



APTA STANDARDS DEVELOPMENT PROGRAM
RECOMMENDED PRACTICE

American Public Transportation Association
1666 K Street, NW, Washington, DC, 20006-1215

APTA SS-SIS-RP-007-10

Approved June 24 , 2010

APTA Transit Infrastructure
Security Work Group

Crime Prevention Through Environmental Design (CPTED) for Transit Facilities

Abstract: This *Recommended Practice* provides guidance the use of crime prevention through environmental design at revenue and non-revenue transit facilities.

Keywords: access control, assessment, CPTED, fencing systems, gate, landscaping, lighting, threat and vulnerability analysis

Summary: This *Recommended Practice* is intended to ensure that security measures are employed, and costs are considered in the application of CPTED concepts and strategies; to incorporate security considerations prior to designing, planning, building or remodeling transit facilities and areas; and to identify all pertinent stakeholders in the process application of CPTED concepts and strategies. Transit systems may use a system security program plan to specify an alternate means to achieve an equivalent level of security as provided by this APTA security *Recommended Practice*. The system security program plan should identify the transit security *Recommended Practice* requirements that cannot be met; state why each of these requirements cannot be met; describe the alternate means to ensure equivalent security is achieved; and provide a reasonable explanation (i.e. operating history, threat, security or risk assessment) for why security is not compromised through alternate means.

Scope and purpose: This *Recommended Practice* provides guidance for the application of CPTED principles to enhance safety and security, while reducing risk to people, operations and assets at public transit facilities. There are no specific transit standards for CPTED. It is a theory to design and build a safer environment. APTA recommends the use of the recommended practice by individuals or organizations that build, operate or maintain transit properties; individuals or organizations that contract to build, operate or maintain transit properties; and individuals or organizations that influence how transit systems develop, inspect, build, maintain or evaluate transit properties. The purpose of an APTA transit *Recommended Practice* is to ensure that each transit system achieves an appropriate level of protection for people, operations and assets, and the general public. APTA transit security *Recommended Practices* represent an industry consensus of acceptable security practices. However, agency specific constraints may make compliance with every provision of an APTA transit security recommended practice impractical.

This Recommended Practice represents a common viewpoint of those parties concerned with its provisions, namely, transit operating/planning agencies, manufacturers, consultants, engineers and general interest groups. The application of any standards, practices or guidelines contained herein is voluntary. In some cases, federal and/or state regulations govern portions of a rail transit system's operations. In those cases, the government regulations take precedence over this standard. APTA recognizes that for certain applications, the standards or practices, as implemented by individual rail transit agencies, may be either more or less restrictive than those given in this document.



Participants

The American Public Transportation Association greatly appreciates the contributions of the **Transit Infrastructure Security Work Group**, which provided the primary effort in the drafting of this *Recommended Practice*.

At the time this standard was completed, the Transit Infrastructure Security Working Group included the following members:

Sean Ryan, *Chair*, MNR

Bill Pitard, *Vice Chair*, PB Americas

Randy Clarke, *Vice Chair*, MBTA

John Plante, CTA

April Panzer, MNR

Dave Hahn, APTA

Charles Rappleyea, CATS

Mark Mahaffey, VTA

Gabriela Amezcua, CTA

Robert Hertan, CPUC

Brian Taylor, Halifax

Gardner Tabon, RPTA

Harry Saporta, Good Harbor

Allen Smith, SPAWAR

Rick Gerhart, FTA

Jane Bass, TSA

Contents

1. CPTED overview	1
1.1 Stakeholder considerations.....	1
1.2 Risk assessment considerations.....	1
2. CPTED strategies	2
3. Approaching the CPTED process	4
4. Training	4
Annex A: CPTED Design Considerations Checklist	5
References	13
Definitions	13
Abbreviations and acronyms	14

1. CPTED overview

Crime prevention through environmental design (CPTED) is the application of designing safety and security into the natural environment of a specific area. Specifically, CPTED concepts and strategies use the three interrelated principles of natural surveillance, natural access and territoriality, plus activity support and maintenance. By using the behavior of people, a knowledge of crime generators, the physical environment, and the space of an area, CPTED can provide benefits of safety and security if applied in the conceptual, design and planning stages of a project. Planning the use of a facility, such as a bus and/or parking garage, transit center, intermodal terminal or a park and ride lot, should also encompass details for providing users with safety and security. CPTED can be the solution to many transit agencies security issues. Additionally, the concepts and strategies of CPTED have been applied for years and incorporated into the designs of several facilities not related to transit. However, there is belief that its principles can assist transit in increasing ridership through a sense of system safety and security.

