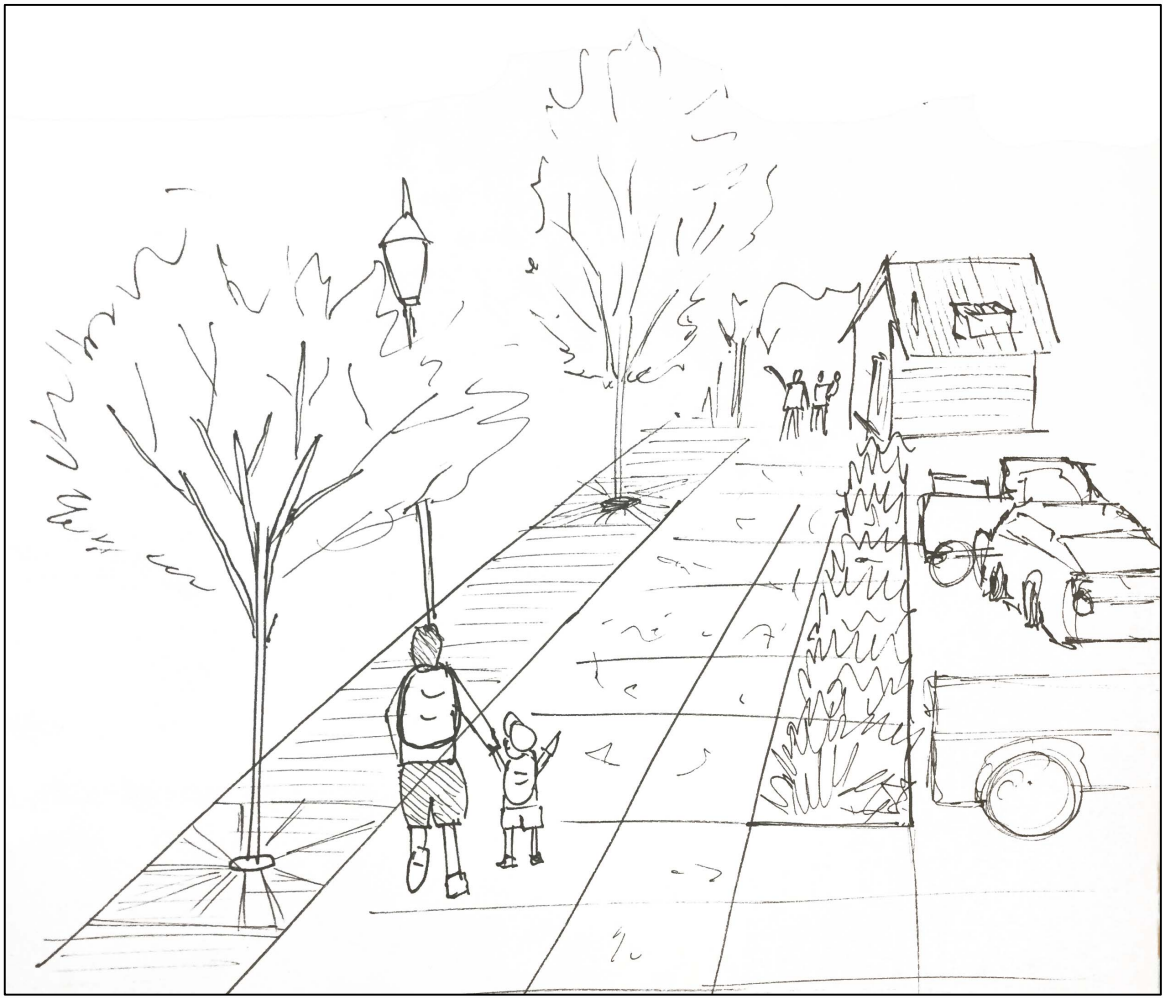


Figure 10: Side walks as a physical feature for social interaction.

C. Gehl (1986) found that “long-duration activities” in residential streets occur in semiprivate zones that are also called soft edges. For ex: front gardens (Figure 11).

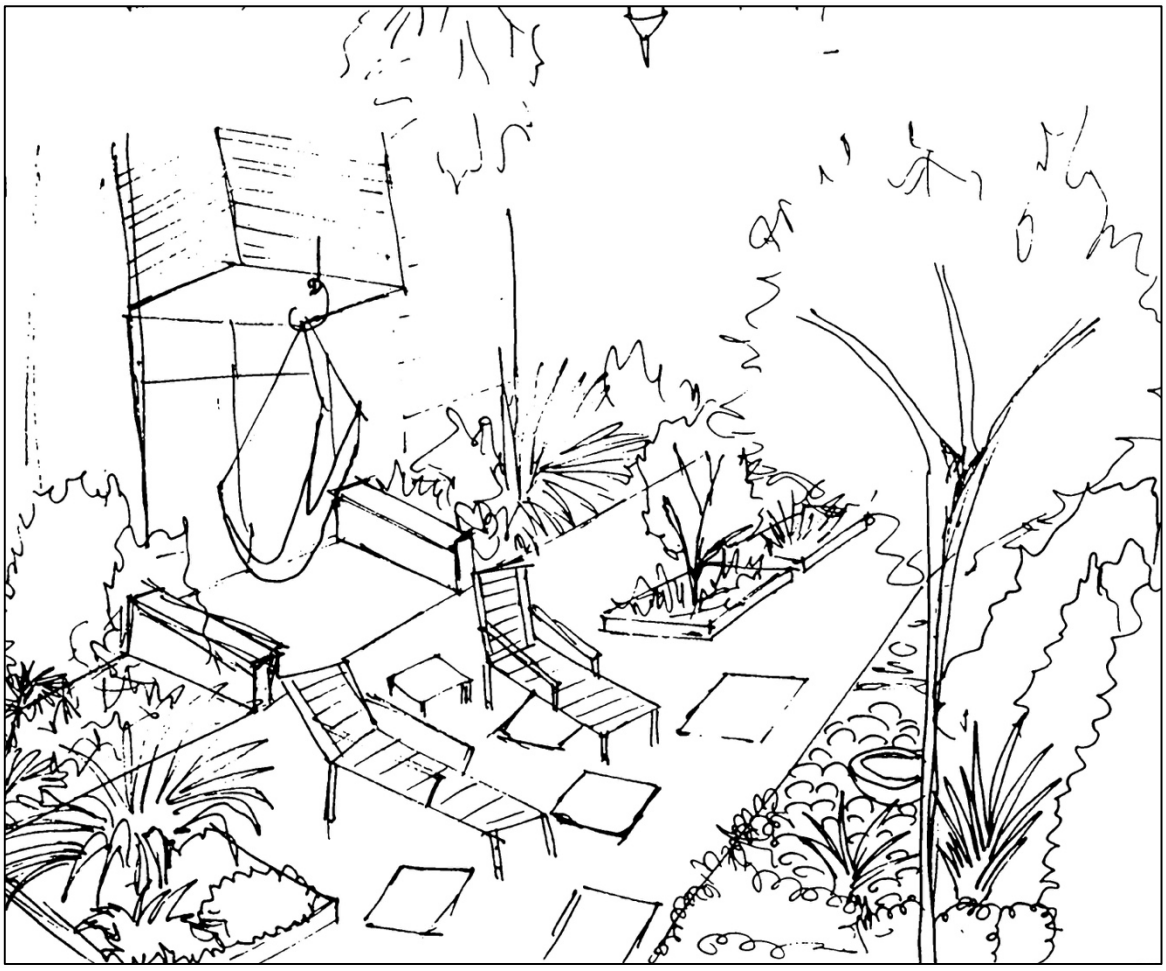


Figure 11: Front gardens as semiprivate areas.

D. Territoriality is a critical mechanism to create a cohesive residential environment and thus make it well contained and easy to monitor and control (Newman, 1972).

E. A territorial definition of the physical environment is achieved by subdivision of residential environments into zones where adjacent residents can easily adopt proprietary attitude (Figure 12). (Newman, 1972)

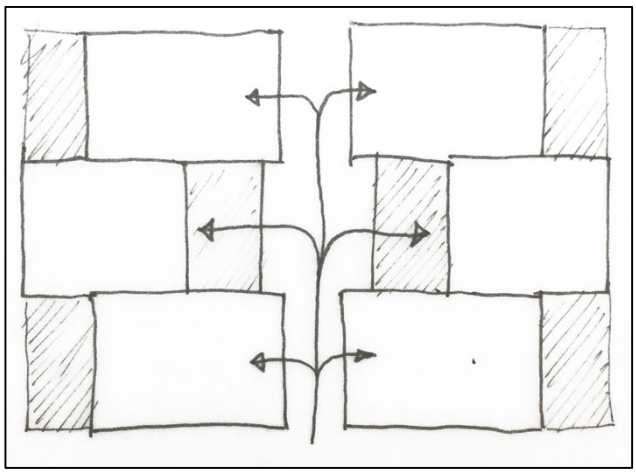


Figure 12: Staggered arrangement to create territories.

F. An intimate spatial scale motivates people to engage in spontaneous activities (Newman, 19Neighbouringoring can be generated by a small-scale and well-defined neighbourhood with clear boundaries (Figure 13).

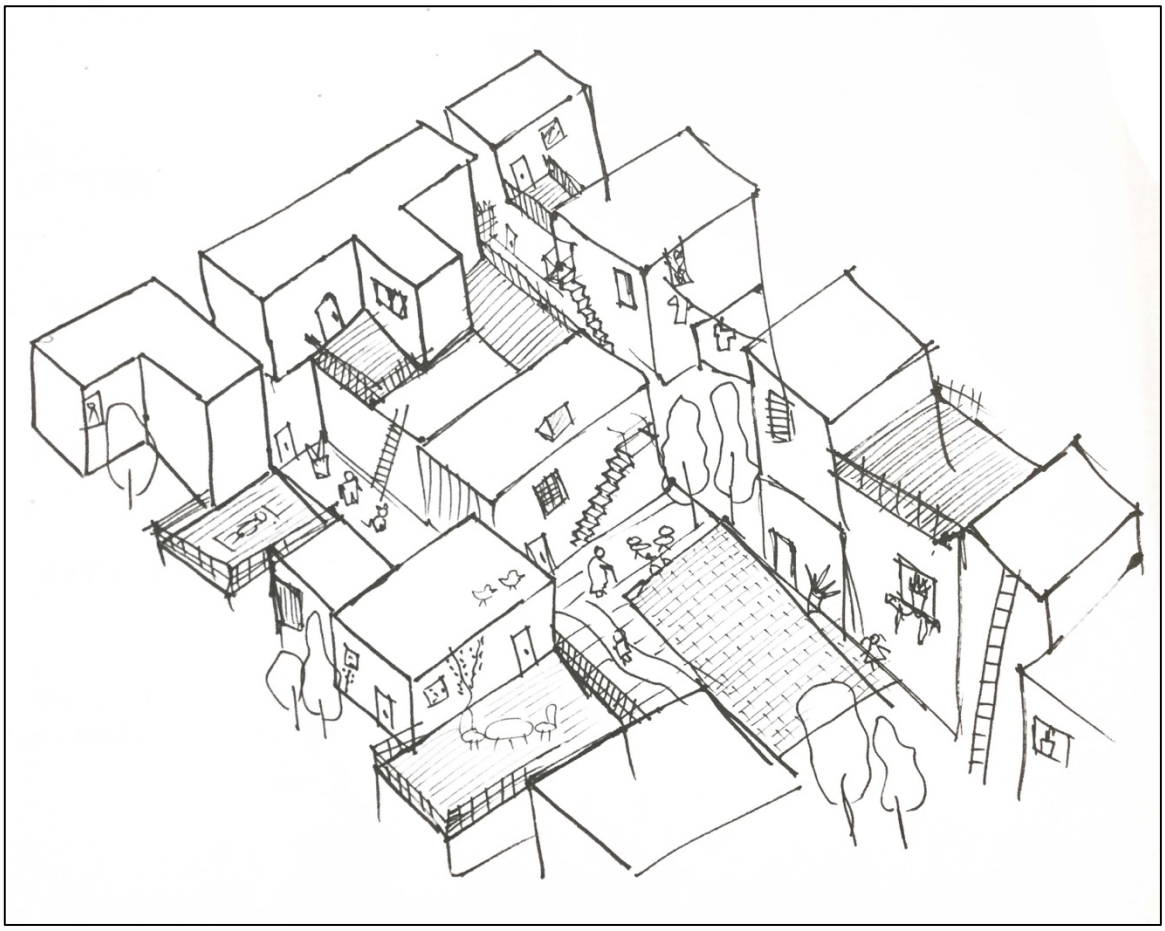


Figure 13: Small spatial scale leads to better neighborhood.

G. “Confused spaces” around blocks, in which land purpose and regulation are unclear needs to be avoided (Newman, 1972).

H. Territorial markings and signage zones of control are created with physical or symbolic barriers that disrupt movement between public and private spaces. and well-defined neighbourhood with clear boundaries (Newman, 1972).

I. Different layouts of building units can create different qualities of spaces and these give rise to different forms of interaction and activities.

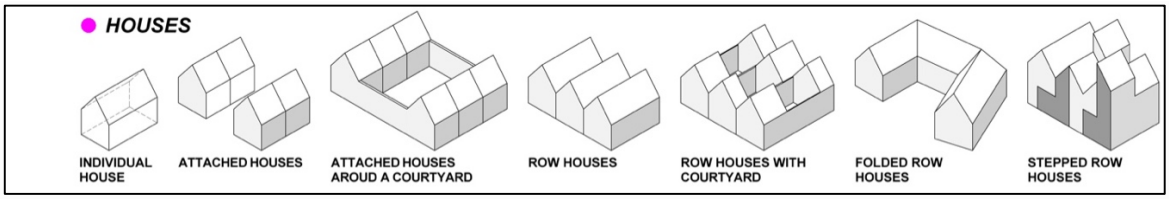


Figure 13: Houses – adaptation after the typologies of Density: New Collective Housing.
(Source: Baldea & Dumitrescu, 2013, pg.180)

3.2.2. VISIBILITY

Greater the visibility of the recreational and gathering spaces, greater will be the activity of that space. But care must be taken to avoid intrusion in public spaces. No external factor must hinder social interaction in a community.

Figure 14: Lighting outdoor spaces

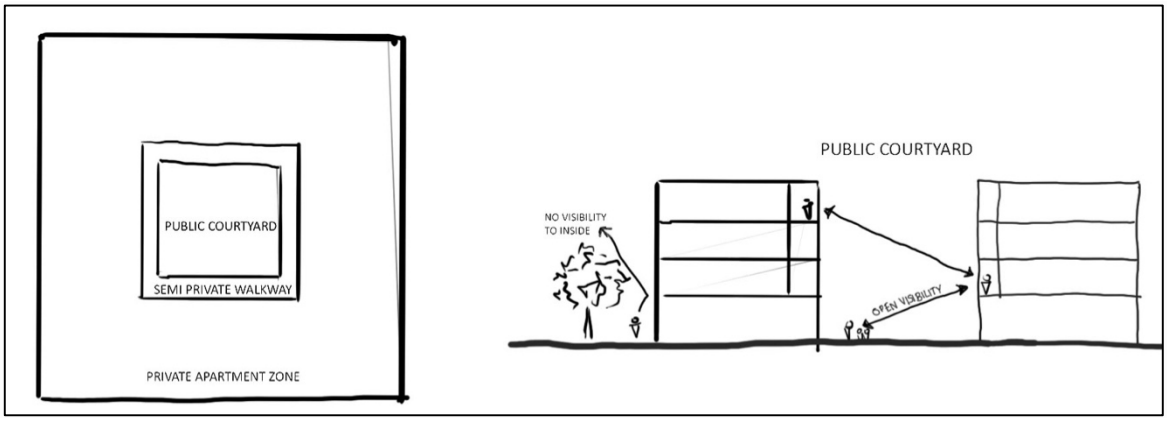


Figure 15: Concept of visibility in outdoor spaces of housing.

3.2.3. MIXED LAND USES

Public housing complexes destroyed traditional mixed-use communities that produce a vibrant street life Choay (1965). When place of residence is juxtaposed with shopping and recreational places, social interaction is facilitated because people are encouraged to roam around and move. Spaces will be empty and unused if activities are not organized in these spaces.

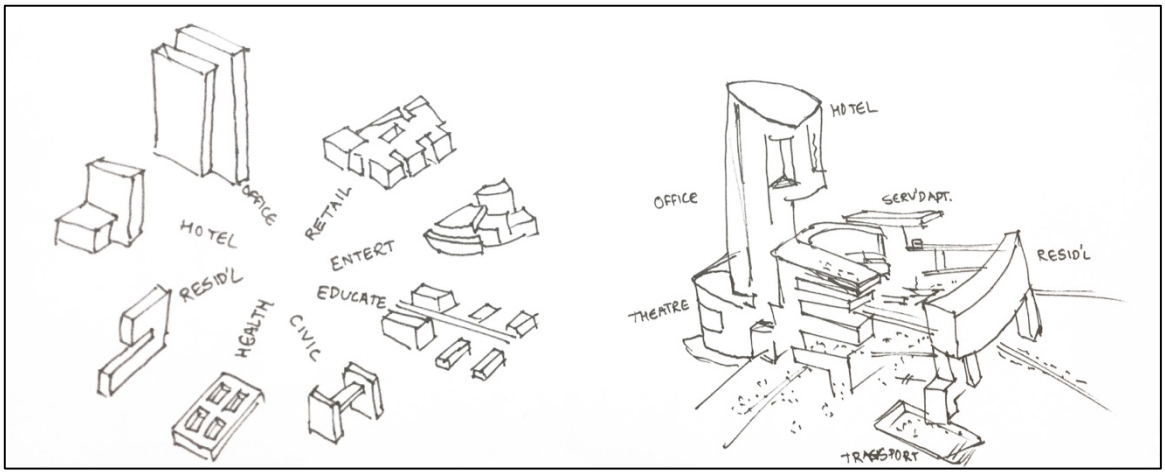


Figure 15: Concept of visibility in outdoor spaces of housing.

3.2.4. PHYSICAL FEATURES

a. A high-quality outdoor space can enhance social interaction by attracting people to come and stay for some time (Figure 16).

The more time people spend outdoors, the more likely are they to engage in activities (Knack, 2000).

