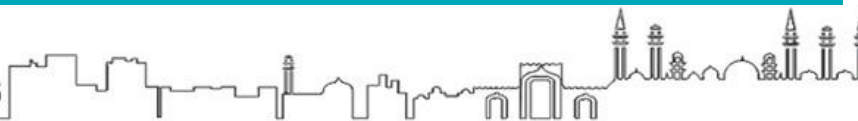




Fire Safety Design Principles for Malls

Alexander Castellanos
Associate Consultant – WSP

22 April 2015





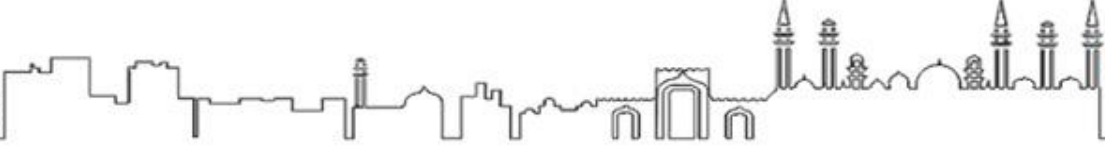
Course Description

Mall design to compliance with codes such as NFPA 101 allows for a flexible design which facilitates the architectural and functional intent of malls. In addition, it allows for various elements of performance based design. This presentation highlights the design fundamentals and identifies some common misinterpretations of the code.



Presenter

- University of Maryland, B.S. Fire Protection Engineering
- 2004 – 2008, RJA New York
- 2008 – 2010, Buro Happold London
- 2010 – 2012, Buro Happold New York
- 2012 – Present, WSP in the Middle East
- Experience in design of high profile, high occupancy buildings
- Fire, Smoke, and egress modelling
- Liaison with Approving Authorities



Learning Objectives

1. *Key Design Challenge*
2. *Understanding Mall Design Principles*
3. *Understanding Common Misinterpretations*

The purpose of this presentation is to convey technical knowledge to the conference participants.

The presentation also contains slides with text that summarises the content of the presentation and the main learning objectives.

These may be used to update CPD records for relevant organisations including the Chartered Institute of Building (CIOB).

