DESIGN GUIDELINES FOR SECURITY OF RESIDENTIAL BUILDINGS AGAINST CRIME

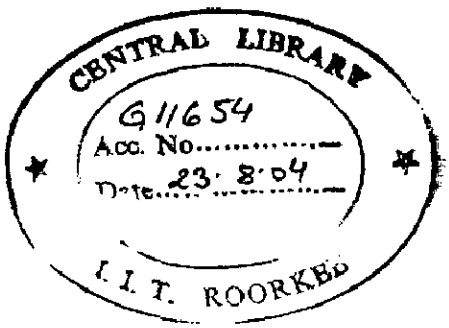
A DISSERTATION

Submitted in partial fulfilment of the requirements for the award of the degree of

MASTER OF ARCHITECTURE

By

RAHUL BHARGAVA



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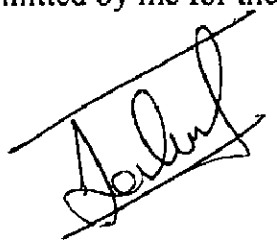
ROORKEE-247 667 (INDIA)

MAY, 2004

CANDIDATE'S DECLARATION

I hereby certify that the work, which is being presented in the dissertation, entitled **DESIGN GUIDELINES FOR SECURITY OF RESIDENTIAL BUILDINGS AGAINST CRIME** in partial fulfillment of the requirement for the award of the Degree of **MASTER OF ARCHITECTURE** submitted in the **Department of Architecture & Planning** of the Indian Institute of Technology, Roorkee is an authentic record of my own work carried out during the period from August 2003 to May 2004 under the supervision of **Prof. P.K. Patel.**

The matter embodied in this dissertation has not been submitted by me for the award of any other degree.



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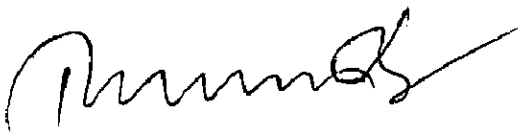
CERTIFICATE

This is to certify that the above statement made by the candidate **RAHUL BHARGAVA** is correct to the best of my knowledge.



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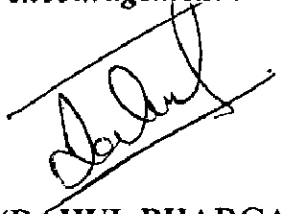

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ABSTRACT

This thesis aims to explore the relationship between crime and residential environment by appropriate intervention through architecture.

This relationship is achieved by survey of residential area and case study of various crime affected areas of Delhi in terms of various design factors. Lot of data has been collected through survey and literature study. It is thought that the data that is collected will be useful in the design process of future residential environment.

Thesis provides the answer of some common questions like,

What are the common crimes in residential areas?

What are the components of crime?

How the environment, which provides a place to live, play, recreation and performing our daily tasks, become cruel that it starts eating us?

What is the relationship between crime and environment?

What already has been done in the field of crime prevention?

Thesis arrives at the proposition that the architectural features and design of our residential environment, results in the instances of crime and have a direct relationship

In the end it proposes some guide lines to Architects, planners for designing a residential environment by addressing crime prevention issues in the design, planning and details of buildings in residential areas with special emphasis on group housing, so that better integration between crime prevention and architectural design results.

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Do's and don't in crime prevention

Source: Self Photographed

Self made

www.greatbuildings.com

LIST OF TABLES

Source: Primary survey

LIST OF ABBREVIATIONS

CPTED	Crime Prevention Through Environmental Design
SBD	Secured By Design
DOC	Design Out Crime
B	Burglary
VT	Vehicle Theft
T	Theft
S	Snatching
PP	Pick Pocket
MT	Minor theft
V	Vandalism
G	Graffiti
TC	Traffic crime
P	Public property theft
SE	Stranger entry
K	Kidnapping
AG	Andrews Ganj
AV	Asian Games Village
MV/B	Mayur Vihar-II, Pocket-B
MV/C	Mayur Vihar-II, Pocket-C
R/A1	Rohini, Sector-7, Pocket-A1
R/F25	Rohini, Sector-7, Pocket-F25
SS	Sample size
Sq.m	Square meter
Y	Yes
N	No
CS	Can't say
#	Y (1) +N (-1) +CS (0)
LIG	Low income group
MIG	Middle income group
HIG	High income group

INTRODUCTION

Topics covered in this chapter:

- **Introduction**
- **Need of study**
- **Hypothesis**
- **Aim & objective**
- **Scope & limitations**
- **Methodology**

CHAPTER 1

The term security derives from the Latin word "secures" meaning safe or free from danger. Our buildings on certain extent provide security from natural or environmental hazards; structural hazards etc., but generally fail to provide security from (criminals). ***My dissertation aims to provide guidelines for that aspect of security.***

1.1 INTRODUCTION

Security is always being the one of the major concern of Architecture from the ages, even when the first dwelling was developed; the major concern was to provide security from wild beast, climate and natural disaster.

Throughout History, we have sought to control their physical environment. The importance of manipulating one's environment to prevent crime or attack was recognized long ago. The classical examples are the moats around castles, and high surrounding walls with niches and windows that allow for surveillance and site defence.

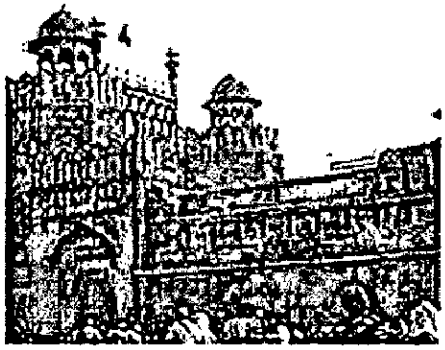


Fig 1.1 Red fort

In present scenario, when we have controlled some of the aspects of security by technical advancements, one of the aspects still affecting the life of average citizen is security from criminals. With increase in number of crimes like theft, vandalism, murder, burglaries, kidnapping etc. its importance is much realised know, but it is generally overlooked.

Aesthetics, choice of construction materials and harmony with surroundings, take precedence over considerations of security in the overall design. [1]

Fig 1.2 Exhibition pavilion

"Form rather than a function, gets the focus of the Architects attention".

In present context of increase incidences of crime requires us as an Architect to change our priorities and give emphasis to security of building in terms of **planning, building design and detailing** and should recognize **security** the fourth element of Architecture.

So, with three elements of Architecture i.e. Aesthetics, Function and Structure, the SECURITY needs to be added as the fourth element of Architecture.

"Aesthetics + Function + Structure + Security = ARCHITECTURE"

1.2 NEED FOR THE STUDY

1.2.1 Increase in number of Crimes:

Every day there are thousands of reports about thefts, burglaries, murders and the likes especially in residential areas. *Our Print media, Electronic media and Police record* is full of reports which itself is a problem to understand. Perhaps lot many such instances go unreported. If newspaper reports are any indication, the crime graph in our built environment is rapidly growing day by day.

1.2.2 Building Codes:

Building Codes does not specify guidelines about security in buildings against crime, it is therefore, important that we work out ways for making our buildings 'Secured by design' as far as possible.

1.2.3 Awareness:

Much less has been talked about crime prevention in the process of designing. Some designers, architects and planners would never ever think such an aspect while designing most buildings.

1.2.4 Change in Socio-Economic structure:

During the last two decades, there has been a tremendous development in the socio-economic status of people. Because of the increasing affordability level, the life styles of the people have also got changed; most of the people like to live in nuclear family instead of group leading to more security threat.

1.2.5 Status of India:

There has been a tremendous development in every field in India, but no concrete work has been done in the field of physical security of buildings. Even no attempt has been made in this direction.

1.2.6 Building Detailing:

In most of our buildings, no attention has been given to building detailing like openings, door-windows in respect of security, which are easy access for criminals.

1.2.7 International status:

Works of the some of the organizations at international level proved that crime can be reduced through design. So, it is required that something can be attempted in our country in this regard.

1.3 HYPOTHESIS:

CRIME CAN BE PREVENTED BY DESIGN.

1.4 AIM & OBJECTIVE:

1.4.1 AIM

The Aim of this study is to develop guidelines for achieving a psychological security by addressing crime prevention issues in the design, planning and details of buildings in residential areas with special emphasis on group housing, so that better integration between crime prevention and architectural design results.

1.4.2 OBJECTIVE:

Keeping above Aim in view following set of objectives have been identified for study:

- To study the nature of crimes that is common in existing Residential areas.
- To study how inappropriate architectural design and planning of residential areas' help increasing incidents of crime.
- To understand the problems faced by the user by sample survey.
- To evaluate the existing group housing colonies against the checklist.
- To frame design parameters for minimizing crime incidents in general and particularly in group housing areas based on the above objectives.

1.5 SCOPE & LIMITATION:

Looking in to the vastness of the present research, the scope of dissertation focuses on the study of residential areas particularly the group housing areas of **Delhi** to study the crime incidences and possible design factors responsible for them. ***The reason of selecting group housing is that most of our population in cities lives in flatted development and these are the areas which are under the influence of crime. Secondly, no one cares for the public spaces in housing as no body feels his responsibility.***

The study could not be carried out in all group housing schemes due to limited time and only few sample case studies will be carried out for survey and study. Other related (demographic, crime data etc) information will be collected through secondary data.

1.6 RESEARCH METHODOLOGY:

Methodology is divided into four stages:

FIRST STAGE: Formulation of Aim & objectives based on

- General reading and observation.

SECOND STAGE: Collection of Data through Literature study and case studies

Literature study/survey includes understanding:

- Crime & types of crime
- Crime in Residential area
- Favorable factors for crime
- Basic elements necessary for a person to commit a crime
- Study of emerging security gadgets and alarm system
- Scenario of Crime in present scenario in Residential areas of Delhi
- Architectural Intervention in field of crime prevention.
- Literature based case studies.
- Based on above, preparation of checklist and questionnaire for survey.

Case studies will be done keeping in mind:

- Site planning
- Dwelling design and detailing
- Nature of crime and finding out the areas more susceptible to crime in housing.
- Interaction with administration in areas to study the nature of crime.
- User response through questionnaire
- Evaluation of case studies against checklist

THIRD STAGE: Analysis and Synthesis of findings

- Identification of problems and issues.
- Analyzing and drawing inferences based on case studies and literature study.

FOURTH STAGE: Final draft

After synthesizing findings

- Formulation of strategies and guidelines for security of buildings against crime.
- Final report.

1.6.1 FLOW CHART OF METHODOLOGY:

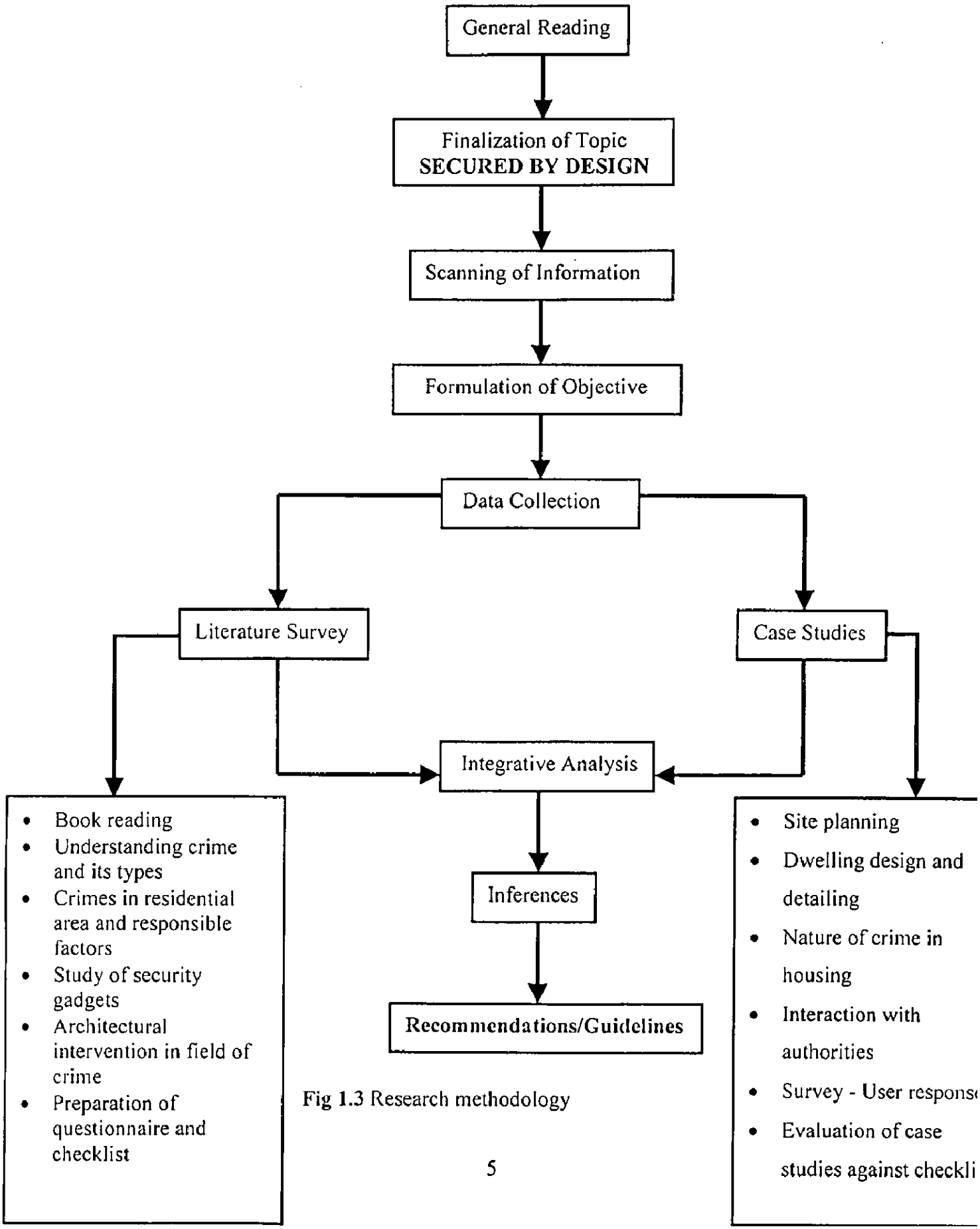


Fig 1.3 Research methodology

1.7 RESEARCH TECHNIQUE:

Looking into the Aim and Objective of the Dissertation, the following research methodology will be utilized for study:

CORRELATIONAL RESEARCH METHOD

CASE STUDIES AND COMBINED STRATEGIES

CORRELATIONAL RESEARCH METHOD

Correlation research is a technique in which one establishes a relationship between variables by analyzing them at different locations and based on the relationship established, one can make a prediction about one variable based on what we know about another variable. So, it's a research method related to predictions and relationships.

The prediction power of this research will be used for my dissertation

Tools of method to be utilized:

- **Survey questionnaire**
- **Observation**
- **Mapping**
- **Archive**

The information collected will be important, as it provides the various view points of the user about the crime and their opinion about the design, which help me to frame the guidelines.

CASE STUDIES AND COMBINED STRATEGIES

This will be used for:

- To study how inappropriate architectural design and planning of residential areas help increasing incidents of crime.

It helps to understand the existing problems in the design and helps in suggesting alternatives.

LITERATURE STUDY

Literature study gives the clear idea of the work already done in the field of study.

In my case Literature study is done to understand the relation between crime and residential environment.

Crime and reasons of crime in residential environment and Architectural intervention in the field of crime prevention

Topics covered in this chapter:

- Security as one of the basic human need
- Crime
- Crime in Residential environment
- Fear of crime
- Favorable factors for crime
- Basic elements necessary for a person to commit a crime
- How crime can be controlled?
- Scenario of Crime in Residential areas of Delhi
- Architectural Intervention in the field of Crime Prevention
- Mechanical/Electronic system for crime prevention

CHAPTER 2

2.1 SECURITY AS ONE OF THE BASIC HUMAN NEED [2]

In 1954 Abraham Maslow proposed a hypothetical model of human behavior in his book MOTIVATION AND PERSONALITY. ***Maslow identifies five sets of basic needs*** from the most fundamental to the most esoteric in a hierarchy of prepotency. Maslow's model describes the best comprehensive view of basic human needs. Indeed, in thinking about design issues, planners and architects who are concerned with a user needs, got the approach to design in terms of **Maslow's hierarchy of human needs.**

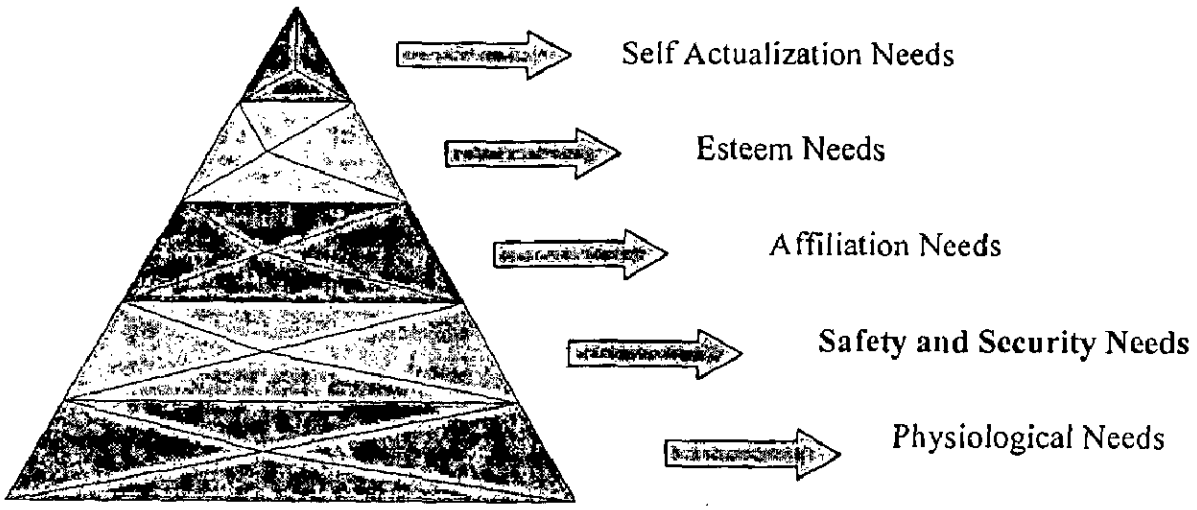


Fig 2.1 Maslow hierarchy of human needs

1. **PHYSIOLOGICAL NEEDS:** The fundamental human need is for survival. In order to survive, the physiological need for water, food, air, and sufficient warmth is to be fulfilled.

2. **SAFETY AND SECURITY NEEDS:** This need has both a physiological and psychological component to it. Physiological safety stems from avoiding harm inflicted, directly or indirectly, by other people and from the biogenic environment; psychological safety and a feeling of security stem from being oriented in space and time, geographically and socially, and being confident of maintaining one's place there.

3. **AFFILIATION NEEDS:** People need to feel loved and to feel a member of a group.

4. ESTEEM NEEDS: The need to be held in esteem by oneself and by others.

5. SELF-ACTUALIZATION NEEDS: Maslow identifies it as the need to be helpful to others as much as the need to achieve one's own potential on one's own.

2.1.1 SAFETY AND SECURITY NEEDS

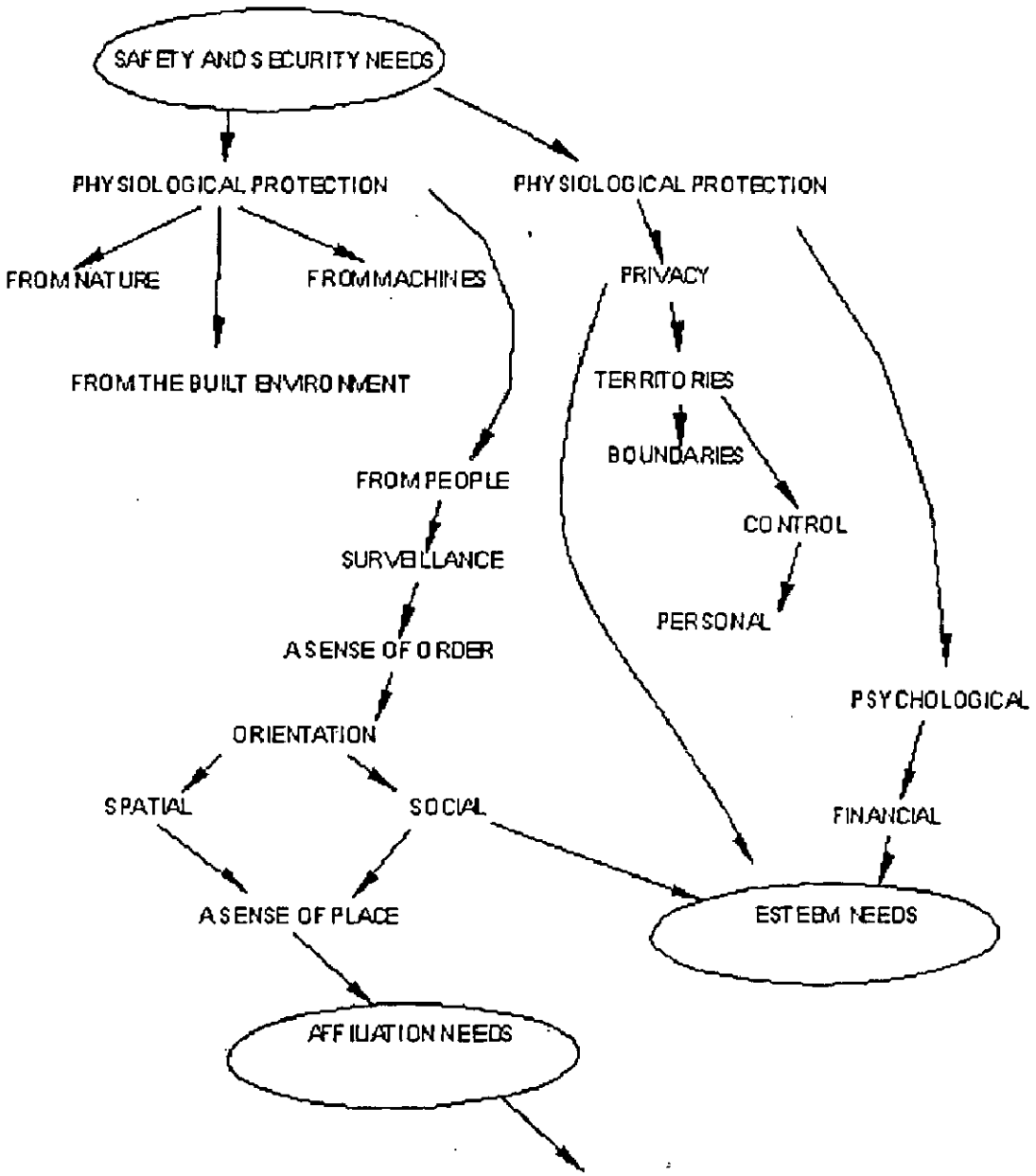


Fig 2.2 Safety and security needs

Once the survival needs and basic comfort requirements are reasonably well satisfied, people's concerns shift up the scale to focus on the fulfillment of other ends, particularly **safety and security needs**. The fear of antisocial behavior (criminals) results in safety and security issues taking precedence over many others in urban design.

There are two basic types of safety and security needs that have an impact on the work of the urban designer/Architect:

(1) Physiological-to have freedom from bodily harm, crime etc and

(2) Psychological-to have a sense of place, geographically and socially in a society.

*To achieve the former, people need to feel safe from wild animals, **criminal assault**, and various types of accidents: household, vehicular, and so on.* To achieve the latter, there is a desire to avoid the unexpected, to be in *control,* to know where one is in one's social and physical surroundings, and not to be afraid of other people and social situations.

2.1.2 Sources of Insecurity

Sources of people's insecure feelings vary considerably. There is still a fear of nuclear disasters and the effects of the continuing pollution of the earth in many minds, particularly those of the young, many of whom have a highly pessimistic view of the future. *The most is a fear of antisocial behavior, criminals even when walking around one's own neighborhood in much of urban India, which is affecting the life of common man.* Dealing with many of these issues falls outside the scope of concern of designers as professionals. They are considered as social problems. But it is possible to design layouts of the environment that provide security from antisocial elements.

2.1.3 Physiological Insecurity

There are four basic sources of danger to one's physiological condition in the environment:

1) Harmful bacteria and pollutants,

2) Natural events of the biogenic world,

3) Elements of the artificial environment-the built environment and the machines we use,

4) The antisocial behavior (criminal behavior) of segments of the population.

My area of study deals with the fourth danger of Physiological Insecurity i.e.

THE ANTISOCIAL BEHAVIOR OF SEGMENTS OF THE POPULATION

In many Indian cities, antisocial behavior seems to have reached a point where there is a regression from a concern with higher-order needs to concerns for safety and security from criminal behavior. Whenever a chaotic state arises, or a threat of such a state or nihilistic attitudes occur, safety and security needs become proponent, and designing social programs and physical environments to deal with them becomes the focus of much attention.

One of the most intractable and emotionally charged issues with which the urban designer/Architect has to contend is both the actuality of high levels of criminal behavior in many places and the fear of it in people's minds.

Crime is a social problem, but we can see the physical design responses to it increasingly in cities, with individual business proprietors putting up riot screens on shop windows and householders barring their windows and doors.

2.2 CRIME:

Crime is any act that is unlawful, or an act committed in violation of a law forbidding or commanding it, and for which punishment is imposed upon conviction.

Crime is a phenomenon resembling somewhat the famous dragon with several heads. There are more than ***25 types of crime*** to be distinguished. Besides crime there is fear of crime which is a different phenomenon.

Some of the general crimes are: [3]

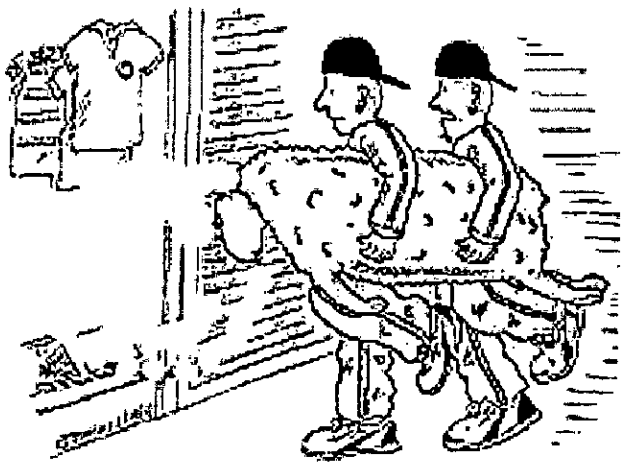
- **Burglary**
- **Vandalism**
- **Graffiti**
- **Car theft**
- **Pick pocketing**
- **Vehicle theft**
- **Arson**
- **Theft**
- **Robbery**
- **Sexual offences**

- **Kidnapping**
- **Murder**
- **Traffic crimes**
- **Violence in public space**
- ***Shoplifting***
- **Violence in semi public space**
- **Violence within households**
- **Fraud**
- **Corruption**
- **Drugs trafficking**
- **Bribery**
- **Threats**
- **Environmental crimes**
- **Workplace crimes**

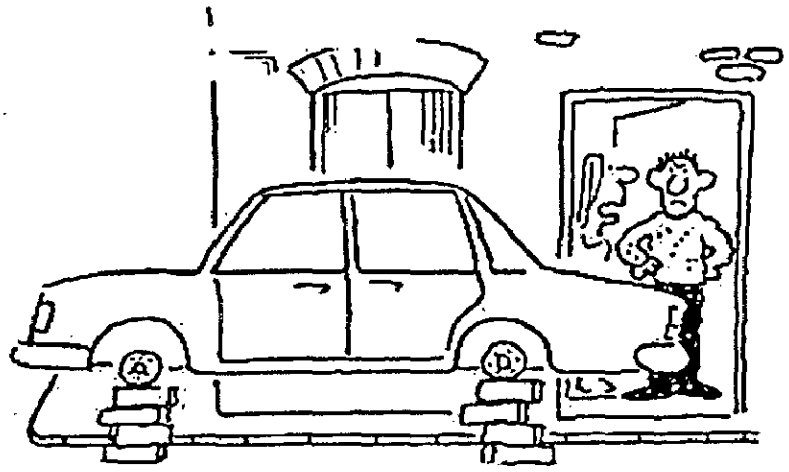
2.3 CRIMES IN RESIDENTIAL ENVIRONMENT:

In residential areas crime are basically of opportunistic nature and can be reduced by proper environmental planning and building design. These are:

(a) BURGLARY



(b) KIDNAPPING



"Look on the positive side - at least it's stopped the car getting stolen!"

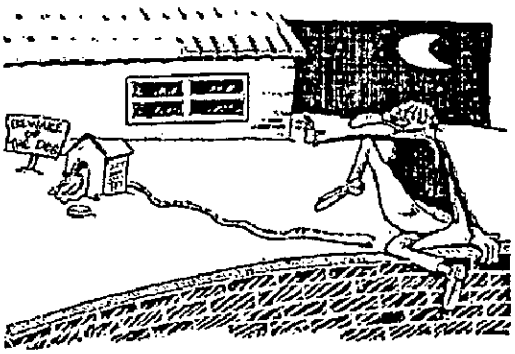
(c)VEHICLE THEFT

CHAIN SNATCHING

SEXUAL OFFENCES

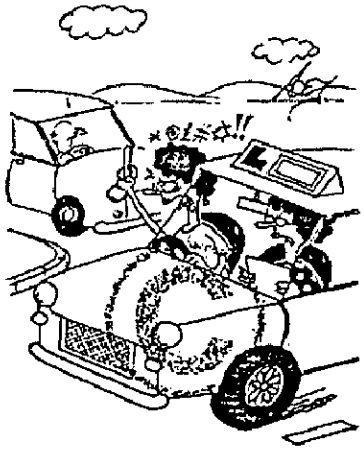
(d)PICK POCKETING

(e)GRAFFITI

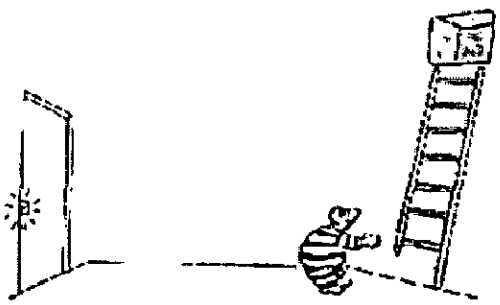


(f) THEFT

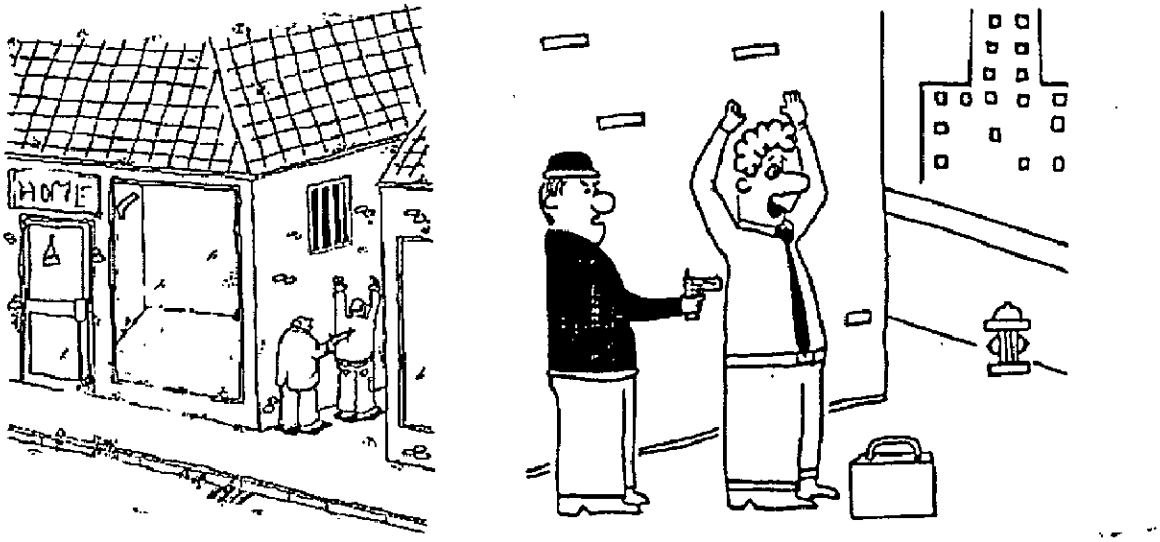
(g) ARSON



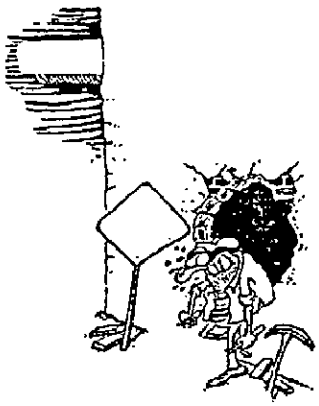
(h) VIOLENCE



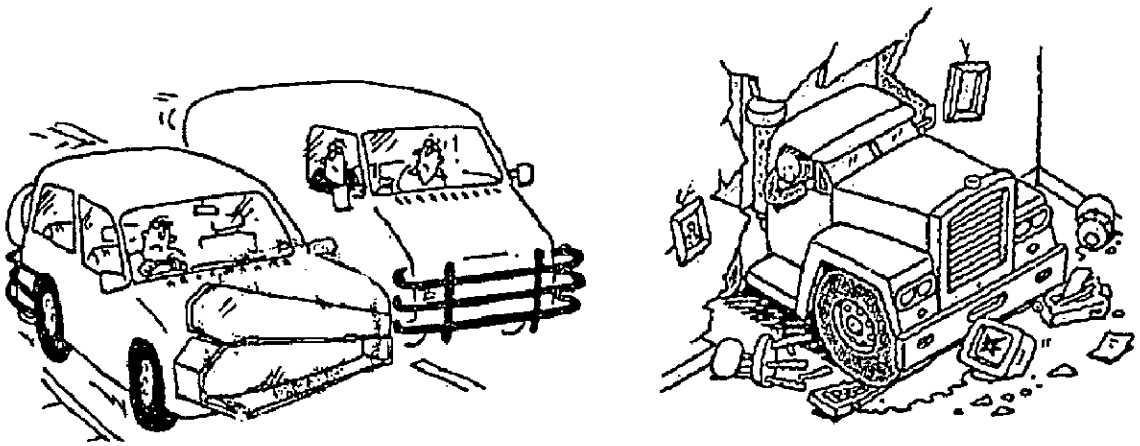
(i) ILLEGAL ENTRY



(j) ROBBERY



(k) VANDALISM



(L) TRAFFIC CRIME

Fig 2.3 (a) to (L) shows various types of crimes in our residential environment

2.4 FEAR OF CRIME:

'Fear of crime' is used to refer to an emotional response to the risk of a crime happening to oneself or to others that incorporates elements of fear, worry, vulnerability and loss of a sense of security or safety.

Example:

ALLEY

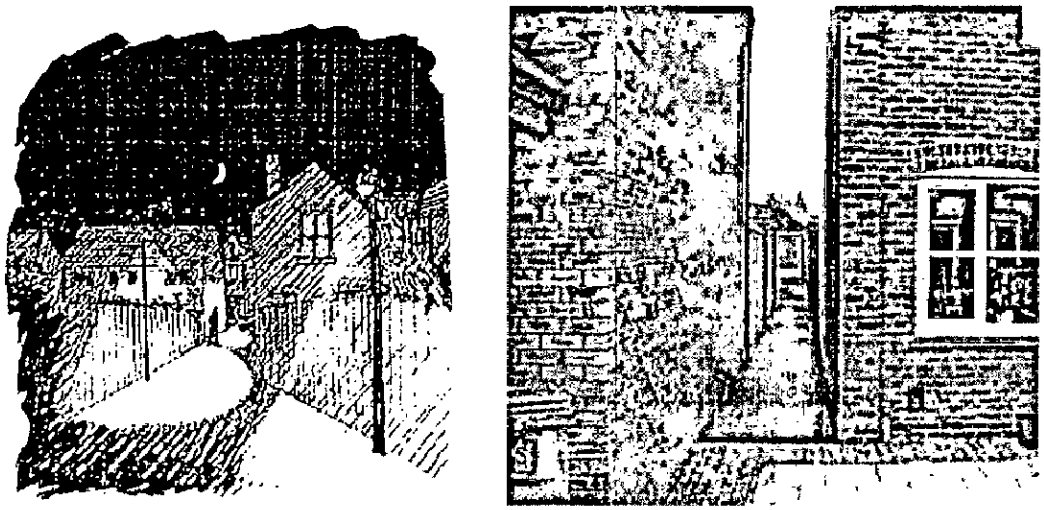


Fig 2.4 View of alleys

- A dark alley may scare us away, while a sunlit street may invite us to stroll--even though we know nothing about the people who live either place.

ILL MAINTAINED AREA

Fig 2.5 View of back and front Yard (ill maintained)

- Well maintained areas invite us and rejuniviate our sense while ill maintained area gives the feeling of happening of something wrong and ill-legal

2.5 FAVORABLE FACTORS FOR CRIMINALS IN HOUSING:

1. Inadequate lighting
2. Inadequate physical security
3. Places of concealment for attackers such as vacant structures, dense shrubbery, trash accumulations, isolated parking areas, no mans land etc.
4. Situations that create potential access difficulties for police
5. Poor building detailing that provide easy access to criminals in house.
6. Easy escape routes.
7. Poor surveillance.
8. Hide out spaces in buildings.
9. Easy access to terrace, shafts and upper floors.
10. Lack of neighborhood environment.

2.6 COMPONENTS OF CRIME:

William Spelman and John Eck's simple model of the components necessary for a crime to occur: [4]

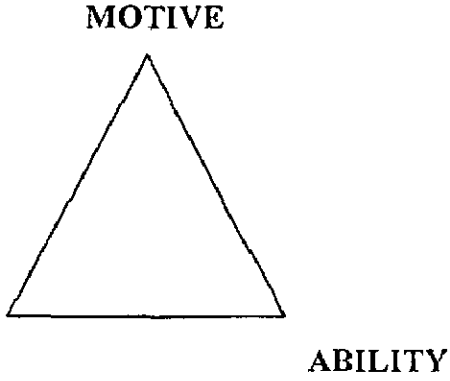


Fig 2.6 John Eck's simple model of the components for a crime

The three sides of this triangle are the three things that need to be present for a crime to occur. Eliminate any single side, and the triangle disappears

2.7 HOW TO REDUCE CRIME:

REACTIVE APPROACH: *Wait till the crime occurs and than take action.*

PRO-ACTIVE APPROACH: *Ability and opportunity must be reduced at planning level.*

Reactive approach, results in loss of thousands of millions of rupees per year and valuable life of innocent citizens.

The lesson is clear: it is too expensive to wait till crimes are committed; crime must be prevented at planning level through:

- ***Environmental prevention*** manipulates building design and the relationship between buildings and their environment to reduce opportunities for crime.
- ***Building design and detailing***
- ***Mechanical prevention*** emphasizes hardware and intelligent system

2.8 CRIME REPORT OF RESIDENTIAL AREA OF DELHI BY DP:

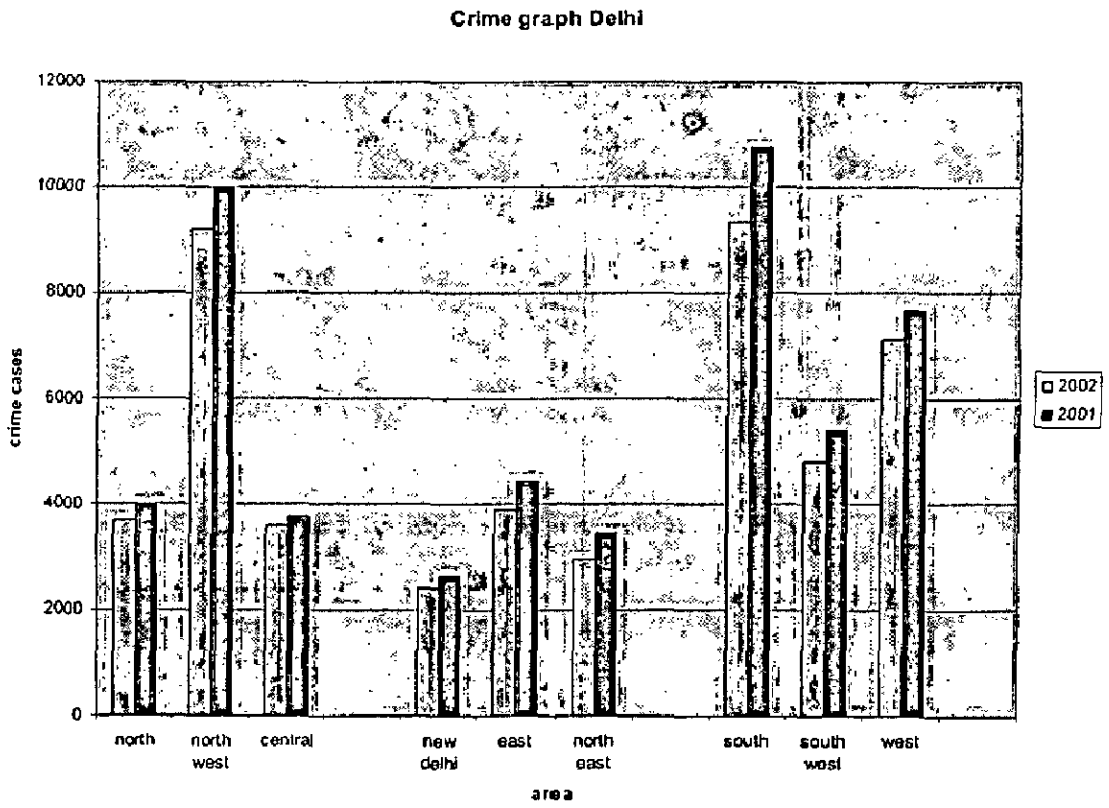


Fig 2.7 Crime in various districts of Delhi

According to them crimes are of two types: **Heinous and Non heinous.**

1. **Heinous crime** are planned one, include dacoit and murder.
2. **Non heinous** are unplanned and committed mostly by the young people and children's.

According to records ***90% crimes*** that occur in residential areas are committed by the ***young people and school children's*** and most of them are not professionals and have got fear of committing crime. These can be easily controlled by proper planning.

2.9 ARCHITECTURAL INTERVENTION IN THE FIELD OF CRIME PREVENTION:

Much less or almost nothing has been done in this subject in Indian context, so whatever the study done to prevent crime is belongs to different European and American countries.

CRIME THE ARCHITECTURAL CONCEPT:

CONTEMPORARY THEORIES: [5]

Although crime has been studied in great detail in relation to the prevalent environmental factors it is only in the last fifty years or so that new concepts and hypothesis have been advocated and to relate the physical-built environment and the CRIMINAL BEHAVIOR. This has been done in an architectural contest, rather than a deterministic climatic sense.

2.9.1 SOCIAL CONTROL THEORY by JANE JACOB

She was the first to put forth the notion that the physical environment and criminal behavior were related in an architectural context.

In his book **"THE DEATH AND LIFE OF THE GREAT AMERICAN CITIES"** in 1961, she suggested that the city becomes unsafe with the development of separate activity areas in the form of residential, commercial, industries, financial and recreational. As a result surveillance of streets and other public areas have been greatly reduced consequently reducing the feeling of cohesion, territoriality and responsibility towards domain. She believes that mixture of land uses is needed to achieve greater safety and safer streets are those frequented at all times of the day and night. Such streets have commercial and other activities at the ground level, some of which go on during evening.

Soon after Jacob's study the concept of social control was developed. The study suggests that streets when populated with strangers (diversity of uses) will result in natural or passive surveillance. Business establishment provides people with a proprietary interest in street directly in front on them, and shops give people a reason for using the streets. Jacob's view of the role of commercial facilities reversed the notion that these intensely public areas attracted crime.

2.9.2 DEFENSIBLE SPACE THEORY by OSCAR NEWMAN

In 1972, he put forward his concept of the **DEFENSIBLE SPACE**, a more formal framework to Jacob's ideas. This theory goes on to suggest that potential criminals are more reluctant to commit crimes in those areas, which are perceived to be under technical influences of a surrounding community.

Oscar Newman used the term defensible space to describe the residential environment designed in such a way as to allow households to supervise, to be seen and to be responsible for, the areas in which they live.

Defensible space is where an area is purposefully divided into physically distinct areas defined as private, semi-private, semi-public and public spaces. The purpose is to create definite boundaries between areas which create a sense of transition from public to private space -a buffer space between public space, where users have a right to be, and private space where they do not.

His theory proposed four elements of physical design which act individually and in combination to contribute to the creation of secure environment:

1. **Territoriality:** Division of communal spaces in and around residential buildings to promote proprietary attitude among residents.
2. **Natural Surveillance:**

The positioning of apartment windows to allow residents to naturally survey the exterior and public areas of their environment as well as the surroundings residences

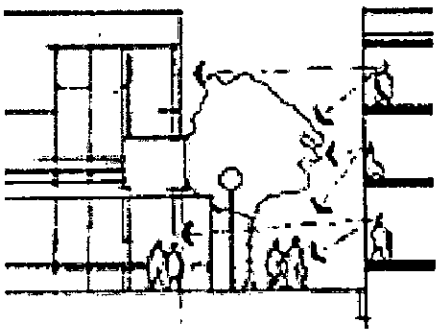


Fig 2.8 Natural surveillance through building

3. **Image:** The use of building forms and material to avoid the stigma of public housing.
4. **Milieu:** Locating residential projects to face onto areas of the city considered safe (such as institutional areas, government offices).

2.9.3 ENCLAVE-ACCESS-CONTROL THEORY

This theory suggests that the environment can be designed to discourage the access of prospective criminals to potential victims or items of value. Airports provide total security with respect to the unauthorized carrying of weapons or dangerous materials. Large suburban shopping plazas employ this approach by performing implicit checks on the behavior of pedestrians prior to entry. While these centers are treated as if they are in the public domain, their physical organization actually limits entrance of undesirable pedestrians and acts as a closed street. Residential applications of this system are numerous, varying as they do from simple door buzzers and intercom systems to complex alarm and intrusion-detection systems. Once good security is provided at the perimeter of a community or a multi-occupancy residence, the potential for positive social interaction within the community is multiplied. The problems are (1) that this can only be done effectively within a homogeneous community, otherwise the potential perpetrators of crime would already be inside the community, and (2) the formation of enclaves leaves the streets outside the community devoid of positive activity and social life. For these reasons, enclave approaches are only partial solutions.

2.9.4 CRIMINAL JUSTICE THEORY

This approach focuses on the presence of police as a primary deterrent to crime. It suggests a form of environmental design in which standards of lighting and access are maintained so as to provide optimal conditions for police patrols. In essence the approach focuses on crime prevention through making prospective criminals aware of the presence of public authority.

All entrances to residential buildings are clearly marked and lighted. Streets are simplified and street angles symmetrized in order to provide clear, unambiguous access. Where possible, emergency lanes do not end in cul-de-sacs; they provide an opportunity for patrol cars to pass through all areas casually, to maintain informal surveillance over an area as well as responding to actual calls for help. Stair halls and elevators should be well lit and exposed to view from the street, especially from passing patrol cars.

The criminal justice model is based on the professional skill of the policeman at briefly yet thoroughly scanning a large area that he passes through very quickly.

2.9.5 BARRY POYNER [6]

Following on the ideas of Newman, Poyner derived design implications which he summarized in the form of patterns in his books called **Design against crime** and **Crime free housing.**

2.9.5.1 DESIGN AGAINST CRIME *by Barry Poyner*

The book suggests the **"Patterns for design and management"** ways in which the environment can be manipulated in order to reduce the opportunities for committing crime. These patterns aim to reduce the opportunity for crime by removing targets, changing accessibility and increasing the natural surveillance qualities of both design and layout. He also advocated the idea of communities of interest stating that some form of common management or shared legal responsibility for the street should be included in a neighborhood. He suggests that the creation of homogenous neighborhoods should be encouraged by the separation of housing from commercial users and of wealthy from poorer housing.

PATTERNS FOR DESIGN AND MANAGEMENT:

a) Neighborhood patterns for crime prevention

1. Street closure and privatization.

Access on foot and by car to residential streets should be limited to avoid thorough movement.

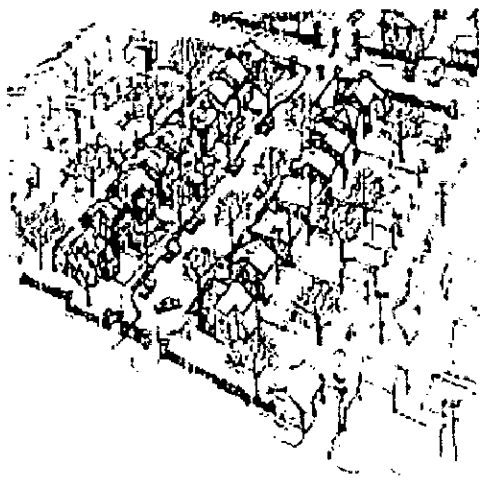


Fig 2.9 Street closure

Fig 2.10 Gateway like entrance

Any access point should be narrowed and formed as a gateway to symbolize privatization.

2. *Homogeneous residential development*

Residential neighborhood should be homogeneously developed as housing and not mixed with other uses, particularly commercial use.

3. *Limit access to neighborhoods*

Neighborhood size should be restricted to 4000 dwellings and main route should not pass through neighborhood.

4. *Separation from commercial areas*

Residential area should be kept separate from commercial uses as far as possible.

5. *Location of poorer housing*

Areas of wealthy or MIG housing should be separated as far as possible from poorer housing.

b) Crime reducing patterns for housing design

1. *Houses and thorough routes*

Housing should face onto and be accessed only from side roads.

2. *Surveillability of houses*

Accessible sides of the house should be relatively open and unobstructed by walls, trees or other landscape elements and they should overlook other houses.

3. *Accessibility to terrace*

Accessibility to terrace from the main staircase should be avoided.

4. *Securing door and windows*

Fig 2.11 Grills to give extra strength

The use of stronger materials and frames, grilles etc. should be considered.

5. Public areas in housing scheme

Surfaces in public areas of housing schemes should be hardened to reduce the risk of damage.

c) Patterns for apartment building

1. Entrance to apartment buildings

The common entrance to an apartment must be manned by security personnel.

2. Doors to apartment

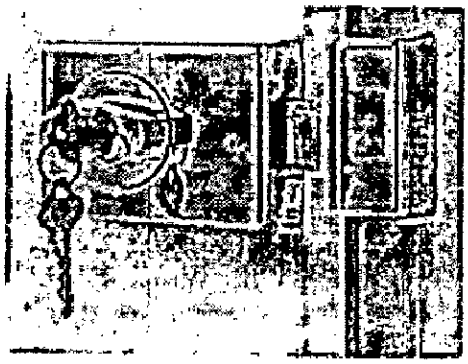


Fig 2.12 Locks

The doors to an apartment should be strongly constructed with a good locking system.

3. Arrangement of apartment doors

Doors to an apartment should not be isolated from areas used by other residents, but grouped in lobbies serving several apartments.

2.9.5.2 CRIME FREE HOUSING *by Barry Poyner* [7]

Predominantly crime is caused by social factors. Both opportunity and motive act as factors for crime i.e. motivated people will find outlets to commit crimes.

Mapping of crime distributions over areas with varied layouts suggests that potential offenders in residential areas can be supplied by low income housing nearby. The pattern of crime suggests that crime rates are low in layouts that provide natural surveillance, open front courts, cul-de-sacs, and flanked pedestrian pathways.

A) REQUIREMENTS FOR CRIME FREE HOUSING:

1. Moderate locking system, provided the opportunity for crime is reduced by design

2. Facing windows: The houses should face each other across the street or similar access area, to create a system of mutual surveillance.

3. High fences at the sides and rear, boundaries of individual housing plots.

4. Front access to a secure yard, by providing a gateway to the front of the house. They should be lockable and easily supervised from inside.

5. Access for servicing and delivering. It is desirable to provide such a space by the front door, but out of sight from the public footpath

6. Space at the front acting as transition zones.

7. All car parking should be on the hard standings within the cartilage of the house, preferably at the front to facilitate surveillance.

8. A garages at the side of the road close to the front entrance.

9. Limit road access to an area as it reduces traffic.

10. Avoid through pedestrian routes. Where pedestrian routes are separate from the roadways, they should not be planned to create a series of through routes.

11. Surveillance of access roads

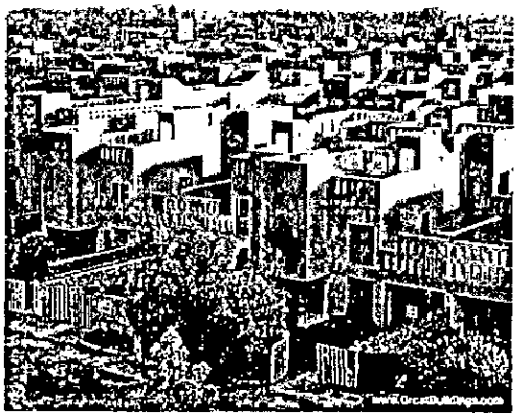


Fig 2.13 Houses facing roads provide surveillance

Houses should be oriented to face access routes and especially to focus on the entry points to provide intensive surveillance.