Figure 16: Outdoor active spaces for social interaction.

b. The visual appearance of common outdoor spaces is important to develop neighbourhood relations (Skjaeveland and Garling, 1997).

c. The existence of interesting objects or features, such as artificial water scenery and properly arranged seats, also encourages the use of public space.

d. The provision of greenery in residential communities' increases opportunities for social activity and enhances social bonding among residents (Shu-Chun, 2006).

e. Playgrounds with recreational facilities that are attractive to children are likely to make people on this site interact

3.2.5. ACCESSIBILITY

Accessibility is another major factor that affects social interactions (Figure 17). Public transport interchange facilities must be provided at convenient locations.

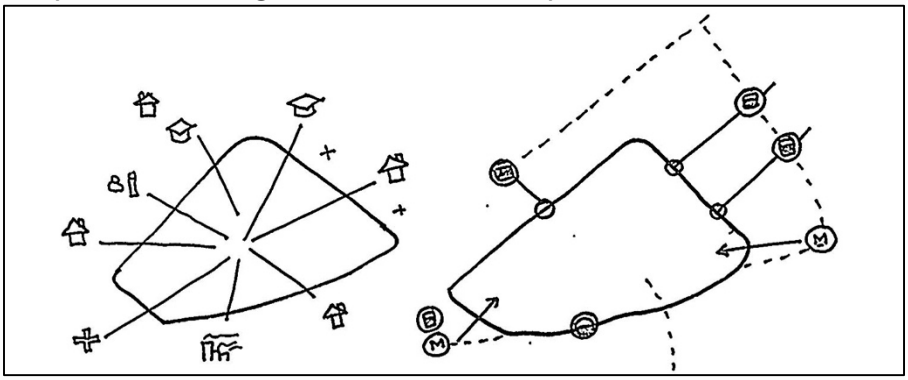


Figure 17: Accessibility of site to all means of transport and infrastructure,

3.2.6. EXPERIENCE

Experience of a space through varying elements of design as well as scales of elements of the building or a building as a whole could create curiosity and a sense of interest and invite a larger group of people to such spaces.

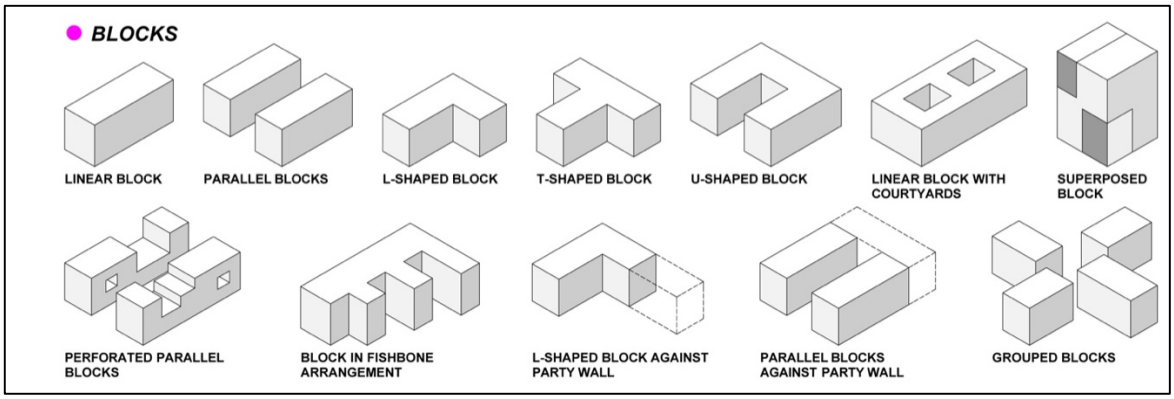


Figure 18: Blocks – adaptation after the typologies of Density: New Collective Housing.
(Source: Baldea & Dumitrescu, 2013, pg.181)

3.2.7. BUILDING FORM

It is essential to create a form that is aesthetically appealing so as to encourage people to participate in its activities. Monotony is a major reason for spaces to go unused and for people of a community not interacting. Therefore, if the built form or landscape is appealing to the human eye, more people will gather and interact efficiently. Also, we must ensure some simplicity in the complexity of our design to allow ease of access, circulation, recognition of spaces etc.

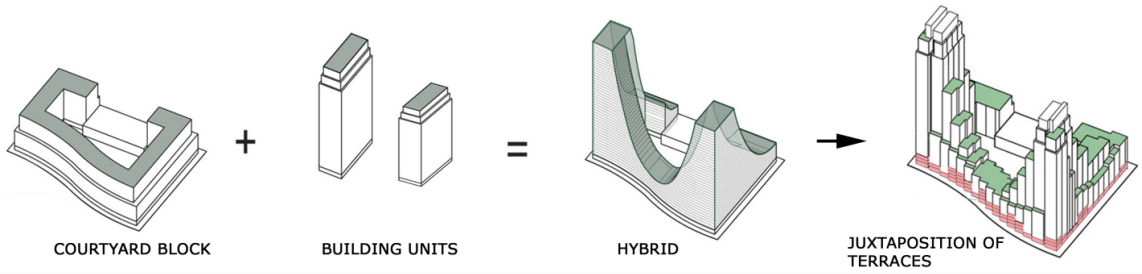


Figure 19: Transforming simple form for aesthetics.
(Source: Karissa Rosenfield. "Largest Affordable Housing Project in New York " 13 Dec 2013.)

3.2.8. INTERACTION WITHIN THE BUILDING

Social interaction need not only be in open spaces on the ground but can be incorporated at various levels of the building housing different activities which is useful in cases of adverse weather conditions.

If a space is large and covered, it feels luxurious and safe, whereas some might feel bound in an enclosure. Hence a decent balance of open, semi open and closed spaces must be maintained in a social setting.

3.2.9. OUTDOOR SHADING

Another solution to the weather adversities could be shading. Sheds could be provided as an element of landscape including sitting spaces where people can sit even on hot sunny days or during heavy rains and enjoy the weather or play games and interact (Figure 20).

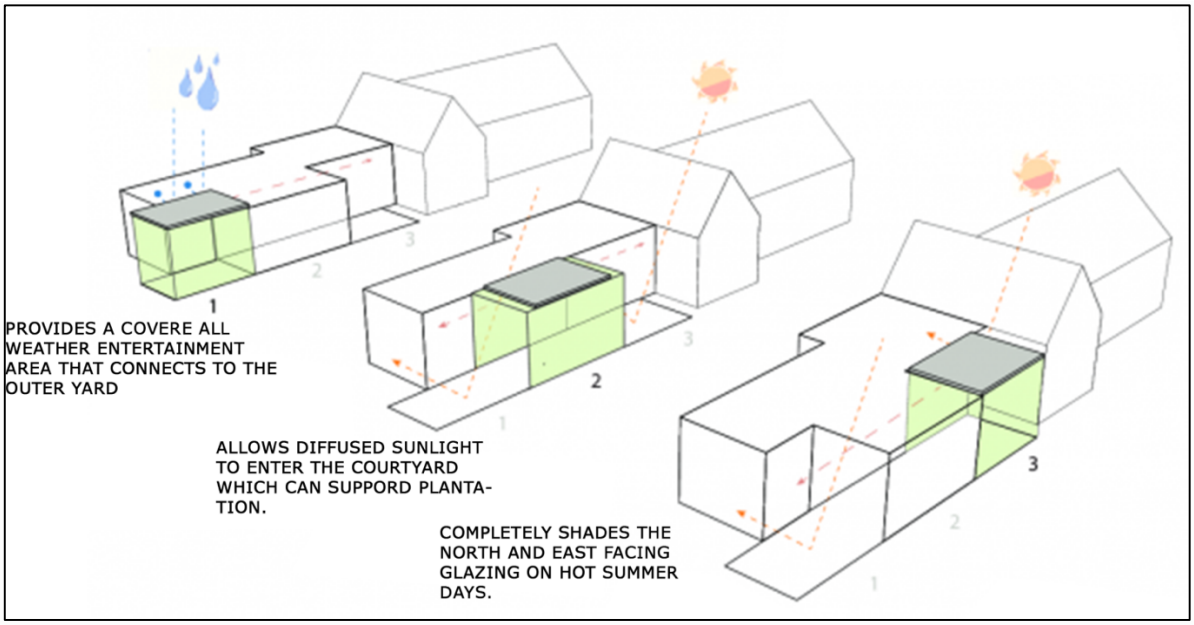


Figure 20: Outdoor shading techniques.
(Source: Cristopher Megowan design, Convertible courtyard house,

3.2.10. CONNECTIVITY

A good sense of connectivity among the different characters of buildings is essential in terms for its accessibility to increase in the interaction of different fields of activities (Figure 21).

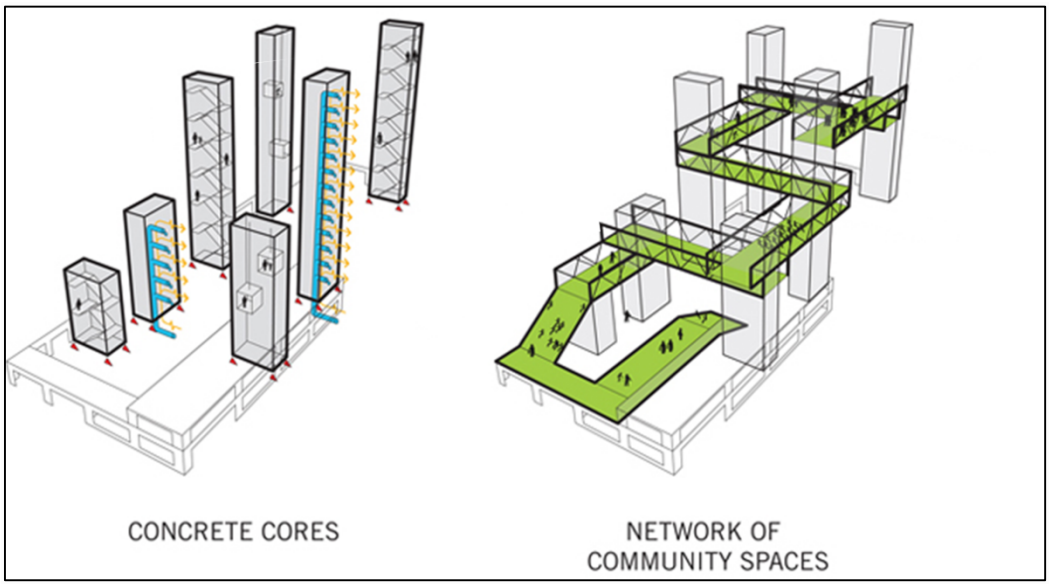


Figure 21: Building connectivity.
(Source: Studio Gang Architects, "The Garden in the Machine", 2012)

3.2.11. ACTIVITY (Wodtke, 2009, section #11)

A multitude of activity must be created in a space to make it most socially active. Yet the building or landscape must not lose its character or offend any cultural or traditional sentiments (Figure 22).
We must try and create activities that are useful to individuals but are much improved by group participation.

Conflict: If there's nothing to do on a site, then it doesn't matter if all your friends are there or not. The site has no more interest than a barren land, and with time it will undergo neglect ion and get abandoned.

a. Sharing
In social community settings, people are dependent on other members of the society for existence and sharing of resources or emotions is inevitable. Sharing gathers people of like interests, and allows for an exchange of ideas.
Hence spaces can be created where a particular activity is focused and people of common interest can share the space and interact.

b. Conversations
Conversations and communication could be through just presence of people in a space or just eye contact. This also ensures a sense of security in an area.

c. Collaboration
When a locality is well designed and a team is assigned and given incentives to maintain its quality, a sense of belongingness enters people and more people collaborate and allow positive and enthusiastic interaction. As architects we must assign spaces to carry out such community responsibilities and provide sufficient avenues for them.

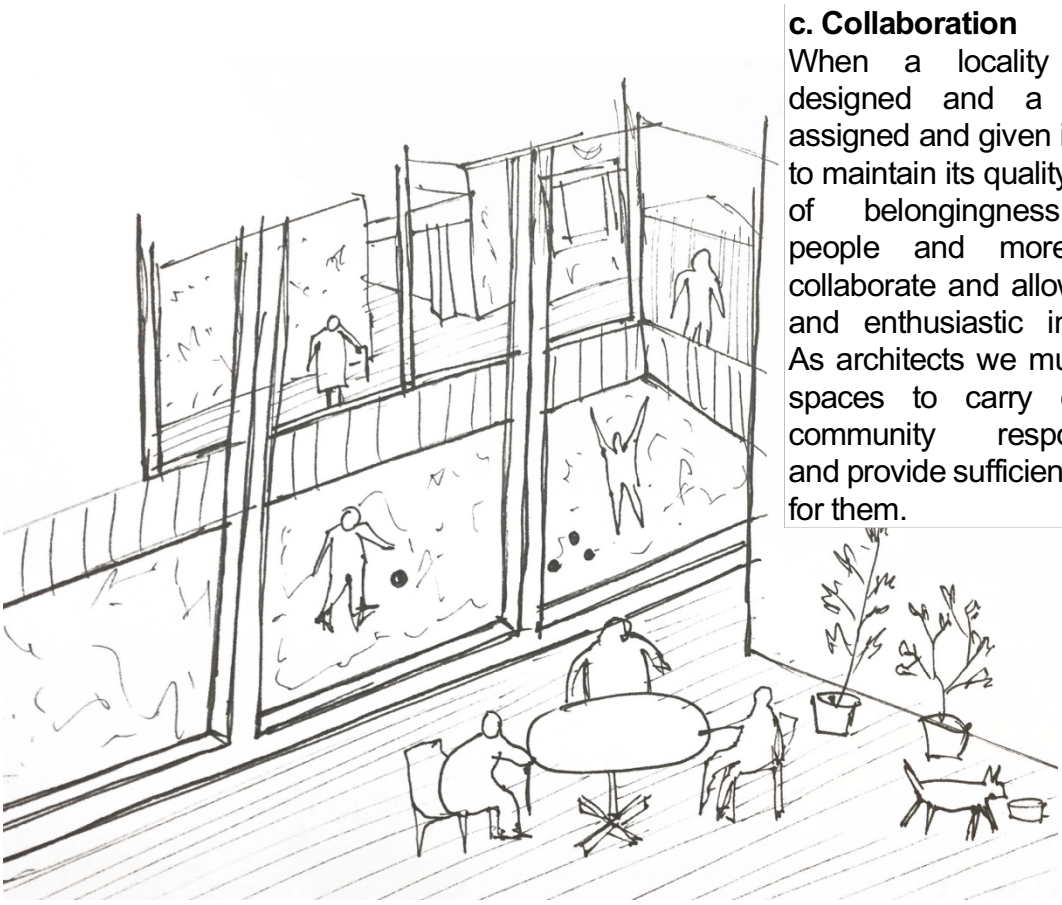


Figure 22: Combination of multiple activities.

3.2.12. IDENTITY (Through culture)

Creating a sense of identity for people in a space is necessary to create healthy interaction.
When a person feels a sense of belongingness he performs better socially and physically.
This can be ensured by creating spaces inspired by the local culture and traditions.

For e.g. Places where the festival Janmashthami is celebrated on a large scale, public spaces have to be provided so as to cater to the crowd and making a large human pyramid for “breaking the Matka (earthen pot)”.

Also, in Mumbai Ganesh Chaturthi is a festival that is celebrated at large and requires a sufficiently large open space for it within a locality.

Figure 23: Burning fire on the festival of Holi.

4. INVOLVING COMMON PEOPLE IN DESIGNING PROCESS

For efficient designing we need to work with the people not for the people, hence public surveys and consultations and suggestions must be taken into account which ensure better quality of life and society friendly environment.
In practicing humanitarian architecture, the practitioner must realize these intricacies of social-housing. He/she must take notice that good housing is made through the social networks, cultural capital, and resources within the population, not from outside methods of top-down intervention. Generative design, which enables adaptation through incremental growth with feedback loops, facilitates this type of bottom-up housing.

"When dwellers control the major decisions and are free to make their own contributions to the design, construction or management of their housing, both the process and the environment produced stimulate individual and social well being. When people have no control over, nor responsibility for key decisions in the housing process, on the other hand, dwelling environments may instead become a barrier to personal fulfilment and a burden on the economy" (Turner and Fitcher, 1972, pg.241). Allowing the user to become invested in their housing, through participation among other strategies, they become empowered and bring that much more success to the project.

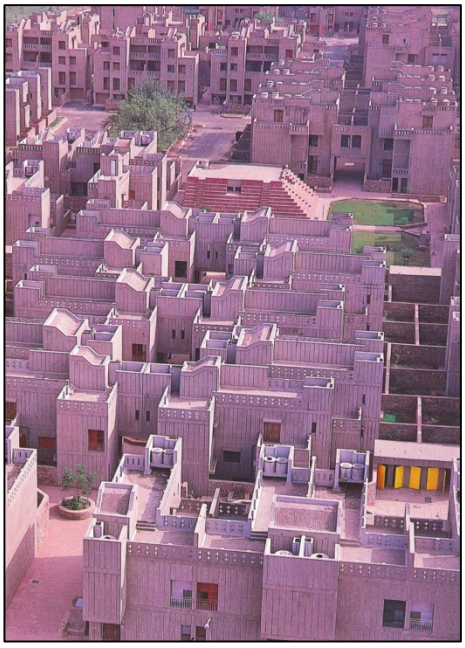
It is a necessary understanding of process; you need to remove hegemonic institutions and stop considering housing as a product. Turner states: "when the house becomes a commodity supplied through paternalistic agencies, there is no room for the enjoyment of the process itself (Turner and Fitcher, 1972, pg.135). Decisions must come from below; complexities and abilities of the people are overshadowed by regulatory structures.

Turner expands on how important it is for the architect to understand, "the initiative, ingenuity, perseverance, and hope so evident in the housing action of such a large part of the population and in the face of so many difficulties" (Turner and Fitcher, 1972, pg.145). The professional has to take responsibility for the artificial, authoritarian barriers in the way. The squatters actually add to the urban fabric, and should be considered a part of the urban environment. In many instances, the urban poor make better use of their resources and are sometimes better housed than their wealthier counterparts (Turner,1976).

5. CASE STUDY- Asian Games Housing, Delhi

Project Data:
Asian Games Olympic Village, Delhi, India.
The housing complex consists of 700 dwelling units and a mix of recreational and commercial facilities.
Client: Delhi Development Authority.
Architects: Raj Rewal Associates.

Quite often housing designed for a specific event becomes a showpiece of contemporary architecture. Raj Rewal's housing for the Asian Gaines held in Delhi in November 1982 has been designed in the tradition of such works, but attempts to create a village to instil a sense of community and participation in the best spirit of an Olympiad.
Located near the medieval nuns of Siri fort in South Delhi, 35 acres were allotted by the Delhi Development Authority (DDA) for some 700 housing units. The project took just under two years to build.



