



DOH Health Facility Guidelines 2019

## Part B – Health Facility Briefing & Design 140 Engineering & Maintenance Unit



## Executive Summary

This Functional Planning Unit (FPU) covers the requirements of an Engineering and Maintenance Unit. It may be in-house or contracted, with an on-call repair service. Some Areas within a facility will require a 24 hour per day, 7 day per week 'on-call' maintenance service available.

The Unit will include several functional zones include workshop areas for various type of engineering-based services, storage areas for paint, gardening and flammable liquids, office area for administrative and clerical activities as well as shared staff amenities.

The Engineering & Maintenance Unit should be located on the ground floor to facilitate delivery and dispatch of heavy items of equipment. Access to a loading dock is desirable. The Unit will require ready access to all areas of the hospital and in particular, to plant rooms and areas.

The Schedules of Accommodation are provided using references to Standard Components (typical room templates) and quantities for typical Units within a Hospital at RDL 3 to 6. This schedule assumes that all services are provided in-house. Note: For maximum functionality, some of the workshop areas should be combined into one large area.

Further reading material is suggested at the end of this FPU but none are mandatory.

Users who wish to propose minor deviations from these guidelines should use the **Non-Compliance Report (Appendix 4 in Part A)** to briefly describe and record their reasoning based on models of care and unique circumstances.

The details of this FPU follow overleaf.



## Table of Contents

<b>Executive Summary .....</b>	<b>2</b>
<b>Table of Contents .....</b>	<b>4</b>
<b>140. Engineering &amp; Maintenance Unit .....</b>	<b>5</b>
<b>1 Introduction .....</b>	<b>5</b>
<b>2 Unit Planning Models .....</b>	<b>5</b>
2.1 Functional Zones.....	5
<b>3 Functional Relationships .....</b>	<b>6</b>
3.1 Functional Relationship Diagram.....	7
<b>4 Standard Components of the Unit .....</b>	<b>7</b>
<b>5 Schedule of Accommodation.....</b>	<b>9</b>
5.1 Engineering and Maintenance Unit.....	9
<b>6 Further Reading.....</b>	<b>11</b>

# 1. Engineering & Maintenance Unit

## 1.1 Introduction

All facilities, no matter how large or small, will require environmental support services in the form of:

- Maintenance services
- Engineering services
- Cleaning services, - external areas, windows & building fabric (refer to Housekeeping Unit for Cleaning of internal areas)
- Waste disposal (refer to Waste Management Unit for specific details)
- Gardening services
- Storage

A Maintenance Service shall be provided. It may be in-house or contracted, with an on-call repair service. The complexity of the services provided by the facility will dictate the nature and extent of the Maintenance Service required. The Maintenance Service is provided to effect preventative maintenance and repairs to all elements of the facility, from the building fabric to items of specialist equipment.

Areas that require a 24 hour per day, 7 days per week 'on-call' maintenance service are:

- Medical gases and suction systems
- Lifts
- Fire systems
- Any life-support systems
- Emergency power systems
- Boiler plant
- Telecommunications systems including public address, fire warning alarm systems, Nurse/Emergency Call, Duress call systems
- Emergency Water Supply (if ADDC supply fails)

The potential life-threatening nature of the failure of any of the above systems justifies a 24-hour service.

## 1.2 Unit Planning Models

### 1.2.1 Functional Zones

The Engineering and Maintenance Unit may consist of the following Functional Areas dependent on the Operational Policy and service demand:

- Workshop areas, which may include separate areas for carpentry, mechanical, plumbing, electrical, biomedical and civil (building works) services
- Storage areas for all specialty services/trades including paint, gardening and flammable liquids
- Office area for administrative and clerical activities
- Staff amenities which may be shared

### **Workshop Areas**

Workshop areas may include those for maintenance, electronics and mechanical. These various workshops areas should be independent to one another rather combined as one. Workshop areas may however be collocated. Specific requirements for possible workshop areas are detailed below.

A general maintenance workshop shall be provided for repair and maintenance. If maintenance is outsourced, a minimum provision for maintenance workshops shall be provided within the facility. Sufficient space is required for a workbench, drill press, angle grinder, stainless steel trough, tool peg board, storage cabinets. Floor space is also required for the standing of equipment during repairs. Adequate lighting, power and ventilation are required.