CPTED emphasizes using the structures, spaces, lighting and people around an area to prevent crime and to increase loss prevention. Accomplishing this task is not an easy one; architects attempt to beautify, and engineers attempt to increase efficiency. While all stakeholders must be responsive to meeting the objectives of the safety and security programs, CPTED concepts and strategies should be identified in consultation with security staff.

Transit systems throughout the United States have limited resources to invest in security systems and security staff. CPTED considerations early in the design and planning may optimize that investment, improving safety and security while reducing risk and incidents. CPTED may also be used with other recommended practices, such as fencing, gates, lighting, landscaping, bus stop/shelter design, etc., to blend security with area aesthetics while adhering to local ordinances. This *Recommended Practice* is designed to provide guidance in achieving successful application of CPTED concepts and strategies at public transit facilities.

1.1 Stakeholder considerations

To the extent possible, the application of CPTED principles should be considered to meet the specific needs of users of transit facilities (parking, walkways, internal or underground areas, maintenance yards, employee parking, etc.). Implementation of CPTED principles serves a meaningful purpose. When appropriately applied, they can be conducive to operations without becoming a financial or maintenance burden. The applications of the principles of CPTED, separately or combined with other practices, provide the following benefits:

- Creates a welcoming environment.
- Fosters a sense of physical and social community order.
- Creates a sense of ownership by transit users and employees.
- Maximizes the presence of transit staff and law enforcement figures.
- Minimizes opportunities for out-of-sight activity.
- Manages access to authorized areas and controls access to non-public areas.

1.2 Risk assessment considerations

Transit agencies should evaluate risk and use system wide and asset-specific risk assessments as a guide in determining the application of CPTED practices to maximize transit safety and security.

1.2.1 Systemwide assessment

Transit agencies should first refer to their security risk assessment findings to determine the risks to their systems' assets and the surrounding environment. Transit agencies that do not have existing security risk assessments should develop them using current government guidelines.

1.2.2 Transit facility risk assessment

Transit agencies should use a risk-based assessment approach to identify safety and security threats to their transit systems. To determine specific risk to passenger facility and nonrevenue areas, agencies should refer to each asset’s criticality ranking and the security and risk management issues for each specific location under review. The approach may also evaluate system vulnerabilities to those threats and identify consequences to people, equipment and property. The findings should be used to determine appropriate security requirements for the protection of critical infrastructure and the deterrence of crime at transit properties. The Federal Transit Administration (FTA) provides information on threat and vulnerability assessments for CPTED applications, as well as other useful security resources, at <http://transit-safety.volpe.dot.gov/Security/SecurityInitiatives/ActionItems/actionlist.asp>. Refer to section 1f and 9c.

1.2.3 CPTED survey

A CPTED survey identifies exposures within the transit system’s built and natural environments and recommends enhancements that reduce risks to people, operations and facilities. The survey is a component of the risk assessment process and focuses on identifying human behaviors, along with other potential exposures within specific areas. Survey findings identify solutions that, if implemented, enhance the safety and security of transit systems. Annex A contains a sample of a CPTED survey that can be utilized by transit systems.

2. CPTED strategies

CPTED involves the design use of five strategies: natural surveillance; natural access control; territorial reinforcement (using buildings, fences, pavement, signs and landscaping to express ownership); activity support (placing the right activity in the space); and maintenance (addressing the inspection, repair and general housekeeping of the space).

Accepted CPTED industry strategies are described below and detailed in **Table 1**:

- **Natural surveillance.** This strategy involves reducing crime by decreasing target opportunities in a space/area by placing physical features, activities and people to maximize visibility.
- **Natural access control.** Channeling people into, alongside or out of spaces/areas and deterring entry elsewhere along the boundary are the concepts of this principle (through the judicious placement of entrances, exits, fencing, landscaping and lighting); This concept denies access to crime targets and creates a perception of risk for adversaries.
- **Territoriality.** Territoriality notifies users and non-users of the boundaries of a space/area or facility. It creates a psychological deterrent to crime by notifying users of the space/area/facility that they are being watched and that the community is the space/area/facility for purposeful activities.
- **Activity support.** By encouraging authorized activities in public spaces, the community and transit system ridership understand its intended use. Criminal acts are discouraged, and an increase in safety and security of the transit system, its operations, facilities, ridership and people are realized.
- **Maintenance.** Care and upkeep demonstrates expression of ownership for the intended purpose of the area. A lack of care indicates loss of control of a space or area and can be a sign of tolerance for disorder. Establishing care and maintenance standards and continuing the service preserves the intended use of the space/area. CPTED maintenance and care standards also safeguard the best interests of the community and transit agency where they serve.

