

# NDY Narridy Land System

Undulating rises, low hills and broad valleys of the Narridy Creek catchment between Narridy and Georgetown

**Area:** 83.1 km<sup>2</sup>

**Annual rainfall** 390 – 520 mm average

**Geology:** Complex of basement sandstones and siltstones, overlain by Tertiary age sands and sandy clays, indurated in places. On some upper slopes deep weathering profiles are protected by silicified or lateritized cappings which in turn have been partially eroded away. Land surfaces are therefore underlain by either Tertiary sand or sandstone, basement rock, deeply weathered and kaolinized rock or silcrete / laterite, or locally derived alluvium. Furthermore, the landscape is covered by windblown carbonates which have leached into the soil. The carbonate is either soft and finely divided, rubbly or massive (calcrete).

**Topography:** The system includes most of the Narridy Creek catchment to the Rocky River flood plain, as well as some land in the east which drains into the Yackamoorundie Creek. The landscape comprises undulating rises and low hills draining to a broad central valley. The slopes of the rising ground are generally less than 10% but there are some prominent crests (associated with deeply weathered residuals) which are steeper. There are sporadic outcrops of silcrete and scattered surface sandstone, calcrete and quartzite. Lower slopes and valleys are very gently inclined and include well defined watercourses feeding the main creek. Severe erosion is common in many creeks.

**Elevation:** The highest point is 360 m in the northeast. The elevation falls to 135 m where Narridy Creek flows out on to the Rocky River flood plain.

**Relief:** Maximum relief is 90 m, but the usual range is 20 - 50 m

**Soils:** There is a range of soils including sandy loam over clay, calcareous sandy loam, gradational clay loam and cracking clay, overlying variable substrates.

### Main soils

*Soils formed on Tertiary sediments (rises) or alluvium (lower slopes and flats)*

- C3** Gradational clay loam
- D2** Sandy loam over red clay
- D3** Hard sandy loam over dispersive red clay

### Minor soils

*Soils formed on Tertiary sediments (rises) or alluvium (lower slopes and flats)*

- A3/A4** Deep calcareous loam – flats
- A4a** Calcareous sandy loam - rises
- A4b** Rubbly calcareous sandy loam - rises
- A5** Rubbly calcareous sandy loam on clay - rises
- A6** Deep calcareous clay loam - rises
- D5** Hard loamy sand over red clay - flats
- E2** Red cracking clay - rises
- M4/C1** Deep gradational sandy loam - flats



*Soils formed on rises on basement rock or silcrete*

- A2** Calcareous sandy loam on rock  
**B2** Shallow calcareous sandy loam on silcrete  
**C2** Gradational loam on rock  
**D1** Sandy loam over red clay on rock  
**L1** Shallow stony sandy loam on rock

**Main features:** The Narridy Land System comprises undulating rises and low hills, and a broad valley. Most of the land is arable. There is a range of soils on the rises, most of which overlie Tertiary sediments or basement rock within a metre. Poor surface structure and sub optimal fertility are the main management issues, along with control of runoff and erosion. On the outwash fans and flats of the valley, hard setting erodible soils predominate. The soils are generally deep and inherently fertile, but erosion in the past (attributable to excessive runoff from the rises) has degraded their physical fertility.

