
Designing Your Buildings to Facilitate
Fire Fighting and Rescue Operations
CIVIL DEFENCE SINGAPORE
SINGAPORE CIVIL DEFENCE FORCE * FIRE SAFETY AND SHELTER DEPARTMENT

SCOPE OF PRESENTATION

1. Introduction
2. Site Planning & External Fire Fighting Provisions
   - Fire Engine Access Road
   - Fire Engine Accessway
   - Fire Access Opening
   - Common Questions Raised



INTRODUCTION

Possible Fire Fighting Appliances that can be Deployed:-



- **Fire Engine (Pump Ladder)**
- **Combined Platform Ladder (CPL)**



- **Light Fire Attack Vehicle (LFAV)**
- **Breathing Apparatus Tender (BAT)**



- **Damage Control Tender (DCT)**

FIRE ENGINE ACCESS ROAD

A *fire engine access road* allows a fire engine to move from one location to another within a development for fire fighting purpose;

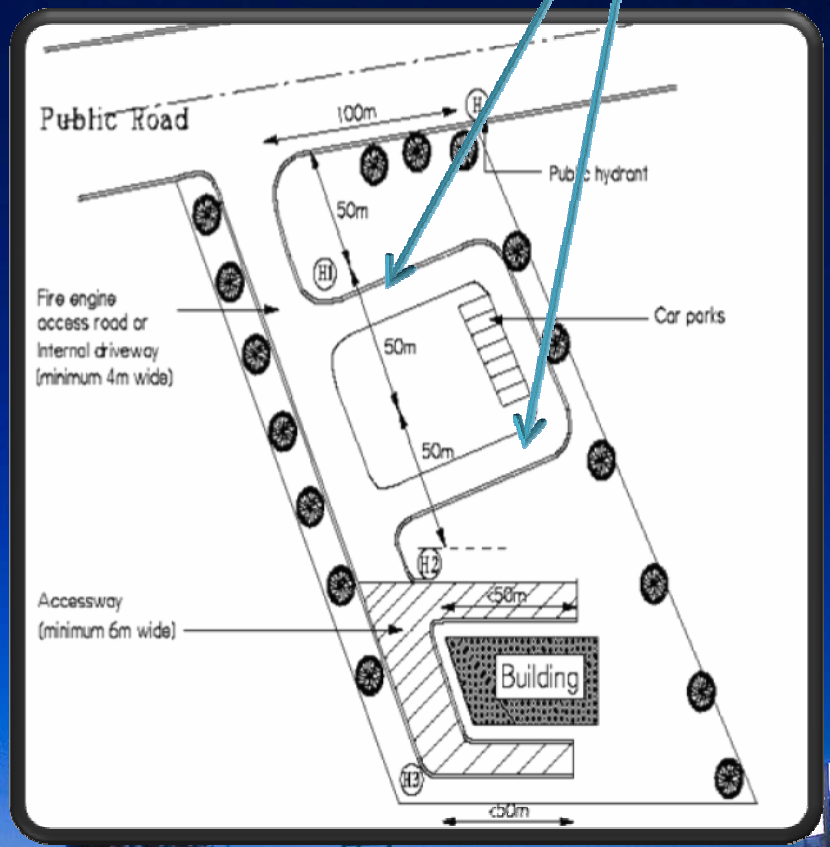




- Minimum width of 4 metres
- Gradient shall not exceed 1:8.3
- Sustain loading capacity of 24 tonnes fire fighting appliance

FIRE ENGINE ACCESS ROAD

Fire engine access road (min 4m wide)





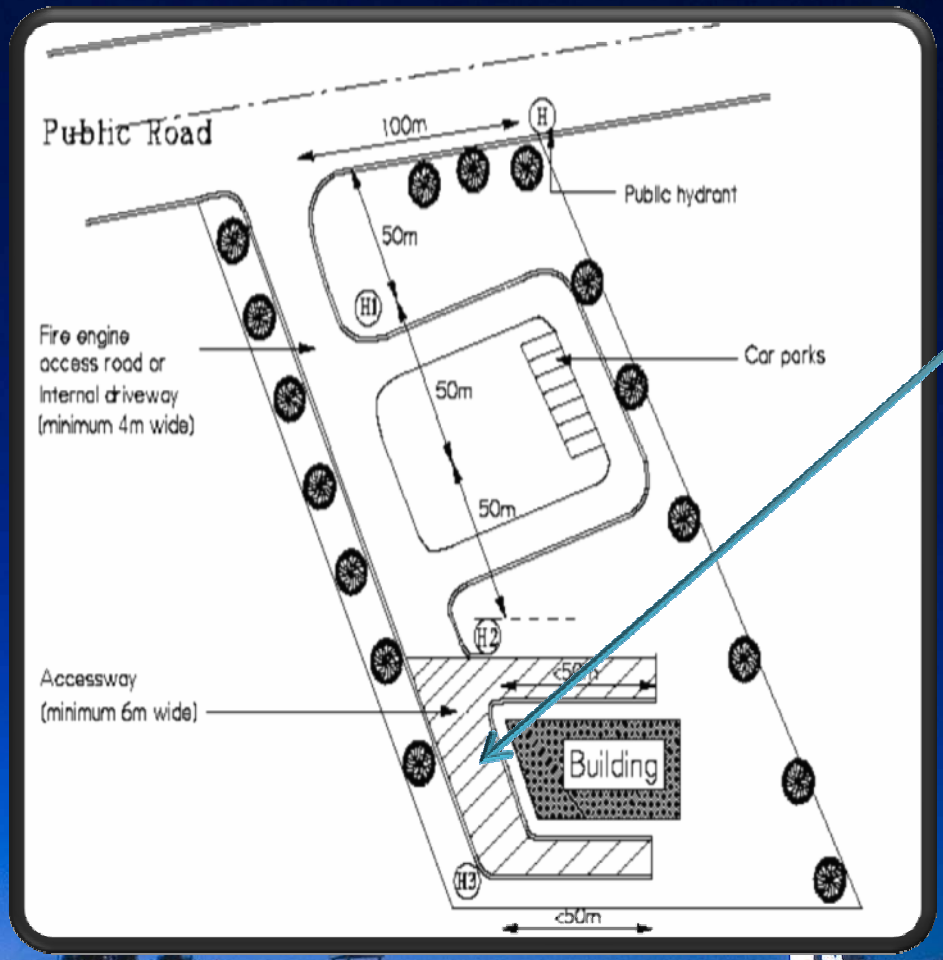
FIRE ENGINE ACCESSWAY

A *fire engine accessway* is a metalled or paved road that had to withstand a loading capacity of a stationary 30 tonnes fire fighting appliance;

- Min width is 6m
- Gradient shall not exceed 1:15
- Nearer edge shall be not less than 2m or more than 10m from centre position of the access opening



FIRE ENGINE ACCESSWAY



Fire engine accessway

(min 6m wide)

ACCESS ROAD FOR FIRE FIGHTING

Purpose group	Habitable Height	Access road/ way?	Note
I (Small residential)	NA	Not required	-
I (Cluster Housing)	-	Access Road	➢ Minimum of 4m ➢ Max. travel distance from the fire appliance to every point on the project plan area of any building shall be 60 m.

