

HAB Hamley Bridge Land System

Dissected low hills and rises of the Alma Range and around the confluence of the Light and Gilbert Rivers

Area: 86.7 km²

Annual rainfall: 415 – 550 mm average

Geology: The land system is underlain by a range of geological formations including Woolshed Flat Shale on the eastern side, and Rhynie Sandstone, Ingomar Quartzite and Stradbroke Formation metasediments. In places there are remnant Tertiary sediments overlying the basement rocks. These tend to be sandy in the southern parts adjacent to the rivers, but clayey in the north. There are limited areas of alluvial sediments derived from the erosion and deposition of basement rocks and Tertiary materials. These sediments are generally clayey in the north, and sandier in the south. All substrate materials are mantled by fine grained carbonates, usually occurring as soft segregations in the lower soil profile, but occasionally hardened to sheet and rubbly forms.

Topography: The Hamley Bridge Land System comprises undulating to rolling low hills of the Alma Range in the north and undulating rises dissected by the Gilbert and Light Rivers in the south. The low hills of the Alma Range are strongly dissected with overall relief of 100 m, characterized by eroded water courses flowing west, south and east from a steep rocky ridge in the north-west. Slopes are gentle to moderate, usually in the range 5-20%. The Light River marks the southern end of the Alma Range. The southern part of the Land System comprises undulating land shaped by the down cutting of the Light and Gilbert Rivers. This dissection has produced relief of up to 50 m and slopes of up to 20%, although 5 - 12% is more usual. The river channels are narrow with steep rocky banks.

Elevation: 290 m (Alma Range) to 90 m in the bed of the Light River, south west of Hamley Bridge

Relief: Maximum local relief is 50 m

Soils: Loamy texture contrast soils are predominant. Gradational clays loams and cracking clays are also common. Shallow stony soils are minor.

Main soils

- D1** Hard loam over red clay on rock - hillslopes
- D2** Hard loam over red clay - lower slopes and flats
- C2** Shallow red gradational clay loam on rock - hillslopes

Minor soils

- D7** Clay loam over dispersive red clay on rock - hillslopes
- E3/E1** Black/brown cracking clay - rises
- C3** Red gradational clay loam - lower slopes and flats
- C5** Black gradational clay loam - rises
- B4** Shallow red gradational loam over calcrete - rises
- A2** Shallow calcareous loam – rises and hillslopes
- D3a** Hard sandy loam over dispersive red clay - rises
- D3b** Hard loam over dispersive red clay- lower slopes and flats
- D5** Firm loamy sand over red clay - rises
- B2** Shallow calcareous loam over calcrete - hillslopes
- B5** Black gradational clay loam on calcrete - rises
- M1** Deep sandy loam - creek flats
- L1** Shallow stony loam over basement rock - rocky hillslopes



Main features: The Hamley Bridge Land System consists of mainly undulating to rolling low hills with a variety of soils typical of landscapes formed on a complex of basement rocks and Tertiary sediments. The northern parts are mostly undulating and are characterized by deep clayey soils with high fertility and water holding capacities. However there has been significant erosion of water courses in the past. The central areas are also eroded, and are steeper, with shallower and loamier soils. Much of this land is only semi arable due to the potential for erosion. The southern areas are undulating with mixed sandy and loamy soils of moderate fertility and high erodibility.

Soil Landscape Unit summary: 19 Soil Landscape Units (SLUs) mapped in the Hamley Bridge Land System:

