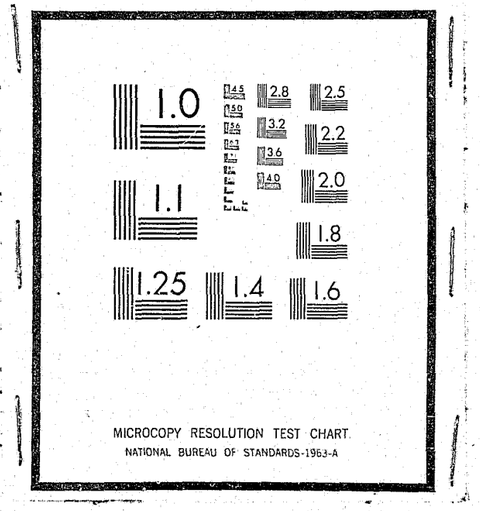

ELEMENTS OF CPTED

(CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN)

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ABSTRACT

This report, *The Elements of CPTED*, provides a functional framework for the development and definition of the Crime Prevention Through Environmental Design (CPTED) approach. It describes the CPTED Program being conducted by the National Institute of Law Enforcement and Criminal Justice of the Law Enforcement Assistance Administration in terms of its definitions and goals, as well as the major studies which led to its establishment. Strategic models for the residential, transportation, school, and commercial environments are described and discussed, as is crime displacement.

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PREFACE

This report, *The Elements of CPTED*, provides an overview of the Crime Prevention Through Environmental Design approach to crime reduction and also discusses related strategies and considerations. It was developed under a contract awarded to the Westinghouse Electric Corporation Consortium by the National Institute of Law Enforcement and Criminal Justice (NILECJ), the research center of the Law Enforcement Assistance Administration (LEAA). The document establishes the framework within which the CPTED approach is being developed: It represents the first attempt at developing such a framework. Consequently, as CPTED experience and knowledge is increased, the CPTED framework can be refined and restated.

This document is a revised and expaned version of an earlier draft which served as a basis for a Program discussion held in August 1974, and which provided essential guidelines to the design of the CPTED demonstrations and the direction of other Program activities. Source materials for this document are identified and summarized in a separtate document entitled, *CPTED Annotated Bibliography*. Another document, entitled *Crime/Environment Targets*, contains background information concerning the levels, trends, and patterns of crimes existent in the four major environments (i.e., residential, commercial, school, and transportation) that were designated by the CPTED program for demonstration consideration. As such, it provided a vehicle for the systematic selection of particular crimes and subenvironments that are being considered by the current CPTED Program for demonstration purposes.

This document was prepared while two of the authors (J.M. Tien and T.A. Reppetto) were associated with Urban Systems Research & Engineering, Inc., Cambridge, Massachusetts.

Several members of the Westinghouse CPTED Consortium have contributed to this document. Special acknowledgement is given to Mr. R.J. Haskell (Westinghouse Electric Corporation), Mr. W.A. Wiles (Barton-Aschman Associates), and Dr. S.I. Gass (Mathematica, Inc.). Professor G.T. Marx (Massachusetts Institute of Technology), consultant to Urban Systems Research & Engineering, also contributed to the document through his critical review of earlier drafts.

In addition, the present revision has benefitted from the review given the original document at the August discussion by other individuals, including: Dr. R. Rau, Dr. F. Heinzelmann, and Ms. L. Mock of the National Institute of Law Enforcement and Criminal Justice; Mr. R. Carlston, Mr. E. Pesce, Mr. D. Deinard, and Mr. H. Gossard of Westinghouse Electric Corporation; and Dr. C. Thomas of Mathematica, Inc.

SUMMARY

The area of crime prevention through environmental design has developed to a point where real need exists to integrate the available knowledge into an effective and viable framework. This document represents a first step in meeting such a need. It attempts to provide not only a functional framework for the execution of current CPTED Program activities but also a basis for further discussion and refinement. Such an attempt is a substantial undertaking. The relevant informational basis lacks the comprehensiveness and quality which would have simplified the task at hand.

The current two-year CPTED Program aims at raising the level of personal security and the quality of urban life in four environmental modes (i.e., residential, commercial, school, and transportation) through a reduction of common predatory stranger-to-stranger crimes and the fear of such crimes. But, obviously, such a broadly stated aim leaves unexplained the reasons why particular crimes are emphasized, what is meant by prevention, what constitutes an environment, and what design variables are the key ones. Nor does it enlighten us about CPTED's antecedent or present applications; nor does it speak to the implicit imperatives of effectuating such an approach in a benign way that enhances, rather than constricts, human behavior.

In brief, the CPTED approach focuses on the interaction between human behavior and the (physically) built environment. It is hypothesized that the proper design *and* effective use of the built environment can

lead to a reduction in crime and fear and, concomitantly, to an improvement in the quality of urban life. Although the purpose of proper design of the built environment is to indirectly elicit the desired human behavior pattern, and the effective use of the built environment represents a direct influence on human behavior, it is the *combination* of proper design and effective use that constitutes the strength of the CPTED approach, leading to a synergistic outcome, where the combination is more effective than the sum of its parts. As a simple example, it can be stated that improved street lighting alone (representing a design strategy) is ineffective against crime without the conscious and active support of both citizens (in reporting what they see) and police (in responding and conducting surveillance). In sum, CPTED encompasses those strategies -- whether they be physical, social, management, or law enforcement in nature -- that affect, either directly or indirectly, human behavior with respect to the built environment.

Following Chapter 1, the introductory chapter, Chapter 2 presents some background material that sets forth the CPTED Program's definition and goals, its historical background, and its formulation in contemporary theory. In addition to the primary goals of crime and fear reduction, the CPTED Program is charged with the institutionalization of the CPTED approach; this is accomplished through a Dissemination and Institutional Impact component of the Program, which encompasses four activities -- a Policy Guidance function, a Technical Assistance Referral Service, a Clearinghouse, and a Curriculum Development effort. The historical foundation of CPTED is traced from the social and physical crime

prevention strategies of medieval times to the more recent programs undertaken by LEAA and other organizations. The body of contemporary literature which is summarized in the last section of Chapter 2 confirms the explicit recognition of CPTED as a focus of increasing concern. It includes the sociologically oriented works of Jane Jacobs and Elizabeth Wood, the explicit design formulations of Oscar Newman and Shlomo Angel, and the criminologically oriented studies of several other researchers such as Scarr, Reppetto, Malt, and Feeney.

Chapter 3 then builds on the background material and develops an integrated framework. First, an outline of the CPTED process is stated, along with a definition of the four environmental modes that the CPTED Program has been directed to address. Next, four CPTED design concepts -- which underpin the CPTED approach -- are defined and discussed. Design concepts, which are statements regarding the interaction between human behavior and the built environment, provide rationales for adopting one or more design strategies. The four design concepts include: (1) Access control, which is primarily directed at decreasing crime opportunity and operates to keep unauthorized persons out of a particular locale; (2) surveillance, which aims at increasing the risk to offenders and consists basically of keeping potential offenders under observation; (3) activity support, which involves methods of reinforcing existing or establishing new community activities as a means of making effective use of the built environment; and (4) motivation reinforcement, which seeks not only to affect offender behavior but also offender motivation; similarly, it seeks to elicit positive, motivation-based behavior on the part of the nonoffender

community. Finally, Chapter 3 discusses some currently familiar strategic models, with special focus on their use of the above-mentioned design concepts. In particular, the Social Control, Defensible Space, Community Enclave, Fortress, and Criminal Justice models are discussed.

Chapter 4 considers some anticipated impacts of a CPTED demonstration; obviously, such consideration should be incorporated into the ongoing Program planning process. In addition to considering scalar, temporal, cost, and other related impacts, extensive attention is given to the highly consequential impact of crime displacement. Following a theoretical examination of the crime displacement potential inherent in both mechanical and corrective crime prevention models, the discussion proceeds to a description of the particular forms of crime displacement. These include temporal, tactical, target, territorial, and functional displacement. The conclusions and their implications for CPTED design are twofold: (1) That many patterns of criminal behavior are not readily subject to change, and (2) that it is possible to approximate the displacement possibilities associated with particular anticrime strategies and, therefore, to minimize crime displacement by carefully selecting and coordinating CPTED strategies.

Chapter 5 provides an inventory and discussion of various CPTED related strategies in each of the four environmental modes: Residential, commercial, school, and transportation. Presented in tabular form, the inventory for each mode is preceded by a brief introduction describing the general availability of information on strategies for that particular

mode. The inventory, which includes some 300 strategies, is not intended to exhaust the range of possible strategies but, rather, to provide the CPTED planner with a list of alternative approaches and salient factors affecting their feasibility. Strategies for each of the four environments are categorized according to whether they involve primarily physical, social, management, or law enforcement components; and they are schematically classified with regard to: (1) The publication(s) from which they were derived, (2) the particular design concept(s) which they exemplify, and (3) their status -- whether they are just recommended or already implemented or additionally evaluated. The pattern here indicates that slightly more than half of the strategies have been implemented, but fewer than twenty have undergone rigorous evaluation.

CHAPTER 1. INTRODUCTION

The area of crime prevention through environmental design has developed to a point where real need exists to integrate the available knowledge into an effective and viable framework. This document represents a first step in meeting such a need. It attempts to provide not only a working framework for current CPTED Program activities but also a basis for further discussion and refinement. Such an attempt is a substantial undertaking. CPTED is not an established discipline like "police administration" or "corrections" but simply a focus of concern. That concern derives from severely felt crime problems, and represents an urgently required effort to provide alternative solutions to the prevention and reduction of crime.

More specifically, the current Program aims at raising the level of personal security and the quality of urban life in four environmental modes (i.e., residential, commercial, school, and transportation) through a reduction of common predatory, stranger-to-stranger crimes and the fear of such crimes.* But, obviously, such a broadly stated aim leaves unexplained the reasons why particular crimes are emphasized, what is meant by prevention, what constitutes an environment, and what design variables are the key ones. Nor does it enlighten us about CPTED's antecedent or present applications, nor speak to the implicit imperatives of effectuating such an approach in a benign way that enhances, rather than constricts, human behavior.

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*Although most research on the subject would argue that the fear of predatory, stranger-to-stranger crimes roughly correlates with their rates of occurrence (i.e., in high crime neighborhoods, there is high fear), crime and fear are not synonymous.

In brief, the CPTED approach focuses on the interaction between human behavior and the (physically) built environment. It is hypothesized that the proper design *and* effective use of the built environment can lead to a reduction in crime and fear and, concomitantly, to an improvement in the quality of urban life. Although the purpose of proper design of the built environment is to indirectly elicit the desired human behavior pattern, and the effective use of the built environment represents a direct influence on human behavior, it is the *combination* of proper design and effective use that constitutes the strength of the CPTED approach, leading to a synergistic outcome, where the combination is more effective than the sum of its parts. As a simple example, it can be stated that improved street lighting alone (representing a design strategy) is ineffective against crime without the conscious and active support of both citizens (in reporting what they see) and police (in responding and conducting surveillance). In sum, CPTED encompasses those strategies -- whether they be physical, social, management,or law enforcement in nature -- that affect, either directly or indirectly, criminal behavior or citizen response to criminal behavior with respect to the built environment. The remainder of this document elaborates upon and expands the above discussion.

A. CPTED in Perspective

It is evident that a program such as CPTED -- no matter how focused and pragmatic its goals are -- cannot be developed and applied in a vacuum, either in terms of past, present, and evolving contexts or of future impacts. By their very nature, the broad scope of the CPTED Program and the uniqueness of the CPTED approach impinge upon all or

most sectors of common experience. Thus, it is important to view CPTED in proper perspective; this is undertaken in Chapter 2. However, it is instructive at this point to make some general remarks concerning the interdisciplinary nature of the CPTED Program, especially with regard to its role in criminology and behavioral science.

In the broad field of criminology, the CPTED Program represents an effort to prevent crime, principally through reducing the opportunities for and increasing the risk of criminal activity. As a crime prevention effort, therefore, it is not specifically concerned with such areas as police science and offender rehabilitation. On a microscopic level, however, it is concerned with police operations -- especially police patrol in relation to the built environment -- and with offender rehabilitation, insofar as CPTED strategies have a corrective influence on potential offenders. In fact, certain offender rehabilitation programs may coincide with those advocated by CPTED (e.g., a work program in which youthful offenders are employed to upgrade the physical appearance of an area or a structure). Thus, in the field of criminology, CPTED represents both an integration of some areas within the field and an extension of the field into that area of criminal behavior that is impacted by the design and use of the built environment. Obviously, as reviewed in Chapter 2, other crime prevention programs in the CPTED vein have been undertaken before this point in time. However, this document does represent the first broad effort to provide a concise and viable framework for crime prevention through environmental design, as well as a preliminary development of the conceptual foundation on which this and other similar crime prevention programs will build.

Although CPTED is primarily a crime prevention program, it is obviously very much dependent upon the concepts and findings of behavioral science, especially in the area concerned with the interaction between human behavior and the built environment. Although this area of behavioral science is at an early stage, an increasing emphasis on environmental concerns is observed. B.F. Skinner's belief that human behavior can be influenced by the environment is expressed in the following excerpts from "Beyond Freedom and Dignity."[2]

> In what we may call the prescientific view (and the word is not necessarily pejorative) a person's behavior is at least to some extent his own achievement. He is free to deliberate, decide, and act, possibly in original ways, and he is to be given credit for his successes and blamed for his failures. In the scientific view (and the word is not necessarily honorific) a person's behavior is determined by a genetic endowment traceable to the evolutionary history of the species and by the environmental circumstances to which as an individual he has been exposed. Neither view can be proved, but it is in the nature of scientific inquiry that the evidence should shift in favor of the second. As we learn more about the effects of the environment, we have less reason to attribute any part of human behavior to an autonomous controlling agent. And the second view shows a marked advantage when we begin to do something about behavior. Autonomous man is not easily changed; in fact, to the extent that he is autonomous, he is by definition not changeable at all. But the environment can be changed, and we are learning how to change it. The measures we use are those of physical and biological technology, but we use them in special ways to affect behavior . . .
>
> It is the environment** which is "responsible" for the objectional behavior, and it is the environment, not some attribute of the individual, which must be changed . . .
>
> The issue is controllability. We cannot change genetic defects by punishment; we can work only through genetic measures which operate on a much longer time scale. What must be changed is not the responsibility of autonomous man but the conditions, environmental or genetic, of which a person's behavior is a function.

The relationships between the emerging body of CPTED knowledge and the more general, but also emerging, body of behavioral theory are multifold and intricate. Each is developing in the context of, and with impacts on, the other. It is doubtful, in fact, that the very concept

**For Skinner, the term "environment" is very broad; it subsumes not only the physically built environment but also all of the people and activities within that environment.

of CPTED would have developed without the contributions of behavioral concepts of environment and behavior, unresolved and unrefined as they presently are. Nevertheless, it is not clear how behavioral concepts and findings can be adapted to particular CPTED requirements, except in the most general way. Thus, whereas the fact of mutual relevance between behaviorism and CPTED is unequivocal, the fashioning of that relevance into a useful form poses a dilemma. The quandry arises principally from the gap between the controlled environments where theory and empirical research have proceeded and the uncontrollable natural environments and untested problem areas that CPTED must address.

B. Scope of Report

The material contained herein represents a synthesis of emerging CPTED knowledge. As such, it should be regarded as preliminary. For the same reason, the various elements of CPTED, as discussed in the ensuing chapters, are treated with varying degrees of specificity. For example, the four general design concepts that are proposed in Section C of Chapter 3 should be regarded as tentative, pending further analysis and refinement. Furthermore, because of the interdisciplinary nature of the Program, much of the working terminology eludes consistent definition. Nevertheless, an attempt is made in Section A of Chapter 3 to define certain critical terms that, heretofore, have been neither explicitly defined nor effectively integrated.

In the chapter that follows, background material on the current CPTED Program and the general CPTED approach is presented. Specifically, the presentation includes a brief statement of Program goals and organization, a detailed definition of the CPTED approach, a short review of related past programs, and a thorough exposition of contemporary works. Chapter 3 then builds on the background material and develops a functional framework. First, an outline of the CPTED process is stated, along with a definition of the four environmental modes that are of concern to the current CPTED Program. Next, four CPTED design concepts -- which underpin the CPTED approach -- are defined and discussed. Finally, some currently familiar strategic models are discussed, in particular with respect to their use of the four design concepts. Chapter 4 considers some anticipated impacts of a CPTED demonstration; such anticipation should, in an analytic sense, be incorporated into the ongoing Program planning process. Extensive attention is given to the highly consequential impact of crime displacement. Chapter 5 provides an inventory and discussion of various CPTED related strategies in each of the four environmental modes. The strategies are categorized according to whether they involve primarily physical, social, management, or law enforcement components. Finally, it should be noted that all references and notes are contained at the end of the document.

CHAPTER 2. CPTED BACKGROUND

This chapter sets forth the CPTED Program in terms of its goals and definition, its historical background, and its foundation in contemporary theory.

A. Program Goals

The primary goals of the CPTED Program are to reduce: (1) The incidence of common predatory stranger-to-stranger crimes, and (2) the public fear of such crimes. Principally as a result of achieving the two primary goals, the third and secondary goal becomes possible: To improve the quality of urban life. A fourth goal lies in institutionalization of the CPTED approach.

It should be noted that the two primary goals are not synonymous. While various surveys have found a positive correlation between crime victimization rate and level of fear,[1] experience of crime victimization appears to explain only partially the uneven distribution of fear among different population groups and in different areas. For example, ethnic background and mass media coverage of sensational crimes are two of several possible fear-explanatory variables. An understanding of fear is complicated by the difficulty of quantifying such a subjective variable: Most attitude surveys approximate fear by such proxy measures as how often one walks alone in the neighborhood after dark, and how concerned one is about having the house broken into.[2] Nonetheless, for purposes of the CPTED Program, crime and fear of crime are treated as distinct -- although obviously related -- phenomena. Correspondingly,

strategies are offered to combat the problem of fear directly, as well as indirectly through an actual reduction of crime.

While the goals of the Program are not novel, the present Program does represent a novel effort to integrate and apply the insights of broadly based research on environmental design in a comprehensive way across multiple environments. The Program is charged with developing (and implementing at least two of) four crime prevention models: One each in the residential, commercial, school, and transportation modes, respectively. (These four modes were specified by the National Institute of Law Enforcement and Criminal Justice.)

Crime prevention strategies encompassed by the CPTED Program are not restricted to architectural design or redesign. Rather, the Program seeks to combine a variety of anticrime resources -- police, community groups, target hardening strategies, social programs, physical redesign -- in such a way as to create an environment minimally supportive of criminal activity. So stated, the goal of this Program is not to alter criminal motivation directly (although indirect alteration may occur) but, rather, to intercede in its actualization: To prevent crime by placing obstacles -- physical, social, management, or law enforcement -- in the way of the criminal objective. More specifically, CPTED focuses on the (physically) built environment; it hypothesizes that the proper design and effective use of the built environment can lead to a reduction in crime and fear and, concomitantly, to an improvement in the quality of urban life. Thus, CPTED strategies -- whether they be physical, social, management, or law enforcement in nature -- include

only those which impact on or are impacted by the built environment. The CPTED focus is further elaborated on in Section B of this chapter.

To achieve the above stated goals, the CPTED Program is divided into five components (as illustrated in Figure 2-1): (1) Research Support and Demonstration Design, (2) Demonstration Execution, (3) Dissemination and Institutional Impact, (4) Planning and Coordination, and (5) Evaluation. The Research Support and Demonstration Design component has primary responsibility in: First, integrating the available and emergent knowledge on crime prevention through environmental design into a viable framework; second, developing effective demonstration models in each of the four aforementioned environments*; and, third,

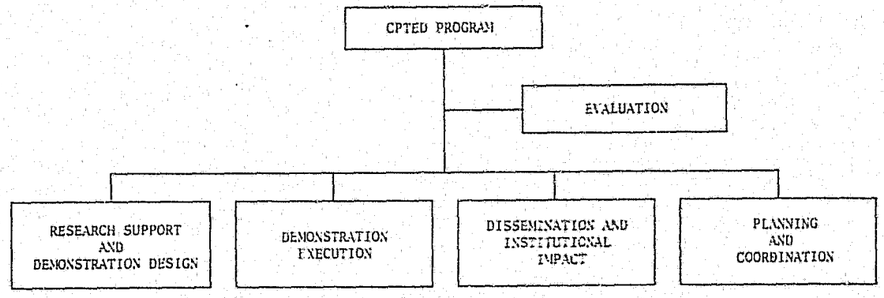

Figure 2-1. CPTED Program Organization

providing technical assistance to the other components of the Program. Research Support includes the development of a statistical base for the evaluation and selection of potential crime/environment targets; identification of CPTED strategies appropriate for the targets actually

*The requirement for a demonstration in the transportation environment was subsequently deleted.

selected; and continuing research to expand present knowledge of the potential of environmental design to prevent crime. Demonstration Design covers all of those activities necessary to develop work plans for the implementation of CPTED crime prevention models at particular sites (including the actual selection of the sites).

Following the design of site-specific demonstrations, the Demonstration Execution component is charged with identifying and enlisting or procuring those sources best qualified to execute the demonstrations. In addition, it holds responsibility for managing the installation and monitoring the conduct and evaluation of the demonstrations. Any necessary modifications and refinements of the demonstrations are identified and carried out with the assistance of the Research Support and Demonstration Design component.

The Dissemination and Institutional Impact component of the Program encompasses four activities -- a Policy Guidance function, a Technical Assistance Referral Service, a Clearinghouse, and a Subprogram Development effort -- aimed at ensuring the broadest possible impact for the Program. In addition to providing direction for Program policy, the Policy Guidance function also identifies the many organizations and government agencies that may be involved in, or concerned with, the implementation of CPTED models. Both the Technical Assistance Referral Service and the Clearinghouse functions provide information and operational assistance to potential users of the Program's output, while the Subprogram Development effort attempts to develop pertinent programs and guidelines for dissemination to key organizations and individuals.

The Planning and Coordination component is responsible for the overall control and coordination of the various Program components, including coordination with such special interest groups as the Building Owners and Managers Association, and the Council of Educational Facility Planners. Program control is accomplished through comparing actual Program status with Program objectives and resolving the differences. This approach, known as management by objectives, necessitates constant updating, reporting, analysis and evaluation, decisionmaking, and replanning.

Finally, the CPTED Program includes an Evaluation component which will seek, to the degree possible, to quantify the Program's progress in meeting the aforementioned goals. The evaluation will be concerned primarily with the effectiveness of the particular demonstration models (i.e., demonstration evaluation) and with the broader impact of the total Program (i.e., programmatic evaluation). Although the demonstration evaluation must definitively discern the total impact of the CPTED model (vis-a-vis other programs that might be in progress at the site), it is unrealistic to expect that the impact of each model component can be objectively stated. Basic to the CPTED Program is the theory that it is the effective manipulation and interaction of several (complementary) crime control strategies that can result in the reduction of crime and fear; thus, measurement of the impact of every individual component strategy is somewhat meaningless, if not impossible.

B. Program Definition

As noted in the preceding section, the CPTED Program ultimately aims at raising the level of personal security through a reduction of common predatory stranger-to-stranger crimes and the fear of such crimes. However, such a broadly stated aim leaves unexplained the reasons why particular crimes may be emphasized, what is meant by prevention, what constitutes an environment, and which aspects of design are critical. Toward the end of providing this information and establishing some common understanding of the Program's focus, this section defines each of the terms in the Program's title and synthesizes these terms into a Program definition.

1. Crime. According to Black's Law Dictionary, crime is defined as a "positive or negative act in violation of penal law." This covers a wide spectrum of behavior, including so-called "white collar" crimes (e.g., embezzlement and consumer fraud); crimes against governmental function (treason and subversion); morals offenses (gambling, prostitution, drugs, and liquor); and organized racketeering. The offense categories addressed by the present Program, however, are more limited, including primarily what the FBI categorizes as Part I or index offenses, and what the media and general public label "crime in the streets." These crimes are predatory offenses against either person (i.e., criminal homicide, forcible rape, robbery, and assault) or property (i.e., burglary, larceny, and auto theft) and, in particular, crimes which

are perpetrated by strangers.* It is possible that, as CPTED research develops, a crime such as arson or vandalism may be seen to be so socially destructive as to deserve similar attention.

In announcing the commencement of the CPTED Program, LEAA stated that "the environmental design program will concentrate on crimes of opportunity -- particularly robbery, burglary, rape, and assault." So stated, the focus of the CPTED Program coincides with the policies of the National Commission on Standards and Goals, as summarized below.[3]

> From the beginning, the Commission concentrated its resources on developing goals, standards, and recommendations directed toward reducing the violent crimes of murder and nonnegligent manslaughter, aggravated assault, rape, and robbery, as well as the property crime of burglary.
>
> These crimes were chosen because of their effect on public fear of crime. It is this fear that so radically diminishes the quality of life and strikes at the most fundamental right of American citizens -- the right to feel secure in one's home and on the streets. They also were chosen because the economic loss resulting from the five target crimes is considerable.

*In the context of this Program, an offender is characterized as a stranger if he is unknown to the person he assaults or to the person who owns or resides in the property he attacks.

> Direct losses as well as medical expenses and loss of work productivity due to violent crimes and burglary are estimated to run into the hundreds of millions of dollars.

2. Prevention. Crime prevention is frequently distinguished from crime control in that "prevention" encompasses measures taken to forestall the commission of a criminal act, while "control" encompasses measures taken afterward to deal with its consequences.[4] Prevention has been further distinguished from deterrence in that prevention is constituted by positive efforts to forestall the formation of criminal desire (e.g., educational or employment programs) and deterrence is constituted by efforts to frustrate criminal opportunity.[5]

Along these lines, Peter Lejins has posited three types of crime prevention -- punitive, corrective, and mechanical -- which he describes as follows:[6]

> Punitive Prevention
>
> In punitive prevention the threat of punishment presumably forestalls the criminal act. The conventional punitive crime control system, based on criminal law, used to rely and still basically relies on this kind of prevention. The legal theory of crime prevention further differentiated for some time between special and general punitive prevention. Special prevention means forestalling further criminal acts of an offender by punishing him so that he "learns his lesson" . . . .
>
> The concept of general punitive prevention . . . is prevention in the true sense of the word; at the same time it is, specifically, punitive prevention because it is the prospect of punishment that keeps many potential criminals from committing crimes.
>
> Corrective Prevention
>
> The concept of corrective prevention is . . . based on the assumption that criminal behavior, just as any other human behavior, has its causes, is influenced by certain factors, and is the result of a certain motivation, whatever the terminology may be. Preventive action means the elimination of those causes, factors, or motivations before the criminal behavior has actually taken place. Such corrective preventive action may be undertaken as a matter of general precaution within the society as a whole, or it may be directed toward specific situations and cases on the basis of symptoms that indicate a threat of criminal behavior. Although prevention in this sense, to a certain extent, seems always to have been used, even in antiquity, it is primarily a product of modern times and is clearly anchored in modern social science.

Mechanical Prevention

The third concept, mechanical prevention, again refers to something entirely different from the first two. Here obstacles are placed in the way of the potential offender that make it difficult or impossible for him to commit an offense. Such preventive action does not involve the personality of the individual: no attempt is made to influence his intentions by threatening punishment or by changing his motivation; hence the suggested term mechanical prevention. An increase in police protection in a neighborhood known for the frequency of certain criminal acts is a typical example. Various security measures, such as dependable locking systems, bars on tellers' windows, signaling systems to be used in case of attack, may serve as further examples of mechanical prevention intended to forestall criminal acts by making their execution more difficult.

This categorization of crime prevention techniques can be diagrammed as shown in Figure 2-2.

It is important to note that "mechanical" crime prevention involved more than so-called target hardening. (In CPTED the emphasis is on the interaction of design and behavioral dimensions. Therefore, the term mechanical must not be misinterpreted to imply only physical dimensions. Certain techniques of architectural design, such as site planning and circulation control, could also be classified as mechanical prevention.)

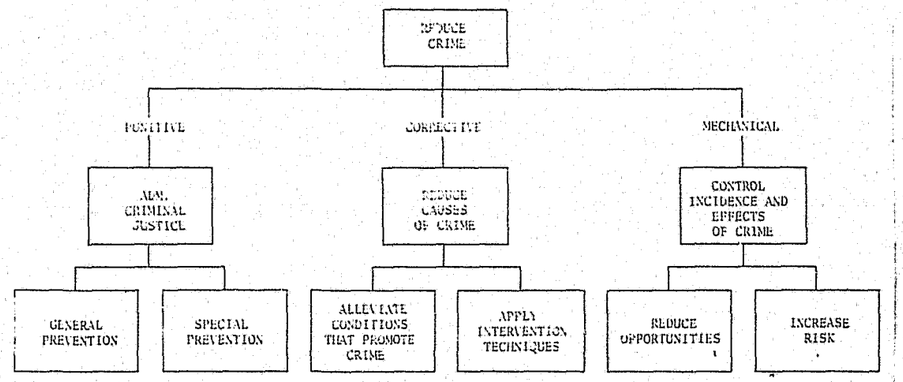

Figure 2-2. Types of Crime Prevention

The essence of mechanical prevention is that it is directed toward reducing opportunity and increasing risk. The reduction of opportunity and the increase in risk could result from an increase in the social cohesion of neighborhoods, greater citizen involvement in crime observation and reporting, etc. Thus, while punitive prevention focuses on the role of the criminal justice system in deterring crime, mechanical prevention could deter by increasing the perception of the certainty of prevention. However, it should be emphasized that corrective prevention and mechanical prevention are to stop crime before its occurrence, while punitive prevention is applied after the act.

In essence, CPTED is principally a mechanical approach to crime prevention. However, it should be noted that CPTED could indirectly cause a corrective change in human behavior -- thus contributing to corrective crime prevention.

3. Environment. Although the definition of environment may be open to broad interpretation (to embrace whole societies, cultures, and economic systems), for purposes of the CPTED Program at least two constraints seem appropriate. First, historically in criminology, as Jeffery has noted:[7]

> Crime control can focus either on the environment or on the criminal. When we deal with the environment, we consider . . . the environment in which criminal acts are committed, e.g., the stolen property or victim. When we deal with criminals, we deal with the individual who commits the crime, e.g., the robber or rapist or murderer. On the one hand, we have human behavior (the criminal); on the other hand, we have environmental conditions.

While an approach that distinguishes between the environment and the criminal is useful, such a dichotomy need not be restrictive. As Jeffery proposes, CPTED can include the offender as part of the environment which also encompasses other environmental elements, including the victim and the physical and social surroundings. Indeed, the crime-specific researchers who have examined crimes such as robbery or burglary as total operations have evidenced (for the most part, tacitly) just such an understanding of "environment". Crime-specific studies usually include chapters describing the elements of the crime, the victim, the offender, and the locale;[8] so that environment, in this context, may be referred to as the total environment of the crime.

A second constraint can be imposed by the interpretation that environment need not be perceived in uncontrollably broad terms but, rather, can be defined by recognizable territorial and/or system limits, in keeping with the area focus of such criminological research as that conducted by the Chicago School of Sociology. This type of research has produced the zonal theory of delinquency and a number of studies of areas exhibiting patterns of crime and delinquency. The focus of the research was summarized by Morris in his definition of human ecology:[9]

> Human or social ecology is concerned with the relationships which exist between people who share a common habitat or local territory and which are directly related to the character of the territory itself; it is a study of social structure in relation to the local environment.

The above statement expresses the key concepts of local territory and relationships between people as a function of the territory itself. Local territory suggests that the CPTED Program may be concerned with a building, a neighborhood, a park, or a school system, but not with such nonlocal entities as nations, cultures, or political systems.

Relationships that are a function of the character of a particular territory would imply, for example, that, in approaching a problem such as crime in high schools, a CPTED planner does not view the students primarily as the future generation, or members of the youth culture, but as occupants of an enclave which is territorially (school and grounds)

or systematically (school systems, including buildings, grounds, buses, etc.) bounded. Therefore, CPTED does not seek to solve *all* problems of youth crime, but only those which manifest themselves within the school mode. The same analogy would hold true for transportation, residential, and commercial modes.**

This second constraint imposes a spatial limitation which, in turn, limits the variables available for manipulation. Thus, environment as a constituent element of CPTED means the social and physical factors indigenous to a territory, which may influence the crime experience of the territory. Section B of Chapter 3 defines the particular environmental modes that are of concern to the current CPTED Program.