A separate workshop may be provided specifically for the storage, repair and testing of electronic and other medical equipment. The amount of space and type of utilities will vary with the type of equipment involved and types of service and maintenance contracts used.

It should be noted that mechanical workshops will further be divided into HVAC and plumbing and these will require further separation.

### **Storage Areas**

#### **Stores**

A storage room shall be provided for the storage of building maintenance supplies. Storage for solvents and flammable liquids shall comply with the relevant statutory requirements; such as the SDS (Safety Data Sheet).

A storage area for the storage of plans, drawings, and document file such as warranty manuals, may also be considered.

#### **Gardener's Facilities**

A room or shed shall be provided for the storage of all the necessary gardening equipment and material.

### **Staff Areas**

#### **Offices**

Offices are required for full time management staff including:

- Engineer/ Head of Department
- Head Gardener, depending on the size of the facility

#### **Meeting Room**

- Meeting room for group discussion, training etc. may be provided

#### **Staff Facilities**

Staff Facilities will include:

- Hand washing facilities located in each of the workshop area
- Toilet, Shower and lockers, that may be shared with the main hospital
- Staff Room that may be shared with the main hospital

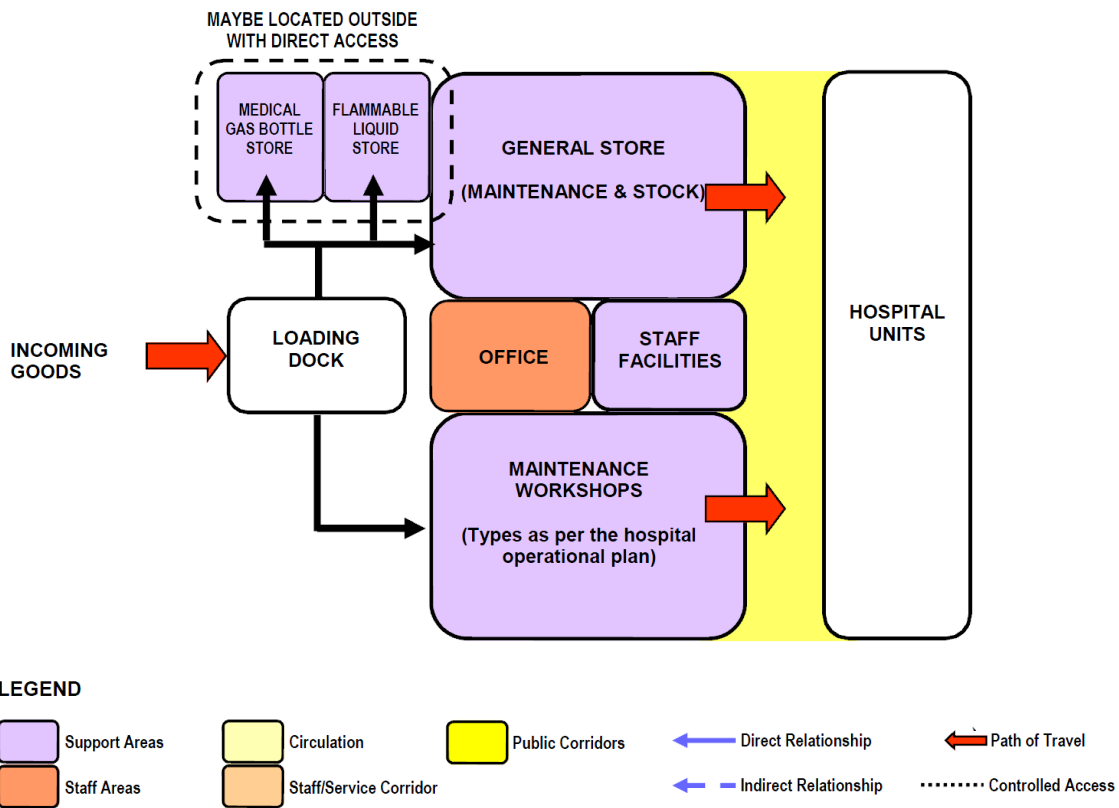
## **1.3 Functional Relationships**

The Engineering & Maintenance Unit should be located to facilitate delivery and dispatch of heavy items of equipment. Access to a service lift is required; and service lifts in hospitals is mandatory.