TABLE 1
CPTED Strategies and Applications

Strategy	Transit Application
----------	---------------------

TABLE 1
CPTED Strategies and Applications








Strategy	Transit Application
<p style="text-align: center;">Natural surveillance</p> <div style="display: flex; justify-content: space-around;">   </div>	<ul style="list-style-type: none"> • Maximize visibility by designing doors and windows to look into public areas, such as parking lots, roadways or sidewalks. • Ensure adequate illumination of public areas. • It is directed at keeping intruders under observation. Organized surveillance strategies include use of police and guard patrols. Lighting and CCTV are mechanical strategies for surveillance, and natural strategies include windows, low landscaping and raised entrances.
<p style="text-align: center;">Natural access control</p> <div style="display: flex; justify-content: space-around;">   </div>	<ul style="list-style-type: none"> • Use landscape structures and architectural designs to discourage access to private areas. • Design streets, roadways, pathways, driveways and neighborhood gateways to mark public routes. • Provides some indication of where people are allowed and not allowed.
<p style="text-align: center;">Territoriality</p> <div style="display: flex; justify-content: space-around;">   </div>	<ul style="list-style-type: none"> • Clearly distinguish the difference between restricted and public areas. • Implement landscape plantings, pavement surface treatments, fences, T-walls, etc., to reinforce the territory of restricted or public areas. • Create physical designs that enhance or extend the sphere of influence so that users develop a sense of proprietorship. Organized territorial strategies typically include neighborhood crime watches, receptionists, and guard stations. Mechanical strategies can be perimeter sensing systems. Natural territorial strategies include fences, walls and landscaping.

TABLE 1
CPTED Strategies and Applications

Strategy	Transit Application
Activity support	<ul style="list-style-type: none"> • Identify activities that create community involvement in the public space. • Ensure that public space activities complement other activities in the same space.
Maintenance 	<ul style="list-style-type: none"> • Maintain the cleanliness and functionality of revenue and nonrevenue areas and spaces. • Inspect assets, equipment and facilities to ensure satisfactory operation. • Keep up with repairs; make necessary replacements; paint; trim landscaping; remove trash and debris; enforce a zero-tolerance policy to graffiti and vandalism; and maintain aesthetic appearance of assets, equipment and facilities.

3. Approaching the CPTED process

CPTED strategies are most successful when they inconvenience the public the least.

4. Training

Transit specific training for CPTED is available from the Transportation Safety Institute (TSI) a training program within the United States Department of Transportation. CPTED courses may also be offered by other agencies, educational institutions, programs and should be considered when gaining a comprehensive overview of the principle. (Additional resources for training would include the National Transit Institute local police academies and Homeland Security).

Annex A: CPTED Design Considerations Checklist

DIRECTIONS: Utilize this checklist to help you decide which principles may be applicable to your transit agency in conjunction with local zoning laws.

PERFORMANCE STANDARD AND FUNCTIONAL AREA CONSIDERATIONS	EVALUATION
<p style="text-align: center;">NATURAL SURVEILLANCE</p> <p style="text-align: center;">Blind corners <i>Avoid blind corners in pathways and parking lots.</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Pathways are direct. All barriers along pathways are permeable (see-through), including landscaping, fencing, etc. <input type="checkbox"/> Low-growth vegetation is be used to prevent blind corners. <input type="checkbox"/> Consider the installation of mirrors to allow users to see ahead of them and around corners. 	<p>Comments or other strategies used:</p>
<p style="text-align: center;">Site and building layout <i>Allow natural observation from the street to the use, from the use to the street, and between uses.</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Main entrances/exits are located at the front of the site and in view of the street. <input type="checkbox"/> There is a clear border definition of controlled space (public to private). <input type="checkbox"/> Transitional zones are clearly marked (for movement into controlled area). <p>Administrative or maintenance facilities:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Boxes or planters are located away from buildings. <input type="checkbox"/> If employee entrances must be separated from the main entrance, they maximize opportunities for natural surveillance from the street. <input type="checkbox"/> In industrial developments, administration/offices are at the front of the building. <p>Surface parking and parking structures:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Large expanses of parking are avoided. Where large expanses of parking are proposed, provide surveillance such as security cameras. <input type="checkbox"/> Access to elevators, stairwells and pedestrian pathways is clearly visible from an adjacent parking area. <input type="checkbox"/> Hidden recesses are avoided. <input type="checkbox"/> Parking areas are located in locations that can be observed by adjoining areas. <p>Common/open space areas</p> <ul style="list-style-type: none"> <input type="checkbox"/> Open spaces are clearly designated and situated at locations that are easily observed by people. Parks, plazas, common areas and playgrounds are placed in the front of buildings. Shopping centers and other similar uses face streets. <input type="checkbox"/> Dumpster enclosures are designed and located to screen refuse containers without providing opportunities to hide. 	<p>Comments or other strategies used:</p>

