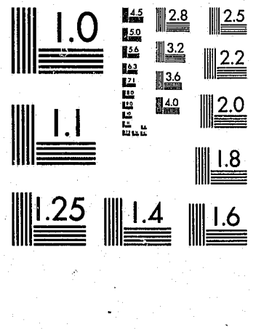
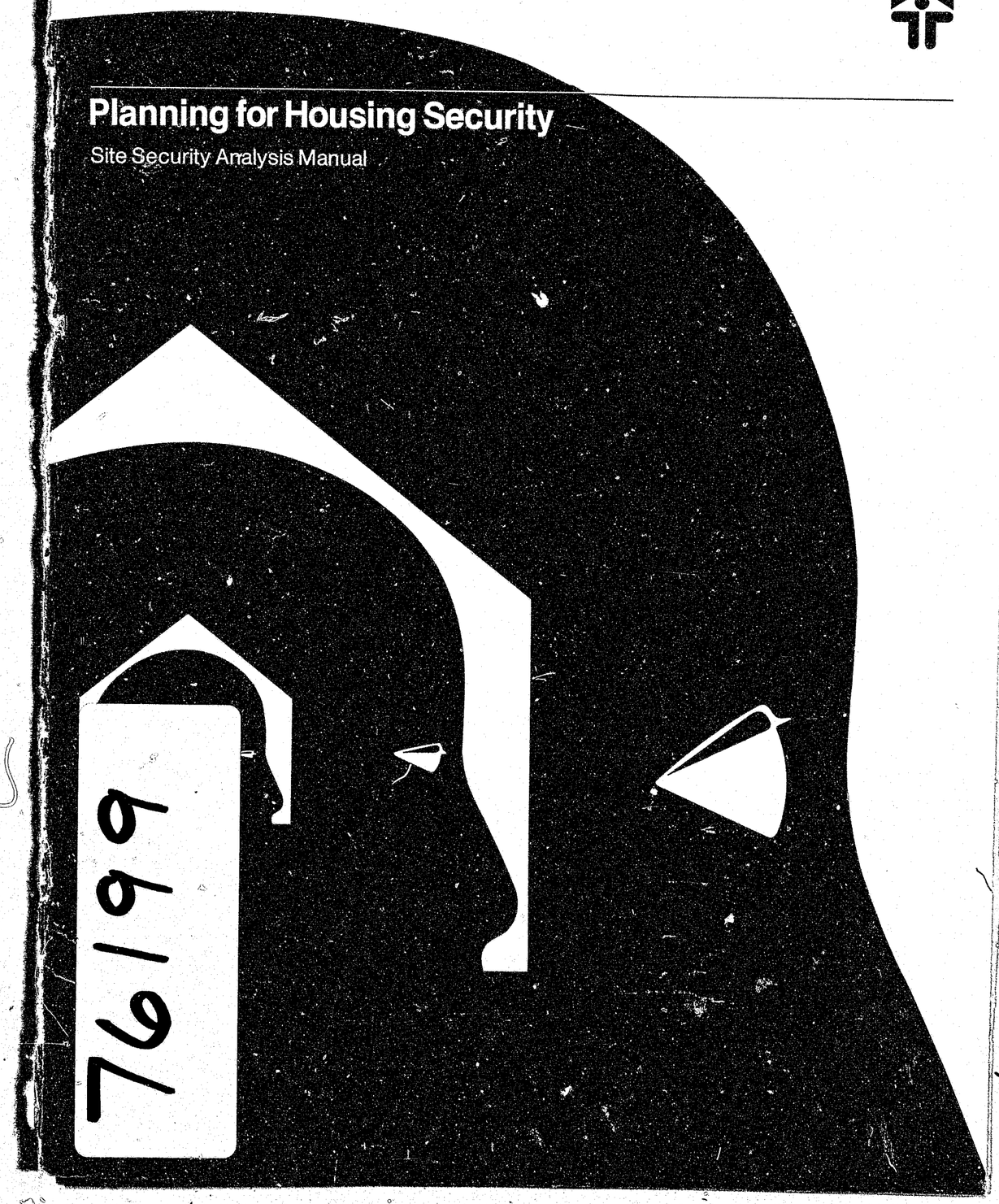


U.S. Department of Housing and Urban Development
Office of Policy Development and Research

Planning for Housing Security

Site Security Analysis Manual



Site Security Analysis Manual

Prepared for

U.S. Department of Housing and Urban Development
Office of Policy Development and Research

Under Contract Number: H-2249R

by

William Brill Associates, Inc.
Annapolis, Maryland 21401

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FOREWORD

It is a rare HUD report that deals in holly and barberry; rarer still is one that talks of pagoda trees, star magnolias, and basket-weave brick paving. It is not unusual, however, for us to discuss site planning for security in public housing.

The two manuals in this set combine site security analysis -- that is, information on how to identify those features of a site that contribute to crime problems -- with specific information on what trees, shrubs, fences, pavements, etc., contribute best to site safety.

These manuals, prepared for the Office of Policy Development and Research by William Brill Associates, are based on studies done at public housing sites in ten different cities. Although the results have not been evaluated, and very little building has followed the advice provided, we publish the manuals with considerable confidence. Clearly organized and easily understood, they are the first books in the literature to offer comprehensive, specific, and practical guidelines to security planning.

Charles Gueli began this project, Richard Burk has completed it. I commend their deeply committed and enthusiastic supervision.

Donna E. Shalala

Donna E. Shalala
Assistant Secretary for Policy
Development and Research

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Introduction

This manual is one of a series prepared by William Brill Associates, Inc., (WBA) on Comprehensive Security Planning, a security planning approach developed by WBA under HUD funding which has been applied to date in housing projects in over 10 cities across the nation.

One element of the planning process that makes up this approach is the careful analysis of the site to identify any features of the site that contribute to resident victimization, resident fear of crime or cause residents to pull back from their environment and each other.

This manual deals with that aspect of the planning process. It provides guidance on how to analyze a site systematically and how to prepare solutions based on that analysis.

This manual should be used in conjunction with the other manuals in this series as the strength of the planning approach of which it is a part lies in the way the various elements — site improvements, management changes, improvements in social services — all fit together.

It is thus important to consult the other manuals in this series when preparing a comprehensive security plan. It is also important to have an overall understanding of the Comprehensive Approach to Security Planning and it is for this reason that an overview of the approach is presented below.

The Comprehensive Approach to Security Planning

The Comprehensive Approach to Security Planning has two major parts. The first, the Residential Vulnerability Analysis, examines those features of the housing site's social and physical environment that contribute to residents becoming victims of crime, cause them to be fearful about crime, or cause them to withdraw from their environment and each other. While this withdrawing behavior seems rational to the individual, it does contribute to the crime problem because it surrenders the environment to outsiders and makes difficult the formation of the close relationships that are necessary if communities are to resist crime.

The second part of the Comprehensive Approach to Security Planning involves preparing a comprehensive plan that is aimed at overcoming the problems in the environment that were identified by the Residential Vulnerability Analysis. The purpose of such plan is to reduce or eliminate the characteristics of the site that make residents vulnerable, as well as to encourage residents to work together and acquire needed assistance from social service agencies, management staff, and police, so that they can erect some of the social defenses against crime that generally go hand-in-hand with strong neighborhoods.

The plan is comprehensive in that it addresses both physical and social factors. Equally important, the plan is synergistic because it strives for a mix of improvements that collectively can be expected to impact on the problem. The plan is not just a list of improvements, but is organized so that various improvements reinforce each other.

Although plans can be expected to vary depending upon the findings of the Residential Vulnerability Analysis, a good comprehensive plan usually makes recommendations to improve the physical environment which are

reinforced by additional recommendations designed to improve the delivery of social services, the management of the project, and to increase the strength of resident organizations.

Principles

The Comprehensive Approach to Security Planning has several operating principles which should be understood before this manual is used. These principles, which reflect the logic behind the material presented in the manuals, are as follows:

The Need to Understand the Vulnerabilities of the Site

This component of the planning approach involves identifying the characteristics of the housing development's physical and social environment that (1) contribute to the criminal victimization of residents, (2) contribute to their fear of crime, and/or (3) cause residents to alter their behavior to such an extent that they limit their opportunities for interactions with their environment and fail to construct the social defenses against crime commonly found in strong, cohesive neighborhoods.

Housing developments may be vulnerable on several levels. The site may have physical characteristics that contribute to crime or fear of crime, or cause people to avoid interaction with each other and their environment. There may also be patterns of interaction among residents that limit their ability to work together or look after one another with the result that residents, because they are isolated, are more likely to be victimized by crime or to be afraid of the possibility.

Housing developments may also be vulnerable because of the manner and extent to which they receive police and other security-related services. If these services are not provided, or are provided in an insensitive or inefficient manner, resident vulnerability increases.

To analyze residential environments along these dimensions, WBA developed its Residential Vulnerability Analysis, a technique that permits the identification of the features of the social and physical environment that could contribute to a crime problem on a site.

This analysis consists of three parts. The first part is the Household Safety and Security Survey that is administered to a sample of the resident population. The survey provides data on actual victimization and measures resident fear of crime and the extent to which residents are altering their behavior because of their concern about crime. An important planning tool because it tells exactly where victimizations are taking place and which areas are viewed most fearfully, this survey allows improvements to be targeted to the most vulnerable areas.

The second element of the Residential Vulnerability Analysis is the Site Security Analysis, the focus of this manual. This identifies the negative design and development features of the site that contribute to residents' vulnerability to crime. Criteria that make up this analysis include: (1) **penetrability** — how the site can be entered, how entry points are structured and controlled; (2) **territoriality** — the presence of design features such as poorly defined front and rear yards that discourage residents from taking control of the site and identifying with it; (3) **opportunities for surveillance** — the extent to which the site provides opportunities for people using the site to be observed in a formal manner by police or more casually and informally by residents; (4) **unassigned space** — the existence of space that no one protects and which can easily be claimed by intruders; (5) **design conflicts** — identifies situations where user groups are forced to compete over the use of the same facility or space; and (6) **neighborhood influences** — how the location of the site and features in the surrounding area affect the security of the development.

The third part of the Residential Vulnerability Analysis examines the cohesiveness and organizational strength of a housing development's social structure. This analysis determines the extent to which residents have formed supportive relationships useful in resisting criminal intrusion or in controlling disruptive behavior of other residents. This part of the analysis also examines how effectively police and other security-related services are delivered to the housing development.

The Need for Evaluation

One of the attributes of the Residential Vulnerability Analysis is that it permits any plan that is prepared to be evaluated according to criteria that are both relevant and explicit. This can be achieved by reapplying the Residential Vulnerability Analysis or any of its dimensions after improvements have been made. A resurvey of the population, for example, can determine, in precise terms, what shifts have occurred in resident victimization, resident fear of crime, and in the extent to which residents are limiting their use of their environment because of their concern about crime. The physical characteristics of the site and the social structure of the residents can also be analyzed on a before-and-after basis.

The Need for Mutually Reinforcing Mix of Improvements

The third operating principle of comprehensive security planning is that an effective security program must present a mutually reinforcing mix of improvements. Experience has shown that many efforts to improve security in housing have failed at least partly because they are one-dimensional approaches to a multi-dimensional problem.

It is not enough to install any one improvement, be it improved lighting, site improvements, resident organizations, or even guards; a coordinated program that involves a mix of reinforcing improvements is necessary.

The Need to Create a Neighborhood

This principle has emerged from repeated analysis and observation on a number of sites all over the country by WBA staff. Time after time, especially in large housing developments, the Residential Vulnerability Analysis revealed that residents felt alone and unsupported, that they were not helping one another in a neighboring way; and that the physical environment reinforced this attitude by being anonymous and institutional in character. The characteristics of this institutional environment not only put residents at risk and increased their anxiety about crime but also inhibited the development of the close, supporting relationships that are necessary if a community is going to resist crime and control mischievous and anti-social elements within the community.

These findings, which will be discussed throughout this manual, led to recommendations in several cases, that wherever possible, large housing developments should be broken up into smaller neighborhoods of from 30 to 50 families so as to provide a social unit with which people can identify. To define these neighborhoods, as well as to organize private and semi-private areas within them, plans in these cases called for the use of architectural elements such as fencing, changes in grade, planting, and shared courtyards. These plans also called for the neighborhoods to be socially reinforced by organizing residents within them, a task expected to be made easier by their physical definition. WBA has also recommended in these instances that the delivery of social and police services be organized to connect directly to these neighborhoods as a way of further strengthening them and assuring, through such contact, that the services would be relevant and sensitive to resident needs.

This principle is important because it seeks to provide residents with a social unit with which they can identify and which will encourage them to build the neighboring relationships that are so important in controlling crime. The achievement of this objective requires an interlocking mix of improvements, of which site improvements of the kind discussed in this manual are an important part.

As can be seen from the foregoing, the Comprehensive Approach to Security Planning is both systematic and comprehensive. It is systematic because it applies precise research instruments to measure factors relevant to the crime problem. It is comprehensive in that it recommends a broad range of improvements that, because they are mutually reinforcing, can be expected to substantially impact on the crime problem in residential environments.

Scope of This Manual

The housing site is one aspect of the environment that is extensively examined as part of the Residential Vulnerability Analysis. This manual deals with that component of the planning approach and is designed to help those people interested in or responsible for developing and managing multi-family projects to uncover the negative features of a site's design that contribute to crime and to develop solutions to these deficiencies.

The manual presents specific criteria that can be used to analyze a site, explains in a step-by-step fashion how the analysis can be performed, and presents design guidelines that are based on WBA's experience in applying the analysis. These guidelines indicate solutions to the more representative vulnerabilities that have been uncovered in previous applications of the site analysis.

