

WIG Wisanger Hills Land System

A series of stony flat-topped hills and adjacent slopes. These hills form a line oriented east southeast–west northwest. This land system is surrounded by lower-lying outwash slopes and rises.

Area: 10.9 km²

Annual rainfall: 550 – 600 mm average

Geology: The flat-topped hills are capped by Jurassic age fine-grained dark grey basalt rock (Wisanger Basalt). This basalt layer is up to 15 m thick and has columnar jointing (a structure of vertical columns). This basalt is the remnant of lava flows from around 150 million years ago when the Antarctic continent was beginning to break away from Australia. The upper hill slopes and some areas of the mid to lower hill slopes have basalt at shallow depth. Shallow and well-structured red soils form from the basalt on the better drained sections of the flat-topped hills, and on the hill slopes. While deeper olive to grey cracking clay soils have formed from the basalt on the less well drained areas of the flat-topped hills.

A small area of younger low density ferruginised sandstone overlies the basalt on the surface of the eastern-most flat-topped hill; giving rise to olive-brown sodic texture contrast soils.

Much of the mid and lower slopes of the flat-topped hills have an underlying Jurassic age geology of kaolinised gritty sandy material, clay, claystone, or sandstone. Quartz seams occur. The clay has a coarse blocky structure. Accessions of fine carbonate material have accumulated as soft and hard carbonate in many subsoils. (Shallow red soil over limey material can result - 'Terra Rossa' soils.) Many soils in these areas have red well-structured topsoils with basalt fragments - this is colluvial material derived from the basalt areas above. Grey calcareous topsoils also occur.

Many of the very lower slopes consist of alluvial/colluvial material which has giving rise to red-brown cracking clay soils and red well-structured soils with basalt fragments.

Topography: These flat-topped low hills have level to very gently undulating surfaces (slopes of 0 - 2%). While the hill slopes are generally around 25% slope. However, some upper slopes and gully slopes have slopes up to 100%.

Elevation: The surfaces of the flat-topped hills vary in elevation from 110 m to 180 m; with hill-top elevation increasing from east to west. The highest elevation in this land system reaches 185 m on the western-most hill. The lowest slopes reach down to an elevation of 50 m.

Relief: <10 m on the hill surfaces; and from 40 m to 90 m on the hill slopes

Main Soils: **C2a** Stony red well-structured soil on basalt
E3-M4 Brown cracking clay

Minor Soils: **C2b** Shallow red soil
A2 Shallow grey calcareous soil
E2-M2 Red-Brown cracking clay
K4 Loamy soil over sodic clay on sandstone



Main Features: Shallow rocky and stony soils limit the productive uses of the flat-topped hill surfaces. However, natural soil fertility is high. Drainage is poor on many parts of the hill surfaces – these tend to be the areas with cracking clay soils, which, while not as shallow or stony as other soils, can be difficult to manage due to their heavy surface textures. The hill slopes are mostly limited by the slope steepness and rockiness. (Red well-structured soils on basalt found in this land system have a high ‘free iron’ content. These soils have been confirmed as *Ferrosols*, are particularly fertile, and are unknown elsewhere in South Australia.)

Soil Landscape Unit summary: Wisanger Hills Land System (WIG)

SLU	% of area	Main features
AAC	62.5	<p>Mostly non-arable hill slopes with varied soils. Main soils: <u>stony red well-structured soil on basalt</u>, mostly on upper slopes C2a (<i>Red Ferrosol-Dermosol</i>). <u>Shallow red soil</u> on some mid and lower slopes C2b (<i>Red Dermosol</i>). <u>Shallow grey calcareous soil</u> on some mid to lower slopes A2 (<i>Calcarosol</i>). <u>Red-brown cracking clay soil</u> on very lower slopes E2-M2 (<i>Red-Brown Vertosol-Dermosol</i>). And minor areas of <u>loamy soil over sodic clay on sandstone</u> K4 (<i>Brown Sodosol</i>).</p> <p>AAC - slopes usually between 10 and 30%, however many upper slopes and gully slopes are up to 100%.</p>
BKZ	37.5	<p>Semi-arable to non-arable flat-topped hill surfaces with shallow red soils on basalt and cracking clay soils. Main soils: <u>stony red well-structured soil on basalt</u> C2a (<i>Red Ferrosol-Dermosol</i>). And deeper <u>brown cracking clay</u> soil with basalt fragments E3-M4 (<i>Brown Vertosol-Dermosol</i>). Mostly minor area/s of <u>loamy soil over sodic clay on sandstone</u> K4 (<i>Brown Sodosol</i>).</p> <p>BKZ - very gently undulating flat-topped hill surfaces (slopes 0-2%).</p>

Detailed soil profile descriptions:

Main Soils:

C2a Stony red well-structured soil on basalt (*Red Ferrosol-Dermosol*)
Medium thickness to thick well-structured red loam to clay loam with polyhedral structure and abundant basalt fragments; over well-structured red or red-brown clay subsoil with polyhedral structure and abundant basalt fragments; over basalt at shallow to moderate depth. Shallower versions of this soil often lack the subsoil layer - with topsoil directly overlying basalt rock. On mid to lower slopes the deeper soils occur, and subsoils may contain some fine carbonate. Better drained areas of flat-topped hill surfaces, upper hill slopes, and some mid and lower hill slopes.

E3-M4 Brown cracking clay (*Brown Vertosol-Dermosol*)
Thin to medium thickness red-brown to grey-brown silty clay loam to silty light clay with polyhedral structure and some basalt fragments; over olive to olive-brown sodic clay with angular blocky or polyhedral structure and some basalt fragments. Minor fine carbonate may occur in the lower subsoil. Less well drained areas on flat-topped hill surfaces.

Minor Soils:

C2b Shallow red soil (*Red Dermosol*)
Shallow well-structured clay loamy soil, which can be calcareous, with basalt fragments; with accumulations of soft and hard carbonate below this layer; overlying kaolinized gritty sandy material, blocky clay, or claystone. Colluvial topsoil material overlying unrelated sediments on mid to lower hill slopes.



A2 Shallow grey calcareous soil (*Calcarosol*)

Shallow calcareous to highly calcareous grey loamy to clay loamy soil; with accumulations of soft and hard carbonate below this layer; over kaolinized gritty sandy material, blocky clay, or claystone. Mid to lower hill slopes.

E2-M2 Red-Brown cracking clay (*Red-Brown Vertosol-Dermosol*)

Medium thickness red-brown to grey-brown light clay, clay loam or loam, often slightly calcareous, with some basalt fragments; over calcareous red or red-brown clay; over calcareous to highly calcareous red, red-brown or olive-brown sodic clay. Some soils contain some hard carbonate fragments. Alluvial/colluvial soil on very lowest hill slopes.

K4 Loamy soil over sodic clay on sandstone (*Brown Sodosol*)

Thin to medium thickness grey-brown light sandy loam to loam with some sandstone fragments; over olive-brown to yellow-brown sodic clay. Area of minor extent on top of eastern-most flat-topped hill with highly acidic light sandy loam topsoil and low density ferruginized sandstone fragments. Also occurs on a few hill slope areas with surface sandstone fragments. Soil profile can include some fine gravelly quartz fragments, basalt fragments, and subsoil fine carbonate.

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

