Australian Government

Department of Education, Employment and Workplace Relations

NWP603 Design pressure sewerage systems

Release: 1

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Modification History

NWP603 Release 1: Primary release.

Unit Descriptor

This unit of competency sets out the knowledge and skills required to apply principles of design for a pressure sewerage system using appropriate design standards.

Application of the Unit

This unit applies to para-professionals required to design pressure sewerage systems as an element of town sewerage.
No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

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 tasks you need to be able to perform, to demonstrate that you can achieve the element. Where ***bold italicised*** text is used, further information is detailed in the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Clarify and confirm design requirements	1.1 Review concept proposal to identify system requirements. 1.2 Identify constraints and parts of the concept proposal requiring clarification or with design problems. 1.3 Identify stakeholders and evaluate and negotiate alternative options to resolve problems. 1.4 Confirm **design standards and specifications** relevant to the pressure sewerage system. 1.5 Define and document detailed design requirements. 1.6 Identify and apply **initial data** to the design.
2 Prepare pressure sewerage system design	2.1 Review ***project design requirements*** prior to proceeding with detailed design. 2.2 Prepare ***designs for pressure sewer systems*** to meet project design requirements and design standards, codes and specifications. 2.3 Design to allow for required land use. 2.4 Determine contributing flows and pumping rates. 2.5 Determine pipe sizes. 2.6 Finalise horizontal alignment and pipeline levels in accordance with project design requirements and design standards and specifications. 2.7 Determine appropriate pipe materials. 2.8 Design and layout on-property pressure sewer components**.** 2.9 Design collection pump units and emergency storage requirements to meet project design requirements and design standards and specifications. 2.10 Design to make allowance for OHS during construction and in service life. 2.11 Prepare design drawings in accordance with design standards, codes and Water Agency requirements.
3 Manage documentation	3.1 Prepare ***supporting documentation*** in accordance with ***legislative and organisation requirements***. 3.2 Maintain engineering and project records in accordance with legislative and organisation requirements.
4 Evaluate design	4.1 Review design to ensure objectives and specifications have been met. 4.2 Identify and evaluate compliance with environmental standards and impacts of the design. 4.3 Identify and evaluate compliance with legislation, codes and standards including OHS. 4.4 Investigate and assess alternative design options. 4.5 Recommend the most appropriate design proposal for adoption.

Required Skills and Knowledge

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

Required skills:

- interpret and apply legislative requirements, codes and standards
- assess environmental impacts
- apply quality requirements
- analyse complex information
- operate computer software
- conduct investigations
- prepare documentation
- collaborate with a diverse team of specialists
- conduct consultations with a range of community interests
- project planning
- data management

Required knowledge:

- application of civil engineering principles, mathematics, computer software
- OH&S and environmental legislation, acts and procedures
- standards, codes and specifications for the design of pressure sewerage systems
- output quality specification requirements
- cost benefit analysis procedures
- risk analysis procedures
- investigation procedures and methodologies
- documentation and information management requirements

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

The candidate should:

- perform each task outlined in the elements consistently and in a representative range of contexts
- meet the performance criteria associated with each element by employing the techniques, procedures, information and resources available in the workplace from those listed in the range statement
- demonstrate an understanding of the underpinning knowledge and the application of skills as described in the required skills and knowledge section

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

The candidate should demonstrate the ability to design pressure sewerage systems including:

- identifying, analysing and defining wastewater collections systems and conditions and constraints
- identifying and interpreting legislative, environmental, business and project management requirements
- identifying and interpreting standards, codes and specifications
- analysing a range of factors to determine hydraulic and system design components
- evaluating and clarifying system plans and options for system design
- managing and securing documentation to support and report project management
- evaluating design process and outcomes
- managing, recording, reporting and information management

Context of and specific resources for assessment

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- workplace specific equipment and technology
- supervision and experienced team members to provide observations, feedback and third party reports
- enterprise operating procedures and work allocation
- relevant codes, standards and government regulations

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Method of assessment

The following methods are suggested:

- assessment in the workplace or in a simulated workplace and under the normal range of workplace conditions
- assessment should also be conducted in conjunction with aspects of technical competencies that are consistent with the work environment
- techniques for gathering evidence of competency may include:
- observation of performance
- written and/or oral questioning to assess knowledge and understanding
- completion of workplace documents and reports produced as part of routine work activities
- third-party reports from experienced practitioners
- completion of performance feedback from supervisors and colleagues

Guidance information for assessment

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

Validity and sufficiency of evidence require 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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit

In all cases where practical assessment is used it will be

combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

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.

Design standards and specifications may include:

- legislation and by-laws
- Australian standards
- ISO standards
- specific design guidelines in accordance with design codes, standards and specifications
- enterprise and organisational plans, policies and procedures
- Water agency requirements
- manufacturers' and contractors' conditions, contracts and standards

Initial data may include:

- costs
- existing and future flows
- hydraulic planning
- input and output quality
- customer requirements
- locations
- catchments
- demographics
- land use
- easements
- topographic information

Project design requirements may include:

- design tolerances
- levels
- ground condition
- impact of consequential damage
- environmental considerations
- easements
- mechanical protection of pipelines
- obstructions and clearances
- trench less techniques
- sewage quality
- design pressures
- design flows and their variability
- sizing of pressure sewers
- pressure sewer design
- control and alarm panels

- emergency storage
- maximum flows to collection/pump units
- connection to property sanitary drain
- pump identification
- property discharge line

Designs for pressure sewer system design may include:

- pressure sewer layout
- pressure sewer profiles
- valves
- provision for condition monitoring, sampling and maintenance

Supporting documentation may include:

- records of:
  - construction
  - installation
  - commissioning
  - production
  - operation
  - maintenance
  - training
  - OHS
  - customer contact
  - environment, culture, heritage
  - design proposals
  - design changes
  - quality assurance
  - estimates of cost
  - approval

Legislative and organisation requirements may include:

- federal and state legislation
- national guidelines
- codes and standards
- environmental protection agencies

Unit Sector(s)

Not applicable.

Competency Field

Asset Creation.