Holding any Olympiad means the initiation of many new building projects for the host nation — new stadia, hotels, visitors facilities and a whole "village" to house contestants from the participating countries. This, requires the mobilisation of resources in terms of finances, manpower and professional expertise. The expenditure is significant and the buildings constructed for this massive influx of people arc often under utilized after the event. With this in mind, the architects designed the Olympic village housing to be used by the local population after the event, and have given the buildings an Indian character.

Urban Village

The village has been designed as a sequence of spaces to create mohallas or neighbourhoods. It parallels efforts by other designers in India to create "urban villages" in a city. In traditional Indian cities each mohalla would be made up of a single social group, and would vary depending on the size and resources of that particular group. Sometimes a minority group, such as the Muslims, would settle together. In Rewal's scheme he had no way of knowing how large a mohalla would actually be and has designed the clusters to be of various sizes to have between 12 to 36 houses. Of the total 700 units, 500 are flats.

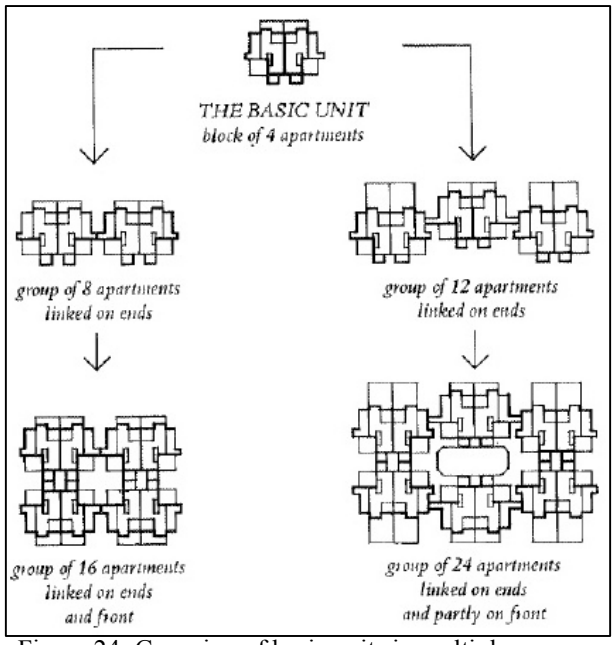


Figure 24: Grouping of basic units in multiple ways.

Building units

The flats vary in size, from 90 square meters to a maximum of 200 square meters. Each unit has its own private open-to-sky space, in the form of a courtyard or a terrace, in addition to sharing a larger less private communal garden area. The house clusters, with their connecting walkways and terraces overlooking the internal pedestrian streets or galis, help give the people of the mohalla a sense of participation in communal activities.

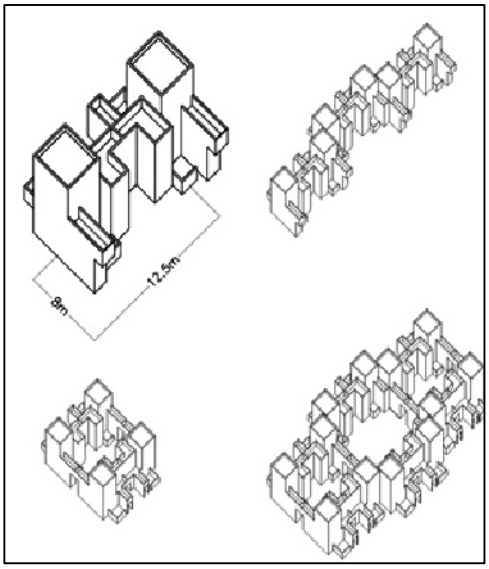


Figure 25: Grouping of basic unit in multiple ways.

Housing a Community

Unlike western neighbourhoods, the sense of actively "keeping an eye" on one's neighbours and being able to share experiences and conversation with each other is integral to the creation of community. Rewal's scheme takes this into account by the honeycombing of spaces and by letting the pedestrian circulation through the wide and narrow galls give access to the houses.

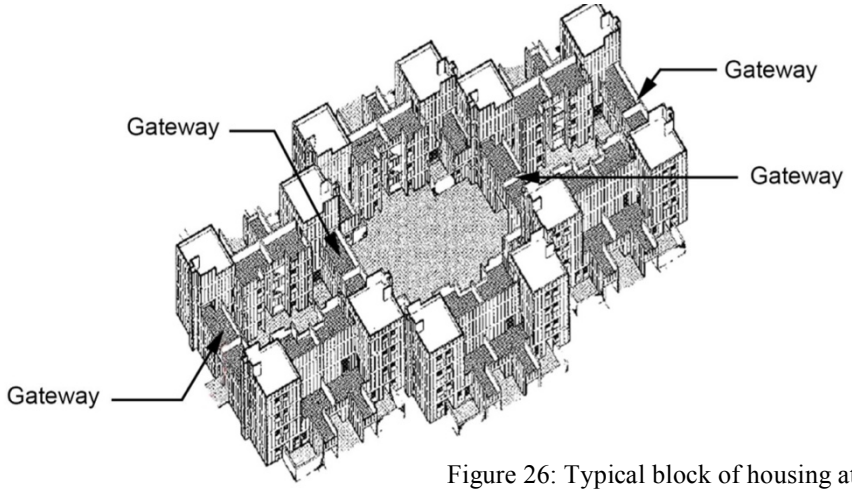


Figure 26: Typical block of housing at Asiad Village.

Connecting spaces

Another defining element in old walled cities, as in Delhi itself, is the gateway or darwaza. The separation of space, of mohallas, is equally as important as its integration in letting communities define themselves. These darwazas were rather grand and sometimes guarded to keep intruders out of a particular neighbourhood; especially at night. With a rather neat twist and use of a traditional clement, the design makes these darwazas define the spans, but they do not actually have closable doors. In fact, this device separates the mohallas at ground level but creates a walkway which connects two sides of a gali above the gateway. This may be visual game-playing, but it is architectural game-playing at its best. Too often in contemporary architecture the symbolic aspects of design are forgotten.

Here they manifest themselves in many different ways; be it the multi-purpose spaces or the visual elements that give the scheme a continuity with the past. The sense of enclosure and continuity of movement is maintained throughout the scheme, respecting the identity of spaces. The scale of the buildings and their density (of 28 units per acre) and the mix of public and commercial spaces, gives the whole village an intimacy and a humane scale.

Figure 26: View of the central courtyard surrounded by building units.

Building materials

There has been a careful selection of materials and colours for the housing. The building external walls are finished with a stone aggregate applied in situ while the courtyard walls are of Delhi quartzite stone. Pedestrian pathways are paved with white or red sandstone. The doors and windows to the houses are of metal and arc painted in bright colours which also give a sense of identity to the different units.

Other features

In the design, easy maintenance has been introduced as with the exposed service ducts. Climate too has played a prominent role in ordering design, for example the terrace parapets are perforated as jabs to allow for air circulation without affecting the privacy of the inhabitants.

Figure 27: Site plan of Asiad village.

Above: The Asian Games housing consists of 500 flats and 200 town houses, in two to four storey buildings, having a density of 28 units per acre. The housing surrounds the present doordarshan complex which was initially used as a dining complex. The buildings are clustered to form mohallas or neighbourhoods, each with between sixteen and thirty-six dwellings. A central pedestrian spine, modelled on traditional galis, interconnects the dusters. Pedestrian and vehicular acmes to housing is kept segregated but linked for convenience. Car parking in cul de sacs is off the peripheral roads.

Right: The isometric drawing of a typical cluster shows how the houses are designed as interlocking units, usually in a block of four to six fiats. Each cluster has its own integrity, being defined by large darwazas or doorways, which have been a feature of old city quarters in northern India. In the long term, it is hoped that each cluster will develop its own identity. The houses and roof terraces often overlook the streets (galis) and the communal courtyards, creating a sense of participation among residents, in what the architect calls "the theatre of the street."

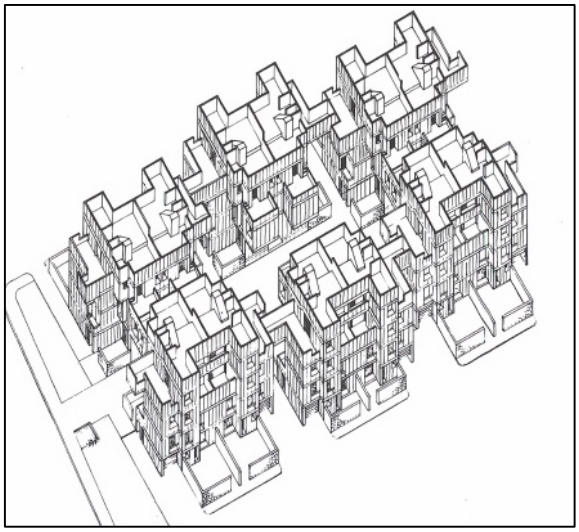
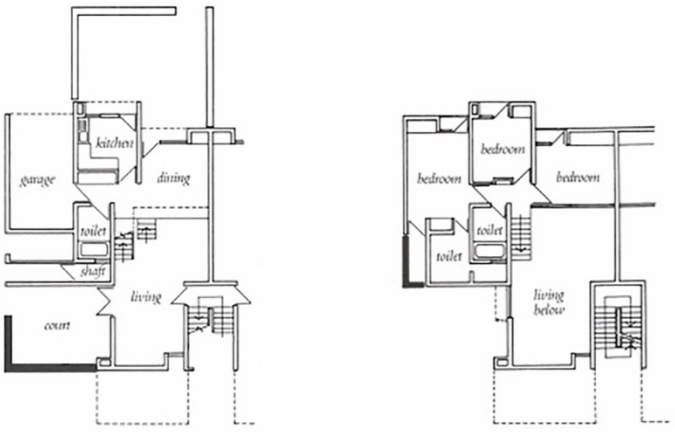


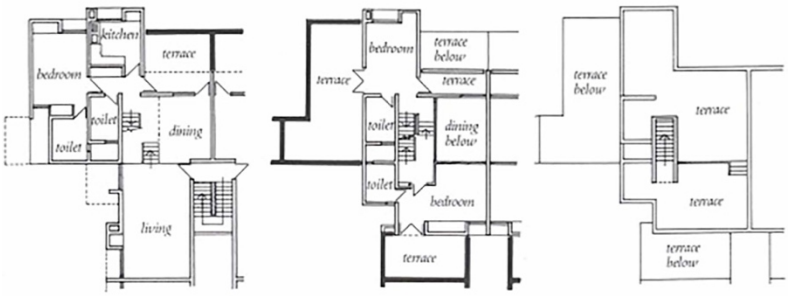
Figure 28: Cluster of housing units

Top: View of one of the inner courtyards of a unit block. The building overhangs provide shade for the pedestrian pathway. To the rear is one if the darwazas, which defines the boundary of this small mohalla. A typical housing unit block is so designed that it can be linked on sides and front to create clusters having a variety of enclosed spaces.

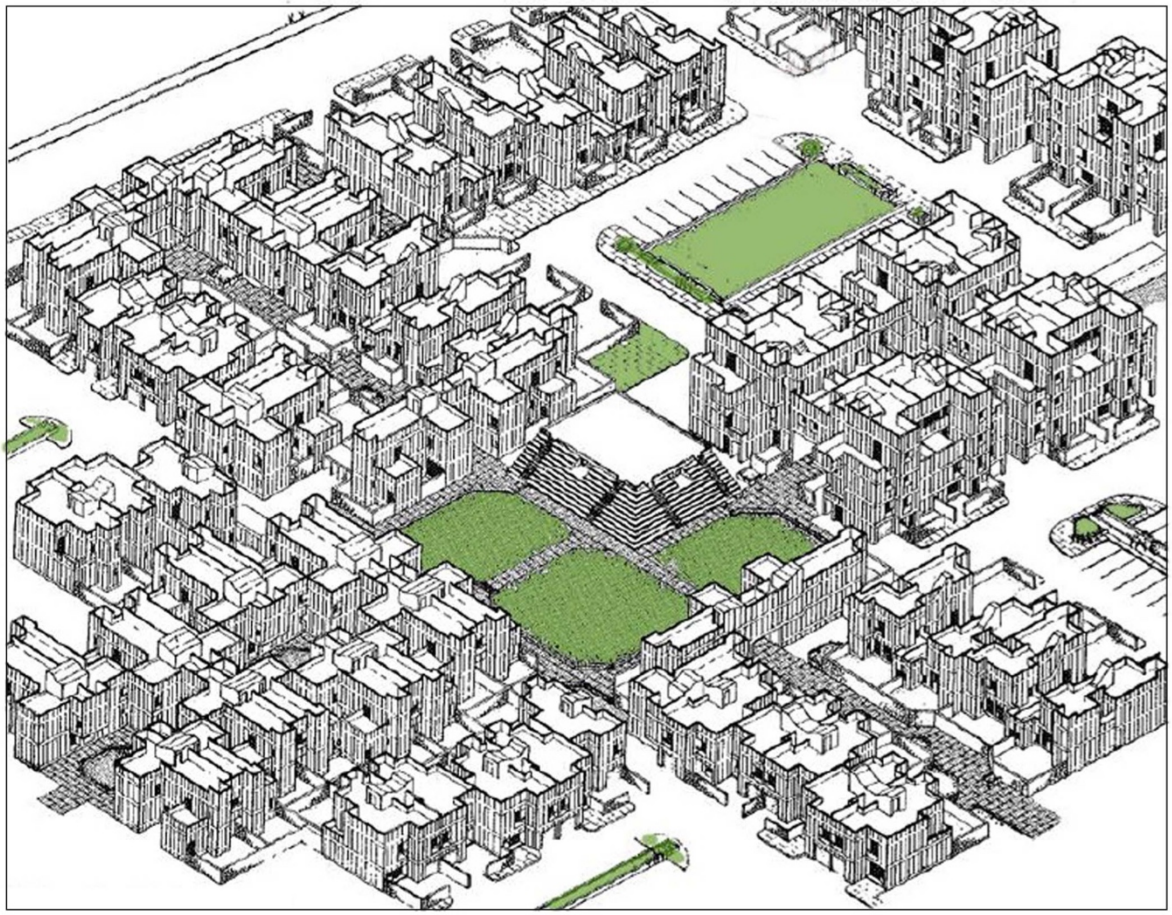


Type E1 *Ground floor plan* *Mezzanine floor plan*

Right: These units rises four storeys and consists of two duplex flats each having three bedrooms



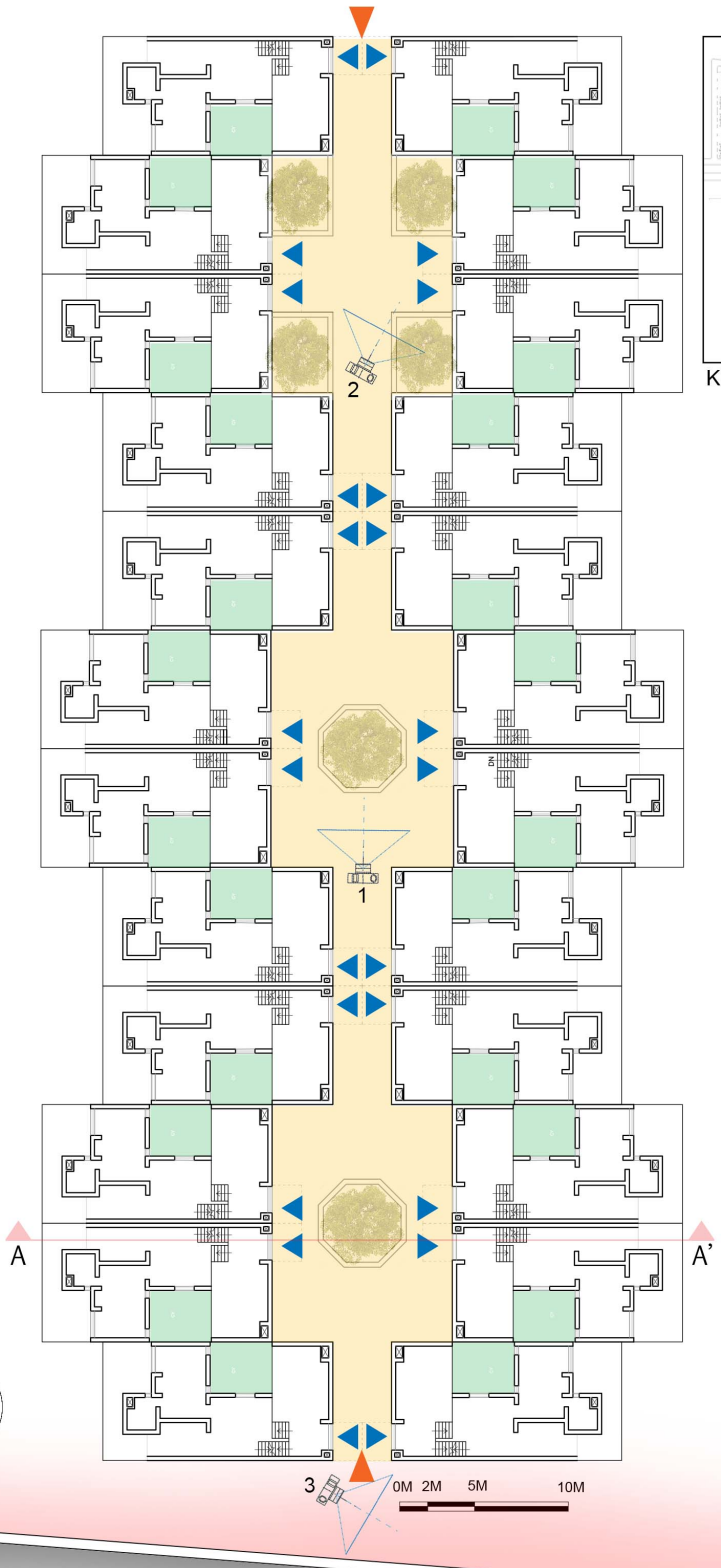
Type E2 *First floor plan* *Second mezzanine floor plan* *Terrace plan*

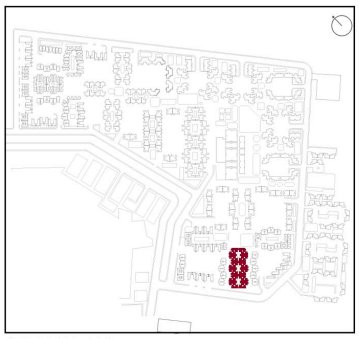


Top: The layout shows the cohesion of all clusters

Above: Different types of apartments generate a variety of clusters at different levels, avoiding the monotony of large scale public housing schemes.

