

# PEH Peep Hill Land System

Low ranges and undulating rises in the Peep Hill - Australia Plains - Robertstown area

**Area:** 125.8 km<sup>2</sup>

**Annual rainfall:** 320 – 430 mm average

**Geology:** The Land System is underlain by a series of rock formations which have a large bearing on the diversity of soil and land types. The formations are in more or less north - south oriented belts and include (from west to east), Saddleworth Formation siltstones, Appila Tillite, interbedded quartzites and siltstones of the Wilyerpa Formation and Tapley Hill slates. On the eastern side is a U shaped (open end pointing south) range of Kanmantoo Group sediments including Carrickalinga Head and Tappanappa Formation phyllites and sandstones, and hard sandstones of the Backstairs Passage Formation. Most of these rocks have been metamorphosed. There are significant areas of locally derived fine to medium grained outwash sediments occurring on outwash fans and on creek flats. All rocks and sediments are capped by variable secondary carbonates in either soft or rubbly forms.

**Topography:** The Peep Hill Land System includes a variety of topographic features. These include:

- Moderately steep rocky ranges, mainly in the north and southeast
- Semi arable ridges and rises with linear rock outcrop
- Undulating rises with minor rock outcrop
- Gently inclined outwash fans
- Creek flats, variably eroded and scalded

The rising ground has a well defined north - south lineation due to the strike of the underlying rock strata. The general drainage trend is towards the east, cutting across the grain of the land. This cross cutting has resulted in an irregular land surface.

**Elevation:** 419 m in the northwest to 240 m in the south east

**Relief:** Maximum relief is 90 m

**Soils:** Shallow loamy soils over basement rock occur on rises, and deeper sandy loam to loam soils over alluvium occur on lower ground. Calcareous soils dominate the rises, and there are extensive areas of non-calcareous texture contrast soils on both flats and rises.

### Main soils

- A2a** Shallow rubbly calcareous sandy loam - common (rises)
- D2** Sandy loam over red clay - limited (flats)
- L1** Shallow stony sandy loam - limited (rocky rising ground)

### Minor soils

*Soils formed on basement rock on rises*

- A2b** Shallow non-rubbly calcareous loam
- D1** Sandy loam over red clay on rock
- D7** Sandy loam over dispersive red clay on rock
- C2** Gradational red loam on rock
- B2/B3** Shallow loam over calcrete
- B6** Loam over red clay on calcrete



*Soils formed on alluvium on flats and outwash fans*

- A4** Rubbly calcareous loam  
**A3** Deep non-rubbly calcareous loam  
**D3** Sandy loam over dispersive red clay

**Main features:** Low rocky non-arable ranges are conspicuous features of the Peep Hill Land System, but arable land predominates. Most of the arable land occurs on undulating rises characterized by rubbly calcareous soils. These are friable and well drained, but limited by moderately low water holding capacity and alkalinity which may affect nutrient availability. Sub dominant soils are sandy loam texture contrast types which are moderately deep and fertile but poorly structured. These are susceptible to high runoff and erosion, patchy plant emergence and impaired root growth. Watercourses are commonly eroded, and on creek flats scalding is also evident - both indicators of severe erosion in the past.

