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INTRODUCTION AND GENERAL REQUIREMENTS

		Introduction
600110	1.1.00	Part E is written specifically as a guideline and not as a performance or outline specification. It precedes the 'Technical Brief' which directly references regulations and standards, and provides performance benchmarks for use by the Design Team in preparation of the Developed Design and Tender Documentation. Currently, Technical Briefs and Guidelines exist for some States (e.g. NSW, Victoria and WA). [Refer to References and Further Reading].
600100	1.1.05	Engineering services account for a significant part of the capital cost of Health Facility construction and for this reason require equal attention in terms of whole of life costs, energy efficiency and sustainability.
600101	1.1.10	Large buildings require complex engineering systems involving a project team of experts. To achieve an integrated building solution and an optimum project delivery process, members of the team need to have a general understanding of the areas of concern specific to each discipline. The increasing specialisation in Project procurement, combined with the introduction of new legislation and developments in risk management has added to the number of consultants in the team; making coordination and communication across design disciplines all the more necessary.
600102	1.1.20	The preliminary briefing and design stage is one of the most important in the design process; the spatial and building design requirements for each engineering service need to be fully understood by Architects in particular, and by other members of the team to achieve the best outcome and avoid costly redesign.

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- 600103 1.1.30 This section of the guidelines addresses the provision of engineering services in Health Facilities as defined in HFG Part A. - Subsection 30: How to read - The Structure of these Guidelines, and lists the range of engineering services applicable to Health Facilities and the specific functions and issues relating to their provision.
- 600104 1.1.40 The information provided is intended to be used by the design team in the preliminary stages of the project and is presented as subjects for consideration; which in turn can be used as a checklist to generate the brief. It is for individual members of the team to select and develop the information relevant to their discipline.
- 600105 1.1.50 The early design process addresses the selection of appropriate engineering services systems, spatial requirements and the modification or reduction of particular services by a review of the climatic or building design options.
- 600106 1.1.60 The procurement of capital infrastructure and the project delivery process for Health Facilities are covered by policy in most jurisdictions. Reference should be made to deliverables and reporting required at each stage of the project delivery process.
- Reporting will generally identify elemental costs and life cycle costing - enabling comparison and assessment; it will also identify any additional costs caused to services by the building design.
- Economical whole-of-life cost options should be implemented in preference to low capital/initial cost options. It should be noted however that 'Whole of Life' cost studies are part of a larger decision making process.
- 600107 1.1.70 Part E is to be used in conjunction with the other parts of the Australasian Health Facility Guidelines for the design and operation of Health Facilities. Refer to:
- Part A for all general information relating to use and aims of this guideline, and for facilities covered, glossary, references, regulations and accreditation.
- Part B for Hospital Planning Unit (HPU) specific requirements.
- Part C for general OHS and security issues.
- Part D for infection control issues.
- Part F for Furniture, Fittings and Equipment, and Operational Commissioning
- The topics covered in Part A are not repeated or expanded in Part E except where considered necessary.

Objectives

- 600108 1.2.00 Part E has the following overall objectives:
- flexibility and innovation in design;
 - improvements in the delivery of engineering services and sustainable outcomes by addressing advances in technology;
 - cost efficiency;
 - integration of relevant design disciplines;
 - principles of quality management.

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- 600109 1.2.10 The specific objective is to assist members of the design team in the preparation of the design brief and documentation for engineering services by covering the subjects that most frequently occur at this stage of the Health Facility design process.
- 600111 1.2.30 The engineering services disciplines are listed in alphabetical order, to avoid conflict with existing construction classification systems which vary between countries, agencies and consultancies.
- 600112 1.2.40 Structural and Civil engineering sections are omitted on the basis that the design issues are fully covered by regulation, standards and published specifications. Facility management, operation and maintenance, and traffic management are omitted except where these might influence the provision of Engineering Services.
- Regulations and standards do not necessarily draw attention to all site and structural risks that apply to hospitals; these should be identified for each project and allowed for in the facility risk management plan (see 1.5.00).
- 600113 1.2.50 The minimum requirements for the provision of all services installations in HealthCare Facilities will be covered by the Technical Brief. Australian Standards may apply in addition to the minimum requirements in Part E, and these will be governed by the type of facility and engineering services proposed.
Some of the information in the following sections may be additional to any statutory requirements.
- 600114 1.2.60 It is assumed that accepted engineering practice, relevant codes and statutory regulations will be observed as part of normal professional services, and that these aspects require no specific reference.

General

- 600115 1.3.00 The design and layout of engineering services should ensure that they are located to avoid compromising possible developments, either that are currently proposed or in the future.
- 600116 1.3.10 For alterations and additions to part of a medical service, all the supporting services appropriate to the required function should be included. The integrity, quality and reliability of site services should be maintained during and after the work. Planning should consider the sustainability and future life costs of the whole facility and not just the alteration or addition.
- 600117 1.3.20 Healthcare procedure-specific equipment is normally excluded from the engineering services and scheduled separately. However engineering services should be provided for the equipment briefed and consideration should be given for the inclusion of an approved margin for growth and change.
- 600118 1.3.30 Access points should be located outside patient areas and circulation areas

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to prevent disturbance to occupant and traffic. Controls should be tamperproof.
Each type of service should be easily identifiable, and designed for minimal dust/contamination collection and easy cleaning.