TYPE A




KEY PLAN

ENTRY TO THE BLOCK
ENTRY TO VILLA
PRIVATE SPACE (INNER COURTYARD)
SEMI-PRIVATE SPACE (SHARED COURTYARD)
PUBLIC SPACE (PAVED & SEMI PAVED)
ROAD

The arrangement of individual houses is such that it generates an intimate spatial scale with clear boundaries motivating people to engage in spontaneous activities.

IMAGE 1

A small scale courtyard brings the dwellings proximate to each other.This leads to better social connection amongst the dwellers.
Also. a courtyard of such intimate scale, awakens a sense of belongingness to the dwellers. This leads to better maintenance and quality of space outside.

IMAGE 2

Territories are defined by subdividng the common courtyard space into zones that are adapted by the adjacent residents. This creates an environment that can be easily controlled and maintained.

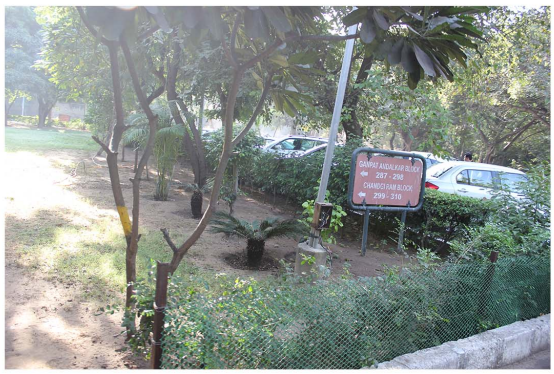
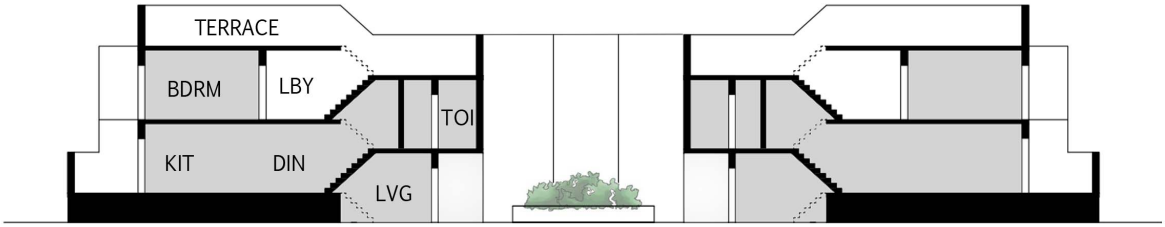


IMAGE 3

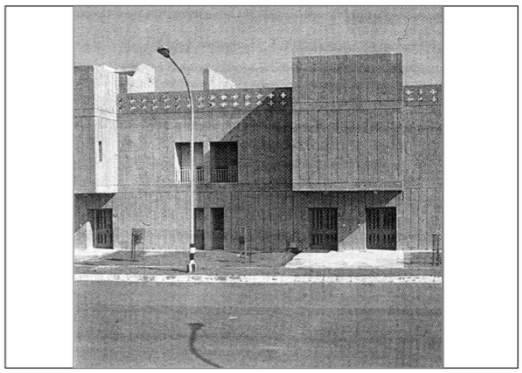
Physical and symbolic barriers disrupts movement between public and semi-private spaces creating territorial markings of a space.

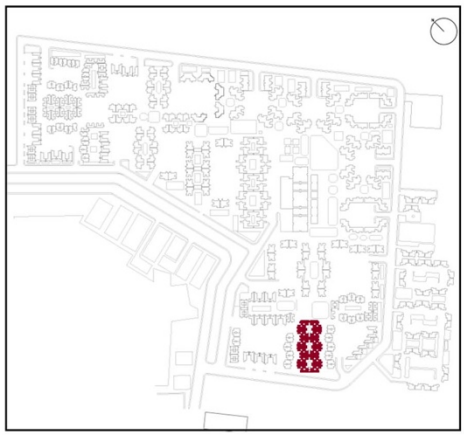
Spaces around the block act as a buffer zone, disrupting the outside distrubances helping to create a more intimate space inside.



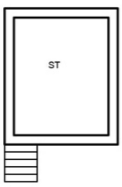
SECTION AA'

Neighboring is generated by a small-scale and well-defined neighborhood with clear boundaries.

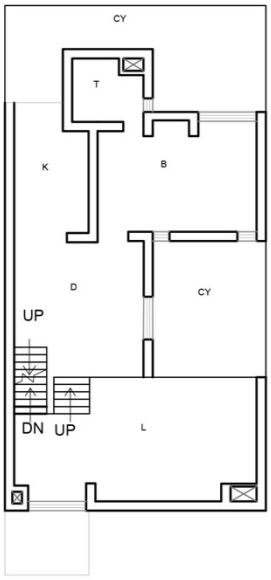




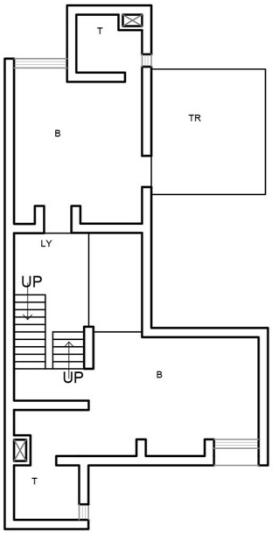
KEY PLAN



BASEMENTPLAN

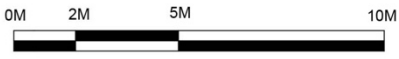


GROUND FLOOR PLAN



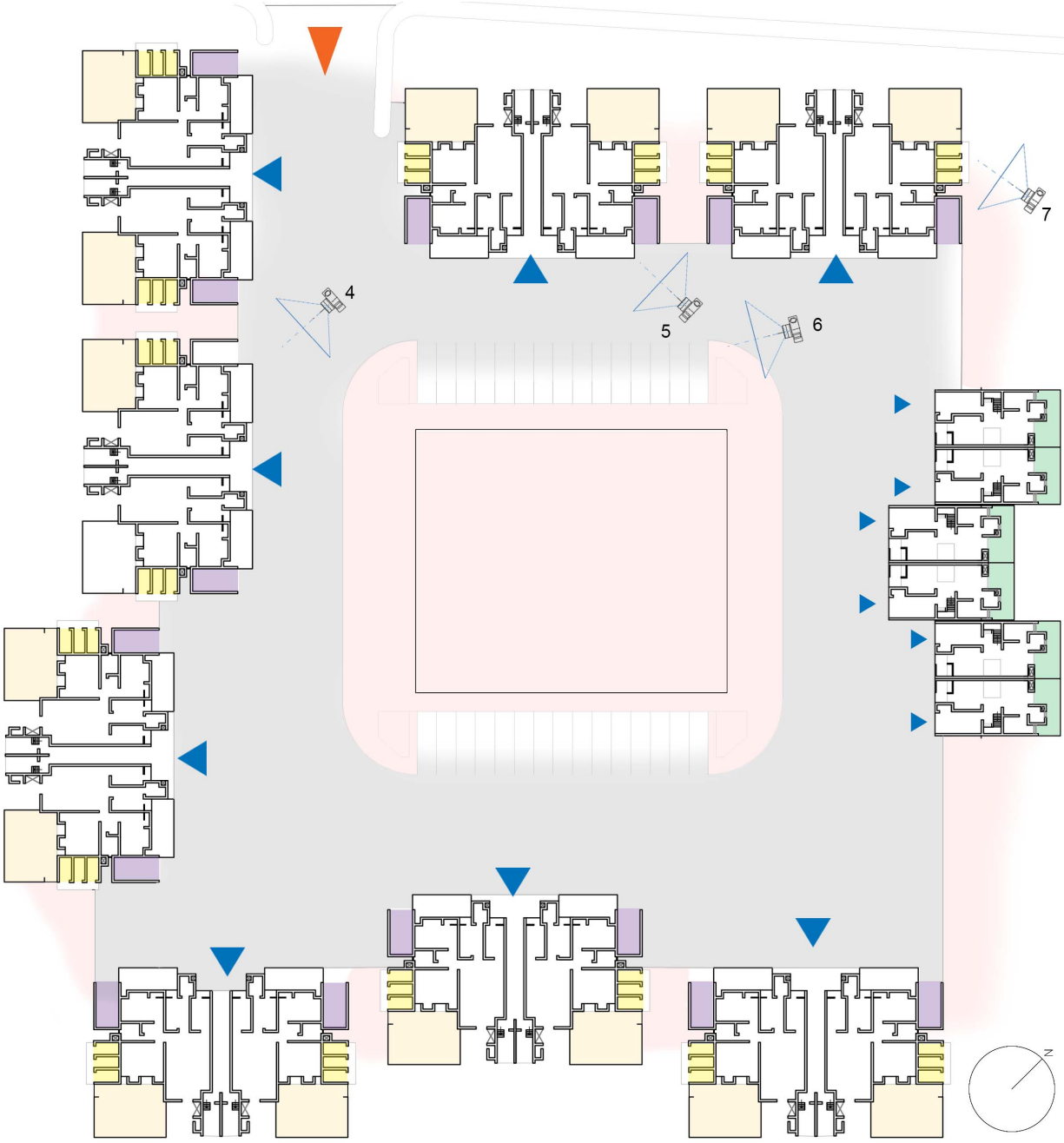
FIRST FLOOR PLAN

L - LIVING ROOM	ONE
D - DINING ROOM	ONE
B - BEDROOM	THREE
K - KITCHEN	ONE
T - TOILET	THREE
ST - STORE	ONE
CY - COURT YARD	TWO
TR - TERRACE	ONE
LY - LOBBY	ONE



TYPE A

S.NO.	TYPE	PARTICULARS	NO. OF UNITS	PLINTH AREA (SQM.)	WET AREA (SQM.)	CIRCULATION AREA (SQM.)	COVERED PARKING
1	A	INDIVIDUAL HOUSE GROUND FLOOR+ FIRST FLOOR(DUPLEX) WITH BASEMENT	24	165	20	16	-



TYPE B + C

0M 4M 10M 20M

ENTRY TO THE BLOCK
ENTRY TO RESIDENTS
COVERED CAR PARKINGS
PRIVATE SPACE (INNER COURTYARD)
SEMI-PRIVATE SPACE (SHARED COURTYARD)
PUBLIC SPACE (GREEN,PAVED & SEMI PAVED)
ROAD
SCOOTER PARKING

Individuals in apartment buildings are separated physically from common courtyard by a moderate distance. Infact, people in apartment buildings are more likely to use common spaces such as entryways and elevators.Thus, interaction at such spaces with lesser physical distances are more likely to occur.

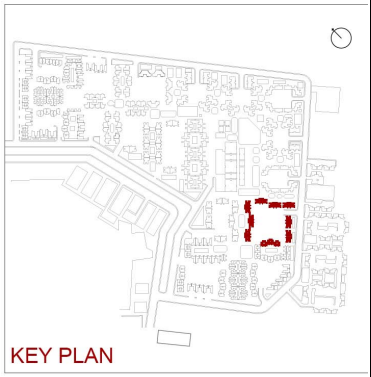


IMAGE 4

Individuals in the apartments are connected with the area that surrounds them through a series of terraces at different levels that visually connects the dwellers from the inside to the outside, but also at the same time maintains privacy.

Lack of servant quarters has led to handing over the garages by the owners to their servants. This may sometimes lead to social dissatisfaction due to bothersome factors to the neigbours like hanging clothes and land encroachments of the public spaces.

IMAGE 5

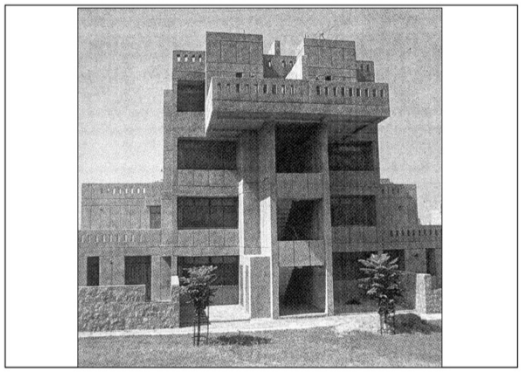
IMAGE 6

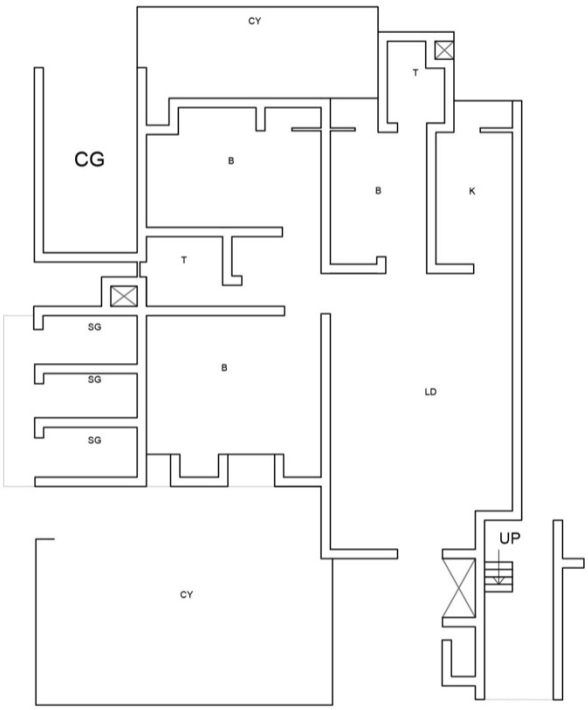
Large trees act as sheds and as an element of landscape including sitting spaces, where people can sit even on hot sunny days and enjoy the weather or play games and interact.

Scooter garages used as service sectors like tailor shops bringing basic necessities closer to the residents.

IMAGE 7

Most of the scooter garages stay unused, thus lie inactive.



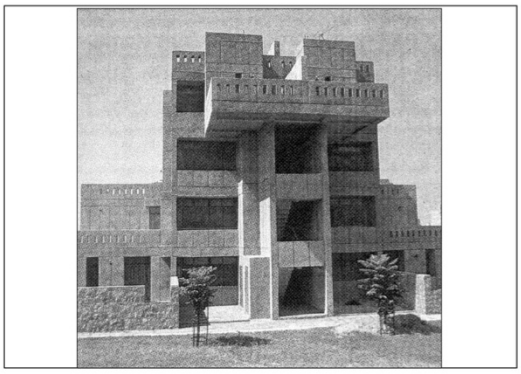


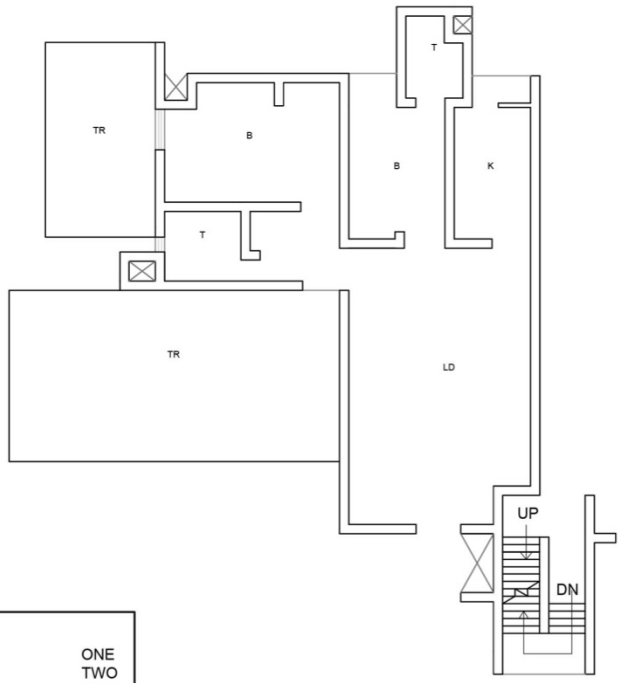
GROUND FLOOR PLAN F1

LD - LIVING CUM DINING ROOM	ONE
B - BEDROOM	THREE
K - KITCHEN	ONE
T - TOILET	TWO
SG - SCOOTER GARAGE	ONE
CY - COURT YARD	TWO

TYPE B

S.NO.	TYPE	PARTICULARS	NO. OF UNITS	PLINTH AREA (SQ.M.)	WET AREA (SQ.M.)	CIRCULATION AREA (SQ.M.)	COVERED PARKING
2	B1	GROUND FLOOR	16	135	19	21	1 SCOOTER GARAGE





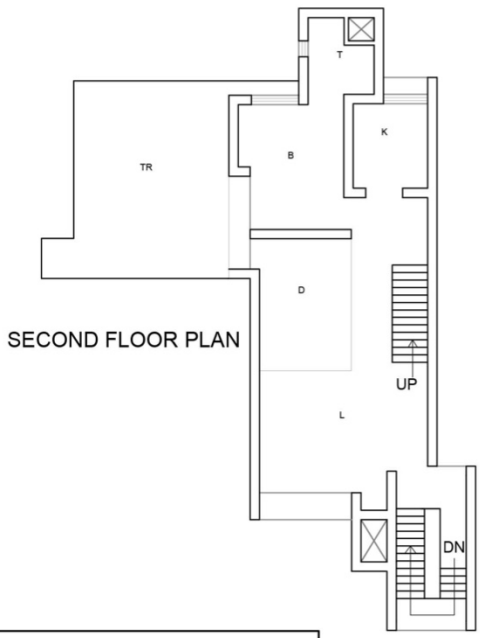
FIRST FLOOR PLAN F2

LD - LIVING CUM DINING ROOM	ONE
B - BEDROOM	TWO
K - KITCHEN	ONE
T - TOILET	TWO
SG - SCOOTER GARAGE	ONE
TR - TERRACE	TWO

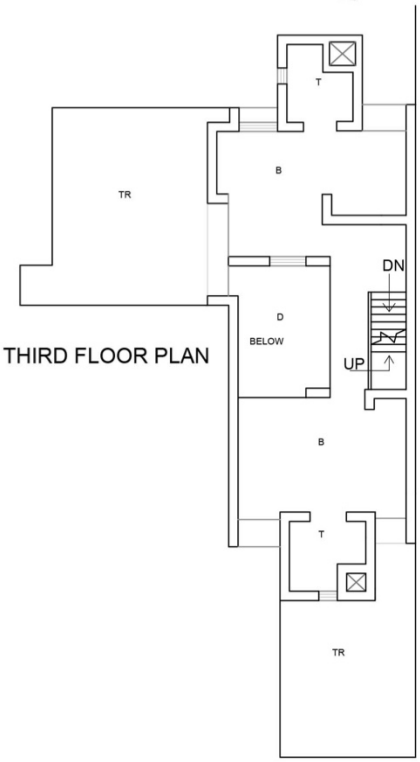
0M 2M 5M 10M

TYPE B

S.NO.	TYPE	PARTICULARS	NO. OF UNITS	PLINTH AREA (SQ.M.)	WET AREA (SQ.M.)	CIRCULATION AREA (SQ.M.)	COVERED PARKING
3	B2	FIRST FLOOR	16	115.64	19	21	1SCOOTER GARAGE

