

DESIGNING FOR FIRE FIGHTING ACCESS AND RESCUE

Part 1: designing for fire fighting from the outside

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140 Fire Appliance Access

ACCESSWAY

(1) Accessway shall be provided within the site of a building to enable fire appliances to gain access to the building. Access openings shall also be provided along the external walls of buildings fronting the accessway to provide access into the building for fire fighting and rescue operations.

(2) The requirements of accessway shall be as follows:

- (a) the accessway shall have a minimum width of 6 metres throughout its entire length and shall be able to accommodate the entry and manouvering of fire engine, extended ladders pumping appliances, turntable and hydraulic platforms;
- (b) the accessway shall be metalled or paved or laid with strengthened perforated slabs to withstand the loading capacity of stationary 30 tonnes fire appliance;

ACCESS OPENING

(c) the accessway shall be positioned so that the nearer edge shall be not less than 2 metres or more than 10 metres from the centre position of the access opening, measured horizontally;

ACCESS ROAD

(d) the accessway shall be laid on a level platform or if on an incline, the gradient shall not exceed 1:15. The access road shall be laid on a incline not exceeding a gradient of 1:8.3;

(e) the dead-end accessway and fire engine access road shall not exceed 46 metres in length or if exceeding 46 metres, be provided with turning facilities;

(f) the outer radius for turning of accessway and fire engine access road shall comply with the requirements of the Fire Authority;

(g) the overhead clearance of fire engine access road shall be at least 4.5 metres for passage of fire appliances;

BUILDING
HEIGHT

197A. Means of access and fire fighting in building over 18.0 metres high.

(1) Buildings in which the topmost floor is more than 18.0 metres above fire appliance access level shall be provided with means of gaining access and fighting fire from within the building consisting of fire fighting access lobbies, fire fighting staircases, fire lifts and dry or wet rising systems.

197B. Fire fighting access lobbies.

Fire fighting access lobbies shall conform to the following requirements:

(a) each lobby shall have a floor area of not less than 6.0 square metres; and

(b) the openable area of windows or area of permanent ventilation shall be not less than 25% of the floor area of the lobby and, if ventilation is by means of openable windows, additional permanent ventilation having a free opening of 464 square centimetres shall be provided except that mechanical pressurisation may be provided as an alternative

FIRE APPLIANCE ACCESS

2012 UBBL 140

ACCESS WAY

An area for the entry, maneuvering and parking of Fire Appliances during fire fighting and rescue operations

ACCESS ROAD

A road capable of accommodating the passage of Fire Appliances to enter an Access Way

ACCESS OPENINGS

Doorways or openings that allows fast and safe entry of Fire Fighting and Rescue personnel into a building during **fire fighting and rescue operations**

EXTERNAL ACCESS

Access for emergency and rescue vehicles,
equipment and personnel

- Roads
- Pavements
- Parking

Availability of water :

- Hydrants
- Storage tanks
- Lakes, rivers, ponds

And access to fire fighting systems in the premises

AT THE PREMISES

Clarity of :

- Type of building and function
- Configuration of building
- Location of fire control panel
- Location of breaching inlets and pump rooms

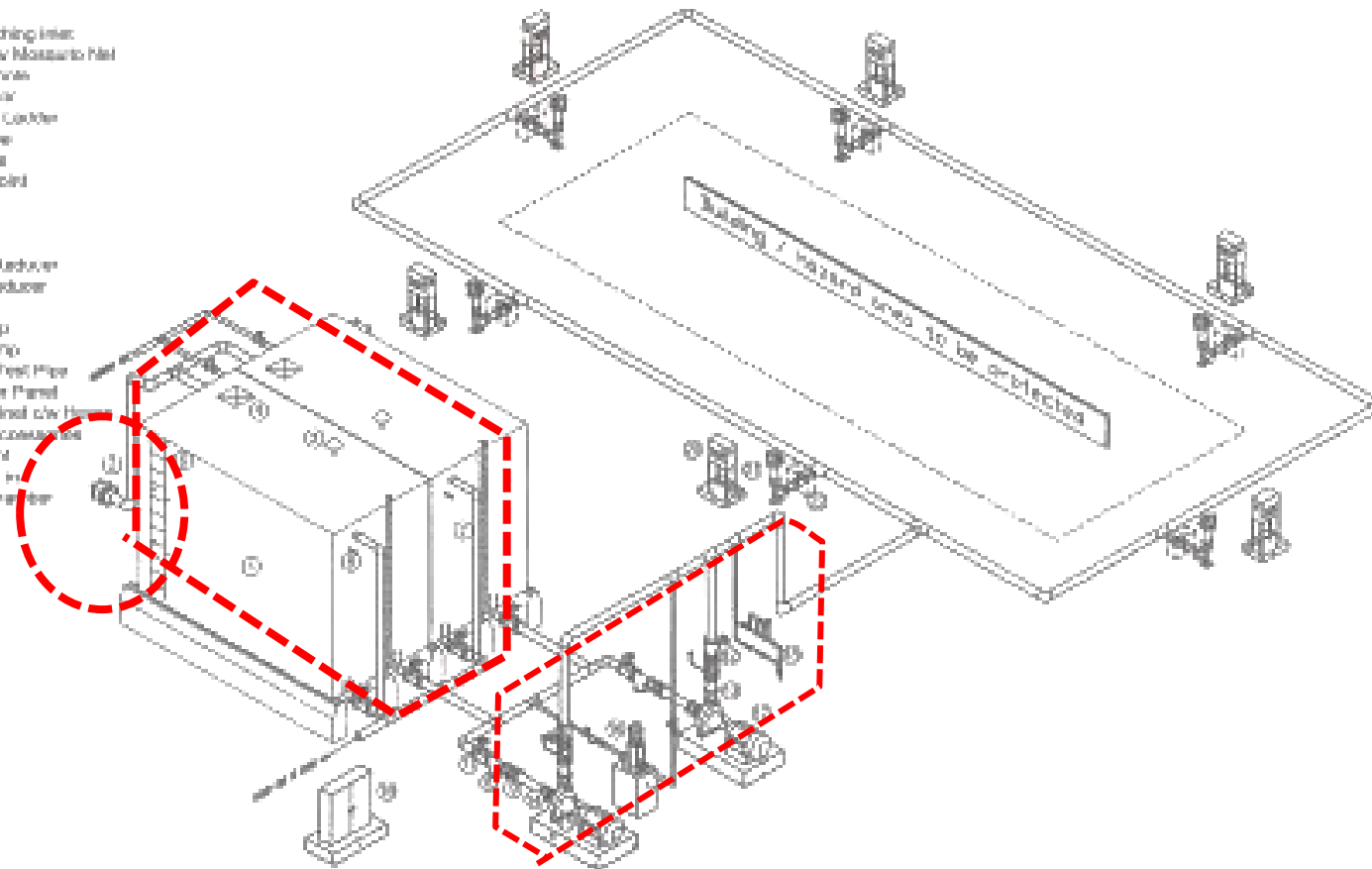
Access into the building

- Protected passage
- Protected stairs
- Firemen's lift
- Fire fighting lobby

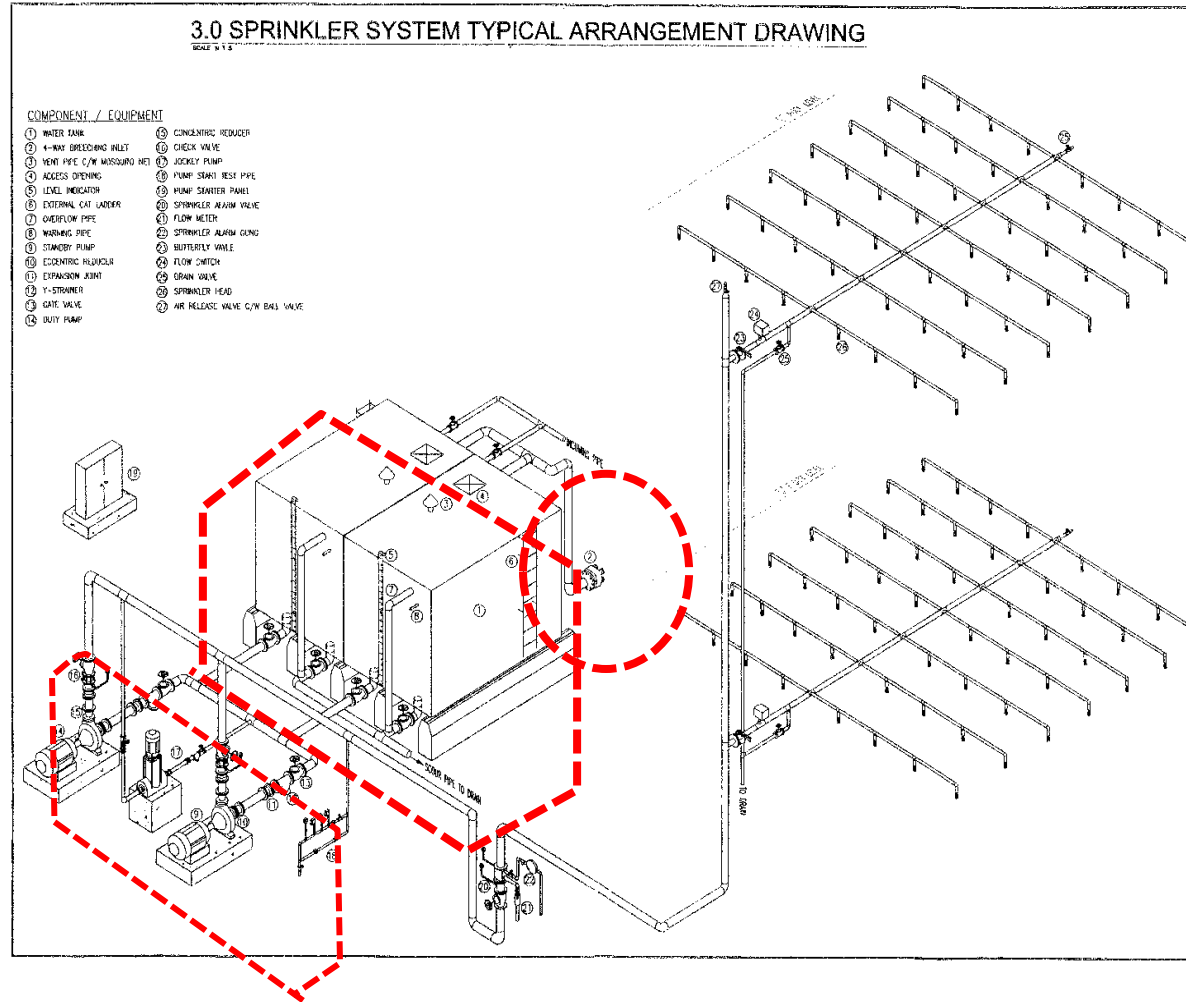
Pressurised Hydrant System

Figure 6.3 Pressurised Hydrant System Typical Arrangement Drawing
SCALE: 1:10

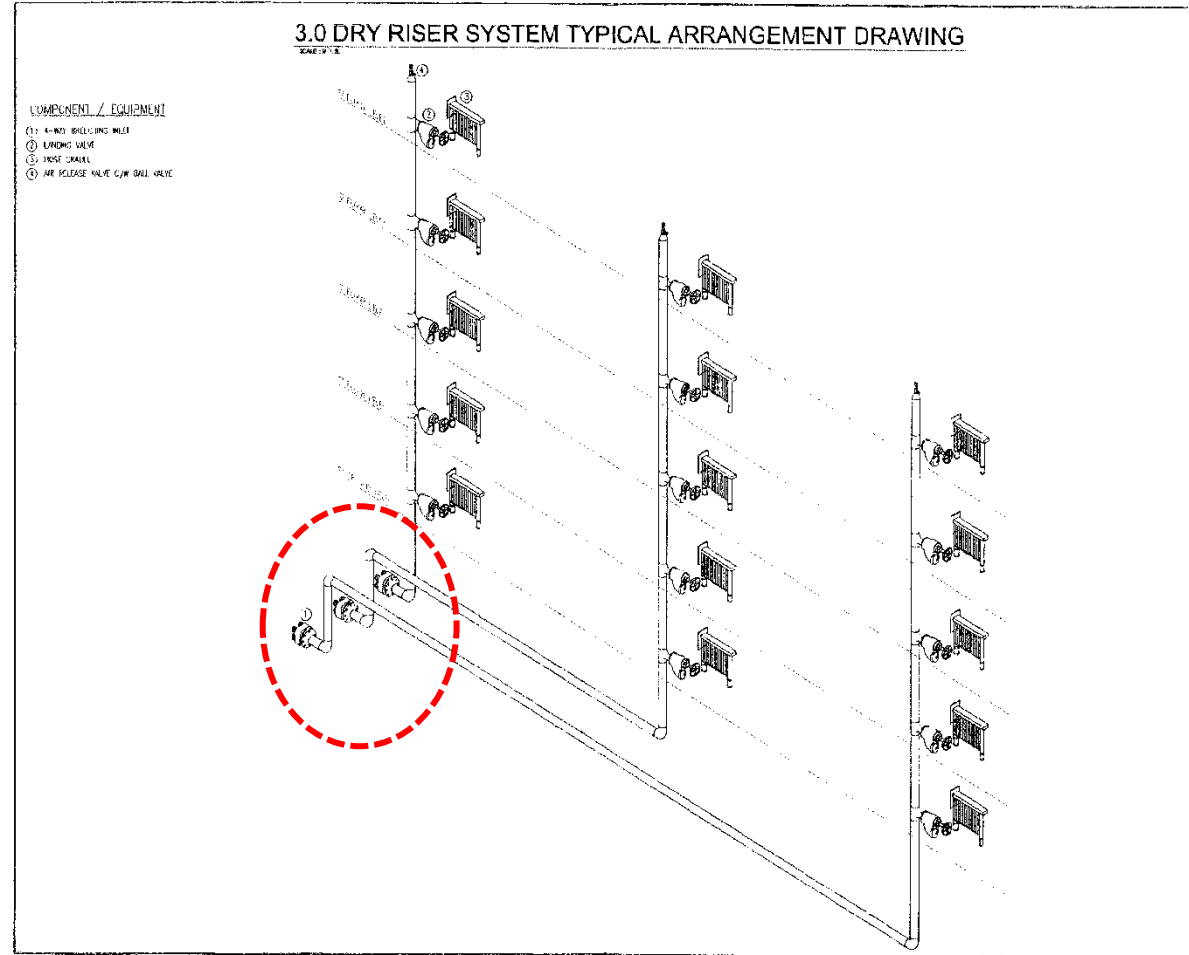
- 1 Water Tank
- 2 4-Way Branching Inter
- 3 Vent Pipe c/w Mossaro Net
- 4 Access Manhole
- 5 Level Indicator
- 6 External Cold Cooler
- 7 Overflow Pipe
- 8 Warning Pipe
- 9 Expansion Joint
- 10 Y-Sensor
- 11 Gate Valve
- 12 Check Valve
- 13 Concrete Reducer
- 14 Escamco Reducer
- 15 Duty Pump
- 16 Jockey Pump
- 17 Standby Pump
- 18 Pump Start Test Pipe
- 19 Pump Starter Panel
- 20 Hydrant cabinet c/w Hydrant
Nozzles & Accessories
- 21 Filter Hydrant
- 22 Shute Valve in
Concrete Chamber