**Soil Landscape Unit summary:** 13 Soil Landscape Units (SLUs) mapped in the Narridy Land System:

SLU	% of area	Main features #
EQD	1.7	Prominent gently undulating upper slopes and crests and breakaway slopes of 10-15% formed on Tertiary sandstones and deeply weathered basement rocks. There are up to 20% silcrete outcrops and 20% or more surface silcrete and ironstone fragments. Main soils: shallow <u>hard sandy loam over red clay</u> - <b>D1</b> (E) and <u>calcareous sandy loam</u> - <b>A4a</b> (E) with <u>gradational loam on rock</u> - <b>C2</b> (L), <u>calcareous sandy loam on rock</u> - <b>A2</b> (L) and <u>shallow stony sandy loam</u> - <b>L1</b> (L). These small isolated areas are often high in the landscape and very exposed. Use 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, low fertility and highly abrasive surface stones.
HJC HJH HJI	20.7 8.6 0.6	Low hills formed on Tertiary sandstones and related unconsolidated sediments. There is 5% silcrete outcrop as breakaways, and up to 10% surface sandstone and ironstone. <b>HJC</b> Low hills with slopes of 4-12% and relief of 30-50 m. <b>HJH</b> Low hills with slopes of 4-12%, relief of 30-50 m and eroded watercourses. <b>HJI</b> Moderately steep slopes of 12-20% up to 30 m high with eroded watercourses. Main soils: <u>hard sandy loam over red clay</u> - <b>D2</b> (C), <u>hard sandy loam over dispersive red clay</u> - <b>D3</b> (C), <u>(rubbly) calcareous sandy loam (on clay)</u> - <b>A4a/A4b/A5</b> (C), <u>gradational clay loam</u> - <b>C3</b> (L) and <u>shallow calcareous sandy loam</u> - <b>B2</b> (L). These slopes are highly erodible due to their predominantly poorly structured soils. Eroded watercourses indicate substantial historic erosion. The hard setting surfaces shed water, reducing profile storage, are difficult to work and may cause patchy emergence.
IWB IWC	4.5 13.1	Rises and low hills formed on Tertiary sandstones, clayey sands and sandy clays, or heavy clays, capped by soft to rubbly carbonate. There is up to 10% surface calcrete, ironstone and sandstone. <b>IWB</b> Rises to 20 m high with slopes of 2-4%. <b>IWC</b> Rises and low hills to 40 m high with slopes of 4-8%. Main soils: <u>calcareous sandy loam</u> - <b>A4a</b> (E), with <u>deep calcareous clay loam</u> - <b>A6</b> (C) with <u>hard sandy loam over dispersive red clay</u> - <b>D3</b> (C), <u>hard sandy loam over red clay</u> - <b>D2</b> (C), <u>gradational clay loam</u> - <b>C3</b> (L) and <u>shallow calcareous sandy loam</u> - <b>B2</b> (L). The rises are fully arable and potentially productive although the mixture of soils has a variety of slight limitations including poor structure, shallow root zone depth, moderate fertility (attributable to sandy and calcareous soils), and waterlogging, boron toxicity and salinity (heavier soils).



JDA	5.0	Drainage depressions and outwash fans formed on fine grained alluvium.
JDB	12.8	<b>JDA</b> Alluvial flats of less than 2% slope.
JDE	3.4	<b>JDB</b> Fans with slopes of 2-4%.
JDJ	2.5	<b>JDE</b> Drainage depressions with stable Watercourses and slopes of 1-2%. <b>JDJ</b> Drainage depressions with eroded watercourses. Main soils: <u>hard sandy loam over red clay</u> - <b>D2</b> (E) and <u>gradational clay loam</u> - <b>C3</b> (E), with <u>deep calcareous loam</u> - <b>A3/A4</b> (L) and <u>hard sandy loam over dispersive red clay</u> - <b>D3</b> (L). Except for the areas immediately adjacent to watercourses, the entire landscape is arable. Hard setting surface soils are the main management problem, because of their adverse effects on runoff / erosion, workability, seedling emergence, and moisture retention. Most soils are reasonably fertile, deep and well drained.
KCB	6.9	Gently inclined outwash fans of 2-4% formed on medium grained outwash sediments. Main soils: <u>deep gradational sandy loam</u> - <b>M4/C1</b> (C), <u>hard loamy sand over red clay</u> - <b>D5</b> (C) and <u>deep calcareous loam</u> - <b>A3/A4</b> (C), with <u>hard sandy loam over red clay</u> - <b>D2</b> (L) and <u>hard sandy loam over dispersive red clay</u> - <b>D3</b> (M). This land is fully arable, the main limitation being the relatively sandy surfaced soils which have a reduced capacity to store moisture and are liable to blow if not well protected. Soil fertility is sub-optimal because of the generally sandy nature of the topsoil.
TAC	8.3	Rises formed on clayey sediments or weathered fine grained rocks.
TAZ	11.9	<b>TAC</b> Gentle slopes of 5-12%, up to 40 m high. <b>TAZ</b> Undulating upper slopes and broad crests, with slopes of less than 4%. Main soils: clayey variants of <u>gradational clay loam</u> - <b>C3</b> (E), with <u>deep calcareous clay loam</u> - <b>A6</b> (C) and <u>red cracking clay</u> - <b>E2</b> (C). These slopes have few limitations with predominantly deep, fertile, well drained soils and slight to moderate erosion potential.

