Title	**Use maps and aerial photographs to establish a plot for commercial forestry**		
Level	**4**	**Credits**	**4**

Purpose	People credited with this unit standard are able to: explain and interpret maps used in forestry operations; explain and interpret aerial photographs used in forestry operations; establish a plot of at least 0.05ha, with at least one change of slope greater than ±1%; and describe developments in surveying in commercial forestry.

Classification	Forestry > Forest Operations Management

Available grade	Achieved

Guidance Information

1 Plots used to establish competency for this unit standard may be any of: pre-harvest inventory plot, quality control plot, permanent sample plot, mid-rotation inventory plot.

2 Topographical maps used to demonstrate competence may be purchased commercially or generated from a forest company's Geographic Information System (GIS).

3 Definitions
Forestry operations – all activities forming a part of the work carried out in a commercial forest including: forest establishment, silviculture, harvesting, forest inventory, and forest and crew management.
Manufacturer's instructions – instructions provided by manufacturers of equipment, used in forestry. These instructions may include details on the correct use and storage of equipment. Examples are operator's manuals and maintenance manuals.
Worksite procedures – documented procedures used by the organisation carrying out the work and applicable to the tasks being carried out. They may include but are not limited to - standard operating procedures, site safety procedures, equipment operating procedures, quality assurance procedures, housekeeping standards, procedures to comply with legislative and local body requirements.

4 Reference
Colley, M. *Forestry handbook / New Zealand Institute of Forestry Inc.* (4th ed). (2005). Christchurch, NZ: New Zealand Institute of Forestry Inc.

Outcomes and performance criteria

Outcome 1

Explain and interpret maps used in forestry operations.

Performance criteria

1.1 The purpose and key features of maps used in forestry operations are explained in accordance with the reference text.

Range maps include – topographical, vegetation, soil, cadastral; key features may include – scale, legend, contour lines, boundaries, land use.

1.2 Distances between grid references (GR) are determined using map measurements.

1.3 Forward and back bearings are determined using a topographical map and compass.

Range a minimum of three specified start and three specified end locations on map.

1.4 Specified positions on a topographical map are located in the field.

Range must include – one position located using natural landmarks, one position located using compass.

1.5 Profile is plotted from a topographical map.

1.6 Gradients of the plotted profile are determined in percentages, degrees, and ratios.

1.7 A specified area on a topographical map is defined.

Range two of – using dot grid, using planimeter, using digitiser.

Outcome 2

Explain and interpret aerial photographs used in forestry operations.

Performance criteria

2.1 The uses of aerial photographs in forestry are explained for forest mapping, forest operations planning, and forest management.

2.2 The management of aerial photographs is explained in terms of acquiring, processing, and storage.

Range digital, film, ortho-rectification, geo-registration in a GIS.

2.3 Different types of aerial photography are explained.

Range vertical, oblique, black and white, colour, infra-red.

2.4 A specified area on an aerial photograph is calculated, and potential sources of error are explained.

Range potential sources of error – relief, tilt displacement.

2.5 Information is plotted from an ortho-photograph to a map.

Range any of – roads, landing, stand boundaries, areas of windthrow.

2.6 At least three land features and at least three vegetation types are determined using a stereoscope.

Outcome 3

Establish a plot of at least 0.05ha, with at least one change of slope greater than ±1%.

Performance criteria

3.1 Surveying instruments are prepared and calibrated in accordance with worksite procedures.

3.2 Plot is established using survey instruments.

3.3 The effect of not closing the traverse on total area is explained.

Outcome 4

Describe developments in surveying in commercial forestry.

Performance criteria

4.1 The principles of the Global Positioning System (GPS) are described in accordance with manufacturer's instructions.

4.2 Situations where GPS can be used in commercial forestry are described in accordance with manufacturer's instructions.

4.3 The principles of the GIS are described in accordance with the reference text.

4.4 Uses of GIS in commercial forestry are described in accordance with the reference text.

Planned review date	31 December 2022

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	28 January 1995	N/A
Review	2	27 May 1998	N/A
Review	3	27 May 2002	N/A
Review	4	16 October 2009	31 December 2017
Review	5	10 December 2015	N/A
Rollover and Revision	6	28 May 2020	N/A

Consent and Moderation Requirements (CMR) reference	0173

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

Comments on this unit standard

Please contact Competenz qualifications@competenz.org.nz if you wish to suggest changes to the content of this unit standard.