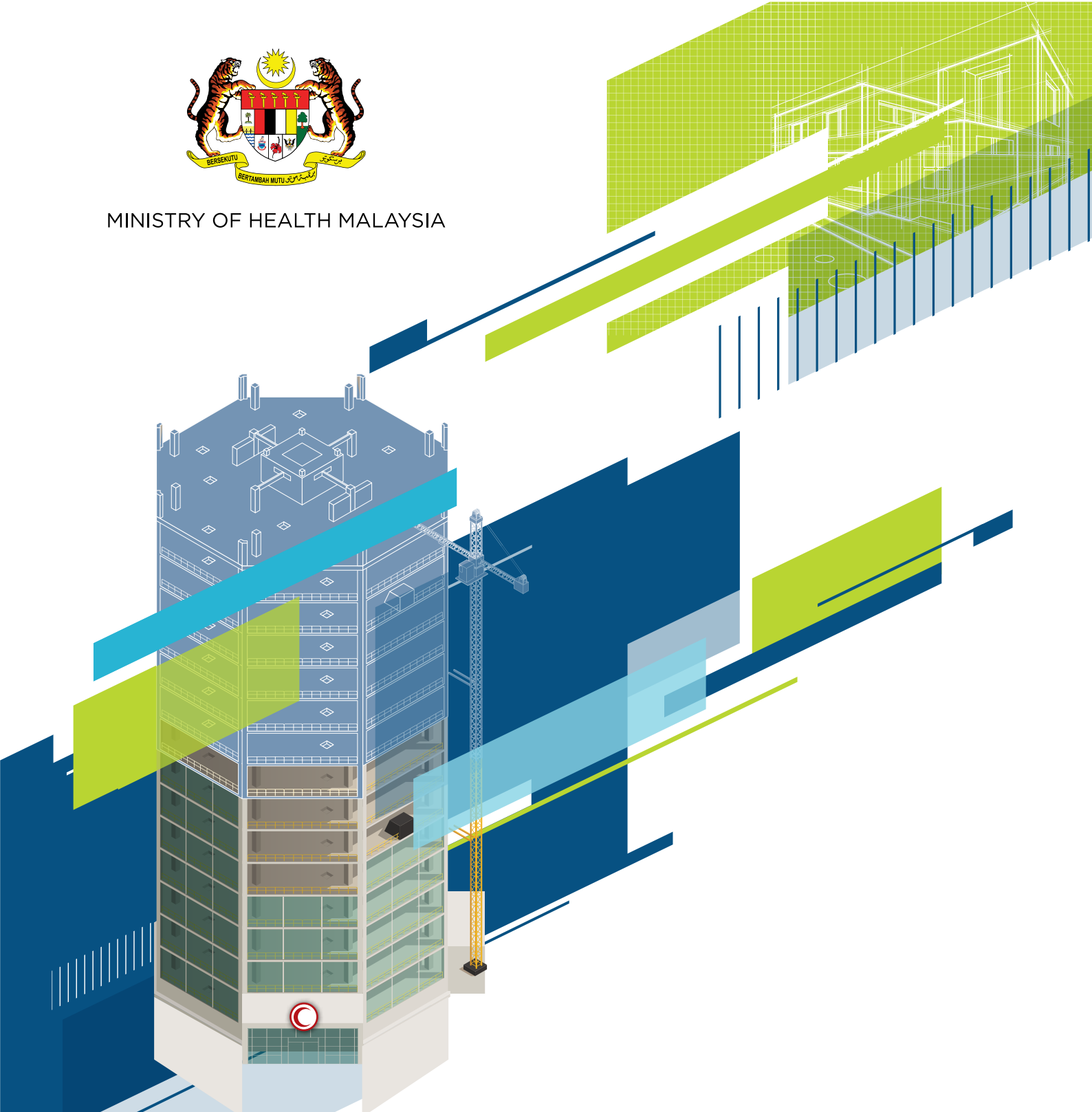


MINISTRY OF HEALTH MALAYSIA



HANDBOOK ON

TECHNICAL DESIGN REFERENCE FOR DISASTER PREPAREDNESS IN SETTING UP NEW HIGH-RISE PRIVATE HOSPITAL



Handbook on TECHNICAL DESIGN REFERENCE FOR DISASTER PREPAREDNESS IN SETTING UP NEW HIGH-RISE PRIVATE HOSPITAL

ALL RIGHTS RESERVED

Ministry of Health Malaysia

All rights reserved. No part of this publication may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without the prior written permission of the publisher, except in the case of brief quotations embodied in critical reviews and certain other non-commercial uses permitted by copyright law.

Prepared By:

Malaysia Productivity Corporation

Lorong Produktiviti, Jalan Sultan 46200 Petaling Jaya, Selangor Darul Ehsan
Tel : 03-7955 7266

In Collaboration With:

Private Medical Practice Control Section (CKAPS), Medical Practice Division, Ministry of Health Malaysia

Level 3, Block E1, Parcel E, Federal Government Administration Centre, 62590 Putrajaya
Tel : 03-8883 1307

PRODUCTIVITY AND REGULATION

Productivity is the only driver of unlimited income growth, as opposed to resource exploitation or an increase in population and labour force participation, each of which faces natural limits. The potential for productivity growth to generate higher income for Malaysians makes it a natural and important consideration for decision-makers. As such the continuing need to stimulate productivity rightly remains at the forefront of government policies. Regulation is the lifeblood of a modern, well-functioning economy.

Almost all regulations have the potential to impact on productivity, either through the incentives which they provide to businesses to change operating and investment decisions, or more directly through their impacts on compliance costs. It is inconceivable to think of a modern economy functioning without regulation. However, poor regulation can cause frustration and unintended consequences, or simply add red tape that adds nothing useful to the economy, society or the environment

ISBN 978-967-2941-03-3



9 789672 941033

© Malaysia Productivity Corporation 2020



Foreword

from **MINISTER OF HEALTH MALAYSIA**

At the Ministry of Health (MOH), we believe that an effective regulatory system contributes towards high growth and creates both economic and social benefits for all. Private healthcare is well known to be one of the sectors that are heavily regulated, mainly because of its utmost importance in providing safe and quality health services while contributing towards economic progress for the nation.

As the regulator of the private healthcare sector, the Private Medical Practice Control Section (CKAPS), Medical Practice Division, we acknowledge that new technology and creativity have its direct influence on the way businesses are designed and operate.

We are also aware of the vertical healthcare design that has become popular among the private healthcare operator due to escalating land prices, affordability through reimbursable medical plans or insurance and accessibility of the medical facilities, which has contributed towards increased demand for private healthcare in urban cities.

This handbook is intended to provide a clear guide and help private hospital operators to submit a quality submission for a new high-rise private hospital in the future.

I commend the efforts and congratulate everyone who contributed in numerous workshops and online public consultations jointly held by PHPN, MPC and CKAPS in producing this **“Handbook on Technical Design Reference for Disaster Preparedness In Setting Up New High-Rise Private Hospitals”**. I trust that this handbook will be followed through and advanced further as a ground for continuous improvement in the future.

Thank you.



A handwritten signature in black ink, consisting of stylized, overlapping loops and lines, representing the name of the Minister.

YB DATO' SRI DR. ADHAM BABA

Foreword

from **DIRECTOR GENERAL | MALAYSIA PRODUCTIVITY CORPORATION**

A well-designed and good regulatory practice are among the important components that will boost business productivity and hence promote economic growth.

Malaysia Productivity Corporation (MPC) has been leading numerous productivity enhancement programmes and has been working closely with both public and private sectors in support of the Government's agendas in providing efficient and conducive business environments in the country, whilst enhancing transparency, predictability and accountability. Some of these initiatives include Modernising Business Licensing (MBL), Regulatory Impact Analysis (RIA), Cutting Red Tape (MyCURE), Reducing Unnecessary Regulatory Burdens (RURB), Removing Non-Tariff Measures (NTMs), INDUSTRY4WRD, and recently "Malaysia Mudah" or #MyMudah. Along with these initiatives, MPC has also been mandated by the Special Cabinet Committee on Anti-Corruption (JKKMAR) Meeting chaired by the YAB Prime Minister Tan Sri Muhyiddin Yassin on 20 June 2020, to ensure that all ministries and agencies responsible for issuing of licenses and permits to publish their respective guidelines on the license application process for easy access by both, businesses and individual. The transparent processes will enhance the integrity and avoid any forms of corruption.



Under the Malaysia Productivity Blueprint, MPC as the Delivery Management Office (DMO) is monitoring the progress of productivity efforts, initiatives and strategies set forth by the nine Productivity Nexus, of which, Private Healthcare Productivity Nexus (PHPN) is one of them. The initiative by Private Healthcare Productivity Nexus (PHPN) and Private Medical Practice Control Section (CKAPS), Ministry of Health Malaysia (MOH) in producing the **"Handbook on Technical Design Reference for Disaster Preparedness In Setting Up New High-Rise Private Hospitals"** is very much needed to provide an easy reference for potential business operators and it is a good move as this helps create a transparent mechanism related to the process involving the management of permits and licenses while enhancing integrity in the new application of setting up a high-rise private hospital. The effect of having a guideline that defines the requirement upfront will reduce unnecessary burdens of going back and forth, eliminating re-work and re-submission when business is applying for the license.

MPC is grateful to those who had assisted in completing this handbook. We have benefited immensely from all the sessions held, i.e. from the team of professionals and technical experts in both the private and public sector - regulators, agencies, private hospital operators, business associations, technical experts and other concerned parties. Valuable inputs and feedback received from the members had contributed greatly to the accomplishment of the handbook.

This is the fifth handbook jointly produced with CKAPS since 2019. It is envisaged to provide transparency and facilitate businesses to complete and comply with the technical design reference for disaster preparedness when setting up a new high-rise private hospital and help reduce unnecessary regulatory burdens caused by uncertain technical requirements for setting up a high-rise hospital. On behalf of Malaysia Productivity Corporation (MPC), I would like to convey our heartiest appreciation to all who have invested their time and efforts in accomplishing this handbook.

Thank you.

A handwritten signature in black ink, consisting of a stylized 'A' followed by a vertical line and a horizontal line at the bottom.

YBHG. DATO' ABDUL LATIF HJ. ABU SEMAN

Foreword

from **CHAMPION PRIVATE HEALTHCARE PRODUCTIVITY NEXUS**

Globalisation in the 21st century brings tremendous growth in the private healthcare sector, where Malaysia is recognised for having world-class standards in various facilities and specialisations within the private medical sector. The Malaysian Private Healthcare system is paving its way towards achieving a breakthrough by setting the bar higher for technology and innovation in the medical field. People from different parts of the world have considered and recognised Malaysia as one of their most preferred destinations in obtaining treatment.

This robust growth has prompted the Government in prioritising productivity as a game-changer through Private Healthcare Productivity Nexus (PHPN), which was established under the Malaysia Productivity Blueprint (MPB). PHPN has been driving initiatives by multiple stakeholders and one of their core focus is in rectifying challenges in regulations especially on issues concerning the implementation of regulatory reforms. One example is the delay in getting approvals for the new healthcare facilities and those undergoing renovations.

“The Handbook of Technical Design Reference for Disaster Preparedness in Setting up New High-Rise Private Hospital” is one of

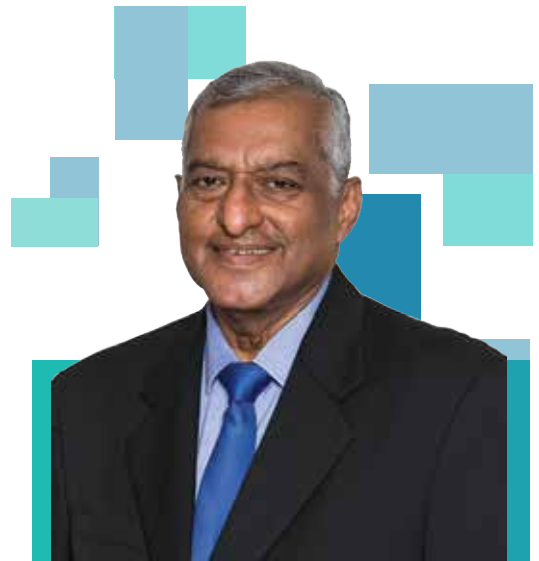
the 5 handbooks that have been produced jointly with CKAPS since 2019. It focuses on implementing a comprehensive Guideline for all stakeholders involved in the construction of high-rise private hospitals whilst ensuring all stakeholders are well-informed of the entire regulatory requirements for construction of a high-rise private hospital. This book is an outcome of various public consultations and engagements amongst stakeholders involved in the construction of such hospitals.

As the Champion of PHPN, I realise that sometimes, we need to take one thing at a time – but ultimately, we strive to ensure that the work we do shall contribute positively towards our nation’s economic growth. This handbook ticks-off one of the initiatives on the regulatory focus area under PHPN. However, our work will not stop here. The work of PHPN shall continue in improving the efficiency of Private Healthcare in Malaysia.

I applaud CKAPS, and all parties - KPKT, NADMA, MOH Engineering Department, BOMBA, DBKL, PBTs, APHM architects, healthcare facilities consultants, engineers, and private hospital operators’ management team, who have put up tireless efforts in developing and refining the handbook. I noted that a series of face-to-face and online engagements, workshops, and meetings with businesses and relevant stakeholders were held before and during the crisis of movement control order (MCO) caused by the COVID-19 outbreak. These engagements were accomplished and more than 500 participants took part in the virtual Public Consultation in which about 106 feedback received through Online Unified Public Consultation (UPC) portal.

I look forward to working together with the public and private sectors to deliver the strategies and action plans to enable us to face the challenges towards enhancing industry growth. My heartiest congratulations to all! Through the launching of the Handbook, it is believed that this can promote a clear, transparent as well as the right platform in ensuring all stakeholders collaborate and communicate effectively in ensuring smooth processes concerning the construction of high-rise private hospitals are easily understood and adhered to.

Thank you.



YBHG. DATO' DR. JACOB THOMAS

Table of Content

TITLE	PAGE
+ Background	2
+ Introduction	3
+ Chapter 1 : High-Rise Hospital Design Principles	8
+ Chapter 2 : Risk Assessment	14
+ Chapter 3 : Prevention and Evacuation Strategy	20
+ Chapter 4 : Operational Planning	37
+ Selected Questions and Answers during Virtual Public Consultation	43
+ Acknowledgement	46



Background

The private sector in the medical industry plays an essential role in ensuring quality service delivery in Malaysia. As the number of patients in the private sector continues to rise, private hospitals always look into ways in maximising the capacity for betterment.

Malaysia Productivity Corporation, a statutory body under the Ministry of International Trade and Industry (MITI) has come together with Private Medical Practice Control Section (CKAPS), under the Ministry of Health Malaysia (MOH) in enhancing the guideline for Handbook of Technical Design Reference for Disaster Preparedness in Setting up New High-Rise Private Hospital. This is an exclusive initiative carried out through the Private Healthcare Productive Nexus (PHPN) to ensure private hospitals have clearer guidelines in carrying out and implementing tasks in the building of high-rise hospitals.

Till to date, various public consultations have been carried out in which ideas and opinions from stakeholders were gathered and evaluated through moderators to ensure a comprehensive guideline is outlined to benefit all the parties. The following aspects are deemed significant to ensure a smooth-delivery of documentations throughout the process of application for the building of private high-rise hospitals;

- The applicant does a self-declaration on the preparedness of the hospital
- The applicant is responsible to ensure the strategy, philosophy and methodology are properly managed

The guideline also provides an inclusive method on submission process on Hospital Disaster Management. Additionally, the guideline also furnishes information on fire, emergency response and localised disasters as advised by the National Disaster Management Agency (NADMA). Overall, the guideline includes four chapters namely:

- Chapter 1 : High-Rise Hospital Design Principles
- Chapter 2 : Risk Assessment
- Chapter 3 : Prevention and Evacuation Strategy
- Chapter 4 : Operational Planning

Due to the involvement of various regulatory bodies, the relevant Acts and Guidelines of the following but not limited to should be referred in achieving statutory compliance:

1. Act 586;
2. Uniform Building By-Laws 1984;
3. Fire Safety Requirement;
4. Other Code of Practises and Malaysian Standard (MS), including MS1183:1990 (Specification for Fire Precautions in the Design and Construction of Buildings), MS1184:1991 (Code of Practice on Access for Disabled Persons to Public Buildings) and MS1331:1993 (Code of Practice for Access of Disabled Persons Outside Buildings).

These acts and regulations must be read in tandem with the requirements set by MoH to comply with the specific requirements as a private hospital.

The guideline is believed to draw the attention of all stakeholders involved in the building of private hospitals to ensure every aspect is adequately addressed to ensure a safe hospital.



Introduction

1. PRIVATE HEALTHCARE FACILITIES AND SERVICES (PRIVATE HOSPITALS AND OTHER PRIVATE HEALTHCARE FACILITIES) REGULATIONS 2006 [P.U. (A) 138/2006]

As cited in **PART XVII : SPECIAL REQUIREMENTS FOR EMERGENCY CARE SERVICES, P.U. (A) 138/2006:**

Chapter 1 – Disaster Preparedness

Disaster preparedness

228. (1) The licensee or person in charge of a private healthcare facility or service shall maintain a written plan on disaster preparedness for all personnel of the private healthcare facility or service which shall be understood by and be made readily available to all personnel and for inspection.