# 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:

- A2** Calcareous sandy loam on rock (Paralithic, Lithocalcic / Hypercalcic Calcarosol)  
Calcareous stony sandy loam to clay loam grading to rubbly or soft carbonate within 50 cm, grading to basement rock within 100 cm.
- A3/A4** Deep calcareous loam (Regolithic, Hypercalcic Calcarosol)  
Calcareous loam becoming more clayey and calcareous with depth, over a weakly to moderately well structured highly calcareous red brown clayey subsoil, grading to clay loamy to clayey alluvium.
- A4a** Calcareous sandy loam (Regolithic, Lithocalcic / Hypercalcic Calcarosol)  
Calcareous stony sandy loam to clay loam grading to rubbly or soft carbonate within 50 cm, continuing below 100 cm and grading to Tertiary sandstone or sandy to sandy clay loam sediments.
- A4b** Rubbly calcareous sandy loam (Regolithic, Supracalcic / Lithocalcic Calcarosol)  
Calcareous sandy loam to clay loam grading to Class III B or III C rubble at 30-50 cm over sandy to sandy clay loam sediments.
- A5** Rubbly calcareous sandy loam on clay (Regolithic, Supracalcic / Lithocalcic Calcarosol)  
Calcareous sandy loam to clay loam grading to Class III B or III C rubble at 30-50 cm over clayey sediments.
- A6** Deep calcareous clay loam (Pedal, Hypercalcic / Calcic Calcarosol)  
Calcareous loam to light clay grading to a highly calcareous well structured clay with soft Class I carbonate from about 50 cm, over Tertiary sediments.



- B2** Shallow calcareous sandy loam (Petrocalcic / Lithocalcic Calcarosol)  
Calcareous sandy loam to sandy clay loam, becoming more clayey, calcareous and rubbly with depth over sheet or rubbly calcrete from about 30 cm. Tertiary sandstone underlies the calcrete within 100 cm.
- C2** Gradational loam on rock (Calcic / Lithocalcic, Red Dermosol)  
Medium to thick loam to sandy loam grading to a well structured red clay with soft (sometimes rubbly) carbonate from about 50 - 70 cm, over highly weathered rock from about 80 cm.
- C3** Gradational clay loam (Calcic / Lithocalcic, Red Dermosol)  
Medium to thick clay loam to sandy loam grading to a well structured red clay with soft (sometimes rubbly) carbonate from about 50 - 70 cm, over clayey sediments.
- D1** Sandy loam over red clay on rock (Calcic, Red Chromosol)  
Medium thickness hard setting sandy loam to clay loam abruptly overlying a well structured red clay with fine Class III A or rubbly Class III B carbonate at base, grading to weathered basement rock within 100 cm.
- D2** Sandy loam over red clay (Calcic / Supracalcic, Red Chromosol)  
Medium to thick hard setting sandy loam to clay loam abruptly overlying a well structured red clay with soft Class I / III A or rubbly Class III B carbonate from between 50 and 80 cm grading to alluvium or Tertiary clay.
- D3** Hard sandy loam over dispersive red clay (Calcic / Supracalcic, Red Sodosol)  
Medium to thick hard setting sandy loam to sandy clay loam sharply overlying a coarsely structured dispersive red clay, with soft Class I carbonate (sometimes rubbly) from about 60 cm, over sandy Tertiary sediments or alluvium within 100 cm.
- D5** Hard loamy sand over red clay (Calcic / Hypercalcic, Red Sodosol)  
Hard setting loamy sand to sandy loam sharply overlying a poorly structured red clay, calcareous with depth, grading to medium grained alluvium or Tertiary sediments.
- E2** Red cracking clay (Self-mulching / Epipedal, Red Vertosol)  
Red well structured cracking clay, grading to a heavy red clay with variable soft carbonate over heavy clay.
- L1** Shallow stony sandy loam (Lithic, Leptic Rudosol)  
Stony sandy loam shallow over hard silcrete.
- M4/C1** Deep gradational sandy loam (Sodic, Hypocalcic / Hypercalcic, Red Kandosol)  
Thick dark brown sandy loam grading to a hard massive red or brown sandy clay loam, with variable fine carbonate at depth, overlying medium textured alluvium from about 100 cm.

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