**Soil Landscape Unit summary:** 21 Soil Landscape Units (SLUs) mapped in the Peep Hill Land System:

| SLU        | % of area   | Main features #  |
|------------|-------------|--|
| AKA<br>AKB | 0.6<br>7.1  | Ridges formed on highly resistant metasandstones of the Backstairs Passage Formation. There is 20-50% surface sandstone and up to 20% outcropping rock.<br><b>AKA</b> Low ridges with slopes of less than 8%.<br><b>AKB</b> Rises and low hills to 40 m high with slopes of 10-25%.<br>Main soils: <u>shallow stony sandy loam - L1/B2 (V) with stony sandy loam over (dispersive) red clay on rock - D1/D7 (C) and shallow calcareous sandy loam / loam - A2a/A2b (L)</u> . This land is very rocky with shallow soils and is not suited to any agricultural uses other than rough grazing. Much is still under native scrub which provides useful shelter.   |
| ARI        | 9.6         | Range up to 60 m high formed on interbedded siltstones and quartzites of the Wilyerpa Formation. Slopes are 15-40%, with some unmapped outwash slopes of 5-10%. There is 20-50% surface quartzite including up to 10% rocky outcrop. Watercourses are commonly eroded.<br>Main soils: <u>stony sandy loam over (dispersive) red clay on rock - D1/D7 (E) and shallow stony sandy loam - L1 (E) with shallow rubbly calcareous sandy loam - A2a (L)</u> . Except for some narrow strips between rocky reefs and minor lower slopes with deeper soils, this land is too rocky and generally too steep for farming, although soils are commonly moderately deep. There is extensive scrub cover providing stock shelter.  |
| DTD<br>DTI | 3.4<br>4.2  | Ridges and rises formed on metasandstones with about 20% rock outcrop in linear reefs.<br><b>DTD</b> Ridges to 40 m high with slopes of 8-20%.<br><b>DTI</b> Dissected rises to 40 m high with slopes of 8-20% and eroded watercourses.<br>Main soils: <u>stony sandy loam over (dispersive) red clay on rock - D1/D7 (E) and shallow stony sandy loam - L1 (E)</u> , with <u>shallow rubbly calcareous sandy loam - A2a (L) and sandy loam over red clay - D2 (M)</u> on lower slopes. This land is semi arable due to rocky outcrop and moderate slopes. The soils between the reefs are generally moderately deep and fertile but poorly structured with hard setting surfaces and sometimes dispersive subsoils. These conditions cause excessive runoff which adds to the erosion hazard.   |
| EEC<br>EEH | 5.7<br>10.7 | Undulating rises formed on phyllites and metasandstones of the Carrickalinga Head and Tappanappa Formations, capped by soft to rubbly carbonates. There are 10-20% (up to 30%) surface calcrete and basement rock fragments and about 5% rocky outcrop. Water courses are well defined and usually eroded to some extent.<br><b>EEC</b> Rises to 30 m high with slopes of 3-6%.<br><b>EEH</b> Rises to 40 m high with slopes of 3-12% and minor to moderate water course erosion.<br>Main soils: <u>shallow rubbly calcareous sandy loam - A2a (V) and shallow non rubbly calcareous loam - A2b (E)</u> . Much of this land is cropped, although significant areas have shallow stony soils. Soils throughout have restricted waterholding capacity due to high rubble content and moderate depth over bedrock. Fertility is generally low to moderate due to low clay content and high pH, but structure, drainage and aeration are good. Very high subsoil pH levels may restrict root growth and water use. |



