



Australian Government

Department of Education, Employment and Workplace Relations

RIICWD601A Manage the civil works design process

Release: 1

RIICWD601A Manage the civil works design process

Modification History

Not applicable.

Unit Descriptor

This unit covers the management of the civil works design process in Civil Construction. It includes the requirements to interpret and scope design requirements; identify project design options and determine the preferred design option; initiate, monitor and support, the design process; prepare and maintain documentation during the design process; review design to achieve acceptance; and support the application of designs.

Application of the Unit

This unit is appropriate for those working in a management role or as a technical specialist, for the management of the civil works design process within:

- Civil construction

Licensing/Regulatory Information

Refer to Unit Descriptor.

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 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.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Interpret and scope civil works design requirements	1.1. Access, interpret and apply compliance documentation relevant to the work activity 1.2. Access, interpret and clarify the client's requirements for the design of civil works 1.3. Advise the client on the implications for sustainability and options for an improved environmental outcome in the project 1.4. Analyse the client requirements for the design criteria to ensure all appropriate specifications are included in the design requirements 1.5. Confirm that all development and implementation factors are accounted for in the design requirements 1.6. Prepare functional specifications applying engineering standards and the design specifications 1.7. Document and obtain the client's agreement on the criteria for the design
2. Identify civil works project design options and determine the preferred design option	2.1. Identify innovative approaches to the development of the possible design concept 2.2. Investigate and analyse the possible design concepts capable of achieving the design requirements 2.3. Seek advice from appropriate personnel and sources where the concept proposal has non standard engineering requirements or where new technology may apply 2.4. Collaborate with the client to adapt the design concept to improve the outcomes and overcome problems 2.5. Advise the client of the likely impacts on the community
3. Initiate, monitor and support the design of civil works	3.1. Analyse and select resources, processes and systems to develop the design 3.2. Arrange design tasks to meet the agreed outcomes and cost structure 3.3. Develop and check the design solution using the engineering specification 3.4. Create (when appropriate) a demonstration

	model of the design
4. Prepare and maintain documentation during the civil works design process	4.1. Establish the documentation management process 4.2. Ensure that the supporting documentation required to implement the design is accurate, concise, complete and clear 4.3. Ensure that the designed item is identified by agreed design documentation and records 4.4. Apply the agreed documentation control process when making changes to design 4.5. Ensure that the documentation for the design remains accurate and current during the design development
5. Review civil works design to achieve acceptance	5.1. Review the design to ensure that the client's requirements are met 5.2. Inform the user of the likely impact on the user's lifestyle 5.3. Incorporate corrections and make improvements to the design ensuring social responsibilities, such as sustainability are met 5.4. Review the design with the client to gain documented acceptance
6. Support the application of civil works designs	6.1. Prepare and implement plans to verify that completed physical work meets client's requirements 6.2. Develop periodic test schedules to monitor performance and enable others to take any corrective action necessary 6.3. Seek feedback from the commissioning process to facilitate corrective actions or improvements 6.4. Evaluate the performance of the design outcomes in the user's environment using appropriate tools 6.5. Evaluate community reaction to the design outcome

Required Skills and Knowledge

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

Required skills

Specific skills are required to achieve the performance criteria in this unit, particularly for the application in the various circumstances in which this unit may be applied. This includes the ability to carry out the following as required to manage the civil works design process:

- apply legislative, organisation and site requirements and procedures
- interpret project plans and drawings
- interpret project specifications
- interpret project design briefs
- interpret Australian and other appropriate standards
- interpret project engineering survey information
- interpret project hydrological data
- interpret meteorological data
- interpret project geotechnical data
- interpret cultural and heritage data
- carry out risk assessments
- provide team leadership and coordination
- apply innovative solutions and new technology
- apply consultative processes
- choose appropriate operational techniques
- develop and apply design plans
- prepare civil works functional specifications
- apply computer aided design (CADD) technology
- apply engineering graphical presentation techniques
- calculate of design costs
- maintain design cost records
- provide clarification and advice
- apply negotiation techniques
- apply client feedback techniques
- apply principles of road user behaviour

Required knowledge

Specific knowledge is required to achieve the Performance Criteria of this unit, particularly its application in a variety of circumstances in which the unit may be used. This includes knowledge of the following, as required to manage the civil works design process:

- risk assessment and management requirement and procedures
- statutory compliance requirements and procedures

