

Design with Security in Mind

Enhance Safety through Programming & Analysis, Project Planning & Design, and Maintenance or Post-Occupancy of Educational Facilities



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Enhance **Safety** through **Programming & Analysis**,
Project Planning & Design, and
Maintenance or Post-Occupancy of Educational Facilities



Contact
Information



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Presentation



01 CPTED

02 Programming & Analysis

03 Project Planning & Design

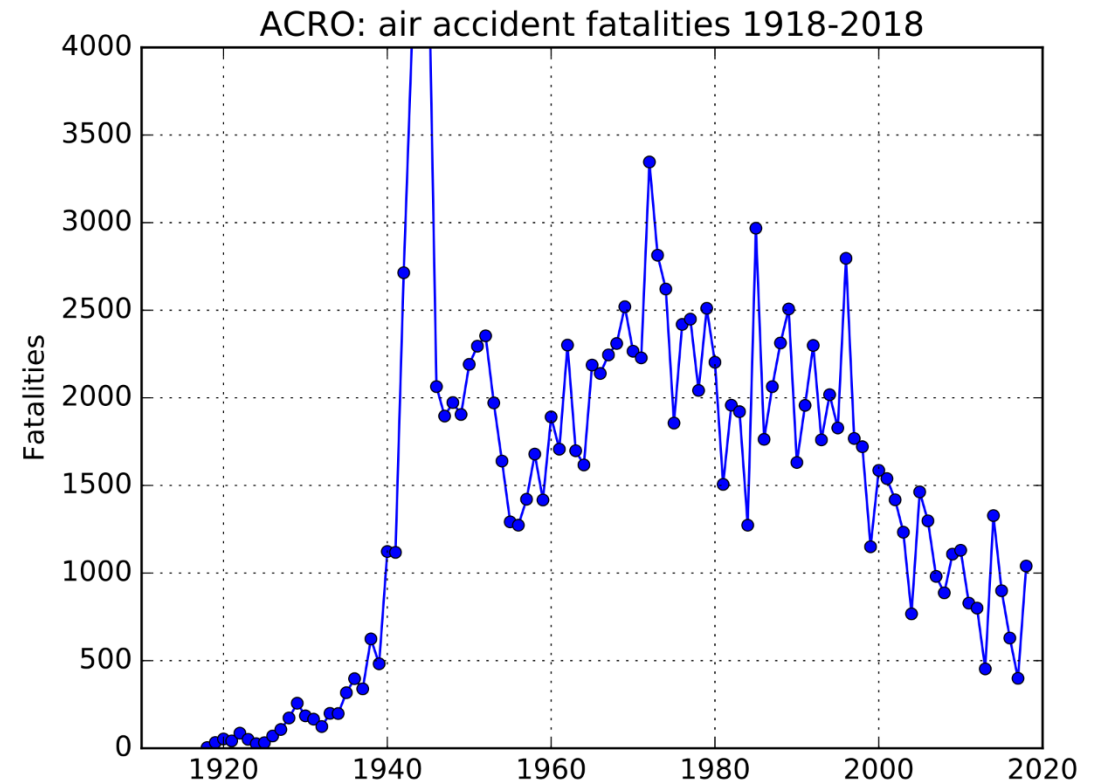
04 Maintenance or Post-Occupancy



- Data analysis
- Standardized training
- Oversight
- Incident reporting
- A mindset that “No crashes are acceptable culture”.

“If Security is treated as a design requirement, it will be seen as no greater burden than fire safety or landscaping features.”

-Randall Atlas Ph.D. AIA



Safe Schools Task Force: <https://schoolsafety.a4le.org/school-facilities/>

School Facilities:

School facilities play a key role in creating a safe school environment.

Preparedness and response policies and procedures can be aided by a school facility that is built to respond to specific needs. The School Facilities section of this web portal focuses on helping schools, school districts and school designers learn about strategies to design and build safe inviting schools as well as tools to assess and address needs in existing schools.

- **Crime Prevention Through Environmental Design**
- **History**
- **Modern CPTED Theory**
- **What CPTED is NOT**
- **Basic Principles of CPTED**



- Local Code & IBC supersedes CPTED strategy recommendations / practices
- CPTED is a guideline providing techniques and strategies. In a few areas CPTED strategies may conflict with the Uniform Building Code (UBC) or International Building Code (IBC) in some occupancy types, in that instance the USBC/IBC will be the prevailing document.
- Some CPTED techniques and strategies relate to hardening of security devices on windows and doors. Careful attention must be given to this activity, as it could lead to the inability of occupants or firefighters to use normal escape routes.



01

Modern CPTED Theory

02

History

How we got here.

03

2nd Generation CPTEDand 3rd, 4th, 5th Generation CPTED

04

4 D's

Important components of Security Design

05

4 Principles of CPTED

- 
- **Great American Cities by Jane Jacobs 1961**
 - **Defensible Space by Oscar Newman 1972**
 - **Crime Prevention Through Environmental Design by C. Ray Jeffery 1971**
 - **Broken Windows by Wilson and Kelling 1988**
 - **2nd Generation CPTED 1997**



Jane Jacobs

Streets are less attractive to criminals when they are bustling with activity and opportunities for watching.

