

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: **Redcliff**

### Overview

Redcliff soils occupy about 2,000 ha on collapsed escarpments of high fans and terraces in the mid-Waiiau. They are formed into predominantly gravels of greywacke and basic volcanic rock, but include unmapped variants that are formed onto non-calcareous soft siltstone and mudstone. Redcliff soils show significant influence of basic volcanic parent material and are well drained, with moderate water-holding capacity and a slightly deep rooting depth that is limited by gravelliness that occurs throughout the soil. Present use is pastoral farming with sheep, beef cattle and some deer. Climate is cool temperate with regular rainfall.

### Soil classification

#### NZ Soil Classification (NZSC):

Argillic Orthic Melanic; rounded stoney, tuffaceous sandstone; clayey

#### Previous NZ Genetic Classification:

Yellow-brown earth

### Classification explanation

The NZSC of Redcliff soils has been reclassified because the soil properties are more similar to Melanic than to Brown soils, showing a strong influence of basic volcanic parent material. This is reflected in the dark coloured topsoils and moderate to strong structure to at least 60cm depth. The soils are naturally fertile, with moderate P-retention, high base saturation and pH values of >5.8 throughout the profile. Subsoils also show a significant accumulation of clay. Redcliff soils have a horizon with >35% gravels within 45cm depth, and textures are typically clayey.

### Soil phases and variants

Identified units in the Redcliff soils are:

- Redcliff hilly shallow (ReH3): has gravel within 45cm depth; occurs on slopes of 15–25°
- Redcliff steep shallow (ReS3): has gravel within 45cm depth; occurs on slopes of >25°
- Redcliff rolling shallow (ReR3): has gravel within 45cm depth; occurs on slopes of 7–15°
- Redcliff undulating shallow (ReU3): has gravel within 45cm depth; occurs on slopes of 0–7°

The soil properties described in this Technical Data Sheet are based on the most common phase, Redcliff hilly shallow (ReH3). 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., Redcliff undulating shallow (ReU3).

## Associated soils

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

- Mangapiri: poorly drained moderately deep to deep soil formed dominantly in fine colluvium from soft mudstone and siltstone
- Excelsior: well drained soil formed in moderately deep to deep loess
- Monowai: well drained shallow strongly leached soil formed in glacial outwash terrace gravels from Fiordland
- Sobig: poorly drained moderately deep soil formed into loess overlying terrace gravels

## Similar soils

Some soils that have similar properties to Redcliff soils are:

- Wairaki: well drained shallow Brown soil; formed into thin loess overlying high terrace gravels from greywacke and basic volcanic rocks of the Takitimu Mountains; does not appear to have a significant influence of basic volcanic parent material, compared to Redcliff
- Oteramika: moderately well to imperfectly drained shallow Brown soil; formed into thin loess overlying weathered high terrace gravels from greywacke and basic volcanic rocks of the Southland Plain
- Kaweku: well drained shallow Brown soil; formed into thin loess overlying moderately weathered high terrace gravels from greywacke and schist gravels in the Waimea Plains

## 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.

Redcliff profile	Horizon	Depth (cm)	Description
	Ap	0–26	Brownish black very gravelly silty clay; loose particle packing; strongly developed very fine polyhedral and medium blocky structure; gravels slightly weathered and rounded; abundant roots
	Ap/Bw	26–41	Greyish yellow very gravelly silty clay; many worm casts; compact particle packing; moderately developed very fine to medium blocky structure; gravels slightly weathered and rounded; many roots
	BCt	41–90+	Dull yellowish brown extremely gravelly clay loam; many clay coats lining pores and interstices; compact particle packing; massive structure; gravels slightly weathered and rounded; few roots

## Key profile features

Redcliff soils have a 25–30cm depth topsoil that is characterised by the dark colour and strongly developed fine structure. Subsoil structure is strong to moderate, grading to structureless in the lower subsoil. Subsoils show a significant accumulation of clay, that increases in abundance with depth.