ACCESS ROAD FOR FIRE FIGHTING

Purpose group	Habitable Height	Access road/ way?	Note
II (Other residential)	⩽ 10 m	Access Road	➢ Minimum of 4m ➢ Max. travel distance from the fire appliance to every point on the project plan area of any building shall be 60 m.
	> 10 m	Access Road	➢ Minimum of 4m ➢ Sustain load of stationary 30 tonnes ➢ Within 18m of breeching inlet (BI) ➢ BI to be located on external wall above ground level nearest to the vertical run of the riser stack

ACCESS ROAD FOR FIRE FIGHTING

Purpose group	Habitable Height	Access road/ way?	Note
III (Institution) IV (Office) V (Shop) VII (Places of Public Resort)	⩽ 10 m	Access Road	➢ Minimum of 4m ➢ Max. travel distance from the fire appliance to every point on the project plan area of any building shall be <u>45m</u>.

ACCESSWAY FOR FIRE FIGHTING

Purpose group	Habitable Height	Access road/ way?	Note
III, IV, V, VII	> 10 m	Accessway	➢ Accessway shall be located directly below access openings ➢ Accessway to be based on gross floor area of the largest floor in the building

GFA for Non-Sprinklered Building (m2)	GFA for Sprinklered Building (m2)	Site Perimeter of Building
Minimum	Minimum	1/6 or min 15m
2000 – 4000	4000 – 8000	¼
> 4000 – 8000	> 8000 – 16000	½
> 8000 – 16000	> 16000 – 32000	¾
> 16000	> 32000	Island site access

ACCESSWAY FOR FIRE FIGHTING

Purpose group	Habitable Height	Access road/ way?	Note
VI (Factory) VIII (Storage)	-	Accessway	➢ Minimum 6m ➢ Sustain load of stationary 30 tonnes ➢ Within 18m of BI (for buildings > 10m) ➢ Accessway to be based on gross cubical extent of the building

ACCESSWAY FOR FIRE FIGHTING

Volume for Non-Sprinklered Building (m3)	Volume for Sprinklered Building (m3)	Site Perimeter of Building
Minimum	Minimum	1/6 or min 15m
> 28,400	> 56,800	¼
> 56,800	> 113,600	½
> 85,200	> 170,400	¾
> 113,600	> 227,200	Island site access



FIRE ACCESS OPENING

- Opening on external wall for external fire fighting and rescue operations
  - For aerial vehicles
  - To provide up to 60m



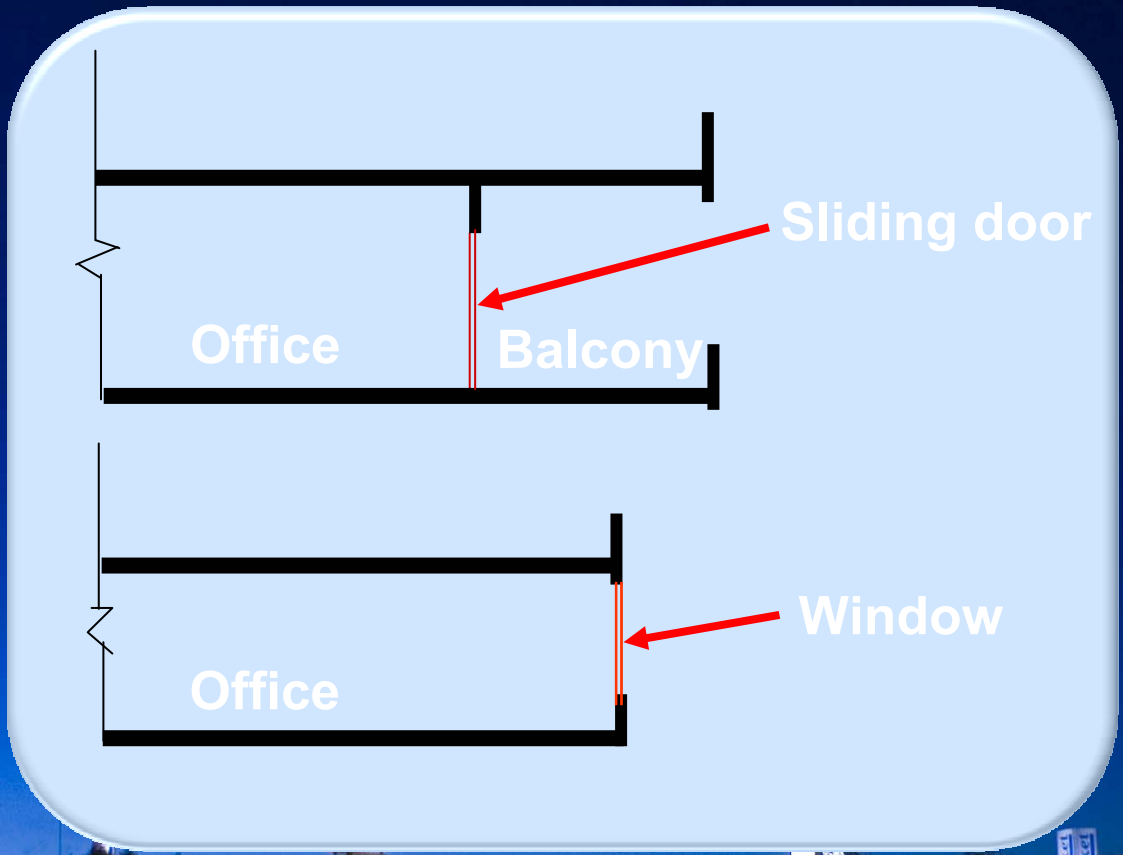
- Readily openable from inside and outside
- Unobstructed at all times



- No need to designate any access opening if external wall faces the accessway has external openings on each storey level.