(2) The licensee or person in charge of a private healthcare facility or service shall ensure that all personnel assists any relevant authorities in the evacuation of mass casualties which may result from natural or man-made disasters occurring within the private healthcare facility or service or within the locality of the private healthcare facility or service and where applicable, such personnel shall provide care to such casualties as is within the capability of the private healthcare facility or service.

(3) A private healthcare facility or service where patients are lodged shall rehearse the disaster plan at least annually.

(4) A record of such rehearsal under sub-regulation (3), including its date and time, a summary of actions and recommendations shall be maintained.

2. Requirement of submission a written Hospital Disaster Management Plan (HDMP)

As per the “Pre-Establishment of a Private Hospital” Application Check-List issued by **Cawangan Kawalan Amalan Perubatan Swasta (CKAPS), Ministry of Health Malaysia:**

BIL.	PERKARA	ULASAN
(i)	Pakar Onkologi Klinikal tetap atau Pakar Perubatan Nuklear tetap yang mempunyai pendidikan dan kemahiran yang berkaitan	
(ii)	Jurusan terlatih dengan kelengkapan, pejabat berkaitan selaras dengan kapasiti, kemudahan, dan perkhidmatan yang disediakan	
(iii)	Pegawai profesional jagaan kesihatan lain (Ara X-ray Terapi / Pegawai Radioterapi / Physiotherapist dan sebagainya)	
(iv)	Lain-lain yang berkaitan	
(j)	Jumlah Tenaga kerja yang disediakan	
(k)	Daftar nama kakitangan kesihatan yang berdaftar dengan Majlis Perubatan Kebangsaan dan mempunyai lesen amalan yang sah	
(l)	Daftar nama kakitangan kesihatan yang berdaftar dengan Majlis Perubatan Kebangsaan dan mempunyai lesen amalan yang sah	
(m)	Lain-lain yang berkaitan (perlu disenaraikan)	
(n)	Menyatakan sumber tenaga kerja yang disediakan akan diperoleh	
(o)	Contoh: Mendapat tenaga kerja jurutera terlatih daripada institusi pendidikan tinggi, membuat minat pakar perubatan, kesihatan yang mempunyai asas pendidikan luar negara untuk pulang bekerja di Malaysia dan sebagainya	
10)	Pelan Tapak (Site Plan) dan Pelan Susunatur (Layout Plan) tidak kurang daripada skala 1:1000 dan menyatakan jenis bangunan yang akan dibina bagi perkhidmatan hospital swasta. Bangunan yang disediakan adalah sekurang-kurangnya bangunan baru "purpose-built". Perlu memastikan terdapat 5 dedicated entrances seperti berikut: a) Main entrance untuk pesakit/pelawat/orang awam (walk-in) b) Entrance yang mencukupi bagi pesakit with disabilities/ wheelchairs / stretchers c) Kecemasan (critical (ambulan) dan non-critical area) d) Body hold (mortuary) e) Service entrance untuk kitchen, storan, domestik waste dan clinical waste	
Nota:		
a) Bangunan pejabat sedia ada atau lot kedar tidak dibenarkan kerana bangunan-bangunan tersebut tidak dibenarkan untuk memuatkan pesakit yang dibenarkan di bawah Peraturan-Peraturan Kesihatan dan Perkhidmatan Jagaan Kesihatan Swasta (Private Hospital and Health Services Regulations 2006) atau 2008 atau 2010.		
b) Bagi cadangan hospital swasta yang melebihi 12 aras klinikal atau 48 metre dari aras bawah, perlu disediakan dengan Hospital Disaster Management Plan dan pengesahan kestabilan bangunan yang munasabah, praktikal dan komprehensif. Kegagalan pemohon mengemukakan hospital disaster management plan dan pengesahan kestabilan bangunan yang munasabah, praktikal dan komprehensif boleh menyebabkan permohonan tidak akan diproses selanjutnya.		
c) Sekiranya bangunan hospital swasta yang disediakan adalah bangunan multi-purpose dengan non-clinical facilities (bagaimanapun, hospital swasta yang melebihi 12 tingkat, 5 dedicated entrances dan sebagainya adalah haruslah dan tidak dibenarkan dengan non-clinical facilities tersebut).		
11)	Pelan Functional Planning Unit (FPU) skala 1:200 (untuk kesemua tingkat)	

Item 10: Nota (b)

Bagi cadangan hospital swasta yang melebihi 12 aras klinikal atau 48 metre dari aras bawah, perlu disertakan dengan Hospital Disaster Management Plan dan pengesahan kestabilan bangunan yang munasabah, praktikal dan komprehensif.

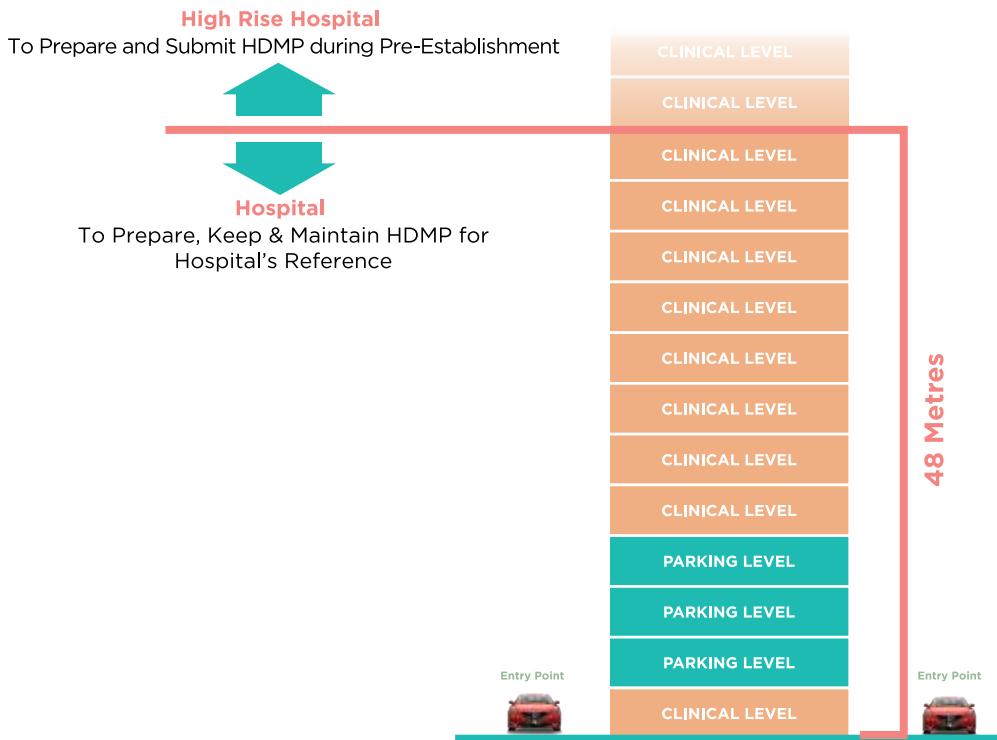
Kegagalan pemohon mengemukakan hospital disaster management plan dan pengesahan kestabilan bangunan yang munasabah, praktikal dan komprehensif boleh menyebabkan permohonan tidak akan diproses selanjutnya.

Introduction

3. Definition of High-Rise Hospital.

The upper limit for a Private Hospital require Hospital Disaster Management Plan (HDMP) to be submitted as per the diagram below; any new development of Private Hospital beyond the upper limits requires submission of the HDMP during Process 1: Submission of "Pre-Establishment" (please refer to Diagram 1) as described in the Check-List:

Scenario 1



Scenario 2

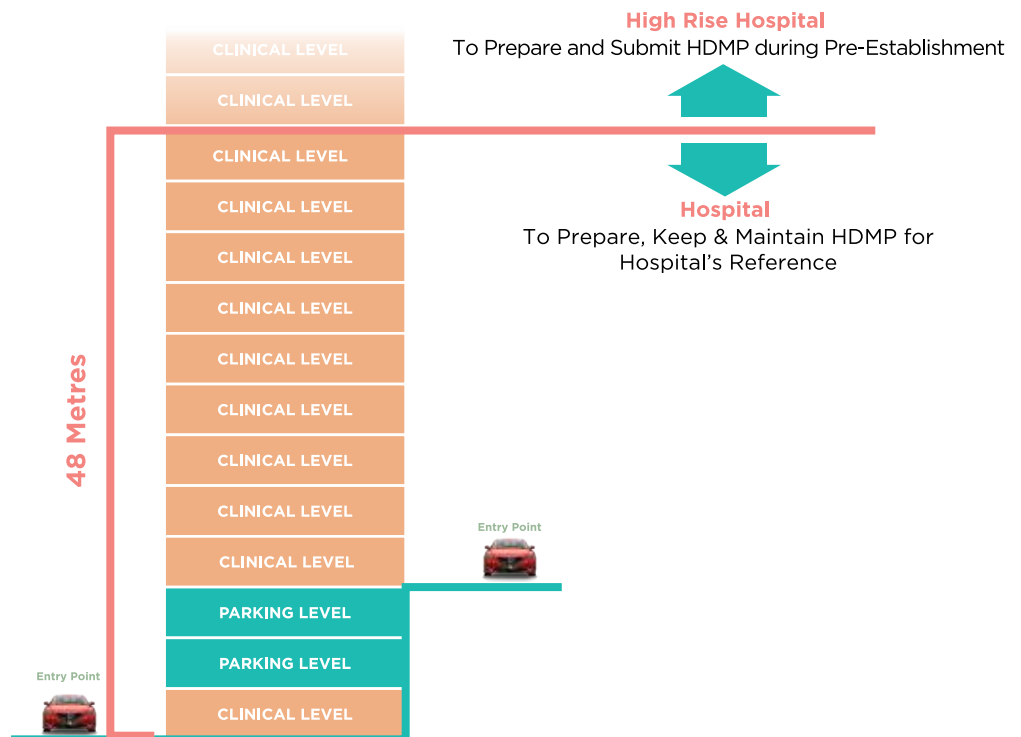
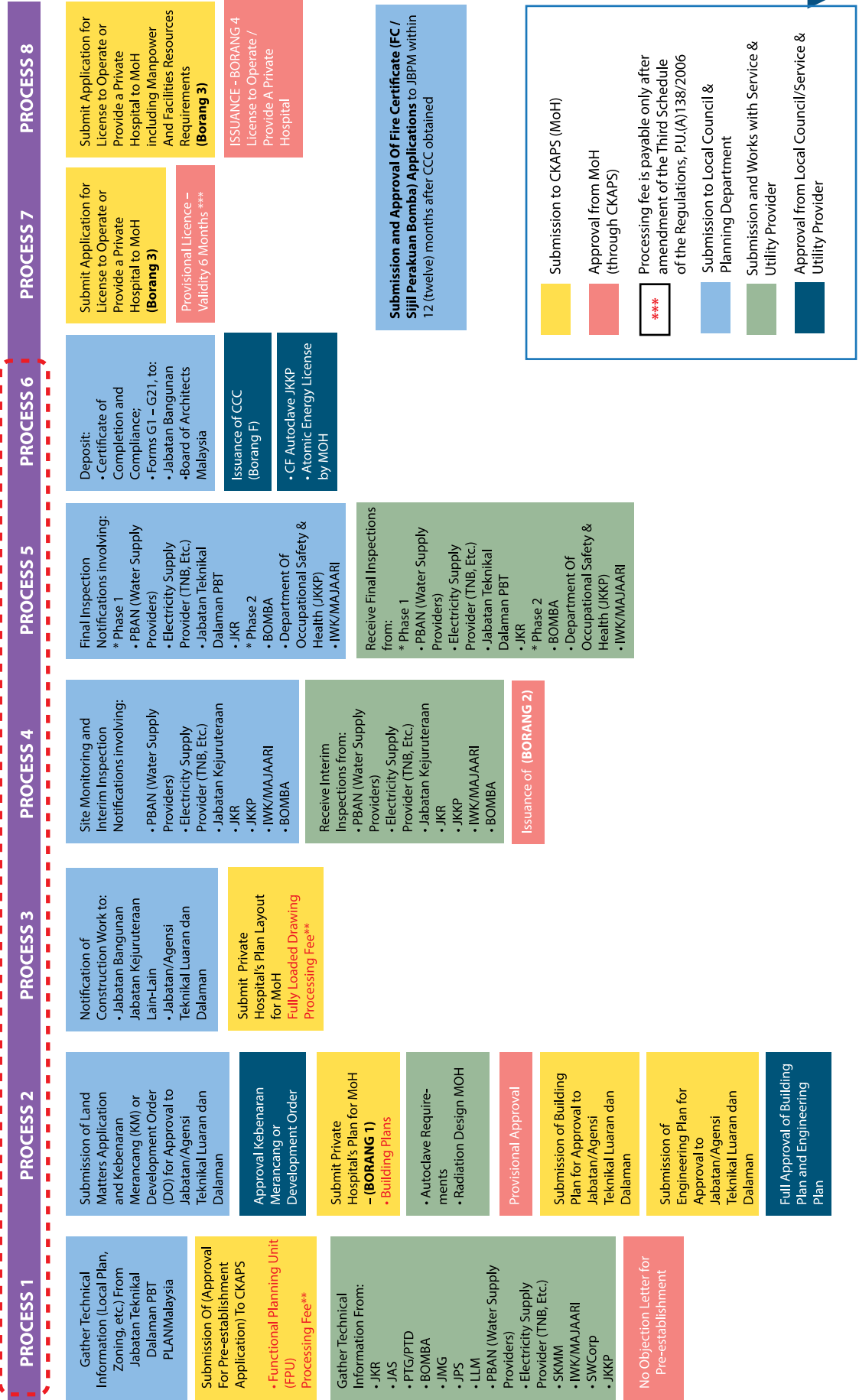


Diagram 1

Eight Processes of Setting Up Private Hospitals under OSC 3.0 Plus

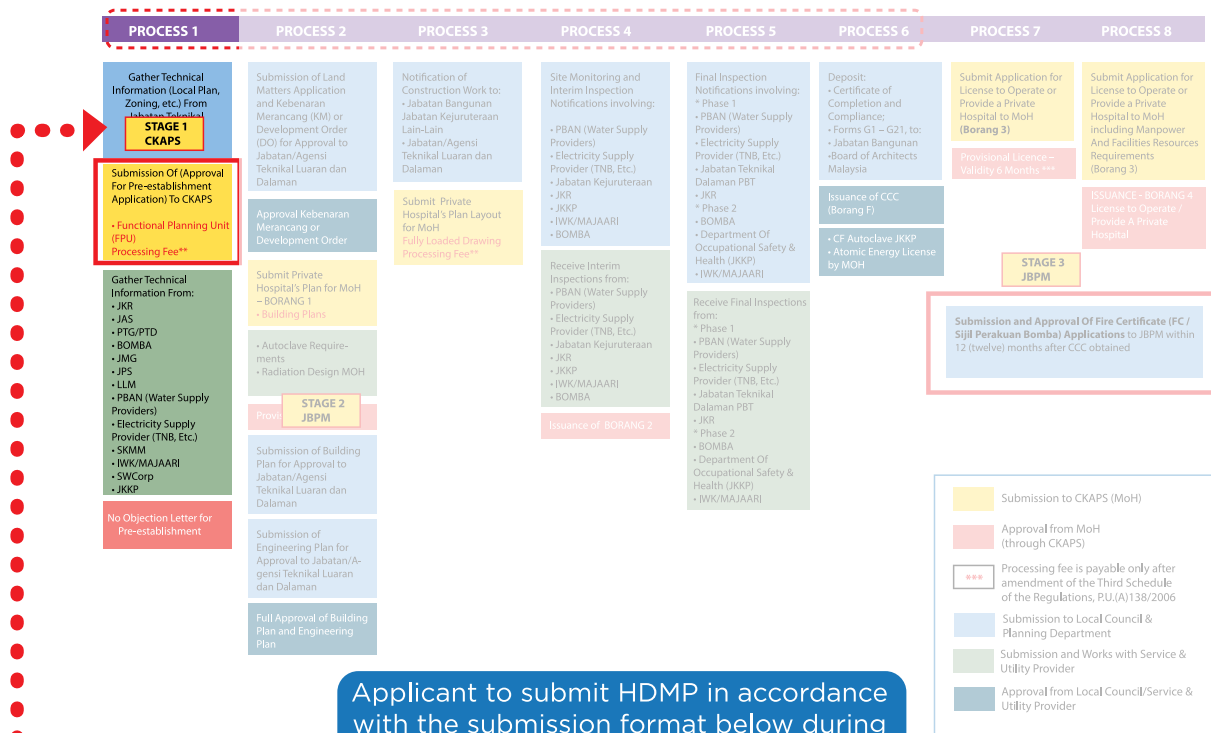


Introduction

4. Submission Format

A comprehensive Hospital Disaster Management Plan (HDMP) shall be submitted during the “Pre-Establishment” Stage and it should include all methodology, principles and preliminary design drawings.

The Applicant shall submit one (1) set of A3 size bound document during the submission.

