

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: Drummond

### Overview

Drummond soils occupy about 3,400 ha on low to intermediate terraces in the Aparima and lower Waiau river valleys. They are formed in moderately deep to deep fine alluvium derived from tuffaceous greywacke and volcanic rocks. The soils are well drained, with good potential rooting depth and natural fertility. Drummond soils are highly versatile for a wide range of land uses. Regular summer rainfall occurs, though soils in more inland areas may be seasonally drier.

### Soil classification

**NZ Soil Classification (NZSC):**

Acidic Mafic Brown; stoneless; clayey over silty

**Previous NZ Genetic Classification:**

Yellow-brown earth to Brown-granular loam intergrade

### Classification explanation

The NZSC of the Drummond soil is consistent with the previous classification. Drummond soils have a strongly developed B-horizon, which has brown colours and chemical properties that reflect the influence of volcanic parent material. Subsoils commonly have a pH of less than 5.5. The soils typically have few gravels to at least 45cm, and have silty clay to heavy silt loam textures.

### Soil phases and variants

Identified units in the Drummond soils are:

- Drummond undulating deep (DdU1): has no gravel within 90cm and occurs on slopes of 0–7°
- Drummond undulating moderately deep (DdU2): has a gravelly layer between 45–90cm depth, and occurs on slopes of 0–7°

The soil properties described in this Technical Data Sheet are based on the most common phase, Drummond undulating deep (DdU1). 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., Drummond undulating moderately deep (DdU2).

### Associated soils

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

- Glenelg soils: shallow with gravels at less than 45 cm depth.
- Tuatapere soils: don't have clayey texture and occur on younger land surfaces.
- Braxton soils: poorly drained soils.

## Similar soils

Some soils that have similar properties to Drummond soils are:

- Papatotara soils: similar land surface in the lower Waiau valley, but have higher P-retention (80%+), and silty to loamy textures.
- Otahuti soils: were previously mapped as Drummond soils, but separated because subsoil properties have little volcanic influence.
- McGaw soils: were previously mapped as Drummond soils, but separated because of imperfect drainage and less volcanic influence.

## 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.

	Horizon	Depth (cm)	Description
	Ap	0–23	Greyish yellow brown silty clay; weak soil strength; strongly developed fine polyhedral structure; abundant roots
	Ap/Bw	23–33	Brown silty clay; many worm casts; weak soil strength; strongly developed medium polyhedral structure; many roots
	Bw	33–63	Brown silt loam; common worm casts; weak soil strength; strongly developed medium polyhedral structure; many roots
	BC	63–100	Brown clay loam; few worm casts; weak soil strength; massive; common roots

## Key profile features

Drummond soils have a well-developed topsoil to 20–30cm depth, and strongly developed structure. Subsoils show the influence of volcanic parent material with dark brown colours, strong structure, and good root distribution throughout the profile.

## 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>	Silty clay	Gravel free
Ap/Bw	23–33	Moderate	<i>Moderate</i>	Silty clay	Gravel free
Bw	33–63	Moderate	<i>Moderate</i>	Silt loam	Gravel free
BC	63–100	Moderate	<i>Moderate</i>	Clay loam	Gravel free

<b>Profile Drainage:</b>	Well drained
<b>Plant readily available water:</b>	<i>High</i>
<b>Potential rooting depth:</b>	Deep
<b>Rooting restriction:</b>	No significant restriction

## Key physical properties

Drummond soils have deep potential rooting depth, with no major rooting restriction. The soils are well drained, have good aeration, and high plant available water. Textures are generally silty clay to heavy silt loam, with topsoil clay of 35–40%. The moderately deep phase will have gravels below 45cm depth, resulting in less rooting depth and available water.

## Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ap	0–23	Moderate	Moderate	High	High	High	Moderate	Low	Low
Ap/Bw	23–33	Moderate	Moderate	Moderate	Moderate	High	Moderate	Low	Low
Bw	33–63	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Very low	Moderate
BC	63–100	Moderate	Moderate	Moderate	High	Moderate	High	Very low	Moderate

### Additional chemical properties (as a profile average)

High subsoil levels of sulphate sulphur; reserve Mg and K are very high; reserve and total P high in topsoil, but low to medium in subsoil.

## Key chemical properties

Topsoil organic matter levels are 8–11%; P-retention values 40–70%; pH values usually above 5.7 in all horizons; cation exchange and base saturation values are medium to high. Natural levels of phosphorus, potassium and magnesium are moderate, with responses to P and K occurring in intensive farming operations. 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 risk 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>	Minimal	These soils have a minimal vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the good drainage and silty clay texture.
<b>Nutrient leaching</b>	Moderate	These soils have a moderate vulnerability to leaching to groundwater. This rating reflects the high total available water.
<b>Topsoil erodibility by water</b>	Minimal	Due to the silty clay texture, the topsoil erodibility of these soils is minimal. 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>	Slight	These soils have a slight vulnerability to waterlogging during wet periods. This rating reflects the good drainage and moderate permeability.

## General landuse versatility ratings for Drummond 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.

### DdU1 (Drummond undulating deep)

Versatility evaluation for soil DdU1		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	High	No major limitation
Arable farming	High	No major limitation
Semi-intensive pasture	Moderate	Potential leaching of nutrients to groundwater
Forestry	High	No major limitation

### DdU2 (Drummond undulating moderately deep)

Versatility evaluation for soil DdU2		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Moderate	Potential root depth may be limited by gravels below 45 cm depth
Arable farming	High	No major limitation
Semi-intensive pasture	Moderate	Potential leaching of nutrients to groundwater
Forestry	High	Potential root depth may be limited by gravels below 45 cm depth

### Management practices that may improve soil versatility

- Management of nutrient applications that minimise leaching losses such as avoiding very high rates in a single application and not applying very soluble fertilisers in wet conditions.
- Clayey textures in topsoil may be limiting for cultivation or harvesting of root crops during wet conditions

## Soil profiles available for Drummond soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
DdU1	EMT3	18	✓	✓	✓	✓
DdU1	ONT10	25	✓	✓	✓	✓
DdU1	SB5949	9	✓			
DdU1	SB0135	9	✓	✓	✓	✓
DdU1	YT11	9	✓	✓	✓	✓
DdU2	YT10	9	✓	✓	✓	✓
DdU2	ZT10	43	✓	✓	✓	✓

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