



Queensland Health

Capital Infrastructure Requirements

Volume 1 Overview



Capital Infrastructure Requirements - Volume 1 Overview

Published by the State of Queensland (Queensland Health), August 2020

This document is licensed under a Creative Commons Attribution 3.0 Australia licence.



To view a copy of this licence, visit creativecommons.org/licenses/by/3.0/au

© State of Queensland (Queensland Health) 2020

You are free to copy, communicate and adapt the work, as long as you attribute the State of Queensland (Queensland Health).

For more information contact:

Capital and Asset Services Branch, Corporate Service Division , Department of Health, Queensland Health, GPO Box 48, Brisbane QLD 4001,
email CAS_Correspondence@health.qld.gov.au.

An electronic version of this document is available at
<https://www.health.qld.gov.au/system-governance/policies-standards/doh-policy>

Queensland Health disclaimer

Queensland Health has made every effort to ensure the Queensland Health Capital Infrastructure Requirements (CIR) are accurate. However, the CIR are provided solely on the basis that readers will be responsible for making their own assessment of the matters discussed. Queensland Health does not accept liability for the information or advice provided in this publication or incorporated into the CIR by reference or for loss or damages, monetary or otherwise, incurred as a result of reliance upon the material contained in the CIR.

The inclusion in the CIR of information and material provided by third parties does not necessarily constitute an endorsement by Queensland Health of any third party or its products and services.

Version	Author	Version Description	Released Date	Approved for Release by
1.0	Health Planning and Infrastructure Division, Queensland Health	First public release	28 May 2012	DDG, Health Planning & Infrastructure Division
1.1	Health Infrastructure Branch	Name changed from Capital Infrastructure Minimum Requirements to CIR Approved	5 April 2013	DDG, System Support Services
2.0	Health Infrastructure Branch	Second public release. Updated information regarding Legionella, infection control and other minor edits.	3 September 2014	DDG, Office of the Director-General
3.0	Capital and Asset Services Branch	Updated to align with the new water risk management provisions under the Public Health Act 2005 (February 2017)	7 August 2017	DDG, Corporate Services Division
4.0	Capital and Asset Services Branch	Incorporation of BIM, updated references, refreshed layout, compliance statement and checklist process reviewed.	22 October 2020	DDG, Corporate Services Division

Contents

1	Introduction	1
1.1	Release notes	1
1.2	Disclaimer regarding compliance	2
1.3	Use of other guidelines and policies	2
2	Objectives	2
2.1	Referral agency and further information	3
2.2	Associated requirements	3
2.3	Scope for application	4
2.4	Facilities covered	4
2.5	Facilities excluded	6
2.6	Advice on alterations to existing facilities	7
2.6.1	Scoping of works	7
2.6.2	Architecture	7
2.6.3	Engineering	7
2.7	Compliance requirements	8
2.7.1	Affected areas	8
2.7.2	Unaffected areas	8
2.7.3	Conversion	8
2.7.4	Undiminished safety	9
2.7.5	Long-range improvement	9
2.8	Maintenance	9
2.9	Work health and safety	10
2.10	Limitations constraints and opportunities	10
2.10.1	Planning process	10
2.10.2	Consultation	10
3	How to read	10
3.1	Structure of CIR	10
3.2	Levels of recommendation	12
3.3	Checklists	12
4	How to use the CIR	13
4.1	Interpretation of the CIR	13
4.1.1	Purpose of interpretation	13
4.2	Public health facilities	13
4.3	Context of the CIR	13
4.4	Strategic infrastructure assessment	15
4.5	Building performance evaluation	15
4.6	Approval-in-principle process	15
4.7	Compliance and accreditation	16
4.8	Equivalent alternatives and departures	16
5	Other building regulations	17

5.1	National Construction Code (NCC)	17
5.2	Food services regulations	17
5.3	Work health and safety	17
6	General requirements	18
6.1	Stakeholders	18
6.2	Risk management	19
6.3	Design stages and costs estimating	19
6.3.1	Design stages	19
6.3.2	Cost estimating per stages	19
6.3.3	Lifecycle costing	20
7	Selecting a building construction procurement strategy	21
8	Terms and definitions	22
9	Abbreviations and acronyms	34
9.1	Common CIR abbreviations and acronyms	34
10	References	36
10.1	Standards	36
10.2	Policies and implementation standards	43

Tables

Table 1	2020 Queensland healthcare provider facility types	4
Table 2	Queensland Health steps for functional design brief approval	16
Table 3	Queensland Health steps for architectural and engineering documents approval	16

Figures

Figure 1	CIR document suite	11
Figure 2	Infrastructure design CIR context	14

1 Introduction

The purpose of the Capital Infrastructure Requirements (CIR) is to provide a consistent and standardised approach to health capital infrastructure planning and design in Queensland Health, which directly links client requirements to the built solution and promotes the application of contemporary and evidenced-based standards.

Queensland Health consists of the Department of Health, the Queensland Ambulance Service and 16 independent Hospital and Health Services (HHSs) situated across the state.

1.1 Release notes

In May 2012, the CIR was originally published as the Capital Infrastructure Minimum Requirements. In 2013, the document was renamed with removal of the word ‘minimum’ in 2012 from the title.

A revised version in 2015 included details of the water risk management plan provisions under the *Public Health Act 2005* for water quality, including other water-related hazards in healthcare facilities (<https://www.health.qld.gov.au/public-health/industry-environment/environment-land-water/water/risk-management>).

This 2020 revised version now updates the CIR to align to the Queensland Health digital delivery requirements released in 2019, commonly referred to as Queensland Health *Building Information Modelling (BIM) guidelines*. This includes the *Project Information Requirements (PIR)* and the *Design and Construction BIM Execution Plans*. This revised version of the CIR also includes updates to codes, standards and policy references, and general document edits for readability and ease of use.

Acknowledgements

Queensland Health wishes to acknowledge other jurisdictions for valuable content made available in their respective CIR and a range of other capital infrastructure planning documents. In particular, the following references have been very helpful:

- Victorian Department of Health, Design Guidelines for Hospitals and Day Procedures Centres
- South Australian Department of Health, Schedule 18, Design Specifications, Functional Brief
- NSW Health, Scope of Services, Project Delivery Standards Part F
- NSW Health, Technical Series TS11 – Engineering Services and Sustainable Development Guidelines.

The preparation of the CIR has been made possible through the efforts of a large number of people from both the public and private sectors. Appreciation is extended to all those individuals and their respective organisations who contributed to the CIR.

1.2 Disclaimer regarding compliance

The individual parts of the CIR are not stand-alone or exhaustive as to their subject matter and must be considered in light of and within the context of the other parts of the CIR.

Nothing in the CIR implies that compliance with them will automatically result in compliance with other legislative or statutory requirements. Similarly, nothing in the CIR implies compliance with the Australian Standards (AS), the National Construction Code (NCC) or Queensland Development Code. Parts of the CIR, such as room layout sheets, necessarily show elements which may be the subject of those legislative or statutory requirements. Every effort has been made to ensure such compliance, however no guarantees are made. It is the responsibility of each user to check and ensure compliance with legislative and statutory requirements.

As the name suggests, the documents provided are requirements. Users—whether Queensland Health staff, contractors or consultants—are advised to seek expert opinion on the important issue of health facility design whilst considering the CIR. Many of the concepts covered by the CIR require a minimum level of knowledge of health facilities and health facility design. Due to the generic nature of the CIR, all the individual circumstances cannot be anticipated or covered. Furthermore, the CIR do not cover the operational policies of individual facilities.

Delivery of excellence in healthcare as well as the provision of a safe working environment will depend on appropriate operational policies. The authors of the CIR, as well as those involved in the checking or approval of the CIR, accept no responsibility for any harm or damage, monetary or otherwise caused by the use or misuse of the CIR. Every effort has been made to check the CIR 4th Edition for errors and inconsistencies.

1.3 Use of other guidelines and policies

This CIR is a consolidation of relevant material from numerous guidelines and policies available from both Australia and overseas.

There are several Queensland Health policies that impact on design and therefore need to be considered and referenced during a design project. Policy will change over time, current Queensland Health policies are available at:

<https://www.health.qld.gov.au/system-governance/policies-standards/doh-policy>.

2 Objectives

Queensland Health is focused on meeting the strategies outlined in *My health, Queensland's future: Advancing health 2026*. Five principles underpin the vision, direction and strategic agenda:

1. Sustainability—we will ensure available resources are used efficiently and effectively for current and future generations.

2. Compassion—we will apply the highest ethical standards, recognising the worth and dignity of the whole person and respecting and valuing our patients, consumers, families, carers and health workers.
3. Inclusion—we will respond to the needs of all Queenslanders and ensure that, regardless of circumstances, we deliver the most appropriate care and service with the aim of achieving better health for all.
4. Excellence—we will deliver appropriate, timely, high quality and evidence-based care, supported by innovation, research and the application of best practice to improve outcomes.
5. Empowerment—we recognise that our healthcare system is stronger when consumers are at the heart of everything we do, and they can make informed decisions.
6. Focus area ‘4.1 Smart technology and infrastructure’ and ‘4.2 Research and new ideas into practice’ are key strategies for health infrastructure. The CIR supports this strategy for Queensland Health.

2.1 Referral agency and further information

Queries regarding interpretation or for further information contact should be made through Capital and Asset Services Branch, Department of Health via email at CAS-Correspondence@health.qld.gov.au.

