

# MIN Mindarie Land System

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

Very gently undulating plain with sandhills from Mindarie - Halidon eastwards to the Victorian border

**Area:** 577.9 km<sup>2</sup>

**Annual rainfall:** 275 – 315 mm average

**Geology:** The land is underlain by Loxton / Parilla Sands, partly veneered by Blanchetown Clay equivalent. A once extensive calcrete cap has been largely eroded or dissolved away, leaving remnants as stony benches. Molineaux Sand has more recently been deposited in dunefields which cover about 40% of the area.

**Topography:** The landscape is essentially a gently undulating plain, with relief provided by sporadic calcrete benches, 3 - 6 m high, and low, moderate and high jumbled sandhills up to 15 m high.

**Elevation:** 40 - 90 m

**Relief:** 5 - 15 m

**Soils:** Sandy and sandy loam texture contrast and gradational soils are predominant on flats, with deep sands on sandhills and shallow stony soils on calcrete rises.

#### Main soils

##### *Sandhills*

**H2** Deep sand

##### *Flats*

**G2** Thick sand over dispersive red sandy clay

##### *Stony rises*

**A4/B2** Shallow calcareous sandy loam

#### Minor soils

##### *Flats*

**D3** Sandy loam over red dispersive clay

**C1** Gradational sandy loam

**G1** Sand over red sandy clay

**Main features:** Sandhills are the most recognizable feature of the Mindarie Land System, even though half of the total area comprises flats. The sandhills are highly erodible and many show evidence of past wind erosion. The flats are predominantly sandy surfaced but there are substantial areas of fertile loamy flats. Both types have dispersive clay subsoils which do not substantially affect dryland crops but affect irrigation drainage. Limited areas of stony rises have shallow soils which have limited productive capacity due to restricted soil moisture availability.