1. Green spaces outside housing areas to be provided near the entrances.

2.9.6 INTERNATIONAL STATUS:

ORGANIZATIONS WORKING IN THE FIELD OF CRIME PREVENTION:

- DESIGNING OUT CRIME (DOC)
- SECURED BY DESIGN (SBD)
- CRIME PREVENTION THROUGH ENVIRONMENT DESIGN

2.9.6.1 DESIGNING OUT CRIME (DOC):

It is an innovation in crime reduction developed by Police service of Northern Ireland with the help of designers and Planners. It suggests security and safety measures to be incorporated in design at planning stage.

1. All space within a development to be clearly assigned to its owning property.
2. Natural surveillance of all parts of the development to be designed into the scheme.
3. Public and private spaces to be clearly separated, including buffer spaces between areas.
4. Maintain high volumes of through movement to create a busy, self policing environment.
5. Clear visibility through and across areas to be maintained and managed by careful sitting and management of landscaping and street furniture.
6. Do not create crime hotspots by creating hidden areas or lonely spaces, give careful attention to boundary design.
7. Do not place open spaces at the backs or rear of developments. Gardens should back onto one another, not onto rear accesses.
8. Do not create high planting and walls. Avoid developing a fortress like mentality e.g. solid shutters.

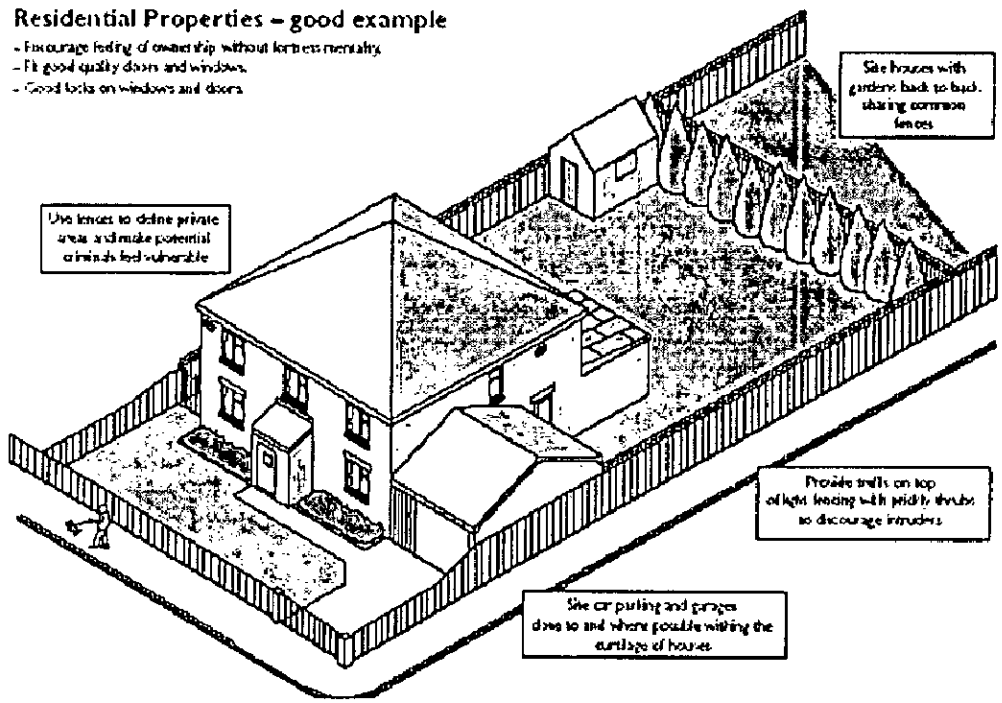


Fig 2.14 Good design of Residence against crime

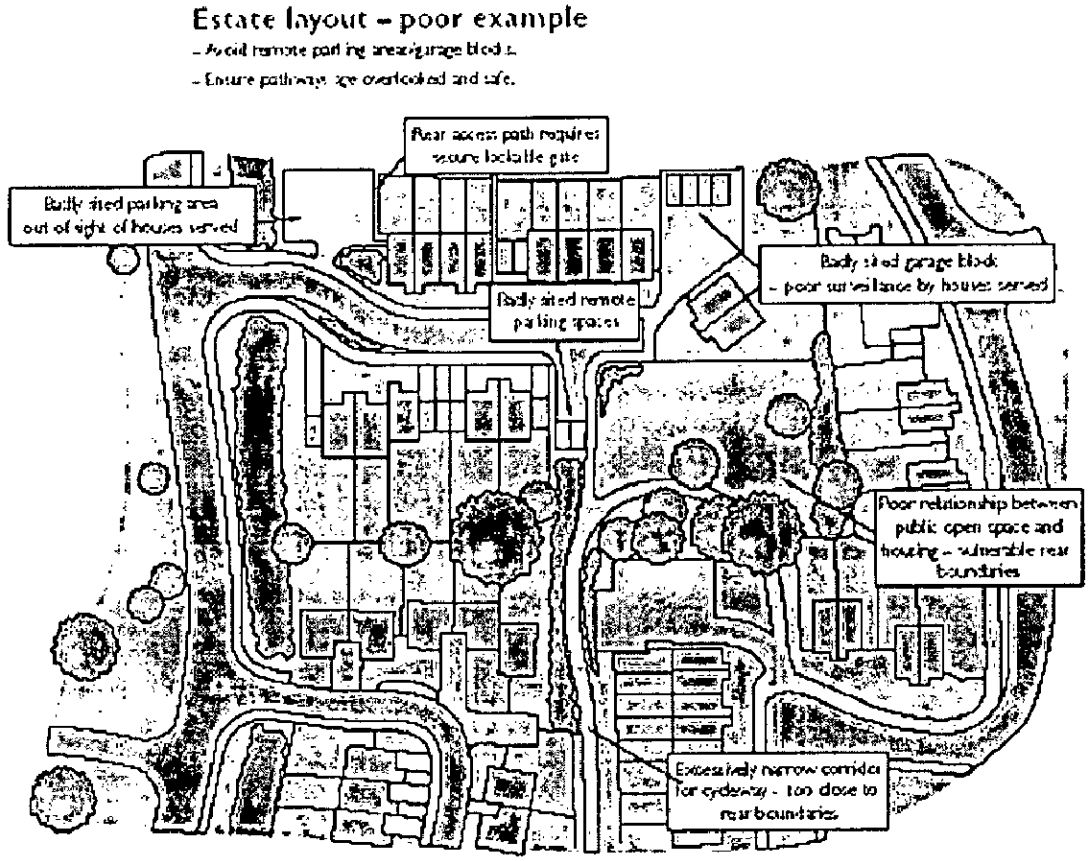


Fig 2.15 Poor Layout of estate

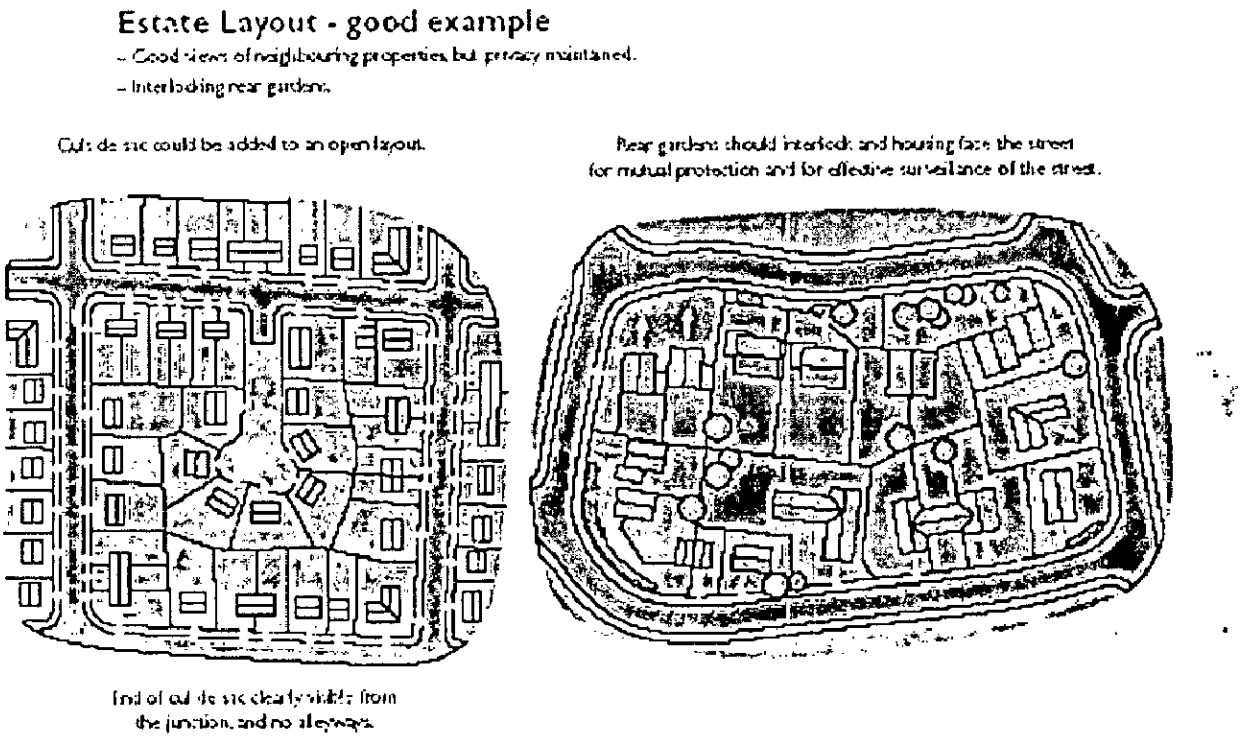


Fig 2.16 Good Layout of estate

2.9.6.2 SECURED BY DESIGN (SBD)

The concept is developed by the Police in Central Holland with the help of Architects and Planners. This describes the requirements that dwelling and environment must possess to be implemented.

The guidelines developed by SBD relate to low, medium and high-rise developments are:

1. NATURAL SURVEILLANCE

Optimum natural surveillance should be incorporated by design: -

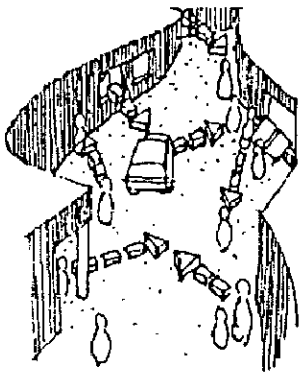


Fig 2.17 Surveillance by surrounding buildings

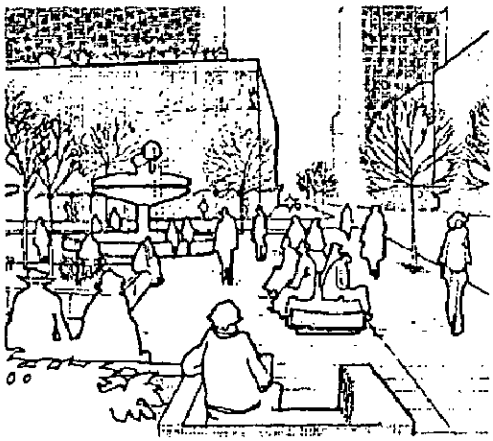


Fig 2.18 Surveillance by people

An unobstructed view from dwellings of the site, its external spaces and neighboring homes, to include external paths, galleries, roadways, communal areas, drying areas, landscaping, garages and parking areas.

2. LIGHTING

Appropriate lighting should be carefully designed to cover potential high risk areas. Good lighting will deter intruders and reduce the fear of crime.

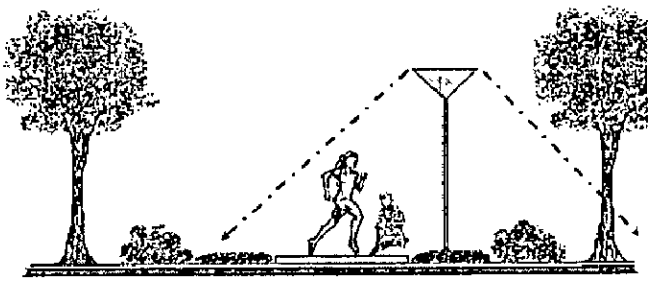


Fig 2.19 Lighting in public areas

The following areas must be lit: Main site access, garages, garage forecourts, car parking areas, all footpaths and associated areas to main building, refuse store, drying areas, secluded areas and similar locations around the site.

3. LANDSCAPING

Landscaping is an important feature of this initiative. Landscaping should not impede natural surveillance and must not create potential hiding places for intruders, especially adjacent to footpaths or close to buildings where it may obscure doors and widows.

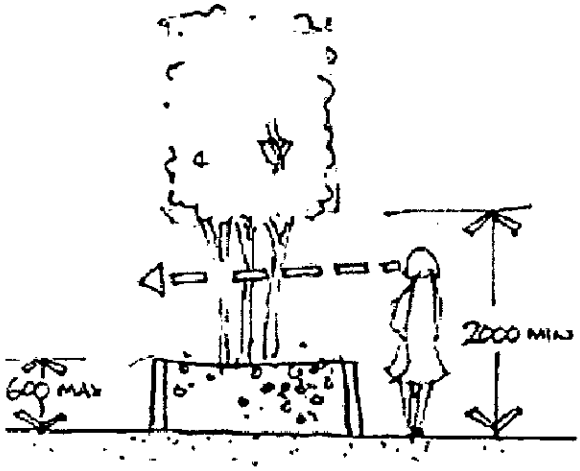


Fig 2.20 Shrubs and tree height

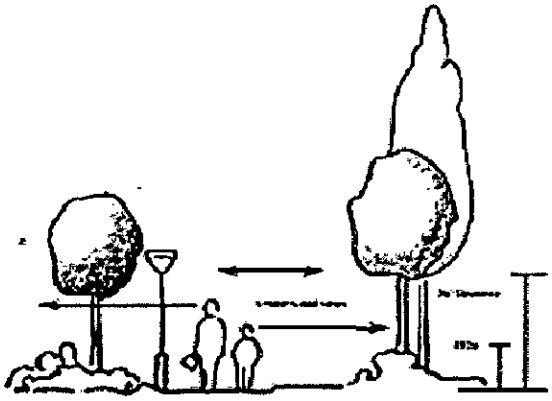


Fig 2.21 Shrubs and tree height

Frontages should be in open view. Ornamental walls and hedges should not exceed one meter in height. The correct use of certain species of plants can help prevent graffiti and loitering, and in addition to fencing may be used to define/reinforce boundaries.

4. CAR PARKING

In-cartilage car parking arrangements are preferred but where communal car parking areas are necessary,

Fig 2.22 View of parking from residence

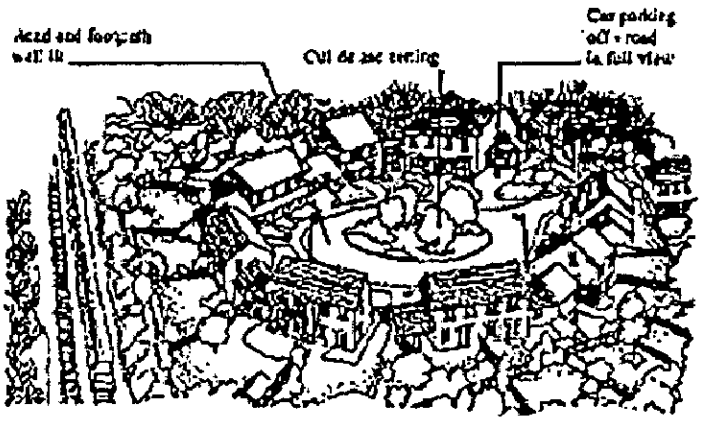


Fig 2.23 Cartilage car parking

They must be in small groups, close and adjacent to the owners which they serve and open to view of the residents from regularly habitable rooms.

2.9.6.2.1 SUCCESS STORY of Secured By Design

According to the report of Economic time's dated 16.5.99, Police force in the English Midlands has laid claim to a 40 percent reduction in crime following 'the introduction of a scheme to design out crime at the planning stage of building developments.

EXAMPLE

EBOR GARDENS, Leeds UK

Ebor Gardens is an area to the north of Leeds city centre in West Yorkshire. It consists of council owned housing and registered social landlord stock, including multi storey flats, semi detached dwellings, a small number of owner occupied homes and a few commercial properties including the obligatory public house. Ebor gardens, over the last ten years, has been transformed from an area of high crime, the second highest in the West Yorkshire Police area in the late 1980's, to a district that now has a housing waiting list something that had never been anticipated. The crimes consisted of robberies, serious assaults, burglary, vehicle crime and arson. As council tenants moved out it was impossible to let the properties out. Over the last ten years a major face-lift has taken place. This includes the demolition of two unwanted multi storey blocks of flats, improvements to the roads and highways systems allowing residents easy and safer access to the city centre, major refurbishment to housing stock, modernized street lighting and environmentally friendly landscaping schemes put into place.

Eight multi storey blocks of flats had been built in Ebor Gardens during the early 1960's. Each consisted of ninety units on fifteen floors. These flats, along with the other housing in the area, had no perimeter demarcation. Indeed, it would appear that little thought had been given to privacy and private space. The doors of the ground floor flats opened out onto the pavements allowing passers-by to peer through the windows. On the fourteen other floors walkways were open to the elements and persistent burglars climbed from floor to floor with ease. Graffiti artists targeted the lift areas and the stairwells were poorly lit and enclosed. It is apparent that there was little sense of safety, that the fear of crime was extremely high and the area virtually unused during the hours of darkness. During the period when the 'Yorkshire Ripper' was active, in the 1970's, Ebor Gardens became an area where prostitutes worked and resided; the spiral of decline had begun.

In 1992 a Leeds based firm of architects West and Machel, were approached by the local council housing department. They were asked to draw up plans to improve the conditions of two of the blocks of flats and work with the police in an attempt to reduce crime, the fear of crime and with a view to achieve Secured By Design. On the 7th October 1993 Saville Green and Appleton Court, two newly refurbished multi storey blocks of flats achieved Secured By Design accreditation. It is suggested that environmental design and crime prevention, made it possible to revitalize this area that had previously been suffering from serious decline and an above average high crime rate.

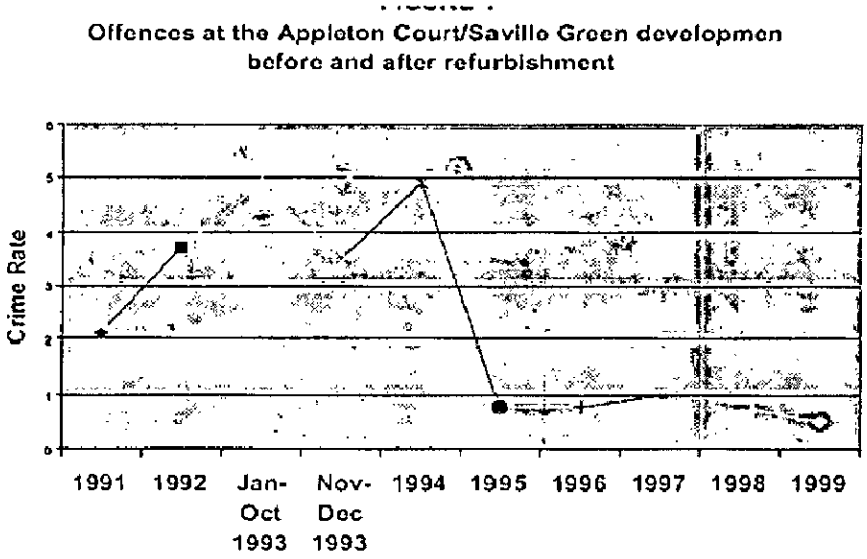


Fig 2.24 Impact of Crime prevention technique on crime rate

Fig 2.24 gives a graphic illustration of the dramatic impact of the SBD refurbishment program upon crime. (this graph is reproduced from Armitage (1999) by kind permission). Crime was reduced in this case study by 50%. In his evaluation - Pascoe (1999), ten SBD housing developments were examined to ascertain whether Secured By Design schemes had been successful in reducing crime, the fear of crime and, arguably most importantly, improved the quality of life for the residents. Ebor Gardens was one of the ten sites evaluated in this analysis and the findings suggest that **Secured by Design** was successful in reducing perceived incivilities, reduced the actual incidents of crime and possibly more importantly, improved the quality of these people's lives.

2.9.6.3 CRIME PREVENTION THROUGH ENVIRONMENT DESIGN [8]

It is based on the idea that the proper design and effective use of the built environment can lead to a reduction in the incidence and fear of crime, and an improvement in the quality of life. In other words, if a site is laid out well, the likelihood of it being targeted for a crime may be reduced.

The concept was developed by the City of Virginia Beach's CPTED Committee to be used as a tool for planners and design professionals to build a "Quality Physical Environment" with the idea of reducing opportunity for crime to occur.

CPTED CONCEPT IS BASED ON FOUR ELEMENTS:

1. NATURAL SURVEILLANCE
2. NATURAL ACCESS CONTROL
3. TERRITORIAL REINFORCEMENT
4. MAINTENANCE & MANAGEMENT

1. NATURAL SURVEILLANCE

Natural Surveillance is a design concept directed primarily at keeping intruders under observation. It utilizes design features to increase the visibility of a property or building.

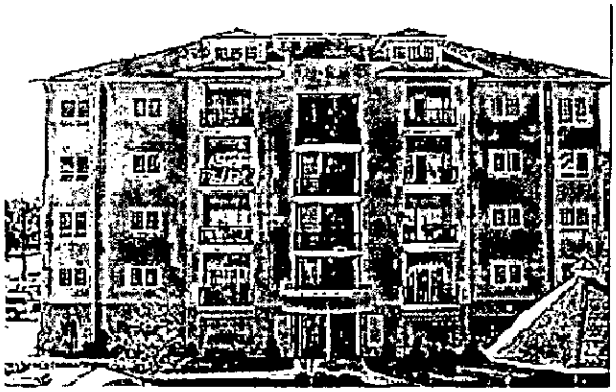


Fig 2.25 Open staircase and balcony

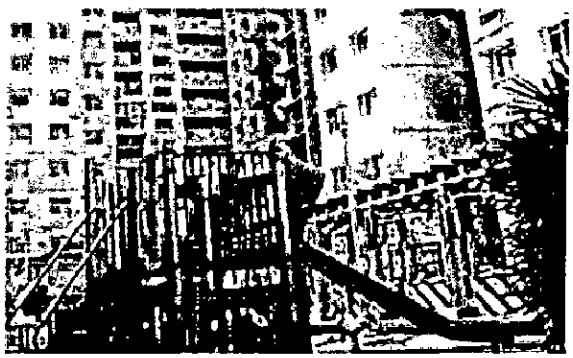


Fig 2.26 Play area visible from apartment

The proper placement and design of windows, lighting, and landscaping increases the ability of those who care to observe intruders as well as regular users, and thus provides the opportunity to challenge inappropriate behavior or report it to the police or the property owner. When natural surveillance is used to its greatest advantage, it maximizes the potential to deter crime by making the offender's behavior more easily noticeable to a passing individual, police patrol, or private security detail.

2. NATURAL ACCESS CONTROL

Natural access control employs elements like doors, shrubs, fences, and gates to deny admission to a crime target and to create a perception among offenders that there is a risk in selecting the target. The primary thrust of an access control strategy is to deny access to a crime target and to create a perception of risk to offenders. Physical and mechanical means of access control-locks, bars, and alarms can supplement natural access control measures if needed. A fence around a neighborhood playground is an example of an access control measure that protects children from wandering off and inhibits entry of potential offenders.

3. TERRITORIAL REINFORCEMENT

People naturally protect a territory that they feel is their own, and have a certain respect for the territory of others.

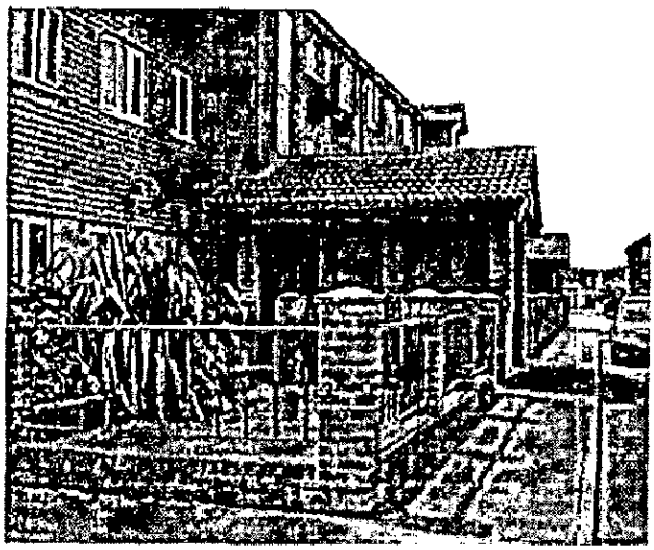


Fig 2.27 Transparent boundary to increase the space under surveillance

Clear boundaries between public and private areas achieved by using physical elements such as fences, pavement treatment, art, signs, good maintenance and landscaping are ways to express ownership. Identifying intruders is much easier in such well defined spaces. Territorial reinforcement can be seen to work when a space, by its clear legibility, transparency, and directness, discourages potential offenders because of users' familiarity with each other and the surroundings.

4. MAINTENANCE &MANAGEMENT

This is related to the neighborhood's sense of 'pride of place' and territorial reinforcement. The more dilapidated an area, the more likely it is to attract unwanted activities. The maintenance and the 'image' of an area can have a major impact on whether it will become targeted.

Fig 2.28 Properly trimmed trees and shrubs

Maintenance and management need to be considered at the design stage.

For example: Plant material should be selected for its size at maturity to avoid blocking of sight lines.

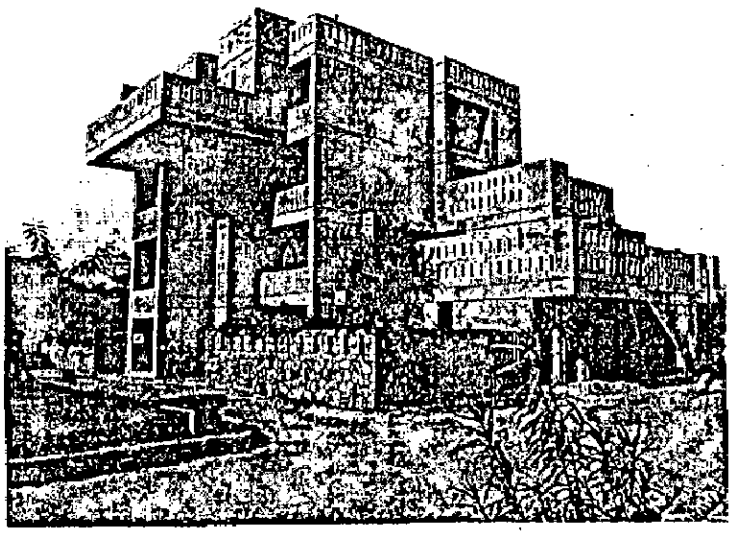


Fig 2.29 Use of natural material to avoid graffiti

The selection of materials and finishes will impact on the types of maintenance regimes that can be sustained over time. For example, Permanent exterior finish with rough texture avoids graffiti.

How Maintenance Relates to Security	
Excellent Maintenance	**Poor Maintenance**
New housing units in good physical condition ↓ Implement a plan of preventive maintenance ↓ Resident complaints addressed promptly ↓ Excellent resident relations; feelings of pride and ownership developing ↓ Initiatives by residents to plant gardens and beautify property beginning	New housing units in good physical condition ↓ No formalized maintenance plan ↓ Resident complaints addressed haphazardly ↓ Unhappy, angry residents, many of whom want to move ↓ Untidy property, graffiti, overall deterioration of property

The cycle of decay that begins when a property (or neighborhood) is not well-maintained can quickly lead to problems of crime and disorder that will contribute to more decay, and so on.

Note: This chart, adapted from *Successful Residential Management* by Barbara Kamanitz Holldan.

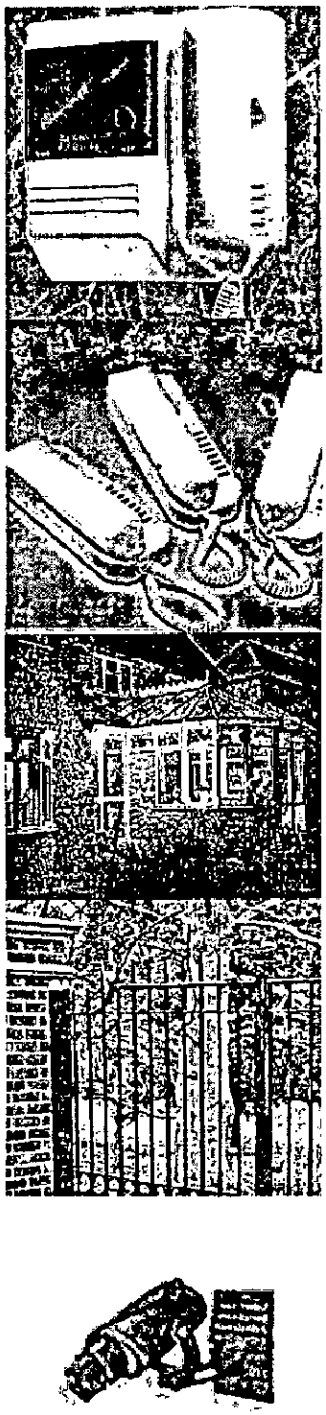
2.9.7 NATIONAL STATUS:

During the last two decades, there has been a tremendous development activity and advancement in the socio-economic requirements. Because of the increasing affordability level the life styles of the people have also changes demanding more security from crimes. The built environment that we have developed so far lacks in providing physical security in buildings. Even National building code does not specify any guidelines about it. It is therefore, important that we work out ways for making our buildings "Secured by design" as far as possible.

2.10 MECHANICAL PREVENTION:

INTELLIGENT SYSTEM FOR SECURITY

Access-control and surveillance can be enhanced into a design through mechanical strategies, such as locks, video cameras, and burglar alarms, and security lights etc.



Video entry system: See who is at the front door from any TV set or from a video entry camera. An added option is to record who came to the house while the occupiers were out.

Audio entry system: Speak with visitors calling at the front door or the front gates from handsets located with-in the property.

Remote access control: Remote controls the drive gates or the garage door from with-in the car, even turn on some house lights remotely.

Entertainment equipment enclosure: Lock all the valuable stereo and video equipment in a secure cupboard. This cabinet is a specially designed feature that will be discussed in detail at the design team meeting.

Security lighting: Use landscape lighting as an integral part of the security lighting system.

Occupancy simulation: Automatic control lighting to give the impression the property is in fact occupied

Life security: Panic alarm buttons placed in various rooms, or carry a small panic alarm the size of a wristwatch around the house. This can either call a neighbor, a family member or a doctor's surgery

Close circuit camera: Keep the vigil on an intruder with in a locality.

Fig 2.30 Intelligent system for security

LITERATURE BASED CASE STUDIES

The purpose of the Literature based case studies is to understand the existing work done in the field of crime prevention.

To know the prevalent crime in residential areas and to understand the outcomes of crime on an area

To know how crime prevention techniques helps to cut down the crime.

Topics covered in this chapter:

- **PRUITT-IGOE, Public Housing In St. Louis**
- **THE CLASON POINT, Public Housing**
- **Integrated Inferences**

CHAPTER 3

3. LITERATURE BASED CASE STUDIES: [9]

CASE STUDY - ONE

3.1 PRUITT-IGOE, PUBLIC HOUSING IN ST. LOUIS

3.1.1 Architectural Background:

The project was designed by one of the most eminent Architect **Minoru Yamasaki** and was hailed as the new enlightenment. It followed the planning principles of Le Corbusier and consisted of 43 blocks. Even though the density was not very high (50 units to the acre), residents were raised into the air in 11-story buildings. The idea was to keep the grounds and the first floor free for community activity.

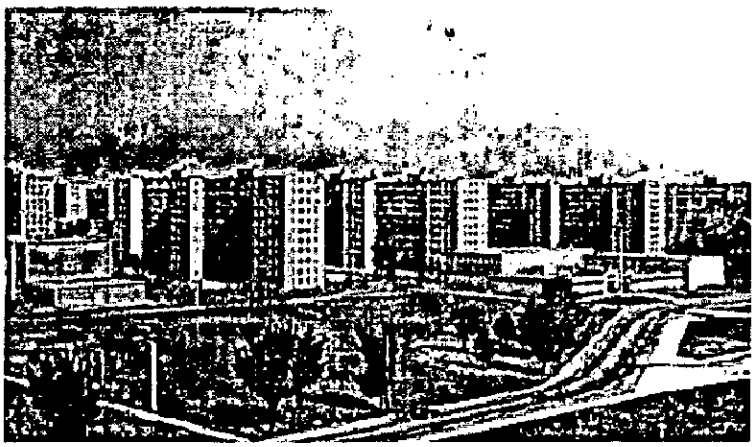


Fig 3.1 View of Pruitt-Igoe public housing

"A river of trees" was to flow under the buildings. Each building was given communal corridors on every third floor to house a laundry, a communal room, and a garbage room that contained garbage chute.

The Project got the national design award but people refused to live in.

3.1.2 Failure of project:

- All the grounds were common and disassociated from the units, residents could not identify with them. The areas proved unsafe.
- The river of trees soon became a sewer of glass and garbage.
- The mail-boxes on the ground floor were vandalized.
- The elevators, laundry, and community rooms were vandalized, and garbage was stacked high around the choked garbage chutes.
- Women had to get together in groups to take their children to school and go shopping.

Fig 3.2 View of corridor connecting different apartments

- The corridors, lobbies, elevators, and stairs were dangerous places to walk. They became covered with graffiti and littered with garbage and human waste.

3.1.3 Surrounding housing complex:

Across the street from Pruitt-Igoe was an older, smaller, row-house complex, Carr Square Village, occupied by an identical population. It had remained fully occupied and trouble-free throughout the construction, occupancy, and decline of Pruitt-Igoe.

The social variables were constant in the two developments, so it was the significance of the physical differences that enabled one to survive while the other destroyed.

To understand the reason, a detailed survey of an area was carried out.

3.1.4 Findings:

- Excluding the interior public areas of the development all areas was ill maintained.
- Where only two families shared a landing, it was clean, while others were disaster.
- Interior of apartments were neat and well maintained and well furnished.

Why such a difference between the interior of the apartment and the public spaces outside?

One could only conclude that residents maintained and controlled those areas that were clearly defined as their own. Landings shared by only two families were well maintained, whereas corridors shared by 20 families, and lobbies, elevators, and stairs shared by 150 families were a disaster they evoked no feelings of identity or control.

Fig 3.3 Destruction of housing due to crime

The project was dynamited in 1972, just fifteen years after his construction.

3.1.5 INFERENCES:

- The residents maintain and look after those areas that are clearly defined as their own.
- Spaces which are not under the surveillance of residents become the piece of cake for criminals.
- Service area if shared by more families become the no mans land.
- Ground should be associated with units; otherwise the open spaces will be underutilized by the residents and more utilized by the strangers.

3.2 THE CLASON POINT, PUBLIC HOUSING

CASE STUDY-TWO

3.2.1 Background

Clason Point is a 400-unit public housing project located in the South Bronx, a comparatively high-crime area of the city of New York. It consists of 46 buildings that mostly contain row houses. Smaller walkup units for seniors are located at the ends of some buildings. At 25 units per acre, this is a dense project by row-house standards. Such a high density was achieved by limiting off street parking to 0.15 spaces.

Demographic structure

Thirty-two percent of the project was occupied by elderly whites, 29 percent by African-American families, and 24 percent by Puerto Rican families.

3.2.2 Crime Prevention study by Oscar Newman

Interviews were conducted with residents and found that

- They were fearful of being victimized by criminals, both during the day and in the evening.
- They had severely changed or curtailed their patterns of activity as a result of the new presence of gangs and drug dealers.

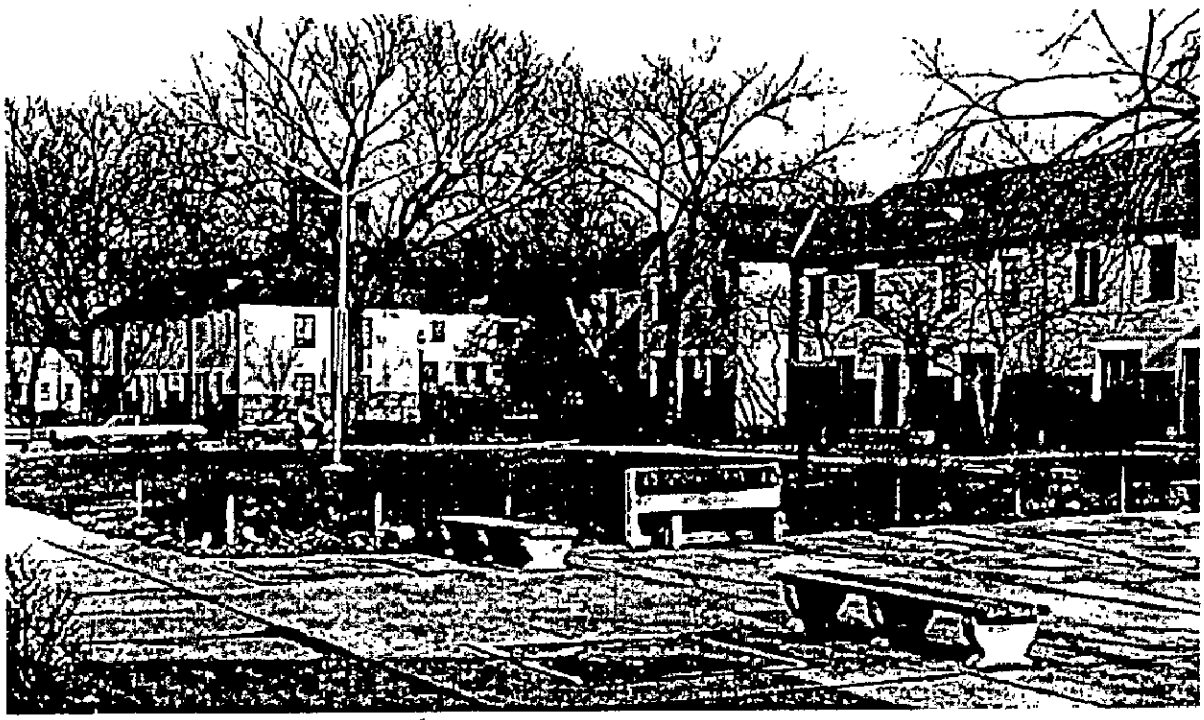


Fig 3.4 View of barren central area

- They fear to go to the central area of their locality as it looks barren.

Fig 3.5 Use of area by the surrounding community

- Teenagers from surrounding streets used the grounds as a congregation area, instilling fear and anger in many Clason Point residents.

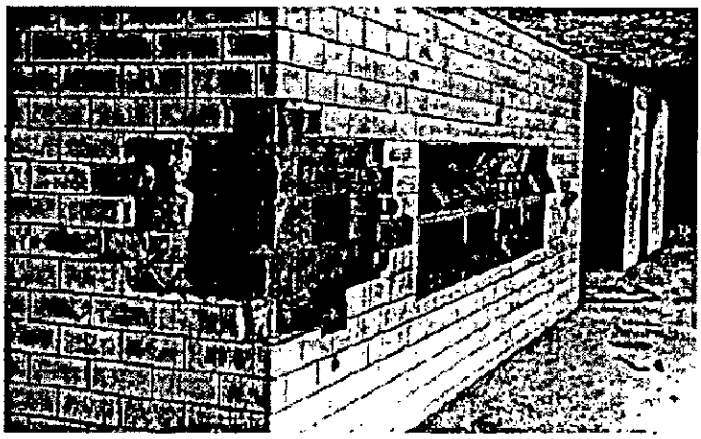


Fig 3.6 Dilapidated condition of structure

- The condition of structure was highly dilapidated and no one cares for them.

Fig 3.7 Barren pathways

- Pathways look barren; nothing was there which attract residents, so residents generally avoid pathways.

- They felt they had no right to question strangers as a means of anticipating and preventing crimes.

3.2.3 SOLUTIONS BY OSCAR NEWMAN:

Fig 3.8 (a)

Increase the proprietary feelings of residents by subdividing and assigning much of the public grounds to the control of individual families and small groupings of families through the use of real and symbolic

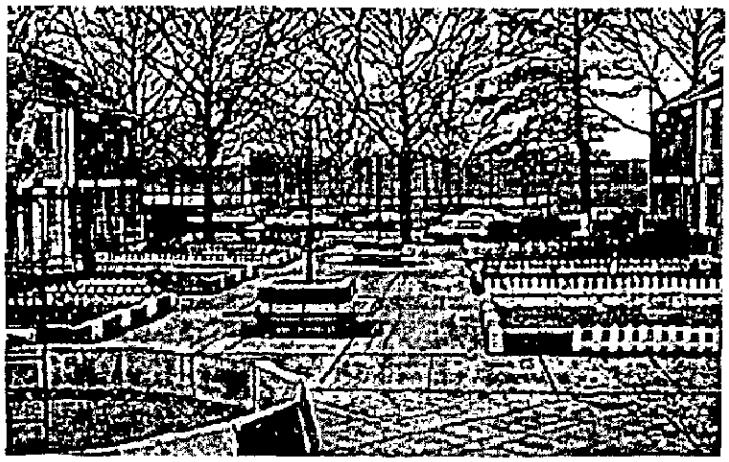
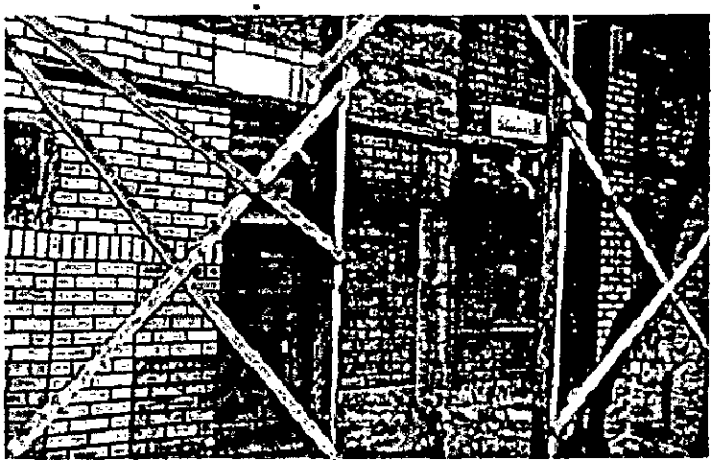


Fig 3.8 (b)

Reduce the number of pedestrian routes throughout the project so as to limit access and to intensify the use of the remaining walks. Only those walks that passed in front of the units would remain in use, and these would be widened to allow them to be used for play and sitting areas. New lighting would be added to improve visibility and to extend the use of walks into the evening.

Central area was modified and divided in to different area for different age groups.

Fig 3.8 (c)



Improve the image of the project by resurfacing the exterior of the existing cement-block building and by further identifying individual units through the use of varying colors and resurfacing materials.

Fig 3.8 (d)

The six foot fencing defined the rear yard stimulated residents to further define their own individual yards. This removed much of the overall ground of the project from access by criminals

Fig 3.8 (e)

Fig 3.8 (a) to (e) shows the changes done by Oscar Newman in an area

- Reduce intergenerational conflict among residents within the project by assigning specific areas for each group to use.
- Intensify tenants surveillance of the grounds by giving them a greater identification with the grounds.

3.2.4 *RESULT OF ABOVE MODIFICATIONS:*

- The overall crime rate in the development (including breach of housing authority rules) dropped by 54 percent in the first year. The pre modification monthly

average overall crime rate at Clason Point was 6.91 crimes per1000 residents and the post modification average was 3.16 crimes per1000 residents.

- The average monthly burglary rate per year dropped from 5.15 per 1000 residents to 3.71, a 28 percent change.
- The average monthly robbery rate dropped from 1.95 per 1000 to 0.
- The average monthly assault rate dropped from 0.53 per 1000 to 0.31, a 42 percent change.
- The number of felonies during evening and night-time hours decreased by more than one-half
- For the serious crime categories burglary, robbery, and assault the average crime rate was reduced by 61.5 percent.
- The percentage of people who felt they had a right to question strangers on the project grounds increased from 27 to 50 percent.
- Resident's fear of crime was reduced even more dramatically than the actual crime rates and, for the first time in years, most residents said they had little fear of walking through the project grounds at night.
- The project, which was 30 percent vacant before the modifications, not only achieved full occupancy, it acquired a waiting list of hundreds of applicants.

3.2.5 Inferences:

- Maintenance plays a very important role in reducing the crime.
- The residents maintain and look after those areas that are clearly defined as their own.
- Spaces which are not under the surveillance of residents become the piece of cake for criminals.
- Too many entries and access points provide opportunity for a criminal to escape easily.
- Localities which look safe are liked by the public.
- Designing different spaces for different category of people reduce conflict.

3.3. INTEGRATED INFERENCES:

- Crimes are of two types: **Heinous and Non heinous.**

Heinous crimes are planned one, include dacoit and murder.

Non heinous are unplanned and committed mostly by the young people and children's (they carry fear of committing crime in his mind).

- **Crime must be prevented at planning level through:**

□***Environmental prevention*** manipulates building design and the relationship between buildings and their environment to reduce opportunities for crime.

□***Building design and detailing***

□ ***Mechanical prevention*** emphasizes hardware and intelligent system

- Inadequate lighting, physical security, availability of place of concealment, poor building detailing, easy escape routes and lack of neighborhood concept leads to increase in rate of crime.
- Natural surveillance, natural access control, proper lighting, maintenance and territorial reinforcement lead to reduction in number of crimes.
- Mixed Land use: According to Jane Jacob, the mixture of land uses is needed to achieve greater safety and security against crime throughout the day and night.
- Sense of responsibility: According to Oscar Newman, the residential environment is to be designed in such a way as to allow households to supervise, to be seen and to be responsible for, the areas in which they live.
- Spaces which are not under the surveillance of residents become the piece of cake for criminals.
- Service area if shared by more families become the no mans land.
- Ground should be associated with units; otherwise the open spaces will be underutilized by the residents and more utilized by the strangers.

Finally:

- **The proper design and effective use of the built environment can lead to a reduction in the fear and incidence of crime, and improvement of the quality of life.**

4. FIELD SURVEY:

4.1 Criteria for selection of field sites

Step-1: Selection of site for field study:

Criteria selected:

- Crime Rate (comparative)
- Type of housing: Flatted development

To get started, information is collected from

- Police Records
- Media Report
- Public perception and my own opinion

Following areas have been identified:

- Mayur vihar-II (East Delhi)
- Rohini (Outer Delhi)
- Khel Gaon and Andrews Ganj (South Delhi)

On further investigation, followings, pockets have been identified:

- **Mayur vihar-II (MV)** Pocket-B & C
- ***Rohini, sector-7 (R)*** Pocket-A1 & F-25
- **Andrews Ganj (AG),** CPWD, housing
- **Asian Games Village (AV)** by Raj rewal

4.1.1 General Information about localities:

	Location					
	South Delhi		East Delhi		Outer Delhi	
	AG	AV	MV/B	MV/C	R/A1	R/F25
Information						
Development type	**Low rise**	**Low &Mid rise**	**Mid rise**	**Mid rise**	**Mid rise**	**Mid rise**
Site Area	26,700sqm	50.000sqm	125300sqm	120363sqm	9280sqm	9280sqm
Ground Coverage	8000sqm	28,000sqm	27,900sqm	26,250sqm	2560sqm	2560sqm
% Ground Coverage	30%	20%	22%	22%	28%	28%
No. of storey	G+1	G+1 to G+3	G+3	G+3	G+3	G+3
Dwelling Unit Area	50sqm	90-130sqm	90sqm	80sqm	80sqm	80sqm
No. of D.U.	320	653+200	1240	1500	128	128
Population	2000	3250+1750	7200	8000	800	800
No. of resident/flat	7	5+3	6	6	8	7
Density/hectare	750	650*+350**	575	665	862	862
Category	L-MIG	H-MIG	MIG	MIG	MIG	MIG
Survey Sample size	**15**	**15**	**15**	**15**	**15**	**15**

Table 4.1 *= Residents density, **=Household servants density in a locality.

Step 2:

The selected localities have been surveyed and checked against the checklist. The following results have been found:

4.2 SURVEY QUESTIONNAIRE RESULTS

4.2.1. Is crime occurred in your locality?

	Y	N
Locality		
AG	100%	0
AV	25%	75%
MV/B	67%	33%
MV/C	93%	7%
R/A1	100%	0
R/F25	100%	0

Table 4.2

Observation:

From the **fig 4.1** it is clear that, Rohini, Andrews Ganj and Mayur Vihar, Pocket-C have high crime rate compare to other areas.

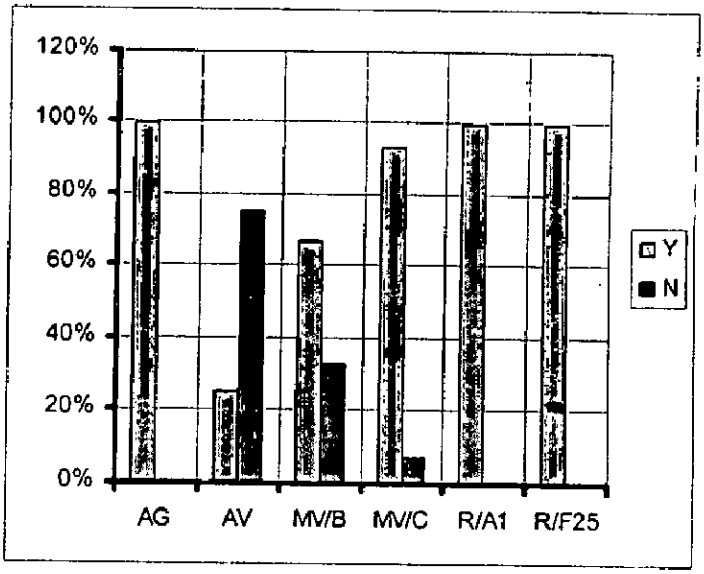


Fig 4.1 Comparative analysis of crime rate

4.2.2. Type of Crime:

	Location					
	AG	AV	MV/B	MV/C	R/A1	R/F25
Burglary (B)	4	0	0	2	3	2
Vehicle Theft (VT)	6	2	6	**12**	**8**	**9**
Theft (T)	8	1	2	8	**9**	**10**
Snatching (S)	8	1	2	7	6	7
Pick Pocket (PP)	2	0	0	2	4	3
Minor theft (MT)	**10**	2	**8**	**12**	**11**	**10**
Vandalism (V)	6	0	1	5	3	4
Graffiti (G)	8	0	0	8	**9**	**10**
Traffic crime (TC)	4	0	1	3	3	4
Public property (P)	**10**	2	0	6	**10**	**9**
Stranger entry (SE)	**12**	1	2	8	**8**	7
Kidnapping (K)	0	0	0	1	2	1

Table 4.3 The most prevalent crime in a particular locality.

LEGEND					
AG	Andrews Ganj	AV	Asian Games Village	MV/B	Mayur Vihar-II, Pocket-B
MV/C	Mayur Vihar-II, Pocket-C	R/A1	Rohini, Sector-7, Pocket-A1	R/F25	Rohini, Sector-7, Pocket-F25

IELD STUDY (SURVEY ANALYSIS)

The aim of conducting the survey is to understand the public perception about crime and secondly for the identification of design parameters, which contribute to the fulfillment of security needs.

A table has been developed for each parameter, which will show the strong and weak points of each case study.