FIRE ACCESS OPENING

Balcony and window as access openings

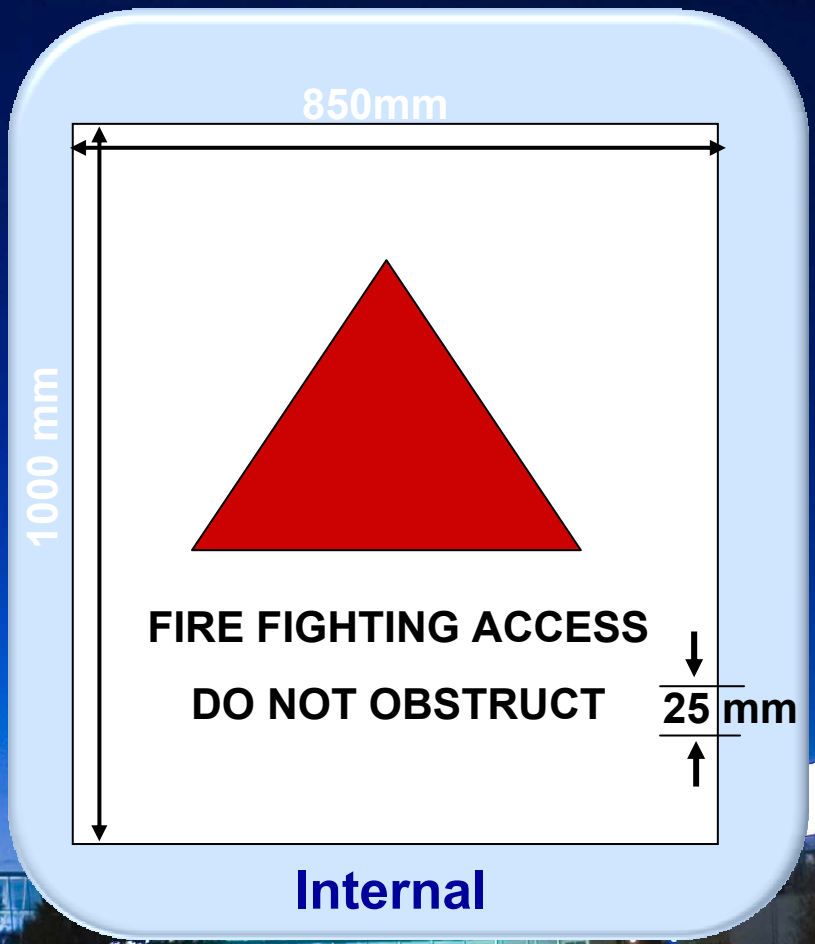


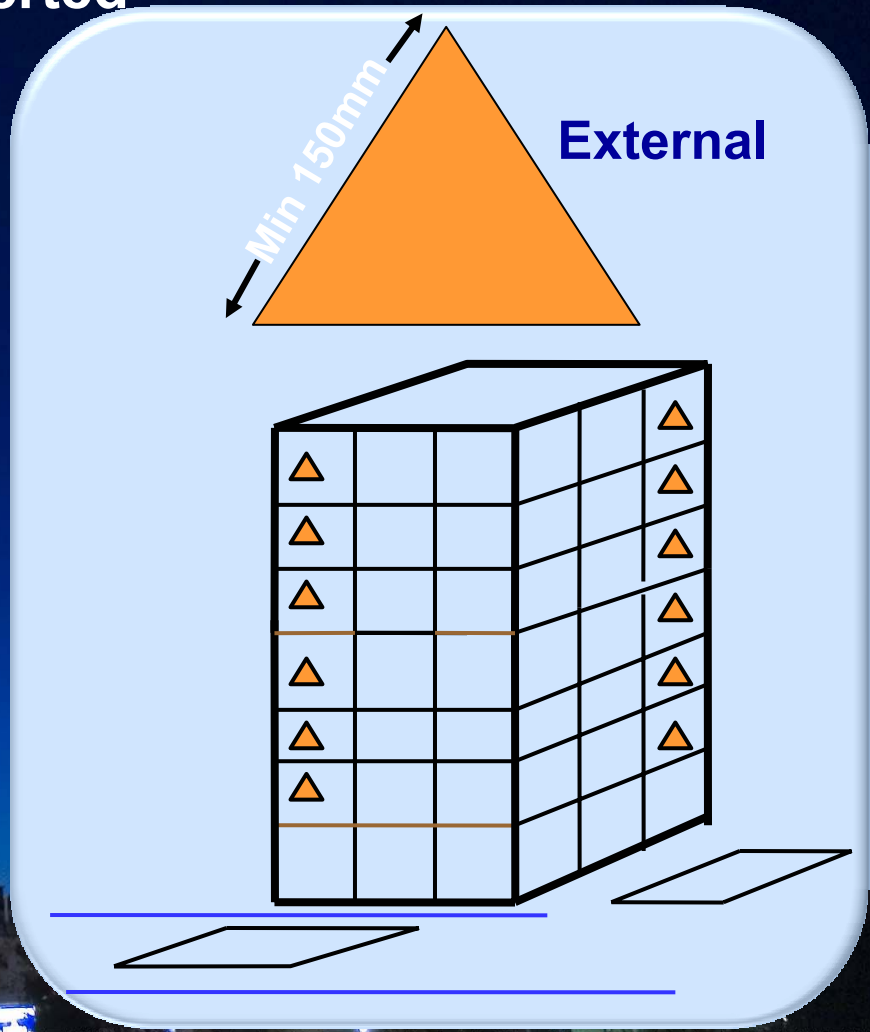
Examples of fire access panels

- Window
- Doors
- Wall panels

FIRE ACCESS PANEL

* Not applicable to Residential Buildings
* Triangle can be upright or inverted





FIRE ACCESS OPENING

Purpose group	Habitable Height	FAP
I & II	NA	Not required
III, IV, V & VII	> 10m & < 60m	➢ At every storey level (except 1st storey)
VI & VIII	-	➢ Access openings to be evenly distributed from 1st storey up to habitable height of 60m

FAP to be spaced not > 20m apart (measured along external wall from center to center of FAP)



