

# WLT Wiltunga Land System

Very gently undulating plains and low dune fields east of Wokurna

**Area:** 82.4 km<sup>2</sup>

**Annual rainfall:** 375 - 400 mm average

**Geology:** The land system comprises four distinctive geological materials. Tertiary age heavy clay (Hindmarsh Clay) underlies the area and is exposed in some low lying depressions. This has been extensively covered by medium to fine textured alluvial sediments derived from erosion of the Hummocks Range to the east. These sediments are in turn overlain by highly calcareous windblown deposits (Woorinen Formation) which varies from soft amorphous material through to rubble and stones. This has been partially covered by Molineaux Sand, which has been reworked by the wind into more or less parallel low dunes and irregular low sand spreads.

**Topography:** The land system is a gently inclined west facing outwash fan, with irregular surface features caused by deposition and reworking of windblown materials. North - south trending sand ridges and dune swale systems are predominant, while more subdued and irregular shaped sandy rises are common throughout. Gradients are less than 4% except on some short sand ridge slopes. There is no defined surface drainage system except for the minor clay depressions which appear to be closed.

**Elevation:** 100 m on the western margin to a maximum of 230 m on the eastern edge, but generally the elevation is less than 200 m.

**Relief:** Maximum relief (sand ridges) is 10 m

**Soils:** The soils are mainly either calcareous sandy loams or deep sands. Differences are due to amount and nature of clay and carbonate in the soil.

#### Main soils

- A4a** Calcareous sandy loam - swales and flats
- A6** Calcareous clay loam - low lying flats and depressions
- H2a** Deep calcareous sand - dunes and sandy rises

#### Minor soils

- A4b** Rubbly calcareous sandy loam - flats and lower slopes of dunes
- H2b** Deep non calcareous sand - dunes and sandy rises
- G1** Sand over red sandy clay loam - dune slopes
- C3** Gradational clay loam - flats and depressions

**Main features:** The Wiltunga Land System is characterized by low dune fields and sand spreads. Deep low fertility and wind erosion prone sandy soils on the dunes alternate with loamier calcareous soils in the swales. These latter soils are potentially productive with minor limitations due to sub optimal waterholding capacity (rubbly types) and fertility. On broader flats, clay loamy calcareous soils are predominant. These are deep and fertile, but often have excessive pH, boron and / or sodicity within potential rootzone depths.



**Soil Landscape Unit summary:** 5 Soil Landscape Units (SLUs) mapped in the Wiltunga Land System

SLU	% of area	Main features #
IAE	2.3	Narrow depressions formed on coarsely structured heavy clay (Hindmarsh Clay). Main soils: <u>calcareous clay loam</u> - <b>A6</b> (E) and <u>gradational clay loam</u> - <b>C3</b> (E). These small areas are fully arable and their heavier textured soils contrast with the sandier soils of the adjacent ground. Associated with substrate clays close to the surface are minor limitations due to waterlogging, salinity, alkalinity, and boron and sodium toxicity.
SSB	42.3	Very gently inclined slopes of 2-4% with very low hummocky relief, formed on medium to fine grained highly calcareous windblown material (Woorinen Formation). There are limited occurrences of clayey alluvium (Pooraka Formation). Molineaux sand is common on the hummocky rises. Main soils: <u>calcareous sandy loam</u> - <b>A4a</b> (V), with <u>calcareous clay loam</u> - <b>A6</b> (L), <u>rubbly calcareous sandy loam</u> - <b>A4b</b> (L) and <u>deep calcareous sand</u> - <b>H2a</b> (L). The land is fully arable and dominated by soils which are moderately fertile with slight limitations due to waterholding capacity and wind erosion potential. These limitations are more severe on the sandier rises.
UEJ UEK	29.3 9.6	Undulating dunefields formed on medium to fine grained highly calcareous windblown sediments (Woorinen Formation). Clayey sediments underlie this material and occur at the surface in some low lying areas. <b>UEJ</b> 30-60% coverage of dunes up to 5 m high. <b>UEK</b> Gently undulating plains with very low irregular sandy rises. Main soils: <u>calcareous clay loam</u> - <b>A6</b> (E) with <u>rubbly calcareous sandy loam</u> - <b>A4b</b> (L) on lower slopes, swales and plains, and <u>deep calcareous sand</u> - <b>H2a</b> (L), with <u>deep non calcareous sand</u> - <b>H2b</b> (L) and <u>sand over red sandy clay loam</u> - <b>G1</b> (L) on dune slopes and crests. The dune-swale landscape has the inherent problem of frequent changes in soil types. Control of wind erosion is the main concern on the sandy rises, along with fertility maintenance and the need to encourage deep rooting to maximize water use efficiency. Fertility is the main issue on the flats, together with the problems of high pH, high boron and high sodicity subsoils.
UIG	16.5	North-south trending sand ridges up to 10 m high, and dune fields with north-south orientation of dunes and swales. Main soils: <u>deep calcareous sand</u> - <b>H2a</b> (E) with <u>deep non calcareous sand</u> - <b>H2b</b> (L) and <u>sand over red sandy clay loam</u> - <b>G1</b> (L) on dunes, and <u>calcareous sandy loam</u> - <b>A4a</b> (E) on swales and lower slopes. The loamy soils are potentially more productive than the sandy types which have low fertility and waterholding capacities. All soils are prone to wind erosion, particularly the sandier types, some of which are only marginally arable. Wind exposure on the ridges is high, exacerbating the hazard.

# 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:**

- A4a** Calcareous sandy loam (Regolithic, Hypercalcic Calcarosol)  
Calcareous sandy loam grading to a very highly calcareous slightly rubbly sandy clay loam to sandy light clay (Class III A carbonate) from about 40 cm.
- A4b** Rubbly calcareous sandy loam (Regolithic, Supracalcic / Lithocalcic Calcarosol)  
Calcareous loamy sand to sandy clay loam grading to Class III B or III C rubble in a sandy clay loam to clay loam matrix, becoming less rubbly and more clayey with depth.
- A6** Calcareous clay loam (Pedal, Hypercalcic / Supracalcic Calcarosol)  
Calcareous clay loam to loam grading to a highly calcareous clay with abundant soft (less commonly rubbly) carbonate from 30 cm, overlying Hindmarsh Clay at about 100 cm.
- C3** Gradational clay loam (Hypercalcic, Red Dermosol)  
Clay loam grading to a well structured red clay, calcareous from about 40 cm, grading to Hindmarsh Clay.
- G1** Sand over red sandy clay loam (Supracalcic / Hypercalcic, Red Chromosol / Kandosol)  
Medium to thick sand overlying a red sandy loam to sandy clay loam grading to soft or rubbly carbonate within 60 cm.
- H2a** Deep calcareous sand (Regolithic, Calcic Calcarosol)  
Thick calcareous sand to loamy sand grading to a very highly calcareous clayey sand to light sandy clay loam below 100 cm.
- H2b** Deep non calcareous sand (Calcareous, Arenic, Red-Orthic Tenosol)  
Very thick reddish sand grading to red calcareous clayey sand at about 100 cm.

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