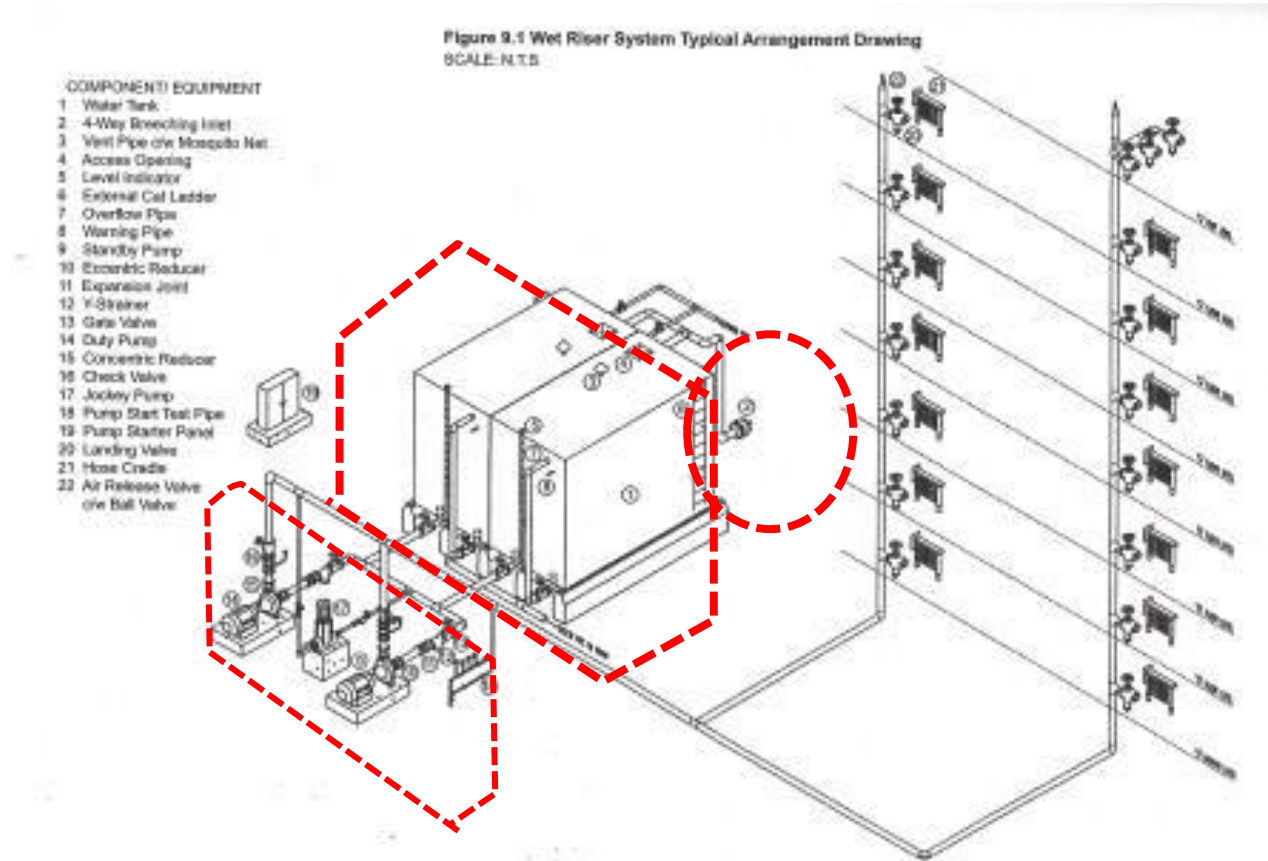
Sprinkler System

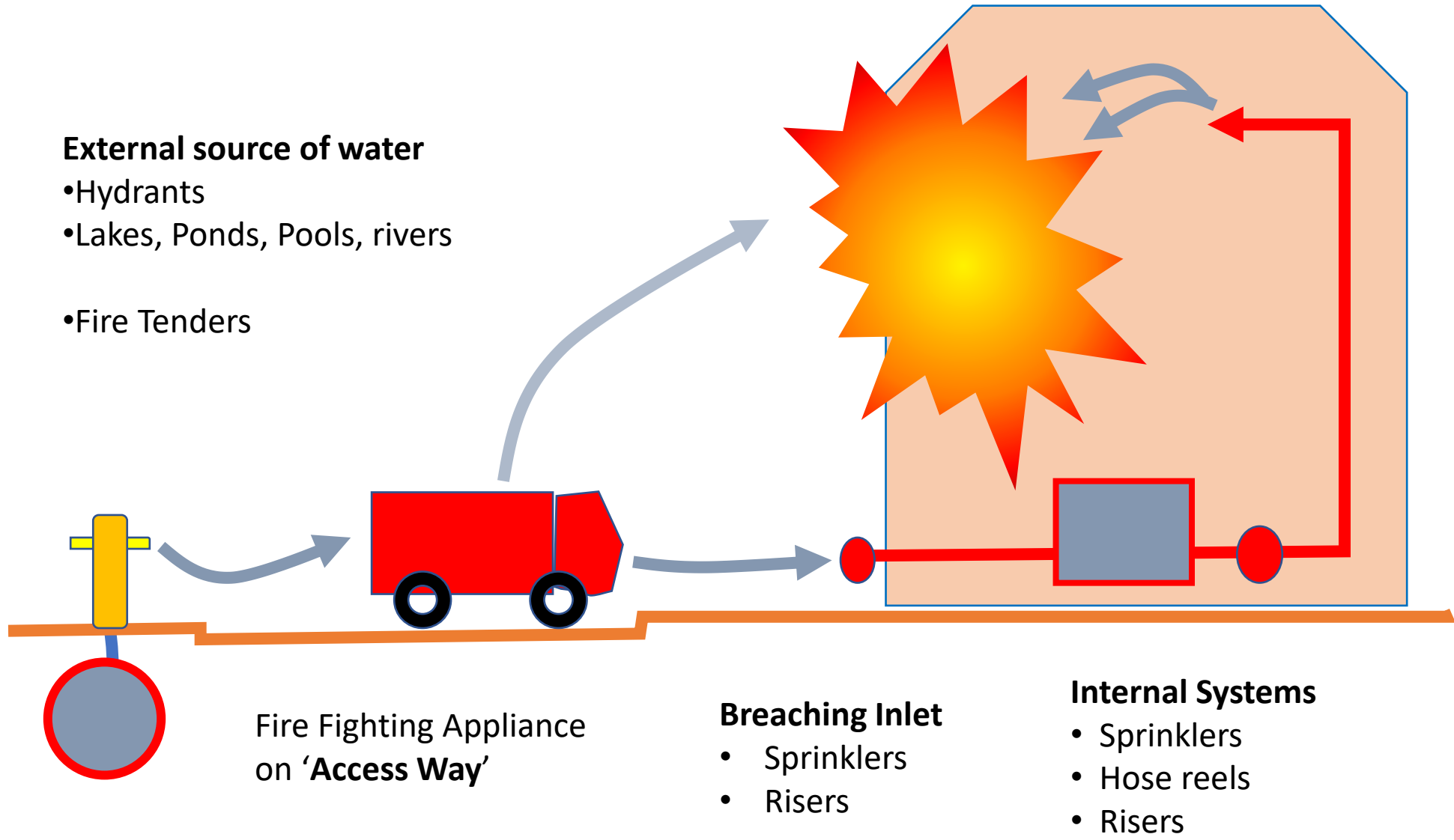


Dry Riser system



Wet Riser System





Required portion of
building fronting the
Access Way

Required portion of
building fronting the
Access Way

ACCESS WAY

ACCESS WAY

- Minimum 6m width
- 30 tonnes load
- Gradient $\leq 1:15$
- No overhead obstructions

ACCESS ROAD

- minimum width 4.5m (suggested)
- Gradient $\leq 1:8.3$
- Minimum overhead clearance 4.5m

ACCESS OPENING

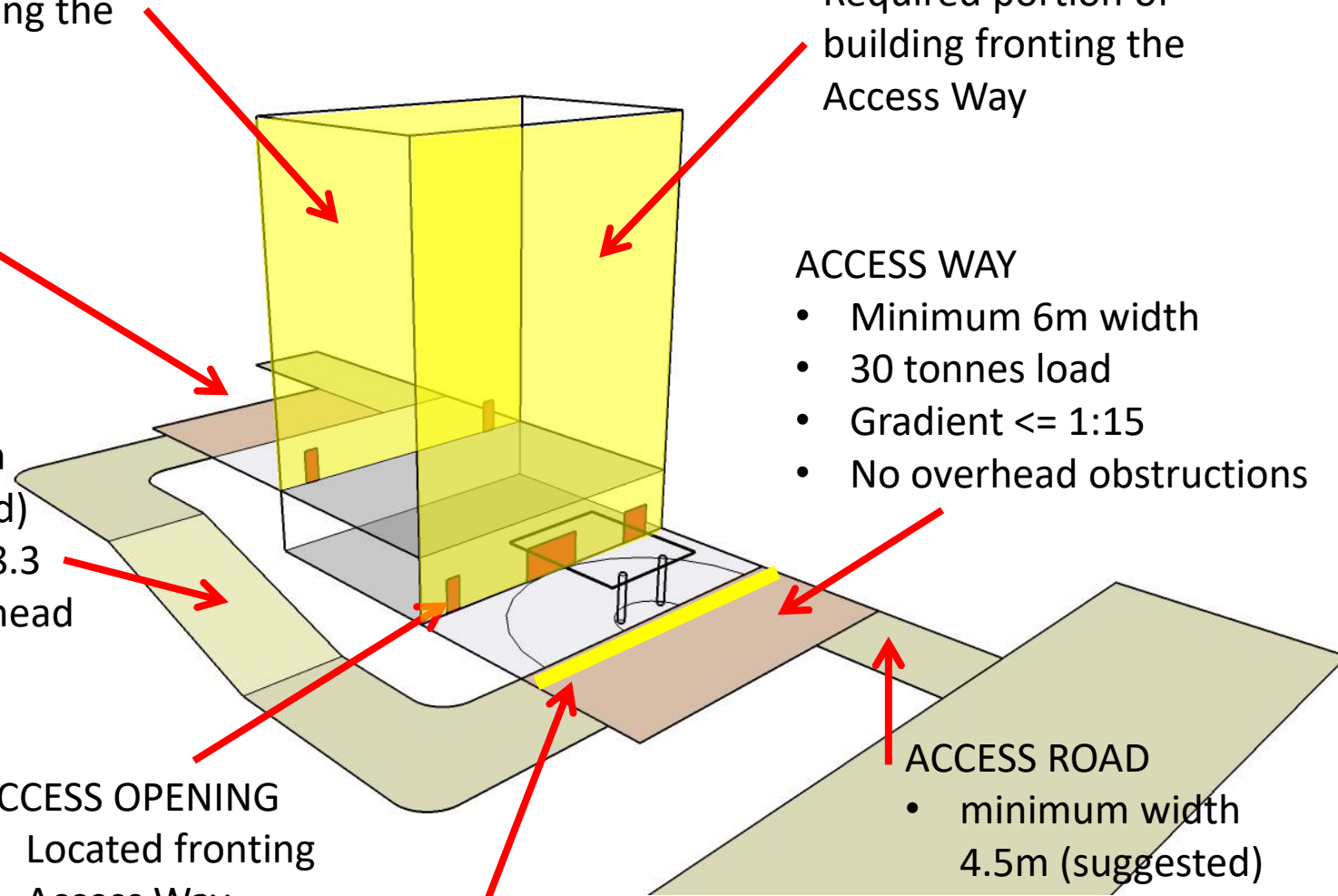
- Located fronting Access Way
- (suggested) width \geq required exit width

