

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: **Glenure**

Overview

Glenure soils occupy about 4,100 ha on terraces and fans in northern, eastern and southern Southland and west Otago. They are formed into moderately deep to deep loess derived from greywacke and schist rock. They are deep, silty, poorly drained soils without a fragipan. At present they are used for pastoral grazing with sheep, dairy and deer with some cropping. Climate varies because of the widespread location of this soil with regular rain in most areas. More inland soils may dry out during dry summers.

Soil classification

NZ Soil Classification (NZSC):

Acid Orthic Gley; stoneless, silty

Previous NZ Genetic Classification:

Yellow-grey earth.

Classification explanation

Glenure soils have been reclassified in this survey as the soil properties are consistent with Gley soils. This is because the poor drainage of Glenure soils is due to a high groundwater table, or water perching on a dense subsoil layer that occurs at greater than 100cm depth. Glenure soils have subsoils that are acidic (pH <5.5), show structural development, typically have gravel at greater than 90cm depth, and silt loam textures.

Soil phases and variants

Identified units in the Glenure soils are:

- Glenure undulating deep (GnU1): has no gravel within 90cm depth; occurs on slopes of 0–7°
- Glenure undulating moderately deep (GnU2): has gravel between 45 and 90cm depth; occurs on slopes of 0–7°
- Glenure rolling deep (GnR1): has no gravel within 90cm depth; occurs on slopes of 7–15°
- Glenure rolling moderately deep (GnR2): has gravel between 45 and 90cm depth; occurs on slopes of 7–15°
- Glenure hilly moderately deep (GnH2): has gravel between 45 and 90cm depth; occurs on slopes of 15–25°

The soil properties described in this Technical Data Sheet are based on the most common phase, Glenure undulating deep (GnU1). Values for other phases and variants can be taken as being similar. Where they differ significantly they are recorded with a separate versatility rating, e.g., Glenure hilly moderately deep (GnH2).

Associated soils

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

- Jacobstown: poorly drained soil formed in alluvium; on floodplains with high groundwater
- Arthurton: Imperfectly drained Brown soil, that is associated with Pallic soils of northern Southland and west Otago.
- Benio: shallow soil formed in old weathered gravely alluvium

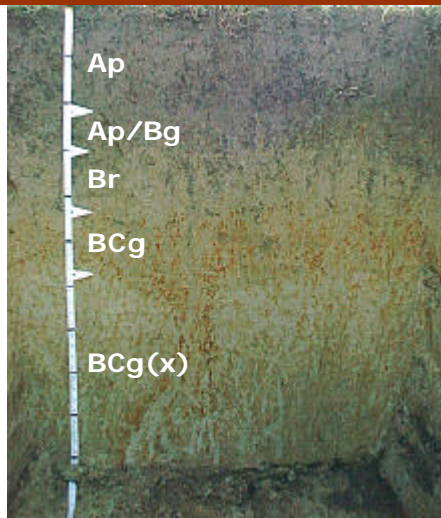
Similar soils

Some soils that have similar properties to Glenure soils are:

- Sobig: moderately deep, poorly drained soil due to water perching on clay bound gravels
- Dipton: shallow, poorly drained soil due to water perching on clay bound gravels
- Waikoikoi: deep, poorly drained, perch-gley soil due to a fragipan
- Athol: deep, poorly drained, perched-gley soil with a degraded fragipan

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.

Glenure profile	Horizon	Depth (cm)	Description
	Ap	0–22	Greyish yellow silt loam; very few bright brown mottles; weak soil strength; moderately developed coarse prismatic and medium blocky structure; abundant roots
	Ap/Bg	22–30	Greyish yellow silt loam; common greyish yellow and few reddish brown mottles; weak soil strength; weakly developed coarse prismatic and medium blocky structure; many roots
	Br	30–43	Greyish yellow silt loam; few bright brown mottles; few worm casts; weak soil strength; weakly developed coarse to very coarse prismatic and extremely fine to medium blocky structure; many roots
	BCg	43–57	Greyish olive loamy silt; common reddish brown and few dull yellow mottles; few worm casts; weak soil strength; massive structure; many roots
	Br	57–90+	Light grey loamy silt; many dull yellow and few bright brown mottles; common light grey veins and bright brown selvedge; slightly firm soil strength; massive structure; common roots
	BCg(x)		

Key profile features

Glenure soils have a topsoil 20–25cm deep that has a moderately developed structure. Subsoil structure is weakly developed, grading to structureless with depth. The dominance of grey colours throughout the subsoil reflects the poor drainage of the soils, and the absence of a fragipan or perching horizon.