4. Design. Design is most commonly understood in its relationship to the creation or shaping of physical objects (e.g., the design of a building). However, that meaning of the term "design" has been broadened by various anthropological, sociological, and behavioral studies, including (as stated in Section 1 of Chapter 1) those which pass under the rubric of environmental psychology or environmental

**It could be argued that modes such as transportation or schools are not territories. The problem of establishing security in noncontiguous areas with ill-defined boundaries is one that has been faced by railroad police, state highway patrols, park and mass transit police, and school security departments, to cite a few examples. However, it is proposed that they be seen as systems with definite territorial boundaries.

design and which analyze the relationship between human behavior and the man-ordered and -defined environment.[10]

Merton's analysis[11] of social interaction as a function of spatial organization, for example, found that the design of residential buildings was a major factor in formation of personal ties. People living in the same or adjacent buildings were more likely to become friends. In addition, the spatial orientation of buildings determined likelihood of social interaction. Buildings where the door opened onto the street, rather than into a courtyard with common exit, seemed to encourage relationships with people living in buildings across the street. Festinger, Schacter, and Back[12] also found that the development of friendships and social groups was facilitated by functional proximity. Furthermore, these groups had the power to impose conforming behavior on their members. Studies by Harlan,[13] Dirksen,[14] and Schmitt[15] reported a definite correspondence between person density and juvenile delinquency.

In criminology, the interest in physical design has crystalized in Newman's theory of "defensible space." As Newman has argued,[16]

> We are reasonably certain that the physical environment provided can directly result in attitudes and behavior on the part of residents which will insure the security of that environment -- will enable them to naturally undertake a self-policing role which will act as a very effective form of target hardening not prone to the changing modus operandi of criminals -- and

finally will make evident to prospective criminals the high degree of probability of their apprehension.

In spite of the proliferation of studies, however, a substantial skepticism remains regarding the influence of physical design on human behavior. In a review of the studies designed to uncover the relationships between "site planning and social behavior," for example, Gutman found that these studies "do not make a very compelling case for the argument that the site plan is an important influence on individual behavior and collective social action."[17] Along the same lines, Proshansky concluded that: "The more complex the behavior or experience that is the focus of our concern, the more likely that there will be a variety of factors influencing it, physical, social, psychological, and so on, and the less likely the physical environment will be a major factor in this respect."[18]

In recognition of the multiplicity of factors that may influence human behavior, Brill described how a combined number of forces can comprise an anticrime "design." As he noted in discussing the vulnerability to crime of public housing projects:[19]

> It is not only a problem of poor lighting, uncontrolled access, poor locks, weak doors, and inadequate patrolling, although this may be the case in some projects. The problem of security in public housing also stems from the weak social structure of the residents, the absence of supporting groups, and lack of interpersonal trust -- all factors that inhibit people from protecting and helping each other.

Thus, the ideal anticrime strategies in housing projects would be those that strengthen both the physical and social components of the environment. In Brill's words, the ideal mix of both hard and soft improvements would produce a "synergistic" effect; that is, an effect that is greater than the sum of its parts, a result caused by just the right combination of the right elements.[20] This broad view -- embracing various physical and social factors (including physical design) -- is ultimately more productive for CPTED purposes than any narrower understanding of environmental design.

There is another important consideration that contributes to a broad view of environmental design for CPTED purposes, and hence to its adaptability or transferability. That is the premise that, in many cases, the most successful anticrime strategies in various environments may include those that are not in fact based on crime prevention or "defensible space" rationales per se but that emerge indirectly as byproducts of design strategies made for other unrelated purposes. Such design strategies might well originate from intentions only remotely concerned with crime prevention as such. Examples are: The provision of well-shared community facilities (e.g., neighborhood health centers,[21] recreation programs, or shared laundry or kitchen facilities) that serve functional needs, promote social interaction, populate an otherwise vulnerable area and, thereby, obviate the likelihood of criminal activity;

the integrated work/study programs designed in several cities for socio-cultural reasons which may achieve as a byproduct the reduction of juvenile criminal activity, as well as the more efficient use of public and private facilities (e.g., the Philadelphia Parkway Program's "School Without Walls,"[22] and the Montreal Metro-Education Program[23]). If, for example, U.S. transit authorities were to adopt some of the design implications or multiuse patterns in the Montreal and Toronto subway systems, the need for crime-prevention systems in U.S. stations might be reduced, because the stations would be so diversely and efficiently used as to discourage the criminally motivated.

Thus, there exist many ongoing programs in otherwise unrelated fields where the CPTED Program may make significant contributions, provided that CPTED's performance standards and design guidelines can be coordinated with and integrated into the programs contemporaneously instead of unilaterally applied after the fact.

5. CPTED, A Synthesis. The theoretical foundations of CPTED derive in large part from the area studies of the Chicago School and the focus of recent criminologists on the total environment of specific crimes. To these analytic works are joined architects', planners', and social psychologists' notions that environmental variables can be designed to alter human behavior. Thus, the CPTED Program primarily seeks to deter or prevent common predatory stranger-to-stranger crimes (and their attendant fears) within a specifically defined environment by manipulating variables that are uniquely related to the environment

itself. The CPTED planner, approaching a problem such as robbery in a public housing project, cannot and does not seek crime control solutions in the universe of human behavior, but only among those variables which can be manipulated in a housing project (or projects). These might include the physical characteristics of the project, the social organization of the residents, their attitudes, policies of management, actions of the police within the project, etc., but do not include such impinging variables as the political and economic systems of the Nation, the operations of the entire police department, or the housing policies of the State, since these are not peculiar to housing projects alone. The variables to be "designed" (whether physical, social, management, or law enforcement) are thus limited by a physical entity -- a "built" environment -- and all such design has, as its end, the most constructive possible use of that environment.

In sum, whether applied to housing, a commercial strip, or any other particular "built" environment, CPTED planning is predicated on the hypothesis that proper design and effective use of that particular physical space can significantly reduce human potential for criminal behavior. Thus, CPTED attempts to achieve its primary goals of crime and fear reductions through judiciously affecting human behavior (as it interacts with the built environment); this can be accomplished either directly, through social and management strategies, or indirectly, through physical and law enforcement strategies. Alternatively, one might think of CPTED as either directly influencing human behavior, so

that effective use is made of the built environment, or indirectly eliciting the desired behavior pattern through the proper design of the built environment.

C. Historical Background

The concept of achieving security through environmental design has a long history, virtually as long as the quest for the good community. Fortress walls and moats around medieval cities bear witness to the application of environmental design to external threats, as community granaries, water wells, market places, and churches testify to the incentives for congregation. However, as external threats to the growing cities faded in importance and cities grew, their security problems became primarily internal. Thus, the social organization of medieval cities also reflected the need for social defense:[24]

> A high degree of social organization existed and municipal institutions were developed to handle every aspect of community life. Within the walls, all citizens and visitors were subject to municipal laws which offered considerable protection to persons and property . . . . The citizens of each town provided for its defense. The gates were closed at night and the walls and streets were patrolled. The sense of community in these towns, the degree to which citizens protected each other, and the citizen's view of his town as an island of peace in a hostile world were remarkable.

Efforts to achieve internal security through environmental design were apparent in, for example, the fortification of private dwellings:[25]

> Many family-owned slender, prismatic towers were built in Italian cities during the 12th century, some over 300 feet high. More than 200 of them were built in Bologna alone. The ground floors were used only for access to the floor above, reached by retractable ladders.

Other crime control measures included the de facto segregation of criminal and disorderly factions into specific districts and the creation of night watches, police departments, and other security patrols. In medieval and other eras, recurring "intermediate associations,"[26] such as the guilds, communes, universities and other fellowships of interest and belief supplied the social network controls that imposed norms and maintained law and order.

Paris offers a salient example of the evolution of environmental design as a response to problems of public safety. Despite the existence of a police force from the 11th century onward, the city was plagued with crime. In the 16th and 17th centuries, entire districts were under criminal control. In the reign of Louis XIV, order was restored by improved policing, illuminating the streets with 6,000 lanterns, and driving criminals out of their haunts, which were then burned down. In the mid-nineteenth century, under Napoleon III, Baron Hausmann undertook a complete restoration of the city, in part to maintain civil order and

control riots. His actions included tearing down old sections and completely redesigning streets into the present familiar pattern of boulevards. In describing the contrast between the new Paris and the old, Hausmann wrote:[27]

> Then I skirted the Palais de Justice with, on my left, the shameful mass of old cabarets that used to dishonor the Cite and which I later had the pleasure of razing to the ground -- hideouts of thieves and assassins who seemed to defy justice and the police.

While cities have, throughout history, used design characteristics to achieve security, only recently has the approach been explicitly developed as a means to reduce the level of stranger-to-stranger street crime. At the national level, CPTED efforts to reduce common predatory crimes and the fear of such crimes dates to the year 1969. Following the creation of the National Institute of Law Enforcement and Criminal Justice (NILECJ -- the research arm of the Law Enforcement Assistance Administration) under which the CPTED Program is being administered, numerous environmental design efforts of varying scale were initiated. A chronology of significant events is detailed below.

1969 -- The U.S. Senate Select Committee on Small Business began the investigation of "Crimes Against Small Business," which influenced the course of target hardening, crime insurance, and police patrol for the next five years.

1970 -- NILECJ funded six major studies which, as their results became available, accelerated the CPTED concept development and began the integration of target hardening, architectural and city planning design, and community cohesion.

-- G. Leudtke completed his NILECJ pilot study, "Neighborhood Design Techniques for Crime Reduction," which began in 1969 and which combined the work of Jane Jacobs with upgraded street lighting to prevent crime.

1971 -- The Federal Crime Insurance Program in the Federal Insurance Administration (FIA) of the U.S. Department of Housing and Urban Development (HUD) began. Using the Oakland Model Burglary Security Code, NILECJ developed for FIA the "Minimum Building Security Guidelines."

-- NILECJ's Burglary Prevention Study in Alexandria, Virginia, developed a "Classification of Burglary Types of Attack" which became the basis for the door and window standards developed by NILECJ.

-- Rand completed its study for the City of New York on "Public Safety in Urban Dwellings," which expanded on the work of Jane Jacobs.

-- Local public housing with LEAA/HUD support began implementing Vertical Policing programs which included construction of separate Elderly Housing units based on Oscar Newman's ideas.

1972 -- NILECJ published the first part of "Patterns of Burglary," by Harry Scarr, a comprehensive study of patterns and characteristics of burglary.

-- Oscar Newman published his book on "Defensible Space" (Macmillan Co.), and NILECJ published its version, "Architectural Design for Crime Prevention."

-- NILECJ held a Seminar on "Urban Design, Security and Crime," which brought together Newman's theory, target hardening, security patrols and security for small business.

-- NILECJ initiated the National Criminal Justice Reference Service.

-- NILECJ published the five-volume Rand study on "Private Police in the United States."

-- HUD/LEAA formed an interagency committee on Security in Public Housing which grew out of the

investigation into elderly housing security by Senator Williams of New Jersey.

-- NILECJ began the development of Door and Window Performance Standards through the LESL/NBS program.

1973 -- NILECJ announced its intention to inaugurate a comprehensive program on "Crime Prevention Through Environmental Design," which would concentrate on private residences, schools, commercial, and transportation system environments.

-- NILECJ received Final reports from five of the six major studies funded in 1970:

- "The Prevention and Control of Robbery," Floyd Feeney, a nonstatistical test study of patterns of robbery in Oakland, California.
- "Patterns of Burglary," Part 2, Harry Scarr, which was published.
- "Tactical Analysis of Street Crime," Harold Lewis Malt, which emphasized the need to determine "Physical indicators" in street environments for preventing crime.

- "Crime and Housing in a Metropolitan Area," Thomas Reppetto, which studied the patterns and characteristics of crimes in and around residences and found that high "cohesion" in a neighborhood highly correlated with the reduction of crime.
- "Residential Security," Arnold Sagalyn, which identified the current security devices and techniques, and which has been published.

-- HUD held a conference on Security in Housing which brought together security experts from local housing authorities and research and development experts and NILECJ grantees to underscore the need for security in public supported housing.

-- HUD published Oscar Newman's Design Guide for "Improving Residential Security."

1974 -- NILECJ received the Final Report from the Kansas City Street Lighting Study, which found that upgraded street lighting significantly deterred the violent crimes of robbery and assault at night, and recommended the upgrading of street lighting for crime prevention.

-- NILECJ's Hartford Study of Residential Neighborhood Crime Control developed an approach to

environmental crime problem and strategy identification which integrates the physical, social, psychological, and criminal aspects in urban environments. William Brill also is developing a similar approach in public housing, sponsored by HUD.

-- NILECJ/NBS completed the single Door Performance Standard and a draft of the Window Standard.

-- The NILECJ CPTED Program was started by the Westinghouse Consortium.

-- The first draft of Oscar Newman's "Design Directives for Achieving Defensible Space" was completed for review by NILECJ.

Thus, the prevailing forms of historic crime control have chiefly involved police systems, citizen observers, target hardening, urban renewal, street redesign, and creation of physical barriers. While all of these phenomena may be subsumed under the heading "Crime Prevention Through Environmental Design," explicit recognition of CPTED as a coherent subject area has only recently developed. The following section sets CPTED in contemporary terms.

D. Contemporary Theory

A number of recent works touch upon the concerns of CPTED as they have been defined herein. In the sphere of environmental design, Rainwater's discussion of "lessons" from the Pruitt-Igoe Housing

Project,[28] Jane Jacobs' "The Death and Life of Great American Cities" (1961),[29] and Elizabeth Wood's "Housing Design: A Social Theory" (1961)[30] stand out for their observations and for their influence on subsequent policy. Rainwater recounted the disintegrative failures and eventual collapse of a public housing project that was heralded as a paradigm when it was first constructed. Jacobs' and Wood's efforts, which illuminate the central role of social activity patterns in preventing crime, both contributed substantially to the more explicit formulations of CPTED found in, for example, Oscar Newman's "Defensible Space" (1973)[31] and Shlomo Angel's "Discouraging Crime Through City Planning" (1968).[32]

Jacobs opposed the division of the city into specialized areas, arguing that neighborhood security was enhanced by diversifying land use so as to generate more street activity, thereby stimulating informal social controls and creating more natural surveillance possibilities. Such informal social control would convey to intruders the silent message that wrongdoing would not be tolerated. Jacobs perceived the district-wide mixing of functions (residential, commercial, cultural, administrative, recreational, and even small-scale industrial) and the inclusion of community facilities as supporting continuous use of physical space and complex street activity, functions which would in turn provide the foundation for a sense of community cohesion and feelings of territoriality and responsibility.

Elizabeth Wood explored the issue of social control on a much smaller scale -- specifically, in public housing projects. Arguing

against the then-current (1961) design policy of public housing authorities, which underwrote a philosophy of "sophisticated family individualism," Wood claimed that large compartmentalized buildings inhibit spontaneous social interaction, which she deemed necessary for the development of community identity. In Wood's view, paid surveillance, project police, guards, and groundsmen could never exert the control provided by an involved and interested community; and, consequently, design must provide, at the very least, the opportunity for such communities to exercise social controls.

Wood stressed designing for natural surveillance through visible identification of a family and its dwelling and through enhanced visibility of public places. Visible identification of a family and its dwelling was intended to encourage interfamily socialization, mutual understanding, and trust. Generously sized exterior corridors and well-lit lobbies with benches for seating and other public facilities were intended to encourage the gathering of residents, who would in themselves constitute a deterrent to crime. Like Jacobs, Wood also insisted on a measure of functional diversity within housing projects. She too discerned the storekeeper's subtle exercise and provision of control. While Wood's theories have never been applied to the extent necessary to evaluate their impact, and while Jacobs has been criticized alternately for projecting a romanticized vision or a security-phobic view of city life, their influence has been considerable.

In "Discouraging Crime Through City Planning," Angel observed that Jacobs' model for safe cities -- multiple uses of land and commercial activities dispersed along residential streets to increase surveillance -- is inapplicable to many cities. The model is particularly inapplicable to Oakland, the site of Angel's study, which is an environment representative of more communities than the special-case, dense environments of Jacobs' concern. Containing approximately 1200 miles of streets Oakland has only 4 miles of total frontage for establishments that remain open at night.

Angel hypothesized that public areas become unsafe not when there are either few or many potential victims present but when there are just enough people on the scene to attract the attention of potential offenders, but not enough people for surveillance of the areas, a condition he labels the "critical intensity zone." Based on this hypothesis, Angel recommended alteration of physical configurations to concentrate pedestrian circulation and thereby eliminate "critical intensity zones." He suggested that commercial strip development along main arteries be divided into two types: Those which are open in the evening and those which are closed. Main pedestrian routes from high-density developments should be located close to that part of the artery that remains open, and the concentration of the few open nighttime establishments in one area would then create opportunities for mutual surveillance. These "evening town squares," equipped with every possible design assurance for maximum safety, would cater to citywide or regional populations.

Smaller agglomerations would serve high-density neighborhoods and would be joined in a citywide network serviced by public transporation.

Although confident that designers can control intensity of pedestrian circulation in nonresidential areas, Angel appeared less confident of the influence of design in residential areas. Essentially, he advocated the abolition of the superblock, elimination of dense shrubs near walkways, bounding of open spaces between buildings, and exposing of corridors and elevator shafts. In effect, he restated many of Wood's and Jacobs' proposals.

Unfortunately, Angel did not offer any empirical data to demonstrate that a disproportionate number of crimes occur in the "critical intensity zone,"[33] yet he suggested building constellations as if this were demonstrably the case. Further, the lack of quantitative figures, the unanswered questions about people's behavior outside their homes, and their commitment to crime prevention cast the critical intensity zone theory in a tenuous light.

Finally, Angel's work -- like Jacobs' and, to a lesser extent, Wood's -- raises obvious problems of social and economic feasibility. The economic repercussions of such an extensive interference in such a massive way in existing patterns of business activity, for example, are considerable; and the likelihood that such repercussions would prove socially acceptable appears remote. Businesses locate where they do for a wide variety of reasons, including rent levels, proximity to clientele, suitability of available space, and idiosyncratic preferences of individual businessmen. Security is only one consideration -- and

individual businesses and the surrounding community would undoubtedly resist any effort to make security, de facto, paramount.

Oscar Newman took issue with Angel for different reasons. Although Angel stressed the importance of surveillance as a deterrent, Newman contended that he failed to identify the relationship of surveillance to the principles of territoriality. Newman observed that design for surveillance, when not reinforced by a system of "defensible space," might achieve little more than displacement of crime and would, in any case, place ultimate responsibility for crime control on the police, since the vigilance of citizens away from their own homes is uncertain.

In his own work, Newman concentrated on environmental design for residential areas only. He took Jacobs' and Wood's somewhat vague descriptions of the operation of social mechanisms in the environment and gave them new form in the concept of defensible space (i.e., spatial arrangements manipulated to alter social behavior in the interest of increased security). In his earlier works (e.g., "Architectural Design for Crime Prevention" [1971][34]), Newman characterized the impersonality created by certain design concepts (in particular the use of high-rise apartment buildings and large undifferentiated open spaces) as contributing to the crime problem. In terms of specific design strategies, defensible space is achieved through a variety of physical design and sociological mechanisms, some of which are also outlined by Wood and Jacobs:

- The extension of traditional areas of concern (e.g., home or block) to greater areas is accomplished through the graduated expansion of private realms in multifamily dwellings. By instituting a series of symbolic or physical barriers which constitute a hierarchical transition between the public street and the private apartment, occupants can be induced to adopt a proprietary attitude. Limiting the number of dwellings and interior subdivisions into recognizable semiprivate areas can foster a legibility of "spheres of influence" by both residents and intruders.
- To accompany the increased sense of territoriality, increased opportunity can be created for both casual and natural surveillance by residents involved in activities either inside or outside.
- Locating complexes near "safe zones" (certain commercial, institutional, industrial or entertainment facilities, and public streets) may effect a reduction in crime.

In his later works,*** Newman discussed means for improving security in existing structures. He suggested the following residential security tactics:

- Creation of a fortress (with limited and controlled access).
- Subdivision of a large residential complex into smaller components so that each can be controlled "naturally" by a small number of residents.
- Relocation of a particularly crime prone group into a safe area, wholly occupied by that group alone.
- Inundation of security personnel.

Indeed, for structures already built, Newman notes that "defensible space" is not a realistic option and instead recommends direct fortification, including the use of hardware, electrical surveillance equipment, and security personnel. He also stresses the role that effective management and resident attitudes can play in a successful, crime-free fortress environment.[35]

*** For example, "A Design Guide for Improving Residential Security," (1973); "Design Directives for Achieving Defensible Space," (1973); and "Immediate Measures for Improving Security in Existing Residential Areas," (1972).

Thus, for Newman, the concepts of defensible space have yet to be definitively tested:[36]

> How high can a building be without inviting crime, or what proportion of difficult problem families can be assimilated into a project with the more stable families?. . . Again there are no definitive answers, but the question is of great interest.

Although many observations of the recently completed projects seem promising, as yet there have been no published reports that attempt to evaluate the crime rates for these projects or to sort out the influence of physical design variables from all the other social, economic, and geographical factors which characterize the projects. Also, as Newman himself acknowledges in his critique of Angel, the success of such defensible space techniques as "maximized surveillance possibilities" depends heavily on the individual citizen's innate propensity to feel a sense of territorial concern. Probably, people are more likely to manifest this concern in areas near their own homes than in anonymous public places -- which makes the applicability of defensible space techniques to nonresidential environments somewhat problematic. Finally, Newman's recommendations may have greatest potential use as guidelines for future urban renewal or conservation projects. Although he does indicate some apparently successful modifications of existing structures, for the most part his design directives -- as presently formulated -- seem to require modification so extensive and expensive (for the typical urban neighborhood and large apartment building) as to be impractical on any large scale.

Newman and the other theorists on the influence of environmental design on crime have also been challenged on very broad grounds. A seminar on architectural and urban design in the prevention of violence, convened on November 15, 1968, under the auspices of the National Commission on the Causes and Prevention of Violence, concluded that, in the modern city, distance and not design was the key to crime control. They specifically rejected environmental determinism, arguing that physical design is a result, not a cause, of human behavior, and concluded that urban design could not act positively to attack the roots of crime, but only to determine its types and locations.[37]

However, other researchers -- more purely criminological in orientation than were the environmental design advocates -- have noted the concentration of specific types of crimes in specific types of environments, and suggested that more than "distance" may be at work in determining the crime experience of an area. Scarr, in a study of burglary,[38] emphasized the differential distribution of burglary rates and their correlation with social and economic factors in geographic areas. Reppetto, in a study of crime on residential premises,[39] noted a similar differential distribution of rates and mix of variables which impacted on residential crime. He concluded that appropriate counter-strategies must not only be crime-specific but also area-specific. Reppetto also posited that displacement -- the phenomenon whereby anti-crime efforts would cause offenders to change to other locates, times,

or crime types -- could be calculated for each area and strategy, and thus minimized. Finally, Malt, in an analysis of street crime,[40] suggested the influence of street design on victims, offenders, and police; and Feeney, in a study of robbery,[41] noted even more pronounced patterns of geographical and temporal concentration for this crime than Scarr and Reppetto had noted for burglary.

CHAPTER 3. CPTED FRAMEWORK

This chapter discusses the application of CPTED within an integrated framework. Since it is likely that continuing CPTED research and the process of model development will substantially refine this framework, what follows must be regarded as only a tentative step in the direction of developing a more definitive and viable framework.

Section A outlines the process within which the CPTED Program is being carried out, including the terms used in the process and the manner in which these terms are linked together. Section B defines the four environmental modes that are of concern to the current CPTED Program. As in initial focus of discussion, four design concepts are identified in Section C. Finally, some strategic crime control models are described in Section D.

A. Outline of Process

The CPTED process can best be understood by first discussing a simple example. As identified in Figure 3-1, the ultimate goal of CPTED can be characterized as the reduction of crime (to which one would also add the fear of crime). The subgoal to control the incidence and effects of crime, while the operating objectives are to reduce opportunities and to increase risk. To achieve the objective of increasing risk, one can both create natural surveillance and induce territorial concern (two related concepts which are not intended to exhaust the possibilities for increasing risk) by defining spaces through the placement of bushes along walkways.

In an effort to provide a common working vocabulary, explicit definitions of the terms used in the logical chain of the CPTED process are set forth as follows:

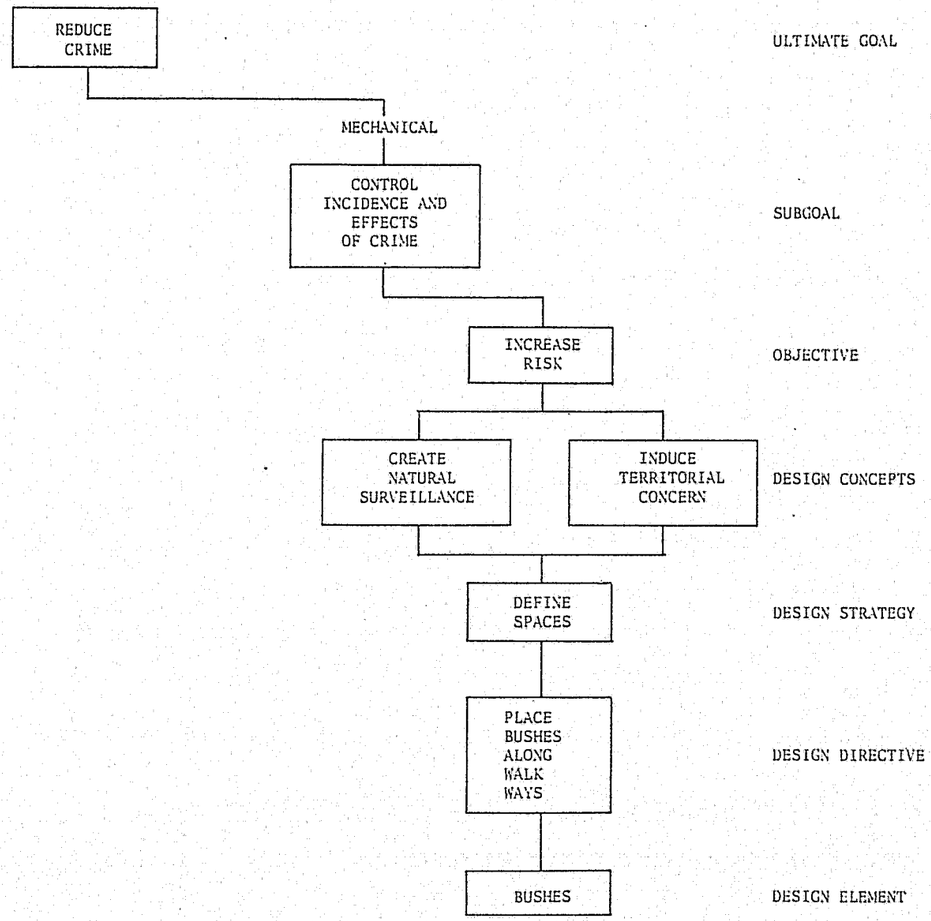

Figure 3-1. An Illustrative Example

- Design Concept -- A statement regarding the interaction between human behavior and the built environment; it provides a rationale for adopting one or more design strategies. Section C in this chapter discusses some potential design concepts -- specifically, the concepts of access control, surveillance, activity support, and motivation reinforcement.
- Design Strategy -- A method of affecting the interaction between human behavior and the built environment (through the purposeful manipulation -- i.e., creation, modification, or elimination -- of one or more of the environmental elements or variables). Chapter 5 contains an inventory of CPTED-related strategies, which may include physical, social, management, and law enforcement strategies.
- Design Directive -- A specific statement (based on a design strategy) defining the manipulation of one or more of the environmental elements which affect the interaction between human behavior and the built environment. Additionally, the design directive could also frame programmatic objectives and guidelines in its statement.

- Design Element -- A specific component or variable of the environment that is capable of purposeful manipulation (in the application of a design directive).

Three additional terms serve to define the CPTED process:

- Strategic Model -- A hypothetical, prototypal representation of a set of coordinated and interrelated design strategies (that can be adapted in a tactical manner to a particular site). Section D in this chapter discusses some well-known strategic models, including those reflective of social control, defensible space, community enclave, fortress, criminal justice, and image development.

- Tactical Model -- A detailed, concrete specification of a set of coordinated and interrelated design directives for application to a particular site. It is derived from a strategic model, taking into consideration certain site specification program-related criteria* such as amenability (to CPTED strategies), implementability (within time and cost constraints), evaluability (within time and cost constraints), impactibility (with respect to institutionalization and crime and fear reduction), and political reality.

*For a more detailed discussion, see Chapter 2 of the "Crime/Environment Targets" report.

- Design Mode -- A functional area defined by the CPTED Program for the theoretical, strategic, and tactical application of crime prevention through environmental design methods. Section B in this chapter identifies the design modes of current CPTED concern: They include the central city neighborhood for the residential environment; the commercial strip for the commercial environment; the secondary school complex for the school environment; and the local rail station for the transportation environment.

In sum then, as illustrated in Figure 3-2, the CPTED process includes the following steps: First, following are applications of crime- and environment-related criteria* to the design mode of concern is defined; second, a strategic model (containing a set of coordinated and interrelated design strategies) is developed by selecting strategies that appropriately responds to the identified crime problem through pertinent design concepts; third, by adapting the strategic model to a specific site through the application of pertinent site-specific or program-related criteria, a tactical model (containing a set of coordinated and interrelated design directives that identify the environmental elements to be manipulated) is developed; fourth, the tactical model is implemented; fifth, the model is evaluated; and, finally, the evaluation findings are integrated into the overall research and analysis function which

*For a more detailed discussion of crime- and environment-related criteria, see Chapter 2 of the "Crime/Environment Targets" report.

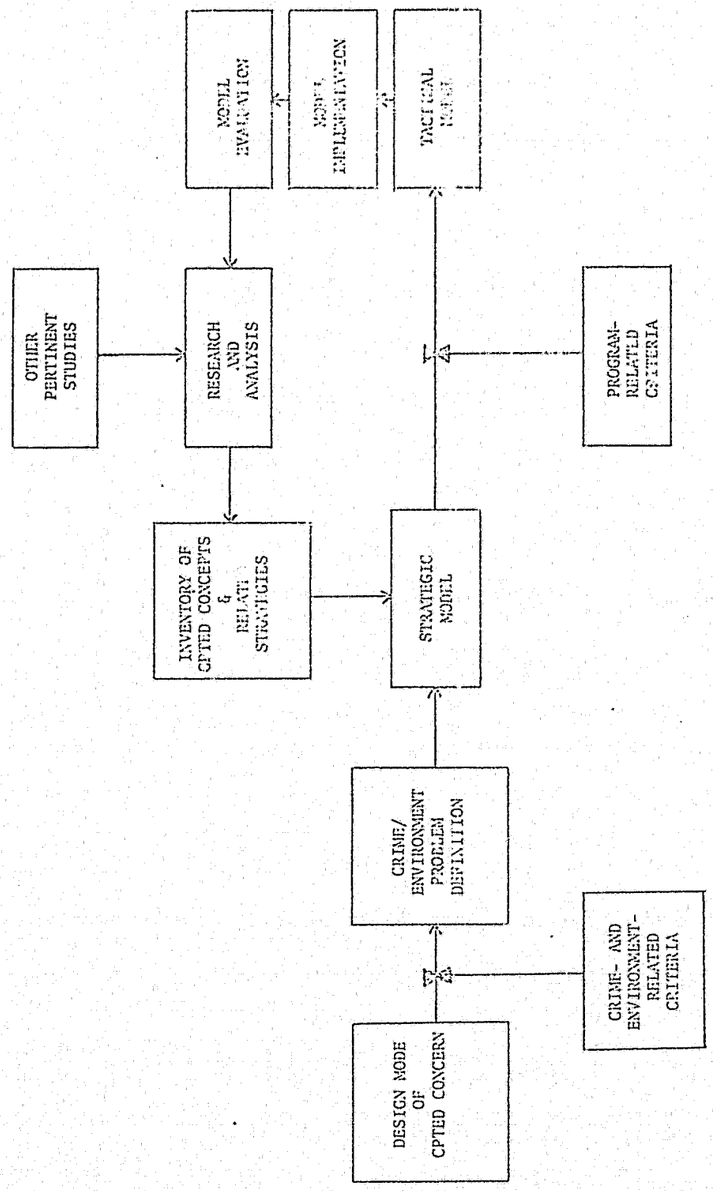

Figure 3-2. The CPTED Process

the inventory of CPTED concepts and related strategies. It should be noted that the process is not strictly unidirectional, moving irrevocably from strategic to tactical. It involves continuous testing, analysis, and dynamic feedback; consequently, a tactical model (and its corresponding strategic model) is constantly being refined and improved.