The manual first discusses the six basic criteria that form the framework of both the analysis and the process through which solutions may be developed. This section includes numerous examples of situations in which the criteria were employed and solutions developed. The next section provides a five-step process that can be used to conduct the analysis and to develop solutions. Detailed descriptions are given for each step in the process, and design guidelines are presented that can be used to prepare the site improvements portion of a comprehensive security plan.

How to Analyze a Site: Factors to Consider

This section presents the criteria that comprise the site analysis and the logic behind the analysis. These criteria can be used to determine the extent to which a site's design and development contributes to the vulnerability of residents by either increasing chances of victimization, causing residents to be fearful, or causing residents to alter their behavior by pulling back from their environment, thereby preventing the formation of the neighborhood ties that would make the community more resistant to crime.

In reviewing these criteria, it is important to realize that site design is only one of the factors that can contribute to a criminal act. The event itself is usually the result of a complex series of factors that may include not only deficiencies in the site but also the motivation of the criminal, features of the life style of the victim that might place the person in special risk (such as heavy drinking, moving through the site at odd hours) and the absence of police protection or a supportive neighborhood.

Fear of crime is equally complex and is not the result of any one factor. Prior exposure to crime, a person's age, health, and general outlook on life can all play a role in how fearful one is about becoming a victim. This is also the case with altered behavior, the third measure of vulnerability. How people feel toward their neighbors and their general environment, and what they think the environment tells them about themselves all influence the degree to which they will choose to interact and to participate actively in their environment.

It is this complexity that led to the development of the Comprehensive Approach to Security Planning, an approach which recognizes that no one improvement or intervention can be expected to impact decisively on such a complicated event. The comprehensive approach is built on the awareness that the solution must be as complex as the problem and it seeks to counteract each of the dimensions of the problem.

The site, therefore, is only one factor that affects a resident's vulnerability to crime. But it is an important one. The design, organization, and development of a site can determine the extent to which opportunities for victimizations occur, and can evoke fear or offer reassurance to residents. A site can be organized so it encourages people to get to know one another and work together, or it can be laid out in such a way as to make the development of close relationships difficult, if not impossible.

The importance of site layout and design as a factor that can affect victimization rates, residents' fear of crime and altered behavior has been confirmed many times by WBA surveys. One of the most important findings relating to the effect of site design and development on crime was uncovered by WBA in a study of the Millvale housing development in Cincinnati. In that project, half the site had received intensive site improvements. Space was defined to indicate use, lighting was installed, the facades of the buildings were changed to present a more varied and interesting appearance; and semi-public and private spaces were separated by a series of symbolic barriers. None of those improvements was installed in the other half of the site.

Since half the site was improved and half was not, Millvale offered an ideal testing ground to measure the effect of site improvements on crime, fear of crime, and altered behavior, the WBA measures of vulnerability.

The results received national attention because the portion of the site that was improved had statistically significant lower rates of crime, fear of crime, and altered behavior.* It was the first quantitative evidence that design does make a difference to these important indicators.

The Criteria

Six basic criteria comprise the site analysis. These criteria, discussed below, measure the extent to which a site contributes to a crime problem. They are based on WBA's experience in analyzing sites and survey data on victimization, fear of crime, and altered behavior in more than 10 housing developments across the country.

Penetrability

This criterion examines how access to the site is structured and controlled. In many public or low-income developments a security problem is created because access is uncontrolled. That is, there are no environmental suggestions as to how the site should be entered or how traffic should move through it: people enter and move through the site without crossing any barriers suggesting that they are entering someone's environment.

Ideally, the entrances to a site and its buildings should be structured and clearly marked. Where access is not desired, formal or symbolic barriers should exist. Generally, entrances to a site should be arranged so those coming and going can be easily seen. Such surveillance can be performed by a security guard or police patrol, but there should also be opportunity for casual surveillance — surveillance conducted by residents from their homes or from sitting areas around the entrances. The entryways should also be emphatic enough so that they clearly tell people coming in that they are entering someone's environment; that there is a difference between the street and the site.

Entrances to spaces inside the site are also important. A thoughtfully developed site usually has different spaces that are intended to be used for different purposes. Good design often strives to provide a hierarchy of space which moves from public spaces open to everyone, to semi-private spaces intended for specific groups of people, and finally to private spaces intended for individual households, all with well defined entrances and boundaries. The significance here is that it is important not to overlook opportunities to establish them where they do not exist.

Many sites do not meet these standards. Many have no formal entrance points or boundaries that announce a residential environment. Many projects are penetrable from 360 degrees on the compass. They can be entered from all sides and angles, and once on the site, there is no indication of how people are to move through the area. In these sites there is usually an absence of formal entryways, as well as barriers to restrain entry at undesired points.

The concept of penetrability aims at identifying these deficiencies. To use it properly, it is necessary to study a site extensively and to determine how people move onto the site and through it. By studying the streets and determining which ones are used the most and by whom, an opportunity may be seen to close some of them and channel traffic through a main entrance point. A look at the boundaries of the housing development may reveal whether there are any real or symbolic barriers that prevent people from entering. A study of worn areas and frequently used short cuts that cut through people's private space may indicate that these should be closed and traffic forcefully redirected. In other instances, it may be best to yield to people's insistence on a route and formalize the path — particularly if it leads to important destinations such as bus stops or shopping areas that can't realistically be changed.

The concept of penetrability has been applied by WBA in several housing developments. Tasker Homes, a low-rise housing development in Philadelphia, offers an example of the problem. (See Figure 1.) This development of some 1200 units can be entered from almost any conceivable direction at 40 different points. Because of this, it is impossible to maintain any control over the site by residents, management, or the police. Outsiders can drift through the site without crossing any real or even symbolic barriers. Residents living in one part of the project can weave through space that should be controlled by others as they make their way across the project.

The solution recommended by WBA in the Tasker case involved a range of social and physical improvements. Some of these spoke directly to the problem of penetrability. First, the site was divided into four sections for planning and improvement purposes. One such neighborhood, the northern one, received fencing around the perimeter (Figure 2). The fencing was constructed of brick and of tubular steel which gives a wrought iron effect, and when joined to the brick buildings it gave a formal yet harmonious impression. It also created attractive sitting areas in front and behind the fence.

An internal loop scheme (Figure 3) was also proposed for Tasker, a solution particularly appropriate to the Philadelphia Housing Authority's decision to convert the northern section for use by the elderly. This improvement, which was designed to accomplish a number of objectives, reduced penetrability by limiting vehicular access to only one point, a route that could be easily watched by police,

*See "Redesign builds security into this low-income project," *House and Home,* July, 1977, and "Cincinnati Housing Authority Builds Safety into Project," *HUD Challenge,* March, 1977, for a description of the site, the improvements, and the study's findings.

and provided the project with an internal focus. People would have to leave at the same point they entered and would not be able to wander randomly through the project.

In addition to projects like Tasker Homes, a number of highrises have also been analyzed. Many of these were found to be highly penetrable. In some cases, no controlled entranceways existed and anyone could enter the building and get on an elevator; in other cases, attempts had been made to use a security guard to screen those entranceways.

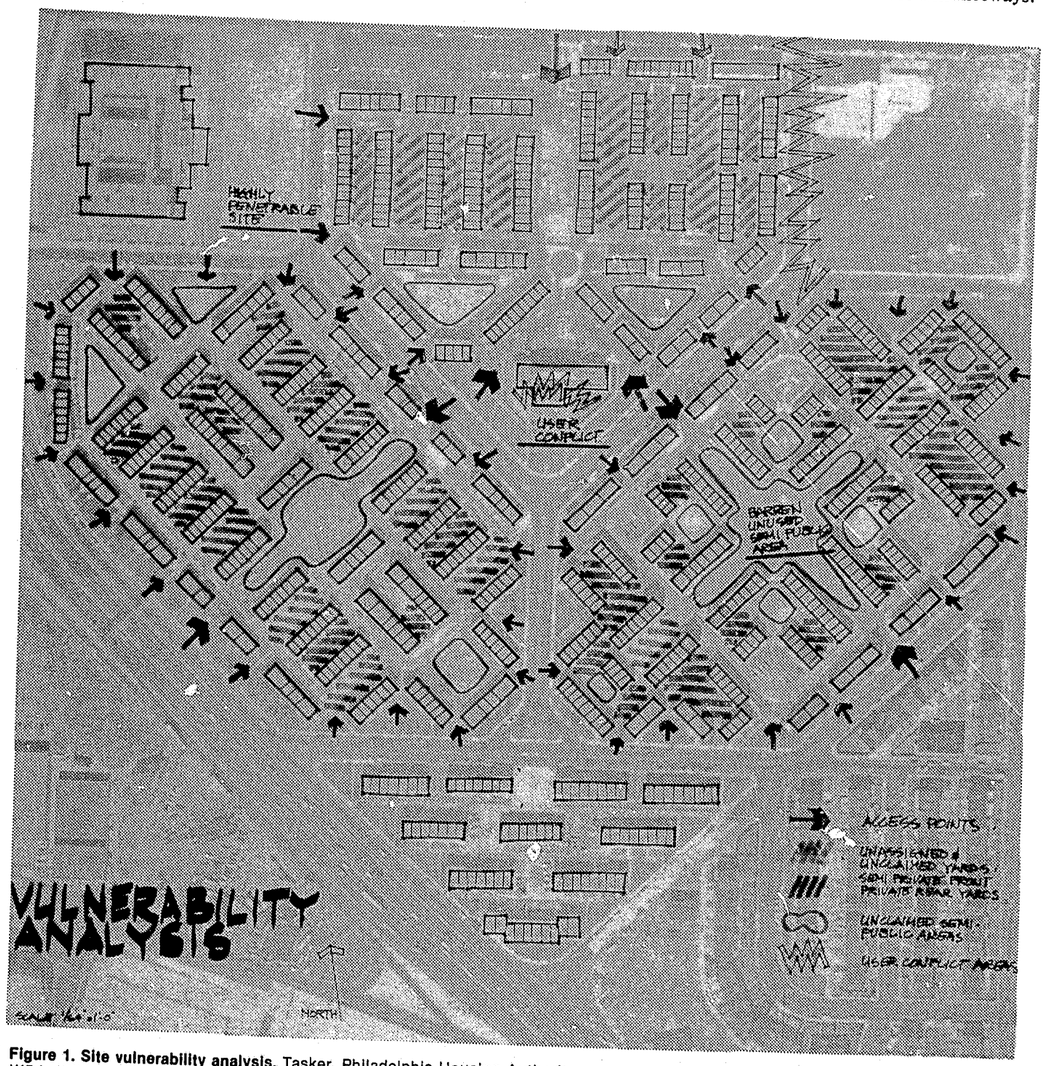


Figure 1. Site vulnerability analysis. Tasker, Philadelphia Housing Authority.
WBA: William Brill Associates, Inc.

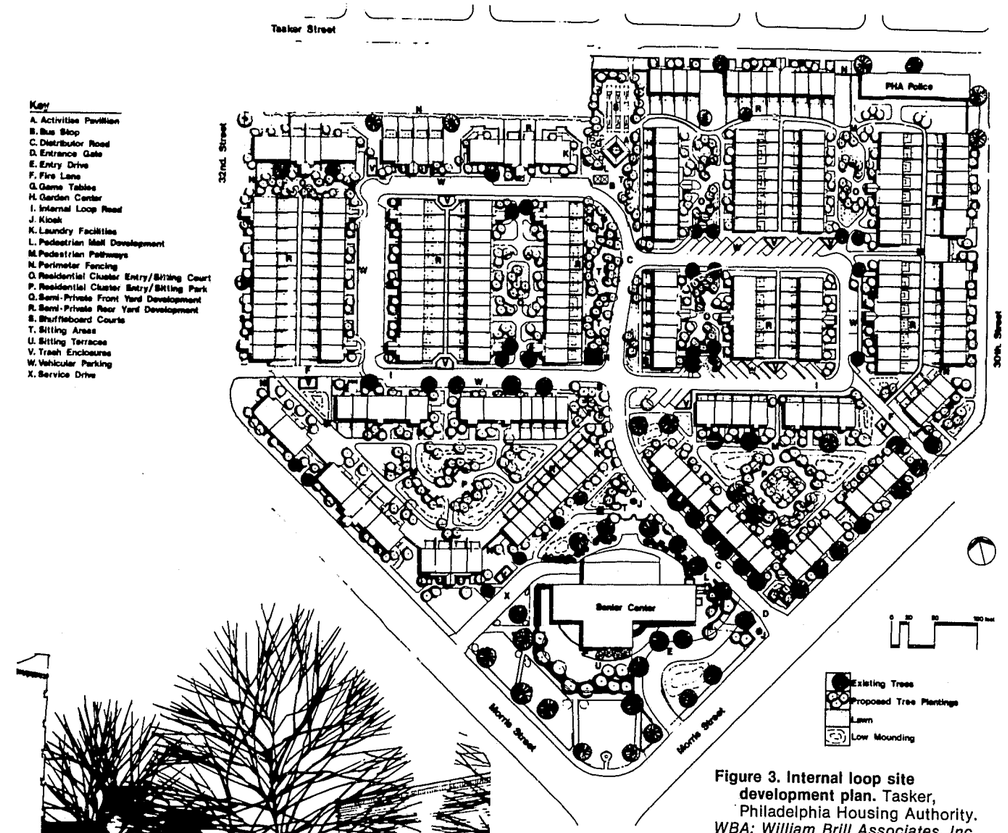


Figure 3. Internal loop site development plan. Tasker, Philadelphia Housing Authority.
WBA: William Brill Associates, Inc.

Figure 2. Perimeter fencing. Tasker, Philadephia Housing Authority.
WBA: William Brill Associates, Inc.