Typical physical properties

Note: values in *Italics* are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Ap	0–22	Moderate – High	<i>Moderate</i>	Silt loam	Gravel free
Ap/Bg	22–30	Moderate – High	<i>Moderate</i>	Silt loam	Gravel free
Br	30–43	Moderate – High	<i>Slow</i>	Silt loam	Gravel free
BCg	43–57	Moderate – High	<i>Slow</i>	Loamy silt	Gravel free
BCg(x)	57–90+	High	<i>Slow</i>	Loamy silt	Gravel free

Profile drainage:	Poor
Plant readily available water:	<i>Moderately high</i>
Potential rooting depth:	Deep
Rooting restriction:	Limited subsoil aeration during sustained wet periods

Key physical properties

Glenure soils have a deep rooting depth and high available soil water, although the rooting depth may be limited by poor aeration during wet periods due to the poor drainage and slow subsoil permeability. Textures are silt loam to loamy silt, and the topsoil clay content is 22–30%. The soils are typically stone-free, although the moderately deep phase will have gravel between 45 and 90cm depth. The gravels in the moderately deep phase may reduce the rooting depth and plant available water.

Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ap	0–22	Moderate	Moderate	Moderate	High	Moderate	Low	Very low	Very low
Ap/Bg	22–30	Moderate	Moderate	Low	Moderate	Low	Very low	Very low	Very low
Br	30–43	Moderate	Moderate	Low	Low	Low	Very low	Very low	Very low
BCg	43–57	Moderate	Moderate	Low	Low	Very low	Very low	Very low	Very low
BCg(x)	43–57	Moderate	Low	Low	Low	Very low	Very low	Very low	Very low

Key chemical properties

Topsoil organic matter levels are 5–7%; P-retention values 20–40% and pH levels moderate, with typically the upper subsoil moderately acidic (mid–low 5s). Cation exchange levels are moderate to high in the topsoil but low in the subsoil. Available calcium values are moderate with magnesium and potassium levels low. Reserve phosphorus levels are low. Micronutrient levels are generally adequate although boron responses in brassicas and molybdenum responses in legumes can be expected.

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	severe	These soils have a severe vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the poor drainage, low clay, and P-retention.
Nutrient leaching	slight	These soils have a slight vulnerability to leaching to groundwater. This rating reflects the slow subsoil permeability and high water-holding capacity.
Topsoil erodibility by water	moderate	Due to the low clay and organic matter content, topsoil erodibility in these soils is moderate. 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 slow permeability of the subsoil and poor drainage.

General landuse versatility ratings for Glenure 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.

GnU1 (Glenure undulating deep)

GnU2 (Glenure undulating moderately deep)

Versatility evaluation for soil GnU1, GnU2		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Inadequate aeration during wet periods; vulnerability to topsoil structural degradation by cultivation and compaction.
Arable	Limited	Inadequate aeration during wet periods; vulnerability to topsoil structural degradation by cultivation and compaction.
Intensive pasture	Limited	Vulnerability to topsoil structural degradation by cultivation and compaction; risk of short-term waterlogging after heavy rain.
Forestry	Limited	Inadequate aeration during wet periods: vulnerability to sustained water logging

GnR1 (Glenure rolling deep)**GnR2 (Glenure rolling moderately deep)**

Versatility evaluation for soil GnR1, GnR2		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Inadequate aeration during wet periods; vulnerability to topsoil structural degradation by cultivation and compaction.
Arable	Limited	Inadequate aeration during wet periods; rolling slopes
Intensive pasture	Limited	Vulnerability of topsoil structural degradation by cultivation and compaction; short-term waterlogging risk after heavy rain.
Forestry	Limited	Inadequate aeration during wet periods; vulnerability to sustained waterlogging

GnH2 (Glenure hilly moderately deep)

Versatility evaluation for soil GnH2		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Unsuitable	Hilly slopes
Arable	Unsuitable	Hilly slopes
Intensive pasture	Limited	Risk of short-term waterlogging after heavy rain; hilly slopes
Forestry	Limited	Inadequate aeration during wet periods

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 should be minimised during these periods.
- Installation and maintenance of subsurface mole and tile drains will reduce the risk of short-term waterlogging.
- If compaction occurs, aeration at the correct moisture condition and depth can be of benefit.

Soil profiles available for Glenure soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
GnU1	WT5	24	✓	✓	✓	✓
GnU2	DT6	37	✓	✓	✓	✓
GnU2	FT13	15	✓	✓	✓	✓
GnU2	GMT5	27	✓	✓	✓	✓
GnU1	QT10	42	✓	✓	✓	✓

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