**Soil Landscape Unit summary:** 12 Soil Landscape Units (SLUs) mapped in the Mindarie Land System:

SLU	% of area	Main features #
GtA	15.1	Very gently undulating flats formed over Loxton/Parilla Sand, sporadically veneered by Blanchetown Clay. There are 10-30% low sandhills, and minor low stony rises. Main soils: <u>thick sand over dispersive red sandy clay</u> - <b>G2</b> (E), with <u>sand over red sandy clay</u> - <b>G1</b> (L), <u>sandy loam over red dispersive clay</u> - <b>D3</b> (L) and <u>gradational sandy loam</u> - <b>C1</b> (M) on flats, <u>deep sand</u> - <b>H2</b> (C) on rises, and <u>shallow calcareous sandy loam</u> - <b>A4/B2</b> (M) on stony rises. The soils of the flats are moderately deep with satisfactory waterholding capacity and of moderate (loamy types) to moderately low (sandy types) fertility. Where Blanchetown Clay underlies the soils, there is a risk of boron toxicity. Irrigation potential is low due to poor subsoil structure caused by dispersive clays and /or presence of Blanchetown Clay restricting drainage. The sandy and stony soils are as described below ( <b>QJB</b> and <b>UNJ</b> ).
HtA	14.6	Flats formed on Blanchetown Clay, with up to 20% low stony rises and less than 10% low sandhills. Main soils: <u>sandy loam over red dispersive clay</u> - <b>D3</b> (E) and <u>gradational sandy loam</u> - <b>C1</b> (C), with <u>thick sand over dispersive red sandy clay</u> - <b>G2</b> (L) on flats, and <u>shallow calcareous sandy loam</u> - <b>A4/B2</b> (L) on stony rises. The predominant soils are moderately deep and fertile, with minor limitations to cropping. Boron toxicity and moderate subsoil salinity associated with impeded leaching conditions affect soils to some degree. For the same reasons, irrigation potential is low. The sandy soils are less fertile and have poorly structured dispersive subsoils, but are less likely to have boron problems. They are however prone to water repellence and wind erosion. The stony rises are as for <b>QJB</b> (below).
<b>QJB</b> <b>QOB</b>	1.2 6.2	Rises and flat topped benches formed on remnant calcretes. There is abundant surface stone, and up to 30% superimposed sandhills. <b>QJB</b> Rises and benches with less than 10% sandhills. <b>QOB</b> Rises and benches with 10-30% sandhills. Main soils: <u>shallow calcareous sandy loam</u> - <b>A4/B2</b> (V), with <u>deep sand</u> - <b>H2</b> (M-C) on sandhills. The calcareous soils are shallow with low water holding capacity a moderate to severe limitation to crop growth. Surface stone is variable, but sufficient in places to prevent cultivation. The sandy soils are infertile and susceptible to water repellence and wind erosion.
<b>UNE</b> <b>UNF</b> <b>UNG</b> <b>UNH</b> <b>UNJ</b>	10.7 14.1 4.1 1.0 22.0	Dunefields of irregular shaped sandhills superimposed on flats. Size and frequency vary: <b>UNE</b> 60-90% high sandhills. <b>UNF</b> 60-90% moderate sandhills. <b>UNG</b> 60-90% low sandhills. <b>UNH</b> 30-60% high sandhills. <b>UNJ</b> 30-60% low sandhills. Main soils: <u>deep sand</u> - <b>H2</b> (E-V) on sandhills, with <u>thick sand over dispersive red sandy clay</u> - <b>G2</b> (C-E), and <u>sand over red sandy clay</u> - <b>G1</b> (M-L), <u>sandy loam over red dispersive clay</u> - <b>D3</b> (L) and <u>gradational sandy loam</u> - <b>C1</b> (L) on intervening flats. The sandhill soils are deep but infertile, often water repellent, and susceptible to wind erosion. The low sandhills are arable with appropriate management. The moderate to high sandhills are commonly non arable - many have been eroded in the past and have needed or are in need of stabilization. The flats are as for GtA (above).
<b>UUG</b> <b>UII</b> <b>UIJ</b>	2.6 0.6 7.8	Dunefields of irregular shaped sandhills superimposed on calcrete benches. <b>UUG</b> 60-90% low sandhills <b>UII</b> 30-60% moderate sandhills. <b>UIJ</b> 30-60% low sandhills. Main soils: <u>deep sand</u> - <b>H2</b> (E-V) on sandhills, with <u>shallow calcareous sandy loam</u> - <b>A4/B2</b> (L-E) and <u>thick sand over dispersive red sandy clay</u> - <b>G2</b> (M-C) in the swales. These landscapes are similar to the UN_ landscapes (above), the main difference being higher proportion of shallow stony soils in the swales. The overall productive potential of the land is accordingly reduced.

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

(D) Dominant in extent (&gt;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 (&lt;10% of SLU)



**Detailed soil profile descriptions:****A4/B2** Shallow calcareous sandy loam (Regolithic/Petrocalcic, Lithocalcic Calcarosol)

Medium thickness sandy loam over a calcareous light sandy clay loam with abundant calcrete rubble, on calcrete as shallow as 10 cm. Calcrete grades to a very highly calcareous sandy clay loam overlying Loxton/Parilla Sand from about 100 cm.

**C1** Gradational sandy loam (Petrocalcic, Red Kandosol)

Medium to thick sandy loam grading to a red sandy clay loam, over calcrete at about 60 cm.

**D3** Sandy loam over red dispersive clay (Calcic, Red Sodosol)

Medium thickness sandy loam to sandy clay loam abruptly overlying a red coarsely structured sandy clay to medium clay, calcareous from about 25 cm, and grading to Blanchetown Clay at about 50 cm. The clay may be as thin as 50 cm over Loxton/Parilla Sand.

**G1** Sand over red sandy clay loam (Calcic, Red Sodosol)

Medium to very thick loamy sand over a firm moderately structured red sandy clay loam to sandy clay, calcareous from about 40 cm, over Parilla Sand from about 70 cm.

**G2** Thick sand over dispersive red sandy clay (Calcic, Red Sodosol)

Thick to very thick sand with a bleached A2 layer, sharply overlying a red coarsely structured sandy clay loam to sandy clay, calcareous from about 100 cm, grading to Parilla / Loxton Sand from about 130 cm.

**H2** Deep sand (Calcareous, Arenic, Brown-Orthic Tenosol)

Loose brown sand becoming orange with depth and weakly calcareous from about 70 cm. Slightly clayey lamellae may occur from about 100 cm. Continuing below 200 cm.

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

