



Australian Government

Department of Education, Employment and Workplace Relations

CPCBC6017A Evaluate services layout and connection methods for the planning of large building projects

Release: 1

CPCBC6017A Evaluate services layout and connection methods for the planning of large building projects

Modification History

Not Applicable

Unit Descriptor

Unit descriptor

This unit of competency specifies the outcomes required to evaluate the layout of services and connection methods in large, high rise and complex buildings (open' licensing classification with special reference to Type A buildings). It includes the evaluation of cold and hot water supply, sewerage layout, electric and electronic installation requirements, and smoke and fire preventative systems. It requires compliance with relevant legislation, Australian standards and the Building Code of Australia (BCA). Builders and other related construction industry professionals for whom this unit is relevant, exercise personal judgement based on their knowledge, skills and experience. They must also coordinate the input and expertise of a range of other professionals in order to assess construction faults and determine appropriate responses.

Application of the Unit

Application of the unit

This unit of competency supports builders, related construction industry professionals and senior managers within building and construction firms responsible for managing the evaluation of service layout and connection methods.

Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Prerequisite units Nil

Employability Skills Information

Employability skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Evaluate layouts of water supply for general and firefighting use.	<p>1.1. Relevant professional expertise is sought to analyse the technical robustness of the planned solution for provision of water supply for general and firefighting services use.</p> <p>1.2. Water supply, connection and layout specified in the building and construction plans are identified, evaluated and recorded as part of the building and construction planning process and in accordance with BCA, relevant legislation and Australian standards.</p> <p>1.3. Installation of water services supplying fire hydrants, fire hose reels and fire sprinkler systems is identified, evaluated and recorded in accordance with BCA, relevant legislation and Australian standards.</p> <p>1.4. Interconnection of water tanks for fire services is emulated in intent of non-return to original tanks and results are evaluated.</p>
2. Evaluate sewerage and drainage disposal methods and their layouts.	<p>2.1. Relevant professional expertise is sought to analyse the technical robustness of planned solution for the provision of sewerage and drainage disposal methods and their layouts.</p> <p>2.2. Sewerage connection and layout are identified, evaluated and recorded in accordance with the BCA, relevant legislation and Australian standards.</p> <p>2.3. Connection methods of main drains to local authority sewers across open ground and within buildings for the whole site, are identified, evaluated and recorded.</p> <p>2.4. Disposal of sewerage from fixtures situated below the level of local authority sewer for both domestic and commercial buildings are evaluated in accordance with BCA, relevant legislation and Australian standards.</p> <p>2.5. Methods for disposal of stormwater drainage systems are evaluated and documented in accordance with the BCA, relevant legislation and Australian standards.</p> <p>2.6. Design and installation of stormwater drainage systems are evaluated and documented in accordance with BCA, relevant legislation and Australian standards.</p>
3. Evaluate smoke hazard management, mechanical	<p>3.1. Relevant professional expertise is sought to analyse the technical robustness of the planned solution for provision of smoke hazard management, mechanical</p>

ELEMENT

PERFORMANCE CRITERIA

ventilation, air conditioning and methods of air filtration and layout.

- ventilation and air conditioning*, and methods of air filtration and layout.
- 3.2. Terms used in mechanical ventilation are clearly recorded, stating how ventilation, volume, velocity and content may be controlled.
- 3.3. Methods of mechanical ventilation, air distribution and smoke hazard management are identified, evaluated and recorded in accordance with BCA, relevant legislation and Australian standards.
- 3.4. Air conditioning and mechanical ventilation basic elements are identified, evaluated and documented, including the function of air conditioning and applications for various types of occupancy in buildings.

