Title	**Describe the contribution of catchment characteristics to raw water quality management**		
Level	**5**	**Credits**	**8**

Purpose	People credited with this unit standard are able to describe: the environmental factors affecting surface water sources; environmental factors and hydraulics of groundwater sources, and their influence on the suitability of groundwater as a source for drinking-water supply; and catchment risk assessment of a drinking-water surface water catchment and groundwater recharge zone.

Classification	Water Industry > Water Treatment

Available grade	Achieved

Guidance Information

1 Evidence presented for assessment against this unit standard must be consistent with safe working practices and be in accordance with applicable legislative and industry requirements.

2 Legislation and references relevant to this unit standard include: Health and Safety at Work Act 2015, Water Services Act 2021, Resource Management Act 1991, and subsequent amendments;
Ministry of Health, *Drinking-water Standards for New Zealand*, Ministry of Health, Wellington, 2005 (Revised 2018), and subsequent replacements, available at www.taumataarowai.govt.nz.

3 Definitions
Critical control point – Specific point, procedure, or step in water abstraction and treatment processes at which control can be exercised to reduce, eliminate, or prevent the possibility of a public health hazard.
Drinking-water supply – the supply catchment, treatment plant, and distribution including tankers. The drinking-water supplier has responsibility for managing the public health risks of the drinking-water supply.
Industry requirements include manufacturers' specifications; and enterprise requirements which may include documented workplace policies, procedures, specifications, business, and quality management requirements relevant to the workplace in which assessment is carried out.
Water quality – the suitability of water for use as drinking-water, with or without water treatment.

4 Learning and assessment activities for this unit standard must be informed by Te Mana o te Wai (refer to Taumata Arowai) and the *National Policy Statement for Freshwater Management 2020* available from https://environment.govt.nz/.

Outcomes and performance criteria

Outcome 1

Describe the environmental factors affecting surface water sources.

Performance criteria

1.1 Surface water environments are described in terms of their suitability as sources for drinking-water supply.

Range lakes, raw water storage, upland rivers and streams, lowland rivers and streams, off-river storage, rainwater harvesting.

1.2 Surface water sources are described in terms of the influences of the natural and regulatory environment.

Range includes but is not limited to – river or stream topography and hydrology, water quality, stream bed movement, contamination sources, resource consents, catchment land use, recreational use, intake security, eutrophication, aquatic life, lithology, stratification; impact of vegetation – colour type;
soil type, rock type, catchment site.

1.3 The changes in surface water quality under different flow regimes are described in terms of the physical and chemical parameters.

Range includes but is not limited to – turbidity, particulate matter, silts and clays, alkalinity, natural organic matter, micro-organisms, flow, weather patterns, cyanotoxins.

Outcome 2

Describe environmental factors and hydraulics of groundwater sources, and their influence on the suitability of groundwater as a source for drinking-water supply.

Performance criteria

2.1 Groundwater environments are described in terms of their suitability as sources for drinking-water supply.

Range includes but is not limited to – gravels, sands, fractured rock, infiltration zones, recharge areas, aquicludes, confined and unconfined aquifers.

2.2 Bore hydraulics is described in terms of different flow rates.

Range includes but is not limited to – drawdown, cone of depression, piezometric head, observation bore, artesian water, springs, permeability, hydraulic capacity, recharge.

2.3 The changes in groundwater quality with time are described in terms of their physical, chemical and microbiological parameters.

Range includes but is not limited to – turbidity reduction, microbiological removal and die-off, ammonia, pH, carbon dioxide, hydrogen sulphide, iron and manganese solubility, nitrates, carbonates, sulphates, chlorides.

2.4 Groundwater and bore security are identified and described in terms of the influences of the natural environment.

Range includes but is not limited to – surface infiltration, borehead construction and protection, groundwater security criteria, proximity of other bores.

Outcome 3

Describe catchment risk assessment of a drinking-water surface water catchment and groundwater recharge zone.

Performance criteria

3.1 Information sources are identified and consulted relevant to the catchment risk assessment of the drinking-water supply.

Range includes but is not limited to – topographical maps, land use maps, soil maps, regional and district plans, resource consents, site detail by site inspection.

3.2 Critical control points in catchment, and abstraction process, of a drinking-water supply are identified.

Range water source – surface water, groundwater;
considerations for critical control points include but are not limited to – existing and potential sources of contamination, impacts from different land uses, potential future activities, resource consents, regional and district plans.

3.3 Methods for assessment of risks associated with critical control points are described in terms of the likelihood of contamination of the raw water.

3.4 Assessment of contamination of water source is described in terms of the role of sampling and analysis.

Range chemical sampling, microbiological sampling, limitations of information provided by sampling.

3.5 Recording and reporting procedures for results are described.

Range risks and their implications identified, significance of risk evaluated, resource material referenced.

Replacement information	This unit standard and unit standard 24898 replaced unit standard 18448.

Planned review date	31 December 2027

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	19 September 2008	31 December 2018
Review	2	16 March 2017	31 December 2024
Review	3	26 May 2022	N/A

Consent and Moderation Requirements (CMR) reference	0101

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 at qualifications@WaihangaAraRau.nz if you wish to suggest changes to the content of this unit standard.