

Demonstrate knowledge of wastewater collection and treatment systems

Level 3

Credits 10

Purpose People credited with this unit standard are able to describe: the purpose of wastewater collection systems, and the composition of wastewater; the components of wastewater collection and treatment systems; the hydraulics of wastewater collection systems; and the operation of wastewater collection systems.

This unit standard is for people who work in wastewater reticulation systems.

Subfield Water Industry

Domain Water Reticulation

Status Registered

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Accreditation Evaluation of documentation by NZQA and industry.

Standard setting body (SSB) Primary Industry Training Organisation

Accreditation and Moderation Action Plan (AMAP) reference 0179

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

Special notes

Definition

Wastewater includes stormwater and sewage systems.

Elements and performance criteria

Element 1

Describe the purpose of wastewater collection systems, and the composition of wastewater.

Performance criteria

- 1.1 The purpose of wastewater collection systems is described in terms of the protection of public health.
- 1.2 Wastewater is described in terms of domestic and industrial wastewater composition.

Element 2

Describe the components of wastewater collection and treatment systems.

Performance criteria

- 2.1 Sources of domestic and industrial wastewater are described in terms of the quantities and qualities of the wastewater.
 - Range quantity – domestic flows, peak flows, stormwater infiltration, industrial flows;
quality – concentration of pollutants in domestic water, pollutants in industrial wastewater.
- 2.2 Property drainage systems are described in terms of their component parts.
 - Range sink, bath/shower, hand basin, toilet fittings and connections; air venting, back and terminal vents, water traps, odour traps, inspection points, cleaning points, boundary traps, connections to sewers, drains-in-common.
- 2.3 Wastewater pumping stations are described in terms of their design features.
 - Range wet well options, dry well options, pump types and layouts, delivery pipework, level operation devices and alarms, covers, electrical supply and cabling, stand-by provisions, duty and stand-by pumps, facilities for maintenance cleaning.
- 2.4 Wastewater treatment plants are described in terms of type, limitations of treatment processes, and general considerations.
 - Range considerations – environmental resource consents, monitoring; plant types – primary, secondary, tertiary; discharges to – land, streams, rivers, lakes, sea; dilution criteria.

Element 3

Describe the hydraulics of wastewater collection systems.

Performance criteria

- 3.1 The drainage system is described in relation to the natural lie of the land.
- Range catchment identification, pipe size increases with flow and fall reductions, gravity service to property, limitations of roading network relative to gradient required.
- 3.2 The capacity of a gravity sewer is described in terms of the fall available, and diameter.
- Range friction loss over distance, velocity, surcharge, corrosion.
- 3.3 The velocity in a sewer is described in terms of self-cleaning limits.
- Range deposition of solids, scour velocity, minimum slope required, low flow conditions, flushing flows, flushing techniques, sulphide gas production.
- 3.4 Wastewater pumping stations are described in terms of their impact on system hydraulics.
- Range rising mains, pressure concepts, intermittent operation, system head curves against pump pressure, flow curve.

Element 4

Describe the operation of wastewater collection systems.

Performance criteria

- 4.1 Stormwater infiltration is described in terms of the causes and impacts on wastewater flows.
- Range causes – illegal property connections, root penetration, domestic roof flow and infiltration, leaking sewers, access chamber entries, groundwater levels and effects on inflow leaks;
impacts – relative flows, pollution of groundwater and surface water due to leaks and overflows, pumping and treatment, effluent discharge, resource consents.

- 4.2 The sources of grease and fat, and impacts of high grease and fat discharges into a gravity sewer are described in terms of the maintenance required.

Range sources – restaurants, wool scours, meat processing;
impacts – sticking to walls and lining, trapping of other solids, need to rod and clean, treatment and pumping, discharge constraints, Biological Oxygen Demand (BOD), need for fat removal at source (grease traps).

- 4.3 The presence of slime and gases are described in terms of maintenance requirements.

Please note

Providers must be accredited by NZQA, or an inter-institutional body with delegated authority for quality assurance, before they can report credits from assessment against unit standards or deliver courses of study leading to that assessment.

Industry Training Organisations must be accredited by NZQA before they can register credits from assessment against unit standards.

Accredited providers and Industry Training Organisations assessing against unit standards must engage with the moderation system that applies to those standards.

Accreditation requirements and an outline of the moderation system that applies to this standard are outlined in the Accreditation and Moderation Action Plan (AMAP). The AMAP also includes useful information about special requirements for organisations wishing to develop education and training programmes, such as minimum qualifications for tutors and assessors, and special resource requirements.

Comments on this unit standard

Please contact the Primary Industry Training Organisation standards@primaryito.ac.nz if you wish to suggest changes to the content of this unit standard.