Access to a loading dock is desirable. The Unit will require ready access to all areas of the hospital and in particular, to plant rooms and areas.

Depending on the size of the Unit and the Operational Policy, considerable noise and fumes may be generated by the Unit and care should be taken in locating the Unit relative to other units such as Inpatient Accommodation Units.

### 1.3.1 Functional Relationship Diagram



### 1.4 Standard Components of the Unit

Standard Components are typical rooms within a health facility, each represented by a Room Data Sheet (RDS) and a Room Layout Sheet (RLS).

The Room Data Sheets are written descriptions representing the minimum briefing requirements of each room type, described under various categories:

- Room Primary Information; includes Briefed Area, Occupancy, Room Description and relationships, and special room requirements)
- Building Fabric and Finishes; identifies the fabric and finish required for the room ceiling, floor, walls, doors, and glazing requirements
- Furniture and Fittings; lists all the fittings and furniture typically located in the room; Furniture and Fittings are identified with a group number indicating who is responsible for providing the item according to a widely accepted description as follows:

Group	Description
1	Provided and installed by the builder
2	Provided by the Client and installed by the builder
3	Provided and installed by the Client

- Fixtures and Equipment; includes all the serviced equipment typically located in the room along with the services required such as power, data and hydraulics; Fixtures and Equipment are also identified with a group number as above indicating who is responsible for provision
- Building Services; indicates the requirement for communications, power, Heating, Ventilation and Air conditioning (HVAC), medical gases, nurse/ emergency call and lighting along with quantities and types where appropriate. Provision of all services items listed is mandatory

The Room Layout Sheets (RLS's) are indicative plan layouts and elevations illustrating an example of good design. The RLS indicated are deemed to satisfy these Guidelines. Alternative layouts and innovative planning shall be deemed to comply with these Guidelines provided that the following criteria are met:

- Compliance with the text of these Guidelines
- Minimum floor areas as shown in the schedule of accommodation
- Clearances and accessibility around various objects shown or implied
- Inclusion of all mandatory items identified in the RDS

The Engineering & Maintenance Unit contains Standard Components to comply with details in the Standard Components described in these Guidelines. Refer to Standard Components Room Data Sheets and Room Layout Sheets.



## 1.5 Schedule of Accommodation

The Schedule of Accommodation (SOA) provided below represents generic requirements for this Unit. It identifies the rooms required along with the room quantities and the recommended room areas. The sum of the room areas is shown as the Sub Total as the Net Area. The Total area is the Sub Total plus the circulation percentage. The circulation percentage represents the minimum recommended target area for corridors within the Unit in an efficient and appropriate design.

Within the SOA, room sizes are indicated for typical units and are organised into the functional zones. Not all rooms identified are mandatory therefore, optional rooms are indicated in the Remarks. These guidelines do not dictate the size of the facilities, therefore, the SOA provided represents a limited sample based on assumed unit sizes. The actual size of the facilities is determined by Service Planning or Feasibility Studies. Quantities of rooms need to be proportionally adjusted to suit the desired unit size and service needs.

The Schedule of Accommodation are developed for particular levels of services known as Role Delineation Level (RDL) and numbered from 1 to 6. Refer to the full **Role Delineation Framework (Part A - Appendix 6)** in these guidelines for a full description of RDL's.

The table below shows a SOA for role delineation RDL 3 to 6.

Any proposed deviations from the mandatory requirements, justified by innovative and alternative operational models may be proposed and record in the **Non-Compliance Report** (refer to **Part A - Appendix 4**) with any departure from the Guidelines for consideration by the DOH for approval.

### 1.5.1 Engineering and Maintenance Unit

ROOM/ SPACE	Standard Component Room Codes				RDL 3 Qty x m <sup>2</sup>	RDL 4 Qty x m <sup>2</sup>	RDL 5-6 Qty x m <sup>2</sup>	Remarks
<b>Workshop/ Storage Areas</b>								
Store - Plans/ File	stgn-14-d similar				1 x 10	1 x 12	1 x 14	Fire-proof Optional; with suitable drawers, cabinets
Store - Flammable Liquid	stfl-d				1 x 9	1 x 9	1 x 9	In a flammable cabinet
Workshop - Biomedical	ws-bm-d similar				1 x 20	1 x 20	1 x 30	
Calibration/ Testing Shop	cal-test-30-d similar				1 x 20	1 x 20	1 x 30	Optional
Workshop/ Store - Gardener	wss-gar-d similar				1 x 12	1 x 12	1 x 20	
Store – Paint	stfl-d similar					1 x 5	1 x 5	Store flammable liquids in appropriate cabinets (Optional)
Workshop – Paint	wss-pt-15-d similar					1 x 10	1 x 15	
Workshop - Carpentry	wk-gm-d similar				1 x 20	1 x 30	1 x 50	
Workshop - Mechanical	wk-gm-d similar				1 x 20	1 x 30	1 x 40	
Workshop - Plumbing	wk-gm-d similar				1 x 20	1 x 30	1 x 40	
Workshop – Electronic	elab-d similar				1 x 10	1 x 15	1 x 20	