- 600119 1.3.40 Engineering services should be designed for safe usage, and for ease and economy of maintenance. Maintenance should cause minimal disruption to healthcare procedures and minimal disturbance to patients.

The building and services should be designed to allow for maintenance and replacements to be undertaken with the minimum interference to the building fabric.

- 600120 1.3.50 Services design and equipment selection should address the need to minimise maintenance in locations where technical resources may be scarce and should be coordinated with the existing protocols or requirements of 'local' Area Health Services.

Consideration should also be given to the issue of remote monitoring and control of building services.

- 600350 1.3.60 For existing sites undergoing redevelopment a current services profile should be done. Eg. Electrical, water and sewer infrastructure should be known and the impact of an increase in load evaluated.

Environment

- 600121 1.4.00 Engineering services in health care facilities should satisfy the relevant requirements for general comfort, healthcare procedures and patient care, within acceptable noise levels. The operation, monitoring and control of services should be designed for the specific patient and healthcare procedure needs of the area serviced.

- 600122 1.4.10 General acoustic requirements and acceptable noise levels must comply with AS 2107 recommendations. Vibration in occupied spaces must comply with AS 2670.1 and be prevented by design, selection, installation and operation of equipment or systems.

- 600123 1.4.20 All equipment should be selected for the required use and for the environmental conditions in the intended location.

- 600351 1.4.30 Sites should be investigated to determine they are free from contamination.

Risk Management

- 600124 1.5.00 Part E does not attempt to cover all engineering options or define the requirements of a risk management system for engineering services. These systems should be developed during the design phase of the project to the relevant standards (e.g. AS 4360), statutory regulations and duty of care.

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Operating policies for engineering services for each stage of the project should be included.

- 600125 1.5.10 Engineering services should not cause any unacceptable hazard resulting from loss of operation. The particular risks involved with patients and healthcare procedures need to be considered. Where loss of service could cause an unacceptable risk, including post disaster function, services must be designed to operate reliably and meet statutory and critical demand requirements as covered by the Technical Brief.
- 600126 1.5.20 Engineering services must be protected from unauthorised interference, or from conditions that will affect operation or damage the service, assets or persons. Protection should be provided with specific alarms, controls, warning devices or security devices; underground and all other services should be clearly identified and protected where required.
- 600127 1.5.30 All services should be designed and installed in a manner that will minimise the opportunities for patient self-harm.
- 600128 1.5.40 Services should not contribute to any risk to the environment. [Refer Sustainability]
- 600129 1.5.50 At the completion of the works, or section of the works, testing will be required to prove the suitability and operation of the works or section of the works, and to ensure that the installation complies in full with the brief. The supply of as-built drawings and detailed Operation and Maintenance Manuals will be required at the end of a project.

Handover and commissioning procedures should provide for adequate pre-handover training for operations and maintenance personnel, especially in respect to complex control algorithms.

Commissioning should include implementation of operating and maintenance arrangements that will deliver risk mitigation and designed whole of life performance.

Design Brief

- 600130 1.6.00 Project specific issues that may be expected to be covered in the Design Brief should address:
- nomination and listing of critical and sterile areas, including unacceptable risks;
 - application of life cycle cost analysis and other financial requirements;
 - provisions for foreseeable modifications and expansion;
 - provisions for foreseeable developments in health care practice and technology;
 - minimisation of environmental impact on surrounding environment;
 - standby power generation and distribution;
 - facility specific requirements;
 - specific risks and risk management policy;
 - trade wastes;
 - service requirements for health care equipment;
 - access for vehicles and equipment for fire fighting;

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- access for vehicles and equipment, and provision of heavy lifting facilities for plant installation and removal;
- safe access for service providers;
- specific Management and Maintenance requirements;
- critical safety and performance parameters for inclusion in the maintenance regime;
- energy recovery systems were justified by life cycle cost analysis and budget constraints.

- 600352 1.6.10 For existing sites undergoing redevelopment input should be sought from the current Facility Maintenance contractor, either in-house or outsourced.

Sustainability

- 600131 1.7.00 Engineering Services should comply with all relevant Environmental Sustainability Development polices and legislation. Sustainability must be included as a part of risk and cost management strategies.
- 600132 1.7.10 The total impact of energy saving strategies should be considered in the evaluation of options, including new or innovative renewable energy technology.
- 600133 1.7.20 Cost analysis should be prepared at the project level, whole of life costs considered for all project components, and options assessed in accordance with the relevant policies and standards.
[Refer to AS 3595 Energy Management programs - Guidelines for financial evaluation of a project].
- 600134 1.7.30 Sustainability targets should be set for the project - to be reviewed and monitored throughout the project. A long term maintenance strategy should be provided for all plant and equipment.
- 600135 1.7.40 An energy and environment management plan (EMP) including environmental performance benchmarks and targets should be prepared. Design and financial criteria for EMP should be provided for major plant and reticulation systems in terms of capital and recurrent costs, payback periods and life-cycle energy costs. An energy management continual improvement process should be initiated.
[Refer to AS/NZS ISO 14000 (Set): Environmental management Standards Set].
- 600136 1.7.50 Services systems (including standby and emergency arrangements) should be low maintenance and comply with the energy efficiency requirements of the Building Code of Australia.
- 600137 1.7.60 An Asset Management and Waste Management Plan including a maintenance strategy should be prepared for all plant and equipment, and handed over immediately after commissioning to Facility Management personnel for implementation.