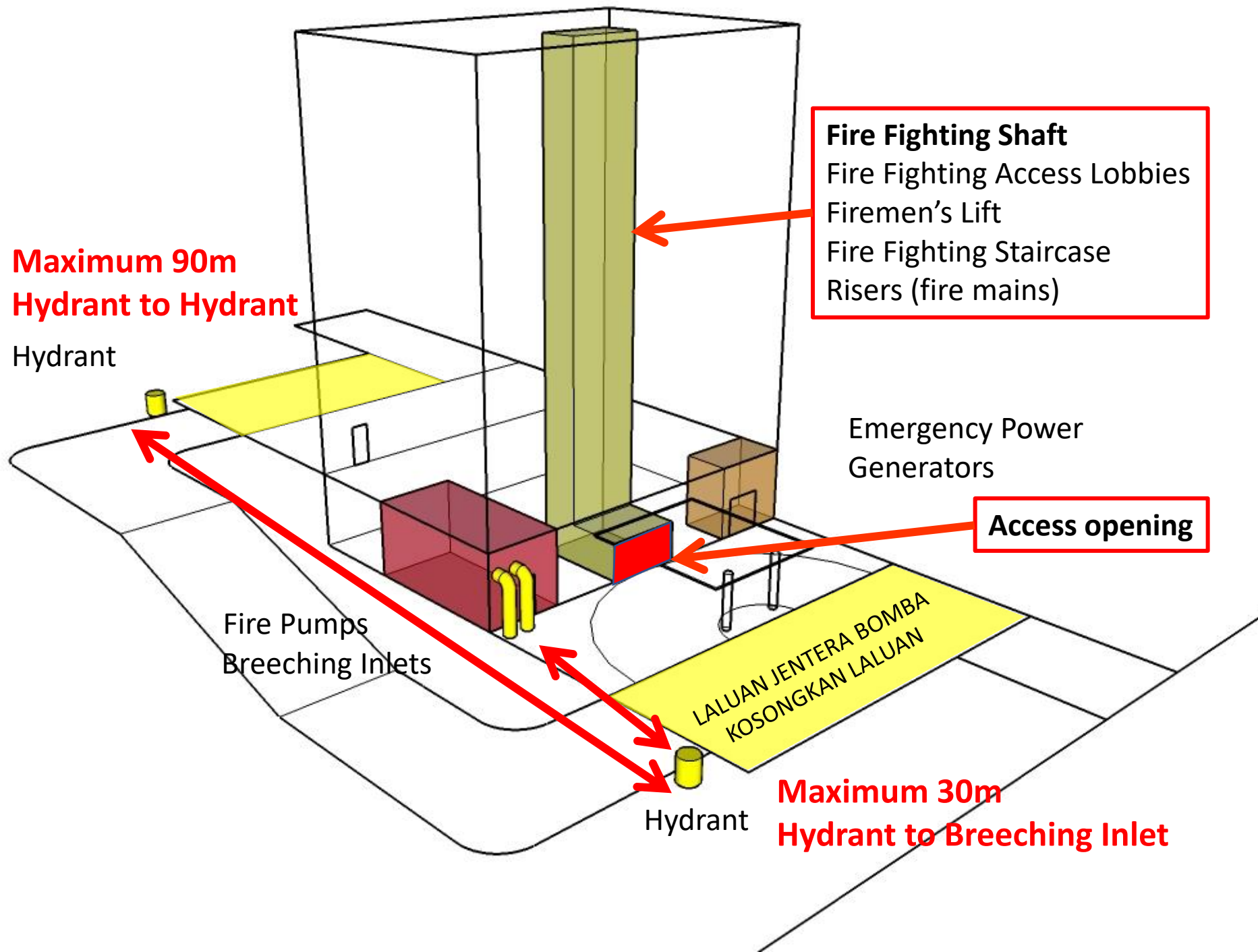
Edge of Access Way

- Minimum 2m
- Maximum 10m

ACCESS ROAD

- minimum width 4.5m (suggested)
- Gradient $\leq 1:8.3$
- Minimum overhead clearance 4.5m

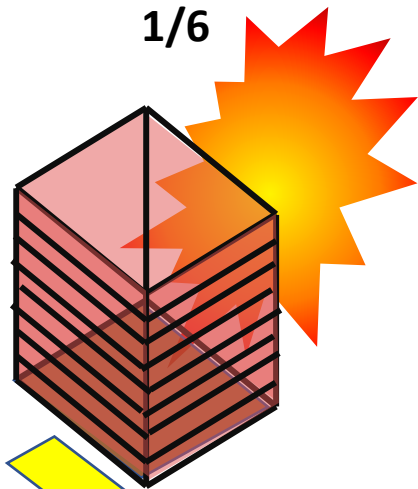




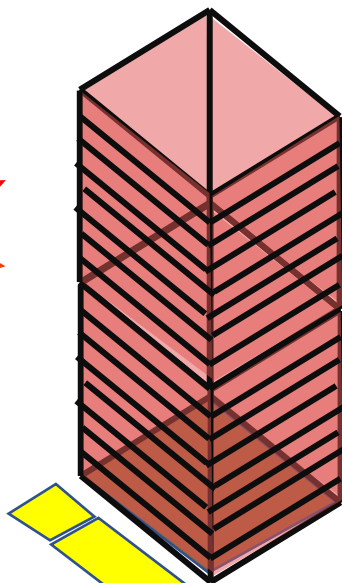
(4) Kadar bangunan yang bersempadanan dengan jalan, lebuh atau kawasan terbuka hendaklah mengikut skala berikut:

BUILDING VOLUME	Isipadu bangunan dalam meter padu	Kadar minimum perimeter bangunan
	7000 hingga 28000	satu perenam
	2800 hingga 56000	satu perempat
	56000 hingga 84000	setengah
	84000 hingga 112000	tiga suku
	112000 dan ke atas	tapak pulau

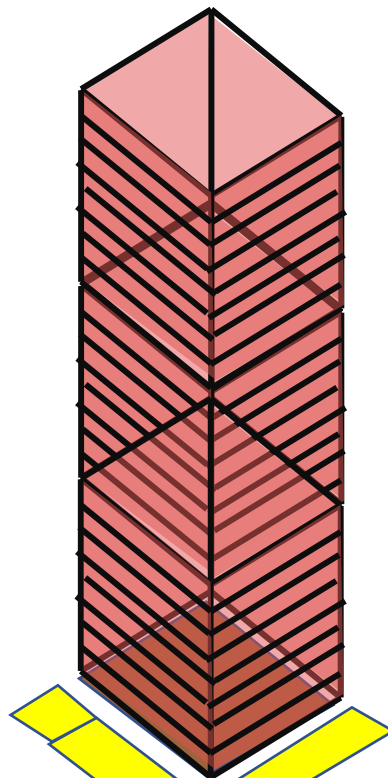
30m x 30m x 30H
27,000m³
1/6



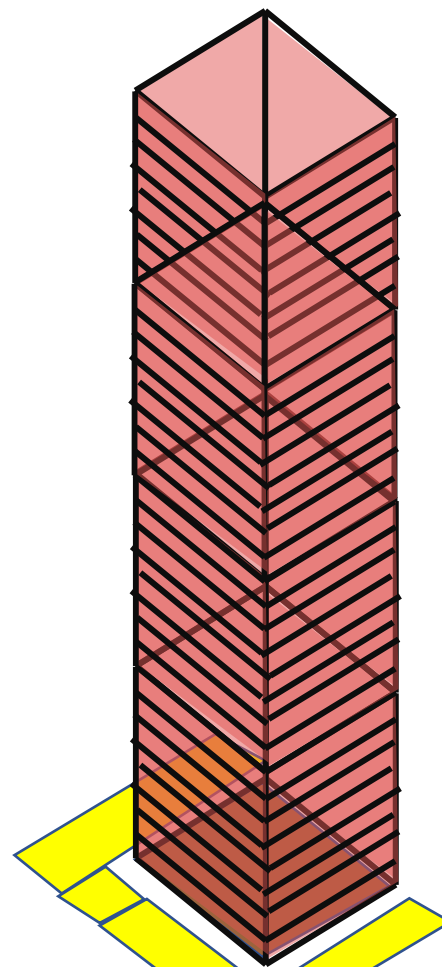
30m x 30m x 60H
54,000m³
1/4



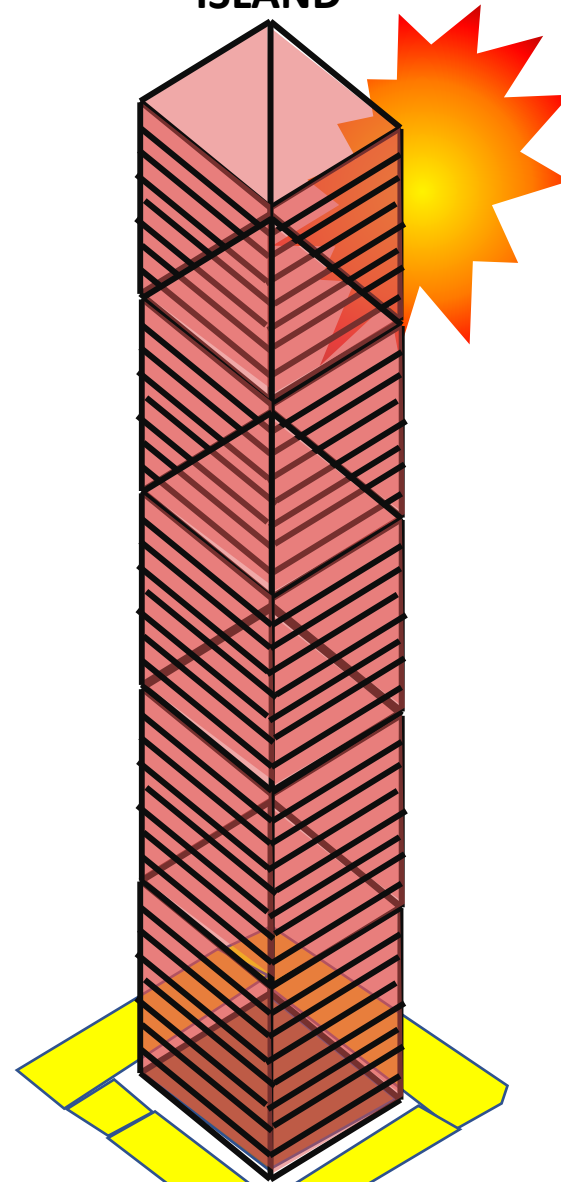
30m x 30m x 90H
81,000m³
1/2

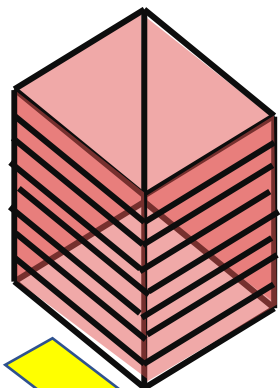


30m x 30m x 120H
108,000m³
3/4

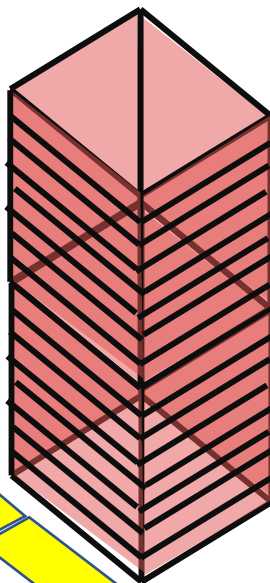


30m x 30m x 150H
135,000m³
ISLAND



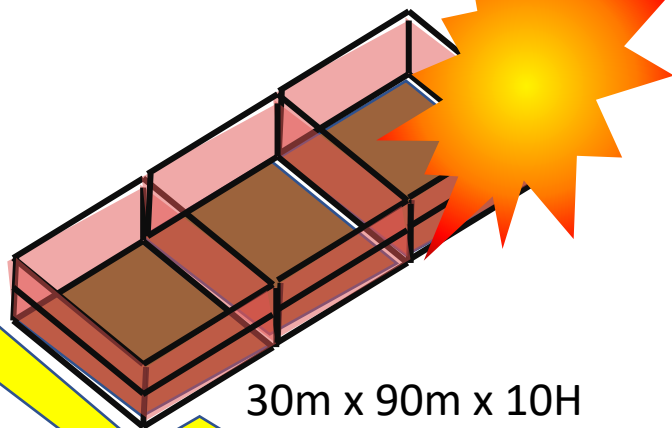


30m x 30m x 30H
27,000m³
1/6

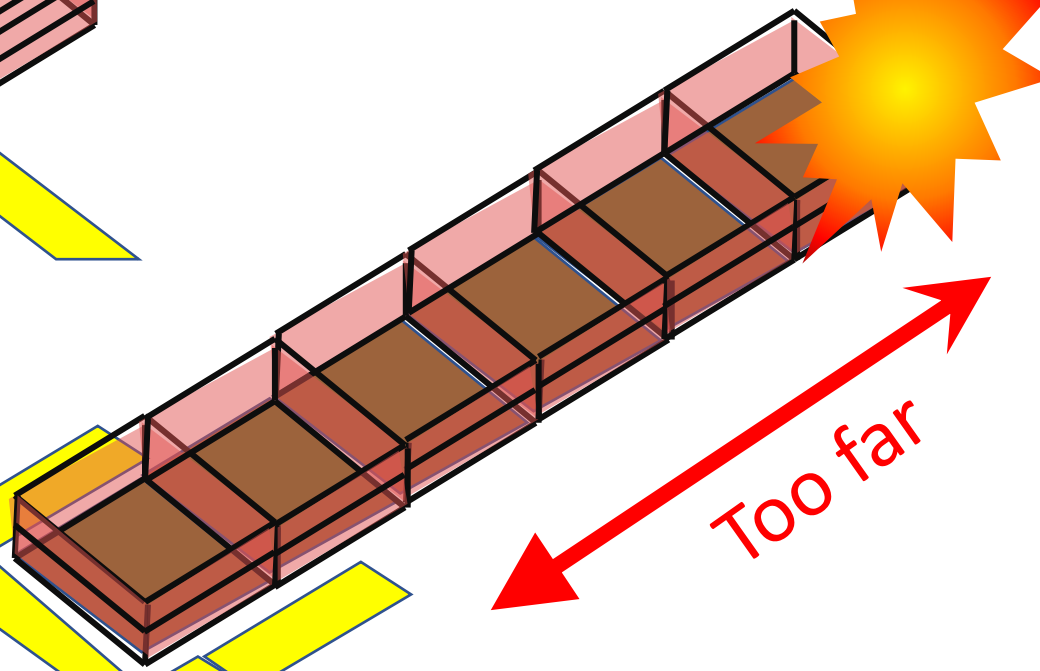


30m x 30m x 60H
54,000m³
1/4

Just minimum prescriptive compliance does NOT necessarily mean performance compliance



