Title	**Install, commission and maintain micro-hydro systems**		
Level	**4**	**Credits**	**25**

Purpose	People credited with this unit standard are able to demonstrate knowledge and skills to install, commission and maintain micro-hydro systems for residential and small community applications. People credited with this unit standard are able to install, commission and maintain micro-hydro systems.

Classification	Renewable Energy Systems > Renewable Energy Systems - Installation and Maintenance

Available grade	Achieved

Guidance information

1 This unit standard has been developed for learning and assessment on-job.

2 References
All Australian Standards (AS) may be found at www.standards.org.au;
All Australian/New Zealand Standards (AS/NZS) may be found at http://www.standards.govt.nz;
AS/NZS 5139:2019, Electrical installations - Safety of battery systems for use with power conversion equipment;
AS/NZS 4777.1:2024*, Grid connection of energy systems via inverters, Part 1: Installation requirements*;
AS/NZS 4777.2:2020, *Grid connection of energy systems via inverters, Part 2: Inverter requirements (Includes Part 3 Grid Protection Requirements)*;
AS/NZS 3000:2018 Amd3: 2023, *Electrical Installations (known as the Australian/New Zealand Wiring Rules)*;
AS/NZS 4509.1:2009, *Stand-alone power systems - Part 1: Safety and installation*;
AS/NZS 4509.2:2010, *Stand-alone power systems - Part 2: System design*;
and all subsequent amendments and replacements.

3 Definitions
a.c. – alternating current.
Current regulations and standards – in this unit standard this term is used to refer to the requirements of the above references.
d.c. – direct current.
Enterprise policies and procedures – those practices and procedures that have been promulgated by the company or enterprise for use by their employees.
Industry practice – those practices that competent practitioners within the industry recognise as current industry best practice.

4 Range
- a All measurements are to be expressed in Système Internationale (SI) units, and where required, converted from Imperial units into SI units.
- b Candidates shall be supplied by the assessor with formulae involving more than three quantities.
- c Use of a calculator during assessment is permitted.
- d All activities must comply with any policies, procedures, and requirements of the organisations involved.
- e All activities and evidence presented for all outcomes and performance criteria in this unit standard must be in accordance with legislation, enterprise policies and procedures, ethical code, current regulations and standards, industry practice; and where appropriate, manufacturer's instructions, specifications, and data sheets.

5 It is recommended that candidates have been assessed against Unit 27426, *Demonstrate knowledge of d.c. and a.c. machines used for small scale renewable energy systems*; and Unit 27429, *Demonstrate knowledge of micro-hydro systems* prior to assessment to this unit standard.

Outcomes and performance criteria

Outcome 1

Install, commission and maintain micro-hydro systems.

Range may include but is not limited to – installation specification, commissioning specification, and maintenance requirements specification for a chosen micro hydro system at a site.

Performance criteria

1.1 Select an appropriate micro-hydro system to accommodate design considerations.

Range topology of the site, local council approvals, environmental considerations, site access and transport of equipment, water and power transmission distances, daily and seasonal load profiles.

1.2 Construct required water control structures using appropriate safety procedures.

Range may include but is not limited to – weirs, dams, open races, penstocks, strainer systems, intake systems.

1.3 Install a turbine.

1.4 Install associated components.

Range delivery pipe and fittings, transmission cable and voltage, voltage and frequency regulation, battery storage type and capacity, battery charger, inverter, back-up generator, load dump.

1.5 Commission the micro-hydro system.

1.6 Demonstrate fault diagnosis and rectification procedures using appropriate safety procedures.

1.7 Demonstrate maintenance methods using appropriate safety procedures.

1.8 Prepare a maintenance schedule for the system.

1.9 Prepare schematic and wiring diagrams for the micro-hydro system in accordance with relevant Standards AS/NZS 3000, AS/NZS 4509, and AS 4086.2.

Range schematic and wiring diagrams include – general circuit layout, protection between micro-hydro system, batteries, inverter, and loads.

Planned review date	31 December 2026

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	21 July 2011	31 December 2020
Review	2	24 October 2019	N/A
Rollover and Revision	3	27 March 2025	N/A

Consent and Moderation Requirements (CMR) reference	0003

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Comments on this unit standard

Please contact Waihanga Ara Rau Construction and Infrastructure Workforce Development Council qualifications@waihangaararau.nz if you wish to suggest changes to the content of this unit standard.