

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: **Hokonui**

Overview

Hokonui soils occupy about 4000ha on fans flanking the Hokonui hills between Mandeville and Mossburn in northern Southland and in local areas in eastern Southland. They are formed in dominantly fine alluvium or *in situ* weathering of tuffaceous argillite, with varying minor inputs of loess derived from greywacke and schist rock. Hokonui soils have poor drainage, moderately deep rooting depth, moderate water holding capacity, and heavy silt loam to clay texture. They are used for pastoral farming with sheep, dairy and beef cattle with some cropping. Soils receive regular rain but can be dry in summer in some years.

Soil classification

NZ Soil Classification (NZSC):

Argillic Perched-gley pallic; stoneless; layered, silty over clayey.

Previous NZ Genetic Classification:

Moderately leached yellow-grey earth

Classification explanation

The NZSC of the Hokonui soil is consistent with the previous classification. Hokonui soils are poorly drained, due to perching of water on a slowly permeable subsoil layer. The soils typically have silty textures in the topsoil, but the lower subsoil is typically more clayey due to the accumulation of clay. The soils are typically stone free.

Soil phases and variants

Identified units in the Hokonui soils are:

- Hokonui undulating deep (HkU1): has no gravel within 90cm depth; occurs on slopes of 0–7°
- Hokonui undulating moderately deep (HkU2): has gravel between 45 and 90cm depth; occurs on slopes of 0–7°
- Hokonui rolling deep (HkR1): has no gravel within 90cm depth; occurs on slopes of 7–15°
- Hokonui rolling moderately deep (HkR2): has gravel between 45 and 90cm depth; occurs on slopes of 7–15°
- Hokonui hilly deep (HkH1): has no gravel within 90cm depth; occurs on slopes of 15–25°

The soil properties described in this Technical Data Sheet are based on the most common phase, Hokonui undulating deep (HkU1). 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., Hokonui hilly deep (HkH1).

Associated soils

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

- Glenure: deep to moderately deep, silty textured poorly drained soil formed in dominantly loess with no fragipan.
- Waikoikoi: deep to moderately deep, silty textured poorly drained soil formed in dominantly loess with a fragipan
- Mandeville: well drained shallow soil, forming onto tuffaceous greywacke bedrock

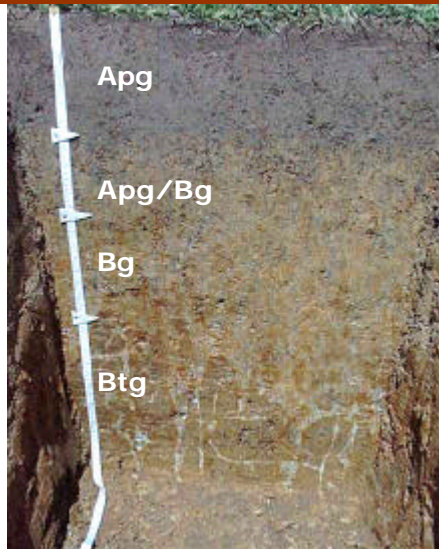
Similar soils

Some soils that have similar properties to Hokonui soils are:

- Pukemutu: poorly drained due to the presence of a fragipan
- Mangapiri: poorly drained, formed in fine colluvium from soft siltstone and mudstone; has clayey textures throughout.
- Sobig: poorly drained due to water perching on clay-bound terrace gravels

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.

Hokonui profile	Horizon	Depth (cm)	Description
	Apg	0–21	Brownish grey silt loam; common brown mottles; weak soil strength; weakly developed medium to coarse blocky structure; abundant roots
	Apg/Bg	21–35	Greyish olive silt loam; many dull yellow and common orange mottles; many worm casts; weak soil strength; weakly developed fine to coarse blocky structure; many roots
	Bg	35–57	Greyish olive silty clay; many orange and common light grey mottles; common worm casts; slightly firm soil strength; weakly developed medium to coarse blocky structure; many roots
	Btg	57–90+	Dull yellowish brown silty clay; many light grey and few brown mottles; abundant light brownish grey clay coats on ped faces; slightly firm soil strength; moderately developed coarse to very coarse blocky and polyhedral structure; common roots
	Btg	57–90+	Dull yellowish brown silty clay; many light grey and few brown mottles; abundant light brownish grey clay coats on ped faces; slightly firm soil strength; moderately developed coarse to very coarse blocky and polyhedral structure; common roots

Key profile features

Hokonui soils have a 18–25cm deep topsoil, with strongly developed structure. Subsoil structure is weakly to moderately developed. Grey colours are dominant in the upper subsoil, with the lower subsoil commonly having a yellow-brown perching layer. The perching layer may be absent, with grey colours dominant throughout the profile.