SLU	% of area	Main features #
AKC	0.3	Rocky slopes of 15-30% formed on interbedded sandstones, quartzites and phyllites. There is up to 20% quartzite surface stone and minor outcrop. Main soils: <u>hard loam over red clay on rock</u> - D1 (E), <u>shallow stony loam</u> - L1 (E) and <u>shallow red gradational clay loam on rock</u> - C2 (C). This small area is moderately steep and rocky, and well covered with vegetation. It provides useful stock shelter. Erosion risk is high if the soil surface is exposed.
AXn	2.3	Channels of the Light and Gilbert Rivers, including moderately steep, rocky and eroded hillslopes either side, and narrow river flats. Main soils: <u>shallow stony loam</u> - L1 (E) and <u>shallow calcareous loam on calcrete</u> - B2 (L) on slopes, and <u>deep sandy loam</u> - M1 (E) on the flats. This land is very fragile and susceptible to degradation. It has little agricultural value.
DDC DDH DDI	4.5 17.8 0.9	Rises formed on Woolshed Flat Shales. DDC Rises with relief to 30 m and slopes of 3-8%. DDH Undulating rises with relief to 40 m, slopes of 3-12% and some water course erosion. DDI Moderately steep slopes and rises with minor rocky outcrop. Slopes are 10-18%. Main soils: <u>hard loam over red clay on rock</u> - D1 (E), <u>shallow red gradational clay loam on rock</u> - C2 (E) and <u>shallow calcareous loam</u> - A2 (C), with <u>shallow red gradational loam over calcrete</u> - B4 (M). These soils are generally fertile and moderately deep. The D1 soils tend to have poorly structured surface soils, but otherwise there are no limitations other than erosion potential. DDI can only be considered as semi arable because of the erosion risk associated with conventional cropping.
DJC DJH DJI	13.2 2.5 2.3	Rises formed on a complex of basement sandstones or siltstones and Tertiary sediments, with sporadic silcrete outcrop on steeper slopes. DJC Rises to 50 m high with slopes of 5-12%. DJH Rises to 50 m high with slopes of 5-12% (and occasional short steeper slopes) and minor to moderate water course erosion. DJI Slopes of 8-20% with moderate water course erosion. Main soils: <u>hard loam over red clay on rock</u> - D1 (E), <u>hard clay loam over dispersive red clay on rock</u> - D7 (C) and <u>hard sandy loam over dispersive red clay</u> - D3a (C), with <u>shallow red gradational loam over calcrete</u> - B4 (L). This land has mainly moderately low fertility soils, often with poorly structured surfaces. Runoff is high, with an associated potential for water erosion. The land is fully arable except for eroded drainage depressions, with moderate production potential.
DQD DQI	2.2 4.3	Rises and low hills formed on interbedded sandstones, quartzites and phyllites, calcreted in places. There is up to 20% surface quartzite, ironstone and calcrete. DQD Rises to 30 m high with slopes of 10-20%. DQI Dissection slopes of 10-20% and up to 30 m high with severe water course erosion. Main soils: <u>hard clay loam over dispersive red clay on rock</u> - D7 (E) and <u>shallow red gradational clay loam on rock</u> - C2 (E), with <u>shallow red gradational loam over calcrete</u> - B4 (L). Although this land has moderately deep and generally fertile soils (especially the C2 soils), its predominant feature is the extent of gully erosion. This has resulted from excessive runoff and unprotected water courses. Control of runoff and maintenance of surface cover is the major management issue on DQI . Both soil landscapes are marginal for cropping because of their slope and loss of accessibility.



HJC HJD	6.0 3.5	Rises formed on a thin cover of Tertiary sediments overlying basement rock. HJC Rises to 30 m high with slopes of 3-12%. HJD Moderately steep dissection slopes of 10-20% up to 40 m high with sporadic silcrete outcrops and minor water course erosion. Main soils: <u>hard sandy loam over dispersive red clay</u> - D3a (E) and <u>firm loamy sand over red clay</u> - D5 (E), with <u>shallow calcareous loam over calcrete</u> - B2 (L). These soils are generally poorly structured and have moderate to low fertility, due to their low clay content. The predominantly sandy loam surfaces are prone to compaction, hard setting and sealing with associated runoff and water erosion potential. The sandier soils are also prone to wind erosion.
JEB JEC JEE JEH JEJ	4.4 1.0 3.8 1.5 7.9	Outwash fans and drainage depressions formed on fine grained alluvium. JEB Fans with slopes of 2-5%. JEC Fans with slopes of 3-8%. JEE Drainage depressions and creek flats with slopes of less than 2%. JEH Fans with slopes of 3-5% and some water course erosion. JEJ Drainage depressions and creek flats with slopes of less than 2% and eroded water courses. Main soils: <u>hard loam over red clay</u> - D2 (E) with <u>hard loam over dispersive red clay</u> - D3b (C) and <u>red gradational clay loam</u> - C3 (C). These soils are deep and inherently fertile, but most are prone to hard setting, sealing surfaces. They are difficult to work and are prone to waterlogging and emergence/early growth problems. Water course erosion is common in drainage depressions. There is sporadic saline seepage so salt levels should be monitored.
TBH TBI	20.3 1.3	Rises formed on clayey sediments. TBH Rises to 40 m high, with slopes of 5-12% and moderate water course erosion. TBI Slopes of 5-20%, with severe water course erosion. Main soils: <u>black/brown cracking clay</u> - E3/E1 (E) and <u>black gradational clay loam</u> - C5 (E), with <u>red gradational clay loam</u> - C3 (L), <u>black gradational clay loam on calcrete</u> - B5 (L) and <u>hard loam over red clay</u> - D2 (L). These soils are highly fertile, deep and generally well structured. However there is a moderate potential for water erosion, with water courses being particularly vulnerable, as is usual for clayey soils. Productive potential is high.

