

CLY Clayton Land System

Complex of flats and sandhills north west of Clayton

Area: 24.0 km²

Annual rainfall: 440 – 460 mm average

Geology: The System is underlain by micaceous clayey sands and sandy clays of apparent alluvial origin, mixed with limited occurrences of a heavy clay similar to Blanchetown Clay. Overlying these sediments (and probably at least partially derived from them) are windblown Molineaux Sands.

Topography: The Land System is a very gently undulating plain, about 25% of which is overlain by low to moderate, and occasionally large sandhills. These are longitudinal (older) to jumbled (younger). The intervening swales and plains are variably covered by a veneer of sand

Elevation: 0 m (lake level) to 10 m

Relief: Less than 5 m

Soils: The soils are predominantly sandy surfaced, generally with sodic clay subsoils, but commonly with more friable sandy clay loam or sandy subsoils. Deep sands occur on sandhills. Associated with the sandy soils are loamy texture contrast soils, also with sodic clay subsoils, and calcareous loams.

Main soils

Soils on sandy flats

G4 Sand over poorly structured clay

B7 Shallow sand over clay on calcrete

Soils on sandhills

H3a Very deep bleached siliceous sand

Soils on sandy rises

G2b Bleached sand over sandy clay loam

Minor soils

Soils on sandy flats

G2a Bleached sand over sandy clay loam

G3a Thick sand over clay

Soils on hard sandy loam flats

D3 Loam over poorly structured red clay

D5 Hard loamy sand over red clay

F2 Sandy loam over poorly structured brown clay

Soils on sandhills

G3b Sand over clay

H3b Moderately deep bleached siliceous sand

H3c Coarse siliceous sand

Soils of stony rises and flats

A4 Deep calcareous loam



Main features: The Clayton Land System comprises 75% very gently undulating flats and low rises, and about 25% sandhills. The flats are characterized by mixed soft sandy and hard sandy loam surfaced texture contrast soils. The outstanding feature of these soils is their poor subsoil structure (most are sodic). Drainage is usually impeded, except where surface soil is thick enough to ensure that most plant roots are above the perched water table. Fertility varies from low (sandy soils) to moderate (sandy loam soils). Subsoil salinity is generally moderate to high. The sandy soils tend to be slightly acidic. The sandhills (25% of the area) are rapidly drained, but highly infertile and subject to wind erosion and water repellence.

Soil Landscape Unit summary: 14 Soil Landscape Units (SLUs) mapped in the Clayton Land System:

SLU	% of area	Main features #
GSB	15.5	Gently undulating rises formed on sandy clays to clays, variably calcified by soft to hard Class III carbonates of the Woorinen Formation. Slopes are up to 4% and there is minor surface calcrete. There is no defined surface drainage pattern. Soils are either sandy or rubbly. Main soils: <u>Bleached sand over sandy clay loam</u> - G2b (V) <u>Deep calcareous loam</u> - A4 (L) Sandy soils are moderately deep to deep but of low fertility and prone to wind erosion. The calcareous soils are shallower, but are more fertile. All soils are well drained.
GcA	4.6	Flats formed on sandy clays to heavy clays. Soils are deep sandy to loamy texture contrast types with sodic subsoils. Main soils: <u>Sand over poorly structured clay</u> - G4 (V) <u>Sandy loam over poorly structured brown clay</u> - F2 (C) These soils are imperfectly drained due to the tendency of water to perch on the dispersive clay subsoils. Root growth is also impeded by these clays. Salinity is moderately high in the subsoil. Fertility is low (sandy soils) to moderate (loamy soils).
GeA	26.2	Gently undulating plains and swales formed on sandy clays to heavy clays. The land occupies slightly higher topographic positions than GcA. Soils are dominantly sandy surfaced with sodic clay subsoils. Main soil: <u>Sand over poorly structured clay</u> - G4 (D) These soils are imperfectly drained due to the tendency of water to perch on the dispersive clay subsoils. Root growth is also impeded by these clays. Salinity is moderately high in the subsoil. Fertility is low.
GhA	2.5	Swales and flats formed on clayey sands to sandy clays. Soils are mixed sandy or sandy loam surfaced texture contrast types. Main soils: <u>Hard loamy sand over red clay</u> - D5 (E) <u>Bleached sand over sandy clay loam</u> - G2a (C) <u>Sand over poorly structured clay</u> - G4 (L) D5 soils are moderately well drained, moderately fertile and have fair to good subsoil structure. G2a and G4 soils are imperfectly drained with low fertility and fair to poor subsoil structure.
GtA	7.7	Swales and flats associated with recent aeolian sand deposits. The soils generally have thicker sandy surfaces than other flats and swales. Main soil: <u>Thick sand over clay</u> - G3a (D) Drainage is moderate to imperfect, fertility is low, but the thickness of surface soil allows greater root zone depth and moisture holding capacity than in other lower lying areas.
GxA	13.8	Depressions underlain by calcrete at shallow depth. Soils are sandy and shallow. Main soil: <u>Shallow sand over clay on calcrete</u> - B7 (D) These soils are marginally saline and imperfectly drained, with low fertility and water holding capacity. Agricultural potential is very limited.
HaB	0.9	Very gentle slopes of 1-3% formed on clayey alluvium. Soils are loamy to sandy texture contrast types. Main soils: <u>Loam over poorly structured red clay</u> - D3 (E) <u>Sand over poorly structured clay</u> - G4 (E) <u>Sandy loam over poorly structured brown clay</u> - F2 (L) Poor subsoil structure, restricting water movement and root growth is the main limitation. Otherwise, the soils are deep and moderately (D3 and F2) to marginally fertile (G4).