Topics covered in this chapter:

- Criteria for selection of field sites & general information
- Survey Questionnaire result
- Public opinion about design factors
- Individual housing locality Analysis of design factors
- Comparative analysis of various design factors
- Problems identified in terms of design factors

CHAPTER 4

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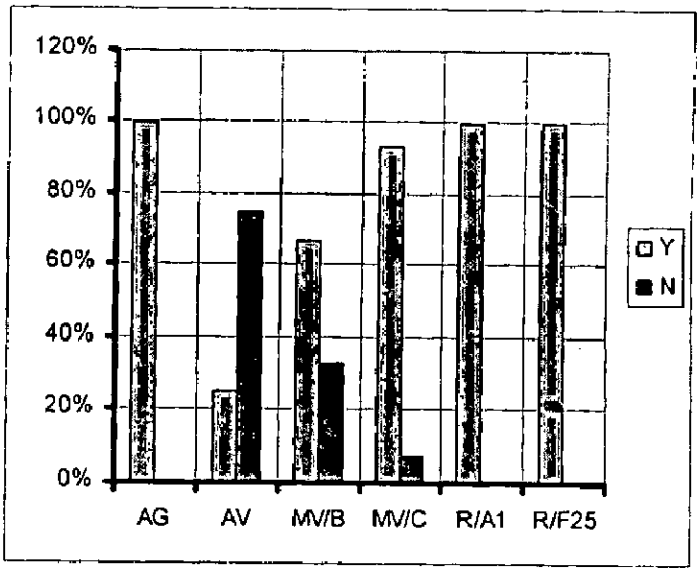

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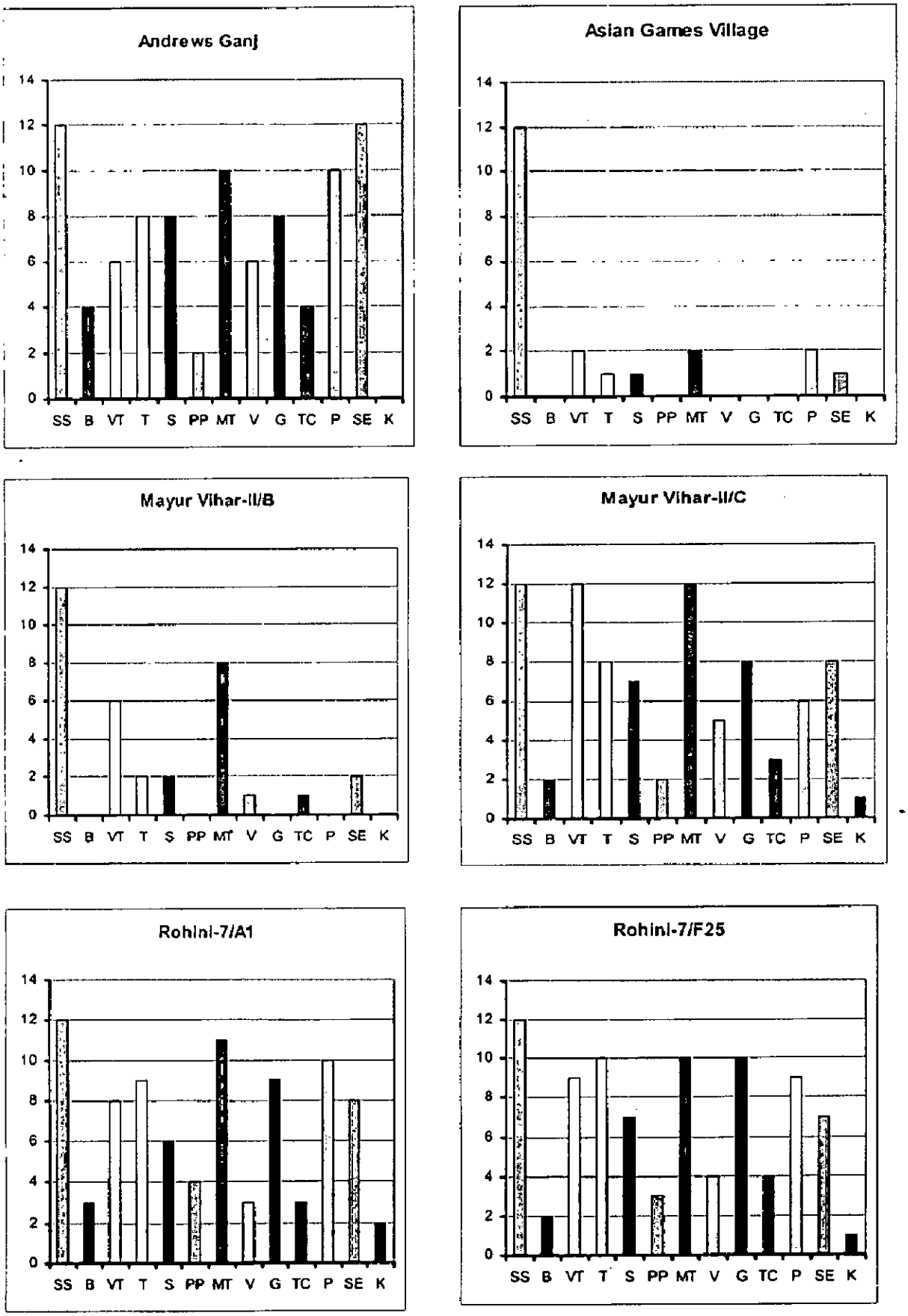


Fig 4.2: Comparative analysis of common crimes in locality SS is sample size.

4.2.3. Locations of crime in different localities:

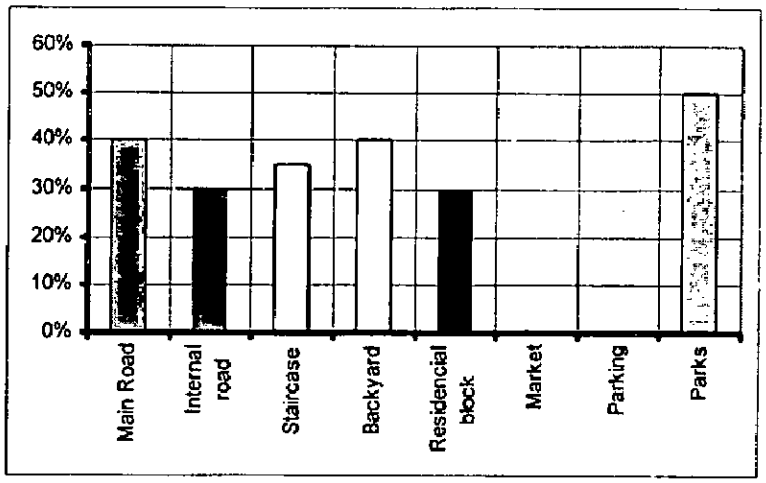


Fig 4.3 Andrews Ganj

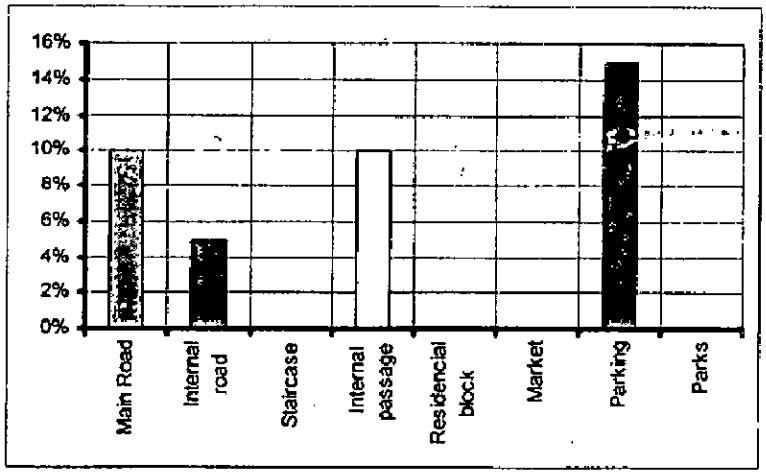


Fig 4.4 Asiad Village

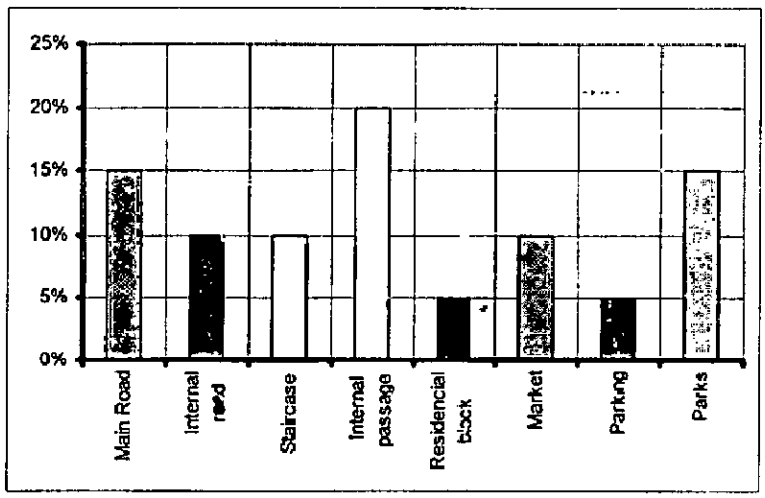


Fig 4.5 Mayur Vihar-II, pocket-B

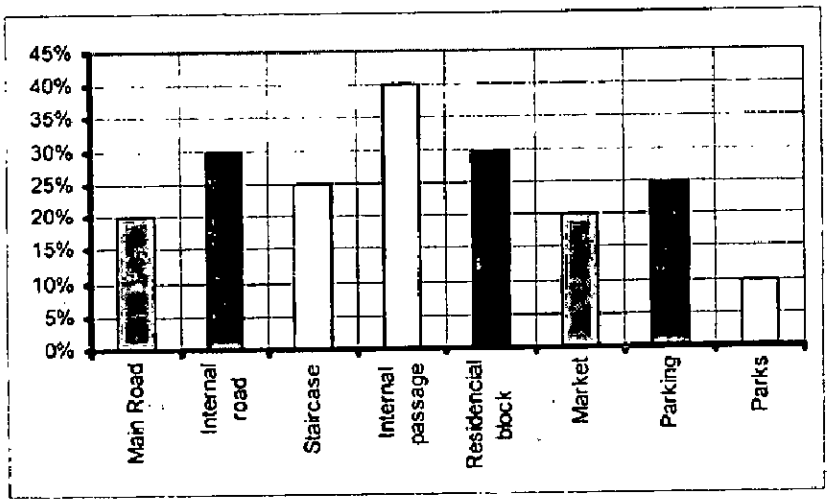


Fig 4.6Mayur Vihar-II, pocket-C

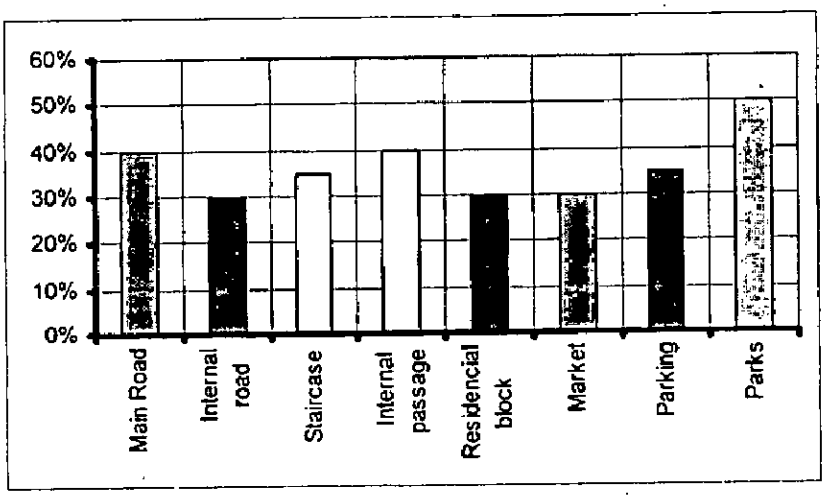


Fig 4.7Rohini, sector-7, pocket-A1

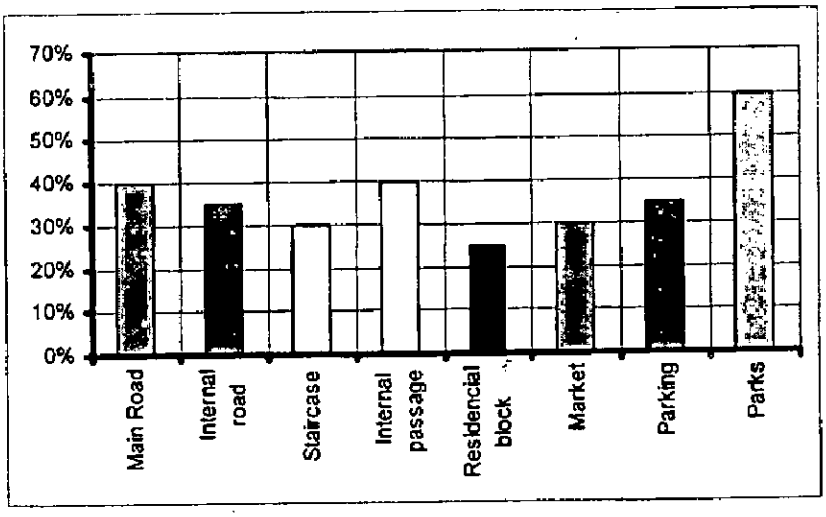


Fig 4.8 Rohini, sector-7, poket-F25

4.2.4. Duration of day, when crime occurred

	DURATION OF DAY			
	Morning	Afternoon	Evening	Night
LOCATION				
AG	1	7	2	6
AV	1	1	0	1
MV/B	0	5	1	6
MV/C	2	4	0	4
R/A1	3	3	1	7
R/F25	1	6	2	8

Table 4.4

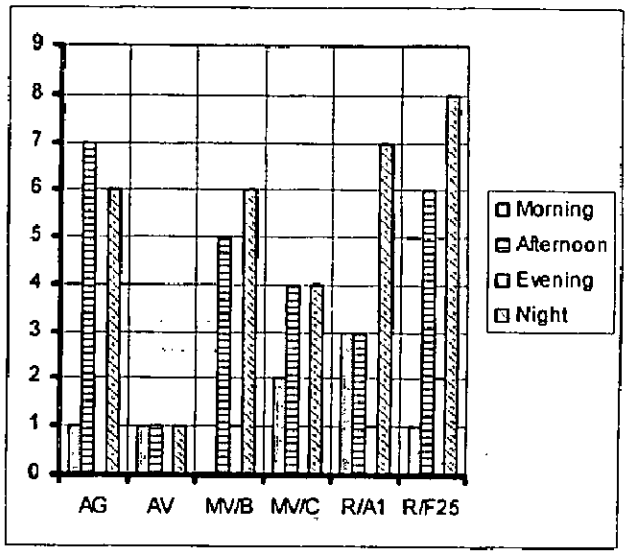


Fig 4.9 Time of occurrence of crime

Observation:

From this chart it is clear that, crime mostly occurred during afternoon and night.

It is also observed that crime rate in summers are more than the winters.

4.2.5. Status of Criminals

	Servants	School Child	Strangers	Residents	Professionals
Location					
AG	1	6	3	6	4
AV	2	0	0	0	1
MV/B	6	8	1	2	3
MV/C	7	8	2	3	4
R/A1	5	2	4	1	6
R/F25	4	1	5	1	7

Table 4.5 Source: Delhi Police

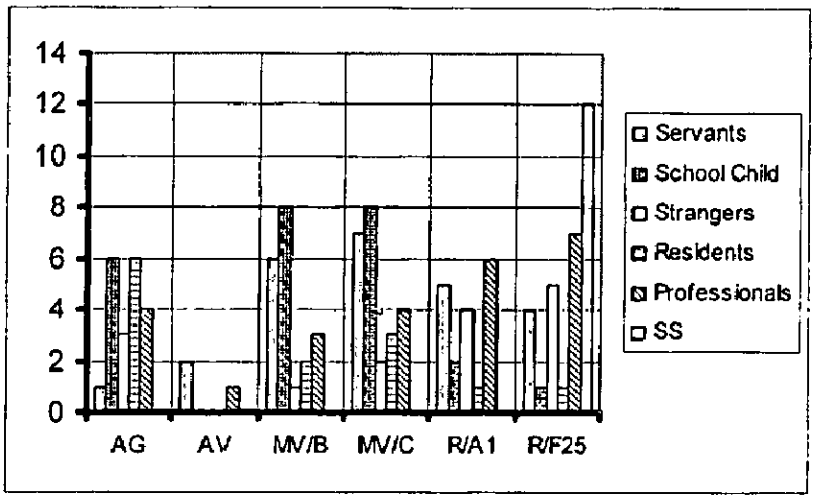


Fig 4.10

Observation: From this it is clear that, crime in most of the localities is generally committed by school children, residents and servants and this can be prevented easily by keeping an eye on them.

4.2.6. Age group of criminals:

	10 to 15 yr	16 to 20 yr	21 to 25 yr	26 to 30 yr	31 & above
Location					
AG	0	6	5	8	4
AV	0	1	1	0	0
MV/B	2	6	3	2	0
MV/C	2	8	3	1	1
R/A1	3	4	6	1	0
R/F25	2	5	7	1	1
Source: Delhi Police					

Table 4.6

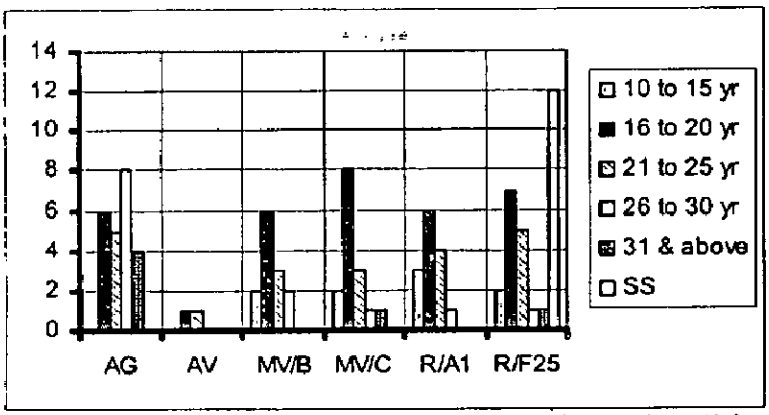


Fig 4.11 Age group of criminals in different localities

Observation: From this it is clear that, crime is generally committed by people between age group 16-20yrs and 21-25yrs. They are not professionals and have got a fear of committing crime.

4.2.7. Neighborhood concept

Do you think neighborhood concept is there in your locality?

	Y	N
Location		
AG	17%	83%
AV	58%	42%
MV/B	66%	34%
MV/C	53%	47%
R/A1	42%	58%
R/F25	33%	67%

Table 4.7

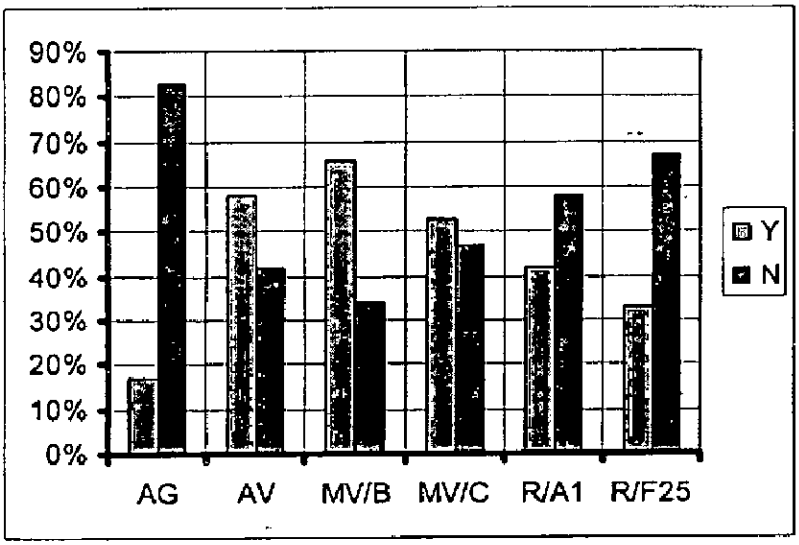


Fig 4.12 Analysis of Neighbor hood concept

Observation: The localities like Andrews Ganj, Rohini lacks neighborhood concept. According to residents this is the one of the reason of high crime rate in locality.

4.2.8. Internal Security

Are you satisfied with the internal security arrangements (hardware)?

	Y	N
Location		
AG	17%	83%
AV	67%	33%
MV/B	67%	33%
MV/C	53%	47%
R/A1	33%	67%
R/F25	42%	58%

Table 4.8

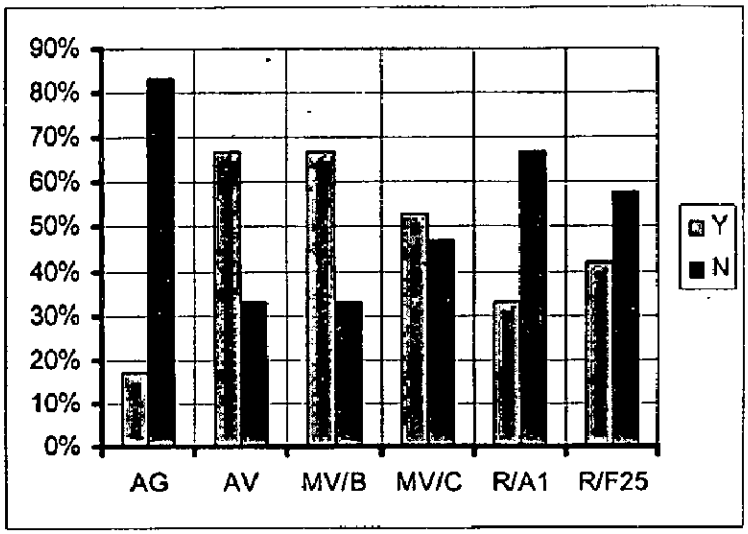


Fig 4.13 Analysis of Internal security

Observation: Most of the residents feel that, door-window locks and fixing are not up to the standards and can be easily broken.

4.2.9. Children Security

Do you feel children are secure in your locality?

	Y	N
Location		
AG	25%	75%
AV	83%	17%
MV/B	73%	27%
MV/C	40%	60%
R/A1	25%	75%
R/F25	33%	67%

Table 4.9

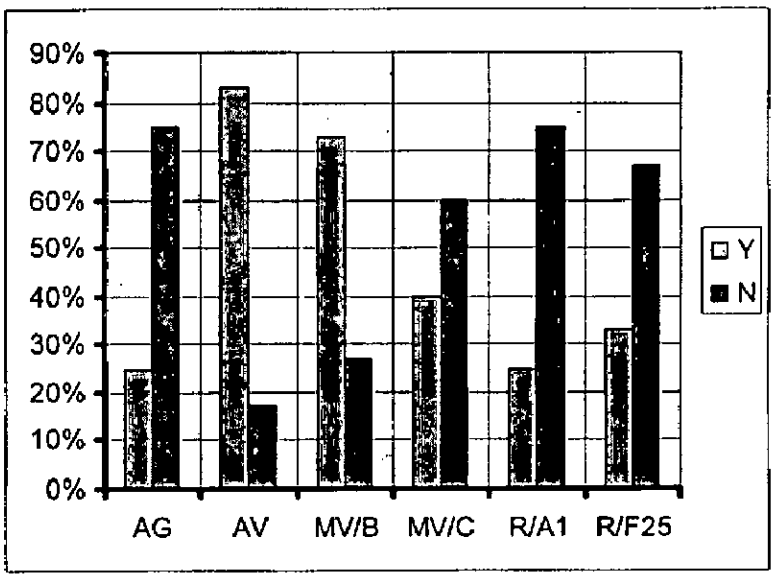


Fig 4.14 Analysis of Children security

Observation: In highly crime affected areas; residents feel their children's are not secure in a locality.

They are not been able to keep a vigil on them from their residence due to poor design.

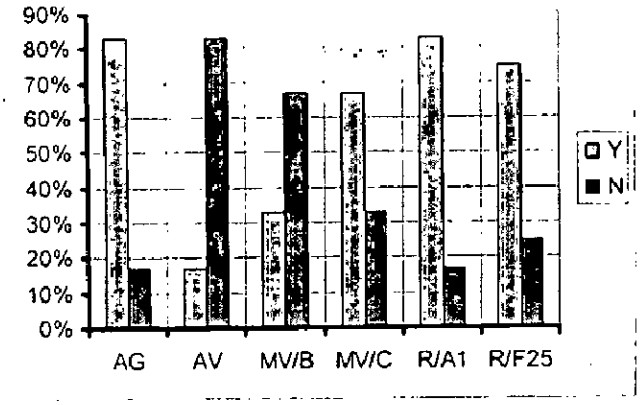
They play on roads and streets, due to non availability of parks and playgrounds.

Most of the parks are not maintained and are used by the strangers.

4.2.10. Fear of Crime: Do you feel fear of crime?

	Locality		Block		DU	
Location	Y	N	Y	N	Y	N
AG	83%	17%	75%	25%	58%	42%
AV	17%	83%	8%	92%	0	100%
MV/B	33%	67%	20%	80%	13%	87%
MV/C	67%	33%	53%	47%	53%	47%
R/A1	83%	17%	67%	33%	58%	42%
R/F25	75%	25%	75%	25%	50%	50%

Table 4.10



Locality

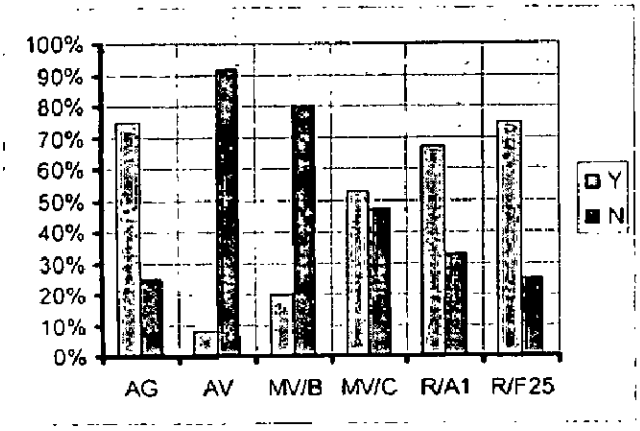
Residents of Andrews ganj, Rohini and Mayur vihar-II, Pocket-C, feel fear of crime in a locality.

Reasons: Poor surveillance

Poor maintenance

No access control

Fig 4.15 Poor lighting etc



Block

Residents of Andrews Ganj and Rohini feel fear of crime in a block.

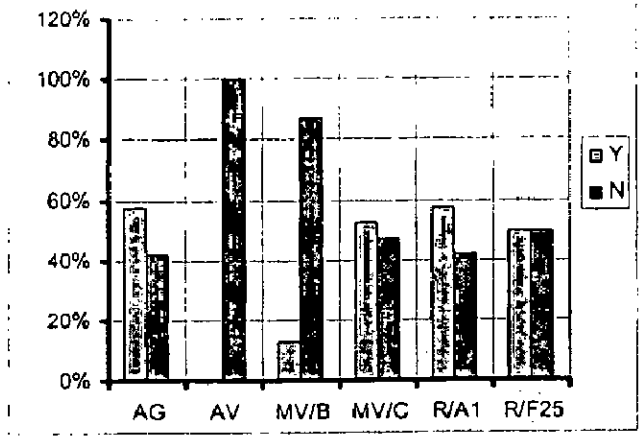
Reasons:

Darkness

No connection with neighbor

No place for conversation in block.

Fig 4.16



Dwelling Unit

Residents of Andrews Ganj and Rohini feel fear of crime in a Dwelling unit.

Reasons:

Too many entries

Easy accessibility to balcony

Easy accessibility to terrace

Fig 4.17

4.2.11. Parking

a) Is adequate parking available in your locality?

	Y	N
Location		
AG	10%	90%
AV	80%	20%
MV/B	67%	33%
MV/C	30%	70%
R/A1	20%	80%
R/F25	18%	82%

Table 4.11

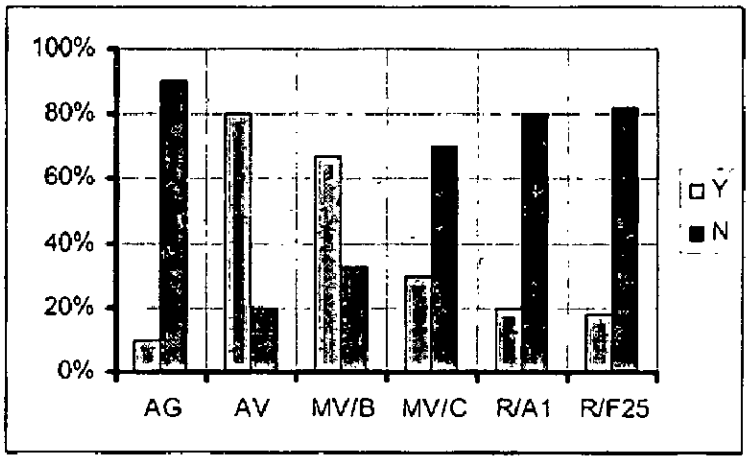


Fig 4.18 Analysis of availability of parking

b) Are you able to see parking from your residence?

	Y	N
Location		
AG	20%	80%
AV	75%	25%
MV/B	65%	35%
MV/C	33%	67%
R/A1	20%	80%
R/F25	15%	85%

Table 4.12

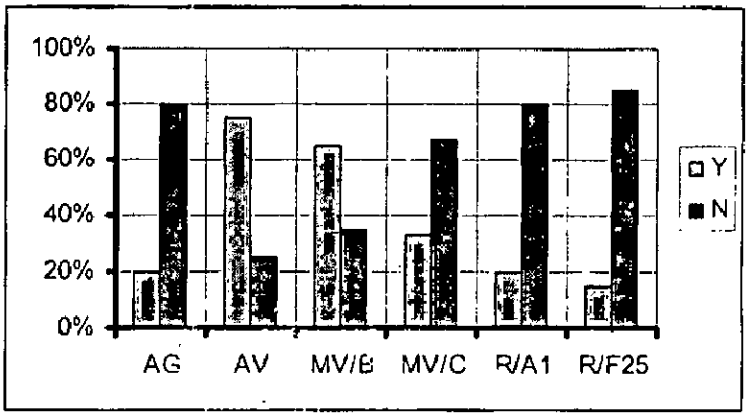


Fig 4.19 Analysis of view of parking

4.2.12. Thoroughfare

Is an area used as a thoroughfare?

	Y	N
Location		
AG	90%	10%
AV	20%	80%
MV/B	40%	60%
MV/C	70%	30%
R/A1	80%	20%
R/F25	82%	18%

Table 4.13

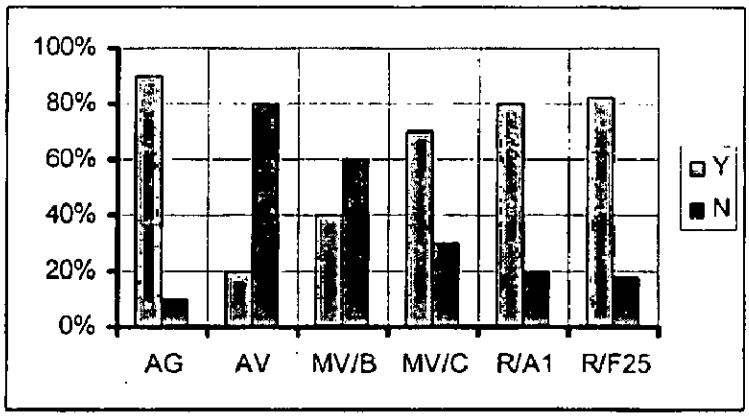


Fig 4.20 Analysis of use of area as thoroughfare

4.2.13. Unauthorized Construction

Is crime rate increasing due to unauthorized construction?

	Y	N
Location		
AG	0%	0%
AV	0%	0%
MV/B	30%	70%
MV/C	67%	33%
R/A1	80%	20%
R/F25	85%	15%

Table 4.14

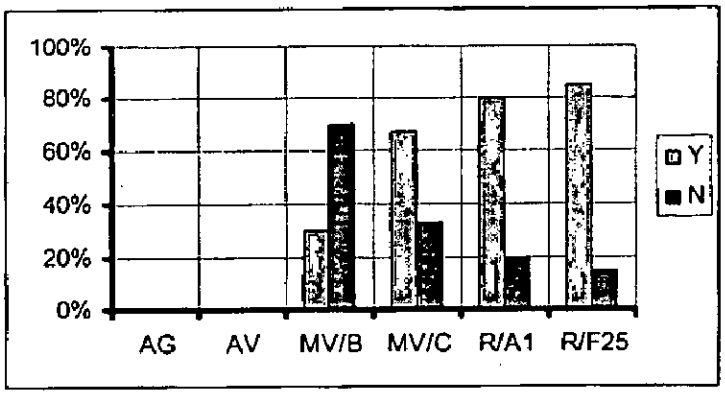


Fig 4.21 Analysis of unauthorized construction

4.2.14. Commercialization

Is crime rate increasing due to commercialization of an area?

	Y	N
Location		
AG	0%	0%
AV	0%	0%
MV/B	30%	70%
MV/C	70%	30%
R/A1	80%	20%
R/F25	82%	18%

Table 4.15

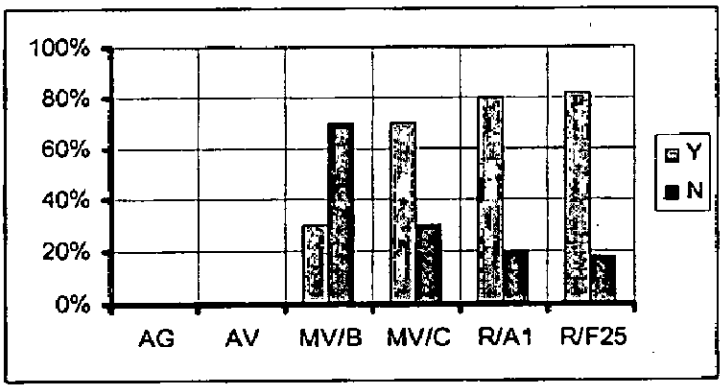


Fig 4.22 Analysis of commercialization

4.2.15. Money

Are you willing to spent extra money to prevent crime?

	Y	N
Location		
AG	83%	17%
AV	100%	0
MV/B	100%	0
MV/C	100%	0
R/A1	92%	8%
R/F25	100%	0

Table 4.16

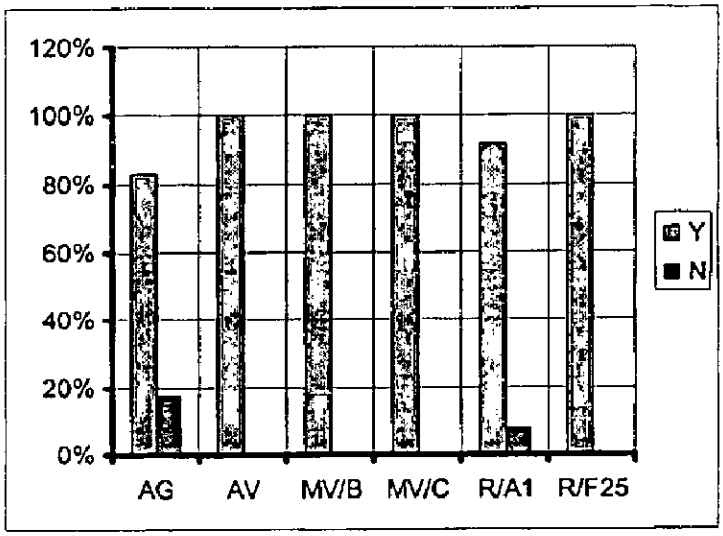


Fig 4.23 Analysis of response about money

4.3 OBSERVATIONS:

Crime: All the areas are affected by crime, some areas have high crime rate while other has low.

Type of crime: Minor theft, Snatching, Theft and Vehicle theft are most common crime in a locality.

Time: Crime mostly occurs in afternoon and night. Crime rate rises in summer.

Criminals and Age group: Generally school children, local residents and servants are involved in criminal activities. Age group is generally between 16 to 25 yrs.

Neighborhood concept: Localities which lacks neighborhood concept have crime rate, like Rohini, Andrews Ganj etc.

Internal Security: Poor quality of Hardware and fixing details are basic problem in all localities.

Children security: It is the biggest issue in all localities, especially residents of Andrews Ganj and Rohini feel that their children are not secure in locality, due to poor design.

Fear of crime: Fear of crime affects more than the actual crime to most of the residents. Residents of Andrews Ganj and Rohini have more fear of crime.

Parking: Localities in which proper parking lots/ parking are not available has more vehicle theft. Example: Rohini and Mayur Vihar, Pocket-C

Thoroughfare: Thoroughfare helps in entry of lot of strangers in a locality, which disturbs the privacy of an area and also provides easy access to criminals. Example Rohini, Andrews Ganj

Unauthorized construction: Unauthorized/Illegal construction causing hike in crime rate i.e. provide opportunity for criminals to commit crime. Example Rohini and Mayur Vihar, Pocket-C.

Commercialization: Commercialization of residences results in increasing in crime rate, due to entry of strangers in a locality. Example Rohini

Crime locations: Internal passages, backyards, service lane, parking area and dark alleys are most susceptible to crime in a locality.

Money: Public is willing to bear extra to prevent crime.

PUBLIC OPINION ABOUT VARIOUS DESIGN FACTORS RESPONSIBLE FOR CRIME IN A LOCALITY: (Y=Yes, N=No, CS= Can't say)

LOCATION	AG				AV				MV/B				MV/C				R/A1				R/F25			
	Y	N	CS	#	Y	N	CS	#	Y	N	CS	#	Y	N	CS	#	Y	N	CS	#	Y	N	CS	#
FACTORS																								
OVERALL LAYOUT																								
• Placement of blocks	9	1	2	8	2	7	3	-5	3	7	2	-4	6	4	2	2	7	3	2	4	8	3	1	5
• Parks	8	1	3	7	4	4	4	0	5	7	0	-2	6	5	1	1	7	2	3	5	7	3	2	4
• Services	3	1	8	2	3	4	5	-1	6	4	2	2	6	5	1	1	4	3	5	1	5	3	2	2
• Market place	5	5	2	0	1	7	4	-6	6	4	2	2	7	4	1	3	10	0	2	10	9	0	3	9
• Boundary wall	12	0	0	12	2	7	3	-5	7	4	1	3	6	4	1	2	10	1	1	9	9	1	2	8
• Surrounding	7	1	4	6	6	3	3	3	6	4	2	2	10	1	1	9	7	5	0	2	7	5	0	2
• No. of Entrance/Exits	10	0	2	10	2	5	5	-3	7	2	3	5	9	3	0	6	7	4	1	3	7	3	2	4
CIRCULATION																								
• Roads pattern	8	1	3	7	1	6	5	-5	5	6	1	-1	6	4	2	2	8	2	2	6	7	2	3	5
• Pathways	5	1	6	4	1	6	5	-5	6	6	0	0	6	4	2	2	8	2	2	6	8	3	1	5
• Alleys	6	6	0	0	3	4	5	-1	5	5	2	0	8	4	0	4	7	4	1	3	7	3	2	4
• No. of approaches	10	0	2	10	4	3	5	1	6	4	2	2	7	4	1	6	5	4	3	1	6	4	2	2
• Thoroughfare	6	0	6	6	6	3	3	3	7	3	2	4	9	2	1	7	7	3	2	4	7	4	1	3
LIGHTING																								
• Street light	9	1	2	8	2	6	4	-4	6	4	2	2	7	5	0	2	9	2	1	7	10	1	1	9
• Service areas	7	0	5	7	5	4	3	1	6	6	0	0	9	3	1	6	8	1	2	7	8	2	1	6
• Parks	6	1	5	5	4	4	4	0	6	4	2	2	6	5	1	1	9	1	2	8	7	1	4	6
LANDSCAPE																								
• Trees	2	8	2	-6	2	6	4	-4	5	3	4	2	6	5	1	1	4	4	4	0	5	4	3	1
• Shrubs	2	4	6	-2	3	4	5	-1	6	5	1	1	7	3	2	4	6	4	2	2	6	3	3	3
• Street furniture	0	0	0	0	2	5	5	-3	4	6	2	-2	4	4	4	0	5	5	2	0	2	2	8	0
MAINTENANCE																								
• Building Façade	8	1	3	7	0	6	6	-6	2	8	2	-6	8	3	1	5	8	3	1	5	7	2	3	5
• Public areas	7	1	4	6	3	6	5	-3	5	7	0	-2	9	2	1	7	7	3	2	4	7	2	3	5

Field study (Survey analysis)

LOCATION	AG				AV				MV/B				MV/C				R/A1				R/F25			
	Y	N	CS	#	Y	N	CS	#	Y	N	CS	#	Y	N	CS	#	Y	N	CS	#	Y	N	CS	#
FACTORS																								
D U DESIGN																								
• Placement of Rooms	2	1	9	1	3	2	7	1	5	6	1	-1	6	5	1	1	7	3	2	4	8	4	0	4
• Position of windows	6	1	5	5	4	5	3	-1	5	5	2	0	7	4	1	3	6	3	3	3	6	2	4	4
• Position of door	3	3	6	0	5	5	2	0	5	6	1	-1	3	3	6	0	5	3	4	2	6	3	3	3
• No. of external Doors	8	1	3	7	1	4	7	-3	4	7	1	-3	3	3	6	0	5	5	2	0	4	4	4	0
• No. of windows	3	2	7	1	0	3	9	-3	4	7	1	-3	3	3	6	0	5	4	3	1	4	3	5	1
• Location wrt other DU	6	2	4	4	2	4	6	-2	3	7	2	-4	6	4	2	2	7	3	2	4	7	2	3	5
HARDWARE																								
• Door lock	7	1	4	6	4	3	5	1	7	4	1	3	9	3	0	6	6	1	5	5	7	2	3	5
• Window lock	8	1	3	7	5	3	5	2	7	3	2	4	7	5	0	2	8	1	3	7	9	1	2	8
• Window fixing	6	2	4	4	4	4	5	0	6	3	3	3	7	3	2	4	6	1	5	5	5	1	6	4
• Door fixing	5	1	6	4	3	4	5	-1	6	5	1	1	7	5	0	2	5	1	6	4	5	1	6	4
• Grill fixing	7	1	4	6	3	3	6	0	5	4	3	1	8	3	1	5	7	1	4	6	8	2	2	6
• Grill spacing	3	1	8	2	3	3	6	0	6	6	0	0	6	4	2	2	2	1	9	1	1	1	10	0
MATERIAL																								
• Facade material	6	1	5	5	1	7	4	-6	4	5	3	-1	9	3	0	6	7	1	4	6	6	0	6	6
• Door material	7	1	4	6	2	6	4	-4	5	6	1	-1	6	5	1	1	5	1	6	4	6	2	4	4
• Window material	8	0	4	8	3	6	3	-3	6	4	2	2	7	4	1	3	6	4	2	2	7	5	0	2
• Grill material	6	1	5	5	2	4	6	-2	6	4	2	2	6	4	2	2	6	1	5	5	5	1	6	4
SERVICES																								
• Shaft	3	3	6	0	4	3	5	1	7	5	0	2	6	4	2	2	3	3	6	0	4	4	4	0
• Pipes	4	2	6	2	2	6	4	-4	4	4	4	0	7	4	1	3	4	2	6	2	5	3	4	2
• Staircase/lift lobby	10	0	2	10	1	7	4	-6	4	5	3	-1	7	3	2	4	9	2	1	7	8	1	3	7
• Terrace	8	2	2	6	2	5	5	-3	4	6	2	-2	8	4	0	4	4	6	2	-2	3	5	4	-2
• Service lane	7	2	3	5	5	4	3	1	6	4	2	2	7	3	2	6	6	5	1	1	6	4	2	2
• Location of Parking	8	1	3	7	4	5	3	-1	6	5	1	1	7	4	1	3	8	1	3	7	7	2	3	5

 # = Y(1)+N(-1)+CS(0)

LOCATION	AG				AV				MV/B				MV/C				R/A1				R/F25			
	Y	N	CS	#	Y	N	CS	#	Y	N	CS	#	Y	N	CS	#	Y	N	CS	#	Y	N	CS	#
FACTORS																								
BUILDING FORM																								
• Projections/chajja	2	8	2	-6	0	5	7	-5	3	6	3	-3	8	3	1	5	5	3	4	2	6	3	3	3
• Balcony	3	6	3	-3	2	6	4	-4	4	6	2	-2	7	5	0	2	6	3	3	3	5	2	5	3
• Recessions	6	2	4	4	5	4	3	1	4	5	3	-1	6	4	2	2	6	2	4	4	6	1	5	5
• Boundary wall	6	3	3	0	0	6	6	-6	6	5	1	1	7	3	2	4	10	2	0	8	11	1	1	10
• Blind corners	5	2	5	3	5	4	3	1	5	4	3	1	7	3	2	4	4	2	6	2	5	3	4	2
OTHERS																								
• Unauthorized const.	0	0	0	0	0	0	0	0	5	6	1	-1	7	3	2	4	8	3	1	5	7	3	2	4
• Commercialization	0	0	0	0	0	0	0	0	5	6	1	-1	7	3	2	4	9	2	1	7	10	1	1	9

Table 4.17 Public opinion about various design factors

Note:
Y=Yes, N=No, CS=Can't say
 # = Y (1) +N (-1) +CS (0)

This survey suggests that following design factors help criminals to perform their task. These points need an attention of an Architect while planning and design. It is also observed that by careful planning of the above factors, crime can be prevented to certain extent.

As per following factors are responsible for crime and fear of crime in a locality:

1. Inadequate lighting
2. Inadequate physical security
3. Easy escape routes
4. Places of concealment for attackers.
5. Poor building detailing that provide easy access to criminals in house.
6. Poor surveillance.
7. Hide out spaces in buildings.
8. Easy access to terrace, shafts and upper floors.
9. No access control.

Various factors responsible for crime in localities are shown graphically below: (Individual housing locality Analysis)

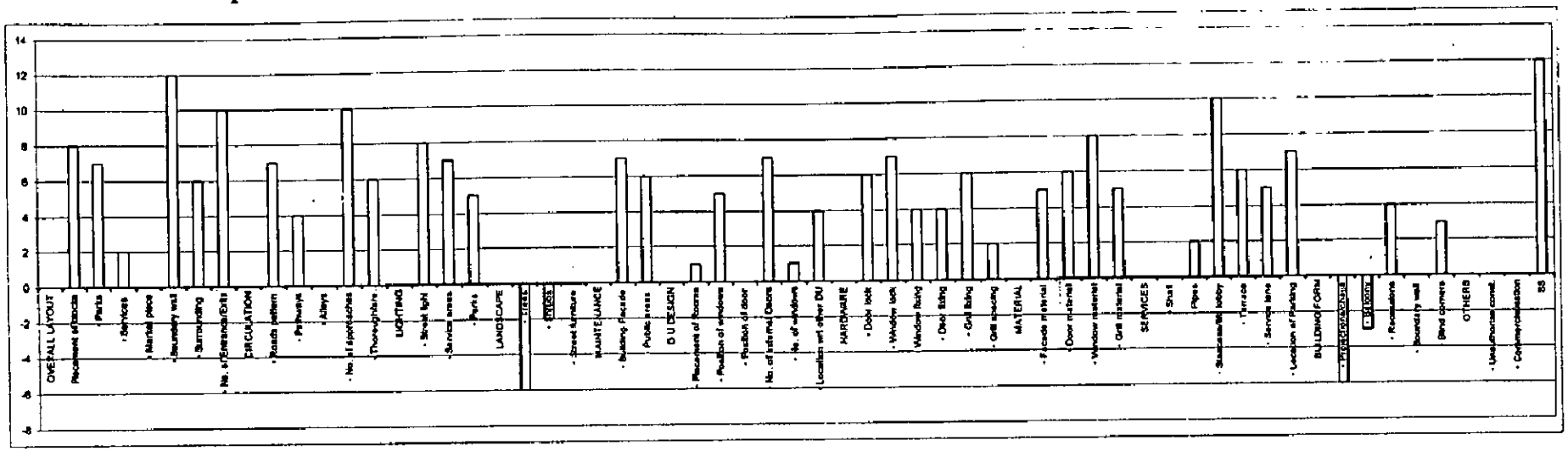


Fig 4.24 Andrews Ganj

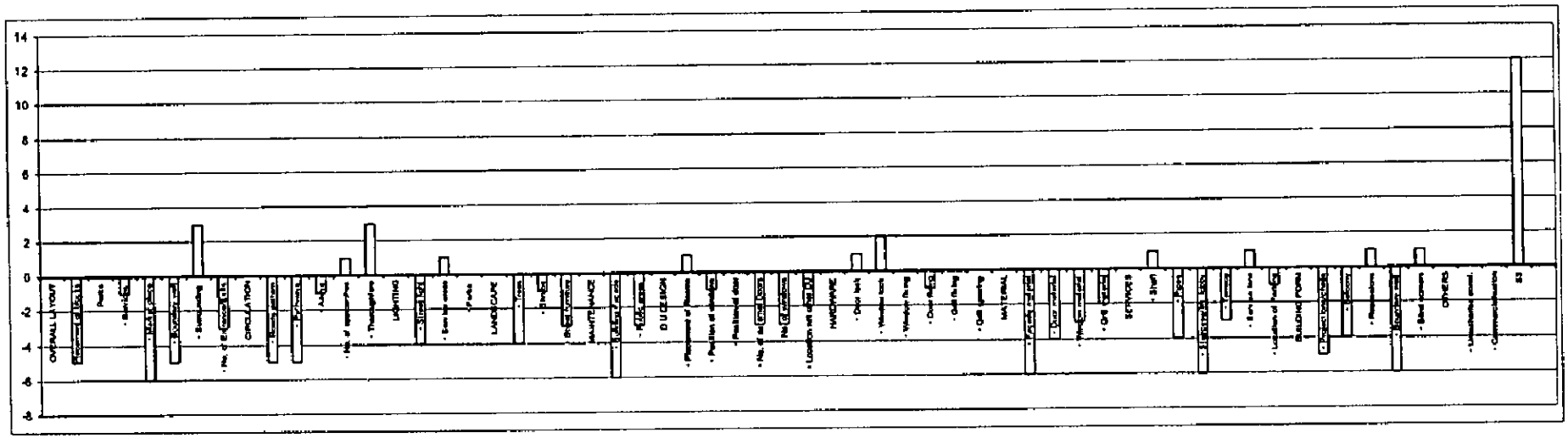


Fig 4.25 Asian Games Village

Note: Graphical Presentation of Design factors. The bars towards positive axis are responsible for crime/fear of crime in a locality to certain extent. While bars in the negative directions shows that these factors are not responsible for crime.

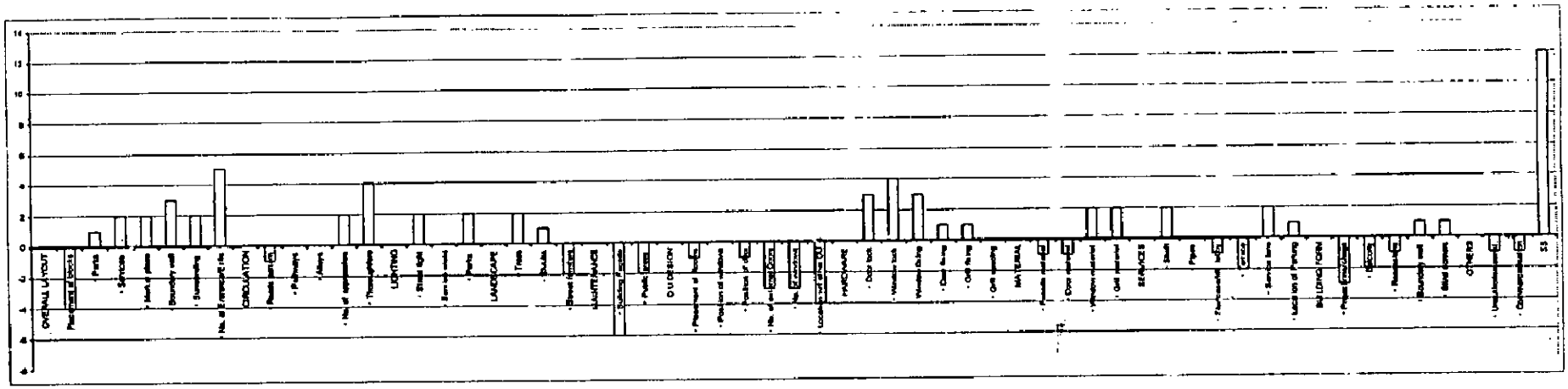


Fig 4.26 Mayur Vihar-II, Pocket-B

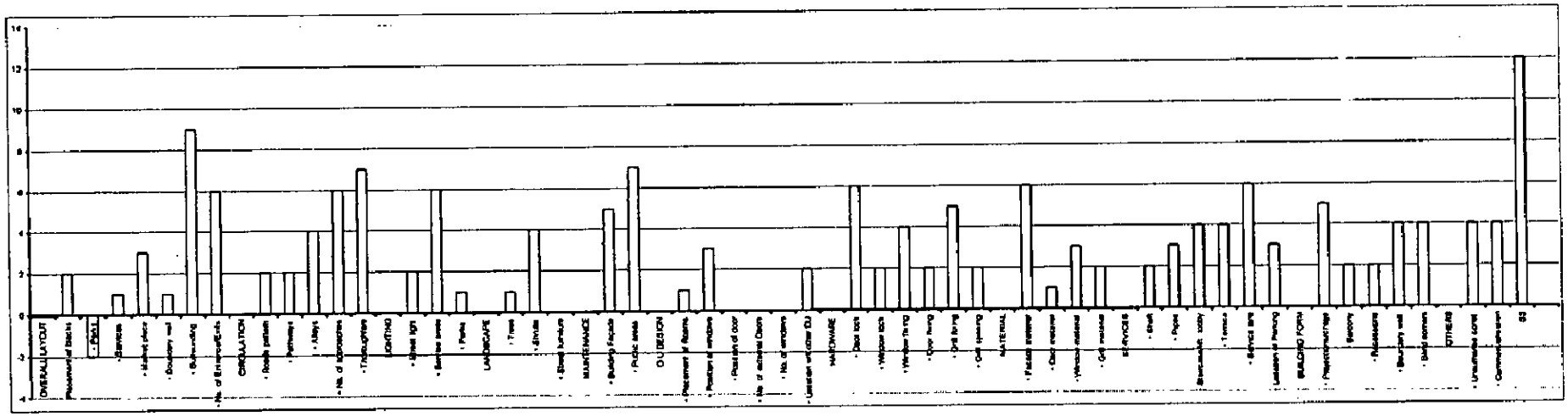


Fig 4.27 Mayur Vihar-II, Pocket-C

Note: Graphical Presentation of Design factors. The bars towards positive axis are responsible for crime/fear of crime in a locality to certain extent. While bars in the negative directions shows that these factors are not responsible for crime.