30m x 90m x 10H
27,000m³
1/6



30m x 180m x 10H
54,000m³
1/4

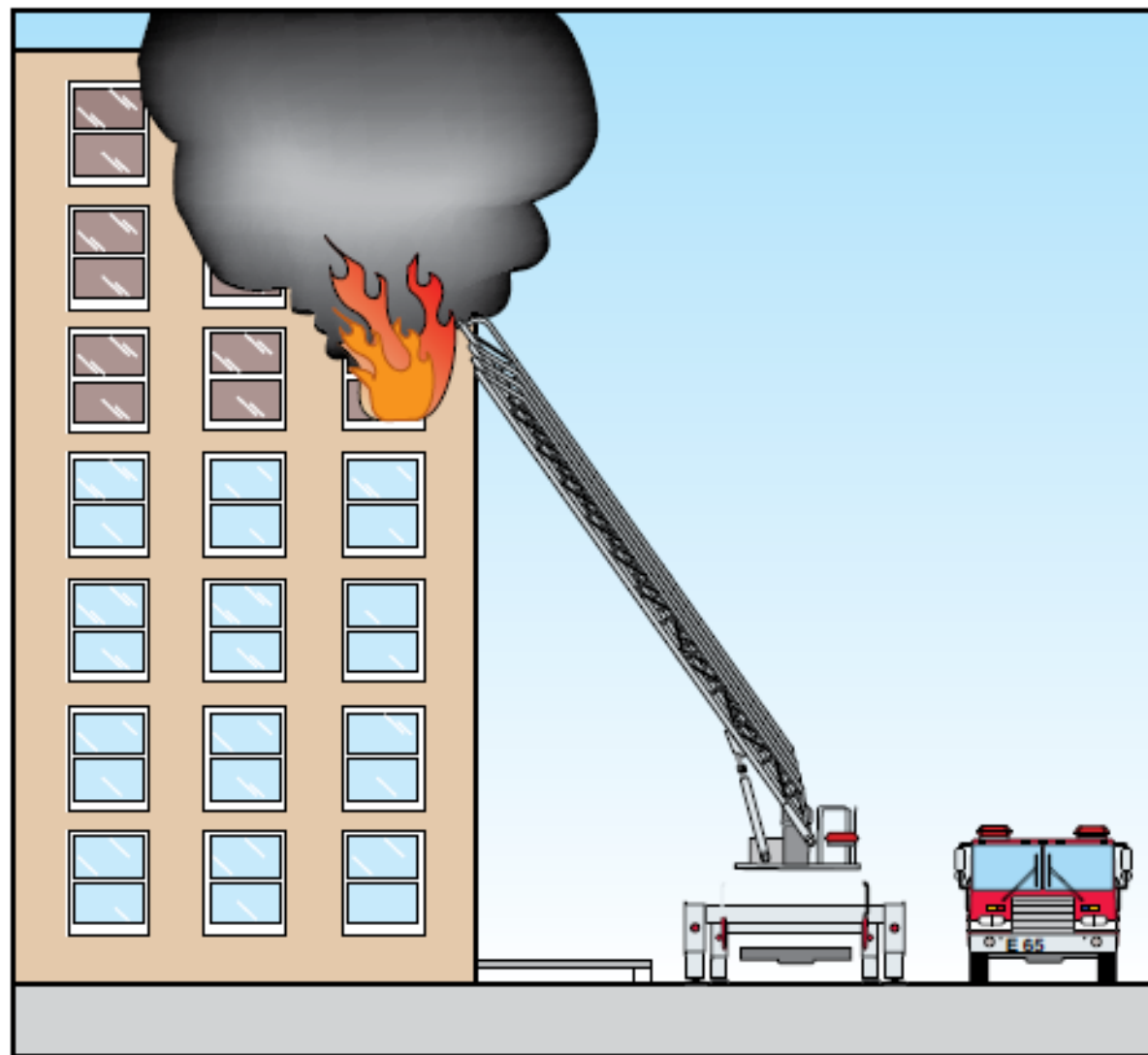
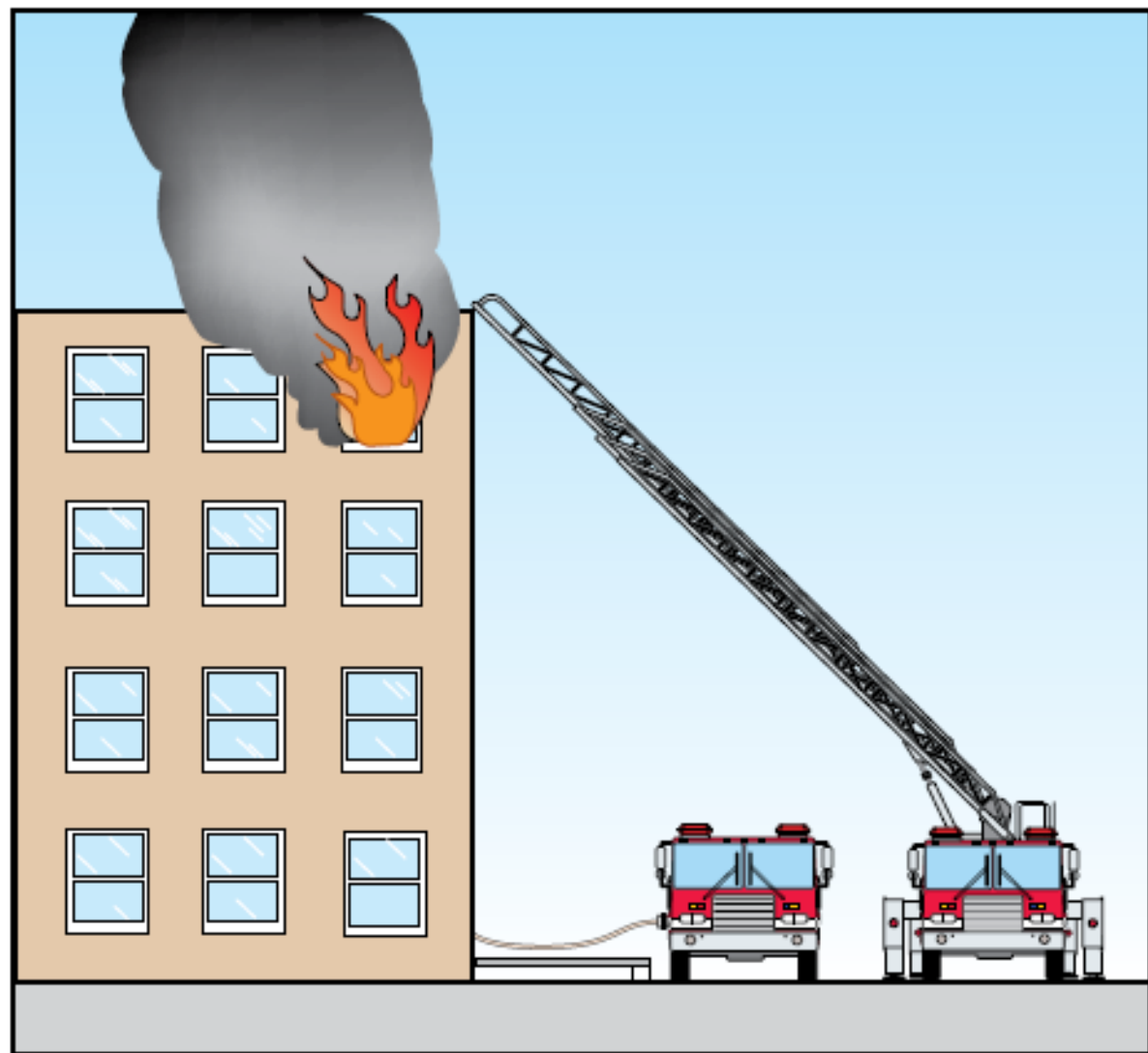
Too far

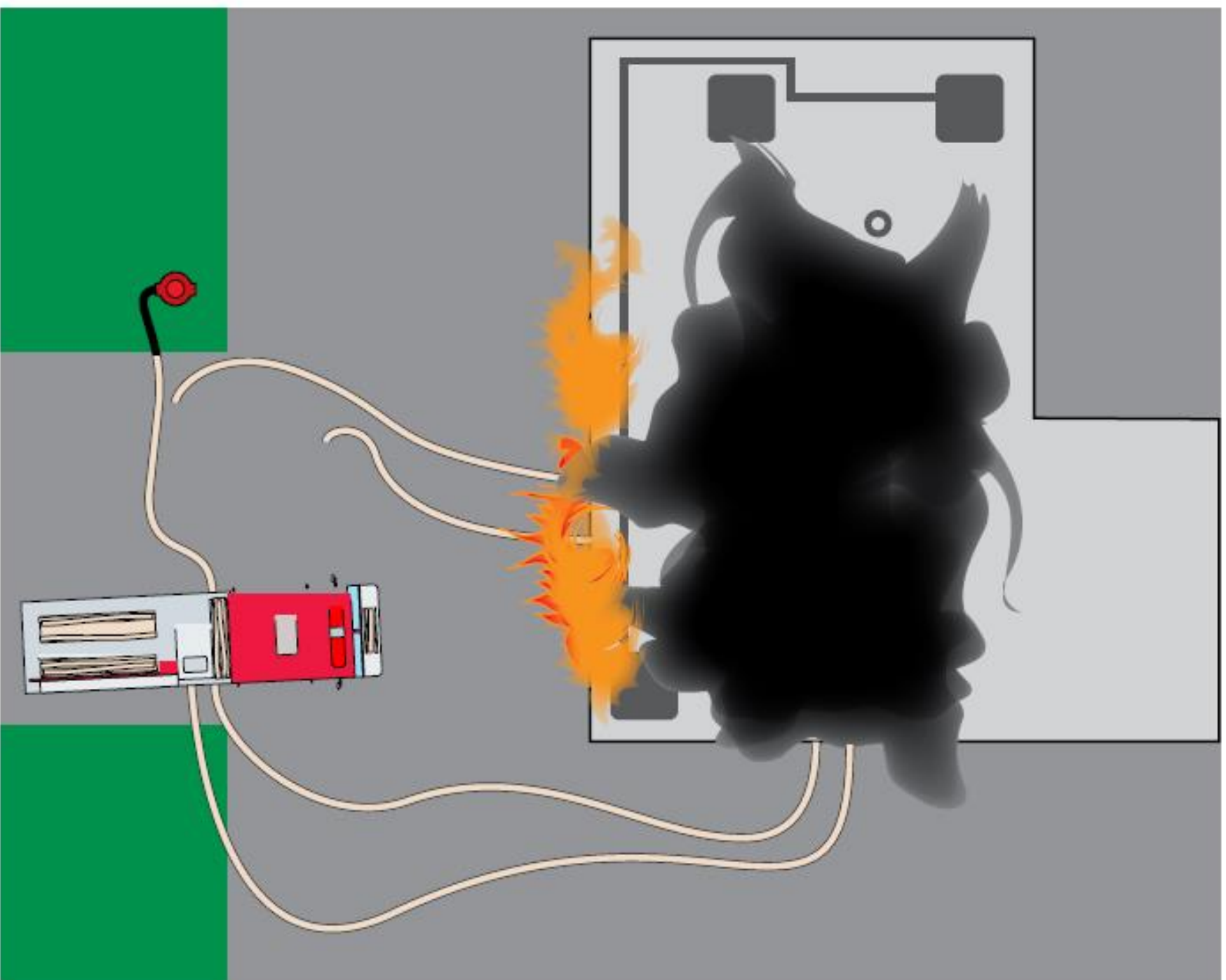
Are we still designing
to
MINIMUM
prescriptions?