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, Supracalcic Calcarosol)

15 - 25 cm calcareous loam to clay loam becoming more clayey and calcareous with depth over rubbly carbonate at about 30 cm, grading to weathering basement rock at about 90 cm.

B2 Shallow calcareous loam over calcrete (Petrocalcic, Supracalcic Calcarosol)

Up to 50 cm calcareous loam with variable carbonate nodules over calcrete.

B4 Shallow red gradational loam over calcrete (Petrocalcic, Red Dermosol)

20 - 25 cm loam grading to a friable red clay loam over a calcrete pan at 45 cm.

B5 Black gradational clay loam on calcrete (Petrocalcic, Black Dermosol)

Black well structured clay loam to clay grading to a black heavy clay on calcreted basement rock or Tertiary sediment within 50 cm.

C2 Shallow red gradational clay loam on rock (Hypercalcic / Calcic, Red Dermosol)

10 - 40 cm clay loam to light clay grading to a well structured red clay with abundant soft carbonate from about 55 cm, grading to highly weathered fine grained rock within 100 cm.



- C3** Red gradational clay loam (Hypercalcic, Red Dermosol)
10 - 40 cm clay loam to light clay grading to a well structured red clay with abundant soft carbonate from about 55 cm, grading to Tertiary clay or alluvial clay at about 100 cm.
- C5** Black gradational clay loam (Hypercalcic, Black Dermosol)
40 - 60 cm black well structured clay loam grading to a black clay, highly calcareous from about 60 cm.
- D1** Hard loam over red clay on rock (Hypercalcic, Red Chromosol)
5 - 25 cm hard loam to clay loam abruptly overlying a well structured red clay, calcareous from about 35 cm grading to fine grained basement rock at about 100 cm.
- D2** Hard loam over red clay (Calcic, Red Chromosol)
25 - 50 cm hard sandy loam to clay loam abruptly overlying a red well structured clay, calcareous from about 70 cm, grading to clayey alluvium below 100 cm.
- D3a** Hard sandy loam over dispersive red clay (Hypercalcic, Red Sodosol)
15 - 40 cm hard loamy sand to sandy loam abruptly overlying a coarsely structured dispersive red clay, calcareous from about 55 cm grading to Tertiary sandy clay/sandstone at about 100 cm.
- D3b** Hard loam over dispersive red clay (Calcic, Red Sodosol)
25 - 50 cm hard sandy loam to clay loam abruptly overlying a red coarsely structured dispersive clay, calcareous from about 70 cm, grading to clayey alluvium below 100 cm.
- D5** Firm loamy sand over red clay (Hypercalcic, Red Sodosol)
20 - 35 cm firm loamy sand over a blocky structured red clay, highly calcareous from about 60 cm, overlying Tertiary sediments.
- D7** Clay loam over dispersive red clay on rock (Calcic, Red Sodosol)
10 - 20 cm hard clay loam over a coarsely structured red clay, calcareous from about 35 cm grading to weathering basement rock within 100 cm.
- E3/E1** Black/Brown cracking clay (Black/Brown Vertosol)
20 - 40 cm seasonally cracking, black to dark brown calcareous well structured clay becoming more clayey, coarser structured and browner at depth, with soft carbonate from about 60 cm.
- L1** Shallow stony loam over basement rock (Lithic, Leptic Tenosol / Rudosol)
Up to 50 cm stony loam directly overlying basement rock.
- M1** Deep sandy loam (Basic, Regolithic, Red-Orthic Tenosol)
Very thick reddish brown sandy loam with variable more clayey and / or gravelly lenses with depth overlying coarse grained alluvium.

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