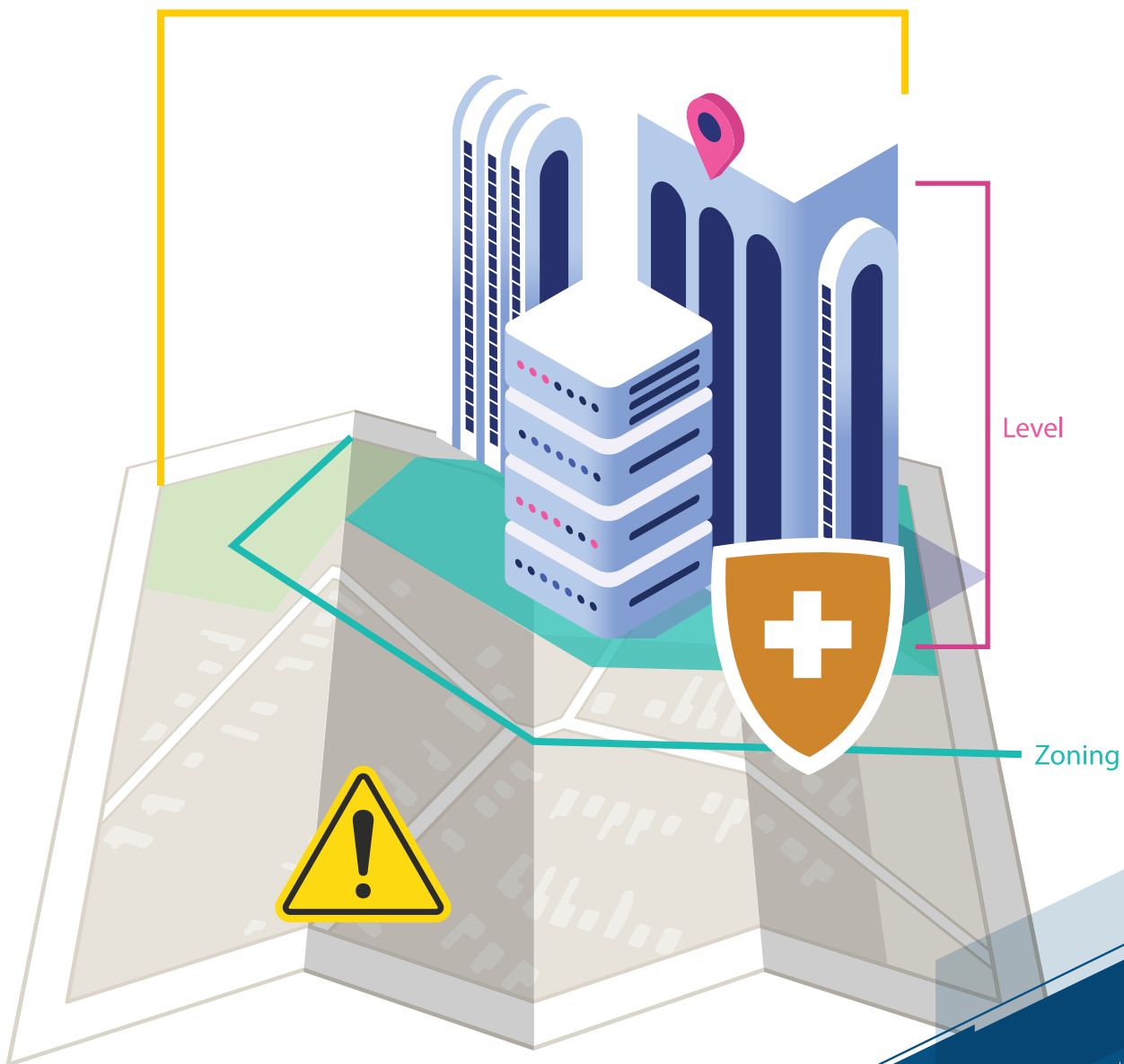


Applicant to submit HDMP in accordance with the submission format below during **Process 1 : “Pre-Establishment”** application :

a) A3 Report – Bound (1 set)
 Note: Ensure clarity and readability of Report.



Chapter 1: **High-Rise Hospital Design Principles**





High-Rise Hospital Design Principles

The applicant shall justify the proposed location for the set up of a high-rise hospital, state the design brief and intention in achieving a safe hospital. Following that, the applicant is also required to state the Key Clinical Services, categorise the patient and illustrate the Functional Planning Unit (FPU) as well as explain and justify the respective stacking strategy.

1.1.0 Rationale:

- 1.1.1 Applicant to justify the development of high-rise hospital based on the following criteria and attach the relevant document / drawing (where applicable):
 - 1.1.1.1 Location & Zoning
 - 1.1.1.2 Geographical Condition
 - 1.1.1.3 Site Context with its constraint
 - 1.1.1.4 Due-diligence assessment report by relevant technical consultants (for retrofit building)
 - 1.1.1.5 Business Plan

- 1.1.2 Some aspects of consideration are:
 - 1.1.2.1 Land size limitation and accessibility
 - 1.1.2.2 Masterplan and development density
 - 1.1.2.3 Geographical condition i.e. flood risk.
 - 1.1.2.4 Commercial reason, economic, land cost or Investor's vision
 - 1.1.2.5 Supporting facility requirement (car-park requirement)
 - 1.1.2.6 Retrofit of building (Change of Usage)
 - 1.1.2.6.1 Fit for healthcare purpose
 - 1.1.2.6.2 Engineering challenges (structural loading, adequate services and utility, vertical transportation system)
 - 1.1.2.6.3 Cost for upgrading and renovation

- 1.1.3 The applicant shall also attach other relevant criteria of justification if applicable and is not limited to the above-mentioned criteria.





1.2.0 Designing Towards the Principles of Safe Hospital:

- 1.2.1 Applicant is required to define the building of high-rise hospital as described by CKAPS as below:

Building with more than 12 clinical floors or 48 metres from Ground Level
(CKAPS Pre-Establishment Checklist, 2016)

- 1.2.2 Applicant to prepare a write-up of the Design Brief and Intention towards achieving a safe hospital in compliance to the following, but not limited to:

- 1.2.2.1 Uniform Building By-Law 1984 (or similar by-law which differs according to states)
- 1.2.2.2 Malaysian Standard (MS 1183)
- 1.2.2.3 Private Healthcare Facilities & Services Act 1998 (Act 586)
- 1.2.2.4 Local Authority / Service Provider requirements
- 1.2.2.5 other relevant standard / building codes

Applicant is required to consider the definition of safe hospital in accordance to World Health Organisation (WHO) Guideline as described below:

A **safe hospital** is defined as health facilities whose services remain accessible and functioning, at maximum capacity and within the same infrastructure, during and immediately following disasters, emergencies or crisis.

A **safe hospital** will;

- not collapse in disasters, killing patients and staff,
- be able to continue to function and provide critical services in emergencies,
- be organised, with contingency plans in place and health personnel trained to keep the network operational.

(United Nations (UN), 2009)





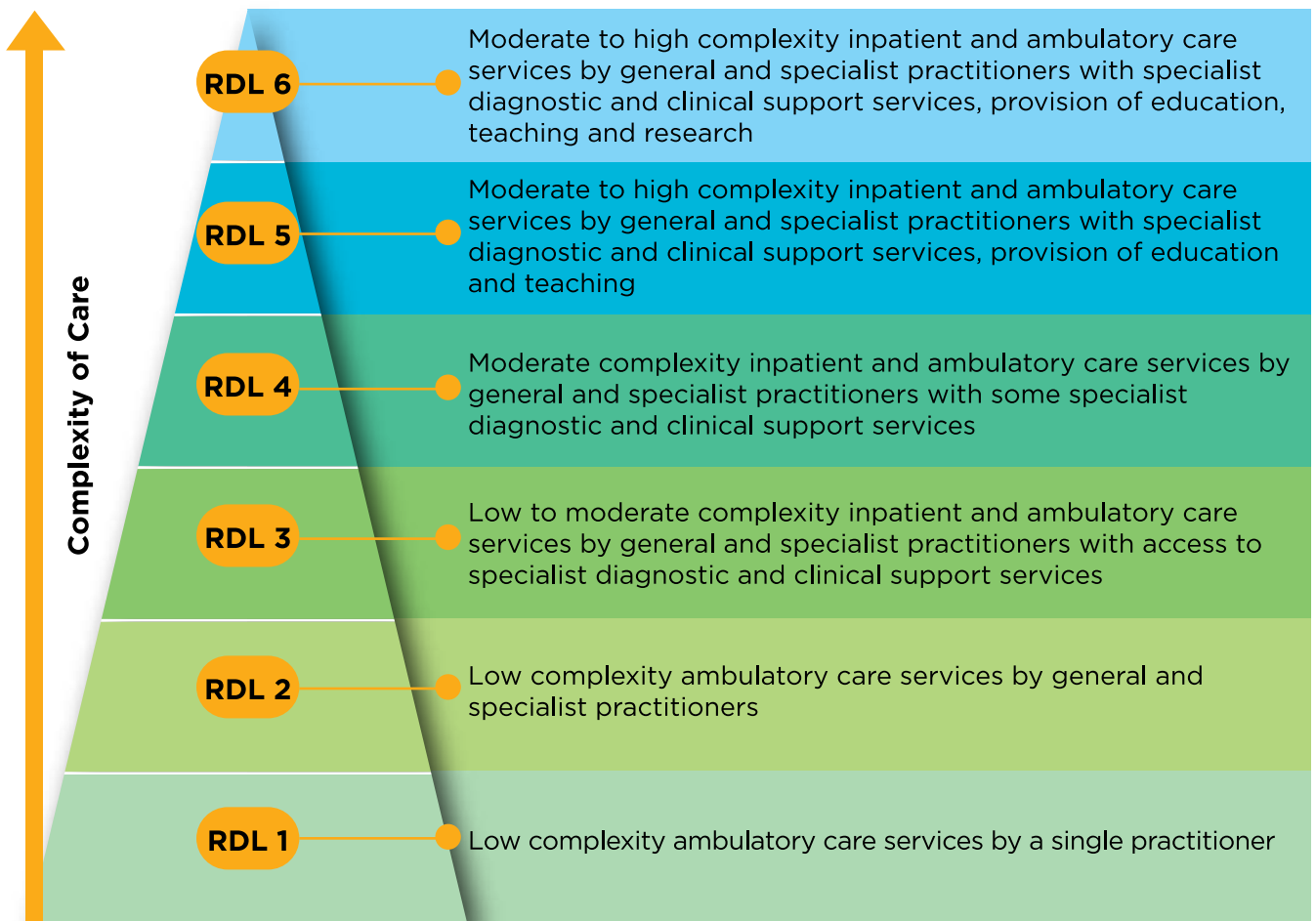
1.3.0 Key Clinical Services & Category of Patients:

1.3.1 Applicant to state the Key Clinical Services with Level of Clinical Services.

One example to illustrate the **Key Clinical Services with Level of Clinical Services** is through Role Delineation Level (RDL) in Guide of International Health Facility Guidelines (iHFG).

The RDL Diagram is as depicted below:

Diagram 1.3.1.1
Role Delineation Level (RDL)



1.3.0 Key Clinical Services & Category of Patients (Cont.):

1.3.2 The Applicant is required to state the type/category of patients at the hospital based on the following:

1.3.2.1 Critical

1.3.2.2 Semi Critical

1.3.2.3 Non-Critical

Applicant may also refer to the Category of Patient within the Hospital, in reference to New York Heart Association (NYHA) Functional Classification as depicted below:

Diagram 1.3.2.1
Patient Functional Class

NYHA Class	Patient Symptoms
I.	No limitation of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, dyspnea (shortness of breath).
II.	Slight limitation of physical activity. Comfortable at rest. Ordinary physical activity results in fatigue, palpitation, dyspnea (shortness of breath).
III.	Marked limitation of physical activity. Comfortable at rest. Less than ordinary activity causes fatigue, palpitation, or dyspnea.
IV.	Unable to carry on any physical activity without discomfort. Symptoms of heart failure at rest. If any physical activity is undertaken, discomfort increases.

(The Criteria Committee of the New York Heart Association. (1994). Nomenclature and Criteria for Diagnosis of Diseases of the Heart and Great Vessels (9th ed.). Boston: Little, Brown & Co. pp. 253-256.)



1.4.0 Illustrate Functional Planning Unit (FPU) & Stacking Strategy (Sectional Diagram) with Category of Patient:

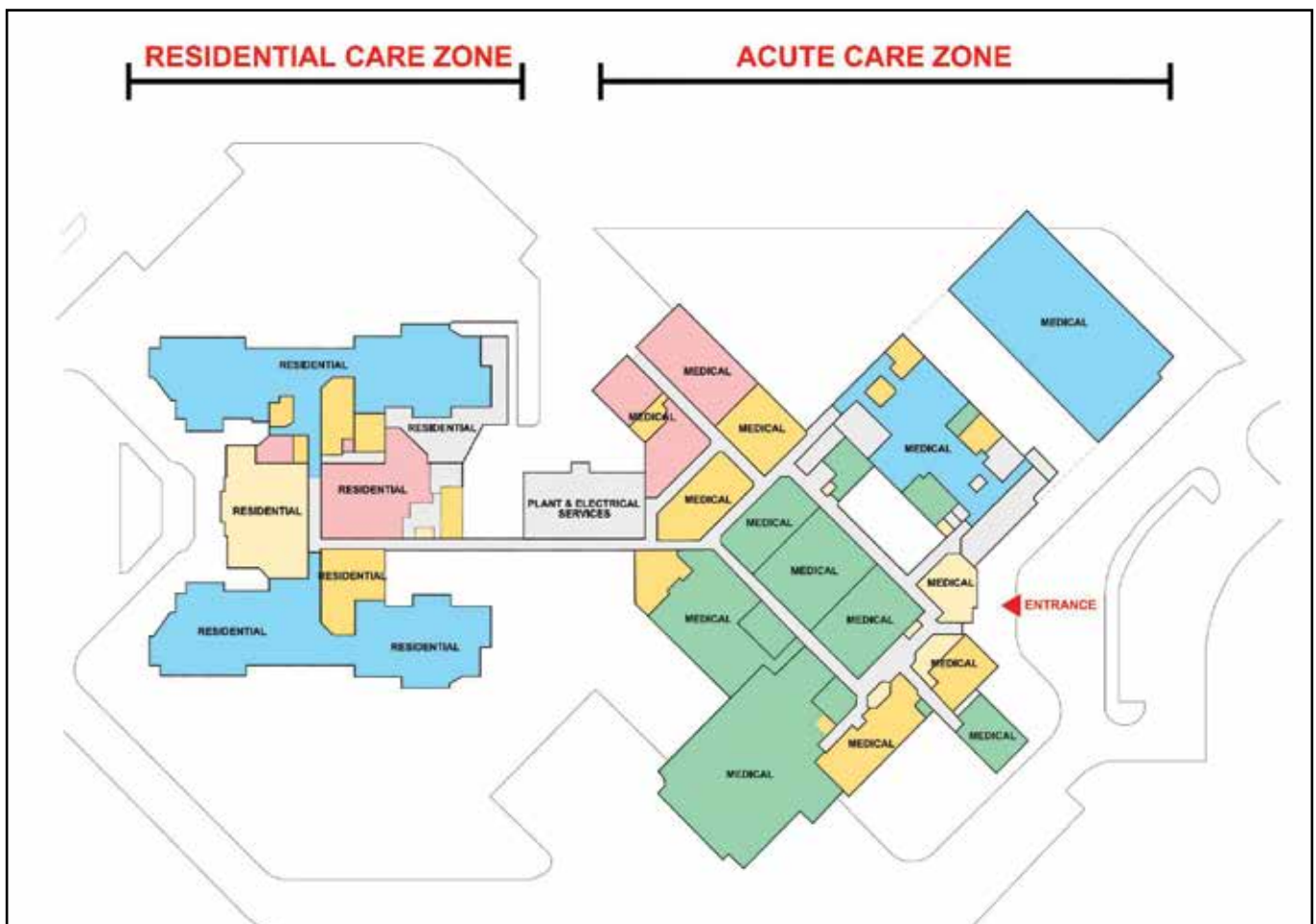
1.4.1 Applicant is required to submit the followings:

1.4.1.1 Illustration of Functional Planning Unit (FPU) as stated in the Checklist for Application of Pre-Establishment for Private Hospital by CKAPS.