2.2 Associated requirements

The CIR must be read in conjunction with associated requirements from the following organisations:

eHealth

For all ehealth Queensland enquires, email eHealth-Comms@health.qld.gov.au

Communicable Diseases and Infection Management

Queensland Health
 PO Box 2368
 Fortitude Valley
 Brisbane QLD 4006 Australia

CDIM_Managers@health.qld.gov.au

National Health and Medical Research Council

Clinical Practice Guidelines, Information for Guidelines Developers, National Institute for Clinical Studies including infection control

GPO Box 1421
 Canberra ACT 2601 Australia

nhmrc@nhmrc.gov.au

<http://nhmrc.gov.au/>

2.3 Scope for application

The adoption of the Queensland Health CIR demonstrates Queensland Health's commitment to achieving infrastructure and asset strategies outlined in *My health, Queensland's future: Advancing health 2026*.

The CIR have been developed to assist in the preparation of project design briefs for all Queensland Health facility types.

CIR Volume 2 Functional design brief is applicable to all health infrastructure projects regardless of their size or complexity.

CIR Volume 3 Architecture and facility design and *Volume 4 Engineering and infrastructure* are also mandatory for all capital infrastructure projects during the planning, design and delivery stages, plus for any asset replacement and significant maintenance activities. A decision to deviate from any of the CIR project must adhere to the process outlined in Section 4.8.

The PIR document is mandatory for all capital infrastructure projects during the planning, design and delivery stages, plus for any asset replacement and significant maintenance activities.

Relevant health infrastructure projects include extensions, expansions and refurbishments of existing buildings in addition to work associated with new buildings.

All projects are required to review the checkpoints or checklists and submit a non-conformance declaration form detailing any deviations from specified requirements provided in CIR Volumes 3 and 4. The **BIM Metrics for Projects spreadsheet** must also be completed so the value of BIM on projects can be tracked and assessed.

Requests for exceptions to the CIR will be submitted through the project steering committee who will review the requirements of these documents in their entirety and will make recommendations to relevant senior officers within the project's governance framework.

Building cost and/or size are not necessarily indicators of appropriateness of applications for exclusions. A relatively small capital infrastructure works project on a medium to large facility can have a significant urban design and functionality impact. Projects must comply with the CIR in full as a default position.

The CIR do not cover private health infrastructure used only for provision of private health services.

2.4 Facilities covered

The types of facilities that the CIR are intended to cover are as follows:

Table 1 2020 Queensland healthcare provider facility types

Facility group	Facility type	Common names
Acute care hospitals	Publicly funded activity in licensed private acute hospital	hospital
	Recognised public hospital—acute other	hospital, primary health care centre, health service, outpatients clinic
	Recognised public hospital—acute outpost	primary health care centre, (health) clinic, outpatients clinic
Psychiatric hospitals	Public psychiatric hospital facility	
Residential aged care services	Public residential aged care service facility	nursing home, nursing centre, nursing care unit, residential care, aged care facility, house, home
Young disabled residential care services	Public young disabled residential care service facility	lodge or centre
Alcohol and drug treatment centres	Public alcohol and drug residential facility	
Hostels and other residential services	Public hostel for aged—state government	
	Public hostel for aged—local government	
	Public hostel (exclude for aged)—state government	
	Public hostel (exclude for aged)—local government	
	Public residential mental health service facility	community care unit
Hospices	Public hospice	
Same day facilities	Public freestanding day surgery centre	
	Public day centre/hospital	
Non-residential health services	Public community health facilities	
	Public domiciliary nursing services	
Birthing centre	Public birthing centres	
Community health facilities	Public community mental health facility	
	Public community child and youth mental health facility	
	Public child and adolescent community health	
	Public Aboriginal and Torres Strait Islander Health—community	

Facility group	Facility type	Common names
	Public alcohol and drug—community	
	Sexual health services—community	
	Oral health—community	
Community Health—program	Public community health—program level	
Health contact centre	Health contact centre	
Independent living units	Independent living unit	
Multi—purpose health services	Flexible residential care service	
Oral health services	Public fixed dental clinic—school based	
	Public fixed dental clinic—hospital based	
	Public fixed dental clinic—community based	
	Public mobile dental clinic	
Pathology laboratories	Public pathology laboratory	
Public health	Public health unit	
Public trading facilities	Public trading facility	
Transition care program	Transition care program	
Previously declared hospital	Primary Health Centre	
Organisation facilities	Hospital and Health Services	
	Department of Health	

Source: Queensland Health QHIK Data Elements - Health Care Provider Facility Type

It is intended that the CIR will apply to third party partnership agreements to ensure a consistent approach in the planning, management and approval for the use of Queensland Health real property assets (land and buildings).

2.5 Facilities excluded

The following facilities are excluded from the scope of the CIR:

- non-government aged residential care facilities
- community residential facilities
- private hospitals
- correctional centres or facilities
- medical practitioners and associated consulting rooms
- pharmacies—retail and standalone
- support residential facilities
- residential housing.

2.6 Advice on alterations to existing facilities

In many cases, facilities are already in existence when new developments or redevelopments of old buildings are planned. All capital infrastructure projects will comply with the CIR and statutory requirements.

The following advice is provided with regard to application of the CIR within existing facilities.

2.6.1 Scoping of works

All capital infrastructure planned works must have a clear plan of the scope of works prior to commencement of work. At a minimum the scoping of planned projects must include an infrastructure assessment, a risk assessment and scope of building services. A business case may be required to compare redevelopment costs to a new build.

2.6.2 Architecture

Requirements for compliance of partial redevelopments should be evaluated in consultation with Queensland Health. The point at which the percentage of redevelopment work triggers a requirement for upgrade of the entire facility to comply with current standards and the CIR, must be assessed as part of the scope of works. While the trigger point has previously been experienced up to the 50 per cent level, every project must be individually assessed based on a balance of cost, need and overall viability.

For existing Health Planning Units (HPUs) within health buildings that are being cosmetically redecorated without re-planning, compliance with the CIR is confined to those applying to surfaces and finishes being altered.

2.6.3 Engineering

The CIR apply to the engineering services of all new health facility types covered. Refurbishment or upgrading of existing health facility engineering services such as heating, ventilation and air conditioning services, hydraulic services, medical gas services, electrical and communication services, will require compliance with the CIR in the same manner but independently of the building works.

Engineering services within existing HPUs being refurbished will require full compliance with the CIR for the entire HPU as determined by the project scope of works. All refurbishment work within the previous three years will be counted as part of the building services project assessment of works required.

If compliance with the CIR is required due to any building work, change of use or services upgrade, then compliance with all engineering requirements is also required. For example, if the air-conditioning system for 70 per cent of an existing operating unit is being refurbished, then the entire air-conditioning system for the unit should comply with the CIR.

Any alterations or extensions that require a change to the water supply system will require assessment of possible impacts on water quality of the existing system, including other water-related hazards, and must meet the requirements of the water risk management plan provisions under the *Public Health Act 2005* (<https://www.health.qld.gov.au/public-health/industry-environment/environment-land-water/water/risk-management>).

2.7 Compliance requirements

Queensland Health facilities and supporting engineering services shall be designed and installed in accordance with the NCC Volume 1 Building Code of Australia (BCA) as 'deemed to satisfy' as a preferred position.

Fire engineering should only be undertaken when the result of the engineered solution will not unduly constrain future flexibility and expansion.

Thermal modelling to meet the requirements of the NCC Volume 1, Section J may be utilised as a method of demonstrating compliance. This is considered a 'deemed to satisfy' approach via a non-prescriptive option.

Where renovation or replacement work is done within an existing facility, all new work and/or additions shall comply with applicable sections of the CIR.

The requirements of Section 2.6.3 above should be followed in relation to water supply systems.

2.7.1 Affected areas

In redevelopment projects and additions to existing facilities, only that portion of the total facility affected by the project shall be required to comply with applicable sections of the CIR, except where the amount of works is equal to or exceeds 50 per cent of the total facility area. In this instance the entire facility will be upgraded to comply with current standards and the CIR.

2.7.2 Unaffected areas

Those existing portions of the facility and its associated building systems that are not included in the redevelopment but are essential to the functionality or code compliance of the redeveloped spaces shall, at a minimum, be brought into compliance commensurate with the new works functional requirements and safety.

When construction on redeveloped areas is complete, the facility shall provide acceptable care and safety to all occupants.

2.7.3 Conversion

When a building is converted from one occupancy to another, it shall comply with the new occupancy requirements.

2.7.4 Undiminished safety

Redevelopments including new additions shall not diminish the safety level that existed prior to the start of the work. Safety in excess of that required for new facilities is not required.

2.7.5 Long-range improvement

Nothing in the CIR shall be construed as restrictive to a facility that chooses to do work or alterations as part of a phased long-range safety improvement plan.

All hazards to health and safety and all areas of non-compliance with applicable codes and regulations shall be corrected as soon as possible in accordance with a plan of correction.

2.8 Maintenance

In planning, designing and specifying a health facility, the recurrent costs involved in maintaining the building infrastructure need to be an important consideration. The primary maintenance objective should be to keep the building condition compliant with the CIR. Health facility managers are required to establish an asset management program to ensure that infrastructure is maintained to an appropriate standard. In the delivery of their design and specifications the architect and engineers should optimise the impact of maintenance on the life cycle costs of the facility. Factors impacting on maintenance costs include building materials, finishes, fitments, plant and access for maintenance purposes.

Under the Queensland Government *Maintenance Management Framework*¹, it is a mandatory requirement to undertake a maintenance demand assessment of each building to quantify the demand for maintenance as the initial step in the planning and delivery of annual maintenance on the building.

This process includes assigning appropriate standards that each health facility building will be maintained at within the building portfolio. Conducting a maintenance demand assessment will ascertain the total maintenance requirements of the building portfolio which includes the requirement for each building.

The scope of maintenance work in the demand assessment process will be a combination of:

- preventative maintenance which takes into account expert advice and manufacturers' recommendations
- condition-based maintenance works identified in maintenance assessment reports
- deferred (backlog) maintenance

¹ Queensland Government, *Maintenance Management Framework*.