ROOM/ SPACE	Standard Component Room Codes				RDL 3 Qty x m <sup>2</sup>	RDL 4 Qty x m <sup>2</sup>	RDL 5-6 Qty x m <sup>2</sup>	Remarks
Store – Medical Gas	stfl-d similar				1 x 15	1 x 15	1 x 15	
Welding Booth	wlb-d				1 x 10	1 x 10	1 x 10	Optional
Store - Engineering	stgn-20-d similar						1 x 15	Spare Parts
Store - Central Stock	stgn-20-d similar				1 x 20	1 x 30	1 x 50	Optional
<b>Office Areas</b>								
Office - Single Person	off-s9-d off-s12-d similar				1 x 9	1 x 12	1 x 12	If Engineer on staff; Qty according to Operation Policy
Meeting Room - Medium/ Large	meet-9-d meet-l-15-d				1 x 9	1 x 15	1 x 15	Optional
Reception/ Clerical	recl-10-d similar				1 x 8	1 x 8	1 x 10	
Waiting	wait-10-d				1 x 10	1 x 10	1 x 10	
<b>Shared Areas</b>								
Bay - Cleaning	bcl-1.5-d				1 x 1.5	1 x 1.5	1 x 1.5	
Staff Room	srm-15-d				1 x 15	1 x 15	1 x 15	Can be shared
Cleaners Room	clrm-6-d				1 x 6	1 x 6	1 x 6	
Staff Change Room	chst-12-d				2 x 12	2 x 12	2 x 12	Including lockers and shower
<b>Sub Total</b>					<b>268.5</b>	<b>339.5</b>	<b>456.5</b>	
<b>Circulation %</b>					<b>15</b>	<b>15</b>	<b>15</b>	
<b>Area Total</b>					<b>308.8</b>	<b>390.4</b>	<b>525</b>	

Please note the following:

- Areas noted in Schedules of Accommodation take precedence over all other areas noted in the Standard Components
- Rooms indicated in the schedule reflect the typical arrangement according to the sample RDL
- All the areas shown in the SOA follow the No-Gap system described elsewhere in these Guidelines
- Exact requirements for room quantities and sizes shall reflect Key Planning Units (KPU) identified in the Clinical Service Plan and the Operational Policies of the Unit
- Room sizes indicated should be viewed as a minimum requirement; variations are acceptable to reflect the needs of individual Unit
- Offices are to be provided according to the number of approved full-time positions within the Unit

## 1.6 Further Reading

In addition to Sections referenced in this FPU, i.e. **Part C- Access, Mobility, OH&S, Part D - Infection Prevention and Control**, and **Part E - Engineering Services, Part G-Acoustics** readers may find the following helpful:

- The Building Regulation & Facilities for the Disabled United Arab Emirates Code  
<https://www.moid.gov.ae/EPublications/The%20Building%20Regulation%20Facilities%20For%20the%20Disabled-en.pdf>
- International Health Facility Guideline (iHFG) [www.healthdesign.com.au/ihfg](http://www.healthdesign.com.au/ihfg)
- Ministry of Health UAE, Unified Healthcare Professional Qualification Requirements, 2017, refer to website: <https://www.haad.ae/haad/tabid/927/Default.aspx>
- The Facility Guidelines Institute (US), Guidelines for Design and Construction of Hospitals, 2018. Refer to website: [www.fgiguilines.org](http://www.fgiguilines.org)
- The Facility Guidelines Institute (US), Guidelines for Design and Construction of Outpatient Facilities, 2018. Refer to website: [www.fgiguilines.org](http://www.fgiguilines.org)