LIP Little Para Land System

Hills and rises around the Little Para Reservoir

Area: 22.9 km^2

Annual rainfall: 510 – 700 mm average

Geology: The land is formed on siltstones, slates and fine sandstones, with minor quartzites and dolomites of the Saddleworth and Stonyfell Formations. These rocks are generally mantled by fine carbonates which have blown on to the land surface and leached into the soil. In places the carbonates have hardened to calcrete. There are minor deposits of locally derived clayey sediments in drainage depressions. There are minor remnants of Tertiary age sediments in the Golden Grove area. These are clayey sands to sandy clays, often indurated to weak sandstones.

Topography: The landscape is dominated by moderately to strongly dissected slopes adjacent to the last five km of the Little Para River before it debouches on to the Adelaide Plains. The slopes are moderate to steep, more than a third of the area being steeper than 30%. There are limited areas of undulating to gently rolling slopes near Golden Grove. The Little Para Reservoir is contained within the Land System.

Elevation: 70 m where the Little Para River flows out of the system, to 290 m

Relief: Up to 130 m but usually less than 100 m

Soils: Most soils are moderately deep to shallow over basement rock. They generally have loamy surfaces, but other profile features are variable, particularly with respect to depth and presence of subsoil clay layers, and presence and nature of carbonates. There are minor sandy soils on Tertiary sediments.

Main soils

Soils formed in calcified weathering basement rock

D1 Shallow loam over red clay on rock
A2 Shallow calcareous loam on rock
C2 Shallow gradational red loam on rock
L1a Shallow stony loam

Soils formed in acid-neutral weathering basement rock

K2 Acidic loam over red clay on rock
L1b Shallow stony loam

Soils formed on alluvium

D2 Loam over red clay

Minor soils

Soils underlain by soft to hard carbonate within 50 cm of the surface

B2 Shallow calcareous loam on calcrete
B6 Shallow loam over red clay on calcrete
C5 Shallow dark clay loam over soft to semi hard carbonate

Soils formed in Tertiary sediments

G4 Sand over poorly structured clay
G2 Thick sand over sandy clay loam

Main features: The Little Para Land System is characterized by moderate to steep slopes created by the river as it cut through the frontal slopes of the western Mount Lofty Ranges. Most of the basement rocks are siltstones, giving rise to loamy surfaced soils with variable amounts of fine carbonates. On strongly dissected slopes, the soils are shallow over rock, but on gentler slopes, most have more clayey subsoils. The soils have good potential for viticulture, being fertile and well drained, although shallow in places. However, much of the land is included in the reservoir reserve, so land use is restricted.

Soil Landscape Unit summary: 8 Soil Landscape Units (SLUs) mapped in the Little Para Land System:

SLU	% of area	Main features #
AAC	24.4	Rolling low hills formed on calcified siltstones, slates and fine sandstones. Slopes range from 18% to 30%, with upper slopes and crests being less steep than mid to lower slopes. Maximum relief is 80 metres. Watercourses are well defined in narrow drainage depressions. Rock outcrop is sporadic, up to 10% on steeper slopes. Most soils are loamy and shallow over calcified siltstone, or siltstone mantled by soft to semi-hard carbonate. Many are calcareous. Main soils: Shallow loam over red clay on rock - **D1** (E) Shallow stony loam - **L1a** (C) Shallow calcareous loam on rock - **A2** (L) Shallow gradational red loam on rock - **C2** (L) Shallow loam over red clay - **B6** (M) } where rock is capped by thin calcrete Shallow calcareous loam - **B2** (M) } Loam over red clay - **D2** (M) in drainage depressions and on lower slopes These soils are fertile and well drained, but often shallow. Moderate slopes limit land use options and much of the land is in reservoir reserve.
AJC AJD	15.1 16.1	Moderately inclined to steep strongly dissected low hills and hills, formed on weakly calcified siltstones, slates and fine sandstones, and minor quartzites and dolomites. Gully slopes are up to 50% (100% in extreme cases), grading to more gently inclined upper slopes and crests (10% to 30% slopes, down to 4% on narrow crests). Maximum relief is 100 metres. Watercourses are well defined in narrow drainage depressions. Rock outcrop is sporadic. There is variable surface stone. **AJC** Moderate slopes and rolling low hills with relief to 60 m, slopes of 20-30% and up to 10% surface stone. **AJD** Steep hillslopes with relief to 100 m, slopes of 30-100%, and up to 20% stone and rock outcrop. Most soils are shallow to moderately deep over siltstone which may be non-calcified, contain soft carbonate in rock fissures, or be overlain by a thick, soft to semi-hard layer of massive carbonate. Common profiles include loams over red brown clays, shallow non-calcareous stony loams, and shallow calcareous loams. Main soils: Acidic loam over red clay on rock - **K2** (E) } on non calcified rocks Shallow stony loam - **L1b** (C) } Shallow loam over red clay on rock - **D1** (L) } on calcified rock Shallow stony loam - **L1a** (L) } Shallow gradational red loam on rock - **C2** (L) } Shallow calcareous loam on rock - **A2** (M) } These soils are fertile and well drained, but often shallow. Moderate to steep slopes limit land use options and much of the land is in reservoir reserve.
AYD	20.0	Steep hillslopes formed on strongly calcified siltstones, slates and fine sandstones. Slopes are up to 100% (but usually less than 75%) and relief is up to 130 metres. Upper slopes and crests are more gently sloping. Rock outcrop is extensive on the steeper ground. Watercourses are very well defined in narrow drainage depressions. The majority of soils are shallow and calcareous over calcified siltstone, or siltstone mantled by a thick layer of soft to semi-hard carbonate. Main soils: Shallow calcareous loam on rock - **A2** (E) Shallow calcareous loam over calcrete - **B2** (C) Shallow loam over red clay on rock - **D1** (L) Shallow loam over red clay on calcrete - **B6** (L)

