PHYSICAL PLANNING

Planning

603704 705 .1.00 Planning of healthcare facilities requires an understanding of the appropriate relationships between the various service areas as well as an understanding of site constraints, and the need for conformity with a range of codes and guidelines.

A thorough assessment of the service planning requirements for the proposed project should be made prior to commencing capital planning.

Comply with the relevant legislation, regulations, codes and policies for each jurisdiction.

603705 705 .2.00 Good planning relationships can:

- increase the efficiency of operation
- promote good practice and safe health care delivery
- reduce risk to staff and patients
- minimise recurrent costs
- improve privacy, dignity and comfort
- minimise travel distances
- support a variety of good operational policy models
- allow for growth and change over time
- maximise accessibility, safety, security, OHS and infection control
- incorporate environmentally sustainable design (ESD) principles and policy.

Planning Models

603706 705 .3.00 The design of healthcare facilities has evolved around a number of workable planning models. These can be seen as templates, prototypes or patterns for the design of new facilities. Typically each model will best suit a certain facility size and site condition.

None of these models overrides the need for compliance with Commonwealth State and Territory legislation and Departmental policy guidelines as applicable.

603707 705 .4.00 It is essential that the planning team defines a clear model of operation for the facility. This should be readily described in a simple and clear flow diagram. Planning teams are encouraged to seek planning relationships that can satisfy more than one operational model rather than satisfy limited, unusual or temporary operational policies.

603708 705 .5.00 Appropriate staff consultation should occur at all stages of the planning process as required by the relevant State and Territory legislation particularly where this covers the subject of employee's contribution in decision making that may affect their health, safety and welfare at work. For each AHIA jurisdiction see References and Further Reading.

603709 705 .6.00 Requirements for proximity to other components or for independent access to a unit will govern the planning relationships for each facility. The need for future expansion or change of function should also be reasonably anticipated in all designs.

603710 705 .7.00 The following general planning models and design notes are used to promote good planning, efficiency and flexibility for the design of healthcare facilities.

Planning Principles

603711 705 .8.00 FLEXIBLE DESIGN

In healthcare, operational policies change frequently. The average cycle may be as little as five years. This may be the result of management change, government policy, and turnover of key staff or change in the market place. By contrast, major healthcare facilities are typically designed for 30 years, but may remain in use for more than 50 years.

If a major hospital is designed very tightly around the operational policies of the day, or the opinion of a few individuals, who may leave at any time, then a significant investment may be at risk of early obsolescence.

Flexible design refers to planning models that can not only adequately respond to contemporary operational policies but also have the inherent flexibility to adapt to a range of alternative, proven and forward looking policies.

Further, flexible design should address future trends and changes in patient profiles, e.g. cultural background and the increase in the number of bariatric patients.

At the macro level, many of the commonly adopted planning models have proved flexible in dealing with multiple operational policies.

At the micro level, designers should consider simple, well proportioned, rectangular rooms with good access to simple circulation networks. Interior features should not be achieved by creating unnecessary complexity.

603712 705 .9.00 ROOMS SHARED BETWEEN UNITS

This concept refers to models that allow for changes in operating mode as a function of management rather than physical building change. For example, two inpatient units can be designed back to back so that a range of rooms can be shared. The shared section may be capable of isolation from one or the other Inpatient Unit by a set of doors. This type of sharing is commonly referred to as ‘swing beds’. It represents a change to the size of one Inpatient Unit without any need to expand the unit or make any physical changes. This is also an example of flexible design.

Designers should consider issues such as compatibility of use, access to treatment rooms, utility rooms, storage, etc and the supervision of patients when using swing beds or rooms, and in particular, the ability to switch nurse call systems to the new Staff Station.

The same concept can be applied to a range of Health Planning Units (HPU) to achieve greater flexibility for the management of these units.

603713 705 .10.00 OVERFLOW DESIGN

Some functions can be designed to serve as overflow for other areas that are subject to fluctuating demand. For example:

- waiting areas for different services can be collocated
- procedure rooms can be equipped to provide capacity for emergency

operating needs
- day and ambulatory care areas can be adapted for overnight use in emergencies such as those relating to natural disasters.