ELEMENT

PERFORMANCE CRITERIA

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| 4. Evaluate hot water systems and factors affecting selection. | 4.1. Relevant professional expertise is sought to analyse the technical robustness of the planned solution for provision of <i>hot water systems</i> .
4.2. Hot water systems are identified and evaluated according to design factors, types of system, height of installation, area to be serviced, number of outlets and energy sources available.
4.3. Operating principles of various types of hot water systems are evaluated and documented. |
| 5. Identify natural lighting for varying situations and evaluate suitable lighting fixtures for a range of operations. | 5.1. Relevant professional expertise is sought to analyse the technical robustness of the planned solution for provision of natural and artificial <i>lighting systems</i> .
5.2. Natural lighting and general aims of design are identified in accordance with authorities and governing regulation requirements.
5.3. Artificial lighting and types of light sources are compared to recommended service luminance for various service situations in accordance with BCA, relevant legislation and Australian standards. |
| 6. Evaluate firefighting and fire detection services. | 6.1. Relevant professional expertise is sought to analyse technical robustness of the planned solution for provision of firefighting and fire detection services.
6.2. Authorities involved in the perusal of plans and site inspection for the various building classifications and their roles and functions are identified.
6.3. Requirements for sprinkler systems, fire hydrants and fire hoses for the various building classifications are identified and evaluated in accordance with BCA, relevant legislation and Australian standards.
6.4. Fire detection and alarm systems are identified and evaluated in accordance with BCA, relevant legislation and Australian standards. |
| 7. Determine requirements for general electrical and electronic service installation. | 7.1. Relevant professional expertise is sought to analyse the technical robustness of planned solution for <i>general electrical and electronic service</i> installation.
7.2. Electrical supply authorities and the relevant legislation are identified and recorded.
7.3. Procedures for electrical supply and connection to site, and electrical design and provision for services and electronic cabling for the project, are identified, evaluated and recorded.
7.4. Design and installation of emergency warning systems, emergency lighting and exit signage systems are evaluated and recorded in accordance with the BCA and relevant Australian standards. |

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills for this unit are:

- ability to evaluate impact of the requirement for service layout and connection methods on the construction process
- analysis and interpretation skills relating to documentation from a wide range of sources, including BCA and Australian standards
- application of design concepts and principles in accordance with Australian standards
- applying building codes and standards
- communication skills to:
 - enable clear and direct communication, using questioning to identify and confirm requirements, share information, listen and understand
 - read and interpret:
 - Australian standards
 - BCA
 - legislation
 - specifications
 - working drawings
 - seek professional expertise
 - use and interpret non-verbal communication
 - use language and concepts appropriate to cultural differences
 - written skills to record relevant information
- numeracy skills ability to perform and apply measurements and calculations.

Required knowledge

Required knowledge for this unit is:

- design concepts and principles in relation to service installations
- general services installation terminology, definitions, installation methods and hazards
- nature of materials and effect of performance
- processes for the interpretation of working drawings and specifications
- relevant federal, state or territory legislation and local government policy and procedures

REQUIRED SKILLS AND KNOWLEDGE

- research methods
- processes for the preparation of documentation
- terminology and methods of roof construction used for daylight transmission
- terminology and methods used in artificial lighting
- terminology with reference to items and services that may be used in plumbing, sewerage and drainage systems
- terminology with reference to vertical transportation.

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment

This unit of competency could be assessed by research, design, analysis, evaluation and reporting to determine service layout and connection methods for large and complex residential and commercial buildings.

Competency must be demonstrated within the context of relevant legislation, the BCA and Australian standards.

This unit of competency can be assessed in the workplace or a close simulation of the workplace environment, provided that simulated or project-based assessment techniques fully replicate construction workplace conditions, materials, activities, responsibilities and procedures.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

A person who demonstrates competency in this unit must be able to provide evidence of the ability to:

- coordinate and assess input received from technical experts
- comply with OHS regulations applicable to workplace operations
- apply organisational management policies and procedures, including quality assurance requirements where applicable
- evaluate the services layout, connection methods and rectification actions for at least one residential and one commercial building project or equivalent, which includes advice on hot and cold water supply, sewerage layout, electrical and electronic installation lighting systems, vertical transportation requirements and smoke and fire detection and prevention systems
- provide reports to appropriate body or individual as determined by project brief
- apply strategic plans, workplace policies and procedures.

