

“MASA ITU
PEDANG,
JIKA TUAN
TIDAK
MEMOTONG,
MAKA TUAN
AKAN
DIPOTONG”

BOMBA CALCULATION DAY

CALCULATION FOR EXIT

STEP 1 : DETERMINE PURPOSE GROUP

STEP 2 : DETERMINE FLOOR AREA

STEP 3 : CALCULATE OCCUPANCY LOAD

STEP 4 : CALCULATE UNIT CAPACITY EXIT

STEP 5 : CALCULATE EXIT WITDH

CALCULATION FOR EXIT

STEP 1 : DETERMINE PURPOSE GROUP : By-Law 134

PG IV : PEJABAT

STEP 2 : DETERMINE FLOOR AREA : By-Law 176(a)

LUAS KASAR (GROSS FLOOR AREA)

STEP 3 : CALCULATE OCCUPANCY LOAD : By-Law 176(b)(c)

LUAS / OCCUPANCY LOAD FACTOR (Jadual 7)

STEP 4 : CALCULATE UNIT CAPACITY EXIT : 7th Schedule

OCCUPANCY LOAD / CAPACITY EXIT (Jadual 7)

STEP 5 : CALCULATE EXIT WITDH : By-Law 181

UNIT X 550mm (UNIT LEBAR TEMPAT KELUAR)

CALCULATION FOR EXIT

STEP 1 : DETERMINE PURPOSE GROUP : By-Law 134

PEJABAT

STEP 2 : DETERMINE FLOOR AREA : By-Law 176(a)

1000 m²

STEP 3 : CALCULATE *OCCUPANCY LOAD* : By-Law 176(b)(c)

1000/10 = 100 OL

STEP 4 : CALCULATE UNIT *CAPACITY EXIT (STAIR) 7th Schedule*

100/60 = 1.67 unit

STEP 5 : CALCULATE *EXIT WITDH* : By-Law 181

2 X 550 = 1100mm

CALCULATION FOR EXIT

STEP 1 : DETERMINE PURPOSE GROUP : By-Law 134

PEJABAT

STEP 2 : DETERMINE FLOOR AREA : By-Law 176(a)

1500 m²

STEP 3 : CALCULATE *OCCUPANCY LOAD* : By-Law 176(b)(c)

1500/10 = 150 OL

STEP 4 : CALCULATE UNIT *CAPACITY EXIT (STAIR) 7th Schedule*

150/60 = 2.5 unit

STEP 5 : CALCULATE *EXIT WITDH* : By-Law 181

3 X 550 = 1650mm

CALCULATION FOR EXIT

STEP 1 : DETERMINE PURPOSE GROUP : By-Law 134

PEJABAT

STEP 2 : DETERMINE FLOOR AREA : By-Law 176(a)

1990 m²

STEP 3 : CALCULATE *OCCUPANCY LOAD* : By-Law 176(b)(c)

1990/10 = 199 OL

STEP 4 : CALCULATE UNIT *CAPACITY EXIT (STAIR) : 7th Schedule*

199/60 = 3.32 unit

STEP 5 : CALCULATE *EXIT WIDTH* : By-Law 181

3 X 550 = 1650mm + 300mm = 1950mm

CALCULATION FOR EXIT

STEP 1 : DETERMINE PURPOSE GROUP : By-Law 134

PEJABAT

STEP 2 : DETERMINE FLOOR AREA : By-Law 176(a)

2500 m²

STEP 3 : CALCULATE *OCCUPANCY LOAD* : By-Law 176(b)(c)

2500/10 = 250 OL

STEP 4 : CALCULATE UNIT *CAPACITY EXIT (STAIR) : 7th Schedule*

250/60 = 4.17 unit

STEP 5 : CALCULATE *EXIT WITDH* : By-Law 181

4 X 550 = 2200 + 300 = 2500mm

CALCULATION FOR EXIT

STEP 1 : DETERMINE PURPOSE GROUP : By-Law 134

PEJABAT

STEP 2 : DETERMINE FLOOR AREA : By-Law 176(a)

3650 m²

STEP 3 : CALCULATE *OCCUPANCY LOAD* : By-Law 176(b)(c)

3650/10 = 365 OL

STEP 4 : CALCULATE UNIT *CAPACITY EXIT (STAIR) : 7th Schedule*

365/60 = 6.09 unit

STEP 5 : CALCULATE *EXIT WIDTH* : By-Law 181

6 X 550 = 3300 + 300 = 3600mm

CALCULATION FOR EXIT

STEP 1 : DETERMINE PURPOSE GROUP : By-Law 134

PEJABAT

STEP 2 : DETERMINE FLOOR AREA : By-Law 176(a)