Work in highrises led to the production of a report by WBA* on controlling access in highrise buildings which should be consulted by those who wish to explore in detail the feasibility and mechanics of installing controlled entranceways in highrise buildings. One of the major points this report makes is that access in a highrise building can be controlled if improved lobby design is coupled with a willingness on the part of management to work with residents to establish a clear understanding of the benefits and inconveniences of controlled entranceways, and a commitment by management to establish realistic procedures for security guards and to educate both guards and residents about these procedures. It is thus important to emphasize that the physical design of the entranceways is only one issue. Equally important is resident involvement, and a consensus by all parties on the operation of the entranceways and the proper training and recruitment of security guards.

Controlling Access in Highrise Buildings: Approaches and Guidelines, prepared by William Brill Associates, Inc.; U.S. Department of Housing and Urban Development Office of Policy Development and Research; Government Printing Office, Washington, D.C., 1977.

From the design standpoint, a controlled entranceway usually has, as shown in Figure 4, an outer lobby to which visitors may freely enter and an inner lobby to which visitors and residents are admitted after being checked for identification. A well designed entranceway permits the guard to survey both the lobby and elevator waiting areas. Figures 5 and 6 provide additional examples of well designed entrance and lobby areas.

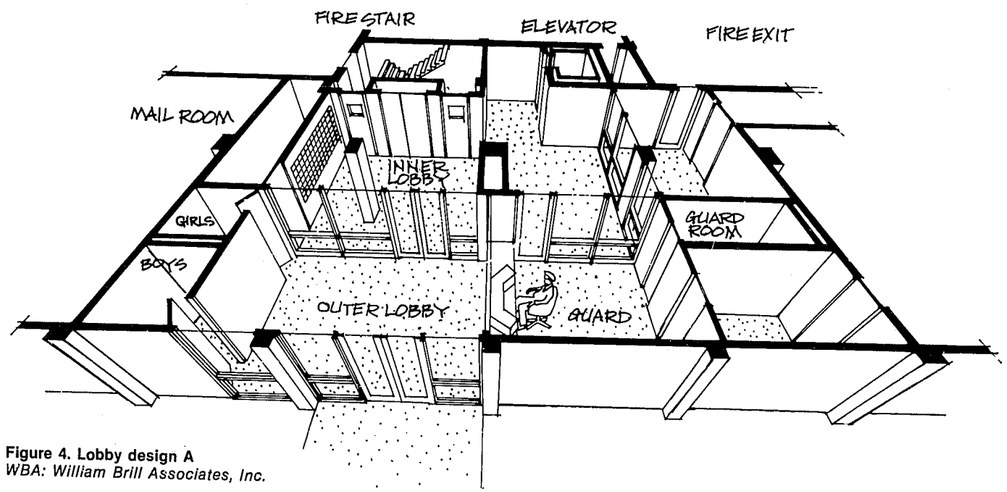


Figure 4. Lobby design A
WBA: William Brill Associates, Inc.

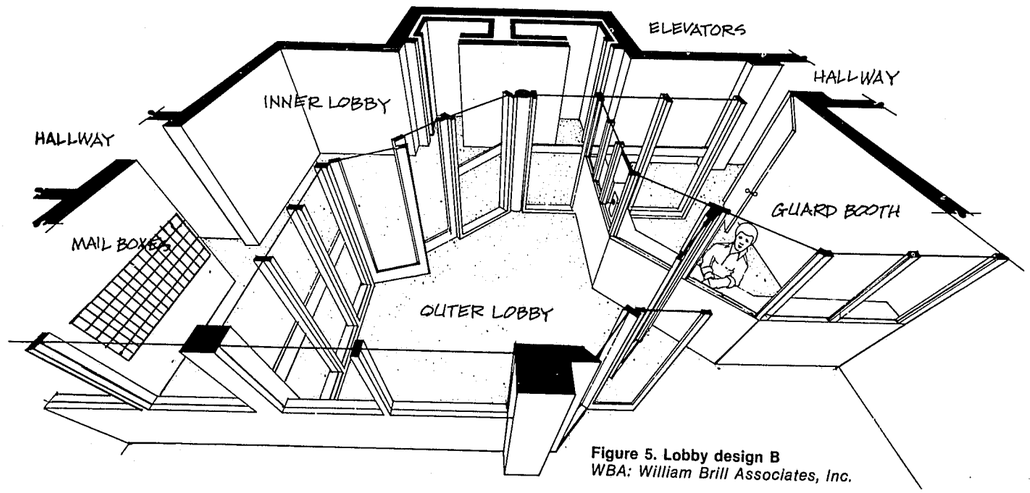


Figure 5. Lobby design B
WBA: William Brill Associates, Inc.

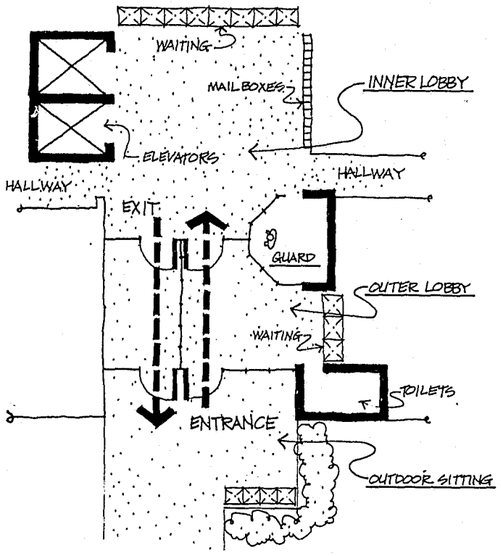


Figure 6. Lobby design C
WBA: William Brill Associates, Inc.

Penetrability is only one factor that should be used to analyze a site, but it can be a critical one. For if anyone can enter a site without being informed by its layout and design that the site is a special environment that belongs to residents, then control over the whole site can be lost, making it difficult, if not impossible, to protect interior and private spaces.

Territoriality

Territoriality refers to the extent to which a housing development's design and layout encourages residents to take control of the site — in other words, to act on the common need to control the space upon which they live.

Good site design encourages territoriality. It invites residents to "claim" space adjacent to their units, and, as a group, to assume control of semi-private areas, such as courtyards. Inadequate site design and development does not do this. In these instances only two kinds of space may exist, public space, which anyone can occupy without challenge, or very private interior space located inside the unit. This means that the only line of defense, a fragile one at best, is the door or window. Ideally, there should be several lines of defense and definition beginning with public space, then semi-private, and finally private space.

There are several ways to encourage territoriality. Semi-private spaces, as discussed earlier, can be created by defining courtyards and structuring access to various parts of the site. It is also important to encourage residents to take control of space immediately adjacent to their unit.

The significance of this kind of resident control cannot be overemphasized. In Scott Manor Homes in Dade County, Florida, for example, a relationship was found to exist between burglaries and resident control over space. In this case, some residents, on their own, had assumed control of their front yards by erecting small fences or by planting in the yards. Most residents, however, had not, with the result that the wide strip between the rows of buildings was largely public (see Figure 7). The walkway which ran down the center of the strip was not respected, and people felt free to meander, without challenge, right up to the doors and windows of the units.

When this project was surveyed to determine the actual crime rate, an interesting finding emerged: those units where the residents had exercised territoriality over their front yards by gardening and erecting fences had a substantially lower burglary rate than those who had not done so.

It was this finding, a result of a Household Safety and Security Survey (part of the vulnerability analysis described in this series of manuals), that led WBA to recommend that small fences be installed at the corners of the front yards to define and establish their boundaries. It was anticipated that once the fences were installed, residents would "move in" behind the fences and, exercising territorial needs, would take control of the newly defined yard space by planting flowers or otherwise claiming the space. This did occur where fences were installed.

Opportunities for Surveillance

This aspect of the site analysis involves assessing the site in terms of the extent to which activities occurring in public and semi-private space can be observed. In assessing a site, it's important to recognize that there are two types of surveillance. The first is casual or informal surveillance — situations where the design of the site allows residents to casually or informally observe the activities of their neighbors or their families. Sites with good opportunities for casual surveillance usually avoid dark, labyrinthine pathways, instead favoring pathways that lead in front of houses where people are likely to be. Bus stops, lobbies, and entrances to elevators are all arranged so that people in these places can be observed by others. Good site design also provides opportunities for mothers to observe their children at play. Kitchen windows overlooking play areas help accomplish this objective.

The significance of these features cannot be overestimated. They provide "eyes and ears" that can see or hear if help is needed; they reassure people that they are not alone and isolated, and this reduces fear. As a result, more

people use the site, which in turn improves security because a criminal will rarely act if he thinks he will be seen.

The other kind of surveillance is the formal surveillance undertaken by security guards and police. It is important that attention be paid to this element. A site should be carefully examined, in concert with the security guards and police who patrol it, to determine which design or development features inhibit formal surveillance. Sometimes it can be high walls that block the view of patrolling guards or policemen, or provide a hiding place for burglars or troublemakers.

This was the case of Nickerson Gardens in Los Angeles, where high cinderblock walls not only prevented police from seeing into backyards but were even used on one occasion to stage an ambush of patrolling policemen.

Another feature of some sites is that many have major areas that security guards and policemen can't get to by car or reach by walking a reasonable distance from their cars. (It is a fact of life that police generally like to stay in, or at least near, their vehicle. They view it as their communication link to both information and help.) In some of the large housing developments, an area that is frequently inaccessible is the ballfield. This was the case in Nickerson Gardens, Los Angeles, (Figure 8), and similarly in East Terrace Homes, San Antonio, Texas, where a large open field in the center of the project could not be patrolled by car. In both of these cases, drug dealers would sell in the center of the large space, secure in the knowledge that they could see anyone coming in plenty of time to throw away their goods.

In Los Angeles, WBA proposed a service roadway to cut through the ballfield. As shown in Figure 9, it was placed so it would not interfere with the layout of the ballfield yet would allow the police to patrol the field and to get their vehicles close to any part of the field.

If opportunities for informal and formal surveillance can be developed, fear of crime as well as people's sense of isolation can be reduced, and many criminal acts can be deterred. Because criminals rarely act where they feel there is a good chance of being observed, surveillance is an important aspect of a site's layout and design.

Unassigned Space

Unassigned spaces are those which individuals or groups of residents have not been able to claim for their own use. Generally this is because these spaces lack environmental cues suggesting how the space is to be used and who should control it. Frequently there is no formal or informal supervision or control over these spaces, and their dimensions are poorly defined. Unassigned spaces may vary in size, location, and character; they may be front or rear yards that are unclaimed by tenants for their own use, or larger open spaces.

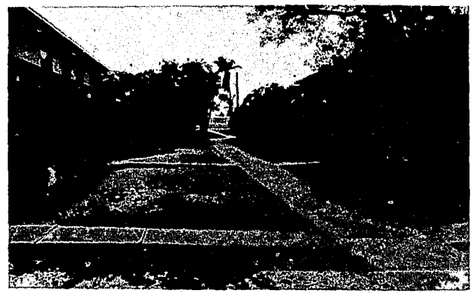


Figure 7. These semi-private front yards lack a sense of territoriality because there is no physical or symbolic boundary between them and the public sidewalk.

Large amounts of unassigned space can be a major vulnerability. Because these spaces are unprotected and uncared for, they provide opportunities for residents and outsiders to engage in mischievous and anti-social activities that would not be tolerated in situations where residents control and maintain their own territory.

Good design usually has little unassigned space. An effort is made to have several levels of space based on need. Spaces are clearly designated as public space, semi-private space, and private space. Each of these kinds of space is organized so that it is clear who is to use it and for what purposes. The goal is thus to encourage residents to lay claim to space. Good design avoids creating large ambiguous, anonymous spaces that residents cannot control because such spaces frequently end up being surrendered to outsiders or to disruptive elements within the community or they simply become vacant eyesores. In such cases, these spaces, instead of enhancing the site, cause people to retreat from their environment and from each other.

In employing this criterion of the site analysis, it is important to look for spaces that are vacant or undeveloped, that no one seems to care for, or which are being used as gathering points for inappropriate behavior. As will be discussed in the next section, these areas must be identified and mapped, and alternatives developed to give them structure and a clearly assigned use.

One example of unassigned use was found in Arthur Capper Dwellings in Washington, D.C., a public housing development for which WBA prepared a comprehensive security plan. Part of the project consisted of low-rise buildings framed around large open spaces (see Figure 10). Field observation revealed that many of these center spaces were completely unlit and unassigned. They were vacant wastelands in the center of more than one hundred family units.