A complete discussion of the CPTED process is outside the scope of this report. The first step in the process has been undertaken; generalized results are contained in a separate document entitled "Crime/Environment Targets." The second step of designing strategic models is the subject matter of the remainder of this chapter and of Chapter 5.
It is at a very preliminary stage and additional efforts are required to develop an effective and refined framework for designing CPTED models. The development of tactical models, defined as step three, is being undertaken and documented elsewhere. Thus far, tactical models have been developed for the secondary school system[1] and for the commercial strip.[2] Similarly, steps four and five, corresponding to implementation* and evaluation, respectively, are also being documented separately. However, the consideration of potential CPTED impacts in Chapter 4 should provide valuable guidance in the development of the CPTED evaluation framework.

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*The effort required to implement CPTED tactical models should not be minimized; it is quite involved and problematic. It includes problems of working in the established municipal organizations, incorporating local requirements and objectives, identifying and securing necessary funds, and satisfying the time and cost constraints of the CPTED Program.

B. Modes of Current Concern

The range of possible environmental modes of CPTED concern is limitless. However, as designated by NILECJ, the design modes receiving attention under the current CPTED Program include the residential, commercial, school, and transportation environments. Although the four major environments are separated into discrete modes so as to manageably address crime prevention strategies, it is clear that these modes are interrelated within the framework of public use. Indeed, real life and actual criminal activity patterns do not stop at the border of any single mode. (The related question of crime displacement is treated in Chapter 4 of this document.) The contiguous or overlapping aspects of the four design modes become apparent, for example, in the consideration of the "public ways" (i.e., the outdoors, and public streets and paths), which forms a part of each design mode and constitute a common element among the four environments.**

Apart from difficulties caused by the overlapping nature of the four NILECJ-designated environmental modes, a more vital concern to the CPTED Program was the identification, within each mode, of a specific submode which would be a focal point for current CPTED demonstration

**Actually, the "public ways" could constitute a completely separate design mode in itself. From the criminological perspective, the public ways seem to contain similar patterns of criminal activity, thus providing a common focus for crime prevention planning. As CPTED efforts continue, the public ways and other functional areas should be considered as possible CPTED design modes.

efforts. The "Crime/Environment Targets" document responded to this concern. Through a systematic analysis of the most up-to-date and available information regarding the national levels (in terms of both severity and fear-producing measures), trends, and patterns of crimes, a target submode was selected in each of the four modes.*** The target selection was undertaken judiciously and on the basis of relevant crime (including severity, fear, environmental patterns, victim/offender profiles, and displacement), environment (including number of sites, population at risk, social dependency, and value at risk), and Program (including amenability, implementability, availability, and impactibility) criteria.

The four environmental modes of current CPTED concern are described in the following subsections, respectively. Each subsection contains a general description of the particular mode, as well as an identification of the specific target submode.

1. Residential. In its broadest terms, the residential mode includes all living or dwelling units, in any combination or configuration, and all appurtenant or ancillary structures and interior and exterior spaces. Thus, the definition of a residential mode can range from a single mobile home to a multistory, high-rise apartment or condominium, and includes single-family detached and attached or townhouse units; garden apartments and midrise developments; and whole neighborhoods. Appurtenant or ancillary structures can include single or multiple garages, carports, storage buildings, central boiler/air-conditioning

***Additionally, target crimes were identified in each target submode. The target crimes include predatory, stranger-to-stranger types of crimes of opportunity, as discussed in Section B of Chapter 2.

plants, play structures, pergolas, and guardhouses. Related interior spaces pertain generally to multiple-unit residences and include lobbies, hallways, laundry and mail rooms, elevators and stairs, storage rooms, boiler or furnace (mechanical) rooms, penthouses, interior garages, recreation rooms, meeting or health facilities, day-care centers and clinics, commercial establishments intended to serve the residents, and business offices or building management spaces. Related exterior spaces include courtyards and "common" areas; lawned or wooded areas; driveways and parking areas; parks and recreation areas; plazas; water impoundments such as pools, fountains, and decorative lakes; and the neighborhood streets, alleys, and sidewalks. Finally, the targets at risk in the residential mode include not only the residents and residences but also the passers-by who use the residential streets.

The particular type of residential submode which seems to offer the most promise for the CPTED Program is found in the geographic locale known as the central city, which experiences a serious burglary and street crime problem. The choice of the central city neighborhood as a CPTED target optimizes the possibilities for beneficial and innovative intervention, possibilities which would be weakened in the inner-ring or outer-ring suburbs, since they sustain a relatively light or nonexistent crime problem. Although the public housing submode has a crime problem comparable to that of the central city neighborhood, the former was eliminated on the basis of the serious scrutiny already awarded public housing by Newman and others.

The submode which most warrants CPTED attention, then, is, as its name implies, a neighborhood as opposed to a single unit or building. The components of the central city neighborhood may be homogeneous or diverse and its boundaries and total size varied. Geographically, it lies near the center of the city, inside of the inner-ring suburbs. It may be found in a city of any size and age, excepting "new towns." The residential units within such a neighborhood are generally aging and often in deteriorating condition. Land use is highly developed, with a population density seven or eight times higher than that of the inner-ring suburb.[3] The streets, lighting, and utilities are not always well maintained, and municipal services are not uniformly rendered. The home of many low-income and minority persons, it contains a large proportion of multiunit housing, occasionally interspersed with luxury apartment complexes and some commercial strips which cater to neighborhood residents.

2. Commercial. A broad picture of the commercial mode must include the entire array of retail, wholesale, service, manufacturing, banking, and real estate establishments. Their geographical locations range from heavily urbanized central business districts to rural villages, from scattered lots in primarily residential areas to large tracts devoted exclusively to commercial use. In addition to the individual businesses, the commercial mode also encompasses the areas created by configurations of commercial establishments and the spaces surrounding them, including, for example, downtown central business districts,

shopping centers and malls, groups of neighborhood convenience stores, and strip commercial areas. The commercial mode can, like the residential mode, be classified into interior and exterior spaces. Interior spaces include entryways and lobbies, stairwells, offices, restrooms, corridors, service spaces, kitchens, and cafeteria areas; while exterior spaces include contiguous streets, alleys, sidewalks and delivery areas, service entrances, parking lots and structures, and walks and entrances. Potential crime targets in the commercial mode include employees, patrons, passers-by, and, of course, the establishments themselves.

When examined in light of the crime-, environment-, and Program-related criteria, small retail and service businesses seemed to warrant CPTED attention. Additionally, in comparison with large businesses, smaller businesses tend to be located in areas of more diverse land use, thereby holding a greater potential for broad public impact. Thus, the commercial strip, composed for the most part of small retail and service establishments, displayed particular potential for the CPTED Program. Also known as a commercial ribbon or string commercial area, the commercial strip is traditionally developed along major streets and highways to provide services to users of these thoroughfares and residents of adjacent areas. More recently, however, these thoroughfares have become the less convenient avenues into the cities, and have consequently undergone a reduction in use. This, combined with the proliferation and increased popularity of shopping centers and malls, has resulted in a general economic decline of the commercial strip, along with a growth in the incidence and fear of crime.

3. School. The school mode can be classified according to different educational levels, consisting of elementary schools, secondary schools, postsecondary schools, and a somewhat overlapping classification -- special schools. Again, in viewing the physical plant, one can divide the school premises into interior and exterior spaces. Interior spaces include corridors, classrooms, lobbies, restrooms, storage, custodial and mechanical rooms, gymnasia and appurtenances, laboratories, offices, libraries, auditoria, kitchens and cafeterias, utility spaces and tunnels, meeting rooms, quasi-commercial areas (such as bookstores), living spaces, stairs, and elevators. Exterior spaces include contiguous driveways, streets, sidewalks, parking areas, recreational areas, and loading and delivery areas. In considering the population at risk in the school mode, it is interesting to note that a large proportion of that population is mandated by law to be in the mode. Potential crime targets include students, teachers, administrators, service personnel, and, of course, the structures themselves.

Based upon an analysis of available data, elementary schools were eliminated from the list of potential CPTED targets on the grounds of low degree of crime and fear present in this submode; special schools were eliminated due to their relative scarcity and small numbers of persons at risk. Of the two remaining subenvironments, secondary and postsecondary schools, the former was selected as the submode of concern, the rationale being that: (1) Secondary schools far outnumber colleges and universities, and place a larger population at risk; and

(2) secondary schools are less likely than postsecondary schools to command their own security resources. The potential for criminal activity in the secondary school mode is enhanced by the fact that it is also a repository of high-value equipment, including typewriters, accounting equipment, television receivers, videotape and audio equipment, industrial arts equipment, and food and food preparation equipment. (Indeed, the typical secondary school plant may be viewed as a microcosm of a commercial retail/service area.)

4. Transporation. The term "transportation," when extended to its broadest definition, includes all vehicles, defined paths of movement, physical structures, and land areas which facilitate and support the movement of people and commodities. Taken within this large context, the term embraces all public and private modes of travel, including walking, and all points of origin and destination, including private residences. A somewhat simplified roster would include private and public (e.g., taxicabs) motor vehicles, local and long-distance buses, local and long-distance trains, airplanes, trucks, boats and ships, and such auxiliary elements as parking facilities, service stations, and terminals. The transportation mode can also be defined in terms of the targets at risk; they include users or passengers, operators, and persons who live or work in proximity to the transportation facility, as well as the facility itself.

The first CPTED Workshop, which examined the possible submodes of concern to the CPTED Program, selected the local rail station as the

focal point for attention. The deliberations of a more recent workshop, however, expanded this focus to include not only a local rail station but the neighborhood surrounding the station, possibly including other urban mass transit components, such as bus stops. This expansion will permit a more comprehensive application of the CPTED approach, based on a composite picture of the physical and social factors in, and the interactions among, the rail station, bus stops, users of the systems, the physically built neighborhood, and neighborhood residents.

C. Some Design Concepts

The following discussion describes four broad design concepts, as well as related strategies for effecting their implementation. In simplest terms, the concepts can be seen as patterns observable in the interaction of human behavior and the built environment. They provide the hypothetical reasons for adopting various crime prevention strategies, a coordinated and interrelated group of which would, in turn, make up a strategic model. Thus, it is hypothesized that crime is prevented through strategies that foster certain types of access control, surveillance, activity support, and motivation reinforcement. Unavoidably, these design concepts do overlap; in fact, as illustrated in the example in Section A of this chapter, a design strategy may reflect more than one design concept. Moreover, the same design strategy may reflect different design concepts when implemented in different environmental settings.

The four major design concepts discussed in this section are neither mutually exclusive nor collectively exhaustive. They do, however, serve as a basis for discussion; in time, they could be further developed, detailed, refined, and tested.

1. Access Control. Access control is primarily directed at decreasing crime opportunity. In essence, it operates to keep persons who do not have legitimate reasons for being there out of a particular locale. In its most elementary form, some access control can be achieved in individual dwelling units or commercial establishments by use of adequate locks, doors, etc. (i.e., the group of design strategies known as target hardening).

However, when one moves beyond private property to public or semi-public spaces, the application of access control becomes more complicated. Lobbies of apartments, office buildings, or schools are often open to the public and, consequently, to some people willing to commit offenses if the opportunity arises. One strategy is to station guards at entrance points to screen visitors. But this procedure is not cost-effective for small units, which must, therefore, generally rely on mechanical means such as door buzzers and intercoms to prohibit unauthorized entry.

The problem is most acute on public streets, subways, and similar areas which are entirely open to public use. In some neighborhoods, particularly those of tightly knit ethnic groups, the streets are effectively denied even to certain noncriminal outsiders by the imposition of social barriers. However, there are other, more legitimate techniques for limiting access in areas nominally open to the public. Physical

barriers imposed by natural forms (such as rivers and lakes), existing man-made forms (such as railroad tracks, parks, vegetation plots, highways, and cemeteries), and artificial forms designed expressly as impediments (such as street closings and fences) serve to restrict movement.

Many burglars and robbers also display various environmental preferences, both physical and social, which may be frustrated by the creation of psychological barriers. These barriers may appear in the form of signs, parkways, hedges -- anything, in short, that announces the integrity and uniqueness of a neighborhood. The hypothesis operative in creating psychological barriers is that targets which seem alien, mysterious, or difficult may also seem unattractive to the potential offender. Paradoxically, the hypothesis can work conversely when areas -- by their clear legibility, transparency, and directness -- discourage the potential offender because of residents' familiarity with each other and their surroundings, and the visible absence of places to hide or conduct furtive acts -- in short, because of the conspicuous cohesiveness of the area.

Finally, any strategy that fosters access control is also likely to impact on egress. Therefore, careful consideration should be given to access control strategies, since they may not only limit the egress of offenders, but also hinder the egress of potential victims.

2. Surveillance. Although surveillance may operate similarly to access control in some respects, it does not aim primarily at keeping intruders out (although it may have that effect) but, rather, at keeping them under observation. Thus, it increases the perceived risk to offenders, and the actual risk if the observers are willing to act when potentially threatening situations develop. A distinction can be made between surveillance which is organized and that which is voluntary or spontaneous.

a. Organized. Organized surveillance is usually carried out by police patrol, although patrol is such a costly method that, in a typical city, it is impossible for the police to survey more than a fraction of the city at a given time. Instead, they attempt to project a sense of omnipresence (i.e., to convey to potential offenders the impression that police surveillance is highly likely at any given location). The effectiveness of this particular technique may vary greatly with geographic considerations, temporal and crime-specific factors, and the efficiency of the police themselves; however, in general, it has not proven highly effective. Police patrol is sometimes supplemented by organized citizen patrols, block-watchers, etc. One analysis of citizen anticrime groups concluded that, from a security standpoint, citizen groups which sought to duplicate police patrol and investigation were ineffective and dangerous, whereas those which assisted the police by acting as observers or by guarding fixed locations could be effective.[4] There is some evidence that such community/police cooperation may be increasing spontaneously, and the spread of such indicators might prove a potentially important trend for emphasis in developing CPTED strategic models.

In a typical city, the potential forces available for surveillance are quite large, although many individuals such as doormen, ticket takers, receptionists, or maintenance men are not specifically identified as being involved in security. Explicitly recognized, trained, and organized as such, they could constitute an invaluable resource.

In some instances, surveillance can be achieved by nonhuman techniques such as closed-circuit television (CCTV) or alarms. Installation of such devices is expensive (although present indications point to prices lowering in a competitive marketplace), and in some instances they are subject to vandalism. However, noteworthy success is reported to have been achieved in certain residential complex systems where the CCTV surveillance channel can be dialed on residents' individual sets. Particularly for elderly people, this medium provides an additional window on the world and even serves to promote social interaction. Better results might be achieved if the surveillance function of the CCTV channel or channels were transformed or subordinated into one of several communications functions of the same system, so that crime surveillance could occur as a natural byproduct of a system actually serving several positive purposes.

b. Natural. Natural surveillance can be achieved by a number of design techniques, such as channeling the flow of activity so as to put more observers near a potential crime area, or creating a greater observation capacity by such design directives as installing windows along the street side, enclosing a staircase in glass, using

single-load corridors. The technique of defining spaces can also convey a proprietary sense to legitimate users, inducing a territorial concern in the residents. At this juncture, the concept of surveillance overlaps with the more positive correctional design concept of (victim) motivation reinforcement that is discussed later.

3. Activity Support. The general design concept of activity support involves methods of reinforcing existing or new activities as a means of making effective use of the built environment. This design concept originates in the observation that in a given neighborhood or city, social and physical networks and nodes exist as latent, often underused, resources capable of sustaining constructive community activities.**** Support of these activities can bring a vital and coalescing improvement to a given community, along with a reduction of the vulnerable social and physical gaps which permit criminal intrusions. Such an approach might focus on a geographic area (e.g., block, neighborhood, city sector), a target population (e.g., vulnerable elderly victims, opportunistic youthful offenders), or an urban system (e.g., health delivery, transportation, zoning[5]). Illustratively, a network medium might be created for bringing lonely elderly people in contact with young couples whose children need occasional minding; a vacant lot might

****It is recognized that not all social networks and nodes are capable of sustaining constructive community activities. The socially destructive or criminal networks are obviously not being addressed in this case.

turned into a neighborhood garden, becoming in the process a node of neighborhood interaction, of functional and symbolic importance; and a group of corner drugstore loiterers might be induced to channel their social network potential into a productive activity. To promote such constructive communal activities, one might, on the one hand, provide incentives and magnets while, on the other hand, directly support participation and interaction.

a. Incentives and magnets. Increased community participation and related social interaction can result from the active design and provision of positive incentives or magnets that spur people to interact productively with each other, whether in the residential complex, the street, the neighborhood, or the city at large. If the incentives and magnets exist for people to populate the street and to treat it as a semipublic extension of their own immediate habitat, they will use the street because it serves their personal needs and will also achieve the byproducts of natural surveillance, access control, and behavior reinforcement.

Historically, there have been numerous periods and places where the streets, squares, and other public domains were actively used, and where the boundaries between public, semipublic, and private were either not so sharply drawn or drawn differently than at present. In fact, the present predominant pattern of deteriorated usage of public ways and spaces is probably more the exception than the rule over the centuries.[6]

Activities and activity patterns appear to be the principle components of such incentives, but they are likely to include physical design manifestations as well. For example, Olmstead's so-called "emerald necklace" concept in Boston's Fenway Park not only strings a sequence of pleasing green spaces together along a linear spine but also sustains a sequence of activity nodes that seem to assure personal security as well as privacy.

A number of strategies can be employed to enhance the effective use of the built environment, including: The reinforcement of existing or encouragement of new social networks; the creation of activity magnets or nodes, especially those involving shared benefits; the development of multipurpose centers which are intensively used; the provision of tax incentives, services, or other tangible benefits for improving a street or area (and thereby raising the factors of territoriality, participation, and social interaction); and the establishment of participatory goal- and priority-setting groups which carry out community programs of action (e.g., community development corporations). Two examples at different scales apply. At the residential street or neighborhood scale, the community garden or comparably shared facility can promote social interaction and community cohesion, thereby providing an environment minimally conducive to criminal activity. At the metropolitan scale, David Crane's "capital web" theory[7] seeks to use public urban infrastructure networks as a catalyst to create overlapping, multipurpose, and socially enriching activity patterns. The Montreal Metro-

Educational system achieves these goals in practice, interweaving the city education system with the subway system, which already overlaps numerous other urban networks.[8] By mere act of locating multipurpose magnets (or incentives) adjacent to the mass transit system stations, the public investment (or "capital web") optimizes its potentials. Because of its accessibility, transparency, and overlapping use patterns, opportunities for crime are reduced.

b. Participation and interaction. The complementary participation and interaction strategy emphasizes the important benefits which accrue when people coordinate and cooperate, thereby taking a share in process and product. Participation has been a primary theme of planning and politics during the later 1960s and early 1970s, when a main thrust developed to decentralize and localize the political and planning processes. The phenomenon has operated in several forms at different levels. For example, on the statewide level, several programs have originated with well-informed grass roots groups and progressed to the point where influential statewide planning alternatives have been represented to the public. Notable among them are: The California Tomorrow Plan,[9] Hawaii 2000, Massachusetts Tomorrow, and the New York Regional Planning Association's Town Meeting of the Air. At the city level, similar precedent-setting processes have occurred in many cities, notably Dallas, Louisville, and Atlanta. The Model Cities

experience, with its prime emphasis on maximum participation, resulted in only spotty success for a complex series of reasons. One lesson from that experience appears to be the need to improve the basis and means of participation and interaction. Recently, the community development corporation has served as a means for multipurpose development of neighborhoods, usually with the emphasis on economic development.

4. Motivation Reinforcement. In contrast to the more mechanical concepts of access control and surveillance which concentrate on making offenders' operations more difficult, motivation reinforcement seeks not only to affect offender behavior relative to the built environment but to affect offender motivation by increasing the risk of apprehension and by increasing the potential offenders' involvement in and identification with physical and social environment that may be the object of criminal activity. Furthermore, this concept emphasizes positive reinforcement of the motivation of the nonoffender community (i.e., it functions to increase territorial concern, social cohesion, and general sense of security).

a. Offender. As indicated in Section A of Chapter 1, behavioral science as it relates to the CPTED approach is in a developmental stage. Understanding of criminal motivation is still limited; although countless correctional programs based on various assumptions concerning criminal behavior have tried to rehabilitate the convicted offender, successes have been few. Section B in Chapter 4, based on limited data, attempts to relate several motivational factors to the understanding of crime displacement.

Nevertheless, in terms of the CPTED Program, which is based on the hypothesis that the proper design and effective use of the built environment can affect offender motivation, one might propose not only those strategies that indirectly affect the offender through the environment but also those that directly promote the transformation of human energy from illegal or destructive activity to legal or constructive outlets (including activity support strategies). These strategies, based on the maximization of positive human potentials, are supported by a growing body of theoretical and empirical studies, which seem ripe for transfer to areas of CPTED concern.

The transformation of inarticulate or destructive personal or group energies into articulate, positive forces has been demonstrated in several areas. A prime example is the Philadelphia Parkway School Program, mentioned elsewhere in this report, in which high school students extend their educational activity during and after school hours by working and studying in the public and private facilities located in downtown Philadelphia. These activities include work/training programs in apprenticeship roles; special projects in the public museums, libraries, and recreation facilities; and a wide range of other constructive activities. In an environmental sense, this program is an ingenious way of making better use of existing, but not optimally used, urban environmental resources on a large-scale multiuse basis. In a

crime prevention sense, it is self-evident that potentially mischief-prone highschoolers engaged in learning a trade or performing a project will, therefore, be prevented from participating in street crime. Other cities have introduced comparable programs. The Washington, D.C., Mall School; Pontiac, Michigan's Human Resources Center;[10] and Boston's Roxbury Model High School are examples. Similar programs in the other modes of CPTED concern could potentially involve other unproductive or excluded groups of the population.

b. Community. As stated earlier, the motivation reinforcement concept also seeks to positively reinforce the motivation of potential victims, who together constitute the nonoffender community. Territorial concern, social cohesion, and a general sense of security may result from such positive reinforcement strategies as altering the scale of a large, impersonal environment to create one that is smaller, more decentralized and personalized. These results may also occur from improving its quality by such measures as upgrading the housing stock, the school facilities, or the interiors of subway cars; organizing occupants; or changing management policy. This last strategy may be very important, since citizen behavior in relation to an environment may not be as dependent on its physical aspects such as architecture, land use, or location, as on its social relationships. One writer examined a British housing project which broke all Newman's design rules yet experienced low crime and vandalism rates, and concluded that "caring," or the humane management of the environment, was more important

than its design.[11] A study of public housing and other government-aided low- and moderate-income housing repeatedly emphasized management and social problems as meriting increased attention.[12] Similarly, reports of model housing complexes such as La Clede in St. Louis emphasize management rather than physical design. One can hypothesize that more pleasant surroundings and humanistic lifestyles will not only encourage people to deter crime but also disincline them from engaging in it.

Territorial concern, social cohesion, and a general sense of security can be reinforced through the development of the identity and image of a community. This approach, consciously recognized, can improve not only the image the population has of itself and its domain but also the projection of that image to others. With a definition and raising of standards and expectations, patterns of social estrangement decline along with opportunities for aberrant or criminal behavior. CPTED application of this approach holds implications for the interaction of people and their built environment, especially by means of their participation in the physical upgrading and in the identity and imagic development of their territory. Even in some of the most poverty-ridden urban squatter settlements of the world, as well as in certain self-help projects in the U.S., observed experience supplies strong evidence of the central importance and potential promise of carefully cultivating the identity and imagic development of a community.[13]

D. Some Strategic Models

This section describes five familiar strategic models; each model, as defined in Section A of this chapter, consists of a set of coordinated and interrelated design strategies which are synergistic in nature. Most of the models respond to the residential mode, where the bulk of past research has taken place. Therefore, what follows is not meant as a definitive account of model design, since that task is yet to be accomplished, but simply as an illustration of how particular design concepts and strategies underlie existing strategic models. In summary form, Table 3-1 graphically displays the interrelationships of the four design concepts, as defined in Section C, and the five strategic models that are described in this section. Only the primary interrelationships are displayed in the table; it is obvious that secondary impacts of each strategic model could reflect any and all design concepts.

Before proceeding with the description of several strategic models, it should be noted that a comprehensive taxonomy of strategic models will require extensive analysis of a broad range of models from diverse sources. As alluded to in Section A of Chapter 1, the Torontos and the Plainvilles, USA, have their useful applications. In a full sense, the effort is as much philosophical and anthropological as it is practical

TABLE 3-1

INTERRELATIONSHIPS OF DESIGN CONCEPTS AND STRATEGIC MODELS

DESIGN CONCEPTS	Social Control	Defensible Space	Community Enclave	Fortress	Criminal Justice
	STRATEGIC MODELS				
Access Control		X	X	X	
Surveillance	X	X	X	X	X
Activity Support	X				
Motivation Reinforcement	X	X	X		

and criminological. One task will be to determine what are the essential, heuristic characteristics, as well as the particular incremental strategies and tactics, that make certain human environments work or fail. Whereas experimental case studies with hard data on crime patterns are of great value in developing and refining strategic models for CPTED application, analysis must not be confined only to those cases but also must include a broad view of nonexperimental cases, to expand the vocabulary of untried but potentially effective design strategies.

1. Social Control. Some models rely heavily on correctional concepts and either benefit from a natural social cohesion or strive to induce it. For example, in Boston's North End district (a mixed residential and commercial environment) security is provided by the Social Control model which primarily emphasizes social cohesion but also contains elements of surveillance and activity support. The residents share a common culture which in turn promotes a sense of identity and community image. This same culture also fosters an active street life, day and night. Thus, the natural surveillance and the shared behavioral and activity norms of the residents translate into security. It is notable that qualities of cohesion and territoriality flow naturally from the local culture and not from techniques which are introduced artifically to induce them.*****

For purposes of developing strategic guidelines for the design and construction of new communities, as well as affecting existing communities, the CPTED Program should come to understand how the beneficial components of social control and of other models like those of Boston's North End can be transferred or replicated. Transfer and replication of these components present a real dilemma; that is, how can a new community be suddenly endowed with history, meaning, and rootedness? Evidence indicates that the dilemma has not yet been solved; for example, drug, burglary, and vandalism problems are very much a part of the Columbia, Maryland, and Reston, Virginia, communities. It is noteworthy

*****Interestingly, while the North End primarily reflects the social control model, it simultaneously possesses strong coincidental characteristics of the Defensible Space, Community Enclave, and Fortress models. What makes this multimodel phenomenon so intriguing for CPTED purposes is that virtually none of these strong environmental functions developed from conscious environmental design. In a real manner, they just happened.

that these two new communities -- particularly Columbia -- went to extraordinary efforts to anticipate population needs and to make provision for facilities and networks which would seemingly obviate the possibility of such problems arising. They came as a surprise. The problems are by no means unique to these new communities, nor, for that matter, to this country. New towns and large-scale developments in Sweden and Germany have experienced strikingly similar problems of youthful alienation and antisocial behavior.

When the number of new and renewed communities (with 30 to 60 million more human beings) that are to be developed in the U.S. between now and the year 2000 is considered along with the already emerging suspicions that much of what is presently being built may turn into instant slums, the dimension of the problems appears grave indeed. Therefore, the urgency is great for understanding and being able to transplant workable representations of social control and other proven strategic models.

2. Defensible Space. As discussed in Section D of Chapter 2, the current representation of the Defensible Space model is the Newman model, designed principally for public housing projects. It employs architectural and landscaping techniques to define spaces and to personalize the built environment to create territoriality. It is expected that territorial concern will, at the minimum, promote citizen surveillance. This surveillance is also facilitated by physical means such as the placement of windows, the covering of stairwells with glass

partitions, and the use of single-load corridors. While the essence of the model lies in the interaction between territoriality and surveillance, it does employ explicit mechanical means such as fences and locks for access control.

The Defensible Space model appears capable of expansion and combination with features of other strategic models. For example, the surveillance ingredient of the model -- the placement of kitchen windows, say, to increase visibility of exterior spaces -- could obviously be enhanced if there existed some cause -- water fountain, bench, play facility, or other social magnet -- for activity in such spaces. Spatial vacuums and places without activity seldom draw the eyes of the resident.

3. Community Enclave. The Community Enclave model, currently undergoing testing in Hartford, Connecticut, attempts to safeguard residential neighborhoods rather than housing complexes. Like Defensible Space, this model cannot rely on local subcultures to promote cohesion and territorial concern. It employs access control techniques (such as cul-de-sacing interior streets and forming other physical barriers) to discourage entry and escape by intruders. It also channels nonresidents into a few preselected areas where police and residents' surveillance can be concentrated. It is hypothesized that the same techniques can bring residents together and increase social cohesion, territoriality, and other protective attitudes. In addition to physical and social techniques, the Hartford model also employs police in innovative ways to complement and support the basic Community Enclave strategies.

4. Fortress Model. Some strategic models, such as the Fortress model, which is most commonly found in luxury apartment complexes (and increasingly in other forms of residential structures as well), lack corrective design concepts. This model emphasizes access control through target-hardening means. While surveillance techniques such as CCTV or guards are employed, their emphasis is not on observing the resident population but on excluding outsiders.

Examples of the Fortress model appear in abundance in the Sunday real estate section of almost any metropolitan newspaper, where the advertisements for all types of garden apartments, townhouse condominiums, and high-rises place pointed emphasis on the security aspects of the complexes (thereby incidentally, increasing the consciousness of lack of security and presence of fear). Although the Fortress model is, in many ways, socially undesirable, it is being replicated throughout the country at an increasing rate. Therefore, the CPTED Program must accept the challenge to offer more socially desirable alternatives to the Fortress model.

5. Criminal Justice. The Criminal Justice model is exemplified in traditional police patrol, which primarily seeks to increase risk to the offender through organized surveillance and quick response. One example is furnished by the New York City subway system, where conventional access control is not usually possible due to the nature of the system and its user population. Similarly, social and territorial concepts are difficult to apply to the transient users. Thus, prime

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reliance is placed on organized surveillance by police or their surrogates. In addition to police patrol of trains and stations, special alarms and CCTV are utilized to summon police to the scene of incidents.

The Criminal Justice model, as applied to other environmental modes, could involve different types of patrol procedures (e.g., targeted patrol, random patrol) and different forms of patrol deployment (e.g., team policing, foot patrol, scooter patrol). Recently, the effectiveness of the model has been questioned by the results of a controlled patrol experiment conducted by the Police Foundation. At any rate, because of the reliance on manpower resource, the Criminal Justice model is costly. Therefore, CPTED should offer more cost-effective alternatives, perhaps combining elements of the model with other less costly strategies.

CHAPTER 4. CPTED IMPACT CONSIDERATIONS

The discussion of a program as potentially consequential as the CPTED Program would not be complete without some attempt to anticipate its potential impacts and incorporate this anticipation into the ongoing program planning process. Accordingly, this chapter attempts to sketch out these impacts: First, on the level of general Program considerations (physical and temporal scale, cost, and related factors), and second, in view of the potential of the Program to cause crime displacement. Displacement, which involves many of the same factors (physical and temporal scale, etc.) of concern to general Program impact assessment, in fact may constitute the most problematic impact inherent in any crime prevention program; consequently, the topic is considered at some length in Section B of this chapter.

A. General Factors

Scalar, temporal, cost, and other related impact areas are considered in this section.

1. Scalar. The scalar impact of CPTED strategies may range from the microscale level (hardened cash registers or citizen alarm wristwatches) to the macroscale level (security-oriented new community designs, or broad-based CPTED course curricula).