1.4.1.2 Stacking Strategy in relations with the category of patients and respective clinical services.

1.4.2 Applicant is required to prepare two (2) diagrams based on their proposed plan. Examples of the drawing are as below:

Diagram 1.4.2.1
Example of Functional Planning Unit





1.4.0 Illustrate Functional Planning Unit (FPU) & Stacking Strategy (Sectional Diagram) with Category of Patient: (Cont.):

Diagram 1.4.2.2
Example 1 of Stacking Strategy

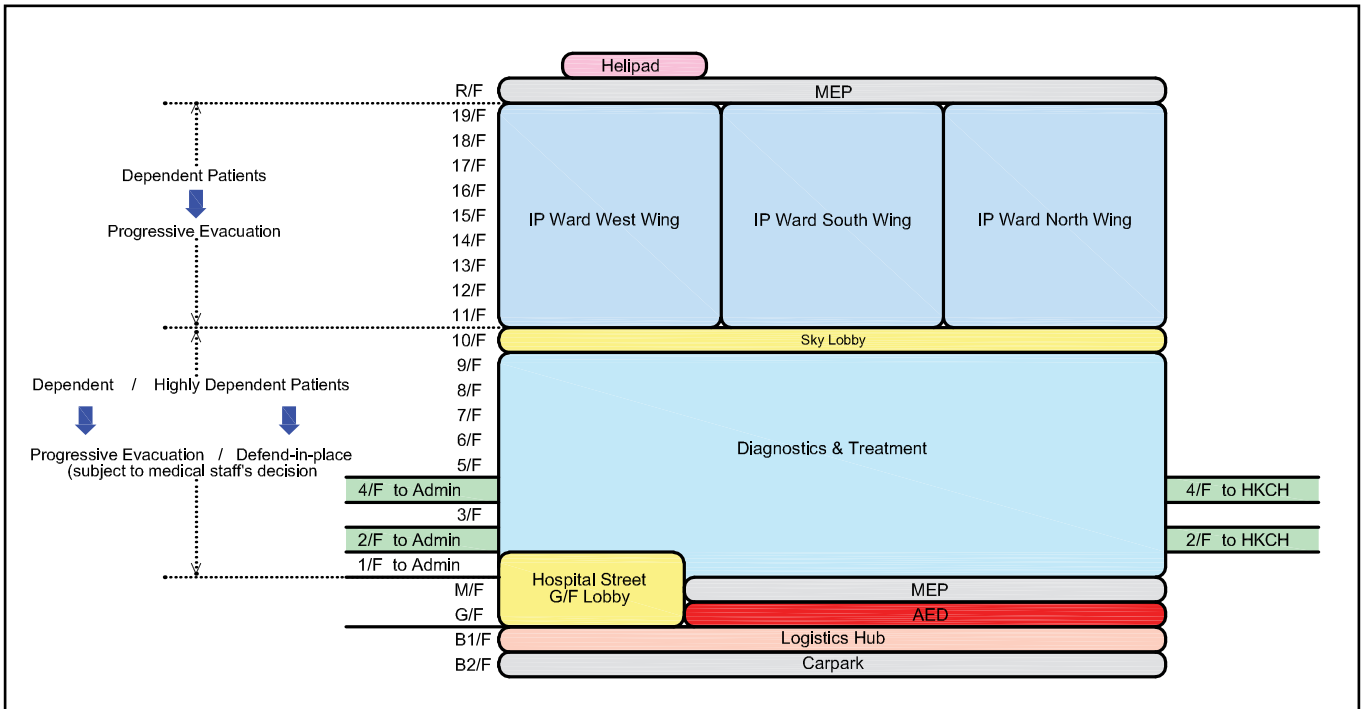
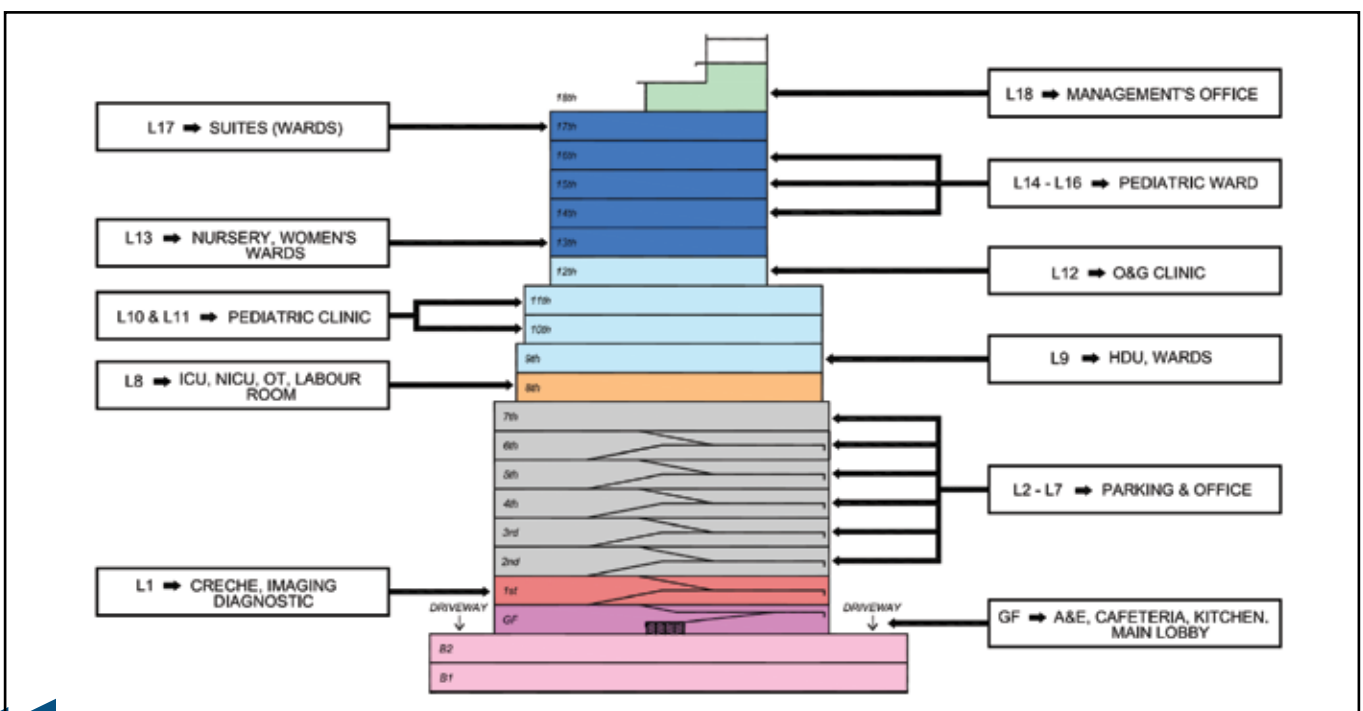


Diagram 1.4.2.3
Example 2 of Stacking Strategy



Chapter 2: **Risk Assessment**



Risk Assessment

The applicant shall identify potential hazards and risk factors (hazard identification), analyse and evaluate the risk associated with the respective hazard (risk analysis, and risk evaluation). The applicant is also required to determine appropriate ways to eliminate the hazard or control the risk (risk control).

2.1.0 Hazard Identification

- 2.1.1 The process of hazard identification includes finding, listing, and characterising hazards. The applicants should identify sources of hazard, areas of impacts, events (including changes in circumstances) and their causes as well as their potential consequences.
- 2.1.2 There are two major considerations in hazard/risk identification namely External and Internal Hazard but not limited to only these. The details are as below:

2.1.2.1 External Hazard

Applicant to consider probable External Hazard that may occur surrounding the premise and ensure that the location is not hazarded.

Examples of Hazard in relation to the location:

- Near the edge of a slope
- Near the foot of a mountain vulnerable to landslides
- Near creeks, rivers or bodies of water that could erode its foundation in tsunami-prone areas
- In flood-prone areas
- Within a typhoon zone
- In areas prone to storm surges

Design & Planning

Identify the hazard and propose design solution.

Aspects to consider:

- How does the use of the building affect the risk?
- How many people are in the building?

2.1.0 Hazard Identification (Cont.):

2.1.2.2 Internal Hazard

Applicant to consider probable Internal Hazard that may occur within the premise.

Examples of Hazard:

- **Biological Hazard**
 - o Pandemic, Outbreak, Anthrax, Bioterrorism, Highly Infectious Diseases (e.g. Ebola)
- **Radiological Hazard**
 - o Radioactive Leakage
- **Chemical Hazard**
 - o Medical Gas Leakage, Chemical Leakage,
- **Physical Hazard**
 - o Vibration, Noise, Falling Debris, Building Collapse, Evacuation Route & Exit
- **Fire Hazard**
 - o Fire-Prone area in a building (Fuel, Ignition, Oxygen)
- **Others**
 - o Utilities Disruption, Explosive Threat, Terrorism, Sabotage, Technology Failure

2.2.0 Risk Analysis

2.2.1 A process for comprehending the nature of hazards and determining the level of risk. Risk analysis can be undertaken with varying degrees of detail, depending on the risk, the purpose of the analysis, and the information, data and resources available. Analysis can be qualitative, semi-quantitative or quantitative, or a combination of these, depending on the circumstances.

2.2.2 Risk analysis have to be tailored specifically to **volume** and **category** of occupants of the building for example and not limited to the **following** :



2.2.0 Risk Analysis (Cont.) :

Occupant of Buildings	Examples	Risk Analysis
1. Independent Occupants	<ul style="list-style-type: none"> • Hospital staffs • Visitors • Outpatients 	<ul style="list-style-type: none"> • Fit / healthy • Ambulant • Can walk without needing assistance • Able to evacuate at will 'free to go'
2. Dependent Occupants	<ul style="list-style-type: none"> • Ward inpatients • Visitors on wheelchairs / walking aids • Patients who are visually / hearing / mentally impaired • Psychiatric patients 	<ul style="list-style-type: none"> • Need assistance / equipment to evacuate
3. Highly Dependent Patients	<ul style="list-style-type: none"> • Coronary patients • Respiratory patients • Bed bound patients • Paediatric patients 	<ul style="list-style-type: none"> • Attached to inotropic supports / oxygen supports / chemotherapy drugs / infusion / close monitoring devices • May not be able to lie flat
	<ul style="list-style-type: none"> • Spinal injuries • Lower limb / pelvic fractures 	<ul style="list-style-type: none"> • Need to actively maintain spinal curvature • May be attached to skeletal traction / Ilizarov



2.2.0 Risk Analysis (Cont.):

Occupant of Buildings	Examples	Risk Analysis
4. Totally Dependent Patients	<ul style="list-style-type: none"> • ICU patients • OT patients • Neuro patients • Neonates • NICU babies • Immunosuppressed patients 	<ul style="list-style-type: none"> • Attached to ventilators / inotropic support / chest tubes / infusion • Exposed organs / operation sites • Sedated patients • Manual bagging to maintain respiration

2.2.3 Risk analysis provides a basis for risk evaluation and decisions about risk control.

2.2.4 Information can include current and historical data, theoretical analysis, informed opinions, and the concerns of stakeholders.

2.2.5 Risk analysis includes risk estimation.



2.3.0 Risk Evaluation

- 2.3.1 The process of comparing an estimated risk against given risk criteria to determine the significance of the risk.
- 2.1.2 This may refer to relevant guidelines such as ISO 31000:2018 Risk Management - Guidelines or National Fire Protection Association (NFPA) NFPA 99 Risk Assessments Guidelines, whichever relevant.

2.4.0 Risk Control

- 2.4.1 The process of comparing an estimated risk against given risk criteria to determine the significance of the risk.
- 2.4.2 The actions consisting of risk evaluation decisions.

Note:

- *Risk control can involve monitoring, re-evaluation, and compliance with decisions.*
- *This may refer to relevant guidelines such as ISO 31000:2018 Risk Management - Guidelines or National Fire Protection Association (NFPA) NFPA 99 Risk Assessments Guidelines, whichever relevant.*



Chapter 3: **Prevention and Evacuation Strategy**



Prevention And Evacuation Strategy

The applicant shall provide the proposed strategies along with both written and pictorial/schematic diagrams to further illustrate the proposed strategies in accordance with the services and facilities intended to be provided.

3.1.0 Prevention Strategy

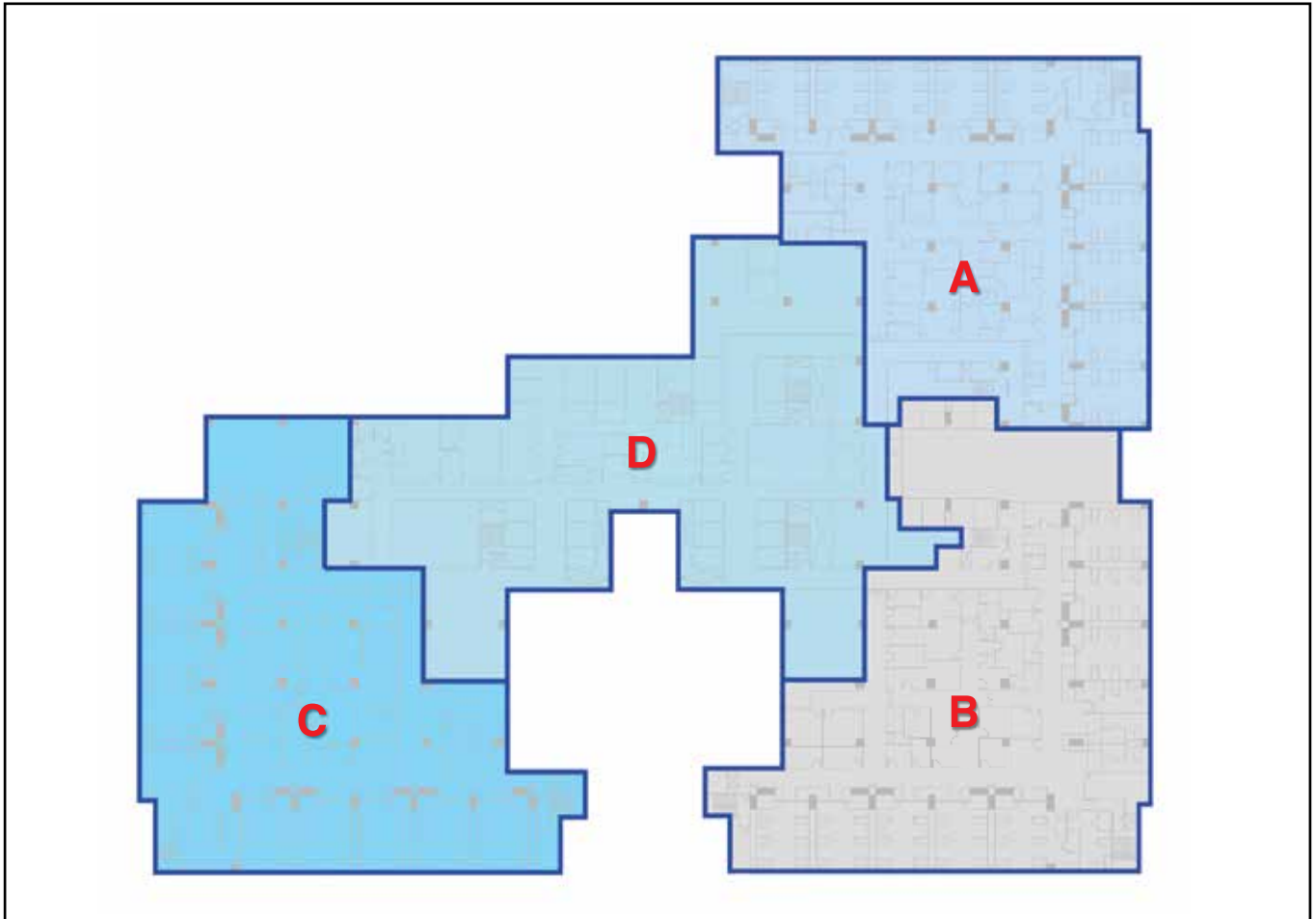
What is Prevention Strategy?

- 3.1.1 **Prevention Strategy** is the overall planning of several methods to prevent or reduce injury/damages in the event of any disasters (fire, gas leakage, etc.).
- 3.1.2 **The proposed strategies should consider all these factors but not limited to:**
 - 3.1.2.1 Design & Planning
 - 3.1.2.2 Structural Design
 - 3.1.2.3 Compartmentation & Refuge Strategy
 - 3.1.2.4 Building Material Selection
 - 3.1.2.5 Mechanical & Electrical System
 - 3.1.2.6 Fire Protection Installation
 - 3.1.2.7 Operational & Awareness on Fire Safety
- 3.1.3 These strategies must be incorporated according to the proposed hospital design and the functional planning unit (FPU) submitted.



Diagram 3.1.3.1

Example 1 of Compartmentation & Refuge Strategy: Floor Plan Showing Compartmentation and Refuge Strategy

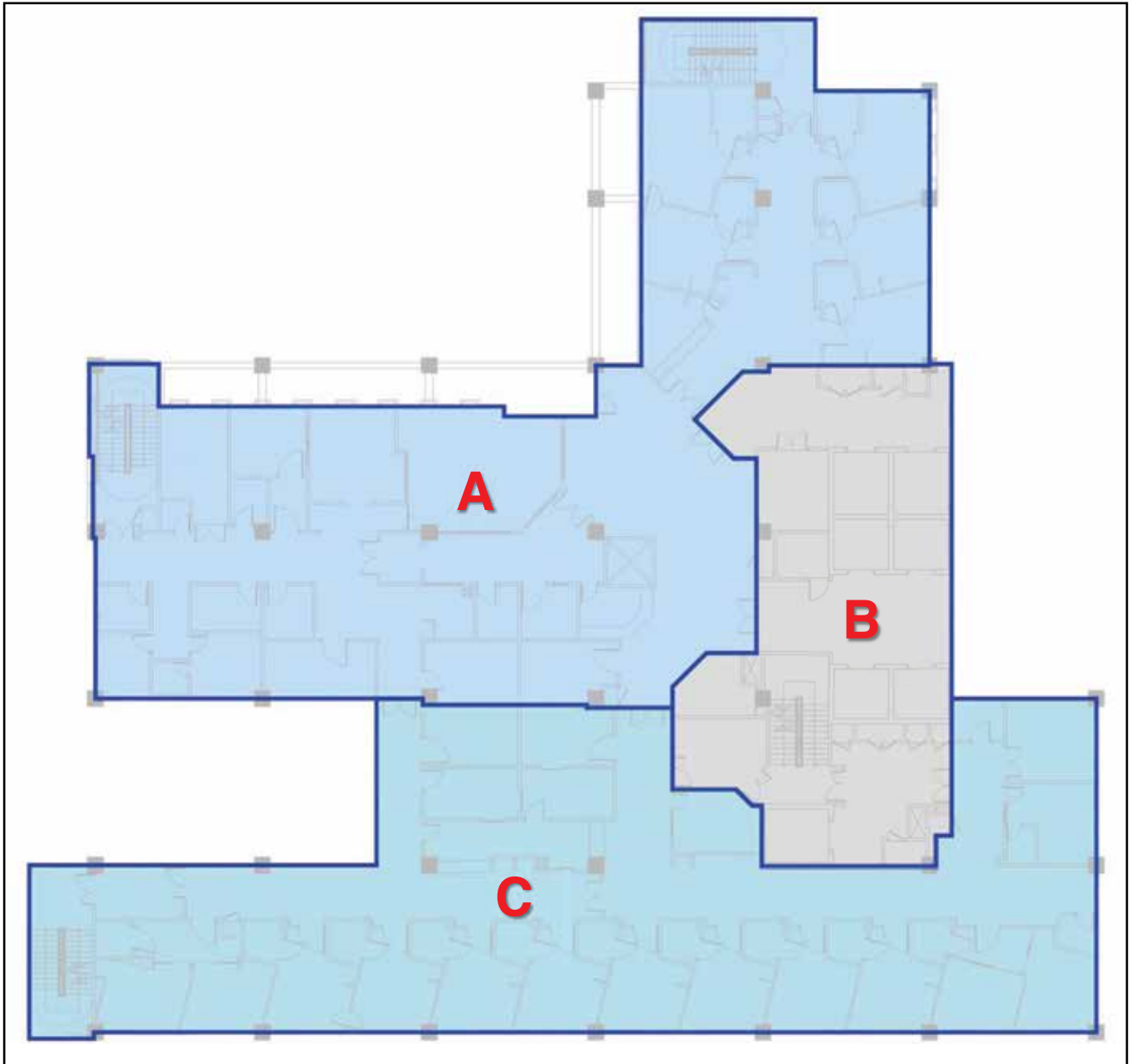


- *Floor Plan Showing Compartmentation and Refuge Strategy*
- *Each area (A, B, C & D) are compartmentalised to ensure that the fire is contained within each compartment. The higher the number of compartmentalised areas, the lower the risk of fire spreading to other areas.*





Diagram 3.1.3.2
Example 2 of Compartmentation & Refuge Strategy: Floor Plan Showing Compartmentation and Refuge Strategy



- *Floor Plan Showing Compartmentation and Refuge Strategy*
- *Each area (A, B & C) are compartmentalised to ensure that the fire is contained within each compartment. The higher the number of compartmentalised areas, the lower the risk of fire spreading to other areas.*





3.2.0 Evacuation Strategy

What is Evacuation Strategy?