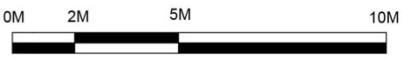


SECOND FLOOR PLAN



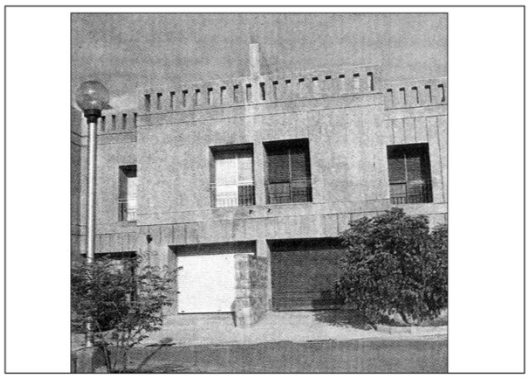
THIRD FLOOR PLAN

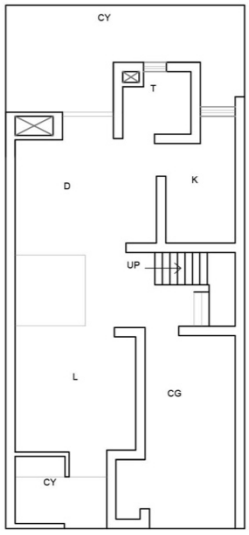
L - LIVING CUM	ONE
D - DINING ROOM	ONE
B - BEDROOM	THREE
K - KITCHEN	ONE
T - TOILET	THREE
CG - CAR GARAGE	ONE
TR - TERRACE	TWO



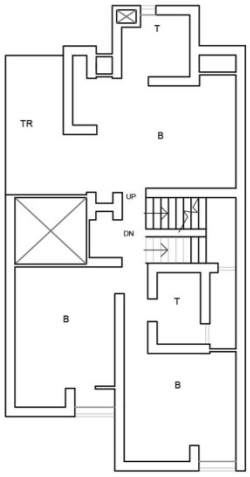
TYPE B

S.NO.	TYPE	PARTICULARS	NO. OF UNITS	PLINTH AREA (SQ.M.)	WET AREA (SQ.M.)	CIRCULATION AREA (SQ.M.)	COVERED PARKING
4	B3	SECOND FLOOR + THIRD FLOOR(DUPLEX)	16	177.11	17	30	1 CAR GARAGE





GROUND FLOOR PLAN



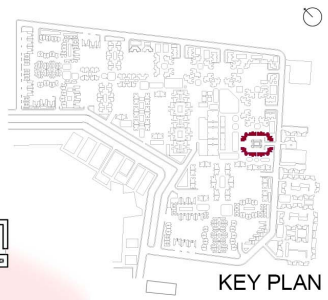
MEZZANINE FLOOR PLAN

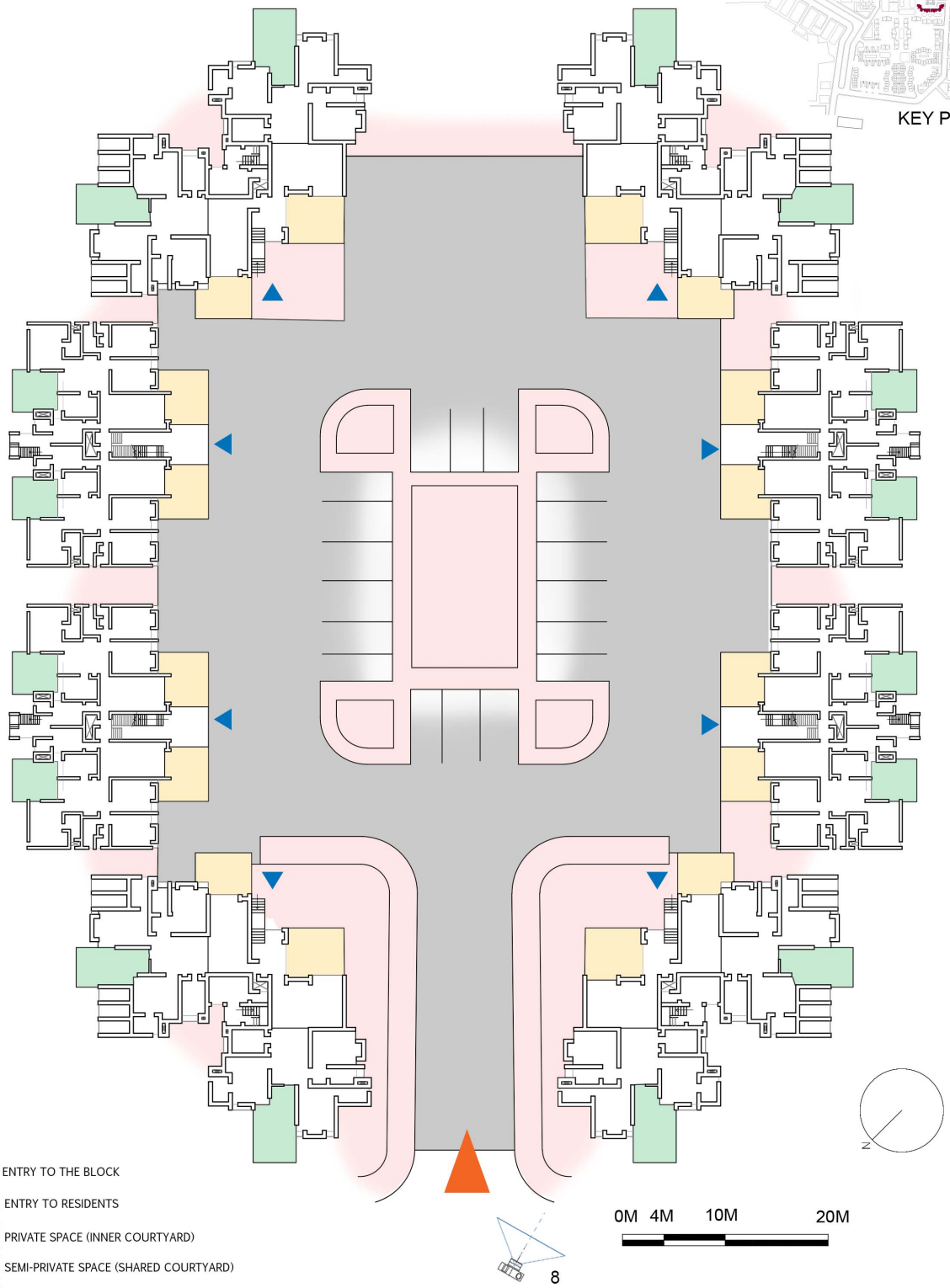
L- LIVING ROOM	ONE
D- DINING ROOM	ONE
B- BEDROOM	THREE
K- KITCHEN	ONE
T- TOILET	THREE
CG-CAR GARAGE	ONE
CY-COURT YARD	TWO

TYPE C

S.NO.	TYPE	PARTICULARS	NO. OF UNITS	PLINTH AREA (SQ.M.)	WET AREA (SQ.M.)	CIRCULATION AREA (SQ.M.)	COVERED PARKING
5	C	INDIVIDUAL HOUSE GROUND FLOOR+ FIRST FLOOR(DUPLEX)	6	155.41	14	18	1SCOOTER GARAGE

TYPE D + E


KEY PLAN

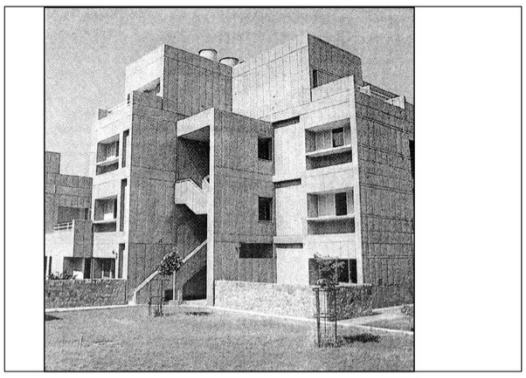

ENTRY TO THE BLOCK
ENTRY TO RESIDENTS
PRIVATE SPACE (INNER COURTYARD)
SEMI-PRIVATE SPACE (SHARED COURTYARD)
PUBLIC SPACE (PAVED & SEMI PAVED)
ROAD
8
0M 4M 10M 20M
N

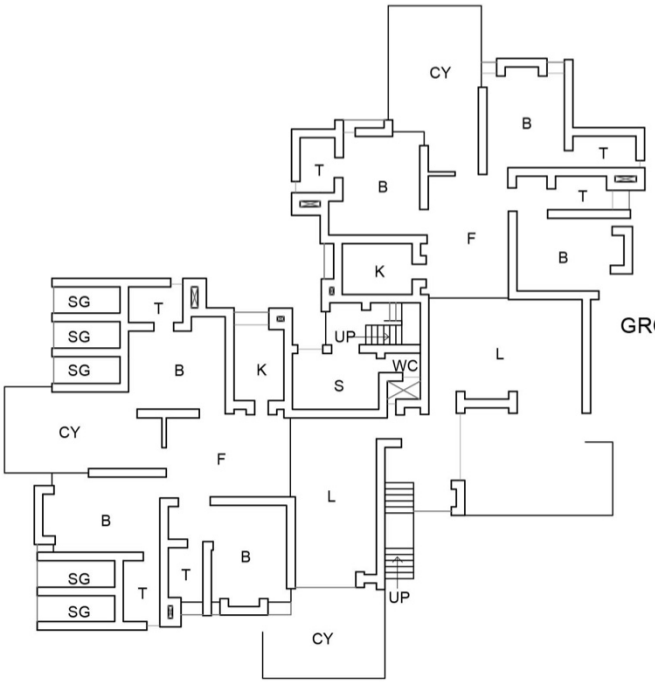
Central courtyard of the currrent layout is much diminishing than that of the previous layout, discouraging possibilities of interactions amongst the dwellers who could use a central space to connect with their neighbours.

IMAGE 8

These large buildings have less physical space between the dwellers. Such buildings with less physical distances encourage more social connection.

Apartments at the higher levels increases the distance of individuals from the outside world than the lower ones. Thus, actions in the street (i.e. vehicles, trees) are of less relevance to the ones residing at higher levels than that of the lower levels.
At the same time, an argument can also be raised that interaction of the dwellers at higher levels is less as compared to the lower levels.

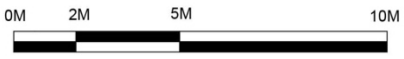




GROUND FLOOR PLAN D1

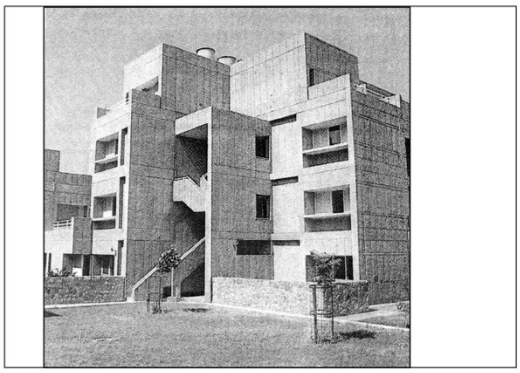
GROUND FLOOR PLAN D2

	P1	P2
L - LIVING ROOM	ONE	ONE
F - FAMILY LOUNGE	ONE	ONE
B - BED ROOM	THREE	THREE
K - KITCHEN	ONE	ONE
S - SERVANT'S ROOM	ONE	-
T - TOILET	THREE	THREE
WC - WATER CLOSET	ONE	-
SG - SCOOTER GARAGE	-	ONE
CY - COURT YARD	TWO	TWO



TYPE D

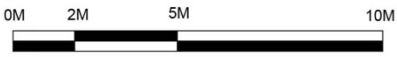
S.NO.	TYPE	PARTICULARS	NO. OF UNITS	PLINTH AREA (SQ.M.)	WET AREA (SQ.M.)	CIRCULATION AREA (SQ.M.)	COVERED PARKING
6	D1	GROUND FLOOR +SERVANT QRT.	4	152.59	30	23	-
	D2	GROUND FLOOR	4	139.7	27	10	1 SCOOTER GARAGE



FIRST FLOOR PLAN D4

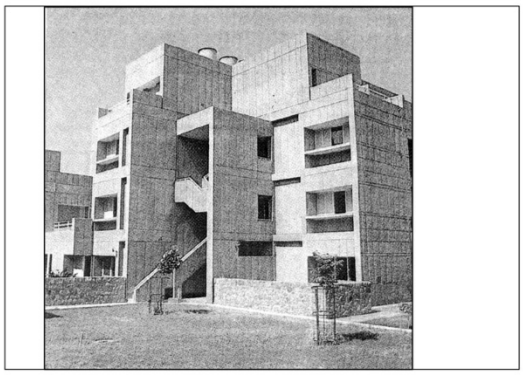
FIRST FLOOR PLAN D3

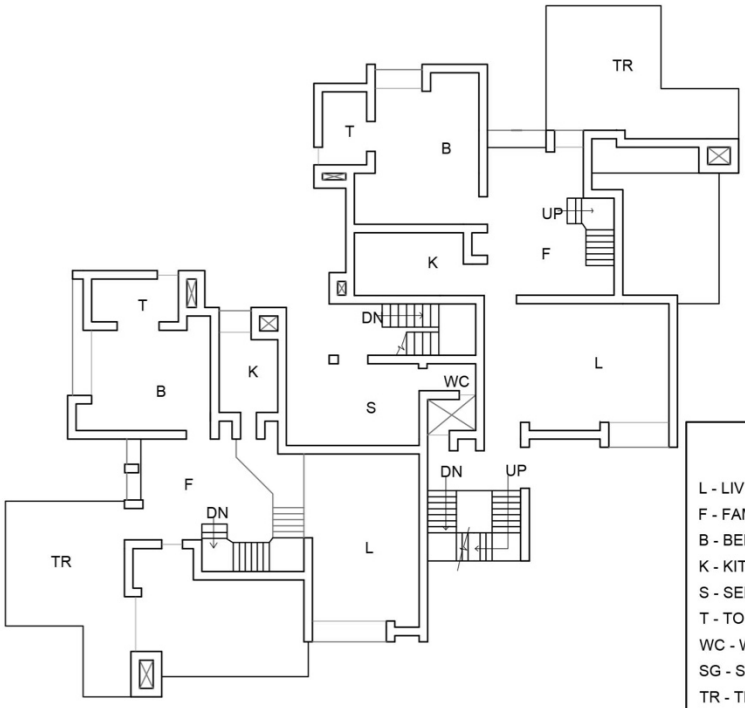
	P3	P4
L - LIVING ROOM	ONE	ONE
F - FAMILY LOUNGE	ONE	ONE
B - BED ROOM	TWO	TWO
K - KITCHEN	ONE	ONE
S - SERVANT'S ROOM	ONE	-
T - TOILET	TWO	TWO
WC - WATER CLOSET	ONE	-
SG - SCOOTER GARAGE	ONE	ONE
TR - TERRACE	THREE	ONE



TYPE D

S.NO.	TYPE	PARTICULARS	NO. OF UNITS	PLINTH AREA (SQ.M.)	WET AREA (SQ.M.)	CIRCULATION AREA (SQ.M.)	COVERED PARKING
7	D3	FIRST FLOOR +SERVANT QRT.	4	129.96	30	49	1 SCOOTER GARAGE
	D4	FIRST FLOOR	4	128.08	27	35	1 SCOOTER GARAGE





SECOND FLOOR PLAN D5

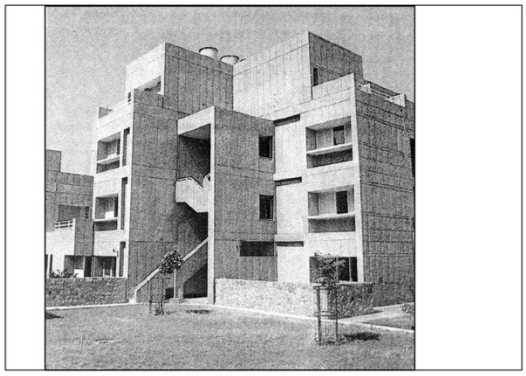
SECOND FLOOR PLAN D6

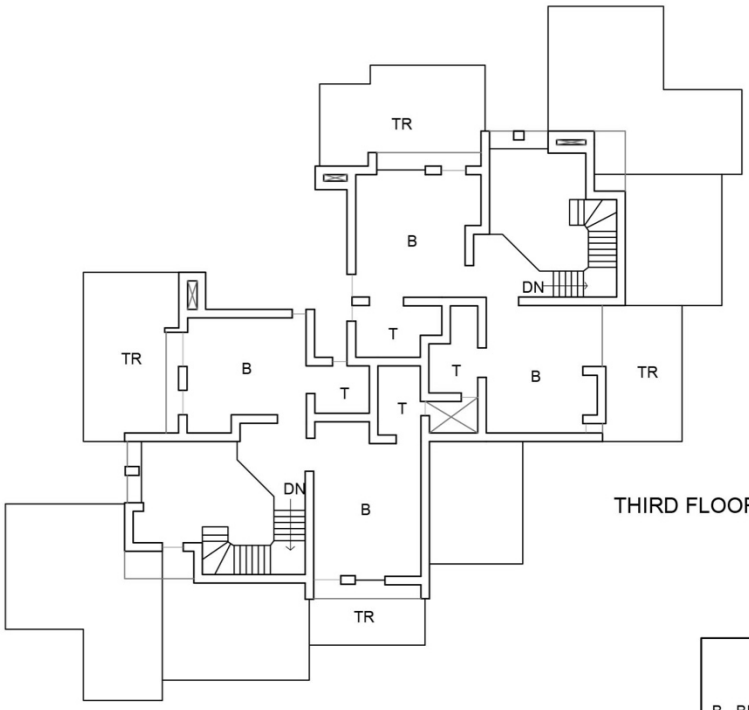
	P5	P6
L - LIVING ROOM	ONE	ONE
F - FAMILY LOUNGE	ONE	ONE
B - BED ROOM	ONE	ONE
K - KITCHEN	ONE	ONE
S - SERVANT'S ROOM	ONE	-
T - TOILET	ONE	ONE
WC - WATER CLOSET	ONE	-
SG - SCOOTER GARAGE	ONE	ONE
TR - TERRACE	ONE	ONE