- maintenance to meet mandatory, statutory and health and safety requirements
- reactive maintenance estimates based on historical information.

2.9 Work health and safety

It is a requirement to comply with all federal and Queensland work health and safety legislation, policies and guidelines, including general Queensland requirements and Queensland Health specific requirements.

2.10 Limitations constraints and opportunities

2.10.1 Planning process

The *CIR Volume 2 Functional design brief* uses health service plans and models of care/service delivery as primary sources of information for design requirements. The 'Functional design brief' document is to inform and educate the design team and others involved in the procurement process.

2.10.2 Consultation

The CIR are not intended to replace the formal consultation required between the design team and user groups, but to enhance communication and understanding between all parties. The architect and the design team are part of an educational process that involves all the user groups, project management teams and selected patient or community reference groups. The CIR ensure that the participants are adequately informed of the terminology and information being used.

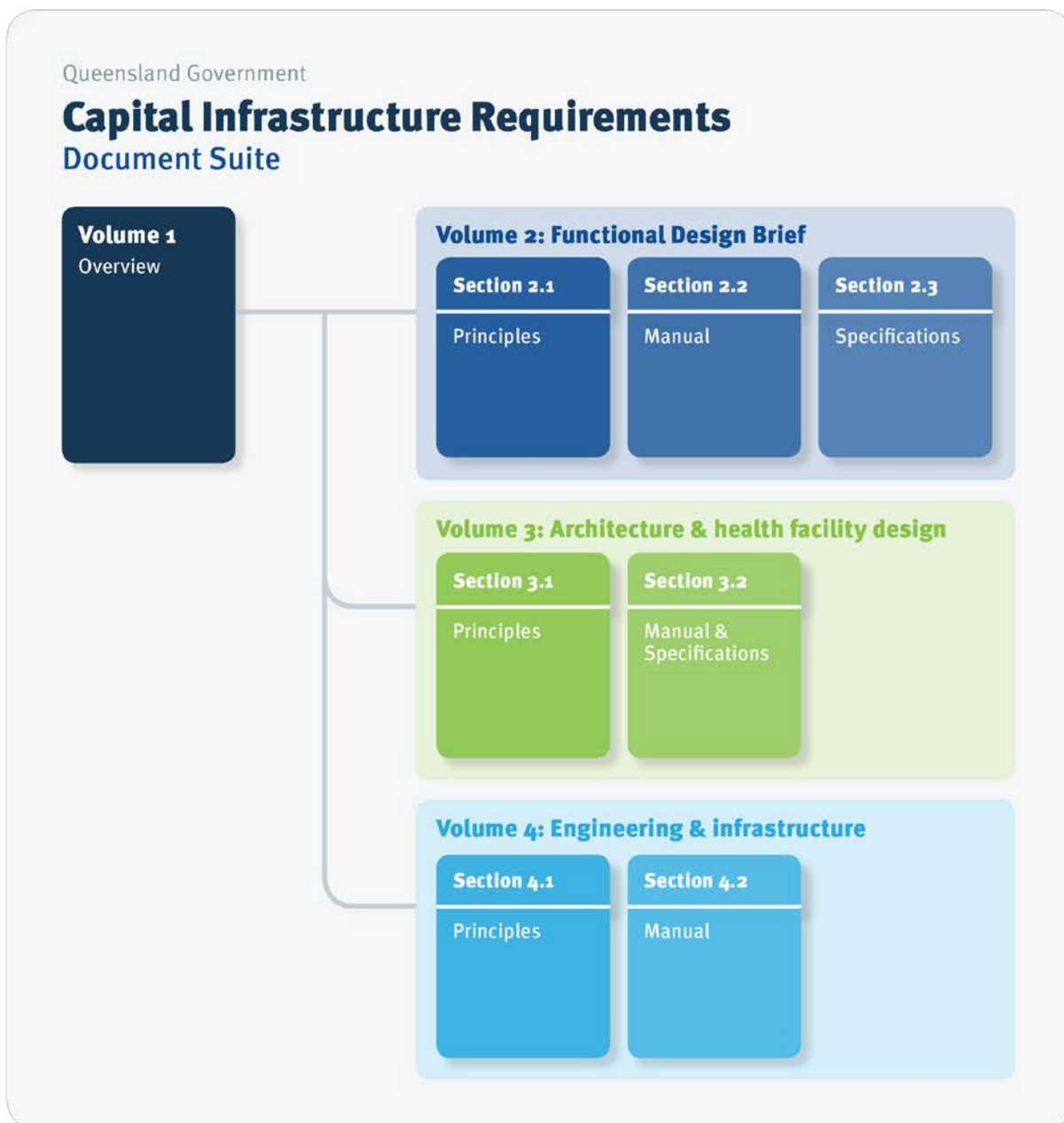
3 How to read

3.1 Structure of CIR

The CIR is structured into four volumes summarised below and in Figure 1:

- Volume 1 Overview
- Volume 2 Functional design brief
- Volume 3 Architecture and health facility design
- Volume 4 Engineering and infrastructure.

Figure 1 CIR document suite



CIR Volume 2 Functional design brief

- Section 1 Principles: provides the overall context and design principles, incorporating both Queensland Government and Queensland Health aims and requirements. It covers specific areas of the functional design brief for which Queensland Health has a preferred or standardised approach.
- Section 2 Manual: provides an example of a standard format for the functional design brief presentation.
- Section 3 Functional design brief specifications and example: provides examples of a completed functional design brief.

CIR Volume 3 Architecture and health facility design

- Section 1 Principles: contains the principles applicable to Queensland Health development. This section generally does not specify how compliance is achieved in detail but outlines overarching requirements and checkpoints for design compliance.
- Section 2 Manual and Specifications: includes mandatory requirements, rationale, examples and checkpoints. Section 2 also includes relevant specifications for key items associated with architecture for health facility and healthcare development works for Queensland Health.

CIR Volume 4, Engineering and infrastructure

- Section 1 Principles: contains the building services design principles applicable for Queensland Health developments. This section generally does not specify how compliance is achieved in detail but outlines overarching requirements which must be adhered to.
- Section 2 Manual: provides specific content per discipline, including application of the principles, requirements and technical details. Each discipline also includes checklists for the designers reference, a table of minimum deliverables by project phase, and a non-conformance declaration form for submission of details regarding deviations from specified requirements.

3.2 Levels of recommendation

The following definitions apply to categories of recommendations made throughout the CIR:

Category	Definition
Minimum standard	Principles, requirements and checkpoints shall be assumed to represent conditions relevant to meeting a standard that supports functional and technical requirements. A minimum standard however, does not necessarily mean it is an optimal standard.
Recommended	On some occasions a standard is mandatory but a higher standard is recommended. The intention is to guide designers who wish to voluntarily upgrade the facility to a higher standard and wish to know what the higher standard is.

3.3 Checklists

A number of checklists have been provided as tools to assist designers in completing planning and design tasks relating to the CIR.

The purpose of these checklists is to verify compliance with the key prescriptive requirements. The checklists themselves are not part of the mandatory requirements of the CIR but a non-conformance declaration is a mandatory deliverable as part of a capital infrastructure work program. These will need to be submitted along with other project reporting requirements at each design stage such as master plan, project definition plan, schematic design, detailed design and contract documentation.

It is acknowledged that particularly in the early stages of planning and design, some documents are iterative such as *Volume 2 Functional design brief*. Checkpoints and therefore non-conformance declarations may need to be revisited when key project planning and design documents are refined in line with the capital infrastructure lifecycle stages.

4 How to use the CIR

4.1 Interpretation of the CIR

4.1.1 Purpose of interpretation

The individual parts of the CIR are not stand-alone or exhaustive as to their subject matter and must be considered in light of, and within, the context of the other parts of the CIR.

4.2 Public health facilities

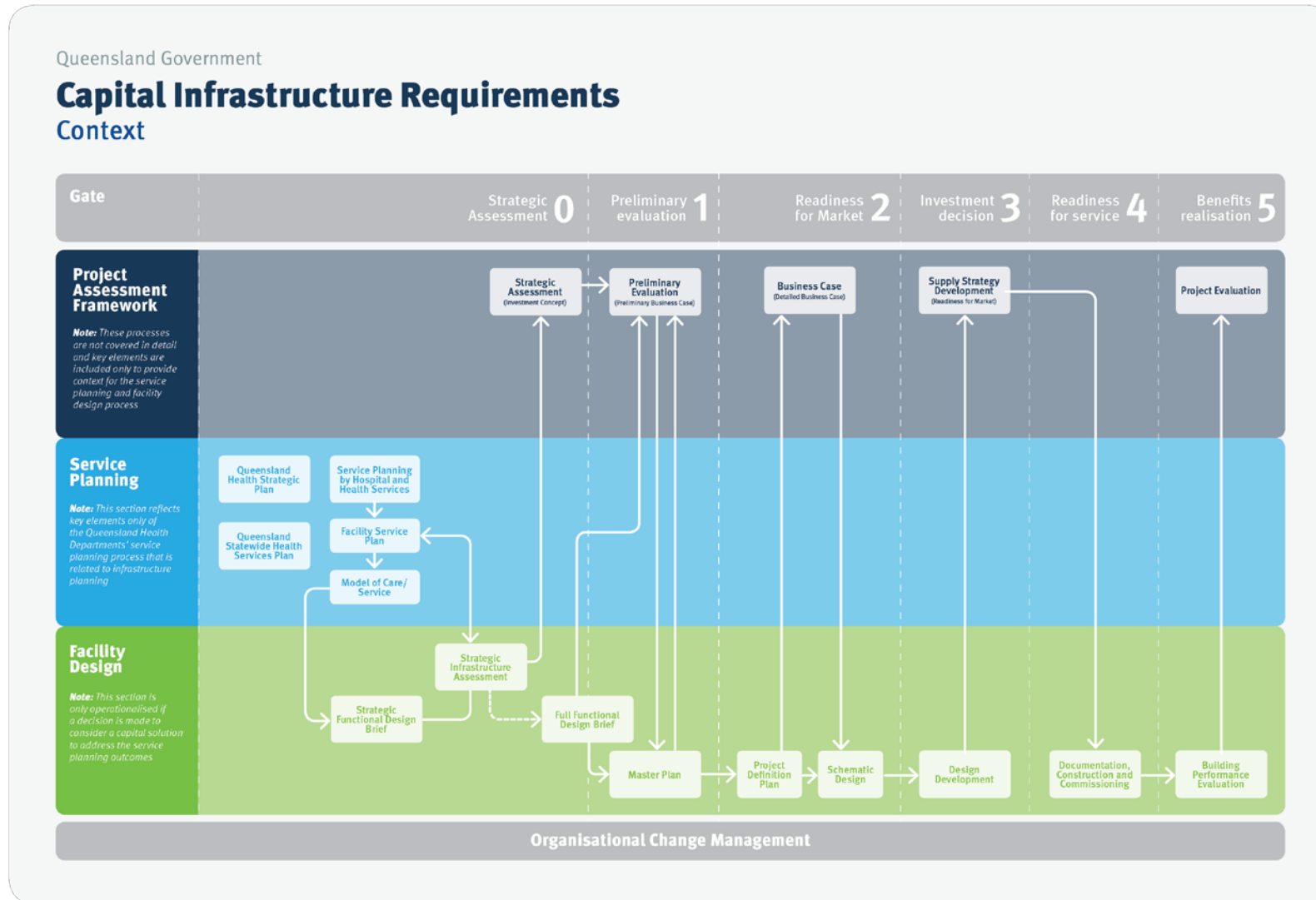
The CIR provides the requirements for the planning and briefing of public health infrastructure. Queensland Health administers compliance with the CIR through the planning and design project phases, conditions of contracts for design consultants and contractors, as well as internal management policies.