3.2.1 **Evacuation Strategy** is the planning of methods to move occupants from an affected area to safety. The methods involved should take into consideration the different category of patients, staffs and visitors.

3.2.2 The proposed strategies should incorporate these components based on the Hospital Design & Category of Patients.

3.2.2.1 **Progressive**

- a) Zoned / Defend-In-Place Strategy and Methodology
- b) Horizontal
- c) Vertical

3.2.2.2 **Total Evacuation**

- a) Phased
- b) Simultaneous

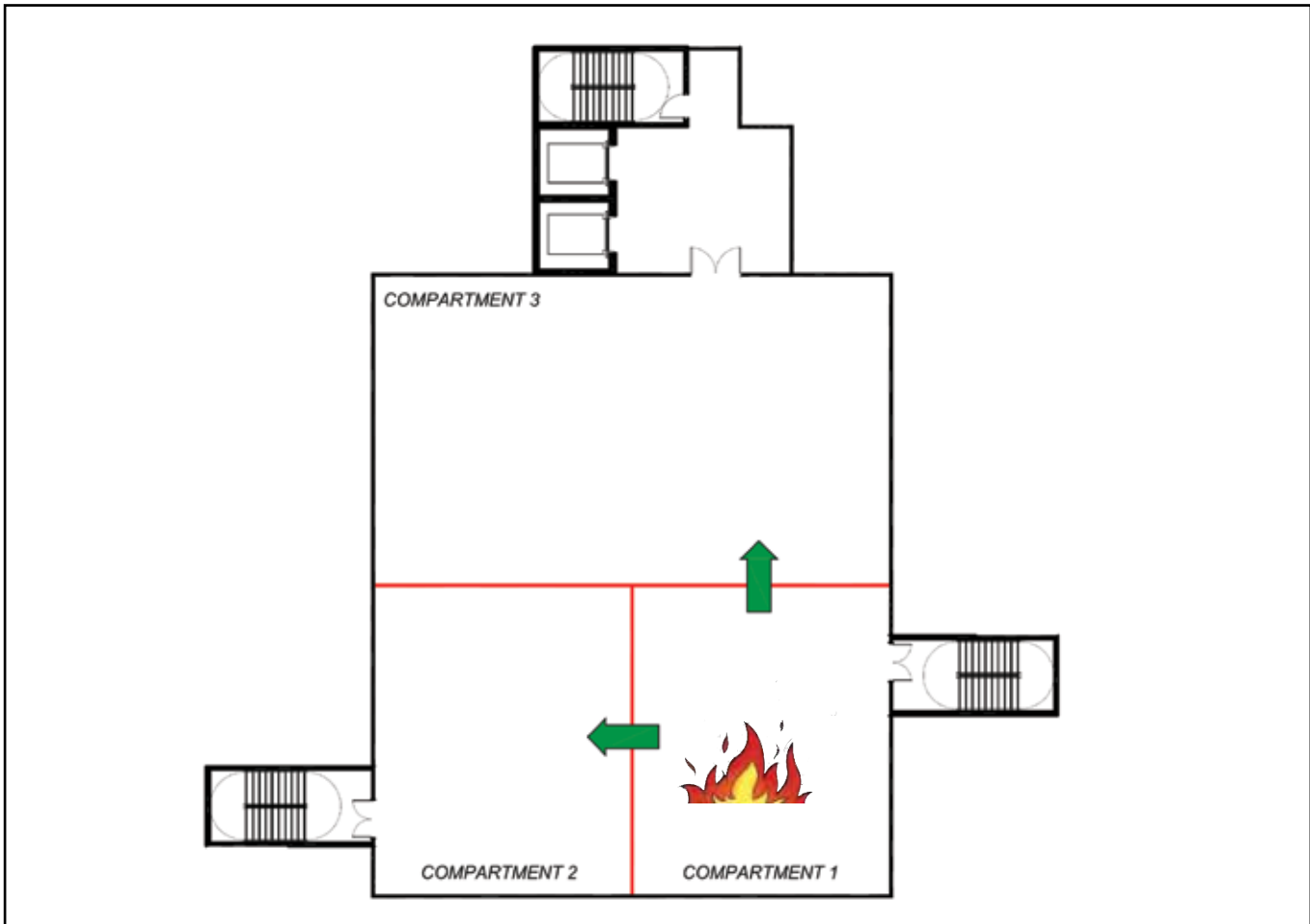
3.2.2.3 **Provision of Evacuation Lift**





3.2.0 Evacuation Strategy (Cont.)

Diagram 3.2.2.1
Example of Stage 1: Horizontal Evacuation to Adjoining Safer Compartment as Temporary Refuge Area



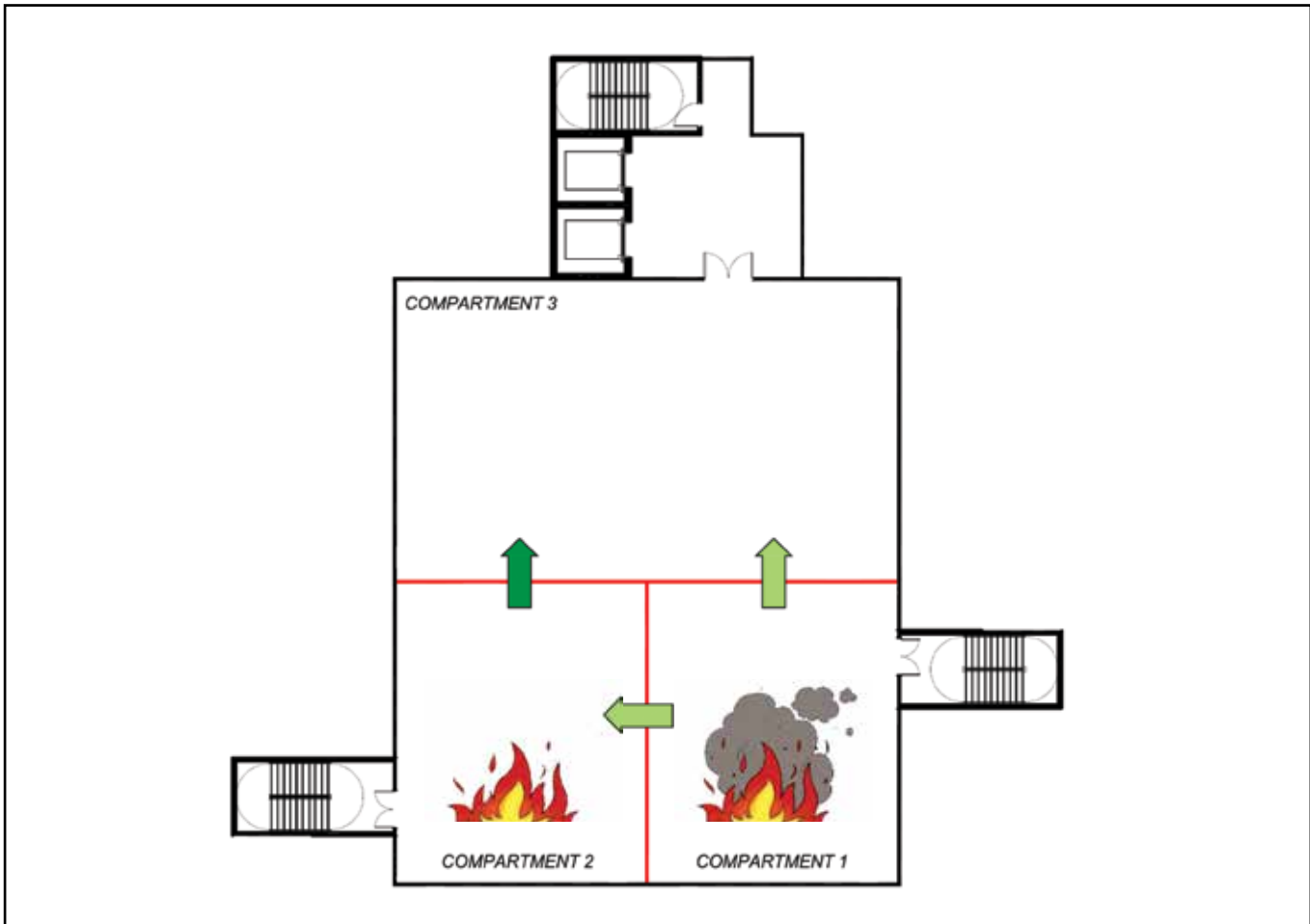
- An example of a schematic diagram showing the horizontal evacuation to Compartment 2 and Compartment 3 as temporary refuge area when fire occurs in Compartment 1.





3.2.0 Evacuation Strategy (Cont.)

Diagram 3.2.2.2
Example of Stage 2: Subsequent Additional Horizontal Evacuation to Adjacent Compartment



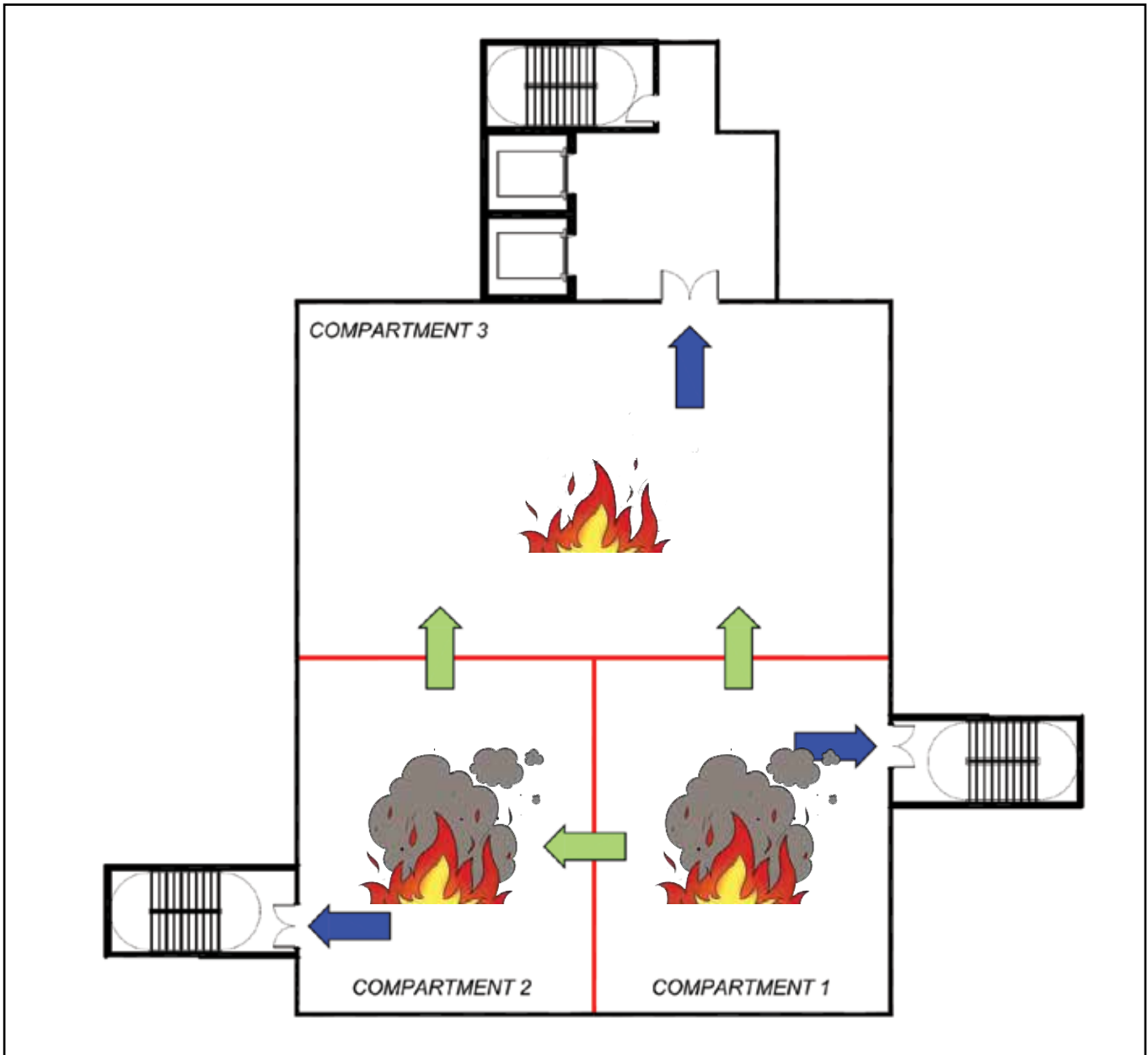
- An example of a schematic diagram showing the horizontal evacuation to Compartment 3 when fire spreads in Compartment 2.





3.2.0 Evacuation Strategy (Cont.)

Diagram 3.2.2.3
Example of Stage 3: Vertical Evacuation to Ultimate Place of Safety by Escape Staircase and/or Evacuation Lift



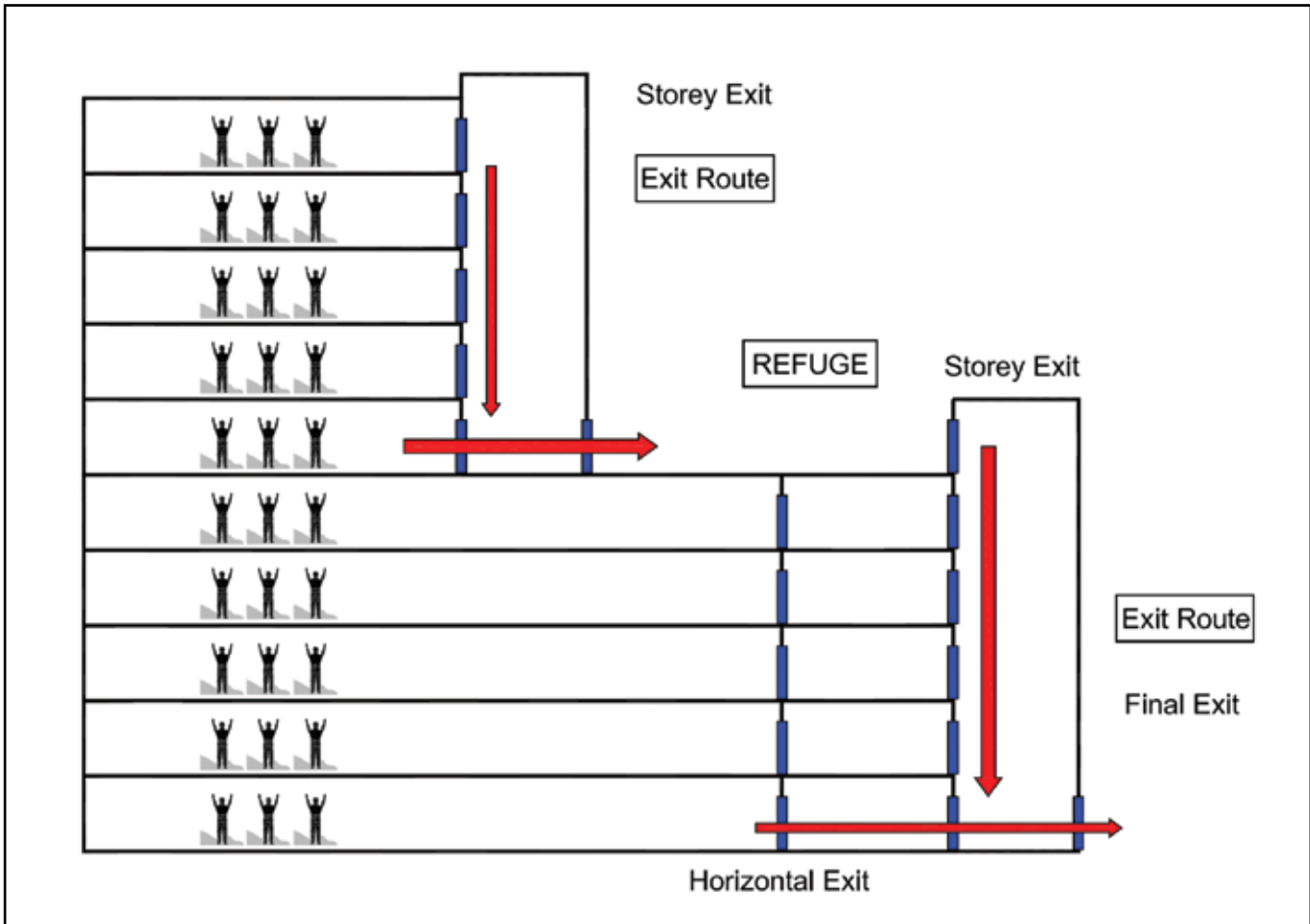
- An example of a schematic diagram showing the vertical evacuation when fire has spread further to Compartment 3.