603714 705 .11.00 STAGED USAGE

Healthcare facilities of all sizes may be subject to fluctuating demand. It is desirable to implement a staged usage policy to close off certain sections when they are not in use. This allows for savings in energy, maintenance and staff costs. It also concentrates the staff around patients and improves communication. In designing for staged usage or progressive shutdown ensure that:

- none of the requirements of these guidelines is compromised in the sections that remain open
- the open sections comply with other statutory requirements such as fire egress
- the open patient care sections maintain the level of observation required by these guidelines
- two clinical areas are not separated by an area such as Administration with shorter opening times thus creating a potential security risk (isolation), and that the Medical Records Unit (24/7) is similarly not isolated from clinical areas
- in the closed sections, lights and air conditioning can be turned off independently of other areas
- the closed sections are not required as a thoroughfare for access to other functions
- nurse call and other communication systems can adapt appropriately to the shutdown mode
- the shutdown strategy allows access to items requiring routine maintenance
- a section can be isolated to facilitate the management of an outbreak of infectious diseases.

603715 705 .12.00 ZONING FOR HOURS OF OPERATION

The design should collocate units with similar operating hours where appropriate, to allow easy shutdown of larger floor areas or even whole floors after hours. This can bring significant benefits in operating costs, particularly in the areas of light and power, airconditioning and security.

603716 705 .12.50 ZONING - SECURITY

Create and maintain safe transit routes through the facility and ensure that it is not necessary for staff to traverse closed areas after hours.

Planning teams should take particular care to avoid the isolation of staff after hours. This can occur if 24 hr zones are located within, or between, eight hour zones e.g. clinical areas operating 24 hrs are separated by an administration unit that operates for eight hours each week day.

Note: ensure that medical records sections (often 24 hrs) are not isolated from clinical areas.

603717 705 .13.00 OPEN ENDED PLANNING

A healthcare facility designed within a finite shape, where various departments and functions are located with correct internal relationships may look and function very well at first. However, any expansion will be difficult. Some expansion requirements can be accommodated in new external buildings with covered links. But over time the site will become complicated with random buildings and long walkways.

The opposite of this scenario is to use planning models and architectural shapes that have the capability to grow, change and develop additional wings - horizontally or vertically - in a controlled way.

The configuration of the circulation system, both vertical and horizontal, on which all functions depend, is critical to the success of Open Ended Planning. Some of the concepts involved in Open Ended Planning policies include the following:

- major corridors located so that they can be extended outside the building
- as far as possible, Health Planning Units (HPU) to have one side exposed to the outside to permit possible expansion
- where the internal location of a critical care HPU 'hard' area is unavoidable, it should be adjacent to other 'soft' areas that can be relocated, such as large stores or administration areas
- avoid HPU that are totally land-locked between corridors
- external shapes should not be finite
- external shapes should be capable of expansion
- finite shapes may be reserved for one-off feature elements such as Main Entrance Foyer
- roof design should consider expansion in a variety of directions
- stairs should not be designed to block the end of major corridors
- the overall facility flow diagram should be capable of linear or radial expansion whilst keeping all the desirable relationships intact
- fixed internal services such as plant rooms, risers, service cupboards should be placed along major corridors rather than in the centre of HPU.

Note: Open Ended Planning policies can be applied to entire facilities as well as an individual HPU.

603718 705 .14.00 MODULAR DESIGN

This is the concept of designing a facility by combining well designed standard components. For example a designer may create a range of patient bedrooms, a range of utility rooms and other common rooms that are based on a regular grid such as 300 or 600mm. These rooms can then be combined to create larger units such as an inpatient unit. The inpatient unit can then be used as a module and repeated a number of times as required.

This approach has many benefits. Modules can be designed only once to work very well. No redesign is necessary to adjust to different planning configurations. Instead the plan is assembled to adapt to the modules. Errors in both design and construction can therefore be minimised.