4.3 Context of the CIR

The planning and delivery of health infrastructure projects is undertaken within the context of whole-of-government policy and process as per the Queensland Government *Capital Works Management Framework*. The CIR assumes that the overall context of project initiation and development will be within the Queensland Government *Gateway Review (assurance)* process and under the *Project Assessment Framework (PAF)*. These documents relate specifically to a capital delivery process that has been sanctioned by Queensland Health. Other service planning, assessment and prioritisation processes occur within Queensland Health before the decision is made to proceed with a capital solution. Once this decision is made then the steps in the capital delivery process must be consistent with the government's capital works management process.

Figure 2 illustrates the sequence of the gateway review and PAF processes in parallel with statewide, HHS and facility level health service planning and infrastructure design processes.

Figure 2 Infrastructure design CIR context



4.4 Strategic infrastructure assessment

The term strategic infrastructure assessment refers to a range of strategic levels, early phase capital infrastructure planning processes. These processes involve determining future requirements of land, buildings, building services, equipment and site improvements such as car parking, to support the operational needs of health services. Assessments of current capital infrastructure also need to be carried out during early strategic planning.

The accumulated activities of strategic infrastructure assessment form a capital infrastructure planning (CIP) study. The range of activities conducted as part of the study, may vary widely depending on the required objectives and outcomes of the study. The desired outcome of capital infrastructure planning is early identification of a preferred capital infrastructure solution for a recognised service need.

A list of Queensland Health terms relating to strategic infrastructure assessment and their descriptions is provided in Appendix A.

4.5 Building performance evaluation

A building performance evaluation (BPE) should be considered as a whole of project lifecycle process which continues for the duration of a capital infrastructure project up to post occupancy stage. The requirements of the BPE should be understood and addressed prior to commencing the strategic assessment and continuing throughout all planning and design documentation processes.

4.6 Approval-in-principle process

All Queensland Health infrastructure projects must comply with the CIR and go through an approval process. The steps for this process are explained in tables 2 and 3.

Table 2 Queensland Health steps for functional design brief approval

Step	Process
One	Queensland Health staff and private consultants will have access to the CIR readily through the Queensland Health website. The CIR will be accompanied by non-conformance declaration form, which must be completed prior to submission of documentation.
Two	The strategic level sections of the functional design brief, including an accommodation brief, are completed and submitted to Queensland Health together with the non-conformance declaration form. Queensland Health assesses the application in accordance with the CIR and issues an approval in principle with or without conditions. The strategic level functional design brief may now be used as the basis of the full functional design brief and for the initial stages of master planning. It will also be used in the PAF preliminary evaluation.
Three	The full functional design brief (operational level) is developed and submitted to Queensland Health together with the non-conformance declaration form. Queensland Health assesses the application in accordance with the new infrastructure design CIR and issues an approval in principle with or without conditions. The full functional design brief comprising strategic and operational level information is now available to inform master planning and the PAF first stage business case.

Table 3 Queensland Health steps for architectural and engineering documents approval

Step	Process
One	Queensland Health staff and private consultants will have access to the CIR readily through the Queensland Health website. The CIR will be accompanied by non-conformance declaration form which must be completed prior to submission of documentation.
Two	Where a departure from the CIR is sought, the departure including the supporting technical documents will be submitted through the course of the project, and a statement of other effected associated clause with the impact of the requested departure to that clause.
Three	Queensland Health assess the application in accordance with the CIR, to determine the impact of the departure and issue either an approval in principle for the departure with or without conditions or a rejection.

4.7 Compliance and accreditation

It is not intended that compliance with the CIR implies that the facility will automatically qualify for accreditation under the National Safety and Quality Health Service Standards. While the physical standard of a facility is relevant, accreditation is mainly concerned with hospital management and patient care practices.

4.8 Equivalent alternatives and departures

The CIR are not designed to restrict innovation which might improve performance and/or outcomes, but rather to support and encourage consistency and best practice. A primary objective of the CIR is to achieve a desired performance result or service.

Prescriptive limitations, when given, such as exact minimum dimensions or quantities, are intended to describe a practical standard for normal operation. Where specific measurements, capacities or other standards are described, equivalent alternative solutions may be deemed acceptable if it is demonstrated that the intent or desired performance result of the standards has been met or improved.

As such, the CIR encourages a continuous process of improvement and strongly promotes alternative ideas, innovations and evidence-based design improvements.

Where a project wishes to pursue an alternative solution, a departure shall be sought from Queensland Health. All departures shall be submitted through the project steering committee and approval sought from senior officer/s (Chief Executive and relevant Capital and Assets Services Branch senior officer or Executive Director) for the individual project. The approving officers might request on its own discretion further supportive information to clarify the departure and inform their decision.

It should be noted that only genuine requests leading to improvements or better value outcomes will be considered.

5 Other building regulations

Compliance with the CIR does not imply compliance with any other regulations. Nor does it relieve any professional from their professional duties of care requirements.

5.1 National Construction Code (NCC)

The NCC includes Volume 1: BCA and the Volume 3: Plumbing Code of Australia (PCA). The requirements of the CIR may be in addition to or in excess of the NCC requirements. In such situations, the higher standard or further requirements of the CIR will be required. Nothing in the CIR implies that compliance with a provision of the NCC is not required.

Both the NCC and the CIR refer to other codes and standards. When such standards are referenced by the NCC or the CIR as required, they also become a mandatory requirement.

5.2 Food services regulations

All food service regulations will overwrite the CIR. Any impact of compliance issues arising by requirements from food services regulations will not require a request for departure, rather an explanatory note as part of the project reporting process.

5.3 Work health and safety

Queensland Health, its workers and others in the hospital and community health sector expect their workplaces to be safe. Work health and safety must be an integral part of the design process and is applicable to all projects undertaken by Queensland Health and their designers.

Project managers, design managers, architects, engineers and others involved in the design process, have an important role to play in identifying health and safety risks that could arise throughout the life cycle of the building or structure and, where practicable, eliminating risks through design.

Often the most cost-effective and practical approach is to avoid introducing a hazard to the workplace in the first place—by eliminating it from the workplace design.

Safe design is a strategy aimed at preventing injuries and disease by considering hazards as early as possible in the planning and design process. A safe design approach considers the safety of those who construct, maintain, clean, repair and demolish a building or structure as well as those who work in it. Safety can be enhanced through choices in the design process. These decisions are made in consideration of other design objectives such as aesthetics, practicality and cost.

In respect of legislative requirements, the *Work Health and Safety Act 2011* indicates that designers of structures can influence the safety of these products before they are used in the workplace. These people have a responsibility, so far as is reasonably practicable, to ensure these products are without risks to the health and safety of people who are at or near the workplace. Queensland Health as a client and other members of the project team, such as people influencing the design, engineers, interior designers, project manager and contractors have similar duties.

The designer must ensure, so far as is reasonably practicable, that the plant, substance or structure is designed to be without risks to the health and safety of persons—

Refer to the *Work Health and Safety Act 2011* and associated regulations for further details.

6 General requirements

6.1 Stakeholders

Stakeholders are those individuals, groups and organisations who are likely to be impacted by, and/or have an interest in, the decisions and actions of Queensland Health.

The purpose of consulting stakeholders for all stages of infrastructure project planning and design, is to understand who may impact the outcomes of the project and what the nature of information sharing or their input may need to be to reach desired objectives.

A matrix of stakeholders would be developed including categories and associated list of names. Points to consider might include:

- the major benefits a stakeholder will receive from the project
- likely attitudes toward the project
- what constitutes success for the stakeholder.

6.2 Risk management

A risk management plan must be prepared on project initiation and updated throughout the project stages. The cost impact of risks must be included in a risk management plan and their relationship to contingencies.

