

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: **Te Waewae**

Overview

Te Waewae soils occupy about 7,300 ha on old exposed coastal marine high terraces west of Riverton. They are formed in deep wind blown loess. Te Waewae soils are moderately well to imperfectly drained, have a deep rooting depth, very high water-holding capacity and silt loam textures. Present use is pastoral farming with sheep, beef cattle and some dairying. Climate is cool, with the area exposed to the prevailing southwest wind. Rainfall is regular and high (1200–1400mm/annum).

Soil classification

NZ Soil Classification (NZSC):

Typic Firm Brown; stoneless; silty

Previous NZ Genetic Classification:

Strongly to very strongly leached yellow-brown earth.

Classification explanation

The NZSC of the Te Waewae soils is consistent with the previous classification. Te Waewae soils are typically moderately well drained, with yellow-brown subsoils, and rarely suffer from drought. There is a subsoil horizon that is structureless, with slightly firm or greater soil strength that may limit root penetration, and has slow permeability that may cause waterlogging during wet periods. The soils have P-retention of 50–75%, are typically stone free and have silt loam textures to 90cm depth.

Soil phases and variants

Identified units in the Te Waewae soils are:

- Te Waewae undulating deep (TbU1): has no gravel within 90cm depth; occurs on slopes of 0–7°
- Te Waewae rolling deep (TbR1): has no gravel within 90cm depth; occurs on slopes of 7–15°
- Te Waewae hilly deep (TbH1): 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, Te Waewae undulating deep (TbU1). 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., Te Waewae hilly deep (TbH1).

Associated soils

Some soils that commonly occur in association with Te Waewae soils are:

- Colac: very poorly drained soil formed in deep peat
- Orepuke: shallow well drained soil formed onto Gabbroic bedrock
- Waihoaka: Podzol formed in deep loess along the flanks of the Longwood Range

Similar soils

Some soils that have similar properties to Te Waewae soils are:

- Waikiwi: very similar soil profile; occur on high terraces of the Southland Plains; consistently well drained
- Waimatuku: have a similar soil profile and occur on the high terraces of the Southland Plain west of the Waimatuku stream. They have a distinct subsoil fragipan.
- Edendale: have a similar soil profile and occur on intermediate terraces in the lower Mataura and Oreti River valleys; consistently well drained
- Lyoncross: occur on high to intermediate terraces of the lower Waiau Valley; subsoil is well structured to 90cm depth, and P-retention is 35–50%,
- Pourakino: occur on the flanks of the Pourakino Valley; paler colours; P-retention 70–85% throughout the profile

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.

Te Waewae profile	Horizon	Depth (cm)	Description
	Ap	0–24	Greyish yellow-brown silt loam; very few dull yellowish brown mottles; weak soil strength; strongly developed very fine to medium polyhedral structure; abundant roots
	Ap/Bw	24–35	Dull yellowish brown silt loam; very few yellowish brown mottles; many worm casts; weak soil strength; strongly developed coarse polyhedral breaking to very fine polyhedral structure; many roots
	Bw	35–50	Dull yellowish brown silt loam few worm casts; weak soil strength; moderately developed coarse to medium polyhedral structure; many roots
	BC(x)	50–90	Dull yellow orange loamy silt; slightly firm soil strength; massive structure; few roots
	BC(x)	50–90	Dull yellow orange loamy silt; slightly firm soil strength; massive structure; few roots

Key profile features

Te Waewae topsoils are 20–30cm deep, with a strongly developed structure. Subsoils have moderately developed structure that becomes more compact and structureless below 50cm depth. The moderate weathering of the soils is reflected in the yellowish brown colour. Mottles in the upper subsoil can commonly occur, reflecting the moderately well to imperfect drainage.

Typical physical properties

Note: values in *Italics* are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Ap	0–24	Moderate	<i>Moderate</i>	Silt loam	Gravel free
Ap/Bw	24–35	Moderate – High	<i>Moderate</i>	Silt loam	Gravel free
Bw	35–50	Moderate – High	<i>Moderate</i>	Silt loam	Gravel free
BC(x)	50–90	Moderate – High	<i>Slow</i>	Silt loam	Gravel free

Profile drainage:	Moderately well
Plant readily available water:	<i>Very high</i>
Potential rooting depth:	Deep
Rooting restriction:	No major restriction

Key physical properties

Te Waewae soils have a deep rooting depth and very high plant available water, meaning there is no significant physical barrier to root growth. The soils are moderately well to imperfectly drained and the compact subsoil is slowly permeable, which may cause short-term waterlogging after heavy rainfall. Texture is silt loam in all horizons, with topsoil clay content of 20–25%. Te Waewae soils are typically stone free.

Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ap	0–24	Moderate	High	Moderate	Very low	Very low	Moderate	Very low	Moderate
Ap/Bw	24–35	Moderate	High	Moderate	Very low	Very low	Very low	Very low	Low
Bw	35–50	Moderate	High	Low	Very low	Very low	Very low	Moderate	Low
BC(x)	50–90+	Moderate	High	Low	Very low	Very low	Very low	Very low	Low

Key chemical properties

Topsoil organic matter levels are about 7–9%, P-retention 50–75% and pH moderate (high 5s). Cation exchange is moderate and base saturation very low. Available calcium and potassium levels are low and magnesium moderate. Soil reserve phosphorus is 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	slight	These soils have a slight vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the good drainage, and the topsoil clay and P-retention content.
Nutrient leaching	moderate	These soils have a moderate vulnerability to leaching to groundwater. This rating reflects the high water-holding capacity and slow subsoil 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	minimal	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	moderate	These soils have a moderate vulnerability to waterlogging during wet periods. This rating reflects the good drainage, but slowly permeable subsoil.

General landuse versatility ratings for Te Waewae 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.

TbU1 (Te Waewae undulating deep)

Versatility evaluation for soil TbU1		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Moderate	Risk of short-term waterlogging after heavy rain
Arable	Moderate	Risk of short-term waterlogging after heavy rain
Intensive pasture	Moderate	Vulnerability to leaching to groundwater; risk of short-term waterlogging after heavy rain
Forestry	High	No major limitation

TbR1 (Te Waewae rolling deep)

Versatility evaluation for soil TbR1		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Moderate	Risk of short-term waterlogging after heavy rain
Arable	Moderate	Rolling slopes; risk of short-term waterlogging after heavy rain
Intensive pasture	Moderate	Vulnerability to leaching to groundwater; rolling slopes
Forestry	High	No major limitation

TbH1 (Te Waewae hilly deep)

Versatility evaluation for soil TbH1		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Unsuitable	Hilly slopes
Arable	Unsuitable	Hilly slopes
Intensive pasture	Limited	Hilly slopes
Forestry	Moderate	Hilly slopes

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 use should be minimised during these periods.
- Careful management of fertiliser nutrient applications to avoid leaching losses

Soil profiles available for Te Waewae soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
TbU1	OCT1	40	✓	✓	✓	✓
TbR1	CLT1	17	✓	✓	✓	✓
TbU1	176/71/13	17	✓			

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