Modular design should not necessarily be seen as a limitation to the designer's creativity but a tool to achieve better results. Designers are encouraged to consult with clients and user groups to agree on ideal modules and then adopt them across all HPU.

In practice, especially in refurbished facilities, it is common for the ideal module to be adjusted to suit the particular circumstances.

Determination of materials and dimensional coordination that may reduce construction material waste may offer cost efficiencies.

603719 705 .15.00 SINGLE HANDING

On plan the option exists to use single (same) handed or mirror-image (mirror-reverse, handed) layouts for identical rooms and room modules such as suites. Typical examples include operating rooms and patient bedrooms with ensuite.

Single handing refers to situations where the room plan is repeated, the term is also used for the layout of furniture and fittings e.g. medical services panels.

Mirror-image, (mirror-reverse, handed) as the name implies refers to a reversal of (inverting) the image on one axis.

By standardising rooms, single handing may provide benefits such as enhanced patient safety, a reduced rate of errors, and more intuitive use by staff and patients

In areas requiring a high level of staff training, such as in the Operating Unit, it may be more appropriate to hand all key rooms in identical manner. This makes the task of staff training easier.

For example, a staff member entering any operating room, regardless of its location and approach from corridor, will find the service panel on the left, x-ray viewer on the right, etc.

At a micro level, medical gases may always be located to the left side of patient's bedhead regardless of the direction of approach. A similar situation may apply to the layout of consult/exam rooms to allow for right-handed examination of a patient.

It has been common practice in healthcare to use back to back room in pairs or module combinations. This use of mirror image planning can provide cost and planning efficiencies e.g. sharing of plumbing services and circulation spaces.

The issue of sound transmission from one room to another e.g. back to back patient bedrooms is usually attributed to common service penetrations or back to back recessed service panels and can be simply prevented with careful design and adequate construction methods or layout offsets.

Planning teams should consider and evaluate the benefits of single handing and mirror image design options on a case by case basis.

Planning Policies

603720 705 .16.00 STANDARDISED DESIGN

This concept is similar to modular design. Standardised design refers to modules, or standard components, designed to perform multiple functions by management choice.

For example, a typical patient single bedroom can be designed to suit a variety of disciplines including medical / surgical / maternity and orthopaedics. Such a room can be standardised across all compatible inpatient units. This will permit a change of use between departments should the need arise.

Standardised design takes into account and allows for all requirements of compatible uses. The opposite of this policy is to specialise the design of each component to the point of inflexibility. The aim of this approach is to resist unnecessary variation between similar components, and to accommodate changes in functionality with one standard design.

Other examples of standardised design are:

- standardised operating rooms which suit a range of operations
- bed cubicles in Day Surgery which suit both preoperative and postoperative care
- offices that are standardised into only a limited number of types for

example 9m2 and 12m2.
- toilets that may all be designed for accessibility (access for people with disabilities), bariatric or unisex.

Note: In previous editions of Part C the term 'universal design' was used for the principles covered by this sub-section. The term 'standardised design' has been substituted since 'universal design' has been adopted in many countries to represent 'accessible design' and the use of the term in this way is now widespread.

Efficiency Guidelines

603721 705 .17.00 GENERAL

The concept of efficiency refers to the ratio between net functional area and circulation space. Over simplistic guidelines for efficiency will be misleading and not appropriate for different functional briefs.

Different circulation percentages should be provided for different generic types of planning units. Such a guide has been provided under the Schedule of Circulation Areas in this section.

Inadequate intra-unit circulation and travel allowances in briefing documents are not recommended as these can lead to undue pressure on designers to reduce sizes and therefore functionality. It should be noted that the circulation percentages are a guide only and apply to the HPU included in these guidelines under Generic Schedules of Accommodation.

Refer to Area Measurement Methodology in Appendix B.

603722 705 .18.00 NET FUNCTIONAL AREAS

In briefing documents, net functional areas represent the sum of individual room areas exclusive of any corridors.