Crime prevention techniques and resulting impacts in the residential mode, for example, could range in scale from improved window locks to standardized State or national building codes that systematically embrace performance specifications for all aspects of residential building.

Techniques and impacts in the transportation mode could range from the assorted specific devices employed in individual vehicles or subway stations to the transformation of overall metropolitan transit use patterns and the subsequent social impacts and large-scale land use and value changes. A similar range in scale of impact can be anticipated for the school and commercial environments.

2. Temporal. Time dimensions of impact range from those which are temporary to those which will span several generations in time. Examples of the former are a flexible and short-term deployment of police in a given problem area or the securing or alteration of an access, with only momentary effects. Examples of the latter are the lifespan of major urban infrastructure systems, whether a future mass transit guideway, a demand-responsive bus fleet, Baron Haussman's Paris boulevard network, or a school system.

In previewing potential temporary impacts of CPTED, it is useful to distinguish between two fields of application: The existing environments, and future environments. In the case of the former, modification or retrofitting appears to be called for, as opposed to costly and disruptive overhaul.* A relevant parallel exists in the retrofitting measures currently employed in existing structures to counteract the

*Recent work by Oscar Newman concludes that, in many residential neighborhoods, the only practical solution may be outright fortification. A logical area of progress for CPTED would be expanding the range of workable solutions.

continuing energy shortage. These measures include adding solar energy systems, improved insulation, and numerous other more modest methods of conserving heat.

In the case of CPTED application to future environments, design guidelines and performance specifications are called for.** In other words, the added requirement for crime prevention is incorporated into the programming and design of the future environment, either in the sense of adding an entirely new and previously unrecognized functional requirement, or in the sense of merely increasing the relative importance of a previously recognized but under-emphasized requirement. Whether one thinks of this application in terms of products (industrial design of housing or vehicular subsystems), of total transportation or education systems and components, or of new towns and cities of 50,000 or 500,000 population, the impacts of endowing the new environments (micro- and macro-) with added guideline requirements are considerable.

3. Cost. Cost impacts are of particular concern when modest investment or the use of minor devices could accomplish the same result as major, elaborate installations. Whether seen from the point-of-view of the individual homeowner who is considering the purchase of an automatically timed light switch, or from the point-of-view of the metropolitan transit administrator, the investment in crime prevention hardware or

**Newman's term "design directives" applies. See the definition given in Section A of Chapter 3.

or programs not only involves widely varying future investments, but affects how cost-effectively the existing investments can be used, and how much money is available for competing needs other than security. The interactions with scalar and temporal impacts are self-evident.

4. Related Impact Areas. Other related areas of significant CPTED impact can be delineated as: Coordination with other public and private programs; correlation with general societal goals external to CPTED; precedents set with respect to prototypality and transferability; and innovation in system and product design.

It is quite possible that one of the most productive areas of CPTED impact may lie in the identification of and contribution to non-CPTED-related governmental and private sector programs. Essentially, what this cross-impact would involve is adding to or transforming programs conceived for other purposes so that they become multipurpose vehicles capable of carrying out CPTED objectives either directly or indirectly.

Indirect impacts serving CPTED purposes can occur as the result of programs or actions undertaken in areas ostensibly unrelated to CPTED. Thus, an education/training program, undertaken with the goal of increasing the use of an existing but underutilized school facility, may also result in the reduction of criminal activity in the surrounding city district, even without the use of explicit crime prevention tactics. The Pontiac, Michigan, Human Resources Center is a notable case illustration of a school being planned and built to accommodate a wide spectrum of community needs for all ages, beyond the customary single-purpose

role of a neighborhood community school. It is reported that the facility has succeeded in catalyzing community interaction, raising job skills and significantly reducing criminal activity in a previously crime-ridden area.[1] There are numerous similar examples in other locations, some of which are mentioned elsewhere in this document.

Clearly, the overall impact of the CPTED Program can be extended by identifying and reinforcing such programs. CPTED would do well to thoroughly investigate existing and emerging Federal, State, and local programs for potential areas of overlap and coordination, since the possibilities of accomplishing CPTED objectives through programs designed for beneficial purposes other than crime prevention per se seem potentially rewarding.

Another important CPTED impact can be characterized as social costs. In several ways, the correlation of CPTED ends and means with more general societal ends and means constitutes a grave and sensitive dimension of CPTED impacts. The ominous vision of "Fortress America" is obviously one to be avoided. The challenge for CPTED is to find a humane territory between that rigid, lifeless extreme and the opposite extreme of uncontrolled crime. CPTED will be most successful in those instances where strategies in fact infringe least on individual mobility and where they appear to intrude least.***

***A parallel which demonstrates the potential volatility of CPTED issues and impacts is the recent flurry of studies on invasion of privacy by computer data bank usages. In this connection, the studies are notable for the concrete, factual issues they raise and for the degree to which they have raised popular awareness of the issues involved. See, for example, Willis H. Ware et al. "Records, Computers and the Rights of Citizens: Report of the Secretary's Advisory Committee on Automated Personal Data Systems." U.S. Department of Health, Education, and Welfare. Cambridge. MIT Press. 1973.

CPTED impacts must also be anticipated in terms of the precedents they will set. When, for example, police first introduced radar to detect highway speeders in the mid-1950s, the innovation met with considerable public outcry over a perceived invasion of individual liberty. Whatever its merits or demerits, however, people became accustomed to and accepted this technique as it became part of common experience. A more pervasive and significant precedent was set when banks and certain types of commercial establishments first began to use CCTV for reasons of security. An inadvertent byproduct of the system was the accumulation of visual information on the activities of persons passing in front of the camera lens. Initially perceived by some as an invasion of personal privacy, the surveillance system nonetheless quickly became integrated into and, in effect, accepted as part of common experience. Aside from the issues these systems raise about whether the public interest is served at given levels of privacy invasion, the point to be made here concerns the remarkable ease with which the precedents were set and the rapid proliferation of the systems. One can reasonably anticipate that successful CPTED demonstrations using various techniques would become similarly widely replicated, and consequently that the precedent-setting potential of the Program must be carefully evaluated, with an eye towards safeguarding such social values as individual privacy.

This potential will be largely determined by the degree to which the strategic models introduced at demonstration sites prove prototypal and capable of subsequent transfer to other sites. Hence, strategies and tactics employed in demonstration environments should emphasize standardized, repeatable design elements as much as possible. For instance, in the transportation mode, intraurban rail station platforms, vehicles, and platform-to-street connections follow a limited variety of typical designs; and CPTED design elements developed for one prototype can be repeated and gradually refined in other similar applications. In the commercial mode, those retail stores which share similar layout configurations would seem most appropriate for development of prototypal CPTED strategies; and the same is true for the school mode, which is also generally reducible to a finite and manageable number of physical units such as classrooms, corridors, and other common elements. The residential and housing mode is, in all likelihood, the most complex case for prototypality and transferability, since a greater variety of configurations occurs at the scales of individual dwelling units, complexes of units, and whole neighborhoods. But even in this relatively complex mode, the repetitive elements may be isolated and the demonstration plan may achieve prototypal character.

CPTED impacts on innovation in system and product design (and, conversely, the impacts of innovation on CPTED) constitute another area of concern. Implicitly, CPTED aims to endow existing and future environments with added capabilities responsive to the need for crime prevention -- physical objects, tangible and intangible systems, and other

innovative products. In much the same way the pollution crisis precipitated a wide range of new systems and products (automobile catalytic converter exhaust devices and entirely new engine systems, industrial stack gas scrubbers and wholly new vocabularies in solid waste and energy systems, new kinds of soap and altered packaging design, etc.), so it can be expected that the CPTED Program will induce both radically and incrementally innovative products and systems.

The potential impacts of CPTED innovations are considerable. Whether in terms of their environmental effect or of their potential for creating new markets, their innovative character or appeal (the new or innovative often exercises irresistible appeal) must also respond to the societal goals raised earlier. In an overall sense, are they beneficient and humane? Or are they compromising and oppressive? What are the benefits? And what are the costs?

B. Crime Displacement

Chapter 2 has noted the existence of a broad category of existing crime programs -- "mechanical" programs -- and placed the present CPTED Program within that category. Since one of the most frequent and serious criticisms levied against mechanical prevention programs in general centers on their potential for simply displacing crime from one environment or target to another, and since the present Program may be liable to the same criticism, some attempt must clearly be made to assess the actual potential for displacement inherent in mechanical types of crime prevention programs. Toward that end, the remainder of this section**** explores the topic of crime displacement; first, outlining the "corrective" vs. "mechanical" prevention debate; then, delineating particular forms of crime displacement, summarizing related research, analyzing the factors which determine displacement potential, and finally suggesting policy implications for CPTED and other such prevention programs.

1. Corrective Vs. Mechanical Prevention Programs. Corrective programs can be described as those which attack perceived causal factors (such as unemployment or drug abuse) on a broad social welfare basis or by treatment of individual offenders; and mechanical programs are those which seek to reduce crime opportunities or increase the risks to offenders by such means as target hardening or improving police operations.[2] Corrective crime prevention, if successful, would reduce crime in an absolute sense; in theory, a gang of street muggers who were given satisfactory employment or a drug addict who was "cured" would stop committing crimes. In contrast, mechanical prevention offers no such promise of absolute reduction. A house which is securely locked or a street that is well patrolled does not lessen an offender's crime propensities in an absolute sense, but only vis-a-vis those targets.

****Adapted from a paper by T.A. Reppetto, "Crime Prevention and the Displacement Problem," published in Crime and Delinquency, April 1976. The appearance of Reppetto's work in these pages is meant to focus attention on the crime displacement problem. His material, however, can only infer, from information presently available, some theoretical underpinnings for future analyses of the displacement phenomenon.

Given these distinctions, corrective crime prevention programs would appear clearly preferable to mechanical ones, or to combination programs like CPTED. However, individual motivation, to which corrective prevention is addressed, derives from the life history and circumstances of the individual, a complex of economic, social, and psychological factors that are often difficult to ascertain and even more difficult to alter. In contrast, mechanical crime prevention possesses a pragmatic advantage (i.e., it is easier to do). Locks and other antiburglary hardware can be installed with relative ease; allocation of police patrol can be readily altered to combat street robberies; even while environments can be redesigned to foster community self-policing capabilities.

The police, however, cannot be everywhere; all houses and commercial establishments cannot be secured with attack-proof doors and windows, and all neighborhood environments cannot be altered. A differential level of protection between various potential targets, both human and nonhuman, will always exist. Given this differential and without reduction in the offender population, will not the foreclosure of one type of criminal opportunity simply shift the incidence of crime to different forms, times, and locales? Indeed, this question has frequently been raised in arguments against mechanical crime prevention programs. The National Commission on the Causes and Prevention of Violence, for example, has warned that:[3]

> The traditional "valve" theory of crime shifts asserts that the volume of crime is not reduced by "hardening targets". If one type of crime, such as robbing busses, is "shut off", crime will shift to other targets, such as robbing taxicabs or stores. Applying this theory to defensive cities, those population groups who flee from the central city to suburban areas or can afford housing in the fortified "cells" within the central city would obtain protection. Crime would be shifted to unprotected neighborhoods inhabited by the poor, who even now are the main victims of crime.

As the above bleak picture suggests, the ultimate value of mechanical crime prevention programs appears critically dependent on their capacity to avoid large scale displacement effects[4] -- a capacity which is not only of interest to policymakers in deciding on the allocation of anticrime resources, but also to citizens affected by the allocations.

As yet, most people are not aware of the import/export activities of anticrime programs. In part, this reflects the normal unconcern of most citizens about subtle forces that affect their lives. In part, it stems from the fact that there have been no permanent large-scale anticrime programs. Heightened police patrol in a neighborhood is usually a temporary phenomenon; target hardening or citizen patrols have been applied in a few small areas such as single-family housing projects.

But with the installation of large-scale workable mechanical crime prevention programs, this is likely to change. As a whole neighborhood of 30,000 persons is permanently altered by an anticrime program, an adjacent neighborhood may experience a crime wave. The differential distribution of crime control programs might then become the subject of judicial determination in the form of class action suits by nonrecipients of anticrime programs.[5]

It is also conceivable that, in the near future, administrators of crime control programs will be forced to specify why particular projects and locales were chosen and what "environmental crime impacts" their projects will have. Since, to date, no concerted attempts appear to have been made to forecast the forms and dimensions of the displacement problem, this topic seems ripe for future research of a comprehensive and quantitative nature. However, in the absence of such research, the present paper can only infer -- from information presently available -- some theoretical underpinnings for future analyses of the displacement phenomenon.

2. Forms of Displacement. One can describe at least five forms of displacement that might occur after the implementation of a crime control program: Temporal, tactical, target, territorial, and functional.

Perhaps the simplest displacement for the offender is to continue to commit the same type of crime, in the same places, against the same targets via the same tactics, but at a different time. For example,

intensive police patrol in the Bronx section of New York City during evening hours reportedly produced a reduction in certain types of crime but at the expense of an increase in the number of crimes occurring in the late afternoon.[6]

Alternatively, offenders may continue to commit the same crime at the same times, places, and against the same targets but may alter their tactics. The installation of alarms in commercial establishments, for example, may cause burglars to switch from breaking and entering a store to smashing and grabbing (i.e., breaking a window, seizing something, and running away).[7]

When one target appears relatively impervious to any criminal tactic, offenders may simply shift to another target. After an increase in police patrol in the New York City subways, for example, there was an apparent increase in bus robberies. Later, when exact fare was instituted and bus robberies dropped, subway robberies rose. One study of this phenomenon concluded that displacement both away from and towards the subways occurred because of perceived or actual changes in the relative attractiveness of buses and subways as targets for robbers. The study also hypothesized that, because of displacement, the anticrime programs instituted in various parts of the transit system reflected only a suboptimal solution to the crime problem. As one analyst of the study commented, "a transportation system administrator whose domain included buses and subways would not have consented to the installation of exact fare systems on the buses."[8]

Offenders may not only move from target to target but also from place to place. A substantial increase in police manpower in one Manhattan precinct apparently produced a reduction in street robbery but may also have been responsible for an increase in the same crime in adjoining precincts.[9]

Finally, offenders may simply switch functionally from one crime type to another: Robbers could become burglars or vice versa, and so on. Presumably, it would constitute a net gain for society if armed robbers switched to stealing hubcaps, since the consequences in terms of fear and risk of life would be much less, but clearly the reverse switch would negate the value of any crime control program against hubcap stealing.

3. Related Research. To assess the probability that any of these forms of displacement will occur, one must rely on existing information about the present behavior patterns of offenders. The assessment which follows is based on published data currently available and on two empirical studies that were undertaken, in part, to determine patterns of crime displacement. In the first, carried out in a major metropolitan area, interviews were conducted with 97 adjudicated burglars, and their histories were analyzed to determine, among other things, their motivations and patterns of operation in relation to time, targets, and possible displacement activities. In the second study, conducted in a medium sized city, 49 street muggers (adjudicated robbers and pursesnatchers) were interviewed, and the histories of 39 additional muggers and 60 residential burglars (encompassing 355 total robbery, pursesnatch, and burglary incidents) were checked for information similar to that referred to above.

In both studies the results were compared to police and victimization survey data on crime. Nevertheless, it is usual to question research based on analysis of adjudicated offenders on the grounds that they are not typical of the "actual" or real-world offender population. The two studies attempted to address this question at some length; while their conclusions cannot be presented in detail here, three primary observations can be summarized as follows:

- Comparison of the demographic profiles of arrested and adjudicated offenders with described offenders in cases that did not result in arrest revealed no major differences, except for some tendency of younger offenders to be caught more frequently.
- Comparison of the number of offenders apprehended against the number of crimes in the community (as indicated by victimization survey data) suggested that, given the operating frequency and financial needs of the typical arrestee, the arrested population reasonably approximated the real-world offender population.

- Direct questions to adjudicated offenders who presumably had some knowledge of the robbery or burglary situation in their areas, elicited the consensus that virtually all offenders who worked with any frequency were caught.

In summary, it would appear that the majority of burglars and street robbers are, as most other published arrest data suggest, similar to the study populations; that is, they are disproportionately drawn from the young, low-income, and minority populations who, to a great extent, live and operate in the core areas of the central city. Thus, it is the contention here that there is a high degree of congruence between the official and actual offender populations for the crimes under discussion,[10] at least as they relate to important characteristics of those categories.

4. Displacement Potential. Given, then, the presently available information on the demographic and behavioral characteristics of arrested offenders, and given the contention that this information more or less accurately depicts the real-world offender population, one can proceed to evaluate the possible displacement effects of mechanical crime prevention programs. Those who argue against mechanical crime prevention programs on displacement grounds offer two basic assumptions about offender behavior:

- That the offender behavior is totally deterministic and, therefore, inelastic. That is, offender X must commit Y number of crimes per day, week, or month; therefore, foreclosing opportunity or increasing risk will do nothing to lessen the offender's frequency of operation.

- That offenders posess total mobility in terms of crime, time, tactics, target, and area. That is, the young burglar who by day climbs in the windows of apartments in the inner-city housing project in which he lives, is entirely capable of moving his operations to the suburbs, cracking safes, working late at night, or becoming a holdup man.

Regarding the deterministic quality of offender behavior, several studies have noted that some offenders, particularly the very young, do not necessarily set out to commit a crime but, rather, act on impulse when opportunity presents itself. Conklin, in interviews with Boston robbers, distinguished the opportunistic robber -- who tended to be young, nonwhite, and from deprived circumstances -- from the professional, who was generally older and of a white, middle- or working-class background. The opportunistic robbery pattern was described as follows:[11]

> Since elaborate plans are not made, robberies by opportunists often seem to happen in a random fashion. A vague idea of trying to get some money exists in the offender's mind, but the robbery sometimes "just happens."

A California study reported similar findings:[12]

> A sizeable number (of robbers), however, indicated that they had not started with that intent, and a number of them were involved in somewhat ambiguous situations. The adults were far more likely to have intended robberies than were the juveniles. Roughly 76 percent of the adults had intended robberies while only about 58 percent of the juveniles had.

Many of the burglars interviewed for the metropolitan study could also be classified as opportunists. Often their decision to burglarize was made on the spur of the moment. As one said,

> "I'm just walking down the street and a couple of friends say, 'Hey, do you want to break into a house with us?', I say, 'OK, if it's a good hit'."

It appears then that, even if one is prepared to concede the primacy of individual motivation in determining criminal behavior, one must acknowledge that motivation is not a constant for all offenders at all times, and that mechanical crime prevention programs may, in fact, absolutely prevent a certain amount of crime. For example, a group of young, low-income males returning from a night on the town may suddenly find themselves sharing the street with a prosperous-looking drunk. At that moment, an intention to rob may form but the sudden appearance of

a police car may lead them to "cool it." In the situation described, it is likely that this is one robbery that will never be committed since the impulse was stifled. That is, while the group may commit other robberies in similar circumstances, these will not be related to the "missed" opportunity.

In contrast, suppose this group set out to look for victims but found the area temporarily saturated with police. In this situation, it might be reasonable to expect some squaring of accounts on another night. But should the saturation prove permanent, opponents of mechanical crime control would argue -- in keeping with the second assumption cited above -- that the would-be offenders would simply switch locations, targets, crimes, or whatever; in other words, that this "dedicated" group of offenders would display an infinite mobility.

In the real world, however, a number of relatively inelastic factors seem to limit offender mobility. Chief among these factors are personality, age, and the structure of the particular crime.

a. Personality. As regards functional mobility, Gibbons and Garrity argue that the real world of crime behavior is comprised of social roles or stable behavior patterns and that these role patterns are differentiated along two major dimensions: Self-definitions and attitudes, and offense behavior. They argue that variations in these two dimensions are highly interrelated: Offenders who express certain kinds of attitudes and self-definitions also commit certain kinds of offenses.[13] Thus, it could be hypothesized that, if robbers and burglars chose their particular mode of theft based on their own personality, they would be unlikely to change.

This hypothesis was to some extent borne out by the interviews with metropolitan burglars, many of whom indicated that their preference for burglary was a product of their reluctance to risk a confrontation with the victim. Consequently, they generally attacked premises which were unoccupied, and very few carried weapons when they were on a job. (The common reaction to the possibility of an unexpected encounter with the victim, or someone else, was to flee.) Police records confirmed the burglars' desire to avoid confrontation, since well over 90 percent of all burglaries during the study period were against unoccupied premises. (In most other cases, the victims, while present, were not aware of the burglar's entry.)

Conklin, in his study of robbers, also noted a linking of personality characteristics with crime type and argued that many robbers chose robbery because they preferred confrontation to stealth.[14] His argument is consistent with the observations of another study, which described a group of armed robbers as follows:[15]

> They scoffed at their criminal acquaintances who were non-violent property offenders . . . They represented themselves as brave daring men who took what they wanted in a straightforward way.
>
> They took real pride in their criminal style -- the taking of property by force or threat of force . . . As a group, these offenders comprised a more homogeneous category personality-wise than did any other criminal pattern group.

However, the degree to which individuals are committed to a particular crime type appears to vary from person to person. An analysis of offender histories in the metropolitan study disclosed that 30 percent of the burglars had been involved in a robbery or pursesnatch offense, while 57 percent of the muggers had been involved in burglary. This suggests that burglars are less likely to turn to robbery than the reverse. Indeed, the street robbers in the city study did not manifest so great a commitment to this particular crime; although, when pressed to name recent criminal activity, they were most likely to mention robbery.

In addition to influencing the type of crime the offender selects, personality may also limit the tactics used and targets attacked. Robbers may employ firearms to enhance their own egoism or, contrarily, as a means of avoiding physical combat. Those concerned about the latter prospect may choose females or the elderly as targets.

b. Age. Age may also significantly limit mobility. Younger offenders generally possess fewer skills and resources because they have not had the time to develop their talents or to make contacts with other criminals. Thus, young burglars (under 18) in the study were limited to breaking into relatively unsecured targets -- low income housing, for example -- by such simple tactics as finding open windows or kicking in a door panel. Similarly, they could steal only money or goods that could be disposed of through their own social contacts rather than through fences.

The younger burglars studied tended to be largely territorially bound (i.e., they worked close to home, partly because they did not generally have access to automobiles but, more importantly, because they had little information about targets outside their own neighborhoods). They had not yet developed a wide acquaintanceship with the city, nor did they have tipsters or experienced criminals to advise them. Furthermore, young burglars had more fear of police patrols and felt more conspicuous in strange neighborhoods where they were less sure of escape routes. For example, all of the offenders arrested for burglary in one large housing project were under 25, and 81 percent of them resided in the project itself.

The criminal activity of young offenders is also limited temporarily by their need to attend school or meet a family curfew.

c. Structures of crime types. The metropolitan burglars indicated the importance of target information in carrying out their crime. They were particularly interested in whether premises were occupied and the prospects of loot -- two essentials of the crime of burglary. One way to obtain these facts was to burglarize in areas familiar to them. As noted above, those under 18 and about half of the older group showed consistent patterns of operating in their own neighborhoods. Thus, the type of crime may partially dictate the locale of its occurrence and the targets attacked. Indeed, a study of crime patterns in St. Louis found that residential burglars were more likely to work near home than other property offenders because of the greater

ease with which they could obtain information about targets. By contrast, armed commercial robbers who, by definition, had to confront their victim would, rather than attack a local storekeeper, be more likely to select a less familiar and more distant target.[16]

The city street muggers interviewed also emphasized the importance of knowing the turf on which they operated. Offenders traveled an average of approximately one-half mile to commit each robbery. Most had one or two regular areas in which they operated, and approximately 75 percent lived in or adjacent to that area. In general, the offender would operate with one or more accomplices at night. They would trail a likely victim (one who appeared to have money and/or looked as if he would not put up much resistance and who was a stranger to them) and would use physical force rather than weapons. The selection of an optimum place to "take off" the victim was important to them, and they usually sought a locale which offered some concealment. Knowledge of the area thus permitted them to estimate the availability of suitable victims and the number of possible "taking-off" places. Offenders also took cognizance of the level of police activity in an area and, most importantly, they amassed knowledge of escape routes, since the possibility of apprehension was a concern (but not a deterrent) for most offenders. Such information was normally acquired not by systematic canvassing or "casing" of targets but, rather, as part of their normal observations of the environment in which they lived or socialized.

Crime types also dictate time of operation. Since most burglars prefer unoccupied premises, they must work in the daytime and on weekdays, when dwellings are most likely to be unoccupied (although, in suburban areas or housing projects, this timetable may be reversed). Commercial burglars, in contrast, must operate at night or on the weekends, when stores and businesses are closed. Robbery is also a crime best perpetrated under cover of night. Therefore, individuals who prefer particular crimes or targets are limited in their selection of operating times.

d. Other factors. In addition to the primary influences of age, personality, and crime structure, other factors may limit an offender's mobility. For example, some geographic preferences may be dictated by race. While white and black interviewees did not display significant differences in choice of time, targets, or tactics, there was a definite tendency to favor particular areas where they felt least conspicuous. Black burglars were concerned about feeling out of place in the suburbs, and most white burglars would not go into ghetto areas. These preferences were confirmed by an analysis of burglary arrests in particular locales which indicated that, in a predominately black inner-city ghetto area, 84 percent of the offenders were black while, in a predominately white suburb, 93 percent were white.

Drug addiction similarly seemed to influence choice of locale; drug addict burglars appeared to be less mobile, since travel time delayed their acquisition of drugs.

In summary, the most striking fact about robbers and burglars is their extremely limited geographic range. An analysis of city offender histories disclosed that, for street robbery, the average distance between place of occurrence and the offender's residence was 0.6 mile; 90 percent of the incidents occurred within 1.5 miles of the offender's residence. The average distance between home and place of operation for residential burglary was 0.5 mile, and 93 percent of the offenses occurred within 1.5 miles of the offender's residence.

A study of robbers (including commercial robbers) in Philadelphia found the mean distance between the scene of the offense and the offender's residence was 1.57 miles.[17] A study of juvenile delinquents in the same city found that the mean distance from residence to offense to be 0.4 mile and that three-quarters of all offenses occurred within 1 mile of the offender's home.[18]

5. Policy Implications for Crime Prevention. The foregoing discussion suggests that many patterns of criminal behavior may not be readily subject to change and that, therefore, the displacement potential of a crime control strategy may be limited by the personality and life circumstances of offenders and the structure of crime. For example, as noted above, many offenders quite territorially bound, either because their crimes are those of opportunity, carried on as adjuncts to normal social patterns (walking to school, hanging on the street corner) or, more importantly, because they need to feel secure in their territory and to acquire information on targets, escape routes, police patrols, and other factors.

Given the weak data currently available, one can roughly sketch out the displacement possibilities associated with particular anticrime strategies. Given, for example, the imposition of a time-constant, anti-burglary technique such as target hardening (i.e., installation of dead-bolt door locks in an apartment area), the most likely form of displacement would be the continuation of residential burglary in the same area with the same tactics but against unhardened targets. If all targets in a particular area were secure, the most likely displacement would be territorial (i.e., to contiguous areas with the same structure of opportunity -- targets, socioeconomic characteristics, police activity -- rather than to remote areas or nearby ones of a different composition). When asked what they would do if their usual targets were hardened, the majority of burglars interviewed in the metropolitan study indicated they would move their operations geographically to a nonhardened area or upgrade their skills, rather than switch to a different crime category. A similar response was obtained from the city street muggers who also indicated they would move geographically rather than change functionally.

Further, forcing offenders to shift their base of operation may limit the frequency of their activity and, therefore, lower the crime rate. Movement of the offender to a new target area may mean his criminal activity cannot be carried on in conjunction with normal social life in his home area and that his target information (likely victims, escape routes, and police patrols) may be much harder to come by. As crime control programs are extended to adjacent areas, offenders may then have to settle for a permanent state of decreased prospects.

The study of saturation policing in New York City precincts tends to confirm these hypotheses. Street robbery rates declined in the "saturated" precinct but increased in adjacent precincts, while the burglary rates showed no change in either the experimental or boundary areas. That is, functional displacement did not occur but robbers did move geographically to nearby areas, although not in numbers equal to the decrease in the target area.[19]

The geographic limitation discussed above is clearly less applicable to older offenders, who are mobile and skilled, or to offender types such as armed robbers, who are less dependent than burglars on geographic familiarity. Similarly, the probability of functional changes -- although generally more remote than other kinds of changes -- may vary according to crime types and offenders (e.g., robbers appear more likely to become burglars than the reverse).

If the foregoing analysis is correct, then one can draw certain implications for the choice of locales and crime types as targets of crime programs. Probably the programs least subject to displacement would be those based on large areas rather than on individual targets, since securing only buses, stores, or particular streets -- while leaving nearby subways, homes, and other streets unprotected -- is likely to be unproductive. For example, a recent study of the effects of street lighting in Kansas City found that the installation of improved lighting in a single block appeared to move crimes such as robbery to adjacent blocks; but the study further hypothesized that relighting across an entire area would limit displacement to the fringes of the target area.[20]

Also, the best locations for crime control programs would appear to be areas where the chief offenders are young and where the rates of residential burglary and street robbery are very high. Here, the simplest anticrime programs (such as target hardening to prevent burglary or increased patrols to deter street robbery) will probably have significant effect,[21] since offenders are not highly skilled, are somewhat opportunistic, and are territorially bound. Thus, a disruption of the local crime pattern would not lead to a complete displacement to other areas.

The locale most likely to export crime after a control program takes effect is one which attracts older, more skilled offenders. In terms of burglary, displacement might occur from a wealthy suburban area to a city neighborhood of luxury apartments. In terms of robbery, the shift would most likely occur not from particular neighborhoods but from specific types of targets: Banks, loan companies, supermarkets, and other lucrative targets. Hardening these targets might shift robbery gangs to wealthy homes, jewelry salesmen making their rounds, etc.

Thus, it could be hypothesized that those neighborhoods that have the highest rates of common predatory crimes and are, therefore, most in need of anticrime programs appear to be the least likely to export crime, since both their high crime rates and low displacement possibilities stem, to a large extent, from the presence of low-income youth.

Among types of crime, street robbery probably holds the greatest promise for deterrence efforts. It has greatest consequences for public

fear, presumably is perpetrated by a smaller offender population, and is concentrated by time and area. The latter characteristic suggests that fewer areas would need to be secured against robberies than against burglaries or other more dispersed crimes.[22]

Based on the foregoing, it would also appear that effective means of countering displacement must be those suitable for areawide application. For example, closed-circuit television might be useful in securing a single street or parking lot but it would probably be impractical on a cost basis to utilize it over 50 square blocks.

Anticrime techniques which permit leveraging and flexibility are also useful for minimizing cost and countering anticipated displacement. For example, the study of robbery in the New York subway system[23] identified the existence of a "phantom effect" whereby police patrol saturation caused a decrease in robbery, even during an 8-month period when it was not in effect. The study suggested that the "phantom effect" could be institutionalized by flexible deployment of police resources.

Finally, police are a notably flexible resource since they can move quickly in large numbers from one area to another. At present, there is some tendency to downgrade police operations as a crime deterrent,[24] but this may be a premature conclusion -- police patrol may be much more effective if used in as yet undetermined ways.[25]

CHAPTER 5. CPTED-RELATED STRATEGIES

This chapter provides an inventory of various CPTED-related strategies in each of the four environmental modes: Residential, commercial, school, and transportation. The inventory, which is presented in tabular form, is not intended to exhaust the range of possible strategies encompassed by the Program but only to provide the CPTED planner with a list of alternative approaches. Also, it is emphasized that strategies cannot be applied indiscriminately -- they should only be applied in response to a specific crime/environment problem and in support of specific CPTED concepts that reflect the hypotheses which relate the problem to the solution.

Strategies for each of the four environments are categorized in the tables according to whether they involve primarily physical, social, management, or law enforcement components.* A description of each strategy, including salient factors affecting its feasibility, is contained in the left-hand column of the table; with the right-hand columns indicating the publication(s) from which the strategy was derived, the status of the strategy (whether it has been merely recommended for implementation, actually implemented but not systematically evaluated, or both implemented

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*Since the focus of the CPTED Program is the (physically) built environment, each of these four components is included only to the extent that it impacts on or is impacted by the built environment.

and evaluated**), and the particular CPTED design concept(s) exemplified by the strategy (based on the four broad design concepts identified in Section C of Chapter 3).