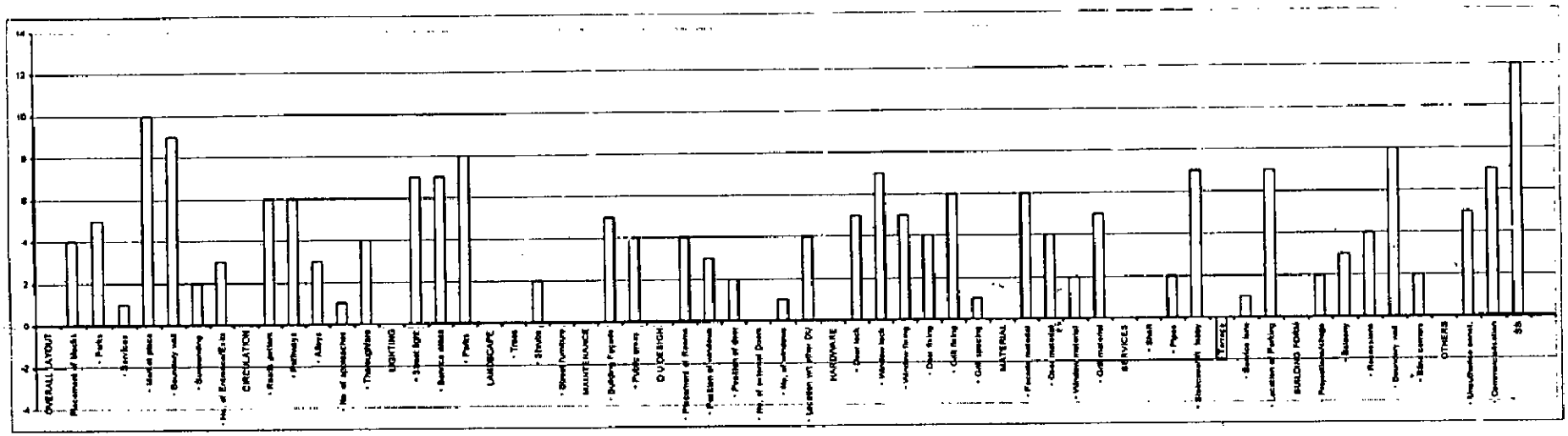


Fig 4.28 Rohini, Sector-7, Pocket-A1

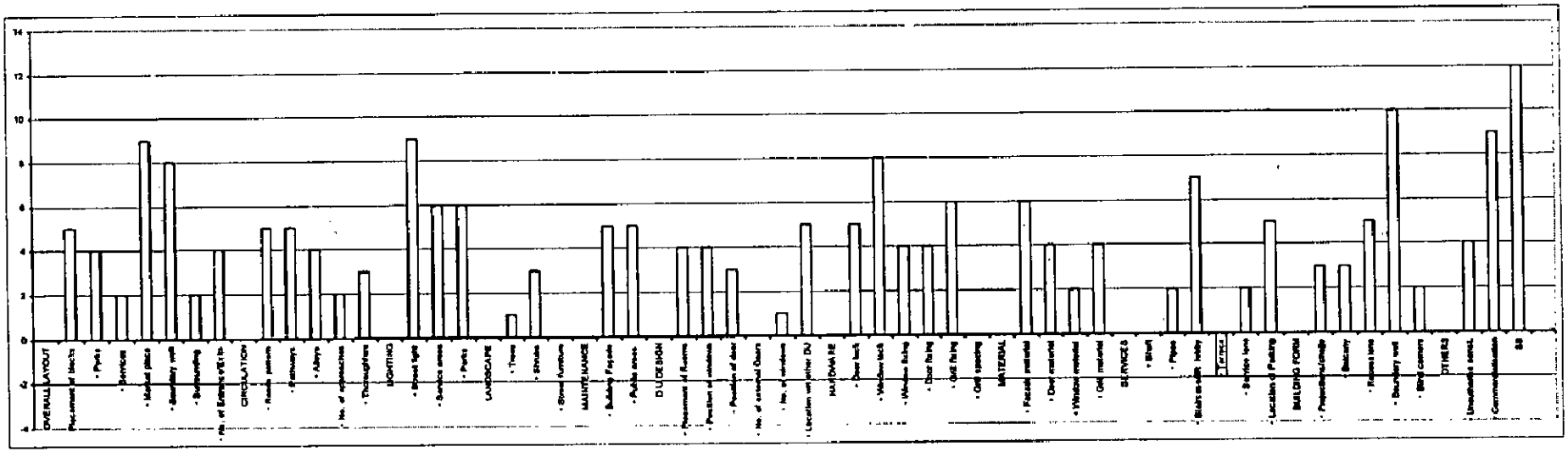


Fig 4.29 Rohini, Sector-7, Pocket-F 25

Note: Graphical Presentation of Design factors. The bars towards positive axis are responsible for crime/fear of crime in a locality to certain extent. While bars in the negative directions shows that these factors are not responsible for crime.

4.5 COMPARATIVE ANALYSIS OF VARIOUS DESIGN FACTORS RESPONSIBLE FOR CRIME IN DIFFERENT LOCALITIES

OVERALL LAYOUT

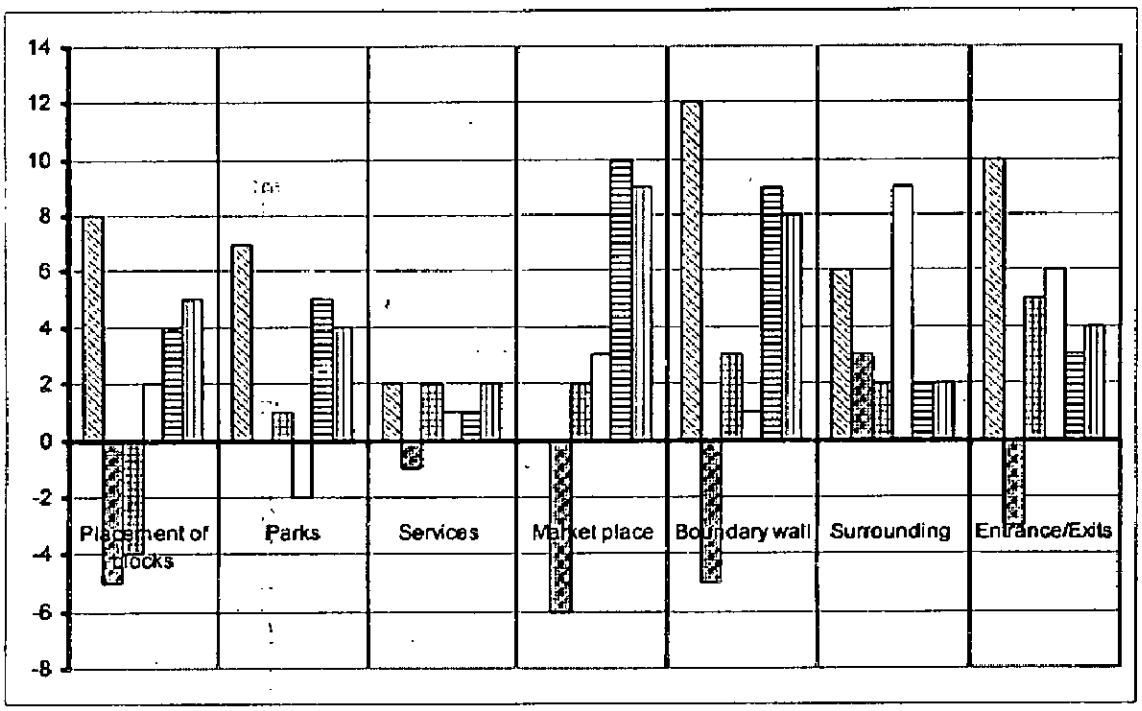


Fig 4.30

CIRCULATION

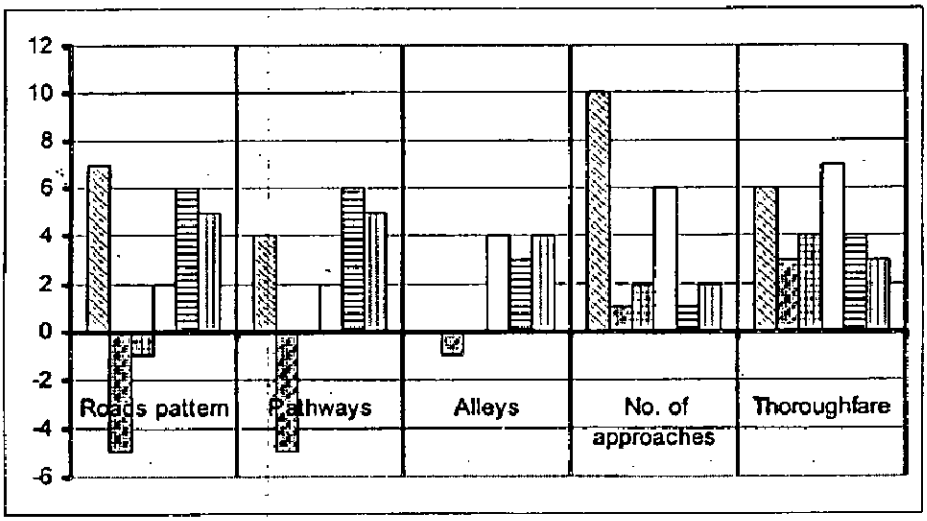
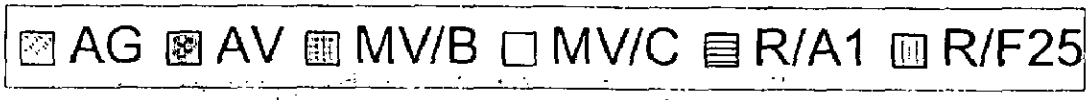


Fig 4.31

Note: Bars on the +ve Y-axis represent the weightage of that factor in crime occurrence in a locality, while bars towards –ve Y-axis represent good factors of locality.



LIGHTING

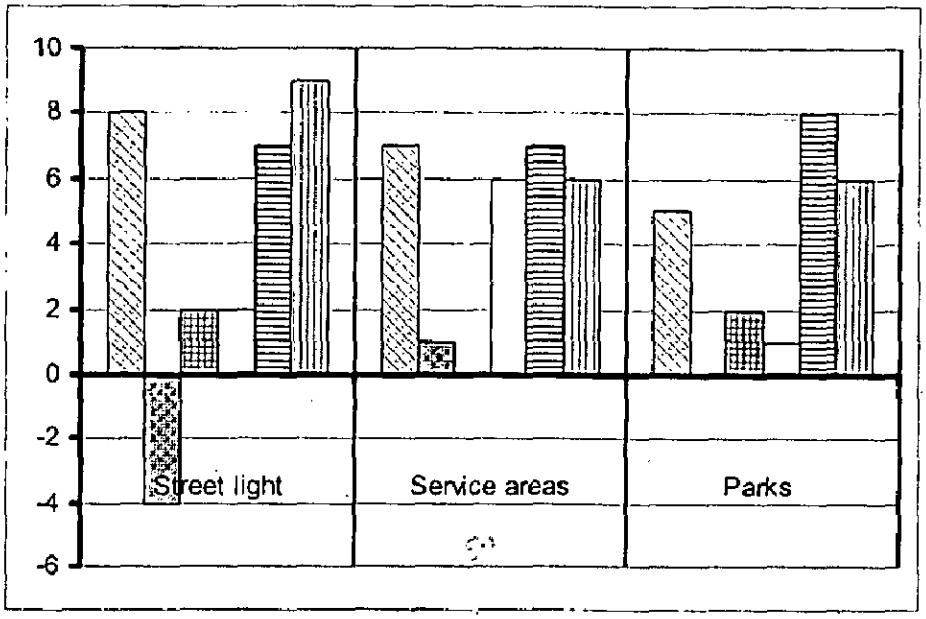


Fig 4.32

LANDSCAPE

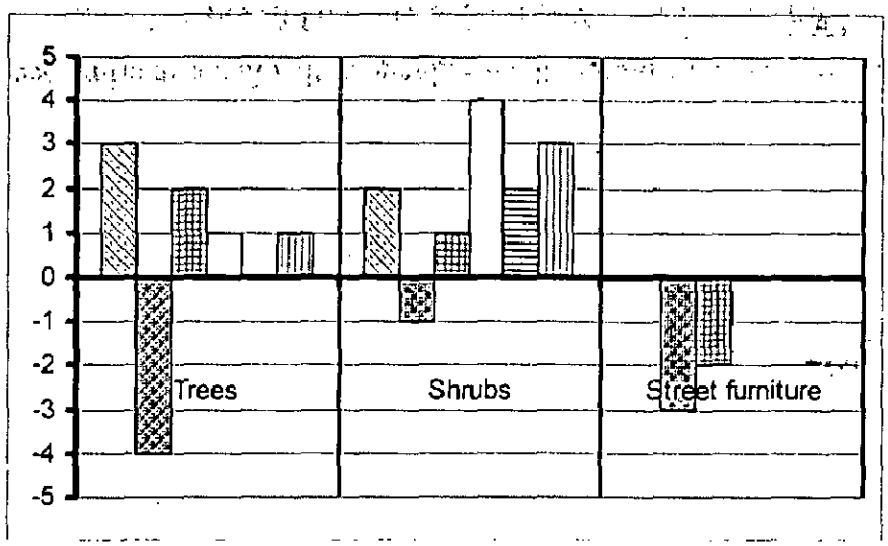
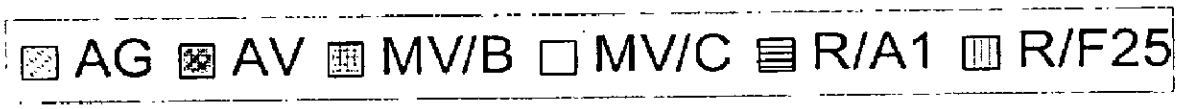


Fig 4.33

Note: Bars on the +ve Y-axis represent the weightage of that factor in crime occurrence in a locality, while bars towards –ve Y-axis represent good factors of locality.

Example: From lighting graph, it is clear that absence of street lighting is responsible for crime in Andrews ganj during night, while proper lighting in Asiad village allow surveillance, usage of space in night which restricts crime.



MAINTENANCE

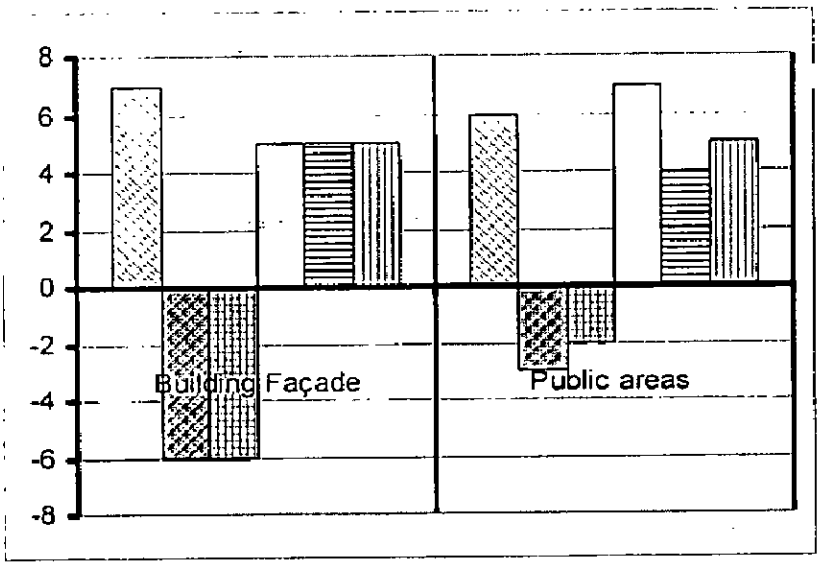


Fig 4.34

DWELLING UNIT DESIGN

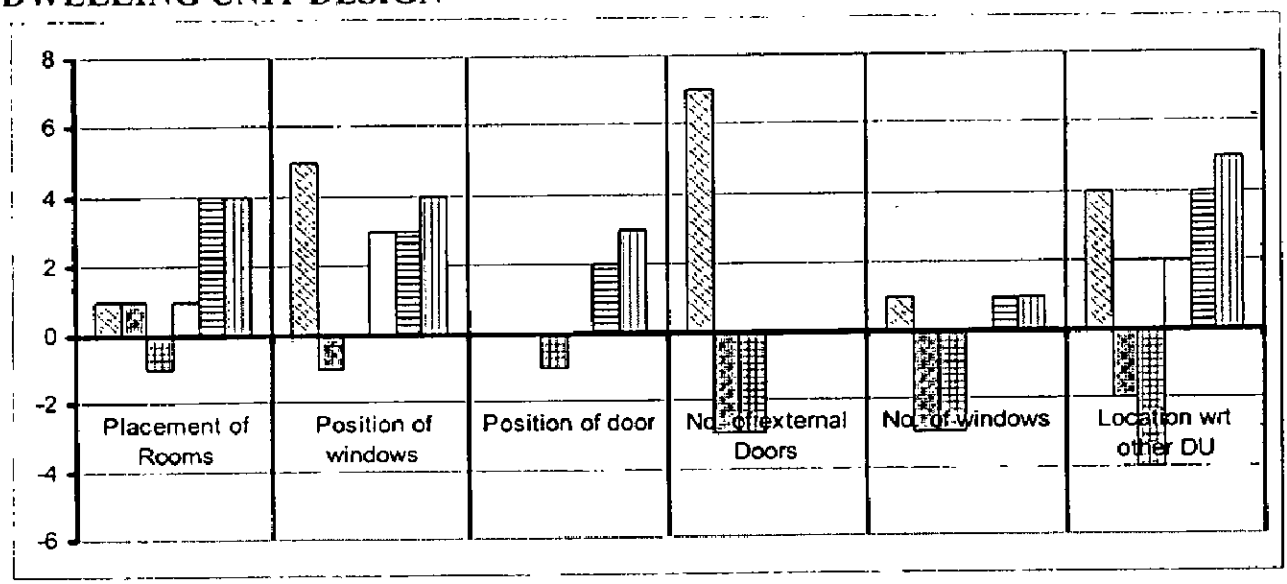


Fig 4.35

Note: Bars on the +ve Y-axis represent the weightage of that factor in crime occurrence in a locality, while bars towards –ve Y-axis represent good factors of locality.

HARDWARE

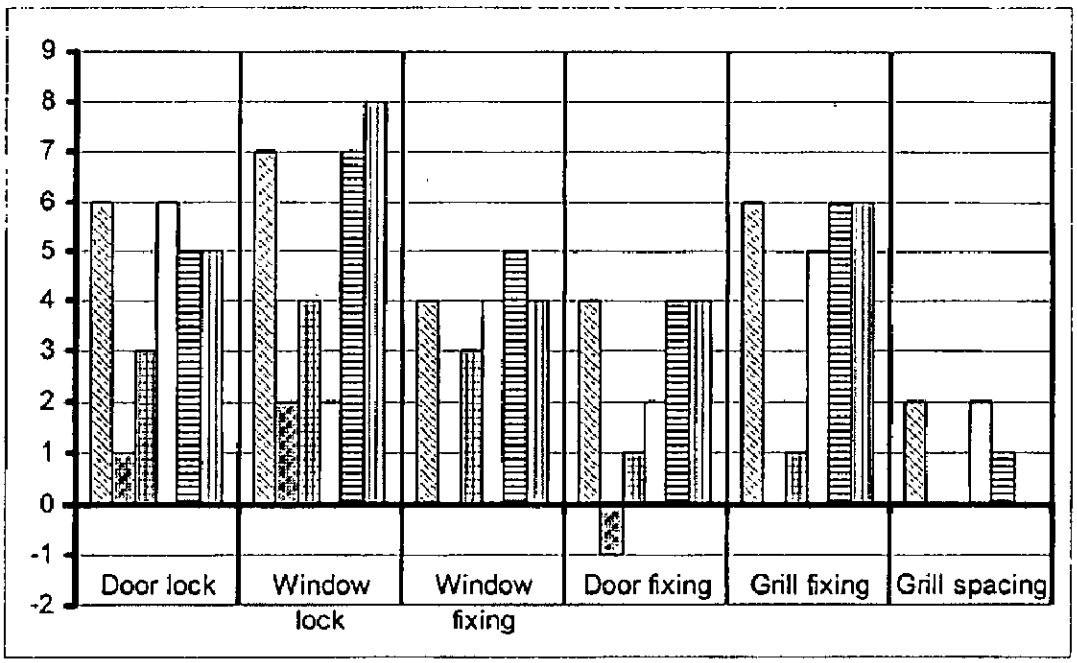


Fig 4.36

MATERIAL

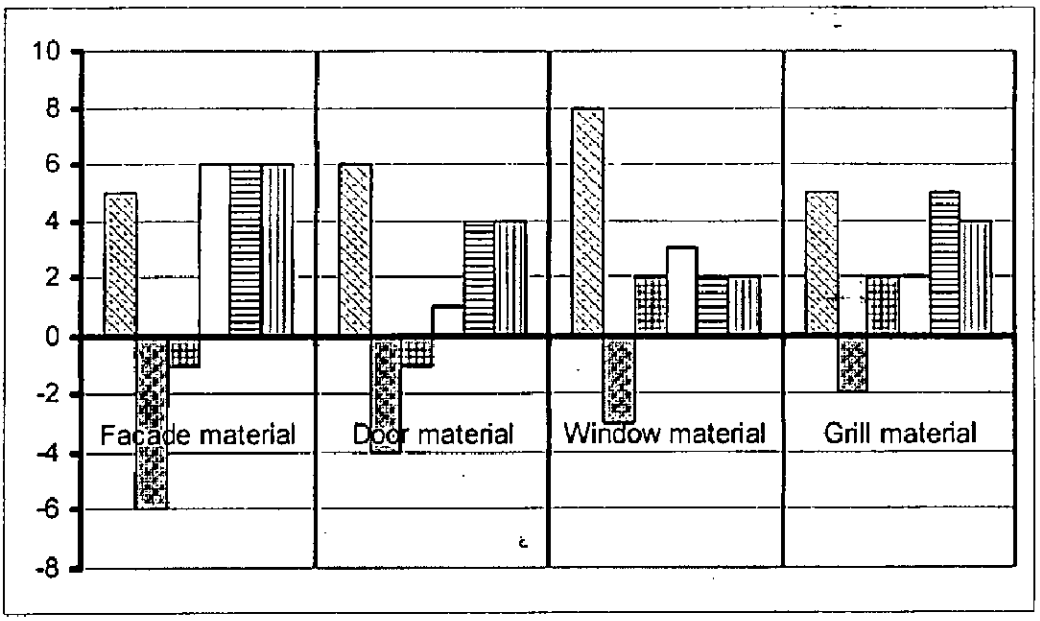


Fig 4.37

Note: Bars on the +ve Y-axis represent the weightage of that factor in crime occurrence in a locality, while bars towards –ve Y-axis represent good factors of locality.

AG AV MV/B MV/C R/A1 R/F25

SERVICES

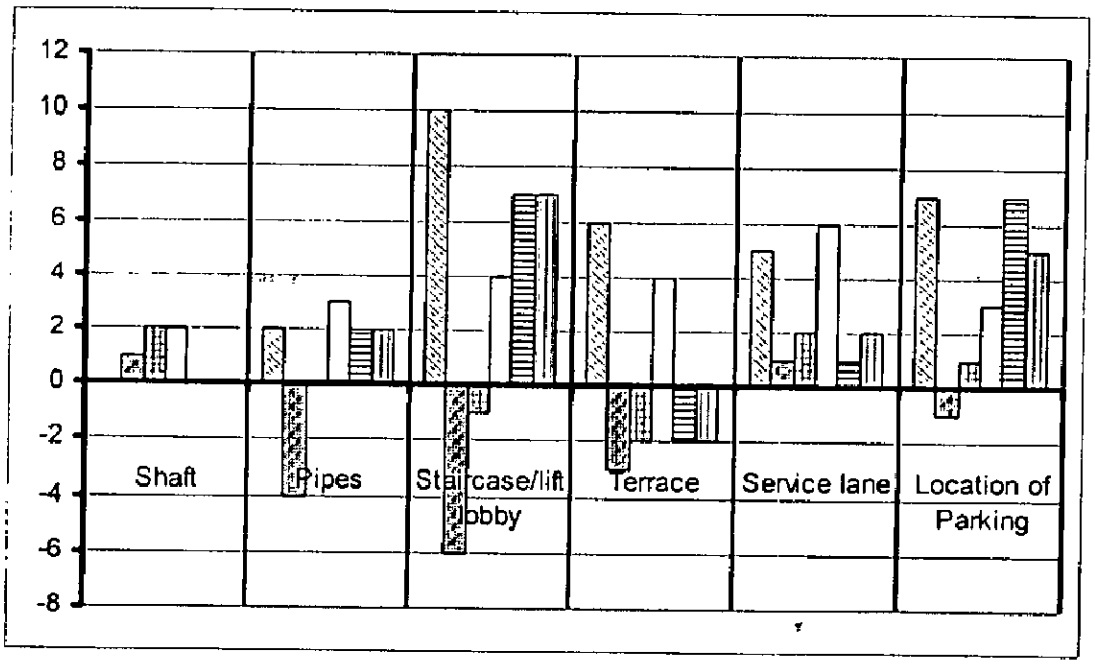


Fig 4.38

BUILDING FORM

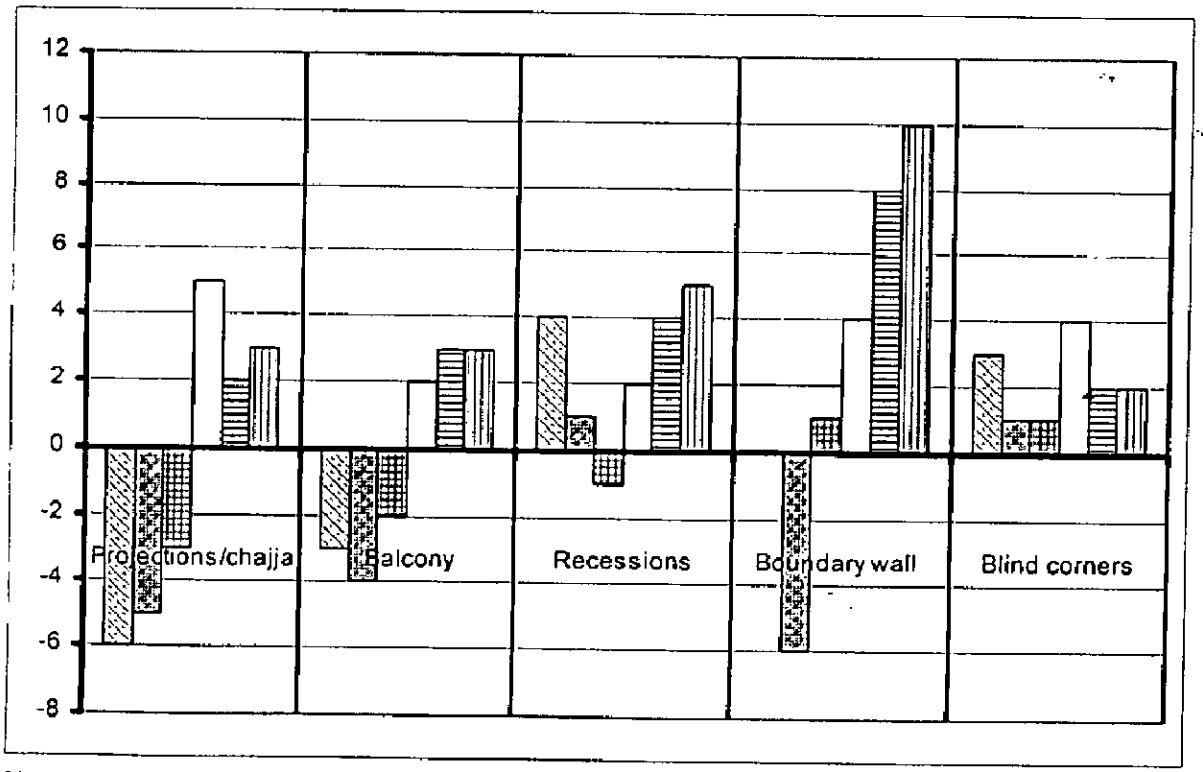


Fig 4.39

OTHERS

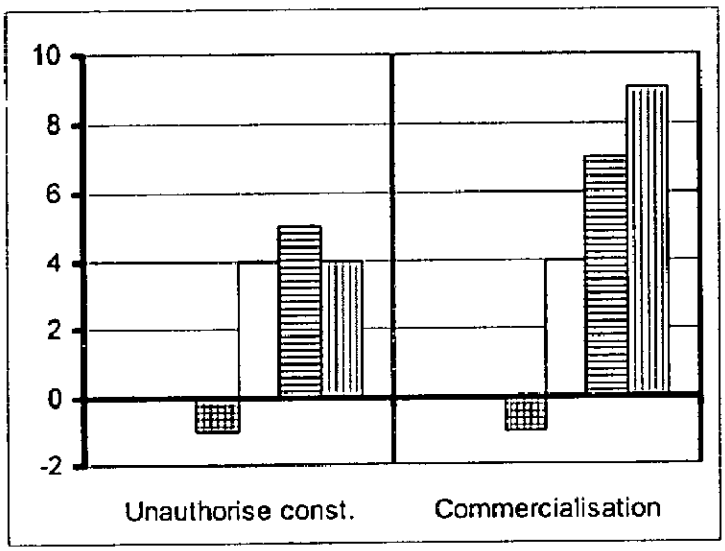


Fig 4.40

4.5.1 INFERENCES:

From the above comparison, we found the sequence of areas in terms of crime in a locality in terms of public response i.e. how they respond to crime?

(*Crime prone to crime free*):

1. **Andrews Ganj** is a highly crime prone locality
2. **Rohini, sector-7, Pocket-A1** is a Crime prone locality
3. **Rohini, sector-7, Pocket-F25** is a Crime prone locality
4. **Mayur Vihar, Pocket-C** is affected by crime
5. **Mayur Vihar, Pocket-B** is affected by crime to some extent. (In between)
6. **Asian Games Village** is a Crime free locality except few small instances committed by servants.

4.6 PROBLEMS IDENTIFIED FROM FIELD SURVEY:

Following are the design factors which are comparatively Good, Intermediate and Bad i.e. Responsible for crime in various localities.

ANDREWS GANJ:

Good factors	Intermediate	Responsible for crime
	Lighting	Layout of blocks
	Services	No Access control
	Maintenance	Staircase
	Hardware	Parking
	Unauthorized construction	Surrounding area
	Surroundings	Dwelling Unit Design
	Landscape	Building form
	Balcony	Approachable terrace
	No. of approaches to cluster	Isolated routes
	No community place	Single window in each room
		Size of windows
		Material
		Boundary wall
		Road frontage
		No Security check post
		Location

Table 4.18

ASIAD VILLAGE:

Good factors	Intermediate	Responsible for crime
Layout of blocks	Lighting	Doordarshan center
Access	Hardware	Surrounding community
DU Design	Maintenance	
Services	Location	
Parking	Isolated routes	
Building form		
Landscape		
Material		
Natural surveillance		
Courtyards		
No approach to terrace		
Security check post		
Limited approach to cluster		
Perforated boundary wall		
Staircase Location		

Table 4.19

MAYUR VIHAR-II, POCKET-B

Good factors	Intermediate	Responsible for crime
Location	Lighting	School
Access	Layout of blocks	No security check post
DU Design	Landscape	No. of approaches to cluster
Services	Maintenance	No boundary wall
Parking	Commercialization	Surrounding community
Building form	Unauthorized construction	No community center
No isolated routes	Surroundings	Hardware
Material	Staircase	
Natural surveillance		
Park Location		
No approach to terrace		
Overlooking terraces		

Table 4.20

MAYUR VIHAR-II, POCKET-C

Good factors	Intermediate	Responsible for crime
	Lighting	School
Security check post	Layout of blocks	Access
Landscape	Services	No. of approaches to cluster
Boundary wall	Maintenance	Parking
	Commercialization	Surrounding community
	Unauthorized construction	No community center
	Surroundings	Hardware
	Staircase	Building form
	DU Design	Approach to terrace
		Isolated routes
		Single window in each room
		Size of windows
		Material

Table 4.21

ROHINI, SECTOR-7, POCKET-A1

Good factors	Intermediate	Responsible for crime
Overlooking terraces	Lighting	Layout of blocks
	Services	No Access control
	Maintenance	No. of approaches to cluster
	Hardware	Parking
	Unauthorized construction	Surrounding community
	Surroundings	No community center
	Staircase	DU Design
	Landscape	Building form
		Isolated routes
		Single window in each room
		Size of windows
		Material
		Boundary wall
		Road frontage
		Lees density
		Commercialization
		Security check post
		Extrovert planning
		Location

Table 4.22

ROHINI, SECTOR-7, POCKET-F25

Good factors	Intermediate	Responsible for crime
Overlooking terraces	Lighting	Layout of blocks
	Services	No Access control
	Maintenance	No. of approaches to cluster
	Hardware	Parking
	Unauthorized construction	Surrounding community
	Surroundings	No community center
	Staircase	DU Design
	Landscape	Building form
	Lees density	Isolated routes
		Single window in each room
		Size of windows
		Boundary wall
		Road frontage
		Commercialization
		Security check post
		Extrovert planning
		Location
		Material

Table 4.23

4.7 ANALYSIS OF CHECKLIST

4.7.1 Results of checklist:

The above case studies which are surveyed for public opinion, also has been checked against the checklist framed on the basis on Literature study (Refer **Appendix I** for checklist)

The following results are found on the basis of checklist:

1. **Andrews Ganj** is a Crime prone locality

i.e. the area is poorly planned

2. **Rohini, sector-7, Pocket-A1** is a Crime prone locality

i.e. the area is poorly planned

3. **Rohini, sector-7, Pocket-F25** is a Crime prone locality

i.e. the area is poorly planned

4. **Mayur Vihar, Pocket-C** is affected by crime (In between)

i.e. the planning is in between

5. **Mayur Vihar, Pocket-B** is affected by crime to some extent, but can be corrected with little modification

i.e. the planning is good and needs certain modifications to make it crime free

6. **Asian Games Village** is a Crime free locality *i.e. the area is well planned*

4.7.2 RESULTS OBTAINED FROM THE SURVEY (PUBLIC OPINION)

1. **Andrews Ganj** is most affected by Crime
2. **Rohini, sector-7, Pocket-A1** is a Crime prone locality
3. **Rohini, sector-7, Pocket-F25** is a Crime prone locality
4. **Mayur Vihar, Pocket-C** is affected by crime (In between)
5. **Mayur Vihar, Pocket-B** is affected by crime (In between)
6. **Asian Games Village** is least affected by Crime

From the above it is clear that Result of questionnaire survey and Checklist are similar to each other to certain extent.

On the basis of results obtained, the study areas are analyzed in terms of design, planning and detailing to find out the possible design factors responsible for crime in an area.

FIELD STUDY (DESIGN ANALYSIS)

The aim of analyzing these case studies (of DELHI) is for the identification of design parameters, which contribute to the fulfillment of performance criteria, which in turn are prerequisites for the fulfillment of security needs. These performance criteria have been identified in the preceding chapter. Thus, the case studies will be analyzed with respect to these preconditions.

Topics covered in this chapter:

- Design Analysis
- Case study 1. Type-II, C.P.W.D. Housing, Andrews Ganj
- Case study 2. Asian games village, New Delhi
- Case study 3. Mayur Vihar, Phase-II, Pocket-B
- Case study 4. Mayur Vihar, Phase-II, Pocket-C
- Case study 5. Rohini (Sector-7, Pocket-A1 & F25)
- Problems Identified
- Observations of case studies

CHAPTER 5

5.1 DESIGN ANALYSIS OF CASE STUDIES:

From literature study it is clear that crime in an area can be prevented by following concepts:

1. NATURAL SURVEILLANCE
2. NATURAL ACCESS CONTROL
3. TERRITORIALITY
4. MAINTENANCE & IMAGE
5. NEIGHBORHOOD CONCEPT.

Architect role is to incorporate the Architectural vocabulary of the above points in design of our buildings.

Architectural Vocabulary of the above concepts:

- Surroundings
- Layout
- Access control
- Landscape
- Lighting
- Dwelling unit & Cluster design
- Built form
- Parking
- Services
- Material
- Maintenance
- Others

The following case studies will be analyzed for the above said points to frame the design guidelines for the crime free housing:

- Type-II, C.P.W.D. Housing, Andrews Ganj
- Asian games village, New Delhi
- Mayur Vihar, Phase-II, Pocket-B
- Mayur Vihar, Phase-II, Pocket-C
- Rohini (Sector-7, Pocket-A1 & F25)

5.2 CASE STUDY 1. Type-II, C.P.W.D. Housing, Andrews Ganj

It is a housing colony developed by CPWD in 1975 for their employees. It is located in South of Delhi near Sri Fort auditorium and South extension. This pocket of Andrews Ganj is developed on a 6 acre site having 320 quarters, in 2 storeys. Residents mainly belong to Lower middle income group and all are govt. employee. *The site for study has been selected based on the high crime rate in a locality to understand the possible design factors responsible for crime.*

5.2.1 General Information:

Site Area = 26,700sqm

Ground Coverage = 30%

Density = 750 residents/hectare

Area of DU = 50sqm.

No. of DU = 320 housing units (One bedroom)

No. of storey = G+1

Population = 2000 residents

Category = Lower MIG

Circulation Area:

Road = 10000sqm

Pathways = 6000sqm

Area in parks = 12,000sqm

Area in backyards = 6000sqm

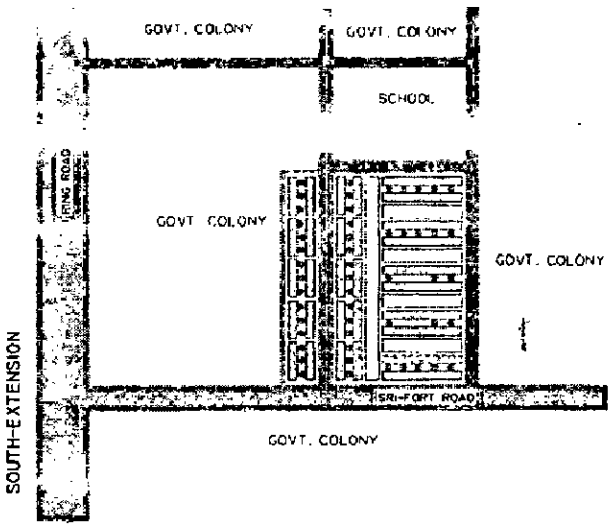


Fig 5.2.1 Location Plan

5.2.2 SURROUNDINGS:

The colony is surrounded by other Govt. housing colonies from three sides and a govt. school from one side. It is located adjacent to heavy traffic road. Due to its location, *the locality is used as a thoroughfare along both the axis*, which results in the penetration of lot of strangers in the locality.

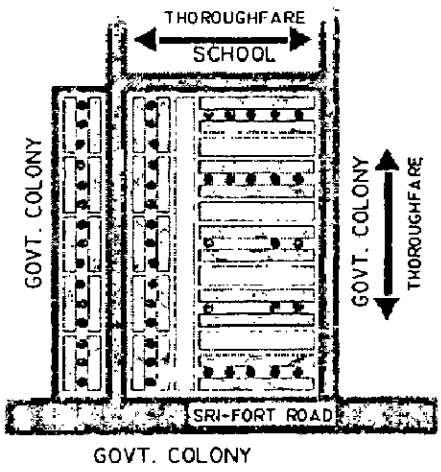
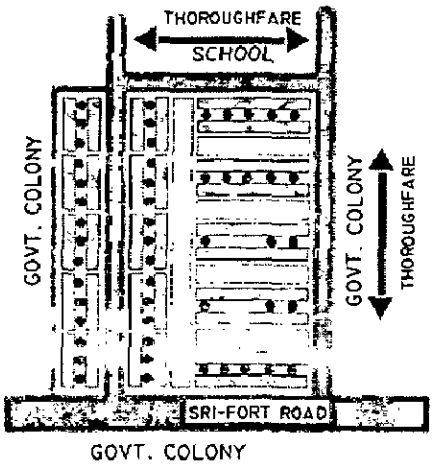


Fig 5.2.2 Surroundings

5.2.3 LAYOUT:

Road Layout



Road Layout: A colony is surrounded by roads from all the sides, (Island type of road network). The surrounding Roads are used to connect different localities.

Due to this reason, there is a *thorough movement of traffic* all round the locality, *which provides offender an opportunity to runaway through vehicle very easily in any direction.*

Fig 5.2.3 Road layout

Layout of blocks:

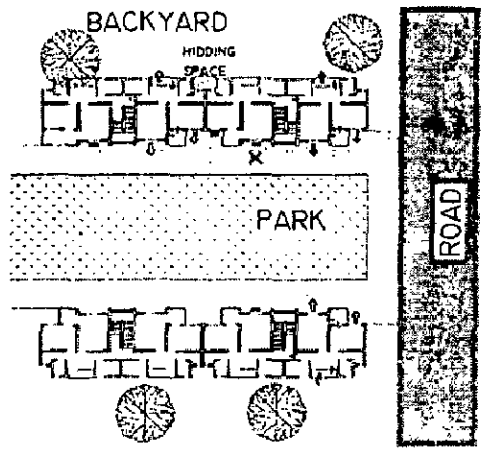


Fig 5.2.4 Layout of blocks

Fig 5.2.5 View of blocks

A typical row housing layout has been adopted, without any set back from roads.

This layout doesn't provide any enclosed space, to sit outside and interact with neighbors.

Area appears open and looks there is no access control.

Block of 2 units on each floor placed side by side to staircase are laid in such a way that kitchen and toilet faces, backyard, while bedroom and common room faces front, but due to smaller size of windows, it is difficult to keep an eye in public areas.

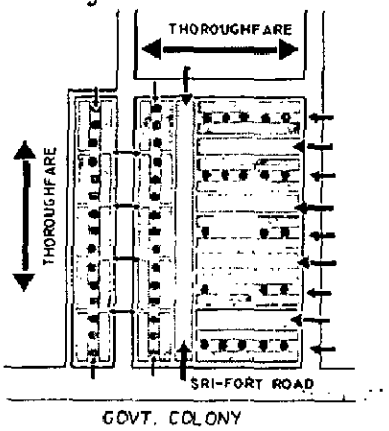
This layout gives a locality a typical public housing image.

Resident feels fear to send their children's to play in an open area in front, as there is no feeling of enclosure.

This makes an offender feel free in a locality.

5.2.4 ACCESS CONTROL:

Locality level:



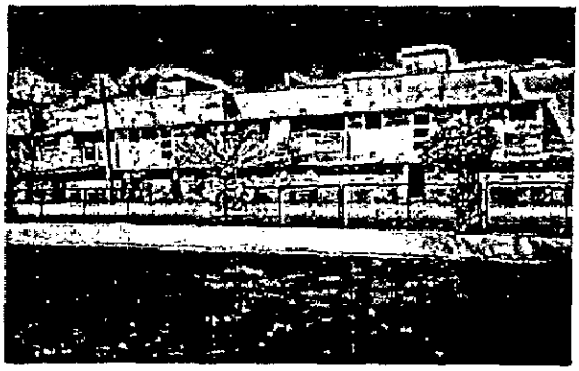
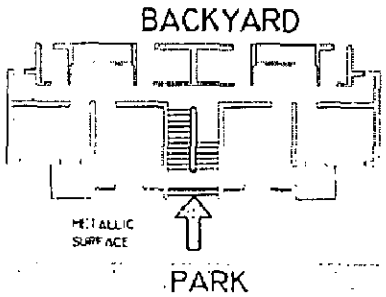


Fig 5.2.6 Access to locality

Fig 5.2.7 View of locality from main road

At locality level, there is no access control and defined entrance to the colony, it can be approached from any where one likes, as it is surrounded by heavy traffic road from all the sides. There is no boundary wall and secondly there is no setback from the road to create an enclosure by the residents.

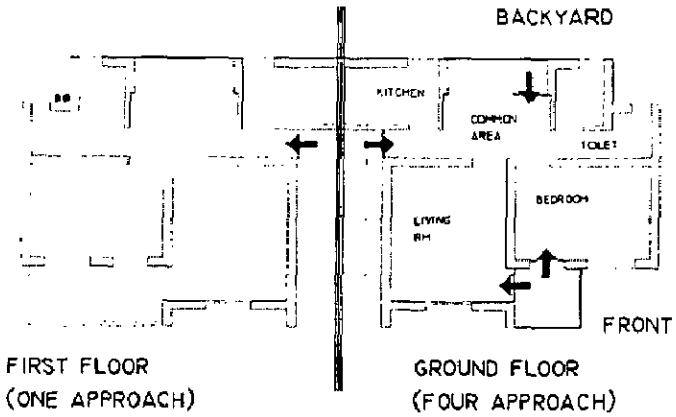
Block Level:



It is a *row housing layout*, having staircase sandwiched between 2 dwellings and closed from back side. Due to this block can be approached from the front only.

Fig 5.2.8 Access at block level

Dwelling unit level:



At DU level, Ground floor *has four entrances in a two room house,* which make it difficult to control access. This provides opportunity to offender to take entry in a house and this is the basic reason of burglary in an area.

Fig 5.2.9 Access at DU level

At first floor level, there is one approach to the dwelling. Due to this people on first floor feels more secure compare to Ground floor.

5.2.5 LANDSAPE:

There is no landscape scheme in an area.

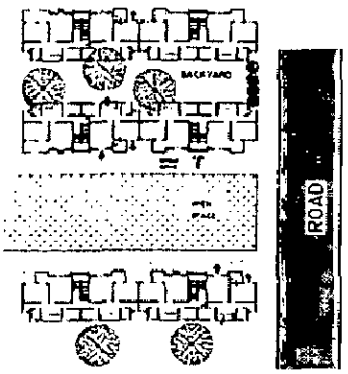


Fig 5.2.10 Landscape plan

In **front open space**, no trees have been planted; due to this the area looks barren and results in the less utilization of a space.

Space doesn't give the feeling of belongingness

Fig 5.2.11 Landscape in front

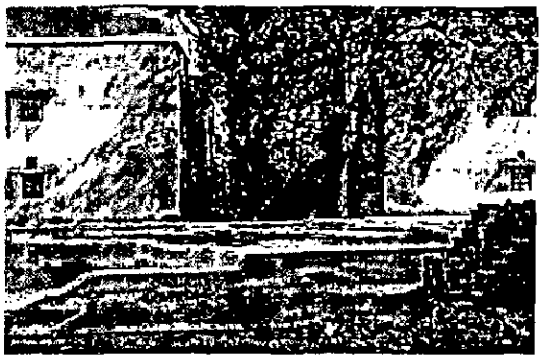


Fig 5.2.12 Landscape in backyard

Backyard: Trees have grown naturally in backyard (as it appears from the growth pattern). The trees have dense foliage and impede surveillance. Also provides access to upper floor. Shrubs are too high in height, dense and provide easy space to hide.

There is also no change in surface material leads to lack of feeling of own property.

Due to poor landscape, space is less used by the residents and more used by the strangers.

5.2.6 LIGHTING:

Lighting is necessary to keep vigil on the movement of people.

Day lighting:

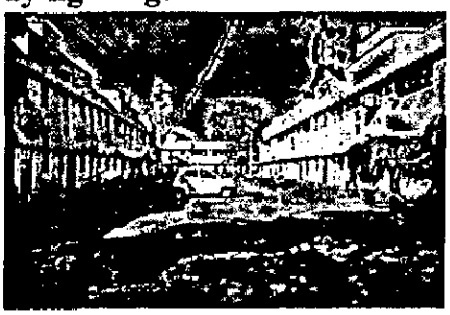
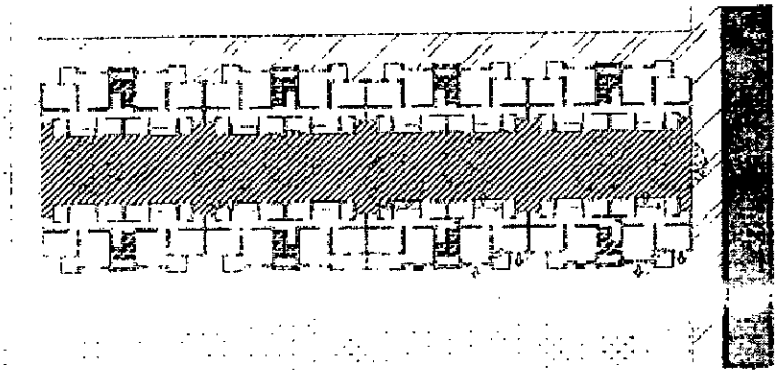


Fig 5.2.13 Front open space seems well lit

Fig 5.2.14 Backyard: Appears dark even in day time.

This makes backyards less usable and provides opportunity for a criminal to perform their activity.

Night:



Street lighting: No street lighting has been provided inside the locality, due to this area become barren during night.

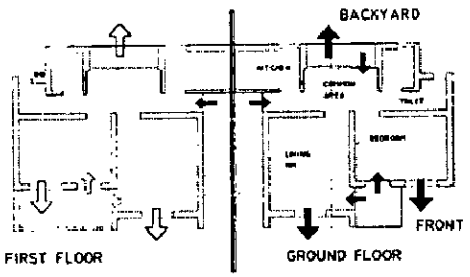
Fig 5.2.15 Lighting situation (Area remains dark)

Parks: No lighting has been provided.

Backyards: No lighting and area become dark and a good hiding place for criminals.

This makes residents feel fear to move outside in the night.

5.2.7 DWELLING UNIT AND CLUSTER DESIGN:



Dwelling unit design doesn't provide natural surveillance of an area, *single window have been provided in each room, which is also covered by cooler,* leaving no provision for surveillance.

Fig 5.2.16 Dwelling unit design

Staircase is sandwiched and hidden between units and has no lobby for interaction. This results in very less interaction between neighbors.

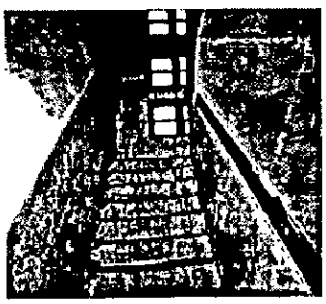
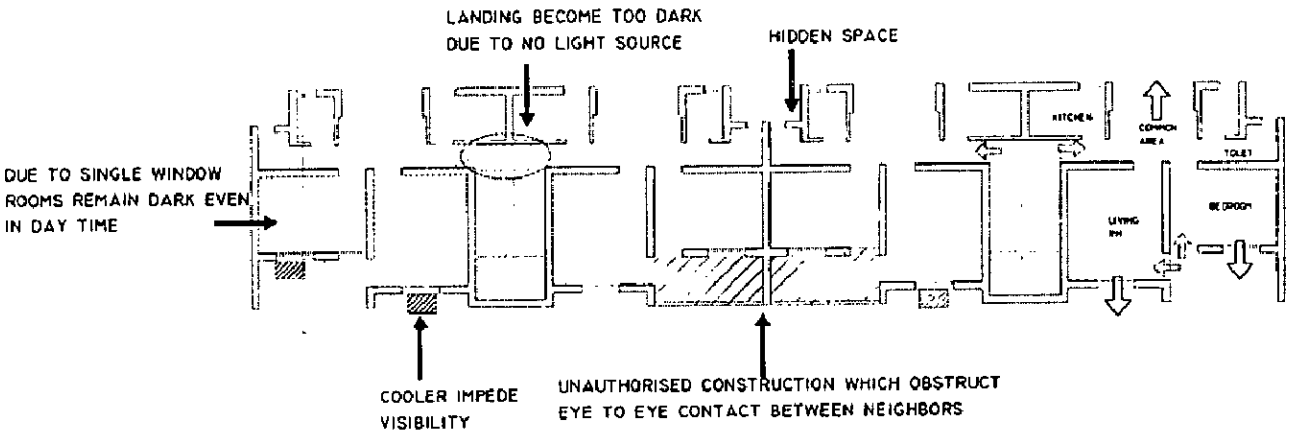


Fig 5.2.17 View of staircase



5.2.8 BUILT FORM:

In CPWD Housing, built form has static character. It gives the image of public housing which provides offender a psychological strength to commit a crime.

Windows are provided with chajja that run all along the row housing.

Balcony is sunken and doesn't provide an opportunity to interact with neighbor.

Terrace is approachable, which help offender to move from one block to another and escape away.

Fig 5.2.18 Built form of an area

All these factors give the image of public housing which provides offender a psychological strength to commit a crime.

5.2.9 PARKING:

Parking is the biggest problem in housing; no parking space has been designed at individual and community level.