Queensland Health's *Integrated Risk Management Policy* states that: 'Queensland Health will manage risk in a proactive, integrated, and accountable manner', to ensure that risks are identified, analysed, prioritised and managed through continuous improvement and performance management strategies'.²

The policy includes five governance principles; *quality, transparency, clear accountability, responsive* and *integrated* to be applied to risk management.

6.3 Design stages and costs estimating

6.3.1 Design stages

The Queensland Health capital infrastructure delivery process incorporates the following design stages:

- master plan
- project definition plan
- schematic design
- detailed design.

Depending on the procurement and delivery methodology the following parts can also apply:

- tender documentation
- contract documentation
- as built documentation
- post construction and defects liability.

6.3.2 Cost estimating per stages

The confidence level required on cost estimation for each project stage is determined by the Queensland Government's, *Capital Works Management Framework – Estimate Categories and Confidence Levels policy advice note* dated June 2010.³

² Queensland Health (2012) *Integrated Risk Management Policy*

³ Department of Housing and Public Works

Preliminary costs should be estimated to return a minimum confidence level in the order of the P50 interval (50 per cent probability) (Cat 2 equivalent) for preliminary business case review when later measured against the more detailed P90 (Cat 3 equivalent) costs presented for investment decision on completion of the detailed business case.

Cost estimation in the early stages of the master plan and project definition phase is primarily based on the use of square metre rates, benchmarking, taking location factors into account and applied to a clustered schedule of accommodation (SOA). The clusters normally represent grouping of individual department areas of a similar type or co-location or can represent stand-alone buildings that contain a single department.

In the project definition planning phase the clusters can be more detailed and the SOA should list each individual department and all external covered areas.

In schematic design cost estimation is based on elemental estimates prepared by measuring detailed quantities priced at unit rates.

From detailed design onwards all areas should be detailed enough for accurate measure and elemental costing based on defined rates.

Cost estimation for all stages will include client costs, information communications and technology, and furniture fit out and equipment.

Refer to Queensland Health PIR document to ascertain the requirements for the use of design BIM/s to inform the cost planning activities including whole of life costs.

6.3.3 Lifecycle costing

The approach to lifecycle costing must be aimed at minimising the cost of long-term asset maintenance and represent value for money.

The objectives of lifecycle planning are to:

- determine the total cost of ownership and operation of an asset to ensure service continuity
- establish a sound basis on which decisions are made by evaluating the total cost of any investment decision, rather than just looking at the short-term impact or the initial capital costs
- identify the impact of refurbishment and maintenance decisions on asset disposal plans.⁴

All buildings and capital infrastructure owned and managed by Queensland Health will be appropriately maintained incorporating best practice whole of life considerations to support the delivery of healthcare services.⁵

⁴ Queensland Government (2010) *Strategic Asset Management Framework, Life-Cycle Planning*

⁵ Queensland Health (2011) *Building and Infrastructure Maintenance Policy*

Lifecycle costing must support Queensland Health’s requirement for building and infrastructure maintenance to minimise whole-of-life costs and ensure that any risks to Queensland Health are effectively managed while ensuring that the physical condition of buildings and supporting infrastructure is kept to a standard appropriate for their service function.

7 Selecting a building construction procurement strategy

In accordance with the Queensland Government *Procurement policy*, procurement strategy and contract selection for government buildings is required, among other things, to achieve value for money.

The CIR are for use in a range of project procurement methodologies as endorsed by Queensland Health.

The common procurement methods broadly used are:

- traditional fully documented—lump sum
- design and construct—lumps sum
- managing contractor—Design and Construction Management
- alliance
- bundling.

Refer to the suite of Queensland Government *Capital Works Management Framework* documents available online www.hpw.qld.gov.au for detailed guidance material.

8 Terms and definitions

Term	Definition
Accommodation brief	The accommodation brief is a listing of the key functional rooms and spaces and their number, which make up a department or facility. It is used at the strategic functional design brief stage.
Building information modelling	The sharing and leveraging of structured information over the asset lifecycle.
Building performance evaluation	A methodology developed to support the systematic evaluation of health service buildings and facilities.
Capital Infrastructure Requirements	Term used to describe the four volumes of requirements for Queensland Health capital infrastructure planning and design.
Capital infrastructure planning	Determines the requirements of land, buildings, building services, equipment and site improvements (for example car parks) to support operational needs of health services now and in the future.
Circulation space	The space required within a department or unit to enable movement and functionality between individual rooms/ spaces for example the corridor that joins two rows of rooms or the entrance alcove to a room. Circulation space is nominated as a percentage of total usable floor area prior to the development of the design.
Clinical service department/unit	A service in the facility where clinical services are provided directly to patients, for example: emergency inpatient interventional suites/perioperative outpatients ambulatory/day areas.
Clinical services capability framework	A standard set of minimum capability criteria for service delivery and planning. The capability of any health service is recognised as an essential element in the provision of safe and quality patient care.

Term	Definition
Clinical support unit	<p>A service with specific design requirements that supports direct clinical care to the patient, for example:</p> <ul style="list-style-type: none"> • medical imaging • nuclear medicine • pharmacy • pathology.
Commercial space	The designated commercial areas of a site.
Commissioning—infrastructure	<p>There are two types of commissioning:</p> <ul style="list-style-type: none"> • building commissioning—refers to the physical facility completion for occupation by the contractor. The activities include the successful running of all plant and equipment • operational commissioning—refers to activities undertaken leading up to handover of the building to the users. Typical activities include familiarisation of staff with safety, security and communications systems. <p>The main objectives of appropriately commissioning a facility are to:</p> <ul style="list-style-type: none"> • ensure new facilities and equipment are ready for occupancy and use, i.e. fit for purpose • ensure that the new equipment meets all government legislative requirements • train staff in the operation of new equipment and safety procedures • identify any minor defects which require rectification by the contractor • receive all warranties and procedure manuals.
Concept plan	<p>The plan establishes the areas of a site/s where future development would occur (in line with service requirements). The plan incorporates:</p> <ul style="list-style-type: none"> • service map with precincts identified for future development • service activity zones within a precinct for example proposed uses, co-location proposals • main transport routes to the site and within the site • block drawings (at department level) of the proposed buildings including scale and footprint.

Term	Definition
Condition assessment	The methodology employed to determine the condition of assets owned and maintained by an organisation or service. Accurate and standardised asset condition data enables asset managers to accurately target their limited maintenance funds to provide maximum user benefit.
Cost benchmark	The cost model, based on real, similar facilities, used to evaluate project costs for a similar type of building.
Design development	<p>Design development includes:</p> <ul style="list-style-type: none"> • completion of design in detail including architectural and engineering design • confirmation that the design meets current government policies • confirmation of the cost estimate to demonstrate the project is within budget • obtaining agreement or sign off from users.
Expansion space	An area nominated in the functional design brief to be included for future service delivery expansion.
Facility	A complex of buildings, structures, roads and associated equipment, that represents a single management unit for financial, operational maintenance or other purposes.
Feasibility study	<p>Evaluates options against a set of agreed criteria and presents a:</p> <ul style="list-style-type: none"> • detailed analysis of a preferred facility development strategy • realistic estimate of the total project investment.
Fittings	Fixed items attached to walls, floors or ceilings that do not require service connections such as curtains, IV tracks, hooks, mirrors, blinds, joinery and pin boards.
Fixtures	Fixed items that require service connection (for example electrical, hydraulic, mechanical). This includes basins, light fittings, clocks and medical service panels. Not to be confused with 'fixed equipment' such as theatre pendants.

Term	Definition
Functional areas	<p>Areas or zones within a clinical, clinical support or non-clinical support service. For example, the functional area of a clinical service may include the following:</p> <ul style="list-style-type: none"> • main entry/reception/clerical area • assessment/procedural area • staff offices/administrative and management area • staff amenities area • inpatient area including outdoor areas.
Functional design brief	<p>A description of the functions to be accommodated and the relationships between functions for a proposed capital project. The functional design brief should identify how the project meets the objectives and policies of the organisation.</p>
Functional relationships	<p>The co-dependencies and interdependencies of areas within the facility as a whole, and of individual clinical, clinical support and non-clinical support services.</p>
Functional spaces	<p>The key functional spaces within a facility being:</p> <ul style="list-style-type: none"> • clinical areas • clinical support areas • non-clinical support areas • staff administration areas • multipurpose outdoor space • commercial space • circulation space.

Term	Definition
Furniture, fittings and equipment (FFE)	<p>Furniture, fittings and equipment that are additional to the basic building structure. As per the Australasian Health Facility Guidelines, FFE is grouped into categories as follows:</p> <p>Group 1: items supplied and fixed by the contractor. These are included in the construction contract.</p> <p>Group 2: items supplied by the client and fixed by the contractor. These include items that are transferred but require installation by the contractor, or where the client chooses to buy a piece of equipment and give it to the contractor for installation.</p> <p>Group 3: items supplied and installed by the client. These include all moveable items that can easily be transferred or installed by staff and major items of electro-medical equipment that are purchased from the project budget but are installed and commissioned by a third party.</p> <p>Group 4: consumable items purchased and installed by the client outside the capital budget. This category includes bed linens, foodstuffs and disposable supplies.</p>
Future proofing	The future functionality of the facility will not be unduly compromised by changes in models of care or service delivery or the advent of new technology.
Health facility planner	A health facility planner undertakes area wide planning for health facilities or planning of a particular unit on the basis of projected consumer/client need. This does not include facility design, architectural plans or construction.
Health planning unit	All the rooms, spaces and internal circulation that make up a particular health service department and that are necessary for that department to function.