The solution proposed to resolve the problem involved enriching these interior spaces and assigning them a clearly

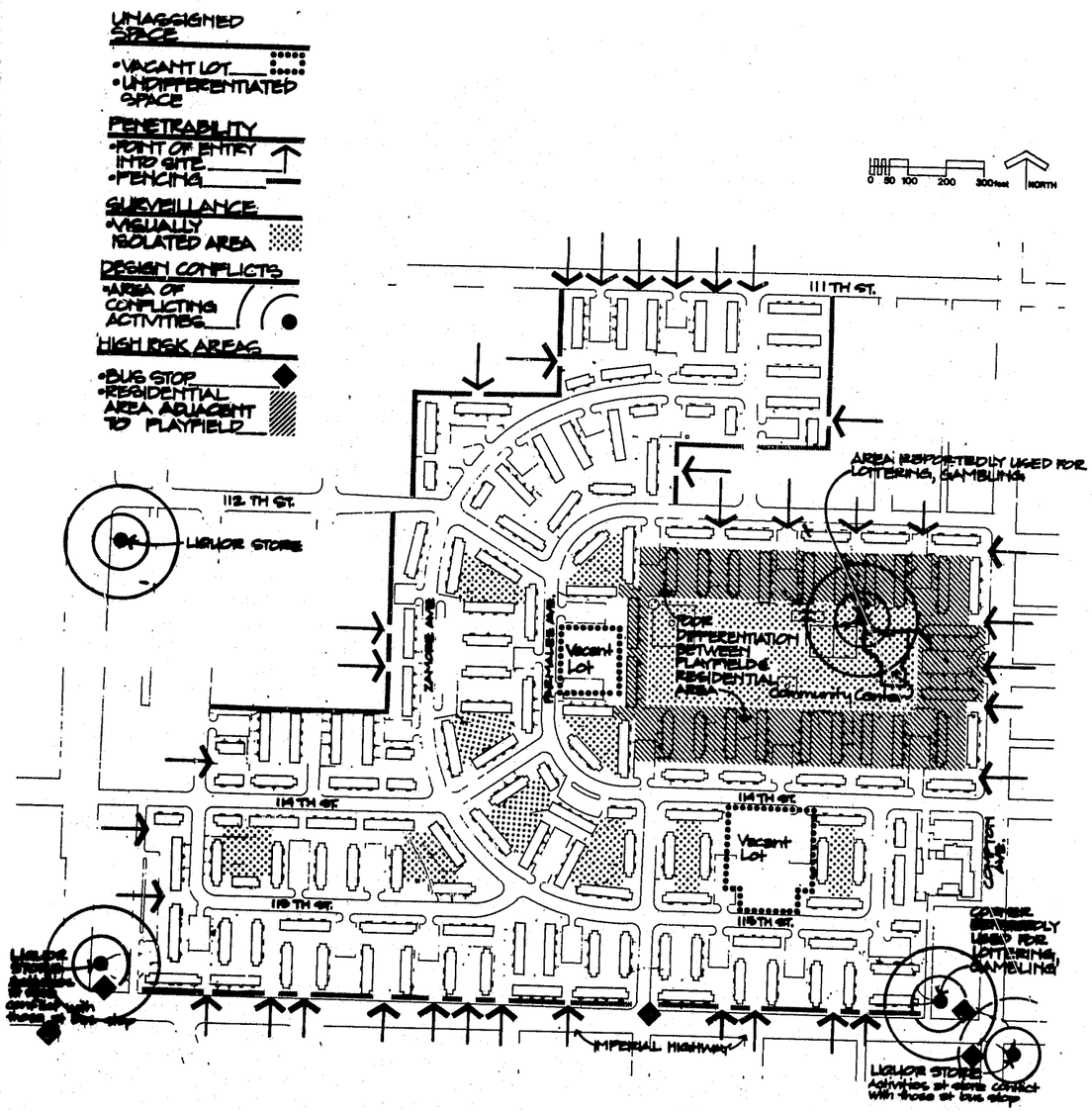
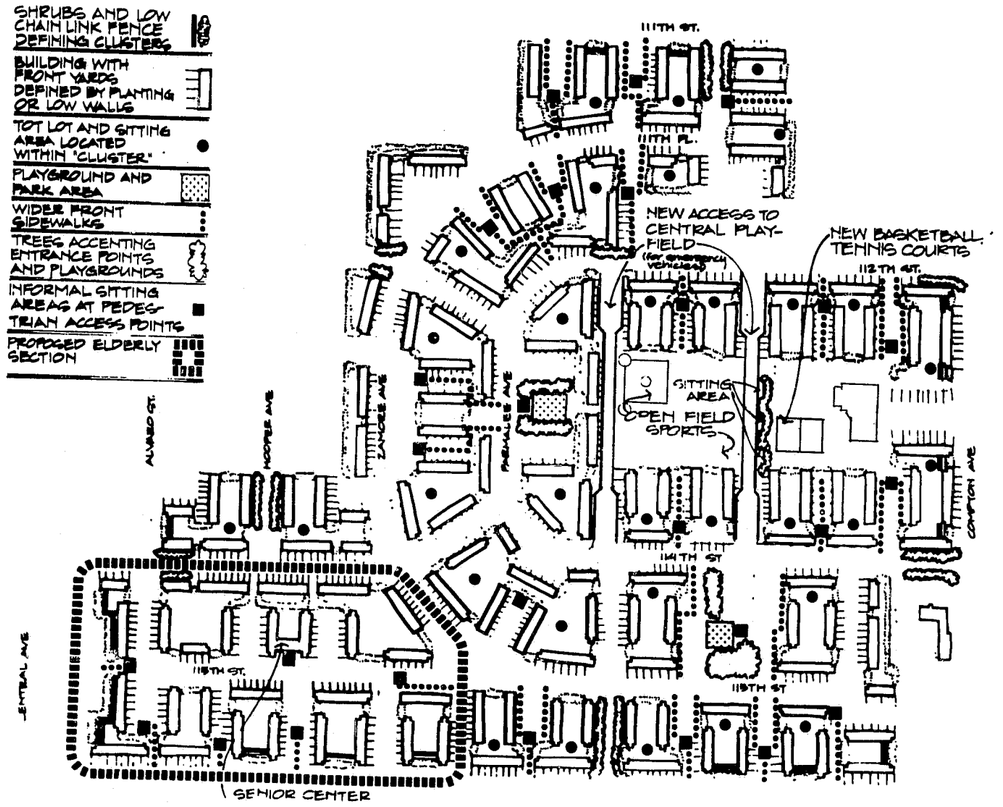


Figure 8. Site vulnerability analysis. William Nickerson, Jr. Gardens, Los Angeles Housing Authority.
WBA: William Brill Associates, Inc.



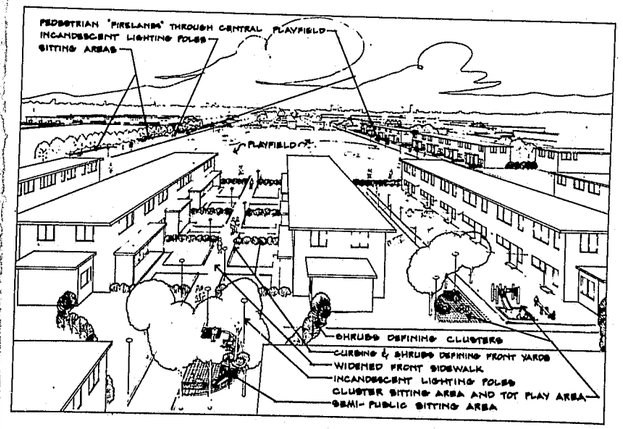


Figure 9. Proposed site plan. William Nickerson, Jr. Gardens, Los Angeles Housing Authority.
WBA: William Brill Associates, Inc.

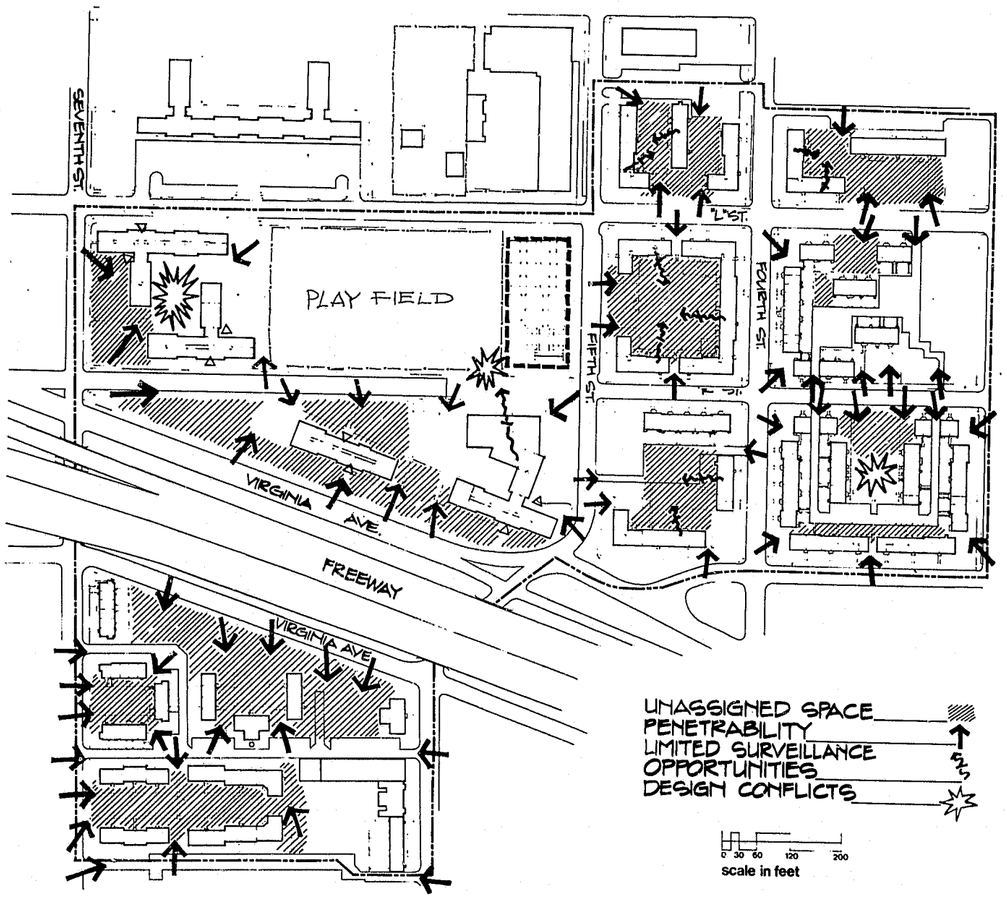


Figure 10. Site security analysis. Capper Dwellings, Washington, D.C.
WBA: William Brill Associates, Inc.

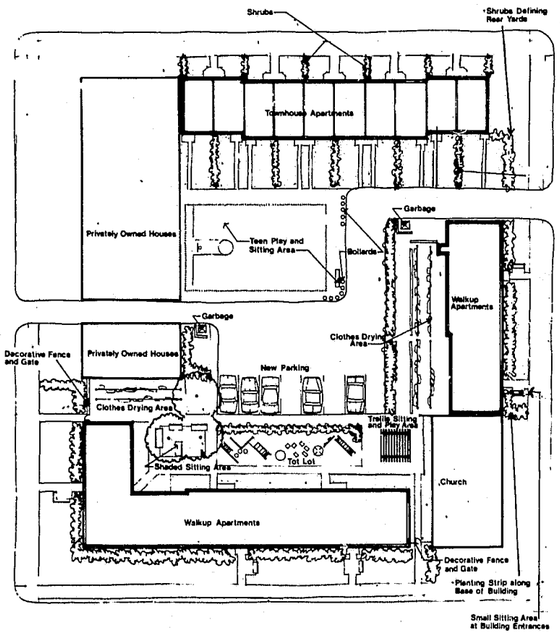


Figure 11. Typical yard development. Capper Dwellings, Washington, D.C.
WBA: William Brill Associates, Inc.

defined use. As shown in Figure 11, enclosed yards were proposed for some of the units as well as parking, teen play, and sitting areas. Access was also structured to reduce penetrability.

The criterion of unassigned space involves identifying and cataloging areas on the site that lack definition and assignment and which as a consequence, expose residents to fear and risk and inhibit their efforts to form neighborhood relationships.

Design Conflicts

Design conflicts occur when two incompatible activities are located next to one another without sufficient separation, or when two incompatible activities are forced to compete for the same space, resulting in continued tension among residents.

The following examples illustrate the various kinds of design conflicts that can arise:

- Pathways to a building for the elderly that lead them right next to an active teenage recreational area:

These instances are particularly unfortunate because elderly persons frequently feel intimidated by rough play even though no threat is intended. The best solution in this case is to organize pathways so that older persons do not have to routinely pass close to teenage play areas to gain access to their homes unless they choose to. If that is impossible, buffers should be established between the walkways and the play areas.

- A tot-lot and basketball court located side-by-side:

This situation can be extremely harmful to the best use of the site because teenagers have a tendency to expand their control over adjacent areas with the result that younger children get pushed away. Tot-lots next to teenage activity areas are also ill-advised because the mothers of young children are frequently made uncomfortable by the rough talk and aggressive behavior of teenagers. In order to be successful, a tot-lot must not only be fun for the child, but comfortable for the mother as well; otherwise she will not bring her child there.

- Entrances to highrise buildings used as lounging areas:

This frequently occurs where there are inadequate recreational facilities for both adults and young people, or where entrances are not guarded or periodically surveyed by police. In such cases, residents are made uneasy while crossing these lounging or "hang-out" areas, and it can be a source of tension in the community. The solution lies in establishing a controlled entranceway along the lines presented in WBA's *Controlling Access in Highrise Buildings: Approaches and Guidelines,* and in providing more attractive lounging and recreational spaces for residents.

• A large ballfield bordering directly on front yards of adjacent residences:

This was the case in Nickerson Gardens, Los Angeles, a public housing development for which WBA prepared a comprehensive plan. A large ballfield was located in the center of the project. Several design conflicts were found. First, the design and arrangement of the facilities failed to establish specific areas which clearly indicated the user group (elementary school, teen or adult) for whom they were intended. This ambiguous design fostered conflict between user groups as they attempted to use the same facilities. Secondly, access to the ballfield was limited, with the result that users developed a series of short cuts that placed them in conflict with the residences that surrounded the ballfield. A further conflict existed between the residential use of the surrounding area and the recreational use of the ballfield because the boundary between the two areas was not firmly established. It was unclear, for example, whether the front yards of the residents belonged to the units or to the ballfield.

The problems of the ballfield in Nickerson Gardens are not uncommon in large housing developments. The solution lies in providing adequate buffers between assigned space uses and in providing recreational facilities for all major age groups so as to decrease competition.