Minimum 2m edge

Minimum 6m Accessway







Singapore Fire Code 2013

Cl. 4.2.2(a)(iv) For buildings under purpose groups III, IV, V and VII not exceeding the habitable height of 10m, accessway will not be required. However, provision of fire engine access road having minimum 4m width for pump appliance will be required to within a travel distance of 45m of every point on the projected plan area of the building.

Cl.4.2.2(b)(i) For buildings under purpose groups III, IV, V and VII exceeding the habitable height of 10m, accessway shall be located directly below the access openings to provide direct outreach to the access openings. **Accessway shall be provided based on the largest gross floor area of the following:**

- (1) any floor including 1st storey,
- (2) if there are more than one floor interconnected, the aggregate areas of all the floor interconnected.

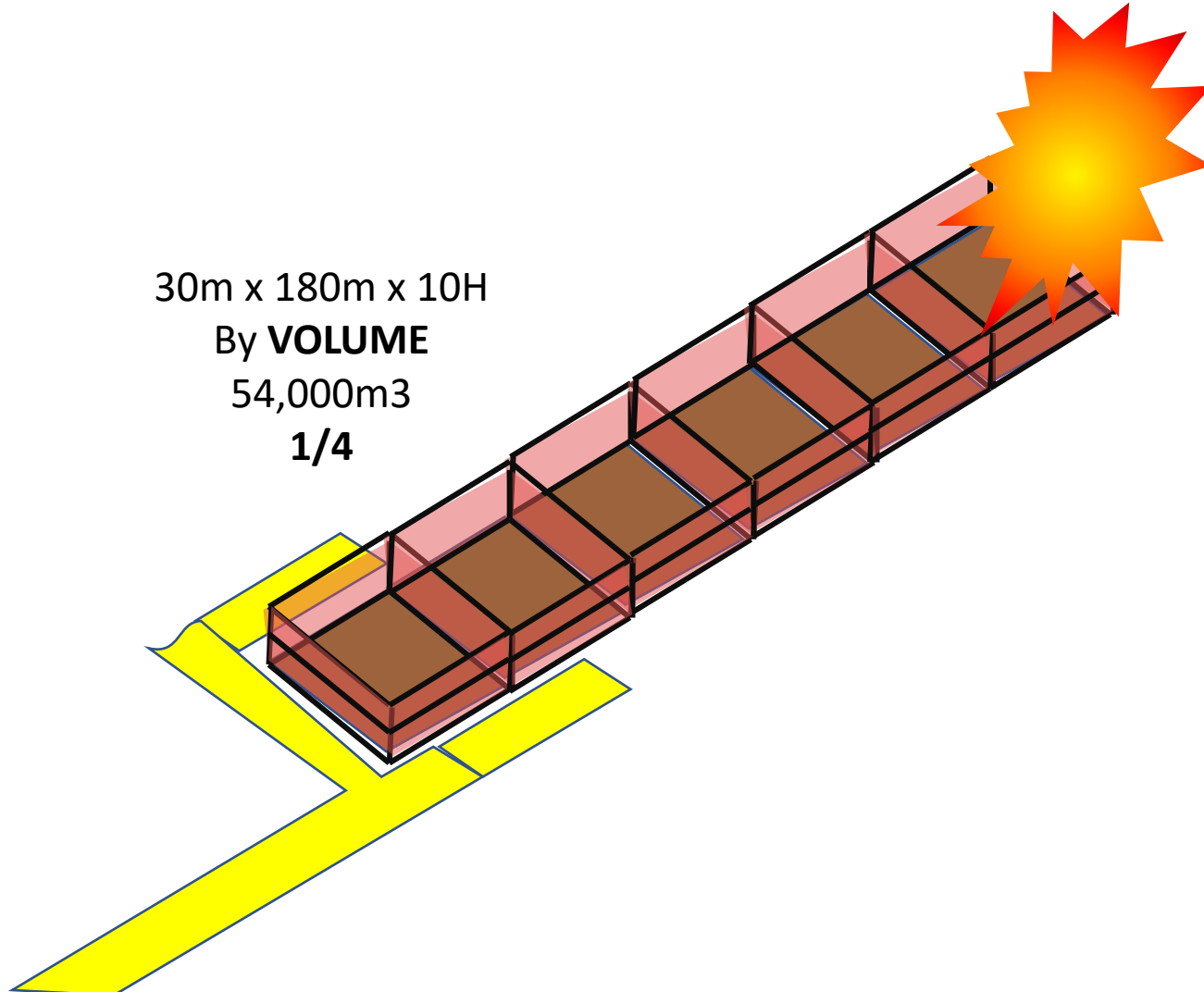
Minimum	$\frac{1}{6}$ perimeter (min 15m)
2000m² to 4000m²	$\frac{1}{4}$ perimeter
>4000m ² to 8000m ²	$\frac{1}{2}$ perimeter
>8000m² to 16,000m²	$\frac{3}{4}$ perimeter
>16000m ²	island site access

For buildings protected by an automatic sprinkler system, the floor area shall be doubled as follows:

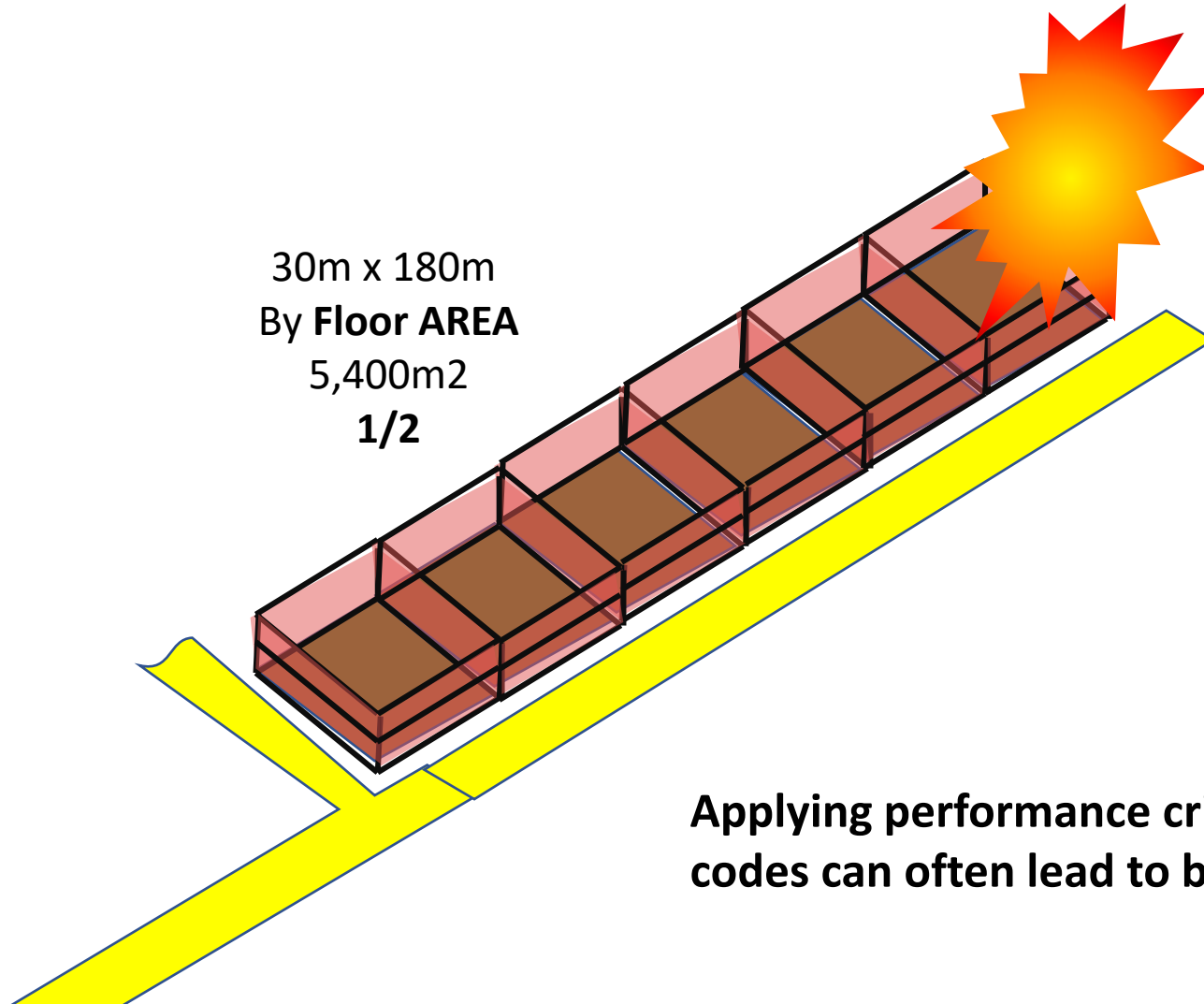
Minimum	$\frac{1}{6}$ perimeter (min 15m)
4000m ² to 8000m ²	$\frac{1}{4}$ perimeter
>8000m ² to 16,000m ²	$\frac{1}{2}$ perimeter
>16,000m ² to 32,000m ²	$\frac{3}{4}$ perimeter
>32,000m ²	island site access.

Proportion of perimeter access determined by **floor plate area** instead of by volume of building

30m x 180m x 10H
By **VOLUME**
54,000m³
1/4



30m x 180m
By **Floor AREA**
5,400m²
1/2

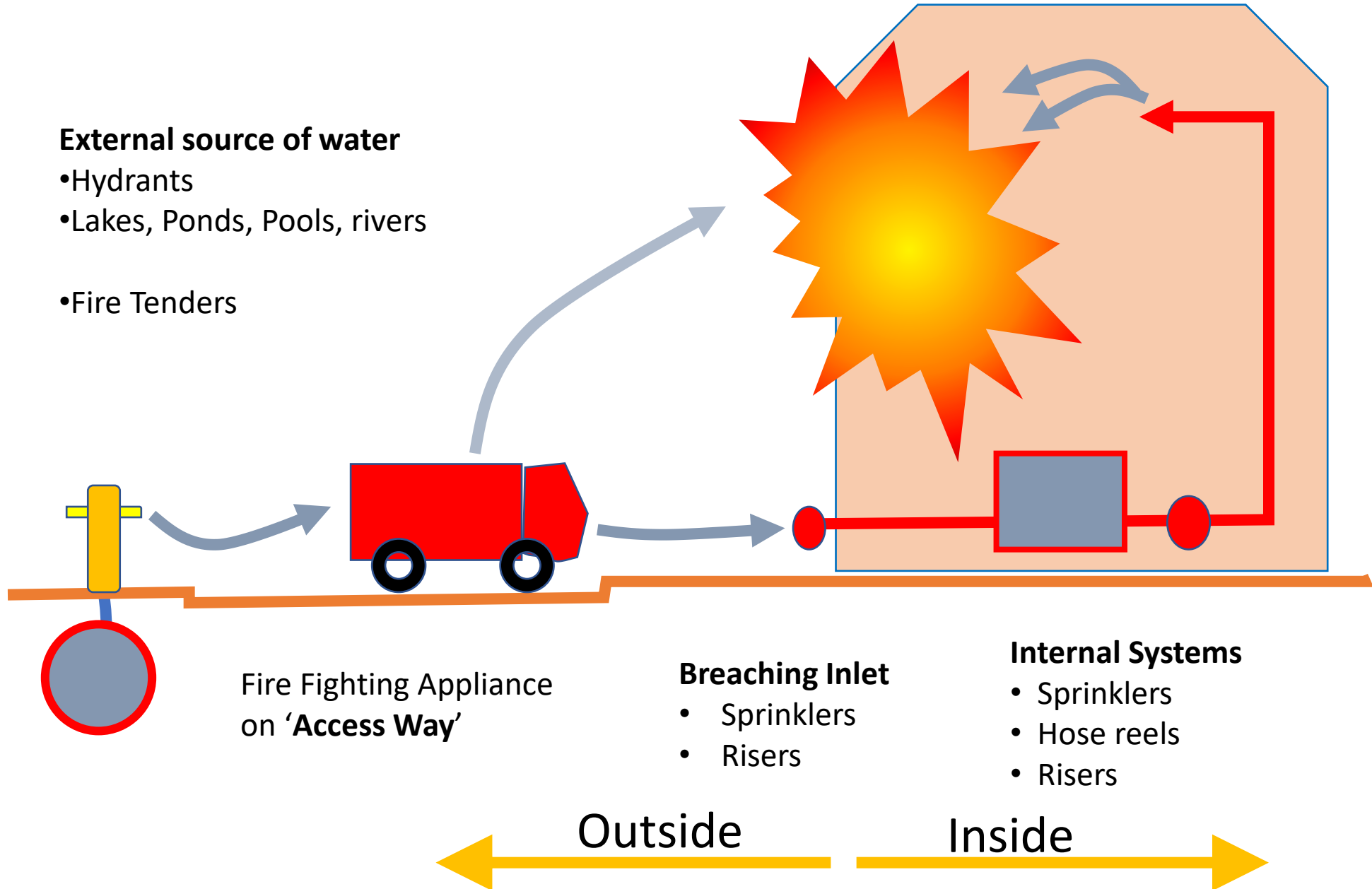


Applying performance criterion to check prescriptive
codes can often lead to better designs