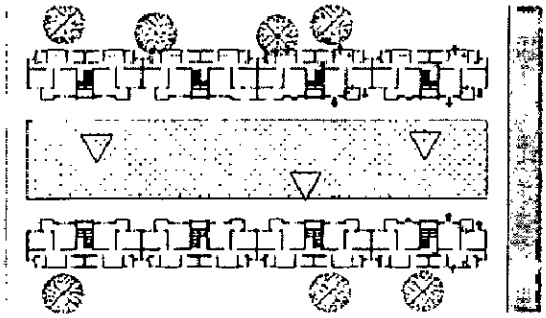


Fig 5.2.19 Parking plan (no parking space)

In absence of designed parking residents are bound to park their vehicles in the parks.

Fig 5.2.20 Parking in parks

Due to this, Vehicle theft is the most common crime.

5.2.10 SERVICES: All the services are kept open in a service lane. All the water meters are placed in an open in backyard and from most of the places they are stolen. Due to open pipes and uncovered drain, the service area looks badly maintained and residents feel fear to go in that area, due to which area is available for criminals to hide.

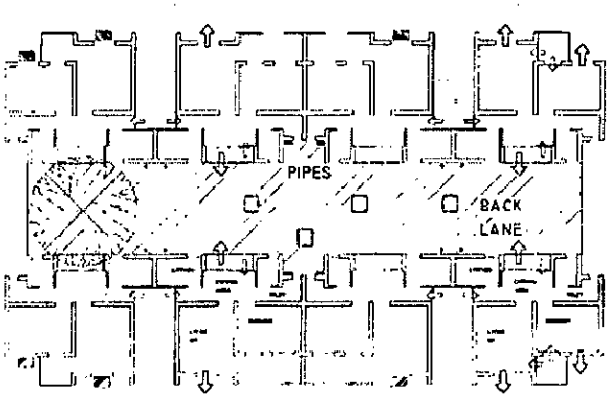


Fig 5.2.21 Open services

Fig 5.2.22

5.2.11 MATERIAL:

Facade

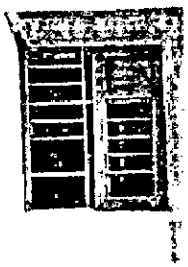
Facade finish is simple plaster having cream color white wash. Due to this finish surface provides opportunity to graffiti artist to make graphics on the walls. This gives a bad image to the locality.

Fig 5.2.23 Finishing on walls

Door-Window

All external doors are panel wooden doors and also have additional iron gates, but their strength is very poor.

Locks and latches are screwed from outside and are easy to remove. In most of the cases criminals entered in the houses by simply breaking the lock.



Windows are made up of wooden frame, with a glass fitted from outside, which is easy to remove.

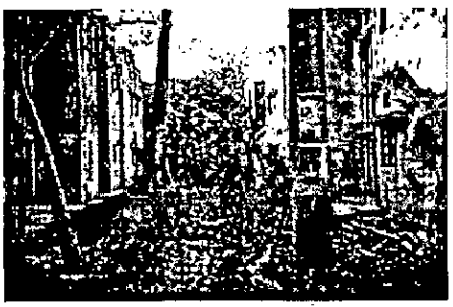
Windows have no locking provision.

Iron grills have very little strength and broken.

Fig 5.2.24 Condition of door-windows

5.2.12 MAINTENANCE:

Maintenance is very poor in an area, parks, roads and service areas are in very dilapidated condition as no body considers its responsibility towards public spaces.



Service areas in backyard are cutoff from the circulation area. The space is used by residents to throw their garbage.

No body willing to go in these areas, due to which area is not maintained and used by strangers to hide.

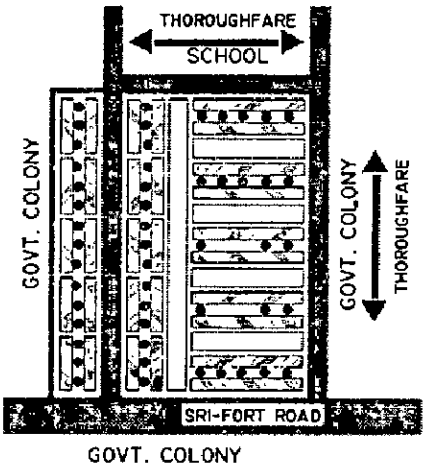
Fig 5.2.25 Poorly maintained backyards

Facade has white wash, due to which it get dull very fast and gives the impression that area is poorly maintained.

Service pipes are broken and drainage is flowing in the backyard.

5.2.13 OTHERS:

There is also no community center in a locality, where residents can sit and chit-chat. This results in lack of interaction between people.



Area has school on one of its surrounding, due to which area is used as a thoroughfare.

The school boys are responsible for the theft of cycle and minor things in some instances.

Fig 5.2.26 Other structures responsible for crime

5.2.14 INFERENCES:

- The area planned as an Island (roads all around without any boundary wall) can be approached through any where result in no access control.
- Too many entries and access points provide opportunity for a criminal to escape easily.
- Open spaces without any enclosure are not used by the residents.
- The spaces which are not under the direct influence of residents and not properly maintained are used by the offenders.
- Projections and chajja above windows provide ladder for criminals to access upper floor directly from the road.
- Temporary finishes, open shafts gives the locality a stigma of public housing. This stigma gives psychological strength to criminal to take entry in a locality without any fear.
- If a room has single window, there will be a chances that it will be covered by the residents through cooler, results in no surveillance through windows
- Hidden staircases provide opportunity of hiding.
- Interconnected terraces provide opportunity to enter from one point and escape from other point.
- If community parking spaces are not provided in a locality, residents park vehicle on the road and make the task of criminals easy.
- Dark spaces, narrow passages provide good shelter to criminals and keep the residents away.
- Location plays an important role in preventing crime; dwellings located along the main road are more prone to crime.
- Dense foliage obstructs lighting and provides potential hiding space to criminals.
- Inadequate lighting, physical security, availability of place of concealment, poor building detailing, easy escape routes and lack of neighborhood concept leads to increase in rate of crime.

Fort like mentality in planning results in more cases of crime.

5.3 Case study 2. ASIAN GAMES VILLAGE, NEW DELHI, By Raj Rewal

In 1982, when India hosted the Asian Games in New Delhi, this housing commissioned and built by the public authorities to accommodate the temporary influx of guests. Once the games were over the units were sold off to private individuals.

5.3.1 GENERAL INFORMATION:

Architect = Raj Rewal

Year of Completion = 1982

Site Area = 50,000sqm

Ground Coverage = 20%

Density = 650 residents/hectare

Area of DU = 80 to 130sqm.

No. of DU = 853 housing units

No. of storey = G+1 to G+3

Population = 5000 residents

Category = MIG+HIG

Circulation Area:

Road = 7000sqm

Pathways = 5000sqm

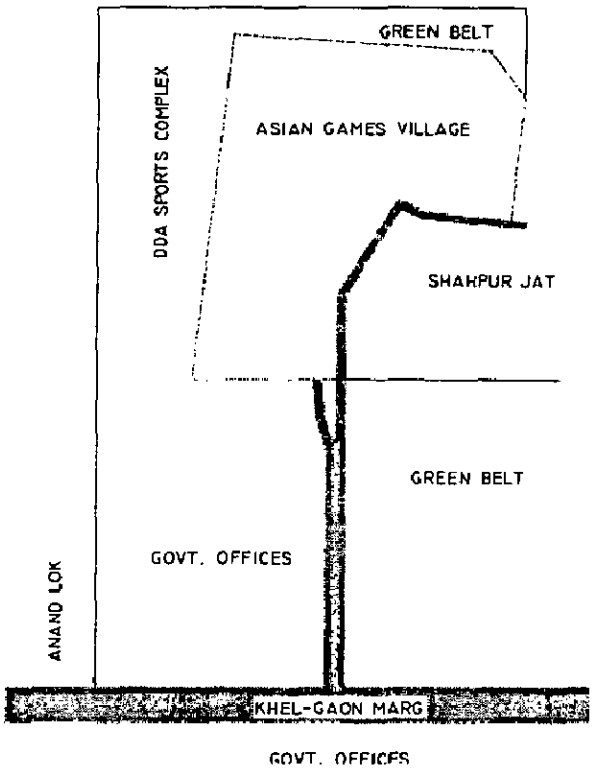


Fig 5.3.1 Location Plan

5.3.2 SURROUNDINGS:

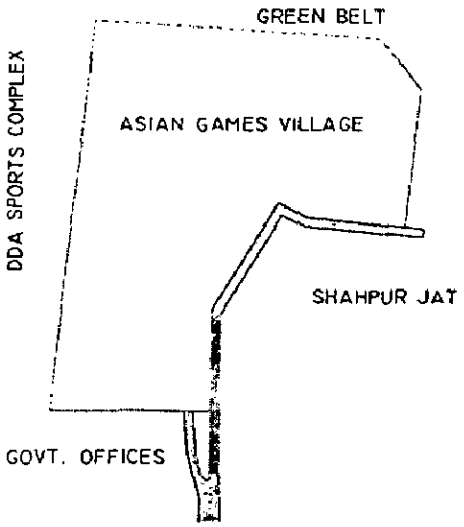


Fig 5.3.2 Surroundings

Surroundings have an important role to enhance or suppress the crime. Asiad village is surrounded by the DDA Sports complex, Green belt, Govt. offices and Shahpur jat.

Fig5.3.3

Shahpur jat is a LIG colony adjacent (Fig 5.3.3) to Asiad village. It is in some respects responsible for the small crimes in a locality.

5.3.3 LAYOUT

Road layout:

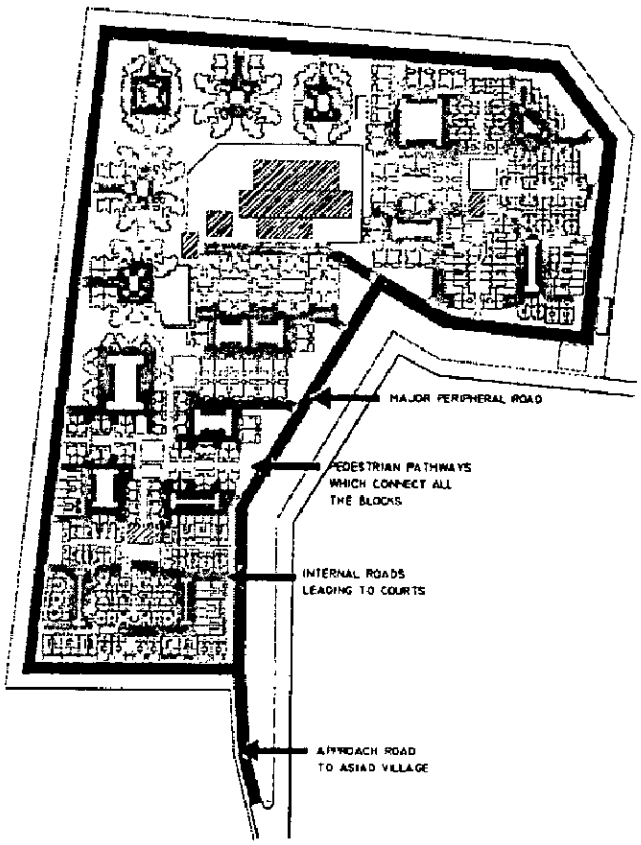


Fig 5.3.5 Road Layout

Fig 5.3.4 View of peripheral road

A road network is very well laid in Asiad village. Major **peripheral road** run around the locality, through which subsidiary roads emerge, which leads to different courts. Internal roads are not connected with each other, *which discourage the thorough movement of traffic.*

Layout of Blocks

In Asiad village concept of COURTYARD PLANNING has been adopted. **Blocks are laid around the court.** Courtyard acts as a buffer space to cluster of housing. Entrance to houses is through the courtyard. These also act as spill out and good place of interaction. These spaces are in the direct surveillance of the residents, so children's feel safe here.

Fig 5.3.6 View of court

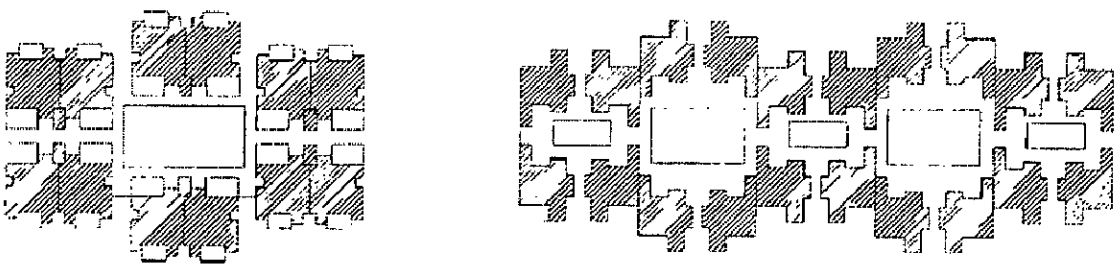
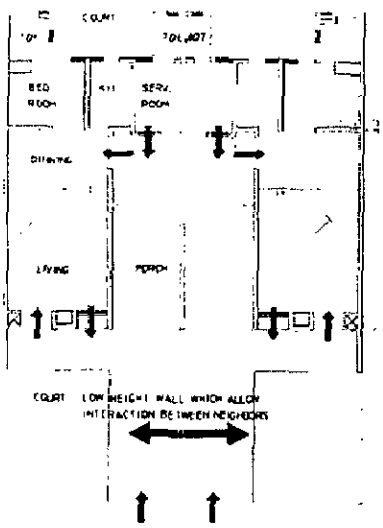


Fig 5.3.7

SEQUENCE OF COURTS

5.3.4 DWELLING UNIT AND CLUSTER DESIGN

In Asiad Village different types of dwelling units have been designed considering the economics of users. Some are 2 to 3 bedroom duplex dwelling units; some are 2 bedroom units. These create an interest and feeling of plotted development in a flatted development, creates sense of belongingness and encourage user to maintain an area.



Type-A is a plotted development, designed in such a way that surveillance of every space is possible through dwellings.. Dwelling is offset from main road to create a semi-private space before entering in to a dwelling. It is designed as a duplex unit.

The blocks are attached side by side having low height wall to allow possible interaction between neighbors.

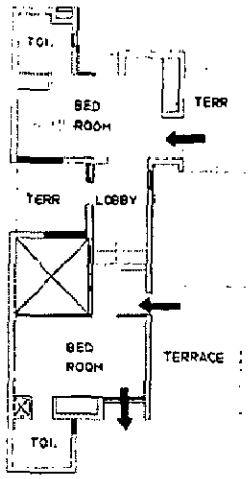
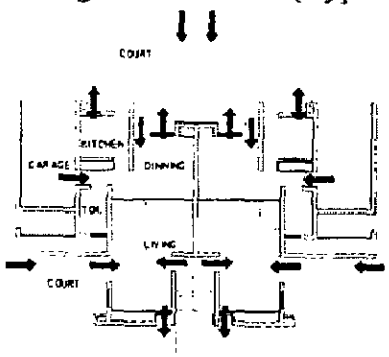


Fig 5.3.8 G floor (Type-A)

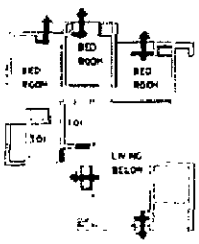
Fig 5.3.9 First floor

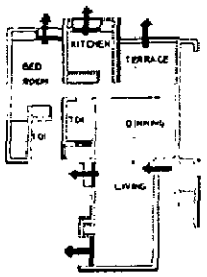


Type –B is designed in such a way that it gives the feeling of plotted development in a flatted development. In a G+3 structure ground and first is owned by separate user while second and third by other.

Ground floor has 5 entrances which provide opportunity for criminals to get an entry.

Fig 5.3.10 G floor (Type-B)





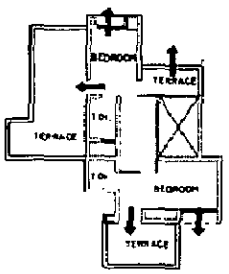


Fig 5.3.11 First floor **Fig 5.3.12** Sec floor **Fig 5.3.13** Third floor

Upper floors are more secure because of single entry to a dwelling.

5.3.4.1 CLUSTERING OF BLOCKS

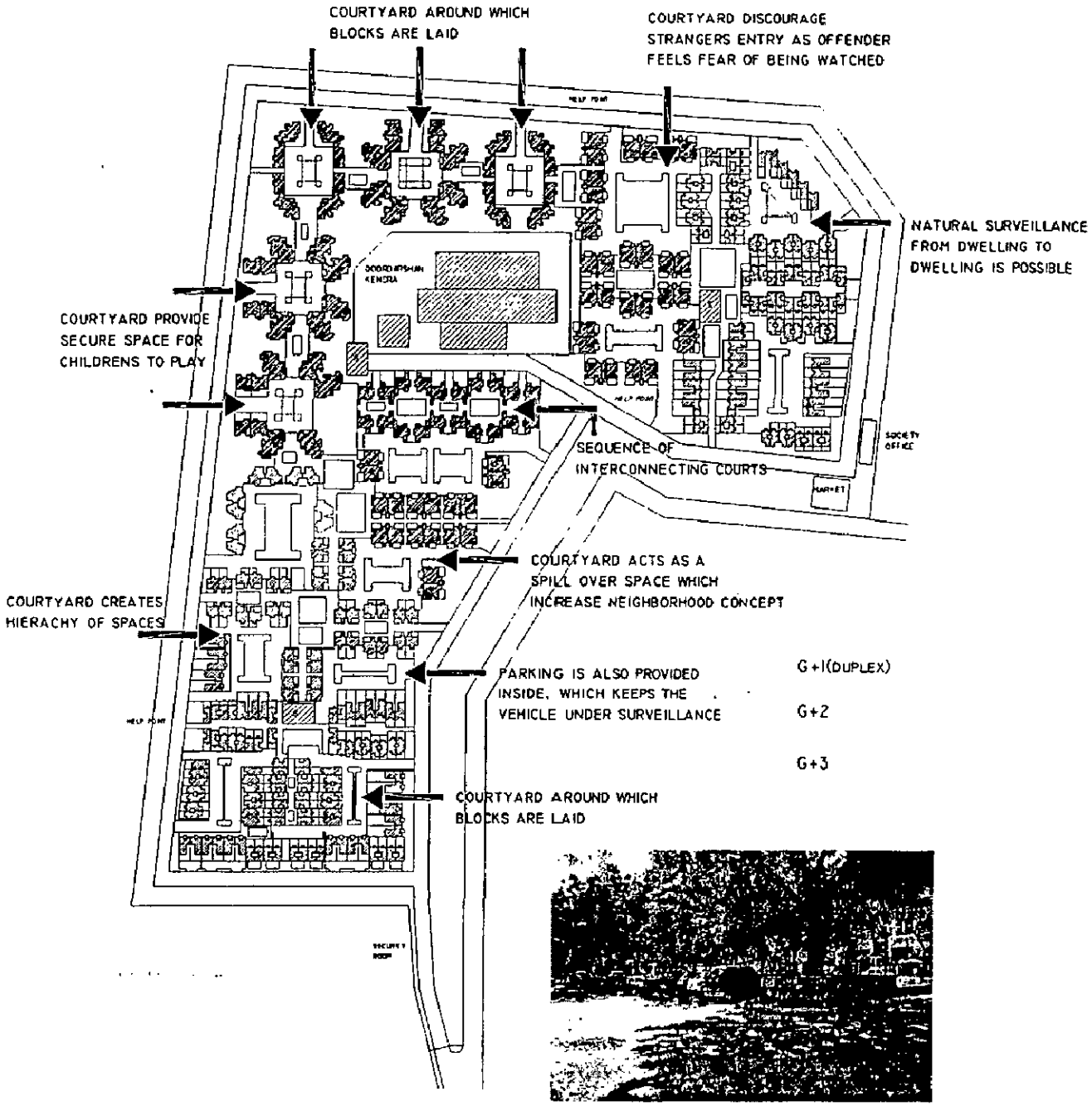


Fig 5.3.14 Layout plan of Asiad village

Fig 5.3.15

Courtyard showing parking space

Dwellings are clustered in a courtyard planning, which provide surveillance, interaction and buffer space, parking space along with sense of security. This kind of clustering gives a defined entrance to the cluster and discourage offender to take an entry in an area.

5.3.5 ACCESS CONTROL:

Locality level:

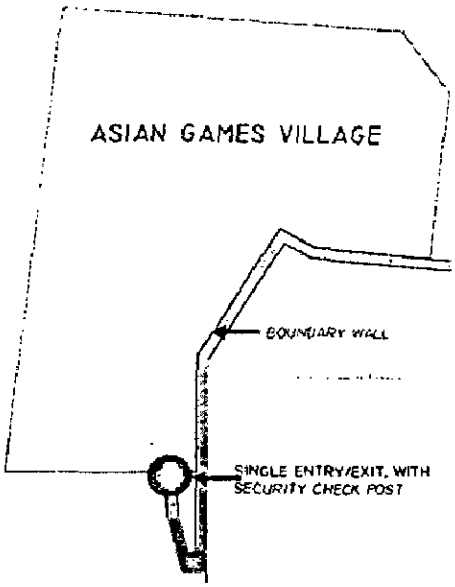


Fig 5.3.17 Entry to locality

At locality level, *Village is* accessed through only one road, which also has security check post at the entry.

This help in reducing the thorough movement of traffic and illegal entry of strangers.

Fig 5.3.16

Boundary wall is also provided around the site, which restricts illegal entry.

Fig 5.3.18 Boundary wall

Cluster Level

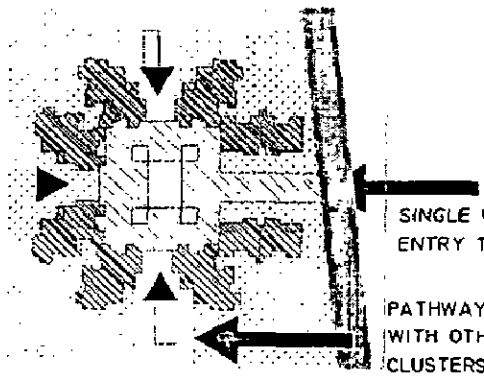


Fig 5.3.19 Entry to cluster

In Asiad village, cluster of houses can only be approached through only one vehicular road which restricts thorough movement of vehicle.

Fig 5.3.20

For pedestrian there are number of entries and exits to the cluster, leading no access control.

Dwelling unit level:

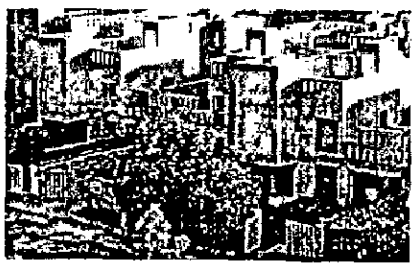


Fig 5.3.21

At the **individual house level,** it is seen that boundary walls are made to clearly mark the individual entrances at **ground floor**.

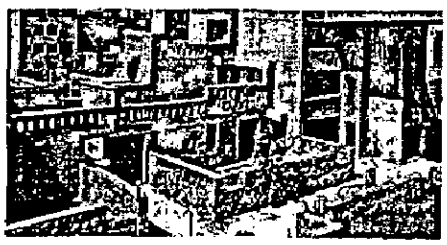


Fig 5.3.22

Upper floors can be accessed is visible from public areas and blocks, results in surveillance.

through **staircase only,** which lies in the circulation route of

Fig 5.3.23 Staircase

5.3.6 LANDSCAPE:

There is a beautiful amalgamation of built mass and Landscape in Asiad Village. Variety of trees has been planted in the campus which creates a beautiful environment and made the public to use the spaces.

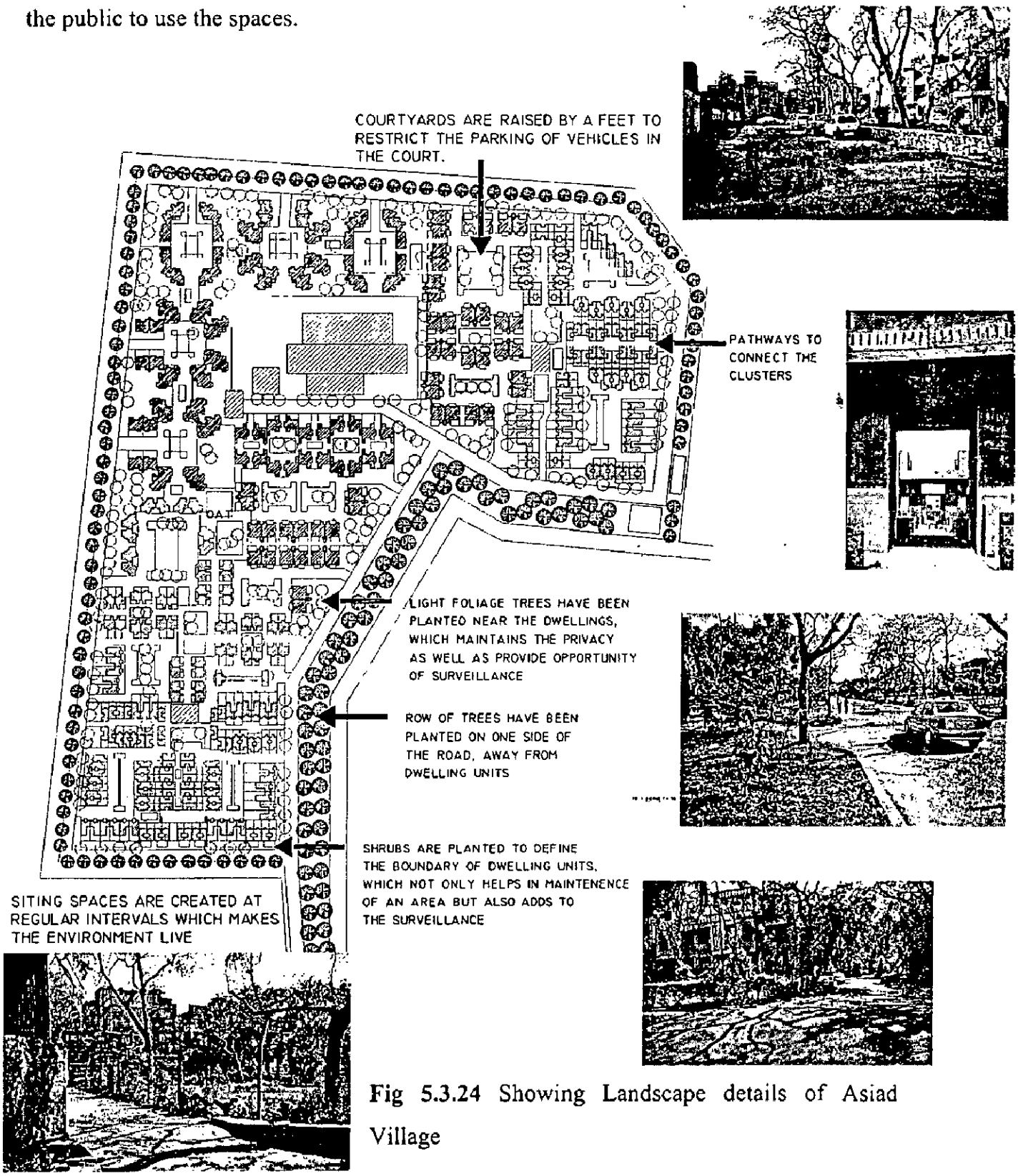


Fig 5.3.24 Showing Landscape details of Asiad Village

5.3.7 BUILT FORM:

Form of a building plays an important role in deciding about the image of a locality. Static and repeated forms of residential buildings give an image of public housing. This form develops psychological strength in offender to commit crime.

While dynamic form with play of terraces, solid and void gives the community an identity and sense of pride among residents.

Terraces on the upper level are often joined overhead to create gateway like entrances to housing along pedestrian walkways that gives a feeling that one is entering in to a private space.

This also makes the offender feel that he is under the surveillance.

Terraces overlooks to the public areas.

Fig 5.3.25 Overlooking terraces to create an entrance

In Asiad village terraces are created at every floor, which are staggered in nature and provide an opportunity to chat with neighbors. Windows are recessed without chajja, to avoid an opportunity to climb. Boundary wall at ground floor is low height which adds to the surveillance.

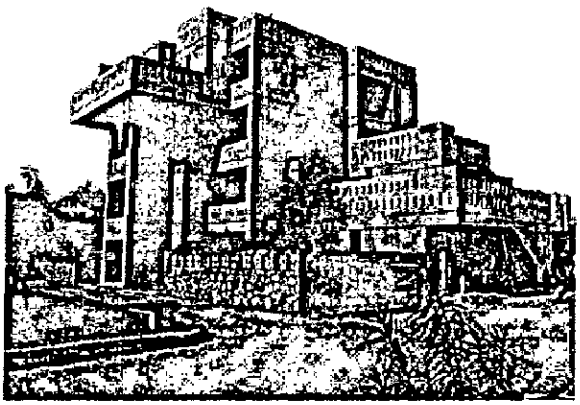


Fig 5.3.26 Overlooking terraces

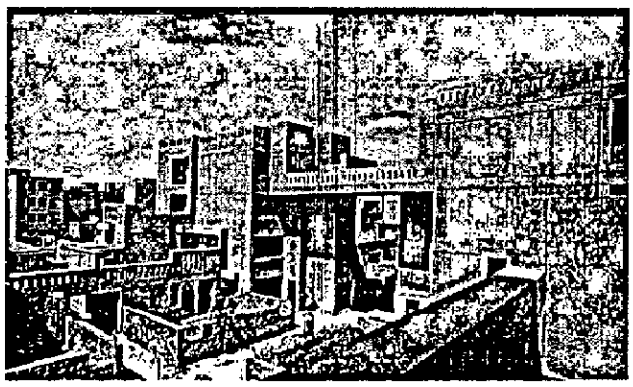
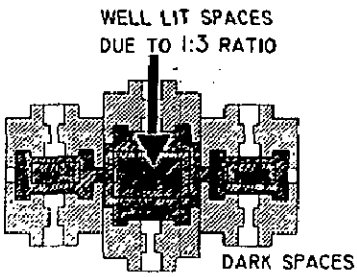


Fig 5.3.27 Built mass

The built mass creates a sequence of spaces interlinked with pedestrian streets, shaded pathways etc. The streets were broken up to provide changing vistas. The spill outs created in between units were to provide intimate encounter between people and to generate sense of belongingness.

5.3.8 LIGHTING:



Day Lighting All the enclosed spaces like courtyards are in the ratio of 1:2.5 (height to width) or more, which results in the penetration of natural light in every space.

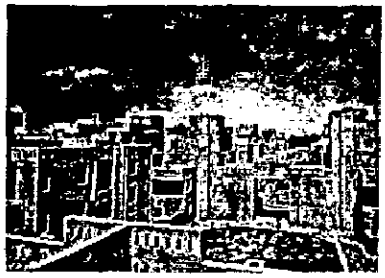


Fig 5.3.28 *This provides opportunity of natural surveillance.* Fig 5.3.29

Street Lighting:

Street lighting is provided all along the road. At intersection and in car parking sodium lights have been provided.

Courtyard and Car park:

Lighting is provided in the courtyards, which not only light the courts but also the car park which made both the spaces live even in night hours.

Fig 5.3.30 Well lit court

Internal Pathways: No lighting has been provided along the pathways, which results in less utilization of these spaces during night.

Service Areas:

Back lanes: No lighting has been provided in the back lanes, which provide potential hideouts to criminals.

The residents feel fear to move in these areas during the night hours.

Fig 5.3.31 Service lane

Staircase Lobby: Lighting is provided in staircase blocks and staircase in some of the clusters is open from both the sides, which result in the penetration of street light in the lobby.

5.3.9 PARKING:

In Asian games village, car parking is provided both at community level and at individual level in some of the dwellings, while in others scooter garage are provided.

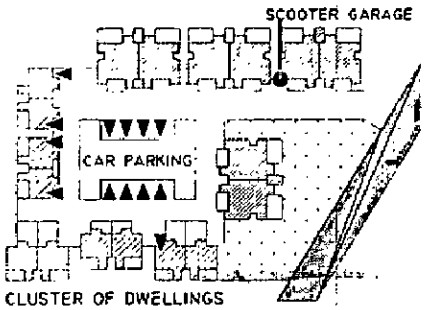


Fig 5.3.32 Parking plan

At community level, car parking is provided in the internal courts. These are under the direct surveillance of residents.

Fig 5.3.33 View of parking

At individual level, car garage and scooter garage has been provided, based on the type of house, but in most of the houses, these garages provide accommodation to household servants, which lead to the shortage of designed parking. This mixing of household servants with residents is responsible for minor crimes in an area.

This leads to the parking of vehicle on peripheral road side, from where the incidences of vehicle theft occur as *peripheral road is not in the direct surveillance of residents, due to introvert planning.*

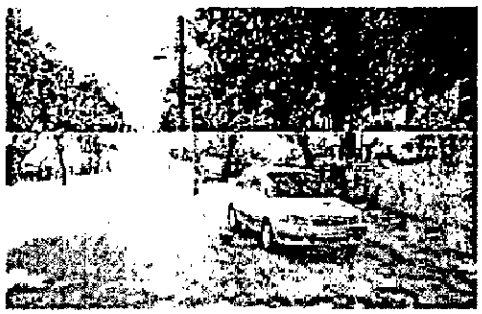


Fig 5.3.34 Parking on road

5.3.10 SERVICES:

Fig 5.3.35 Service shaft

In Asiad village, all the services are enclosed in a shaft provided in the back courtyards.

But these shafts are quite big in size (3'x6') and are in the reach of intruders, which provide potential hiding space to offenders.

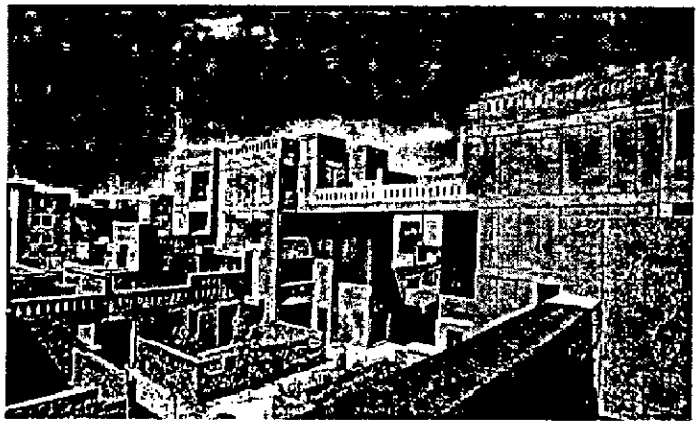
Water meters are also provided in the back lane, which results in the theft of these.

Electric meter room is designed below the staircase.

5.3.11 MATERIAL:

Selection of material is directly related to the image of an area and the 'image' of an area can have a major impact on whether it will become targeted or not.

In Asiad village utmost attention has been given to selection of material.



FACADE has permanent grit finish, which provide easy maintenance of facade and discourage graffiti artist, to make graphics on the walls.

This also gives surface a natural finish that merges with the surroundings and gives strong image to a locality.

Fig 5.3.36 Grit finish facade

Internal courts and pathways have red sand stone flooring, which is durable and easy to replace.

Plant material: Utmost attention has been given to the selection of plant material; the trees planted have light foliage, so that regular trimming is not required. This type of trees, also adds to the surveillance.

Fig 5.3.37 Light foliage trees

Door-Window:

In Asiad Village, All external doors are **38mm thick flush doors** and also have additional **iron gates** which are quite strong. Entry doors have peep-hole viewer, to have a look of visitor.

Windows are made up of L-shape angle iron frame, with a glass fitted from outside, some instances have been reported in which criminals/servants removed the glass for minor theft.

Grill material is quite strong to provide access to criminal.

5.3.12 MAINTENANCE:

This is related to the neighborhood's sense of 'pride of place' and territorial reinforcement. The more dilapidated an area, the more likely it is to attract unwanted activities. The maintenance and the 'image' of an area can have a major impact on whether it will become targeted.

Asiad village was completed in 1982; still after 22 yrs of construction area is quite maintained and has got a strong image.

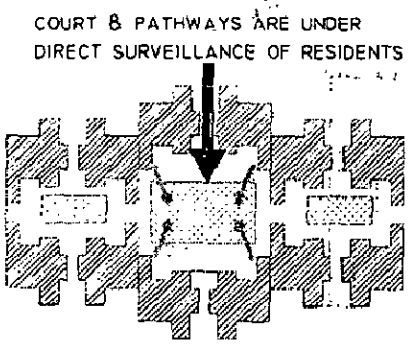


Fig 5.3.38
Plan showing relation of court with dwelling

Reason being all the public areas (like court, pathways etc) are under the direct surveillance of residents and residents maintained those areas, which they feel is under their territory.

Fig 5.3.39
View of court from dwelling

Second reason is selection of material, material selected for facade finish has permanent finish. All the court and pathways have sand stone tiles which are easy to replace.

Fig 5.3.40 View of road
Façade finish and roads are in good condition.

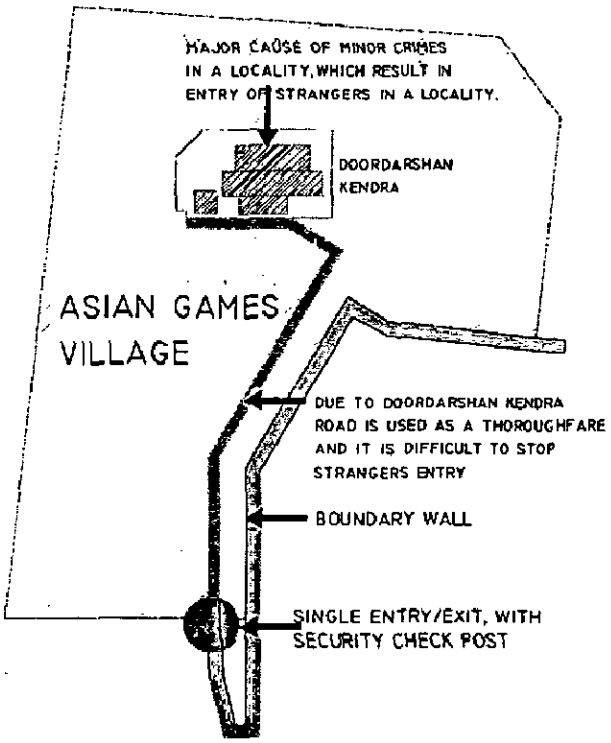
Fig 5.3.41 View of pathways
Internal courtyards and pathways.

Condition of maintenance is quite evident from pictures.

The areas are quite well maintained and give the feeling of identity and sense of pride to residents.

5.3.13 OTHER ACTIVITIES/STRUCTURES:

It is very important to have compatibility between the dwellings and other built up structures/activities in a locality and if they are not compatible they result in entry of unauthorized persons.



In Asiad village, the most of the crime that occur is happening because of the location of Doordarshan Kendra in the center of Village.

It is approached through the road leading to flats, which result in thoroughfare and entry of strangers in an area.

Fig 5.3.42 Other structure responsible for crime

5.3.14 INFERENCES:

- Less the number of entry and exit to the colony, less will be chances of intrusion.
- Courtyard planning defines the territory and provides opportunity of surveillance.
- Courtyards act as a good place of interaction, which develop neighborhood concept and provide secure space for small children's to play.
- Residents maintained those areas which are under the direct influence of their dwelling.
- Overlooking terraces helps to increase neighborhood concept as well as help to keep vigil on stranger movement.
- Low height boundary wall, in front yard of ground floor unit, increase the territory of dwelling and also increases the surveillance.
- Length to width ratio of spaces plays an important role towards the sense of place.
- Lighter foliage plants provide visual permeability with screening.
- Hierarchy of spaces generates sense of security and discourages intrusion.
- Material plays an important role in creating the hierarchy of spaces and defining the boundary.
- Community parking in flatted development under the surveillance prevents vehicle theft.
- Disconnected internal roads avoid thorough movement of vehicles in a locality.
- Permanent finish keeps the façade in good condition, resists graffiti and vandalism.
- Maintenance is directly related to the image of an area, if an area looks maintained its usage increases.
- Proper lighting in public spaces helps in increasing the usage of space.
- Boundary wall if constructed of iron grill, extent the limits of locality and helps in keeping the surveillance around the locality.
- Compatibility of different land uses is necessary in neighborhood; otherwise it leads to intrusion and thoroughfare.

Dynamic form, Play of solid and voids, terraces generate the interest in a locality and give the residents a sense of pride

5.4 Case study 3. MAYUR VIHAR, PHASE-II,(Pocket-B)

Mayur vihar-II is located in the south east of Delhi. It is a public Group housing, developed by Delhi Development Authority in 1989. It is divided in to 6 Pockets from A to F, having population near about 40,000. The majority of population belongs to Middle Income Group, with two family members working.

As per police records and actual survey done, crime in an area varies from pocket to pocket. For the purpose of study two Pockets with same demographic structure have been selected for study i.e. **Pocket-B and Pocket-C**.

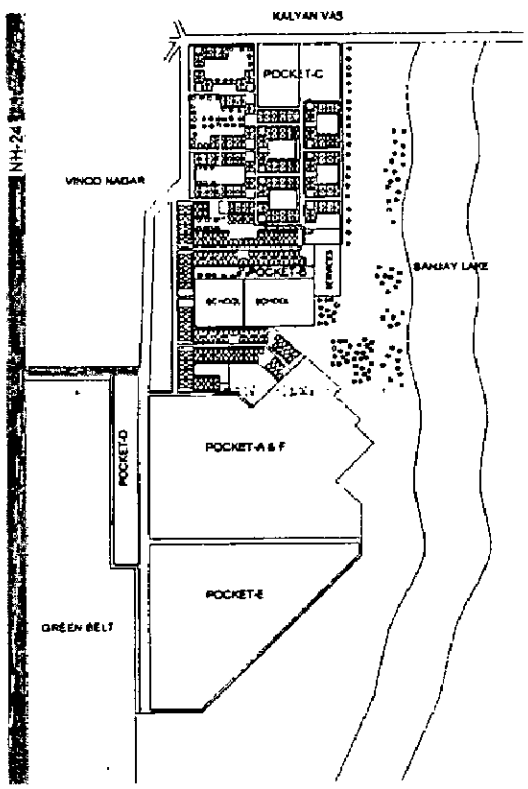


Fig 5.4.1 Location Plan

5.4.1 GENERAL INFORMATION (Pocket-B)

Site Area = 125300sqm

No. of DU = 1240 housing units (Two bedroom)

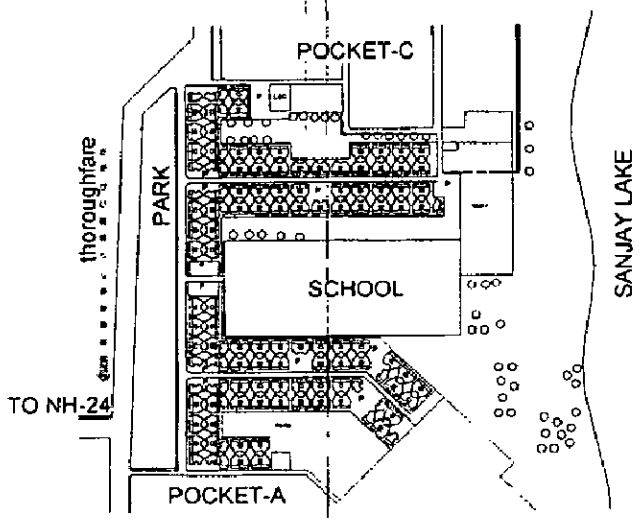
Dwelling unit area = 90sqm

Height of structure = G+3

Population = 7200 residents

Density = 575 residents/hectare

Category = M.I.G + L.I.G



5.4.2 SURROUNDINGS:

Surroundings play an important role to enhance or suppress the crime.

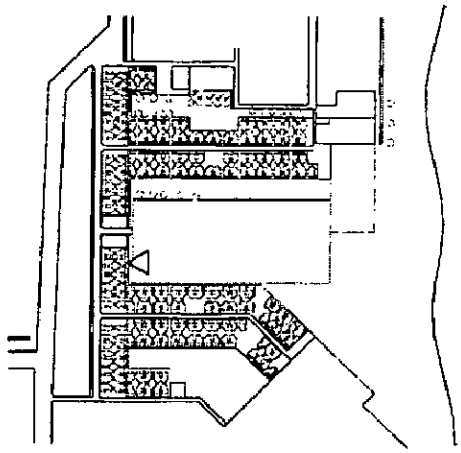
Pocket-B is surrounded by the Sanjay Lake, Park and pocket C and A, which provide physical boundary to the pocket-B and prevent thoroughfare along one axis.

Fig 5.4.2 Surroundings

5.4.3 LAYOUT

Layout of a locality has direct relationship with the incidences of crime. Layout which provides natural surveillance, access control and inherent maintenance gives the residents a sense of belongingness.

Road layout



A road network is very well planned. There is only one Major road run on one side of the locality, through which two subsidiary roads emerge, which leads to different blocks. Internal roads are not connected with each other, *which discourage the thorough movement of traffic.*

Fig 5.4.3 Road layout

Layout of blocks

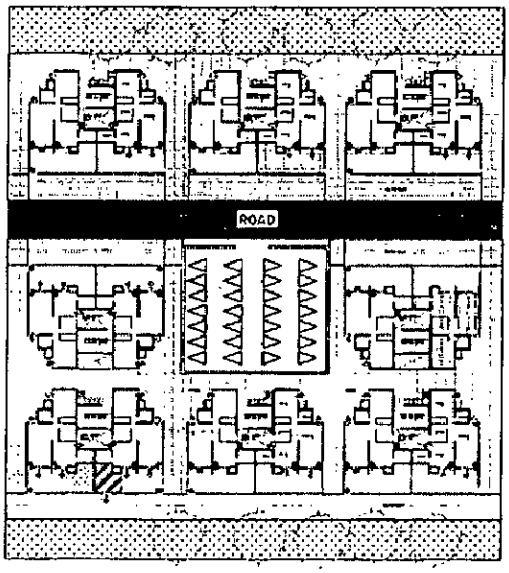


Fig 5.4.4 Block layout

Fig 5.4.5 View of blocks

Block comprise of 16 units, 4 on each floor.

Blocks are laid in such a way that two flats in a cluster of 4 units faces road and other 2 faces park.

Blocks are placed across the road, which results in very less commercialization.

Staircase is provided in the center in cluster of 4 units it is not visible, but in a cluster of 2 units, it is visible from the public area, which adds to the surveillance.

This layout provides opportunity for surveillance of road and park simultaneously. This makes offender feels that he is being watched all the time and at all the places.

5.4.4 ACCESS CONTROL: The primary thrust of an access control is to deny access to a crime target and to create a perception of risk to offenders.

Locality Level

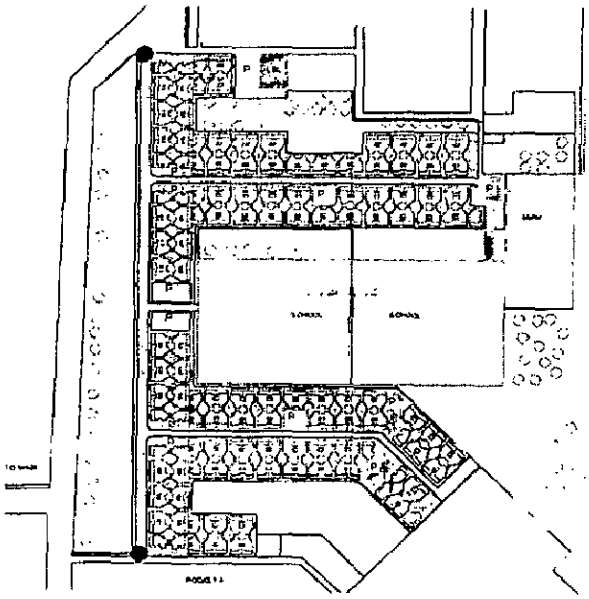


Fig 5.4.6
Plan showing access to colony

Fig 5.4.7 Access road

At locality level, Pocket-B is approached through only one road. This helps in reducing thoroughfare through vehicles and also results in **one entry and exit at locality level through vehicle.**

Circulation Area

Road = 9000sqm

Pathways = 12000sqm

Block level

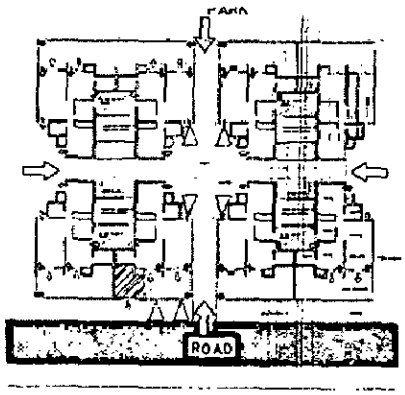


Fig 5.4.8 Access to block

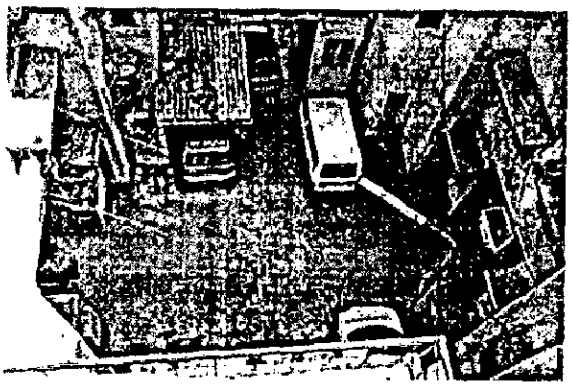


Fig 5.4.9 View of court

At block level, pocket-B lacks in terms of access control. **Each block is approachable from all four sides,** so it is easy for an offender to commit a crime and escape away. Also **no boundary wall** has been provided around the locality which helps offenders.

Individual house level

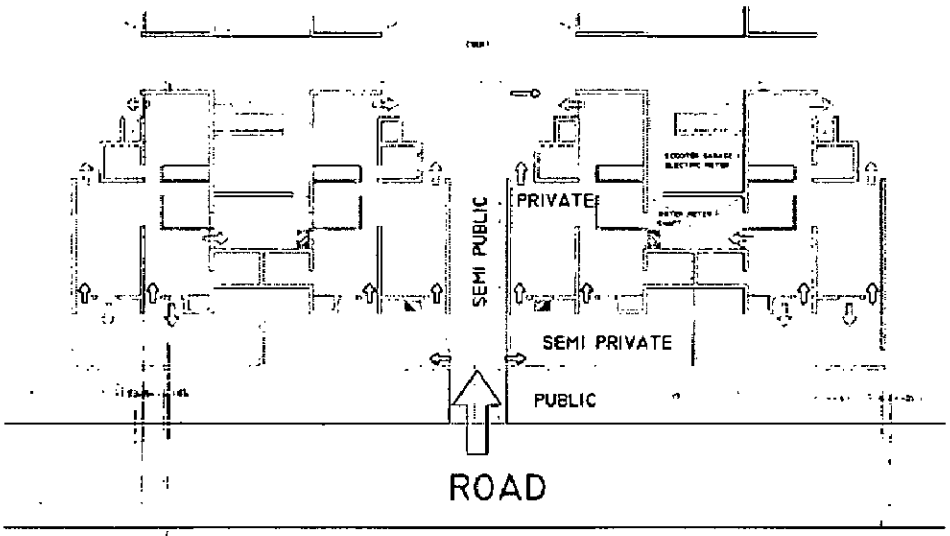


Fig 5.4.10 Access to individual dwelling

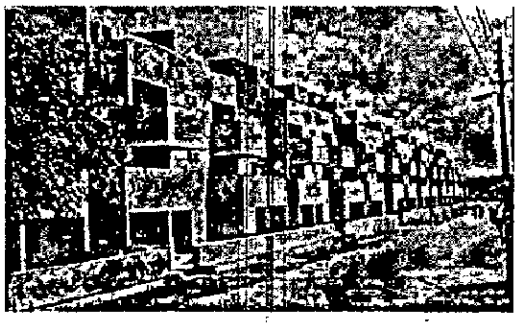


Fig 5.4.11 Access to ground floor

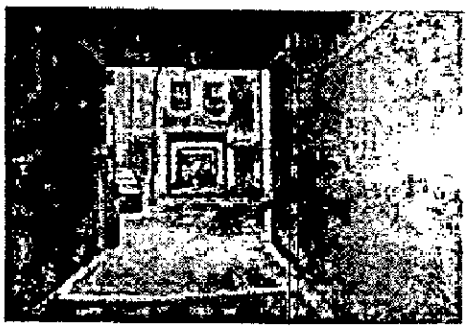


Fig 5.4.12 Access to court

At the individual house level, it is seen that boundary walls are made to clearly mark the individual entrances, terraces on the upper level are joined overhead to create gateway like entrances to housing along pedestrian walkways.

There is a hierarchy of spaces i.e. Public---Semi Public----Semi Private---Private space which gives the residents feel that it is a part of their territoriality. This helps in the maintenance of these areas.

5.4.5 LANDSCAPE:

Landscaping is an important feature of an overall scheme in any locality to prevent crime. Landscaping should not impede natural surveillance and must not create potential hiding places for intruders, especially adjacent to footpaths or close to buildings where it may obscure doors and widows.