|                          |                          |  |
|--------------------------|--------------------------|--|
| EFB<br>EFC               | 3.7<br>3.0               | <p>Undulating rises formed on metasiltstones of the Saddleworth Formation with up to 20% surface siltstone and quartzite fragments.</p> <p><b>EFB</b> Low rises with slopes of 2-4%.<br/><b>EFC</b> Slopes and rises of 4-10%.</p> <p>Main soils: <u>shallow non rubbly calcareous loam</u> - <b>A2b</b> (E), with <u>stony sandy loam over red clay on rock</u> - <b>D1</b> (C), <u>gradational red loam</u> - <b>C2</b> (L), <u>shallow stony sandy loam</u> - <b>L1</b> (L) and <u>shallow loam over calcrete</u> - <b>B2/B3</b> (L). This land is fully arable with mainly calcareous soils. These have favourable structure but may be susceptible to lime induced nutrient deficiencies. Although these soils are deeper than most other soils on rising ground in this Land System, moisture holding capacity is nevertheless the main limitation.</p>  |
| EIB<br>EIC<br>EIH        | 6.4<br>6.8<br>1.5        | <p>Undulating rises formed on mixed metamorphosed sandstones and siltstones of the Appila Tillite, Wilyerpa and Tapley Hill Formations. There are up to 20% surface quartz and calcrete fragments.</p> <p><b>EIB</b> Rises to 30 m high with slopes of 2-4%.<br/><b>EIC</b> Rises to 30 m high with slopes of 3-7%.<br/><b>EIH</b> Slopes of 5-10% with eroded watercourses.</p> <p>Main soils: <u>shallow rubbly calcareous sandy loam</u> - <b>A2a</b> (V) with <u>stony sandy loam over (dispersive) red clay on rock</u> - <b>D1/D7</b> (C), <u>shallow loam over calcrete</u> - <b>B2/B3</b> (M) and <u>loam over red clay on calcrete</u> - <b>B6</b> (M). <u>Sandy loam over red clay</u> <b>D2/D3</b> (M) occurs on lower slopes. Most soils are moderately shallow and calcareous. Soil structure is favourable, but moisture holding capacity and fertility are limiting. Sub-dominant soils have reverse properties, being deeper and more fertile, but with poor structure. Erosion potential is moderately low to moderate - <b>EIH</b> has the highest hazard.</p> |
| EZH<br>EZI               | 3.6<br>3.2               | <p>Lower slope complex of rises formed on basement metasandstones and outwash fans formed on locally derived outwash sediments. Surface stone is extensive on rises.</p> <p><b>EZH</b> Slopes are 5-10% on rises and 3-5% on fans. There is minor watercourse erosion.<br/><b>EZI</b> Slopes are 10-20% on rises and 4-8% on fans. Watercourses are usually eroded.</p> <p>Main soils: <u>shallow rubbly calcareous sandy loam</u> - <b>A2a</b> (E) and <u>stony sandy loam over red clay on rock</u> - <b>D1</b> (L) on rises, and with <u>sandy loam over red clay</u> - <b>D2</b> (L) and <u>rubbly calcareous loam</u> - <b>A4</b> (C) on fans. Erosion potential is the main limitation on <b>EZI</b> - slopes are moderate and the surrounding steeper land generates substantial runoff which has caused damage in the past. The gentler slopes of <b>EZH</b> are more amenable to cropping, although there is potential for serious erosion. Restricted moisture holding capacity is the other main limitation.</p>  |
| JDG<br>JDJ<br>JDY<br>JDo | 0.7<br>6.2<br>3.4<br>0.4 | <p>Outwash fans and flats formed on clayey alluvium.</p> <p><b>JDG</b> Fans with slopes of 2-3% and minor water course erosion.<br/><b>JDJ</b> Drainage depressions and flats with moderate water course erosion.<br/><b>JDY</b> Creek flats with minor watercourse erosion and up to 5% of the land affected by scalding.<br/><b>JDo</b> Severely eroded and scalded creek flats.</p> <p>Main soils: <u>sandy loam over (dispersive) red clay</u> - <b>D2/D3</b> (V), with <u>deep non rubbly calcareous loam</u> - <b>A3</b> (L) and <u>loam over red clay on calcrete</u> - <b>B6</b> (M). These soils are deep and moderately fertile but most have hard setting surfaces which tend to shed water and impede uniform emergence and root growth. Erosion potential is moderately low, but run off from adjacent rising ground must be controlled. Gully erosion and scalding bear testimony to erosion that has occurred on these landscapes in the past.</p>  |
| KHB<br>KHG<br>KHH        | 11.7<br>4.1<br>4.0       | <p>Outwash fans formed on fine grained alluvium. There is variable surface calcrete stone, up to 10%, with up to 20% on very low rises.</p> <p><b>KHB</b> 2-3% slopes.<br/><b>KHG</b> 2-3% slopes with eroded watercourses.<br/><b>KHH</b> 3-7% slopes with eroded watercourses.</p> <p>Main soils: <u>rubbly calcareous loam</u> - <b>A4</b> (E) and <u>sandy loam over (dispersive) red clay</u> - <b>D2/D3</b> (E), with <u>deep non rubbly calcareous loam</u> - <b>A3</b> (L) and <u>shallow loam over calcrete</u> - <b>B2/B3</b> (M). There are two distinctive soil classes on these flats. The calcareous soils have good physical characteristics, but are often shallow over rubble (limiting moisture availability) and being calcareous throughout, may suffer from induced nutrient deficiencies. The texture contrast soils (D2/D3) on the other hand, are moderately fertile and deep, but have hard setting surfaces, affecting water infiltration and root growth. Subsoil salt levels are low to moderate.</p>  |