PERFORMANCE STANDARD AND FUNCTIONAL AREA CONSIDERATIONS	EVALUATION
<p style="text-align: center;">Building interior <i>Provide natural surveillance for common/open space areas.</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Active uses or habitable rooms are positioned with windows adjacent to main common/open space area. <input type="checkbox"/> Adequate lighting is provided in hallways, restrooms, stairways and work areas. <input type="checkbox"/> The building has separate areas for receiving mail, deliveries, etc. <input type="checkbox"/> There is an integrated communication system throughout the building. <input type="checkbox"/> There are no obstructions that prevent visibility through windows. <input type="checkbox"/> Waiting areas and external entries to elevators/stairwells are located close to areas of active use to make them visible from the building entry. <input type="checkbox"/> Seating is located in areas of active use. 	<p>Comments or other strategies used:</p>
<p style="text-align: center;">Entrances <i>Provide entries that are clearly visible.</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Entrances are designed to allow users to see into them before entering. <input type="checkbox"/> Entrances are be clearly identified. 	<p>Comments or other strategies used:</p>
<p style="text-align: center;">Fencing <i>Fence design should maximize surveillance from the street to the building and from the building to the street, and minimize opportunities for intruders to hide.</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Front fences are predominantly open in design, such as pickets or wrought iron, or low in height. <input type="checkbox"/> High solid front fences are designed in a manner that incorporates open elements to allow visibility above the height of 5 feet. <input type="checkbox"/> If noise insulation is required, double glazing is installed at the front of the building rather than solid fences higher than 5 feet. 	<p>Comments or other strategies used:</p>
<p style="text-align: center;">Landscaping <i>Avoid landscaping that obstructs natural surveillance and allows intruders to hide.</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Trees with dense, low-growth foliage are spaced, or their crowns are raised to avoid a continuous barrier. <input type="checkbox"/> Low groundcover, shrubs a maximum of 24 inches in height, or high-canopied trees (clean trimmed to a height of 8 feet) are used around parking areas and along pedestrian pathways. <input type="checkbox"/> Vegetation that conceals the building entrance from the street is avoided. 	<p>Comments or other strategies used:</p>

PERFORMANCE STANDARD AND FUNCTIONAL AREA CONSIDERATIONS	EVALUATION
<p style="text-align: center;">Exterior lighting <i>Provide exterior lighting that enhances natural surveillance.</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Lighting plan is prepared in accordance with Illuminating Engineering Society of America (IESA) Standards, which addresses project lighting in a comprehensive manner. Lighting approach is consistent with local conditions and crime problems. <input type="checkbox"/> Elevated light fixtures (poles, light standards, etc.) are located in a coordinated manner that provides the desired coverage. The useful ground coverage of an elevated light fixture is roughly twice its height. <input type="checkbox"/> For areas intended to be used at night, lighting supports visibility. Where lighting is placed at a lower height to support visibility for pedestrians, it is vandal-resistant. <input type="checkbox"/> Inset or modulated spaces on a building façade, access/egress routes and signage are well lit. <input type="checkbox"/> In areas used by pedestrians, lighting shines on pedestrian pathways and possible entrapment spaces. <input type="checkbox"/> Lighting takes into account vegetation, in both its current and mature forms, as well as any other element with the potential for blocking light. <input type="checkbox"/> Areas not intended for nighttime use are not lit, to avoid giving a false impression of use or safety. If danger spots are usually vacant at night, then avoid lighting them and close them off to pedestrians. <input type="checkbox"/> “Safe routes” are selected and lit so that these become the focus of legitimate pedestrian activity after dark. <input type="checkbox"/> Light standards and electrical equipment are located away from walls or low buildings to avoid climbing opportunities. <input type="checkbox"/> Photoelectric rather than time switches are used for exterior lighting. <input type="checkbox"/> In areas used primarily by older people, higher levels of brightness are provided in public/common areas. 	<p>Comments or other strategies used:</p>
<p style="text-align: center;">Mix of uses <i>In mixed-use buildings, increase opportunities for natural surveillance while protecting privacy.</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Where allowed by city code, ticket kiosks and shops are located on lower floors and offices on upper floors. In this way, office workers can observe the businesses after hours, while the office entrances can be observed by the business during business hours. <input type="checkbox"/> Food kiosks, restaurants, etc. are included within parks and parking structures, if applicable. 	<p>Comments or other strategies used:</p>
<p style="text-align: center;">Security bars, shutters and doors <i>Where used and permitted by building and fire codes, security bars, shutters and doors should allow observation of the street and be consistent with the architectural style of the building.</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Security bars and security doors should be visually permeable (see-through). 	<p>Comments or other strategies used:</p>
<p style="text-align: center;">ACCESS CONTROL Building identification <i>Ensure that buildings are clearly identified by street number to prevent unintended access and to assist people who are trying to find the building.</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Street numbers are plainly visible and legible from the street or road fronting the property. <input type="checkbox"/> Street numbers are made of durable materials, preferably reflective or luminous, and unobstructed (e.g. by foliage). <input type="checkbox"/> For larger projects, location maps (fixed plaque format) and directional signage are provided at public entry points and along internal public routes of travel. 	<p>Comments or other strategies used:</p>

