



Australian Government

AHCIRG503 Design irrigation, drainage and water treatment systems

Release: 1

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Modification History

Release Number	TP Version	Comments
1	AHCv1.0	Initial release

Application

This unit of competency describes the skills and knowledge required to design irrigation, draining and water treatment systems.

It applies to individuals who analyse information and exercise judgement to complete a range of skilled activities and demonstrate deep knowledge in a specific technical area. They have accountability for the work of others and analyse, design and communicate solutions to a range of complex problems. All work is carried out to comply with workplace procedures.

No occupational licensing, legislative or certification requirements are known to apply to this unit at the time of publication.

Pre-requisite Unit

Nil.

Unit Sector

Irrigation (IRG)

Elements and Performance Criteria

Element	Performance criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
1. Determine design requirements	1.1 Analyse water quantity and quality needs for a particular crop or situation so that an estimation can be made for sufficiency and timeliness 1.2 Evaluate water transfer, recharge, reuse and harvesting systems 1.3 Determine water collecting and storing processes that do not degrade the water quality 1.4 Determine construction specifications that satisfy organisational

Element	Performance criteria
	and regulatory requirements 1.5 Identify and protect environmentally sensitive areas as required by local, State and National legislation 1.6 Investigate regional geology and geography so that a prediction can be made on the sustainability of irrigation, drainage, storage and treatment system 1.7 Conduct a site investigation to assess type of soil, depth of soil, depth of ground water, water salinity, and structural or chemical impediments and to determine the most cost effective irrigation, drainage, treatment and storage systems 1.8 Document design calculations and decisions
2. Define pumping and power systems	2.1 Identify pumps that can deliver water efficiently when needed, from the water storage at the flow and at the pressure required to operate the distribution system to the design specifications 2.2 Select pump motor combinations that are efficient, reliable, functional, serviceable and flexible for the intended application 2.3 Determine energy requirements and layout of electricity lines and check with local authorities 2.4 Optimise the relationship between capital and operational costs including a comparison of energy sources 2.5 Document performance indicators, design calculations and decisions 2.6 Design construction specifications that define work required to make suitable pumping and power systems available
3. Design an irrigation distribution system	3.1 Investigate regional geology and geography so that a prediction can be made on the sustainability of irrigation 3.2 Evaluate distribution systems and design with respect to a range of key variables 3.3 Size pipes, valves and fittings according to design system specifications so that capital cost is balanced against operation costs over the anticipated system life 3.4 Calculate and document flows, water levels and pressures so that they are within the acceptable tolerances for optimum performance 3.5 Include mechanisms for controlling and adjusting pressure and confirm isolation valves to direct water to areas with different irrigation schedules 3.6 Design distribution and monitoring systems to meet industry recommendations and calculate distribution system flow and velocity 3.7 Design construction plans and specifications that define the work required to achieve the required standards of uniformity and

Element	Performance criteria
	efficiency of water application
4. Design a drainage, storage and treatment system	4.1 Document predictions of leaching fractions and salt movements and develop soil amelioration and drainage management plans 4.2 Determine the need for leachate interception and dewatering system, and if required, prepare construction specifications for interception and collection, water treatment, disposal and reuse or recycle 4.3 Design drainage, storage and treatment systems to meet industry recommendations and calculate distribution system flow and velocity 4.4 Produce construction plans and specifications that define the work required to achieve standards of uniformity and efficiency of the drainage, storage and treatment systems 4.5 Determine if drains and structures are capable of carrying the design water volumes and intensities 4.6 Minimise damage from drainage, storage and treatment system issues 4.7 Use hydrological calculations to predict volumes and rates of surface run-off
5. Determine capital expense budget	5.1 Document design calculations and decisions and communicate relevant information through plans, specifications and manuals 5.2 Determine and document materials requirements from plans and specifications 5.3 Estimate labour requirements based upon documented work schedule with reasonable allowance for variances in work schedules 5.4 Base costing attributed to each component on quoted information from suppliers, or sound analysis of individual elements 5.5 Confirm budget output by checking with an appropriately experienced and qualified person
6. Determine operating expense budget	6.1 Determine an operating expense budget that includes all expenses applicable to the completed irrigation, drainage, storage and treatment systems

Foundation Skills

Foundation Skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

Unit Mapping Information

This unit is equivalent to AHCIRG503A Design irrigation, drainage and water treatment systems.

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=c6399549-9c62-4a5e-bf1a-524b2322cf72>

Assessment Requirements for AHCIRG503 Design irrigation, drainage and water treatment systems

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Performance Evidence

The candidate must be assessed on their ability to integrate and apply the performance requirements of this unit in a workplace setting. Performance must be demonstrated consistently over time and in a suitable range of contexts.

The candidate must provide evidence that they can:

- collect and analyse information
- compare costings
- develop budgets
- develop system specifications
- document outcomes
- identify adverse environmental impacts of irrigation, drainage, water treatment and storage activities and take appropriate remedial action
- identify system design requirements

Knowledge Evidence

The candidate must demonstrate knowledge of:

- contractual development and obligations
- control and monitoring systems
- cost/benefit analysis
- design processes
- developments in irrigation, drainage, storage and treatment technology
- environmental impacts of irrigation, drainage and water treatment
- soil types and their impact on the systems
- work health and safety and environmental protection legislation and regulations, codes of practice and enterprise policies and procedures

Assessment Conditions

Assessors must satisfy current standards for RTOs.

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