



4.4 Building & Site Safety

1. Includes Environmental Health & Safety, Facilities Management, Facilities Development, Campus Planning.
2. Personal safety and security of building occupants can be enhanced by prudent planning and design. Factors to be taken into consideration in the design of space include but are not limited to:

4.4.1 Awareness Of The Surrounding Environment

1. Includes the ability to see, perceive, and to understand the surrounding environment through unobstructed sightlines, adequate lighting, and the indication of possible situations to avoid such as confined and hidden areas

4.4.2 Visibility By Others

1. Includes the ability to be seen by others, reducing potentials for isolation, improving the mix of programmatic uses to create more consistent activity and vitality within a space, intelligent use of activity generators, and the creation of a sense of ownership through maintenance and management of the built environment

4.4.3 Finding Help

1. Includes the ability to communicate, find help, or escape when in danger through improved signs and design

4.4.4 Lighting and Visibility

1. Light fixtures shall be placed so as to eliminate entrapment spots and shall provide a uniform level of lighting minimizing the contrast between light and shadow. Light fixtures which can withstand vandalism and which can be easily maintained shall be provided. Perimeter wall surfaces should be light in colour, which would improve visibility in interior public spaces.
2. Areas of special attention:
 - a. Washrooms
 - i. There must be at least two lighting fixtures, one of which must be on at all times and connected to emergency power.
 - ii. The light switches for the washroom must be controlled. The switches shall either be secure key switches or shall be located within a locked controlled location. They may also be located in an electrical panel, however the breakers or the panel should be locked. This would prevent a person from closing the lights when someone else is still within the washroom.
 - iii. Natural light should be provided if at all possible.

b. Stair Lighting

Refer to Electrical Section 5.17.8.29 “Stairwell lighting design in New building” and Section 5.17.8.30 “Existing stairwell lighting retrofit” for detail of control strategies and requirements.

c. Parking Areas (Surface and Underground)

- i. Lighting levels must be adequate to avoid contrast between light and shadow to eliminate entrapment spots.
- ii. Perimeter wall surfaces and under slab areas shall be light coloured so as to provide maximum reflection.
- iii. The lighting level in underground parking garages shall be a minimum of 5 lux.
- iv. Some lighting fixtures in underground parking garages shall be connected to emergency power.

d. Pathways (Interior and Exterior)

- i. Lighting levels must be adequate to allow an individual to see and identify a person 15 m ahead.
- ii. Lighting levels shall be adequate to provide minimum contrast between light and shadow.
- iii. Lighting levels shall be maintained along a pathway so that promise of safety at the beginning of the path is maintained along its length.
- iv. Temporary lighting shall be provided on hoarding around construction sites.
- v. The designer shall consider providing low level lighting within shrubbery and landscaping.

4.4.5 Sightlines

1. All university buildings and surrounding areas must be designed so as to maximize lines of sight ahead, behind and to the sides. Consultants should utilize barrier materials which are visually permeable and use reflective surface at comers to improve visibility. Maximize clear glazing in areas such as stairwells, elevator lobbies and entrances to offices and work areas. Landscape material should be selected and located so as not to impede long views. Building exterior design and placement should maximize opportunities for overlook and casual surveillance of public spaces.

2. Areas of special attention:**a. Corridors**

- i. Hidden recesses in corridors shall be eliminated.
- ii. In curved or angled corridors, mirrors or mirrored surfaces should be provided to allow a view further ahead.



- iii. Wheelchair ramps are to be as open and transparent as possible. The sides of ramps shall not be constructed of a solid material. A transparent material or pickets providing views through and beyond the ramp shall be used. If the ramp is placed adjacent to a solid wall, the other side should be transparent.
- b. Reception or Reference Areas
 - i. Reception or reference areas shall not be isolated from other offices or areas. Sight lines shall be provided between reception areas and surrounding spaces providing casual surveillance.
- c. Computer laboratories (and other labs)
 - i. In computer laboratories and other areas, it is important to be able to see into these spaces from the corridor, giving people passing by an unobstructed sight line into the spaces and vice versa. In an internal workstation configuration, glass shall be provided in doors and in glazing panels beside doorways.
 - ii. The designer must find solutions which provide proper sight lines, and minimize noise and provide adequate acoustic privacy.
- d. Library Stacks and Storage Shelving
 - i. There must be an ability to see around edges and through stacks/shelves.
- e. Laundry rooms
 - i. Laundry rooms shall be located adjacent to high activity areas such as stores, lounges, recreation rooms etc. There shall be windows located in the doors or walls, so that the other occupants and people passing by can see into the space, providing casual surveillance.
- f. Service areas
 - i. As with laundry rooms, service areas are typically low traffic areas and should be located adjacent to high volume, high traffic areas so that the people occupying that space are not completely isolated.

4.4.6 Entrapment and Movement Predictors

1. Areas of entrapment are to be avoided. Such areas are single entrance/exit offices in areas of low traffic or vulnerable areas such as where student counselling takes place or areas where researchers work at night or during off hours. Other potential areas of entrapment are: unlit recesses, comers or alcoves; small structures (sheds, storage areas) which are unlit or unlocked.
2. Washrooms which are located in low activity areas can be entrapment areas, especially if the entrance configuration is complicated and communication to a corridor is difficult. Single use washrooms are better choices in low activity areas.
3. Incorporate clear glass panes in doors to stairwells, corridors and entrances. Alternative pedestrian routes, multiple exits and choices in direction should be provided wherever



possible. Structures which create entrapment spots shall be avoided. In enclosed public spaces, columns rather than shear walls should be used as structural members.