Typical physical properties

Note: values in *Italics* are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Apg	0–21	Moderate	<i>Moderate</i>	Silt loam	Gravel free
Apg/Bg	21–35	Moderate	<i>Moderate</i>	Silt loam	Gravel free
Bg	35–57	Moderate – High	<i>Slow</i>	Silty clay	Gravel free
Btg	57–90+	High	<i>Slow</i>	Silty clay	Gravel free

Profile drainage:	Poor
Plant readily available water:	<i>Moderate</i>
Potential rooting depth:	Moderately deep
Rooting restriction:	High density in the lower subsoil

Key physical properties

Hokonui soils have moderate plant available water and a moderately deep rooting depth that is limited by the high bulk density in the lower subsoil. The rooting depth may also be limited by poor aeration during wet periods due to the poor drainage and slow subsoil permeability. Textures are heavy silt loam to clay in the upper horizons, and silty clay to clay in the lower subsoil. Topsoil clay content is 30–50%. The soils are typically stone free, although the moderately deep phases will have gravel or bedrock between 45 and 90cm depth.

Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Apg	0–21	<i>Moderate</i>	<i>Low</i>	<i>Moderate</i>	<i>High</i>	<i>High</i>	<i>Moderate</i>	<i>Very low</i>	<i>Low</i>
Apg/Bg	21–35	<i>Moderate</i>	<i>Moderate</i>	<i>Moderate</i>	<i>High</i>	<i>Moderate</i>	<i>Moderate</i>	<i>Very low</i>	<i>Low</i>
Bg	35–57	<i>Moderate</i>	<i>Moderate</i>	<i>Moderate</i>	<i>Moderate</i>	<i>Low</i>	<i>High</i>	<i>Very low</i>	<i>Low</i>
Btg	57–90+	<i>Moderate</i>	<i>Moderate</i>	<i>Moderate</i>	<i>Moderate</i>	<i>Low</i>	<i>High</i>	—	—

Additional chemical properties (as a profile average)

Low sulphate sulphur levels, moderate Kc (reserve potassium) levels.

Key chemical properties

Topsoil organic matter levels are 6–8%; P-retention levels 30–40% and pH values moderate (mid 5s). Subsoil pH values tend to be higher. Cation exchange values are moderate to high with high base saturation. Available calcium and magnesium are moderate to high with potassium low. Reserve phosphorus levels are also low. Micro nutrient 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, but is offset by the high clay content.
Nutrient leaching	slight	These soils have a slight vulnerability to leaching to groundwater. This rating reflects the poor drainage and slow permeability.
Topsoil erodibility by water	minimal	Due to the high clay content, topsoil erodibility in these soils is minimal. Erodibility is highly dependent on management, particularly when there is no vegetation cover.
Organic matter loss	moderate	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 and poor drainage.

General landuse versatility ratings for Hokonui 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.

HkU1 (Hokonui undulating deep)

HkU2 (Hokonui undulating moderately deep)

Versatility evaluation for soil HkU1, HkU2		
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	Limited	Risk of short-term waterlogging after heavy rain
Forestry	Limited	Inadequate aeration during wet periods; vulnerability to sustained waterlogging

HkR1 (Hokonui rolling deep)**HkR2 (Hokonui rolling moderately deep)**

Versatility evaluation for soil HkR1, HkR2		
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; rolling slopes
Intensive pasture	Limited	Risk of short-term waterlogging after heavy rain
Forestry	Limited	Inadequate aeration during wet periods; vulnerability to sustained waterlogging

HkH1 (Hokonui hilly deep)

Versatility evaluation for soil HkH1		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Unsuitable	Hilly slopes
Arable	Unsuitable	Hilly slopes
Intensive pasture	Limited	Hilly slopes; risk of short-term waterlogging after heavy rain
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 sub-surface mole and tile drains will improve aeration, and reduce the risk of short-term waterlogging.

Soil profiles available for Hokonui soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
HKU1	RT8	11	✓	✓	✓	✓
HKU1	M3094	1	✓	✓	✓	
HKU1	QT2	42	✓	✓	✓	✓
HKU1	WCT2	34	✓	✓	✓	✓

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