

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: Northope

### Overview

Northope soils occupy about 1,600 ha on the flood plains and low terraces of the Oreti River south of Benmore. They are formed in dominantly deep fine alluvium, with gravel occurring below 45cm in some places. Northope soils have heavy silt loam texture and imperfect drainage, causing limited seasonal wetness. Northope soils are suitable for a wide range of farming activities and receive regular summer rainfall.

### Soil classification

**NZ Soil Classification (NZSC):**

Mottled-pedal Immature Pallic; stoneless; silty

**Previous NZ Genetic Classification:**

Recent Soil

### Classification explanation

These soils were previously classified as Recent soils, but have been separated because they show greater soil development than occurs in Recent soils. Northope soils have moderately developed subsoil structure and heavy silt loam textures to 90cm depth. The slowly permeable subsoil causes the soils to be imperfectly drained.

### Soil phases and variants

Identified units in the Northope soils are:

- Northope undulating deep (NhU1): has no gravel within 100cm and slopes of 0–7°
- Northope undulating moderately deep (NhU2): has gravel between 45 and 90cm and slopes of 0–7°

The soil properties described in this Technical Data Sheet are based on the most common phase, Northope undulating deep (NhU1). Values for other phases and variants can be taken as being similar.

### Associated soils

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

- Riversdale: well drained, shallow soils with gravel at less than 45cm depth
- Matura: found on the active, accumulating floodplain. Classified as Recent soils with no B horizon development in the subsoil
- Makarewa: poorly drained
- Caroline: poorly drained, with an iron pan

## Similar soils

Some soils that have similar properties to Northhope soils are:

- Winton: well drained equivalent of the Northhope soil
- Ardlussa: well drained, and textures are generally not heavy silt loams. Classified as Brown soils with P-retention of greater than 30%

## 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.

Northhope profile	Horizon	Depth (cm)	Description
	Ap	0–26	Greyish yellow-brown silt loam; weak soil strength; moderately developed medium polyhedral structure; abundant roots
	Ap/Bw(g)	26–40	Dull yellowish brown silt loam; few greyish yellow and bright brown mottles; many wormcasts; weak soil strength; strongly developed fine to medium polyhedral structure; abundant roots
	Bw(g)	40–65	Dull yellowish brown silt loam; common yellowish grey and bright brown mottles; few wormcasts; slightly firm soil strength; moderately developed coarse to medium prismatic structure; many roots
	BC(g)	65–100	Dull yellowish brown silt loam; common yellowish grey and bright brown mottles; weak soil strength; weakly developed coarse prismatic structure; few roots
	BC(g)	65–100	Dull yellowish brown silt loam; common yellowish grey and bright brown mottles; weak soil strength; weakly developed coarse prismatic structure; few roots

## Key profile features

Northhope soils have well-developed topsoil to around 25cm depth, with mottles below the topsoil indicating imperfect drainage. Structure is moderate grading to weakly developed in the lower subsoil. Although roots are evident to 100cm, they generally become restricted in the lower subsoil.

## Typical physical properties

Note: values in *Italics* are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Ap	0–26	Moderate – High	<i>Moderate</i>	Silt loam	Gravel free
Ap/Bw(g)	26–40	Moderate – High	<i>Moderate</i>	Silt loam	Gravel free
Bw(g)	40–65	Moderate – High	<i>Moderate</i>	Silt loam	Gravel free
BC(g)	65–100	Moderate – High	<i>Moderate</i>	Silt loam	Gravel free

**Profile drainage:** Imperfect  
**Plant readily available water:** *Moderate – high*  
**Potential rooting depth:** Deep  
**Rooting restriction:** root penetrability becomes limited in the lower subsoil

## Key physical properties

Northope soils have no rooting barrier, but have high bulk density that limits the degree of subsoil root growth. Aeration is limited for parts of the year. Textures are generally heavy silt loam to silty clay, with clay content of 30–40% in the topsoil. They are dominantly gravel free, although moderately deep soils do have gravelly layers below 45cm depth.

## Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ap	0–26	Moderate	Low	Moderate	Very high	High	Moderate	Very low	Low
Ap/Bw(g)	26–40	Moderate	Moderate	Moderate	High	High	Moderate	Very low	Low
Bw(g)	40–65	Moderate	Moderate	Moderate	High	Moderate	Moderate	Very low	Low
BC(g)	65–100	Moderate	Low	Moderate	High	Moderate	Moderate	Very low	Low

## Key chemical properties

Topsoil organic matter levels are 4–6%; P-retention values mostly under 30%; pH values are moderate and tend to increase down the profile. Cation exchange values are moderate and base saturation values high, as are calcium values, reflecting the influence of limestone outcrops upstream of these soils. Reserves of phosphorus, potassium, sulphur and nitrogen are low, with good pasture and crop responses to these nutrients. 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 should be sought from Environment Southland or a farm management consultant.

Vulnerability factor	Rating	Vulnerability compared to other Southland soils
<b>Structural compaction</b>	Severe	These soils have a severe vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the imperfect drainage and low P-retention.
<b>Nutrient leaching</b>	Moderate	These soils have a moderate vulnerability to leaching to groundwater. The vulnerability will vary, depending on the amount of gravel in the subsoil, which determines the subsoil water holding capacity.
<b>Topsoil erodibility by water</b>	Slight	Due to the heavy silt loam texture, 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>	Moderate	These soils have a moderate vulnerability to waterlogging during wet periods. This rating reflects the imperfect drainage and undulating slopes.

## General landuse versatility ratings for Northhope 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.

### NhU1 (Northhope undulating deep)

### NhU2 (Northhope undulating moderately deep)

Versatility evaluation for soil NhU1 and NhU2		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Moderate	Inadequate aeration for sustained periods; restricted subsoil root penetrability
Arable	Moderate	Aeration in winter/early spring and structural vulnerability to compaction with continuous cropping
Intensive pasture	Moderate	Aeration in winter/early spring and structural vulnerability to compaction with continuous cropping
Forestry	Limited	Flooding for long term crops

### Management practices that may improve soil versatility

- Flood protection
- Installation of artificial drainage to remove excess water during wet periods.
- Careful management of stocking and minimal cultivation when soils are wet.

## Soil profiles available for Northhope soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
NhU1	IT9	8	✓	✓	✓	✓
NhU1	CT5	6	✓	✓	✓	✓
NhU1	XT4	13	✓	✓	✓	✓
NhU1	YT4	9	✓	✓	✓	✓

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