

# YAT Yattalunga Land System

West facing slopes of the Mount Lofty Ranges between Gawler and Little Para Reservoir

**Area:** 57.6 km<sup>2</sup>

**Annual rainfall:** 475 - 600 mm average

**Geology:** The landscape is underlain predominantly by siltstones, slates and fine sandstones, variably capped by fine carbonates. In places, the carbonates are indurated to moderately cemented rubbly or sheet calcrete. On gentle upper slopes, the rocks have deeply weathered in situ, forming heavy clays from which distinctive soils are formed. Scattered throughout the basement rocks are strata of coarser sandstones and quartzites, usually marked by rockier land surfaces. Locally derived silty, sandy and light clayey sediments have accumulated in minor drainage depressions. There are isolated remnants of Tertiary sediments in the north. These are capped by calcareous rubble. Small exposures of relic Tertiary sands on the eastern margin are free of carbonate.

**Topography:** The landscape is essentially a west facing slope, extensively dissected by watercourses flowing to the plains. With the exception of the South Para River which cuts through the northern part of the land system, drainage originates from within the land system. Short watercourses have cut narrow valleys up to 80 m deep through the rocky substrate. Slopes are highly variable, but generally are less than 30%. In the south east are two more or less flat topped crests, which are the relatively intact remnants of an old land surface.

**Elevation:** 70 m in the west to 298 m in the east

**Relief:** Local relief is typically 50 - 100 m

**Soils:** Most of the soils are moderately deep to shallow over basement rock. Typically they have hard loamy surfaces overlying either weathering rock, or more commonly a red friable clay loamy to clayey subsoil. Some are calcareous throughout. On rising ground there are limited areas of deep clay loamy to clayey gradational soils or black cracking clays on highly weathered rocks. On minor lower slopes and creek flats, deep red loam over clay loam to clay soils predominate, with small areas of deep sandy loams. There are minor rubbly calcareous loams over Tertiary sandstones.

**Main soils:** *Soils formed on calcified basement rock*

- D1a** Shallow loam over red clay
- L1** Shallow stony loam
- C2** Shallow gradational red loam

**Minor soils:** *Soils formed on calcified / calcreted basement rock*

- B6** Shallow loam over red clay on calcrete
  - A2** Shallow calcareous loam
  - B2** Shallow calcareous loam on calcrete
  - D1b** Shallow sandy loam over red sandy clay
  - C5** Shallow dark clay loam
- Deep soils formed on highly weathered rocks*
- A6** Gradational calcareous clay loam
  - C3** Gradational friable red clay loam
  - E1** Black cracking clay



*Soils formed on calcreted Tertiary sandstones***A4** Deep (rubbly) calcareous loam*Soils formed in alluvium***C1** Gradational red sandy loam**D2** Loam over red clay**M1** Deep sandy loam

**Main features:** The Yattalunga Land System is a west facing slope, extensively dissected by watercourses flowing to the plains. There is a regular pattern of moderate to moderately steep slopes and narrow drainage depressions. The soils are characteristically shallow to moderately deep, with loamy surfaces either grading directly to weathering rock, or underlain by red more clayey subsoils. Often there is a soft to hard carbonate layer between the soil and the rock. The soils are naturally fertile and well drained, but variable depth limits productivity of dryland crops and pastures. Only 15% of the area is fully arable, but about 95% is suitable for perennial crops. Viticulture in particular has potential where water is available, although westerly exposure may be a limitation.