The remaining sections of this chapter present strategy inventories for each of the four modes in the form described above. Each section contains a brief introduction describing the general availability of information on strategies for that mode and also contains a bibliographic listing of references, with reference numbers corresponding to reference numbers noted on the strategy table.

A. Residential

Table 5-1 outlines CPTED-related strategies against crime in residential environments. Since much of the work in CPTED theory concerned primarily residential environments (e.g., the work of Newman, Jacobs, and Wood), a broader array of recommended strategies exists for the residential mode than for any of the other CPTED environments. Basically, these strategies fall into two categories: Those which involve specific and limited tactics, and those which involve comprehensive prevention models.

The specific strategy category includes techniques usually aimed at protecting the interior of the dwelling unit and thus at deterring the crime of burglary. The installation of burglar alarms and other such anti-intrusion

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**Judging from the tables, slightly more than half of the identified strategies have been implemented, while the rest exist as proposals or recommendations. Furthermore, of the nearly 300 strategies contained in this chapter, less than 20 have undergone rigorous evaluation.

devices is a much popularized example -- although research to date has stressed that the cost-effectiveness of such devices has not been proven. Other strategies frequently suggested or employed include: The improvement of hardware used to construct and secure doors and windows, the use of lights and other devices to simulate occupancy, and identification markings for personal property to counter conversion of stolen goods.

Comprehensive crime prevention models for the residential environment -- such as those advocated by Newman and Wood -- were discussed in some detail in Section D (Contemporary Theory) of Chapter 2 and Section D (Some Strategic Models) of Chapter 3. Both the "tactical" types of strategies and the component strategies of the broader crime prevention models are outlined in Table 5-1.

TABLE 5-1. INVENTORY OF RESIDENTIAL STRATEGIES (Page 1 of 18)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
PHYSICAL								
EXTERNAL								
General Site Planning								
- Determine optimal size of building, in view of security considerations, for the population group intended as residents (for example--moderate-scale walk-ups appear most suitable for families with children while large high-rises may be optimal for families without children)	11-16		X					X
- Limit, across the board, the heights of residential buildings to enhance surveillance capacity, interaction between residents, and awareness of activity between building interior and grounds	11-16	X				X		X
- Limit or reduce the population density of residential areas and buildings to enhance residents' sense of community and sense of responsibility for maintaining security	11-16	X						X
- Emphasize a direct relationship between the building and adjacent streets and public areas to avoid isolating the building and its residents by:								
• Locating building to facilitate direct, rather than circuitous or obscured, access from street	6, 9, 11-16		X		X			
• Bringing vehicular and pedestrian traffic into the grounds	6, 9, 11-16		X			X	X	
• Enabling surveillance of streets and adjacent areas from the building	9, 11-16	X				X		
• Positioning the building so as to define its grounds and their semi-private quality	9, 11-16	X					X	
- Locate stores within residential blocks to generate activity and thus increase surveillance on the part of storekeepers and patrons during operating hours	9		X			X	X	

TABLE 5-1. INVENTORY OF RESIDENTIAL STRATEGIES (Page 2 of 18)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
Street Design								
- Direct general flow of through traffic from residential streets to give such streets an image of semi-privacy by one or more of the following means (note: may incur objections from police, as patrol car response may be interrupted):	11-16		X		X			X
• Make street one-way								
• Change texture of street (to gravel, brick, etc.) to make it less conducive to fast-moving traffic								
• Cul-de-sac the street								
• Eliminate the street and replace it with a park (e.g., sitting areas, playgrounds, gardens, etc.) the maintenance and protection of which are the collective responsibility of residents								
Design of Grounds								
- Differentiate open grounds according to a hierarchy of public/semipublic/private zones in landscaping, thus eliminating areas of "no man's land" by defining public vs. residents' right to use and fostering a sense of community and of responsibility among residents. Use such means as the following:	10, 11-16, 18		X		X			X
• Differentiate grounds by means of low walls, steps, stoops, ramps, varied levels, bushes, recessed entrances, fences, and plants								
• Create recreation areas with distinct facilities and uses (e.g., playgrounds, tennis courts, etc.) or conversation areas with seating and tables								
• Demarcate land to be used by residents to cultivate gardens								
- Use fences and walls to limit the amount of space requiring surveillance and to channel or restrain movement	10, 11-16		X		X	X		

vs.

TABLE 5-1. INVENTORY OF RESIDENTIAL STRATEGIES (Page 3 of 18)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
Eliminate visual barriers (fences, walls, bushes, etc.) for purposes of surveillance	10, 11-16		X		X			
- Design pathways across grounds so as to facilitate surveillance by users and other residents or security personnel:								
• Limit the number of pathways	11-13		X		X	X		
• Design smaller pathways to converge into one large pedestrian street	11-13		X		X	X		
• Design pathways wide to highlight their public quality	18	X				X		
vs.								
Design with various textured surfaces or various widths to suggest degree of public/private right to use	18	X				X		X
• Eliminate twists and turns or obstructions to facilitate pre-scanning	18	X				X		
• Locate facilities which will attract users alongside the pathways, so as to increase surveillance opportunities; i.e., locate seating, recreation facilities or gardens near pathways	9, 11-16, 18		X			X	X	X
• Design pathways (and adjacent activities) along the front of the building to facilitate surveillance of the lobby	11-13		X			X	X	
Security Measures								
- Provide adequate level of lighting for pathways, entries/exits, parking areas and recreation areas, etc. by means such as the following:	7, 11-16, 17		X			X		X
• Provide at least 5-10 footcandles of mercury vapor or sodium vapor light								
• Insure that lighting levels are even to avoid shadows which might afford concealment to offender								
• Provide extra light for areas used by a large number of elderly residents								

TABLE 5-1. INVENTORY OF RESIDENTIAL STRATEGIES (Page 4 of 18)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
• Install extra lighting if closed circuit TV is to be used for grounds surveillance								
• Install break-resistant plastic bulb protectors to prevent vandalism								
SURFACE								
Aperture Design								
- Limit the number of points of access/egress requiring surveillance:	7, 11-16, 17	X			X	X		
• Limit number of entry/exit doors								
• Limit number of windows on ground and top floors because of ease of access from ground or roof								
• Eliminate windows in storage rooms to limit access to them								
- Locate apertures so as to enhance surveillance opportunities:	11-16	X				X		
• Locate windows and balconies to look out onto public areas--either external (e.g., pathways, play areas, etc.) or internal (in this case, one-way transparent windows facing on lobbies or corridors)								
• Design fire-escape so as to exit on ground at points adjacent to main entrance								
vs.								
End fire-escape at second floor level, providing retractable ladder to ground								
- Enhance visibility of lobby from street by using large apertures of break-resistant, transparent materials	11-16		X			X		
- Eliminate cornices, ledges and other design elements near windows which would aid offender in entering (or altogether avoid locating apartments on the ground floor	7	X			X			

TABLE 5-1. INVENTORY OF RESIDENTIAL STRATEGIES (Page 5 of 18)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
Aperture Reinforcement								
- Upgrade materials used in the construction of doors and windows and make sure all doors and windows are tightly fitting (note: guidelines and standards are currently being developed under the LEAA Equipment Systems Improvement Program)	1, 7, 11-16, 17		X		X			
- Install optimum performance locks on all apertures (note: guidelines and standards are currently being developed under the LEAA Equipment Systems Improvement Program)	1, 7, 11-16, 17		X		X			
- Provide extra protection in the form of grills, bars, gates, etc., to: ground and top floor windows; windows adjacent to fire-escapes, stairwells or lobbies; hatches, skylights, stairwell entrances or other points of access to roof; etc.	7, 11-16, 17		X		X			
- Lock stairwell to permit entry only from the inside of building and exit only on the outside	7, 11-16, 17		X		X			
Security Measures								
- Utilize an alarm system which detects and reports intrusion of the home or residential building at points of access/egress (e.g., doors, windows, emergency exits)--select type most appropriate to particular circumstances such as:	7, 14-16, 17		X		X	X		X
• Silent alarm--notifies police, private protection agency (e.g., central station system), security guard or neighbors of intrusion (note: effectiveness of system is dependent on quick response time and absence of false alarm problem)								
• Local audial alarm--loud buzzer is set off by (1) contact, i.e., electric circuit is disrupted when position of window, door, etc. is changed, or (2) motion, i.e., circuit detects human movements (note: can function as a means of both apprehension by alerting persons nearby and deterrence by frightening off offender)								

TABLE 5-1. INVENTORY OF RESIDENTIAL STRATEGIES (Page 6 of 18)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
• Local visual alarm--functions like a local audial alarm, except that bright lights are activated								
- Install additional electronic devices such as those described below, to protect points of access/egress (note: some of the electronic surveillance devices described in the "Internal" section which follows may be applicable to surface protection as well (e.g., closed circuit TV cameras, microphones, etc.)	7, 14-16, 17		X		X	X		X
• Install hidden photo-electric cells at various points of entry to signal security guard or doorman of a person's presence								
• Install intercom system in outer area of lobby to allow residents to restrict admission to the building								
• Provide garages with self-closing doors, opened electronically from one's car by means of a coded card, key, or remote control device								
INTERNAL								
Design of Space								
- Locate and design internal elements to enhance visibility and, hence, surveillance opportunities of residents and security guards								
• Locate elevators so as to be directly visible from both the street and lobby and to open directly onto the corridors; i.e., avoid any recessed locations or blind spots	7, 11-16	X				X		
• Design stairways to exit on the main lobby	11-16	X				X		
• Avoid use of scissor stairs which cut off visibility and provide hiding places	11-16	X				X		

TABLE 5-1. INVENTORY OF RESIDENTIAL STRATEGIES (Page 7 of 18)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
• Use vandal-resistant, transparent materials, or open up space, whenever possible, to increase visibility--e.g., provide laundry room, mail room and lobby elevators with large transparent windows or doors; expose or partially expose stairways to corridors if fire safety codes permit; etc.	11-16		X			X	X	
• Use single-loaded or open corridors to provide greater surveillance from residents or law enforcement personnel outside	11-16			X		X		
- Design so as to foster in residents a private and/or communal sense of concern and responsibility for the use of internal public areas	11-16							X
• Limit the number of units sharing a corridor and the number of residents sharing a lobby, to enable residents to recognize one another and to foster a sense of social cohesion and territorial concern								
• Use means--such as varied floor or wall surfaces, steps and landings--to differentiate private and semi-private sections from those intended for public use; e.g., enhance private quality of unit entrances, differentiate between the public lobby and the hallway of ground floor residents, etc.								
- Design internal elements to congregate residents or centralize activities, in order to enhance natural surveillance opportunities and foster a sense of community								
• Limit number of laundry rooms and other facilities to ensure greater numbers of residents using it at one time	7	X					X	X
• Locate facilities (such as laundry rooms, mail rooms, day care, etc.) near active and populated sectors of the building	7	X					X	X
• Locate dwelling unit doors directly across from neighbors' doors	11-16					X		X
Security Measures								
- Utilize means of mechanical reinforcement to secure internal areas, such as:	7, 11-16, 17	X			X	X		X

TABLE 5-1. INVENTORY OF RESIDENTIAL STRATEGIES (Page 8 of 18)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
• Select and install optimum locking systems for such facilities as laundry rooms, mail rooms and mailboxes, storage and meeting rooms, as well as individual dwelling units								
• Restrict use of elevators and stairways to building residents by supplying them with keys to the locking systems								
• Construct internal doors and other facilities such as mailboxes, to be durable and tight-fitting								
• Utilize simple mechanical devices to enhance surveillance capacity--e.g., provide mirrors in lobbies or in upper back corners of elevators to prevent concealment, provide peephole interviewers in apartment doors, etc.								
- Select and install electronic visual surveillance devices in key internal locations (to be monitored centrally by security guards, management personnel, tenant security groups, or by residents in their own apartments on vacant television channels), specifically:	11-16		X		X	X		X
• Mount closed circuit TV cameras to focus on otherwise unmonitored spots in areas such as elevators, lobbies, and garages (note: such areas should be designed or altered to facilitate the use of such cameras)								
• Utilize cameras with zoom, pan and focus changing capabilities to enhance effectiveness								
• Utilize (1) recording cameras which provide film of offender to assist in apprehension, or (2) non-recording or "dummy" cameras, the effects of which are primarily deterrent								
- Select and install electronic audial surveillance devices such as the following:	1, 7, 11-16, 17		X			X		X
• Install 2-way microphones in elevators to facilitate the resident's surveillance capacity in both the corridor onto which elevator will open and the elevator into which he will enter								

TABLE 5-1. INVENTORY OF RESIDENTIAL STRATEGIES (Page 9 of 18)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
• Install microphones in apartment doors designed to stay "on" so residents may monitor hallway noises outside their apartments								
- Consider using additional electronic devices, such as those described below, to enhance security in internal spaces:	1, 7, 11-16, 17	X						X
• Install emergency buttons in elevators or facilities (or inside apartments in the case of elderly residents) to enable residents to signal security guards or management in case of emergencies								
• Design or alter elevators to include such security features as: a device to trap offenders or suspects (e.g., switch operated by lobby security guard, the elimination of "stop" buttons to prevent offender from trapping victim, etc.)								
• Provide residents with alarms to be worn on person (e.g., in form of wrist-watch) which, when activated in case of personal assault, transmit location of victim direct to police over building's power lines (note: currently being developed under the LEAA Equipment Systems Improvement Program)								
- Provide adequate level of lighting (recommendations range from 25-200 watts of fluorescent or incandescent illumination for various purposes) in lobbies, elevators, stairwells and corridors; additionally, use recessed lighting and bulb protectors to counter vandalism	7, 11-16, 17		X			X		X
SOCIAL								
POLICE/COMMUNITY PROGRAMS								
- Foster cooperative police/community relations by organizing meetings in which police and community groups discuss neighborhood crime problems and possible solutions	19		X					X
- Enlist the cooperation of the police in organizing and maintaining anti-crime community action programs which engender a sense of community and enhance security through such measures as those described below:	5, 7, 8, 12		X					X

TABLE 5-1. INVENTORY OF RESIDENTIAL STRATEGIES (Page 10 of 18)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
• Organize cooperative programs under which neighbors undertake the responsibility of watching a set number of houses or dwelling units and agree to report unusual occurrences to police								
• Organize campaigns to enlist resident support in reporting all incidents of crime and vandalism to the police								
- Institute police-conducted security education courses to:	19		X					X
• Conduct inspections of individual dwellings (of voluntary participants) to recommend security measures and dispense information on merits and use of various types of security hardware								
• Inform residents of high crime areas and time periods to be avoided								
• Enable residents to participate in program such as "Operation Identification", in which valuables are marked with social security or drivers' license number and such fact is advertised to deter potential burglars								
• Inform residents of the variety of simple methods by which property crimes may be prevented; e.g., avoiding the presence of large amounts of cash/checks in dwelling unit, simulating occupancy during absences from home, advertising one's use of hardware or other protective devices, teaching children to dial the police, etc.								
• Elicit cooperation in providing clearly visible identification of building or home to facilitate police response to incidents								
- Organize under police sponsorship, voluntary or compensatory resident security forces to perform such services as:	7		X		X	X	X	X
• Patrolling specific high crime areas								
• Maintaining stationary guard at strategic points of access to grounds or building								
• Escorting other residents								

TABLE 5-1. INVENTORY OF RESIDENTIAL STRATEGIES (Page 11 of 18)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
- Cooperate with police in setting up programs to create para-professional jobs in security for residents	6	X					X	X
• Provide educational and training opportunities in fields related to security and community organization								
• Allow residents to acquire experience and expertise through training as security aides to police or to security guard force								
OTHER SOCIAL AND EDUCATIONAL PROGRAMS								
- Organize neighborhood activities which foster a sense of community amongst residents, specifically:	7	X						X
• Provide communal recreational facilities or sponsor recreational activities such as parties and picnics								
• Organize day-care, cultural or educational centers within the community								
- Provide educational or job training and placement programs within the community	7	X					X	X
- Provide assistance from social workers to help families adjust to new environments, such as:	3		X					X
• Encourage social workers to meet with prospective residents								
• Enable social workers to bring together residents with similar needs or situations (e.g., the elderly, who are often isolated)								
• Utilize social agencies in forming and maintaining vital social assistance programs, (e.g., rent subsidizing, etc.)								
- Engage teenagers in community maintenance services and recreational supervision to imbue them with sense of responsibility and concern for their homes	6	X					X	X

TABLE 5-1. INVENTORY OF RESIDENTIAL STRATEGIES (Page 12 of 18)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
- Institute offender rehabilitation and community employment programs	7	X					X	X
- Institute tenant organizations which would allow residents to participate in decisions relating to the security of their community through:	7	X					X	X
• Setting up a reparation program in which residents caught vandalizing could repair damages								
• Setting standards for resident conduct and participating in decisions to admit or retain residents								
• Cooperating with management personnel in selecting security measures to be employed								
MANAGEMENT								
COLLECTIVE PRACTICES								
- Ascertain that minimum security provisions (in the form of performance criteria or design standards) be incorporated into local and state building codes	17	X					X	
- Mandate insurance reduction for increasing level of security	16	X					X	
- Organize or support lobbies for government incentives to encourage the private installation of security devices (e.g., tax write-off, subsidies for security equipment and guards, grants to residential blocks to increase security, etc.)	16, 17	X					X	X
- Consider and select zoning plan which best serves security needs of the community								
• Zone for diversity of residential/commercial uses	9	X					X	
vs.								
Zone areas to serve a distinct function, consolidating residential and commercial blocks	2	X					X	

TABLE 5-1. INVENTORY OF RESIDENTIAL STRATEGIES (Page 13 of 18)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
OPERATING PRACTICES								
- Screen applicants to exclude probable offenders (note: practice is vulnerable to possible discrimination charges)	7, 16	X			X			
- Include security considerations in assigning families to buildings or dwelling units								
• Segregate the elderly (subject to their consent), or assign them to least vulnerable locales (i.e., other than ground or top floors, etc.)	11-16		X					X
• Segregate problem families (note: practice must be approached with caution and monitored to limit possible exacerbation of security problems)	14-16	X						X
• Manipulate location of types of families to create greater social/economic integration	11-16		X					X
- Employ such basic security procedures as routine checks on residences of absent tenants	7	X					X	
- Utilize police or other outside experts (architects, planners, social workers, etc.) in selecting optimal security system for specific building or community needs (e.g., whether to employ private security guard, tenant security group, management personnel or local police services for handling surveillance, apprehension, record-keeping and additional security functions; determining most effective use of security personnel in relation to given physical space; anticipating possible community opposition to proposed security policies, etc.)	7	X			X	X	X	X
LAW ENFORCEMENT								
POLICE OPERATIONS								
- Investigate and evaluate various methods of patrol deployment and operation, such as those described below, and utilize methods deemed most appropriate to particular circumstances								

TABLE 5-1. INVENTORY OF RESIDENTIAL STRATEGIES (Page 14 of 18)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
• Employ "saturation" deployment to inundate high-crime neighborhood with police for limited period of time as a show of force for deterrent purposes (note: practice may alienate residents or displace offenders)	15, 17		X			X		
• Assign a special team to one detail, neighborhood, or group of apartments to integrate all patrol, traffic, community relations and detective functions	7, 17		X			X		X
• Create sub-stations to serve as base of operations on a localized, neighborhood or apartment-complex scale for regular police department forces	7		X			X	X	
• Use bicycles and scooters to patrol residential areas not accessible to patrol cars	4, 7, 17			X		X	X	
- Utilize various types of electronic technology to enhance surveillance and apprehension functions	7	X				X		X
• Monitor certain sectors by closed circuit TV (note: may arouse community opposition)								
• Employ alarms connected directly to the police precinct (note: false alarm problem may negate effectiveness)								
SECURITY GUARD OPERATIONS								
- Employ and supervise a contract security guard service (vs. voluntary resident security force, doormen or local police) to handle security functions	19		X		X	X		
- Investigate various types of surveillance functions and select type/s most required under particular circumstances	19		X		X	X		
• Utilize stationary post guard (e.g., in lobby of building, booth on grounds with view of main approach and parking facilities, etc.)								
• Utilize patrolling guard (e.g., to vertically patrol buildings, covering stairs, elevators, lobbies and corridors; to patrol on area-wide basis, covering paths, parking lots, access/egress points, trouble spots; etc.)								

TABLE 5-1. INVENTORY OF RESIDENTIAL STRATEGIES (Page 15 of 18)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
- Evaluate and selectively employ various types of deployment practices, such as the following:	19		X		X	X		
• Concentrate forces at peak hours and in trouble areas								
• Enhance visibility of guards, as mere presence may serve deterrence function								
- Train guards with respect to desired function (i.e., guards whose duties include apprehension need training in use of weapons and apprehension practices; guards with deterrent function alone, alternatively, require ability to discern danger, swiftly notify police and accurately report details, etc.)	19		X			X		
- Investigate and select law enforcement equipment to suit particular security requirements	19		X			X		X
• Use uniforms to make guards highly visible and instill pride and confidence in them								
• Use communications equipment, such as walkie-talkies, to link patrolling or stationary guards to supervisors or local police								
• Use closed circuit TV cameras and monitors to extend surveillance								
• Consider type of weapon to be used (e.g., night sticks, mace, guns) in light of severity of problem and receptivity of residents								
- Consider using trained dogs to survey large areas of the grounds or building interior at nighttime	19			X		X		
- Maintain accurate records of time, location, victim/offender and other characteristics of all crimes; compile statistics in order to discern crime trends	7	X						X
- Coordinate on a day-to-day basis all facets of the security system, (e.g., maintain all security devices, run performance checks on guards, etc.)	19	X					X	

TABLE 5-1. INVENTORY OF RESIDENTIAL STRATEGIES (Page 16 of 19)

(References)

1. Aerospace Corporation. Law Enforcement Development Group. Equipment Systems Improvement Program Development: Candidate Equipment Projects, Fiscal Year 1974. Prepared for the U,S, Department of Justice, Law Enforcement Assistance Administration, National Institute of Law Enforcement and Criminal Justice. El Segundo, CA: Aerospace Corporation, March 30, 1973.

2. California. University. Space Sciences Laboratory and Center for Planning and Development Research. Discouraging Crime Through City Planning, by Shlomo Angel. Prepared for the National Aeronautics and Space Administration. Working Paper no. 75. Berkeley, CA: University of California, February 1968.

3. Banham, Reyner. "Parkhill Revisted," Architecture Plus, 2(3):109-115, May/June 1974.

4. Boston, Mass, Mayor's Safe Streets Act Advisory Committee. Victims: A Study of Crime in a Boston Housing Project, by Deborah Blumin. Boston, MA: Mayor's Safe Streets Act Advisory Committee, 1973.

5. Brenner, R. A. Security in Multi-Family Housing: Neighborhood Watch. Paper presented at the Security in Multi-Family Housing Conference in Washington, DC, September 10-12, 1973, sponsored by the U,S, Department of Housing and Urban Development. Washington, DC: National Sheriff's Association, 1973. (Duplicated.)

TABLE 5-1. INVENTORY OF RESIDENTIAL STRATEGIES (Page 17 of 19)

(References)

6. U.S. Department of Housing and Urban Development. Career Ladder and Curriculum Guide Instructor's Manual: Housing Management, Resident Selection and Occupancy Trainee -- Resident Security Aide, Resident Security Officer, Security Officer II, Community Security Aide (Cover Title), by Center for Social Policy and Community Development, School of Social Administration, Temple University, under contract to Shaw University. Washington, DC: Department of Housing and Urban Development, April 1973.

7. U.S. Department of Housing and Urban Development. Security Planning for Multi-Family Housing: A HUD Handbook (Draft). Washington, DC: Department of Housing and Urban Development, August 1973. (Duplicated.)

8. Correspondence from the Chief of Police of the Freeport, New York, Police Department describing the "40,000 Pairs of Eyes Program." May 1974.

9. Jacobs, Jane, The Death and Life of Great American Cities. New York, NY: Vintage Books, 1961.

10. Liechenstein, Michael. Designing for Security. Paper presented at the American Institute of Aeronautics and Astronautics Urban Technology Conference, New York, NY, May 24-26, 1971. P-4633. New York, NY: The Rand Corporation, (n.d.)

TABLE 5-1. INVENTORY OF RESIDENTIAL STRATEGIES (Page 18 of 19)

(References)

11. U.S. Department of Justice. Law Enforcement Assistance Administration. National Institute of Law Enforcement and Criminal Justice. Architectural Design for Crime Prevention, by Oscar Newman; New York University, Institute of Planning and Housing. Washington, DC: Government Printing Office, March 1973.

12. Newman, Oscar. Defensible Space: Crime Prevention Through Urban Design. New York, NY: Macmillan, 1972.

13. Center for Defensible Space Design. Immediate Measures for Improving Security in Existing Residential Areas, by Oscar Newman et al. Prepared for the U.S. Department of Housing and Urban Development; U.S. Department of Justice; and Criminal Justice Coordinating Council of the Mayor's Office of the City of New York. New York, NY: Center for Defensible Space Design, 1972.

14. New York University. Institute of Planning and Housing. Project for Security Design in Urban Residential Areas -- Final Report, by Oscar Newman. Prepared for U.S. Department of Justice, Law Enforcement Assistance Administration, National Institute of Law Enforcement and Criminal Justice. New York, NY: New York University, January 31, 1973.

15. U.S. Department of Housing and Urban Developments. Office of Policy Development and Research. Division of Building Technology. A Design Guide for Improving Residential Security, by Oscar

TABLE 5-1. INVENTORY OF RESIDENTIAL STRATEGIES (Page 19 of 19)

(References)

Newman; Center for Residential Security. HUD Guideline 2. Washington, DC: Government Printing Office, December 1973.

16. Center for Residential Security Design. Design Directives for Achieving Defensible Space, by Oscar Newman. Prepared for U.S. Department of Justice, Law Enforcement Assistance Administration, National Institute of Law Enforcement and Criminal Justice. New York, NY: Center for Residential Security Design, June 1973.

17. U.S. Department of Justice. Law Enforcement Assistance Administration. National Institute of Law Enforcement and Criminal Justice. Residential Security, by Arnold Sagalyn et al. NILECJ Monograph Series. Washington, DC: Government Printing Office, December 1973.

18. Wood, Elizabeth. Housing Design, A Social Theory. New York: Citizens' Housing and Planning Council, 1961. Reprinted in Gwen Bell and Jaqueline Tyrwhitt (eds.), Human Identity in the Urban Environment, Baltimore, MD: Penguin, 1972, p. 327-351.

19. Other references and sources (including strategies suggested by Westinghouse CPTED Consortium members).

B. Commercial

This section reviews information available on strategies for the commercial mode. The section also includes narrative summaries of two techniques -- street lighting and burglar alarms -- which have been more or less documented in existing literature, and a tabulation of other techniques specifically proposed for, or applicable to, the commercial mode but not yet implemented and/or evaluated.

As is apparent from Table 5-2, there is very limited information on this subject (i.e., a paucity of data on the crime impact of programs which were actually implemented and evaluated). The preponderance of commercial strategies exist as speculative suggestions (such as those advanced by Luedtke and Angel) or as unfunded, unexecuted proposals (such as many of those covered by the Impact Cities Program). While local governmental agencies may be sponsoring anticrime programs appropriate for the commercial environment, documentation on these programs could be difficult to obtain if, indeed, such documentation existed.

A further informational problem arises from the lack of geographical or target specificity of many of the control programs which have been implemented and documented. That is, relatively few programs address themselves to specifically commercial crimes or specifically commercial environments.

TABLE 5-2. INVENTORY OF COMMERCIAL STRATEGIES (Page 1 of 15)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
PHYSICAL								
EXTERNAL								
General Site Planning								
- Cluster commercial establishments so that those with similar operating hours are located together, thus avoiding what Angel calls the "zone of critical intensity" (i.e., the number of people too small to deter crime but large enough to attract criminals)	2, 13	X					X	
vs.								
Diversify land use along commercial strips to attract different types of people at different times, thus encouraging a continual flow of pedestrians throughout the day and evening	2	X					X	
- Locate those business enterprises or other facilities which attract potential offenders (i.e., teenage hangouts, bars) in the midst of heavily trafficked areas, where surveillance is maximal	22	X				X	X	
vs.								
Isolate those business enterprises or other facilities which attract potential offenders	6	X					X	
- Eliminate space for on-street parking to maximize opportunities for police surveillance	13	X				X		
- Centralize parking facilities so that customers need not traverse relatively deserted areas and provide clearly marked and/or lighted pathways from parking to stores	2	X				X	X	
- Locate public transit stops in the center, rather than at the periphery, of strip, with clearly marked and/or lighted pathways to stores	2	X				X	X	
- Install bus shelters and create mini-plazas at key transit stops to encourage usage and minimize hazards (supplement by improved bus scheduling)	22	X					X	X

TABLE 5-2. INVENTORY OF COMMERCIAL STRATEGIES (Page 2 of 15)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
Street Design								
- Close off streets to create pedestrian arcades, malls, or parks which both concentrate pedestrians for surveillance purposes and restrict access/egress to area	13		X		X	X		
vs.								
Provide both front and rear vehicle access to commercial strips to facilitate police patrol (note: may also serve to facilitate offender access)	17		X		X	X		
- Use limited street closings to channel vehicular traffic into strip area; e.g., close off streets providing access from residential areas	22	X			X			
- Link commercial activity nodes to adjacent residential areas by converting selected streets into "safe-passage corridors", secured by a combination of strategies (e.g., intensified police patrol, upgraded lighting and other physical modifications, etc.)	22	X				X	X	X
Design of Pedestrian Ways								
- Situate and design walkways so as to concentrate pedestrian flow at optimum density for deterrent purposes	2	X				X		
- Provide amenities (e.g., benches, shrubs, etc.) to encourage pedestrian access to undertrafficked area	6		X			X	X	
- Use barriers (e.g., walls, fences, etc.) to restrict pedestrian access to undertrafficked area	17, 18		X		X			
- Use barriers, transition points, graphic signs, lighting, etc. to clearly differentiate public pedestrian ways from vehicular routes and private areas	6	X			X			X
- Eliminate blind corners, alleys, etc. which may provide concealment for would-be offenders	3, 7, 13, 17	X				X		

TABLE 5-2. INVENTORY OF COMMERCIAL STRATEGIES (Page 3 of 15)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
Security Measures								
- Upgrade street lighting from incandescent to high power mercury or sodium vapor on an area-wide basis (note: Kansas City study has indicated street lighting may be more effective in commercial environment than elsewhere, particularly against robbery and assault)	21			X		X		X
- Provide supplementary lighting in high risk areas (e.g., vacant lots, alley ways, selected streets, etc.)	22	X				X		X
- Install emergency phones or other citizen alarm devices to enhance surveillance, as well as to improve citizens' sense of security (note: in experimental stage in City of West New York--thus far, false alarm and vandalism problems have been experienced)	22		X			X		X
SURFACE								
Aperture Design								
- Minimize number of accessible doors and windows needing to be secured vs. Make abundant use of strategically located transparent apertures to increase visibility of store interior by police patrol or passersby	3, 9, 15, 17, 22	X			X			
	9, 10, 17	X			X	X		
- Locate and design all customer and service entrances/exits to give the user a clear view of outside activity as he exits	10	X				X		X
- Eliminate external obstructions to visibility of apertures, such as bushes, hedges, walls, etc.	3, 6, 7, 10, 13, 17	X				X		
Aperture Reinforcement								
- Upgrade materials used in construction of doors, e.g., steel doors, and windows, e.g., Luxon glass (note: guidelines and standards are currently being developed by the LEAA Equipment Systems Improvement Program)	1, 9, 10, 11, 14, 18		X		X			

TABLE 5-2. INVENTORY OF COMMERCIAL STRATEGIES (Page 4 of 15)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
- Install optimal locking system (note: guidelines and standards are currently being developed under the LEAA Equipment Systems Improvement Program)	1, 9, 10, 11, 14, 18		X		X			
- Provide additional reinforcement (grills, bars, shutters, etc.) for such vulnerable openings as windows, transoms, ventilation outlets, etc.	9, 10, 11, 14, 16		X		X			
- Restrict access to delivery area by means of fences, padlocked gates, etc.	9, 10, 17, 18		X		X			
Security Measures								
- Utilize an alarm system which detects and reports intrusion of the establishment, select type most appropriate to particular circumstances:	4, 5, 14, 17		X		X			X
• Silent alarm--transmits alarm directly to police through privately leased telephone line (note: severe false alarm problem may impair police effectiveness)								
• Central station alarm--similar to silent alarm in function and drawbacks, but connects directly to an installation owned and operated by a commercial protection agency								
• Local audial alarm--emits loud sounds to both frighten intruder and alert passers-by to summon the police (note: effectiveness depends almost entirely on the psychological disposition of the burglar and the presence/willingness to act of passers-by)								
• Local visual alarm--activates a flashing sign directly outside business, alerting passers-by to summon police (e.g., "EMERGENCY! Robbery in Progress! Dial POLICE at 911 immediately!")								
- Use peripheral lighting, possibly in conjunction with aperture reinforcement measures, to both deter and detect offenders--select appropriate system from such types as:	13, 18		X			X		X
• Continuous intersecting floodlights around the exterior walls of the structure								

TABLE 5-2. INVENTORY OF COMMERCIAL STRATEGIES (Page 5 of 15)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
• Glare lights at vulnerable doors, windows and other points of entry								
• Manually or electronically triggered lights								
INTERNAL								
Design of Space								
- Locate centers for large monetary transactions (e.g., cash registers, check cashing booths, safes) near windows or otherwise in view of maximum number of customers, passing pedestrians, patrolling police, employees	22	X				X		
vs.								
Conceal or isolate financial centers to avoid attracting criminal attention	11	X			X			
- Use changes of level (balconies, mezzanines, stairways, ramps) and other circulation elements to increase visibility from one part of the interior to another	22		X			X		
- Minimize public circulation to remote or obscured spaces conducive to criminal acts against employees, customers or property	22		X		X	X		
Security Measures								
- Utilize mechanical reinforcement means whenever practical to secure strategic storage or monetary centers, such as:	1, 9, 10, 11, 14		X		X			
• Limit access to storage area for valuables through use of appropriate locks (e.g., electrically coded, timed or sequentially keyed locks)								
• Reinforce walls and doors throughout interior, particularly those leading to storage areas								
• Provide protection for employees handling large sums of money by installing bullet proof glass booths, metal cages, etc.								
• Protect monies by providing appropriate and immobile storage facilities (i.e., install vault, embed safe in cement, avoid transportable cash box, etc.)								

