

SAL Sandilands Land System

Elevated plains, slopes, and rises

Area: 183.9 km²

Landscape: Elevated plains, slopes, and rises. The system is primarily a raised area underlain by Proterozoic age bedrock. There is little to no surface expression of this bedrock. Most soils are underlain by clayey sediments, most often silty light clay, which has formed in situ from the bedrock. Many soils contain fine quartz fragments which is a weathering product of the underlying rock – some soils are very gritty.

Accessions of wind-deposited carbonate dust have infused into profiles in relatively recent geological times. Many profiles are calcareous throughout; and many contain hard carbonate fragments. Wind-deposited calcareous loess (Woorinen Formation) overlies older sediments in some areas; and calcrete (Bakara Calcrete) has formed below many profiles.

Annual rainfall: 400 - 465 average

Main soils:

D3-D2	<i>loam over red clay</i>
C4-C3	<i>gradational clay loam</i>
B6	<i>shallow loam over clay on calcrete</i>
A6	<i>gradational calcareous clay loam</i>
A5-A4	<i>calcareous loam</i>

Minor soils:

B3	<i>shallow loam on calcrete</i>
B2	<i>shallow calcareous loam on calcrete</i>

Main features: The land system is mostly arable, however, a few soils are too stony and shallow to be cropped. The most common soils are various soils with clayey subsoils. Soils underlain by calcrete at shallow depth are also relatively common. Loamy and clay loamy surface soils are the most common throughout the system. Many soil profiles contain hard carbonate fragments, while fine quartz fragments also occur in many soils. The presence of hard carbonate fragments and/or calcrete at shallow depth, limits profile water holding capacity and hence its productive potential.

Many soils have clayey subsoils, which are typically dispersive at least in the lower subsoil, and there are numerous clay loamy to light clayey subsoils which are also dispersive. Such subsoils restrict soil internal drainage and can lead to waterlogging conditions, particularly when situated in low lying areas. Dispersive and hard subsoils also limit potential root exploration of such layers.

Calcareous soils restrict the availability of certain nutrients: deficiencies of the major nutrient phosphorus and the trace element zinc are common, while deficiencies of the trace elements manganese and iron are possible. Temporary trace element deficiencies can occur in cold and wet conditions with susceptible crops. This is particularly true for soils with highly calcareous surfaces.

There is some potential for water erosion for soils on sloping land. Care needs to be taken with surface management in these areas to minimise the risk of water erosion, especially with texture contrast soils.

Many soils across the system have raised subsoil salinity levels; in many cases upper subsoil salinity levels are relatively high. In most instances, this is probably due to an accumulation of cyclic salt in soil profiles, although, the effects of salinity at the land surface on some slopes is the result of saline seepage. Correspondingly, it is likely that most lower subsoils have accumulations of sodium which are toxic to the majority of crop roots.



Soil Landscape Unit summary: Sandilands Land System (SAL)

