

# SAH Sams Hills Land System

Strongly dissected and eroded low hills associated with down-cutting by watercourses in discrete areas between Gladstone and Koolunga.

**Area:** 65.9 km<sup>2</sup>

**Annual rainfall** 400 - 450 mm average

**Geology:** Siltstones of the Saddleworth Formation, capped in places by remnant Tertiary sand deposits, which are often silcreted. Prior to dissection by watercourses, the siltstones apparently underwent deep weathering, protected by the silcreted Tertiary sand capping. Erosion of much of this capping has exposed these kaolinized deep weathering materials at the surface in parts of the land system. These exposed materials are highly susceptible to scalding and gully erosion.

**Topography:** There are three discrete occurrences of this Land System. Each has the essential characteristics of strongly dissected low hills created by major watercourses cutting through ranges. In the most northerly and largest area, the Rocky River has cut through the southern extension of the Mt. Herbert Range to depths of 125 m. In the middle and southern areas, the Yackamoorundie Creek and a smaller (un-named) watercourse respectively have cut through a low range to depths of up to 80 m. The most notable topographic features are severely gullied and scalded low hills having rounded upper slopes and crests with slopes of less than 10%, and moderately steep to steep side slopes with gradients up to 80%.

**Elevation:** The highest point is 350 m at the northern extremity near Mt. Herbert. The lowest point is 110 m where the Rocky River exits on to the Crystal Brook plains. The maximum and minimum elevations for the middle and southern occurrences are 234 m and 130 m, and 270 m and 180 m respectively.

**Relief:** Maximum relief is 125 m, but 30 m to 80 m is more typical

**Soils:** Most soils have sandy loam to loam surfaces with red clayey subsoils, often dispersive. There are also calcareous loams and shallow skeletal soils.

**Main soils:**

|              |                         |
|--------------|-------------------------|
| <b>D1</b>    | Hard loam over red clay |
| <b>A2/B2</b> | Calcareous loam         |
| <b>L1b</b>   | Shallow stony loam      |
| <b>C2/C3</b> | Gradational loam        |

**Minor soils:**

|              |  |
|--------------|--|
| <b>D7/D3</b> | Hard sandy loam over dispersive red clay |
| <b>L1a</b>   | Shallow stony loam over calcareous rock  |

**Main features:** The Sams Hills Land System is characterized by strongly dissected and severely eroded slopes. These are commonly non or semi arable, due to the topography and the extensive rocky outcrops. The soils are typically hard sandy loams over dispersive clays, but shallow calcareous loams and stony sandy loams over rock are common. These all have marginal fertility. Control of erosion is the over riding soil management issue.



**Soil Landscape Unit summary:** 15 Soil Landscape Units (SLUs) mapped in the Sams Hills Land System

| SLU                             | % of area                         | Main features #  |
|---------------------------------|-----------------------------------|--|
| AAB<br>AAC<br>AAI<br>AAJ        | 0.7<br>13.8<br>2.1<br>11.0        | <p>Rocky low hills formed on mainly fine grained rocks.</p> <p><b>AAB</b> Lower slopes of 8-20% and relief to 30 m. There is up to 10% rock outcrop and 10-20% surface quartzite and siltstone.</p> <p><b>AAC</b> Low hills with slopes of 10-30%, relief of 30-80 m, up to 10% rock outcrop and 10-20% surface quartzite and siltstone.</p> <p><b>AAI</b> Rounded low hills with gently sloping crests grading to moderately steep to steep rocky slopes up to 60 m high. Gradients vary from less than 10% to 100% on some short slopes, but are usually less than 30%. Watercourses occupy narrow gullies and are commonly eroded. There is up to 10% rock outcrop and more than 20% surface stone.</p> <p><b>AAJ</b> Steep low hills up to 100 m high with slopes of 30-50%. Watercourses occupy narrow gullies and are commonly eroded. There is up to 10% rock outcrop and more than 20% surface stone.</p> <p>Main soils: <u>calcareous loam</u> - <b>A2/B2</b> (E) with <u>shallow stony loam</u> - <b>L1b</b> (C), <u>hard loam over red clay</u> - <b>D1</b> (L) and <u>gradational loam</u> - <b>C2/C3</b> (L), the latter two on lower slopes. The hills are non arable due to the roughness of the terrain, moderate slopes and shallow stony soils. Rocky outcrops limit accessibility in places and runoff is rapid. However, areas of deeper soils are potentially productive for grazing.</p>   |
| AXC<br>AXH<br>AXI<br>AXJ<br>AXi | 1.0<br>4.4<br>5.3<br>3.6<br>7.3   | <p>Rises and low hills formed on basement rocks which are usually deeply weathered and capped by Tertiary sediments and silcrete. Surface silcrete, quartzite, calcrete and sandstone are common.</p> <p><b>AXC</b> Moderately inclined upper slopes of 10-25% and relief to 40 m. The unit is characterized by breakaway features on upper slopes and flat topped crests. There is extensive silcrete stone and outcrop on the breakaways.</p> <p><b>AXH</b> Gentle slopes (up to 10% gradient), dissected by severely eroded watercourses creating side slopes in gullies of up to 30%. There is up to 20% variable surface stone (sandstone, quartzite, silcrete, calcrete).</p> <p><b>AXI</b> Moderately steep slopes of 10-30% and relief of 40-70 m dissected by watercourses which are commonly eroded. There is up to 20% variable surface stone (sandstone, quartzite, silcrete, calcrete).</p> <p><b>AXJ</b> Steep strongly dissected low hills with slopes of 20-50% and relief to 60 m. There is up to 10% rock outcrop and 20-50% variable surface stone (sandstone, quartzite, silcrete, calcrete).</p> <p><b>AXi</b> Moderately steep to steep low hills with slopes of 15-40%, relief to 70 m, severe scalding on hillslopes, and erosion in watercourses. There is up to 20% variable surface stone (sandstone, quartzite, silcrete, calcrete) and sporadic silcrete outcrop.</p> <p>Main soils: <u>shallow stony loam</u> - <b>L1b</b> (E) with <u>calcareous loam</u> - <b>A2/B2</b> (C), <u>hard sandy loam over dispersive red clay</u> - <b>D7/D3</b> (C) and <u>shallow stony loam over calcareous rock</u> - <b>L1a</b> (C). These slopes are non arable because of their slopes, severe erosion, extensive rockiness and shallow, low fertility soils. Deeply weathered kaolinitic soils are often associated with high levels of stored salts, so recharge of groundwater should be controlled in these areas.</p> |
| DJC<br>DJD<br>DJH<br>DJI<br>DJn | 5.1<br>5.0<br>10.3<br>24.8<br>5.1 | <p>Rises and low hills formed on basement rock, deeply weathered in places and partially overlain by Tertiary sandstone and silcrete. Surface ironstone, silcrete, quartzite, sandstone and calcrete are common.</p> <p><b>DJC</b> Undulating low hills with slopes of 4-12% and relief of 20-50 m. There is up to 20% variable surface stone.</p> <p><b>DJD</b> Undulating to rolling slopes of 6-20% and relief to 40 m. There is up to 20% variable surface stone.</p> <p><b>DJH</b> Undulating rises and low hills with slopes of 6-15%, relief to 50 m and eroded watercourses. There is up to 20% variable surface stone.</p> <p><b>DJI</b> Rolling low hills with slopes of 10-25%, relief to 60 m and eroded watercourses. There is up to 20% variable surface stone.</p> <p><b>DJn</b> Rolling low hills with slopes of 8-20%, relief to 50 m, eroded watercourses and 5-10% scalding. There are some flat topped crests flanked by breakaway features. There is up to</p>  |