FIRE ACCESS OPENING



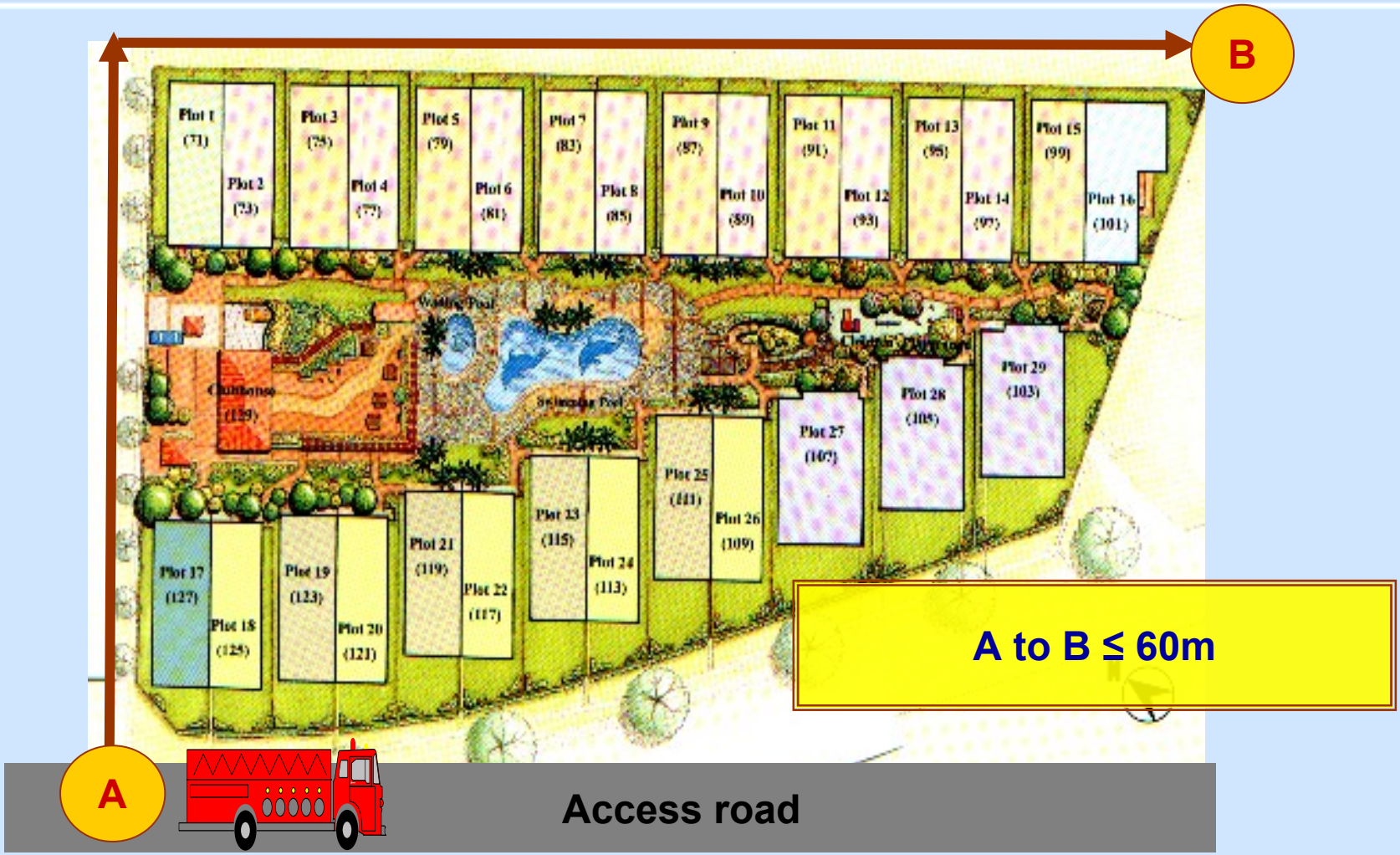
FAP enable fire fighters to gain access

FAP shall not be placed in plant/ store room

Do not open into protected area, eg. staircase, smoke stop lobby, fire fighting lobby

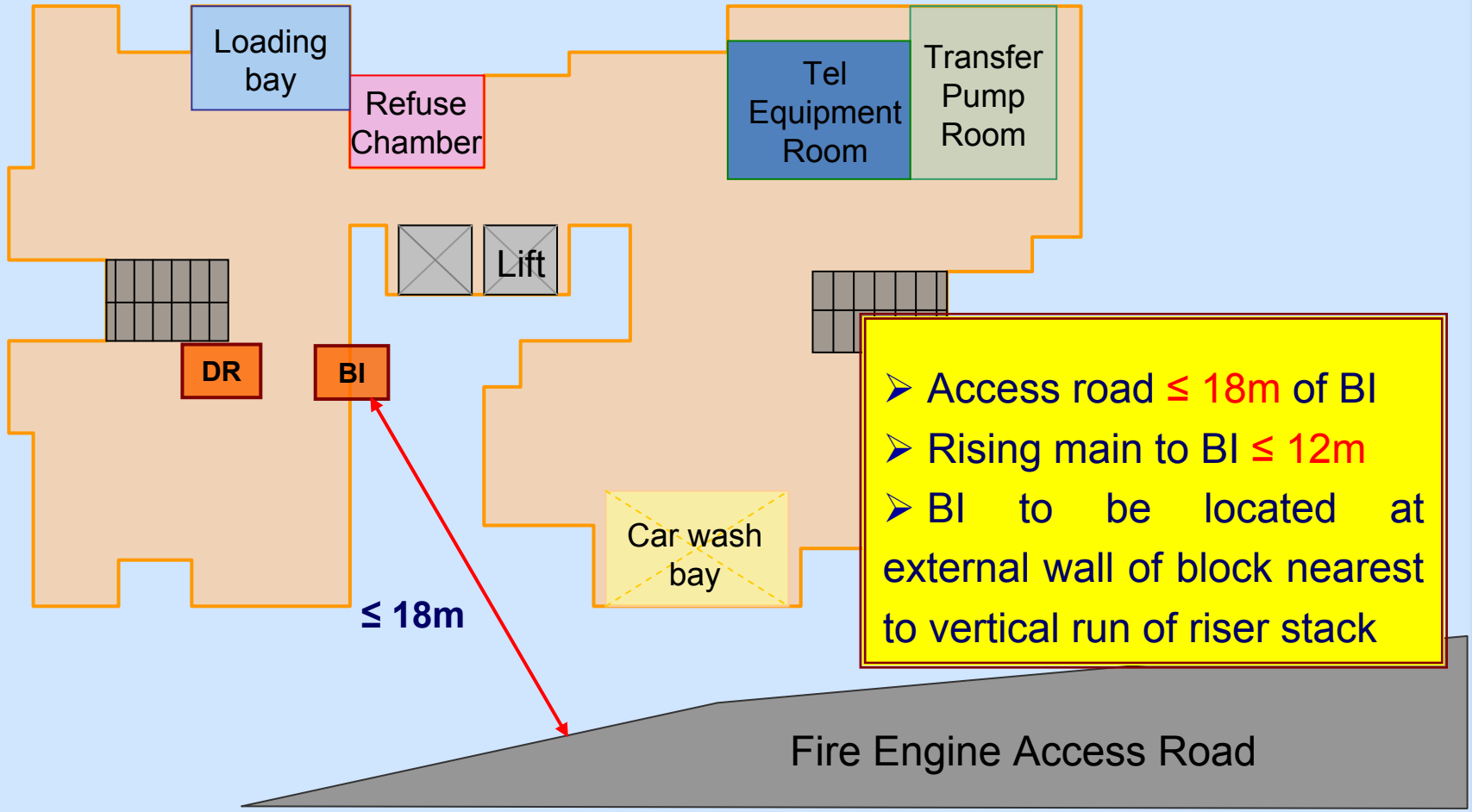
COMMON QUESTIONS RAISED

i) Fire engine access road



COMMON QUESTIONS RAISED

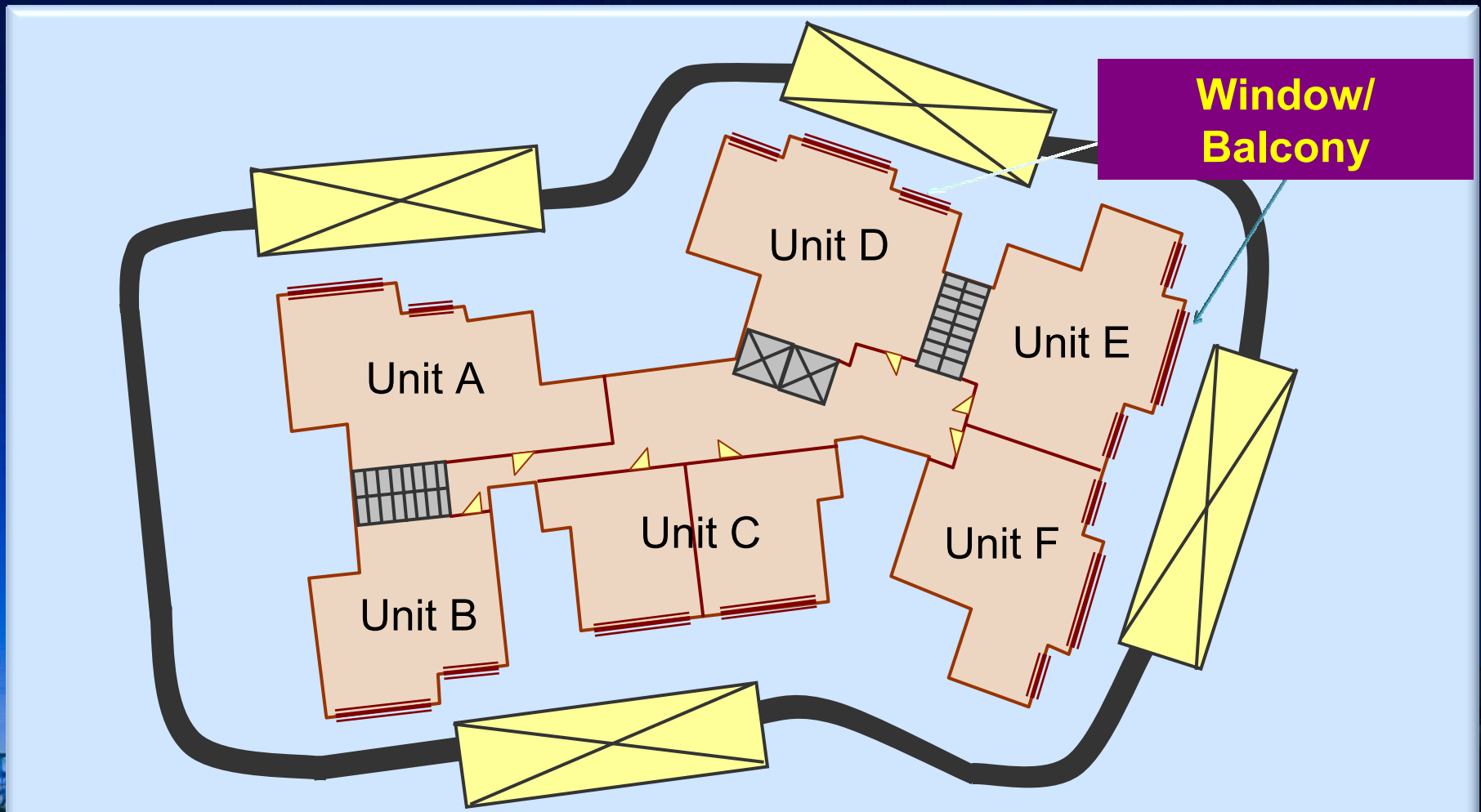
ii) Requirements for fire engine access road (Residential – PG II ≥ 10m)