SLU	% of area	Main features
GJB	0.8	Land dominated by sandy texture contrast soils. Main soils: <i>sand over clay</i> G4 grading to <i>loam over red clay</i> D3 in lows. And with some <i>shallow sand over clay on calcrete</i> B7 . GJB – slopes and low rises with vague drainage lows (slopes 0.5-3%).
HMA HMB	5.1 1.6	Land dominated by soils formed in clayey sediments. Main soils: <i>loam over red clay</i> D3 grading to <i>gradational clay loam</i> C4 and <i>gradational calcareous clay loam</i> A6 . With some <i>calcareous loam</i> A5-A4 . HMA – somewhat elevated plain with drainage lows (slopes 0-1%). HMB – slight slopes with drainage lows (slopes 0.5-2%).
HVA HVB HVC HVL HVZ	14.3 13.1 9.5 1.9 5.5	Land dominated by soils formed in clayey sediments. Main soils: <i>loam over red clay</i> D3-D2 (some can be very gritty) grading to <i>gradational clay loam</i> C3-C4 and <i>calcareous loam</i> A5-A4 . With some <i>shallow loam over clay on calcrete</i> B6 grading to <i>shallow loam on calcrete</i> B3 and <i>shallow calcareous loam on calcrete</i> B2 . HVA – somewhat elevated plains/low rises with some drainage lows/depressions (slopes 0-1%). HVB – slopes and rises with some drainage lows/depressions (0-3%). HVC – slopes (slopes 1-6%). HVL – slopes (slopes 0.5-2.5%). HVZ – rise surface (slopes 0-1.5%): with some vague gilgai microrelief in the southwest unit.
TAB	0.4	Land dominated by clayey to clay loamy soils formed in clayey sediments. Main soils: <i>gradational clay loam</i> C3-C4 grading to <i>loam over red clay</i> D3 , often with vertic (reactive) clayey subsoils. Probably with some <i>red-brown cacking clay</i> E2-E3 . TAB – slopes with some gilgai microrelief (slopes 0.5-2%).
TBA TBAw TBE	2.9 6.1 0.2	Land dominated by clayey to clay loamy soils formed in clayey sediments. Main soils: <i>gradational clay loam</i> C4-C3 grading to <i>gradational calcareous clay loam</i> A6 and <i>loam over red clay</i> D3 . TBA – elevated plain/rise surface with drainage lows (slopes 0-1%). TBAw – elevated plain with drainage lows (slopes 0-1%): somewhat low lying in relation to adjacent land. TBE – drainage depression (slopes 0.5-1.5%).
TCA	3.0	Land dominated by clayey to clay loamy soils formed in clayey sediments. Main soils: <i>gradational clay loam</i> C4-C3 . And <i>shallow loam over clay on calcrete</i> B6 . TCA – elevated plain with drainage lows/depressions (slopes 0-1%).
TPA TPB	0.4 0.9	Land dominated by clayey to clay loamy soils formed in clayey sediments. Main soils: <i>gradational clay loam</i> C4-C3 grading to <i>gradational calcareous clay loam</i> A6 . TPA – relatively low lying plain (slopes 0-1%). TPB – slight slopes with drainage lows or all slope area concave (slopes 0-1.5%).
IOA IOB	1.9 1.7	Land dominated by calcareous soils formed in clayey sediments. Main soils: <i>gradational calcareous clay loam</i> A6 grading to <i>loam over red clay</i> D3 . With extensive areas of <i>calcareous loam</i> A5-A4 . IOA – somewhat elevated plain with some vague drainage lows (slopes 0-1%). IOB – slopes with some vague drainage lows (slopes 0.5-2.5%).
IVA IVB	4.3 0.8	Land dominated by calcareous soils formed in clayey sediments. Main soils: <i>gradational calcareous clay loam</i> A6 grading to <i>calcareous loam</i> A5-A4 , with extensive areas of <i>loam over red clay</i> D3 , and possibly with areas of <i>gradational clay loam</i> C3-C4 . Also with minor areas of <i>shallow calcareous loam on calcrete</i> B2 grading to <i>shallow loam on calcrete</i> B3 and <i>shallow loam over clay on calcrete</i> B6 . IVA – rise surface/elevated plain (slopes 0-1.5%). IVB – rise (slopes 0.5-2%).
IYA IYB IYC IYE IYZ	1.6 5.8 1.9 0.2 5.5	Land dominated by calcareous soils formed in clayey sediments. Main soils: <i>gradational calcareous clay loam</i> A6 grading to <i>loam over red clay</i> D3 and <i>rubbly calcareous loam</i> A5-A4 . Also with some <i>shallow calcareous loam on calcrete</i> B2 grading to <i>shallow loam on calcrete</i> B3 and <i>shallow loam over clay on calcrete</i> B6 . IYA – elevated plain with some drainage lows (slopes 0-1%).



