

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: Edendale

Overview

Edendale soils occupy 9,700 ha of land on gently sloping to undulating intermediate terraces in the lower Mataura and Oreti river valleys. They are formed in deep wind-blown loess derived from greywacke and schist rocks. Edendale soils are well drained and have a deep rooting depth, high water-holding capacity, and silt loam textures. They are high producing soils currently used for intensive sheep, dairy and deer production, with limited cropping. They have a cool temperate climate with rain over the year and seldom dry out.

Soil classification

NZ Soil Classification (NZSC):

Typic Firm Brown; stoneless; silty

Previous NZ Genetic Classification:

Lowland Yellow-Brown Earth

Classification explanation

The NZSC of the Edendale soils is consistent with the previous classification. Edendale soils are well-drained soils 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 30-85%, are typically stone free and have silt loam textures to 90cm depth.

Soil phases and variants

Identified units in the Edendale soils are:

- Edendale undulating deep (EdU1): has no gravel within 100cm and slopes of 0-7°
- Edendale undulating moderately deep (EdU2): has gravel between 50 and 100cm and slopes of 0-7°
- Edendale undulating deep, imperfectly drained variant (EdU1vi): has imperfect drainage, no gravel within 100cm and slopes of 0-7°
- Edendale rolling deep (EdR1): has no gravel within 100cm and slopes of 8-15°

The soil properties described in this Technical Data Sheet are based on the most common phase, Edendale undulating deep (EdU1). 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., Edendale rolling deep (EdR1).

Associated soils

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

- Mokotua: imperfectly drained soils on the same landform west of Invercargill
- Arthurton: imperfectly drained soils on the same landform in the Edendale township area
- Waikoikoi: poorly drained soils on low terraces and foot slopes of adjacent high terraces
- Jacobstown: poorly drained soils on floodplains.

Similar soils

Some soils that have similar properties to Edendale soils are:

- Clinton: occur on undulating fans west of Clinton township; have P-retention of 30-45% throughout profile.
- Pourakino: occur on the flanks of the Pourakino Valley; paler colours; P-retention 70-85% throughout profile.
- Waikiwi: very similar soil profile; occur on high terraces of the Southland Plains.
- Waimatuku: very similar soil profile; occur on high terraces of the Southland Plains west of the Waimatuku Stream; have a distinct subsoil fragipan.

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.

Edendale profile	Horizon	Depth (cm)	Description
	Ap	0-20	Dark greyish brown silt loam; weak soil strength; strongly developed, fine to medium, polyhedral structure; abundant roots.
	Ap/Bw	20-30	Dull yellowish brown silt loam, 50% worm mixed; weak soil strength; strongly developed, fine to medium, polyhedral structure; many roots
	Bw	30-55	Dull yellowish brown silt loam; weak soil strength; moderately developed, medium to fine, polyhedral structure; common roots
	BC	55-100	Dull yellowish brown silt loam; firm soil strength; apedal, massive; few roots

Key profile features

Edendale soils have topsoils 20-30cm deep with moderate to strongly developed structure. Subsoils have moderate structure that becomes more compact and structureless below 50cm depth. The moderate weathering of the soil is reflected in the yellowish brown colour.

Typical physical properties

Note: values in *Italics* are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Ap	0-20	Moderate	<i>Moderate</i>	Silt loam	Gravel free
Ap/Bw	20-30	Moderate	<i>Moderate</i>	Silt loam	Gravel free
Bw	30-55	Moderate – High	<i>Moderate</i>	Silt loam	Gravel free
BC	55-100	High	<i>Slow</i>	Silt loam	Gravel free

Profile drainage: Well
Plant readily available water: *Moderately high*
Potential rooting depth: Deep
Rooting restriction: No major restriction

Key physical properties

Edendale soils have a deep rooting depth and high plant-available water, meaning there is no significant physical barrier to root growth. The soils are well drained but the compact subsoil is slowly permeable, and may cause short-term waterlogging after heavy rainfall. Texture is silt loam in all horizons, with topsoil clay content of 25-30%. Edendale soils are typically stone free, although the moderately deep phases have gravels between 45 and 90cm depth that may restrict rooting depth and available water to moderately high.

Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ap	0–20	Moderate	Moderate	Moderate	Moderate	Moderate	Low	Moderate	Low
Ap/Bw	20–30	Moderate	High	Moderate	Moderate	Low	Very low	Very low	Low
Bw	30–35	Moderate	High	Moderate	Moderate	Very low	Very low	Very low	Low
BC	55–100	Moderate	Moderate	Low	Moderate	Very low	Very low	Very low	Low

Additional chemical properties (as a profile average)

Reserves of magnesium are high and of potassium are moderate

Key chemical properties

Topsoil organic matter levels are 10-15%, P retention values 55-75%, pH values are usually above 5.5 in all horizons, with moderate cation exchange capacity and base saturation values. Natural reserves of P, K, Mg, and S are moderate to high. Soils respond well to lime and phosphate. Potassium and nitrogen are required in intensive use situations. Micro-nutrient levels are generally adequate, although boron responses in brassicas and molybdenum responses in legumes can occur.

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 values.
Nutrient leaching	moderate	These soils have a moderate vulnerability to leaching to groundwater. This rating reflects the moderately high water-holding capacity and slow subsoil permeability offset by the good profile drainage.
Topsoil erodibility by water	slight	Due to the clay 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	slight	These soils have a slight vulnerability to waterlogging during wet periods. This rating reflects the good drainage but slowly permeable subsoil.

General landuse versatility ratings for Edendale 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.

EdU1 (Edendale undulating deep)

EdU1vi (Edendale undulating deep, imperfectly drained variant)

Versatility evaluation for soil EdU1, EdU1vi		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Moderate	Short-term waterlogging after heavy rain
Arable	Moderate	Short-term waterlogging after heavy rain
Intensive pasture	High	Vulnerability to leaching to groundwater
Forestry	High	Few limitations

EdU2 (Edendale undulating moderately deep)

Versatility evaluation for soil EdU2		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Moderate	Short-term waterlogging after heavy rain
Arable	Moderate	Short-term waterlogging after heavy rain
Intensive pasture	High	Vulnerability to leaching to groundwater
Forestry	Moderate	Restricted rooting depth

EdR1 (Edendale rolling deep)

Versatility evaluation for soil EdR1		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Moderate	Rolling slopes; risk of short-term waterlogging after heavy rain
Arable	Limited	Rolling slopes
Intensive pasture	High	Rolling slopes; vulnerability to leaching to groundwater
Forestry	High	Few limitations

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 vehicular traffic should be minimised during these periods.
- Installation and maintenance of subsurface drainage with moles and tiles may reduce the risk of short-term waterlogging
- If compaction occurs, aerating at the correct depth and moisture condition can be of benefit.

Soil profiles available for Edendale soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
EdU1	CT4	6	✓	✓	✓	✓
EdU1	JT13	21	✓	✓	✓	✓
EdU1	JT4	21	✓	✓	✓	✓
EdU1	176/74/5	8	✓			
EdU1	SB10134	28A	✓	✓	✓	

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