DESIGNING FOR FIRE FIGHTING ACCESS AND RESCUE

Part 2: designing for fire fighting from the inside

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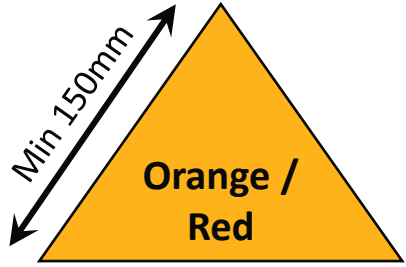


Singapore Fire Code 2013

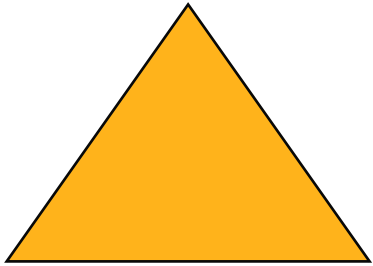
Access Openings/ Fire Access Panels

- Opening on external wall for external fire-fighting and rescue operation.
- Easily opened from inside and outside (or fitted with breakable glazing)
- Unobstructed at all time
- The opening is marked with a red/orange triangle
- The minimum size of the opening is 850 mm by 1000 mm
- The panels should be provided and evenly distributed along external walls to floors up to **60m high from Fire Appliance Access Level**
- FAP to be spaced not more than 20m apart from each other

Singapore Fire Code 2013



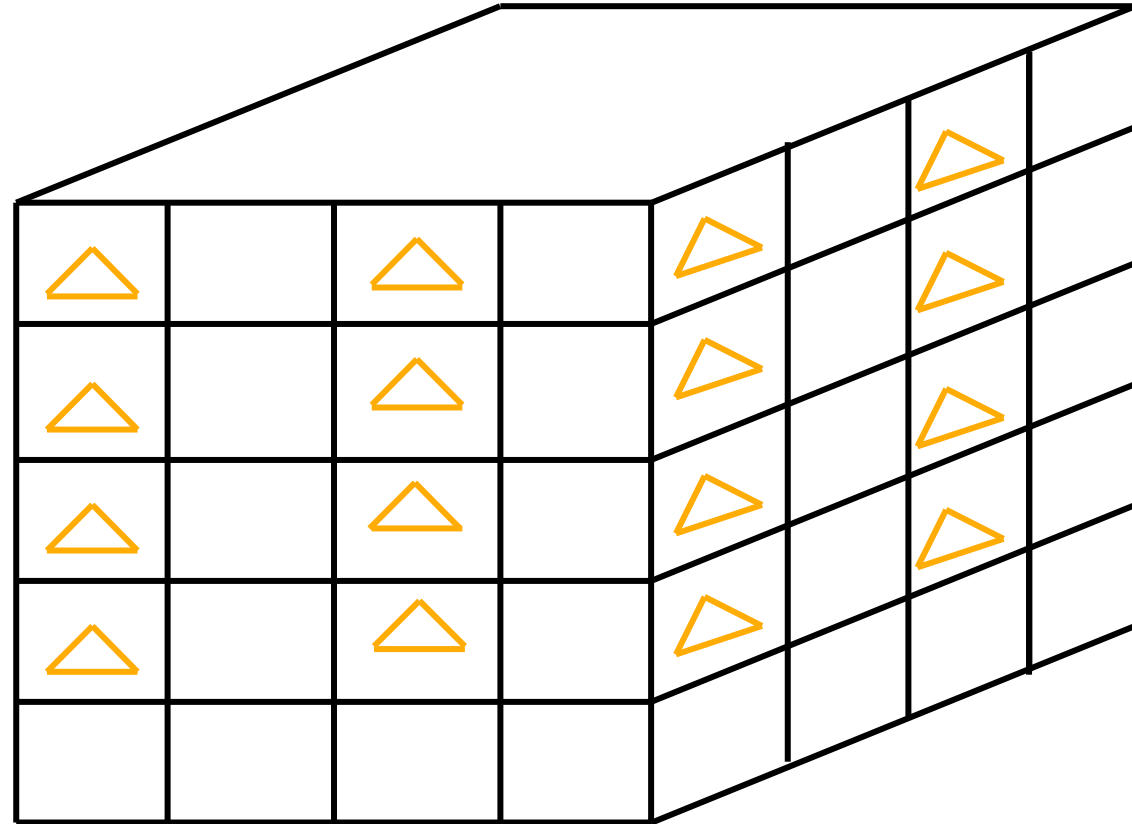
Side facing the outside.

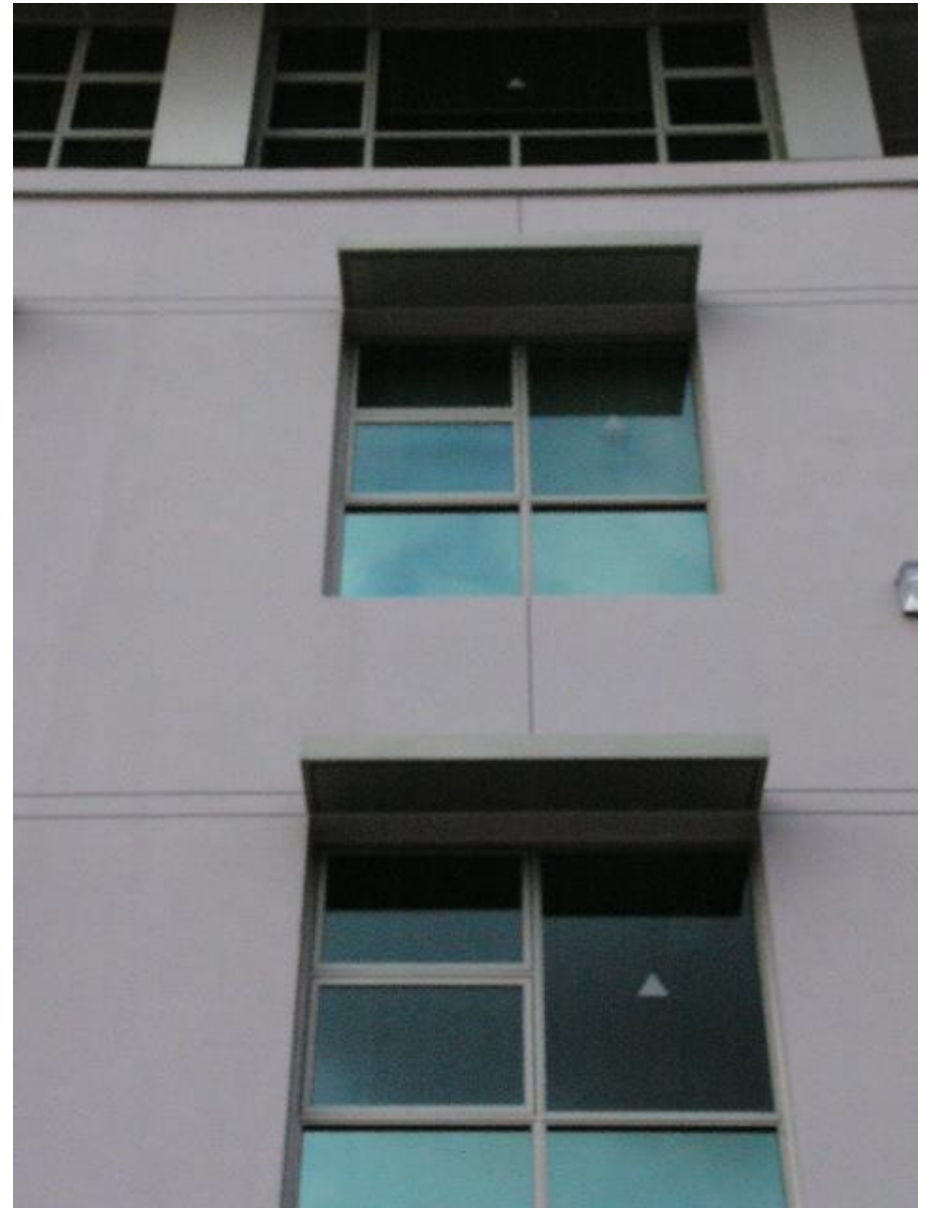


Side facing the inside.

