



Australian Government

RIICWD532E Prepare detailed design of tunnels

Release: 1

RIICWD532E Prepare detailed design of tunnels

Modification History

Release	Comments
Release 1	This version first released with RII Resources and Infrastructure Industry Training Package Version 6.0.

Application

This unit describes the skills and knowledge required to prepare detailed design of tunnels in civil construction, including evaluating design options, preparing and finalising designs and advising on design implementation.

It applies to those working in management or technical specialist roles. They generally apply a broad range technical and managerial skills and are responsible for the delivery of outputs that meet site requirements.

Licensing, legislative and certification requirements that apply to this unit can vary between states, territories, and industry sectors. Users must check requirements with relevant body before applying the unit.

Unit Sector

Civil construction

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Plan and prepare for detailed tunnel design	1.1 Obtain, interpret, clarify and confirm work requirements 1.2 Access, interpret and apply documentation required for detailed tunnel design and confirm work activity is compliant 1.3 Prepare design plan according to resourcing and design requirements
2. Carry out detailed tunnel design	2.1 Obtain, interpret and analyse required data and identify tunnel design options according to job requirements 2.2 Interpret and analyse tunnel design options and recommend design option according to job requirements 2.3 Develop and complete detailed tunnel design according to job requirements

ELEMENT	PERFORMANCE CRITERIA
	2.4 Prepare cost estimate for implementing tunnel design 2.5 Participate in review of tunnel design with required stakeholders 2.6 Complete required documentation for tunnel design according to workplace requirements 2.7 Communicate and coordinate with personnel involved in design process according to workplace requirements and within scope of own role 2.8 Gain design approval from required authorities
3. Finalise tunnel design processes	3.1 Confirm design records are filed according to workplace requirements 3.2 Complete design cost and reporting requirements and deliver to required stakeholders 3.3 Participate in performance review of design process according to workplace requirements 3.4 Review client feedback and contribute to design verification according to workplace requirements 3.5 Close out systems according to workplace requirements
4. Support and review tunnel design implementation	4.1 Provide clarification and advice to personnel implementing design as required to meet job requirements 4.2 Contribute to design validation process as required to meet job requirements

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance but not explicit in the performance criteria.

Skill	Description
Numeracy	Calculates resourcing requirements and performs mathematical calculations
Oral communication	- Presents information and provides assistance using sector-specific vocabulary - Uses listening and questioning to clarify and confirm understanding
Reading	Identifies and interprets information from workplace procedures, documentation, legislation and regulations
Writing	Prepares and completes workplace reports using sector-specific vocabulary, grammatical structures and conventions

Unit Mapping Information

Supersedes and is equivalent to RIICWD532D Prepare detailed design of tunnels.

Links

Companion Volume Implementation Guide is found on VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=88a61002-9a21-4386-aaf8-69c76e675272>

Assessment Requirements for RIICWD532E Prepare detailed design of tunnels

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Performance Evidence

The candidate must demonstrate the ability to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including evidence of the ability to:

- prepare detailed designs of tunnels on at least two occasions, including:
 - carrying out risk assessments
 - evaluating tunnel design options
 - interpreting and analysing data, including calculating:
 - areas
 - volumes
 - densities
 - mass
 - percentages
 - grades
 - earthworks volumes
 - sizes of components for tunnels
 - loading and capacity requirements for tunnels
 - preparing tunnel design plans
 - preparing cost estimates
 - obtaining design approval
 - participating in performance reviews of design processes
 - providing clarification and advice to personnel implementing the design
 - maintaining design and cost records
 - validating designs.

During the above, the candidate must:

- locate and apply required legislation, documentation, policies and procedures

- implement the requirements, procedures and techniques to prepare detailed design of tunnels, including:
 - accessing and interpreting required documentation, including:
 - plans
 - drawings
 - specifications
 - design briefs
 - engineering surveys
 - geotechnical information
 - hydrological, meteorological, cultural and heritage data
 - test results for tunnel construction material
 - data for selecting options for tunnel
 - applying civil design techniques, including:
 - computer aided drafting design (CADD) and drafting technology
 - industry or government standard design software
 - engineering graphical presentation techniques
- work with others to prepare detailed design of tunnels in a way that meets required outcomes, including:
 - complying with reporting requirements and procedures
 - communicating with others to receive and clarify work instructions
 - communicating with others to coordinate work activities.