MzB	0.2	<p>Isolated lake shore rises formed on Bridgewater Formation calcarenites. Undulating rises formed on calcareous sands of the Bridgewater Formation. Slopes are up to 10% and relief is less than 20 metres. There is extensive surface calcareous stone and sheet rock. Soils are generally shallow and calcareous over sheet calcareous.</p> <p>Main soils: <u>shallow calcareous loamy sand</u> - B2 (E) <u>Sandy loam over thin red clayey subsoil</u> - B3 (E).</p> <p>Lack of moisture holding capacity and surface stone are the main limitations to agricultural production.</p>
O-B O-C O-D	11.2 7.7 7.8	<p>Sandhills formed on windblown Molineaux Sand, deposited over the top of older land surfaces.</p> <p>O-B Large longitudinal dunes with relief to 10 m and side slopes of 2-5%. Main soils: <u>Very deep bleached siliceous sand</u> - H3a (D) <u>Moderately deep bleached siliceous sand</u> - H3b (M)</p> <p>O-C Moderate jumbled to longitudinal dunes of medium to coarse sand. Main soil is: <u>Coarse siliceous sand</u> - H3c (D)</p> <p>O-D Small sandhills and gently undulating rises formed on aeolian sand overlying clayey sands to sandy clays. Main soils: <u>Moderately deep bleached siliceous sand</u> - H3b (E) <u>Sand over clay</u> - G3b (E) <u>Very deep bleached siliceous sand</u> - H3a (M)</p> <p>These soils are predominantly infertile, water repellent and prone to wind erosion. Most are well drained, except for the G3b soils of O-D. These have clayey subsoils which perch water. All surfaces are sandy and slightly acidic.</p>
THA	0.1	<p>Gilgai flats with Blanchetown Clay near the surface. Flat plains and swales underlain at shallow depth by Blanchetown Clay. Gilgai microrelief is characteristic of these landscapes. Soils vary considerably over short distances as a result of seasonal clay movement.</p> <p>Main soils: <u>Grey-brown cracking clay</u> - E3 (E) <u>Sandy loam over poorly structured brown clay</u> - F2 (C) <u>Sand over poorly structured clay</u> - G4b (L) <u>Gradational calcareous clay loam</u> - A6 (L)</p> <p>Impeded drainage, poor root growth conditions, uneven land surface, workability problems, boron toxicity and marginal salinity combine to affect the productive potential of this land.</p>
Vt-	1.2	Discontinuous sections of lake shore. No soils data. Erosion is the main concern.
ZA-	0.6	<p>Saline flats and lunettes.</p> <p>ZA- Moderately to highly saline flats. Main soils: <u>wet saline clay loam</u> - N2/M2 <u>Saline sandy loam over black clay</u> - N2/F2 <u>Marly saline calcareous sandy loam</u> - N2/A7 (E-V), with <u>black cracking clay</u> - E1 (M-E)</p> <p>subdominant on moderately saline land. The flats are non arable, and a significant proportion is bare or carries only light cover. Opportunistic grazing is an option, but care must be taken to minimize damage to vegetation. Seeding of these areas to salt tolerant grasses or revegetating with suitable perennials should be considered. These saline flats are at risk of developing acid sulfate conditions. Advice should be sought before any attempt at drainage.</p>

