

# BLL Belalie Land System

Plains and gently sloping outwash fans of the Belalie Valley

**Area:** 127.3 km<sup>2</sup>

**Annual rainfall** 420 – 500 mm average

**Geology:** Fine to medium grained alluvium derived from basement rocks of the Tapley Hill Formation and Appila Tillite. Tapley Hill slates and siltstones underlie the alluvium and outcrop sporadically. Both sedimentary deposits and rocks are covered by a thin layer of fine grained aeolian carbonate.

**Topography:** The Land System encompasses the Belalie Valley and includes two catchments. The larger comprises the flats and associated fans of Freshwater Creek, extending from east of Jamestown southwards between the Brown Hill Range to the east and Ward Hill Range to the west. The southern extremity of the system is at Spalding. The smaller catchment includes Belalie Creek and its tributaries which originate in the Belalie Valley and flow south west to a gap in the range one km east of Jamestown. The Freshwater Creek flats have a steady fall of 1% to the south, but on either side of the creek, outwash fans with slopes of up to 4% grade to the adjacent ranges. Slopes in the northern catchment range from 1-4%. There are isolated rises on the watershed between the two catchments where basement rock protrudes through the sedimentary cover.

**Elevation:** 620 m to 500 m in the northern catchment. 550 m to 300 m in the southern catchment.

**Relief:** Maximum relief from watercourse to upper boundary of fans is 20 m. The isolated basement rock rises are usually 10 - 20 m high, but one is 40 m.

**Soils:** The characteristic soils are red loamy texture contrast soils with clayey (commonly dispersive) subsoils.

#### Main soils

**D2** Hard loam over red clay - extensive on flats and fans on alluvium

**C3/M2** Gradational loam - extensive on flats and fans, overlying alluvium

**D3** Hard loam over dispersive red clay - extensive on flats and fans on alluvium

#### Minor soils

**E3** Brown cracking clay - flats over clayey alluvium

**A2** Shallow calcareous loam } basement rock highs

**C2/L1** Shallow (gradational) loam }

**Main features:** The land is flat to gently sloping with deep, inherently fertile and moderately well drained soils. Poor soil structure (particularly surface soil) is the main limitation with resultant water ponding, workability and emergence problems, and water erosion potential on the sloping fans. Dispersive subsoils causing more prolonged waterlogging occur in places. Watercourse erosion is locally significant and there is minor saline seepage. Subsoil salinity levels are probably moderate.



**Soil Landscape Unit summary:** 10 Soil Landscape Units (SLUs) mapped in the Belalie Land System:

SLU	% of area	Main features #
EGB EGC	1.6 3.2	Rises and low hills formed on basement siltstones. <b>EGB</b> Rises with slopes of 2-4%. <b>EGC</b> Rises and low hills with relief of 10-40 m and slopes of 3-8% Main soils: <u>shallow calcareous loam - A2</u> (V) with <u>shallow (gradational) loam - C2/L1</u> (E). The rises are fully arable (except for minor outcrop), although because most of the soils are relatively shallow, moisture shortages may limit crops in dry finishes. Reduction of water loss and erosion through runoff is the main management issue, together with fertility maintenance. "Lime - induced" nutrient deficiencies are possible on calcareous soils.
ESD	0.1	Rocky rises up to 10 m high with slopes of 5-15% and 10-20% rocky outcrops. Main soils: <u>shallow gradational loam - C2</u> (E) and <u>shallow calcareous loam - A2</u> (E) formed over siltstone basement rock and containing variable amounts of soft and rubbly carbonate. <u>Shallow loam - L1</u> (C) occurs in rocky areas. Rocky reefs, shallow stony soils and sometimes moderate slopes limit cropping of these areas. Erosion is a problem because of high runoff rates.
JEA JEB JEF JEJ JEQ	17.4 64.3 9.0 0.6 0.2	Flats and fans formed on alluvial sediments. <b>JEA</b> Flats with slopes of 1-2%. The southern occurrence includes the channel of Freshwater Creek. <b>JEB</b> Fans with slopes of 2-4% and well defined stable watercourses. <b>JEF</b> Flats adjacent to Freshwater Creek with slopes of 1%. The creek is deeply incised with eroded banks and some eroded lateral streams. <b>JEJ</b> Severely eroded fan where a series of watercourses converges before passing through the gap in the range east of Jamestown. <b>JEQ</b> Saline seepage on <b>JEB</b> fan. Main soils: <u>hard loam over red clay - D2</u> (E) and <u>hard loam over dispersive red clay - D3</u> (E), with <u>gradational loam - C3/M2</u> (C) and <u>brown cracking clay - E3</u> (M) formed over alluvium. The soils are deep, inherently fertile and generally moderately well drained. The main limitations are poor surface (and subsurface in places) structure. Poor surface structure causes reduced water infiltration resulting in increased erosion potential and surface waterlogging, working difficulty and seedling emergence problems. Dispersive subsoils in <b>D3</b> soils cause more prolonged waterlogging. Watercourse erosion is significant in <b>JEF</b> and <b>JEJ</b> . Saline seepage is minor, but it is likely that subsoil salinity levels are moderate and that saline water tables occur in places.
JYB JYC	2.7 0.9	Complex of very gently undulating basement rock rises interspersed with flats formed on alluvium. <b>JYB</b> Slopes of 2-4%. <b>JYC</b> Slopes 3-10%. Main soils: <u>hard loam over red clay - D2</u> (L) and <u>hard loam over dispersive red clay - D3</u> (L) with <u>gradational loam - C3/M2</u> (L) on alluvium, and <u>shallow calcareous loam - A2</u> (C) with <u>shallow (gradational) loam - L1/C2</u> (L) on rises. The flats are similar to <b>JEB</b> and the rises are similar to <b>EGB</b> and <b>EGC</b> .

# 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 Calcarosol)  
Calcareous loam grading to soft or rubbly carbonate over weathering siltstone within 100 cm of the surface.
- C2/L1** Shallow (gradational) loam (Calcic, Red Dermosol / Paralithic, Leptic Tenosol)  
Medium thickness loam overlying either a red friable clayey subsoil with fine carbonate (Dermosols) grading to weathering rock, or directly overlying weathering rock (Tenosols). Weathering siltstone is within 100 cm of the surface, and commonly within 50 cm.
- C3/M2** Gradational loam (Calcic, Red Dermosol)  
Medium thickness loam to clay loam grading to a well structured red clay with fine (occasionally rubbly) carbonate at depth.
- D2** Hard loam over red clay (Calcic, Red Chromosol)  
Medium thickness hard massive sandy loam to clay loam (most commonly loam), abruptly overlying a red well structured friable clay grading to highly calcareous clay over alluvium.
- D3** Hard loam over dispersive red clay (Calcic, Red Sodosol)  
Medium thickness hard massive sandy loam to clay loam (most commonly loam), abruptly overlying a red coarsely structured dispersive clay grading to soft carbonate, formed over alluvium.
- E3** Brown cracking clay (Brown Vertosol)  
Brown cracking clay with a non calcareous finely structured surface, grading to a calcareous coarsely structured heavy clay subsoil forming in clayey alluvium.

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