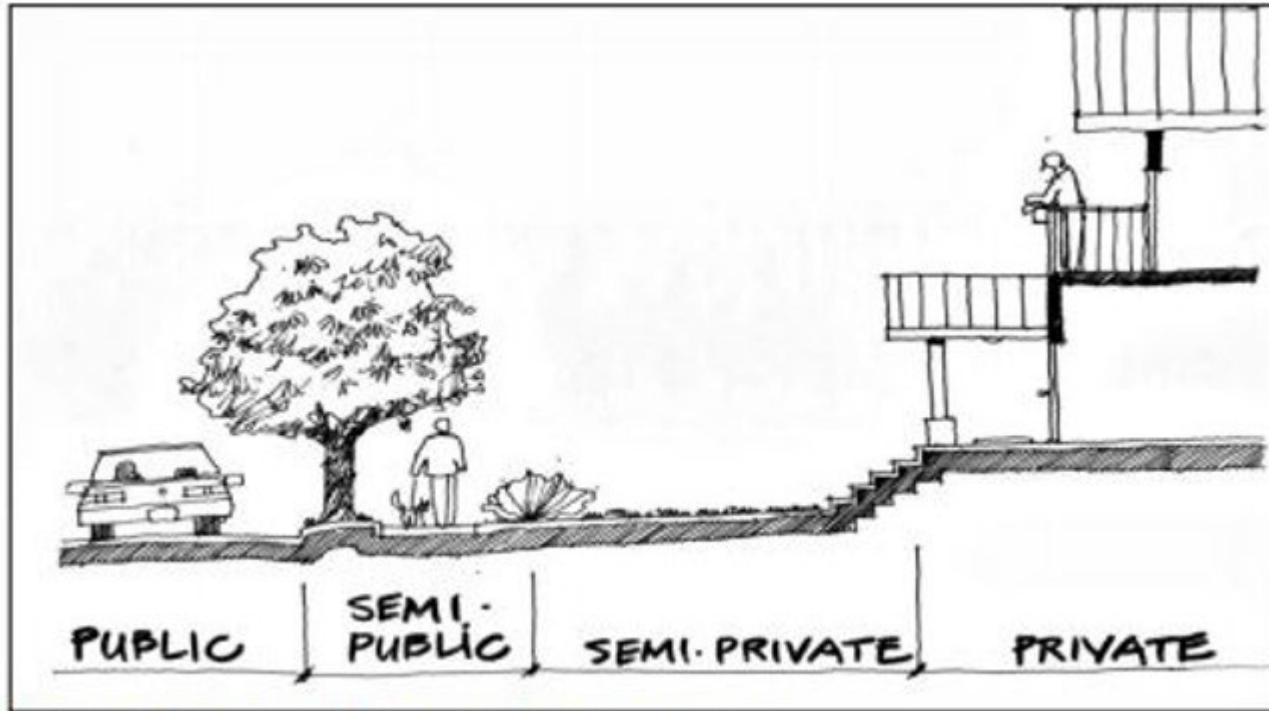


Figure 5. Transitional Zones or Hierarchy of Space

This form of personalization can be achieved by using real or symbolic definitions through:

- Building design and layout;
- Landscaping
- Paving stone, pavement stamping
- Raised or textured surfaces
- Changes in grade
- Fences, signage and wayfinding
- Use of color, artwork, murals
- Traffic calming
- Points of interest, community boards

Crime Prevention Through Environmental Desin



C. Ray Jeffery
(1921-2007)

- **CPTED** (*sěp'·těd*) – direct controls over environmental conditions to preclude the occurrence of crime
- Closely related to Newman’s “defensible space” but more diverse and less ‘territorial’
- Three interrelated strategies
 - Access control / target hardening: limit opportunity
 - Organized; mechanical; natural
 - Surveillance: observational monitoring
 - Territorial reinforcement: sense of ownership

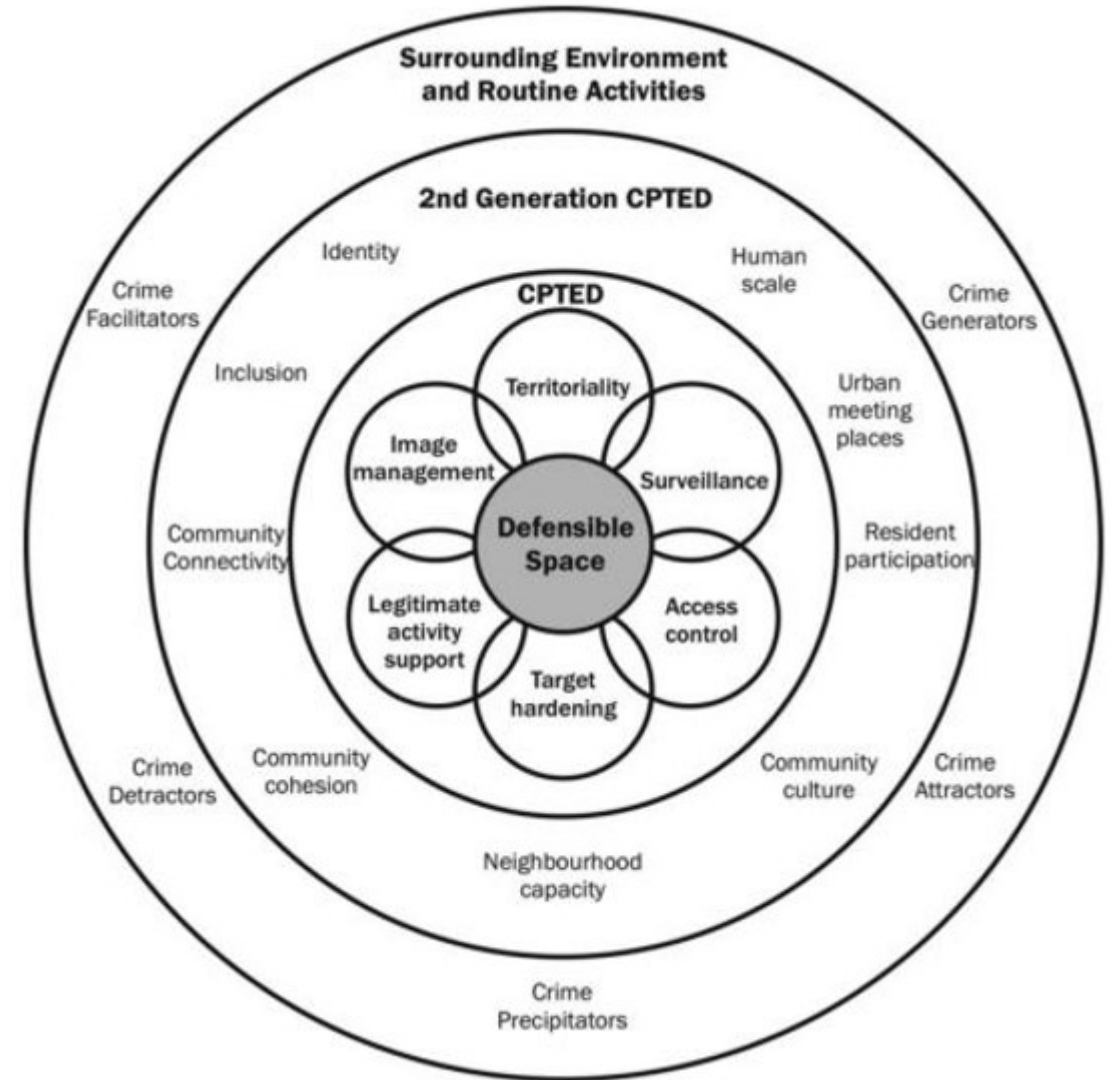
- **Broken Windows by Wilson and Kelling**