**Soil Landscape Unit summary:** 15 Soil Landscape Units (SLUs) mapped in the Yattalunga Land System

SLU	% of area	Main features #
AAC AAD AAI	12.5 0.3 15.2	<p>Moderately steep to steep slopes underlain by siltstones, slates and fine sandstones. Slopes are 18-50% and relief is up to 80 m. There is up to 10% surface stone and rock outcrop. Watercourses are well defined in narrow drainage depressions. Soils are generally loamy and shallow over rock, but many have more clayey subsoils.</p> <p><b>AAC</b> Moderate slopes of 18-30% up to 50 m high.  <b>AAD</b> Steep slopes of 30-50% up to 50 m high.  <b>AAI</b> Moderate slopes of 18-30% up to 80 m high, with some eroded watercourses.</p> <p>Most soils are loamy and shallow over calcified siltstone, or siltstone mantled by soft to semi-hard carbonate. Many are calcareous.</p> <p>Main soils: <u>Shallow stony loam</u> - <b>L1</b> (E) } all formed on  <u>Shallow loam over red clay</u> - <b>D1a</b> (C) } weathering rock  <u>Shallow calcareous loam</u> - <b>A2</b> (L) }  <u>Shallow gradational red loam</u> - <b>C2</b> (L) }  <u>Shallow loam over red clay on calcrete</u> - <b>B6</b> (M) }  <u>Shallow dark clay loam</u> - <b>C5</b> (M) }</p> <p>These slopes are too steep and rocky, and the soils too shallow for cropping, although they are inherently fertile. They are used for rough grazing, but have potential for viticulture where water is available and sites are protected from westerly exposure.</p>
ALD ALI	2.9 7.2	<p>Moderately inclined to steep rocky hillslopes formed on calcified sandstones and siltstones. Slopes range from 15% to 50%, and are up to 60 metres high. This land includes those areas where the basement rocks are mainly sandstones. These occur as rocky reefs in a landscape of generally finer grained rocks.</p> <p><b>ALD</b> Steep rocky hillslopes with relief to 50 m, slopes of 30-50% and up to 20% stone and rock outcrop.  <b>ALI</b> Moderately inclined hillslopes with relief to 60 m, slopes of 15-30%, some eroded watercourses, and up to 10% stone and rock outcrop.</p> <p>All soils are shallow to moderately shallow over sandstone or siltstone mantled by carbonates. These occur as fine deposits in rock fissures through to semi-hard calcrete. Sandy to loamy surface soils over red brown clays are common, together with shallow loamy sands to loams which may be either calcareous or non calcareous.</p> <p>Main soils: <u>Shallow stony loam</u> - <b>L1</b> (E) } all formed on  <u>Shallow sandy loam over red sandy clay</u> - <b>D1b</b> (C) } weathering rock  <u>Shallow loam over red clay</u> - <b>D1a</b> (L) }  <u>Shallow calcareous loam</u> - <b>A2</b> (M) }  <u>Shallow calcareous loam on calcrete</u> - <b>B2</b> (L) }</p>



		This land is rough grazing country, with extensive rock and shallow soils, all on moderately steep to steep slopes. Much of the land retains scattered tree cover. There is some potential for viticulture where water is available, exposure is not excessive and land is accessible ( <b>ALI</b> only).
AZm	1.9	<p>Steep slopes created by the down cutting of the South Para River. Slopes are variable up to 100% and relief is up to 70 m. There is up to 50% surface stone and rocky outcrop. Minor discontinuous flats adjoin the river.</p> <p>Main soils: <u>Shallow stony loam</u> - <b>L1</b> (V) } over basement rock on slopes  <u>Shallow loam over red clay</u> - <b>D1a</b> (L) }  <u>Deep sandy loam</u> - <b>M1</b> (L) on flats</p> <p>This land is either steep and rocky, or subject to flooding, so has very limited agricultural potential, but high conservation and water resource protection value.</p>
DCC DCD DCI	5.8 27.3 7.7	<p>Undulating rises and rolling low hills formed on calcified siltstones, slates and fine sandstones. Slopes range from 4% to 18%. Rock outcrop is sporadic, but there is up to 10% surface stone.</p> <p><b>DCC</b> Undulating rises with relief to 40 m and slopes of 4-10%.  <b>DCD</b> Moderate slopes of 10-18%, up to 50 m high.  <b>DCI</b> Moderate slopes of 10-18%, up to 50 m high with some eroded watercourses.</p> <p>Most soils are moderately deep to shallow over calcified siltstone, or siltstone mantled by soft to semi hard carbonate.</p> <p>Main soils: <u>Shallow loam over red clay</u> - <b>D1a</b> (E) } on weathering rock on slopes  <u>Shallow gradational red loam</u> - <b>C2</b> (C) }  <u>Shallow stony loam</u> - <b>L1</b> (L) }  <u>Shallow loam over red clay on calcrete</u> - <b>B6</b> (L)  <u>Loam over red clay</u> - <b>D2</b> (M) on alluvium on lower slopes and creek flats</p> <p>The soils are fertile and well drained, although often shallow, thereby restricting waterholding capacity. Surface soils set hard, creating workability and emergence problems, and increasing erosion susceptibility. However, the land is potentially productive - <b>DCC</b> is suitable for cropping provided that adequate erosion control measures are used, but <b>DCD</b> and <b>DCI</b> are marginal due to the potential for erosion. The land is suited to horticultural development where water is available and exposure is not excessive.</p>
DFC DFI	5.1 3.8	<p>Undulating to gently rolling rises and low hills to 60 m high formed on calcified siltstones and slates, commonly deeply weathered. Slopes are 3-20%.</p> <p><b>DFC</b> Undulating rises and low hills to 50 m high with slopes of 3-12%.  <b>DFI</b> Gently rolling low hills to 60 m high with slopes of 12-20% and some eroded watercourses.</p> <p>A wide variety of soils occurs, differences being mainly attributable to parent materials. Common profiles include loams over red brown clays, cracking clays, and calcareous and non-calcareous loams.</p> <p>Main soils: <u>Shallow loam over red clay</u> - <b>D1a</b> (C) } on basement rocks  <u>Shallow gradational red loam</u> - <b>C2</b> (C) }  <u>Shallow stony loam</u> - <b>L1</b> (L) }  <u>Gradational calcareous clay loam</u> - <b>A6</b> (L) } on deeply weathered rocks  <u>Gradational friable red clay loam</u> - <b>C3</b> (L) }  <u>Black cracking clay</u> - <b>E1</b> (L) }  <u>Loam over red clay</u> - <b>D2</b> (M) on alluvium on lower slopes</p> <p>The shallower soils on basement rock are similar to those of <b>DCC/DCD</b>, but the deeper soils on highly weathered rocks or alluvium are fertile and have high waterholding capacities. Although some have poor surface structure, they are potentially highly productive. Boron toxicity may be a problem on the deeper soils.</p>
GBD	0.5	<p>Undulating upper slopes of 2-10% formed on Tertiary sandstones, with reworked sandy sediments in hollows and depositional areas. There is negligible surface stone and there are no defined watercourses. Soils are invariably sandy surfaced, usually with more clayey subsoils, but some deep gritty sands occur on reworked sediments.</p> <p>Main soils: <u>Bleached sand over sandy clay loam</u> - <b>G2</b> (E)  <u>Sandy loam over poorly structured brown clay</u> - <b>F2</b> (C)  <u>Thick sand over clay</u> - <b>G3</b> (L)  <u>Deep loamy sand</u> - <b>M1</b> (L)</p> <p>These soils are moderately deep, but highly infertile and prone to acidification and water repellence. Drainage is variable, usually moderately well to well, but some hollows are imperfectly</p>