8958 m²

STEP 3 : CALCULATE *OCCUPANCY LOAD* : By-Law 176(b)(c)

8958/10 = 896 OL

STEP 4 : CALCULATE UNIT *CAPACITY EXIT (STAIR)* : 7th Schedule

896/60 = 14.93 unit

STEP 5 : CALCULATE *EXIT WITDH* : By-Law 181

15 X 550 = 8250mm

CALCULATION FOR EXIT

STEP 1 : DETERMINE PURPOSE GROUP : By-Law 134

HOTEL

STEP 2 : DETERMINE NUMBER OF ROOM/FLOOR

40 ROOMS

STEP 3 : CALCULATE *OCCUPANCY LOAD* : By-Law 176(b)(c)

40 X 2 pax = 80 OL

STEP 4 : CALCULATE UNIT *CAPACITY EXIT (STAIR) 7th Schedule*

80/45 = 1.78 unit (say 2 unit)

STEP 5 : CALCULATE *EXIT WIDTH* : By-Law 181

2 X 550 = 1100mm

CALCULATION FOR EXIT

STEP 1 : DETERMINE PURPOSE GROUP : By-Law 134

HOTEL

STEP 2 : DETERMINE NUMBER OF ROOM/FLOOR

326 ROOMS

STEP 3 : CALCULATE **OCCUPANCY LOAD** : By-Law 176(b)(c)

326 X 2 pax = 652 OL

STEP 4 : CALCULATE UNIT **CAPACITY EXIT (STAIR) 7th Schedule**

652/45 = 14.48 unit (say 14 unit)

STEP 5 : CALCULATE **EXIT WIDTH** : By-Law 181

14 X 550 = 7700mm + 300mm = 8000mm

CALCULATION FOR EXIT

STEP 1 : DETERMINE PURPOSE GROUP : By-Law 134

RUMAH PANGSA

STEP 2 : DETERMINE FLOOR AREA

1900m²

STEP 3 : CALCULATE *OCCUPANCY LOAD* : By-Law 176(b)(c)

1900/24 pax = 79.2 OL

STEP 4 : CALCULATE UNIT *CAPACITY EXIT (STAIR) 7th Schedule*

80/45 = 1.78 unit (say 2 unit)

STEP 5 : CALCULATE *EXIT WIDTH* : By-Law 181

2 X 550 = 1100mm

CALCULATION FOR EXIT

STEP 1 : DETERMINE PURPOSE GROUP : By-Law 134

RESTAURANT

STEP 2 : DETERMINE FLOOR AREA

1500m² gross

700m² nett

STEP 3 : CALCULATE *OCCUPANCY LOAD* : By-Law 176(b)(c)

700/1.35 pax = 518.5 OL

STEP 4 : CALCULATE UNIT *CAPACITY EXIT (STAIR) 7th Schedule*

518.5/75 = 6.91 unit (say 7 unit)

STEP 5 : CALCULATE *EXIT WIDTH* : By-Law 181

7 X 550 = 3850mm

CALCULATION FOR EXIT

STEP 1 : DETERMINE PURPOSE GROUP : By-Law 134

PEJABAT

STEP 2 : DETERMINE FLOOR AREA : By-Law 176(a)

1000 m²

STEP 3 : CALCULATE *OCCUPANCY LOAD* : By-Law 176(b)(c)

1000/10 = 100 OL

STEP 4 : CALCULATE UNIT *CAPACITY EXIT (STAIR) 7th Schedule*

100/60 = 1.67 unit

STEP 5 : CALCULATE *EXIT WIDTH* : By-Law 181

2 X 550 = 1100mm

1100mm (MINIMUM WIDTH REQUIRED)

= Proposed 2 stair

Used 2-1 formula

1100/2-1 = 1100 for 1 stair

CALCULATION FOR EXIT

STEP 1 : DETERMINE PURPOSE GROUP : By-Law 134

PEJABAT

STEP 2 : DETERMINE FLOOR AREA : By-Law 176(a)

1500 m²

STEP 3 : CALCULATE *OCCUPANCY LOAD* : By-Law 176(b)(c)

1500/10 = 150 OL

STEP 4 : CALCULATE UNIT *CAPACITY EXIT (STAIR) 7th Schedule*

150/60 = 2.5 unit

STEP 5 : CALCULATE *EXIT WIDTH* : By-Law 181

3 X 550 = 1650mm

1650mm (MINIMUM WIDTH REQUIRED)

