

This Technical Data Sheet describes the *typical average properties* of the specified soil.

It is essentially a summary of information obtained from one or more profiles of this soil that were examined and described during the Topoclimate survey or previous surveys. It has been prepared in good faith by trained staff within time and budgetary limits. However, no responsibility or liability can be taken for the accuracy of the information and interpretations. Advise should be sought from soil and landuse experts before making landuse decisions on individual farms and paddocks. The characteristics of the soil at a specific location may differ in some details from those described here. No warranties are expressed or implied unless stated.

Soil name: Acton

Overview

Acton soils occupy about 700 ha on the flood plain of the Acton River in the Mossburn district of northern Southland. They are formed into fine alluvium derived from greywacke and ultrabasic rock. Soils are moderately deep to deep, poorly drained and have silty textures. Gravel occurs in the subsoil of moderately deep soils. Present use is pastoral grazing with sheep, beef cattle and deer. Climate is temperate with cold winters and warm summers, when soils can dry out.

Soil classification

NZ Soil Classification (NZSC):

Melanic Orthic Gley; soils with stones; silty over skeletal.

Previous NZ Genetic Classification:

Gley recent

Classification explanation

The NZSC for Acton soils is consistent with the previous classification. The soils are poorly drained due to a high groundwater table, and accumulation of sediment is sufficiently slow that subsoils show moderate to strong structural development. Subsoils are fertile, with pH >6.0, reflecting the influence of the ultrabasic rock. The soils typically have gravel between 45 and 90cm depth, and have silt loam textures.

Soil phases and variants

Identified units in the Acton soils are:

- Acton undulating moderately deep (AcU2): has gravel between 45 and 90cm depth; occurs on slopes of 0–7°
- Acton undulating deep (AcU1): has no gravel within 90cm depth; occurs on slopes of 0–7°

The soil properties described in this Technical Data Sheet are based on the most common phase, Acton undulating moderately deep (AcU2). Values for other phases and variants can be taken as being similar. Where they differ significantly they are recorded with a separate versatility rating.

Associated soils

Some soils that commonly occur in association with Acton soils are:

- Lumsden: poorly drained shallow soil with gravels within 45cm depth
- Gore: well drained shallow soil on low terraces, with gravels within 45cm depth
- Oreti: well drained shallow soil on intermediate terraces, with gravels within 45cm depth, and a pan in the subsoil

Similar soils

Some soils that have similar properties to Acton soils are:

- Makawera: poorly drained floodplain soil from mixed sources and clayey textures
- Jacobstown: poorly drained floodplain soil from mixed sources, although dominantly greywacke and schist; has silty textures but shows no influence of ultrabasic parent material

Typical profile features

The following is a 'generic' or composite profile description representing the most common combination of characteristics for this soil type. The actual profiles for which descriptions and data are available are listed at the end of this Technical Data Sheet.

Acton profile	Horizon	Depth (cm)	Description
No profile photo of FT22 available	Ap	0–23	Brownish black silt loam; few brown mottles; weak soil strength; strongly developed medium breaking to fine polyhedral structure; abundant roots.
	Ap/Bg	23–34	Brownish grey silt loam; common reddish brown mottles; many wormcasts; slightly firm soil strength; moderately developed medium to coarse blocky structure; many roots.
	Bg	34–66	Yellowish grey slightly gravelly silt loam; many brown mottles; few wormcasts; firm soil strength; moderately developed medium to very coarse blocky structure; few roots.
	2BCg	66–90+	Light grey very gravelly clay loam; common bright brown mottles; dense particle packing; massive structure; gravels slightly weathered and rounded; common roots.

Key profile features

Acton topsoils are about 20–30cm deep with a strongly developed structure. Subsoils have a moderately developed structure. The dominance of grey colours throughout the subsoil reflects the poor drainage.