4. In any area where entrapment is an issue, consideration must be given to communication needs, particularly for emergency assistance.
5. Areas of special attention:
 - a. Corridors
 - i. Corridors with unlit recess shall be avoided. Long corridors should have midway exit possibilities. There should be a choice for exiting or going back.
 - b. Library Stacks and Storage Shelving
 - i. Stacks/shelves must be arranged so as to avoid people becoming trapped in the stack area.
 - ii. Entrapment areas must be avoided and proper sight lines maintained.
 - iii. Moveable stacks must be designed so as to avoid people becoming trapped between them.
 - c. External paths
 - i. External paths shall be designed and located to avoid entrapment areas. Appropriate signage should be located so as to identify a choice in direction or route and where each will lead.
 - ii. All unnecessary corners, planters, walls and fences which could produce entrapment spots shall be eliminated.
 - d. Pathways which force users to go past entrapment areas shall be avoided. Paths shall be designed to allow users several alternate means of movement and a means of escape.
 - e. Edges of Buildings
 - i. Recesses and unlit areas shall be avoided. Reflective surfaces should be provided at corners where appropriate. Proper lighting shall be provided to avoid dark entrapment areas.
 - f. Construction zones with hoarding
 - i. On construction sites, entrapment areas are created by hoarding which is not or cannot be properly secured. As well, inadequately signed or inappropriately signed sites can create entrapment areas. For example, when a construction area interferes with a well travelled path (formal or informal), a safe and usable alternate path must be clearly indicated and properly lit.
 - ii. Proper lighting must be provided on hoarding.



g. Underpasses

- i. Underpasses should be avoided. However, where underpasses are required, they should be wide, well lit and provide an opportunity for a change in direction.

4.4.7 Predictable Routes

1. Predictable routes offer no alternatives for pedestrians in which an attacker can predict where the pedestrian will end up once they are on the path. Examples include pedestrian tunnels, pedways, staircases. Predicted routes are of particular concern when they are also isolated or terminate in entrapment areas. Some design options include:
 - a. improving visibility of and to the predictable routes;
 - b. adequate lighting;
 - c. providing emergency telephone, panic hardware or electronic surveillance;
 - d. improving sightlines along the route;
 - e. identification of alternate routes at the entrance to the predictable routes.

4.4.8 Isolation

1. Isolated activities and those which occur during off hours such as laundry and service facilities shall be located next to high volume, randomly attended activities such as lounges, TV rooms etc. The following measures should be incorporated into the design:
 - a. In areas of low pedestrian traffic, clear, concise and highly visible signage should be used. Clear directions to the nearest communication device/must be given.
 - b. Wherever it is deemed necessary, alert stations (emergency telephones) and/or formal surveillance (i.e. audio or video monitors) should be used to aid in emergency situations.
 - c. Surface parking lots located behind or beside buildings must have sightlines to nearby assistance within the building.
 - d. Clear, concise, diagrammatic building plans should be provided inside the building entrance identifying the location of washrooms, telephones, reception areas, public spaces, cafeterias and lecture halls. Sufficient information, identifying the nearest staffed area or exit should be provided at major decision points within the building.

4.4.9 Communication

1. The need to communicate and to be able to call for assistance in cases of emergency shall be addressed by the provision of a means of communication in areas of greatest vulnerability and potential for confrontation, including cash collection locations, library fine counters, reception counter areas, parking kiosk and other areas where confrontational discussions may occur.



2. A number of design options could be considered, a final system selection being dictated by the specific situation following discussions with the University during the design phase. Some of the design options include:
 - a. provision of alert buttons;
 - b. providing a network communication system through the computer local area network. A distress call could be punched in on the computer and come up on screens in adjacent offices;
 - c. providing emergency phones in problematic areas or isolated areas connected to Campus Security;
 - d. providing a public address system in buildings to facilitate internal building communication;
 - e. maintaining clear sightlines between these areas and adjacent office.

4.4.10 Activity Generators/Activity Mix

1. High risk potential and/or low activity areas should not be isolated but located near or adjacent to high activity areas, e.g. laundry rooms adjacent to common rooms.
2. This should be considered in the following situations:
 - a. Within academic buildings, administrative staff should be located close to academic offices.
 - b. There are situations to be avoided where the office areas and reception areas are far removed from the main doors or entrances to a space thus allowing anyone to enter and wander through the space at anytime.
 - c. Childcare facilities are sometimes situated in isolated locations. They should be located within high activity buildings where possible.
 - d. Special attention shall be paid to the location of pathways, entrances and exits for people with mobility difficulties.



Revision History

| Revision Date | Version | Description |
|----------------------|----------------|---|
| Sept 2018 | 1.1 | Baseline version |
| July 6, 2023 | 1.0 | Added Revision History table to end of document and reset to Version 1.0. |
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