= Proposed 3 stair

Used -1 formula

1650/3-1 = 825 for 1 stair

Therefore 1 stair = 1100mm (2 exit unit)

CALCULATION FOR EXIT

STEP 1 : DETERMINE PURPOSE GROUP : By-Law 134

PEJABAT

STEP 2 : DETERMINE FLOOR AREA : By-Law 176(a)

8958 m²

STEP 3 : CALCULATE **OCCUPANCY LOAD** : By-Law 176(b)(c)

8958/10 = 896 OL

STEP 4 : CALCULATE UNIT **CAPACITY EXIT (STAIR) : 7th Schedule**

896/60 = 14.93 unit

STEP 5 : CALCULATE **EXIT WIDTH** : By-Law 181

15 X 550 = 8250mm

8250mm (MINIMUM WIDTH REQUIRED)

= Proposed 4 stair

Used -1 formula

8250/4-1 = 2750mm for 1 stair

CALCULATION FOR EXIT

STEP 1 : DETERMINE PURPOSE GROUP : By-Law 134

HOTEL

STEP 2 : DETERMINE NUMBER OF ROOM/FLOOR

40 ROOMS

STEP 3 : CALCULATE **OCCUPANCY LOAD** : By-Law 176(b)(c)

40 X 2 pax = 80 OL

STEP 4 : CALCULATE UNIT **CAPACITY EXIT (STAIR) 7th Schedule**

80/45 = 1.78 unit (say 2 unit)

STEP 5 : CALCULATE **EXIT WIDTH** : By-Law 181

2 X 550 = 1100mm

1100mm (MINIMUM WIDTH REQUIRED)

= Proposed 2 stair

Used 2-1 formula

1100/2-1 = 1100 for 1 stair

CALCULATION FOR EXIT

STEP 1 : DETERMINE PURPOSE GROUP : By-Law 134

HOTEL

STEP 2 : DETERMINE NUMBER OF ROOM/FLOOR

326 ROOMS

STEP 3 : CALCULATE **OCCUPANCY LOAD** : By-Law 176(b)(c)

326 X 2 pax = 652 OL

STEP 4 : CALCULATE UNIT **CAPACITY EXIT (STAIR) 7th Schedule**

652/45 = 14.48 unit (say 14 unit)

STEP 5 : CALCULATE **EXIT WIDTH** : By-Law 181

14 X 550 = 7700mm + 300mm = 8000mm

8000mm (MINIMUM WIDTH REQUIRED)

= Proposed 6 stair

Used -1 formula

8000/6-1 = 1600mm for 1 stair

CALCULATION FOR EXIT

STEP 1 : DETERMINE PURPOSE GROUP : By-Law 134

RESTAURANT

STEP 2 : DETERMINE FLOOR AREA

1500m² gross

700m² nett

STEP 3 : CALCULATE *OCCUPANCY LOAD* : By-Law 176(b)(c)

$700/1.35 \text{ pax} = 518.5 \text{ OL}$

STEP 4 : CALCULATE UNIT *CAPACITY EXIT (STAIR) 7th Schedule*

$518.5/75 = 6.91 \text{ unit (say 7 unit)}$

STEP 5 : CALCULATE *EXIT WIDTH* : By-Law 181

$7 \times 550 = 3850\text{mm}$

3850mm (MINIMUM WIDTH REQUIRED)