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:*Soils on sandy flats*

- B7** Shallow sand over clay on calcrete (Lithocalcic, Brown Sodosol)
Medium thickness dark brown sand to light sandy clay loam with a pale brown A2 horizon, overlying a dark brown and yellow sandy clay loam to light clay with coarse columnar, grading to coarse blocky structure. The profile is formed on a rubbly or platy calcrete pan (Class III C carbonate) from 40 cm. Under the pan is a yellow and grey highly calcareous clay.
- G2a** Bleached sand over sandy clay loam (Sodic, Eutrophic, Brown Chromosol)
Thick to very thick dark brown sand with a bleached A2 horizon, overlying a reddish yellow massive sandy clay loam to sandy clay, grading to brown, red and yellow massive clayey sand from 80 cm.
- G3a** Thick sand over clay (Calcic, Mottled-Mesonatric, Brown Sodosol)
Thick grey sand with a strongly bleached A2 horizon, overlying a yellowish brown, brown and red mottled sandy clay with coarse columnar structure, more clayey with depth, and highly calcareous (Class I carbonate) from 80 cm, grading to alluvial clayey sand to clay.
- G4** Sand over poorly structured clay (Calcic, Mottled-Mesonatric, Brown Sodosol)
Medium thickness brown sand to light sandy clay loam with a massive bleached A2 horizon, overlying a brown, grey and red mottled clay with coarse columnar structure, calcareous with soft carbonate segregations from 45 cm (Class I carbonate). The carbonate grades to sandy clay or heavy clay (Blanchetown Clay) at 60 cm.

Soils on hard sandy loam flats

- D3** Loam over poorly structured red clay (Calcic, Subnatric, Red Sodosol)
Medium thickness reddish brown massive sandy loam to fine sandy clay loam with a paler A2 horizon, overlying a reddish brown and greyish brown mottled clay with strong blocky structure and soft Class I carbonate segregations from 55 cm. The soil overlies a dark brown mottled clay with decreasing amounts of carbonate.
- D5** Hard loamy sand over red clay (Hypercalcic, Red Chromosol)
Medium thickness massive dark brown loamy sand to sandy loam with a paler A2 horizon, overlying a yellowish red sandy clay loam to clay with strong blocky structure and abundant soft calcareous segregations (Class I carbonate) from 45 cm, grading to yellow and brown clayey sand to sandy clay alluvium from 65 cm.
- F2** Sandy loam over poorly structured brown clay (Calcic, Mottled-Subnatric, Brown Sodosol)
Medium thickness grey brown massive loamy sand to sandy clay loam with a paler and sandier A2 horizon, overlying a brown, grey and yellow heavy clay with strong blocky structure, highly calcareous from 50 cm (Class I carbonate layer). The carbonate grades to Blanchetown Clay at 70 cm.

Soils on sandhills

- G3b** Sand over clay (Mesotrophic, Brown Sodosol)
Very thick pale brown sand, overlying an orange sandy clay loam to light clay with weak columnar structure, grading to a yellow, red and brown clayey sand to sandy clay from 110 cm.
- H3a** Very deep bleached siliceous sand (Arenic, Bleached-Orthic Tenosol)
Very thick white loose sand, organically darkened at the surface, overlying a yellow loose sand, grading to a pale brown sand from 125 cm.



- H3b** Moderately deep bleached siliceous sand (Arenic, Bleached-Orthic Tenosol)
Thick white sand, organically darkened at the surface, overlying a yellow sand grading to a buried sand over clay soil at variable depths below 100 cm.
- H3c** Coarse siliceous sand (Arenic, Bleached-Orthic Tenosol)
Up to 250 m white coarse sand over a brown sand to clayey sand.

Soils on sandy rises

- G2b** Bleached sand over sandy clay loam (Lithocalcic, Mottled-Subnatric, Brown Sodosol)
Very thick pale brown loose sand, overlying a yellowish brown and red mottled clayey sand to light sandy clay loam, grading to sandy clay loam with soft to rubbly Class III carbonate from 85 cm. The profile becomes sandier with depth.

Soils of stony rises and flats

- A4** Deep calcareous loam (Supracalcic Calcarosol)
Medium thickness brown calcareous loamy sand to light sandy clay loam with minor calcrete nodules, overlying a brown highly calcareous massive sandy clay loam, grading to a pale brown, very highly calcareous clayey sand to light clay with up to 50% calcrete nodules (Class III B carbonate). The carbonate layer grades to a brown, yellow, grey and red sandy clay from 65 cm.

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