Term	Definition
Health service plan	<p>Health service plans provide information on the current and projected health needs of a population, contain evidence-based service models, and outline a process for change, including defined service goals, objectives and strategies.</p> <p>The health service planning process aims to ensure that health services align and grow with changing patterns of need while making the most effective use of available and future resources.</p> <p>Service planning must precede and inform other types of planning—including capital infrastructure, workforce and information management.</p>
Hot floor	<p>The floor/s of the facility on which the technical suites are located. Ideally on one floor but not always possible in a large facility.</p>
Infrastructure assessment	<p>An assessment of the suitability of existing infrastructure in the delivery of health services. It incorporates the physical and functional aspects of buildings and building services and equipment and includes:</p> <ul style="list-style-type: none"> • building condition assessment including strengths and deficiencies • assessment of current function in delivering health services (for example role in service activities) and issues with the asset in performing the required function • current use and potential capacity to meet service requirements for example frequency of use, purpose, changes over time • rectification costs, where required.
Land assessment	<p>An assessment of potential sites for the acquisition of land for a health facility. This assessment includes:</p> <ul style="list-style-type: none"> • future expansion areas • access to road networks and public transport • issues such as urban design, town planning and cultural heritage.

Term	Definition
Master plan	A thorough investigation of a feasible range of facility planning options which meet the services needs/gaps, resulting in confirmation of the site location and a recommended plan for the future development of the health service/agency, within a prescribed timeframe and estimate.
Master planning	<p>Identifies a preferred infrastructure development strategy for the site to meet future service requirements. The plan includes:</p> <ul style="list-style-type: none"> • future health service requirements • building condition assessment and site assessment • infrastructure assessment • SOA • local and state planning requirements • environmental impact assessments • determination of open space areas • assessment traffic and roads on and near the site including public transport • car parking • geotechnical analysis of the site • site development options and the preferred option • staffing of proposed development • category 2 cost estimate of the preferred option • risk mitigation and management plan.
Model of care	A description of how care is managed and organised, providing the clinical and organisational framework for the service.
Model of service delivery	A description of how non-clinical support services are managed and organised, providing the organisational framework of the service.
Multipurpose space	A category of space which can accommodate a range of functions including group meetings (staff or patient), multi-disciplinary meetings and patient therapy spaces.
NCC	<p>The regulation controlling construction of all building in Australia and any subsequent or updates. Incorporates:</p> <ul style="list-style-type: none"> • Volume 1 – BCA (Classes 2-9) • Volume 3 – National PCA

Term	Definition
Operational policies	A statement outlining the objectives, principal functions and modes of operation of facility, a department, particular service or activity at a non HHS level. At HHS level there are operational briefs and local work instructions/procedures.
Patient journey	<p>A component of the facility model of care and in general terms means the following stages of the patient pathway or patient flow through the healthcare system:</p> <ul style="list-style-type: none"> • access • diagnosis • treatment and intervention • inpatient care • discharge • outpatients.
Pneumatic tube system (PTS)	A system incorporating a series of tubes through which cylindrical containers are propelled. Small bore PTS distribute pharmaceutical goods and specimens. Large bore PTS distribute waste and dirty linen to a central location.
Pod	A group of core spaces.
PPE	Personal protective equipment includes gloves, gowns, masks, aprons, caps, shoe covers and goggles.
Principal consultant/consultants	<p>In most projects the principal consultant will be the architect. The principal consultant is responsible for leadership of the consultant team.</p> <p>Consultants are responsible to the project control group to provide specialist expertise and advice in management, planning, design and construction.</p> <p>For large or complex projects, a project manager or director will be responsible for leadership of the consortia of consultants and sub-consultants.</p>

Term	Definition
Project assessment framework (PAF)	<p>PAF ensures that project management is undertaken effectively across the Queensland public sector and delivers value for money to the government from its significant investment in project activity.</p> <p>PAF is a whole-of-government project assessment process that establishes a common approach to assessing projects at critical stages in their lifecycle. Its aim is to maximise the benefits returned to government from project investments.</p>
Project brief	<p>The project brief is a document initially prepared on completion of PDP which summarises the client needs. It defines all elements of the project, states project and budget objectives, service delivery outcomes and can be used as a benchmark to measure quality outcomes at the end of the project. It may be updated throughout subsequent stages of the project.</p> <p>The project brief includes the design brief, project procurement strategy, ICT requirements, project program, cost estimates and prequalification service risk rating for the project.</p>
Project definition plan	<p>Clearly defines the scope of the building required to accommodate services to be provided by a new facility. The PDP details options for operational policies, models of care and accommodation requirements in the new facility.</p>
Project design brief	<p>Part of the project brief, the project design brief outlines planning and design principles, and the functional requirements of the project.</p>
Project information requirements	<p>A document defining Queensland Health required uses of BIM and identifying the information required at specific project stages.</p>
Project manager	<p>The project manager works with the procurement manager in managing the project on behalf of the project owner. The project manager's responsibility is to manage the scope, time, cost, quality, resources, communications and risk aspects of the project.</p>

Term	Definition
Project director	The project director, Queensland Health capital infrastructure projects, is the person who has the authority to run the project on a day-to-day basis on behalf of the project board (steering committee). The project director brings together and manages all aspects of the program or project to deliver within budget, time and scope.
Refurbishment	Standards Australia defines this as 'work intended to bring an asset up to a new standard or to alter it for a new use.'
Room data sheets	A briefing document providing information on the minimum requirements for each room in the facility incorporating room details, room fabric, fittings, FFE with associated Services.
Schedule of accommodation	A schedule of accommodation specifies the number and size of rooms that will be required, the relationships between rooms and groups of rooms, the finishes, equipment, furniture that will fit the room for its functional purpose and the environmental conditions that will assist the purpose. Environmental conditions might include temperature range, humidity, air movement and acoustic isolation.
Schematic design	Preparation of design briefs and layout, including key physical elements, areas, locations, and volumes including basic building services systems and cost estimate.

Term	Definition
Site assessment	<p>An assessment of land and other property related aspects of a site/s to identify future development opportunities. The assessment incorporates:</p> <ul style="list-style-type: none"> • site access such as roads and parking • access to building services such as power and water • proximity to other health services • social and cultural aspects of the site such as suitability of the development in relation to surrounding uses and impacts on neighbouring developments such as noise and traffic • natural environment including features and design opportunities • statutory impacts for example zoning, flood levels • sustainability of services during redevelopment • size of site for example; collocation and commercial opportunities and public open space and future expandability • physical attributes for example geology, gradient and climate • financial costs for example demolition of existing structures, site preparation, water upgrade • economic analysis for example other land use options, impact on services.
Strategic business case	<p>This provides a preliminary justification for the program or project based on a strategic assessment of business needs and a high-level assessment of the program or project's likely costs and potential for success.</p>
Telehealth	<p>Telehealth is the transmission of health-related services or information over the telecommunications infrastructure. As such, telehealth includes both telemedicine, which involves providing clinical services remotely, and non-clinical elements of the healthcare system, such as education.</p>
Travel	<p>The space that is required for the circulation of people and goods both vertically and horizontally in a facility. Examples include: ramps, lift wells, links, tunnels, main corridors and detached covered ways joining two buildings.</p>

Term	Definition
Treatment area	The BCA defines this as 'an area within a patient care area such as an operating theatre and rooms used for recovery, minor procedures, resuscitation, intensive care and coronary care from which a patient may not be readily moved.'
Universal design	A non-discriminatory design approach that provides increased usability for everyone without the need for adaption or specialised design.
User	A user is defined as those people who have experienced services (staff member, contractor, patient, relative or friend) or who could potentially access services provided by Queensland Health in the future.
Wayfinding	Wayfinding is a methodology of arranging indicators such as signs, light, colour, materials and pathways to guide people to their destinations. A successful wayfinding program is intuitive and self-navigable, and it protects the overall visual integrity of the site. Wayfinding is specific to its place and visitors.
Wayfinding system	A wayfinding system is more than just signs; it encompasses architecture, landscape architecture, technology infrastructure, lighting, landmarks and orientation points.

9 Abbreviations and acronyms

9.1 Common CIR abbreviations and acronyms

The following table provides a list of abbreviations and acronyms used throughout the CIR volumes.

Acronym	Term
.IFC	Industry foundation classes
AAAC	Association of Australasian Acoustical Consultants
ACH	Air changes per hour
AHU	Air handling units
AIP	Approval in principle
AS	Australian Standards
AusHFG	Australasian Health Facility Guidelines
BCA	Building Code of Australia
BEM	Building engineering maintenance
BEP	BIM execution plan
BIM	Building information modelling
BMS	Building management systems
BPE	Building Performance Evaluation
CCTV	Closed circuit television
CCU	Coronary care unit
CCU	Critical care unit
CD	Contract documentation
CID	Community infrastructure designation
CIP	Capital Infrastructure Planning
CIR	Capital infrastructure requirements
CLR	Contaminated land register
CMMS	Computerised maintenance management system
CPTED	Crime prevention through environmental design
CSCF	Clinical Services Capability Framework
DD	Detailed design
DECC	Department of Environment and Climate Change
EBD	Evidence-based design
ED	Emergency Department
EDB	Electrical distribution boards
EMR	Environmental management register
EPA	Environmental Protection Agency
EPR	Environmental Protection Regulation
ESD	Environmentally sustainable development
ESD	Ecological sustainable development
EWIS	Emergency Warning and Intercom System
FECA	Fully enclosed covered area
FFE	Furniture, fittings and equipment
FTE	Full time equivalent
GP	General Practitioner
HACCP	Hazards analysis critical control point

Acronym	Term
HAI	Healthcare associated infections
HB	Handbook
HHSs	Hospital and Health Services
HPU	Health planning unit
HSIA	Health Service Information Agency
HVAC	Heating ventilation and air-conditioning
ICT	Information and communication technology
ICU	Intensive care unit
IPU	Inpatient unit
IT	Information technology
LPS	Lightning protection system
MI	Medical imaging
MP	Master plan
MSB	Main switchboard
MSP	Medical services panels
MSSB	mechanical services switchboards
NCC	National Construction Code
NHMRC	National Health and Medical Research Council
NICU	Neonatal intensive care unit
NSP	Network service provider
OHS	Occupational health and safety
PACS	Picture archive and communication system
PAF	Project assessment framework
PCA	Plumbing Code of Australia
PDP	Project definition Plan
PFC	Power factor correction
PICU	Paediatric Intensive care unit
PIR	Project information requirements
PPE	Personal protective equipment
PTS	Pneumatic tube system
RCDs	Residual current devices
RDS	Room data sheet
RIS	Radiology information system
RMO	Resident medical officer
SD	Schematic design
SOA	Schedule of accommodation
UPS	Uninterruptible power supply
VAV	Variable air volume
VOC	Volatile organic compound
WOG	Whole of Government
WOL	Whole of life
WRMP	Water risk management plan

10 References

10.1 Standards

The following standards have been grouped as ‘general’ or discipline specific. All designers are required to adhere to the requirements of the AS irrespective of whether these are listed as discipline specific standards or not. The grouping is provided to assist designers only as a ready reference.