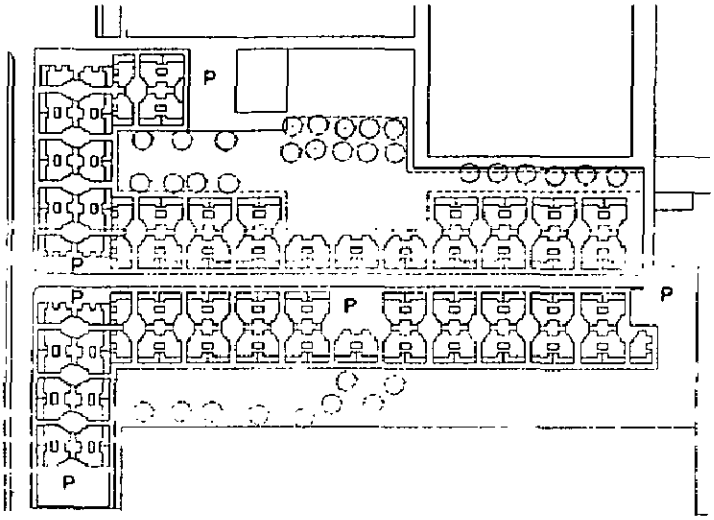


Fig 5.4.13 Landscape Plan

In pocket-B, considerations has been given to the selection of tree variety, the trees planted along road have light foliage and provide natural surveillance.

Fig 5.4.14 Plantation along road

In parks trees are dense type which provide shade and are properly trimmed, but shrubs are dense which creates a sense of fear.

No consideration has been given to street furniture. It is vandalized and stolen.

Fig 5.4.15 View of park

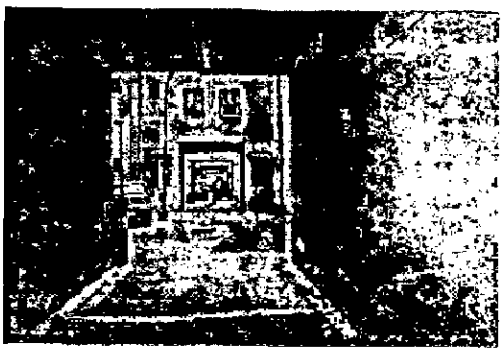
At some locations along the road, tree foliage is very dense and is very near to dwelling unit, which provide offender an access to upper floor.

Fig 5.4.16 Tress near to dwelling

There is also a change in surface material between public and semi public area.

5.4.6 LIGHTING

Appropriate lighting should be carefully designed to cover potential high risk areas. Good lighting will deter intruders and reduce the fear of crime.



Day lighting: In pocket-B, spaces between blocks are in the ratio of 1:2 due to which the areas remain lit during day time. This reduces opportunity for an offender to hideaway.

Fig 5.4.17 Well lit court

For **night hours** street lighting is provided all along the road. At intersection and in car parking sodium lights have been provided.

But at certain locations street lighting is vandalized.

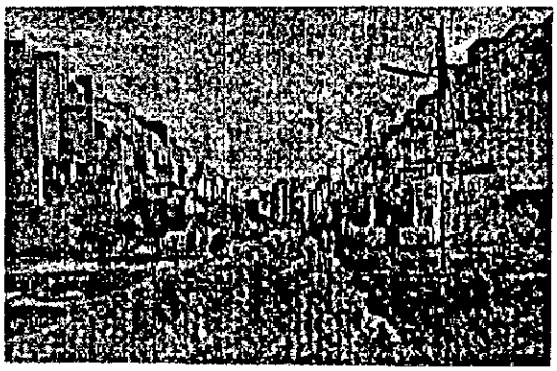


Fig 5.4.18 View of street light

Fig 5.4.19 View of park having no light pole

Park Lighting: No lighting has been provided; due to this parks are not used in nights and incidents of crime generally happened there in nights.

Service areas: Like staircase lobby, areas between blocks are well lit. These areas are maintained by the residents themselves.

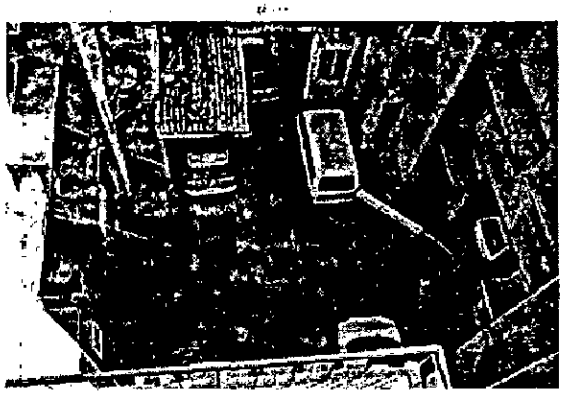


Fig 5.4.20 Internal court with light pole

5.4.7 DWELLING UNIT AND CLUSTER DESIGN

Design should be such that it provides opportunity for natural surveillance.

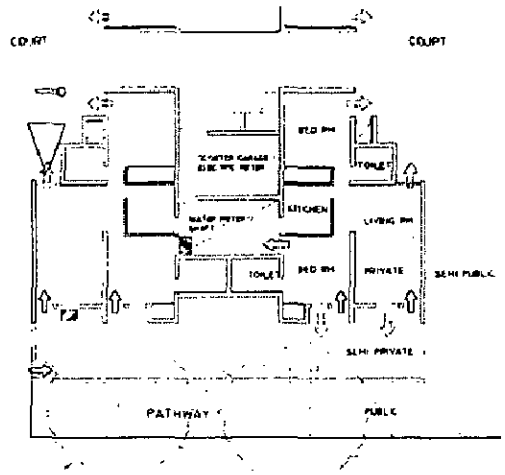


Fig 5.4.21 Plan of dwelling

Fig 5.4.22 View of dwelling

In pocket-B, DU is designed in such a way that, surveillance of every space is possible through DU. Most commonly used rooms are placed in front. Each room has two windows, so even in case if cooler is fitted in one window, other window is available for surveillance. Windows open towards service area, road and park.

There is only one entry to each dwelling and that also opens in to the common staircase lobby which helps in maintaining social contacts among neighbor.

Staircase is located in the center of dwelling cluster, which is not visible from outside and results in snatching cases sometimes.

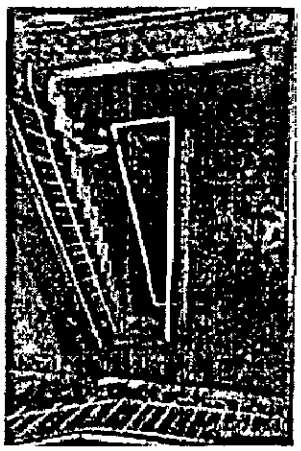
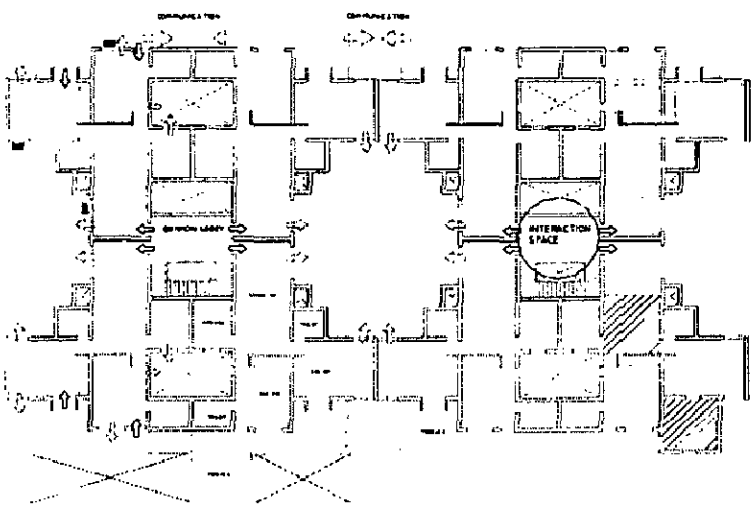


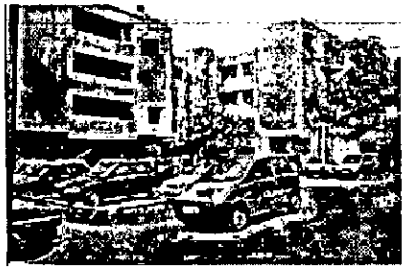
Fig 5.4.23 View of staircase lobby

Fig 5.4.24 View of staircase



Dwellings are clustered in such a way that through one dwelling, surveillance of other dwellings is possible.

Fig 5.4.25 Plan of cluster



DUE TO DIRECT LINKAGE OF PATHWAYS FROM THE ROAD RESIDENTS PARK THEIR CARS IN PASSAGES WHICH LEAD TO THE OBSTRUCTION IN MOVEMENT AND ALSO PROVIDE HIDDING SPACE TO OFFENDERS.

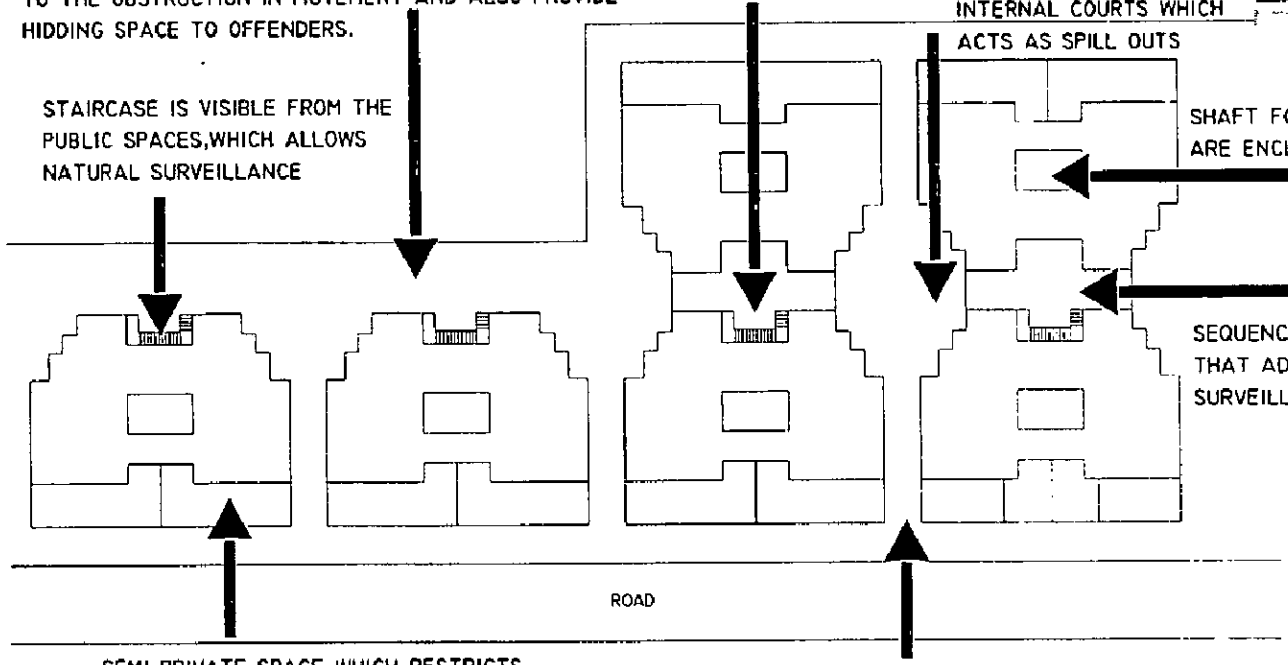
STAIRCASE IS SANDWITCHED BETWEEN UNITS, BUT LOCATED ON THE MAIN PEDESTRIAN CIRCULATION WHICH ALLOW SURVEILLANCE

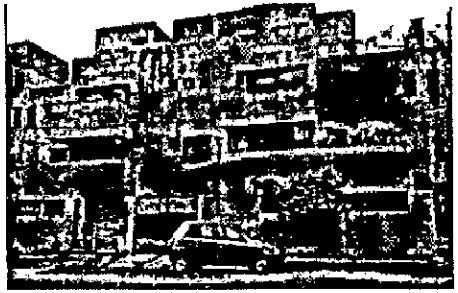
INTERNAL COURTS WHICH ACTS AS SPILL OUTS

STAIRCASE IS VISIBLE FROM THE PUBLIC SPACES,WHICH ALLOWS NATURAL SURVEILLANCE

SHAFT FOR SERVICES ARE ENCLOSED

SEQUENCE OF PESAGES THAT ADDS TO THE SURVEILLANCE

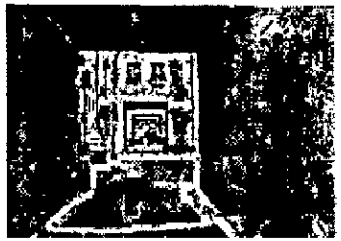




SEMI PRIVATE SPACE WHICH RESTRICTS DIRECT ENTRY OF STRANGERS AND GIVE BREATHING TIME TO RESIDENT TO TAKE NECESSARY ACTION

ROOMS ON UPPER FLOOR ARE JOINED TO CREATE A GATEWAY LIKE ENTRANCES, WHICH GICES A FEELING THAT ONE IS ENTERING IN TO A PRIVATE AREA

ANALYSIS OF CLUSTER DESIGN



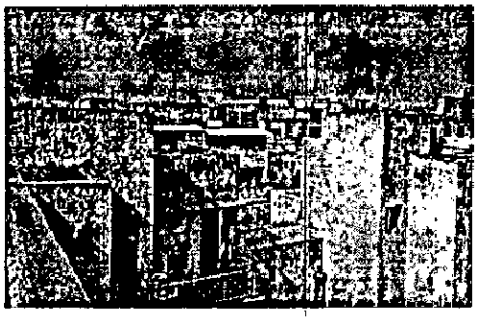
5.4.8 BUILT FORM:

Form of a building plays an important role in deciding about the image of a locality. Static and repeated form gives the image of public housing and provides psychological strength to offender to commit crime. While dynamic form with play of terraces, solid and void gives the community an identity and sense of pride among residents.

Fig 5.4.26 View of cluster showing built form

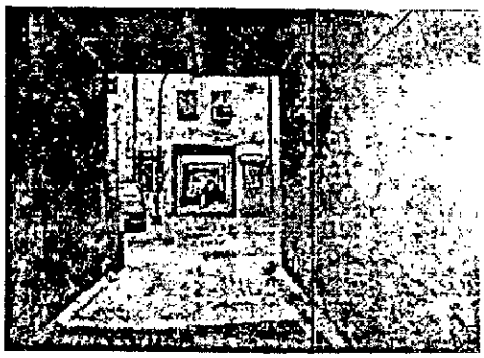
Fig 5.4.27

In pocket-B, terraces are created at every floor, which are staggered in nature and provide an opportunity to chat with neighbors. Windows are recessed without chajja, so doesn't provide an opportunity to climb. Boundary wall at ground floor is low height which adds to the surveillance.



Terrace is used only for services and is not approachable through staircase and also not connected with other blocks, which prevent bock to block movement through terrace.

Fig 5.4.28 View of roof



At first floor, rooms are projected, which creates a gateway like entrance to block, which gives a feeling that one is entering in to a private space.

Fig 5.4.29 Gateway like entrance to cluster

5.4.9 MATERIAL:

Selection of material is directly related to the image of an area and the 'image' of an area can have a major impact on whether it will become targeted or not.

Fig 5.4.30 Madrasi dana finish

Facade Material: In pocket-B, permanent textured finish has been used, which avoids graffiti and is easy to maintain.

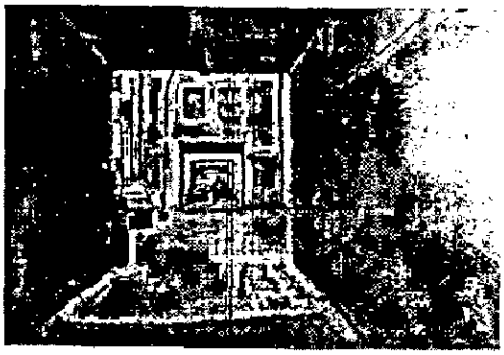


Fig 5.4.31 Red sand stone flooring

Internal courts have red sand stone flooring, which is easy to replace and also durable while pathways have concrete flooring.

Plant material is also selected in such a way that the trees in front of dwellings have light foliage, to allow surveillance while trees planted in parks have dense foliage.

Door-Windows:

Door and windows are generally the easiest approach in the hand of criminals to take an entry in a house. In most of our flats, little consideration has been given to door-window material and hardware.

In pocket-B, the solid core **38mm thick flush doors** and **iron gates** have been provided at entry of dwelling which are quite strong. But *door and window is as strong as their weakest part.*

Here locks/hardware detailing and position is not proper. Few instances have been reported in which criminal entered in the house by breaking the lock.

Fig 5.4.32 External Iron gate

Windows are made up of L-shape angle iron frame, with a glass fitted from outside, some instances have been reported in which criminals removed the glass to cut the grill and got the entry in the dwelling.

5.4.10 PARKING:

The most common theft in our housing localities is vehicle theft. Reason being parking is not properly designed or if designed is not adequate to the need.

In pocket-B, car parking is provided at community level, while scooter garage is provided in every block.

Community level:

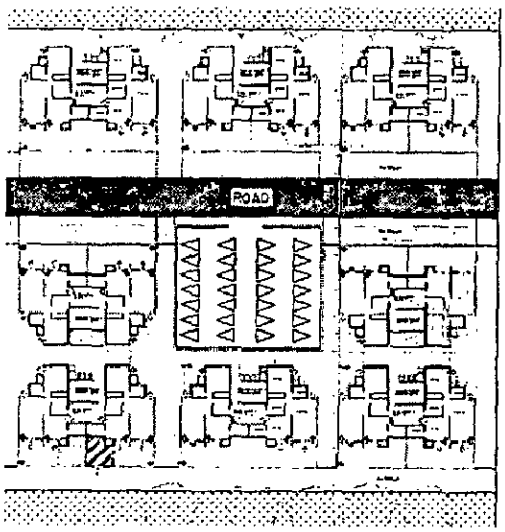


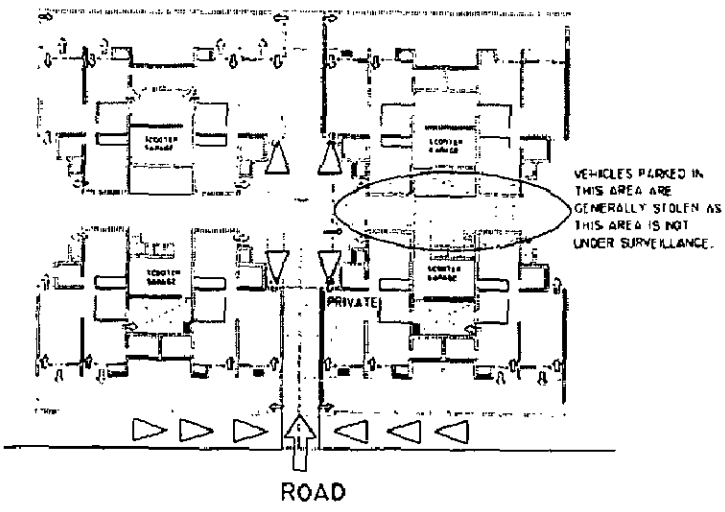
Fig 5.4.33 Parking layout

Fig 5.4.34 View of parking

At community level cluster is broken in to the unit of two, at regular interval to provide car park. These car parks are under the surveillance of people.

But still parking is not sufficient and residents used to park their car along road and in internal court.

Fig 5.4.35 These areas are also under the surveillance of local residents. **Fig 5.4.36**



Individual level: For every resident a common scooter parking is provided in service area, which cab be locked.

Although the vehicle parked in covered areas in front of staircase are stolen some time as these are not in the surveillance of residents.

Fig 5.4.37

5.4.11 SERVICES:

Planned spaces for services are directly related to the image of an area. In most of our localities, service areas are not designed and provide easy access/hiding space to criminals.

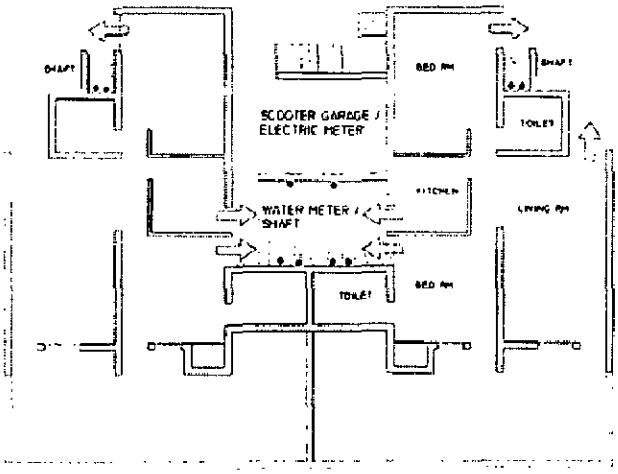


Fig 5.4.38 Plan of services shaft

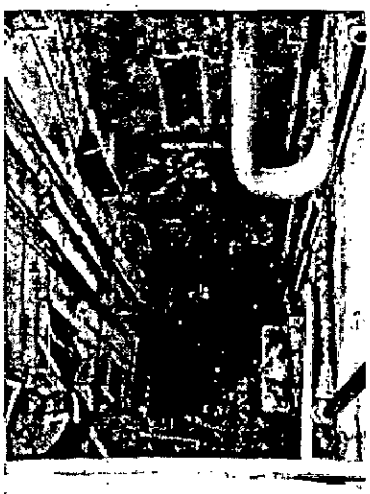


Fig 5.4.39 View of bigger shaft

Fig 5.4.40 View of shaft

In Pocket-B, all the services are enclosed in a shaft. There is separate electric and water meter room. Theses rooms are under the direct surveillance of residents. So the theft of public property is very low.

At some locations, the smaller shafts provide a hiding space for intruders, there doors are broken.

5.4.12 MAINTENANCE:

This is related to the neighborhood's sense of 'pride of place' and territorial reinforcement. The more dilapidated an area, the more likely it is to attract unwanted activities. The maintenance and the 'image' of an area can have a major impact on whether it will become targeted.

The selection of materials and finishes will impact on the types of maintenance regimes that can be sustained over time. For example, Permanent exterior finish with rough texture avoids graffiti.

Fig 5.4.41

Fig 5.4.42

In Pocket-B, the most of the areas are under the direct surveillance of residents and are satisfactorily maintained. Even though maintenance is done by municipal body

5.4.13 OTHER ACTIVITIES/STRUCTURES: It is very important to have compatibility between the dwellings and other built up structures/activities in a locality and if they are not compatible they result in entry of unauthorized persons.

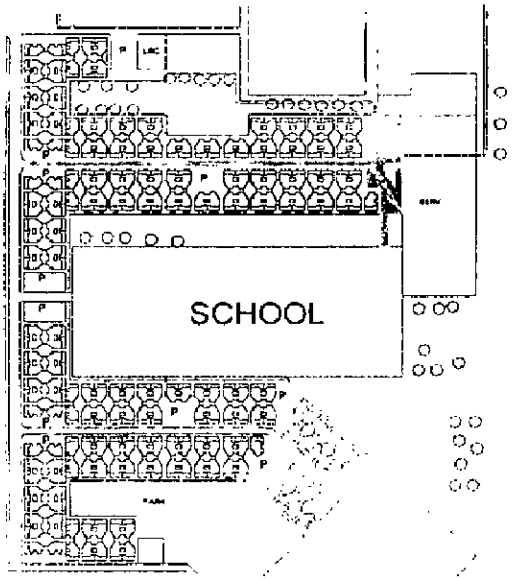


Fig 5.4.43 location of school

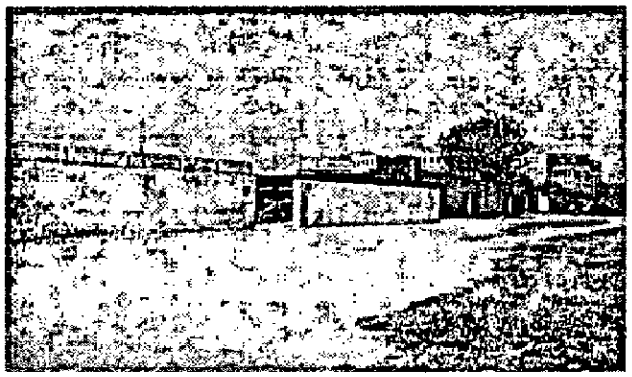


Fig 5.4.44 View of school

In pocket-B, the most of the crime that occur is happen because of the location of Government school in the center of pocket-B and is approached through the road leading to flats, which result in thoroughfare and entry of strangers.

Commercialization: The flats along the main road are getting commercialized day by day and are also attracting outsiders in a locality.

Fig 5.4.45 Commercialization of flats

There is also no community center in a locality, where residents can sit and chit-chat. This results in lack of interaction between people.

5.4.14 INFERENCES:

- Less the number of roads approaching the site, less the intrusion by the intruders.
- Too many entries and exits at any level (whether at locality, cluster or dwelling unit level) create a sense of confusion and fear.
- If internal roads are not connected with each other, it reduces thorough movement and accidents.
- The places which are under the direct influence of residents are well maintained while others are not.
- Residences along the main road and the road which is used as a thoroughfare get commercialize very fast and attract outsiders.
- Positioning of other structure at proper location is very necessary to control thoroughfare.
- Recessed windows, covered shafts makes the task difficult for a criminal
- Overlooking terraces helps to increase neighborhood concept as well as provide natural surveillance.
- Lobby in a staircase acts as a good communication place in a block.
- Four units on each floor sharing common lobby generates a sense of belongingness between residents. Less or more than that creates confusion.
- Permanent finish keeps the façade in good condition and resists graffiti and vandalism.
- Natural surveillance through flats discourages intrusion.
- Lighter foliage plants provide visual permeability with screening.
- More the no. of windows more will be the no. of eyes watching strangers.
- Community parking in flatted development under the surveillance prevents vehicle theft.
- Proper demarcation of activities and creation of different spaces according to age group helps in creating activity in a locality.
- Backyards are prone to be used by the offender's rather then residents.
- Proper setback from the road is necessary to avoid commercialization.

If an area looks safe, feels safe.

5.5 Case study 4. MAYUR VIHAR-II, POCKET-C

5.5.1 GENERAL INFORMATION:

Year of Construction = 1985

Site Area = 120363sqm

Ground Coverage = 22%

Density = 665 residents/hectare

Area of DU = 80sqm.

No. of DU = 1500 housing units (Two bedroom)

No. of storey = G+3

Population = 8000 residents

Category = MIG+LIG

Circulation Area:

Road = 12000sqm

Pathways = 15000sqm

Area in parks = 30,000sqm

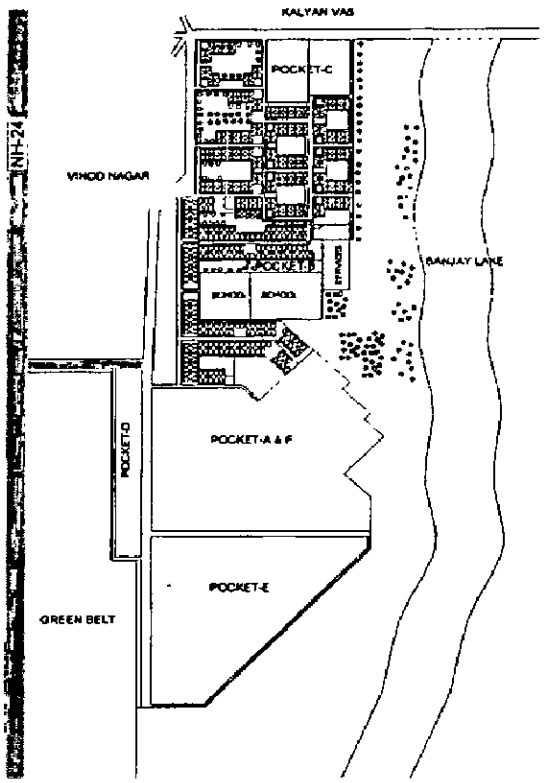


Fig 5.5.1 Layout plan

5.5.2 SURROUNDINGS:

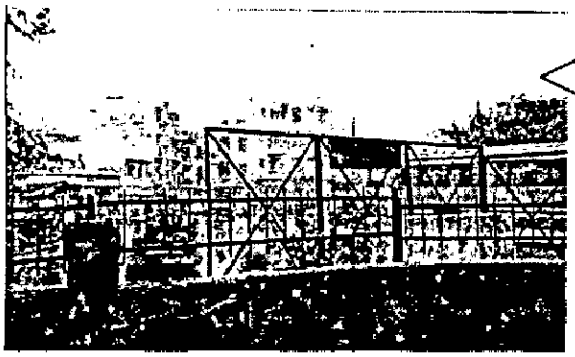


Fig 5.5.2 View of surrounding

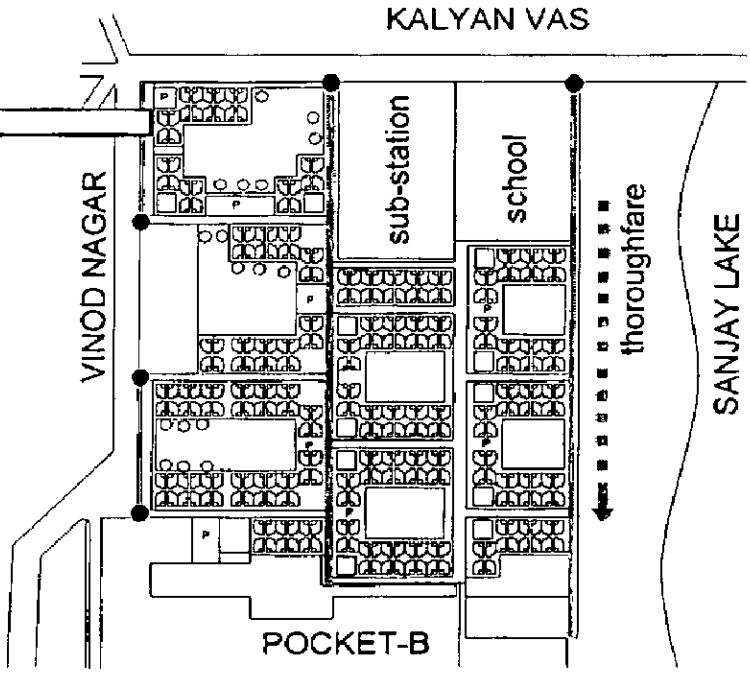
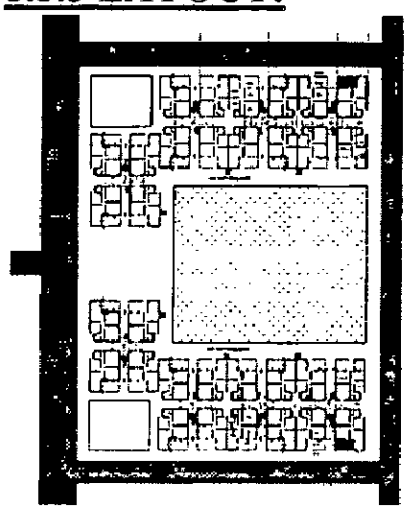


Fig 5.5.3 Surroundings

Pocket-C is surrounded by the Sanjay Lake, Kalyan Vas, Vinod Nagar and pocket-B. Kalyan vas and Vinod Nagar belongs to refugee colony and EWS of society. Due to number of entry and exits area is used as a thoroughfare by the maid servants and other workers to go to other pockets. *Due to this area is prone to crime.*

5.5.3 LAYOUT:



Road layout:

A typical Island type of road network has been laid in pocket-C. Due to this sort of planning, there is a *thorough movement of traffic* all round the blocks, *which provides offender an opportunity to runaway through vehicle very easily in any direction.*

Fig 5.4.4 Road layout

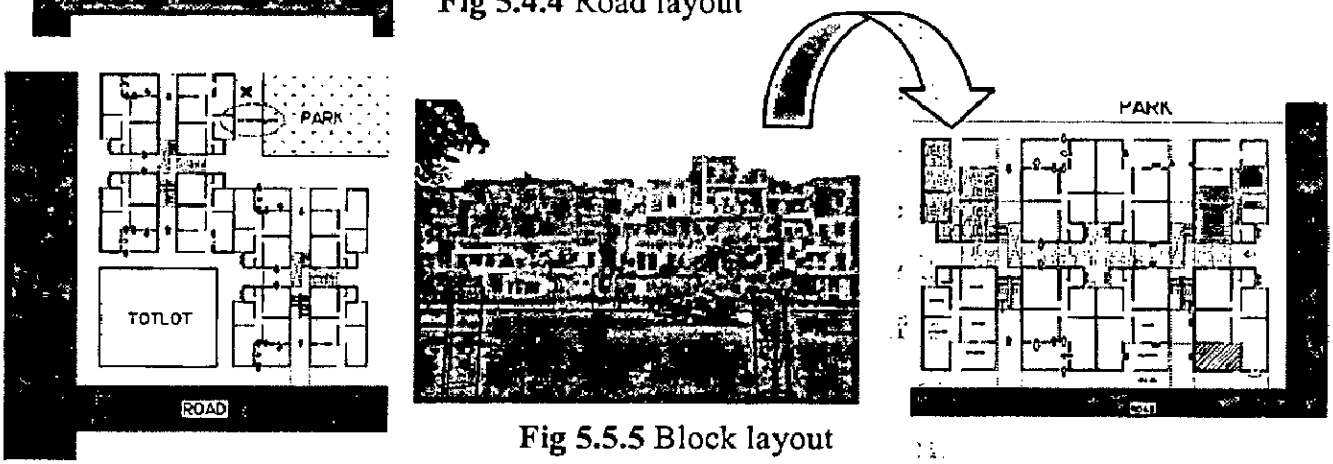
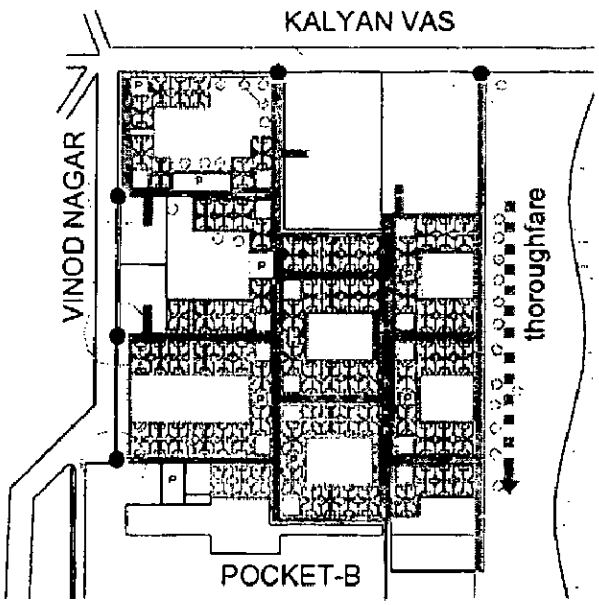


Fig 5.5.5 Block layout

Layout of blocks: In pocket-C, blocks are laid in such a way that in a cluster of 4 units on each floor, 2 units faces road while other 2 faces road, but due to improper location and size of windows, the surveillance through dwelling is not possible, which result in failure of planning. This makes an offender feel free.

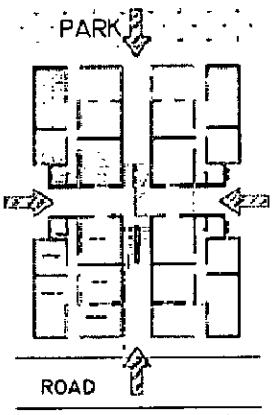
5.5.4 ACCESS CONTROL:



Locality level: At locality level pocket-C is approachable from all the sides. There is no access control, although boundary wall has been provided. There are five entries directly from the main road. All the internal roads are interconnected, so if an offender takes an entry from one of the road, he can go all along the pocket and can easily runaway.

Fig 5.5.6 Access to locality

Block level



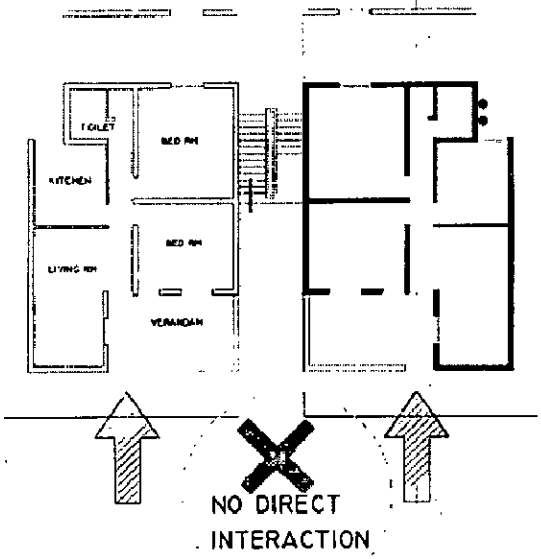
At block level, pocket-C lacks access control. Each block is approachable from all sides, so it is escape.

Also the access points are very narrow and remain dark even during day time and also lacks sense of space in terms of volume, which generate psychological fear.

Fig 5.5.7 Access to block

Fig 5.5.8 Approach to staircase

Dwelling Unit level:



At the dwelling unit level, it is seen that boundary walls are made to clearly mark the individual entrances and to control the access, but *the entrances are provided at opposite corners, which results in no direct relationship between neighbors*. Boundary wall height is also near about 6', which obstruct the eye to eye contact.

Fig 5.5.10

Fig 5.5.9 Access to dwelling

5.5.5 LANDSCAPE:

Fig 5.5.11 View of cascade

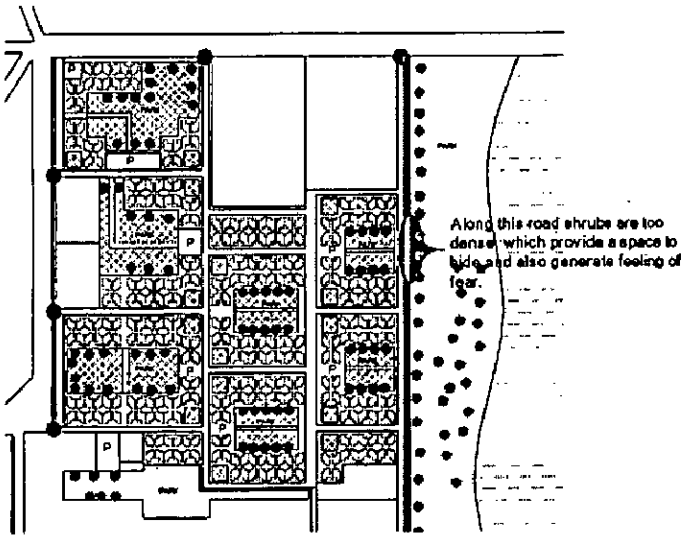


Fig 5.5.12 Landscape plan

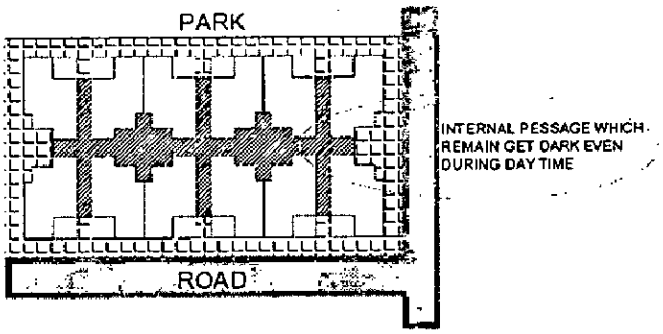
In pocket-C, Landscape is very well maintained, light foliage trees are planted along the road.

In parks, trees are planted in periphery and are kept properly trimmed that doesn't impede natural surveillance. Pathways are designed to walk and are very well lit. Fountain and attracting features are designed; **due to these parks are used even during night time for walk and remain active, which result in less intrusion by the strangers**

But at certain locations as shown in plan, shrubs are very dense and provide space for an intruder to hide. Due to this, road is not used even during the day time.

Fig 5.5.13 View of dense shrubs

5.5.6 LIGHTING:



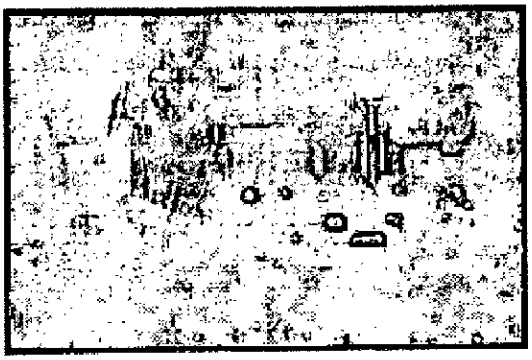
Day lighting: In pocket-C, internal passages have 1:4 height to width ratio, due to which these areas remain dark, even during the day time. These areas provide hiding space to intruders.

Fig 5.5.14

Street Lighting: Street lighting has been provided all along the road, but it is vandalized, due to which some areas of pocket-c become dark during night.

Park Lighting: Sodium lamps have been provided in the larger parks which made them use even during night hours, but smaller parks and tot lots have no light.

Fig 5.5.15 Sodium light in parks



Service areas: Like internal passage, parking areas have no provision of lighting; these areas provide space for hiding the criminals.

Fig 5.5.16 Dark spaces

5.5.7 DWELLING UNIT AND CLUSTER DESIGN:

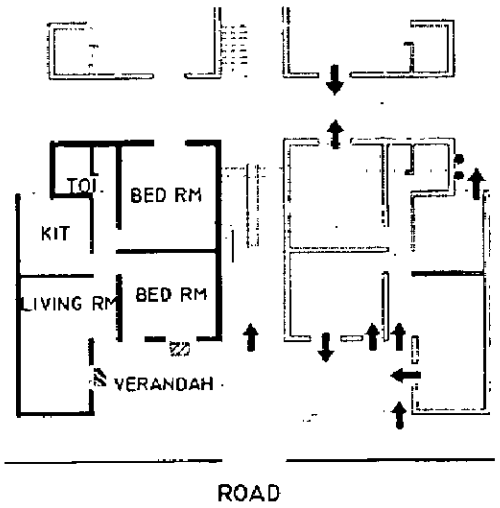


Fig 5.5.17 Layout of dwelling

Fig 5.5.18 View of dwelling

In pocket-C, dwelling unit design doesn't provide natural surveillance of an area, *single window have been provided in each room, which is also covered by cooler,* leaving no provision for surveillance. Commonly used rooms are provided in front but there, windows are open towards verandah.

Staircase is sandwiched between units and **has** no lobby for interaction. This results in very less interaction between neighbors.

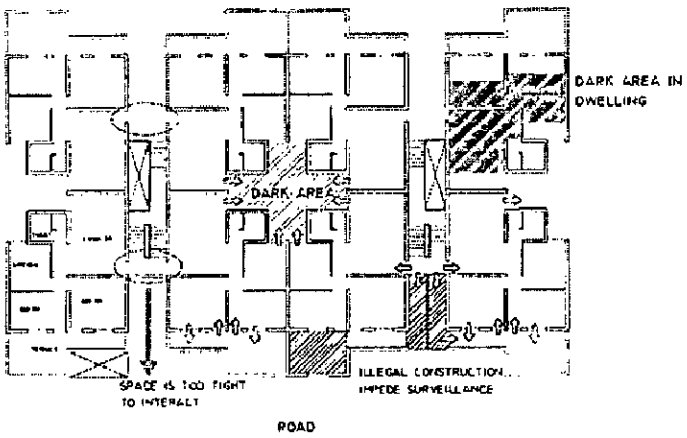


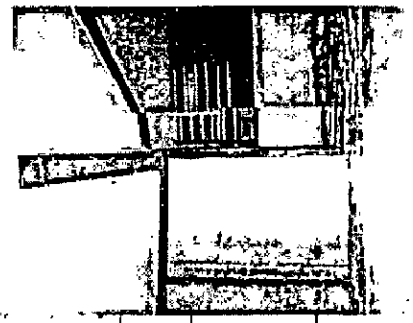
Fig 5.5.19 Layout of cluster

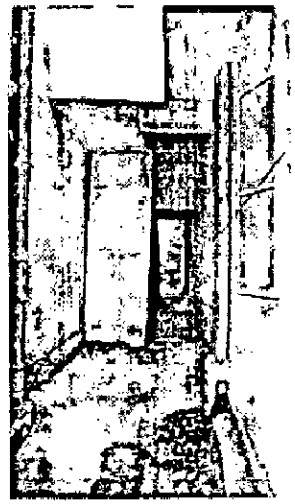
Fig 5.5.20 View of staircase

Dwellings are clustered in a group of 4. Upper floors have only one entranced which opens up in to the landing area of staircase, which is only 3'x6' wide. Area remains get dark due to its location.

Also illegal construction has been done by the residents which impede natural surveillance and also provide additional entry to the dwelling and access to upper floors.

ANALYSIS OF CLUSTER DESIGN

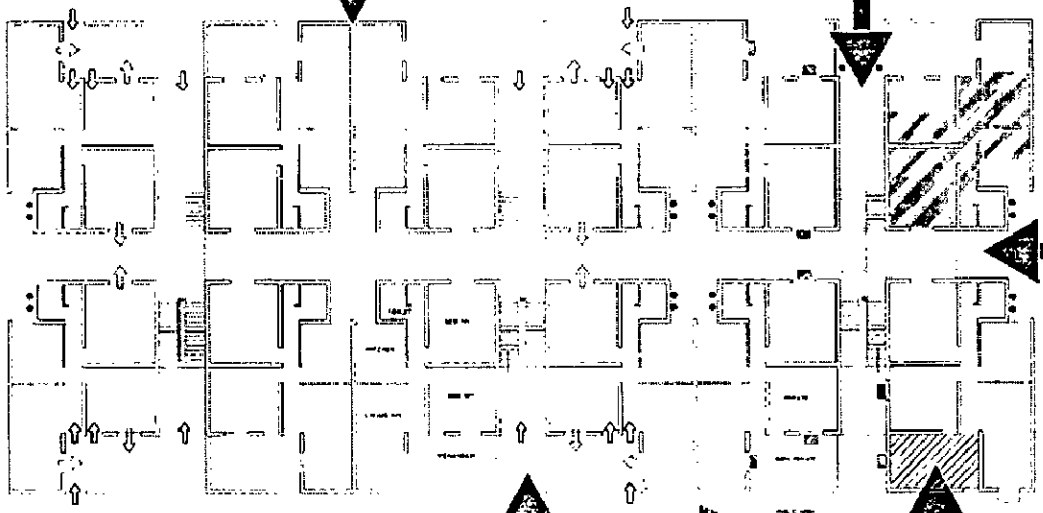




NO SURVEILLANCE THROUGH DWELLINGS

STAIRCASE IS HIDDEN BETWEEN BLOCK AND CAN BE APPROACHED THROUGH NARROW PASSAGE ONLY

PARK



SPACE LOOSES SENSE OF ENCLOSURE

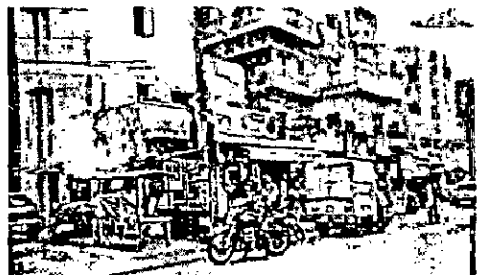
NARROW PASSAGE WHICH REMAIN DARK EVEN IN DAY TIME AND PROVIDE HIDDING SPACE TO OFFENDERS

ROAD

NO ACCESS CONTROL

UNAUTHORISED CONSTRUCTION IMPEDING NATURAL SURVEILLANCE

CARS ARE PARKED ON THE ROAD LEADING VEHICLE THEFT & ACCIDENTS



5.5.8 BUILT FORM:

Built form of pocket-c has static character. It has an image of public housing, without any play of built mass.

Fig 5.5.21 Monotonous built form

In pocket-C, built form provides an opportunity to access upper floors. *Windows have chajja at 7' level. Boundary wall height is 5'.* Both together acts as a ladder to approach upper floors.

Terraces are created at every floor, which looks in to the other dwelling terraces, *which provides an opportunity to interact with neighbors*

But most of the terraces are covered to create another room, due to which terraces losses it's vary purpose.

In pocket-C, **staircase leads** to the roof level, and all terraces are interconnected. These are occupied by the top floor residents and converted in to the dwelling unit.

Fig 5.5.22

5.5.9 SERVICES: In pocket-C, all the services are kept open in a service area. All the water meters are placed in an open in backyard, where they are not under surveillance and from most of the places they are stolen. Due to open pipes and uncovered drain, the service area is very badly maintained and residents feel bad to go in that area, due to which area is available for criminals to hide. Rain water pipe also provides access to first floor balcony.

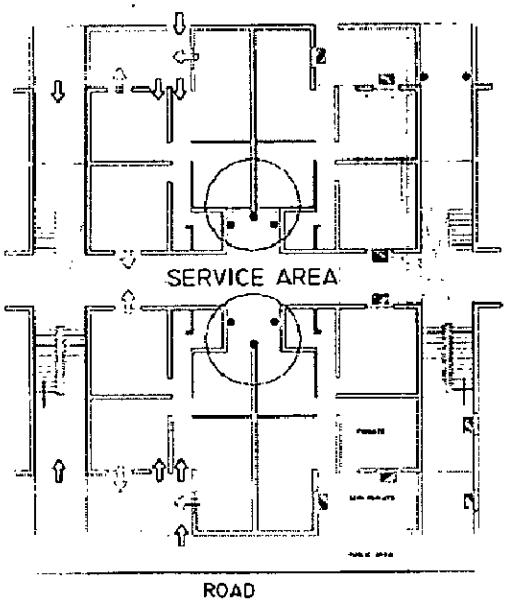
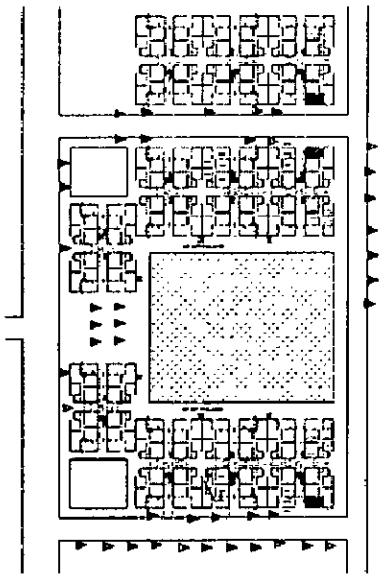


Fig 5.5.23 Layout (Open services)

Fig 5.5.24 (View of exposed services)

5.5.10 PARKING:

Parking is the biggest problem in pocket-C, no parking space has been provided at individual and community level.



In absence of designed parking residents are bound to park their vehicles on the road.

Parking on road

Since, roads are not visible from residences, these can be easily stolen. *Vehicle theft is the most common crime in pocket-C.*

Vehicles parked in the covered areas are stolen frequently in pocket-c, as covered spaces are neither in the surveillance of residents nor they are visible to passerby.

Fig 5.5.25 Road side parking plan

5.5.11 MATERIAL:

Façade material in pocket-c is simple plaster having cream color white wash. Due to this finish surface provides opportunity to graffiti artist to make graphics on the walls. This gives a bad image to the locality.

Fig 5.5.26 Graffiti on wall

Plant material is selected in such a way that the trees in front of dwellings have light foliage, to allow surveillance while trees planted in parks have dense foliage.

Door-Window

Fig 5.5.27

Windows are made up of L-shape angle iron frame, with a glass fitted from outside, which is easy to remove. Iron grill is very light and has little strength.

All external doors are **38mm thick flush doors** and also have additional **iron gates** which are quite strong, but *door and window is as strong as their weakest part.* Here locks/hardware detailing and position is not proper. Some instances have been reported in which criminal entered in the house by breaking the lock.

5.5.12 MAINTENANCE:

In pocket-C, parks and roads are well maintained but service areas are in very dilapidated condition.

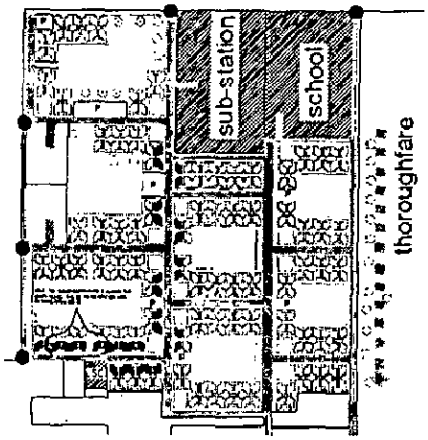
Service areas are lying between the clusters of dwelling unit and are cutoff from the circulation area. The space is used by residents to throw their garbage.

No body willing to go in these areas, due to which area is not maintained and used by strangers to hide.

Façade has white.wash, due to which it get dull very fast and gives the impression that area is poorly maintained.

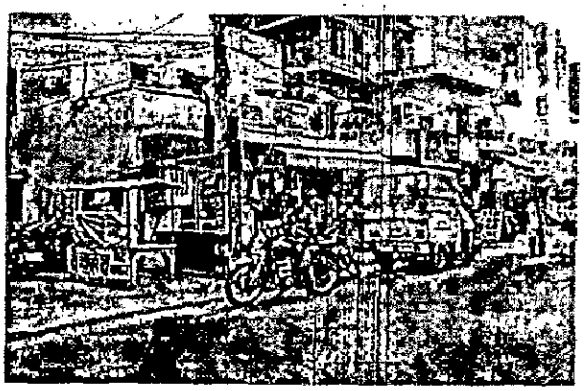
Fig 5.5.28 Exposed services result in poor maintenance of backyard

5.5.13 OTHER ACTIVITIES/STRUCTURES:



In pocket-C, the location of other structures like sub-station, school along the main approach road is also responsible for crime to some extent. Due to these areas in the locality, without any separate approach road, locality is used as a thoroughfare.