3.2.0 Evacuation Strategy (Cont.)

Diagram 3.2.2.4
Example of Horizontal and Vertical Evacuation Strategy



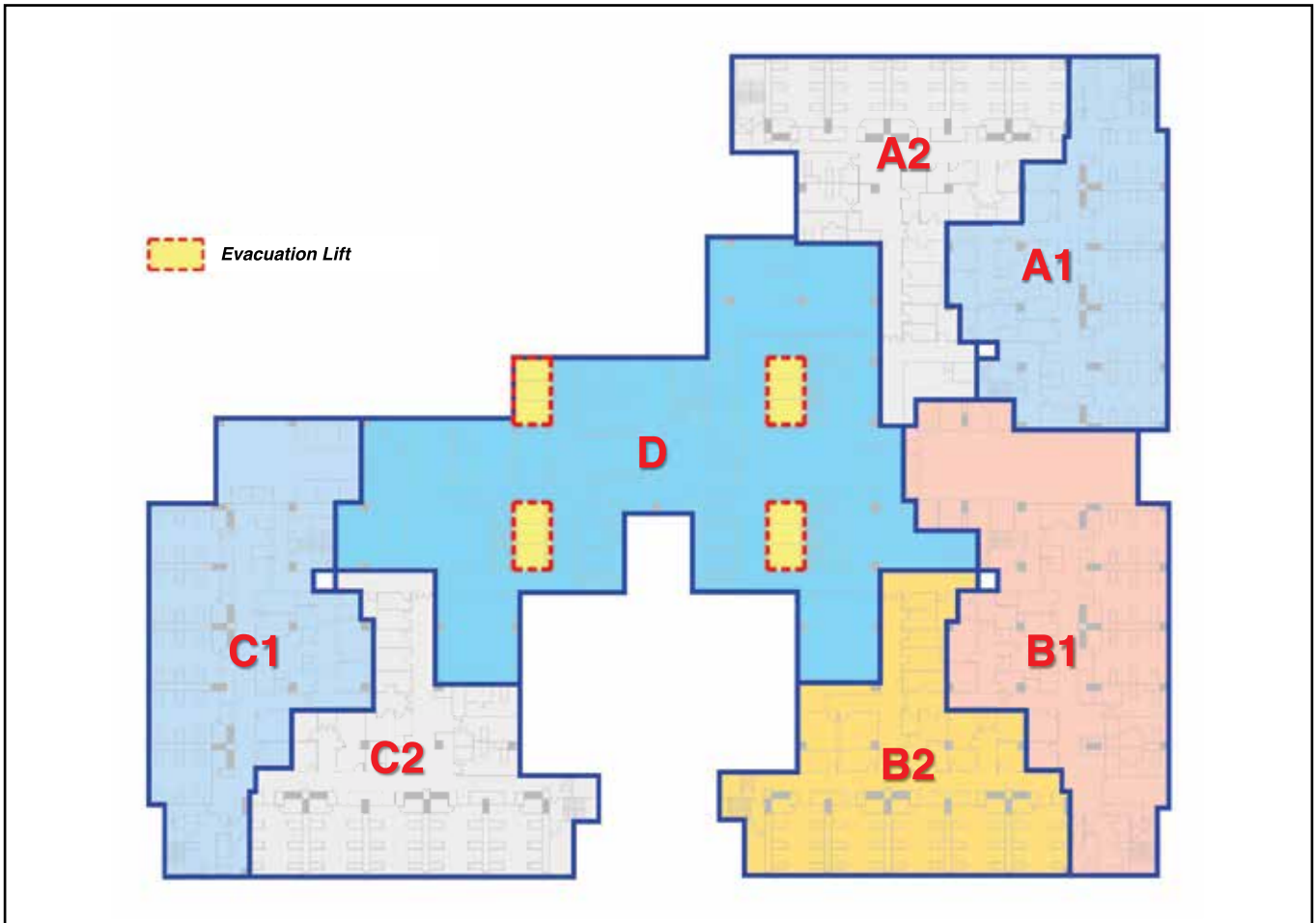
- An example of a schematic diagram showing the horizontal and vertical evacuation to the refuge floor before proceeding to the final exit.





3.2.0 Evacuation Strategy (Cont.)

Diagram 3.2.2.5
Example 1 of Proposed Evacuation Lifts



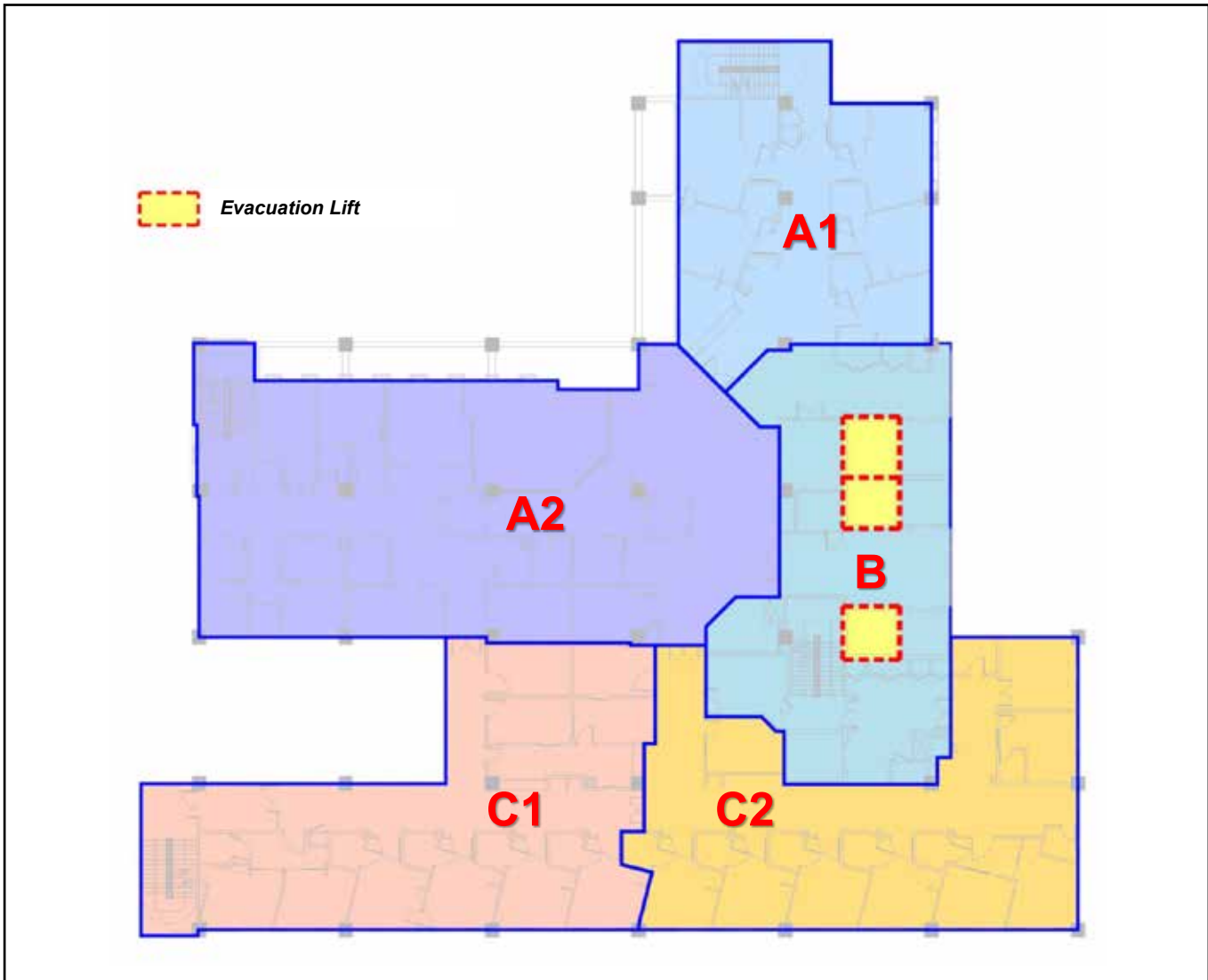
- An example of a floor plan whereby the four (4) compartments are subdivided into seven (7) compartments. The location and number of evacuation lifts based on the hospital design need to be clearly shown.





3.2.0 Evacuation Strategy (Cont.)

Diagram 3.2.2.6
Example 2 of Proposed Evacuation Lifts



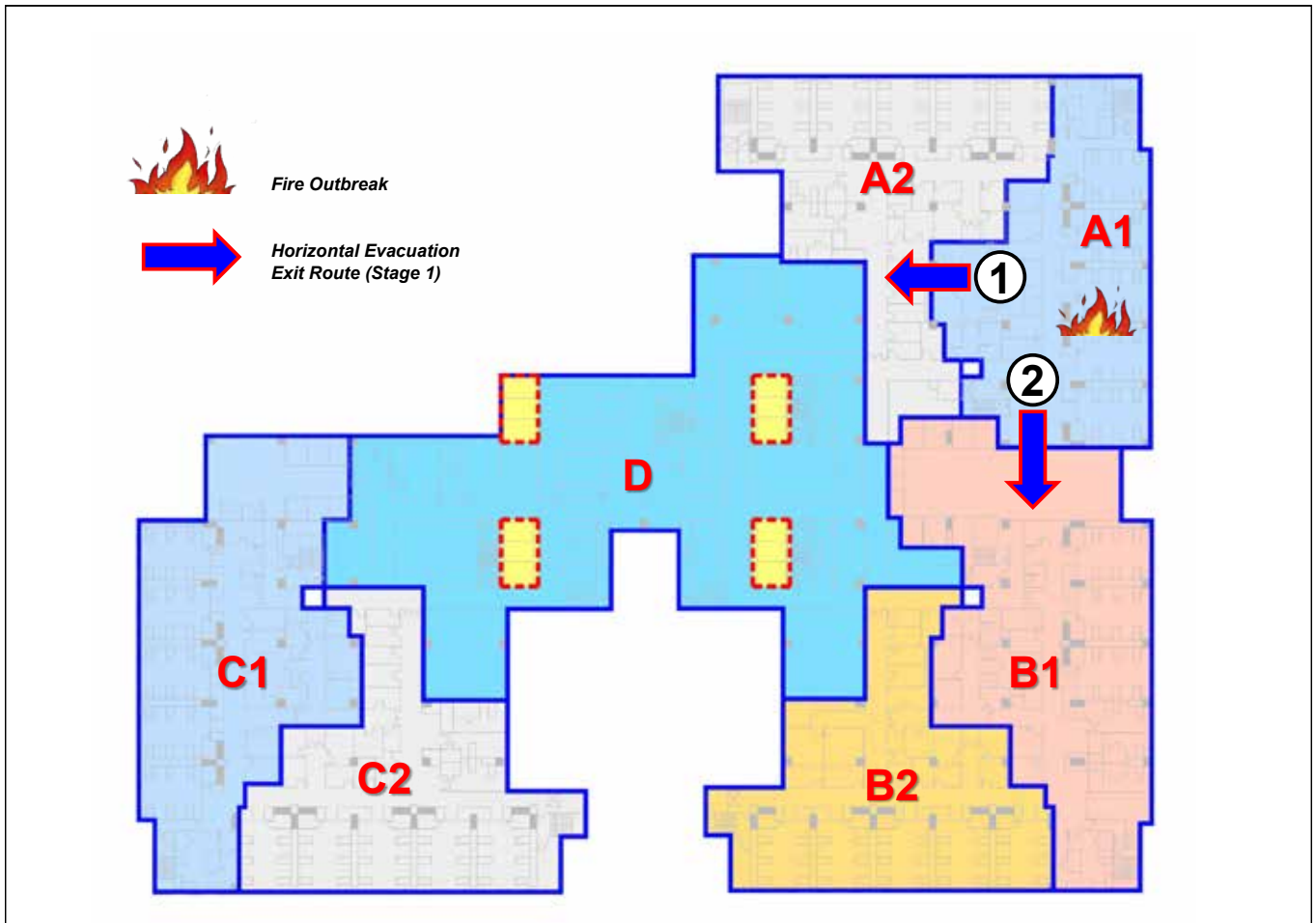
- An example of a floor plan whereby the three (3) compartments are subdivided into five (5) compartments. The location and number of evacuation lifts based on the hospital design need to be clearly shown.





3.2.0 Evacuation Strategy (Cont.)

Diagram 3.2.2.7
Example 1 of Fire Scenario Study: Stage 1



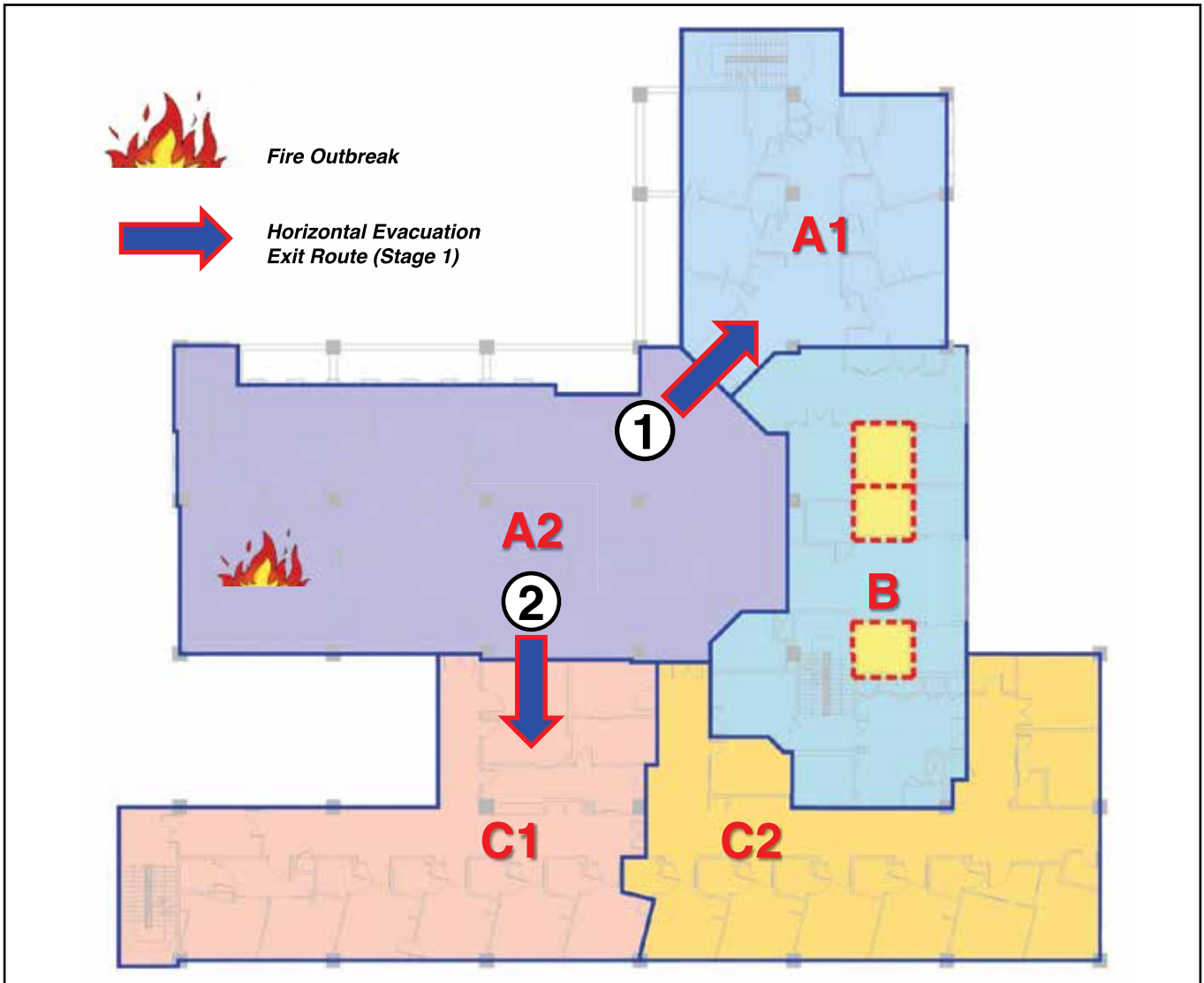
- An example of a floor plan showing the scenario on how the occupants are evacuated to the immediate adjacent compartments (A1 to A2) and (A1 to B1).