Category	Standard
General	<ul style="list-style-type: none"> • National Construction Code of Australia, including: <ul style="list-style-type: none"> ○ Building Code of Australia ○ Plumbing Code of Australia. • AS/NZS 1170 series - Structural design actions <ul style="list-style-type: none"> ○ AS/NZS 1170.0:2002 - Structural design actions—Part 0: General principles ○ AS 1170.1:1989 – Structural design actions—Part 1: Dead and live loads and load combinations ○ AS/NZS 1170.2:2011 (R2016)—Structural design actions—Part 2: Wind actions ○ AS 1170.4:2007 (R2018)—Structural design actions—Part 4: Earthquake actions in Australia. • AS 1432:2004 (R2016)—Copper tubes for plumbing and drainage applications • AS/NZS 2107:2016—Recommended design sound levels and reverberation times for building interiors • AS 2021:2015—Acoustics—Aircraft noise intrusion—Building siting and construction • AS/NZS 2243 series—Safety in laboratories <ul style="list-style-type: none"> ○ AS/NZS 2243.1:2005—Safety in laboratories—Planning and operational aspects ○ AS/NZS 2243.2:2006—Safety in laboratories—Chemical aspects ○ AS/NZS 2243.3:2010—Safety in laboratories—Microbiological safety and containment ○ AS/NZS 2243.4:2018—Safety in laboratories—Ionizing radiations ○ AS/NZS 2243.5:2004—Safety in laboratories—Non-ionizing radiations - Electromagnetic, sound and ultrasound ○ AS/NZS 2243.6:2010—Safety in laboratories—Plant and equipment aspects ○ AS 2243.7:1991—Safety in laboratories—Electrical aspects ○ AS/NZS 2243.8:2014—Safety in laboratories—Fume cupboards ○ AS/NZS 2243.9:2009—Safety in laboratories—Recirculating fume cabinets ○ AS/NZS 2243.10:2004—Safety in laboratories—Storage of chemicals.

Category	Standard
	<ul style="list-style-type: none"> • AS 2252 series—Controlled Environments <ul style="list-style-type: none"> ○ AS 2252.4—Controlled Environments—Biological Safety Cabinets Classes I and II—Installation and Use ○ AS 2252.5—Controlled Environments—Cytotoxic Drug Safety Cabinets—Design, Construction, Installation, Testing and Use ○ AS 2252.6—Controlled Environments—Clean Workstations—Design, Installation and Use • AS/NZS 2293 series—Emergency evacuation lighting and exit signage for buildings <ul style="list-style-type: none"> ○ AS/NZS 2293.1:2018—Emergency evacuation lighting and exit signage for buildings: System design, installation and operation ○ AS/NZS 2293.2:2019—Emergency evacuation lighting and exit signage for buildings: Routine service and maintenance ○ AS/NZS 2293.3:2018—Emergency evacuation lighting and exit signage for buildings: Emergency luminaires and exit signs. • AS/NZS 2982:2010—Laboratory design and construction—General requirements • AS/NZS 3000:2007—Electrical Installations • AS/NZS 3013:2005—Electrical Installations—Classification of the Fire and Mechanical Performance of Wiring System Elements. • AS/ISO 3001 Risk Management • AS 3996:2019—Access covers and grates • AS/NZS 4187:2014—Reprocessing of reusable medical devices in health service organisations • AS 4260:1997 (R2018)—High efficiency particulate air (HEPA) filters—Classification, construction and performance • AS/NZS 4536:1999 (R2014) —Life Cycle Costing—An Application Guide • AS/NZS ISO 31000:2009—Risk Management—principles and guidelines • ISO 14644 series—Cleanrooms and Associated Controlled Environments <ul style="list-style-type: none"> ○ AS ISO 14644.1:2017—Cleanrooms and Associated Controlled Environments: Classification of air cleanliness by particle concentration ○ AS ISO 14644.2:2017—Cleanrooms and Associated Controlled Environments - Part 2: Monitoring to provide evidence of cleanroom performance related to air cleanliness by particle concentration ○ AS/NZS 14644.3:2009—Cleanrooms and Associated Controlled Environments—Part 3: Test methods ○ AS/NZS ISO 14644.4:2002 (R2016)—Cleanrooms and Associated Controlled Environments: Design, construction and start-up ○ AS/NZS ISO 14644.5:2006 (R2016)—Cleanrooms and associated controlled environments—Part 5: Operations ○ AS/NZS ISO 14644.7:2006 (R2016) —Cleanrooms and associated controlled environments—Part 7: Separative devices (clean air hoods, gloveboxes, isolators and mini-environments)

Category	Standard
	<ul style="list-style-type: none"> ○ ISO 14644-16:2019—Cleanrooms and associated controlled environments—Part 16: Energy efficiency in cleanrooms and separative devices. ● HB 436:2013—Risk management Guidelines ● HB 260: 2003—Hospital acquired infections: Engineering down the risk. ● AS 4970-2009 Protection of trees on development sites ● ISO 19650—2018 Organization and digitization of information about buildings and civil engineering works, including BIM—Information management using BIM
Discipline specific	
Communications	<ul style="list-style-type: none"> ● AS/NZS 3013:2005—Electrical installations—Classification of the fire and mechanical performance of wiring systems elements ● AS/NZS 3080:2003—Telecommunications installations—Generic cabling for commercial premises ● AS/NZS 3084:2017—Telecommunications installations—Telecommunications pathways and spaces for commercial buildings ● AS/ACIF S009:2009—Installation requirements for customer cabling
Electrical	<ul style="list-style-type: none"> ● AS/NZS 1680.1:2006—Interior and workplace lighting—General principles and recommendations ● AS/NZS 1768:2007—Lightning Protection ● AS/NZS 2500:2004—Guide to the safe use of electricity in patient care ● AS/NZS 3003:2018—Electrical installations—Patient treatment areas of hospitals, medical, dental practices and dialyzing locations. ● AS/NZS 3009:1998—Electrical Installations—Emergency Power Supplies in Hospitals ● AS/NZS 3017:2007—Electrical installations—Verification guidelines ● AS/NZS 3439 series—Low-voltage switchgear and control gear assemblies <ul style="list-style-type: none"> ○ AS/NZS 3439.1:2002—Low-voltage switchgear and control gear assemblies: Type tested and partially type tested assemblies ○ AS/NZS 3439.2:2002—Low-voltage switchgear and controlgear assemblies: Particular requirements for busbar trunking systems (busways) ○ AS/NZS 3439.3:2002—Low-voltage switchgear and controlgear assemblies: Particular requirements for low-voltage switchgear and controlgear assemblies intended to be installed in places where unskilled persons have access for their use—Distribution boards ○ AS/NZS 3439.4:2009—Low-voltage switchgear and controlgear assemblies: Particular requirements for assemblies for construction sites ○ AS/NZS 3439.5:2009—Low-voltage switchgear and controlgear assemblies: Particular requirements for assemblies for power distribution in public networks.

Category	Standard
	<ul style="list-style-type: none"> • AS CISPR 14.1:2018—Electromagnetic Compatibility, or internationally recognized equivalent(s) • Standards Australia—Handbook on Electromagnetic Compatibility Standards and Regulation
Fire	<ul style="list-style-type: none"> • AS 1221:2003—Fire Hose Reels • AS 1603 series—Automatic fire detection and alarm systems <ul style="list-style-type: none"> ○ AS 1603.1:1997 (R2016) —Automatic fire detection and alarm systems: Heat detectors ○ AS 1603.2:1997 (R2016)—Automatic fire detection and alarm systems: Point type smoke detectors ○ AS 1603.3:2018—Automatic fire detection and alarm systems: Heat alarms ○ AS 1603.5:1996 (R2016)—Automatic fire detection and alarm systems: Manual call points ○ AS 1603.7:1996 (R2016) —Automatic fire detection and alarm systems: Optical beam smoke detectors ○ AS 1603.8:1996 (R2016)—Automatic fire detection and alarm systems: Multi-point aspirated smoke detectors ○ AS 1603.11:2018—Automatic fire detection and alarm systems: Visual warning devices ○ AS 1603.13:2018—Automatic fire detection and alarm systems: Duct sampling smoke detectors ○ AS 1603.14:2001—Automatic fire detection and alarm systems: Point type carbon monoxide fire detectors ○ AS 1603.15:2002 (R2016) —Automatic fire detection and alarm systems: Remote indicators. • AS 1670 series—Fire detection, warning, control and intercom systems <ul style="list-style-type: none"> ○ AS 1670.1:2015—Fire detection, warning, control and intercom systems—System design, installation and commissioning: Fire ○ AS 1670.3:2018 - Fire detection, warning, control and intercom systems—System design, installation and commissioning: Fire alarm monitoring ○ AS 1670.4:2004—Fire detection, warning, control and intercom systems—System design, installation and commissioning: Emergency warning and intercom systems ○ AS 1670.5:2016—Fire detection, warning, control and intercom systems—System design, installation and commissioning: Special hazardous systems ○ AS 1670.6:1997—Fire detection, warning, control and intercom systems—System design, installation and commissioning: Smoke alarms. • AS 1668.1:2015—The use of ventilation and air conditioning in buildings—Fire and smoke control in buildings • AS 1851:2012—Routine service of fire protection systems and equipment • AS 2118 series—Automatic fire sprinkler systems