Up to 60m

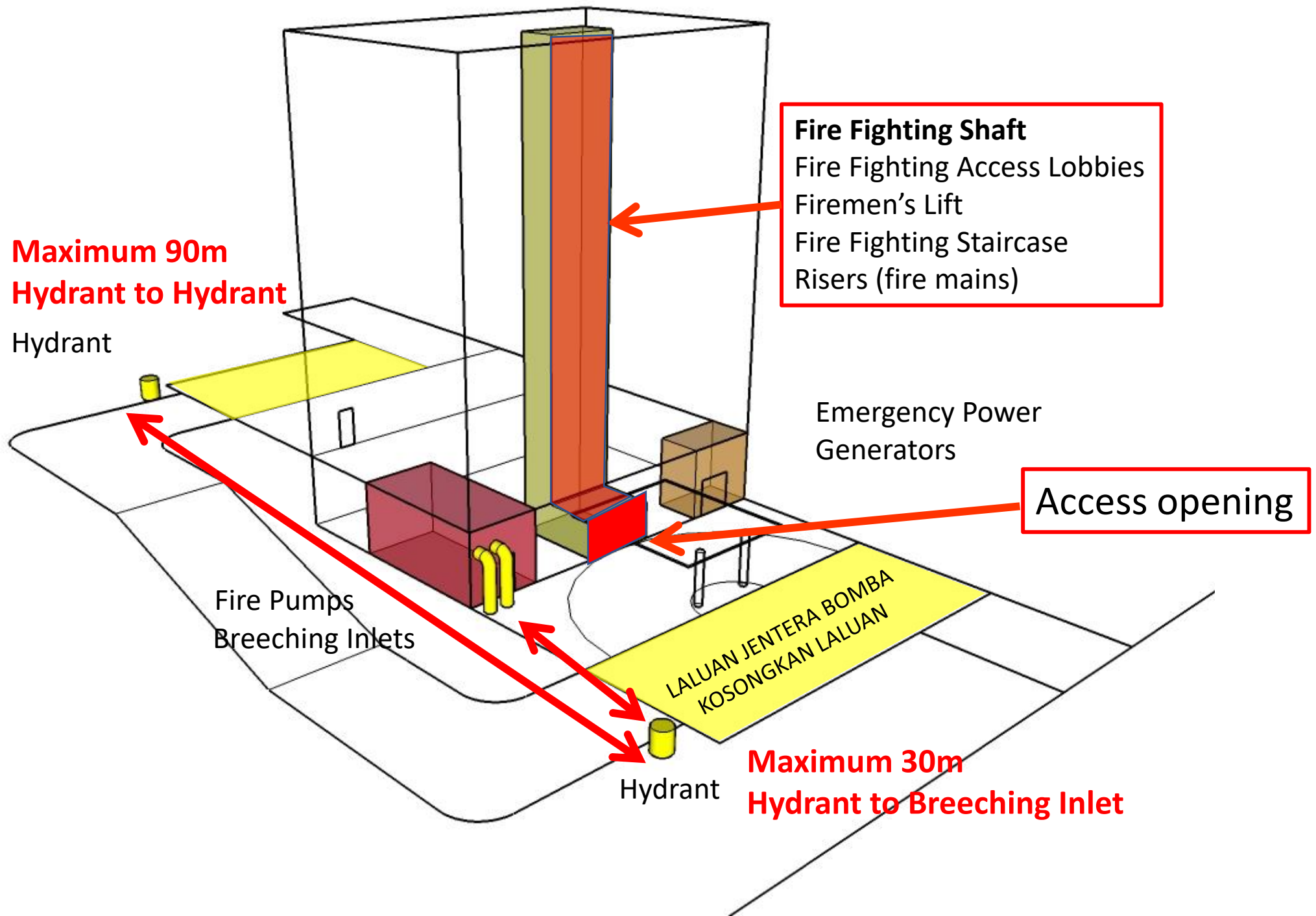
Max 20m



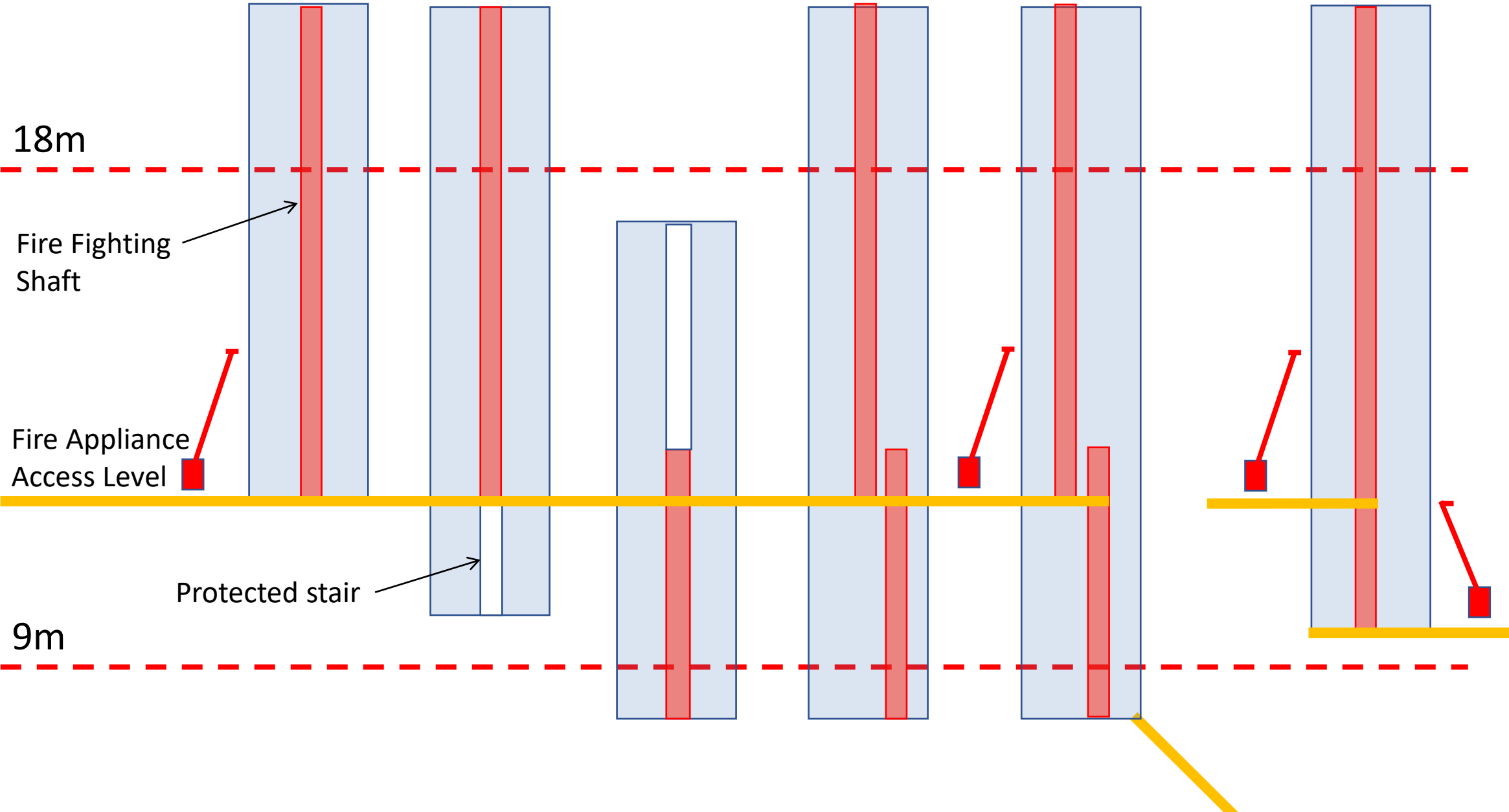








FIRE FIGHTING SHAFTS



FIRE FIGHTING SHAFTS : LOCATION

Radial distance

Risers (UBBL 230, 231)

All parts of floor within **45m** from a landing valve

Fire Fighting Access Lobbies (UBBL 197A)

Level distance from furthestmost point does not exceed **45m**

Route distance

Fire Lifts (UBBL 197A)

Not more than **61m** travel distance from furthestmost point

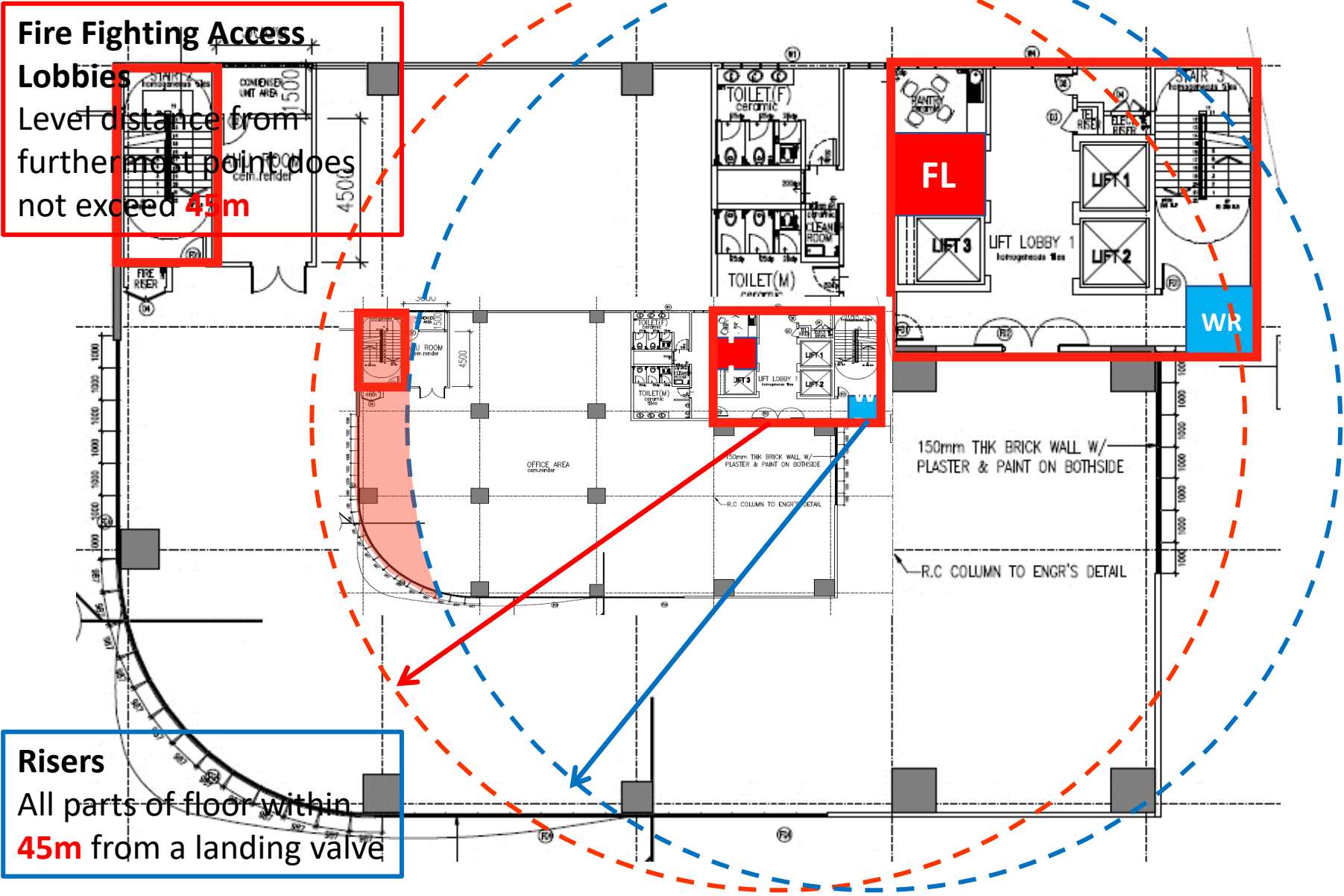
Fire Fighting Shafts (MS1183 21.2.3)

With Fire Lift, no more than **61m** from fire mains outlet measured on route in laying a hose

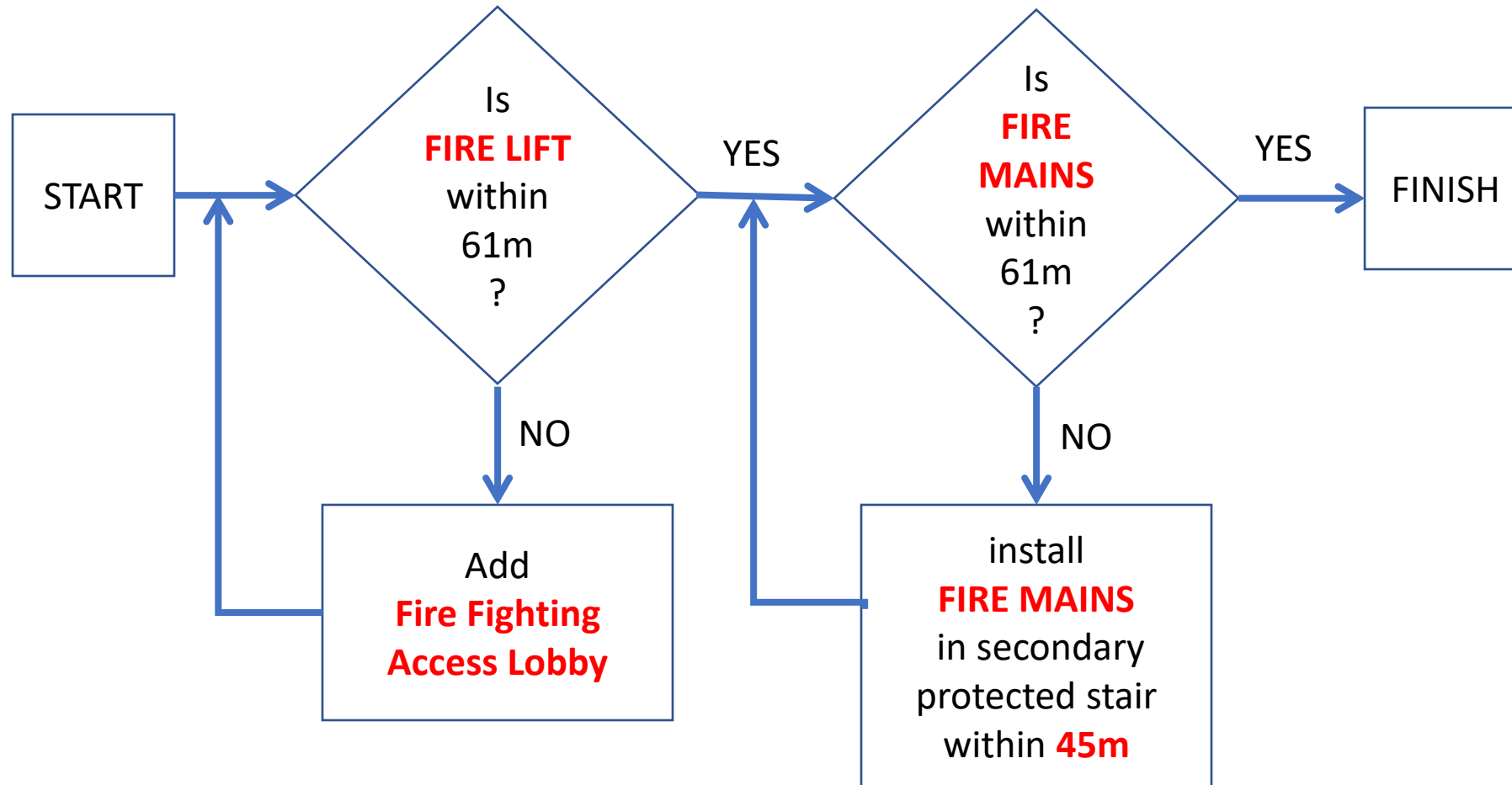
AND

Without Fire Lift, no more than **45m** from fire mains outlet measured on route in laying a hose