“If a window in a building is broken and left unrepaired, all the rest of the windows will soon be broken...”



“...one unrepaired broken window is a signal no one cares, and so breaking more windows costs nothing” 13

In 1997, an article by Greg Saville and Gerry Cleveland, 2nd Generation CPTED, exhorted CPTED practitioners to consider the original social ecology origins of CPTED, including **social** and **psychological issues** beyond the built environment.



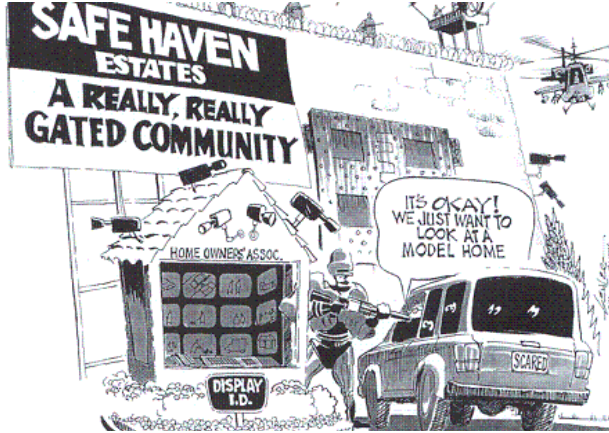
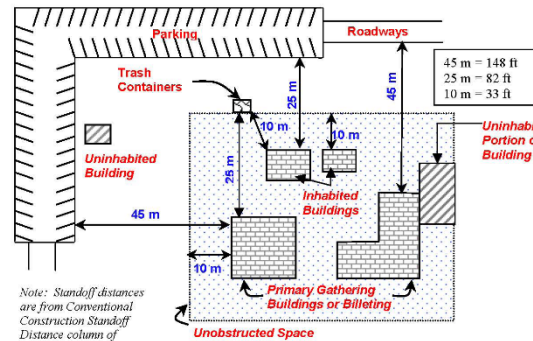


Figure B-2 Standoff Distances and Building Separation – No Controlled Perimeter



Note: Standoff distances are from Conventional Construction Standoff Distance column of Table B-1

