

Title	Demonstrate knowledge of the design, construction, and maintenance of road drainage systems		
Level	5	Credits	15

Purpose	<p>This unit standard is for people who are responsible for and require understanding of the design, construction, and maintenance of road drainage systems.</p> <p>People credited with this unit standard are able to demonstrate knowledge of:</p> <ul style="list-style-type: none"> – road drainage system design; – the construction of stormwater systems for road drainage; – the construction of subsoil drainage systems for road drainage; – road drainage system structures and their connections; and – drainage system maintenance.
----------------	--

Classification	Infrastructure Works > Generic Road Works
-----------------------	---

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 relevant legislative and industry requirements. Assessment against this unit standard excludes assessment of knowledge of slinging, lifting, and placing, or trench shoring requirements.
- 2 Legislation and standards relevant to this unit standard include:
 - Health and Safety at Work Act 2015;
 - TNZ F/2: 2000: *Notes on Pipe Subsoil Drain Construction Specification*; available from www.nzta.govt.nz;
 - AS/NZS 1254:2010; *PVC-U pipes and fittings for stormwater and surface water applications*;
 - AS/NZS 1260:2009 *PVC-U pipes and fittings for drain, waste and vent application*;
 - AS/NZS 1462: series *Methods of test for plastics pipes and fittings*;
 - AS/NZS 2033:2008 *Installation of polyethylene pipe systems*;
 - AS/NZS 3725:2007 *Design for installation of buried concrete pipes*;
 - AS/NZS 4058:2007 *Precast concrete pipes (pressure and non-pressure)*;
 - NZS 4406:1986 *Helical lock-seam corrugated steel pipes – Design and installation*; available at <http://www.standards.co.nz>;
 - and all subsequent amendments and replacements.

3 Definitions

Industry requirements refer to relevant policies, processes, methodologies, industry codes of practice, site specific health and safety plans, standard operating procedures, site safety plans, quality plans, work plans, traffic management plans, contract work programmes, job safety analysis, safe work method statements, job instructions, manufacturer's requirements, contract specifications, manuals, procedural documents.

Specialist structure means drainage features such as pump stations, flood gates, and dams.

Technical instructions mean the defined procedures for the method of carrying out the construction process. For this unit standard they include manufacturers' instructions, local authority requirements, and Waka Kotahi New Zealand Transport Agency specifications and guidelines.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of road drainage system design.

Performance criteria

- 1.1 The main considerations involved in road drainage system design are identified and described in accordance with Waka Kotahi New Zealand Transport Agency and local authority requirements.
- 1.2 Methods for providing road drainage are identified and explained in relation to site conditions and local authority requirements.
- Range road drainage – surface stormwater, pavement, subsoil;
site conditions – steep slope, sand, permeable gravel, low water table, high water table, swamp, cambers, crossfall.
- 1.3 Methods for constructing drainage channels to relate to road pavement levels are identified and described.
- Range one method each for – open drain, kerb and channel.
- 1.4 Effects of different pavement compositions on drainage requirements are identified and explained.
- Range chipseal, asphalt, unsealed.

Outcome 2

Demonstrate knowledge of the construction of stormwater systems for road drainage.

Performance criteria

- 2.1 Planning procedures for road drainage works are identified and described in accordance with contract specifications.

- 2.2 The setting out of culvert lines is explained in accordance with technical instructions.
- 2.3 The determining of trench dimensions for road drainage stormwater systems is outlined in accordance with technical instructions.
- Range clearances and fittings batter.
- 2.4 Methods for setting depth and gradient of trench for constructing road drainage stormwater systems are identified and described in accordance with technical instructions.
- 2.5 Placing of pipe bedding in trenches for road stormwater drainage is described in accordance with technical instructions.
- 2.6 The use of geotextiles in road drainage stormwater system construction is described in accordance with technical instructions.

Outcome 3

Demonstrate knowledge of the construction of subsoil drainage systems for road drainage.

Performance criteria

- 3.1 Procedures for constructing subsoil drainage systems are determined and explained in accordance with contract specifications and technical instructions.
- 3.2 Requirements for setting out subsoil lines are determined and explained in accordance with technical instructions.
- 3.3 The determining of trench dimensions is explained in accordance with technical instructions.
- Range clearances and fittings batter.
- 3.4 Methods for setting depth and gradient of trench are explained in accordance with technical instructions.
- 3.5 Installation of filter fabric is described in accordance with technical instructions.
- 3.6 Installation of filter aggregate is described in accordance with technical instructions.
- 3.7 Placing of pipe bedding in trenches is described in accordance with technical instructions.
- 3.8 Orientation of perforations when placing pipes is justified in accordance with technical instructions.

Outcome 4

Demonstrate knowledge of road drainage system structures and their connections.

Range sump, inspection chamber, access point, head wall, drop structure, specialist structure.

Performance criteria

4.1 The purpose and the effect of function on the design of road drainage system structures are identified and explained.

4.2 Requirements for the installation of drainage system structures are described and explained in accordance with technical instructions.

Range clearances and fittings batter.

4.3 Requirements for connecting pipes to drainage system structures are determined and explained in accordance with technical instructions.

Outcome 5

Demonstrate knowledge of drainage system maintenance.

Performance criteria

5.1 Maintenance of drainage system is described in accordance with technical instructions.

Range pavement drainage, underground stormwater pipes, subsoil drainage.

5.2 Maintenance of drains, culverts, and sumps is described in accordance with technical instructions.

5.3 Bridge drainage maintenance is described in accordance with technical instructions.

5.4 The repair of undermined culvert end-walls is described in accordance with technical instructions.

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 December 1998	31 December 2012
Review	2	30 May 2000	31 December 2012
Review	3	25 September 2006	31 December 2012

Process	Version	Date	Last Date for Assessment
Review	4	18 March 2011	31 December 2016
Review	5	19 February 2015	31 December 2023
Review	6	28 October 2021	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 Connexis - Infrastructure Industry Training Organisation
qualifications@connexis.org.nz if you wish to suggest changes to the content of this unit standard.