- occupational health and safety requirements and procedures
- environmental management requirements and procedures
- cultural and heritage requirements and procedures
- quality management requirements and procedures
- communication requirements and procedures
- Australian and other relevant standards requirements and procedures
- industry and organisational design procedures and practice
- current industry best practice
- civil works options
- civil works geometric requirements
- civil works surfacing requirements
- potential hazards, constraints and conditions that may affect civil works design and construction
- current industry best practice in civil works design and construction
- techniques for choosing preferred options
- team leadership techniques
- operational techniques required for the execution of civil works construction tasks
- civil works construction plant and equipment capabilities
- cost estimation techniques
- design review principles and procedures
- documentation requirements
- reporting requirements and procedures
- design approval requirements and procedures
- design records filing requirements and procedures
- performance review requirements and procedures
- systems close out requirements and procedures
- principles of road user behaviour

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	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	The evidence required to demonstrate competency in this unit must be relevant to worksite operations and satisfy all of the requirements of the performance criteria, required skills and knowledge and the range statement of this unit and include evidence of the following: • knowledge of the requirements, procedures and instructions for the management of the civil works design process • implementation of procedures and techniques for the safe, effective and efficient completion of the civil works design process • the identification of the relevant information and scope of the work required to meet the required outcomes • the identification of viable program options and the selection of programs that best meet the required outcomes • working with others to undertake and complete the management of the civil works design process • consistent and timely completion of the civil works design process
Context of and specific resources for assessment	• This unit must be assessed in the context of the work environment. Where personal safety or environmental damage are limiting factors, assessment may occur in a simulated environment provided it is realistic and sufficiently rigorous to cover all aspects of workplace performance, including task skills, task management skills, contingency management skills and job role environment skills. • The assessment environment should not disadvantage the participant. For example, language, literacy and numeracy demands of assessment should not be greater than those required on the job.

	• Customisation of assessment and delivery environment to sensitively accommodate cultural diversity. • Aboriginal people and other people from a non English speaking background may have second language issues. • Assessment of this competency requires typical resources normally used in a civil works environment. Selection and use of resources for particular worksites may differ due to site circumstances. • Where applicable, physical resources should include equipment modified for people with disabilities. • Access must be provided to appropriate learning and/or assessment support when required.
Method of assessment	This unit may be assessed in a holistic way with other units of competency. The assessment strategy for this unit must verify required knowledge and skill and practical application using more than one of the following assessment methods: • written and/or oral assessment of the candidate's required knowledge • observed, documented and/or first hand testimonial evidence of the candidate's: • implementation of appropriate procedures and techniques for the safe, effective and efficient achievement of the required outcomes • identification of the relevant information and scope of the work required • identification of viable options and the selection of the civil works design process that best meet the required outcomes • consistently achieving the required outcomes • first hand testimonial and documentary evidence of the candidate's: • working with others to undertake and complete the civil works design process • consistent and timely gaining of approval of civil works designs • provision of clear, timely required support

	and advice on the implementation of the civil works design process
Guidance information for assessment	Consult the SkillsDMC User Guide for further information on assessment including access and equity issues.

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.

Relevant compliance documentation may include:	• legislative, organisational and site requirements and procedures • manufacturer's guidelines and specifications • Australian standards • code of practice • Employment and workplace relations legislation • Equal Employment Opportunity and Disability Discrimination legislation
Design may include:	• calculations, which may include: • loads • shear forces • bending moments • stresses • construction materials and services quantities • construction cost estimates • recommended sizing of components • recommended materials • recommended reinforcement sizing and location • drawings • risk assessment of: • the existing conditions • the application of the design • maintainability of the works • health, safety and environmental requirements • contribution to ancillary documentation, which may include: • design notes • construction notes • supplementary drawings • input to the specifications

Civil Works may include:	• land clearing • bulk earthworks • surface drainage works • water storage dams construction • tailings dams construction • topsoil management • rehabilitation works • road works preparation (including the sub grade) • pavement construction, including: • flexible pavements, including: • natural pavement materials • manufactured pavement materials • asphalt placement • spray seal application • stabilisation • rigid pavement construction • underground services construction • construction of civil structures • tunnelling • dredging
Confirm may include:	• consultation with the client • consultation with others within the organisation • obtaining further site data, including: • geological data • survey data • hydrological data
Development and implementation factors may include:	• project specifications • project site geological data • project site hydrological data • project site engineering survey data • existing project drawings • relevant Australian or other standards
Arranging the design tasks may include:	• human resource requirements • design hardware and software • coordination requirements • scheduling • review requirements • communication and reporting requirements

Unit Sector(s)

Civil Works Design

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.