B-3





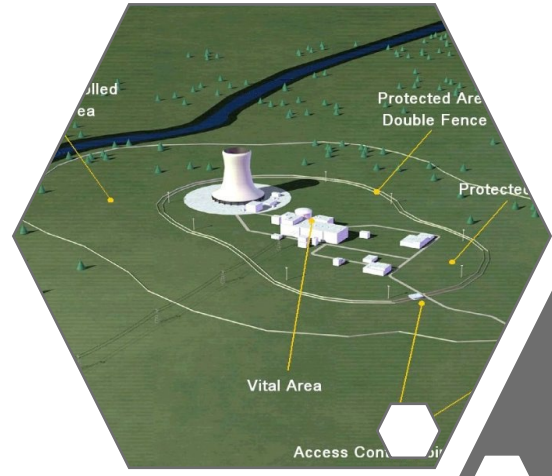
Deter



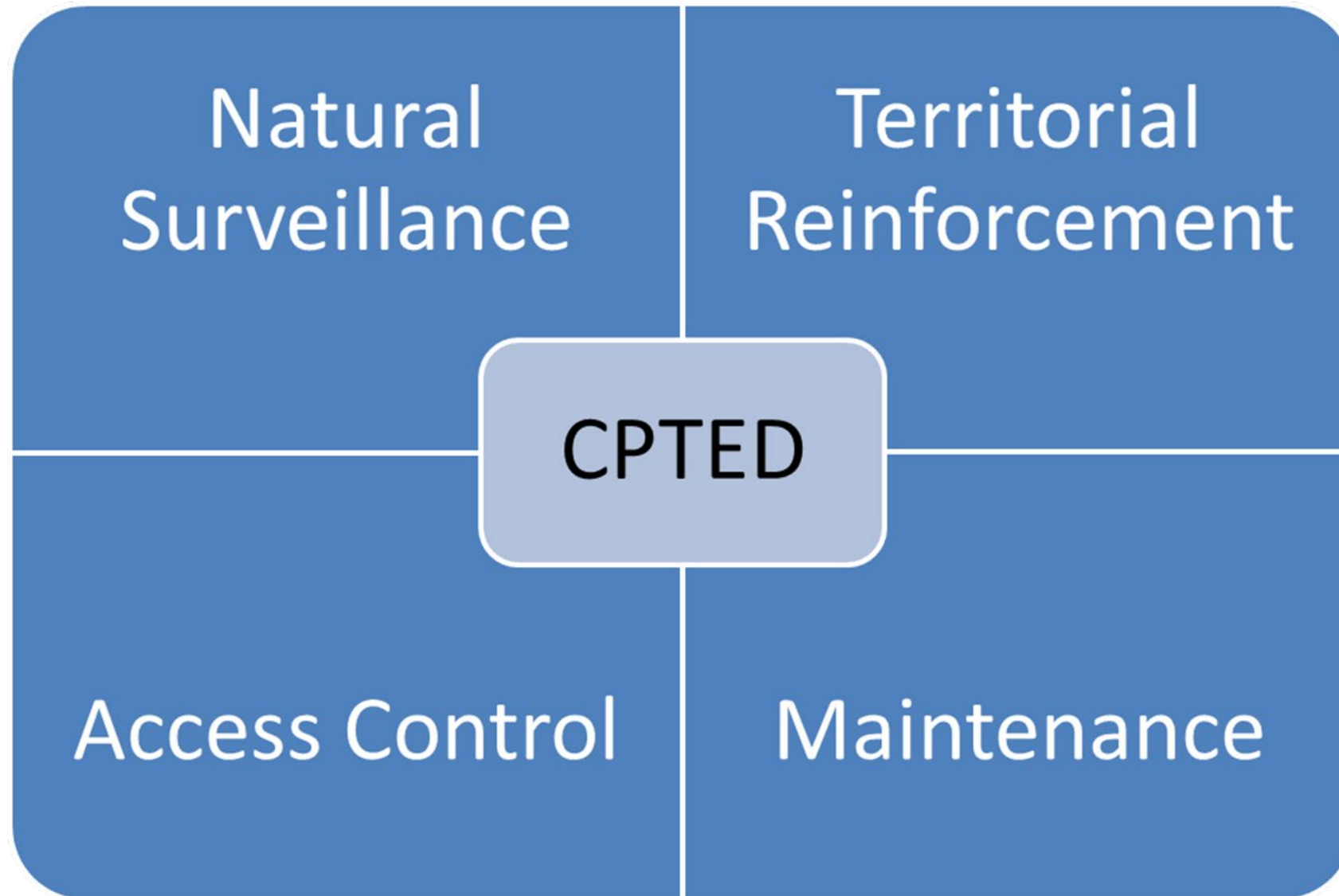
Detect

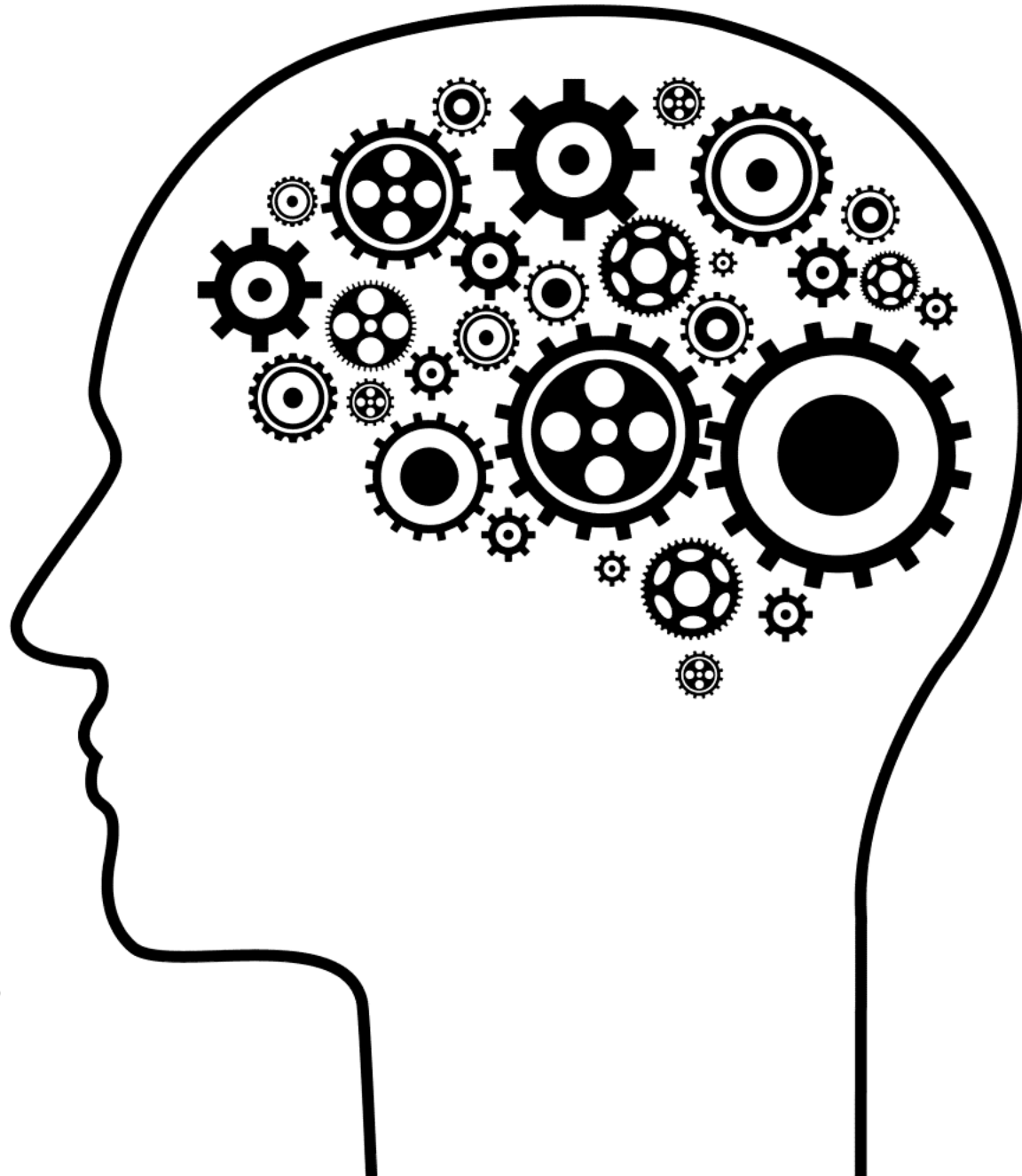


Deny / Recover




Delay





QUESTIONS?
THOUGHTS?

BREAK



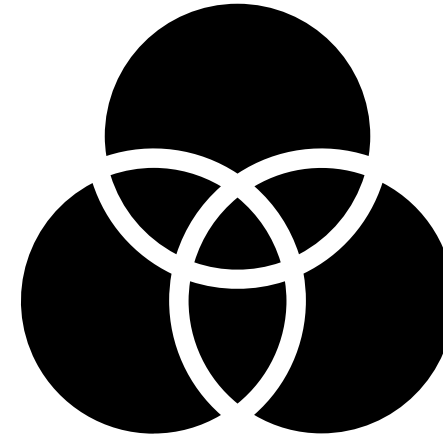
Sun Tzu

To... not prepare is the greatest of crimes; to be prepared beforehand for any contingency is the greatest of virtues.

AZ QUOTES

The image features a central black rectangular area with a decorative white border. On the left side of this area is a photograph of a stone statue of Sun Tzu, a Chinese general and strategist. To the right of the statue, the name 'Sun Tzu' is written in white. Below the name is a quote in white text: 'To... not prepare is the greatest of crimes; to be prepared beforehand for any contingency is the greatest of virtues.' At the bottom center of the black area, the text 'AZ QUOTES' is displayed in white, with 'AZ' in orange and 'QUOTES' in white.

Programming refers to the uses and activities that take place within a space. By analyzing the programming of a space, it is possible to identify potential areas of vulnerability and develop strategies to reduce the risk of crime.



Analysis involves examining crime statistics and patterns to identify the types of crimes that are most likely to occur in a particular area. This information can be used to inform design decisions and develop strategies to prevent crime.

General All-Hazards Risk Matrix

The goal is to help stakeholders in planning and design of educational facilities answer the following questions:

- How to identify and prioritize threats?
- How to choose effective countermeasures?
- How to prioritize the choices within budget constraints?



