WRK Wirrakinta Land System

Low range between Wirrabara and Appila, Southern Flinders Ranges

Area: 66.1 km^2

Annual rainfall: 400 - 475 mm average

Geology: Tillites (Appila Formation), siltstones and slates (Saddleworth and Kadlunga Formations), interbedded with Gilbert Range quartzites. The rocks are generally capped by secondary carbonates, (either soft segregations in rock cleavages, rubble layers or sheets above the weathering rock). There are extensive deposits of locally derived fine to medium textured alluvium on lower slopes between the bedrock highs.

Topography: Range of low hills with a north - south orientation, between the Rocky River to the west and Pine Creek to the east. The Land System is dominated by two quartzite ridges up to 50 m high, between which are undulating to gently rolling rises and low hills formed on softer basement rocks. These slopes grade in turn to gentle outwash fans which merge with the flood plains of the adjacent land systems. Slopes are mostly less than 20% except on parts of the quartzite ridges where they may reach 30%. There is variable surface stone, mostly on the ridges where it is associated with rocky outcrops.

Elevation: The lowest point is 260 m at the southern end. The highest point is 456 m near Wirrakinta in the north west.

Relief: Maximum relief is 50 m, (quartzite ridges). Elsewhere relief is less than 30 m

Soils: Two thirds of soils are moderately deep to shallow over basement rock. These are either calcareous loams, or have loam over red clay profiles. Deeper loam over clay soils are predominant on lower slopes and outwash fans.

Main soils:

Soils formed over basement rock on rises

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

Soils formed over alluvium on fans

D2 Hard loam over well structured red clay

Minor soils:

Soils formed over alluvium on fans

D3 Hard loam over dispersive red clay
C3 Deep gradational loam
A3 Deep calcareous loam

Soils formed over basement rock on rises

L1/B3 Shallow stony loam

Main features: The Wirrakinta Land System is mostly undulating to moderately sloping arable to semi arable land flanking rocky non arable ridges. Soils are generally moderately deep, (except on upper slopes) and loamy, some are calcareous throughout and some are not. Fertility is moderate, and soil structure varies between friable calcareous types and hard setting and dispersive types. Excessive run off with associated erosion potential is a significant threat on this land.

Soil Landscape Unit summary:6 Soil Landscape Units (SLUs) mapped in the Wirrakinta Land System

SLU	% of area	Main features #
ABC	9.2	Moderately steep ridges with slopes of 15-30% and up to 50 m high formed on mainly fine grained rocks with 10-20% prominent quartzite reefs. Main soils: hard loam over red clay on rock - **D1** (C) and shallow gradational loam on rock - **C2** (C), with shallow stony loam - **L1** (C) and stony shallow calcareous loam - **A2** (C). These ridges are non arable and largely inaccessible to machinery due to moderate slopes and rocky reefs. The soils are mainly shallow and stony with marginal waterholding capacities and fertility.
EGB EGC	11.1 44.4	Rises and low hills formed on fine grained rocks with variable surface siltstone, calcrete and quartzite. **EGB** Rises with slopes of 2-4%, up to 5% rock outcrop and up to 20% surface stone. **EGC** Slopes and low hills of 4-12% and relief to 50 m with up to 10% rock outcrop and 20% or more surface stone. Main soils: shallow calcareous loam - **A2** (E), with hard loam over red clay on rock - **D1** (C), shallow gradational loam on rock - **C2** (L) and shallow stony loam - **L1** (M) on rises, and hard loam over well structured red clay - **D2** (L) on lower slopes. The land is fully arable although soils are commonly shallow and have low clay contents with consequent limitations due to waterholding capacity and fertility. Heavy stone in places restricts workability. There is moderate potential for water erosion.
ESD	9.1	Rises on basement rock with slopes of 8-20% and relief to 40 m. Up to 25% of the land is too rocky for cultivation. There is 20-50% surface quartzite and siltstone. Main soils: shallow gradational loam on rock - **C2** (E) and shallow calcareous loam - **A2** (E), with hard loam over red clay on rock - **D1** (C) and shallow stony loam - **L1** (C). These rises are characterized by rocky reefs restricting the amount of arable ground. Between the reefs the soils are shallow and stony with sub-optimal waterholding capacities and fertility. The potential for water erosion is moderately high.
JDB JDC	21.8 4.4	Outwash fans formed on fine grained alluvium. **JDB** Slopes of 2-4%. **JDC** Slopes of 4-12%. Main soils: hard loam over well structured red clay - **D2** (E), with hard loam over dispersive red clay - **D3** (C), deep gradational loam - **C3** (L) and deep calcareous loam - **A3** (L). The land is arable with poor soil structure being the main limitation. Hard setting surfaces and dispersive clays in some soils reduce infiltration, affect workability and lead to patchy emergence. The slopes are prone to run-on from upslope. This has the potential to cause erosion.

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:

A2 Shallow calcareous loam (Paralithic / Petrocalcic, Calcic / Lithocalcic Calcarosol)
Calcareous loam to clay loam with soft or rubbly carbonate at shallow depth over weathering siltstone (70%) or calcrete (30%) at between 30 cm and 100 cm.

A3 Deep calcareous loam (Pedal, Hypercalcic Calcarosol)
Calcareous well structured clay loam to light clay, becoming more calcareous and clayey with depth.

C2 Shallow gradational loam on rock (Calcic / Lithocalcic, Red Dermosol)
Medium thickness loam to clay loam grading to a well structured red clay loam to clay with soft or rubbly carbonate at depth, over weathering rock within 100 cm.

C3 Deep gradational loam (Hypercalcic, Red Dermosol)
Medium thickness clay loam overlying a well structured red clay, calcareous at depth over alluvium.

D1 Hard loam over red clay on rock (Calcic / Hypercalcic, Red Chromosol)
Medium thickness hard setting sandy loam to clay loam abruptly overlying a red well structured clay with soft carbonate from about 60 cm, grading to weathering siltstone or sandstone within 100 cm.

D2 Hard loam over well structured red clay (Calcic / Hypercalcic, Red Chromosol)
Medium thickness hard setting sandy loam to clay loam overlying a well structured red clay, calcareous below 50 cm over alluvium.

D3 Hard loam over dispersive red clay (Calcic, Red Sodosol)
Medium thickness hard setting loam to clay loam abruptly overlying a coarsely structured and dispersive red clay, calcareous with depth over alluvium.

L1/B3 Shallow stony loam (Calcareous, Paralithic / Petrocalcic, Leptic Tenosol)
Stony loam grading to weathering siltstone with soft carbonate, or calcrete shallower than 50 cm.

Further information: DEWNR Soil and Land Program