0M 2M 5M 10M

TYPE D

S.NO.	TYPE	PARTICULARS	NO. OF UNITS	PLINTH AREA (SQ.M.)	WET AREA (SQ.M.)	CIRCULATION AREA (SQ.M.)	COVERED PARKING
8	D5	2ND+3RD FLOOR (DUPLEX)+SRVNT QRT.	4	175.39	18	62	1 SCOOTER GARAGE
	D6	2ND+3RD FLOOR (DUPLEX)+SRVNT QRT.	4	179.63	18	45	1 SCOOTER GARAGE





THIRD FLOOR PLAN D6

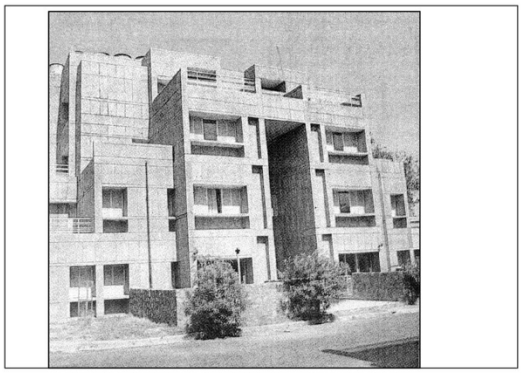
THIRD FLOOR PLAN D5

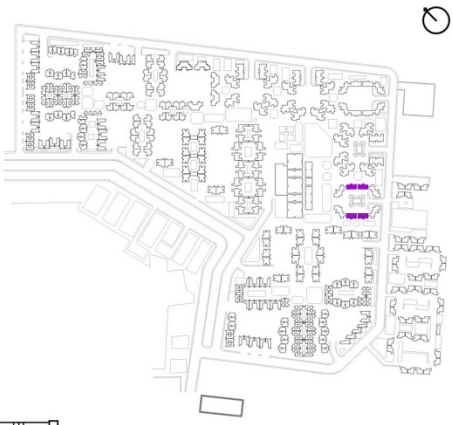
	P5	P6
B - BED ROOM	TWO	TWO
T - TOILET	TWO	TWO
TR - TERRACE	TWO	TWO

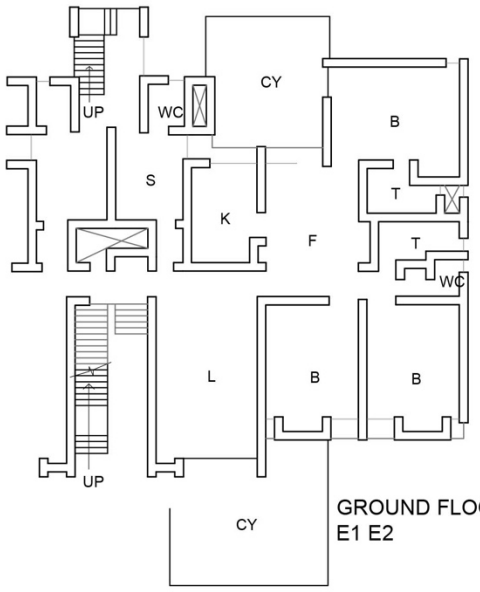
0M 2M 5M 10M

TYPE D

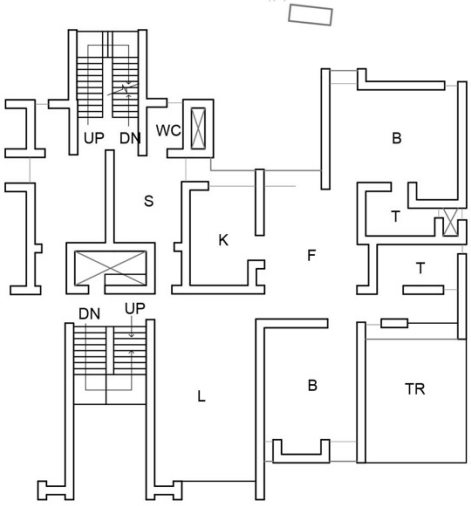
S.NO.	TYPE	PARTICULARS	NO. OF UNITS	PLINTH AREA (SQ.M.)	WET AREA (SQ.M.)	CIRCULATION AREA (SQ.M.)	COVERED PARKING
9	D5	2ND+3RD FLOOR (DUPLEX)+SRVNT QRT.	8	175.39	18	62	1 SCOOTER GARAGE
	D6	2ND+3RD FLOOR (DUPLEX)+SRVNT QRT.	8	179.63	18	45	1 SCOOTER GARAGE





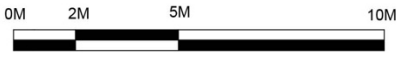


GROUND FLOOR PLAN
E1 E2



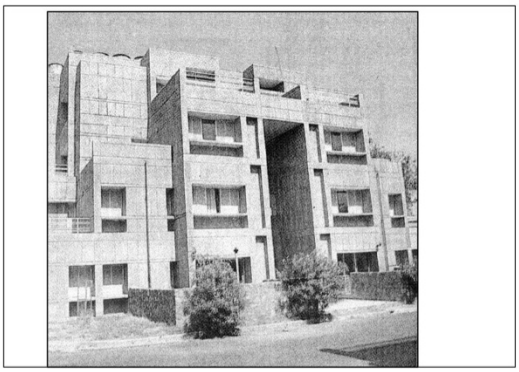
FIRST FLOOR
PLAN E3 E4

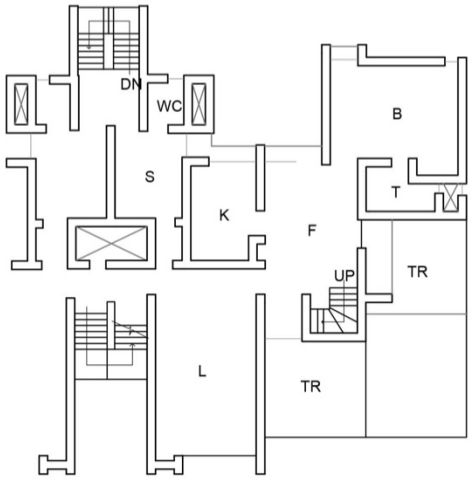
	Q1 Q2	Q3 Q4
L - LIVING ROOM	ONE	ONE
F - FAMILY LOUNGE	ONE	ONE
B - BED ROOM	THREE	TWO
K - KITCHEN	ONE	ONE
S - SERVANT'S ROOM	ONE	ONE
T - TOILET	TWO	TWO
WC - WATER CLOSET	TWO	ONE
C -COURT YARD	TWO	-
TR - TERRACE	-	ONE



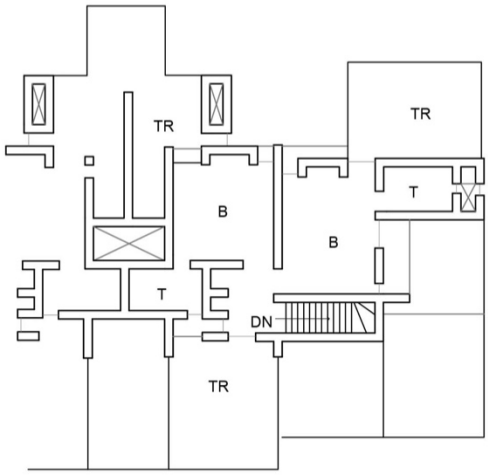
TYPE E

S.NO.	TYPE	PARTICULARS	NO. OF UNITS	PLINTH AREA (SQ.M.)	WET AREA (SQ.M.)	CIRCUL-ATION AREA (SQ.M.)	COVERED PARKING
10	E1/ E2	GROUND FLOOR+ SERVANT QUART.	8	149.23	36	55	-
11	E3/ E4	FIRST FLOOR+ SERVANT QUART.	8	139.85	36	43	1SCOOTER GARAGE





SECOND FLOOR PLAN E5 E6



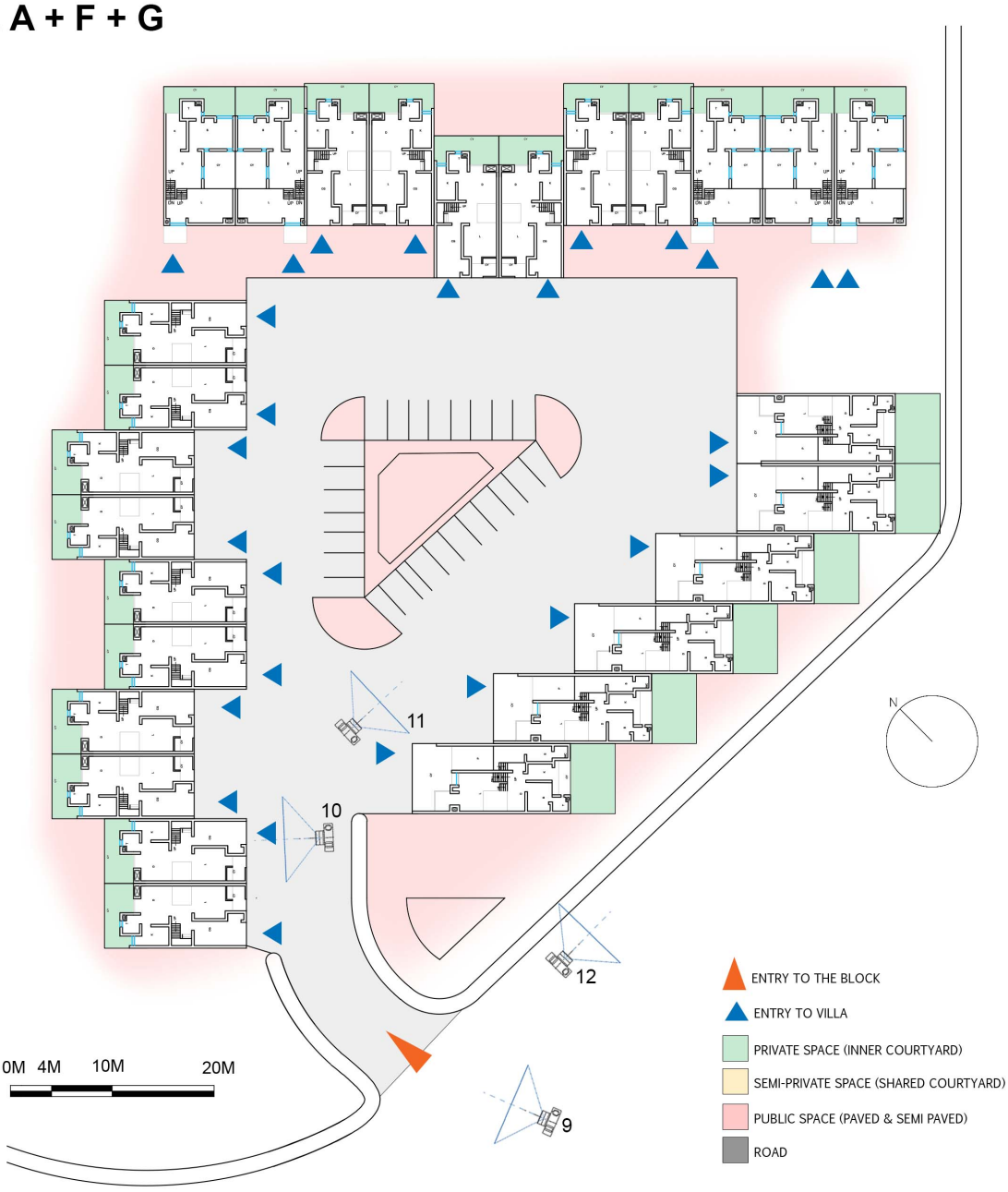
THIRD FLOOR PLAN E5 E6

	Q5 Q6 II	Q5 Q6 III
L - LIVING ROOM	ONE	-
F - FAMILY LOUNGE	ONE	-
B - BED ROOM	ONE	THREE
K - KITCHEN	ONE	-
S - SERVANT'S ROOM	ONE	-
T - TOILET	ONE	TWO
WC - WATER CLOSET	ONE	-
TR -TERRACE	TWO	THREE

TYPE E

S.NO.	TYPE	PARTICULARS	NO. OF UNITS	PLINTH AREA (SQ.M.)	WET AREA (SQ.M.)	CIRCUL-ATION AREA (SQ.M.)	COVERED PARKING
12	E5/ E6	2ND+3RD FLOOR +SERVANT QRT.	8	180.18	23	35	1 SCOOTER GARAGE
	E5/ E6	2ND+3RD FLOOR +SERVANT QRT.	8	175.79	23	35	-

TYPE A + F + G



KEY PLAN

Irregular arrangement of individual redidential blocks has led to confused outdoor spaces that lay unused and marks no clear boundaries.

The layout lacks sense of belongingness at the neighbourhood surroundings because of a larger scale with unclear outdoor spaces.

IMAGE 9

Huge trees with wide foliages encourage shades the outdoor spaces, encouraging public to come out even at hot sunny days and move around.

With a few later modifications on the elevation and combination of three different dwelling plans in the layout, each dwelling stands as a seperate unit with no such physical element that binds them together as one space.

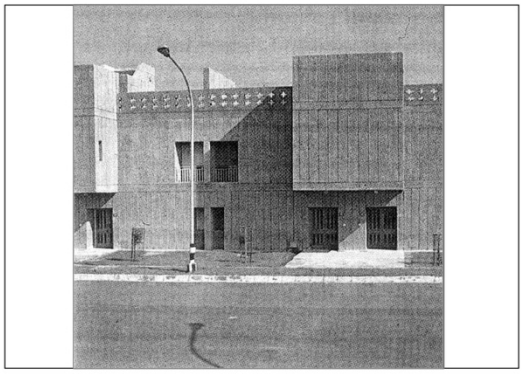
IMAGE 10

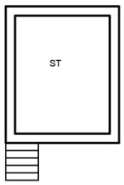
IMAGE 11

Lack of moderate sized central courtyard and wider roads increases the physiacl space and discourages one to come out and interact with their neighbours at a common public space.

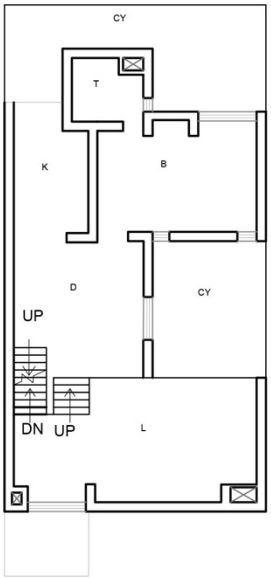
A high quality outdoor space with better connectivity and road conditions leads to individuals' satisfaction, improving judgments about residential conditions

IMAGE 12

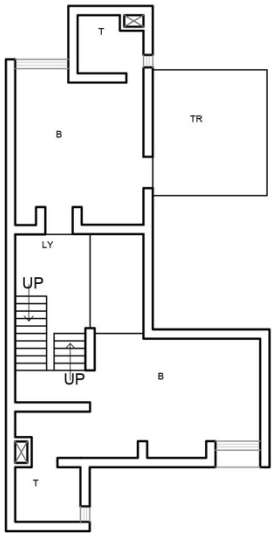




BASEMENTPLAN

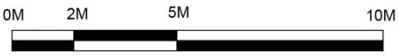


GROUND FLOOR PLAN



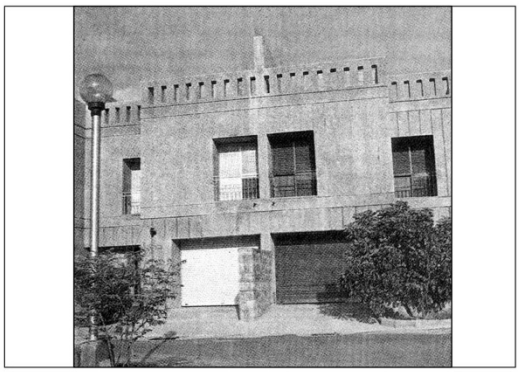
FIRST FLOOR PLAN

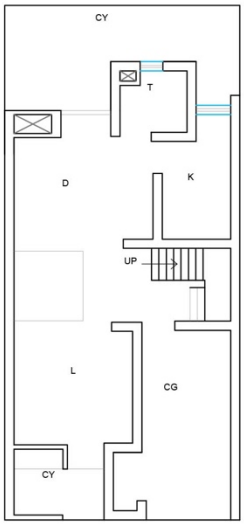
L - LIVING ROOM	ONE
D - DINING ROOM	ONE
B - BEDROOM	THREE
K - KITCHEN	ONE
T - TOILET	THREE
ST - STORE	ONE
CY - COURT YARD	TWO
TR - TERRACE	ONE
LY - LOBBY	ONE



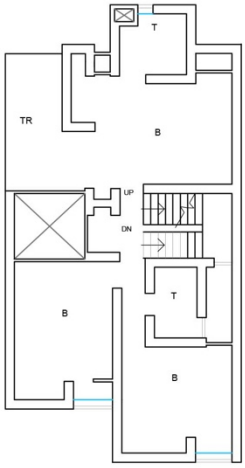
TYPE A

S.NO.	TYPE	PARTICULARS	NO. OF UNITS	PLINTH AREA (SQM.)	WET AREA (SQM.)	CIRCULATION AREA (SQM.)	COVERED PARKING
1	A	INDIVIDUAL HOUSE GROUND FLOOR+ FIRST FLOOR(DUPLEX) WITH BASEMENT	5	165	20	16	-





GROUND FLOOR PLAN



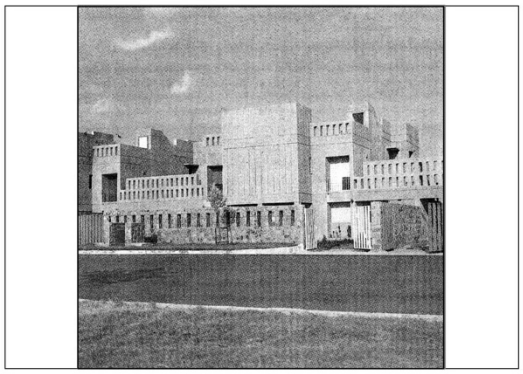
MEZZANINE FLOOR PLAN

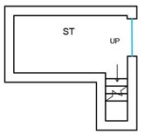
L- LIVING ROOM	ONE
D- DINING ROOM	ONE
B- BEDROOM	THREE
K- KITCHEN	ONE
T- TOILET	THREE
CG-CAR GARAGE	ONE
CY-COURT YARD	TWO