= Proposed 4 stair

Used -1 formula

$3850/4-1 = \underline{1284\text{mm}}$ for 1 stair

CALCULATION FOR EXIT

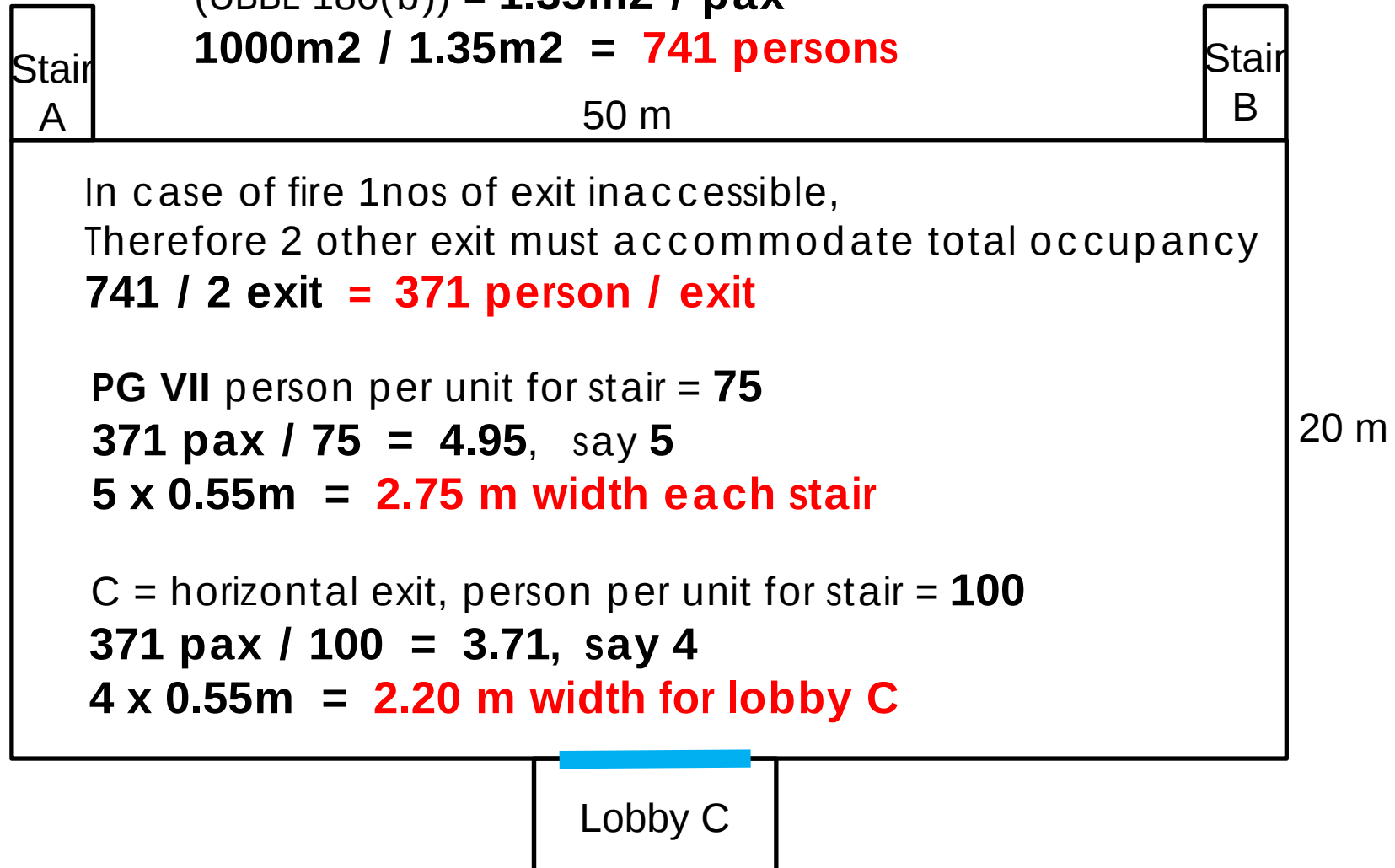
Scenario: Upper floor exhibition area in an Institutional Building