3.2.0 Evacuation Strategy (Cont.)

Diagram 3.2.2.8
Example 2 of Fire Scenario Study: Stage 1



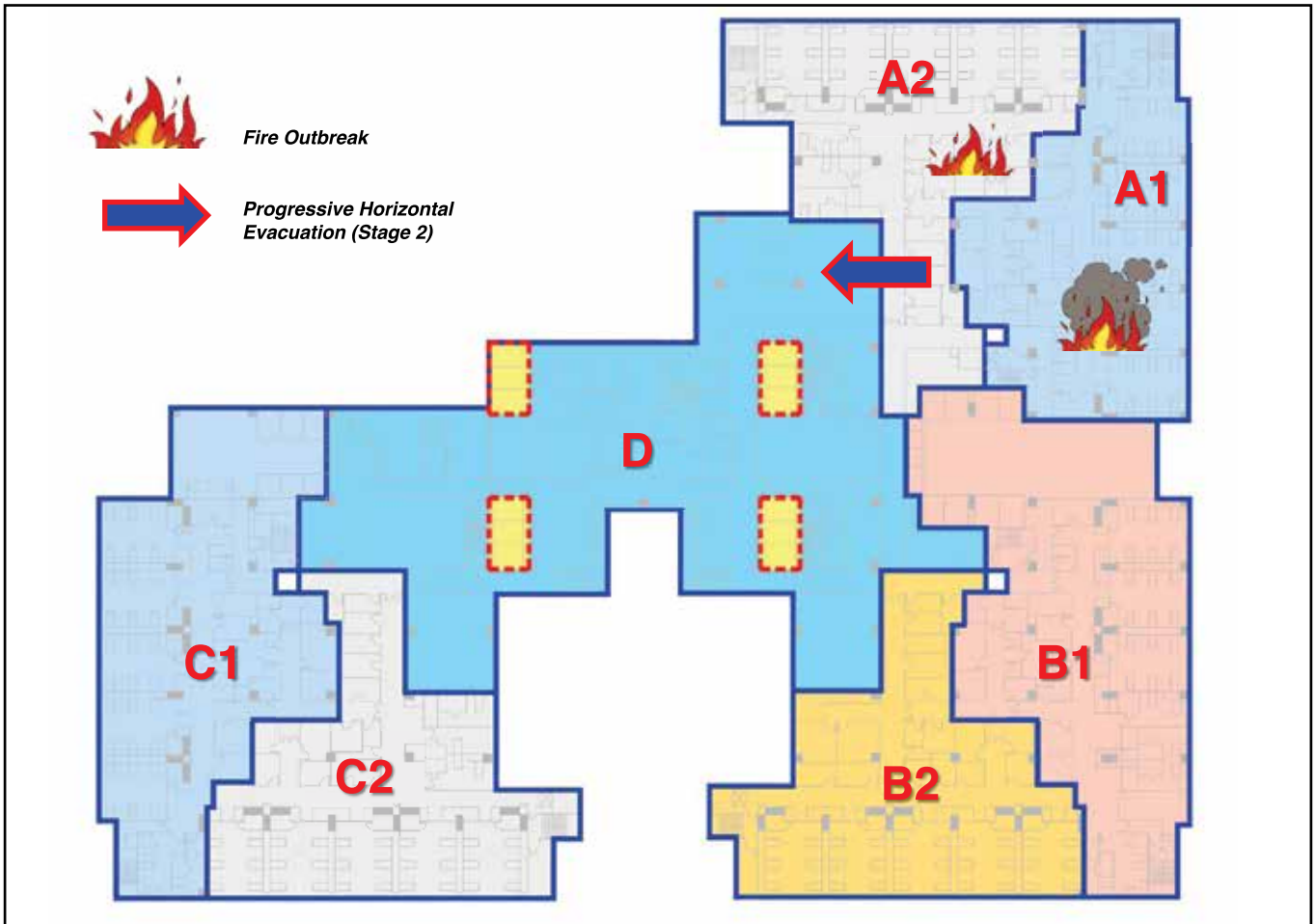
- An example of a floor plan showing the scenario on how the occupants are evacuated to the immediate adjacent compartments (A2 to A1) and (A2 to C 1).





3.2.0 Evacuation Strategy (Cont.)

Diagram 3.2.2.9
Example 1 of Fire Scenario Study: Stage 2



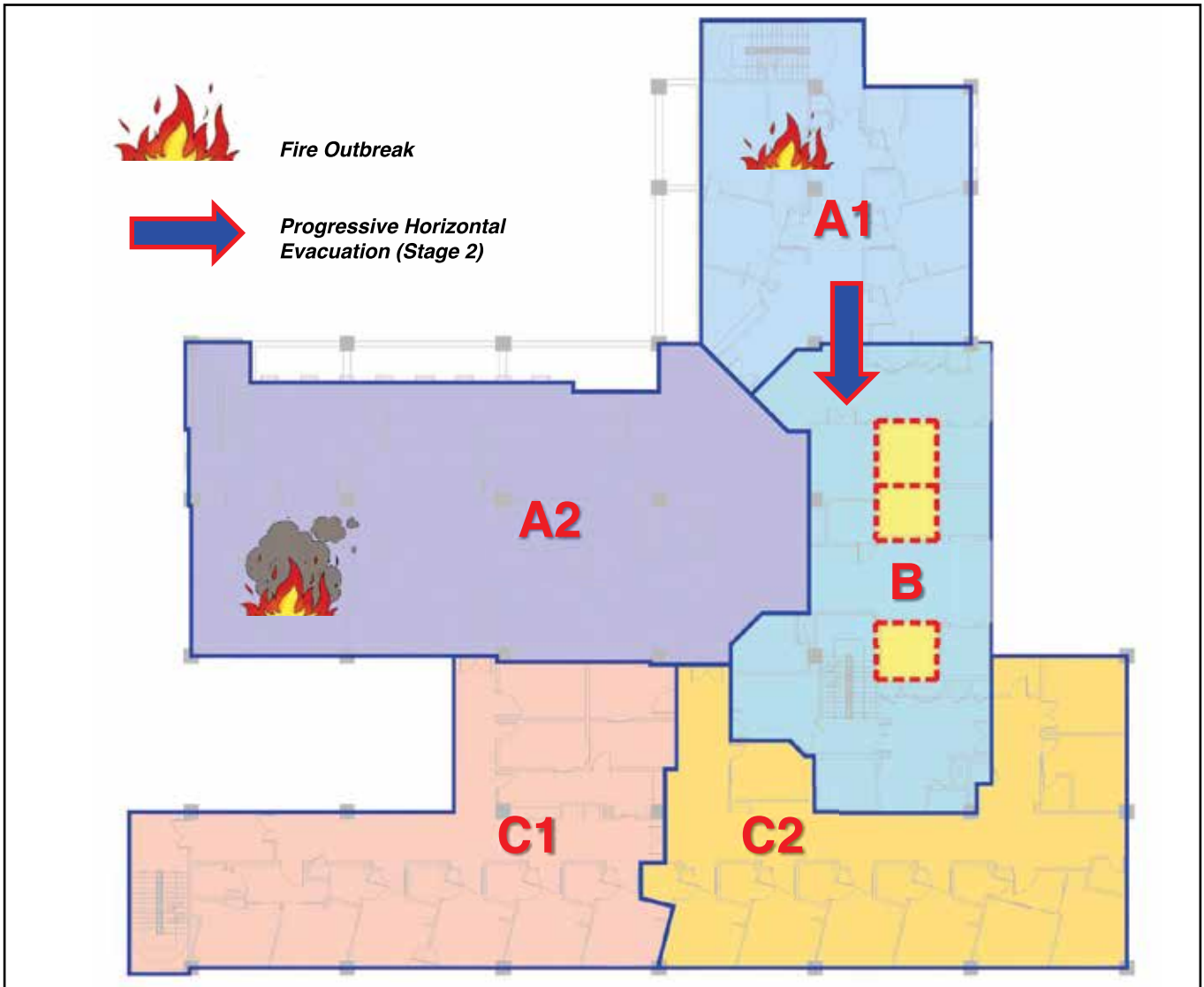
- An example of a floor plan showing the scenario on how the occupants are evacuated to the temporary refuge area (A2 to D).





3.2.0 Evacuation Strategy (Cont.)

Diagram 3.2.2.10
Example 2 of Fire Scenario Study: Stage 2



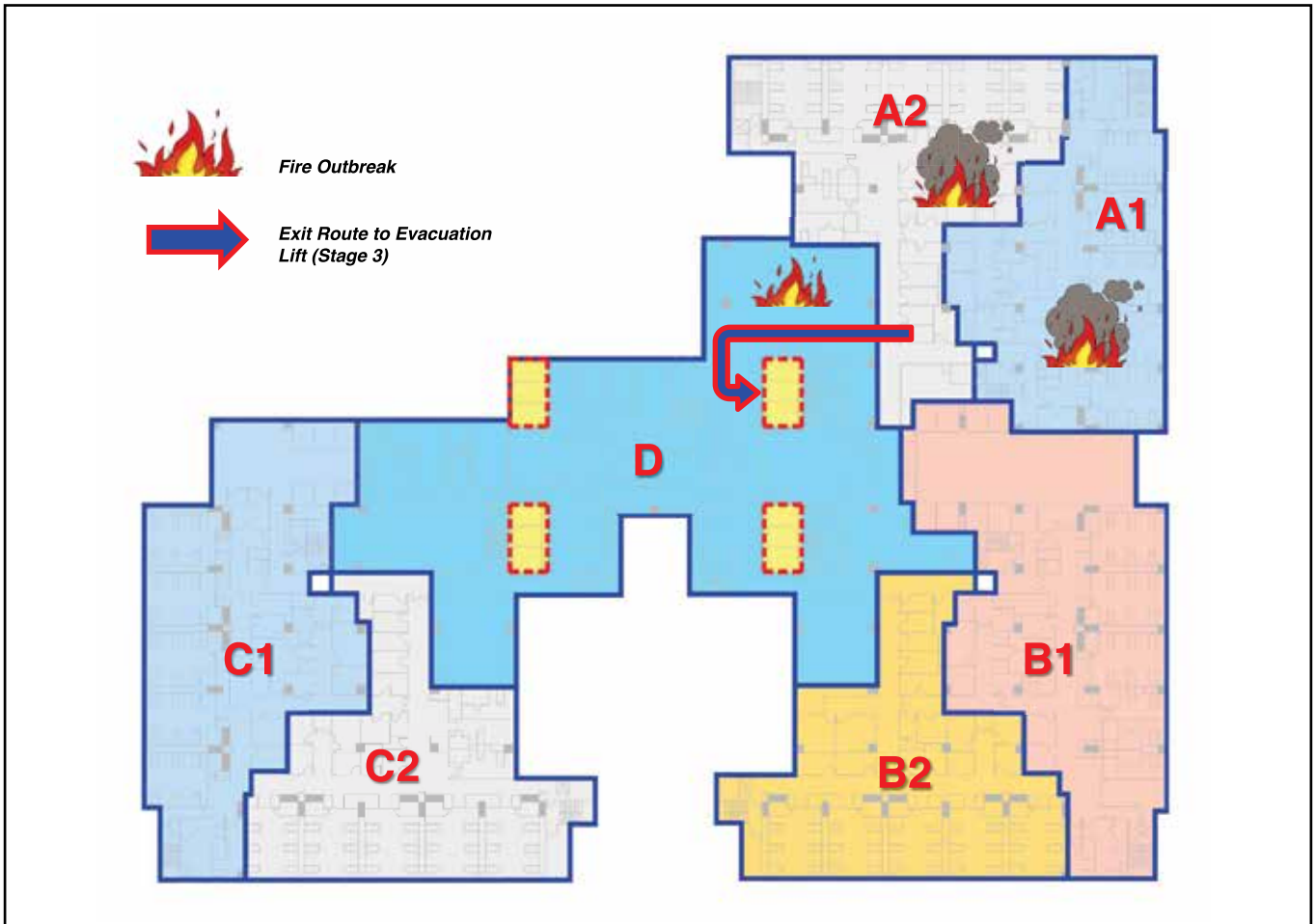
- An example of a floor plan showing the scenario on how the occupants are evacuated to the temporary refuge area (A1 to B).





3.2.0 Evacuation Strategy (Cont.)

Diagram 3.2.2.11
Example 1 of Fire Scenario Study: Stage 3



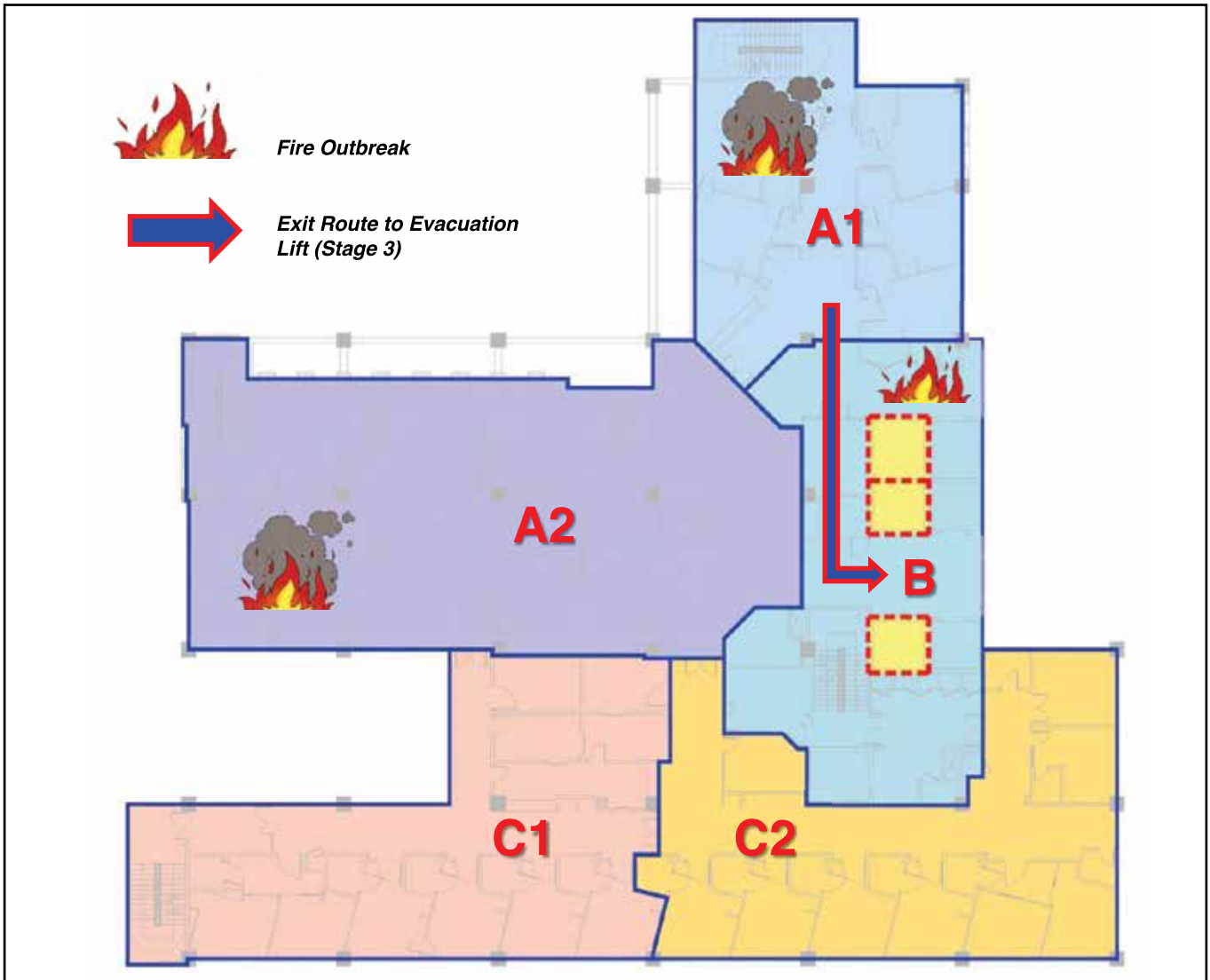
- An example of a floor plan showing the scenario on how the occupants are evacuated to the exit route via evacuation lifts.





3.2.0 Evacuation Strategy (Cont.)

Diagram 3.2.2.12
Example 2 of Fire Scenario Study: Stage 3



- An example of a floor plan showing the scenario on how the occupants are evacuated to the exit route via evacuation lifts.



Chapter 4: **Operational Planning**



High-Rise Hospital Design Principles

The applicant shall understand that a safe hospital needs to be prepared to face all kinds of disasters to maintain accessibility and functions during disasters. Operational planning is the framework outlining the standard operating procedure and scope of personnel who are involved during an event of disasters. The framework includes the organisational structure, responsibilities of each personnel and training programme of the hospital.

4.1.0 EMERGENCY RESPONSE PLAN (ERP) :

- 4.1.1 The applicant shall establish an emergency response plan to manage risks of disasters to protect the safety and lives of patients, staffs and public at the hospital, minimise damage to or loss of properties and reduce interruption of normal hospital operational activities.
- 4.1.2 The applicant shall: -
 - 4.1.2.1 Establish an Emergency Response Team (ERT);
 - 4.1.2.2 Make available a plan of disaster prevention, protection and measures according to the purpose or use of the building, the numbers of occupants and the activities or processes undertaken therein; and
 - 4.1.2.3 Ensure that the ERP is disseminated and understood by all staffs at the hospital.