		<p>IYB – slopes with some drainage lows/drainage ways (slopes 0.5-2.5%): some vague gilgai microrelief in the southwest unit.</p> <p>IYC – slopes with some drainage lows/drainage ways (slopes 1-4%).</p> <p>IYE – relatively low lying plain (slopes 0-1%).</p> <p>IYZ – rise surface with some to a few drainage lows (slopes 0-1.5%).</p>
ObD	0.04	<p>Sand over clay sand dunes.</p> <p>Main soils: <i>thick sand over clay</i> G3 grading to <i>sand over clay</i> G4 and <i>loam over red clay</i> D3.</p> <p>ObD – low dune.</p>
QIB	2.8	<p>Land dominated by shallow soil on calcrete.</p> <p>Main soils: <i>shallow calcareous loam on calcrete</i> B2, grading to <i>shallow loam over clay on calcrete</i> B6 and <i>shallow loam on calcrete</i> B3. With <i>loam over red clay</i> D3 grading to <i>gradational clay loam</i> C4 and <i>gradational calcareous clay loam</i> A6, in lows.</p> <p>QIB – low rises to rises (slopes 0-3%).</p>
QnB QnBw	1.0 0.1	<p>Land dominated by shallow soil on calcrete.</p> <p>Main soils: <i>shallow calcareous loam on calcrete</i> B2 and extensive areas of <i>shallow loam on calcrete</i> B3 grading to <i>shallow loam over clay on calcrete</i> B6. Minor areas of <i>loam over red clay</i> D3 may occur in lows, and minor areas of <i>calcareous loam</i> A4-A5 may also occur.</p> <p>QnB – rise to low rise (slopes 0-2%).</p> <p>QnBw – low lying plain/lower slope (slopes 0-2%).</p>
QoB QoC QoZ	0.2 0.1 0.1	<p>Land dominated by shallow soil on calcrete.</p> <p>Main soils: <i>shallow calcareous loam on calcrete</i> B2 grading to <i>shallow loam on calcrete</i> B3 and <i>shallow loam over clay on calcrete</i> B6. With some <i>loam over red clay</i> D3 grading to <i>gradational calcareous clay loam</i> A6 and <i>calcareous loam</i> A5-A4.</p> <p>QoB – slopes (slopes 0.5-2%).</p> <p>QoC – rise/lower slopes (slopes 1-6%).</p> <p>QoZ – rise surface (slopes 0-1%).</p>
RAA RAB	0.2 0.4	<p>Land dominated by shallow soil on calcrete.</p> <p>Main soils: <i>shallow loam over clay on calcrete</i> B6 grading to <i>shallow loam on calcrete</i> B3 and possibly <i>shallow calcareous loam on calcrete</i> B2. With some <i>loam over red clay</i> D3 grading to <i>gradational calcareous clay loam</i> A6, and some <i>calcareous loam</i> A5-A4.</p> <p>RAA – somewhat elevated plain (slopes 0-1%).</p> <p>RAB – lower slopes (slopes 0.5-1.5%).</p>
RFB RFBw	0.4 0.1	<p>Land dominated by shallow soil on calcrete.</p> <p>Main soils: <i>shallow loam over clay on calcrete</i> B6 grading to <i>shallow loam on calcrete</i> B3 and possibly <i>shallow calcareous loam on calcrete</i> B2. Minor areas of <i>loam over red clay</i> D3 may occur in lows.</p> <p>RFB – rise (slopes 0.5-2.5%).</p> <p>RFBw – lower slopes (slopes 0.5-2%).</p>
RHA RHB	3.3 1.1	<p>Land where loamy texture contrast soils dominate, many of which are underlain by calcrete.</p> <p>Main soils: <i>shallow loam over clay on calcrete</i> B6 and extensive areas of <i>loam over red clay</i> D3 grading to <i>gradational clay loam</i> C4 and <i>gradational calcareous clay loam</i> A6. And with some <i>calcareous loam</i> A5-A4.</p> <p>RHA – elevated plains with drainage lows (slopes 0-1%)</p> <p>RHB – slopes (slopes 0.5-4%).</p>
SAA	0.2	<p>Land dominated by soils formed in non rubbly calcareous loess.</p> <p>Main soils: non rubbly <i>calcareous loam</i> A4-A5.</p> <p>SAA – elevated plain and upper slopes (slopes 0-1.5%).</p>
SbA	0.1	<p>Land dominated by soils formed in rubbly calcareous loess.</p> <p>Main soils: rubbly <i>calcareous loam</i> A5-A4. With some <i>gradational calcareous clay loam</i> A6 grading to <i>loam over red clay</i> D3.</p> <p>SbA – slight lower slope (slopes 0-1%).</p>
SdB	0.9	<p>Land dominated by soils formed in rubbly calcareous loess.</p> <p>Main soils: rubbly <i>calcareous loam</i> A5-A4. With some <i>gradational calcareous clay loam</i> A6 grading to <i>loam over red clay</i> D3, and with some <i>shallow calcareous loam on calcrete</i> B2 grading to <i>shallow loam on calcrete</i> B3 and <i>shallow loam over clay on calcrete</i> B6.</p> <p>SdB – slopes (slopes 0.5-3%).</p>