- Access road ≤ 18m of BI
- Rising main to BI ≤ 12m
- BI to be located at external wall of block nearest to vertical run of riser stack

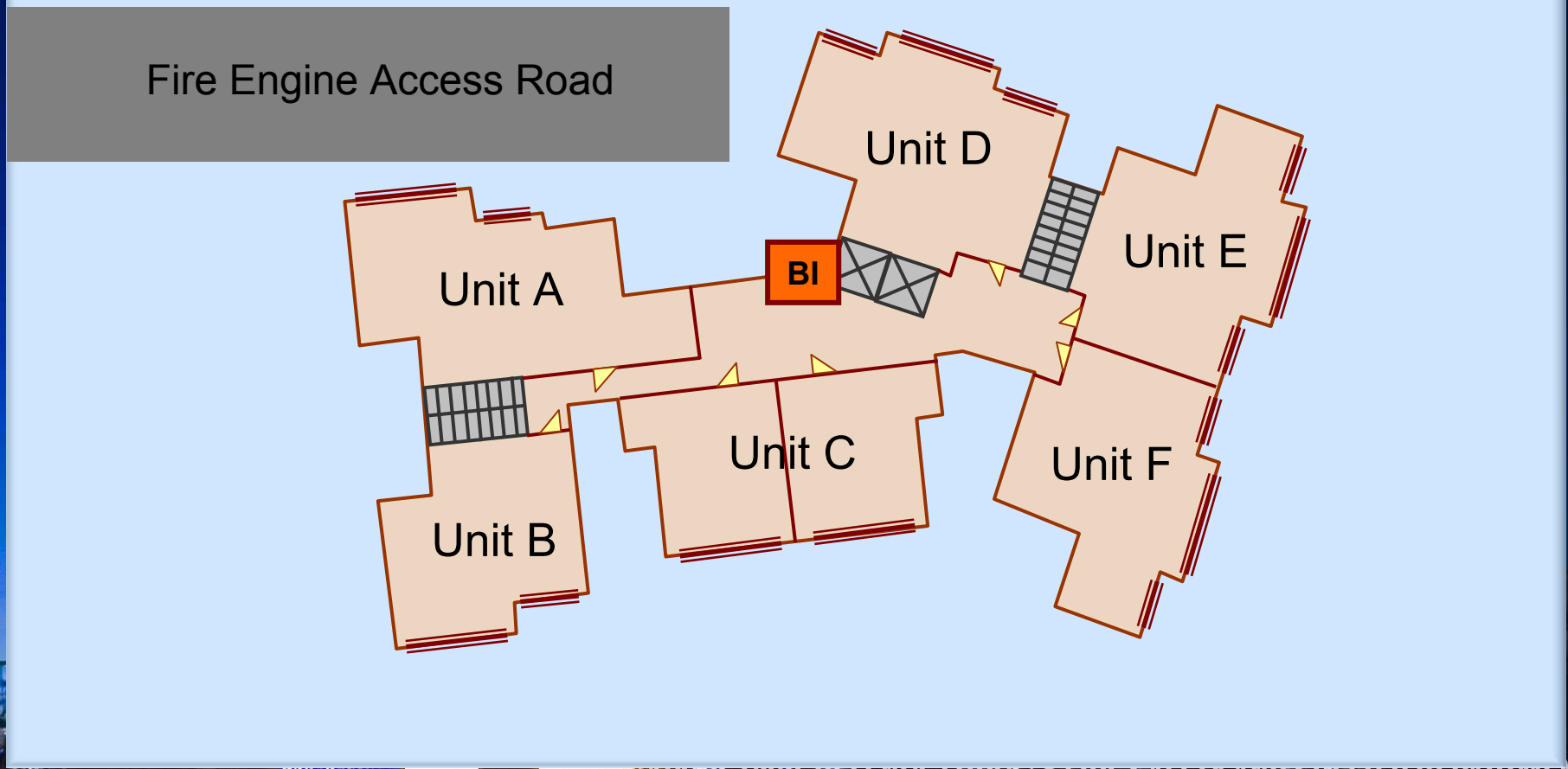
COMMON QUESTIONS RAISED

* At least 1 access opening directly accessible from hardstanding – **FIRE CODE 1991**