Key Design Challenges



High Occupant
Loads



Means of Egress
System Design

High Occupancy Challenges

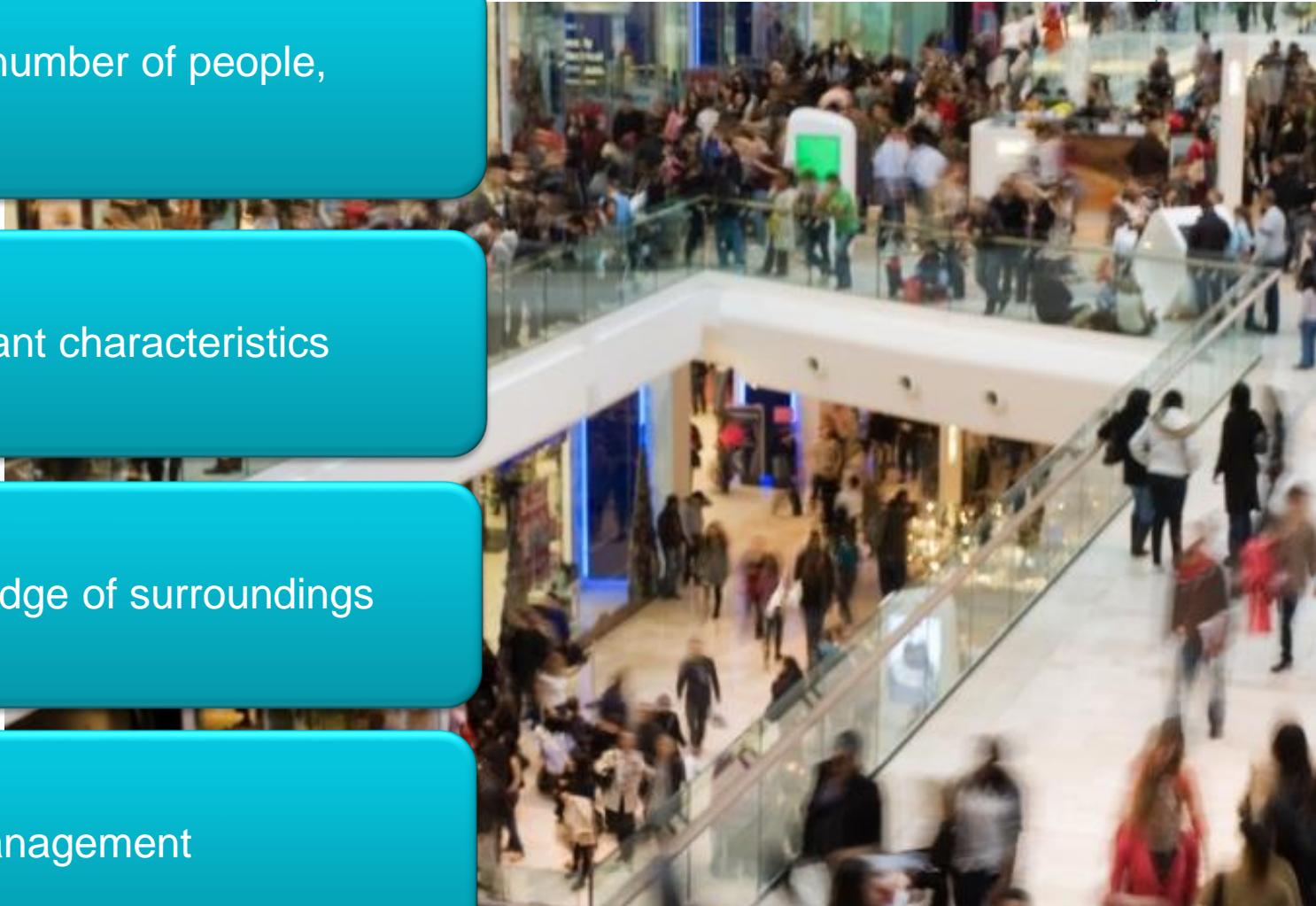


Large number of people,
crowds

Occupant characteristics

Knowledge of surroundings

Mall management