• Elderly persons attending a lunch program at a community center use the same entrances as young people and must share lounge areas:

Elderly persons should not be put in positions where they have no choice but to compete for space with younger people. Like all age groups, they should have the freedom to choose the extent to which they wish to interact with other age groups. The design and operation of community centers that serve elderly individuals as well as families should recognize this and provide separate spaces and programs for the elderly.

• A liquor store located near one of the entrances to the housing development on a corner which is also a bus stop used by residents:

This situation constitutes a severe design conflict as it forces residents waiting for a bus to deal with the rough-and-tumble atmosphere of a liquor store corner, subjecting them to possible harassment and discomfort. Several housing developments surveyed by WBA had this problem; one was Nickerson Gardens in Los Angeles.

Solutions in this case are difficult if the liquor store is already in business. Consideration can be given, however, to changing bus stops and entrances to the site, and some control over liquor store operations or future locations can, in some instances, be gained by consulting local officials regarding zoning regulations and the granting of use permits to liquor stores.

The effects of the above-noted design conflicts on crime, fear of crime, and altered behavior can be substantial. Competition over use can lead to quarrels which can end in assaults or worse. The same design conflict can also cause one user group to withdraw and do without needed facilities. In these cases, people are pulled apart rather than encouraged by the design of their environment to work together and coexist peacefully.

Design conflicts can also contribute to fear of crime whether entirely rational or not. An elderly person who must pass close to a rough play area cannot help but feel some sense of anxiety; the same is true of a mother who must pass through an entrance to her building that is crowded with lounging teenagers.

There are a number of solutions available for design conflicts. These will vary depending upon the site, the exact nature of the problem, and the resources available. In general, solutions should be directed at separating and containing competing users. This can be done by establishing buffers, such as walls, shrubs or trees,* or by providing an alternative site for one of the activities — relocating a conflicting activity, for example. Solutions can also include rerouting people around a design conflict. If the problem is outside the site — such as the case of the liquor store next to the bus stop — a change in the location of the entrance to the site might be considered, as well as a related change in the location of the bus stop. Petitions and inquiries to local zoning boards can also be initiated to prevent the location of businesses that would be in conflict with the needs of a residential environment.

Influence of Surrounding Neighborhoods

Neighborhood influences on a site are important to identify. Although neighborhoods can offer a setting which provides a variety of support services such as commercial stores, parks and transportation lines, some neighborhoods generate pedestrian patterns or attract undesirable groups which impact negatively on the security of a site. Many times the location of a site in a neighborhood can make it especially vulnerable. Security in a housing development can be influenced if two different kinds of housing developments abutt one another, such as an elderly next to a family project, a juxtapositon that could impact negatively since the vigorous activities and noise of the children in the family development could intrude upon the adjacent outdoor spaces of the elderly development and discourage their intended use by the elderly residents. A housing development located next to a public ballfield or

*For a detailed discussion of the site elements that can be used to accomplish these objectives, see *Site Elements Manual*, prepared by William Brill Associates, Inc. for U.S. Department of Housing and Urban Development Office of Policy Development and Research, Summer 1979.

basketball court may also be negatively impacted by the large groups of teenagers and young adults who are drawn to the facilities and spill-over onto the site as they wait their turn or watch the games. The location of bus or subway stops can affect security on a site, sometimes by encouraging non-residents to take short-cuts through the site; or, if located in poorly protected areas, these stops can be fear-evoking places of victimization.

Nearby liquor stores or bars can also exert negative influences. This was the case in Dunbar Village, a housing development studied by WBA in West Palm Beach, Florida. Here the development was located right across the street from a liquor store. The result was that people from the neighborhood would buy liquor at the store and then come across the street and sprawl on the grass at the edge of the site and drink. To solve this problem, it was recommended that the trees be cut back so as to provide less shade against the Florida sun and that the lounging space be "neutralized" by covering it with ground cover, an improvement designed to make it unattractive to loiterers while at the same time keeping the space part of the housing site.

The possible solution of making the area which led into the development a gateway with sitting areas was deliberately rejected. The Dunbar Village residents who were consulted felt it would be asking too much of residents to defend such an area against the appeal it would have for loungers. Therefore, the decision was to neutralize it, rather than make it a space that was not realistically defensible.

Thus it is important to understand how the environment on a site is influenced by broader neighborhood factors. Neighborhood influences can determine how people do move through a site and what changes should be made to increase their security and that of the residents. If a site is located next to a crime-generating area, this factor must be understood and dealt with. If the site is isolated and people must move through pathways to other activities that expose them to crime or make them fearful, then these routes must be made safer.

Preparing the Plan

Overview

This section tells how to analyze sites using the criteria discussed in the preceding section. It outlines a five step process to follow.

Step 1: Preparation of the Base Map. This step involves preparing a base map of the site which indicates the layout of the site and buildings. This map is a basic working document of the Site Security Analysis.

Step 2: Organizing the Site Security Analysis. In this step, decisions are made about who is going to participate in the analysis and how responsibilities are to be shared and coordinated. Information on the site is collected from available sources such as city planning agencies, the police, etc.

Findings from the Household Safety and Security Survey, if one was administered, should be carefully reviewed at this time. Resources that might be used to implement the site improvement program proposed as a result of the analysis should be identified both in terms of their source and dollar amount. It is also important in this step to establish coordination with any groups that are working on other aspects included in the comprehensive plan, such as management, police or social services, to assure that the final plan will be coordinated and comprehensive.

Step 3: Administering the Site Security Analysis. Here the site is analyzed according to the criteria presented previously. This involves developing a site vulnerability map or series of maps that indicate the major problem areas of the site.

Step 4: Developing Design Solutions. This step involves preparing recommendations based on the analysis. These can be simple depictions of recommended site improvements such as solution maps indicating where fencing is required or, if professional help is available, they can be in the form of preliminary schematic drawings and sketches. These drawings would indicate the positioning of the improvements and their dimensions. Sketches would also be included.

Step 5: Integrating Design Solutions into a Comprehensive Plan. This step involves fitting the design recommendations into the goals of the overall plan so that these solutions can reinforce recommendations in other areas such as police and social services and the management of the housing development.

Step 1: Preparation of the Base Map

The base map is one of the basic documents of the Site Security Analysis. When completed, it will indicate the location and layout of all the existing features of the site such as buildings, open space, sidewalks, fencing, streets, and parking areas. It is on this map that your findings should be recorded. The base map is thus extremely important, because it not only familiarizes the team working on the analysis with the site, but provides a consistent format upon which to record observations and findings for different steps in the analysis. Several copies of the base map will eventually be needed because the other required maps (the site vulnerability analysis and recommended solution

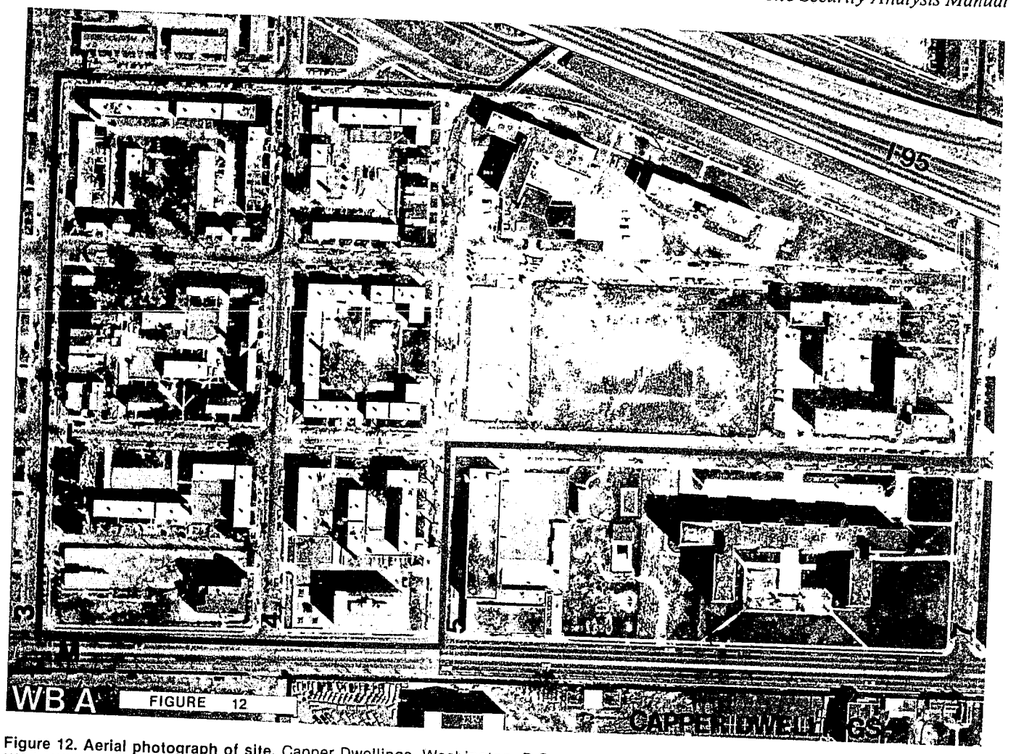


Figure 12. Aerial photograph of site. Capper Dwellings, Washington, D.C.
WBA: William Brill Associates, Inc.

maps) will use the same format to present different information.

A complete set of base maps should have two parts or perspectives. One can be derived from an aerial photograph; the other from construction drawings that were made when the site was originally developed.

Aerial Photographs

An aerial photograph, because of the altitude at which it is taken and because it is actually a photographic picture of the site "as is" (and not as someone drew it), provides a remarkable perspective of a site (Figure 12). Aerials are extremely valuable because they provide an overall sense of the site as well as important information on specific site features that relate to penetrability, unassigned space, neighborhood influences, and so on. An aerial photograph is able to do this because it can reveal how a site is actually being used, in addition to depicting the static layout and features of a housing development. For example, if people are parking in their front or rear yards, this can be seen. If the photograph is made large enough to show the areas surrounding the site, it can reveal and thus help you identify the neighborhood influences which affect the site. The same is true of informal pathways or barren areas that might indicate unassigned space — all of these important factors are revealed by an aerial.

Aerial photographs are also useful for briefing purposes because they present a visually dramatic view of the entire site which is usually interesting to most people. Because of their scope, the photographs can give viewers a quick understanding of the site, and when used with transparent overlays, they can be particularly useful for indicating problem areas and depicting recommended solutions.

City planning offices as well as commercial facilities usually have aerial photographs of almost any site. You should try to obtain several copies as you may want to have someone — a staff architect, draftsman, or even a student architect — do a series of overlays as you move into the analysis. These overlays, which are made on transparent

plastic, can be used to illustrate problem areas as well as solutions, and can be designed to lay right over the photograph so the viewer can see exactly how and where the comments and recommended improvements apply to the site.* Many people find transparent overlays extremely useful in briefing citizen groups and public officials.

Copies of the aerial photographs are made by obtaining a "film positive" photograph of the site, which is like a large transparent black-and-white slide. A blueprint shop can make copies to be used in recording your observations and analysis of the site.

These copies can also be used to add details of features on the site that might not have shown up on the original aerial.

Construction Drawings

Construction drawings are drawings prepared by architects to indicate how the site and buildings of a housing development were to be developed and constructed. Usually a large roll of blueprinted sheets weighing several pounds, they include drawings relating to every construction item.

For the purposes of the Site Security Analysis, what is required is the site plan — the drawing that indicates the basic arrangement of the buildings. It is also useful to have a plan of the interior layouts of typical buildings. In going through a roll of construction drawings, identify these drawings and have them reproduced at a blueprint shop. They are the only ones you will need. Generally the landscape architect's portion of the drawings also offers a good drawing of the site plan, and provides information about the outdoor features of the site such as fencing and planting. The interior of the buildings will be presented in many of the individual sheets. Pick one that is the least cluttered with technical information and have that reproduced.

The construction drawings for most housing developments are usually stored in the management office, as they are often used as reference for maintenance, repairs, and new construction. Other possible sources of the drawings are the maintenance supervisor, the central office of the agency or organization responsible for your development, or, as a last resort, the architect or builder of the development. To get blueprint copies, the original reproducible drawings are required. In most cases, WBA staff has found the people who have the drawings to be extremely cooperative, both in terms of finding the drawings and arranging for them to be reproduced. If you can't obtain the originals necessary to have them reproduced by blueprinting, you should try to get someone, a student architect or draftsman, to trace the drawings you need from one of the copies. This is something that will probably have to be done anyway since it is likely that the available drawings will contain a number of confusing and unnecessary details that can be omitted from the traced drawing copy. This will simplify the base map and leave more room to record observations and findings.

In any case, one of the first things you want to do when you get the proper drawings is to check their accuracy. Many times significant changes have occurred on a site that is several years old, and it's important to be aware of them. As you check the site, remember to record on your map derived from the construction drawings important site features that were revealed by the aerial, such as worn grassy areas of informal pathways. Also mark places where additional trees or other landscape features such as fences, shrubs, or playground equipment are now located.

Once you have completed these tasks, you should have a good base map from which to work. The aerial will provide you with perspective on the whole site, and some of the patterns of use (or non-use) on the site, and the map created from the construction drawings will give you an accurate layout of the site and buildings once it is updated. The rest of your work will be drawn on copies of this base map or on overlays of the aerial.

Step 2: Organizing the Site Security Analysis

At this point, you have completed the development of the base map as described in Step 1, and you are familiar with the purpose and scope of the analysis and the criteria that are used to assess a site. This next step, which could overlap with the preceding step, involves setting up the organizational framework for the analysis.

Here decisions must be made as to who is going to participate in the study, how responsibilities are going to be divided, and what timetables are to be followed.