PERFORMANCE STANDARD AND FUNCTIONAL AREA CONSIDERATIONS	EVALUATION
<p style="text-align: center;">Entrances <i>Avoid confusion in locating building entrances.</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Entrances are easily recognizable through design features and directional signage. <input type="checkbox"/> Entry access into facilities is limited. <input type="checkbox"/> The number of entry points is minimized. 	<p>Comments or other strategies used:</p>
<p style="text-align: center;">Landscaping <i>Use vegetation as barriers to deter unauthorized access.</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Consider using thorny plants as an effective barrier. 	<p>Comments or other strategies used:</p>
<p style="text-align: center;">Landscaping location <i>Avoid placement of vegetation that would enable access to a building or to neighboring buildings.</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Large trees, garages, utility structures, fences and gutters are not located next to second-story windows or balconies that could provide a means of access. 	<p>Comments or other strategies used:</p>
<p style="text-align: center;">Security <i>Reduce opportunities for unauthorized access.</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> There is some kind of active surveillance (CCTV, alarm systems, guard service or police patrols). <input type="checkbox"/> Floor-level windows are made of lexan, polycarbonate, etc. <input type="checkbox"/> Doors to critical areas are secured, or have access control. <input type="checkbox"/> The facility practices key control. <input type="checkbox"/> The facility practices inventory control. <input type="checkbox"/> Tamper-proof locking systems are used for the building and offices. <input type="checkbox"/> Consider the use of security hardware and/or human measures to reduce opportunities for unauthorized access. 	<p>Comments or other strategies used:</p>
<p style="text-align: center;">Signage <i>Ensure that signage is clearly visible, easy to read and simple to understand.</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Strong colors, standard symbols and simple graphics are used for informational signs. <input type="checkbox"/> There is signage to reinforce transition zones and give direction. <p>Surface parking and parking structure:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Upon entering the parking area, both pedestrians and drivers can get a clear understanding of the direction to stairs, elevators and exits. <input type="checkbox"/> In multi-level parking areas, creative signage is used to distinguish among floors to enable users to easily locate their cars. <input type="checkbox"/> Users are advised of security measures that are in place and where to find them — i.e., security phones or the intercom system. <input type="checkbox"/> Signage is provided in the parking area advising users to lock their cars. <input type="checkbox"/> Where exits are closed after hours, this information is indicated at the parking area entrance. 	<p>Comments or other strategies used:</p>