Means of Egress Challenges



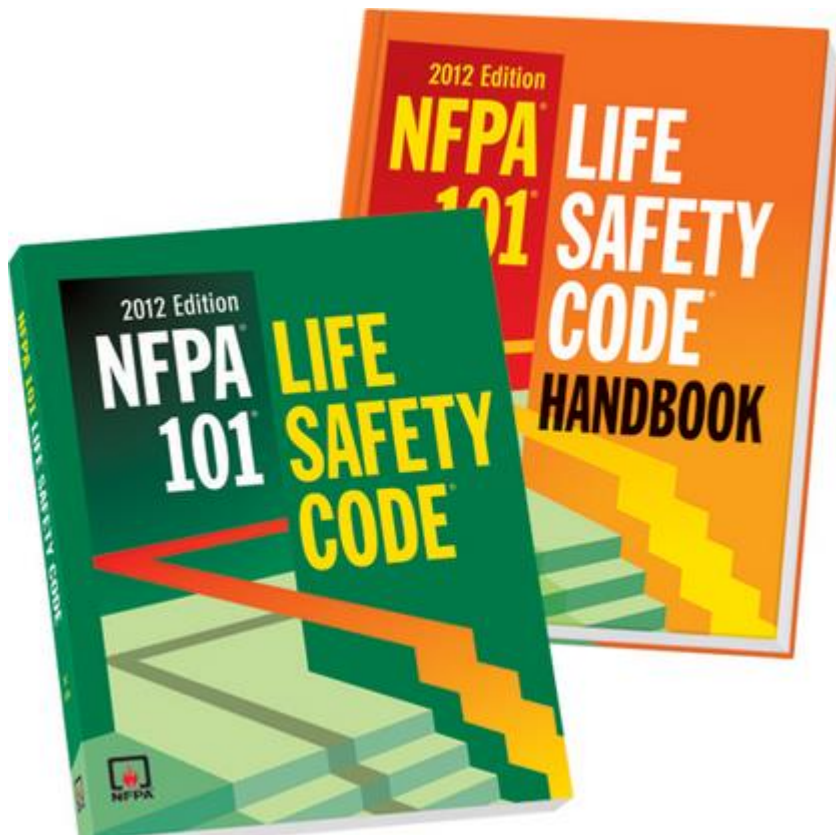
Occupant Loads

Exit Width

Travel Distance

Exit Discharge

Advantages Built Into NFPA 101



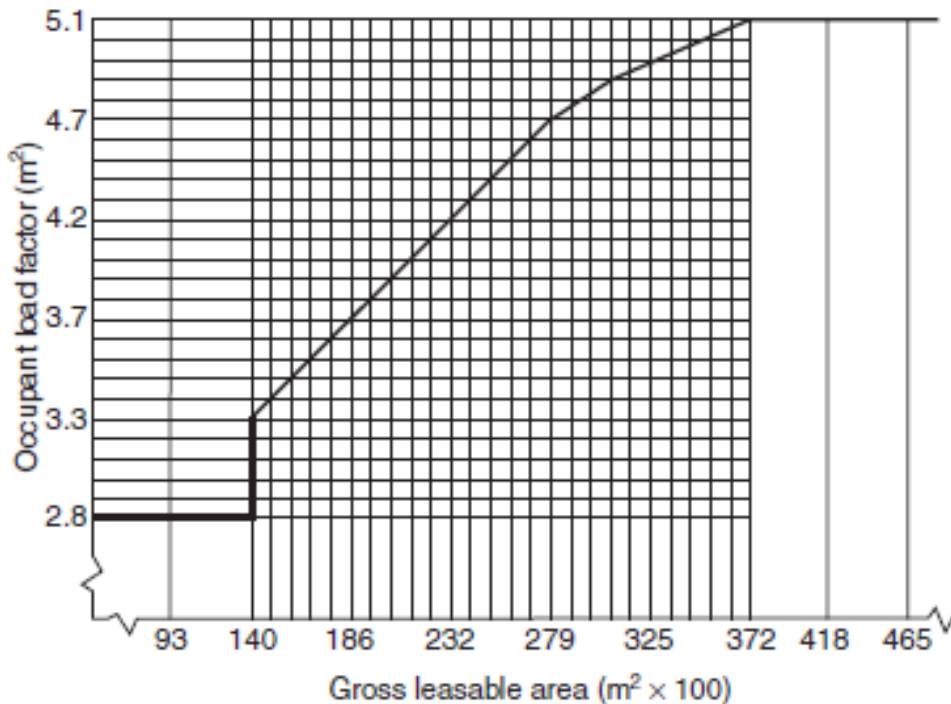
Based on Mall
Precedents and
Research From
Large Malls