## Typical physical properties

Note: values in *Italics* are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Ap	0–26	—	<i>Moderate</i>	Silty clay	Moderately gravelly
Ap/Bw	26–41	—	<i>Moderate</i>	Silty clay	Very gravelly
BCt	41–90+	—	<i>Moderate</i>	Clay loam	Extremely gravelly

**Profile drainage:** Well  
**Plant readily available water:** *Moderate*  
**Potential rooting depth:** Slightly deep  
**Rooting restriction:** Gravelly subsoil

## Key physical properties

Redcliff soils have moderate available water and a slightly deep rooting depth that is restricted by the gravelliness of the subsoil. These soils are well drained, with good aeration and moderate permeability throughout the soil. Textures are typically silty clay to clay loam, with topsoil clay content of about 35%. The soils are gravelly throughout, and typically have at least 35% gravel within 45cm depth. Soft siltstone or mudstone bedrock may occur in the lower subsoil.

## Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ap	0–26	Moderate	Moderate	High	Moderate	High	High	High	Low
Ap/Bw	26–41	Moderate	High	Moderate	Moderate	High	High	Low	Low
BCt	41–90+	Moderate	Moderate	High	Moderate	High	High	Very low	Moderate

## Key chemical properties

Topsoil organic matter content is about 9%; P-retention 50–60%, and pH moderate (high5s to low 6s). Cation exchange is high and base saturation moderate. Available calcium, magnesium and potassium values are high. Soil reserve phosphorus levels are 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
<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, moderate P-retention, organic matter levels, and clay content.
<b>Nutrient leaching</b>	severe	These soils have a very severe vulnerability to leaching to groundwater. This rating reflects the good drainage, moderate permeability, and moderate water-holding capacity.
<b>Topsoil erodibility by water</b>	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.
<b>Organic matter loss</b>	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).
<b>Waterlogging</b>	slight	These soils have a slight vulnerability to waterlogging during wet periods. This rating reflects the good drainage.

## General landuse versatility ratings for Redcliff 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.

### ReH3 (Redcliff hilly shallow)

Versatility evaluation for soil ReH3		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Unsuitable	Hilly slope
Arable	Unsuitable	Hilly slope
Intensive pasture	Limited	Hilly slope; restricted rooting depth
Forestry	Limited	Restricted rooting depth

### ReS3 (Redcliff steep shallow)

Versatility evaluation for soil ReS3		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Unsuitable	Steep slope
Arable	Unsuitable	Steep slope
Intensive pasture	Limited	Steep slopes; restricted rooting depth
Forestry	Limited	Steep slopes; restricted rooting depth

**ReU3 (Redcliff undulating shallow)**  
**ReR3 (Redcliff rolling shallow)**

Versatility evaluation for soil ReU3, ReR3		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Restricted rooting depth
Arable	Limited	Restricted rooting depth; rolling slopes for Rolling phase
Intensive pasture	Limited	Restricted rooting depth
Forestry	Limited	Restricted rooting depth

**Management practices that may improve soil versatility**

- Management of nutrient applications so as to minimise leaching losses

## Soil profiles available for Redcliff soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
ReH3	MT 3	7	✓	✓	✓	✓
Reh3	158/75/7	7	✓			

Published by Crops for Southland with financial support from Environment Southland.

**Copyright © 2002, Crops for Southland**

This Technical Data Sheet may be reproduced in whole or in part and in any form for educational or non-profit purposes without special permission from the copyright holder, provided acknowledgement of the source is made. Crops for Southland and Environment Southland would appreciate receiving a copy of any publication that uses this Technical Data Sheet as a source.

No use of this Technical Data Sheet may be made for resale or for any other commercial purpose whatsoever without prior permission in writing from Crops for Southland.

Crops for Southland  
 PO Box 1306, Invercargill. New Zealand



[www.cropssouthland.co.nz](http://www.cropssouthland.co.nz)