FIRE FIGHTING SHAFTS : LOCATION check with RADIAL DISTANCE



FIRE FIGHTING SHAFTS : LOCATION check with ROUTE DISTANCE



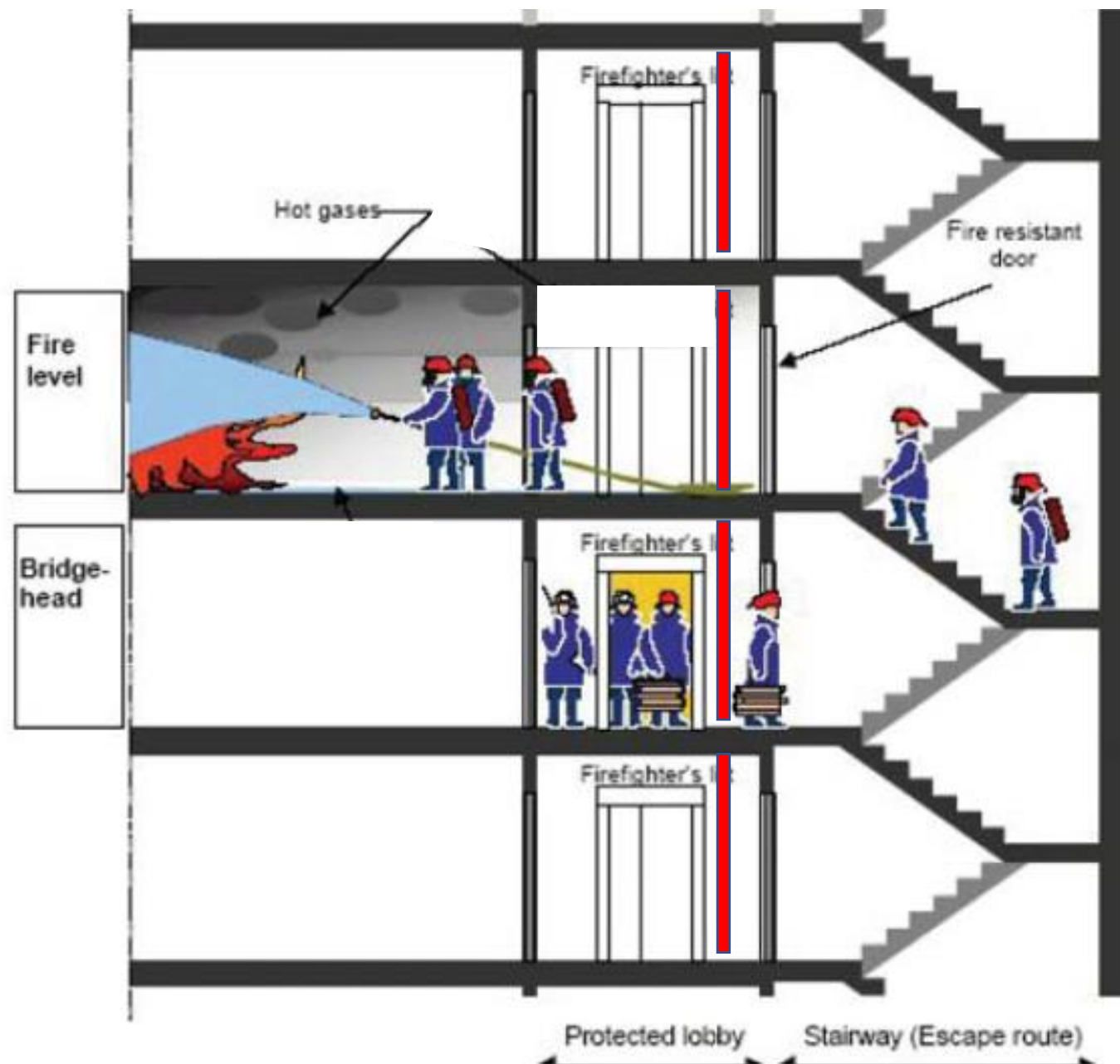
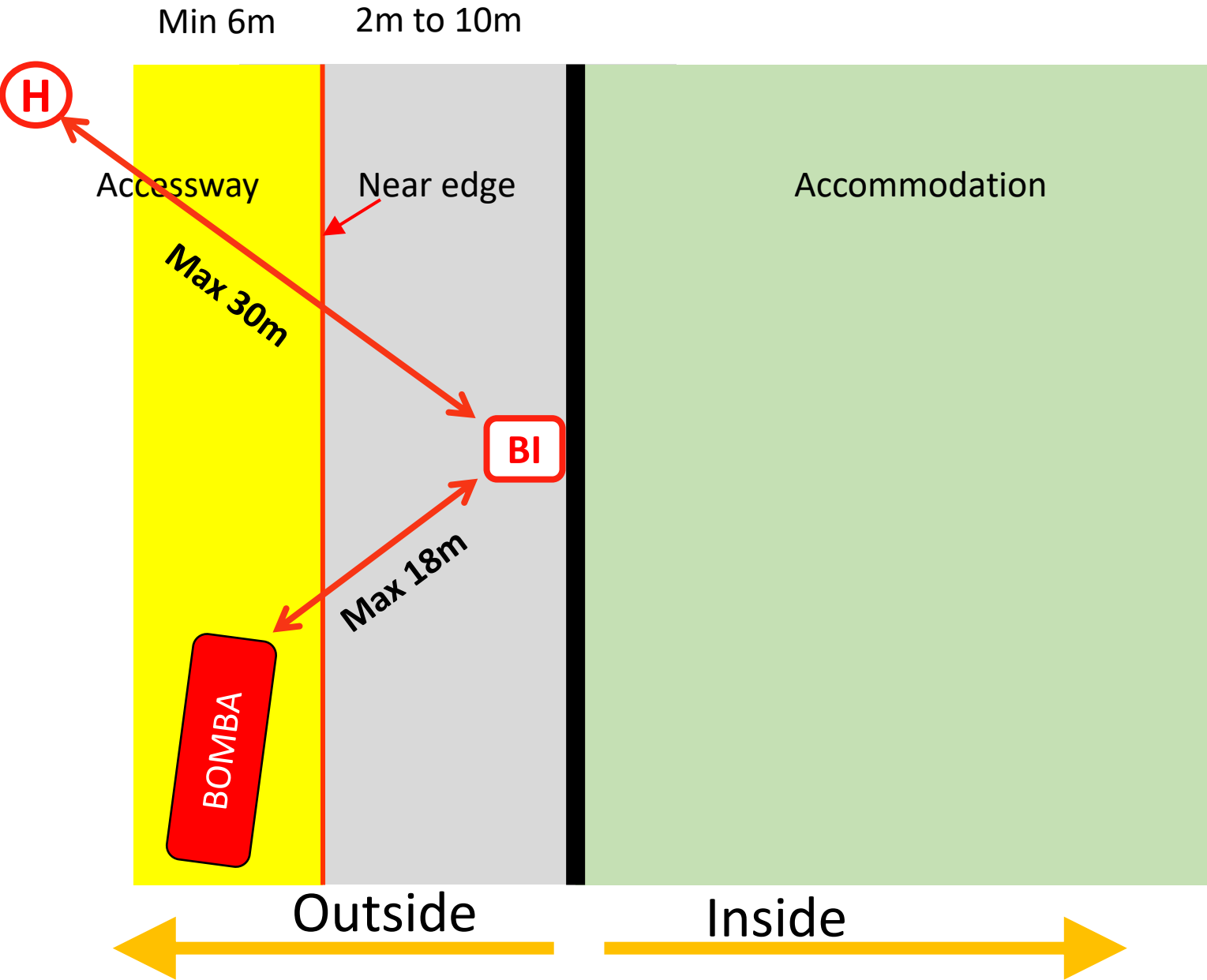
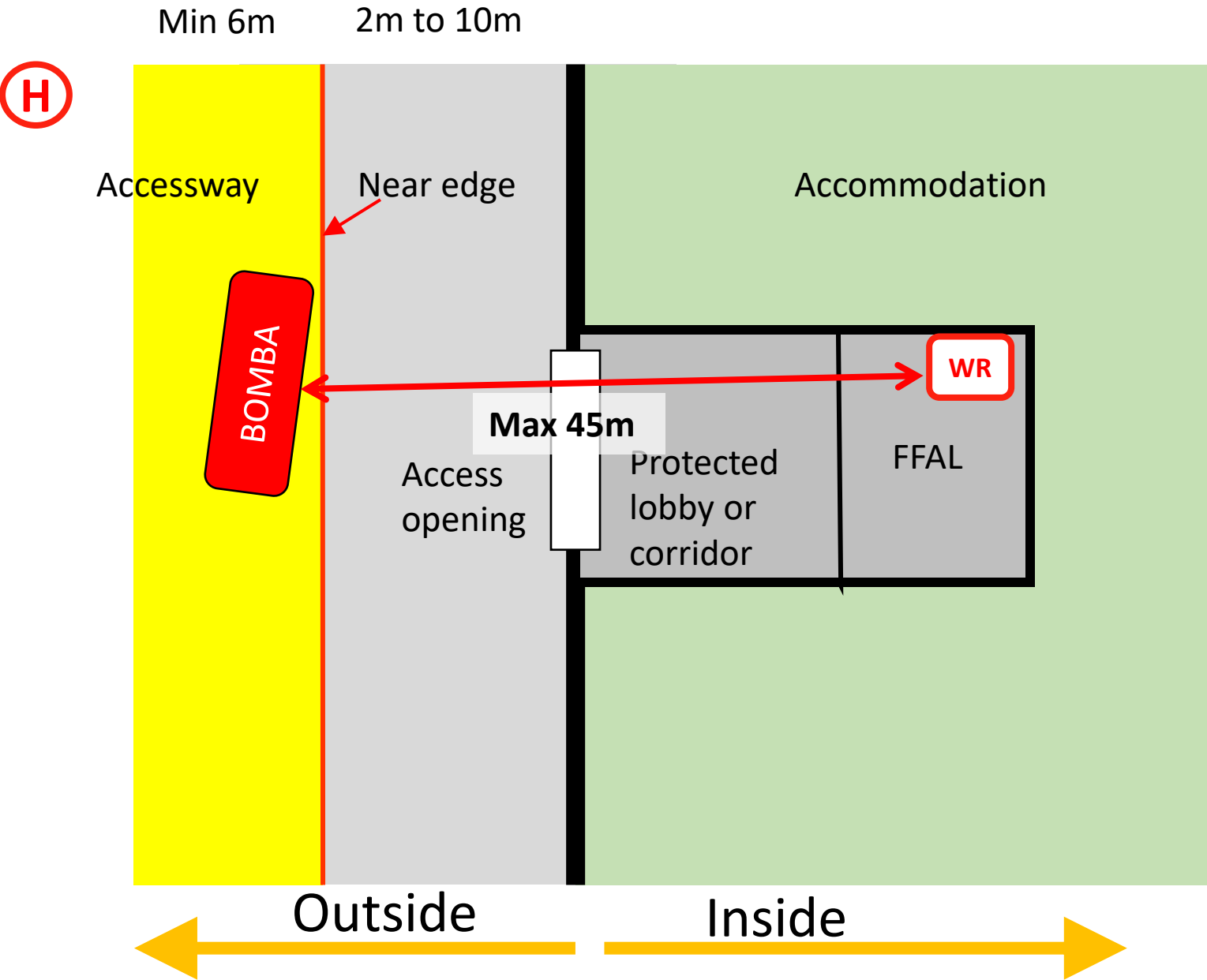


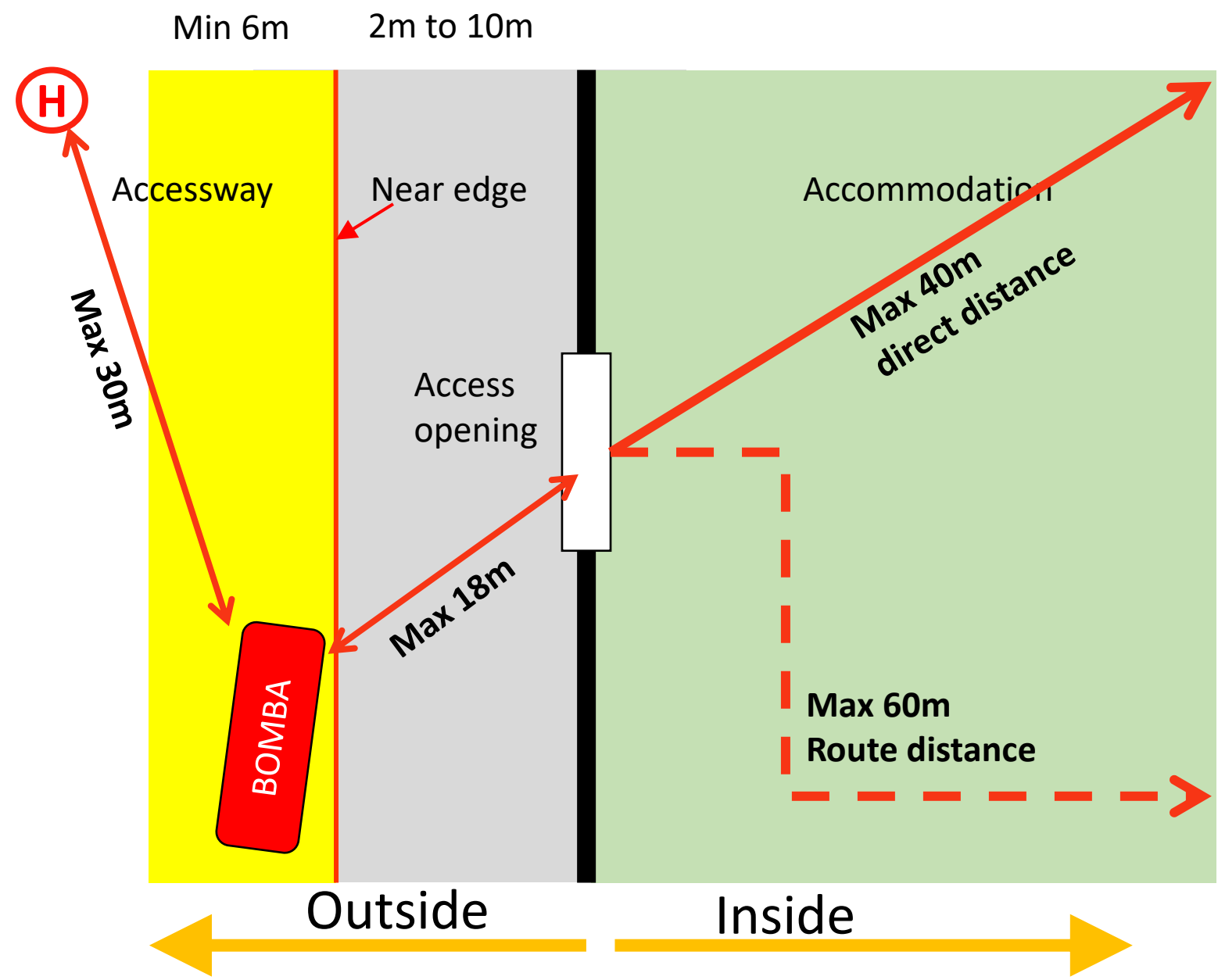
Figure 1. The use of the firefighting shaft in a high-rise fire (from BS5588/CEN standards)

MS 1183:2015 FIRE APPLIANCE ACCESS : to Breaching Inlets



MS 1183:2015 FIRE APPLIANCE ACCESS : to Access Openings





Are we still designing
to
MINIMUM
prescriptions?

Minimum 2m edge

Minimum 6m Accessway



Thank you!