During Project Planning & Design Phase we must 1st understand RISK.

- Threat
- Asset
- Vulnerability



<https://schoolsafety.a4le.org/school-facilities/>



Types of threats to schools:

Human:

- Vehicle attack (bomb)
- Bullying
- Vandalism
- Theft
- Active shooter
- Arson

Natural:

- Tornado
- Hurricane
- Flood
- Earthquake
- Fire (includes accidental)
- Landslide
- Snow
- Storm surge/tsunami
- High winds

Can you think of other threats?

- Biological
 - diseases, insect/animal infestation, etc.
- Accidental
 - train derailment, power failure, etc.
- Others?

The threats are assigned a level of likelihood.

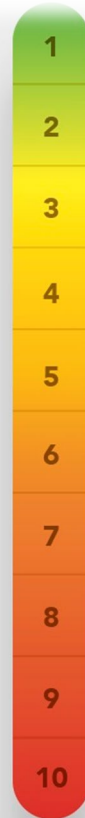
The WBDG document lists 4 threats levels:

❖ Minimal

❖ Potential

❖ Credible

❖ Defined



<u>Definitions of threats:</u>	
<u>Almost non-existent (DGL addition to WBDG):</u>	
	<ul style="list-style-type: none"> • Human: No known aggressors • Natural: Either extremely rare or very distant in future
<u>Minimal:</u>	
	<ul style="list-style-type: none"> • Human: No known aggressors • Natural: Rare or unknown occurrences
<u>Potential:</u>	
	<ul style="list-style-type: none"> • Human: Known that aggressors do target this type of facility, but there is no history of aggression at specific facility or in area • Natural: sporadic occurrences
<u>Credible:</u>	
	<ul style="list-style-type: none"> • Human: Known that aggressors do target this type of facility, and there is a history of aggression at specific facility or in area • Natural: periodic occurrences
<u>Defined:</u>	
	<ul style="list-style-type: none"> • Human: Known aggressor with stated intent • Natural: frequent occurrences

Table 2: Definitions of Threats

Asset value Assessment

(Scale 1-10, with 10 being most important)

Occupied

Vs.