Occupant Load

Means of Egress

Large
Connecting
Volumes

Mall Occupant Load Assessments



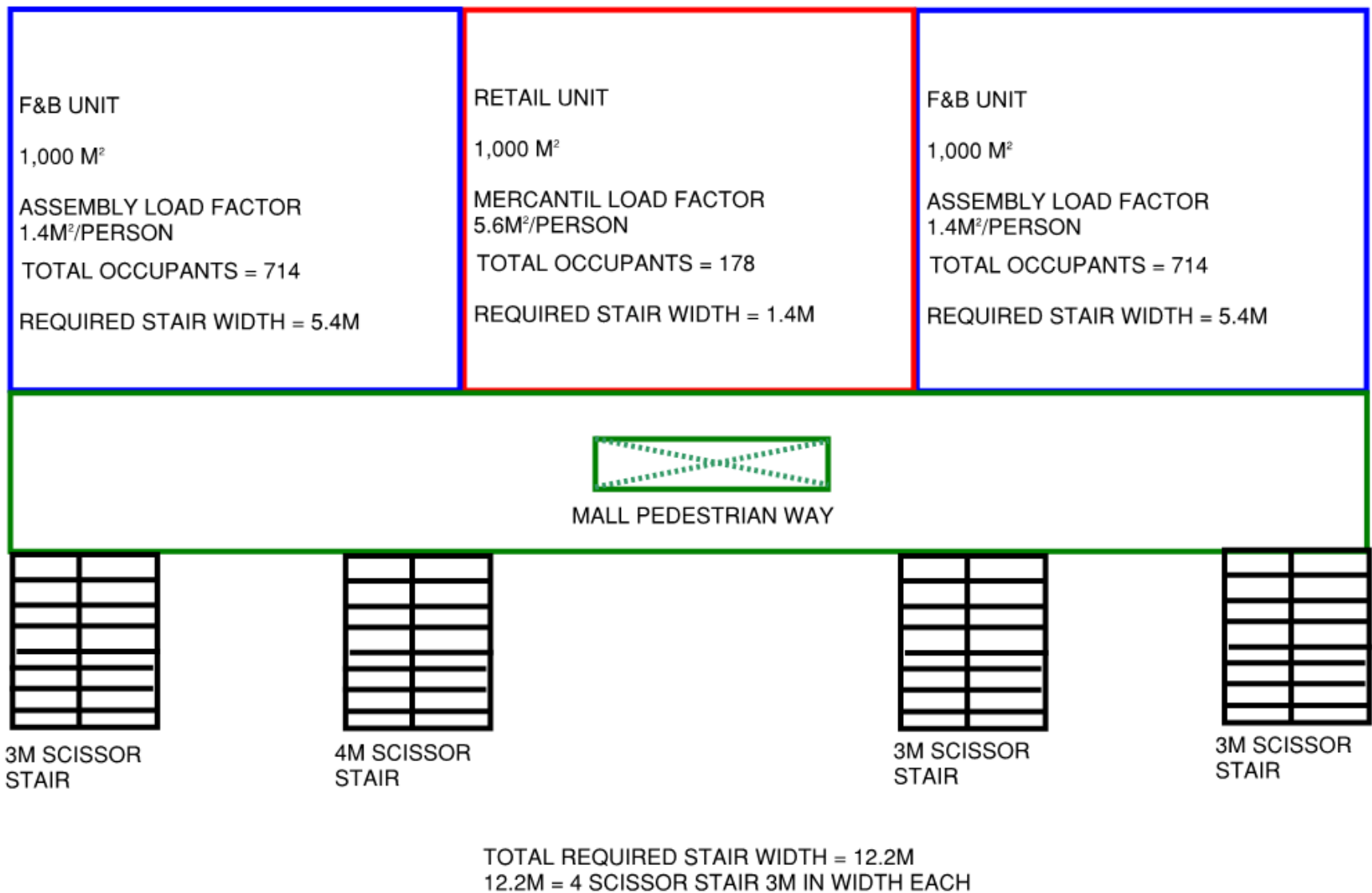
Mall Exit Assessment

- Total GLA (Determines Factor)
- Non GLA Calculated Separate
- Assess Individual Levels

