

BUR Burdett Land System

(Based on the description by A. K. McCord in "A Description of Land in the Southern Mallee of South Australia")

Undulating stony rises extending from Mannum south to Tailem Bend, east to Perponda and north to Bow Hill.

Area: 1,182.2 km²

Annual rainfall: 290 – 380 mm average

Geology: The System is formed on a virtually continuous sheet of calcrete which follows the land surface. Windblown Molineaux Sand, which has been reworked into low dunes, covers about 15% of the land surface. Underlying the calcrete is a discontinuous layer of Blanchetown Clay capping more or less uninterrupted deposits of Tertiary sands to sandy clays (Loxton/Parilla Sands). The Blanchetown Clay occurs under about half of the landscape. Its thickness varies from 100 cm to more than 10 m (average 350 cm). Elsewhere, the Tertiary sands directly underlie the calcrete. Older marine limestones are rarely within 10 m of the surface. Basement rocks underlie the landscape at depth. Cambrian schists and Ordovician granites are within 10 m of the surface over about 15% of the area of the System. They outcrop sporadically.

Topography: The land is undulating with slopes of up to 8% and relief to 30 m. Stony (calcrete) patches occur throughout, and in places surface stone and rocky reefs are sufficient to prevent cultivation. There are isolated outcrops of granite. Low to moderately high rounded sandhills are draped over the land. They are usually oriented east - west, but in places they are jumbled. Some of these are high and uncleared. Adjacent to the River Murray the land has been dissected by streams flowing to the river. Here, the calcrete cap has been largely eroded away and the slopes are moderate leading down to the river cliffs.

Elevation: 20 - 160 m

Relief: Up to 30 m

Main soils: The soils are mainly shallow over sheet or rubbly calcrete. There are variations in colour (often reflecting carbonate content), rubble and texture (sandy loam to sand).

Main soils

Soils on stony rises and flats

- A4** Grey brown rubbly calcareous sandy loam
- B2** Brown calcareous rubbly sandy loam on calcrete
- B3** Red stony sandy loam on calcrete

Soils on sandhills

- H2** Deep sand

Minor soils

Soils on stony rises and flats

- B8** Sand over calcrete
- C1** Gradational sandy loam



Main features: The Burdett Land System is an extensive tract of undulating stony rises with limited areas of low to moderate sandhills. Although most of the land is stony, relatively small areas are non arable. Restricted water holding capacity is nevertheless a limiting factor over much of the land, the main soils of which are shallow stony calcareous sandy loams. Other limitations to cropping are stoniness and marginal natural fertility associated with the predominantly low clay content calcareous soils. The sandhills are infertile, often water repellent and prone to wind erosion. Occasional high dunes are uncleared.

Soil Landscape Unit summary: 16 Soil Landscape Units (SLUs) mapped in the Burdett Land System:

SLU	% of area	Main features #
QMB QME	21.1 3.0	Slopes and depressions formed on sheet calcrete, with extensive reefs of sheet rock and abundant surface stone. Most of the land is underlain at depths of 200-300 cm by Blanchetown Clay or equivalent age sandy clay. QMB Undulating slopes. QME Depressions. Main soils: <u>brown calcareous rubbly sandy loam on calcrete - B2 (V)</u> , with <u>red stony sandy loam on calcrete - B3 (C)</u> and <u>grey brown rubbly calcareous sandy loam - A4 (L)</u> . This land is mostly non arable due to the extent of surface stone and the general shallowness of soil profiles.
QVB	4.0	Undulating slopes formed on calcrete, characterized by extensive areas of surface calcrete stone and some sheet rock, interspersed with relatively stone free slopes. Main soils: <u>red stony sandy loam on calcrete - B3 (E)</u> and <u>brown calcareous rubbly sandy loam on calcrete - B2 (E)</u> , with <u>grey brown rubbly calcareous sandy loam - A4 (L)</u> . These slopes are intermediate between the fully arable slopes of QcB and the non arable slopes of QMB . There is a mixture of moderately deep arable soils and very shallow non arable soils, as determined by the hardness of the calcrete, amount of stone and overall soil depth. There are very few sandy areas.
QcA QcB	0.5 45.9	Undulating slopes and flats formed on variable calcretes. Hard calcrete occupies about 60% of the landscape in association with sporadic outcrops of sheet rock and extensive surface stone. Elsewhere, the near surface carbonates are nodular. Blanchetown Clay or equivalent age sandy clay tend to occur under the harder calcretes, while Tertiary sands and clayey sands occur directly under the nodular forms. Sand spreads and low sand hills cover 10-30% of the slopes. Deep boring suggests that basement rocks are closer to the surface in these landscapes than elsewhere in the System – schist or granite was encountered within 10 m in 25% of bore holes. QcA Flats. QcB Slopes. Main soils: <u>brown calcareous rubbly sandy loam on calcrete - B2 (E)</u> and <u>sand over calcrete - B8 (L)</u> on stony areas, with <u>grey brown rubbly calcareous sandy loam - A4 (L)</u> , <u>deep sand - H2 (C)</u> on sand spreads and <u>gradational sandy loam - C1 (M)</u> on some lower slopes. This land, although formed over calcrete and often very stony is virtually fully arable. Depending on the depth to calcrete, water holding capacity is a moderate to moderately severe limitation to productivity. The mostly calcareous, high pH and low clay content soils are prone to nutrient deficiencies, especially phosphorus, zinc and copper, as well as nitrogen. Calcrete stone is brought to the surface by cultivation but is rarely a significant problem (compared with QMB and QVB). The soils of the sandy areas are deeper but are infertile and prone to water repellence and wind erosion.
QgB	1.7	Undulating slopes formed on calcreted granite which outcrops sporadically. Apart from the granitic outcrop, the land and soils are similar to QcB . The granite may influence aquifer recharge through its effect on the flow of deep drainage water.
QpB	6.5	Undulating slopes formed on calcrete with low to medium jumbled sand hills covering between 20% and 40% of the surface. Main soils: <u>brown calcareous rubbly sandy loam on calcrete - B2 (E)</u> , with <u>sand over calcrete - B8 (L)</u> and <u>grey brown rubbly calcareous sandy loam - A4 (L)</u> on slopes, and <u>deep sand - H2 (C-E)</u> on sandhills. These slopes are similar to those of QcB , except for the extensive cover of sandhills which are characterized by moderately deep to deep, infertile, water repellent soils prone to wind erosion. The productivity of the non sandy soils is affected by restricted moisture holding capacity, the severity of which depends on the