		drained with seepage areas. The sands are highly erodible, to both wind and water, so cropping is not generally sustainable. Most of the land is suitable for perennial horticulture and viticulture, although drainage management is required in some parts.
IUC	3.3	Undulating crests and upper slopes of 4% to 10% and relief up to 50 metres formed on calcreted Tertiary clayey sands, sandy clays, sandstones and limestones. Minor watercourses drain the slopes. Main soil: <u>Deep (rubbly) calcareous loam</u> - <b>A4</b> (D) These are moderately deep and well drained, but alkaline due to the high carbonate content. This condition affects the availability of some nutrients. With appropriate attention to nutrition, they are productive soils for field crops and viticulture.
KIE	1.9	Drainage depressions, including concave lower slopes and creek flats, formed on alluvium associated with hillslopes of calcified siltstones and slates. Slopes range from 2% on flats to 10% on lower slopes adjacent to surrounding rising ground. Deep sandy or loamy soils with clayey subsoils, together with a range of miscellaneous alluvial soils occur on the floors of the depressions. On lower slopes, shallower soils are more common, formed on siltstone, or siltstone capped by soft to semi-hard carbonate. Main soils: <u>Gradational red sandy loam</u> - <b>C1</b> (C) } on flats <u>Deep sandy loam</u> - <b>M1</b> (C) } <u>Shallow calcareous loam</u> - <b>A2</b> (L) } on rock on lower slopes <u>Shallow gradational red loam</u> - <b>C2</b> (L) } <u>Shallow loam over red clay</u> - <b>D1a</b> (L) } The soils of the flats are deep, well drained and moderately fertile, but small in area, so development potential is limited. The soils of the lower slopes are moderately shallow (restricted waterholding capacity), but well drained and fertile.
TBZ	4.6	Undulating summit surfaces formed on clays derived from the deep weathering of siltstone and claystone bedrock. Slopes vary from 0% on crests to 10% on margins. Watercourses are very weakly defined. Soils are clayey to clay loamy. Main soils: <u>Black cracking clay</u> - <b>E1</b> (E) <u>Gradational friable red clay loam</u> - <b>C3</b> (E) These soils are deep and highly fertile, although sometimes alkaline to the surface. Drainage is impeded by the clayey textures, and soils are prone to wetness at times. Boron toxicity may be a problem in places. Productive potential for field crops is high, although exposure may reduce yields. The soils are less favourable for horticulture and viticulture.