Fig 5.5.29 Location of school in locality



Commercialization: The flats along the main road are getting commercialized day by day and are also attracting outsiders in a locality.

Fig 5.5.30 Commercialization of flats

There is also no community center in a locality, where residents can sit and chit-chat. This results in lack of interaction between people.

5.5.14 INFERENCES:

- Number of entries in a locality is directly related to the incidences of crime. More the entry more will be the crime. Too many entries and access points provide opportunity for a criminal to escape easily, even if the boundary wall is provided along the site.
- The spaces which are not under the influence of residents are used by strangers.
- Fear of crime affects the life of residents more than the actual crime.
- Internal roads if connected with each other result in thoroughfare and traffic crimes.
- The flats which face the main road have higher chances of converting into shops, results in commercialization, which attract strangers.
- Projections and chajja provide ladder for criminals to access upper floor directly from the road.
- Staircase without any lobby space, results in less interaction between neighbors.
- Narrow & dark alleys between blocks; provide offenders a potential hiding space.
- Unauthorized construction, temporary finishes, open shafts, dark alleys gives the locality an image of public housing.
- Poor hardware detailing, improper position, no. of door & windows help criminals
- Trees planted near residences impede surveillance and provide easy access to upper floors.
- Interconnected terraces provide opportunity to enter from one point and escape from other point.
- If parking spaces are not provided in a locality, residents park vehicle on the road and make the task of criminals easy.
- Vehicles parked in narrow passages, backyards are more susceptible to crime, than the vehicles parked on the road because of poor surveillance of these areas.
- Small open spaces without any enclosure are not used by the residents.
- Compatibility of different land uses is necessary in neighborhood; otherwise it leads to intrusion and thoroughfare.

Image of housing is directly related with instances of crime in a locality.

5.6 Case study 5. ROHINI (Sector-7, Pocket-A1 & F25)

The biggest housing colony developed by DDA to accommodate the growing need of Delhi growing population. The Rohini is located in the outer Delhi and divided in to near about 60 sectors.

For the selection of site a survey of police stations have been done and found that **Rohini sector-7** is the most crime effected area. Two pockets based on the crime rate and with same demographic structure have been selected for study purpose. i.e. **Pocket A1 and F25**. Both the pockets have same design and other features. They are different in location

5.6.1 GENERAL INFORMATION:

Year of Construction = 1990

Site Area = 9280sqm

Ground Coverage = 28%

Density = 862 residents/hectare

Area of DU = 80sqm.

No. of DU = 128 housing units (Two bedroom)

No. of storey = G+3

Population = 800 residents

Category = MIG

Circulation Area:

Road = 3000sqm

Pathways = 2280sqm

Area in parks = 1400sqm

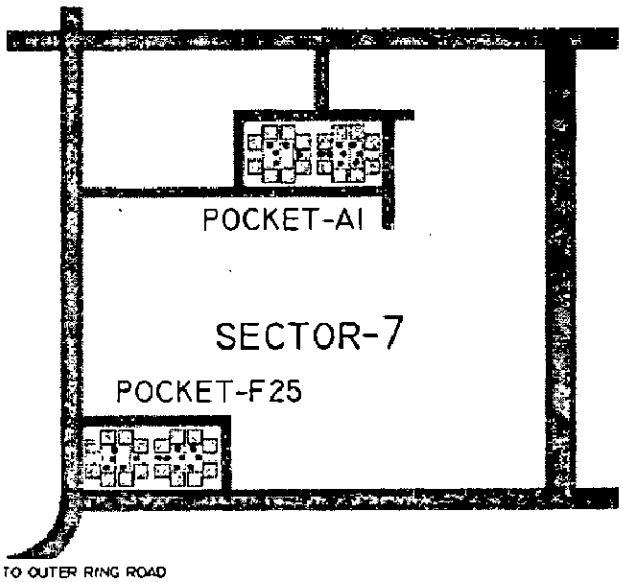


Fig 5.6.1 Layout plan

5.6.2 SURROUNDINGS:

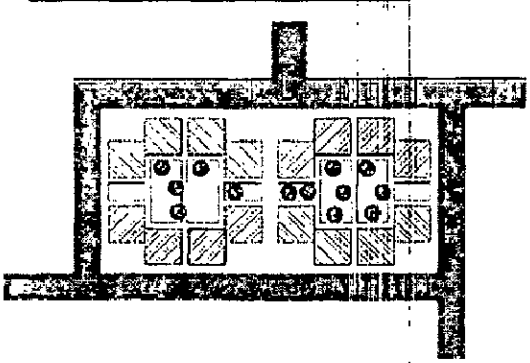
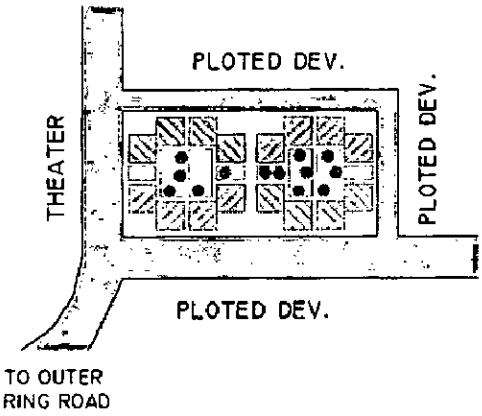


Fig 5.6.2 Surrounding

Pocket-A1 is surrounded by plotted development from all the four sides and has plotted development all around.

Fig 5.6.3 View of surrounding



Pocket-F25 is located on the intersection of two major roads and is surrounded by plotted development from three sides and fourth side has theater and office complex.

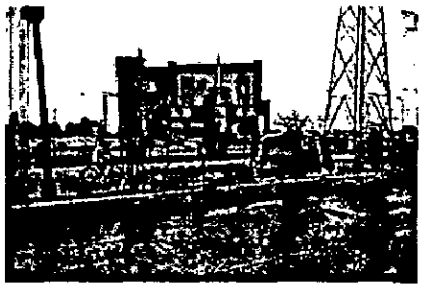


Fig 5.6.5

Fig 5.6.4 *Due to their surroundings, both the areas get highly commercialized and attracting lot of outsiders.*

Except location and surrounding all other design factors are same in both pockets.

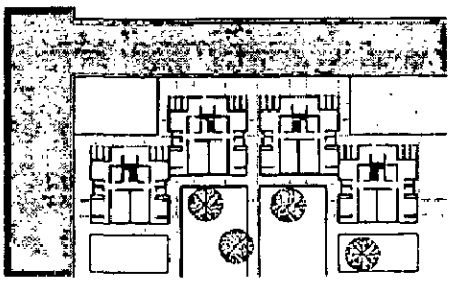
5.6.3 LAYOUT:

Road Layout:

A typical Island type of road network has been laid in both the pockets. Due to this sort of road layout, there is a *thorough movement of traffic* all round the blocks, *which provides offender an opportunity to runaway through vehicle very easily in any direction.*

Fig 5.6.6 Road layout

Layout of blocks:



Block comprise of 8 dwelling, two on each floor, placed side by side.

Staircase is hidden between the blocks.

No setback has been left from the road, leads to the commercialization of an area.

Fig 5.6.7 Layout of blocks

Courtyard planning concept has been used, but instead of facing front and opening windows towards court, backyard faces court. Even the staircase faces the road.

Due to this courtyard loosing its purpose of acting as an interaction space

Resident feels fear to send their children's to play in courtyard as there is no surveillance possible and secondly court is approachable from all the sides.

This makes an offender feel free in a locality.

5.6.4 ACCESS CONTROL:

Locality level

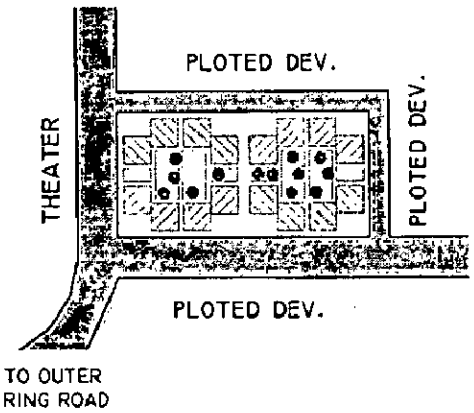


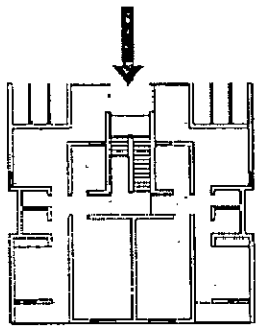
Fig 5.6.8 Access to locality

At locality level, there is no access control and defined entrance to the colony, it can approached from any where one likes, as it is surrounded by road from all the sides.

There is no boundary wall and security check post. Secondly there is no setback from the road to create an enclosure.

This gives an opportunity to offender, to commit crime and escape from anywhere he likes.

Block Level



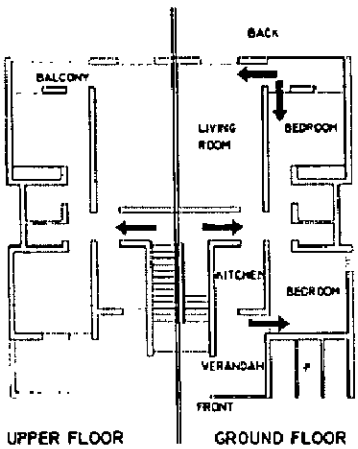
Block is approached through only front, as staircase is enclosed between the block and closed from back.

But there is no hierarchy of space, there is direct approach, from public area to private area.

Fig 5.6.9 Access to block

Fig 5.6.10 Access to staircase

Dwelling Unit Level:

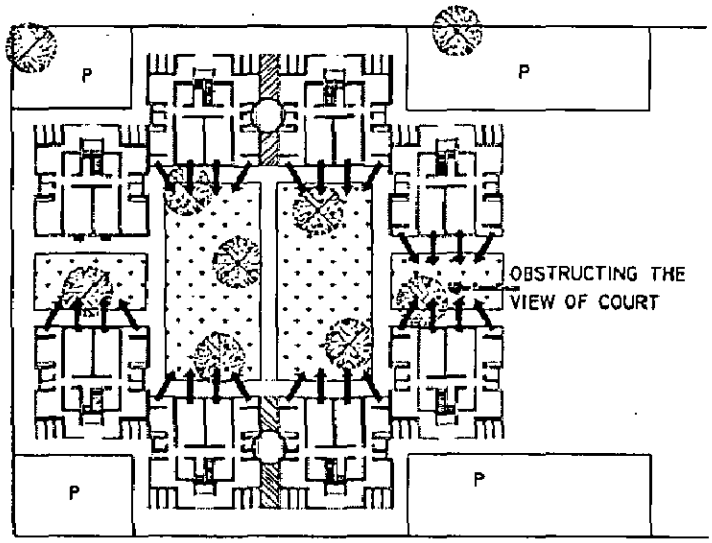


At DU level, Ground floor *has four entrances in a three room house*, which make it difficult to control access. This provides opportunity to offender to take entry in a house and this is the basic reason of burglary in an area.

Fig 5.6.11 Access to dwelling

At upper floor level, there is one approach to the dwelling. Due to this, residents of upper floor feels more secure compare to Ground floor.

5.6.5 LANDSCAPE:



No consideration has been given to design of landscape and location of trees/street furniture. Trees and shrubs in the courtyard are growing themselves and obstructing the view from windows which impede surveillance.

Fig 5.6.12 Landscape plan

Fig 5.6.13 View of court

At some locations trees provide access to first floor balcony also and their dense foliage obstructs the lighting, making a space dark.

Fig 5.6.14 View of dense shrubs

There is also no change in surface material between public and semi public spaces, *which results in no territorial reinforcement.*

5.6.6 LIGHTING:

Day lighting: Spaces between blocks are in the ratio of 1:2 due to which the areas remain lit during day time. But at certain locations, due to dense foliage of trees, light doesn't penetrate into areas, which provide potential hiding space to offender.

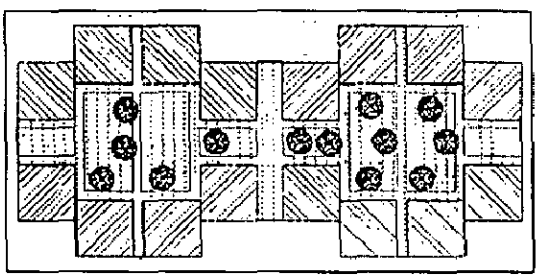


Fig 5.6.15 No street lighting

Street lighting: No street lighting has been provided inside the locality (as it is clear from the picture, no electric pole is visible), due to this area become dark during night and provides opportunity for criminals to perform their task.

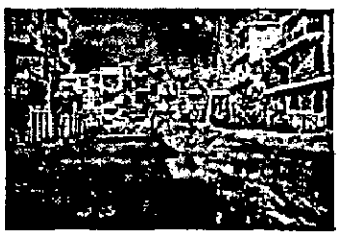
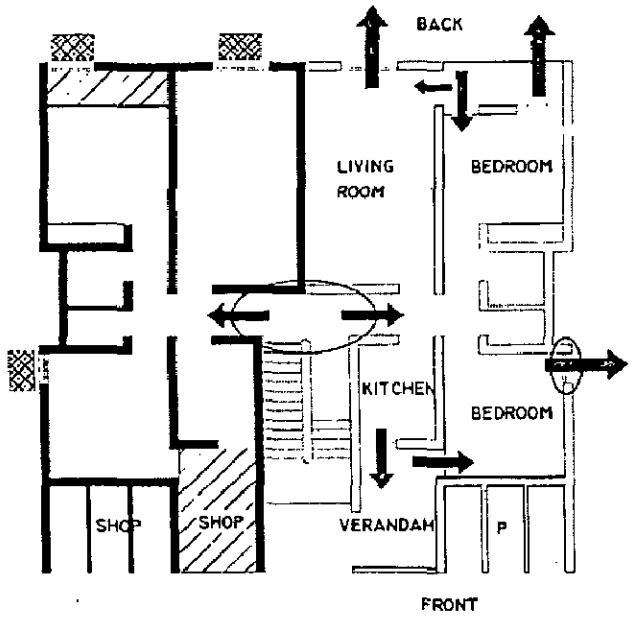


Fig 5.6.16

Courtyard: No street lighting has been provided, due to this courtyard is not used during night by the residents, incidents of crime generally occurred their in night.

5.6.7 DWELLING UNIT & CLUSTER DESIGN:



Dwelling unit design doesn't provide natural surveillance of an area, as *single window have been provided in each room, which is also covered by cooler,* leaving no provision for surveillance.

Front verandah are also been converted into shops as front of houses directly faces the road, due to which possibility of surveillance become nil through houses.

Fig 5.6.17 Layout of dwelling

Staircase is sandwiched and hidden between units and has no lobby for interaction. This results in very less interaction between neighbors.

The landing remains dark, even during day time and there is no access control to staircase, so it is used by strangers to relax, even in day time.

Surveillance from one dwelling to another dwelling is also not possible as no dwelling faces each other. Dwelling faces road.

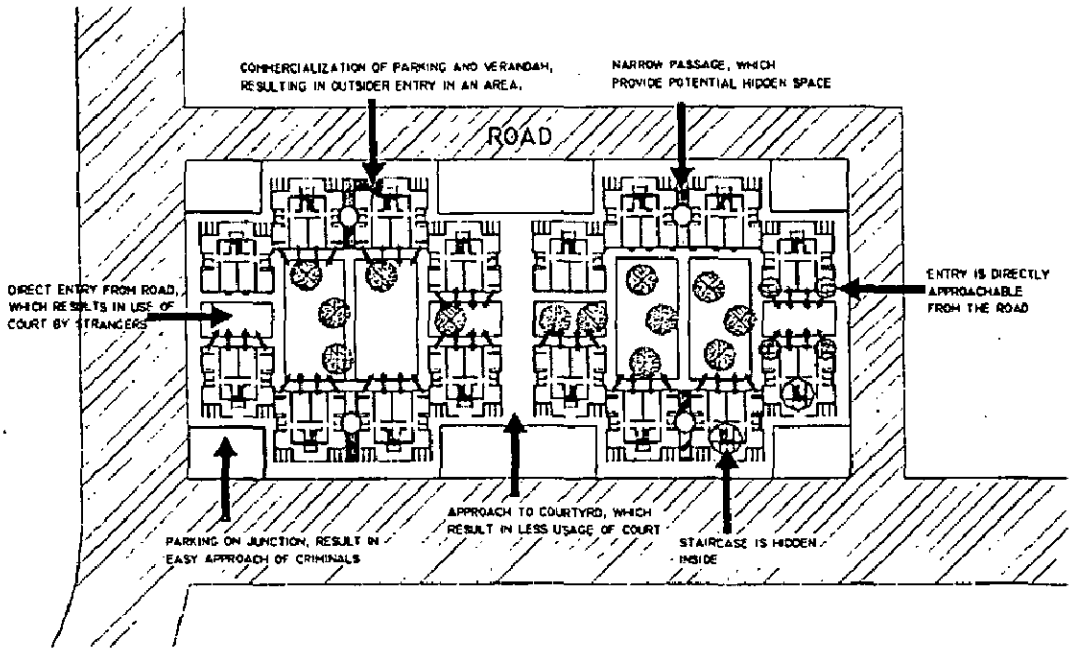


Fig 5.6.18 Cluster Layout

5.6.8 BUILT FORM:

Built form has a static character and due to unauthorized construction, the area got image of public housing

Built form provides an opportunity to access upper floors. *Windows have chajja at 7' level. Boundary wall height is 5'.* Both together acts as a ladder to approach upper floors

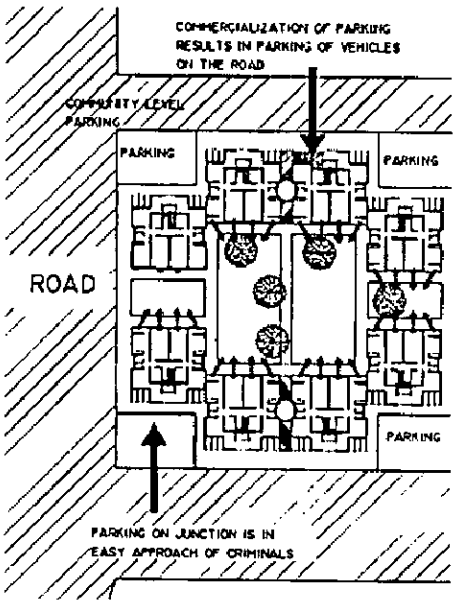
Fig 5.6.19 View of locality showing built form

Balcony are created at every floor, which looks in to the other dwelling terraces, *which provides an opportunity to interact with neighbors*

But most of the balconies are covered to create another room, due to which balcony losses it's vary purpose.

Terrace is used only for services and is not approachable through staircase and also not connected with other blocks, *which prevent bock to block movement through terrace.*

5.6.9 PARKING: Car parking is provided at community level, while scooter garage is provided in every block.



Car parking is provided at community level, but these parks are in the direct approach of strangers from road and have no boundary wall around them. There is no lighting also in car parks. They become easy potential for criminals in night time. Surveillance is also not possible due to unauthorized construction.

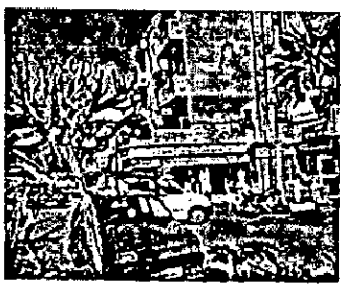


Fig 5.6.20 Parking

Fig 5.6.21 Parking layout

At block level, scooter garage is provided, but these *garages are converted in to the shops*, resulting in parking of vehicle on road.

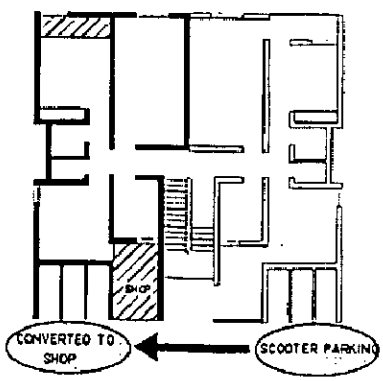
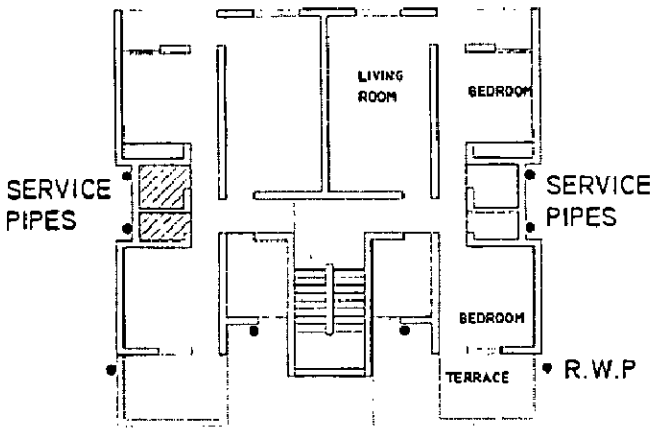


Fig 5.6.22

5.6.10 SERVICES:



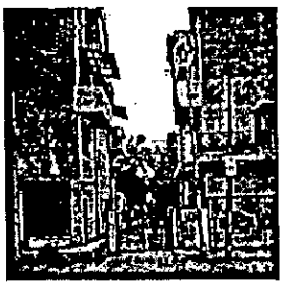
No service area has been designed; services are spread all along the block. Services pipes are open and give a bad image to a locality.

Public property like manhole covers is stolen from some locations.

Rain water pipe provides access to first floor terrace.

Fig 5.6.23 Exposed services

5.6.11 MATERIAL:



Facade material in pocket-c is simple plaster having cream color white wash. Due to this finish, surface provides opportunity to graffiti artist to make graphics on the walls. *This gives a bad image to the locality.*

Fig 5.6.24 White wash surface finish

Windows are made up of L-shape angle iron frame, with a glass fitted from outside, which is easy to remove. Iron grill is very light and has little strength.

All external doors are **38mm thick flush doors** and also have additional **iron gates** which are quite strong, but locks/hardware design, quality and position is not proper. Some instances have been reported in which criminal entered in the house by breaking the lock.

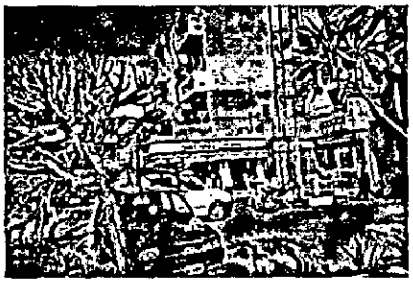
5.6.12 MAINTENANCE:

Maintenance of public areas is very poor in locality. Courtyard is used to throw garbage, as it is cutoff from the circulation area.

No body willing to go in these areas, due to which area is not maintained and used by strangers to hide.

Facade has temporary finish (white wash), due to which it get dull very fast and gives the impression that area is poorly maintained.

5.6.13 OTHER FACTORS:



Commercialization: All the flats in pocket face the main road and commercialized. Due to this there is a lot of movement of strangers in a locality.

Fig 5.6.25 Commercialization of flats

No boundary wall has been provided around the housing and there is no setback from the road, due to this, residences are in the direct reach of criminals.

Fig 5.6.26 Open boundary

There is also no community center in a locality, where residents can sit and chit-chat. This results in lack of interaction between people.

So from the study of design factors of pocket-A1 and pocket-F25, it is clear that, design plays an important role to make an image of a locality, whether it will become targeted or not.

Location is the secondary issue.

5.6.14 INFERENCES:

- Island type of planning results in no access control.
- Too many entries and access points at locality level provide opportunity for a criminal to escape easily.
- Courtyard planning looses it's vary purpose if the residences doesn't face court.
- Proper location of rooms in a dwelling is necessary for proper surveillance.
- Balconies are more prone to get covered, results in no surveillance from dwelling than the double height terraces.
- Area will be more prone to be used as a thoroughfare if no boundary wall will be provided around the locality.
- No setbacks from the main road provide easy access to dwelling unit and are more prone to get commercialize.
- Extrovert planning and location of main road around dwelling leads to commercialization.
- Absence of community spaces in a locality, results in no neighborhood concept among residents.
- Temporary finishes attracts graffiti.
- Improper location of trees, dense shrubs impedes surveillance.
- Hidden staircases serving two flats on a floor result in less interaction between neighbors.
- Poor workmanship, material (*hardware especially*) and maintenance give the locality an image of public housing and opportunity to offenders.
- Blind corners, Niches, narrow passages provide hiding spaces to criminals.
- Improper location of parking spaces results in vehicle theft.
- Garages facing the main road generally converted into shops; result in parking of vehicles on the road.
- Dark spaces, ill maintained areas provide good shelter to criminals and keep the residents away.

Same design faces the same kind of threat from crime irrespective of its location.

5.7 PROBLEMS IDENTIFIED IN OUR RESIDENTIAL ENVIRONMENT

- Too many entries and access points.
- Poor layout of housing and dwelling design that doesn't provide opportunity of surveillance.
- Places of concealment for attackers such as vacant structures, dense shrubbery, trash accumulations, isolated parking areas etc.
- Inadequate lighting and physical security.
- Situations that create potential access difficulties for police
- Poor building detailing that provide easy access to criminals in house.
- Easy escape routes.
- Poor surveillance.
- Improper parking locations.
- Hide out spaces in buildings.
- Easy access to terrace, shafts and upper floors.
- Dense foliage that impede surveillance and provide opportunity of hiding.
- No interaction spaces in a locality.
- Lack of neighborhood environment.
- Incompatible land uses in locality which result in thoroughfare.

5.8 OBSERVATIONS OF CASE STUDIES (Design factors):

5.8.1. LAYOUT

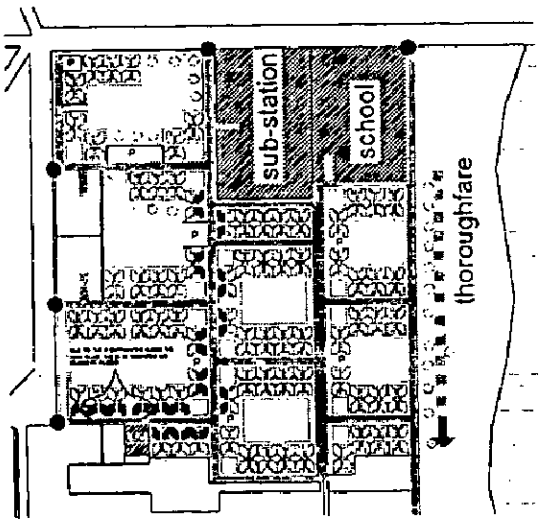


Fig 5.8.1 Layout having too many entrances and exits provides easy escape route to criminals. Connected internal roads results thorough

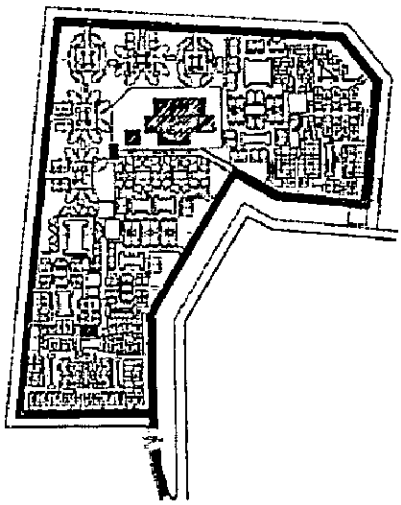


Fig 5.8.2 Locality approached through one entry restricts the movement of strangers.

Disconnected internal roads prevent

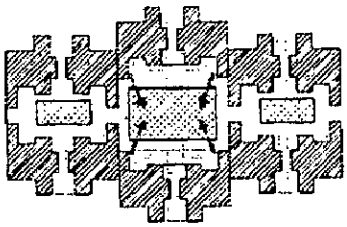


Fig 5.8.3 Plan of court

Courtyard planning defines the territory, provides opportunity of interaction and surveillance.

Fig 5.8.4 View of court

Fig 5.8.5

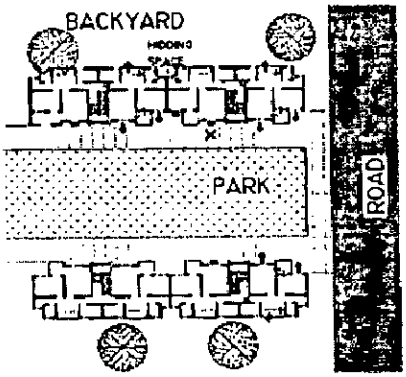


Fig 5.8.6

This type of layout doesn't provide any enclosed space, to sit and interact with neighbors. Are appears open and looks there is no access control, which result in very less utilization of space.

5.8.2. DWELLING UNIT & CLUSTER DESIGN

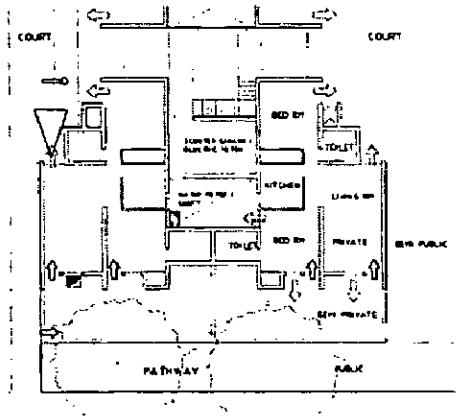


Fig 5.8.7

DU having windows on all faces provide surveillance of every space is possible. Most commonly used rooms if placed in front, provide good surveillance.

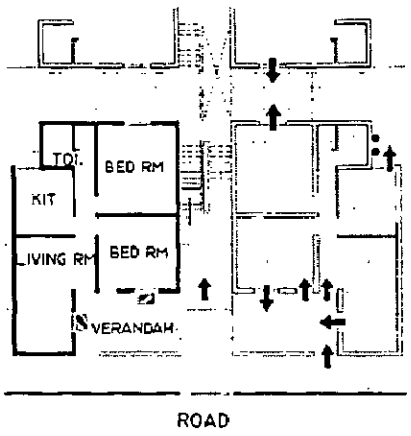


Fig 5.8.8

Dwelling unit having windows open in internal area doesn't provide natural surveillance of an area.

This type results in less interaction between

Staircase lobby

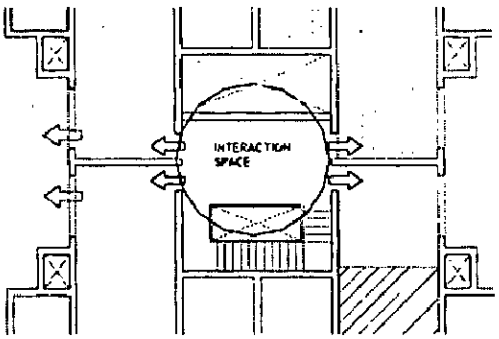


Fig 5.8.9

This kind of lobby provides an opportunity of interaction and surveillance of others entry, as all the dwellings are opening in a common lobby.

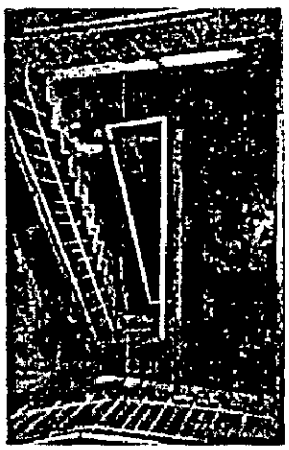


Fig 5.8.10

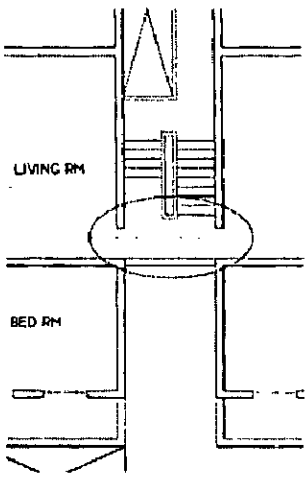
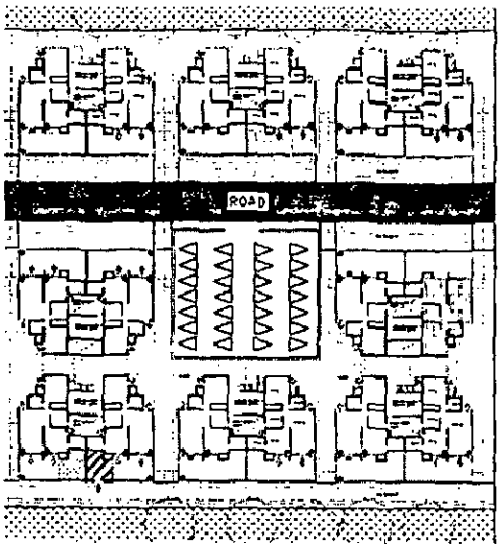


Fig 5.8.11

This kind of lobby doesn't provide opportunity of interaction because of its small size and no place for standing.

Fig 5.8.12

5.8.3. PARKING



Community levels parking that is in small groups, located between the clusters of DU, close to the dwellings they serve and open to view of the residents from regularly habitable rooms are less prone to crime.

Fig 5.8.13

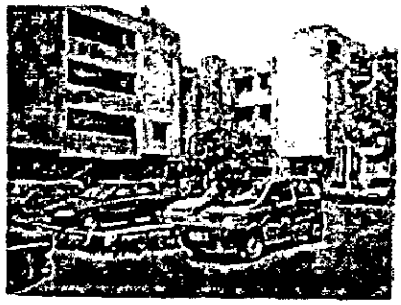
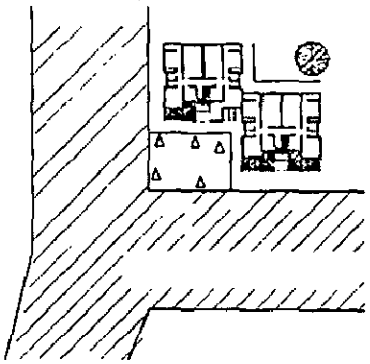


Fig 5.8.14



Parking space located on the direct approach of main road and is not under the surveillance or residents are prone to vehicle theft and other crimes.

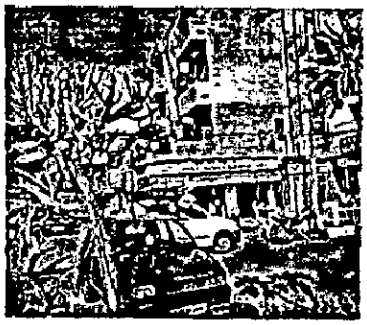


Fig 5.8.15

Fig 5.8.16

5.8.4. SERVICES

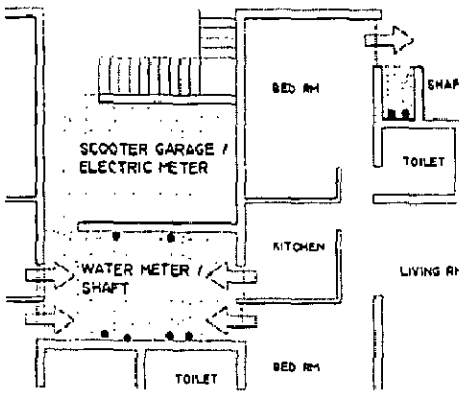


Fig 5.7.17

Services enclosed in a shaft and are in the surveillance of residents are less prone to crime and gives a locality a good image.

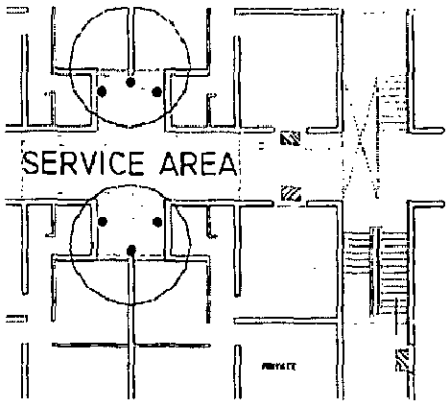


Fig 5.7.18

Services in open areas result in poo maintenance of space and als provide good hiding space t criminals.

Fig 5.8.19

Landscape areas having elements of attraction are more utilized and give a good image to locality.

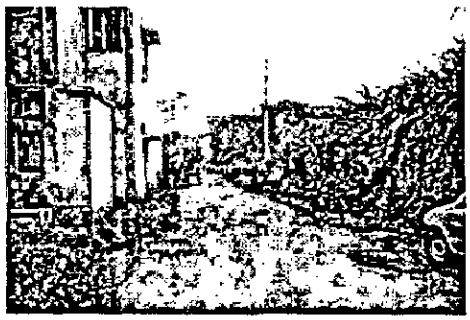


Fig 5.8.20

Areas having dense shrubs provide potential hiding space for criminals and keep the residents away.

5.8.6. BUILT FORM

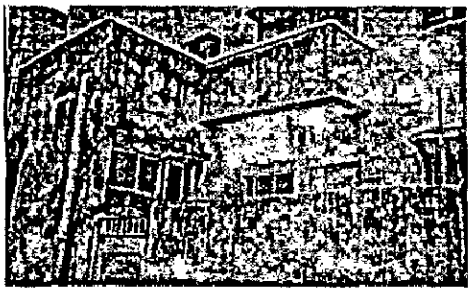


Fig 5.8.21

Monotonous built form, with projected chajjas above window

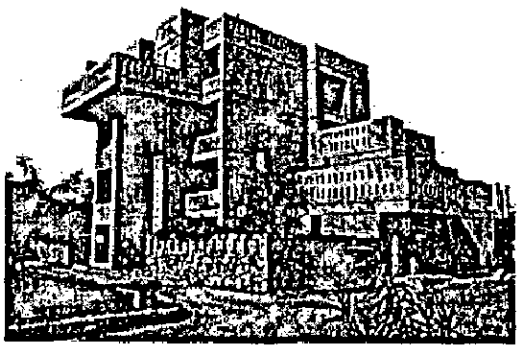


Fig 5.8.22

Dynamic built form, having play of terraces, solid and voids, recessed windows avoid access to upper floor and provide locality a good image.

5.8.7. MATERIAL

Fig 5.8.23

Temporary finishes are more prone to vandalism and graffiti and gives a bad image to locality.

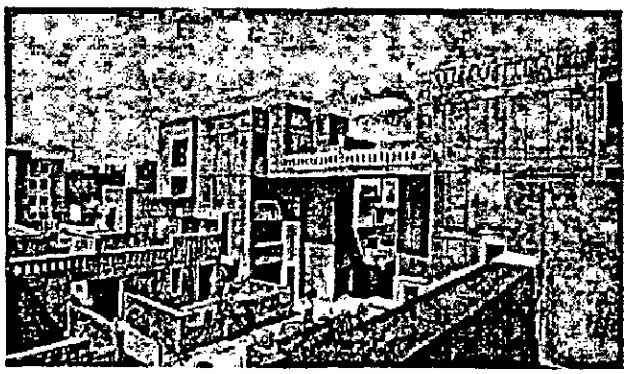


Fig 5.8.24

Permanent and natural finishes avoid graffiti and gives a locality a good image and enhance the sense of pride in residents.

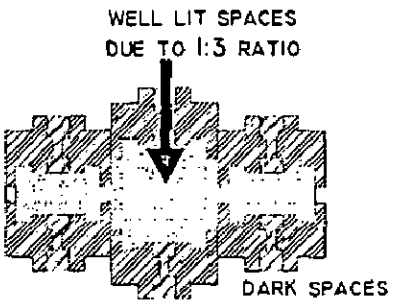


Fig 5.8.25

Enclosed spaces having height to width ratio more than 1:2, remain well lit and give a sense of enclosure, while spaces with ratio less than 1:1, gives claustrophobic feeling, remains dark & result in less utilization .

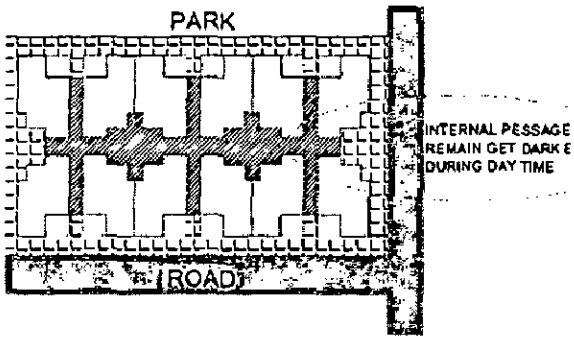


Fig 5.8.26

5.8.9. SERVICE LANES

Fig 5.8.27

Service lanes designed separately and away from circulation route, provide hiding space for criminals and also result in poor maintenance.

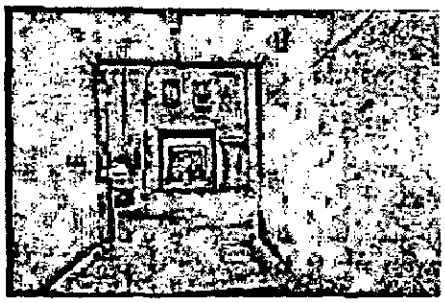


Fig 5.8.28

Services lanes designed as a pedestrian circulation routes, increases its usage, become less vulnerable to crime and also result in good maintenance.

5.8.10. BOUNDARY

Fig 5.8.29

Low height boundary, increase the territory of dwelling, provide natural surveillance of surroundings and helps in maintenance of surroundings.

Fig 5.8.30

Fortress kind of boundary, result in poor maintenance of an area, poor surveillance of public areas and helps criminals to move freely in locality.

DESIGN GUIDELINES

After the extensive literature study, field surveys and case studies of various housing societies, we are now in a position to be able to frame design criteria for the security of residential buildings against crime. These criteria can be directly inferred from the study of the preceding chapters.

Topics covered in this chapter:

- **General**
- **Design Guidelines**
- **Do's and Don't**

CHAPTER 6

6.1 GENERAL:

From the study it is clear that Crime can be prevented by following concepts:

1. NATURAL SURVEILLANCE

The fundamental premise is that criminals do not wish to be observed. Surveillance or the placing of legitimate 'eyes on the street' increases the perceived risk to offenders. This may also increase the actual risk to offenders if those observing are willing to act when potentially threatening situations develop. So the primary aim of surveillance is not to keep intruders out (although it may have that effect) but rather, to keep intruders under observation.

2. NATURAL ACCESS CONTROL

The primary thrust of an access control strategy is to deny access to a crime target and to create a perception of risk to offenders.

3. TERRITORIALITY

People naturally protect a territory that they feel is their own, and have a certain respect for the territory of others. The basic idea of this concept to define and extent the limit of boundary of residents, so that resident's feel the space around him belongs to his dwelling. Identifying intruders is much easier in such well defined spaces. This discourages potential offenders because of users' familiarity with each other and the surroundings.

4. MAINTENANCE AND IMAGE

This is related to the neighborhood's sense of 'pride of place' and territorial reinforcement. The more dilapidated an area, the more likely it is to attract unwanted activities. The maintenance and the 'image' of an area can have a major impact on whether it will become targeted or not.

5. NEIGHBORHOOD CONCEPT

It is a concept that is related with the relationship/contacts between neighbors. Good relationship among residents not only prevents the crime, but also creates a larger family in which hundreds of eyes keep the locality under surveillance. This gives the opportunity of acting together in case of crime and increase the perceived risk of getting caught by the people together.

The Architectural vocabulary of the above concepts will frame the guidelines.

6.2 GUIDELINES FOR CRIME PREVENTION IN RESIDENTIAL AREAS (ARCHITECTURAL VOCABULARY)

6.2.1 LAYOUT: Layout of a locality has direct relationship with the incidences of crime. Layout which provides natural surveillance, access control and inherent maintenance gives the locality an image and the 'image' of an area can have a major impact on whether it will become targeted or not.

Layout of roads:

- Locality should have minimum roads and should occupy minimum area that leads to minimum traffic movement in a locality, leads to less no. of traffic crimes.
- There should be a single major road and should not cross the locality.
- All internal roads should be disconnected with each other; a peripheral road should be laid to connect internal roads.
- Minimum width of road should be equal to the height of surrounding building, less than this can be claustrophobic.
- Footpaths should be designed along with road to avoid traffic crimes
- Pedestrian pathways should be provided to connect the colony internally.
- Internal routes should be well connected to their surroundings/dwellings to maximize their use and maintain a high frequency of trips.

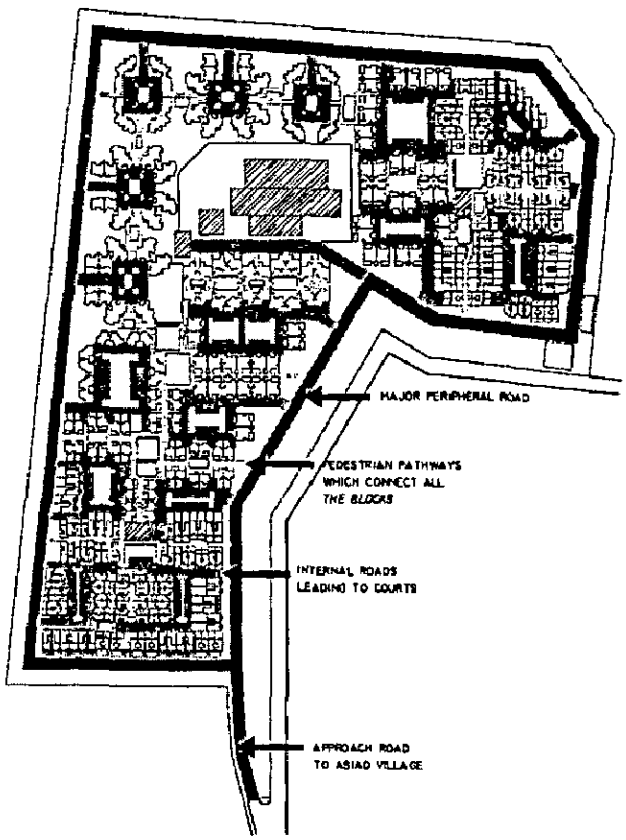


Fig 6.2.1 Layout of locality

Layout of blocks:

- Layout should be divided into small distinct neighborhoods or identity areas each with a recognizable character. This will provide residents with a sense of "ownership" and "collective concern" for the area and increases the chance of strangers being noticed.

- Layout should encourage natural surveillance of public areas, parking, streets, other dwellings etc.
- The layout should seek to provide clear distinction between private, semiprivate and public spaces.
- Blocks should be laid across the main road to avoid commercialization of dwellings and if not possible, should have proper setback from the road.

Courtyard type of layout is best suited as security is concerned. It defines the territory, provide spill out spaces, which increases interaction between neighbors and create enclosed space where children can play. This also provides opportunity for natural surveillance from dwelling.

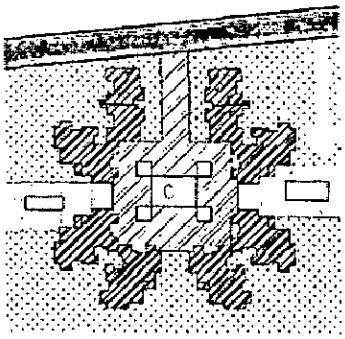


Fig 6.2.2

Width of court: [10]

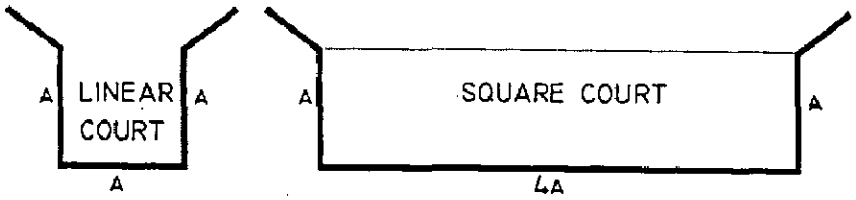


Fig 6.2.3

- In case of linear court, it should have a minimum 1:1 height to width ratio and max 1:2.5
- Incase of square court, it should be maximum 1:4 ratio.

Layout of Play areas and Public spaces:

- Children's play areas should be located in close proximity to residential dwellings to ensure high levels of natural surveillance by parents.
- Play provision for specific age groups should be segregated through the use of effective boundary treatment to limit misuse of facilities by other age groups.
- Public spaces should be located in the view of dwellings and vice versa.

6.2.2 DWELLING UNIT AND CLUSTER DESIGN:

Dwelling is the smallest part of the overall scheme, but its design should have a major role of being targeted or not.

- Design should be such that it provides opportunity for natural surveillance.
- Commonly used rooms should be kept in front like kitchen or family lounge.

- Dwelling entrances and exits should face the street or be otherwise overlooked from occupied public space or adjacent dwelling.
- Dwelling should have fewer doors but more windows.
- Locate windows in normally occupied rooms with a view over public space wherever possible.
- Avoid blank, windowless street-level facades.
- Rooms should have a separate space for fixing A.C., Cooler etc, so that they don't occupy the windows.

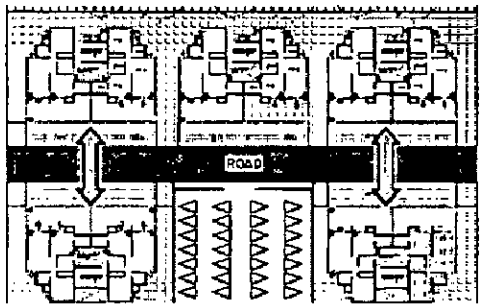


Fig 6.2.4 Parking layout

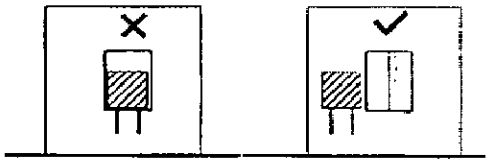


Fig 6.2.5

Cluster design

- **In a cluster** Lobbies, corridors, stairwells and elevators, are most vulnerable. These areas should be visible from outside and public areas.
- Main staircase should not approach the terrace; otherwise offender can take entry from one terrace and exit from other.

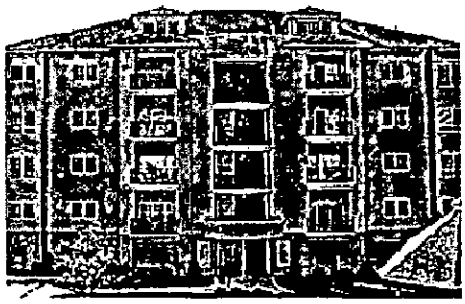


Fig 6.2.6 Stair visible from out

- All terraces should be disconnected to avoid thorough movement at terrace level.
- A cluster of four to six units per floor is recommended to have good interaction between neighbors.
- In a cluster, doors to dwellings should not be isolated from lobby, but grouped in lobby serving other dwellings.

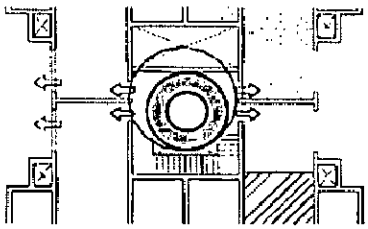


Fig 6.2.7 Lobby

6.2.3 BUILT FORM:

Form of a building plays an important role in deciding about the image of a locality. Monotonous and repeated form gives the image of public housing and provides psychological strength for offender to commit crime.

While dynamic form with play of terraces, solid and void, light and shades creates interest in built form and gives the community an identity and sense of pride among residents.

- Built form should have a character, play of solid and void, terraces, light and shade to create an interest and break the image of public housing.
- Building and spaces not only have to be in scale with people, they have to be in scale with each other
- Terraces should overlook each other to increase the interaction.
- Sharp corners, niches and hidden spaces should be avoided.
- Built form should not provide ladder for criminals to approach upper floors.

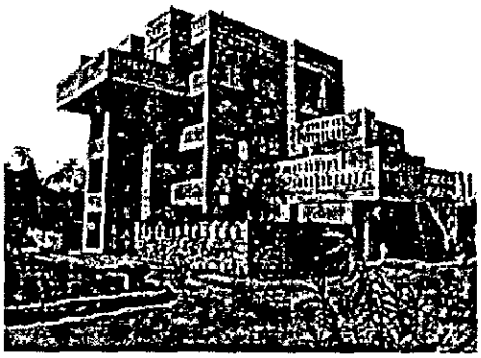


Fig 6.2.8 Terraces

- Projections/chajja above windows should be avoided, rather windows should be recessed.
- Different height of units should be designed to break the monotony, like some G+1, G+2, G+3 etc.
- Double height balconies should be provided to discourage the unauthorized construction that impedes surveillance.

6.2.4 ACCESS CONTROL:

The primary thrust of an access control is to deny access to a crime target and to create a perception of risk to offenders.

At locality level

- Access points into a locality should be kept to the minimum required to serve the needs of the area and preferably one, guarded by security check post, to control the movement of stranger.
- Entrance gate should be designed to give the stranger a feeling that one is entering in to a private territory.

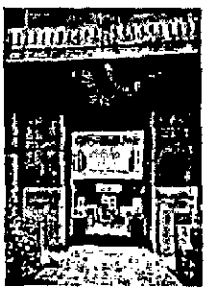


Fig 6.2.9

At Cluster level:

- There should be a defined entrance, defined with landscape, gateways and terraces, so one feels entering in to a private space.
- Entrance can further be enhanced by change in material, change in level etc.
- Entrance should be clearly visible from the road for proper surveillance.

