

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: **Braxton**

### Overview

Braxton soils occupy about 19,300 ha on intermediate terraces adjacent to the Aparima River and Waiiau Valley. They are formed in a mixture of fine alluvium and loess that is derived from tuffaceous greywacke and volcanic rocks of the Takitimu Mountains. These soils are deep to moderately deep, poorly drained, and have silty clay to heavy silt loam textures. They are used for sheep, deer and dairy production with some cropping. Climate is cool temperate with regular summer rain.

### Soil classification

#### NZ Soil Classification (NZSC):

Typic Orthic Gley; stoneless; silty over clayey.

#### Previous NZ Genetic Classification:

Moderately to strongly gleyed intergrade between yellow-brown loams and yellow-brown earths

### Classification explanation

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

### Soil phases and variants

Identified units in the Braxton soils are:

- Braxton undulating deep (BxU1): has no gravel within 90cm depth; occurs on slopes of 0–7°
- Braxton undulating moderately deep (BxU2): has gravel between 45 and 90cm; occurs on slopes of 0–7°
- Braxton rolling deep (BxR1): has no gravel within 90cm depth; occurs on slopes of 7–15°

The soil properties described in this Technical Data Sheet are based on the most common phase, Braxton undulating deep (BxU1). Values for other phases and variants can be taken as being similar.

### Associated soils

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

- Glenelg: well drained, shallow stony soil
- Pukemutu: poorly drained soil due to water perching on subsoil fragipan
- Drummond: Well drained, moderately deep to deep soil

## Similar soils

Some soils that have similar properties to Braxton soils are:

- Sobig: occur on high terraces; moderately deep to deep soils that are poorly drained due to water perching on clay-bound gravel
- Glenure: occur on terraces and downlands in northern Southland; consistently have silty textures
- Dipton: occur on intermediate terraces, shallow soils that are poorly drained due to water perching on clay bound gravel
- Makarewa: occur on floodplains

## 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.

Braxton profile	Horizon	Depth (cm)	Description
	Apg	0–25	Greyish yellow-brown silt loam; few brown mottles; weak soil strength; moderately developed medium polyhedral structure; abundant roots
	Apg/Bg	25–35	Light grey silt loam; common orange mottles; many wormcasts; weak soil strength; moderately developed medium polyhedral structure; abundant roots
	Bg1	35–85	Light grey silty clay; many orange mottles; few wormcasts; slightly firm soil strength; moderately developed medium to coarse blocky structure; many roots
	Bg1	35–85	Light grey silty clay; many orange mottles; few wormcasts; slightly firm soil strength; moderately developed medium to coarse blocky structure; many roots
	Bg2	85–90+	Light grey very slightly gravelly silty clay; many bright brown mottles; slightly firm soil strength; moderately developed medium to coarse blocky structure; few roots

## Key profile features

Braxton soils have a topsoil 20–25cm deep that has a moderately developed structure. Subsoil structural development is also moderate. The dominance of grey colours throughout the subsoil reflects the poor drainage of the soils.

## Typical physical properties

Note: values in *Italics* are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Apg	0–25	Moderate – High	<i>Moderate</i>	Silt loam	Gravel free
Apg/Bg	25–35	Moderate – High	<i>Moderate</i>	Silt loam	Gravel free
Bg1	35–85	Moderate – High	<i>Slow</i>	Silty clay	Gravel free
Bg2	85–90	Moderate – High	<i>Slow</i>	Silty clay	Gravel free

**Profile drainage:** Poor

**Plant readily available water:** *High*

**Potential rooting depth:** Deep

**Rooting restriction:** Limited subsoil aeration during sustained wet periods

## Key physical properties

Braxton 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. Mottles occur in all horizons – another indication of poor drainage. Texture varies between heavy silt loam and silty clay in the subsoil, and silt loam 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.

## Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Apg	0–25	Moderate	Moderate	Moderate	Moderate	Moderate	Low	Very low	Low
Apg/Bg	25–35	Moderate	Moderate	Moderate	High	Moderate	Low	Very low	Low
Bg1	35–85	Moderate	Moderate	Moderate	High	Moderate	High	Very low	Low
Bg2	85–90	Moderate	Moderate	Low	High	Moderate	High	Very low	Low

## Key chemical properties

Topsoil organic matter levels range from 7 to 10%; P-retentions 30–60%, with moderate pH values (5.5–6.2) that change little down the profile. Cation exchange values are moderate and base saturation values high. Available magnesium and potassium are low. Reserve phosphorus values are low. Micro-nutrient levels are generally adequate, although boron responses in brassicas and molybdenum responses in legumes are likely.

## 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
<b>Structural compaction</b>	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.
<b>Nutrient leaching</b>	slight	These soils have a slight vulnerability to leaching to groundwater. This rating reflects the poor drainage, high water-holding capacity and slow subsoil permeability.
<b>Topsoil erodibility by water</b>	slight	Due to the moderate clay content, the topsoil erodibility of these soils is slight. Erodibility is highly dependent on management, particularly when there is no vegetation cover.
<b>Organic matter loss</b>	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).
<b>Waterlogging</b>	severe	These soils have a severe vulnerability to waterlogging during wet periods. This rating reflects the poor drainage and slow subsoil permeability.

## General landuse versatility ratings for Braxton soils

**Note:** The versatility ratings in the table below are indicative of the major limitations for semi-intensive to intensive land use. 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.

**BxU1 (Braxton undulating deep)**

**BxU2 (Braxton undulating moderately deep)**

**BxR1 (Braxton rolling deep)**

Versatility evaluation for soil BxU1, BxU2, BxR1		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Inadequate aeration during wet periods; risk of short-term waterlogging after heavy rainfall.
Arable	Limited	Inadequate aeration during wet periods; risk of short-term water logging after heavy rainfall.
Intensive pasture	Moderate	Inadequate aeration during wet periods; risk of short-term waterlogging after heavy rainfall.
Forestry	Limited	Inadequate aeration during wet periods; vulnerability to sustained waterlogging.

### Management practices that may improve soil versatility

- Careful management after heavy rainfall 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 Braxton soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
Enter	YT13	9	✓	✓	✓	✓
BxU1	CLT6	17	✓	✓	✓	✓
BxU1	CT14	6	✓	✓	✓	✓
BxU2	IT11	8	✓	✓	✓	✓
BxU1	MT6	7	✓	✓	✓	✓
BxU1	ZT8	43	✓	✓	✓	✓

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