

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: **Stonycreek**

Overview

Stonycreek soils occupy about 700 ha on lower slopes on the north side of the Hokonui Hills. They are formed into a thin layer of loess mixed with colluvium derived from tuffaceous greywacke rock. Soils are imperfectly to poorly drained, with a slightly deep rooting depth, and moderate plant available water. Present use is pastoral farming with sheep, deer and beef cattle. Climate is temperate with regular rainfall during the year, though summers can be seasonally dry.

Soil classification

NZ Soil Classification (NZSC):

Mottled Orthic Melanic; angular-stony, tuffaceous greywacke; silty.

Previous NZ Genetic Classification:

Weakly weathered yellow-grey earth.

Classification explanation

The NZSC of Stonycreek soils has been reclassified because the soil properties are more similar to Melanic than to Pallic soils. This is reflected in the dark coloured topsoils and moderate to strong structure to at least 60cm depth. The soils are naturally fertile, with low P-retention, high base saturation and pH values of >5.8 throughout the profile. Stonycreek soils typically have a horizon with >35% gravels within 45cm depth, and textures are typically silt loam in the topsoil.

Soil phases and variants

Identified units in the Stonycreek soils are:

- Stonycreek rolling shallow (StR3): has gravel within 45cm depth; occurs on slopes of 7–15°
- Stonycreek undulating shallow (StU3): has gravel within 45cm depth; occurs on slopes of 0–7°
- Stonycreek hilly shallow (StH3): has gravel within 45cm depth; occurs on slopes of 15–25°

The soil properties described in this Technical Data Sheet are based on the most common phase, Stonycreek rolling shallow (StR3). 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., Stonycreek undulating shallow (StU3).

Associated soils

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

- Kaihiku: well drained shallow soils formed in gravelly tuffaceous greywacke colluvium
- Mandeville: well drained shallow soils forming onto bedrock within 45cm depth
- Glenure: poorly drained deep to moderately deep soils formed into loess

Similar soils

Some soils that have similar properties to Stonycreek soils are:

- Mossburn: poorly drained deep to moderately deep soil formed into loess and gravelly colluvium
- Lintley: poorly drained shallow soil formed into greywacke fan gravels

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.

Stonycreek profile	Horizon	Depth (cm)	Description
	Ap	0–25	Dark brown very gravelly silt loam; slightly firm soil strength; strongly developed fine polyhedral structure; abundant roots.
	Ap/Bw	25–33	Yellowish brown very gravelly silt loam; slightly firm soil strength; moderately developed fine blocky and polyhedral structure; abundant roots
	Bw(g)		
	Bt(g)	33–43	Yellowish brown very gravelly clay loam; many light grey and yellowish brown mottles; slightly firm soil strength; moderately developed coarse blocky structure; many roots
	Bt(g)	43–66	Yellowish brown very gravelly clay loam; many light grey and yellowish brown mottles; firm soil strength; weakly developed coarse blocky structure; many clay coats lining pores and ped faces; common roots
	2Bt(g)	66–90+	Yellowish brown moderately gravelly silty clay; few light olive firm veins with strong brown selvedge; soil strength; weakly developed coarse prismatic breaking to medium blocky structure; many clay coats lining pores and ped faces; few roots

Key profile features

Stonycreek topsoils are 15–25cm deep, with a strongly developed structure. Subsoil structure is moderately developed, grading to weakly developed 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	0–25	—	<i>Moderate</i>	Silt loam	Very gravelly
Ap/Bw	25–33	—	<i>Moderate</i>	Silt loam	Very gravelly
Bw(g)	33–43	—	<i>Slow</i>	Clay loam	Very gravelly
Bt(g)	43–66	—	<i>Slow</i>	Clay loam	Very gravelly
2Bt(g)	66–90+	—	<i>Slow</i>	Silty clay	Moderately gravelly

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

Key physical properties

Stonycreek soils have moderate plant available water and a slightly deep (45–60cm) rooting depth that is limited by the subsoil gravels. The soils are imperfectly to poorly drained, with the aeration being limited by the slow subsoil permeability. Textures are silt loams in the topsoil, with heavier clay loams to silty clay in the subsoil. Topsoil clay content is about 20–30%. Gravel occurs throughout the profile, but may vary in abundance.

Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ap	0–25	Moderate	Moderate	Moderate	High	Moderate	Moderate	Moderate	Low
Ap/Bw	25–33	Moderate	Moderate	Moderate	High	Low	Moderate	Very low	Low
Bw(g)	33–43	Moderate	Low	Moderate	High	Moderate	High	Very low	Low
Bt(g)	43–66	Moderate	Low	Moderate	High	Moderate	High	Very low	Moderate
2BCt(g)	66–90+	High	Low	Moderate	High	Moderate	High	Very low	Moderate

Key chemical properties

Topsoil organic matter levels are about 6%, P-retention 20–35% and topsoil pH moderate (high 5s). Subsoil pH increases with depth (typically >6.0). Cation exchange levels are moderate and base saturation levels high. Available calcium and magnesium levels are moderate and potassium and sodium moderate to low. Soil reserves of phosphorus 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
Structural compaction	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 to poor drainage, with moderate to low organic matter, clay and P-retention.
Nutrient leaching	severe	These soils have a severe vulnerability to leaching to groundwater. This rating reflects the imperfect drainage and slow permeability, but moderate water holding capacity. <u>Poorly drained soils are likely to be moderately vulnerable.</u>
Topsoil erodibility by water	moderate	Due to the moderate to low clay and organic matter levels, topsoil erodibility in these soils is moderate. Erodibility is highly dependent on management, particularly when there is no vegetation cover.
Organic matter loss	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).
Waterlogging	moderate	These soils have a moderate vulnerability to waterlogging during wet periods. This rating reflects the imperfect to poor drainage and slow permeability.

General landuse versatility ratings for Stonycreek 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.

StR3 (Stonycreek rolling shallow)

Versatility evaluation for soil StR3		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Inadequate aeration; restricted rooting depth
Arable	Limited	Rolling slopes
Intensive pasture	Moderate	Inadequate aeration; restricted rooting depth
Forestry	Limited	Restricted rooting depth

StU3 (Stonycreek undulating shallow)

Versatility evaluation for soil StU3		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Inadequate aeration; restricted rooting depth
Arable	Moderate	Inadequate aeration; vulnerability to structural compaction
Intensive pasture	Moderate	Inadequate aeration; restricted rooting depth
Forestry	Limited	Restricted rooting depth

StH3 (Stonycreek hilly shallow)

Versatility evaluation for soil StH3		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Unsuitable	Hilly slopes
Arable	Unsuitable	Hilly slopes
Intensive pasture	Limited	Hilly slopes
Forestry	Limited	Restricted rooting depth

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 traffic use should be minimised during these periods.

Soil profiles available for Stonycreek soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
StH3	M191	1	✓	✓	✓	
StR3	FT12	15	✓	✓	✓	✓

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