PERFORMANCE STANDARD AND FUNCTIONAL AREA CONSIDERATIONS	EVALUATION
<p style="text-align: center;">OWNERSHIP</p> <p style="text-align: center;">Maintenance <i>Create a "cared for" perception.</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Building is well-maintained. <input type="checkbox"/> Landscaping is well-maintained, in order to give an impression of ownership, care and security. 	<p>Comments or other strategies used:</p>
<p style="text-align: center;">Materials</p> <p style="text-align: center;"><i>Use materials that reduce the opportunity for vandalism.</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Consider using strong, wear resistant laminate, impervious glazed ceramics, treated masonry products, stainless steel materials, anti-graffiti paints, and clear over sprays to reduce opportunities for vandalism. Avoid flat or porous finishes in area where graffiti is likely to be a problem. <input type="checkbox"/> Where large walls are unavoidable, vegetative screens are used. <input type="checkbox"/> Common areas and/or street furniture are be made of long-wearing, vandal-resistant materials and are secured by sturdy anchor points, or removed after hours. 	<p>Comments or other strategies used:</p>
<p style="text-align: center;">STATIONS AND TERMINALS (BUS OR RAIL)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Storage and baggage lockers are not incorporated in station design. <input type="checkbox"/> Information centers, ticket vending machines and concessions are placed so as not to obstruct sight lines. <input type="checkbox"/> Street entrances are well illuminated. <input type="checkbox"/> Stairways are left open to increase visibility. <input type="checkbox"/> Mirrors are installed on blind corners. <input type="checkbox"/> Bathrooms are located near a highly traveled part of the station, not in a remote area. <input type="checkbox"/> Bathroom doors are locked open during business hours. <input type="checkbox"/> Clear border definition of controlled space (public to restricted) is provided. <input type="checkbox"/> Transitional zones are clearly marked. <input type="checkbox"/> Cul-de-sacs and alcoves are avoided. <input type="checkbox"/> Transparent materials are used to enhance sight lines and enhance security. <input type="checkbox"/> Walls are painted or tiled in a reflective material to increase illumination. <input type="checkbox"/> Where possible, stations/terminals have open shafts or skylights to bring in natural light. <input type="checkbox"/> Underpass and passageways illuminations are vandal resistant. <input type="checkbox"/> Off-hour waiting areas are clearly marked, visible to customers and equipped with CCTV and intercom system. <input type="checkbox"/> Train enunciators, visual and audio, in stations alert customers of arrivals and minimize time spent on isolated platforms or mezzanines. <p>Site layout:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Structures are set back from roads and parking areas, if applicable. <input type="checkbox"/> Physical barriers such as bollards, road spikes, and fencing enforce setbacks and/or prevent ramming. <input type="checkbox"/> Vehicle entrances are kept to a minimum. <input type="checkbox"/> Sight lines around the station are unobstructed. <p>Architectural features:</p> <ul style="list-style-type: none"> <input type="checkbox"/> "No Trespassing" signage is provided where applicable. <input type="checkbox"/> Instructions are posted or broadcasted on how to report suspicious activity. <input type="checkbox"/> Bright paint colors are used to increase ambient lighting. 	<p>Comments or other strategies used:</p>

PERFORMANCE STANDARD AND FUNCTIONAL AREA CONSIDERATIONS	EVALUATION
<p style="text-align: center;">STATIONS AND TERMINALS (BUS OR RAIL) (continued)</p> <p>Interior layout:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Interior station layout provides unobstructed sight lines, minimizing hidden areas or remote passageways. <input type="checkbox"/> Kiosks, ads and other information are positioned so they don't disrupt sight lines. <input type="checkbox"/> Columns and blind corners are minimized. <input type="checkbox"/> Security mirrors are installed on columns and corners. <input type="checkbox"/> Operator booth is positioned for maximum presence and visibility within station. <input type="checkbox"/> Nonpublic facilities are hidden and not identified. <p>Systems and services:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Appropriate surveillance is provided at entrances, at access points to nonpublic areas and throughout the station. <input type="checkbox"/> Sufficient lighting is provided for nighttime surveillance. <input type="checkbox"/> Intrusion alarms are installed at access points to nonpublic areas. <input type="checkbox"/> Communication links to administrative and emergency response centers are provided. <input type="checkbox"/> Backup emergency lighting is installed. 	<p>Comments or other strategies used:</p>
<p style="text-align: center;">ELEVATED STRUCTURES</p> <p>Site layout:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Access to land below structure is restricted, where possible. <input type="checkbox"/> Structure is set back from roads, parking areas and other buildings, if possible. <input type="checkbox"/> Physical barriers such as fences, bollards and fenders enforce setbacks and prevent ramming. <input type="checkbox"/> Adjacent roadways are designed to inhibit high-velocity ramming of columns. <input type="checkbox"/> Clear sight lines are provided under and around the structure. <p>Interior layout:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Emergency and maintenance access points are limited. <p>Architectural features:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Emergency and maintenance access points are secured with gates, locks or other access-control measures. <input type="checkbox"/> "No Trespassing" signage is provided where applicable. <input type="checkbox"/> Columns are made difficult to climb (by choice of materials, dimensions or barriers such as fences). 	<p>Comments or other strategies used:</p>
<p style="text-align: center;">STRATEGIES FOR TRANSIT STOPS</p> <p>Site layout:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Physical barriers such as bollards and fencing are provided to prevent ramming, or to prevent unauthorized access if the stop has a segregated transit way. <p>Interior layout:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Kiosks, ads and information are positioned so as to not disrupt sight lines. <p>Architectural features:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Signage deters nontransit vehicles from the stop area. <p>Systems and services:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Emergency call boxes are provided report incidents. <input type="checkbox"/> Adequate lighting is provided for surveillance. 	<p>Comments or other strategies used:</p>