Typical physical properties

Note: values in *Italics* are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Ap	0–23	Moderate	<i>Moderate</i>	Silt loam	Gravel free
Ap/Bg	23–34	Moderate	<i>Moderate</i>	Silt loam	Gravel free
Bg	34–66	Moderate – High	<i>Slow</i>	Silt loam	Slightly gravelly
2BCg	66–90+	Moderate – High	<i>Moderate</i>	Clay loam	Very gravelly

Profile drainage:	Poor
Plant readily available water:	<i>Moderately high</i>
Potential rooting depth:	Moderately deep
Rooting restriction:	Gravelly subsoil

Key physical properties

Acton soils that are deep have a moderately deep to deep rooting depth (60–90cm), and moderately high plant available water, that may be limited by the subsoil graveliness. The rooting depth may also be limited by poor aeration during wet periods due to the poor drainage and slow subsoil permeability. Texture is dominantly silt loam with clay loams occurring at depth. Topsoil clay content is about 25–30%. Moderately deep soils have gravel below 45cm.

Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ap	0–23	Moderate	Moderate	High	High	High	High	Very low	Low
Ap/Bg	23–34	Moderate	Moderate	Moderate	High	Moderate	High	Very low	Very low
Bg	34–66	Moderate	Low	Moderate	Very high	Low	High	Very low	Very low
2BCg	66–90+	Moderate	Low	Moderate	Very high	Low	High	Very low	Low

Key chemical properties

Topsoil organic matter levels are about 8%, P-retention 20–40% and pH moderate (about 6.0–6.5). Cation exchange and base saturation values are high. Available calcium and magnesium levels are high and potassium levels low. Magnesium levels are high throughout the profile, reflecting the ultrabasic rock parent material. Soil reserve phosphorus and sulphur levels are low. Micronutrient levels are generally adequate.

Vulnerability to environmental degradation

Note: the vulnerability ratings given in the table below are generalised and should not be taken as absolutes for this soil type in all situations. The actual risk depends on the environmental and management conditions prevailing at a particular place and time. Specialist advice should be sought before making management decisions that may have environmental impacts. Where vulnerability ratings of Moderate to Very severe are indicated, advice may be sought from Environment Southland or a farm management consultant.

Vulnerability factor	Rating	Vulnerability compared to other Southland soils
Structural compaction	moderate	These soils have a moderate vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the poor drainage, offset by the moderate clay, organic matter, and P-retention.
Nutrient leaching	slight	These soils have a slight vulnerability to leaching to groundwater. This rating reflects the poor drainage, moderately high water holding capacity and slow permeability.
Topsoil erodibility by water	slight	Due to the moderate clay and organic matter content, topsoil erodibility in these soils is slight. Erodibility is highly dependent on management, particularly when there is no vegetation cover.
Organic matter loss	slight	Vulnerability to long-term decline in soil organic matter levels is partly dependent on soil properties and highly dependent on management practices (e.g., crop residue management and cultivation practices).
Waterlogging	severe	These soils have a severe vulnerability to waterlogging during wet periods. This rating reflects the poor drainage and slow permeability.

General landuse versatility ratings for Acton soils

Note: The versatility ratings in the table below are indicative of the major limitations for semi-intensive to intensive landuse. These ratings differ from those used in the past in that sustainability factors are incorporated in the classification.

Refer to the Topoclimate district soil map or property soil map to determine which of the soil symbols listed below are applicable, then check the versatility ratings for that symbol in the appropriate table.

AcU2 (Acton undulating moderately deep)

AcU1 (Acton undulating deep)

Versatility evaluation for soil AcU2, AcU1		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Inadequate aeration during wet periods; risk of short-term waterlogging after heavy rain
Arable	Limited	Inadequate aeration during wet periods; risk of short-term waterlogging after heavy rain
Intensive pasture	Moderate	Inadequate aeration during wet periods; vulnerability to topsoil structural degradation by cultivation and compaction with heavy stocking.
Forestry	Limited	Inadequate aeration during wet periods; potential flood risk.

Management practices that may improve soil versatility

- Careful management after heavy rain and wet periods will reduce the impact of short-term waterlogging. Intensive stocking, cultivation and heavy vehicular traffic use should be minimised during these periods
- Installation of subsurface tile and mole drains will reduce the risk of aeration limitations and short-term waterlogging.

Soil profiles available for Acton soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
AcU2	FT22	15	✓	✓	✓	✓

Published by Crops for Southland with financial support from Environment Southland.

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