0M 2M 5M 10M

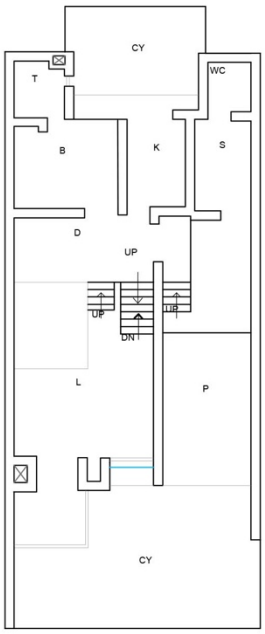
TYPE F

S.NO.	TYPE	PARTICULARS	NO. OF UNITS	PLINTH AREA (SQ.M.)	WET AREA (SQ.M.)	CIRCUL-ATION AREA (SQ.M.)	COVERED PARKING
1	F	INDIVIDUAL HOUSE GROUND FLOOR+ FIRST FLOOR(DUPLEX)	65	155.41	14	18	1 CAR GARAGE

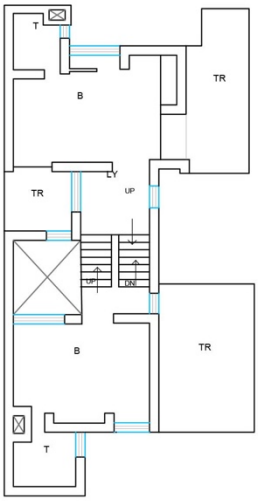




BASMENT PLAN



GROUND FLOOR PLAN



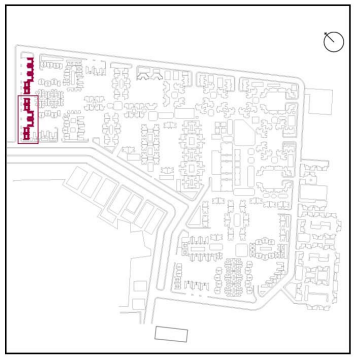
FIRST FLOOR PLAN

L - LIVING ROOM	ONE
D - DINING ROOM	ONE
B - BEDROOM	THREE
K - KITCHEN	ONE
T - TOILET	THREE
ST- STORE	ONE
S - SERVANTS ROOM	ONE

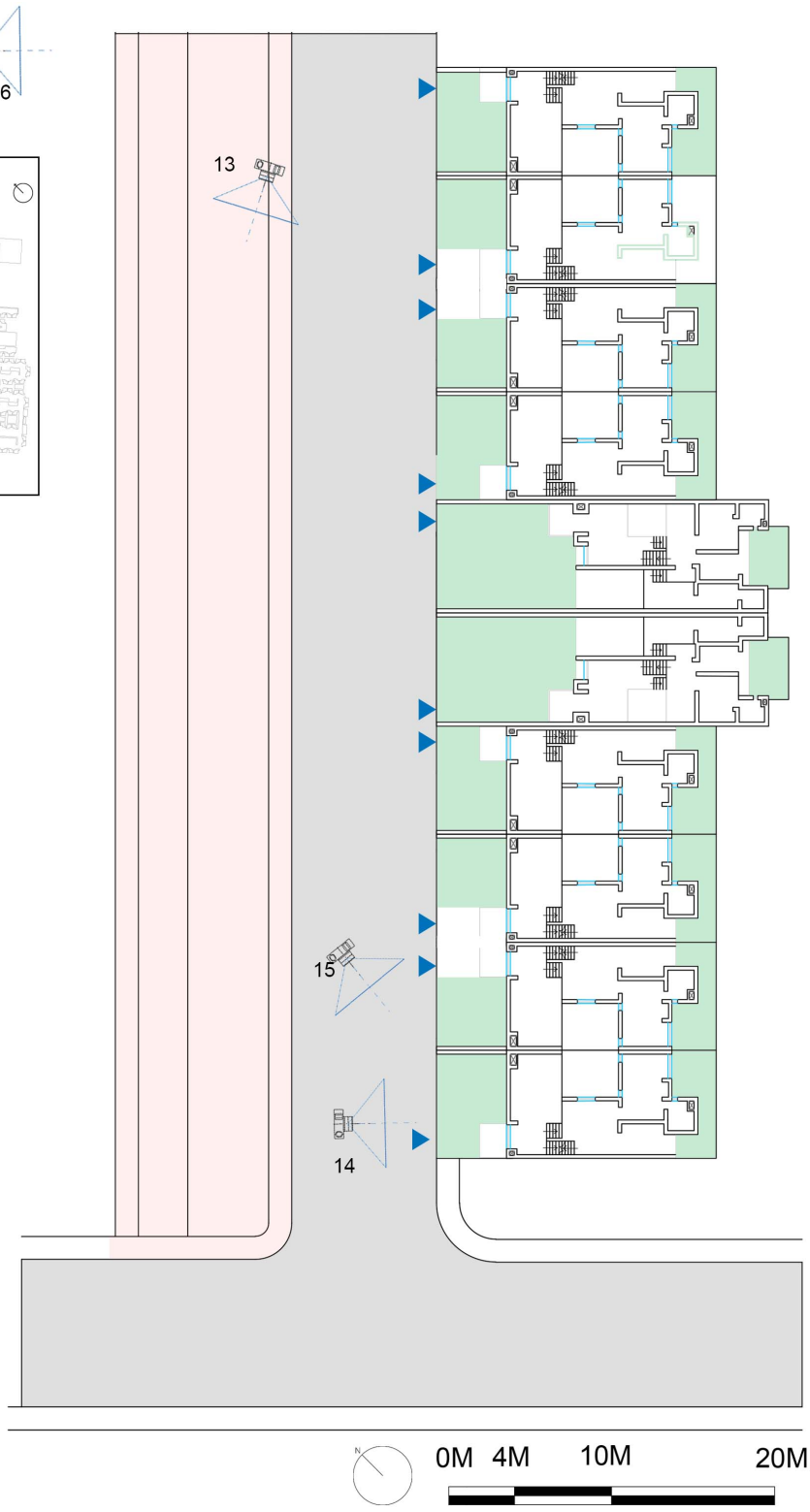
TYPE G

S.NO.	TYPE	PARTICULARS	NO. OF UNITS	PLINTH AREA (SQ.M.)	WET AREA (SQ.M.)	CIRCUL-ATION AREA (SQ.M.)	COVERED PARKING
2	G	INDIVIDUAL HOUSE GROUND FLOOR+ FIRST FLOOR(DUPLEX) WITH SERVANT QUART.	6	198.65	14	21	1 CAR GARAGE

TYPE A+G



KEY PLAN



ENTRY TO VILLA

PRIVATE SPACE (INNER COURTYARD)

PUBLIC SPACE (PAVED & SEMI PAVED)

ROAD

Linear arrangement of individual dwelling units along the road with private courtyards at front and rear side of each unit leaves no space for interaction amongst the dwellers except for the road that is common.

IMAGE 13

Difference in levels between the road and the walkway makes it a complete unused and inactive space. Thus, it could be understood that approachability to the physical features in a neighborhood is a major factor that influences social life.

IMAGE 14

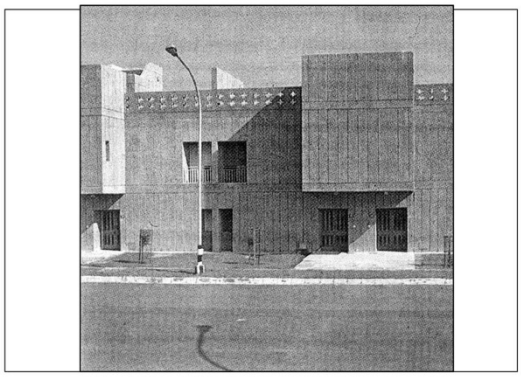
Long-duration activities in residential streets occur only in semiprivate zones that are the front gardens.

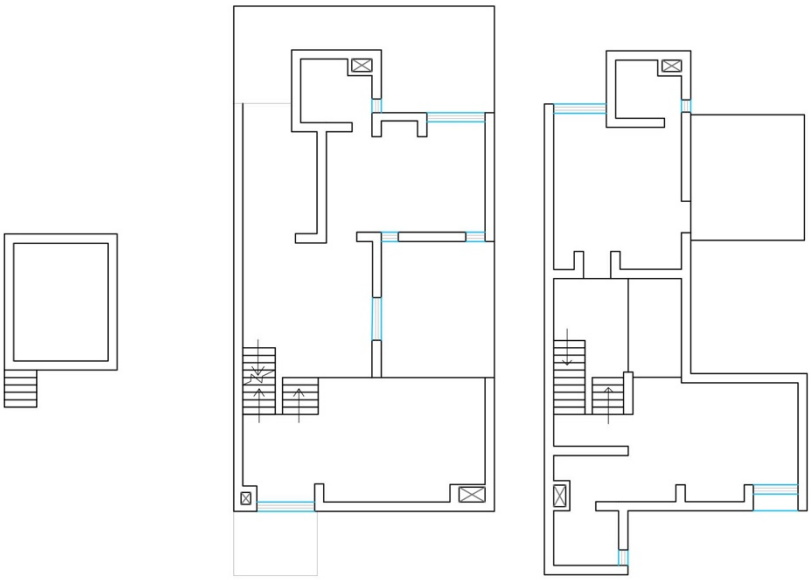
IMAGE 15

No physical distance between entrances of seperate dwelling units may sometimes hinder privacy of the individuals.

IMAGE 16

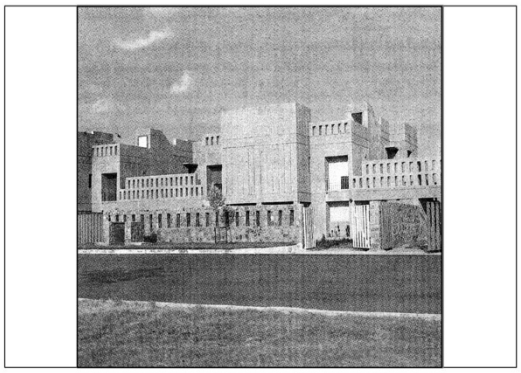
A good sense of connectivity among the different characters of buildings exists in terms of its accessibility that increases the interaction of different fields of spaces within the complex.

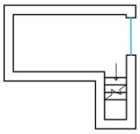


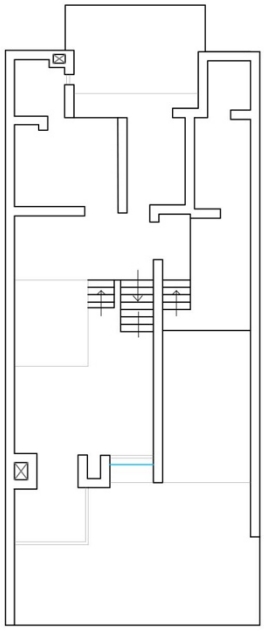


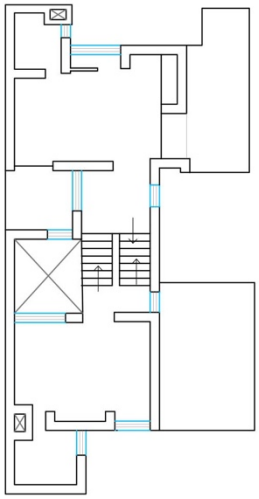
TYPE A

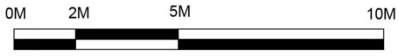
S.NO.	TYPE	PARTICULARS	NO. OF UNITS	PLINTH AREA (SQ.M.)	WET AREA (SQ.M.)	CIRCULATION AREA (SQ.M.)	COVERED PARKING
3	C	INDIVIDUAL HOUSE GROUND FLOOR+ FIRST FLOOR(DUPLEX) WITH BASEMENT	12	164.86	20	16	-











TYPE G

S.NO.	TYPE	PARTICULARS	NO. OF UNITS	PLINTH AREA (SQ.M.)	WET AREA (SQ.M.)	CIRCUL-ATION AREA (SQ.M.)	COVERED PARKING
2	G	INDIVIDUAL HOUSE GROUND FLOOR+ FIRST FLOOR(DUPLEX) WITH SERVANT QUART	10	198.65	14	21	1 CAR GARAGE

6. ISSUES AND POTENTIALS

6.1. SOCIAL VARIABLES

6.1.1. The residents' sense of identity

The notion of identity occurs within the context of the two most important relationships for the resident: the attitude to oneself and to a person's surroundings, i.e. the space, culture and tradition.
The lack of a well-established identity is the major cause of antisocial behaviour, a sense of insecurity in residents and indifference to social pathologies that manifest themselves in the way a public space looks and how it is used.

6.1.2. The determination of territoriality

The plan of public space development in a housing estate should contain a structured set of physical attributes that are used for outlining various types of boundaries. These may be elements of small architecture, different types of surface and greenery of different forms, sizes, shapes and colours. The ability to delimit these boundaries correctly is essential in assigning individual parts of a public space to different functions and different groups of users.

6.1.3. The creation of prestige and image

Prestige and image are most often associated with the high standard, good management and maintenance of a public space. At the same time, one should remember about the cost of monitoring and security and the desire to limit free access to those public spaces through different types of access control or blocked access at night.

6.1.4. Increasing the legibility of the spatial structure of the estate

The legibility of urban structures does not only imply a good sense of direction, but also the ability to understand the role and importance of various functions of public space. It allows for easy differentiation of the functional purpose of a given space and clear distinction of its limits. In this context, a well- designed public space makes the structure of a housing estate legible and fulfils an organizing and informing role.

6.1.5. The reflection of residents' culture(s)

. Local culture assigns a significant role to local customs, wherein the composition exhibits values such as the tradition of the place, the character of urban interiors, the acceptance of other people's needs and respect for the environment. One can find here the elements of cultural symbolism and the diversity of expression.

6.1.6. Succumbing to fashion

. In this sense, public space has not been spared by fashion. "Frequenting"

fashionable clubs, practicing fashionable sports and resting at trendy places are well documented ways to improve one's mood. This procedure takes place through "trendy" façade decoration or adding "trendy" details to public spaces.

6.1.7. The sense of rootedness in the neighbourhood

. Public places stimulate a whole range of feelings; they can bring about friendly relations of man with the environment creating positive sensations. However, they can also create negative reactions, such as aversion, fear or opposition. Public space, being a determinant of a place, brings about specific relationships with the housing estate, such as "the sense of space", "rootedness in space", "space admiration", "space uniqueness" and "familiarity - strangeness of space".

6.2. SPATIAL VARIABLES

6.2.1. Connectivity of public areas in housing estates

Public areas in housing estates should have a network structure. This means that it must be connected with major destinations by means of *green corridors*. Green corridors:

- encourage walking, cycling and reduce car use,
- provide opportunities for rest and recreation,
- contribute to the improvement of the environment in housing estates,
- improve visual and landscape quality,
- increase the use of cultural resources by the residents because of their greater accessibility.

6.2.2. The fundamentals of design strategy

The aim of the strategy to improve the quality of public space in neighbourhoods. The planning system meets the three key tasks:

- protection of public spaces against building development (public spaces are essential to the quality of life in a housing estate).
- improvement of the quality of degraded public spaces.
- ensuring the quality of public spaces in newly constructed housing estates.

6.2.3. Environmental objectives

- Improvement of the natural structure and landscape quality of the housing estate.
- Providing sports and recreational facilities, playgrounds for children, leisure facilities for the elderly.
- Inclusion of green corridors in the city network.

6.2.4. Economic objectives

- Increasing investment attractiveness through well-designed and safe public

space.

- Attracting creative business (freelancers, artists, designers, advertisement and fashion designers, etc.) combining housing functions with work in the SOHO style (Small Office Home Office), particularly attractive to women and freelancers.
  High quality public space in a housing estate brings about attachment to the place, builds a sense of identity and makes the area more attractive to live in, work in and pass the time in.

6.2.5. Residential network of public spaces

Residential public spaces should be part of a network. This helps in making the functional structure of the city more legible and facilitates the movement of people in the city. One of the tasks included in the planning process is to incorporate as many residential public spaces as possible in a network.
A proper network design should meet the following criteria:

- Limit the use of cars by the residents and at the same time facilitate pedestrian and bicycle traffic. The design should be coordinated with the city's public transport strategy.
- Create better conditions for rest and recreation.
- Improve the safety of the residents, especially by lowering the number of road accidents.
- Improve the visual quality of housing estates.
- Stabilize the natural balance and improve the quality of the natural environment.
- Improve the accessibility of city's cultural resources for pedestrians.

6.2.6. Evaluation and control

The strategy has multiple advantages:

- It strengthens public awareness of the resources in the neighbourhood and the problems associated with their maintenance, protection and management.
- It boosts rationality in spending and the accuracy of investment decisions.
- It gives the basis to seek public funding (local funding or EU programmes) to improve the quality of public spaces in housing estates.
- It facilitates public control over the distribution of the money for the maintenance, management and design of public spaces.

It should be noted that social participation applies not only to the residents of the housing estate. It can also involve local businesses, sports clubs, community and environmental organizations, schools, and other services.

7. CONCLUSION

Public spaces in residential areas should be identified on the basis of a socio-spatial analysis. This analysis is a prerequisite for the initiation of the design and planning procedure. Conclusions contained in these documents define the role and place of a public space, the scope of the necessary investments, the type of management and maintenance needed.