PERFORMANCE STANDARD AND FUNCTIONAL AREA CONSIDERATIONS	EVALUATION
<p style="text-align: center;">ADMINISTRATIVE BUILDINGS AND OCCs</p> <p>Site layout:</p> <ul style="list-style-type: none"> <input type="checkbox"/> The number of access points is minimized. <input type="checkbox"/> Building entrances face away from unsecured areas. <input type="checkbox"/> Sight lines are unobstructed around the building. <p>Interior layout:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Building layout provides unobstructed sight lines, minimizing hidden areas and blind corners. <p>Architectural features</p> <ul style="list-style-type: none"> <input type="checkbox"/> Critical equipment is secured with gates, locks or other access-control measures. <input type="checkbox"/> "No Trespassing" signage is provided where applicable. <input type="checkbox"/> Sufficient lighting is provided for nighttime surveillance. <input type="checkbox"/> Appropriate surveillance and access management system are provided at entrances. <input type="checkbox"/> Backup emergency lighting is provided. 	<p>Comments or other strategies used:</p>
<p style="text-align: center;">MAINTENANCE AND STORAGE FACILITIES</p> <p>Site layout:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Structure and vehicle-storage areas are set back from roads and public parking areas. <input type="checkbox"/> Physical barriers such as bollards, fencing and grade changes are used to enforce setbacks and secure the perimeter. <input type="checkbox"/> The number of access points is minimized. <input type="checkbox"/> Staffed security checkpoints are provided at site access points. <input type="checkbox"/> Sight lines are unobstructed throughout the site. <input type="checkbox"/> The parking area is segregated from transit vehicles and fuel storage. <p>Interior layout:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Building layout provides unobstructed sight lines, minimizing hidden areas and blind corners. <p>Architectural features:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Rolling doors restrict view or access into maintenance barns. <input type="checkbox"/> Critical equipment is secured with gates, locks or other access-control measures. <p>System and services:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Remote surveillance and alarm systems are installed. <input type="checkbox"/> Sufficient lighting is provided for nighttime surveillance. <input type="checkbox"/> Backup emergency lighting is provided. 	<p>Comments or other strategies used:</p>

PERFORMANCE STANDARD AND FUNCTIONAL AREA CONSIDERATIONS	EVALUATION
<p style="text-align: center;">TRACK, TUNNEL AND RIGHT OF WAY (RAIL ONLY)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Tracks and track right-of-way are protected against encroachment and unauthorized access. <input type="checkbox"/> Vegetation is eliminated from the track right-of-way and kept low in the areas adjacent to tracks. <input type="checkbox"/> Signage warn of potential dangers. <input type="checkbox"/> Natural barriers are used whenever possible. <input type="checkbox"/> Clearly identified boundary lines are established. <input type="checkbox"/> Tunnels are adequately illuminated. <input type="checkbox"/> Rooms, used or unused, are well-secured. <input type="checkbox"/> Intrusion detection prevents unauthorized entrance into tunnels, exits and ventilation shafts. <input type="checkbox"/> Access control is provided for employees into tunnels, shafts, etc. <input type="checkbox"/> Provisions are made for people to call for help. <input type="checkbox"/> Walkways are clearly identified. <input type="checkbox"/> Access points are isolated from public roadways and parking areas. <input type="checkbox"/> Physical barriers such as ditches, bollards, road spikes and fencing are provided around portals and other access points. <input type="checkbox"/> Vent ducts are situated in self-contained secure buildings, locked, elevated and hidden. <input type="checkbox"/> Tunnels do not contain unnecessary niches that may conceal people or explosives. <input type="checkbox"/> Physical barriers shield tunnel walkway from platform or portal access. <input type="checkbox"/> Emergency exit doors lock from the outside but allow unimpeded egress during emergencies. <input type="checkbox"/> Solid access doors are provided to ventilation shafts whenever grating is unnecessary. <input type="checkbox"/> "No Trespassing" signage is provided where applicable. 	<p>Comments or other strategies used:</p>

References

American Society for Industrial Security (ASIS), "International Glossary of Security Terms."