Calculate Stair A, Stair B and Lobby C minimum width

Occupant Load

(UBBL 180(b)) = **1.35m² / pax**

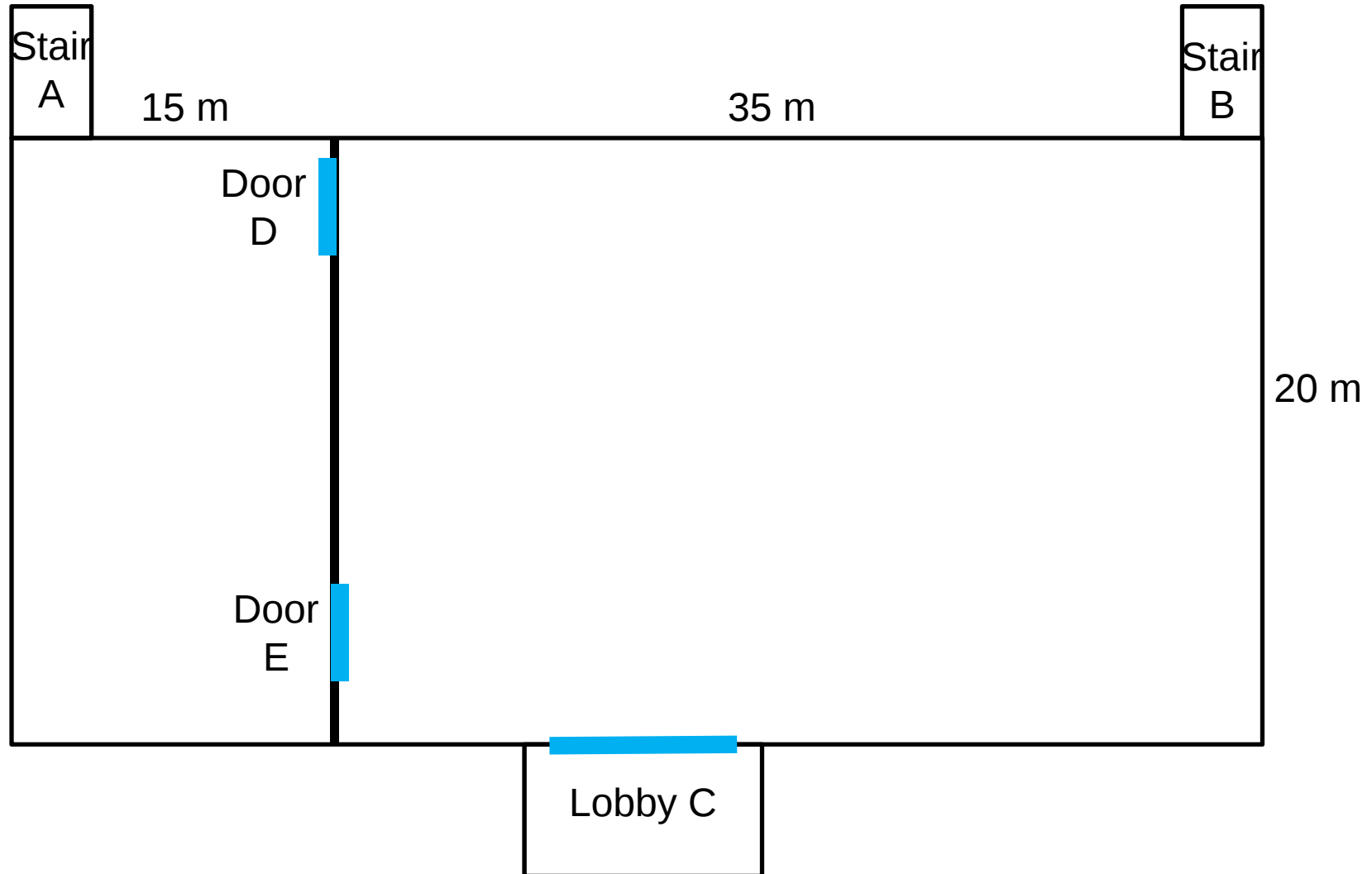
1000m² / 1.35m² = 741 persons



CALCULATION FOR EXIT

Scenario: Upper floor exhibition area in an Institutional Building

Calculate minimum exit width for Door D and Stair B



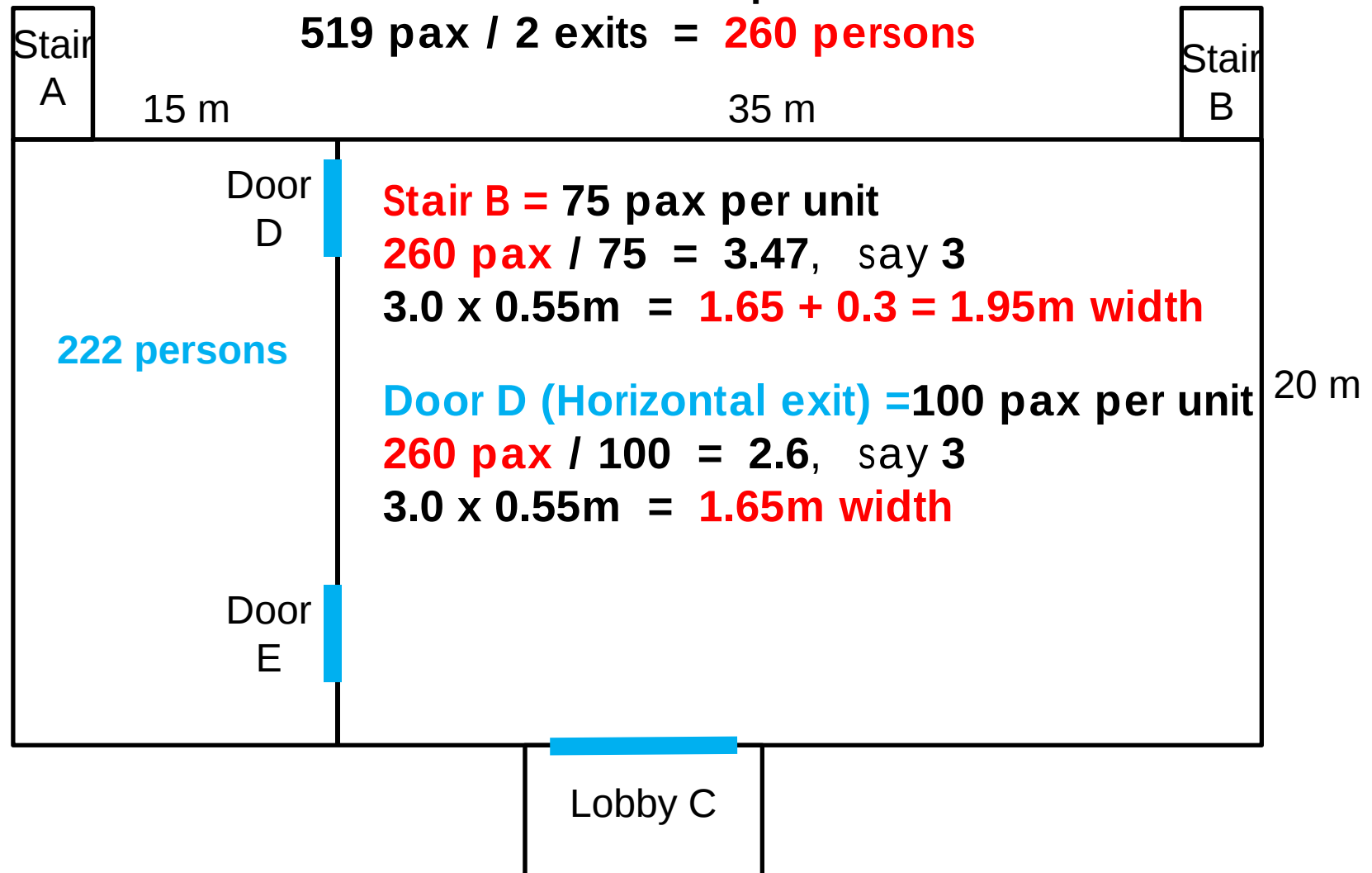