One of the best ways to organize your analysis and decide how to allocate resources available to you, is to prepare a work schedule. "Resources available" usually includes time, money and personnel, as they are all intimately related to the success of your analysis. Making a schedule will require you to list every task you plan to do and then specifically relate them to your resources. The schedule should serve as a "road map" indicating what you have done, what is left to do, and whether or not you are completing the tasks on time. Schedules can help you estimate and re-estimate if necessary, how much time, money and personnel you need to complete the analysis. Figure 13 on page 20 provides an example of the format your work schedule might utilize.

Linkage must also be established with any individuals who are working on other elements of the comprehensive plan, such as police and social services, tenant organiza-

*Figure 1, page 7 is an example of a transparent overlay used with an aerial photograph to depict site vulnerabilities.

Work Schedule

Godder Homes Site Security Analysis		Week										
Assigned Team	Task	1	2	3	4	5	6	7	8	9	10	11	12
Team A	1.												
Team B	2.												
Team C	3.												
Team B	4.												
Team A	5.												
Team C	6.												
Team B	7.												
Team A	8.												
Team A	9.												

Figure 13. Sample work schedule.

tions or management. If these people are the same ones who are conducting the Site Security Analysis, be sure to place an emphasis on making the plan comprehensive, so that it includes social and management changes and not just physical improvements.

Ideally, any group that is conducting a Site Security Analysis should include participants from the management staff of the project, particularly people who might have technical skills, representatives from the police, local planning agencies, and from the resident community. This range of participation is required for two reasons: first it assures that the plan will be sensitive, realistic, and comprehensive. Secondly, it encourages support among those who will probably be responsible for implementing the plan. To include these people in the planning process will assure that they will know how the plan was formed and thus be likely to support it.

In addition to forming and organizing the group that will be working on the Site Security Analysis, relevant data about the site should be gathered. Local planning agencies should be consulted to see what, if any, plans they have for the site or the community of which it is a part, and what maps or planning documents they have prepared. It is also important to consult the police and obtain any data they have on crime on the site or in the surrounding area. And finally, the findings of the Household Safety and Security Survey, if one was administered, should be carefully reviewed. If at all possible the findings should be mapped on one of the base maps so everyone can see which units are being victimized and where crime is occurring on the site (Figure 14). The mapping techniques used in analyzing the survey, which are discussed in another manual in this

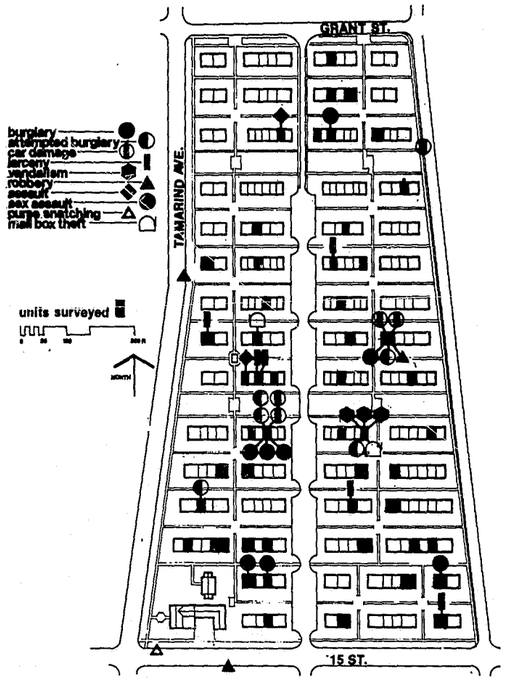


Figure 14. Pattern of victimization. Dunbar Village, West Palm Beach Public Housing Authority.
WBA: William Brill Associates, Inc.

series, also include identifying high-fear areas utilizing data drawn from the survey.

Still another task that must be performed is to get an idea of available resources to implement the improvement program. Your organizational plan should include this assignment. If your housing development is a public housing project, modernization program funds would be a likely source as well as other special programs that HUD funds from time to time. Other subsidized housing developments also have improvement monies, either out of operating budgets, renegotiated mortgages or public programs such as community block grant funds. The key point here is that sources, amounts, and requirements for eligibility should be investigated. This information will help you order your priorities realistically and could give you a budget figure within which to plan.

In summary the tasks to be performed in this step consist of:

1. Identification of participants in the planning group.
2. Development of assignment and schedules; coordination with social and management components as well as resident organizations to assure a comprehensive approach.
3. Collection and review of relevant data about the site and its crime problems from local planning agencies, police, and particularly the Household Safety and Security Survey.

Step 3: Administering the Site Security Analysis

The administration of the Site Security Analysis requires that the site and the activities taking place there be carefully observed and recorded in terms of the six criteria of the Site Security Analysis: penetrability, territoriality, opportunities for surveillance, unassigned space, design conflicts and neighborhood influences. As discussed in the first section of this manual, these criteria measure the extent to which the features of a site contribute to a crime problem.

Observing the Site

A key part of the Site Security Analysis is the careful and accurate observation of the site and how it is used, and the recording of these findings in a systematic way.

There are a number of different ways this can be done. Probably the best way to begin is by driving through the site and verifying or completing the information on the base map. Areas identified as dangerous by police, residents, or survey data should be noted.*

Once these preliminary observations have been completed, you can then begin to walk the site in order to take a closer and more detailed look at the project. In doing this, it doesn't matter too much where you start, so long as your approach is systematic and you take care to record your observations on a base map. You should also plan to walk the site at various times of the day and night as sites are used differently at different times. It is usually necessary to walk a site many times to get the proper "feel" for the site and make looking at the site map more meaningful. If possible, the observer should try to conduct informal interviews with the residents along the way.

What to Look For

The site analysis involves assessing the site according to six criteria: penetrability, territoriality, opportunities for surveillance, unassigned space, design conflicts, and neighborhood influences. The characteristics of each of these criteria were discussed extensively in the first section of this manual. What is presented below is a series of indicators to help you employ each criterion.

*Instructions on how to record this information on the map are given at the end of this section.

Penetrability

Penetrability refers to the ease with which a site may be entered or penetrated. It refers not only to the penetration of the exterior of the site, but also to the penetration of housing units and the semi-private areas within the site.

Penetrability may be a problem if:

- Easy access to the site is possible from many or all points around the perimeter of the housing development.
- Public spaces such as streets or sidewalks serve as points of uncontrolled or unobserved access throughout the site.
- No visual or physical distinctions are made between vehicular and pedestrian paths intended for the public, and those intended only for residents.
- Pedestrian circulation through outdoor spaces is indiscriminate and unfocused due to unclear or poorly planned sidewalk systems.
- Public paths and outdoor areas are not controlled by physical or symbolic design elements which clearly separate public areas from the rest of the site.
- Front and back yard areas are used as short cuts by residents and/or outsiders.
- Unobserved and/or uncontrolled building access can occur through access points other than the main entrance, such as garage or basement doors, stairways, or fire exits.
- Pedestrian circulation within apartment housing units is poorly planned and/or controlled.
- The architectural features of the housing units permit easy entry — flimsy door and window hardware, low windows located next to doors, large numbers of broken or unlocked doors and windows, etc.

Territoriality

Territoriality refers to the extent to which the site's layout, design, and development encourage residents to take control of the site and indicate how it is to be used.

Territoriality may be a problem if:

- All residential activities appear to be restricted to inside the housing unit.
- Private and semi-private spaces such as balconies, porches, patios, backyard areas and courtyards appear deserted and/or neglected.
- Residents have not attempted to decorate or modify these private and semi-private spaces to suit their needs and tastes.

• There is little visual and physical differentiation between private and semi-private spaces on the site.

• Residents have not attempted to define the areas which "belong" to them with fencing, planting, or seating.

• Residents do not appear to take an interest in, or accept responsibility for the appearance of their private and communal outdoor spaces.

• The larger communal and/or recreational outdoor spaces are not actively used by residents.

• The site and buildings have been subjected to a great deal of vandalism.

• The housing development and the site do not present a strong and positive image to residents and/or outsiders.

Opportunities for Surveillance

This criterion refers to the extent to which the site and the people using the site can be observed formally by security guards and informally by residents.

Your site may lack opportunities for surveillance if:

• The arrangement of buildings, pedestrian and vehicular traffic, and outdoor spaces does not provide opportunities for guards or residents to formally or informally monitor the behaviors and activities which take place on the site.

• Entrances to the site and its buildings are not located or designed in such a way as to allow residents or guards to observe the people who enter or leave the development.

• Guard booths and resident sitting areas are not strategically located near entrances, or along boundaries which separate public and private spaces on the site.

• Sitting, play, and/or recreational activities are located in such a manner that they cannot be seen by residents from inside their housing units.

• Security guards and/or police do not have unobstructed views of, and quick access to, key areas on the site such as lobbies, walkways, open spaces, or any other areas you have identified as dangerous.

• The site contains activity areas which by their location are isolated from the rest of the development.

• Design elements such as walls, fences, trees, or shrubbery serve to screen or block views into and out of entrances, along sidewalks, or into adjacent open spaces.

• The site is not evenly and brightly lit at night; particularly areas such as bus stops, parking lots, sidewalks, and entrances to buildings.

Unassigned Space

Unassigned space refers to space that has no environmental cues as to how it is to be used or by whom. It is usually vacant and open and is often the scene for inappropriate or anti-social behavior.

Unassigned space may be a problem if:

• The overall site design does not provide a format for the organization and control of site activities by establishing a well-defined hierarchy of public, semi-private, and private space.

• There are no physical or symbolic design elements to indicate the boundaries of public, semi-private, and private spaces on the site.

• There are areas on the site which do not appear to be associated with any particular building or housing unit.

• Entrance areas or spaces between buildings appear to be acceptable for use by anyone.

• The site contains large unbroken expanses of open space.

• These open space areas are barren, overgrown with weeds, or heavily littered.

• There are spaces on the site which are rarely used by residents.

• There are spaces on the site which are avoided by residents.

• The site contains spaces whose intended use is not clear.

• The site contains spaces whose intended uses are clear but do not address the needs of the residents and are therefore rarely used.

• Spaces on the site have been claimed by outsiders for purposes which jeopardize the security of the site, such as short cuts or loitering.

Design Conflicts

Design conflicts are situations where user groups are forced to compete for the same space or facility or where incompatible users are located adjacent to each other on the site.

Design conflicts may be a problem if:

• Frequent arguments occur between residents over the use of open space and outdoor facilities.

• Some resident user groups appear to monopolize existing facilities at the expense of others.

• There does not appear to be enough open space to accommodate all the resident user groups in the development.

• Pedestrian paths lead residents through active play areas.

• Too many different and/or incompatible activities, such as stickball, tot play, and adult sitting occur simultaneously in the same open space or adjacent to one another.

• The design of the site does not incorporate physical design elements to separate or buffer conflicting activities.

• The design of the site does not provide visual cues which indicate what kinds of behavior and activities are appropriate for a space and for whom.

Neighborhood Influences

Neighborhood influences are factors outside the site that affect its vulnerability.

Neighborhood influences may present a problem if:

• The design of your site does not provide physical or symbolic elements which formally announce the boundaries of the development and separate it from the public thoroughfare.

• Activities generated by nearby schools, stores, parks, or playgrounds "spill over" onto the site.

• The site is dominated by a commercial facility, highway or larger housing project located nearby.

• The site is used for short cuts or as a lounging area by non-residents.

• Non-residents feel free to use the open space and/or outdoor facilities intended for use by residents.

• Potentially inviting or desirable open space areas are located near the perimeter of the site where they are easily accessible to passers-by who may be attracted to them.

• The design of your site does not provide physical barriers such as plantings, earth berms, and fencing to protect the site from encroachment by undesirable neighborhood influences.

As you begin to observe the site, look for the kinds of negative site features, social characteristics, and visual cues described by the site criteria indicators. Keep in mind that these indicators are only meant to initiate the analysis. It is up to you to investigate the implications of the indicators you find, and expand your observations to fit the size and complexity of your site.

Another point to remember is that in addition to examining the individual problem areas and site vulnerabilities, it is important to consider the ways in which they collectively affect the security of the total site. Look for possible relationships between the negative features you have identified and examine the patterns they form over the site as a whole.

Recording Site Vulnerabilities

There are a number of ways to record and present information on base maps. Initially an ordinary #2 soft lead pencil can be used to record on-site observations. The lead will be dark enough to be read easily and can be erased if necessary. Later, when all the observations have been compiled, you can refine and clean up the graphic appearance of your final base map so that you can use it to communicate with others.

Two basic systems can be used to graphically record your observations on the base maps:

• Short written phrases related to the areas on the map to which they refer.

• Symbol systems which utilize numbers and letters or graphic designs such as arrows, circles, stars and textures.

As illustrated in Figures 15 and 16 observations can be presented in short written phrases connected by a line or arrow to the areas on the map to which they refer. This may be the most comfortable system for those who have little graphic experience; however, it requires more work, uses up more space, and takes longer to read than a symbol system, which functions like shorthand.

Symbol systems (Figures 17 and 18) are a convenient method of recording observations because they are concise, read at a glance, and do not take up room on a crowded or complex site plan. Symbol systems are easy to devise as long as you remember to define each symbol and use them consistently. Once you assign a meaning to a symbol, use it to represent the same thing on all the maps you develop. Provide a legend or key which defines the meaning of every symbol used on each map so that anyone who reads the map will be able to interpret the information on it. It is not necessary to copy the exact symbols shown in the examples; you can adapt them for your own purposes or create your own.

Record your observations by whatever system you feel comfortable, choosing the system you will use before you begin to record your observations, so that your notations will be consistent and you do not waste time at the site worrying about how to record what you see. Don't worry about the initial appearance of the maps, as long as the recording system used is accurate, consistent, and clearly understood by you. At this point it is the information you are recording rather than the graphic appearance of the map that is important. Later, for presentation purposes, pens and simple architectural graphic aids can be used to upgrade the appearance of your final maps.