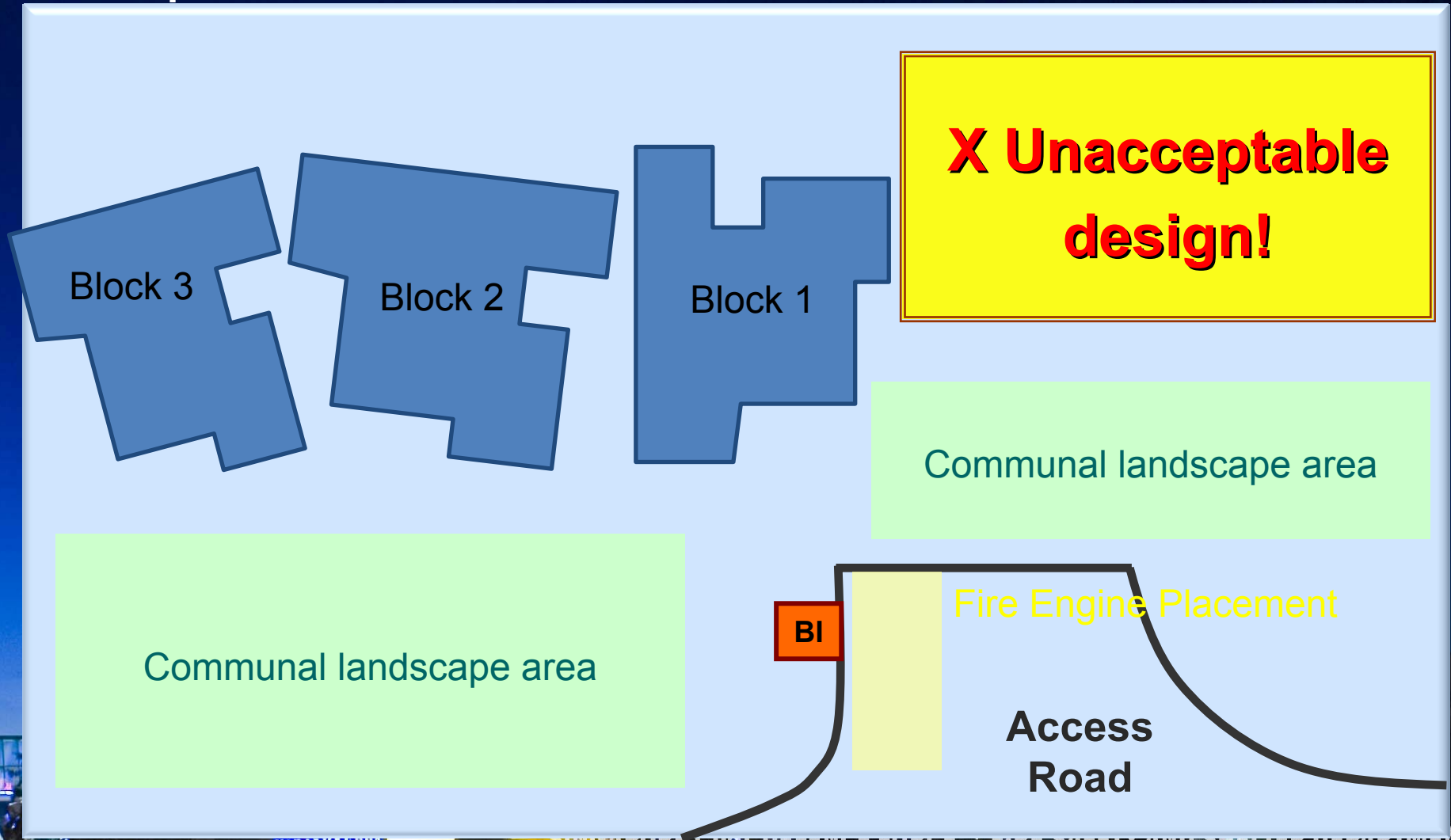
COMMON QUESTIONS RAISED

* **Access road under current code**



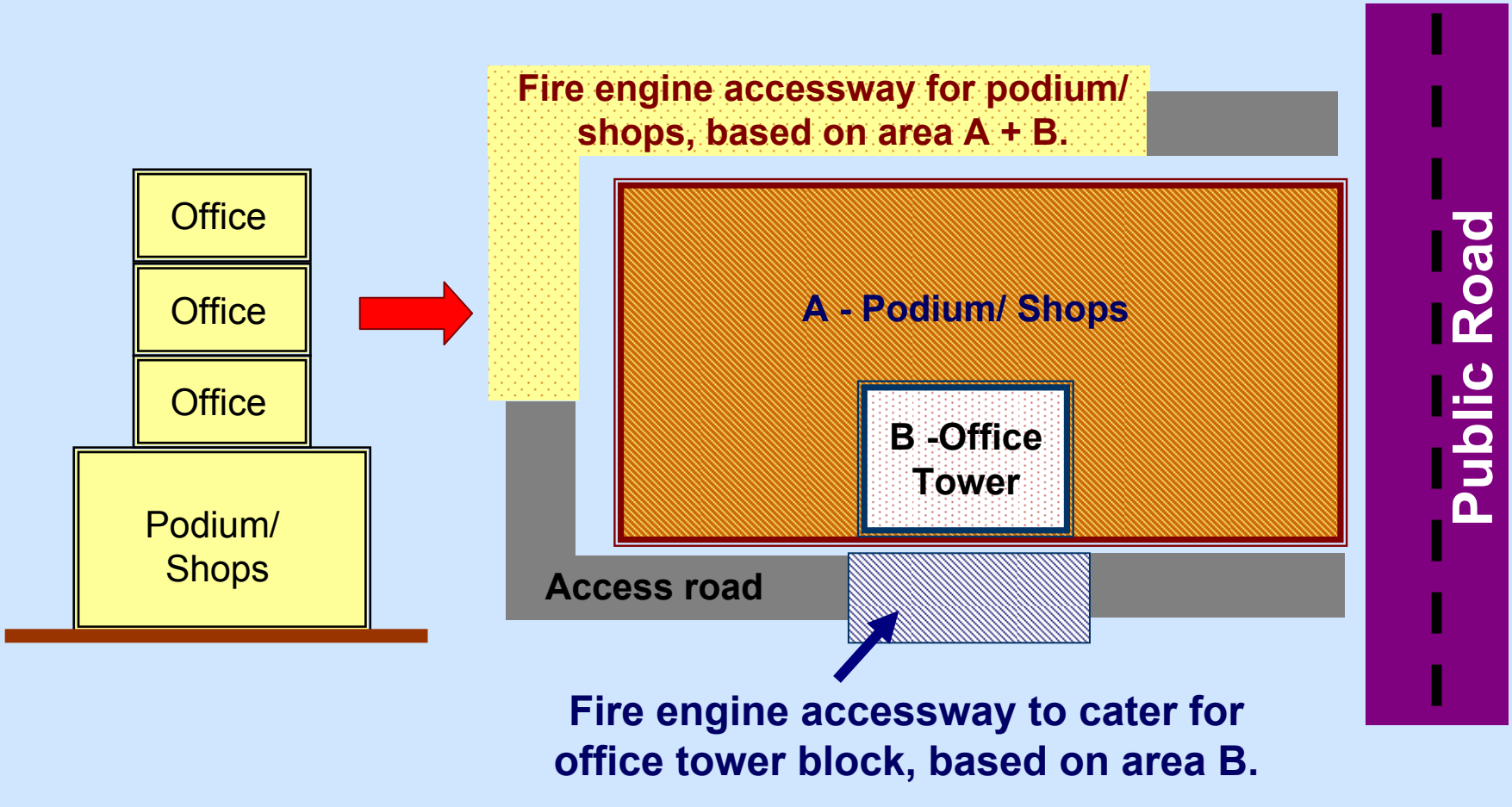
COMMON QUESTIONS RAISED

* Example of 3 residential blocks with only 1 access point from access road



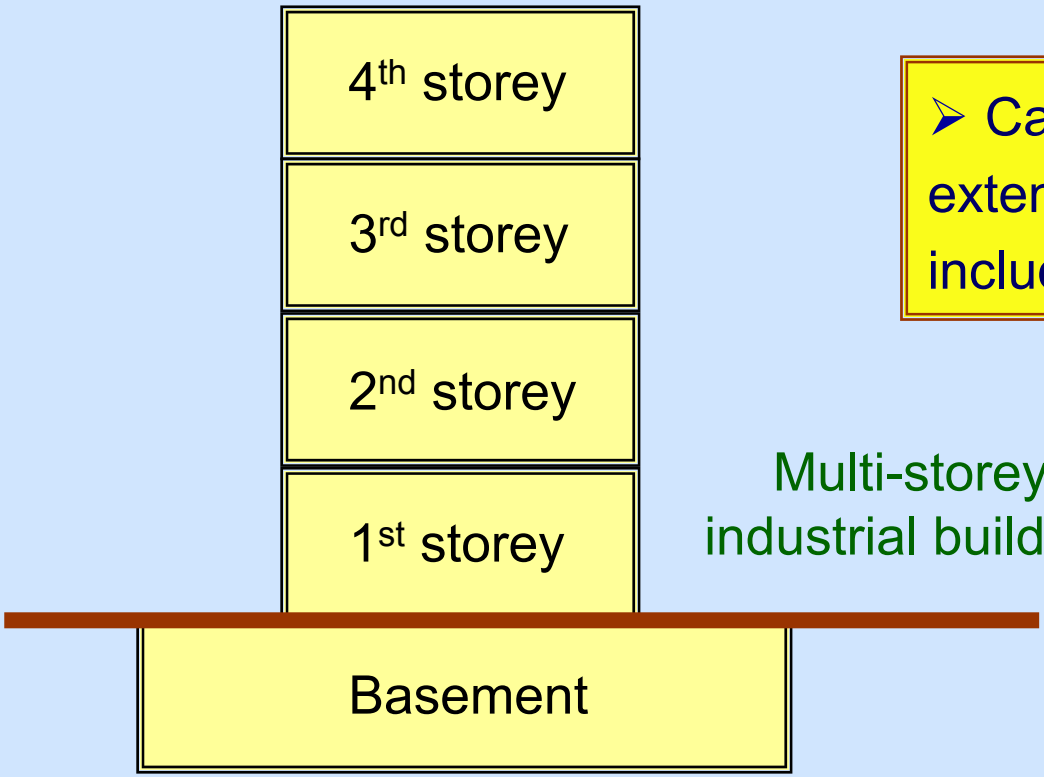
COMMON QUESTIONS RAISED

iii) Determination of fire engine accessway for mixed occupancy building.



COMMON QUESTIONS RAISED