Answer : Assume Lobby C is inaccessible, either B or D must accommodate

Occupant Load

(UBBL 180(b)) = $1.35\text{m}^2 / \text{pax}$

$700\text{m}^2 / 1.35\text{m}^2 = 519 \text{ persons}$

$519 \text{ pax} / 2 \text{ exits} = \mathbf{260 \text{ persons}}$



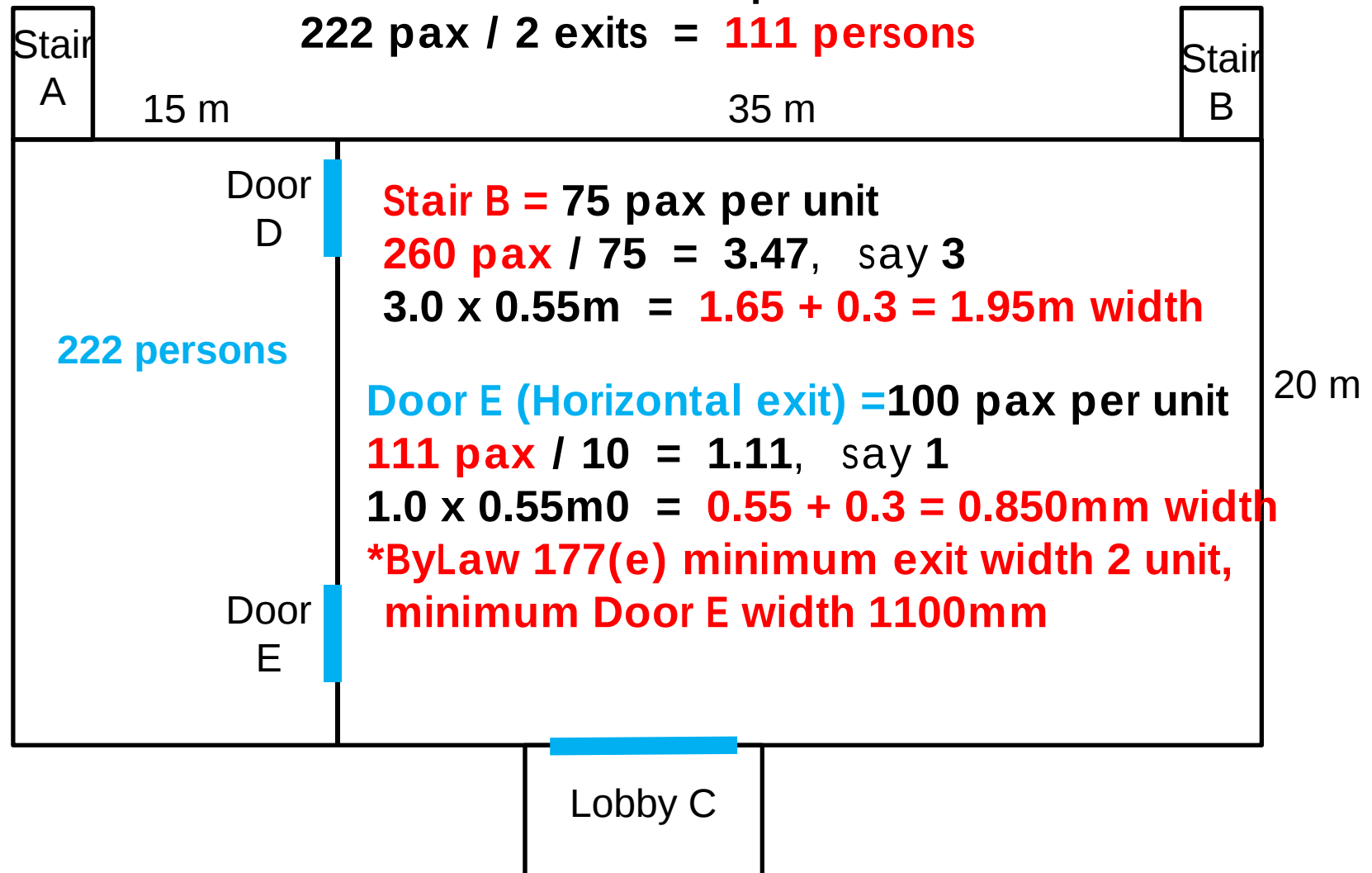
Question : Assume Stair A is inaccessible, Calculate width of **Door E**