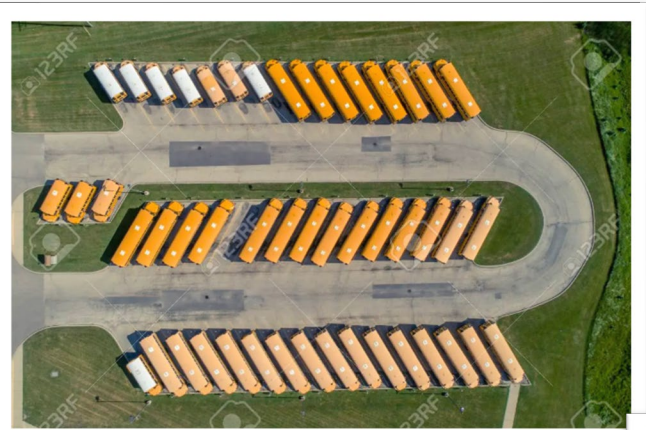
Non-occupied

Critical Infrastructure

Supply Chain

Reputation of or Confidence in Entity





Impact of Loss: Degree to which the mission of the agency is impaired by a successful attack from the given threat.

- **Minor:** The facility experiences no significant impact on operations or assets
- **Noticeable:** The facility is temporarily closed or unable to operate, and/or there is limited damage to assets
- **Severe:** The facility is partially damaged/contaminated and must be closed partially or entirely for an extended period; functions must be relocated during reconstruction
- **Devastating:** The facility is damaged/contaminated beyond habitable use, with most assets damaged beyond repair or use; functions must be permanently relocated

Table 3: Impact of Loss



RATING CATEGORY	DESCRIPTION
Very High 8-10	The risk is totally unacceptable. Immediate measures must be taken to reduce these risks and mitigate hazards.
High 6-7	The risk is unacceptable. Measures to reduce risk and mitigation hazards should be implemented as soon as possible.
Medium 4-5	The risk may be acceptable over the short term. Plans to reduce risk and mitigate hazards should be included in future plans and budgets.
Low 1-3	The risks are acceptable. Measures to further reduce risk or mitigate hazards should be implemented in conjunction with other security and mitigation upgrades.