iv) **Calculation of cubical extent for industrial buildings with basement.**

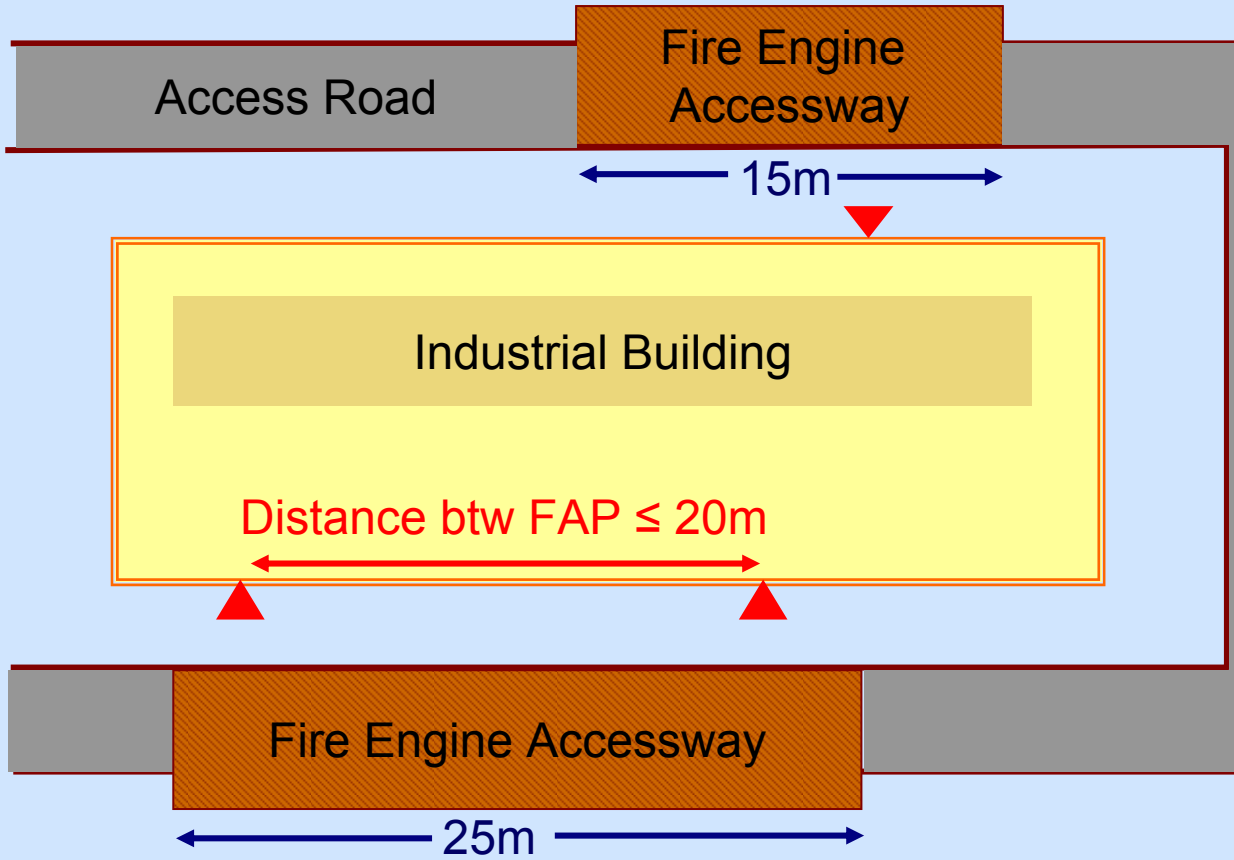


Multi-storey industrial building

- Calculation of cubicle extent NOT required to include basement.

COMMON QUESTIONS RAISED

v) **Length of accessway can be divided into different portions, min 15m for each portion.**



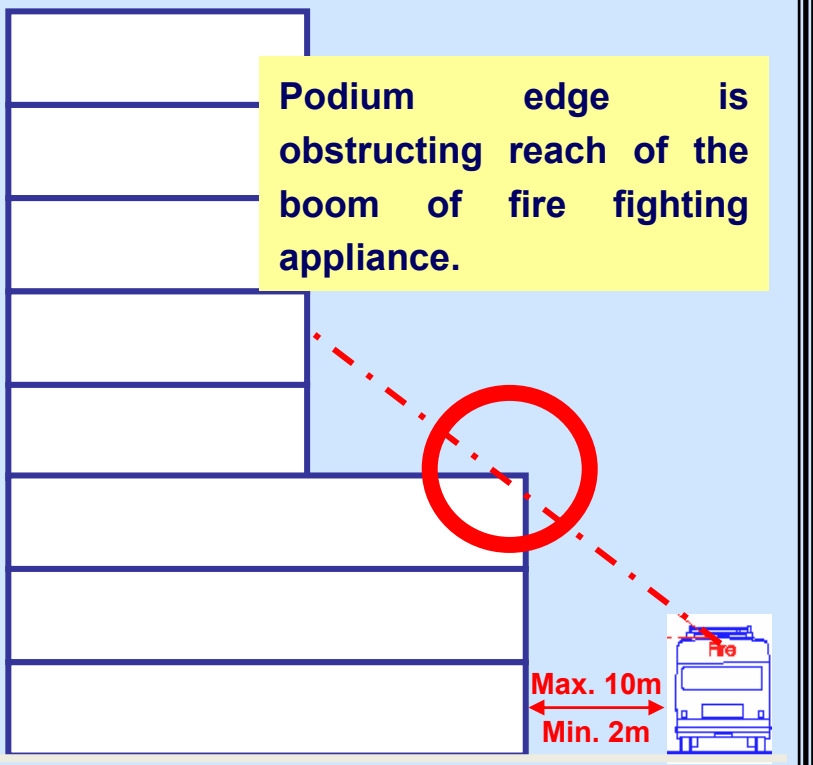
- Eg. 40m of fire engine accessway required based on cubicle extent.