TABLE 5-2. INVENTORY OF COMMERCIAL STRATEGIES (Page 6 of 15)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
• Limit accessibility of cash through use of hardened cash register which reads value of inserted bill and issues exact change--eliminating opening of cash drawer (note: currently being developed under LEAA Equipment Systems Improvement Program)								
- Install employee-activated alarm systems--primarily effective against robbery--such as the following (note: these and other human-activated alarms exhibit the potential drawback of inciting the offender to harm the victim):	14, 19		X				X	X
• Cooperative alarm system--victim activates alarm received by employee at another business, who in turn notifies the police								
• Automatic dial alarm system--when activated by victim, sensor activates device which automatically dials police or community answering service and submits pre-recorded emergency message, address, etc.								
- Employ surveillance devices--generally human operated--such as the following (note: such devices are subject to vandalism):	11, 14		X			X		X
• Automatic cameras (may (1) run continually, in which case film is not developed unless an incident occurs, or (2) produce a single picture when an individual approaches a strategic location, e.g., a teller's cage or cash register, which can aid police investigation and produce deterrent effects								
• Mirrors, ceiling peep holes and door viewers--although generally employed against shoplifting and employee pilferage, these devices may also serve, in larger retail or wholesale establishments, to extend the surveillance capacity management personnel against the crime of robbery								
- Maintain an adequate level of nighttime interior illumination (in combination with unobstructed visibility through display windows) to both facilitate police patrol observation of burglaries in progress and discourage most burglaries other than the smash-and-grab variety.	10, 14, 22		X			X		X

TABLE 5-2. INVENTORY OF COMMERCIAL STRATEGIES (Page 7 of 15)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
SOCIAL								
POLICE/COMMUNITY PROGRAMS								
- Institute a mechanism for periodic building security inspections in which especially trained police officers survey premises for security problems, providing written recommendations to owners/managers (note: program has been implemented in Oakland and Monterey, California, among other sites)	3, 7, 17		X				X	X
- Institute a mechanism for security technology evaluation and counseling sessions in which police officers with special expertise inform interested businessmen of appropriate technologies for particular applications	7		X				X	X
- Institute police-sponsored public education programs (e.g., seminars, media campaigns, distribution of information) to advise businessmen of burglary, robbery, and theft precautions (note: the Los Angeles Police Department's anti-robbery information distribution serves as an example)	3		X				X	X
- Establish police-sponsored "Operation Identification" programs involving the etching of business identification numbers on items of value and displaying decals advertising the fact that items are so marked (note: has been implemented in residential premises; usefulness in the commercial environment not established but believed to hold potential for both deterrence and apprehension efforts)	1, 3		X				X	
- Establish police-sponsored "Reparations" programs in which offenders convicted of a "commercial" offense would incur an obligation to "work off" their sentence in a job specified by agreement between police or correctional agency and commercial "victim"; the job may be designed to improve the commercial environment (note: such a program implemented in Philadelphia with vandalism offenders seems to be effective; however, may be legally questionable, inadvisable for older offenders or resisted by the business community)	22		X				X	X
- Establish a police "storefront" to enhance police community relations (and increase efficiency of patrol and investigative functions)	22	X					X	X

TABLE 5-2. INVENTORY OF COMMERCIAL STRATEGIES (Page 8 of 15)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
OTHER SOCIAL AND EDUCATIONAL PROGRAMS								
- Improve community attitudes towards local businesses (thus possibly leading to corrective prevention and/or citizen surveillance and action against crime) by educating public users of the commercial environment in crime prevention measures:	22	X					X	X
• Hire personnel from surrounding community to improve community relations								
• Provide incentives for employees to participate in local community affairs (e.g., through school programs, organized softball teams, cultural events, etc.)								
• Provide special services (e.g., discount pricing, delivery service, day care facilities) to disadvantaged population groups and publicize these services								
• Participate in or initiate local school programs dealing with the operations of a business, career opportunities in business (as exemplified by the Philadelphia Parkway "School Without Walls" Program)								
• Provide job training program for ex- or would-be offenders and/or agree to hire a number of such persons (as practiced by Ford Motor Co. and other large industrial concerns)								
• Provide customers with security advice or 'equipment', e.g., distribute police whistles and instruct customers on their use (as practiced in several neighborhoods in New York City and other cities)								
• Enlist neighborhood youth programs in physical improvement projects for commercial area								
• Increase cooperation between local businesses and area residents by such means as: promoting joint business/residential sponsorship of community activities; encouraging use of commercial malls, arcades, etc. for activities of local resident groups; establishing "safe refuge" homes along major arteries to commercial nodes, etc.								

TABLE 5-2. INVENTORY OF COMMERCIAL STRATEGIES (Page 9 of 15)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
• Establish a currency substitution program through local banks and business associations, to discourage local residents from carrying substantial amounts of cash and enable them to advertise their "cashlessness"								
• Provide safe, reliable public transportation to elderly or infirm users through coordination with local jitney (e.g., Dial-A-Bus) programs								
MANAGEMENT								
COLLECTIVE PRACTICES								
- Hire a security advisor to work with local business (and residential) organizations	22	X					X	
- Pool financial resources to hire security guard for entire block or strip or institute other security precautions (e.g., the Bergen Street Merchant Association's program in Newark)	22		X				X	
- Initiate a kind of business "buddy system" whereby adjacent businesses are cooperatively alarmed, agree to report suspicious behavior on each others' premises, etc.	20		X				X	X
- Cooperate with neighboring businesses in taking explicit measures to project an identity and image of solidarity and defensibility (e.g., use of graphics advertising security measures undertaken, general rehabilitation/upkeep of area, upgrading of lighting, etc.)	22		X				X	X
- Work through local merchant's association to encourage new businesses to locate in area	22	X					X	X
- Encourage establishment of incentives for businesses to adopt sound security measures	22	X					X	

TABLE 5-2. INVENTORY OF COMMERCIAL STRATEGIES (Page 10 of 15)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
OPERATING PRACTICES								
General Procedures								
- Restrict access during peak robbery hours (i.e., late afternoon and evening) by requiring customers to ring doorbell for admittance (note: practical only for smaller, specialty businesses, such as jewelry stores)	22	X			X			
- Coordinate, if possible, opening and closing hours with those of neighboring businesses to maximize number of witnesses available in event of robbery	5	X				X	X	
- Avoid, if possible, having lone employee on premises during peak robbery periods, as inexperienced or opportunistic offenders may be deterred by presence of additional witness	22	X					X	X
- Provide psychological deterrents to both burglary and robbery by advertising security precautions (e.g., premises protected by attack dog)	22	X					X	
Cash Handling								
- Avoid accumulation of large amounts of cash, if possible, by encouraging use of credit cards; requiring exact change after certain hours (e.g., gas stations); depositing cash supply promptly in bank or other secure location; limiting check cashing service; etc.	10	X					X	
- Vary procedures in handling cash (e.g., do not make bank deposits regularly on the same day at the same time) to remove crime opportunity	11	X					X	
- Diversify locations of cash used during operating hours to delay commission of robbery, allowing additional time for police notification and response	11	X					X	
Employee Practices								
- Instruct employees on appropriate procedures in case of robbery to minimize risk of personal injury and increase likelihood of apprehension	3, 10, 19		X				X	X

TABLE 5-2. INVENTORY OF COMMERCIAL STRATEGIES (Page 11 of 15)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
- Encourage employees to observe and report suspicious behavior	10, 19		X					X
- Hire personnel specially trained in security practices (cost-effective only for larger businesses)	10		X				X	
- Provide key employee (e.g., manager, switchboard operator) with work space suited to surveillance (e.g., opposite cash register, or on mezzanine level) and equip with alarm, phone or other means of summoning police in case of robbery	10		X			X	X	
LAW ENFORCEMENT								
POLICE OPERATIONS								
- Investigate and evaluate the comparative utility of alternative modes of patrol (e.g., foot, motor scooter, patrol car, etc.) and apply mode deemed most effective in terms of cost, scale, speed of response, area coverage, and characteristics of the environment	22		X			X	X	X
- Investigate and evaluate various types of patrol deployment techniques, such as the following, and apply the technique deemed most effective:								
• Employ saturation patrol by; for example, maximizing number of foot police (both uniformed and plainclothes) during peak robbery periods and, particularly where street crimes tend to cluster (note: such strategy has been implemented and evaluated in New York City and Washington, D.C.; some crime reduction but also displacement effect observed)	8, 16			X		X		X
• Employ "stake out" techniques by, for example, using plainclothes or decoy police (i.e., police dressed as old women, hippies, etc.), stationed in high crime commercial areas (note: technique is widely implemented, though only substantiated effect--i.e., Philadelphia study--has been an increase in arrests)	22			X		X	X	X

TABLE 5-2. INVENTORY OF COMMERCIAL STRATEGIES (Page 12 of 15)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
• Use helicopter patrol in combination with lighting for surveillance of large-scale commercial areas after dark (note: it is of questionable utility in areas where pedestrian/vehicle traffic is densely concentrated)	22		X			X	X	
- Tailor police operations to the environment through recognition of particular environment, for improved policing potential	22	X					X	X
SECURITY GUARD OPERATIONS								
- Employ security guard/s and/or dogs to provide surveillance and protection of premises during operating hours and/or after closing, as deemed appropriate	Several		X			X	X	
- Coordinate security guard operations with local police	22	X					X	
- Use various communications or surveillance techniques to extend security guard capabilities	Several		X			X	X	

TABLE 5-2. INVENTORY OF COMMERCIAL STRATEGIES (Page 13 of 16)

(References)

1. Aerospace Corporation, Law Enforcement Development Group. Equipment Systems Improvement Program Development; Candidate Equipment Projects, Fiscal Year 1974. Prepared for the U,S. Department of Justice, Law Enforcement Assistance Administration, National Institute of Law Enforcement and Criminal Justice. El Segundo, CA: Aerospace Corporation, March 30, 1973.

2. California. University. Space Sciences Laboratory and Center for Planning and Development Research. Discouraging Crime Through City Planning, by Shlomo Angel. Prepared for the National Aeronautics and Space Administration. Working Paper no. 75. Berkeley, CA: University of California, February 1968.

3. California Council on Criminal Justice. Selected Crime Prevention Programs in California. Sacramento, CA; California Council on Criminal Justice, March 1973.

4. Cedar Rapids, Iowa. Police Department. Installation, Test, and Evaluation of a Large-Scale Burglar Alarm System for a Municipal Police Department -- Second Phase Completion Report. Prepared for U.S. Department of Justice, Law Enforcement Assistance Administration, National Institute of Law Enforcement and Criminal Justice. Cedar Rapids, IA: Cedar Rapids Police Department, December 1971.

5. GTE Sylvania Incorporated. Security Systems Department. An Evaluation of Small Business

TABLE 5-2. INVENTORY OF COMMERCIAL STRATEGIES (Page 14 of 16)

(References)

and Residential Alarm Systems, by T.P. Chleboun and K.M. Duvall. 2 v. Prepared for U.S. Department of Justice, Law Enforcement Assistance Administration. M-1442. Mountain View, CA: GTE Sylvania Incorporated, June 1972.

6. Chicago, Ill. Mayor's Committee for Economic and Cultural Development. 51st and State: A Pilot Security Plan for Inner City Commercial Centers, by Environmental Planning and Research, Inc. Chicago, IL: Environmental Planning and Research, Inc., 1972.

7. Fabbri, John. "Crime Prevention -- Before or After the Fact," FBI Law Enforcement Bulletin, 42(1):20-24, January 1973.

8. Hall, G.E., and S.A. Lindgren. Washington, DC Urban and Suburban Crime Interaction. sented at the Metropolitan W. :ton Crime Conference, New Carrolton, MD. Sept. 13, 1971.

9. Healy, R.J. Design for Secu. . New York, NY: Wiley, 1968.

10. Hemphill, C.F., Jr. Security for Business and Industry. Homewood, IL: Dow Jones-Irwin, 1971.

. Hughes, M.M. (ed.). Successful Retail Security: An Anthology. Los Angeles, CA: Security World Publishing, 1973.

12. Jacobs, Jane. The Death and Life of Great American Cities. New York, NY: Vintage Books,1961.

13. Luedtke (Gerald) and Associates. Crime and the Physical City, by Gerald Luedtke et al.

TABLE 5-2. INVENTORY OF COMMERCIAL STRATEGIES (Page 15 of 16)

(References)

Prepared for U.S. Department of Justice, Law Enforcement Assistance Administration, National Institute of Law Enforcement and Criminal Justice. Detroit, MI: Gerald Luedtke and Associates, 1970.

14. Mandelbaum, A.J. Fundamentals of Protective Systems: Planning/Evaluation/Selection. Springfield, IL: C.C. Thomas, 1973.

15. Panhandle Regional Planning Commission. A Study of Building Codes as Related to Crime Prevention, by Peat, Marwick, Mitchell and Company. Prepared for U.S. Department of Housing and Urban Development, and for Texas Criminal Justice Council. Amarillo, TX: Panhandle Regional Planning Commission, September 1972.

16. New York City Rand Institute. Some Effects of an Increase in Police Manpower in the 20th Precinct of New York City, by S.J. Press. R-704-NYC. New York, NY: The Rand Corporation, October 1971.

17. Southern California Association of Governments. Handbook of Crime Prevention Bulletins: Crime Prevention Through Physical Planning. Los Angeles, CA: Southern California Association of Governments, September 1971.

18. U.S. Department of the Army. Physical Security. FM 19-30. Washington, DC: Department of the Army Headquarters, February 17, 1965.

TABLE 5-2. INVENTORY OF COMMERCIAL STRATEGIES (Page 16 of 16)

(References)

19. U.S. Congress. Senate. Crime Against Small Business. A Report of the Small Business Administration Transmitted to the Select Committee on Small Business. S. Rept. 91-14, 91st Congress, 1st Session, 1969.

20. Weber, T.L. Alarm Systems and Theft Prevention -- An Expert Says: "Think Like a Thief." Los Angeles, CA: Security World Publishing, 1973.

21. Michigan. University. Impact of Street Lighting on Street Crime, by Roger Wright et al. 2 v. Prepared for U.S. Department of Justice, Law Enforcement Assistance Administration, National Institute of Law Enforcement and Criminal Justice. Ann Arbor, MI: University of Michigan, May 1974.

22. Other references and sources (including strategies suggested by Westinghouse CPTED Consortium).

The Rand study of the effects of increasing police manpower in New York City, for example, did center on a precinct of mixed commercial/residential land use, but no effort was made in the study to sort out commercial crimes from residential ones, or to evaluate crime patterns on an intraprecinct level (e.g., by predominantly commercial versus predominantly residential blocks).

Finally, a large amount of the conventional wisdom in the area of prevention techniques (e.g., "install burglarproof locks, standard doors, window gratings) has never been subjected to any kind of rigorous testing. Such security manuals (of which there are many) as "Security for Business and Industry" and "Fundamentals of Protective Systems" offer recommendations formulated by the authors' common sense and personal experience but provide little empirical proof of the efficacy of the recommended techniques. While it seems sensible to conclude that better locks will impede criminal entry, the extent to which "impediments" constitute "preventions" remains largely undetermined. Unfortunately, the few attempts that have been made to implement this kind of common sense target hardening on any large scale (e.g., the Oakland Business Security Code) were not sufficiently systematic to provide solid support for this approach to commercial crime control.

Because of these problems, "proven" strategies against commercial crimes are few in number. The remainder of this section summarizes two strategies against commercial crime that have been documented in criminological literature, and provides a classification of the known

strategies that have been suggested, proposed, and implemented, but not evaluated.

1. Alarm Systems. The most authoritative study of the effectiveness of commercial burglar alarm systems appears to be that conducted by the Cedar Rapids Police Department under a NILECJ grant in 1969-1970. Although various other studies treat the subject in more technological detail (e.g., "An Evaluation of Small Business and Residential Alarm Systems," Sylvania; "Proceedings of the 1973 Carnahan Conference on Electronic Crime Counter Measures"; Underwriters Laboratory reports), these studies are of limited use to the present Program, since they tend to hypothesize the effectiveness of alarm systems as a whole and then simply evaluate the performance characteristics of the different types of systems. The Cedar Rapids Study, in contrast, was not concerned with comparing types of alarm systems but, rather, with comparing the crime experience of "alarmed" with "nonalarmed" businesses.

Briefly, the program involved the installation of simple, inexpensive silent alarm systems in 350 statistically selected businesses throughout the city. Businesses were selected on the basis of previous burglary experiences and were (in approximately 200 cases) matched with control businesses of a similar nature and crime experience but without alarms.

The conclusions reached by the study were basically favorable regarding the efficacy of burglar alarms. Chiefly, however, it should be

noted that the burglar alarms installed in Cedar Rapids served primarily to increase the effectiveness of police operations; improved response rate was reflected in significantly higher arrest and clearance rates. The alarms did not appear to act as deterrents. In fact, the experimental alarmed businesses were burglarized more often than the nonalarmed but similar businesses -- which suggests that burglar alarms may not be properly considered crime "prevention" devices. (Data gathered for other studies [e.g., the SBA Report] also indicate that businesses with alarms are victimized more often than those without, but since businesses with serious crime problems are most likely to install alarms, no conclusions about the efficacy of alarms can be drawn from this kind of data.)

Finally, with regards to the appropriateness of alarm systems for the CPTED Program, one must consider that any system aimed purely at the crime of burglary is unlikely to have the kind of areawide effect that one might wish the program to have. Burglar alarms seem unlikely to affect the level of street crime in an area; furthermore, there is no indication that the presence of one alarmed business on a block renders neighboring unalarmed businesses any more secure. While alarm systems can also be installed to be victim-activated (e.g., for robberies), the usefulness of this function remains largely untested. Also, it must be noted that the false-alarm rate, although treated optimistically in the Cedar Rapids Study, is so severe for most existing systems that several police departments have relegated business alarms to the lowest priority response.

2. Street Lighting. Among studies which deal with the effectiveness of street lighting on crime, only the recent Kansas City Study has made a serious attempt to sort out the effect of the lights according to the type of area in which they were installed. The study examined the effects on nighttime crime of upgrading street lighting from incandescent to mercury and sodium vapor along approximately 500 blocks in selected high-crime commercial and residential areas in Kansas City. Crime data for the selected areas for the year preceding the program's initiation (October 1971) were compared with those for the following year (1972-1973); in addition, the latter data were compared with data from a sample of nonrelit blocks.

In brief, the study found that improved street lighting appeared a more effective deterrent to crime in commercial areas than in residential ones. In particular, the improved lighting reduced crimes of violence -- robbery and assault -- than against property crimes. Among property crimes (burglary, larceny, auto theft), only burglary of commercial -- not residential -- establishments evidenced a statistically significant decline in the relit areas during the test period. The study also attempted to analyze the displacement effect of the program, but the analysis was not clearly explicated and the results, consequently, appear obscure.

There are also, predictably, methodological problems with the study but, in spite of the problems, the study remains the most systematic examination thus far of the anticrime capabilities of street lighting encountered.

C. School

This section summarizes available information regarding the range of CPTED-related strategies against crime in the school mode. As is apparent from Table 5-3 and the bibliographical listing which follows this narrative, information in this area is even more limited than for the other environmental modes.

Strategies listed in the table are principally derived from two LEAA-funded research reports based upon surveys of local school districts and State-level boards of education. The reports are: "A Survey of Techniques Used to Reduce Vandalism and Delinquency in Schools," and "Other Recommendations for Phase III in Criminal Justice Programs and Planning." As is suggested by their titles, these works concern a wide spectrum of antisocial behavior, ranging from simple misdemeanors to the very serious CPTED target crimes. Consequently, security countermeasures for the school environment appear to encompass an extremely broad spectrum of preventive functions, deterring everything from graffiti inscription to aggravated assault. For example, an improved external lighting program around school grounds may be designed to deter youthful vandals from damaging school property, but may also foreclose the opportunity to commit assault in previously darkened spaces.

A large number of school crime prevention strategies in fact consist of target-hardening techniques aimed at protecting school property; however, less traditional strategies aimed at protecting persons are also finding application in the school environment. The United

Federation of Teachers (UFT), for example, recently authored and distributed a booklet aimed at increasing the personal security of individual students, teachers, secretaries, paraprofessionals, and other school employees. Unfortunately, there is no information available to indicate the extent to which UFT recommendations have been implemented or the effect they may have had. In fact, two observations seem to hold true of school anticrime strategies in general: (1) Applied strategies appear to vary greatly from one school district to another, and (2) scant information exists regarding the effectiveness of strategies that are applied.

TABLE 5-3. INVENTORY OF SCHOOL STRATEGIES (Page 1 of 10)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
PHYSICAL								
EXTERNAL								
Design of Grounds								
- Eliminate high shrubbery or trees which prevent school administrators from viewing activity on school grounds	4, 8		X			X		
- Locate drinking fountains on school grounds and at some distance from buildings to minimize motivation of youngsters to enter school during non-use hours	8		X				X	
Security Measures								
- Use mechanical means, such as the construction of wire fences, to fortress entire school complex, i.e., buildings, appurtenances, recreational areas, athletic fields, etc. (note: such fortressing may create more of a psychological barrier than a physical one, as youngsters can climb over a wire fence)	3, 10		X		X			
- Install citizen call boxes which provide user, through the "911" or other toll-free citizen alarm system, with immediate contact to police dispatcher (note: risk of vandalism may be prohibitively high)	5							X
- Use means of electronic surveillance (e.g., closed circuit television cameras) to monitor critical areas, such as bicycle compounds and parking lots	11	X				X		
- Provide improved lighting for school grounds, i.e., parking areas, student walkways, recreational areas, etc.	5, 8, 10		X			X		X
SURFACE								
Design Measures								
- Eliminate possible footholds on or near all exterior wall surfaces (e.g., garbage compactors, alarm boxes, rubbish bins, window sills, fire ladders, lighting fixtures, trees, fence connections, etc.) to foreclose entry opportunity through roof openings	2, 4		X		X			

TABLE 5-3. INVENTORY OF SCHOOL STRATEGIES (Page 2 of 10)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
- Minimize number of doors, windows and other apertures to reduce access points requiring surveillance and control	2, 4		X		X			
- Avoid locating windows or other glass surfaces near doors to prevent breaking of glass to reach inside for door handles	7	X			X			
Aperture Reinforcement								
- Utilize means of mechanical reinforcement to secure apertures:								
• Brick up door and window spaces which are frequently used as illegal entry points	10		X		X			
• Install screens on skylights, or replace with hard-to-remove plastic domes, to minimize entry opportunity through roof	10		X		X			
• Upgrade materials used in construction of windows (e.g., replace with break-resistant glass or transparent plastic) and doors (e.g., use heavier materials, remove glass panels, etc.)	4, 5, 7, 8, 10			X	X			
• Weld hinge pins on doors with external hinges to foreclose entry opportunity (note: this would force offender to work on lock, which should also be reinforced)	4		X		X			
Security Measures								
- Install alarm system at access/egress points to detect intrusion:								
• Install local audible alarm which, when activated, emits loud signal to alert passers-by, custodian, or police patrol and, possibly, to force offender to flee (note: effectiveness to some extent is dependent on citizens' willingness to report to police)	2, 6, 8, 10	X			X			X
vs.								
Install silent alarm which, when activated by sonar, radar or microwave detection of motion automatically dispatches signal to central monitor (e.g., principal's office, police dispatcher or contract security firm (note: primary function is apprehension, rather than deterrence; must be supported by rapid response)	2, 4, 8, 10			X	X			X

TABLE 5-3. INVENTORY OF SCHOOL STRATEGIES (Page 3 of 10)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
- Install peripheral lighting at access/egress points to deter intrusion and provide sense of security	5, 8, 10	X				X		X
INTERNAL								
Design of Space								
- Eliminate or redesign all isolated spaces, deep recesses, cul-de-sacs and other areas conducive to crime (e.g., dark corridors, spaces enclosed under stairwells, etc.)	4, 8, 9		X			X		X
- Eliminate any transoms, louvres, or other unnecessary internal openings which would provide illegal means of entering classrooms, offices, and special purpose rooms	5, 8, 10		X		X			
- Relocate such elements as teacherplanning areas, administrative facilities, custodial areas, coaches' offices, etc. to enable surveillance of certain areas like locker rooms, athletic fields, restrooms, etc. where assaults are likely to occur	11	X				X	X	
- Provide in centralized areas high value modules or secure storage areas for high value equipment--such as audio-visual equipment, shop tools, musical instruments, food stores, and office equipment	11	X			X			
Security Measures								
- Secure high value storage areas (and other vulnerable areas such as cafeteria, athletic facilities, etc.) against property crimes, by using means such as the following:								
◦ Reinforce by mechanical means such as: steel or concrete construction materials, ceiling-high steel gates to seal off portions of the building, improved and/or keyless locking systems, etc.	5, 8, 10			X	X			
◦ Secure by installation of motion detector or other suitable alarm system	11	X			X			

TABLE 5-3. INVENTORY OF SCHOOL STRATEGIES (Page 4 of 10)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
• Restrict access to such areas to authorized personnel by use of system which grants access by coded, programmable card lock and emits silent signal if locking device is tampered with	4	X			X			
- Protect students, teachers, administrators and others from personal assault through use of electronic security devices, i.e.,								
◦ Install visual surveillance equipment, such as closed circuit television cameras to monitor halls, classroom lavatories, etc.	4	X				X		
• Install audial surveillance system (e.g., microphones which enable principal's office to monitor lavatories, classrooms, halls, etc.)	8	X				X		
• Provide telecommunications system (e.g., 2-way intercom which enables teacher to call office if assistance is needed)	2, 8	X						X
• Provide personal alarm system to school personnel, e.g., pocket-size transmitter which sends silent signal to main office when activated in case of threat (note: system may include digital code to identify location of alarm)	4, 9		X					X
◦ Employ hand-held portable transceiver units to provide communication capability between school administration, hall security monitors, security guard and police	4, 5, 8		X			X		X
- Improve lighting in high value storage sectors and spaces occupied by personnel working late hours (note: one could prevent tampering by removing light control boxes from public areas)	5, 8, 10		X			X		X
SOCIAL								
POLICE/SCHOOL LIAISON PROGRAMS								
- Draw upon police assistance in the development of a total security program:								

TABLE 5-3. INVENTORY OF SCHOOL STRATEGIES (Page 5 of 10)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
• Institute police-conducted security surveys of school buildings and grounds to point out key problem areas and suggest countermeasures	1, 2 10		X					X
• Establish programs to acquaint students with role of police in the community and increase police/student understanding and cooperation (note: current programs range from "Officer Friendly" type to instruction in criminal codes and local criminal justice practices)	1, 2, 10			X			X	X
SCHOOL/COMMUNITY PROGRAMS								
- Encourage use of school facilities by community groups during evening hours to forestall illegal activities or vandalism (note: evidence on effectiveness is mixed)	2, 8			X			X	
- Organize volunteer security aide groups, e.g., parents who function to maintain order during school hours or survey school facilities during non-use hours	10		X			X	X	X
- Cooperate with local recreation departments or other community groups to provide leisure time activities for students after school hours	9		X				X	X
- Develop school/community service programs (characterized by joint participation of school and social welfare agencies to assist alienated youths, delinquents, underachievers, etc.)	9		X				X	X
- Develop work study/new careers program in which community businesses and industries provide job training opportunities to acquaint youth with various employment alternatives	8		X				X	X
- Institute neighborhood security advisory committee, composed of parents, students, teachers, security personnel and neighborhood residents, to develop cooperative relations and positive actions on security matters	11	X					X	X
INTERNAL PROGRAMS								
- Initiate activities which directly involve students in school total security program, i.e,	11	X					X	X

TABLE 5-3. INVENTORY OF SCHOOL STRATEGIES (Page 6 of 10)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
• Use student activity clubs to assist in the storage of high value equipment								
• Train students to act as monitors of hallways, grounds, etc.								
• Initiate peer counseling program, under student leadership, in which high school students work with younger students to increase social cohesion; reduce fear, develop positive attitudes toward school, etc.								
- Use educational films or other programs to increase student perception of school crime problem--its extent, how it affects them, how they can help	11		X				X	X
- Initiate program to develop socially relevant curriculum (note: this is operative in many U.S. school systems; courses include human relations and desegregation issues, social and family living, social issues, etc.)	2			X			X	X
- Initiate specialized education program to develop course content, teaching methods, course sequences, etc. geared to special social needs (e.g., vocational and technical training, alternative education, drug abuse programs, tutor/student advocacy programs, etc.)	2			X			X	X
- Sponsor pre-school programs to develop positive attitude patterns in early years	8		X				X	X
- Provide delinquent and pre-delinquent identification programs	8			X			X	X
- Provide program to increase teacher understanding of and constructive relations with problem children	2			X			X	X
- Provide social/psychological services to redirect maladjusted children through testing, guidance and counseling	2			X			X	X
- Schedule extra-curricular activities to involve majority of students, thus enhancing social cohesion	11		X				X	X

TABLE 5-3. INVENTORY OF SCHOOL STRATEGIES (Page 7 of 10)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
MANAGEMENT								
COLLECTIVE PRACTICES								
- Develop school department legal codes to provide policy guidance on such issues as school security measures, codes of conduct and student rights, treatment of students committing criminal acts, use of police on school grounds	2, 9, 10		X				X	X
- Develop model security guidelines, to include design specifications for future school complexes or school remodeling programs	11	X					X	X
- Develop model crime reporting system to facilitate analysis of crime problems by environmental locale, type of loss, etc.	11	X					X	X
OPERATING PRACTICES								
- Employ an identification card system to challenge non-authorized persons on school grounds and in buildings	6		X		X			
- Identify high value school property (e.g., audio-visual equipment, typewriters, shop tools, etc.) by special electric engraving, distinctive casing or special imprint to reduce theft of articles	11	X						X
LAW ENFORCEMENT								
POLICE OPERATIONS								
- Utilize patrol by uniformed patrol officers in marked vehicles to deter or challenge potential offenders on school grounds	2		X			X		X
- Employ uniformed auxiliary officers to patrol school grounds, particularly at night, observing and reporting to police by radio	2		X			X		
- Use plainclothes detectives assigned to schools, particularly where serious crime and drug traffic exist	2		X					X

TABLE 5-3. INVENTORY OF SCHOOL STRATEGIES (Page 8 of 10)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
- Employ police rapid response system in order to apprehend detected burglars and thieves and, secondarily, to deter potential offenders	11	X						X
SECURITY GUARD OPERATIONS								
- Evaluate various security personnel plans and employ that which best serves school's surveillance, protection and order-maintenance requirements, i.e.,								
• Use school department security personnel to patrol grounds and buildings, during and after school hours	5, 6, 8, 10		X			X		
• Use canine attackers or watchdogs in conjunction with trained security personnel during non-use school hours	5, 8, 10		X		X	X		
• Enable school custodian and his family to set up residence in school building, equipped with means of reporting crime (note: effectiveness depends on the school complex's scale and lay-out)	8			X		X		X
• Stagger custodial personnel hours to provide around-the-clock occupancy of the school building	5, 8			X		X	X	X

TABLE 5-3. INVENTORY OF SCHOOL STRATEGIES (Page 9 of 10)

(References)

1. Michigan, Department of State Police. The Evaluation of a Police-School Liaison Program, by D.H. Bouma et al. Prepared for the U.S. Department of Justice, Law Enforcement Assistance Administration, National Institute of Law Enforcement and Criminal Justice. East Lansing, MI: Department of State Police, October 21, 1970.

