

Appendix L:

Landcare Research Soil Investigation



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Evaluation of the soils mapped at 144 Ripponvale Road

The characteristics of the soils mapped at 144 Ripponvale Road have been summarized from the publicly available New Zealand digital soil map and database SmapOnline, <https://smap.landcareresearch.co.nz/>.

These soil characteristics were compared to those criteria considered necessary for soils to be classified as 'high-class' soils.

High class soils are versatile soils capable of growing a wide range of crops. They are generally deep (>100cm), have silt loam or sandy loam fine earth textures, have potential rooting depths of >100cm, contain no root barriers, are either stone free or contain very few stones, are well or moderately well drained, have unlimited root zone aeration, moderate or rapid profile permeability, high profile available water, and are on flat to undulating slopes (<7°).

The area under consideration at 144 Ripponvale Road is bounded by the red lines on Fig 1. The soil family and siblings mapped in the area of interest are Clare (Clare_1a.1), Ranfurly (Ranf_4a.1), Waenga (Waen_5a1), Ripponvale (Ripp_2a1), and Molyneux (Moly_10a). The key characteristics of these soils are tabulated in Table 1.

On Table 1 the key criteria on which the soils fail are indicated in red. Pink distinguishes criteria that have marginal values as some of the classes used are very broad. For example, top soil stoniness, the moderately stony class ranges from >5<35%. Most of the mapped soils are at the top end of the moderately stony range, with 25 to 35% stones in the top 0-20cm.

None of the 5 soils mapped in this area meet the criteria required to be classified as high class.

All soils fail on the 'soil depth' and 'depth to stony layer' criteria. The Clare_1a.1, Ranf_4a.1, Waen_5a1, Ripp_2a1, and Moly_10a siblings also fail on the 'profile available water in the 0-100cm' criteria; the Clare_1a.1 and Ranf_4a.1 siblings also fail on the 'potential rooting depth', root barrier within 100cm', 'depth to slowly permeable horizon' and 'permeability of the slowest horizon' criteria; The Clare_1a.1, and Moly_10a siblings also fail on the slope criteria, and the Clare_1a sibling also fails on the 'root zone aeration' criteria.

A soil from the Otago region that is classified as a high-class soil (Clutha deep silt loam) is included on Table 1 for comparison.

Although some of the soils within the block are currently growing specialty high value crops (pip and/or stone fruit, grapes etc.) they are not suitable for intensive arable cropping due to the combinations of

soil depth, potential rooting depth, topsoil stoniness, profile available water and depth to a stony layer criteria and therefore fail to be classified as high class soils.



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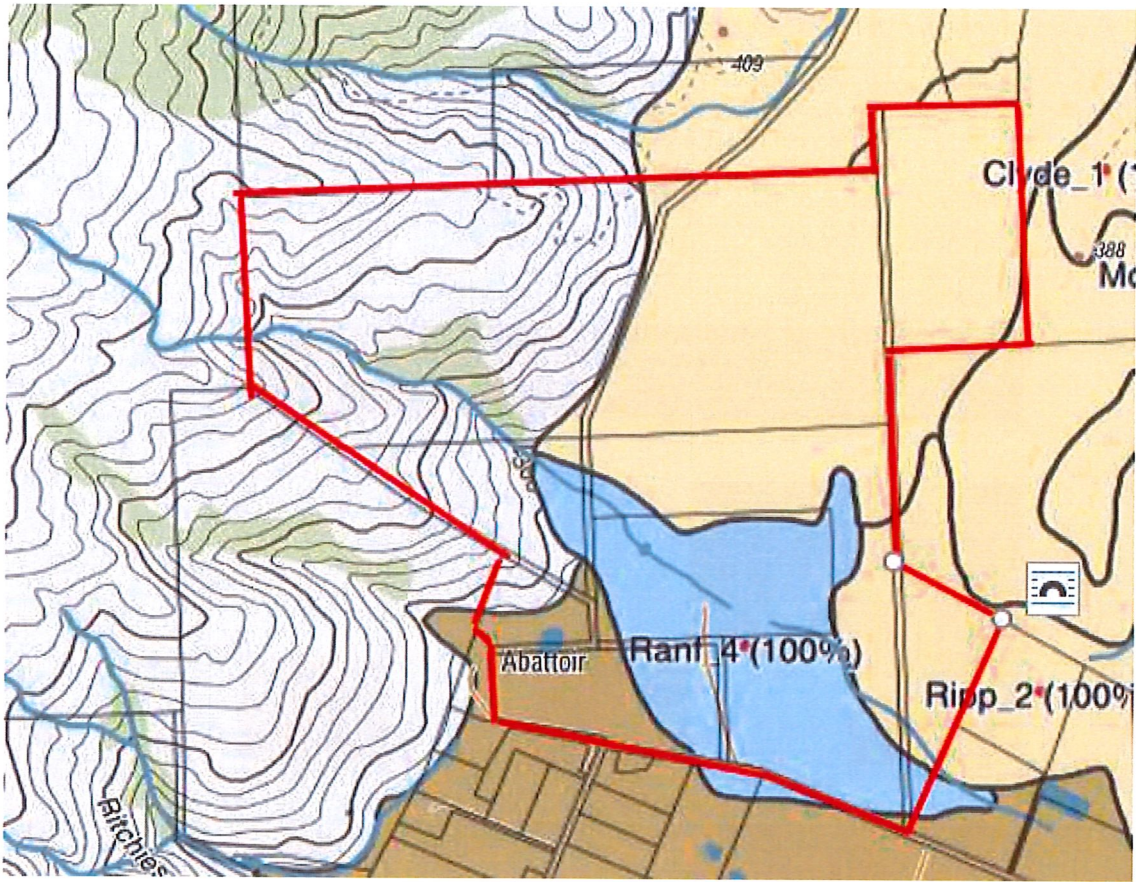