		depth to calcrete.
RCE	0.6	Closed depressions usually surrounded by calcreted slopes. Main soils: <u>red stony sandy loam on calcrete</u> - B3 (V) and <u>brown calcareous rubbly sandy loam on calcrete</u> - B2 (C). These limited areas are generally arable (compared with the depressions of QME), but soils are nevertheless shallow and have restricted waterholding capacity.
SgC SgI	3.9 0.3	Moderate slopes formed by the erosion of the Burdett land surface by water courses flowing into the Murray River. Underlying materials are variable depending on the degree of dissection, but generally the hard calcrete cap characteristic of the Land System has been removed. Tertiary clayey sands, sandy clays and clays occur, capped by variable soft to rubbly carbonates. Low sandhills cover 10-30% of the land surface. SgC Moderate slopes. SgI Moderately steep slopes with eroded water courses. Main soils: <u>grey brown rubbly calcareous sandy loam</u> - A4 (V) with <u>deep sand</u> - H2 (C) on sandhills and <u>gradational sandy loam</u> - C1 (L) on lower slopes. The calcareous soils are fully arable with variable limitations due to moisture holding capacity depending on soil depth. Some steeper slopes running down to the river cliffs are susceptible to water erosion unless adequately covered. The sandy soils are infertile, water repellent and prone to wind erosion.
U-D UJa UJb UJc UJe UJf	0.8 0.7 0.9 2.3 2.5 5.3	Dunes of Molineaux Sand with variable size, shape and frequency, draped over the undulating landscape. Calcrete generally underlies the sand at depths of 200-400 cm. U-D Single low linear sand ridges. UJa 60-90% large jumbled dunes. UJb 60-90% medium jumbled dunes. UJc 60-90% small jumbled dunes. UJe 30-60% medium jumbled dunes. UJf 30-60% parallel sand ridges. Main soils: <u>deep sand</u> - H2 (E-V) on sand rises, with <u>sand over calcrete</u> - B8 (M-L), <u>brown calcareous rubbly sandy loam on calcrete</u> - B2 (L-C) and <u>grey brown rubbly calcareous sandy loam</u> - A4 (M-L) on intervening flats and slopes. The sandhills are infertile due to low clay content of the soils and loss of organic matter enriched topsoil from past erosion. They are also water repellent in some seasons. The combination of sandy texture, low fertility, water repellence and exposure on ridges makes these soils highly susceptible to wind erosion, and soil conservation management is required, either through specialized cropping systems or controlled grazing. The flats and slopes are dominated by calcareous sands to sandy loams, often shallow and stony, as for QcB .

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 on stony rises and flats*

- A4** Grey brown rubbly calcareous sandy loam (Lithocalcic / Supracalcic Calcarosol)
Medium thickness highly calcareous grey brown sandy loam to light sandy clay loam becoming more clayey and calcareous with depth over rubbly carbonate from about 35 cm, grading to a very highly calcareous non rubbly sandy clay loam to sandy clay continuing below 200 cm.
- B2** Brown calcareous rubbly sandy loam on calcrete (Petrocalcic, Lithocalcic Calcarosol)
Thin calcareous brown sandy loam becoming more clayey and calcareous with depth, and with increasing rubble, over fractured calcrete from about 25 cm, grading to a very highly rubbly calcareous sandy clay loam continuing below 150 cm.
- B3** Red stony sandy loam on calcrete (Petrocalcic, Red Kandosol)
Thin red sandy loam grading to a red sandy clay loam over fractured calcrete at about 20 cm and continuing below 100 cm, and then grading to a very highly calcareous rubbly sandy clay loam.
- B8** Sand over calcrete (Petrocalcic, Leptic Tenosol)
Medium to thick brown sand to loamy sand, paler coloured with depth over calcrete.
- C1** Gradational sandy loam (Hypercalcic, Red Kandosol)
Loamy sand to sandy loam becoming more clayey with depth grading to a very highly calcareous sandy clay loam.

Soils on sandhills

- H2** Deep sand (Calcareous, Arenic, Brown-Orthic Tenosol)
Brown loose loamy sand grading to a yellowish red sand, over an orange soft clayey sand from about 80 cm, weakly calcareous with depth and continuing below 200 cm. Thickness of layers is highly variable depending on erosion history.

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