		Shallow stony loam - **L1a** (L) Shallow dark clay loam - **C5** (M) These soils are shallow and the slopes are steep, thereby restricting land use to grazing only.
DBC	3.0	Gently inclined slopes and undulating rises formed on siltstones, slates and fine sandstones, mantled by soft fine grained carbonate. Slopes range from 2% to 10% and relief is up to 20 m. There is negligible rock outcrop, but minor surface slate, sandstone, quartz and calcrete occurs. Watercourses are moderately well defined, and sometimes gullied, in shallow, broad drainage depressions. The predominant soils are loamy (less commonly sandy loam) over red clay subsoil. Main soils: Shallow loam over red clay on rock - **D1** (E) on slopes Loam over red clay - **D2** (E) in drainage depressions and on lower slopes These soils are moderately deep to deep, fertile and adequately drained. The slopes are arable, and are well suited to perennial horticulture (especially viticulture). Management is needed to ameliorate hard setting surfaces and associated erosion potential.
DCD	16.1	Gently rolling low hills with relief to 60 m and slopes of 10-18% formed on calcified siltstones, slates and fine sandstones. Most soils are loamy and shallow over calcified siltstone, or siltstone mantled by soft to semi-hard carbonate. Many are calcareous. Main soils: Shallow loam over red clay on rock - **D1** (E) Shallow stony loam - **L1a** (L) Shallow calcareous loam on rock - **A2** (L) Shallow gradational red loam on rock - **C2** (C) Shallow loam over red clay - **B6** (M) on calcrete capping Shallow calcareous loam - **B2** (M) on calcrete capping Loam over red clay - **D2** (M) in drainage depressions and on lower slopes These soils are fertile and well drained, but often shallow. The slopes are semi arable, but are well suited to viticulture and other perennial horticultural crops where water is available.
GOD	3.7	Undulating to moderately inclined rises and crests formed on Tertiary clayey sands and sandy clays (often indurated to sandstones), and reworked sandy clays on lower slopes. Slopes are 4% to 12% (up to 20% on some short slopes). Relief is less than 20 metres. Watercourses are well defined. There is no rock outcrop. The soils are dominantly texture contrast types with sandy to sandy loam surfaces and subsoil clays which are either well structured and friable, or sodic and hard. Main soils: Sand over poorly structured clay - **G4** (E) mainly on lower slopes Thick sand over sandy clay loam - **G2** (E) on upper slopes These soils are infertile and acidic. Those with poorly structured subsoils are imperfectly drained. All soils are prone to wind and water erosion. Productivity potential is low.
KIE	1.6	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: Gradational red sandy loam - **C1** (C) } on flats Deep sandy loam - **M1** (C) } Shallow calcareous loam - **A2** (L) } on rock on lower slopes Shallow gradational red loam - **C2** (L) } Shallow loam over red clay - **D1a** (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.

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

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

Detailed soil profile descriptions:

Soils formed in calcified weathering 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.

C5 Shallow dark clay loam (Hypercalcic, Black Dermosol/Chromosol)
Medium thickness dark crumbly clay loam, overlying a well structured dark reddish brown to black clay loam to light clay. A semi hard carbonate layer occurs before 50 cm, grading to weathering calcareous siltstone, marble or limestone by 100 cm.

D1 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.

L1a Shallow stony loam (Calcareous, Paralithic, Leptic Tenosol)
Thick, stony, reddish brown loam, grading to highly calcified weathering siltstone or fine sandstone before 50 cm.

Soils underlain by a calcrete pan within 50 cm of the surface

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 (Petrocalcic, Red Chromosol)
Medium thickness hard setting loam with a paler and stony A2 horizon, over a dark reddish brown, well structured clay underlain by a massive calcrete pan at about 40 cm. The calcrete grades to a highly calcareous clay loam with weathering calcified rock at variable depths averaging 100 cm.

Soils formed in acid-neutral weathering basement rock

K2 Acidic loam over red clay on rock (Eutrophic, Red Kurosol)
Medium thickness loam with a paler coloured and gravelly A2 horizon, overlying a reddish brown to red, well structured clay with rock fragments, grading to weathering siltstone or slate by 100 cm.

L1b Shallow stony loam (Basic, Paralithic, Leptic Tenosol)
Thick, stony sandy loam to loam, forming in weathering siltstone at 50 cm or less.

Soils formed on alluvium

D2 Loam over red clay (Sodic, Calcic, Red Chromosol)
Thick hard setting loam with a paler coloured A2 horizon, overlying a dark reddish brown, well structured clay subsoil, which is highly calcareous (Class I carbonate) from about 60 cm. The soil grades to medium to fine grained alluvium below 100 cm.

Soils formed in Tertiary sediments

G4 Sand over poorly structured clay (Calcic, Brown Sodosol)
Thick loamy sand to sandy loam with a bleached A2 layer, sharply overlying a brown mottled clay with coarse columnar structure, calcareous with depth.

G2 Thick sand over sandy clay loam (Mesotrophic, Brown Kurosol)
Very thick sand with a yellow or bleached A2 layer, sharply overlying a massive orange to brown sandy clay loam grading to weak sandstone within 150 cm.

Further information: DEWNR Soil and Land Program