Detailed soil profile descriptions:**Main soils:**

- D3-D2** *loam over red clay* [Sodic-Effervescent Hypercalcic-Lithocalcic Red-Brown Chromosol-Sodosol]
Red brown to brown medium thickness to thin sandy loam, loam, or sandy clay loam topsoil overlying red to red brown to brown clayey subsoil grading to clay with abundant fine carbonate. Subsoils are typically dispersive. Profiles often include hard carbonate fragments and fine quartz fragments – some soils are very gritty. Topsoils can be calcareous and tend to be hardsetting. These profiles are usually underlain by clayey sediments – often silty light clays. **D2** variants have clay loamy subsoils.
- C4-C3** *gradational clay loam* [Sodic Hypercalcic Red-Brown Dermosol]
Red brown to brown medium thickness to thin clay loamy to clayey topsoil overlying red to red brown to brown clayey subsoil grading to clay with abundant fine carbonate. Subsoils, and especially lower subsoils, are typically dispersive. Profiles can contain some fine quartz fragments, and may contain some hard carbonate fragments. Topsoils can be slightly calcareous. These profiles are usually underlain by clayey sediments. Mostly found in relatively low lying areas. **C3** variants have clay loamy subsoils.
- B6** *shallow loam over clay on calcrete* [Petrocalcic Red-Brown Chromosol-Dermosol]
Medium thickness to thin loamy to clay loamy topsoil overlying a red to red brown clayey subsoil. Subsoils tend not to be dispersive. The profile is underlain by calcrete at shallow depth – the calcrete layer is often only relatively thin (30 to 50 cm). The calcrete can be underlain by highly calcareous clayey to sandy sediments. The soil layer directly overlying the calcrete often contains abundant hard carbonate rubble. Profiles can be calcareous throughout.
- A6** *gradational calcareous clay loam* [Pedal Hypercalcic-Lithocalcic Calcarosol]
Calcareous grey brown to brown medium thickness to thin loamy, clay loamy or clayey topsoil grading to clayey subsoil with abundant fine carbonate. Fine carbonate content increases with depth. Subsoils are typically dispersive. Profiles are generally underlain by clayey to clay loamy sediments; and can include some hard carbonate fragments.
- A5-A4** *calcareous loam* [Regolithic Hypercalcic-Lithocalcic Calcarosol]
Grey brown to brown medium thickness calcareous loamy to clay loamy topsoil grading to loamy to light clayey subsoil with abundant fine carbonate. Profiles often contain abundant carbonate rubble, and can contain some fine quartz fragments. Profiles are often underlain by clayey sediments (often light clays) (soil **A5**), or lighter textured calcareous sediments (which can be calcareous loess deposits). Subsoils are usually strongly alkaline and are dispersive when clay loamy or light clayey. Usually found on slightly raised areas.

Minor soils:

- B3** *shallow loam on calcrete* [Petrocalcic Tenosol-Chromosol]
Brown to red brown loamy to clay loamy soil overlying calcrete at shallow depth. Profiles often contain abundant hard carbonate rubble. Typically found on stony rises.
- B2** *shallow calcareous loam on calcrete* [Petrocalcic Calcarosol-Chromosol]
Grey brown to brown calcareous loamy to clay loamy soil overlying calcrete at shallow depth. Profiles often contain abundant hard carbonate rubble. Typically found on stony rises.

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