Appropriate design of public spaces in residential areas should give the following effects:

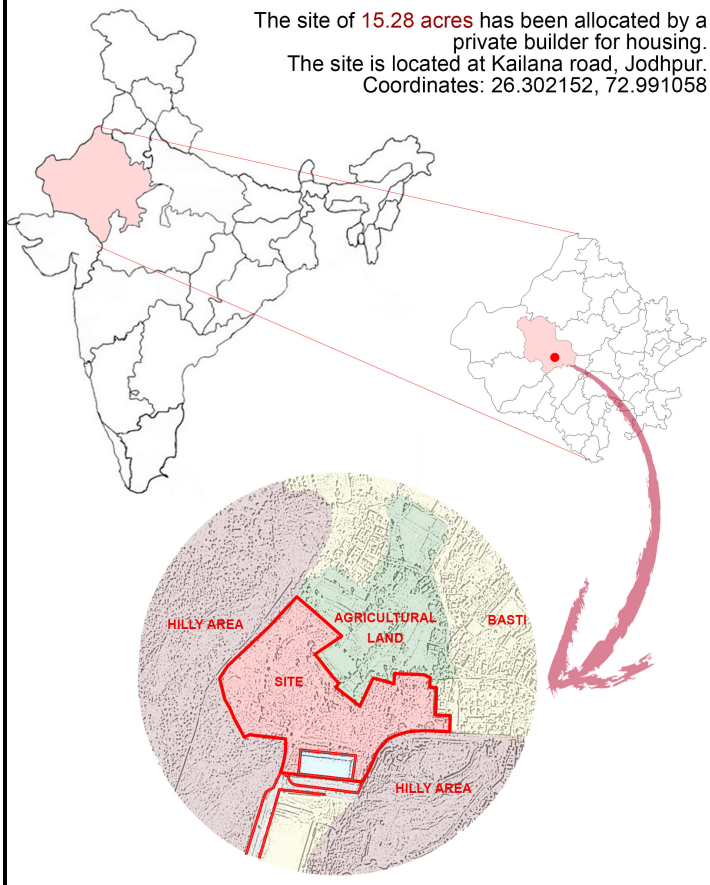
- *Social satisfaction to the residents.*
- *More involvement of the residents in external roles.*
- *Better interaction amongst the residents improving social relationships.*
- *Reduction in antisocial behaviour and crime.*
- *Enhancement of long duration activities outdoors improving social interaction.*
- *Achieve cohesive residential environment.*
- *Improvement of visual standards and landscape quality.*
- *Improvement of accessibility- mainly pedestrian, cycling and public transport.*
- *Improvement of the state of the environment in residential areas (reduction of pollution and noise).*
- *Social stabilization.*
- *Minimization of social exclusion.*
- *Strengthening of neighbourly bonds.*
- *Reduction of social pathology.*

It is important to draw attention to the interaction between the quality of public spaces and social groups living in housing estates. The quality of public spaces largely shapes the spatial behaviour of their residents. It is therefore important to attach significance to the undeveloped spaces of within a housing estate. Unfortunately, the value of this space, from an economic point of view, is still incalculable, and the manner of its shaping is mostly accidental.

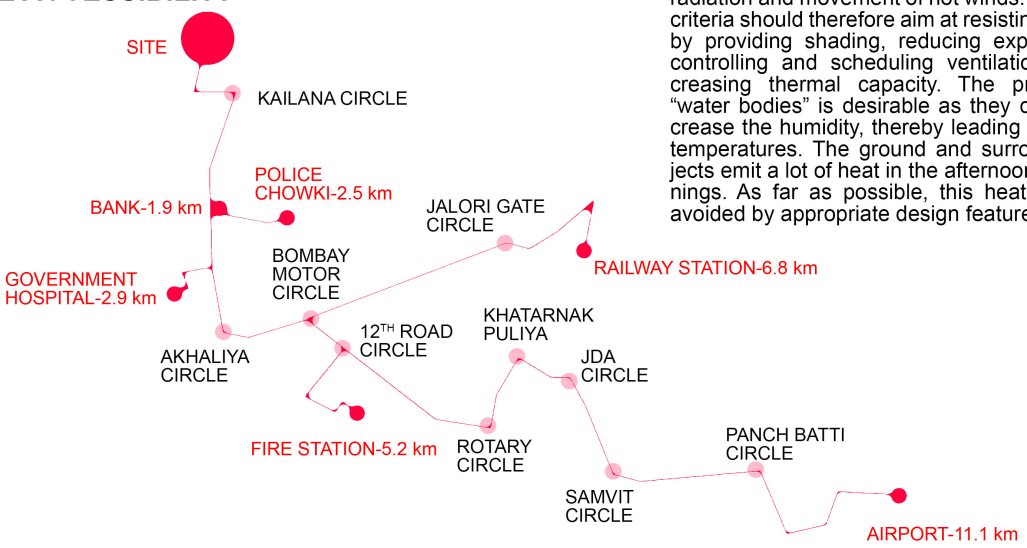
The presented methodological approach is based on a broad comprehensive account of social conditions. It refers to the inhabitants' sense of identity, the personalization of the environment and the sense of rootedness in the neighbourhood. These social needs must be translated into the language of architectural forms that organize sp ace in a housing estate.

SITE BRIEF

The site of 15.28 acres has been allocated by a private builder for housing.
The site is located at Kailana road, Jodhpur.
Coordinates: 26.302152, 72.991058



SITE ACCESSIBILITY



CLIMATE ANALYSIS

Jodhpur comes under the Hot and arid climatic zones of India.

SITE CONDITION
The site is usually flat with sandy or rocky ground conditions, and sparse vegetation comprising cacti, thorny trees and bushes.

HYDROLOGY
There are few sources of water on the surface, and the underground water level is high because of its location at the foothills.

SOLAR RADIATION
Due to intense solar radiation (values as high as 800-950 W/m2), the ground and the surroundings of this region are heated up very quickly during day time.

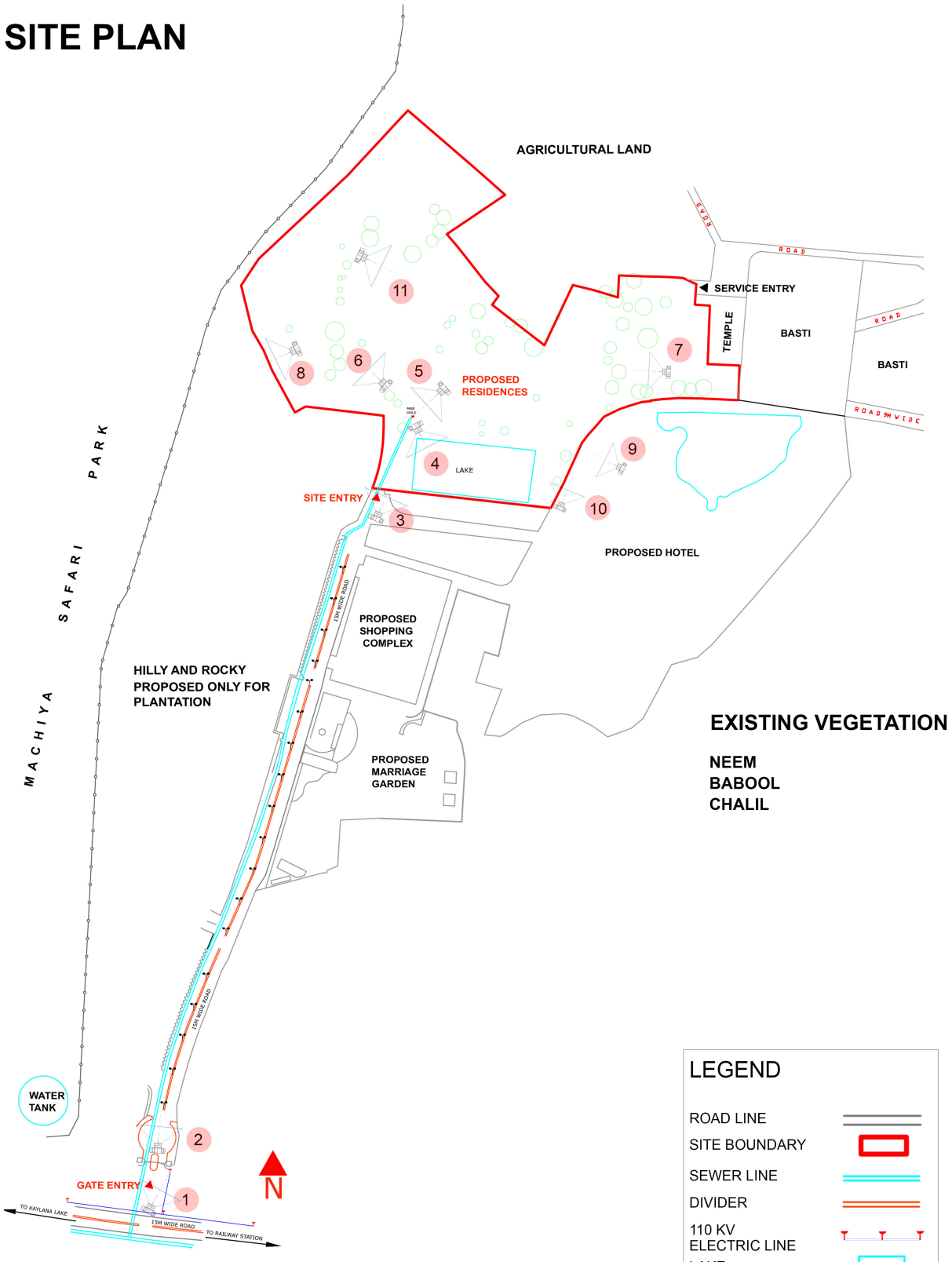
TEMPERATURE
In summer, the maximum ambient temperatures are as high as 40°-45°C during the day, and 20°–30°C at night.
In winter, the values are between 7°-25°C during the day and 3°-10°C at night.
It may be noted that the diurnal variation in temperature is quite high, that is, more than 10°C.

HUMIDITY
The climate is described as dry because the relative humidity is generally very low, ranging from 25 to 40 % due to low vegetation and surface water bodies. Moreover, the hot and dry regions receive less rainfall, the annual precipitation being less than 500 mm.

WIND
Hot winds blow during the day in summers and sand storms are also experienced. The night is usually cool and pleasant. A generally clear sky, with high solar radiation causing an uncomfortable glare, is typical of this zone. As the sky is clear at night, the heat absorbed by the ground during the day is quickly dissipated to the atmosphere. Hence, the air is much cooler at night than during the day.

DESIGN CRITERIA
In such a climate, it is imperative to control solar radiation and movement of hot winds. The design criteria should therefore aim at resisting heat gain by providing shading, reducing exposed area, controlling and scheduling ventilation, and increasing thermal capacity. The presence of “water bodies” is desirable as they can help increase the humidity, thereby leading to lower air temperatures. The ground and surrounding objects emit a lot of heat in the afternoons and evenings. As far as possible, this heat should be avoided by appropriate design features.

SITE PLAN



EXISTING VEGETATION

NEEM
BABOOL
CHALIL

LEGEND

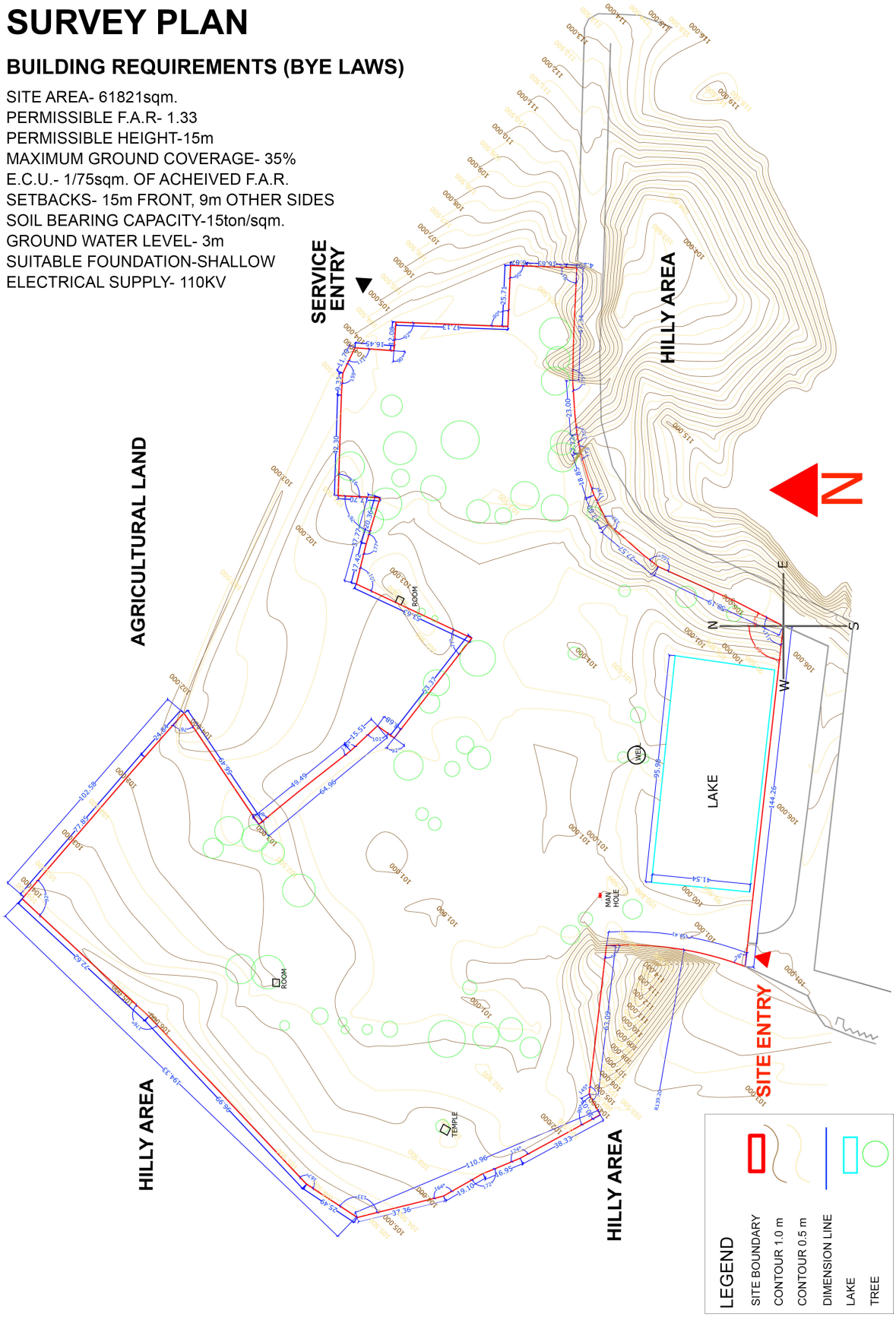
- ROAD LINE
- SITE BOUNDARY
- SEWER LINE
- DIVIDER
- 110 KV ELECTRIC LINE
- LAKE
- FENCE LINE
- TREE

SITE IMAGES

SURVEY PLAN

BUILDING REQUIREMENTS (BYE LAWS)

SITE AREA- 61821sqm.
PERMISSIBLE F.A.R- 1.33
PERMISSIBLE HEIGHT-15m
MAXIMUM GROUND COVERAGE- 35%
E.C.U.- 1/75sqm. OF ACHEIVED F.A.R.
SETBACKS- 15m FRONT, 9m OTHER SIDES
SOIL BEARING CAPACITY-15ton/sqm.
GROUND WATER LEVEL- 3m
SUITABLE FOUNDATION-SHALLOW
ELECTRICAL SUPPLY- 110KV



PROGRAM REQUIREMENT

- SITE AREA- 61821sqm.
- AREA OF LAKE- 4100sqm.
- USABLE AREA- 57721sqm.
- ACHEIVABLE F.A.R.-61821X 1.33- 82221sqm.
- PERMISSIBLE GROUND COVERAGE- 57721X0.35=20202sqm.
- MAX. PERMISSIBLE HEIGHT(INCLUDING STILT)-15m

MINIMUM AREA REQUIREMENTS IN A HOUSING UNIT

Sl. No.	Component of Building	Min. requirement for plots above 50 sq m.	
1	Habitable Room	Area	9.50 sq m.
		Width	2.40 m.
		Height	2.75 m.
2	Kitchen	Area	4.50 sq m.
		Width	1.50 m.
		Height	2.75 m.
3	Pantry	Area	3.00 sq m.
		Width	1.40 m.
		Height	2.75 m.
4	Bathroom	Area	1.80 sq m.
		Width	1.20 m.
		Height	2.20 m.
5	W.C.	Area	1.10 sq m.
		Height	0.90 m.
		Height	2.20 m.
6	Combined Bath & W.C. (Toilet)	Area	2.80 sq m.
		Width	1.20 m.
		Height	2.20 m.
7	Store	Area	No restriction
		Width	No restriction
		Height	2.2 m.
8	Projections	Permitted within the setbacks upto 0.75 m. width	
9	Garage	Area	14.85 sq m.
		Width	2.75 m.
		Length	5.40 m.
		Height	2.40 m.
10	Passage	Width	1.00 m.
11	Doorways Habitable rooms	Width	0.90 m
		Height	2.20 m.
	For kitchen bath, W.C. etc.	Width	0.75 m.
		Height	2.00 m
12	Staircase	Width	0.90 m.

SOURCE: MINISTRY OF URBAN DEVELOPMENT

SPACES REQUIRED

LIMITATIONS ON SITE

COMMERCIAL- 3% OF F.A.R.-2466 sqm.
HEALTHCARE- 3% OF F.A.R.-2466 sqm.
SERVICES- ADDITIONAL 7% OF F.A.R.- 5755 sqm.
HOUSING-94% OF F.A.R.-77287 sqm.
LANDSCAPE- MIN.10% OF SITE AREA -6182 sqm.

NOTE:
7% OF SERVICE SPACES WILL INCLUDE

TRANSFORMER
GENERATOR ROOM
PUMP ROOM
ELECTRIC PANEL ROOM
SWITCH ROOM
DRAINAGE
CONDUITS
CATCHMENT CHAMBER
GARBAGE CHUTE
SECURITY CABIN
SEWERAGE TREATMENT PLANT
COVERT SPACES

AREA AVAILABLE FOR HOUSING- 77287 sqm.
HIG 25% OF 77287sqm.- 19321sqm.
MIG 75% OF 77287sqm.- 57965sqm.
(5% EWS/LIG ADDED TO THE ADJACENT PLOT)

HOUSING UNITS ON SITE
HIG-200sqm. each-16197/200=96 UNITS
MIG-13-sqm. each- 50091/130=445UNITS

COMMON AMENITIES
PARK WITH A CLUB HOUSE- (MAX. 10% PLINTH OF OPEN AREA)= 4000 sqm.
1 PARK- MIN. 3000sqm.
LAKE- 4100sqm.
1 SWIMMING POOL (30mx15m)- 450sqm.
2 TENNIS COURTS(12mx30m)- 720sqm.
2 BASKETBALL COURTS(34mx21m)- 1500sqm.
PLACE OF WORSHIP WITH A PARK- 2000sqm.

PARKING REQUIREMENTS
HIG-96*2 CAR PARKING= 160+25% VISITORS=240 E.C.U.
MIG-445*1 CAR PARKING=445+25% VISITORS=557 E.C.U.
TOTAL 4 WHEEL PARKING REQUIRED- 797 E.C.U
TOTAL 2 WHEEL PARKING REQUIRED- 797/3=266 E.C.U
TOTAL PARKING REQUIRED ON SITE= 797+266=**1063 E.C.U**
TOTAL E.C.U ON STILT-20202/28=721 E.C.U.
TOTAL E.C.U. IN OPEN AREA- 908-721=342 E.C.U.
TOTAL AREA REQUIRED IN OPEN - 342x23= 7866sqm.