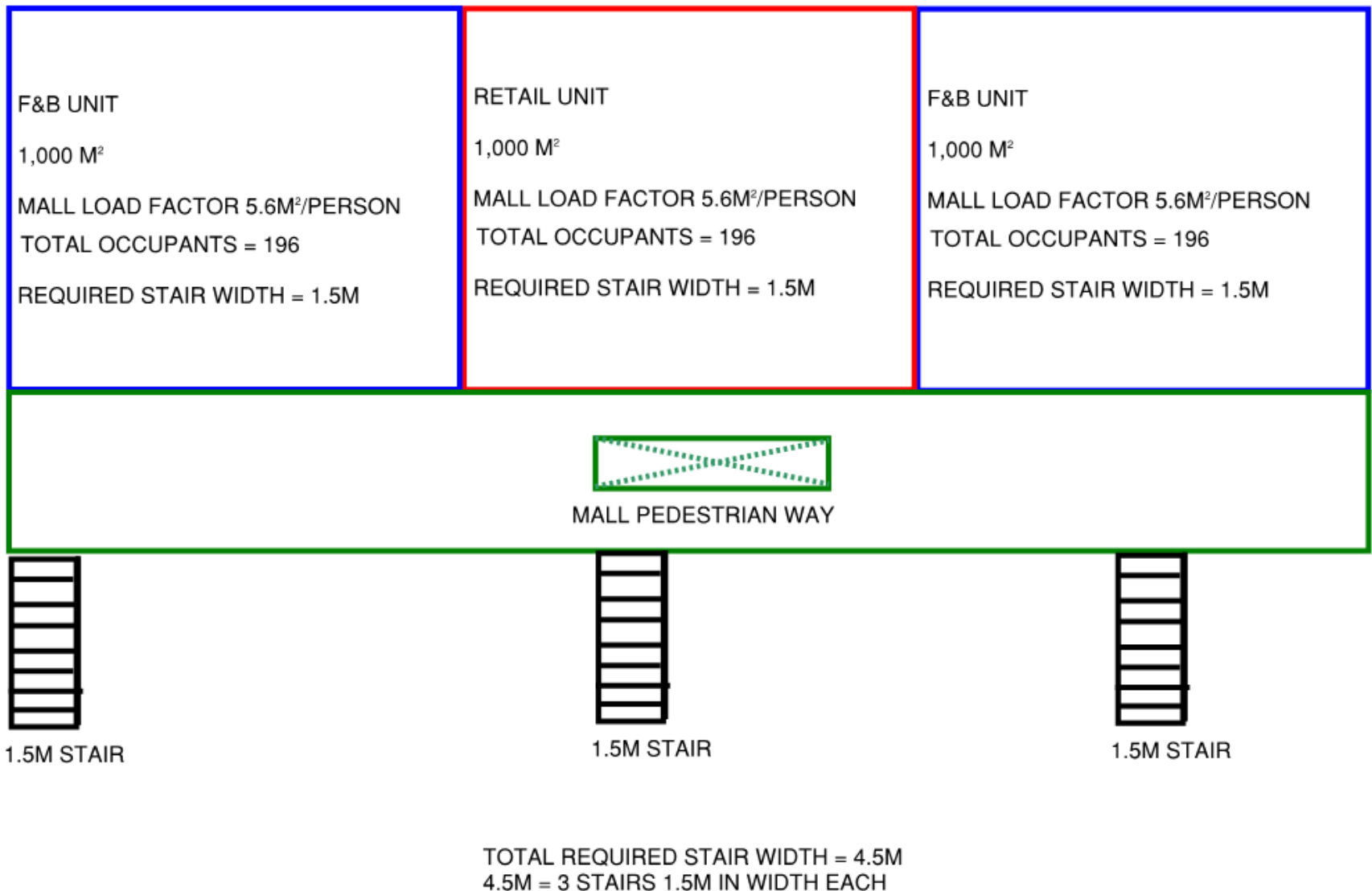
Individual Unit Egress Assessment

- Assembly - 1.4m²/person
- Retail (Ground) - 2.8 m²/person
- Retail (Upper Levels) - 5.6m²/person
- Storage - 27.9m²/person (UAE Fire Code)