# 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:

- A2a** Shallow rubbly calcareous sandy loam (Paralithic, Lithocalcic / Supracalcic Calcarosol)  
10 - 15 cm calcareous stony sandy loam over rubbly Class III C or III B carbonate, grading to a very highly calcareous sandy loam to sandy clay loam merging with weathering rock at 65 cm.
- A2b** Shallow non rubbly calcareous loam (Paralithic, Hypercalcic Calcarosol)  
10 - 20 cm calcareous loam becoming very highly calcareous with depth and grading to weathering basement rock at 50 cm.
- A3** Deep non rubbly calcareous loam (Regolith, Calcic Calcarosol)  
10 - 20 cm calcareous loam to clay loam grading to a very highly calcareous brown clay loam to clay merging with clayey alluvium from about 100 cm.
- A4** Rubbly calcareous loam (Regolith Lithocalcic / Supracalcic Calcarosol)  
15 - 25 cm calcareous loam to clay loam overlying rubbly Class III C or III B carbonate becoming less rubbly with depth grading to very highly calcareous light clay.
- B2/B3** Shallow loam over calcrete (Petrocalcic Calcarosol / Petrocalcic, Leptic Tenosol)  
Up to 50 cm sandy loam to loam with variable content of fine and rubbly carbonate, overlying calcreted basement rock.
- B6** Loam over red clay on calcrete (Petrocalcic, Red Chromosol)  
20 - 30 cm hard loam over a well structured red clay with a calcrete pan within 50 cm.
- C2** Gradational red loam on rock (Hypercalcic, Red Dermosol)  
10 - 35 cm clay loam to loam grading to a well structured red clay with soft carbonate from about 50 cm, over weathering siltstone from about 100 cm.
- D1** Sandy loam over red clay on rock (Hypercalcic, Red Chromosol)  
15 - 40 cm hard quartz gravelly sandy loam to clay loam abruptly overlying a well structured red clay, calcareous from 45 cm grading to weathering metasandstone or metasilstone at 80 cm.
- D2** Sandy loam over red clay (Hypercalcic, Red Chromosol)  
10 - 40 cm hard quartzite gravelly fine sandy loam to loam abruptly overlying a well structured red clay with soft or occasionally rubbly carbonate from 45 cm, over alluvium.
- D3** Sandy loam over dispersive red clay (Hypercalcic, Red Sodosol)  
10 - 40 cm hard quartzite gravelly fine sandy loam to loam abruptly overlying a coarsely structured and dispersive red clay with soft or occasionally rubbly carbonate from 45 cm, on alluvium
- D7** Sandy loam over dispersive red clay on rock (Hypercalcic, Red Sodosol)  
15 - 40 cm hard quartz gravelly sandy loam to clay loam abruptly overlying a coarsely structured and dispersive red clay, calcareous from 45 cm grading to weathering quartzite, metasandstone or metasilstone at 80 cm.
- L1** Shallow stony sandy loam (Lithic, Leptic Tenosol / Rudosol)  
10 - 30 cm stony sandy loam to loam directly overlying basement rock.

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