If areas are measured off the plans, then the following measurement method will apply:

- external wall thickness is excluded
- internal wall thicknesses and columns are included
- wall thickness is divided equally between adjoining rooms
- corridor walls are allocated to adjoining rooms
- passing service risers and service cupboard are excluded.

603723 705 .19.00 GROSS DEPARTMENTAL AREAS

Gross Floor Area (GFA) on a departmental basis is calculated by adding the net functional areas and intra-departmental corridors. These are corridors that are entirely within one department (HPU).

In calculating the departmental corridors the following should be taken into account:

- columns are included
- service cupboards and passing risers are excluded
- corridor wall thicknesses are excluded as these are included in room areas
- fire stairs are excluded
- lifts and lift shafts are excluded.

603724 705 .20.00 TRAVEL

Travel represents arterial corridors that connect HPUs. Travel is required to allow passage from one HPU to another without going through the internal corridors of another unit. A target of 10-12.5% is appropriate for travel in a hospital of one to three storeys.

In calculating travel, the following should be considered:

- fire stairs are included once for each floor to floor connection
- external wall thicknesses are included
- lift shafts are excluded
- service cupboards are excluded
- wall thicknesses are excluded as these are part of the Departmental GFA.

603725 705 .21.00 ENGINEERING

Engineering refers to the area of plant rooms and other service areas. In calculating the engineering allowance the following areas should be included:

- service cupboards
- lift motor rooms
- service shafts and risers.

Lift shafts should be excluded.

The target of 10-12.5% applied to Gross Departmental Areas may be used for a typical one to three storey hospital building.

603726 705 .22.00 DEPARTMENT SIZES

The actual size for a department will depend upon its role as set out in the Service Plan and supporting Operational Policies and the organisation of services within the hospital. Some functions may be combined or shared provided that the layout does not compromise safety standards and medical and nursing practices.

If a function is to be combined or shared, the size will need to be adjusted to meet the combined needs of staff/units.

Note: Departmental sizes also depend on design efficiency. For guidelines on this subject refer to Schedule of Circulation Areas in this section.

603727 705 .23.00 ROOM SIZES

Room sizes may require adjustment in response to current or predicted usage and for Furniture, Fittings and Equipment requirements. The size of equipment for example, may change over time or for use, and this will need to be considered in determining room sizes for specific purposes e.g. bariatric equipment.

Ensure that consideration is given to the need to provide services to bariatric patients.

The recommended room / space areas given in the AusHFG represent a nominal area and not the actual or clear room area measured between finished wall surfaces. This nominal area is based on the principle of measurement from the centre lines of walls - in this case a wall thickness of 100mm. The convention of using a nominal area acknowledges that the actual area is proportionally less.

Refer to Appendices - Area Measurement Methodology Diagrams for examples.

From the user's perspective a nominal 9m2 Office (100mm thick walls) translates to an actual floor area of approximately 8.4m2, i.e. for every 1m of wall length, 0.05m2 of area should be deducted. Note: room shape will make no appreciable difference, but area reduction decreases proportionally as room size increases.

For wall thicknesses of 120mm and over, the actual room area should be increased to maintain the area which would have been produced if standard 100mm walls had been used. For example, a 9m2 room with 150mm walls will result in an actual area of 8.1m2 (difference of 0.3m2), this should be added back, to give an adjusted nominal area of 9.3m2.

Wall thicknesses are determined by function and construction, e.g. acoustic, recessed service panels, fire or smoke construction, masonry or hollow partition, or a combination of any of these. In some cases an estimate of wall thicknesses can be made using evidentially based information, known user requirements and/or standard rooms. In other cases wall thicknesses may be difficult to determine accurately until the detailed planning stage. An adjustment to compensate for wall thicknesses over 100mm should be made appropriate to the planning stage and information available.

The use of nominal areas and the measurement method set out above should be clearly communicated to user groups in the early stages of a project. Design decisions made with a clear understanding of this principle will assist in managing risk.