Exit Capacity – Base Factors



Exit Capacity – Mall Factors



Unit Travel Distance



76m Internal Travel Distance

Mall Travel Distance



60m Mall Travel Distance

Based on Smoke Control Provisions

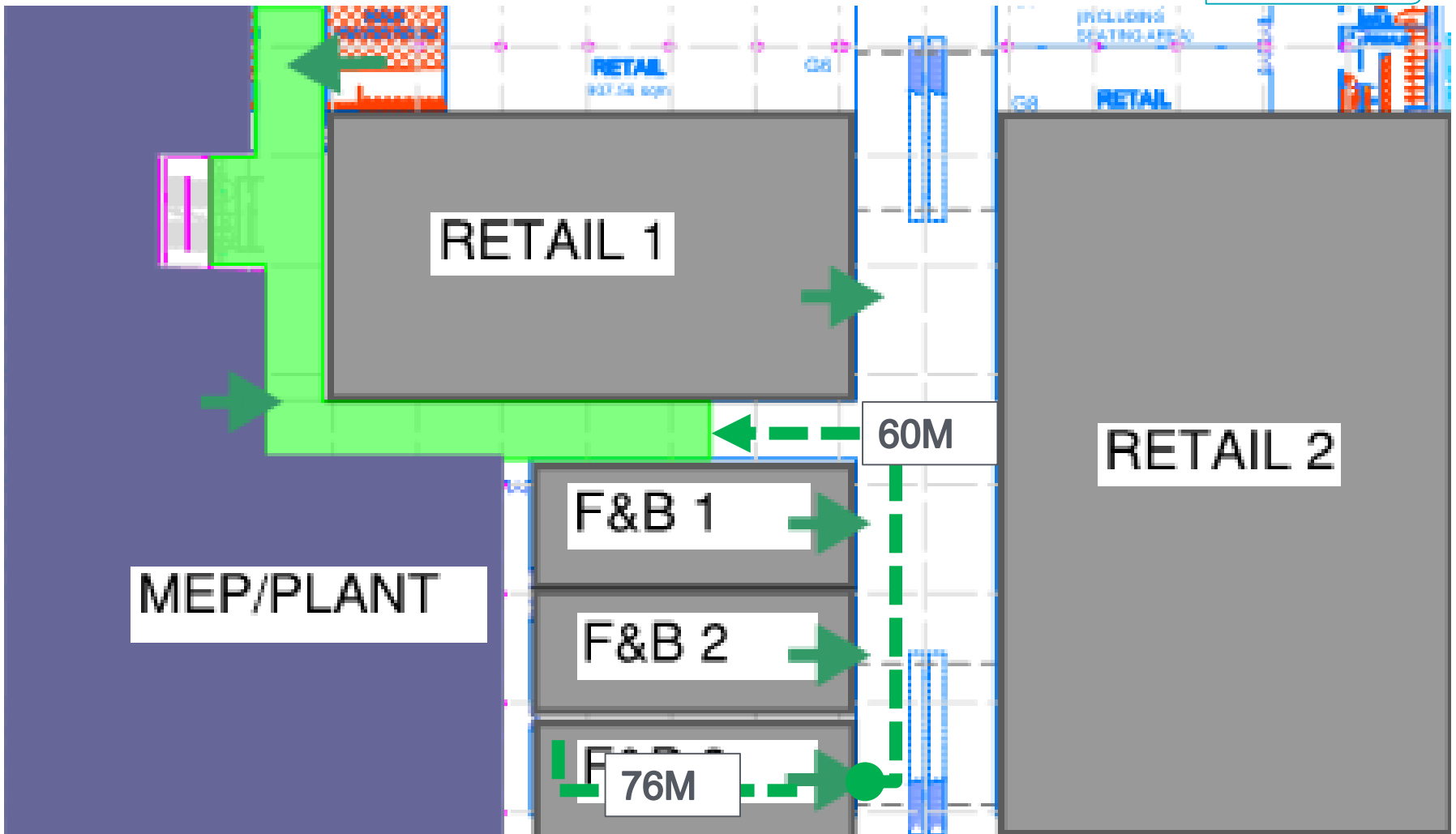
Mall Exit Passageways



Flexibility on Exit Passageways

Openings and Services
Permitted

Mall Design Basics - Summary



Smoke Management - Mall

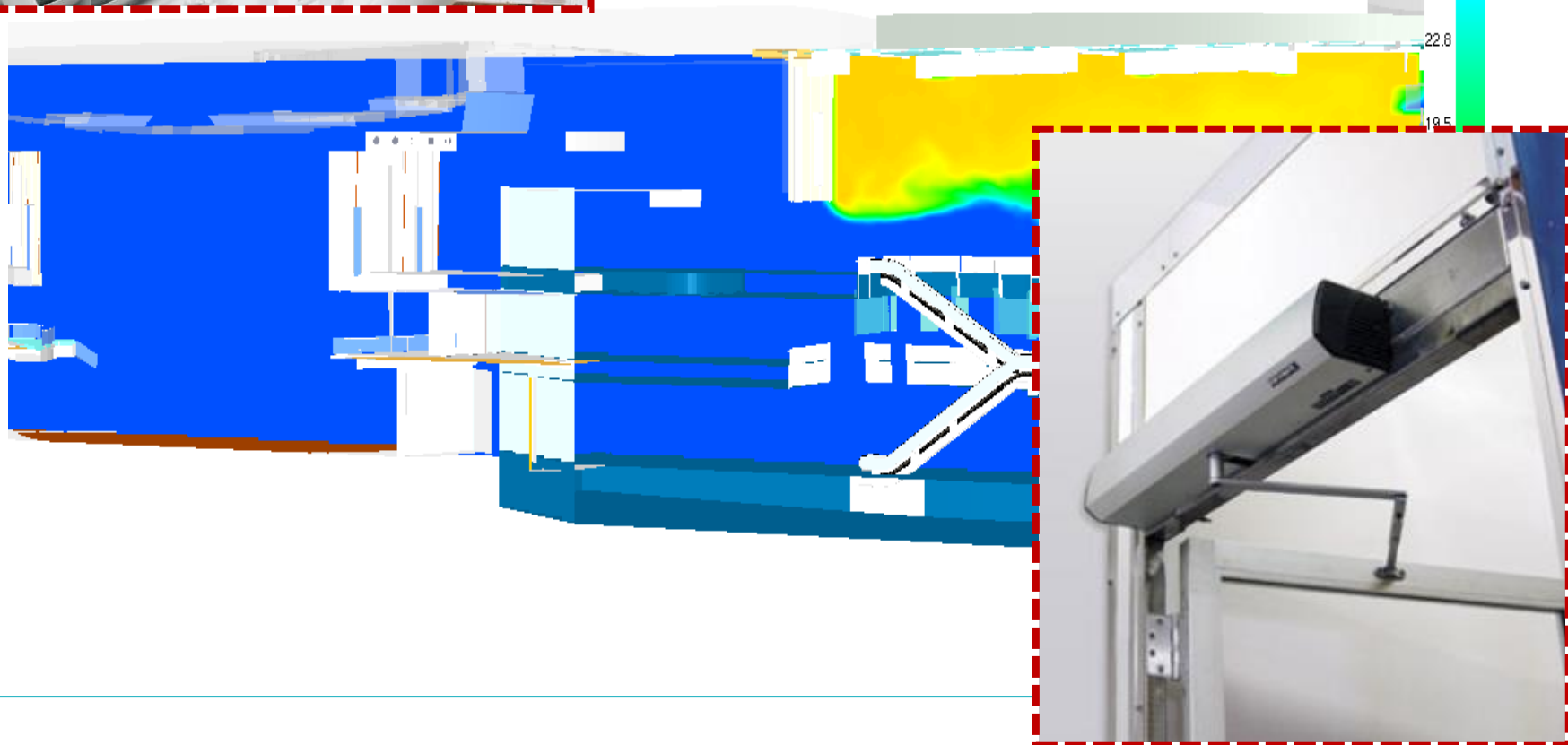


NFPA – Chapter 30 – MALL
CONNECTING MORE THAN 2 LEVELS

GENERAL LOCAL PRACTICE –
MINIMUM 6 AIR CHANGES



Smoke Management - Mall



Mall Expansion



Determine
Applicable
Code

Assess Impact
on existing
adjacent
structures

Treat as new
build where
feasible

Use existing
strategy where
available

Mall Expansion



Mall Refurbishment



Determine Original Strategy and Code

Assess Impact on existing adjacent structures

Use existing approved strategy where necessary, and achieve new code where practical

Coordinate interface with other engineering