Context of and specific resources This competency is to be assessed using standard

EVIDENCE GUIDE

for assessment

and authorised work practices, safety requirements and environmental constraints.

Assessment of essential underpinning knowledge will usually be conducted in an off-site context.

Assessment is to comply with relevant regulatory or Australian standards' requirements.

Resource implications for assessment include:

- a situation, real or realistically simulated, requiring assessment of service layout and connection method requirements for residential and commercial buildings.

Reasonable adjustments for people with disabilities must be made to assessment processes where required. This could include access to modified equipment and other physical resources, and the provision of appropriate assessment support.

Method of assessment

Assessment methods must:

- satisfy the endorsed Assessment Guidelines of the Construction, Plumbing and Services Training Package
- include direct observation of tasks in real or simulated work conditions, with questioning to confirm the ability to consistently identify and correctly interpret the essential underpinning knowledge required for practical application
- reinforce the integration of employability skills with workplace tasks and job roles
- confirm that competency is verified and able to be transferred to other circumstances and environments.

Validity and sufficiency of evidence requires that:

- competency will need to be demonstrated over a period of time reflecting the scope of the role and the practical requirements of the workplace
- where the assessment is part of a structured learning experience the evidence collected must relate to a number of performances assessed at different points in time and separated by further learning and practice, with a decision on competency only taken at the point when the assessor has complete

EVIDENCE GUIDE

confidence in the person's demonstrated ability and applied knowledge

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence.

Assessment processes and techniques should as far as is practical take into account the language, literacy and numeracy capacity of the candidate in relation to the competency being assessed.

Supplementary evidence of competency may be obtained from relevant authenticated documentation from third parties, such as existing supervisors, team leaders or specialist training staff.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Water supply includes consideration of:

- town supply
- tank storage supply relative to public water supply and reservoir heights
- single and two-stage pumping for multi-function and single function connected services

Firefighting services use includes consideration of:

- sprinkler systems (BCA deemed-to-satisfy [DTS] provisions)
- fire hydrants
- fire hose reels and fire extinguishers
- installation of fire stopping and fire collars
- fire and smoke detection and alarm systems (BCA DTS provisions).

Sewerage connection includes consideration of:

- local authority sewerage drainage system
- septic or bio-chemical treatment unit
- graded or vertical discharge pipes

RANGE STATEMENT

Stormwater includes consideration of:

- inspection shafts and overflow relief gullies (ORGs).
- design, installation and disposal
- connection to local government water drains
- use of soakage pits and on-site water detection systems
- size, location and construction requirements for eaves and box gutters
- downpipes and unground or concealed piping.

Mechanical ventilation and air conditioning include:

- air conditioning applications
- air distribution, including mechanical ventilation requirements for enclosed car parks
- air filtration, including air filters, ducting and main filter types
- air intake systems
- fire dampers
- fume discharge systems
- installation of fire stopping
- smoke control and exhaust systems
- warm water and cooling towers.

Hot water systems include consideration of:

- area to be serviced
- energy sources available
- height of installation
- number of outlets
- type of occupancy
- type of system.

Lighting systems include consideration of:

- emergency and exit signage systems
- natural and artificial lighting
- terms, such as:
 - brightness
 - control of glare
 - installation of fire stopping
 - intensity
 - lifespan
 - locations for installation
 - reflections.

General electrical and electronic service systems include consideration of:

- categories of cabling:
 - data
 - lift controls
 - power supplies

RANGE STATEMENT

- telecommunications, including connection to site and distribution facilities
- electrical supply authorities connection to site and distribution facilities (switch room and substations)
- emergency lighting and exit signage systems
- emergency warning and intercommunication systems
- fire stopping
- layout of equipment for:
 - computers
 - lift controls
 - power supplies
 - telephones
- service system safeguards
- service system access for maintenance, repair and extension
- type of service (emergency power and alternative power sources).

Unit Sector(s)

Unit sector Construction

Co-requisite units

Co-requisite units Nil

Functional area

Functional area