603728 705 .24.00 SCHEDULE OF CIRCULATION AREAS

The following Circulation Areas are recommended as a starting point for briefing typical Health Planning Units (HPU). Clearly circulation percentages will vary as a result of the configuration of the unit, including the use of a racetrack arrangement or double loaded corridors.

The figures given are a guide only and the Schedules of Accommodation provided within each HPU should be consulted for more detailed and accurate allowances. The actual spatial allocation will depend on the role delineation of the service, the re-use of existing buildings and the skill of the individual designer.

The provision of appropriate areas for circulation requirements will be tested during the preliminary design phases. Both under and over provision of circulation space should be avoided.

HPU	CIRC'N - %	PROPOSED %					REMARKS
ADMINISTRATION	20						Depending on size of Unit
REHABILITATION / ALLIED HEALTH	25						
AMBULATORY CARE	32						
BIOMEDICAL ENGINEERING	20						
CATERING UNIT	25						
CHAPEL	10						
CHILD CARE	20						

CLEANING / HOUSEKEEPING	10						
CLINICAL INFORMATION	15						
CORONARY CARE	35						as a component of Cardiac Services Unit
DAY ONCOLOGY	30	35					as a component of Cancer Centre
DAY SURGERY / PROCEDURES UNIT	35						
ORAL HEALTH UNIT	20						
EDUCATION & TRAINING	15						
EMERGENCY UNIT	40						
ENDOSCOPY UNIT (REFER DPU ABOVE)	35						
ENGINEERING & MAINTENANCE	15						
INPATIENT UNITS	32						
INTENSIVE CARE	40						
LAUNDRY	10						
LINEN SERVICE	10						
LONG TERM CARE (NOT PART OF HFG)	32						
MEDICAL IMAGING	35						
MORTUARY	20						
NEONATAL ICU / SCC							
NUCLEAR MEDICINE / PET	30						
MATERNITY UNIT	35						
OPERATING UNIT	35-40						
OUTPATIENT UNIT	20						BCA Class 5
OUTPATIENT UNIT	25						BCA Class 9A
PAEDIATRIC / ADOLESCENT	32						
PATHOLOGY	25						
PHARMACY	25						
MENTAL HEALTH UNIT-ADULT ACUTE	32						
MHU-CHILD & ADOLESCENT							
MHU-AMBULATORY CARE							
PECC							
PUBLIC AMENITIES	10						

RADIATION THERAPY	32						
REHABILITATION INPATIENT	40						
RENAL DIALYSIS	32						
STAFF ACCOMMODATION	10						
STAFF AMENITIES	10						
STERILE SUPPLY SERVICES	20						
SUPPLY UNIT	10						
WASTE MANAGEMENT UNIT	20						

603729 705 .25.00 SCHEDULE OF ALLOWANCES FOR TRAVEL AND ENGINEERING

Refer to: NSW Health Standard Facility Cost Planning Guidelines (NSW Health 2004b).

The allowance for travel and engineering should be determined in conjunction with the planning team to take account of the requirements of the specific project.

Where no other information is available the allowance for combined travel and engineering should generally be as follows:

TRAVEL & ENGINEERING		AREA %					
ONE STOREY		20					
TWO STOREY		23					
THREE STOREY		25					
FOUR STOREY		28					

References and Further Reading

603730 705 .95.00 GENERAL

This Section should be read in conjunction with current versions of the following documents or web references. The list is not inclusive and additional references are provided within the text.

References for OHS, etc, that may impact on the subject of this Section are provided in the appropriate sections that follow.

AUSTRALASIAN

Australian Institute of Quantity Surveyors 1990, Australian Standard Method of Measurement of Building Works 5th Edition.

INDIVIDUAL JURISDICTIONS

NSW

NSW Health 2004a, Policy Directive 2005_060: Facility Planning Manual (The Process of), NSW Health.

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Victorian Office of Building 1996, Assessing the Condition of Constructed Assets: An Asset Management Guideline for the Victorian Public Sector, Office of Building Victoria.

FURTHER READING

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