



Australian Government

SFIAQU512 Plan and design water supply and disposal systems

Release: 1

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Modification History

Release	Comments
Release 1	This version released with SFI Seafood Industry Training Package Version 2.0.

Application

This unit of competency describes the skills and knowledge required to plan and determine the design and hydraulic requirements for water supply and disposal systems. It includes the ability to allocate pumps and infrastructure, design distribution, storage and treatment systems, and manage budgets and operational procedures.

This unit applies to individuals who have specialised knowledge and technical and management responsibilities for planning and designing water supply and disposal systems for aquaculture workplaces.

All work must be carried out to comply with workplace procedures, according to state/territory health and safety, food safety, biosecurity and environmental regulations, legislation and standards that apply to the workplace.

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

Pre-requisite Unit

Nil

Unit Sector

Aquaculture (AQU)

Elements and Performance Criteria

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Determine design requirements	1.1 Establish water budget based on identifying water sources that ensure water is available in sufficient quantities at all times 1.2 Determine water and soil quality to ensure appropriate

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<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	environment is provided for stock 1.3 Design water transfer, recharge, reuse and treatment systems to conserve natural resources and match requirements for stock 1.4 Position culture or holding structures and systems to make the best use of water resources 1.5 Match water requirements with workplace production forecasts, expansion plans and seasonal variation 1.6 Ensure collection and storage processes do not degrade the water quality for the workplace or the environment 1.7 Document design calculations and decisions according to workplace requirements, ensuring construction specifications define the work required to provide suitable water for workplace 1.8 Identify environmentally sensitive areas and land degradation issues according to legislative requirements 1.9 Determine allowable effluent standards from relevant authority 1.10 Determine technology that will enable the diagnosis of changes in environmental conditions
2. Define pumping and power systems	2.1 Select pumps to deliver water efficiently from the water source or storage according to expert information or advice 2.2 Ensure pump motor combinations are efficient, reliable, functional, serviceable and flexible for the intended application 2.3 Optimise relationship between capital and operational costs and compare energy sources 2.4 Select accessories and performance indicators, and integrate into functional systems that can be monitored and maintained 2.5 Document design calculations and decisions 2.6 Define work required in construction specifications to make suitable pumping and power systems available to workplace 2.7 Check power supply design specification with power authorities 2.8 Identify and minimise risks associated with power configurations, personal safety, water pressures and loads through system design and appropriate operating procedures
3. Design a distribution system	3.1 Commission detailed topographic survey or an accurate map showing extent, pond tank layout, physical constraints and contours with suitable interval

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	3.2 Develop excavation and earth moving plan, identifying internal or outside personnel, labour and machinery 3.3 Determine water budgets according to evaporation and seepage characteristics and water usage practices 3.4 Evaluate distribution systems and design according to system efficiencies, biosecurity and maintenance 3.5 Size pipes, valves and fittings according to design system specifications 3.6 Calculate achievable flows, water levels and pressures for the pumps 3.7 Include mechanisms for controlling and adjusting pressure, and isolation valves to direct water to areas with different water flow schedules 3.8 Design channel systems and attendant structures according to system requirements and calculation of channel flow velocities 3.9 Compare soil types for erodibility to select suitable fill for construction 3.10 Define construction plans and specifications to achieve the desired standards of uniformity and efficiency of water application
4. Design a drainage, storage and treatment system	4.1 Investigate regional geology and geography to predict sustainability of pond construction and water storage 4.2 Use site investigations to determine depth of clay, depth of ground water, soil and water salinity and structural or chemical impediments and calculations 4.3 Use costings to determine the most cost-effective storage system 4.4 Develop designs in conjunction with contractors and authorities 4.5 Design drains and structures capable of carrying planned water volumes and flow intensities 4.6 Incorporate waste-water treatment structures according to design specifications
5. Determine capital expense budget	5.1 Document design calculations and decisions, and communicate relevant information clearly through plans, specifications and manuals 5.2 Organise a competent designer to check design output against workplace objectives 5.3 Determine material requirements and document from plans and

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	specifications 5.4 Estimate labour requirements based upon documented work schedule with reasonable allowance for variances in work schedules 5.5 Attribute costing to each component based upon quoted information from suppliers or sound analysis of individual elements
6. Establish management procedures	6.1 Confirm operating expense budget is applied to the completed water supply and disposal system 6.2 Develop contingency plans in the event of reduced water quality or quantity 6.3 Develop procedures for handling notifications from authorities pertaining to water supply and disposal 6.4 Involve the business in an integrated regional approach to water monitoring, quality and quantity supply issues and future planning 6.5 Research mechanisation or automation of process or activity, including the use of specialised contract services, and introduce as required 6.6 Establish record-keeping procedures for managing water supply and disposal system that meet administrative, workplace and regulatory requirements

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential for performance in this unit of competency but are not explicit in the performance criteria.

Skill	Description
Reading	Research, extract and analyse technical information relating to water supply and disposal systems from a range of sources
Writing	- Document plans, specifications and procedures using appropriate format, clear language and accurate technical terminology - Maintain accurate records relating to water supply and disposal
Oral communication	Participate in verbal exchanges to consult others and organise requirements using technical terminology and specifications

Skill	Description
Numeracy	• Apply mathematical formulae to determine water flow, pressure and velocity and temperature control • Calculate quantities, measurements and sizing of materials and components • Calculate and itemise costs to analyse budget and expenditure

Unit Mapping Information

Code and title current version	Code and title previous version	Comments	Equivalence status
SFIAQU512 Plan and design water supply and disposal systems	SFIAQU507 Plan and design water supply and disposal systems	Extra requirement regarding technology that diagnoses changes in environmental conditions added to performance criteria and knowledge evidence	Not equivalent

Links

Companion Volumes, including Implementation Guides, are available at VETNet: -
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=e31d8c6b-1608-4d77-9f71-9ee749456273>

Assessment Requirements for SFIAQU512 Plan and design water supply and disposal systems

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Performance Evidence

An individual demonstrating competency must satisfy all of the elements and performance criteria in this unit.

There must be evidence that the individual has developed and documented a plan to meet the hydraulic requirements for water supply and disposal systems of an aquaculture facility on at least one occasion, including:

- determined the water supply system design based on facility and legislative requirements
- defined the design requirements for the following systems:
 - pumping and power
 - distribution
 - drainage, storage and treatment
- established operational parameters and procedures for the aquaculture water supply and disposal systems
- developed a detailed budget based on resource requirements.

Knowledge Evidence

An individual must be able to demonstrate the knowledge required to perform the tasks outlined in the elements and performance criteria of this unit. This includes knowledge of:

- processes for designing aquaculture water supply and disposal systems
- basic bookkeeping for managing budgets
- diagnostic methods to check changes in environmental conditions
- key features and obligations within contracts or legal documentation
- key features of legislation relevant to water and disposal systems in an aquaculture setting
- benefits and limitations of options for:
 - automatic control and monitoring systems
 - drainage and storage development technology
 - mechanisation or automation of process or activity
- issues relating to waste management impacts on the environment

- current and emerging pump technology
- current and emerging treatment technology
- biosecurity in the context of water supply and disposal systems.

Assessment Conditions

Assessment of the skills in this unit of competency must take place under the following conditions:

- physical conditions:
 - skills must be demonstrated in an aquaculture workplace or an environment that accurately represents workplace conditions
- resources, equipment and materials:
 - technology for researching and documenting information
- specifications:
 - relevant workplace operational information and budget needed to plan and design water supply and disposal systems.

Assessors of this unit must satisfy the requirements for assessors in applicable vocational education and training legislation, frameworks and/or standards.

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