Table 6: Interpretation of the risk ratings

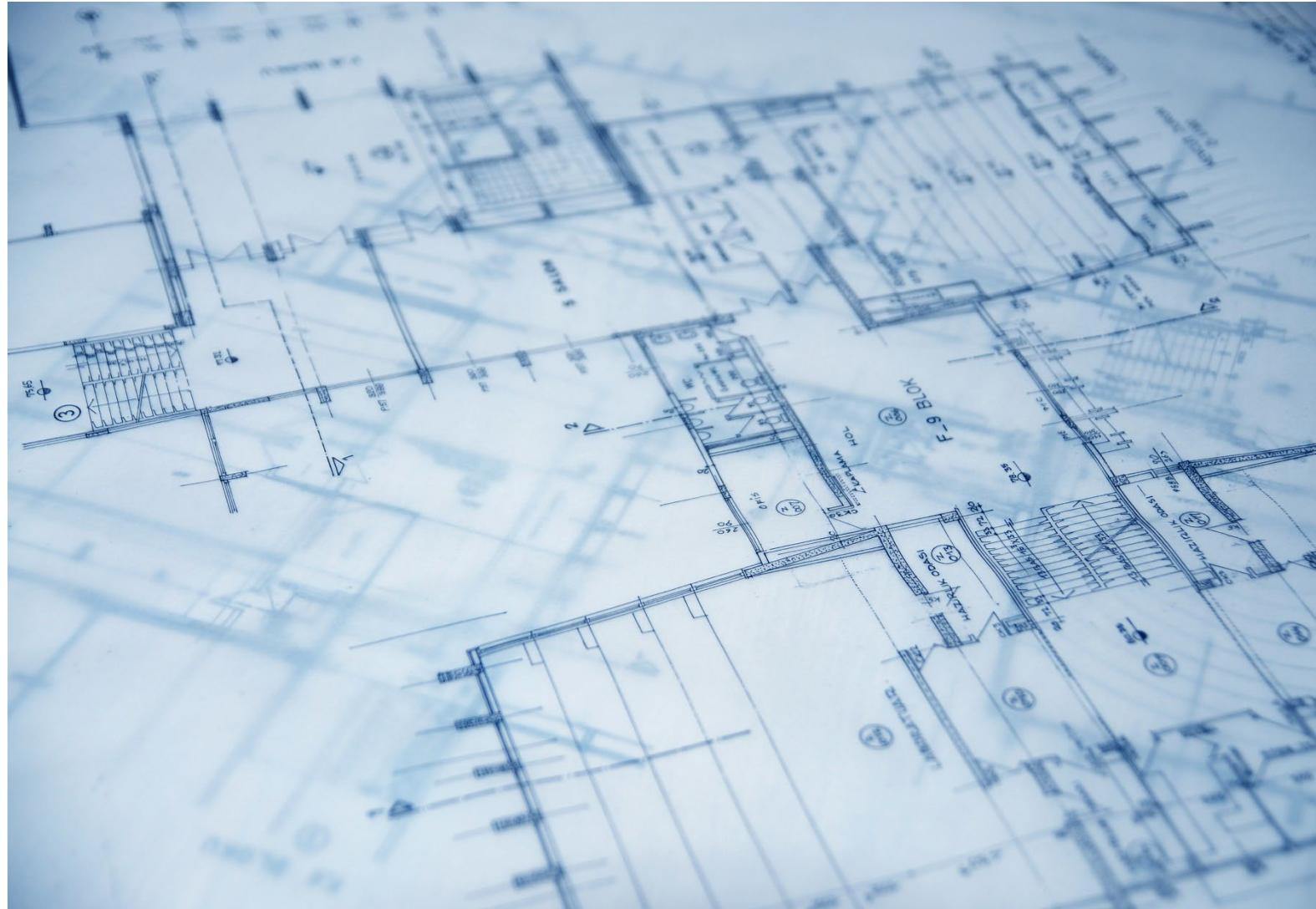
General All-Hazards Risk Matrix

Function (i.e. People)	Natural Hazards						Man Made Threats												
	Drought / Extreme Heat	Earthquake	Flood	Landslide / Sinkhole	Severe Storm / Lightning	Wind	Aircraft Impact	Armed Attack	Civil Disruption	Communication Disruption	Criminal (Espionage)	Criminal (Armed Assault, Larceny, Robbery, Theft)	Cyber Attack	EMP	Explosive Blast	Fire/Arson	Kidnapping / Hostage	Sa	
Building Lobby (1st)	28	28	70	28	112	168	105	252	210	21	7	336	56	14	420	70	280	28	
Computer Lab	96	24	180	24	240	108	90	96	108	162	36	216	432	120	360	210	90	36	
CIO Data Center	56	42	175	42	336	126	63	84	84	189	42	252	504	140	420	245	35	42	
Classrooms	20	20	75	20	80	90	75	100	60	30	10	60	40	10	300	150	125	5	
Executive Suite (Dean's Office)	28	28	175	28	112	126	105	168	252	126	42	210	280	70	420	210	210	21	
Site	12	12	75	12	48	54	45	60	108	45	15	90	24	18	180	75	75	15	
Architectural	8	20	50	20	80	60	42	32	24	6	2	12	16	4	120	50	10	10	
Structural Systems	32	96	80	48	64	96	120	64	96	24	16	48	64	16	480	120	40	8	
Envelope Systems	96	96	80	48	256	336	168	64	96	24	16	48	64	16	480	200	40	24	
Utility Systems	84	84	140	42	168	84	105	56	84	42	14	42	168	140	420	70	35	21	
Mechanical Systems	64	64	160	48	256	144	144	64	96	120	16	48	320	112	480	120	40	24	
Plumbing/Gas Systems	24	48	60	24	48	36	54	48	72	18	6	36	48	12	360	90	30	6	
Electrical Systems	120	80	200	20	320	180	180	80	120	150	20	60	400	160	600	150	50	30	
Fire Alarm Systems	48	48	60	12	144	72	108	96	144	54	6	36	144	84	360	90	30	12	
IT/Communications Systems	72	48	90	12	240	144	108	72	72	90	12	144	240	108	360	90	30	18	

Any Questions?



Safety through Project Planning & Design of Educational Facilities



Natural Surveillance is a design strategy which mainly aims at keeping potential intruders under observation.

The primary goal of an access control strategy is to deny access.







Large windows promote casual supervision of sidewalk.

Porches and sidewalk encourage interaction between neighbors.

Paving and architectural treatments define public and private zones.

Good pedestrian-scaled lighting on street.

Low landscaping and fences define property lines without creating hiding places.

Safety through Maintenance or Post-Occupancy of Educational Facilities



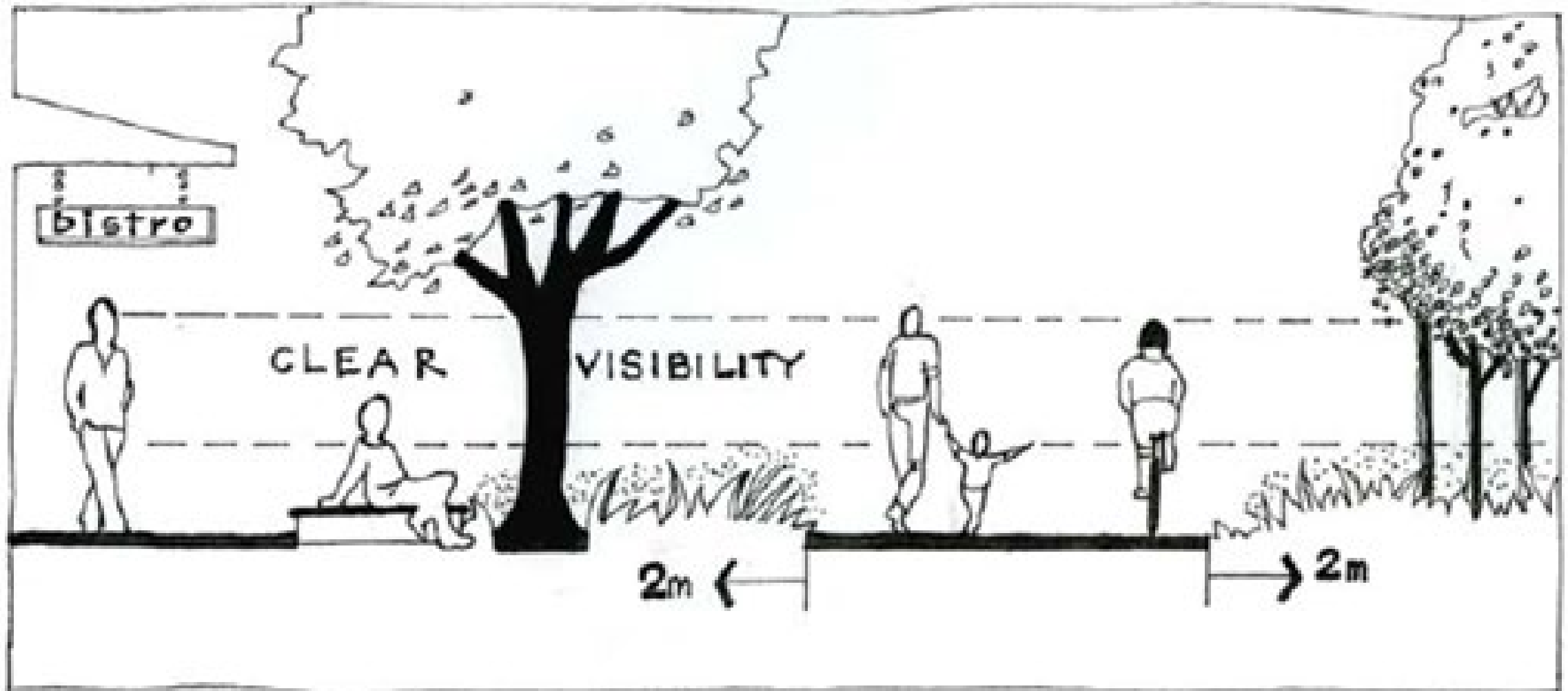
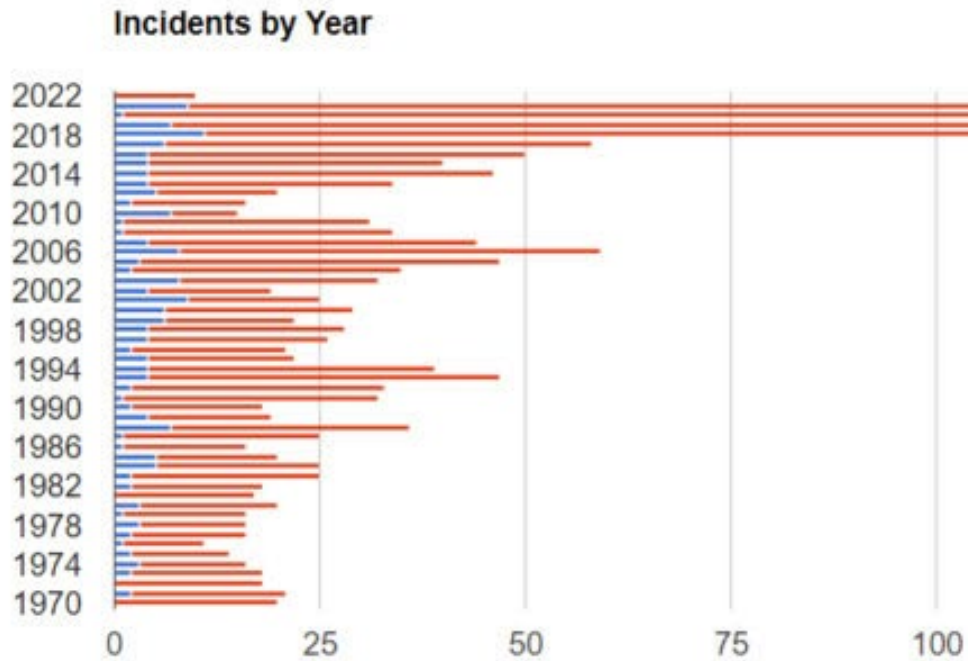