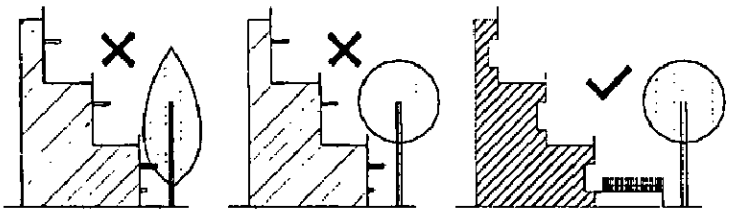
At dwelling unit level

- Dwelling should have one entry/exit
- Dwelling at ground floor should have boundary wall defined by landscape, fencing etc to allow surveillance of surroundings.
- Entry should face the other dwelling entrance also.
- At upper floor levels, entry should be through common lobby, facing the entry of other dwellings.

6.2.5 LANDSCAPE:

Landscape design helps to improve the appearance of an area. It adds texture and color and softens harsh building materials and outlines. Used wisely it can also make a positive contribution to crime prevention. It can protect buildings and spaces and create a feeling of confidence in an area. It enhances the usage and image of an area.

- Trees should be planted all along the roads to create a lively environment. A lighter foliage variety should be used to provide visual permeability whilst still offering amenity screening.
- Trees should be located away from the dwellings where they can become aids to climbing over boundaries or onto buildings.



- Trees should be located away from the window, where they obscure surveillance.

Fig 6.2.10 Location of trees

- Trees should not obscure lighting.
- Trees should be trimmed up to the height of 2m to allow surveillance.
- Street furniture like bollards, benches, dustbins should be located away from the building edges and boundaries to avoid intrusion.
- Shrub planting immediately adjacent to footpaths, or in other areas requiring a high-level of natural surveillance, should have a natural growth height of no more than 1 meter.

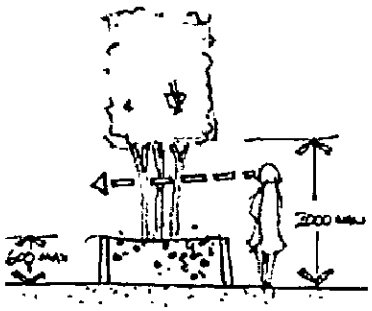


Fig 6.2.11

6.2.6 PARKING:

The most common theft in our housing localities is vehicle theft. Reason being parking is not properly designed or if designed is not adequate to the need.

- In group housing schemes, parking should be provided at community level, as individual garages are more prone to get commercialized.
- Community level parking should be in small groups, close and adjacent to the owners which they serve and open to view of the residents from regularly habitable rooms
- Parking space should have one entrance that can be locked in night hours
- If individual parking will be provided it should not face directly the main road.

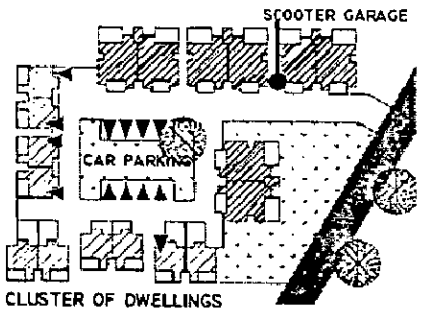


Fig 6.2.12
Parking layout

6.2.7 LIGHTING:

Lighting should be designed to enhance external security for both people and property, through the provision of adequate continuous illumination during the hours of darkness.

- Lighting should be such that it maximizes natural surveillance and creates a feeling of security.
- All public areas like parking, streets, parks, internal courts, lifts and stairwell should be well lit to allow surveillance and usage during night hours.
- Special provisions should be made to light entrances, parking space and junctions.
- Light fittings should be robust and vandalism free.
- Street light poles should be away from dwelling edges to avoid climbing

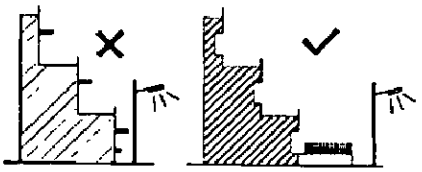


Fig 6.2.13 Location of poles

- Should not create glare and such that a person can recognize face from 10m.

6.2.8 SERVICES:

Services are perhaps the most vulnerable to crime in our localities. In most of our localities, service areas are not designed and generally provide easy access/hiding space to criminals.

- All services pipes should be enclosed in a shaft and should be enclosed through gate.
- Should have a room for electric and water meter on ground floor to avoid the theft
- Service lanes and pedestrian circulation routes should be combined to avoid service lanes and allow surveillance.

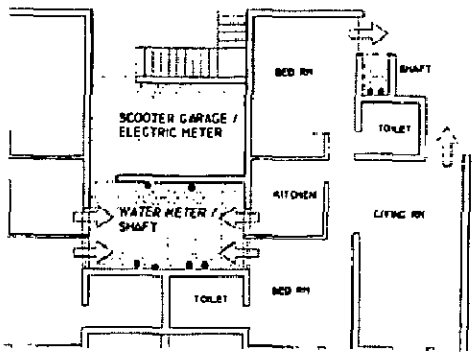


Fig 6.2.14 Enclosed services

6.2.9 BOUNDARY

A clear distinction between public and private spaces, whether it should be through physical barrier or through visual barrier and should define the territory of dwelling

- **At dwelling level,** boundary should be designed to create barriers, without creating a 'fortress mentality'. This can be done by change of material, landscape etc.
- Boundaries should be transparent or kept low to allow for surveillance and for interaction with neighbor. If height of boundary to be raised, it should be raised by fixing vertical railings without horizontal members at lower levels to avoid climbing.
- **At locality level,** boundary wall should be provided with low wall and trellis for additional security and clear vision.
- Boundary wall material should be vandal free and robust.

Fig 6.2.15 Boundary

6.2.10 MAINTENANCE AND MATERIAL

This is related to the neighborhood's sense of 'pride of place' and territorial reinforcement. The more dilapidated an area, the more likely it is to attract unwanted activities. The maintenance and the 'image' of an area can have a major impact on whether it will become targeted.

Maintenance starts with the selection of material and finishes. The selection of materials and finishes will impact on the types of maintenance regimes that can be sustained over time.

Facade material:

- Permanent exterior finish with rough texture avoids graffiti.
- Natural and permanent finishes are easy to maintain, merge with surroundings and avoid graffiti.

Pathways

- Use hardy, easily-replaced and standard size materials.
- Avoid removable materials such as paving bricks.

Trees

- Choose light foliage variety that provides surveillance with screening.

Street furniture

- Should be robust and vandal free.

All areas should be in the view of dwellings, as residents maintain those areas which are under direct surveillance.

6.2.11 DETAILING

DOOR – WINDOWS

The most vulnerable component of the residence is door and window from where criminal takes the entry in the house

Door

- Exterior doors should be a minimum of 45 mm thick, preferably of solid core wood.
- Door frame materials should be strong and of steel
- Door frame should be fixed in concrete block.
- Fit locks should be fixed on external doors.

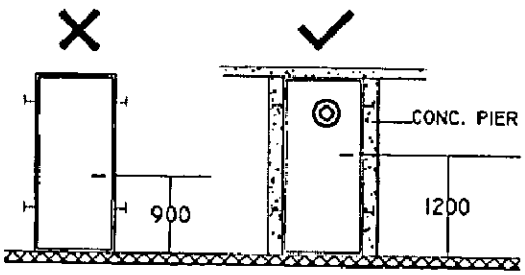


Fig 6.2.16 Latch height

- Door viewer should be installed in all external doors.
- There should be additional Iron Gate on entrance of dwelling with solid core wooden door.
- Latch height of door should be 5' minimum away from the reach of small children's.

- Many homes have doors that open to the outside, exposing the hinge pins. Despite a good strong lock, the burglar can remove the pins and lift the door from the frame. So doors should be open towards inside.

Window

- Frame should be of steel.
- Window glass should be fixed from inside rather than outside.

Grill

- Should have spacing not more than 200mm
- Should be of robust and vandal free material and of 10mm thick iron section
- Should be inserted in frame or welded, instead of screwing.

Exhaust fan opening

- Instances have been reported in which small children took the entry in the dwelling through exhaust fan cutout and opened the door from inside. To avoid this exhaust fan cutout should not be more than 9" diameter.

6.2.12 OTHER CONSIDERATIONS:

House Type - By providing a range of house types in a development, daytime occupancy can be maximized and subsequently the natural surveillance of an area increased. For example, starter units are usually empty during the day and are therefore vulnerable. Family housing which is occupied at irregular times of the day and old persons' housing, which is usually occupied, provide better vigilance and surveillance.

Community spaces, club, library etc should be provided in a locality to increase interaction and neighborhood concept.

Commercialization and Unauthorized construction should be banned in residential environment.

If other structures like school, offices are located in the residential area, they should have separate approach road.

Help points

- Help points like telephone, security points should be provided in a locality.
- Should be in the reach of children's, senior citizens and disabled
- Should be clearly visible from the public areas

Size of locality:

- Locality should have 600 to 800 dwellings and have population 3000 to 5000, more than that requires more entrances to the colony, leading security problem.
- Should have density 600 to 700 people/hectare
- Should have a proper setback from road, minimum 5meters

Technology

Advances in security technology have allowed us to provide and enhanced the level of protection in our residential environment

At residential level

- Electronic equipments like CCTV etc should be used to keep a vigil on strangers
- Alarm working with backup power should be installed between neighbors, to communicate in case of danger.
- Card access system should be used to take the entry in a residence.

6.2.13 In case of HIGH RISE DEVELOPMENT, following additional considerations should also be followed:

- Community space for interaction should be provided at mid level of high rise buildings.
- Lift should stop at alternate floor, so that interaction between the residents of adjacent floor increases.
- If basement will be there, it should be half above ground and half below, to have natural surveillance of basement from ground.
- Corridors, lifts, stairwell should be located in such a way that they got natural light through out the day.
- Tower should be connected with each other at some level, for movement of people from one tower to other, so that interaction increases.
- Ground floor of block should not be left for parking, it should have dwellings, so that, residents feel connected with ground and also maintain the ground floor.

FINALLY, BASIC AIM OF DESIGN SHOULD BE TO REMOVE THE FEAR OF CRIME AMONG RESIDENTS AND INHIBITING THE FEAR OF COMMITTING CRIME IN CRIMINAL

6.3 DO'S AND DON'T FOR CRIME PREVENTION

1. Entry/Exit in locality

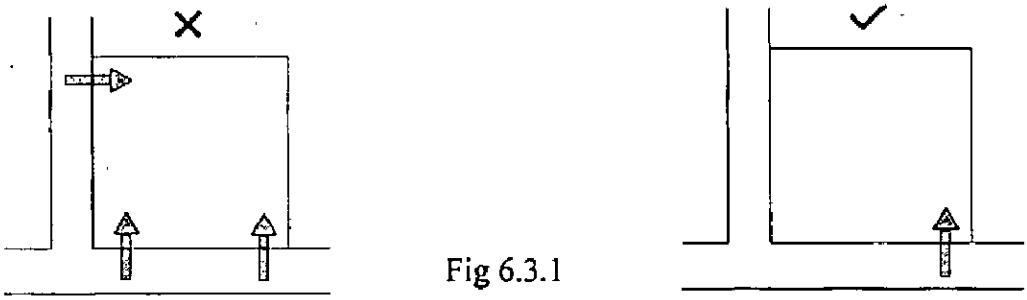


Fig 6.3.1

More the entries more are the chances of intrusion	Less no. of entry/exit allows easy control over unauthorized movement

2. Road Layout

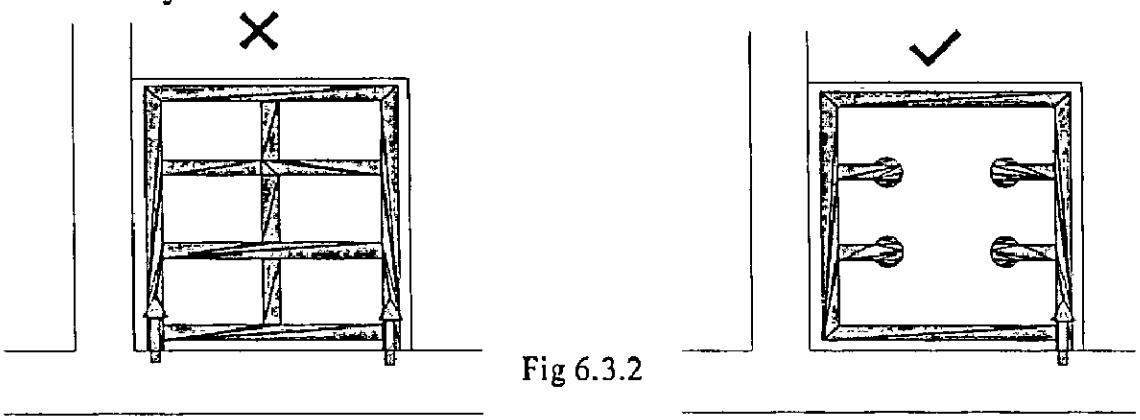


Fig 6.3.2

Interconnected Roads allows easy escape and movement of strangers	Disconnected roads stops thoroughfare and control the speed of vehicles

3. Boundary wall

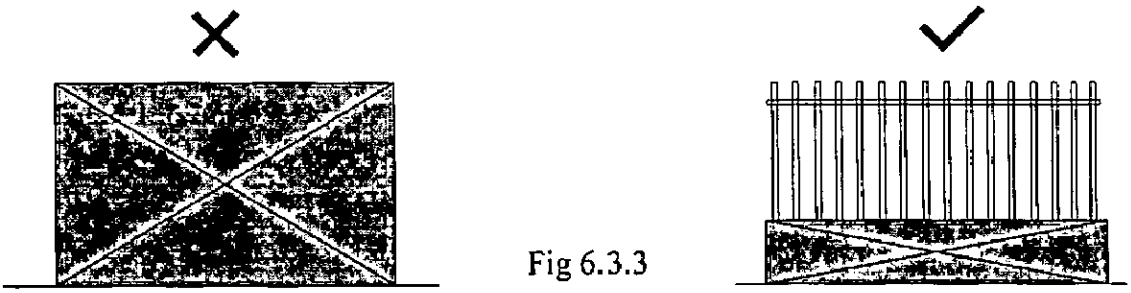
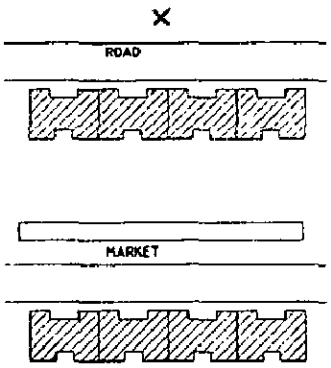


Fig 6.3.3

Solid Boundary wall cuts surveillance and create fort like mentality	Transparent boundary allows surveillance and increase area under vision

4. Layout of blocks



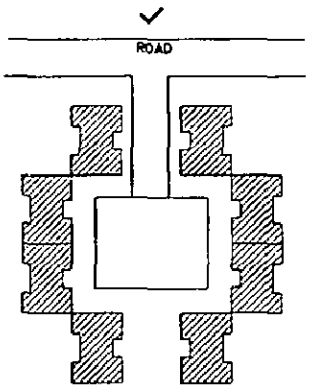
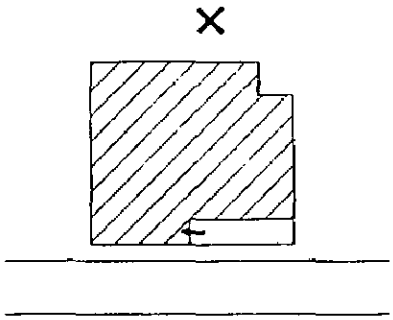


Fig 6.3.4

Road facing and market facing flats are more easily get commercialize and approached	Flats along the roads and around court allows better surveillance and lee prone to commercialization

5. Entrance to dwelling



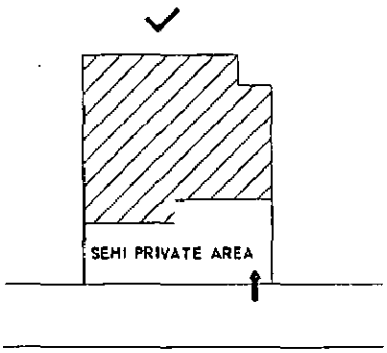
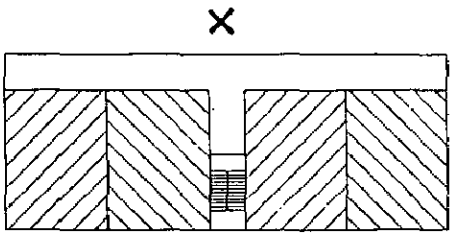


Fig 6.3.5

Direct approach from the road does not give a resident a breathing time	Public to semi private to private space movement give resident a breathing time

6. Location of staircase



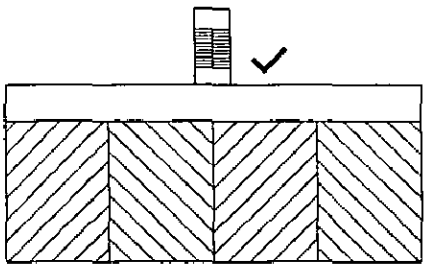


Fig 6.3.6

Staircase sandwiched between dwelling provide hiding space for criminals	Staircase located outside can easily be under surveillance by the residents.

7. Staircase Lobby

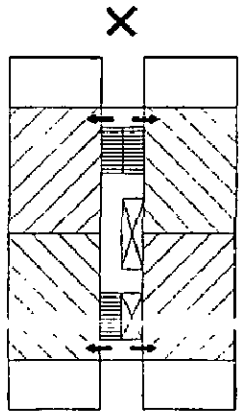
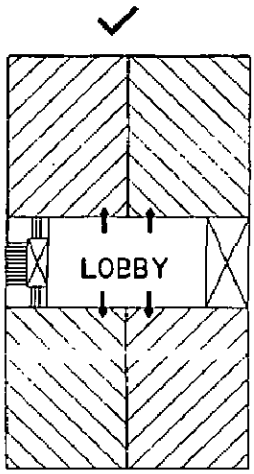


Fig 6.3.7



This kind of lobby does not provide an interaction space	Lobby provides interaction space and develop neighborhood concept

8. Service area

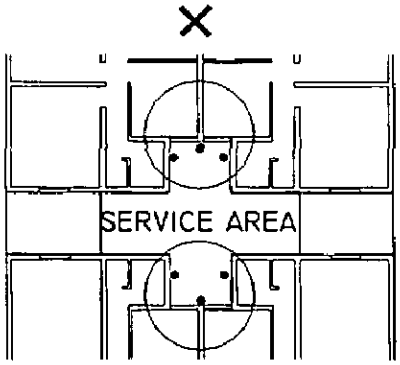
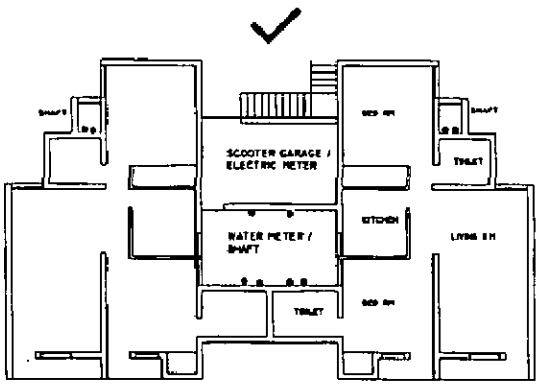


Fig 6.3.8



Open services provide easy access to upper floor and theft of public property	Closed services keep the area maintained and avoid theft of public property

9. Parking

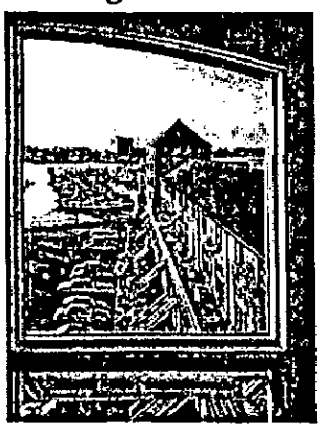
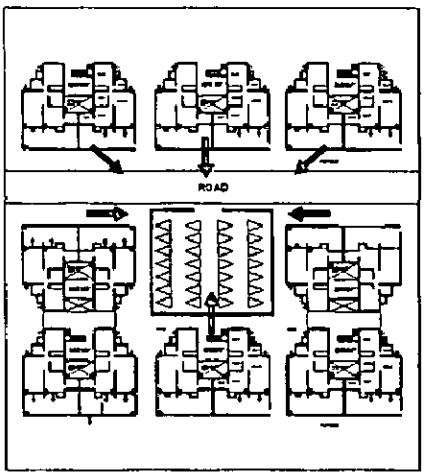
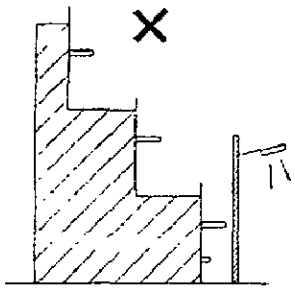


Fig 6.3.9



Parking should be visible from a commonly used room to avoid vehicle theft

10. **Street lights**



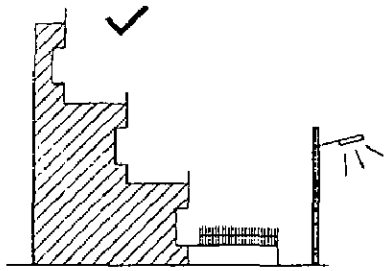
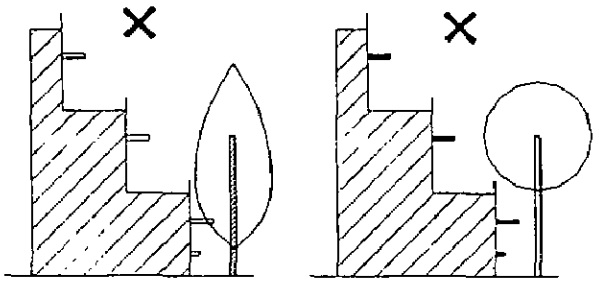


Fig 6.3.10

Electric pole near the wall acts as a ladder to approach upper floor	Electric pole should be located away from outer wall

11. **Tree location**



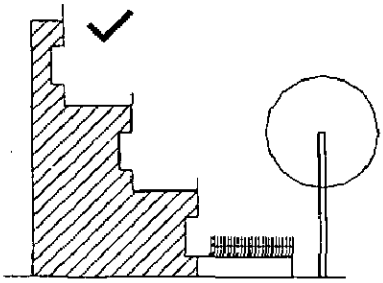
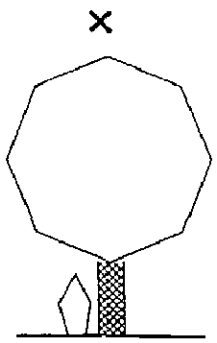


Fig 6.3.11

Trees located near the wall acts as a ladder to approach upper floor and impede surveillance	Trees should be located away from outer wall and window

12. **Height of plantation**



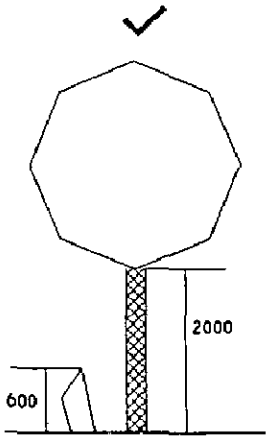


Fig 6.3.12

Trees should be trimmed up to 2m and shrubs should not be more than 600-750mm in height, otherwise they impede normal vision

13. Chajja projection

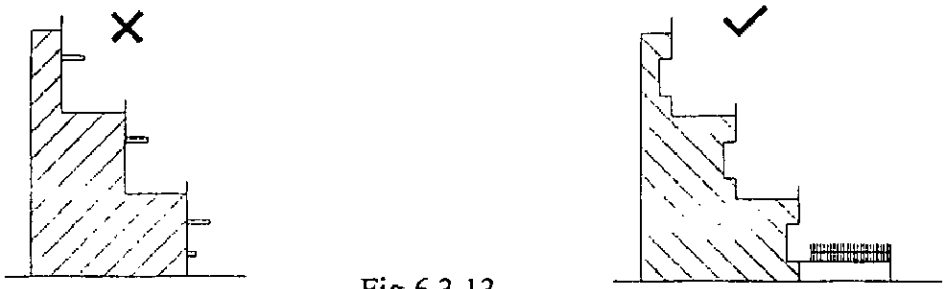


Fig 6.3.13

Chajja above window provide a ladder to climb upper floor	Recessed window avoid climbing and also adds to the aesthetics

14. Balcony / Terraces

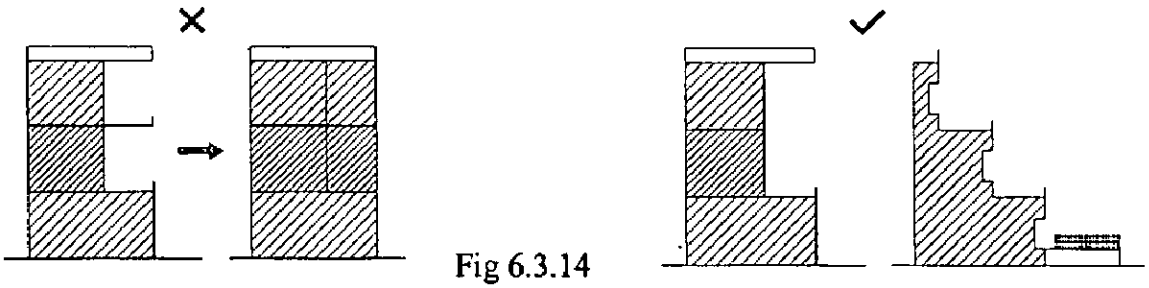


Fig 6.3.14

Single height balcony are generally get covered and impede surveillance	Double height balconies and terraces have less chances of getting covered

15. Space for Air cooler

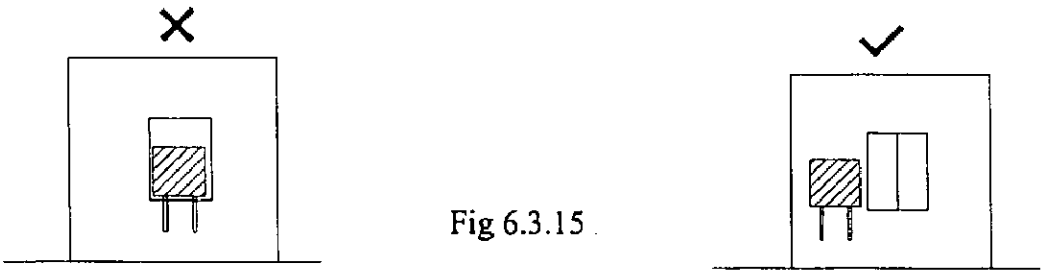
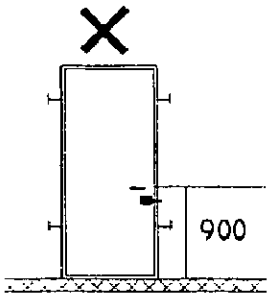


Fig 6.3.15

If a room has single window it generally get covered by cooler in summers	Room should have a separate space for cooler, to have surveillance from window

16. **Door detail**



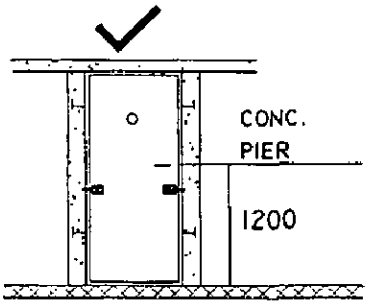
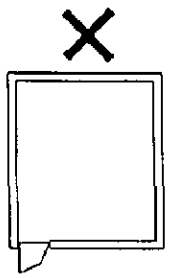


Fig 6.3.16

Door fixed in wall without concrete pier is easy to take out Door with latch at 900mm height can easily be opened by children	Door fixed in wall with concrete pier is difficult to take out Door with latch at 1200mm is difficult to operate by children Locks fixed on both the side provide additional strength to door

17. **Door opening**



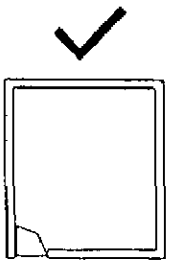
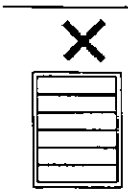


Fig 6.3.17

Door opens towards outside are easy to remove as their hinges are visible	Door should open towards inside so that their hinges should not be visible

18. **Grill spacing**



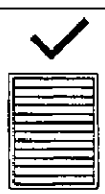


Fig 6.3.18

Grill should be minimum 8mm thick of steel and should not have spacing more than 150mm

CONCLUSION:

1. **Crime which is considered as a social problem** can be prevented by Design through following concepts:
   a) NATURAL SURVEILLANCE
   b) NATURAL ACCESS CONTROL
   c) TERRITORIALITY
   d) MAINTENANCE AND IMAGE
   e) NEIGHBORHOOD CONCEPT

2. **Relationship between crime and Architecture**

   People live in environments; people work in environments and people take leisure in environments. Crime occurs in all environments and is committed by people not buildings or any other component of the environment. The environment is created by Architecture. There is a relation between the two.

   This relation is direct co-relation between Architecture and Crime.

   MATHEMATICAL REPRESENTATION OF RELATION

   CRIME α 1 / ARCHITECTURE

   I.e. Crime and Architecture has direct relationship, but are inversely proportional which indicates that as the architecture loose its qualities the crime rate increases.

Finally:

- **The proper design and effective use of the built environment can lead to a reduction in the fear and incidence of crime, and gives psychological security.**

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Appendix 1

CHECKLIST FOR CRIME PREVENTION IN HOUSING:

Name of Area_____ **Date**_____

PLANNING & DESIGN

Is the site planning introvert? Yes[ ] No[ ]
Is the site planning extrovert? Yes[ ] No[ ]
Is it mix kind of planning (Introvert + Extrovert)? Yes[ ] No[ ]
Does the design provide territorial reinforcement through design features? Yes[ ] No[ ]
Does the design allowed for easy maintenance? Yes[ ] No[ ]
Is pleasing built environments compromise security concerns? Yes[ ] No[ ]
Is there space that can become dead space? Yes[ ] No[ ]
Is unprotected & secluded area between & behind buildings are avoided? Yes[ ] No[ ]
Are Back alleyways avoided? Yes[ ] No[ ]
Is area acts as a thorough fare for surrounding development? Yes[ ] No[ ]

LIGHTING

Are light fixtures provided for areas that require good visibility such as pedestrian routes and entrapment areas? Yes[ ] No[ ]
Are light fixtures protected against vandalism? Yes[ ] No[ ]
Is lighting at areas used during night time e.g. car parks, space around buildings adequately provided? Yes[ ] No[ ]
Is back lane lighting provided? Yes[ ] No[ ]
Is lighting adequately provided such that a person can recognize a face from about 10 meters? Yes[ ] No[ ]

NATURAL SURVEILLANCE

Do areas of concerns such as isolated routes and parking areas provide natural surveillance? Yes[ ] No[ ]
If providing natural surveillance is not possible, are emergency telephones, panic alarm and attendants provided? Yes[ ] No[ ]
Are front windows look out across communal areas including streets, children's play areas and open space to create a system of natural surveillance? Yes[ ] No[ ]
Are Building entrances face the street where surveillance from passing traffic is Encouraged? Yes[ ] No[ ]
Are the opening/entrances of houses facing each other for surveillance? Yes[ ] No[ ]
Is there natural surveillance from surrounding buildings or passing members of the public? Yes[ ] No[ ]

BOUNDARY WALL

Is boundary wall provided around the site? Yes[ ] No[ ]
Does the boundary wall design & material inhibit graffiti and vandalism? Yes[ ] No[ ]
Does the boundary wall provide appropriate and adequate security? Yes[ ] No[ ]
Does the natural surveillance is possible through boundary wall? Yes[ ] No[ ]

PARKING

Is the most commonly used parking area visible from the main entrance?	Yes[ ] No[ ]
Does the car park drive-by surveillance?	Yes[ ] No[ ]
Is the car park designed to exclude entrapment spots?	Yes[ ] No[ ]
Is the parking area adequately lit?	Yes[ ] No[ ]
Is the adequate parking provided for residents?	Yes[ ] No[ ]
Is parking located within view of the buildings it serves?	Yes[ ] No[ ]

SECURITY

Are entrance/exit doors installed with peephole viewers?	Yes[ ] No[ ]
Is the shaft properly closed and difficult to approach by the stranger?	Yes[ ] No[ ]
Do the building, landscaping, pillars and placement of additional features prevent access to window and door openings?	Yes[ ] No[ ]
Are there small, confined areas, such as alcoves, solid staircases, garbage bins, alleys, lanes, parking spots where someone could hide or be hidden from view?	Yes[ ] No[ ]
Is the building and landscaping designed to minimize access to rooftops?	Yes[ ] No[ ]
Has consideration been given to protecting or eliminating recessed doorways, shrubs, planted areas and similar features which can give cover to intruders?	Yes[ ] No[ ]

LANDSCAPING

Is the landscaping designed to reduce spaces where intruders can hide?	Yes[ ] No[ ]
Does the landscaping allow for entrances/exits to be clearly visible from the street and from parking areas?	Yes[ ] No[ ]
Are obstacles such as garden furniture and rubbish bins located away from building edges and boundaries to minimize intrusion?	Yes[ ] No[ ]
Are the trees planted away from the houses to avoid climbing?	Yes[ ] No[ ]
Are trees and shrubs obscure lighting?	Yes[ ] No[ ]
Are parks well landscaped and trees properly trimmed?	Yes[ ] No[ ]

ENTRANCE/EXITS

Is there limited entry and exit in colony?	Yes[ ] No[ ]
Is the main entry properly secured?	Yes[ ] No[ ]
Are the main entrances/exits clearly visible from the street and from nearby parking areas?	Yes[ ] No[ ]
Is security check post provided at entry/exit?	Yes[ ] No[ ]
Is lighting installed near entrances/exits to provide safety after dark?	Yes[ ] No[ ]
Are measures taken to prevent unauthorized entry to the premises?	Yes[ ] No[ ]
Are buildings designed to prevent ready access, except through normal entrances?	Yes[ ] No[ ]
Are visitors encouraged to use the main door?	Yes[ ] No[ ]

HELP POINTS

Are help points provided in the colony?	Yes[ ] No[ ]
If yes, Are help points adequately lit for after dark use?	Yes[ ] No[ ]
Are help points easily accessible to children, seniors and disables?	Yes[ ] No[ ]
Are help points clearly visible to pedestrians and drivers passing by?	Yes[ ] No[ ]

FOOTPATHS AND WALKWAYS

Do footpaths clearly direct people to help points? Yes[ ] No[ ]

Are footpaths and walkways visible from nearby residences/buildings, parking areas and the street? Yes[ ] No[ ]

Are Footpaths well defined, broad with no opportunities for concealment and provide direct routes to encourage use and increase potential surveillance? Yes[ ] No[ ]

MAINTENANCE

Are the parks kept in good repair? Yes[ ] No[ ]

Are the roads kept in good repair? Yes[ ] No[ ]

Are the streets kept in good repair? Yes[ ] No[ ]

VISIBILITY

Does layout of the site and building(s) provide for maximum visibility of the street and parking areas, paths and walkways? Yes[ ] No[ ]

Are there any structures, landscaping, vegetation, corners, ditches, vehicles, signs that would impede visibility? Yes[ ] No[ ]

Is children area can be easily observed? Yes[ ] No[ ]

Is it possible to monitor the arrival and departure of visitors? Yes[ ] No[ ]

MANAGEMENT

Is the area or building monitored? (Police, security staff, etc) Yes[ ] No[ ]

Are security staff and building managers aware of personal safety concerns for women and children? Yes[ ] No[ ]

CIRCULATION

Is the number of road and pedestrian routes is limited? Yes[ ] No[ ]

Is Layouts avoiding the use of cul-de-sac, which limit the generation of sufficient passing traffic to facilitate effective surveillance? Yes[ ] No[ ]

SIGHT LINES

Can blind corners or sudden changes in grades that reduce sight lines be avoided? Yes[ ] No[ ]

Do areas of concerns such as stairwells, lobbies of high-rise building have clear sight lines? Yes[ ] No[ ]

Does the building interior contain sharp corners, isolated areas? Yes[ ] No[ ]

ENTRAPMENT

Is there an entrapment area and can it be eliminated? Yes[ ] No[ ]

Can it be closed during off hours? Yes[ ] No[ ]

Is the entrapment area visible through natural or formal surveillance? Yes[ ] No[ ]

COMMUNITY FACILITIES

Is common spaces provided to encourage tenant interaction? Yes[ ] No[ ]

Is community center/club provided to encourage interaction? Yes[ ] No[ ]

COMMERCIALIZATION

Is residential area separated from commercial area?	Yes[ ] No[ ]
Is residential area affected by commercialization?	Yes[ ] No[ ]
Is commercialization attracting outsiders?	Yes[ ] No[ ]

CONSTRUCTION MATERIAL

Are construction materials used to enhance safety and security?	Yes[ ] No[ ]
Facade	
Is the façade material vandal and graffiti free?	Yes[ ] No[ ]
Is it easy to maintain?	Yes[ ] No[ ]
Does it properly maintain?	Yes[ ] No[ ]
Door and Window	
Is it strong enough to prevent criminal entry?	Yes[ ] No[ ]
Is iron grill and iron doors provided?	Yes[ ] No[ ]
Walls	
Is all external walls are 9"thick?	Yes[ ] No[ ]

APPROACH

Are the blocks interconnected through corridor at upper level?	Yes[ ] No[ ]
Is the terrace approachable from the main staircase?	Yes[ ] No[ ]
Is the terraces interconnected?	Yes[ ] No[ ]
Is the balcony at first floor easy to climb?	Yes[ ] No[ ]
Does the rain water pipe provide access to balcony?	Yes[ ] No[ ]
Are the lintel and other projections acts as a ladder for criminal?	Yes [ ] No[ ]
Is unauthorized construction providing easy access to upper floors?	Yes[ ] No[ ]

INTELLIGENT SECURITY SYSTEM

Is security systems like:	
CCTV	Yes[ ] No[ ]
Automatic alarm	Yes[ ] No[ ]
Electronic card system	Yes[ ] No[ ]
etc installed to check the entry of stranger?	
Is alarm connected to Police station?	Yes[ ] No[ ]
Is alarm between two neighbor installed to inform about danger?	Yes[ ] No[ ]

OTHER INFORMATION

Population of an area = Site Area =

Dwelling Unit Area = No. of Dwellings = No. of storey =

Average number of residents / dwelling = Density =

Majority = Children [M / F] Adult [M / F] Elders [M / F]

Class of people = L.I.G [ ] M.I.G [ ] H.I.G [ ] Mix [ ]

Profession = Govt. sector [ ] Public sector [ ] Businessman [ ]

CONCLUSION **Locality is crime free [ ] Crime prone [ ] In-between [ ]**

Can be corrected with little modifications [ ]

DEPARTMENT OF ARCHITECTURE AND PLANNING
INDIAN INSTITUTE OF TECHNOLOGY, ROORKEE -247667

TITLE: DESIGN GUIDELINES FOR SECURITY OF RESIDENTIAL BUILDINGS AGAINST CRIME

Survey Questionnaire

(Information collected will be confidential & entirely used for the academic purpose)

Please 'X' the appropriate box (X).

Name of Area: _____

Flat No. _____

Name of head of family_____

Surveyor: **Rahul Bhargava**
Student of M.Architecture, IIT-Roorkee
Resident of 181-B, Pkt-B, Mayur Vihar-II
Delhi-91, Ph: 011-22786485

Ownership status: Govt. accommodation ( ) Rented accommodation ( ) Own house ( )

1. PERSONAL INFORMATION

How many members are there in your family? Male_____ Female_____ Total_____
How many members are working? _____
What are the professions of working members/members go out? Timings
Member age below 18yr _____ _____
Member age above 18yr _____ _____
Member age above 24yr _____ _____

Is house lying vacant at any time of the day? Yes ( ) No ( ) Sometimes ( )
If yes, than duration of day
8AM to 2PM ( ) 8AM to 5PM ( ) 8AM to 7PM ( )
9AM to 2PM ( ) 9AM to 5PM ( ) 9AM to 7PM ( )
Any other time_____

2. INFORMATION ABOUT CRIME

LOCALITY LEVEL:
Is crime occurred in your locality? Yes ( ) No ( )
Type of crime
1.Burglary ( ) 2.Vandalism ( ) 3.Graffiti ( )
4.Car theft ( ) 5.Pick pocketing ( ) 6.Vehicle theft ( )
7.Arson ( ) 8.Theft ( ) 9.Robbery ( )
10.Sexual offences ( ) 11.Kidnapping ( ) 12.Murder ( )
13.Traffic crimes ( ) 14.Violence ( ) 15.Shoplifting ( )
16.Theft of minor things/clothes ( ) 17.Any other crime _____
18. Stranger entered with wrong intention but runaway as you have seen him ( )

General Victims of the crime Children (M / F) Adult (M / F) Elder (M / F)

Have any member in your family encountered with crime in locality? Yes ( ) No ( )
Victim of the crime in your family Children (M / F) Adult (M / F) Elder (M / F)
If yes, than type of crime_____ *(use above list to fill type of crime, write Sr.No.)*

Location, where you encountered with crime
Park ( ) Street ( ) Main road ( ) Shopping center ( )
Bus stop ( ) Parking ( ) Residential block ( ) Temple ( )
Other location _____
Time of occurrence _____ _____ _____
Have you tried to catch them? Yes ( ) No ( )
If you fail to catch them, than what was the probable reason
Disappear in the dark ( ) Crossed the boundary wall ( ) Runaway through vehicle ( )
Hit you and runaway ( ) Hide away ( ) Other_____

HOUSE LEVEL:

Is the criminal/stranger ever entered in your house? Yes ( ) No ( )
If yes, have crime occurred in your house? (any type, listed above) Yes ( ) No ( )
If no, Run away as you have noticed them ( ) Neigh borer noticed them ( )
If yes, Type of crime: _____ _____ *(use above list to fill type of crime)*
Time of occurrence _____ _____ _____
How the criminal entered in your house (even if the crime not occurred)?
Main Door ( ) Back door ( ) Window ( ) Terrace ( )
Balcony ( ) Shaft ( ) Any other way_____
Is criminal known to you? Yes ( ) No ( )
Is it Servant ( ) Relative ( ) Friend ( ) Any other ( ) Neighbor ( )
What action have you taken? Start shouting ( ) Approached neighbor ( )
Indulge with criminals ( ) No action because of fear of getting injury ( )
Is anybody had came to help? Yes ( ) No ( )
If no, due to No one knows you in neighbor ( ) New in the colony ( )
No one wants to interfere in others matter ( ) Any other reason _____

3. INTERNAL SECURITY

Do you feel your door/windows are strong enough to stop the entry of criminal in your house? Yes ( ) No ( )
If no, due to Poor joining ( ) More gap between grill ( ) Poor material ( )
Less strength ( ) Any other reason ( )
Is any Electronic gadget have been installed to keep an eye on stranger? Yes ( )No( )
Are all external doors having additional Iron Gate? Yes ( ) No ( )
Are all windows having iron grill? Yes ( ) No ( )
Is the door lock/handle accessible to small children's? Yes ( ) No ( )
Is external door has peephole viewer? Yes ( ) No ( )
Is there any arrangement to communicate the neighbor in case of crime? Yes ( )No( )

4. CHILDREN SECURITY

Where do your children play?
Park ( ) playground ( ) tot lot ( ) street ( ) road side ( )
Terrace ( ) House ( ) Any other place _____
What do you feel about security of your children in play area? Secure ( ) Insecure ( )
If insecure, due to
Play areas are away ( ) Not maintained ( ) Play on road ( ) Fear of attack ( )
Are you able to keep an eye on them from your house? Yes ( ) No ( )
If yes, how Window ( ) Door ( ) Balcony ( ) Terrace ( )

5. LIGHTING

What is your impression of the Street lighting?
Poor ( ) Satisfactory ( ) Good ( )
Is it creating glare to your eye? Yes ( ) No ( )
Are you able to see a person from 10m distance in night? Yes ( ) No ( )

6. HIDEOUTS

Do you feel any obstruction to see the movement of people clearly? Yes ( ) No ( )
If yes, the reasons may be: Sharp corners ( ) High walls ( ) Bushes ( )
Fences ( ) Dense Plantation ( ) Others_____
Are there places for hiding the criminal? Yes ( ) No ( )
If yes, the places are Garbage bins ( ) Vacant houses ( ) Back yards ( )
Alcoves ( ) Shaft ( ) Dense shrubs ( ) Corners ( )
How easy would it be for a criminal to disappear?
Very easy ( ) Quite easy ( ) Easy ( ) Difficult ( )
If easy, than generally from where they disappear
Disappear in the dark ( ) Crossed the boundary wall ( ) Hide away ( )
Runaway through vehicle ( ) Hit and runaway ( ) Any other way_____

7. MAINTENANCE (parks, roads, streets, landscape, Garbage bins, buildings)

What are your impressions of maintenance of public area and buildings?
Poor ( ) Satisfactory ( ) Good ( )
If poor, than what are the problems?
Parks No fencing ( ) Dense plantation ( ) No plantation ( )
Roads Broken ( ) Used as parking ( )
Building Façade Permanent finish ( ) White wash ( )
If white wash, Done yearly ( ) Once in two years ( ) Never ( )
Garbage bins, Good ( ) Broken ( ) Open ( ) Used by garbage collectors ( )
External Lights Maintained properly ( ) Not maintained at all ( ) Occasionally( )
Landscape Dense ( ) No plantation ( ) Hard ( ) Soft ( )

8. FEELING IN AN AREA

Do you feel secure in your locality? Yes ( ) No ( )
If no, due to Movement of strangers ( ) Poor circulation ( )
Poor maintenance of public areas ( ) No surveillance ( ) No access control ( )
Do you feel secure in your building block? Yes ( ) No ( )
If no, due to Darkness ( ) Hide out places ( ) Poor maintenance ( )
Do you feel secure in your house? Yes ( ) No ( )
If no, due to Too many entries ( ) Approachable terrace ( )
Fear of entering someone through door-window ( ) No interaction with neighbor ( )
On which floor are you living? _____
Do you feel insecure compare to other floor residents? Yes ( ) No ( )
If yes, due to _____
Is commercialization in an area giving a feeling of insecurity? Yes ( ) No ( )
Is unauthorized construction in an area giving a feeling of insecurity? Yes ( ) No ( )
Please list five specific places where you feel the least secure
1._____ 2._____ 3._____
4._____ 5._____

9. SOCIAL CONTACT

Do you like to maintain social contact with neighbors? Yes ( ) No ( )
If yes, than
To know neighbor Yes ( ) No ( )
To get help when in need Yes ( ) No ( )
To simply chat Yes ( ) No ( )
If no, due to No spare time ( ) Self centeredness ( ) Language problem ( )
Whole day spent in office and traveling ( ) No place for conversation ( )
Conversation:
Is place for conversation available in your block? Yes ( ) No ( )
Do you get involved in conversation with neighbors while moving in your area/block?
Never ( ) Occasionally ( ) Often ( ) Always ( )
If yes, than where do you converse?
Staircase lobby ( ) Park ( ) Street ( ) Road ( )
Shopping center ( ) Temple ( )
Do you celebrate National festivals at locality level? Yes ( ) No ( )
If yes, where Park ( ) Street ( ) Road ( ) Temple ( )
If no, due to No space available ( ) People are unknown ( )
Most of the residents are on rent ( ) Belongs to different religion ( )

10. OVERALL SITE LAYOUT

What is your impression of the overall design in terms of security?
Poor ( ) Satisfactory ( ) Good ( )
Is the circulation pattern is well defined? Yes ( ) No ( )
Are the entry /exit well defined? Yes ( ) No ( )
Are public areas/parks/parking/roads etc visible from your residence? Yes ( ) No( )
Is the planning too congested? Yes ( ) No ( )
If yes, it gives you feeling of Security ( ) Insecurity ( ) Fear ( )

11. FEAR OF CRIME

Is fear of crime affects your life? Yes ( ) No ( )
If Yes, due to Poor maintenance ( ) Poor security ( )
Poor lighting ( ) Surrounding community ( ) Poor design ( )
Lack of neighborhood concept ( ) Strangers ( ) Poor security ( )
Dense Plantation ( ) Any other specific reason _____

12. VEHICULAR MOVEMENT AND PARKING

Is your colony is used as a thoroughfare by other people? Yes ( ) No ( )
Do you feel insecure because of them? Yes ( ) No ( )
Is adequate parking available? Yes ( ) No ( )
If yes, than Garage ( ) Parking lots ( )
If no, where do you park vehicle
Street ( ) Main road ( ) No specific place ( ) Park ( )
Do you park your vehicle in garage? Yes ( ) No ( )
If no, due to Improper location ( ) Improper size ( )
Is parking visible from your residence? Clearly ( ) slightly ( ) Invisible ( )

13. MOVING OUT FOR RELAXATION

Do you go for walking /jogging? Yes ( ) No ( )
If yes, than in Morning ( ) Evening ( ) Night ( )
If in night, than how do you feel? Secure ( ) Insecure ( )
If insecure, due to
Improper lighting ( ) dense plantation ( ) Poor pathways ( ) Fear of attack ( )
Where do you prefer to walk?
Morning Park ( ) Road ( ) House ( ) Other_____
Night Park ( ) Road ( ) House ( ) Other_____
If Road, due to Parks are not maintained ( )Used by strangers ( )Dense plantation ( )

14. MONEY

Incorporation of crime prevention techniques result in increase of cost of residence
Do you like to spend more to prevent our self from crime? Yes ( ) No ( )
If yes, how much 5% ( ) 10% ( ) 15% ( )
If no, reason_____

15. FROM THE QUESTIONS THAT YOU JUST COMPLETED

1) Do you have any other specific recommendations regarding house design and overall community design or any specific requirement to prevent crime, please suggest?*

_____
_____
_____
_____
_____
_____

2) If you know the modus operandi of any crime occurred in your locality/house, please write

_____
_____
_____
_____
_____
_____

3) Sketch the area of your locality which you considered most secure and insecure.*

Signature & Date Name: _____ **Age:** _____ **Occupation**_____
*Use separate sheet to fill the suggestions if required (write in any language Hindi / English)

Appendix 3

Do you feel following Design factors are responsible for crime in your locality?

1. OVERALL LAYOUT
- Placement &connection of blocks — Yes / No / Can't say
- Location of parks — Yes / No / Can't say
- Location of services — Yes / No / Can't say
- Location of market place — Yes / No / Can't say
- Location of public parking — Yes / No / Can't say
- No Boundary wall — Yes / No / Can't say
- Surrounding community/Other structures — Yes / No / Can't say
- No. of Entrance/Exits — Yes / No / Can't say

2. CIRCULATION
- Roads pattern — Yes / No / Can't say
- Pathways — Yes / No / Can't say
- Narrow alleys — Yes / No / Can't say
- No. of approaches — Yes / No / Can't say
- Thoroughfare — Yes / No / Can't say

3. LIGHTING
- Street light — Yes / No / Can't say
- Lighting in service areas — Yes / No / Can't say
- Lighting in Parks etc — Yes / No / Can't say

4. LANDSCAPE
- Trees — Yes / No / Can't say
- Dense Shrubs — Yes / No / Can't say
- Location of street furniture — Yes / No / Can't say

5. MAINTENANCE
- Building Facade — Yes / No / Can't say
- Public areas — Yes / No / Can't say

6. DWELLING UNIT DESIGN
- Placement of Rooms — Yes / No / Can't say
- Position of windows — Yes / No / Can't say
- Position of door — Yes / No / Can't say
- No. of external Doors — Yes / No / Can't say
- No. of windows — Yes / No / Can't say
- Location wrt other DU — Yes / No / Can't say

7. HARDWARE
- Door lock — Yes / No / Can't say
- Window lock — Yes / No / Can't say
- Window fixing — Yes / No / Can't say
- Door fixing — Yes / No / Can't say
- Grill fixing — Yes / No / Can't say
- Grill spacing — Yes / No / Can't say

8. MATERIAL

- Facade material — Yes / No / Can't say
- Door material — Yes / No / Can't say
- Window material — Yes / No / Can't say
- Grill material — Yes / No / Can't say

9. SERVICES

- Location of shaft — Yes / No / Can't say
- Open shaft — Yes / No / Can't say
- Open pipes — Yes / No / Can't say
- Location of staircase/Lift lobby — Yes / No / Can't say
- Approachable terrace — Yes / No / Can't say
- Service lane — Yes / No / Can't say
- Location of Parking — Yes / No / Can't say

10. BUILDING FORM

- Projections/chajja — Yes / No / Can't say
- Balcony — Yes / No / Can't say
- Recessions — Yes / No / Can't say
- Height of boundary wall (Ground floor DU) — Yes / No / Can't say
- Blind corners — Yes / No / Can't say

Any other design element according to you _____ _____ _____