Category	Standard
	<ul style="list-style-type: none"> ○ AS 2118.1:2017/Amdt 1-2017—Automatic fire sprinkler systems: General systems ○ AS 2118.2:2010—Automatic fire sprinkler systems: Drencher systems ○ AS 2118.3:2010—Automatic fire sprinkler systems: Deluge systems ○ AS 2118.4:2012—Automatic fire sprinkler systems: Sprinkler protection for accommodation buildings not exceeding four storeys in height ○ AS 2118.6:2012—Automatic fire sprinkler systems: Combined sprinkler and hydrant systems in multistorey buildings ○ AS 2118.8:1997 (R2013)—Automatic fire sprinkler systems: Minor modifications ○ AS 2118.9:1995 (R2013)—Automatic fire sprinkler systems: Pipe support and installation ○ AS 2118.10:1995 (R2013) —Automatic fire sprinkler systems: Approval documentation.
	<ul style="list-style-type: none"> ● AS 2419 series—Fire hydrant installations <ul style="list-style-type: none"> ○ AS 2419.1:2017—Fire hydrant installations: System design, installation and commissioning ○ AS 2419.2:2009—Fire hydrant installations: Fire hydrant valves ○ AS 2419.3:2012—Fire hydrant installations: Fire brigade booster connections. ● AS 2441:2005 (R2018) —Installation of fire hose reels ● AS 2444:2001—Portable fire extinguishers and fire blankets ● AS 2941:2013—Fixed fire protection installations ● AS 4118:1996 (R2013)—Fire Sprinkler system components ● AS 4428 series—Fire detection, warning, control and intercom systems <ul style="list-style-type: none"> ○ AS 4428.0:1997 (R2016)—Fire detection, warning, control and intercom systems—Control and indicating equipment: General requirements and test methods ○ AS 4428.1:1998 (R2016) —Fire detection, warning, control and intercom systems—Control and indicating equipment: Fire ○ AS 4428.3:2010—Fire detection, warning, control and intercom systems—Control and indicating equipment: Fire brigade panel ○ AS 4428.4:2016 - Fire detection, warning, control and intercom systems—Control and indicating equipment: Emergency intercom control and indicating equipment ○ AS 4428.5:1998 (R2016)—Fire detection, warning, control and intercom systems—Control and indicating equipment: Power supply units ○ AS 4428.6:2018—Fire detection, warning, control and intercom systems—Control and indicating equipment: Alarm signalling equipment ○ AS 4428.7:1999 (R2016)—Fire detection, warning, control and intercom systems—Control and indicating equipment: Air handling fire mode control panel

Category	Standard
	<ul style="list-style-type: none"> ○ AS 4428.10:1998 (R2016) —Fire detection, warning, control and intercom systems—Control and indicating equipment: Alarm investigation ○ AS 4428.16:2015—Fire detection, warning, control and intercom systems—Control and indicating equipment: Emergency warning control and indicating equipment. ● AS ISO 14520 (various parts):2009—Gaseous fire-extinguishing systems—Physical properties and system design
Hydraulics	<ul style="list-style-type: none"> ● AS/NZS 1596:2014—The storage and handling of LP Gas ● AS 3500:2018—Plumbing and drainage Set ● AS 4032:2005 (R2015) —Water supply—Valves for the control of hot water supply temperatures ● AS/NZS5601:2013 Gas installations
Lifts	<ul style="list-style-type: none"> ● AS 1428 (Set)—2010—Design for access and mobility; ● AS 1735 (Set) —2016—Lift, Escalators and moving walks ● AS 4431:2019—Guidelines for safe working on new lift installations in new constructions ● EN81.1 Safety Rules for the Construction and Installation of Lifts—Part 1—Electric Lifts ● EN115 ● ASME A17.1 ● CIBSE Guide D Transportation Systems in Buildings
Mechanical	<ul style="list-style-type: none"> ● AS 1324.1:2001 - Air filters for use in general ventilation and air-conditioning: Application, performance and construction ● AS 1668 series - The use of ventilation and air-conditioning in buildings <ul style="list-style-type: none"> ○ AS 1668.1:2015—The use of ventilation and air-conditioning in buildings: Fire and smoke control in multi-compartment buildings ○ AS 1668.2:2012—The use of ventilation and air-conditioning in buildings: Ventilation design for indoor air contaminant control. ● AS 1668.4:2012 - The use of ventilation and air-conditioning in buildings: Natural ventilation of buildings ● AS/NZS 3666 set—Air handling and water systems of buildings ● AS 3892:2001 (R2016) —Pressure equipment-Installation ● AS 4254 (Set): 2012—Ductwork for air-handling systems in buildings ● AS 4343:2014—Pressure equipment—Hazard levels ● AS 4260:1997 (R2018) - High efficiency particulate air (HEPA) filters - Classification, construction and performance ● AS 4426:1997 (R2018)—Thermal insulation of pipework, ductwork and equipment-Selection, installation and finish. ● HB 260:2003—Hospital acquired infections—Engineering down the risk ● Seismic Restraint Manual (Guidelines for Mechanical Services by SMACNA) ● CIBSE Guides, particular Guide B for commissioning

Category	Standard
Medical gases	<ul style="list-style-type: none"> • AS 1210:2010—Pressure vessels • AS 1894:1999—The storage and handling of non-flammable cryogenic and refrigerated liquids • AS 4484:2016—Gas cylinders for industrial, scientific, medical and refrigerant use - Labelling and colour coding • AS 2030 (various)—Gas Cylinders (series). • AS 2120:1992—Medical suction equipment • AS 2120.3:1992—Suction equipment powered from a vacuum or pressure source • AS 2473.3-2007—Valves for compressed gas cylinders—Outlet connections for medical gases • AS 2568:2019—Purity of medical air produced from on-site compressor systems • AS 2896:2011—Medical gas systems—Installation and testing of non-flammable medical gas pipeline systems • AS 3840.1:1998—Pressure regulators for use with medical gases • AS 4041:2006—Pressure piping • AS 4332:2004—The storage and handling of gases in cylinders • AS 4484:2016—Gas cylinders for industrial, scientific, medical and refrigerant use - Labelling and colour coding. • BS 5682 Specification for terminal units, hose assemblies and their connectors for use with medical gas pipeline systems
Security	<ul style="list-style-type: none"> • AS/NZS 1158 Set:2010—Lighting for roads and public spaces • AS/NZS 2201 Set:2008—Intruder alarm systems Set • AS/NZS 2208:1996—Safety Glazing Materials in Buildings • AS 4485.1:1997—Security for Health Care Facilities (Part 1: General Requirements) • AS 4485.2:1997—Security for Health Care Facilities (Part 2: Procedures Guide) • AS 4083:2010—Planning for Emergencies; Healthcare Facilities

10.2 Policies and implementation standards

Policy, guidelines and implementation standards will change over time, current Queensland Health documents are available at:

<https://www.health.qld.gov.au/system-governance/policies-standards/doh-policy>.

Queensland Government policies

Queensland Government *Asbestos Management Policy for its Asset*

Queensland Government *Capital Works Management Framework*

Queensland Government *Design Guidelines for Government Buildings*

Queensland Government *Digital Enablement for Queensland Infrastructure—Principles for BIM Implementation*

Queensland Government *Maintenance Management Framework*

Queensland Government *Procurement Policy*

Queensland Government *Project Assessment Framework*

Queensland Government *Strategic Asset Management Framework*

Queensland state planning policy guideline: mitigating the adverse impacts of flood, bushfire and landslide

Queensland Health policies

Clinical Services Capability Framework

Department of Health *Health, safety and wellbeing policy (QH-POL-401:2018)*

Department of Health *Risk Management (QH-POL-070:2015)*

Queensland Health *Project Information Requirements: Building Information Modelling (QH-GDL-374-9:2019)*

Queensland Health *Single asset identifier (SAID) guideline (QH-GDL-354-1-1:2017)*

Queensland Health *wayfinding guidelines (QH-GDL-343-6-1)*

Queensland Health *Workplace and Office Accommodation Guideline (QH-GDL-057-2008)*

Queensland Health directives

Healthier Food and Drinks at Healthcare Facilities (QH-HSD-049:2019)

Hospital Car Parking—Patient and Carer Car Parking Concessions (QH-HSDIMP -042-2:2017)

Hospital Car Parking Provisions (Hospital) (QH-HSD-042:2014)

Hospital Car Parking—Provision of Staff Parking (QH-HSDGDL-042-1:2014)

Other references

ANSI/ASHRAE Standard 154: Ventilation for Commercial Cooking Operations

ASHRAE ‘HVAC Design Manual for Hospitals and Clinics’.

ASHRAE: Standard 170: Ventilation of Health Care Buildings

Association of Australasian Acoustical Consultants (AAAC) Guideline for Health Care Facilities.

AusHFG Isolation Room—Engineering and Design Requirements

Australian Drinking Water Guidelines 2011

CIBSE Guide A, Environmental Design (2015)

Seismic restraint manual guidelines for mechanical systems, SMACNA

UK Health Department—*Health Technical Memorandum 03-01: Specialised ventilation for healthcare premises. Part A - Design and installation*