<http://www.asisonline.org/library/glossary/index.xml>

Crowe, Timothy, *Crime Prevention Through Environmental Design (CPTED)*, 2nd edition, Butterworth-Heinemann, 2000.

Johns Hopkins University Center for Technology in Education, CPTED definition, 2008. info@cte.jhu.edu

Transportation Research Board, NCHRP Report 525, *Surface Transportation Security Volume 14, Security 101: Physical Security Primer for Transportation Agencies*, 2009.

http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_525v14.pdf

Transportation Research Board, TCRP Report 86, *Public Transportation Security Volume 4, Intrusion Detection for Public Transportation Facilities Handbook*, 2003.

http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_86v4.pdf

U.S. Department of Transportation, *Transit Security Design Considerations*, FTA-TRI-MA-26-7085-05, November 2004. <http://transit-safety.fta.dot.gov/security/SecurityInitiatives/DesignConsiderations/CD/front.htm>

U.S. Department of Transportation Transit Safety Institute, *Crime Prevention Through Environmental Design*, FT00531, 2009.

Virginia Crime Prevention Association, *Safer by Design: Creating a Safer Environment in Virginia*, 2004.

<http://www.illinoislighting.org/resources/VCPA%20CPTED%20Guidelines.pdf>

Definitions

activity support: Placing activities in public spaces that are intended for use by residents or customers and other legitimate users and, therefore, discourage criminal or undesirable activity.

asset: Any real or personal property, tangible or intangible, that a company or individual owns that can be given or assigned a monetary value.

crime generators: Locations and activities that have the propensity to generate crime in the surrounding area.

crime statistics: The tabulations of crimes by time, geography, characteristics of offenders and victims, modus operandi, effectiveness of police response, arrests, convictions, sentences and other data.

design conflict: Two incompatible activities that are located next to each other and are forced to compete for the same space.

maintenance: The continued care and upkeep of a space for its intended purpose. It also serves as an expression of ownership.

natural access control: The physical channeling of people coming and going from a space by the judicious placement of entrances, exits, fencing systems, landscaping and lighting.

nonrevenue transit facility: A non-publicly accessible transit facility or the non-publicly accessible portion of a mixed revenue/nonrevenue facility, i.e. operations control centers, maintenance facilities, bus vehicle storage yards, rail vehicle storage yards, traction power substations, communication rooms, train control rooms, emergency fan plants, elevator rooms, passenger station ancillary rooms and other similar facilities.

natural surveillance: The placement of physical features, activities, and people in a way that maximizes visibility.

revenue transit facility: A publicly accessible transit facility or the publicly accessible portion of a mixed revenue/nonrevenue facility, i.e. passenger stations and terminals.

risk assessment: A formal methodical process used to evaluate risks to a transit system. The security portion of the risk assessment identifies security threats (both terrorism and crime) to the transit system; evaluates system vulnerabilities to those threats; and determines the consequences to people, equipment and property.

station: A type of public transportation passenger facility designated for the purpose of boarding and alighting passengers. Station features and amenities may include information/waiting areas, boarding and alighting platforms, ticket/fare card sales, turnstiles or other fare collection equipment, restrooms, concourses, mezzanines, vendor shops and other related facilities.

transit agency: A representative organization that operates transit and other transportation related services.

target hardening: Providing physical security to a target making it more resistant to attack.

territorial reinforcement (territoriality): The use of physical attributes that express ownership such as fences, signage, landscaping, lighting, pavement designs, etc.

unassigned space: Sites built with spaces that have no assigned purposes and no one to exercise control over them.

Abbreviations and acronyms

ADA	Americans with Disabilities Act
APTA	American Public Transportation Association
ASIS	American Society for Industrial Security
CCTV	closed-circuit television
CPTED	crime prevention through environmental design
FTA	Federal Transit Administration
IESA	Illuminating Engineering Society of America
NCHRP	National Cooperative Highway Research Program
OCC	operations and control center
TCRP	Transit Cooperative Research Program
TSI	Transportation Safety Institute