To split into 15m and 25m.

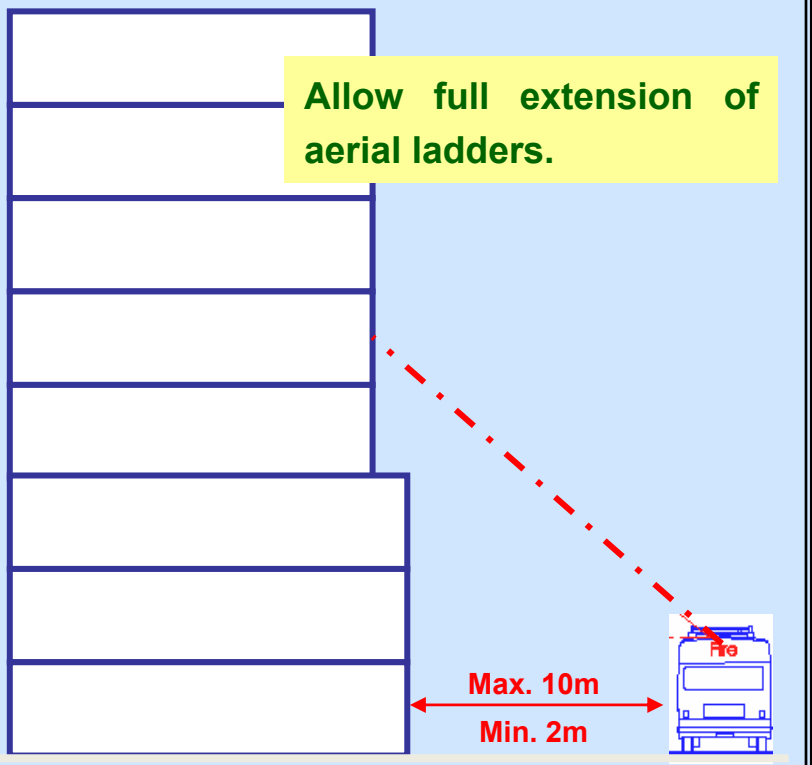
COMMON QUESTIONS RAISED

vi) Placement of FAP for buildings with extended building edge/ canopy.

X NOT Favourable



√ Favourable




Thank you . . .
KANSALLINEN
KIRJAKAUPPA
Autokill
TOYOTA

INTRODUCTION



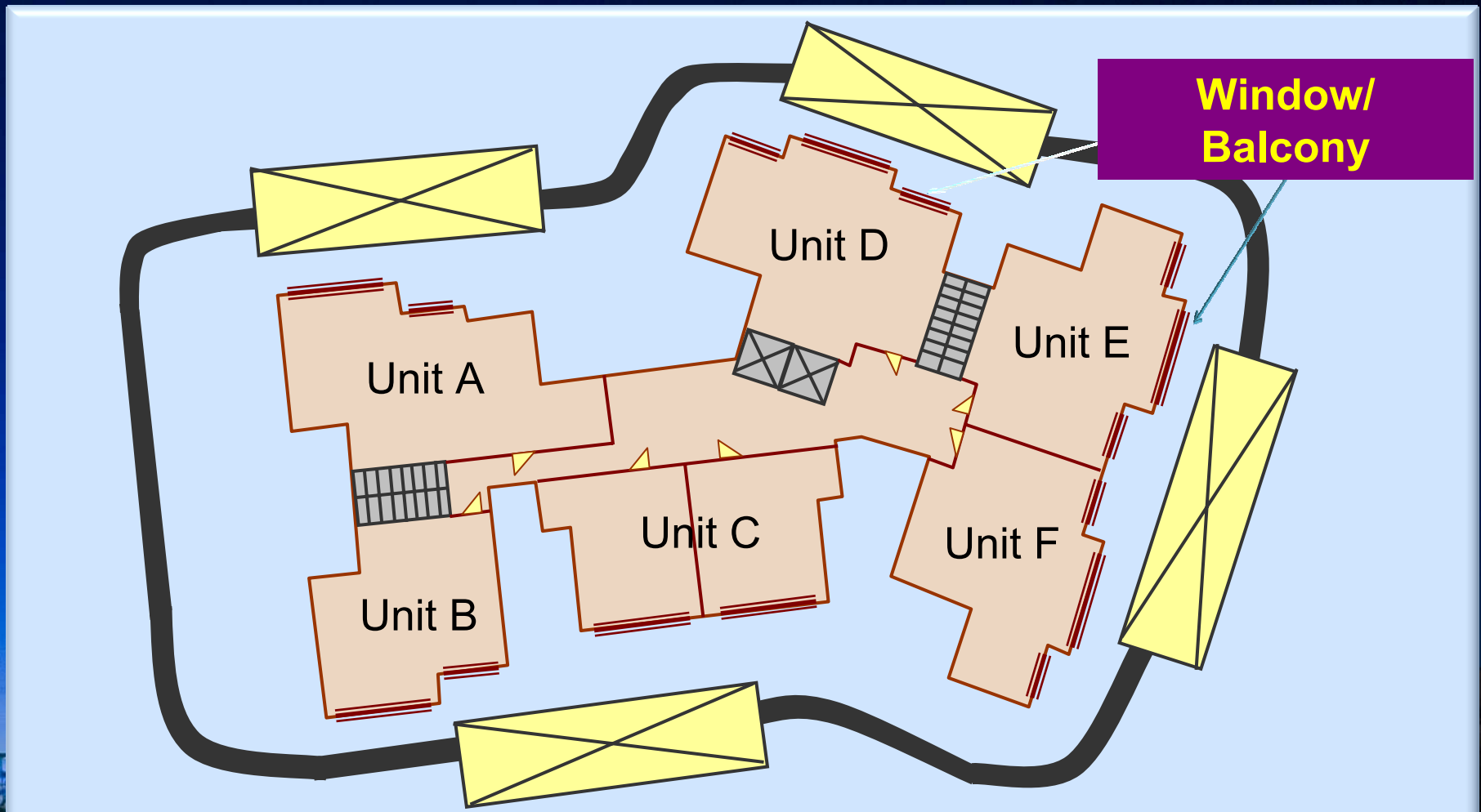
Effective Fire Fighting Operation

- Internal Approach
- External Approach

Provisions at External of Building for Fire Fighting and Rescue Operations

COMMON QUESTIONS RAISED

* At least 1 access opening directly accessible from hardstanding – **FIRE CODE 1991**



COMMON QUESTIONS RAISED

* At least 1 access opening directly accessible from hardstanding – **FIRE CODE 1991**