Knowledge Evidence

The candidate must be able to demonstrate knowledge to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including knowledge of:

- legislation required to prepare detailed design of tunnels
- policies, procedures and documentation required to prepare detailed design of tunnels, including those relating to:
 - Australian and other relevant Standards
 - cultural and heritage management
 - design approvals and review
 - environmental management
 - equipment safety requirements
 - geotechnical management
 - hydrological and meteorological management
 - incident and emergency response
 - performance reviews
 - quality management
 - risk assessment and management
 - statutory compliance

- system close outs
- trench and pit shoring requirements
- work health and safety
- workplace recording and reporting
- types, characteristics, technical capabilities and limitations of materials, plant and equipment required for tunnel design and construction
- principles and techniques for preparing detailed design of tunnels, including:
 - techniques for evaluating potential site hazards, constraints and conditions
 - techniques for identifying and evaluating design options
 - data analysis techniques, including calculating:
 - areas
 - volumes
 - densities
 - mass
 - percentages
 - grades
 - sizes of components for tunnels
 - capacity requirements for tunnels
 - geometric requirements for tunnels
 - surfacing requirements for tunnels
 - cost estimation techniques
 - requirements of a design plan
 - design review and validation techniques
 - performance review techniques
 - techniques for using software and technology to develop and present designs
 - techniques for advising on design implementation
- principles and techniques for leading and coordinating teams.

Assessment Conditions

Mandatory conditions for assessment of this unit are stipulated below. The assessment must:

- include access to:
 - designs for tunnels
- be conducted in a safe environment; and,
- be assessed in the context of this sector's work environment; and,
- be assessed in compliance with relevant legislation/regulation and using policies, procedures and processes directly related to the industry sector for which it is being assessed; and,
- confirm consistent performance can be applied in a range of relevant workplace circumstances.

Where outcomes of this unit occur in an office-based setting, assessment may occur in a simulated work environment* provided it is realistic and sufficiently rigorous to cover all aspects of this sector's workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.

• **Assessor requirements**

Assessors must be able to clearly demonstrate current and relevant industry knowledge and experience to satisfy the mandatory regulatory standards as set out in the Standards for Registered Training Organisations (RTOs) 2015/Australian Quality Training Framework mandatory requirements for assessors current at the time of assessment and any relevant licensing and certification requirements. This includes:

- vocational competencies at least to the level being delivered and assessed
- current industry skills directly relevant to the training and assessment being provided
- current knowledge and skills in vocational training and learning that informs their training and assessment
- formal relevant qualifications in training and assessment
- having knowledge of and/or experience using the latest techniques and processes
- possessing the required level of RII training product knowledge
- having an understanding and knowledge of legislation and regulations relevant to the industry and to employment and workplaces
- demonstrating the performance evidence, and knowledge evidence outlined in this unit of competency, and
- the minimum years of current** work experience after competency has been obtained as specified below in an industry sector relevant to the outcomes of the unit.

It is also acceptable for the appropriately qualified assessor to work with an industry expert to conduct assessment together and for the industry expert to be involved in the assessment judgement. The industry expert must have current industry skills directly relevant to the training and assessment being provided. This means the industry subject matter expert must demonstrate skills and knowledge from the minimum years of current work experience after competency has been obtained as specified below, including time spent in roles related to the unit being assessed:

Industry sector	AQF indicator level***	Required assessor or industry subject matter expert experience
Drilling, Metalliferous Mining, Coal Mining, Extractive (Quarrying) and Civil Infrastructure	1	1 year
	2	2 years
Drilling, Coal Mining, Extractive (Quarrying), Metalliferous Mining and Civil Infrastructure	3-6	3 years
Other sectors	Where this unit is being assessed outside of the resources and infrastructure sectors assessor and/or industry subject matter	

	expert experience should be in-line with industry standards for the sector in which it is being assessed and where no industry standard is specified should comply with any relevant regulation.
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*Guidance on simulated environments has been stipulated in the Companion Volume Implementation Guide located on VETNet.

**Assessors can demonstrate current work experience through employment within industry in a role relevant to the outcomes of the unit; or, for external assessors this can be demonstrated through exposure to industry by conducting a minimum number of site assessments as determined by the relevant industry sector, across various locations.

*** While a unit of competency does not have an AQF level, where a unit is being delivered outside of a qualification the first numeric character in the unit code should be considered as the AQF indicator level for assessment purposes.

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