# PROPORTION codes assigned to soils within Soil Landscape Units (SLU):

(D)	Dominant in extent (>90% of SLU)	(C)	Common in extent (20–30% of SLU)
(V)	Very extensive in extent (60–90% of SLU)	(L)	Limited in extent (10–20% of SLU)
(E)	Extensive in extent (30–60% of SLU)	(M)	Minor in extent (<10% of SLU)

### Detailed soil profile descriptions:

#### *Soils formed on calcified basement rock*

- A2** Shallow calcareous loam on rock (Paralithic, Calcic Calcarosol)  
Medium thickness calcareous reddish brown stony loam, overlying a brown highly calcareous stony clay loam, increasingly calcareous and paler coloured with depth. Highly calcareous weathering siltstone or slate occurs at about 50 cm.
- C2** Shallow gradational red loam on rock (Hypercalcic, Red Dermosol)  
Medium thickness red brown loam to clay loam, grading a red well structured clay loam, grading to massive semi hard carbonate, over weathering siltstone below 50 cm.
- D1a** Shallow loam over red clay on rock (Hypercalcic, Red Chromosol)  
Medium thickness hard setting loam with a paler and stony A2 horizon, overlying a dark reddish brown, well structured clay which is highly calcareous from about 50 cm. Weathering, calcified siltstone or slate occurs within 100 cm.



- D1b** Shallow sandy loam over red sandy clay on rock (Hypercalcic, Red Chromosol)  
Medium thickness hard sandy loam, with a very stony and paler coloured A2 horizon, overlying a red sandy clay to clay which is highly calcareous from about 50 cm. Weathering calcified sandstone occurs within 100 cm.
- L1** Shallow stony loam (Calcareous, Paralithic, Leptic Tenosol)  
Thick, stony, reddish brown loam, grading to highly calcified weathering siltstone or fine sandstone within 50 cm.

*Soils formed on calcreted basement rock*

- B2** Shallow calcareous loam (Petrocalcic, Calcic Calcarosol)  
Medium thickness calcareous reddish brown stony loam, grading to a brown highly calcareous stony clay loam, increasingly calcareous and paler coloured with depth, over a moderately cemented massive to nodular calcrete pan at about 30 cm, with weathering rock at about 60 cm.
- B6** Shallow loam over red clay on calcrete (Petrocalcic, Red Chromosol)  
Medium thickness hard setting loam with a paler and stony A2 horizon, overlying a dark reddish brown well structured clay with a massive calcrete pan at 55 cm, overlying a highly calcareous clay loam which grades to weathering calcified rock at variable depths averaging 100 cm.
- C5** Shallow dark clay loam (Supracalcic, Black Dermosol)  
Medium thickness dark crumbly clay loam, overlying a well structured dark reddish brown to black clay loam to light clay. A carbonate pan or semi hard carbonate layer occurs before 50 cm, grading to weathering calcareous siltstone, marble or limestone by 100 cm.

*Deep soils formed on highly weathered rocks*

- A6** Gradational calcareous clay loam (Pedal, Calcic Calcarosol)  
Medium thickness reddish brown calcareous loam to clay loam, grading to a well structured reddish brown clay subsoil, becoming more clayey and calcareous with depth. Coarsely structured brown heavy clay continues below 200 cm.
- C3** Gradational friable red clay loam (Calcic, Red Dermosol)  
Medium thickness dark reddish brown clay loam, overlying a dark reddish brown well structured clay subsoil which is calcareous with depth. Highly calcareous clay continues below 100 cm.
- E1** Black cracking clay (Self-Mulching, Black Vertosol)  
Medium thickness brown to black well structured light clay, grading to dark brown to black strongly structured heavy clay, calcareous with depth. Coarsely structured brown heavy clay with soft calcareous segregations continues below 200 cm.

*Soils formed on calcreted Tertiary sandstones*

- A4** Deep (rubbly) calcareous loam (Lithocalcic / Hypercalcic Calcarosol)  
Medium thickness dark brown calcareous sandy loam to sandy clay loam, overlying a dark brown highly calcareous clay loam with up to 50% carbonate nodules, grading to a pale brown very highly calcareous clay with more than 50% calcrete nodules (Class III C carbonate) from 50 cm. Weak calcrete pans occur sporadically. Highly calcareous sandstone or limestone from 120 cm.

*Soils formed on alluvium*

- C1** Gradational red sandy loam (Calcic, Red Kandosol)  
Thick reddish brown sandy loam to fine sandy loam with a pink A2 horizon, overlying a yellowish red weakly structured clay loam to clay, calcareous with depth.



**D2** Loam over red clay (Sodic, Calcic, Red Chromosol)

Thick loam with a paler coloured A2 horizon, overlying a dark reddish brown well structured clay, highly calcareous (Class I carbonate) from about 60 cm. The soil grades to medium to fine grained alluvium below 100 cm.

**M1** Deep sandy loam (Basic, Regolithic, Brown-Orthic Tenosol)

Thick brown sandy loam to loamy sand, overlying a reddish brown clayey coarse sand to silty sand, grading to variable sandy and gritty alluvial sediments.

**Further information:** [DEWNR Soil and Land Program](#)

