Title	**Describe hazards of machine assisted tree felling, and fell trees using machine assistance for arboriculture work**		
Level	**5**	**Credits**	**5**

Purpose	People credited with this unit standard are able to: describe the use of, and associated hazards associated with using, a machine to push trees to assist tree felling; describe the use of, and associated hazards associated with using, a winch or winch equipped machine to back-pull trees for tree felling; prepare for tree felling where machine assistance is required; and fell trees using machine assistance.

Classification	Horticulture > Arboriculture

Available grade	Achieved

Prerequisites	Unit 17258, *Use advanced felling techniques in arboriculture, and describe methods to handle windthrown trees* or equivalent knowledge and skills.

Guidance Information

1 Legislation relevant to this unit standard includes but is not limited to:
- Health and Safety at Work (HSW) Act 2015;
- Resource Management (National Environmental Standards for Plantation Forestry) Amendment Regulations 2018;
  and any subsequent amendments.

2 References
Approved Code of Practice (ACOP) for Safety and Health in Forest Operations, December 2012, available from https://worksafe.govt.nz/;
Tree Felling Best Practice Guide, Forest Owners Association, May 2016, available from http://www.nzfoa.org.nz/resources/file-libraries-resources/health-safety/628-tfellingbpg/file or https://worksafe.govt.nz/;
Machine Assisted Felling Using a Grapple, available from Worksafe – http://worksafe.govt.nz/;
Approved Code of Practice for Operator Protective Structures on Self-Propelled Mobile Mechanical Plant, available from https://www.worksafe.govt.nz/dmsdocument/1679-operator-protective-structures-on-self-propelled-mobile-mechanical-plant.

3 Definitions
Machine assistance – tree felling using machines that can either push or back pull trees.

PPE refers to personal protective equipment and may include but is not limited to high-visibility, protective clothing, gloves, face and eye protection, safety helmet, footwear, hearing protection, and safety devices.
Workplace procedures refer to documented procedures used by the organisation carrying out the work and applicable to the tasks being carried out. Workplace procedures 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 Machines suitable for pushing trees include – skidders; wheeled and tracked excavators with grapple, of a sufficient size (capacity) and traction for the job, with an engineered or purpose-built surface to stop the tree from sliding sideways.
Machines suitable for back-pulling trees include – excavators, tractors, skidders and cable-haulers, winches.

The following devices should not be used for back-pulling trees – electric winches designed for vehicle recovery, winches on the back of chippers designed for feeding.
Situations where a machine is used to assist with felling trees include but are not limited to – where trees are growing along boundaries, close to environmentally sensitive areas, within two tree lengths from roads, close to physical structures, and in other hazardous situations.

5 For the purposes of assessment:
- evidence must be presented in accordance with workplace procedures;
- assessment may be carried out in an on-job or simulated workplace situation;
- tree fellers using machines to assist in felling trees are responsible for the safety of the machine operator, the observer, or any other person directly involved in the felling.

Outcomes and performance criteria

Outcome 1

Describe the use of, and hazards associated with using a machine to push trees to assist tree felling.

Performance criteria

1.1 Describe hazards and associated risks specific to machine pushing of trees in terms of the control measures.

Range includes but is not limited to – tree movement, slope, ground conditions, logging debris, overhead hazards, insufficient hinge wood remaining, pushing point slipping off the tree stem, unexpected movement of machine or attachment, poor communication, obstructed visibility.

1.2 Describe machine pushing of trees in terms of the situations where it may be applied.

Range includes but is not limited to – difficult trees and sites, environmental considerations, hung-up trees, cut-up trees.

1.3 Describe safety requirements and procedures for machine pushing of trees in terms of Codes of Practice and Best Practice Guides.

1.4 Describe machine pushing of trees in terms of the on-site requirements.

Range machine requirements, machine positioning, observer, communication, scarf alignment, quarter cut back cut.

Outcome 2

Describe the use of, and hazards associated with, using machinery to back-pull trees for tree felling.

Performance criteria

2.1 Describe back-pulling of trees in terms of the situations where it may be required.

2.2 Describe safety requirements and procedures for back-pulling trees in terms of Codes of Practice and Best Practice Guides.

2.3 Describe back-pulling of trees in terms of the on-site requirements.

Range machine positioning, winch use, observer, communication, rope use, positioning of strops, scarf alignment away from pulling machine.

2.4 Describe hazards associated with back-pulling trees in terms of the control methods.

Range may include but is not limited to – cable rating, cable testing, undercut/overcut scarf, communication, cable or rope positioning, rope handling, rope bight, tree movement, slope, ground conditions, overhead hazards;
evidence of six hazards is required.

Outcome 3

Prepare for tree felling where machine assistance is required.

Performance criteria

3.1 Wear and maintain PPE.

3.2 Communicate responsibilities for all aspects of the operation to personnel.

3.3 Establish communication between all personnel involved using recognised industry verbal instructions and/or hand signals.

3.4 Assess site to determine factors affecting machine suitability.

Range access, slope, ground conditions, machine capability, pushing point.

3.5 Assess the tree for defects and suitability that may affect felling operations.

3.6 Determine felling method according to the conditions on site and the resources available.

Range direction of fall, safety, equipment, method to be employed.

3.7 Assess machinery and rigging to ensure it meets operational requirements.

Range winch capability, cable and/or rope length, machine weight, machine power, safe working load of cables and/or ropes and rigging.

Outcome 4

Fell trees using machine assistance.

Range one of – back-pull technique, push technique.

Performance criteria

4.1 Evaluate trees for suitability for technique.

4.2 Determine and communicate the felling plan to other personnel involved in the operation.

4.3 Prepare the work area and escape route.

4.4 Carry out felling.

Range sequence of cuts, timing of cuts, rope attachment, communication, use of safe area, machine positioning.

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	24 June 2021	N/A

Consent and Moderation Requirements (CMR) reference	0032

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

Comments on this unit standard

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