Occupant Load

(UBBL 180(b)) = $1.35\text{m}^2 / \text{pax}$

$300\text{m}^2 / 1.35\text{m}^2 = 222 \text{ persons}$

$222 \text{ pax} / 2 \text{ exits} = \mathbf{111 \text{ persons}}$



QUESTION 4

(25 marks)

The provided conceptual schematic drawing (*see next page*) are for a 48 level tower block on 4 levels of basement in Kuala Lumpur, comprising the following:

B1 – B4	Basement Car Park
Levels 1 – 2	Lobby, Public Space and Services
Levels 3 – 24	Office Suites
Level 25	Mechanical Services
Level 26	Restaurant and Bar
Levels 27 – 48	Serviced Studio Apartments

Based on the schematic sketch given, and without changing the design:

a) Calculate the minimum staircase widths for the three main zones of:

- Serviced Studio Apartments
- Restaurant / Bar
- Office Suites

Cite the relevant By-Laws.

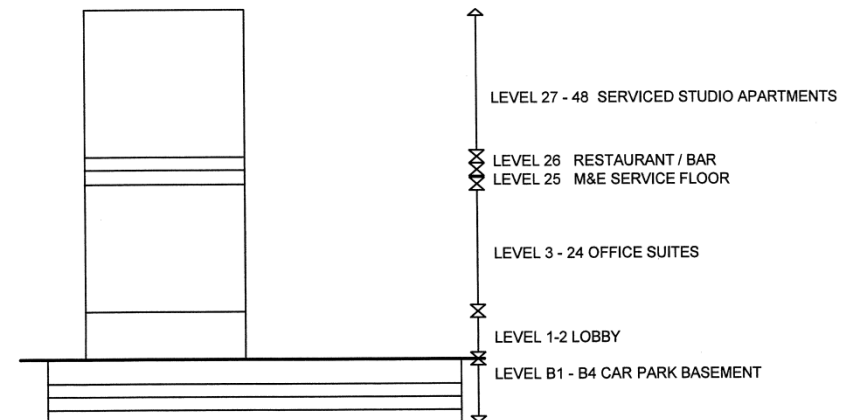
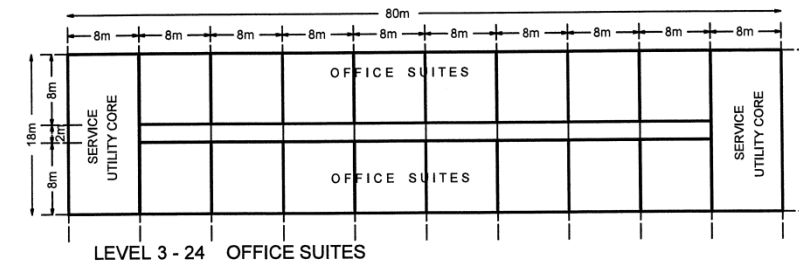
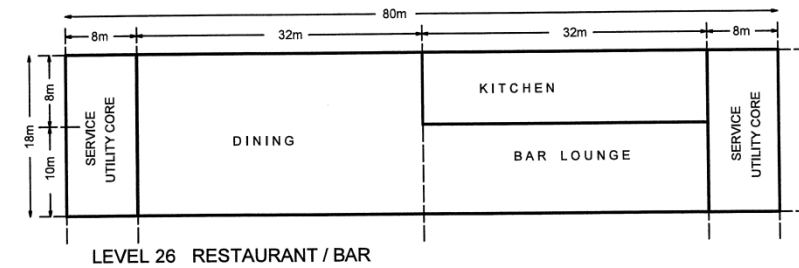
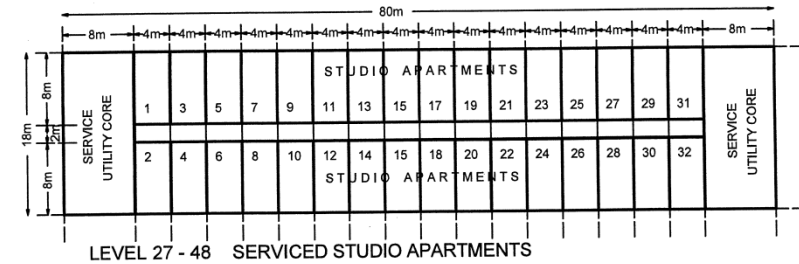
(15 marks)