Figure 1. The area of interest indicated by the red boundary overlain on Smap.

Table 1. Key soil criteria for the soil mapped on 144 Ripponvale Road.

Soil Family/Series	Clare shallow sandy loam	Ranfurlly moderately deep silt loam	Waenga shallow sandy loam	Ripponvale shallow sandy loam	Letts shallow and stony sandy loam	Clutha deep silt loam
Sibling	Clare_1a1	Ranf_4a1	Waen_5a3	Ripp_2a1	Moly_10a	Waim_58a1
NZSC	Weathered Aged-argillic Semi-arid	Mottled Argillic Semi-arid	Typic Argillic Semi-arid	Typic Immature Semi-arid	Typic Immature Semi-arid	Weathered Fluvial Recent
Soil depth	shallow (15-35cm)	moderately deep (35-55cm)	shallow (20-50cm)	shallow (0-45cm)	shallow (10-45cm)	deep (>100m)
Fine earth Texture	sandy loam	loam	loam	loam	sandy loam	silty loam
Potential Rooting Depth	20-80cm	35-65cm	>100cm	>100cm	>100cm	>100cm
Root barrier within 100cm	Clay pan	densely packed gravels	Nil	Nil	Nil	Nil
Topsoil stoniness (0-20cm)	Moderately stony >5<35%	Stoneless	Moderately stony >5<35%	Stoneless	Moderately stony >5<35%	Stoneless
Drainage class	well drained	imperfectly drained	moderately well drained	well drained	well drained	well drained
Root zone aeration	moderately limited	limited	unlimited	unlimited	unlimited	unlimited
Permeability profile	moderate over slow	moderate over slow	moderate	rapid	rapid	moderate
Depth to slowly permeable horizon	20-80cm	35 to 60cm	no slow horizon	no slow horizon	no slow horizon	no slow horizon
Permeability of slowest horizon	Slow (<4mm/h)	Slow (<4mm/h)	Moderate (4-75mm)	rapid (>72mm/h)	rapid (>72mm/h)	moderate (4-72mm/h)
Profile Available Water	low (0-100cm = 34mm)	mod to high (0-100cm) = 129mm	low (0-100cm) = 55mm)	Moderate (0-100cm) = 69mm)	low (0-100cm) = 36mm)	High (0-100cm) = 226mm
Depth to stony layer	shallow (10-30cm)	moderately deep (35-70cm)	shallow (10-20cm)	Shallow (10-45cm)	shallow (5-45cm)	No stony layer within 100cm
Slope	strongly rolling, (16 to 10 degrees)	flat to gently undulating (0-3 degrees)	flat to gently undulating (0-3 degrees)	flat to gently undulating (0-3 degrees)	hilly 16-25 degrees)	flat to gently undulating (0-3 degrees)
	Not high class	Not high class	Not high class	Not high class	Not high class	High class