2. Alabama, University. Strategies for Delinquency Prevention in the Schools and Other Recommendations for Phase III in Criminal Justice Programs and Planning, by S.L. Brodsky and R.D. Knudten. Prepared for U.S. Department of Justice, Law Enforcement Assistance Administration, National Institute of Law Enforcement and Criminal Justice. University, AL: University of Alabama, 1973.

3. Educational Resources Information Center. ERIC Clearinghouse on Educational Management. School Security, by Nan Coppock. Educational Management Review Series no. 23. Eugene, OR: University of Oregon, October 1973.

4. Educational Facilities Laboratories, Inc. Designing Schools to Minimize Damage from Vandalism and Normal Rough Play. Schoolhouse Newsletter no. 15. New York, NY: Educational Facilities Laboratories, Inc., 1974.

5. Stanford Research Institute. School Vandalism: A National Dilemma, By Bernard Greenberg. SRI Project no. 077531-034. Menlo Park, CA: Stanford Research Institute, October 1969.

TABLE 5-3. INVENTORY OF SCHOOL STRATEGIES (Page 10 of 10)

(References)

6. Slaybaugh, D.J. "School Security Survey (1973)," School Product News, 12(6):10-14, June 1973.

7. National School Boards Association. Educational Policies Service. School Board Policies on School Safety and Security. School Board Policy Development Kit no. 73-34. Evanston, IL: National School Boards Association, July 1973.

8. Research Analysis Corporation. Public Communications and Safety Department. A Survey of Techniques Used to Reduce Vandalism and Delinquency in Schools, by H.C. Olson and J.B. Carpenter. Prepared for U.S. Department of Justice, Law Enforcement Assistance Administration, National Institute of Law Enforcement and Criminal Justice. RAC-CR-26. McLean, VA: Research Analysis Corporation, January 1971.

9. United Federation of Teachers. Security in the Schools: Tips for Guarding the Safety of Teachers and Students. New York, NY: United Federation of Teachers, 1973.

10. National School Public Relations Association. Vandalism and Violence: Innovative Strategies Reduce Cost to Schools, by Elmer Wells. A special report by the staff of Education U.S.A. Arlington, VA: National School Public Relations Association, 1971.

11. Other references and sources (including strategies suggested by Westinghouse CPTED Consortium members).

D. Transportation

Inasmuch as a decision was made relatively early in the CPTED Program to focus crime prevention efforts in the transportation mode on local rail stations, the strategies contained in Table 5-4 pertain only to that type of transportation environment. Available literature affording information on crime prevention and control strategies for the local rail environment fails into two general categories: (1) Published and circulated reports, primarily issued by studies funded by the Urban Mass Transportation Administration (UMTA); and (2) materials prepared by or for the various individual rail transit systems. Salient characteristics of the body of literature -- its relative recentness and its diverse and unsystematized nature -- actually serve as indicators of the status of the strategies themselves.

1. UMTA Reports. The UMTA-sponsored reports provide ample evidence of the recent growth of concern over crime in rail transit systems but suggest that actual efforts directed against crime -- particularly those involving physical design and electronic technology -- are only now emerging from the initial stages of development. The Vandalism and Passenger Security study of 1973, in its reportage of anticrime techniques that have been proposed or employed, represents the beginnings of a body of knowledge. A wide variety of methods are discussed in the report, but these are in large part untested; many have yet to be adapted and applied to transit environments, and very few (generally only security personnel practices) have been systematically evaluated.

TABLE 5-4. INVENTORY OF TRANSPORTATION (LOCAL RAIL STATION) STRATEGIES (Page 1 of 21)

STRATEGY DESCRIPTION	REFERENCES	STATUS: RECOMMENDED	STATUS: IMPLEMENTED	STATUS: EVALUATED	DESIGN CONCEPTS: ACCESS CONTROL	DESIGN CONCEPTS: SURVEILLANCE	DESIGN CONCEPTS: ACTIVITY SUPPORT	DESIGN CONCEPTS: MOTIVATION REIN.
PHYSICAL								
EXTERNAL								
- Maximize the transit station's inherent role as a generator of economic and social activity and hence, of pedestrian traffic and natural surveillance opportunities (note: designers of new and future systems have exploited this potential--i.e., in San Francisco, Montreal, Washington, D.C., Atlanta, etc.), including:	3, 4, 12		x				x	x
• Encourage the location of commercial recreational, transportation interface and other joint-use activities in the immediate environs of transit stations								
• Provide, where feasible, amenities such as benches, trees, fountains, telephones, concessions and play areas to exploit station potential as social generator								
- Utilize standardized design, to the extent possible, at each station site in order to increase patron familiarity and, hence, sense of predictability and security and to reinforce behavior in using the system, specifically:	3, 4, 12		x			x		x
• Use standardized, easily identifiable and highly visible marking at each site (supplemented at nighttime by effective illumination)								
• Use clear, standardized graphics on signs, maps, and diagrams to make station approaches attractive								
- Maximize the visibility from surrounding environments of approaches to the station and bring sense of street activity to the station by means such as open spatial design and the provision of wide, direct pedestrian ways	3, 4, 12		x					x

TABLE 5-4. INVENTORY OF TRANSPORTATION (LOCAL RAIL STATION) STRATEGIES (Page 2 of 21)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
SURFACE								
Design of Access/Egress Points								
- Keep entrance and exit points, and other apertures, to a minimum (preferably only one or two) to create a relatively closed system that would limit unlawful penetration and escape opportunities (note: problems with BART underground stations having 4-9 accessways were predicted by pre-operations security survey study)	3, 6, 8, 13, 18	X			X			
- Eliminate at elevated stations any features allowing illegal access/egress (e.g., install high fencing to prevent access from contiguous rooftops, etc.)	19	X			X			
- Enhance visibility and, hence, surveillance opportunities of users at all points of access/egress, i.e.,								
• Locate all entrances/exits so as to be visible from the street	4, 6, 8, 18		X			X		
• Locate all exits so as to be visible from any area of the station platform or lobby	13		X			X		
• Use transparent materials whenever feasible to enclose outdoor walkways and entry/exit points and to form end walls, roofs, windbreaks, kiosks or any other elements which define the station's surface (note: As BART survey has suggested, extensive use of glass may entice vandals--hard transparent plastic or tested break resistant glass should be used)	3, 6, 9, 13		X			X		
• Provide "daylight" level of glare-free illumination to minimize visual adjustment required by transition from outdoors to indoors (e.g., use skylights at entry/exit points, as implemented by BART and Washington METRO systems; use wide, open construction of stairs and other access ways to permit penetration of sunlight, as implemented by BART and Boston MBTA systems; etc.)	3, 4, 12		X			X		
• Provide orientation and enhance surveillance by increasing level of illumination to highlight turnstiles or other fare collection equipment	4, 9	X				X		

TABLE 5-4. INVENTORY OF TRANSPORTATION (LOCAL RAIL STATION) STRATEGIES (Page 3 of 21)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
Fare Collection Methods								
- Control access by means of fare collection method deemed optimal in terms of passenger flow, type of services, and cost-effectiveness, as well as security considerations, i.e.,								
• Use regular turnstile at attended entrances (note: tall, possibly transparent, barriers or anti-vaulting devices may be used as supplements, but they may interfere with passenger flow and operations).	6, 9		X		X			
• Locate all fare collection areas within purview of station agent, whose surveillance capabilities may be further enhanced by locating agent's booth in a transparent kiosk, affording a 360 degree surveillance of fare collection and waiting areas (as implemented in Washington and Montreal METRO's), or by the provision of mirrors	Several		X			X		
• Eliminate all exchange of cash through fully automatic revenue collection, with ticket and transfer vendors and changemakers (note: Due to relatively recent and limited implementation of automatic fare collection methods, opinions vary widely with regard to overall cost-effectiveness, the gravity of operational difficulties, etc.--PATCO claimed great success, while BART has had negative experiences)	10			X	X			
• Insure that automatic fare collection methods be complemented by closed circuit television surveillance, alarms, and information/aid communications equipment, plus emergency electronic monitoring of vending machines and gates by the station agent or television monitor	3, 6, 9, 13, 17			X		X		
• Supplement automatic fare collection with credit/ID cards	10	X					X	
• Further supplement by deducting extra fee "time penalty" from credit cards, to discourage loitering within the system	13	X					X	
- Keep platforms, stairs, lavatories, public facilities and concessions within paid area to discourage loitering within system and resultant use of the system as a staging area for crime vs.	6, 18		X				X	

TABLE 5-4. INVENTORY OF TRANSPORTATION (LOCAL RAIL STATION) STRATEGIES (Page 4 of 21)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
Keep concessions in free area only--never on platform--to facilitate flow of passengers and prevent congestion (note: free area location may keep offenders who operate in concession areas out of the system altogether)	9		X				X	
Exit-Blocking Measures								
- Utilize EXIT blocking devices to prevent escape (as well as unlawful entry) through exit points								
• Close off extra entrances/exits after peak hours with aesthetically pleasing but impenetrable, easily closed, locked and maintained security gates	6, 8, 9, 14		X		X			
• Use turnstiles for egress, supplemented by wide pass gates for emergency exits	8, 9		X		X			
• Provide for emergency remote control locking of exit points to cut off escape, and remote control opening to permit exit of passengers in emergency	6, 8, 14, 17		X		X			
vs.								
Allow possibly dangerous offender to escape from within but provide means at exit for future identification of offender (e.g., automatic videotaping, spray paint marking, etc.)	6, 8, 14	X			X			X
• Enable station agent to reverse escalator to thwart escaping offender	13		X		X			
- Utilize alarms activated by station agent to block offender's escape, i.e.,								
• Employ silent-transmitting alarm which, when activated by hand- or foot-switch in agent's booth, sends emergency signal to police headquarters	6, 8, 10, 14, 15		X					X
• Install street level signal lights which, when activated by agents, produce blinking beams to alert police in nearby patrol cars	15	X						X
- Utilize "intrusive detection" or "perimeter protection" devices to alert transit personnel of unlawful entry (and thus, imminent escape attempt)								

TABLE 5-4. INVENTORY OF TRANSPORTATION (LOCAL RAIL STATION) STRATEGIES (Page 5 of 21)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
• Install devices which detect and silently signal presence of offender in yard, storage track or other nonpublic areas (e.g., audio, motion or vibration detectors; radar; photo-electric cells; etc.)	6, 9, 13, 14, 17		X			X		X
• Install "local audible" alarms which buzz or ring to call attention to unauthorized activity (note: as these alarms may startle or further enrage a violent offender, they are best applied in nonpublic areas only--however, similar alarms installed at automatic fare collection points and emitting loud squawks in case of evasion have been found to be effective by the PATCO system)	6, 14, 17		X			X		X
INTERNAL								
Open Space Design								
- Maximize amount of open, unobstructed or uncomplicated space to provide clear, unbroken visibility for passengers, collection booth agents, kiosk employees and law enforcement personnel (note: this guideline is basic to the Washington METRO design), i.e.,								
• Eliminate any structural columns, advertising display panels or other visual barriers which clutter lobbies, platforms or passageways	Several		X			X		
• Keep fences, platform barriers, etc. low in height; alternatively, use open gridwork on higher portions, or break-resistant transparent materials (note: while low and open barriers enhance surveillance, the BART security survey stressed that these features may afford access/egress to offenders by permitting easy scaling or vaulting)	6, 10, 18		X		X	X		
• Provide high, clear-span vaulted ceilings (e.g., the arch construction first used in the Washington METRO station design) for clear sightlines (note: this also facilitates optimal location of closed circuit TV cameras)	6, 8, 13, 14		X			X		
• Keep stations at maximum of 2 levels to facilitate direct surveillance by law enforcement and station agents (note: Montreal and Washington METRO's combine mezzanine and platform areas in one open space	8, 13		X			X		

TABLE 5-4. INVENTORY OF TRANSPORTATION (LOCAL RAIL STATION) STRATEGIES (Page 6 of 21)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
• Make maximum use of open construction for stairs, ramps and escalators (or enclose with transparent materials)	4, 6, 9		X			X		
Circulation Path Design								
- Design to simplify and clearly define internal circulation paths, minimizing spaces requiring surveillance by directing passengers into certain areas								
• Simplify circulation paths, to extent possible, and indicate by use of well-placed directional signs, lighting, color-coding, etc.	4, 8, 9, 13, 14		X			X		
• Avoid twisted or dog-legged corridors to eliminate concealed spaces, blind corners, etc.	3, 6, 9, 13		X			X		
• Avoid reverse stair landings (or completely enclose the space between back to back stairs to eliminate hiding places)	9, 18		X			X		
• Use island, rather than side, platforms to provide a single area straight-through and direct vertical circulation patterns and to facilitate law enforcement response to incidents (note: a recent Chicago transit study found no evidence to indicate that island or side platforms induce or reduce crime, or positively influence response time)	1, 4, 6, 8, 9, 13, 14		X			X		
Passenger Density Control								
- Provide measures which encourage the congregation or dispersion of passengers to achieve optimal density for deterring crime and to keep passengers within controllable premises (note: "optimal" density cannot be conclusively defined, as (1) each type of crime may require a different density for deterrence, e.g., lack of overcrowding to discourage pursesnatching, pickpocketing, and assault, but presence of bystanders to discourage murder, rape, robbery, etc., and (2) there exists no guarantee, within the anonymous, desocialized and superficial situations in public transit usage, that the mere presence of other passengers will result in witnessing, intervention, or even deterrence--therefore, the measures described below must also be considered desirable in that they keep passengers within areas which permit surveillance control by transit and law enforcement personnel), i.e.,								

TABLE 5-4. INVENTORY OF TRANSPORTATION (LOCAL RAIL STATION) STRATEGIES (Page 7 of 21)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
• Adapt platform size to passenger density by closing off portions at off-peak hours with movable barriers (preferably transparent) or remote controlled gates	6, 8, 14, 17	X				X		
• Congregate passengers in certain portions of waiting areas and platforms during off-peak hours by (1) clearly designating by signs, color coding or enhanced lighting certain "safe areas", (2) providing localized platform rather than total station heating (also discourages loitering), and (3) indicating definite platform loading areas (note: end loading points congregate passengers and eliminate blind spots, while multiple loading points at peak hours disperse and facilitate flow of passengers)	6	X				X		
• Completely close off all unused or non-public spaces, including train tunnels, to eliminate unsupervisable, unobservable spaces; reduce number of waiting rooms and platforms to a minimum; perhaps eliminate all lavatory facilities	Several		X			X		
• Locate phones, lockers and lavatories in centralized, easily supervised areas	4, 8		X			X		
• Include commercial concessions to increase passenger activity and surveillance	8, 14		X			X	X	
vs.								
Eliminate concessions, which impede passenger flow (pursesnatch and pickpocket opportunities), offer readily available cash targets, etc.	13		X				X	
vs.								
Include concessions but place out of circulation paths, in areas which can be readily controlled by personnel	8, 9		X				X	
Mechanical Reinforcement								
- Further regulate passenger flow into controlled premises by mechanical means such as the following:								

TABLE 5-4. INVENTORY OF TRANSPORTATION (LOCAL RAIL STATION) STRATEGIES (Page 8 of 21)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
• Use simple structural methods, such as fixed fences or barriers of optimal height, secure locking systems on all doors, and one-way gates, etc. (note: one must eliminate features which permit easy scaling or by-passing, e.g., mesh materials with large openings, horizontal bars or doorhandles which provide footholds; proximity to parapets or stairway walls which facilitates climbing; slack in chain link fence which allows crawling under, etc.)	Several		X		X	X		
• Provide only airplane-type, single occupancy lavatories or limit public access by requiring key kept by station agent to prevent loitering and use of facilities as a staging area (note: BART provides remote control locking by station agents, while Philadelphia's SEPTA loans key on deposit)	1, 3, 6, 8, 14		X		X			
- Further protect passengers and employees from property and violent crimes by measures such as the following:								
• Provide lockers and safes for passengers' and employees' valuables	6,		X		X			
• Provide alarm-equipped booths in waiting areas in which threatened persons can lock themselves (note: such booths may allow offenders to trap victims)	8	X			X			
• Construct collection booths of bullet-proof or heavy cinderblock material, with break-resistant windows and bank trays, and consider recessing in wall to lessen exposure	6, 8, 11		X		X			
• Employ revenue collection procedures which discourage employee robbery--e.g., employ pneumatic tubes to prevent build up and exposure of money; collect currency frequently by armored or special rail car, employing private security company, etc.	8, 9, 10	X					X	
- Counter vandalism and its demoralizing effects by:								
• Use of damage-resistant, easily cleaned materials for surfaces, stairways, benches, etc. (note: new materials for transit application are currently being developed)	6, 8, 9, 11		X					X

TABLE 5-4. INVENTORY OF TRANSPORTATION (LOCAL RAIL STATION) STRATEGIES (Page 9 of 21)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
• Recess of passageway and platform walls beyond reach to thwart graffiti artists (note: this is incorporated in design of all new Washington METRO stations)	13		X		X			X
- Provide a "secure room" at each station to serve as first aid and detention/ interview facility	3	X					X	
Electronic Communications Equipment								
- Extend the capacity of passengers to promptly report the commission or suspicion of criminal activity to transit system or law enforcement personnel by providing an efficient, cost-effective combination of the following devices in strategic locations throughout mezzanines, passageways and waiting areas (note: such devices speed up provision of assistance to the victim and apprehension efforts; in addition, their visible presence in the system may serve to bolster passengers' psychological sense of security and deter potential offenders):								
• Install public pay phones which have a no-deposit, direct line to police or transit headquarters, possibly on a self-locating basis	6, 10, 14		X					X
• Provide clearly marked, conveniently located emergency phones or call boxes, preferably self-locating and on independent lines, possibly monitored by station agent	6, 7, 9, 17		X					X
• Install on platforms, stairs, ramps and in turnstile areas silent-transmitting alarms, activated by passenger emergency button or bar to alert security patrol, police headquarters, station agent and/or closed circuit television monitor	6	X				X		X
- Enhance transit employees' role in security efforts by providing for their use an optimal combination of the following devices:								
• Install transit system phones in collection booths or kiosks and throughout the facilities which directly link station agents and traffic supervisors, company head-quarters, security patrols and dispatch, and/or public address system	6, 8, 9, 13, 14, 19		X					X

CONTINUED

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TABLE 5-4. INVENTORY OF TRANSPORTATION (LOCAL RAIL STATION) STRATEGIES (Page 10 of 21)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
• Install public address system, to enable station agent or closed circuit television monitor to address passengers and employees throughout entire station (or in restricted areas during emergency)--i.e., to issue warning to passengers, to inform offender he is under surveillance, to assure victim that help is forthcoming, etc.	6, 8, 9, 14, 17, 18		X			X		X
• Employ public address system at entry points to broadcast message to passengers, advising them of existence of various security devices and providing instructions for their use (note: while such message may aid public relations by reassuring patrons of management concern, it may produce negative effects--i.e., serve to magnify passengers' perception of the severity of the crime problem; issue a challenge to offenders; etc.)	6	X						X
• Employ train annunciators (buzzers or bell) or signal lights, activated by station agents (or automatically) to enable passengers to remain in areas subject to surveillance near access point until train arrival	6, 13, 14, 15		X			X		X
• Provide any closed circuit TV monitor (local or central) with communication links (i.e., phones, alert signals, etc.) to station agents and/or law enforcement dispatchers and patrols	6	X				X		X
- Provide for 2-way communications between passengers and transit employees, i.e.								
• Equip passenger-activated alarms or phones with such capacity	6	X						X
• Install 2-way intercoms at fare collection facilities (note: serves both to detect and reprimand fare evaders and to assist in cases of user difficulty or mechanical malfunction)	10, 17		X					X
- Install and test communications devices considering possible interference with voice or electronically transmitted messages due to noise levels, acoustical difficulties or other obstructions; minimize interference to the extent possible (note: lowering of noise level also serves to reduce adverse psychological effects on passengers and personnel--the new Washington METRO system utilizes cushioned tracks, continuously welded rails, sound-absorbent panels, etc to greatly reduce noise level)	6, 8, 13		X					X

TABLE 5-4. INVENTORY OF TRANSPORTATION (LOCAL RAIL STATION) STRATEGIES (Page 11 of 21)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
Electronic Surveillance Equipment								
- Use visual surveillance systems typified by closed circuit television to extend surveillance capacities of transit and/or law enforcement personnel (note: two conditions in particular may prohibit proliferation of such systems--(1) installation, maintenance and monitoring are costly and (2) CCTV camera effectiveness is precluded by design of many existent stations, e.g., by low ceilings, nooks and crannies, obstructive posts, etc.), i.e.,								
• Extend coverage over entire system of stations or limit to high crime stations; and then cover entire station area or only problematic locales	Several		X			X		X
• Monitor system of closed circuit TV cameras on central console (note: necessitates laying of coaxial cable)	6	X				X		X
vs.								
Monitor cameras in each station locally at station ticket agent booth, providing agent with direct line to law enforcement dispatchers (note: eliminates necessity of coaxial cable and increases manageability of system, as well as enhancing security of ticket booth)	19	X				X		X
• Install non-recording cameras (including possible "dummy" cameras)	Several		X			X		X
vs.								
Install videotape cameras which record events for future investigation, indiscriminately or when activated by emergency alarm or monitor control	6, 8, 14	X				X		X
• Equip videotape cameras monitored at station agent booths with instant replay features to apprise law enforcement personnel of incident upon their arrival	6	X				X		X
• Equip monitor's console with automatic pattern recognition or motion detection capacities which reduce both monitor fatigue and required manpower	6, 14	X				X		X
• Enable monitor to activate pan, tilt, zoom and other camera features to locate and zero in upon incident or offender	6	X				X		X

TABLE 5-4. INVENTORY OF TRANSPORTATION (LOCAL RAIL STATION) STRATEGIES (Page 12 of 21)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
- Use audial surveillance systems, typified by microphones (with or without recording capacities) to enhance transit and or law enforcement personnel's surveillance capacity								
• Install microphones in locations, such as areas closed to the public or low density passenger areas, where competing noise levels are low	8, 17	X				X		X
• Install microphones which are activated if station booth door is opened, to alert transit or law enforcement headquarters to listen in for potential trouble	6, 19		X			X		X
- Combine visual and audial surveillance systems (as well as design and communications features) in erecting on station platforms "observation posts" (note: construction of one-way transparent material facilitates direct surveillance of immediate area, while electronic equipment affords indirect surveillance of remaining areas)	14	X				X		X
Lighting								
- Maintain at least minimum adequate level of illumination for each type of station area (i.e., mezzanines, passageways, platforms, stairways, etc.) to maximize visibility (note: IRT provides guidelines for each type of area)	Several		X			X		X
- Standardize illumination levels for similar areas, but use variations to add interest to the environment and provide orientation by highlighting certain areas (e.g., turnstiles, directional signs and maps, circulation paths, telephone and alarm facilities, etc.)	4	X				X		X
- Consider using various features which yield both optimal illumination level and maximal vandal resistance (note: these features are being included in the New Washington METRO stations)	13		X			X		X
• Directly illuminate passageways with incandescent lights located in recessed cylinders in ceiling								

TABLE 5-4. INVENTORY OF TRANSPORTATION (LOCAL RAIL STATION) STRATEGIES (Page 15 of 21)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
• Provide indirect, glareless light at platforms by illuminating walls with fluorescent tubes recessed in channel between wall and platform surfaces								
• Illuminate elevated platforms by day (using skylight through resistant, transparent plastic) and by night (using incandescent tubes, recessed in canopy, and vandalproof globes atop pylons)								
SOCIAL								
- Develop cooperation with the public and with other outside interests (note: since local rail stations function as public facilities, utilized for transitory periods by persons who are for the most part total strangers, social measures to foster a sense of community or collective responsibility in this environment are largely inapplicable--rather, these measures are basically of a public relations nature, aimed at eliciting passengers' good will and cooperation with transit security policies while using the system), i.e.,								
• Conduct public relations program to insure that users are aware of and utilize surveillance/communication equipment or other strategies that are introduced	6		X					X
• Elicit public attitudes on transit crime problems and security policies through surveys, interviews, etc. and manifest an effort to respond to these attitudes (note: unless crime problems and anti-crime measures are brought to public attention with subtlety and after careful consideration, perception of the rail system as a dangerous place may only be magnified)	6, 7, 8, 19			X				X
• Enlist public support by offering rewards to those passengers who report crimes or acts of vandalism	14			X				X
• Coordinate with schools, museums, recreation departments, commercial firms and other public and private organizations in planning joint use of transit facilities for such activities as cultural displays, citizen participation projects, to increase passengers' interest and pride in system (note: this is commonly practiced in foreign systems; notably, Montreal, Toronto, Paris, and Mexico City)	8, 14		X				X	X

TABLE 5-4. INVENTORY OF TRANSPORTATION (LOCAL RAIL STATION) STRATEGIES (Page 14 of 21)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
• Use such measures as film presentations on the detrimental effects of vandalism to elicit cooperation of school-age passengers and other user groups	6, 14, 15, 17		X					X
• Train law enforcement personnel in propitious methods for dealing with the public	3		X					X
• Elicit cooperation of the media in presenting positive image of transit system security to the public	2, 14		X					X
MANAGEMENT								
PERSONNEL PRACTICES								
- Encourage "incidental" surveillance by employees and stress the importance of their general contribution to creating passenger perception of local rail as a safe environment; e.g., encourage motormen, conductors and station agents to act as observers and reporters of crime	3, 6, 14, 17		X			X		X
- Employ at all times at least one attendant per station for public relations and security practices; consider completely freeing station agent from activities other than interface with the public and surveillance of the station (note: importance of "humanizing" the desocialized environment of local rail is particularly stressed by BART and Washington METRO systems)	3, 4, 6, 8		X			X	X	X
vs.								
Reduce personnel expenditures by using fully automated fare collection, surveillance and communications methods at unmanned entrances	3, 4, 6, 8, 9, 14		X			X		X
OPERATING PRACTICES								
- Maintain well-kept and usually pleasant facilities (e.g., BART uses soft "cheerful" colors to engender pacifying effect) to increase passengers' sense of well-being and, possibly, to discourage acts of vandalism	Several		X					X
- Provide climate control for optimum passenger comfort so that assaultive-type incidents triggered by temper flare-ups, impatience, etc. may be minimized	13		X					X

TABLE 5-4. INVENTORY OF TRANSPORTATION (LOCAL RAIL STATION) STRATEGIES (Page 15 of 21)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
- Develop cooperative relationship with local police	2, 9, 14		X					X
vs.								
Set up separate transit system security force (note: majority of U.S. systems have own force; however, a BART security plan report advises that a special security force should be maintained only when limited capacity of local police or multiple governmental jurisdictions will not allow local departments to handle security problems)	2, 3, 9, 14		X					X
LAW ENFORCEMENT								
- Increase the effectiveness of law enforcement personnel by various deterrence, response and apprehension tactics and develop means of evaluating results of these efforts (note: in the local rail environment, the same law enforcement functions are served, and the same strategies are employed, by local police as by transit security forces--thus, the measures outlined below are applicable to both types of personnel)								
DEPLOYMENT								
- Achieve maximum deterrence capability through evaluating alternative deployment modes as outlined below, and employing most effective mode(s):								
• Periodically increase the number of one- or two-member patrol units, as a "show of strength"	5, 6, 12, 17		X			X		X
• Employ random patrol	11		X			X		X
• Employ flexible deployment schedule, increasing or diminishing forces without notice over time periods of varying length, to achieve "phantom effect"	5, 6, 14			X		X		X
• Apply flexible deployment in high crime stations or station areas--or in areas lacking electronic surveillance and communications	6		X			X		X
• Use special tactics--e.g., stake-out, plainclothes patrol, etc. (note: while such tactics are frequently employed by various systems, no conclusive evidence of their efficacy has emerged)	5, 6, 14, 19		X			X		X

TABLE 5-4. INVENTORY OF TRANSPORTATION (LOCAL RAIL STATION) STRATEGIES (Page 16 of 21)

STRATEGY DESCRIPTION	REFERENCES	STATUS			DESIGN CONCEPTS			
		RECOMMENDED	IMPLEMENTED	EVALUATED	ACCESS CONTROL	SURVEILLANCE	ACTIVITY SUPPORT	MOTIVATION REIN.
• Use dogs on patrol (note: several systems have experimented with use of dogs on trains or in stations--however, due to difficulties with passenger acceptance, dogs seem best employed for control of yards and non-public areas)	6, 8, 10, 12, 14		X			X		X
• Adapt patrol practices to compensate for station features (e.g., concentrate patrol at remote, recessed spaces; at vulnerable apertures; etc.) or to support other strategies (e.g., link with electronic surveillance system, etc.)	6	X				X		X
TECHNOLOGY								
- Increase rate of apprehension and shorten response time through use of electronic equipment:								
• Enhance communication with portable 2-way radios and improved frequency transmission on UHF frequencies (note: absence of radio communication in subways and impeded communication in above-ground portions pose considerable problem for effective law enforcement in most systems)	6, 8, 9, 14, 17, 19			X				X
• Install lossy line to enable walkie-talkies to transmit in subway portions of the systems	6, 14			X				X
• Provide phones for police patrol and head-quarters use (preferably a 2-way multiplex with independent lines)	6, 14		X					X
• Consider automatic monitoring, tape recording, and notation of time placed of all emergency calls for future identification and follow up	4	X						X
- Assess crime problems and evaluate strategies by accumulation of an adequate and pertinent data base, i.e.,								
• Utilize an environmentally related reporting procedure	5, 6, 14, 17		X				X	
• Utilize computerization to store and analyze crime data	6, 13, 14		X				X	

TABLE 5-4. INVENTORY OF TRANSPORTATION (LOCAL RAIL STATION) STRATEGIES (Page 17 of 21)

(References)

1. American Transit Association. Vandalism and Passenger Security: A Study of Crime and Vandalism on Urban Mass Transit Systems in the United States and Canada, by J.B. Schnell et al. Prepared for U.S. Department of Transportation Administration. Washington, DC: American Transit Association, September 1973.

2. Young (Arthur) and Company. A Report on the Requirements for Establishing a Metro Security Program. Prepared for the Washington Metropolitan Area Transit Authority. Washington, DC: Arthur Young and Company, December 1972.

3. Keith Bernard; Director of Marketing and Research, San Francisco BART System, San Francisco, California; telephone conversation and forwarded materials: (a) Arthur Young and Company. "A" Line Security Survey. Prepared for San Francisco Bay Area Rapid Transit. Sacramento, CA: Arthur Young and Company, December 1972. (b) _____. A Report on the Interim BART Security Plan. Prepared for San Francisco Bay Area Rapid Transit. Sacramento, CA: Arthur Young and Company, August 1972.

