

Title	Construct culverts and structures for a forestry earthworks site		
Level	3	Credits	20

Purpose	People credited with this standard are able to: prepare for construction of culverts for forestry earthworks; prepare the forestry earthworks site for construction of culverts; prepare bedding for culverts on a forestry earthworks site; lay and join culverts and carry out initial inspection for culverts; install inlet and outlet structures; backfill trench and apply surfacing; and clean up a forestry earthworks site.
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Classification	Infrastructure Works > Forestry Earthworks
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Available grade	Achieved
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Prerequisites	Unit 17769, <i>Demonstrate knowledge of general health, safety, and environmental requirements in forestry</i> ; and Unit 22994, <i>Demonstrate knowledge of factors that affect the performance of forestry workers</i> , or demonstrate equivalent knowledge and skills.
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Guidance Information

- Learning and assessment within this unit standard must be carried out in an infrastructure forestry earthworks environment and in accordance with the following legislation, guidelines, and codes of practice, as relevant to their role, and any subsequent amendments:
 - Health and Safety at Work Act 2015;
 - Resource Management Act 1991;
 - Heritage New Zealand Pouhere Taonga Act 2014;
 - Resource Management (National Environmental Standards for Plantation Forestry) Regulations 2017 User Guide (2018) (forestry earthworks regulations 22-35), available from <https://www.mpi.govt.nz/>;
 - Approved Code of Practice (ACOP) for Safety and Health in Forest Operations (2012), available from <https://www.worksafe.govt.nz/>;
 - Excavation Safety Good Practice Guidelines (2016), available from <https://worksafe.govt.nz/>;
 - Operator Safety Manual for Earthmoving Machinery 2017, available from <https://civilcontractors.co.nz/>;

- Plantation Forestry Code of Practice Eliminating Alcohol and Other Drugs from the Workplace (2015), available from <http://www.nzfoa.org.nz/>;
- New Zealand Forest Road Engineering Manual: Operators Guide 2020, available from <http://www.nzfoa.org.nz/>;
- Forest Practice Guides (2020), available from <http://www.nzfoa.org.nz/>.

2 Definitions

Benchmark is the starting set-out position from which control marks are derived. *Company requirements* include the policy, procedures, and methodologies of the company. They include legislative and regulatory requirements that may apply across the company or to a specific site. Requirements are documented in the company health and safety plans, traffic management plans, work programmes, quality assurance programmes, policies, and procedural documents.

Job prescriptions are those given to the operator prior to undertaking a job. They may include site safety instructions, mapping information, contract drawings, and written memos.

Manufacturer's instructions may include specifications, installation, handling, use and maintenance instructions, and safety data sheets.

Set out means to set out a site by survey method using pegs.

Outcomes and performance criteria

Outcome 1

Prepare for construction of culverts for forestry earthworks.

Performance criteria

- 1.1 Location of culvert is confirmed in accordance with job prescriptions.
- 1.2 Culvert type, class, and capacity is confirmed in accordance with job prescriptions.
- 1.3 Bedding material and backfill are confirmed in accordance with job prescriptions.
- 1.4 Culvert details such as inlets, outlets, aprons, and reinforcing are confirmed in accordance with job prescriptions.
- 1.5 Any existing services are verified in accordance with company requirements.
- 1.6 Responsibilities to adjoining landowners during culvert works are described in accordance with company requirements.
- 1.7 Plant and labour requirements are confirmed in accordance with job prescriptions and company requirements.

Outcome 2

Prepare the forestry earthworks site for construction of culverts.

Performance criteria

- 2.1 The site is set out in accordance with job prescriptions, and onsite survey marks.
- Range may include but is not limited to – levels, benchmarks, alignment, gradients, offsets, measuring equipment, pegs, stakes.
- 2.2 Trench is excavated in accordance with job prescriptions and company requirements.

Outcome 3

Prepare bedding for culverts on a forestry earthworks site.

Performance criteria

- 3.1 Water is removed from the area through which the culvert is to be installed in accordance with job prescriptions and company requirements.
- Range may include but is not limited to – temporary diversion, temporary sump, submersible pump, well pointing, sediment trap.
- 3.2 Alignment and invert levels of trench are checked in accordance with job prescriptions.
- Range may include but is not limited to – benchmarks, levels, alignment, gradient, offsets, pegs, stakes, pipe laser.
- 3.3 Trench bed is trimmed and shaped in accordance with job prescriptions.
- 3.4 Bedding material is placed in trench in accordance with job prescriptions.

Outcome 4

Lay and join culverts and carry out initial inspection for culverts.

Performance criteria

- 4.1 Methods of lifting culverts for laying are described in accordance with manufacturer's instructions and company requirements.
- 4.2 Culverts are orientated and laid ensuring continuous contact and support of collars and barrels in accordance with job prescriptions.
- 4.3 Culverts are firmly bedded in accordance with the requirements of the job prescriptions for compaction.

4.4 Culverts are joined in accordance with job prescriptions, and manufacturer's instructions.

Range at least one of – rubber ring, solvent cement, butt, thermo butt, bevel joint, steel weld, thermo weld, solvent weld, socket joint.

4.5 Culvert and joins are visually inspected on completion of bedding to ensure they meet the requirements of job prescriptions.

Outcome 5

Install inlet and outlet structures.

Performance criteria

5.1 Area for structure is excavated in accordance with job prescriptions and site conditions.

5.2 Culvert ends are prepared for fitting to structure in accordance with job prescriptions.

Range may include but is not limited to – removal of collar, scabbling, saw cutting.

5.3 Structures are installed in accordance with job prescriptions.

Range at least one of – precast, in-situ structure, gabion basket, rockwork, geotextile bag, flume, inlet apron.

5.4 Area around structure is backfilled, compacted, and shaped in accordance with job prescriptions.

Outcome 6

Backfill trench and apply surfacing.

Performance criteria

6.1 Trench is backfilled in accordance with job prescriptions.

Range may include but is not limited to – material type, layer depth, compaction, suitable compaction equipment, testing requirements.

6.2 Trench is surfaced in accordance with job prescriptions.

Outcome 7

Clean up a forestry earthworks site.

Performance criteria

- 7.1 Culvert and structures are inspected to ensure they meet job prescriptions and company requirements.
- 7.2 Quality assurance records are completed in accordance with company requirements.
- 7.3 Surplus materials and debris are removed from the site in accordance with job prescriptions and company requirements.

Planned review date	31 December 2028
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	1 March 2018	31 December 2025
Review	2	25 May 2023	N/A

Consent and Moderation Requirements (CMR) reference	0101
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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.