Materials

The following is a suggested list of materials that will help you to adequately record and present your observations. They can be purchased at any art supply store that carries architectural, graphic, or commercial art supplies.

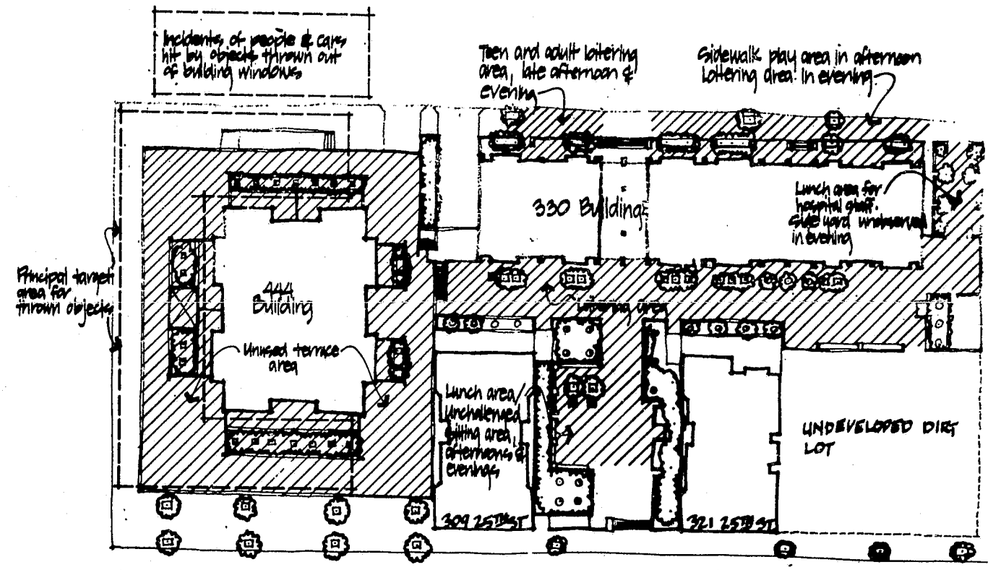


Figure 15. Undifferentiated-unassigned space and trouble spots/Written Graphics.
WBA: William Brill Associates, Inc.

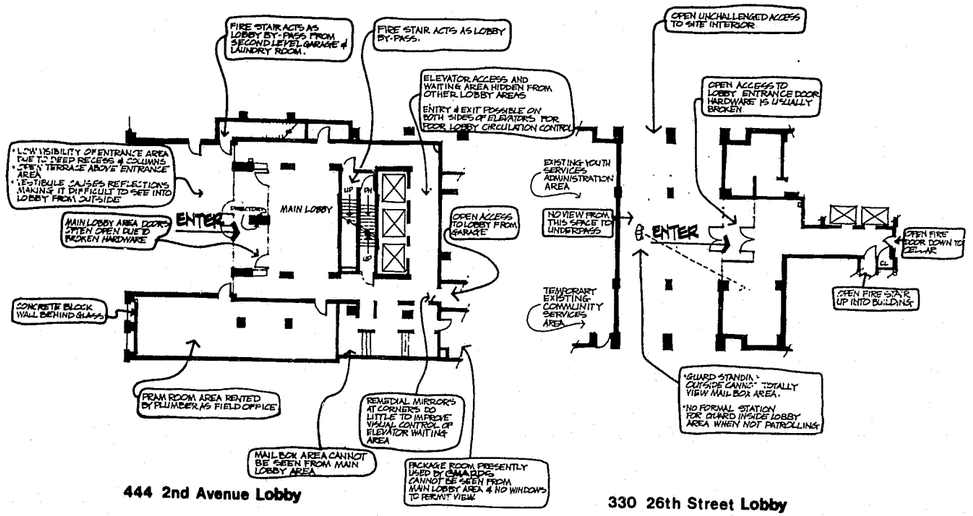


Figure 16. Lobby vulnerability/Written Graphics.
WBA: William Brill Associates, Inc.

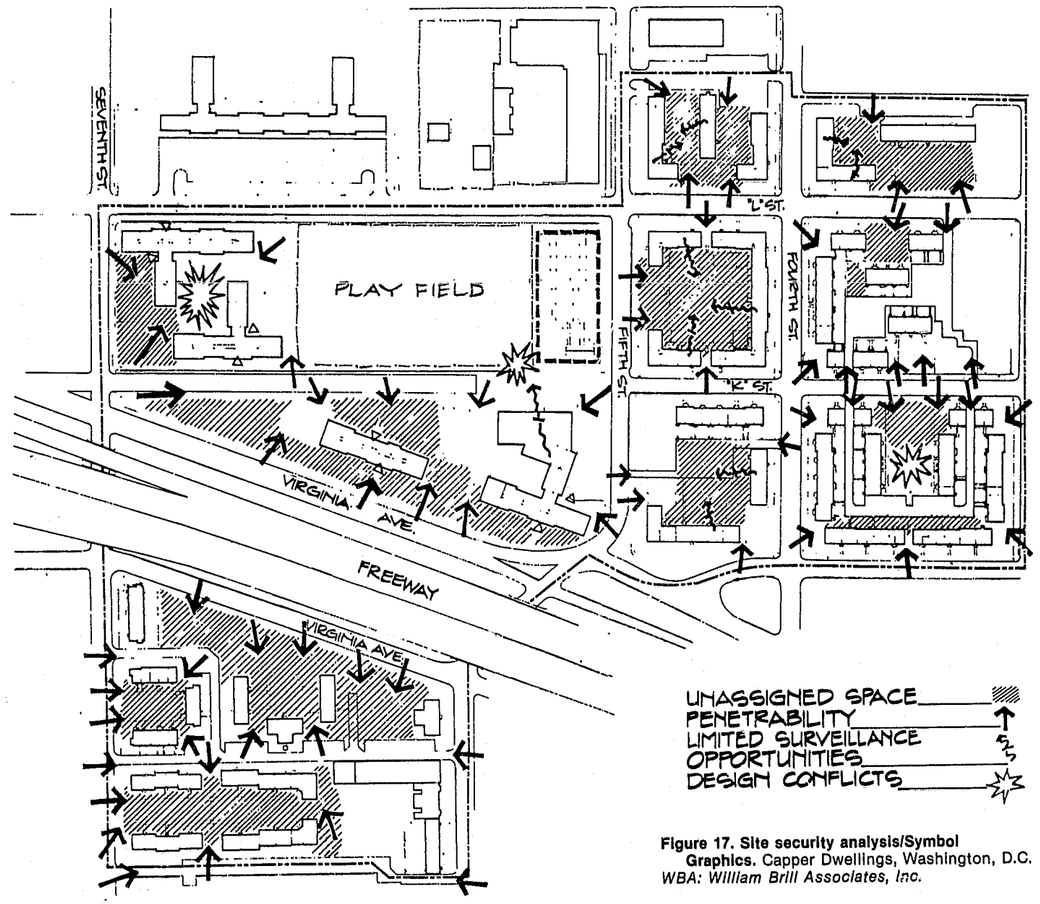


Figure 17. Site security analysis/Symbol Graphics. Capper Dwellings, Washington, D.C.
WBA: William Brill Associates, Inc.

Architectural Scale. This is a special ruler which can be used to determine the number of feet represented by any fraction of an inch as set by the scale on the base map. This measuring system is similar to the way distances are measured on road maps, only instead of miles to the inch, the architectural scale measures feet per 3/32, 3/16, 1/4, 1/2, etc. of an inch. This ruler is useful in measuring the dimensions of the buildings and outdoor spaces on the base map.

Black Magic Markers and Pens. These can be used to draw the final versions of your maps. A good reason to copy your maps over in ink is that they will be easier to see and will show up better on blueprints should you need to make extra copies of your final maps.

It is helpful to have three different points that will produce three different line weights:

Thin _____ Heavy _____

Medium _____

For example thin line pens can be used to mark street names or label important site elements such as buildings, major activity areas, and pathways. Medium pens can be used to present more important information such as your

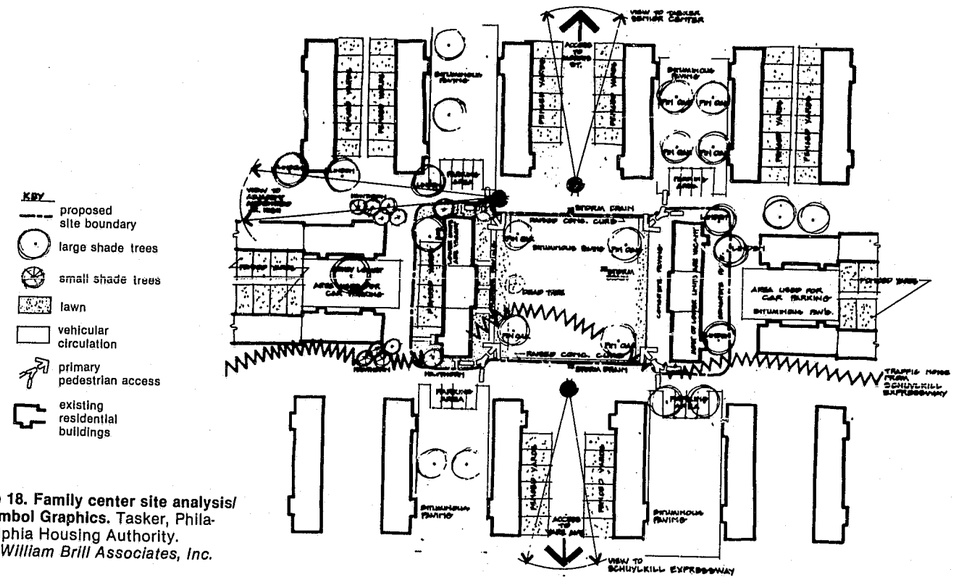


Figure 18. Family center site analysis/ Symbol Graphics. Tasker, Philadelphia Housing Authority.
WBA: William Brill Associates, Inc.

written phrases, symbol system, arrows etc. Heavy lines can be used to denote major labeling such as the name of the project, the key to the base map, or draw attention to major changes or recommendations proposed on base maps at the end of the analysis.

Tracing Paper. It may be helpful to buy a roll of tracing paper referred to in architectural slang as "trash" because it is meant to be used for practice drawings or to experiment with solutions without using up expensive base maps. Trash can be bought in widths wide enough to cover the base map, and when taped over the map, can be used as a surface for preliminary drawings which utilize the outlines of the base map visible through the trash. Trash provides an inexpensive way of refining the layout and appearance of recordings without actually marking the base map until the final map for an analytical step is ready to be drawn.

Transparent Overlays. These are felt-tip pen black ink drawings made on paper thin sheets of transparent plastic which, like architectural trash, utilize the outlines of the maps visible beneath them. They are an effective tool because they can be used with both aerial photographs and construction drawings. Since the original map can be seen through the plastic, the information drawn on the overlay, whether it presents site vulnerabilities or recommended site improvements, can easily be related to the original state of the site or buildings. Figure 1, page 7 is an example of the effect that is achieved by an overlay laid over an aerial photograph.

Optional Materials

"Rub-off" or "Instant" Lettering. Instant lettering sets are clear sheets of plastic which have letters, numbers, graphic symbols, or textures affixed to the back of the sheet. When these sheets are placed directly on the base map and rubbed with a hard point such as the cap of a pen, the letters come off of the back of the sheet and are transferred to the surface of the base map.

These help to improve the appearance of the base map because a wide variety of styles and sizes are available and the lettering, numbers, symbols, or textures always appear uniform, thus making the map easier to read.

Colored Pencils or Markers. Colored pencils or markers can be used to depict some of your observations on the base maps. For example, the color red could be used to indicate those areas experiencing the highest incidence of crime, blue could represent unassigned spaces, yellow could represent private spaces lacking any indication of territoriality, and so on. Do not be afraid to overlap colors in areas exhibiting more than one attribute. If the site has a complex pattern of site vulnerabilities, however, colors may not be practical because too many overlapping colors will appear as black. One final point; colors are not reproducible on a blueprint machine, so if you decide to use them, remember that each copy you make must be colored by hand after the final map has been blueprinted. This means that if you want 10 copies of a map in color, you will have to color them in 10 times. For this reason you may wish to color one map to be used solely for group presentation purposes.

Step 4: Developing Design Solutions

The purpose of this step is to help you develop design solutions to the site vulnerabilities identified during the initial steps of the site analysis. During this step you must decide how to respond to these vulnerabilities, and how to integrate the solutions you select into a final plan for site security. This final plan should reflect all the information and data you have gathered in the previous steps and should utilize the design guidelines presented below.

As you begin to develop specific design solutions, try to establish priorities as soon as you can. Usually only a limited amount of time, money, and personnel are available for a project, thereby limiting at least initially the number of solutions that can be implemented. For this reason it is important to decide which offers the greatest opportunities for improvement, and which can be resolved incrementally later.

Design Guidelines

The guidelines presented below are organized around the six criteria of the Site Security Analysis. They present representative solutions to the most frequently encountered problems identified by the analysis.

Penetrability

Solving problems of penetrability involves controlling how people gain access to a site and its buildings and how people move, or circulate, through them. For example, a site's vulnerability to strangers can be decreased by limiting the number of entrances and locating them next to guard stations. Security can also be improved by reducing the number of pathways through the site and locating them next to apartments where residents can provide informal surveillance.