Figure 3. Vegetation should not obscure sight lines and movement



We are stronger TOGETHER!



- Data analysis – Risk Assessment
- Standardized training – a4le
- Oversight
 - Integrate Security Assessment Reviews
- Incident reporting
- A mindset that “No Active Shooter Incidents are acceptable culture”.



Thank You



Contact
Information



Presentation

Resources/Links:

Resources:

1. "Crime Prevention Through Environmental Design, 3rd Edition"; book, (the updated Crowe book, edited by Lawrence Fennelly);
<http://www.amazon.com/Crime-Prevention-Through-Environmental-Design/dp/0124116353>
2. "Annotated Bibliography on CPTED", by Greg Saville, Ph.D., Prof Sean Michaels, and Joel Warren from Utah State University; Today this work remains one of the most expansive CPTED bibliographies in the world. <https://www.cpted.net/CPTED-bibliography>
3. Environmental Protection Agency Risk Assessment <https://www.epa.gov/risk>
4. **a4le Safe Schools Task Force - School Facilities** <https://schoolsafety.a4le.org/school-facilities/> and Risk Assessment Tool
5. 51 Years of Data: K-12 School Shooting Statistics Everyone Should Know
<https://www.campussafetymagazine.com/safety/k-12-school-shooting-statistics-everyone-should-know/>
6. When the shooting stops: recovery from active-shooter events for K-12 schools
<https://calhoun.nps.edu/handle/10945/56864>
7. DOJ: Center for Problem Oriented Policing: Using CPTED in Problem Solving (Diane Zahm): <http://www.popcenter.org/tools/pdfs/cpted.pdf>
8. **21st Century CPTED and Security (Randy Atlas, editor)**; http://www.amazon.com/21st-Century-Security-CPTED-Infrastructure/dp/1439880212
9. National Crime Prevention Council – CPTED Best Practices from Weed and Seed Sites;
<https://www.ncpc.org/resources/files/pdf/training/Best%20Practices%20in%20CPTED%20-2.pdf>
10. National Criminal Justice Reference Service - Florida's Approach to CPTED (by Sherry and Stan Carter), <https://www.ncjrs.gov/pdffiles1/Photocopy/143817NCJRS.pdf>
11. Wikipedia - CPTED; https://en.wikipedia.org/wiki/Crime_prevention_through_environmental_design
12. **International CPTED Association**; <http://www.cpted.net>
13. "The" CPTED LinkedIn Group, representing the largest CPTED group with over 3780+ members; <https://www.linkedin.com/groups/931077>
14. Texas Crime Prevention Association (<http://tcpa.org/>)
15. Texas Gulf Coast Crime Prevention Association (<http://www.tgccpa.org/>)
16. Oklahoma Sheriffs' Association (<https://www.oklahomasheriffs.org/>)
17. National Crime Prevention Council (<http://www.ncpc.org/>)
18. **Your local Law Enforcement Crime Prevention Unit**