|     |     |   |
|-----|-----|---|
|     |     | 20% variable surface stone.<br>Main soils: <u>hard loam over red clay</u> - <b>D1</b> (E) with <u>calcareous loam</u> - <b>A2/B2</b> (C), <u>gradational loam</u> - <b>C2/C3</b> (L), <u>hard sandy loam over dispersive red clay</u> - <b>D7/D3</b> (L) and <u>shallow stony loam over calcareous rock</u> - <b>L1a</b> (M). These slopes are dominated by severely eroded watercourses. This is partly the result of the moderate gradients and partly due to the high erodibility of the hard setting poorly structured soils which dominate. Apart from erosion potential, these soils suffer from poor infiltration and waterholding capacities, they are difficult to work without affecting structure and they cause patchy emergence. Surface stones are common and the quartzitic and ironstone types are highly abrasive. |
| EQI | 0.5 | Dissected slopes of 10-20% and relief to 30 m formed on silcreted Tertiary sediments. There is up to 20% silcrete outcrop and 20% surface silcrete stone. Watercourses are commonly eroded.<br>Main soils: <u>hard loam over red clay</u> - <b>D1</b> (E) and <u>calcareous loam</u> - <b>A2</b> (E) with <u>shallow stony loam</u> - <b>L1b</b> (L). Use of these isolated rises is primarily limited by the extensive outcrops of silcrete and associated shallow stony soils. The remainder of the land is arable but with limitations due to erosion potential, shallow soils, marginal fertility and highly abrasive surface stones.   |

# 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/B2** Calcareous loam (Paralithic / Petrocalcic, Calcic / Lithocalcic Calcarosol)

Calcareous stony sandy loam to clay loam grading to soft or rubbly carbonate within 40 cm, overlying basement rock, sheet calcrete or Tertiary sandstone.

#### **C2/C3** Gradational loam (Hypercalcic / Supracalcic, Red Dermosol)

Medium to thick clay loam to loam grading to a red well structured clay with abundant soft to rubbly carbonate from about 60 cm overlying basement rock which is commonly deeply weathered.

#### **D1** Hard loam over red clay (Calcic / Hypercalcic, Red Chromosol)

Medium thickness hard setting gravelly sandy loam to sandy clay loam abruptly overlying a red strongly structured clay with soft carbonate at depth grading to weathering basement siltstone, ferruginized sandstone or highly altered (kaolinized or ferruginized) material.

#### **D7/D3** Hard sandy loam over dispersive red clay (Calcic / Supracalcic, Red Sodosol)

Medium thickness hard setting quartz gravelly sandy loam to sandy clay loam sharply over a red poorly structured dispersive clay with soft to rubbly carbonate at depth grading to weathering quartzitic rock.

#### **L1a** Shallow stony loam over calcareous rock (Calcareous, Paralithic, Leptic Tenosol)

Shallow stony sandy loam to clay loam, becoming more clayey and calcareous with depth overlying basement rock within 50 cm.

#### **L1b** Shallow stony loam (Lithic / Silpanic / Petrocalcic Rudosol)

Shallow sandy loam to clay loam overlying hard basement rock, silcrete or calcrete.

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