4. Massachusetts Bay Transit Authority. MBTA Manual of Guidelines and Standards, by Cambridge Seven Associates, Inc. 10 v. Cambridge, MA: Massachusetts Bay Transit Authority, December 1966.

5. New York City Rand Institute. The Impact of Police Activity on Crime -- Robberies on the New

(References)

York City Subway System, by Jan M. Chaiken et al. Prepared for City of New York Bureau of the Budget. R-1424-NYC. New York, NY; The Rand Corporation, January 1974.

6. (a) Loss Prevention Diagnostics, Inc. Three Solutions in Reduction of Criminal Opportunity in Mass Transportation. A Selection of Devices and Techniques to be Demonstrated in Mass Transportation. Prepared for City of Chicago, Department of Public Works, Transit Security Study. Caldwell, NJ; Loss Prevention Diagnostics, Inc., June 15, 1973.

(b) Carnegie-Mellon University. Transportation Research Institute and Urban Systems Institute. Improvement of Mass Transit Security in Chicago. A Report to the City of Chicago Department of Public Works Recommending Specific Security Measures for Demonstration on Chicago Transit Authority Facilities. Pittsburgh, PA; Carnegie-Mellon University, June 30, 1973.

(c) Chicago, Ill. Department of Public Works. Transit Security Study -- Final Report. Prepared for U.S. Department of Transportation, Urban Mass Transit Administration. Chicago, IL: Department of Public Works, December 17, 1973.

(d) Golden, Harry, Jr. "C[hicago] T[ransit] A[uthority] Crime Facts in Detail," Chicago Sun-Times, June 30, 1974.

(e) _____. "C[hicago] T[ransit] A[uthority] Train Crime Risk 10 Times That on Buses," Chicago Sun-Times, June 30, 1974.

(References)

(f) _____. "Improve C[hicago] T[ransit] A[uthority] Patrol: Simon," Chicago Sun-Times, July 1, 1974.

(g) Chicago, Ill. Department of Public Works. Phase II -- Transit Security System for the City of Chicago -- Application of the City of Chicago to the Urban Mass Transportation Administration for a Demonstration Grant under the Urban Mass Transportation Act of 1964 as Amended. Chicago, IL: Department of Public Works, July 1974.

7. Metropolitan Washington Council of Governments. Department of Public Safety. Comparative Evaluation of Public Safety Services in Selected Metropolitan Areas with Rapid Rail Transit Systems. Washington, DC; Metropolitan Washington Council of Governments, February 1974.

8. Carnegie-Mellon University. Transportation Research Institute. A Methodology for Developing Security Design Criteris, by O.L. Harris, Jr. CMU TRI-TP-71-04. Pittsburgh, PA: Carnegie-Mellon University, October 1971.

9. Institute for Rapid Transit. Moving People Safely: Safety Guidelines for Urban Rapid Transit Systems. Sections 3("Security"); 5("Lighting"); 9("Public Telephones and Communications"); and 10("Concessions"). January 1974.

10. Korach, R.S. P[ort] A[uthority] T[ransit] CO[rporation]'s Experience with Unmanned Stations and an Automatic Fare Collection System. Paper presented at the Institute for Rapid Transit

TABLE 5-4. INVENTORY OF TRANSPORTATION (LOCAL RAIL STATION) STRATEGIES (Page 20 of 21)

(References)

Annual Conference, Fare Collection Subcommittee Meeting, San Francisco, CA, June 27, 1972. Camden, NJ; Port Authority Transit Corporation, (n.d.).

11. Mitre Corporation. Research Requirements Survey of the Rapid Rail Industry, by T.J. McGean. Prepared for U.S. Department of Transportation, Urban Mass Transportation Administration. MITRE 6025. McLean, VA: Mitre Corporation, June 1971.

12. (a) Carmody, Deirdre. "Beame Demands Safer Subways," New York Times, July 29, 1974.

(b) Burks, E.C. "M[etropolitan] T[ransit] A[uthority] to Use Dogs in Its Battle on Graffitti," New York Times, July 29, 1974.

13. Cody Pfanstiehl, Director of Community Services, Washington Metro System, Washington, DC; telephone conversation and forwarded materials, June 1974.

14. American Transit Association, op. cit., Chapter V.

15. Southeastern Pennsylvania Transit Authority. SEPTA Annual Report, 1969. Philadelphia,PA: Southeastern Pennsylvania Transit Authority, 1970.

16. U.S, Department of Transportation. Urban Mass Transportation Administration. The State-of-the-Art Car: Advancing Rail Rapid Transit. (Brochure.) Washington, DC: Department of Transportation, 1974.

17. U.S. Department of Justice. Law Enforcement Assistance Administration. National Institute of

TABLE 5-4. INVENTORY OF TRANSPORTATION (LOCAL RAIL STATION) STRATEGIES (Page 21 of 21)

(References)

Law Enforcement and Criminal Justice. Crime/Environment Targets: A CPTED Planning Document, by J.M. Tien et al.; Westinghouse Electric Corporation. Washington, DC: Department of Justice, (in press).

18. Williams, E.M. "Control of Mass Transit Vandalism and Other Crime." In Pittsburgh Urban Transit Council, Mobility -- The Fifth Freedom. Proceedings of the International Conference on Urban Transportation in Pittsburgh, PA, September 8-10, 1971. Pittsburgh, PA: Pittsburgh Urban Transit Council, 1971.

19. Massachusetts Bay Transit Authority. Facilities Planning Department. Improved Subway Security Through Planning and Design, by J.I. Williams. Boston, MA: Massachusetts Bay Transit Authority, October 13, 1966.

20. Other references and sources (including strategies suggested by Westinghouse CPTED Consortium members).

Previous to the Vandalism and Passenger Security study, the UMTA-sponsored reports: (1) Registered the degree of severity of crime and vandalism problems through documenting official recognition of the need to research new strategies; (2) posited that physical and nonphysical design factors play an important role in creating or preventing security in subway systems; and (3) attempted to develop a methodology for arriving at specific crime correlates and strategies. The UMTA-sponsored transit security study in Chicago, now entering the implementation phase, in fact represents the first attempt to systematically *evaluate* the effects of a multifaceted, thoroughly researched program to combat rail transit crime.

2. Transit System Materials. Written materials available from the transit industry and individual companies make evident the fact that, over the past several years, security has become an increasingly prominent consideration in the design and redesign, the equipping, and the operating policies of rail transit systems. The "Manual of Guidelines and Standards" prepared for the Massachusetts Bay Transit Authority's (MBTA) new construction and rennovation efforts in 1966 reflects the orientation which prevailed in most systems until only very recently. The fundamental objective behind its recommendations was to enhance the quality of service afforded the transit patron by making the system both more aesthetically pleasing and more efficient in operation. However, although neither crime prevention and control nor patron sense of security are directly stated as foci for concern, many of the techniques

presented actually serve these ends.* (In addition, during the same time period, a member of the MBTA security force presented a paper on improving subway design to aid security personnel in their efforts.)

It would seem that, as recently as the planning phase for the San Francisco Bay Area Rapid Transit (BART) system which opened last year, the main objective was to create an environment conducive to the comfort and convenience of riders with the assumption that several features of such an environment would enhance security. BART's recognition of the necessity of addressing potential crime problems is primarily reflected in its creation of a 100-man security force, bolstered by a strong community relations effort. However, planners of the Washington, D.C., Metro system, which opened early in 1976, made a substantial effort to study the experience of other systems and to apply their findings in the creation of a transit environment that would most effectively function to deter crime. The overriding concern in building the system was to provide riders with the greatest possible sense of security.

3. Summary. A manual of guidelines for the design of future rail facilities, published in 1972 by the Institute of Rapid Transit, is representative of the limitations of the available literature, limitations which serve to complicate the task of determining the actual status of crime control strategies. While a section devoted to "Security" reflects the

*Also, a high degree of concern on the part of transit officials over a general upsurge in vandalism has prompted the development of resilient new materials, surveillance strategies, and operational procedures. Many of these measures serve also to deter more serious crimes or to improve the patrons' image of the system.

the concern over crime and the effort to counter it, many of the physical design ideas of most interest for CPTED must be ferreted out of other sections. Moreover, most of the strategies are presented only as recommendations, guidelines, suggestions, of hypotheses; it is difficult to ascertain whether they have in fact been tested or even implemented in any of the systems. Their appearance alone would seem to indicate that security strategies are becoming a part of recognized transit company policy, but it is impossible to be certain that this is actually so.

Thus it would seem that, in general, the newest of the local rail systems (e.g., PATCO [Philadelphia], BART, Metro, and those now being planned for Atlanta, Baltimore, and Buffalo), beginning operations during a period of serious concern over transit crime and having the greatest opportunity to implement means of prevention, afford the most fertile grounds for further exploration of strategies. Of course, given the early state of these systems, gaining direct information on the testing or evaluation of these strategies is practically precluded.

NOTES

NOTES

Chapter 1 -- Introduction

1. Jeffery, C. R. Crime Prevention Through Environmental Design. Beverly Hills, CA: Sage Publications, 1971, p. 19.
2. Skinner, B. F. Beyond Fredom and Dignity. New York, NY: Alfred A. Knopf, 1971, p. 96, 70, 71.

Chapter 2 -- CPTED Background

1. See, for example, The President's Commission on Law Enforcement and Administration of Justice. Task Force Report: Crime and Its Impact -- An Assessment. Washington, DC. Government Printing Office. 1967. p. 86
2. For a more complete discussion of the relationship between crime and fear, see U.S. Department of Justice. Law Enforcement Assistance Administration. National Institute of Law Enforcement and Criminal Justice. Crime/Environment Targets: A CPTED Planning Document, by J. M. Tien et al.; Westinghouse Electric Corporation. Washington, DC: Department of Justice, (in press), chapter 4, section C.
3. U.S. National Advisory Commission on Criminal Justice Standards and Goals. Task Force on Community Crime Prevention. Community Crime Prevention. Washington, DC: Government Printing Office, 1973, p. 1.
4. See Peter P. Lejins. "The Field of Prevention.". In W. E. Amos and C. F. Wellford (eds.). Delinquency Prevention: Theory and Practice. Englewood Cliffs, NJ: Prentice-Hall, 1967, p. 2.

5. (a) See R. S. Laymon, Architectural Design and Crime, (NILECJ).
   (b) See also U. S. National Advisory Commission on Criminal Justice Standards and Goals, loc.cit.
6. Lejins, op.cit., p. 3-5.
7. Jeffery, C. R. Crime Prevention Through Environmental Design. Beverly Hills, CA: Sage Publications, 1971, p. 19.
8. (a) U.S. Department of Justice. Law Enforcement Assistance Administration. National Institute of Law Enforcement and Criminal Justice. Patterns of Burglary. 2nd ed. By H. A. Scarr et al.; Human Sciences Research, Inc. NILECJ Criminal Justice Research Series. Washington, DC: Government Printing Office, June 1973.
   (b) California. University. Center on Administration of Criminal Justice. The Prevention and Control of Robbery, by Floyd Feeney and Adrianne Weir (eds). 5 v + Summary. Prepared for the U.S. Department of Justice, Law Enforcement Assistance Administration, National Institute of Law Enforcement and Criminal Justice, and the Ford Foundation. Davis, CA: University of California, 1973-1974.
   (c) Reppetto, T. A. Residential Crime. Cambridge, MA: Ballinger, 1974.
   (d) Matt (Harold Lewis) Associates, Inc. Tactical Analysis of Street Crimes, by H. L. Malt et al. Prepared for City of Jacksonville, Fla., Office of the Sheriff. Washington, DC: Harold Lewis Malt Associates, Inc., 1973.

9. Morris, Terence. The Criminal Area. London, UK: Routledge & Keegan Paul, 1951, p. 1.

10. Proshansky, Harold. Environmental Psychology: Man and His Physical Setting. New York, NY: Holt, Rinehart & Winston, 1970, p. 5.

11. See Robert Merton, "The Social Psychology of Housing."

12. Festinger, Leon, et al. Social Pressures in Informal Groups. Stanford, CA: Stanford University Press, 1950.

13. See H. Harlan, "Delinquency and Housing," in Social Forces, 1948.

14. Dirksen, C. Economic Factors in Delinquency. Milwaukee, WI: Bruce Publishers, 1948.

15. See R. C. Schmitt, "Density, Delinquency and Crime in Honolulu," in Sociology and Sociology Research, 1957.

16. Newman, Oscar. "Architectural Design for Crime Prevention," p. 57. In U.S. Department of Justice, Law Enforcement Assistance Administration. National Institute of Law Enforcement and Criminal Justice. Deterence of Crime In and Around Residences. Papers on Related Topics Presented at the Fourth National Symposium of Law Enforcement Science and Technology, Washington, D.C., May 1-3, 1972. NILECJ Criminal Justice Monograph Series. Washington, DC: Government Printing Office, June 1973.

17. Cited in Constance Perin. With Man in Mind: An Interdisciplinary Prospectus for Environmental Design. Cambridge, MA: MIT Press, 1970, p. 25.

18. Proshansky, H. M. "Environmental Psychology and the Design Professions." In Jon Lang et al. (eds.). Designing for Human Behavior Architecture and the Behavioral Sciences. Stroudsberg, PA: Hutchingson & Ross, 1974, p. 79.

19. Brill, W. H. "Security in Public Housing: A Synergistic Approach," p. 26-43. In U.S. Department of Justice, Law Enforcement Assistance Administration, National Institute of Law Enforcement and Criminal Justice, Deterence of Crime In and Around Residences, op.cit.

20. Ibid, p. 27-28.

21. (a) For an example of one influential prototype of community health center that demonstrates the ways one activity or institution can reinforce others, see I. H. Pease, M.D., and L. M. Crocker. The Peckham Experiment: A Study in the Living Structure of Society. London, UK: Allen & Unwin, 1943.

(b) For recent examples of community health centers and their effects, see U.S. Office of Economic Opportunity. Bibliography (Annotated) of the Comprehensive Health Services Program and Addendum. Washington, DC: Government Printing Office, 1969, 1970.

22. (a) Bremer, John, et al. The Parkway Program. Philadelphia, PA: The School District of Philadelphia, (n.d.). (Duplicated.)

(b) "The Parkway Program," Time, March 23, 1970.

(c) This program is cited in Charles Silberman. Crisis in the Classroom: The Remaking of American Education. New York, NY: Random House, 1971. Also cited are similar programs in North Dakota;

Harlem; Tucson, Arizona; Cambridge and Newton, Massachusetts; and Portland, Oregon.

(d) A similar "schools without walls" plan for the aborted Fort Lincoln New Town in Washington, D.C., which is applicable to other urban situations, is discussed in D. Fantini and M. A. Young Designing Education for Tomorrow's Cities. New York, NY: Holt, Rinehart, and Winston, 1970.

23. Lincount, Michael and Harry Parness. Metro/Education. Montreal, Que: Universite de Montreal, 1970. (Funded by the Central Mortgage and Housing Corporation of Canada and the Education Facilities Laboratory, New York.) In this notable urban design system, access to a citywide range of educational facilities is promoted by their integration with and location adjacent to the excellent metro system. Not only does this result in an enormously expanded accessibility by students to learning situations and an integrated continuity of the "real world" with school but it eliminates needless duplication of educational structures, ancillary services, and skills. In a real sense, the classroom becomes the whole city.

24. U.S. National Commission on the Causes and Prevention of Violence. Crimes of Violence. Staff Report, by D. J. Mulvihill et al. 3 v. (Volumes 11, 12, and 13 of the Staff Reports.) Washington, DC: Government Printing Office, December 1969, v. 12, p. 701.

25. Ibid, p. 699.

26. (a) Robert A. Nisbet's term, as described in his Quest for Community. New York, NY: Oxford University Press, 1953. p. 266. Nisbet continues:

> What Lewis Mumford has written in *The Culture of Cities* is eloquent and irrefutable. "We need, in every part of the city, units in which intelligent and co-operative behavior can take the place of mass regulations, mass decisions, mass actions, imposed by ever remoter leaders and administrators. Small groups: small classes: small communities: institutions framed to the human scale, are essential to purposive behavior in modern society. Very stupidly we have overlooked the way in which large units limit opportunity all along the line: not merely by physical friction of space, or the burden of a vast mechanical and administrative overhead, but also by diminishing opportunities for people with special capacities. Thus Sir Raymond Unwin has pointed out that twenty communities with a population of fifty thousand people would not merely be more adequately governed, probably, than one city that contained a million: it would, for example, give an opportunity for twenty mayors or city managers, against one in the big center. This rule holds true

in every other part of society. We demand the impossible in the way of direction and specialized service from a few people, and we fail to demand the possible from those who are better equipped to handle adequately a smaller job. With our overgrown institutions, overgrown colleges, overgrown corporations, overgrown cities, is it any wonder that we easily become the victims of propaganda machines, routineers, and dictators?"

(b) David Lilienthal, in T.V.A.: Democracy on the March, New York, NY: Harper, 1944, repeatedly invokes the benefits of decentralization. Since TVA represented a successful milestone in American planning which may well bear productive lessons for the CPTED endeavor, the potential resoures of "intermediate associations" may constitute a primary ingredient of CPTED strategic models.

27. Chapman, J. M. and Brian. The Life and Times of Baron Haussmann. London, UK: Weidenfeld & Nicolson, 1957, p. 2.

28. Rainwater, Lee. "The Lessons of Pruitt-Igoe," The Public Interest, 8(Summer 1967):116-126.

29. Jacobs, Jane. The Death and Life of Great American Cities. New York, NY: Vintage Books, 1961.

30. Wood, Elizabeth. Housing Design, A Social Theory. New York: Citizens' Housing and Planning Council, 1961. Reprinted in Gwen Bell and Jaqueline Tyrwhitt (eds.), Human Identity in the Urban Environment, Baltimore, MD: Penguin, 1972, p. 327-351.

31. Newman, Oscar. Defensible Space: Crime Prevention Through Urban Design. New York, NY: Macmillan, 1972.

32. California. University. Space Sciences Laboratory and Center for Planning and Development Research. Discouraging Crime Through City Planning, by Shlomo Angel. Prepared for the National Aeronautics and Space Administration. Working Paper no. 75. Berkeley, CA: University of California, February 1968.

33. See California. University. Center on Administration of Criminal Justice. The Prevention and Control of Robbery, op.cit. This work tends to support Angel's thesis.

34. U.S. Department of Justice. Law Enforcement Assistance Administration. National Institute of Law Enforcement and Criminal Justice. Architectural Design for Crime Prevention, by Oscar Newman; New York University, Institute of Planning and Housing. Washington, DC: Government Printing Office, March 1973.

35. Center for Defensible Space Design. Immediate Measures for Improving Security in Existing Residential Areas, by Oscar Newman et al. Prepared for the U.S. Department of Housing and Urban Development; U.S. Department of Justice; and Criminal Justice Coordinating Council of the Mayor's Office of the City of New York. New York, NY: Center for Defensible Space Design, 1972, p. 107, 109-111.

36. New York University. Institute of Planning and Housing. Project for Security Design in Urban Residential Areas -- Final Report, by Oscar Newman. Prepared for U.S. Department of Justice, Law Enforcement Assistance Administration, National Institute of Law Enforcement and Criminal Justice. New York, NY: New York University, January 31, 1973, p. A7.

37. See U.S. National Commission on the Causes and Prevention of Violence, Crimes of Violence, op.cit., chapter 16.

38. U.S. Department of Justice. Law Enforcement Assistance Administration. National Institute of Law Enforcement and Criminal Justice. Patterns of Burglary, op.cit.

39. Reppetto, T. A. Residential Crime. Cambridge, MA: Ballinger, 1974.

40. Malt (Harold Lewis) Associates, Inc., op.cit.

41. California. University. Center on Administration of Criminal Justice. The Prevention and Control of Robbery, op.cit.

Chapter 3 -- CPTED Framework

1. See U.S. Department of Justice. Law Enforcement Assistance Administration. National Institute of Law Enforcement and Criminal Justice. Crime Prevention Through Environmental Design Schools Demonstration Plan, Broward County, Florida, by T. D. Crowe et al; Westinghouse Electric Corporation. Washington, DC: Department of Justice, (in press).

2. See U.S. Department of Justice. Law Enforcement Assistance Administration. National Institute of Law Enforcement and Criminal Justice. Crime Prevention Through Environmental Design Commercial Demonstration Plan, Portland, Oregon, by L. S. Bell; Westinghouse Electric Corporation. Washington, DC; Department of Justice, (in press).

3. Hoover, C. and R. Vernon. Anatomy of a Metropolis. Cambridge, MA: Harvard University Press, 1959.

4. Marx, G. T., and Dane Archer. "Citizen Involvement in the Law Enforcement Process: The Case of Community Police Patrols," American Behavioral Scientist, 15(1):52-72, September/October 1971.

5. (a) For an example of a variety of particularly promising zoning techniques which effectively combine municipal policy, development economics, and physical design, New York City's newly applied "point scoring system" modification of incentive zoning has shown itself to be a potent creative tool. See Jonathan Barnett. Urban Design as Public Policy: Practical Methods for Improving Cities. New York, NY: Architectural Record Books, 1974.

(b) For a detailed treatment of zoning design guidelines for a housing security and safety program, see Michael Kwartler et al. Housing Quality: A Program for Zoning Reform. New York, NY: Urban Design Council of the City of New York. 1973.

6. (a) J. B. Jackson, in "The Purpose of the City" compares the varying uses of European streets over three centuries. In the 17th

century, the urban populace used the streets as virtual outdoor living rooms, serving a multitude of busy, interactive social purposes. One reason for this was the shortage of indoor space, but the more important reasons concerned the scale of the streets, the functions served by the street furniture, and the services available from people in the street. In Marcus Whiffen (ed.). Architect and the City. Cambridge, MA: MIT Press, 1966, p. 13-36.

(b) From the viewpoint of the urban designer, David A. Crane has examined the multifold functions of the street as, "outdoor living room, carrier, city-builder, connector, and as revealing intelligence at two levels: functional and symbolic." (See his "The Public Art of City Building," Annals, March 1964, Philadelphia, American Academy of Political and Social Science.)

(c) Also see David A. Crane & Associates and Keyes Lethbaridge & Condon. Developing New Communities: Application of Technological Innovations. Washington, DC: Government Printing Office, 1968.

(d) Similar urban design functions and potentials of streets and related public ways are discussed in several other works adaptable to CPTED design goals and objectives: David A. Crane, "The City Symbolic," Journal of American Institute of Planners, Fall 1960.

(e) Also see Paul Ritter. Planning for Man and Motor. Elmsford, NY: Plagamon Press, 1964.

7. (a) As described in various sections of David A. Crane. Planning and Design in New York. New York Institute of Public Administration, 1966.

(b) Also described in his influence on urban design in Boston Redevelopment Authority. General Plans for Boston and Regional Core. Boston, MA: Boston Re-Redevelopment Authority, 1965.

8. Lincourt, Michael and Harry Parnass. Metro/Education. Montreal, Que: Universite de Montreal, 1970.

9. Heller, Alfred (ed.). The California Tomorrow Plan. Los Altos, CA: W. Kaufmann, Inc., 1971. This is believed to be the first prototype of this new generation of grass-roots statewide goal statements.

10. Maslow, Abraham. Toward a Psychology of Being. 2nd ed. New York, NY: Van Nostrand Reinhold, 1968, p. 220.

11. Ibid, p. 221-222.

12. For a variety of evidence of the needs for continuity and self-expression between persons and their physical surroundings (particularly their houses and immediate environs) see:

(a) N. J. Pinney, op.cit.

(b) Gaston Bachelard. Poetics of Space. New York, NY: Grossman, 1964.

(c) C. G. Jung, (ed.). Man and His Symbols. New York, NY: Doubleday, 1969.

(d) Amos Rapoport. House Form and Culture. Englewood Cliffs, NJ: Prentice Hall, 1968.

(e) I. H. Pease, M.D., and L. M. Crocker. The Peckham Experiment: A Study in the Linked Structure of Society. London, UK: Allen & Unwis, 1943.

(f) CSTI, "Self-Help Housing in the U.S.A.";

(g) American Public Health Association's Committees on the Hygiene of Housing. Planning the Neighborhood. Chicago, IL: Public Administration Service, 1948.

(h) Clare Cooper. The House as Symbol of Self. Working Paper 120. Berkeley, CA: Institute of Urban and Regional Development, 1971.

13. (a) The Human Resources Center in Pontiac is a multipurpose educational institution designed to help develop talents and human potential through integration of school and community activities. Pontiac City School District. Human Resources Center: An Innovation in Education. Pontiac, MI: Pontiac City School District, 1970.

(b) A number of comparable programs which emphasize school/community intervention have been described in the Education Facilities Laboratory's periodical Planning, a recent example of which is "Connecting Campus, Community and School." 3(5):5/5 October 1974.

(c) Also see Educational Facilities Laboratory. Community/Schools. New York, NY: Educational Facilities Laboratory, 1973.

14. Banham, Reyner. "Parkhill Revisited," Architecture Plus, 2(3):109-115, May/June 1974.

15. U.S. National Commission on Urban Problems. More Than Shelter: Social Needs in Low- and Moderate Income Housing, by George Scherner Associates. Washington, DC: Government Printing Office, 1968.

16. (a) See John F. C. Turner et al. Freedom to Build. London, UK: Architectural Press, 1974, for numerous demonstrations of the benefits to community identity and image achieved through self-help and participatory processes -- as opposed to bureaucratic processes imposed in top-down fashion.

(b) Pinney examines related processes and implementation methods at the scales of both aggregated and individual dwelling units. Massachusetts Institute of Technology. Community Projects Laboratory. Toward Participatory Dwelling Design: Process and Product, by N. J. Pinney. Cambridge, MA: MIT, 1972.

(c) At the same scales, the importance of identity and image are found in Julian Beinart, "Government-Built Cities and People-Made Places." In David Lewis. The Growth of Cities. New York, NY: Wiley, 1972.

(d) Also in Philippe Bourdon. Lived-In Architecture: La Corbussier's Pessac Revisited. Cambridge, MA: MIT Press, 1972.

(e) Also in Arnold Rudofsky. Architecture Without Architects: A Short Introduction to Non-Pedigreed Architecture. New York, NY: Doubleday, 1969.

Chapter 4 -- CPTED Impact Considerations

1. Architectural Forum. April 1972.
2. Peter Lejins. "The Field of Prevention." In W. E. Amos and C. F. Wellford (eds.). Delinquency Prevention: Theory and Practice. Englewood Cliffs, NJ: Prentice-Hall, 1967, p. 4-5.
3. U.S. National Commission on the Causes and Prevention of Violence. Crimes of Violence. Staff Report, by D. J. Mulvihill et al. 3 v. (Volumes 11, 12, and 13 of the Staff Reports.) Washington, DC: Government Printing Office, December 1969, v. 12, p. 717.
4. The phenomenon has also been referred to as the "mercury effect." See George E. Hall and S. A. Lindgren, "Washington, D.C. Urban and Suburban Crime Interaction." (Paper presented at the Metropolitan Washington Crime Conference, New Carrolton, Maryland, September 13, 1971.)
5. (a) An analogous area is suits challenging disparity in the provisions of local government services. See *Hawkins v Town of Shaw, Miss.*, 437 F. 2d 1286 (1971); *Serrano v Priest*, 5 Cal. 3d. 584 (1971)

   (b) For studies in the area of crime prevention, see C. S. Shoup, "Standards for Distributing a Free Governmental Service: Crime Prevention." Public Finance. 19(1964):383-392.

   (c) See also J. C. Weicher. "The Allocation of Police Protection by Income Class." Urban Studies. 8(1971:207-220.
6. Maltz, M. D. Evaluation of Crime Control Programs. Washington, DC: Government Printing Office, 1972, p. 21.

7. This type of crime is in fact common in areas where there is extensive use of locks, alarms, and grills to secure commercial establishments. See Gerald Luedtke Associates. Crime and the Physical City, by Gerald Luedtke et al. Prepared for U.S. Department of Justice, Law Enforcement Assistance Administration, National Institute of Law Enforcement and Criminal Justice. Detroit, MI: Gerald Luedtke and Associates, 1970, p. 19.
8. New York City Rand Institute. The Impact of Police Activity on Crime -- Roberies on the New York City Subway System, by Jan M. Chaiken et al. Prepared for City of New York Bureau of the Budget. R-1424-NYC. New York, NY: The Rand Corporation, January 1974, p. 26-28, 30-31.
9. See New York City Rand Institute. Some Effects of an Increase in Police Manpower in the 20th Precinct of New York City, by S. J. Press. R-704-NYC. New York, NY: The Rand Corporation, October 1971.
10. Other empirical studies which tend to support this viewpoint are:

    (a) New York City Rand Institute. The Impact of Police Activity on Crime -- Robberies on the New York City Subway System, op.cit., p. 55-56.

    (b) J. E. Conklin. Robbery and the Criminal Justice System. Philadelphia, PA: Lippincott, 1972, p. 196.
11. Conklin, op.cit. p. 69-70.
12. Adrianne Weir. "The Robbery Offender." In California. University. Center on Administration of Criminal Justice. The Prevention and Control of Robbery, by Floyd Feeney and Adrianne Weir (eds). 5 v + Summary. Prepared for the U.S. Department of Justice, Law Enforcement

Assistance Administration, National Institute of Law Enforcement and Criminal Justice, and the Ford Foundation. Davis, CA: University of California, 1973-1974.

13. Gibbons, D. C., and D. L. Garrity. "Definitions and Analysis of Certain Criminal Types," Journal of Criminal Law and Police Science, 53(1962):28-35.

14. Op.cit., Conklin, p. 87-88.

15. J. B. Roebuck and M. L. Cadwallader. "The Negro Armed Robber as a Criminal Type: The Construction and Application of a Typology." Pacific Sociological Review. Spring 1961. Reprinted in M. B. Clinard and Richard Quinney (eds.). Criminal Behavior Systems: A Typology. New York, NY: Holt, Rinehart & Winston, 1967. p. 380-381.

16. Boggs, S. L. "Urban Crime Patterns," American Sociological Review, 32:899-908.

17. Normandeau, Andre. Trends and Patterns in Crimes of Robbery (With Special Reference to Philadelphia, Pennsylvania, 1960 to 1966). Dissertation (PhD in Criminology), University of Pennsylvania, 1968, p. 268.

18. S. Turner. "Delinquency and Distance." In Thorsten Sellin and M. E. Wolfgange (eds.). Delinquency: Selected Studies New York, NY: John Wiley and Sons, p. 4.

19. New York City Rand Institute. Some Effects of an Increase in Police Manpower in the 20th Precinct of New York City, op.cit.

20. Michigan. University. Impact of Street Lighting on Street Crime, by Roger Wright et al. 2 v. Prepared for U.S. Department of Justice, Law Enforcement Assistance Administration, National Institute of Law Enforcement and Criminal Justice. Ann Arbor, MI: University of Michigan, May 1974, p. 119-120.

21. It is also possible that increased police patrols in some high-crime areas might exacerbate community tensions. Thus, the overall effects must be calculated before instituting heightened policing.

22. (a) For example, in 1972, U.S. cities sustained approximately 300,000 street robberies and nearly 1,500,000 residential burglaries. See U.S. Department of Justice. Federal Bureau of Investigation. Crime in the United States, 1972. (Uniform Crime Reports.) Washington, DC: Government Printing Office, 1973, Table 22.

(b) In a typical city, such as Seattle, nearly two-thirds of all robberies occurred within two miles of the central business district (CBD); whereas burglaries were dispersed throughout the entire city, with significant concentrations in areas six to seven miles from the CBD. See Washington (State). Planning and Community Affairs Agency. Law and Justice Planning Office. Crime in the State of Washington, by C. F. Schmid and S. E. Schmid. Olympia, WA: Washington Planning and Community Affairs Agency, 1972, p. 126-128, 132-134.

23. New York City Rand Institute. The Impact of Police on Crime -- Robberies on the New York City Subway System, op.cit., p. 132-134.

24. D. Burnham. "A Police Study Challenges Value of Anticrime Patrol," The New York Times, November 11, 1973, p. 1.

25. For an example of an innovative use of police to combat burglary in one urban area, see Police Foundation. Team Policing: Seven Case Studies, by L. W. Sherman et al. Washington, DC: Police Foundation, August 1973, p. 45-53.

END

7 microfilm