4.1.0 EMERGENCY RESPONSE PLAN (ERP) (Cont.) :

4.1.3 Emergency Response Team (ERT)

4.1.3.1 A team needs to be established to handle emergencies, with details such as below:

4.1.3.1.1 A **Crisis Management Committee** with technical expertise that could advise an executive committee regarding crisis, emergency and disaster management.

4.1.3.1.2 An **Emergency Response Team** headed by higher management (who can make decisions on the response of the hospital when an emergency occurs) and may be assisted by physicians, nurses, an emergency management technician-trained staff, paramedics and trained ambulance driver.

4.1.3.1.3 A **Health Emergency Planning** group responsible for formulating a health emergency mitigation/prevention, preparedness, response and recovery plan and other hospital response plans.

4.1.3.1.4 A **Safety Committee** headed by an officer in charge of promoting safety in the hospital against all hazards.

4.1.3.1.5 A **Hospital Operations Centre** headed by a hospital emergency management coordinator in charge of monitoring emergencies or disasters, dispatching response teams, mobilising other resources for emergencies, operational 24 hours a day, seven days a week. It has a designated office or unit with personnel equipped with communications facilities, a computer system, directories and an alternate communications system if the system fails.

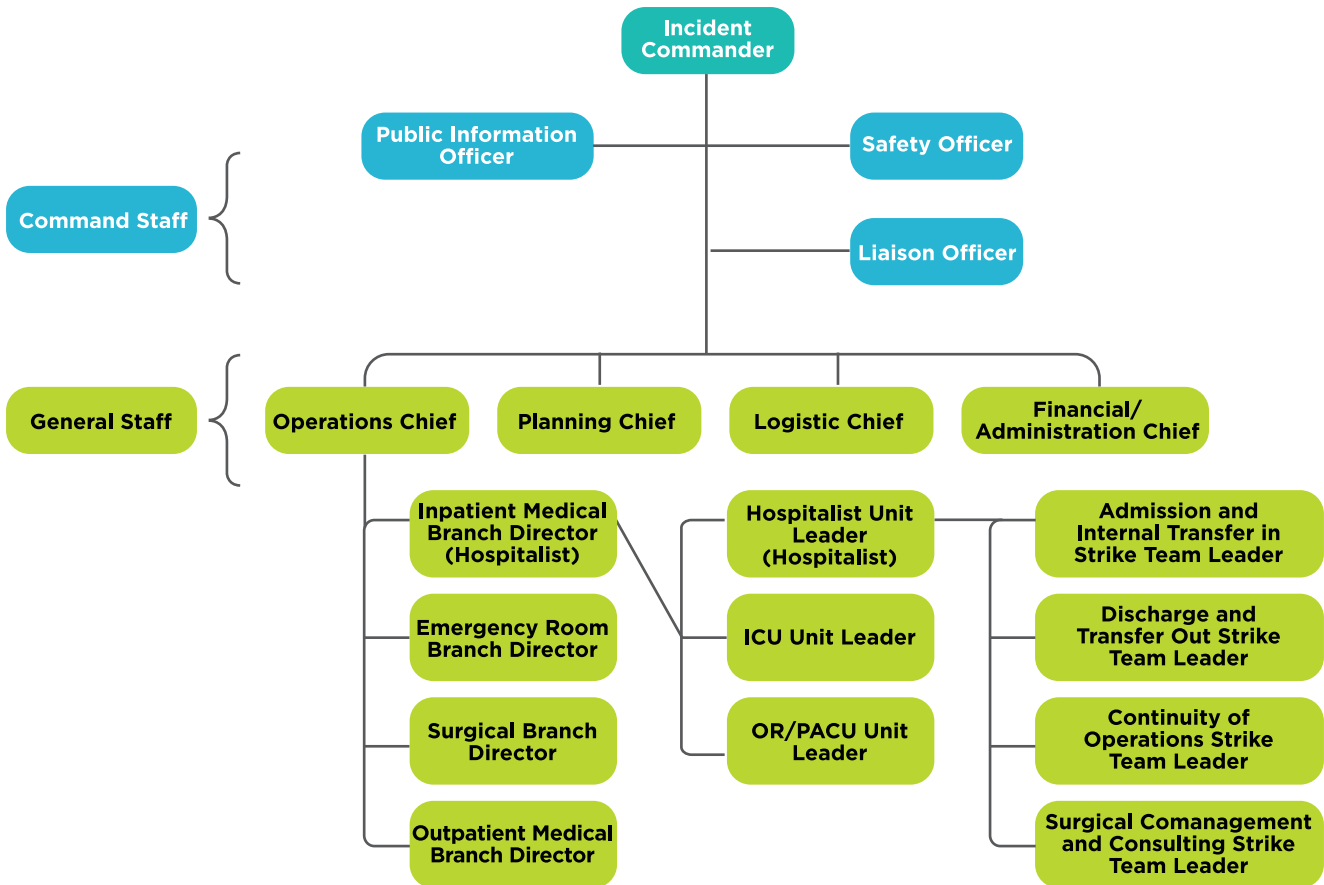


4.1.0 EMERGENCY RESPONSE PLAN (ERP) (Cont.) :

4.1.3.1.6 Organisational Chart:

The applicant shall have an organisational chart which reflects the Emergency Response Plan which delineates the position and roles of the individuals in the ERT.

Diagram 4.1.3.1.6.1
Example of Emergency Response Team’s Chart



4.1.0 EMERGENCY RESPONSE PLAN (ERP) (Cont.) :

- 4.1.3.2 The applicant shall identify the training needed and how it will be provided. This is not limited to the following:
 - 4.1.3.2.1 Staff identified as trained in the use of related emergency equipment.
 - 4.1.3.2.2 Staff identified to register visitors at the assembly point(s).
 - 4.1.3.2.3 Staff identified as having duties specific to the type of evacuation.
 - 4.1.3.2.4 Method of ensuring everyone understands how to operate the fire alarm.
 - 4.1.3.2.5 Method of ensuring everyone has sufficient instruction and training for emergency evacuation.
 - 4.1.3.2.6 Method of ensuring visitors / contractors have sufficient information on procedures in the event of an emergency evacuation.
- 4.1.3.3 The applicant shall elaborate on the **method(s) of informing personnel (including visitors / public) of escape routes**. This should include the following:
 - 4.1.3.3.1 Instruction
 - 4.1.3.3.2 Training
 - 4.1.3.3.3 Emergency exit / route signage
 - 4.1.3.3.4 Emergency action notices
 - 4.1.3.3.5 Include method of informing personnel of an alternative escape route should the main one be blocked or inaccessible
- 4.1.3.4 The applicant shall also provide **awareness programmes** to ensure the staff are made aware of actions that needs to be taken during emergencies.



4.2.0 EXECUTION (CASE SCENARIO)

- 4.2.1 The applicant shall plan for drills to satisfy the requirements of Jabatan Bomba dan Penyelamat Malaysia.

4.3.0 MAINTENANCE

- 4.3.1 The applicant shall ensure proper maintenance plans are in place and executed by appointed relevant team. The equipment shall always be properly maintained and made available.

4.4.0 HOUSEKEEPING

- 4.4.1 Housekeeping services properly operated and maintained to provide a safe environment.



SELECTED QUESTIONS AND ANSWERS DURING VIRTUAL PUBLIC CONSULTATION



1. Q : High-rise hospitals start @ 48m. Say 1 story is 4.8m. So we have 10 storeys. If we have less than a 10-storey building, say 8 storeys but the height is more than 48m, does this hospital fall under high-rise hospital? Maybe some floors have more height like ground floor has 6m height. Does a hospital fall under the high-rise category if it has a height of more than 48 metres?

A : Yes. Any hospital building exceeding 48 metres in height, irrespective of the number of floors, is considered to be a 'high-rise' hospital.

2. Q : Does the Hospital Disaster Management Plan (HDMP) require any specific approval in order to obtain the final approval for pre-establishment?

A : No. The HDMP is a part of the document submission at the pre-establishment application stage. Approval for pre-establishment application is issued by Ministry of Health (MOH).

3. Q : At Pre-Establishment Stage, applicants are required to propose their Emergency Response Team. Would this just be the category of staff or are actual persons need to be identified at such an early stage?

A : Applicant is required to submit the organisation chart and the category of staff only. Please refer to Chapter 4 for detailed explanation.

4. Q : Who is the submitting person of the HDMP? Is it the consultant OR the hospital operator? Or both?

A : The applicant for pre-establishment is a person who fulfils the requirements as outlined under section 6, Act 586. However, the submission must comprise of inputs from various consultants. HDMP does not require a different submitting person as it is part of the document submitted with the application.

5. Q : Based on all the risk analysis, precaution and evacuation strategy, does it cover the zone above 12 storey/48m only or the whole building?

A : You need to submit the relevant documents for the whole building.

6. Q : Do you allow evacuation to the roof if the building has helipad?

A : Yes, it is allowed.



7. Q : Is it possible to repurpose existing high-rise buildings? Especially in central urban areas.

A : Yes, provided the facility is able to comply with all relevant acts, rules and regulations.

8. Q : Prevention and Evacuation Strategy: Is it compulsory to include fire detection and mass communication system (public announcement, PA system, as term commonly used in Malaysia) and CCTV system in the design?

A : The intention of the Technical Reference is to provide guiding principle and does not limit the design proposal.

9. Q : Operational Planning Emergency Preparedness: Should HDMP include method to shut off medical gases, fuel lines and boilers, attending to operating fire protection system, etc.

A : The intention of the Technical Reference is to provide guiding principle and does not limit the design proposal.

10. Q : Will CKAPS provide additional checklist and more detailed requirements on the submission of HDMP?

A : This is a guiding principle. The Applicant/Operator should tailor-make the submission based their own intention and the purpose of the facilities.

11. Q : Is the technical design reference and the technical requirements different from the existing UBBL in terms of Bomba requirements?

A : The intention of the Technical Reference is to provide guiding principle and does not limit the design proposal.

All design must be in compliance with all statutory requirements but not limited to:

1. Act 586;

2. Uniform Building By-Laws 1984;

3. Fire Safety Requirement;

4. Other Code of Practises and Malaysian Standard (MS), including MS1183:1990 (Specification for Fire Precautions in the Design and Construction of Buildings), MS1184:1991 (Code of Practice on Access for Disabled Persons to Public Buildings) and MS1331:1993 (Code of Practice for Access of Disabled Persons Outside Buildings).

12. Q : At pre-establishment/no objection from CKAPS stage, a hospital operator/land owner will only be establishing the feasibility of setting up a hospital on a particular site. Having such scenario, is it a requirement for developer (and their consultants) to come up with a schematic layout showing internal layouts with PFUs when they don't even know if the land/location is approved and may result in a lot of abortive work, if the site is rejected.

A : It is the Developer/Consultants' responsibilities to ensure the proposed sites are in accordance with the PBT zoning and the proposed healthcare facilities are supported by CKAPS. All the requirements stated in 'pre-establishment' check-list is to guide the developers on this purpose.



13. Q : Facility management practices in Malaysia is quite conservative and lacks initiatives as well as is driven by profit. This at times puts safety and health at risk. While at the same time, cost is revving up for facilities management to run building operations due to lack of innovations.

At times, a lot of considerations and guidelines are being implemented during design stages which eventually fail during operations. This is due to the fact that design is not holistic or flexible enough to ensure changes and adapt new requirements. Hence, it is significant to know if the entire LCC of the building is required rather than in design stages. Design stages also sometimes fail as the operations due to lack of consideration for maintenance activities, such as simple ingress and egress of maintenance personnel.

A : Life Cycle Costing of Building Maintenance is indeed crucial as this analysis may reduce the regulatory burden and empower the building owner to uphold the responsibility to perform necessary renovations and maintenance of the facility. This is in line with the spirit of existing laws and regulations to ensure the safety of the patients and occupants of the building. On the other hand, it is also imperative that the initiatives to heighten the awareness of all building owners and operators on the importance of timely maintenance.

14. Q : In some countries a refuge floor is required when the building height reaches some level. Is this required as well for a high-rise hospitals?
How if the hospital is set up in a mixed-use development (with hotel, retail, condo, etc.)?

A : Refuge Floor is not a compulsory requirement in UBBL and CKAPS will not reject the submission if the Applicant/Developer wish to have a refuge floor. The reference will also guide the developer for proper planning of mixed-use development.

15. Q : Not many consultants are familiar with the multiple laws and bylaws of Malaysia; either they are clinically inclined or they are technically inclined. An ideal hospital setup will rely on the balance of both to ensure operations and maintenance or future expansion or upgrade of the building is still possible. Does CKAPS have any plans on training the consultants to be technically and clinically capable while designing a private hospital?

A : CKAPS is aware of the request for training program for the industry. As such, training modules catering to specific groups of personnel within the industry is currently being planned and it will be announced once it is ready.





ACKNOWLEDGEMENT

TECHNICAL REPRESENTATIVES

Public Sector

Dr. Ahmad Razid bin Salleh

Director,
Medical Practice Division, Ministry of Health

Dr. Afidah binti Ali

Deputy Director,
Private Medical Practice Control Section (CKAPS) Medical Practice Division,
Ministry of Health

Dr. Siti Zufina binti Abd Samah

Head of Policies, Resources and Standards Sector,
Private Medical Practice Control Section (CKAPS), Medical Practice Division,
Ministry of Health

Dr. Alicia Liew Hsiao Hui

Head of Technical and Operational Sector,
Private Medical Practice Control Section (CKAPS), Medical Practice Division,
Ministry of Health

Dr. Nurul 'Ain binti Selamat

Head of Hospital Unit, Technical and Operational Sector,
Private Medical Practice Control Section (CKAPS), Medical Practice Division,
Ministry of Health

Dr. Mohd Zulfahmi Bin Amali

Principal Assistant Director, Hospital Unit, Technical and Operational Sector,
Private Medical Practice Control Section (CKAPS), Medical Practice Division,
Ministry of Health

Dr. Azrin bin Samsuddin

Principal Assistant Director, Hospital Unit, Technical and Operational Sector,
Private Medical Practice Control Section (CKAPS), Medical Practice Division,
Ministry of Health

Dr. Hapizi bin Mohd Yunus

Principal Assistant Director, Hospital Unit, Technical and Operational Sector,
Private Medical Practice Control Section (CKAPS), Medical Practice Division,
Ministry of Health

Dr. Muhamad Hakime bin Masri

Principal Assistant Director, Policies and Resources Unit, Policies, Resources and
Standards Sector,
Private Medical Practice Control Section (CKAPS), Medical Practice Division,
Ministry of Health





Ir. Ts. Mohammad Faizal bin Khalid

Principal Assistant Director,
Engineering Services Division, Planning Section,
Ministry of Health

Muhamad Faiz bin Shahrom

Senior Assistant Director,
Engineering Services Division, Planning Section,
Ministry of Health

Taufik bin Ahmad

Principal Assistant Director,
Service Industry Section, Economic Planning Unit (EPU)

Ismawijaya Zah bin Mohamed Jais

Senior Deputy Director,
Building Control Department, Kuala Lumpur City Hall (DBKL)

Tahrina binti Taib

Building Surveyor,
Building Control Department, Kuala Lumpur City Hall (DBKL)

Amram bin Jaya

Senior Fire Superintendent II,
Fire and Rescue Department of Malaysia (BOMBA)

Yusri bin Basri

Senior Fire Superintendent I,
Fire and Rescue Department of Malaysia (BOMBA)

Khairul Azuwan bin Ibrahim

Senior Fire Superintendent I,
Fire and Rescue Department of Malaysia (BOMBA)

Mejar Shahrul Nizam bin Jaafar

National Disaster Management Agency (NADMA)

Zahid bin Ismail

Deputy Director General,
Malaysia Productivity Corporation (MPC)

Mohamad Azrol bin Mohamad Dali

Director,
Malaysia Productivity Corporation (MPC)



Private Sector

Ar. Datuk Hj. Saiful Anuar bin Abdul Aziz

Anuar Aziz Architect / Healthdesigns Asia Sdn Bhd

Haji Syamsul Arman bin Yap

Anuar Aziz Architect / Healthdesigns Asia Sdn Bhd

Mohamad Nizam bin Mohd Walid

Anuar Aziz Architect / Healthdesigns Asia Sdn Bhd

Dato' Dr. Ir. Abu Hashim bin Abd Ghani

Perunding Hashim & NEH Sdn Bhd

Ir. Ahmad Masyhur bin Jahaya

Perunding Hashim & NEH Sdn Bhd

Ezlin binti Tajuddin

Total Alliance Health Partners International (TAHPI)

Wong Wan Yee

Total Alliance Health Partners International (TAHPI)

Mohd Rodzi bin Husin

AVISENA Hospital Group

Mohd Fitri bin Jalil

AVISENA Hospital Group

Secretariat

Dr. Mohamad Norjayadi bin Tamam

Director, Malaysia Productivity Corporation (MPC)

Azimah binti Adnan

Manager, Malaysia Productivity Corporation (MPC)

Nur Syafina binti Anuar

Manager, Malaysia Productivity Corporation (MPC)

Nazahiah binti Mohamad

Manager, Malaysia Productivity Corporation (MPC)

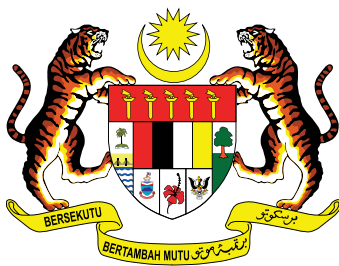
Jamaliah binti Daud

MPC Associates

Kamine Nathan

MPC Associates





www.moh.gov.my