Guidelines for Solutions to Penetrability Problems

- Limit the number of site entry and exit points and locate them next to guard stations or where surveillance is possible.
- Organize the on-site vehicular and pedestrian circulation into orderly patterns so that it is indicated clearly how people and cars are to enter and leave the site.
- Utilize physical and symbolic design elements such as low walls, plant materials, changes in grade, and lighting to control pedestrian traffic and separate public and private spaces.
- Eliminate opportunities for casual pedestrian "shortcuts" by fencing strategic areas or if necessary, the entire site.
- Reduce pathways through the site and locate them where residents can provide informal surveillance.
- Repair or change housing unit design features or hardware which facilitate unauthorized access — windows located next to doors, unlocked basement entrances, broken door locks and handles, etc.
- Close off extra or unneeded doors that permit unobserved access to buildings (Building and Fire Safety Codes must be considered).
- Establish formal guard posts to control entrances to buildings in highrises and walkups. Enlarge or redesign lobbies to emphasize the importance of main entrance points in highrises or walk-ups.

Territoriality

Developing solutions to territorial problems will require you to establish areas on the site where residents can be encouraged to define, personalize and control their own yards and/or communal spaces. Such an effort would involve the use of physical design features to define the boundaries of these areas both to residents and outsiders, and the creation of a supportive management policy which permits residents to personalize their yard areas and encourages them to maintain them.

If residents cooperate by further defining these yards with fences or shrubs, or decorating them with flowers and lawn ornaments, the result will be a strong visual message asserting that residents have claimed the yards, and that they are in control of the behaviors and activities that occur within them. Residents who live in highrises do not have the opportunity for such a direct relationship with their open spaces and must learn to share common activity areas. Try to clearly identify and associate these communal spaces with specific buildings and the residents for whom they are intended by locating them near entrances or adjacent to buildings, and separating them from the street. Finally, keep in mind that the main security objective of territoriality is to extend each household's line of defense from the apartment door to as much of the site as possible.

Guidelines for Solutions to Territoriality Problems

- Divide large sites into neighborhoods or clusters using architectural devices such as fencing and planting to reinforce the division.

• Develop the neighborhood or cluster concept by incorporating centrally located communal or semi-private informal spaces intended to encourage residents to become visually and socially acquainted with each other.

• Subdivide undefined front and back yard open spaces into smaller, more manageable areas to encourage residents to claim them. Where possible, assign individual front and/or back yards to each residence.

• Install fencing, planting, or earth berms to define these private yard areas and separate them from public areas.

• Revise or develop management policy so that residents are permitted to personalize their yard areas and encouraged to maintain them. To reinforce this effort, you may wish to make a set of yard tools available to residents for borrowing over short periods of time.

• Elicit resident corporation and involve them in the management/maintenance decision-making processes so that the revised policy is both feasible and acceptable to residents.

Opportunities for Surveillance

Solving surveillance problems will require you to create opportunities for residents, guards, management and/or maintenance personnel to observe activities and behavior which occur on the site. This can be done by locating activities where they can be seen from resident housing units or from a major control point such as a guard station or management office.

Often the greatest need for surveillance is at night; make sure your site is well lit, particularly the parking lots, bus stops, walkways, and building entrances.

Guidelines for Solutions to Surveillance Problems

• List the areas and activities on the site that require surveillance.

• Determine whether these areas and activities require formal surveillance by security guards and/or local police, or whether informal surveillance by residents, management, or maintenance personnel will suffice.

• Formal surveillance of the site can be assisted by providing security guards and local police with a clear field of vision and quick access to key areas on the site such as lobbies, walkways, open spaces, or any other areas you have identified as dangerous.

• Encourage informal surveillance by the people who live and work on the site. Where possible, arrange the layout of the site so that children at play can be watched by their mothers from inside the housing units. Locate walkways, parking lots, and bus stops in areas where the people using them can be seen.

• Assist identification of strangers by placing entrances to the site and buildings where people entering or leaving can be observed either by guards or residents.

Unassigned Space

Solving problems of unassigned space will involve finding ways to assign the use and control of the areas on your site which are not currently claimed by residents. Try to assign specific uses to each space by providing visual cues to indicate appropriate behaviors and activities. For example, play equipment encourages a space to be used for active play by children, benches encourage quiet activities and tend to attract older residents. Install fencing and planting, or incorporate changes in grade to define the boundaries of these spaces, and indicate that they are to be used by residents by formally separating them from the street.

Ultimately all of the open spaces should be assigned a use that meets the needs of some group of residents on the site so that they will be willing to assume responsibility for the condition of these spaces and the activities which occur within them.

Guidelines for Unassigned Space Problems

• Identify the different user groups within your resident population who could use the site's open space.

• Determine the type of activities that should be provided for each user group. One convenient way to do this is to set up user groups by dividing residents into age groups such as toddlers, grade schoolers, teens, young adults, and elderly. Generalizations about their interests and the kinds of activities that should be provided for each group somewhere on the site can then be made. For example, toddlers would need sheltered small-scale play areas, grade schoolers would need a place for active play, etc.

• Decide where to locate these activities on the site, making sure not to place conflicting user groups or activities close together.

• Locate activities next to the user group that will use them; quiet sitting areas next to an elderly complex, playgrounds near a family complex, etc.

• Whenever possible, break up large unclaimed spaces into areas designed to accommodate specific user groups and activities; sitting areas for adults, playgrounds for children, basketball courts for teens, etc., and buffer these areas from one another with plantings, fencing, and walkways.

• Separate and define public, private, and semi-private areas with fencing, plantings, changes in grade, and changes in paving.

• Develop a management policy that actively encourages residents to personalize their private spaces and supports any efforts by residents to assume responsibility for the behavior and activities which occur within them.

Design Conflicts

Most on-site design conflicts are the result of situations in which two or more resident user groups must compete for limited open space, or in which incompatible resident user group activities (such as elderly sitting and teenage recreation) are located adjacent to each other. These problems can be resolved by redistributing activities and recreational facilities over the site if space is available. If additional open space is not available, developing scheduled times for activities or separating activity areas with fencing or plantings may help. Try to provide residents with a choice of activity areas and reduce the possibility of contact between incompatible user groups and activities.

Guidelines for Solutions to Design Conflict Problems

• List the incompatible user groups and activities that are forced to compete for the same spaces or that are located next to each other on the site.

• Determine the kinds of open space that would satisfy each user group's needs.

• Separate conflicting user groups or activities by redistributing them over the site to available open spaces.

• Create new open spaces and/or facilities on the site to accommodate the user groups or activities that must be relocated.

Neighborhood Influences

Negative neighborhood influences are difficult problems to resolve because they are initiated off-site and are therefore almost always out of your control. For this reason, most solutions focus upon defining the boundaries of the site and making the interior an identifiable place that clearly and formally belongs to its residents, and not to the surrounding neighborhood. This can be achieved in a number of ways: by installing perimeter fencing or plantings, by establishing formal and supervised entrances to the site, and by locating major site activities on the interior of the site, rather than along the perimeter.

Guidelines for Solutions to Negative Neighborhood Influences

• Orient the site's open space areas and activities away from intrusive neighborhood influences and toward the interior of the site.

• Utilize architectural devices such as planting, walls, changes in grade, and fencing to create open spaces that are clearly within the site's boundaries, and which formally belong to residents, not to the surrounding neighborhood.

• Locate open spaces and activities in areas where they can be watched and formally or informally controlled by security guards and residents.

• Where necessary, install physical barriers, such as planting, earth berms, and fencing between undesirable neighborhood influences and the site, to prevent them from spilling over or intruding onto the site.

• Undesirable neighborhood pedestrian traffic onto and through the site can be controlled by blocking access to the paths favored by the neighborhood, and/or by providing desirable alternative routes which are also protective of the site.

Including an Evaluation Component

In preparing your plan, it is important to build in an evaluation component. If well designed, this component will allow you to adjust your plan to new information and experience as the plan is being implemented, and it will also allow you to determine if, in fact, the plan has been successful in practical terms. This information will help you to do an even better job in subsequent planning efforts and will contribute to the knowledge of others about how to plan effectively.

Essentially there are two types of evaluations that you should try to include. One type is a "before-and-after" evaluation. Here data relevant to the problem are gathered before the improvements are made, and then the same measurement is taken after the improvements are installed. In this way, change over time can be measured.

There are a number of complicated issues associated with measuring change and ascribing it to any one improvement or even a set of improvements. If you elect to make a major effort along these lines, your group should get some help from the staff of a local college or university.

However, even without extensive technical or outside assistance, there are some steps you can take to provide a basis for a before-and-after evaluation. If feasible in terms of time and budget, they should include:

• **Administering the Household Safety and Security Survey on a before-and-after basis.** This survey, which is the subject of a companion manual, measures resident victimization, resident fear of crime, and the extent to which residents are altering their behavior or otherwise pulling back from their environment because of the crime problem. The survey thus provides baseline data that measure the crime problem at a particular point in time. If re-administered after the improvements are made, changes in these indicators can then be measured.

• **Gathering additional baseline data from police and the records of management.** These data can also provide a basis for a before-and-after evaluation. If reported

crime drops, then all things being equal, progress has been made.

• **Conducting the Site Security Analysis in a precise enough manner that it can be reapplied and comparisons made.** This is one of the contributions of the Site Security Analysis — that if done carefully and thoroughly, it can be reapplied. After the improvements are made, the same criteria and maps can be applied to the site and the same checklists employed. In this manner, expected decreases in unassigned space, penetrability, design conflicts, etc., can be observed and identified.

The second kind of evaluation, one that is an absolute necessity, is some form of process evaluation. This means that someone from the planning group must be assigned the responsibility of monitoring the progress of the plan and making sure that it is implemented. If this is not done, a different plan than was intended might be implemented. This would ruin the validity of the post-implementation evaluation because it would be measuring something other than that which was originally proposed. Equally important, however, is the need to be sensitive to the problems of implementing the plan and to be alert to the need to alter the plan based upon unforeseen obstacles or new information. These adjustments cannot be made, at least by the planning group, if someone is not monitoring progress and reporting back regularly to the planning group.

Presenting Your Recommendations

An important part of any planning effort is the ability to present your findings accurately and persuasively. The findings and recommendations will have little value if they cannot be communicated to people who control funds and whose support and assistance is needed to implement the plan.

Before organizing your presentation, you should have a minimum of three final maps: first, the original base map depicting existing site conditions, such as the street and building layout of the site; second, a site vulnerability analysis map which shows the location of unassigned space, points of penetrability, design conflicts, neighborhood influences, and so on; and the third map, which should present a final plan for site security which identifies the areas on the site where territoriality should be encouraged, access to the site controlled or established, surveillance opportunities provided, etc., and should illustrate the solutions you propose to achieve these improvements to the site. Finally, if you conducted a Household Safety and Security Survey, the data and/or the information gained from that should be written up and/or mapped and available as well.

Basically, there are three types of presentations that are suitable for the kind of material you will have at the end of the process described in this manual. In many cases you will want to combine these and use more than one. The basic types are:

- Written report, illustrated by maps.
- Oral briefing, illustrated by maps and/or slides.
- Guided walk through the site.

The type of presentation you select should depend on your resources, your audience, and the situation. Some people need to see the site to make a decision, others prefer a full written report to understand the situation, while still others want an oral briefing, supplemented by brief summaries of the major points.

Whatever format you select, certain basic requirements must be met. The approach you followed and the logic behind the Site Security Analysis component of the Residential Vulnerability Analysis should always be presented first. This should be followed by a presentation of your findings. Finally, your plan for site security, based upon the findings of the vulnerability analysis, should be presented.

To be less systematic can create confusion and misunderstandings and lead listeners to think your presentation is just another "wish list" of improvements without any rationale or analysis behind them. It is important to make clear that this is not the case, and to impress upon the listener the thought and analysis that support your recommendations. This will separate your report from most in the field and increase your chances immeasurably of gaining the listeners' support and cooperation.

You and your group should be prepared to meet these requirements, and should make sure the time you allot to the Site Security Analysis includes the preparation of a report and/or briefing material. Try to make sure your drawings and maps are available, and if you choose to make an oral briefing, make sure your presentation is rehearsed as well as structured. You should have, for example, an outline of your briefing and typewritten copies of the major points of your plan which can be distributed at the time of the briefing or put on charts that can be seen by everyone as you give the briefing.

Don't be surprised or discouraged if your plan does not earn immediate acceptance. The planning process is a long and sometimes contradictory one. You may have to revise your plan several times or develop several alternate plans before a consensus can be achieved. This is part of the planning process. Different people involved in the process may have different ideas and one report or briefing may not persuade them at the outset to implement your plan. But your report and the skill and thoroughness of the analysis should assure you access to the decision-making processes that govern your housing development. This can be a

significant gain that can lead to opportunities to make important contributions.

Step 5: Integrating Site Improvements into the Comprehensive Plan

Although this is the final step in the planning process, it is one that is integral to the concept of comprehensive security planning. As discussed earlier, the impact of the comprehensive plan is not from one series of improvements — either social or physical — but from combining these improvements. It is important, therefore, at every step in the planning process to search for ways social and physical improvements can be combined for maximum impact.

Strategies to achieve this combination in which social and physical improvements would be reinforced were presented at several points in this manual. One such strategy that was discussed at length was the idea of breaking up larger developments into smaller neighborhoods and using site improvements to give them definition while at the same time organizing residents within these neighborhoods. It was also recommended that a social service delivery system be connected to these neighborhoods and clusters.

This step involves meshing the site improvements with the needed improvements in management and the delivery of social services so a comprehensive strategy emerges. How this will be achieved will vary from site to site. The point is not to lose sight of the fact that the strength of the comprehensive plan will come from its ability to establish a reinforcing mix of improvements. It is important to realize therefore that the site improvements that emerge from the analysis presented here must be supported by and in turn support improvements in resident organization, management, and the delivery of social and police services — aspects of the comprehensive planning process that are discussed in the other manuals of this series.

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