b) List the Active Electrical and Mechanical Fire Safety installations that are required to be installed in accordance with the UBBL 1984 requirements.

(10 marks)

(*see plan on next page*)

48 LEVEL TOWER BLOCK ON 4 LEVEL BASEMENT



CALCULATION FOR EXIT

STEP 1 : DETERMINE PURPOSE GROUP - By-Law 134

KEDAI

STEP 2 : DETERMINE FLOOR AREA - By-Law 176(a)

4000 m²

STEP 3 : CALCULATE **OCCUPANCY LOAD** - By-Law 176(c)

4000/6 = 365 OL

STEP 4 : CALCULATE UNIT **CAPACITY EXIT (STAIR) – 7th Schedule**

666.66/60 = 11.1111 unit

STEP 5 : CALCULATE **EXIT WIDTH** - By-Law 181

11 X 550 = 6050mm + 300mm = 6350mm

6350 (MINIMUM WIDTH REQUIRED)

= Proposed 4 stair

Used -1 formula

6350mm/4-1 = 2117mm for 1 stair

CALCULATION for exit door width at UPPER LEVEL

STEP 1 : DETERMINE PURPOSE GROUP - By-Law 134

KEDAI

STEP 2 : DETERMINE FLOOR AREA - By-Law 176(a)

4000 m²

STEP 3 : CALCULATE **OCCUPANCY LOAD** - By-Law 176(c)

4000/6 = 365 OL

STEP 4 : CALCULATE UNIT **CAPACITY EXIT (DOOR) – 7th Schedule**

666.66/100 = 6.66 unit

STEP 5 : CALCULATE **EXIT WIDTH** - By-Law 181

7 X 550 = 3850mm

3850mm (MINIMUM WIDTH REQUIRED)

= Proposed 4 Door

Used -1 formula

3850mm/4-1 = 1284mm for 1 door

***By-Law 163 : fire door minimum 900x2100 or 1800x2100**

Use double door 1800

CALCULATION exit width for Main Door at STREET LEVEL

STEP 1 : DETERMINE PURPOSE GROUP - By-Law 134

KEDAI

STEP 2 : DETERMINE FLOOR AREA - By-Law 176(a)

4000 m²

STEP 3 : CALCULATE **OCCUPANCY LOAD** - By-Law 176(c)

4000/3 = 1333.33 OL

STEP 4 : CALCULATE UNIT **CAPACITY EXIT (DOOR) – 7th Schedule**

133.33/100 = 13.33 unit

STEP 5 : CALCULATE **EXIT WIDTH** - By-Law 181

13 X 550 = 7150mm + 300mm = 7450mm

*Main exit must be 50% of total exit width : **7.45m X 50% = 3.725m**

Nos main door provided : **2 numbers**

Exit width per door : **1863mm**

Exit provision from upper to street level :-

Exit staircase provided : 4 doors @ 1284mm

Exit door at Street Level provided : 2 doors @ 1863mm

Thank You
Good Luck for Mac Fighter