

AMC Amen Corner Land System

A sluggishly drained plateau area with numerous drainage flats, drainage lines and creek lines. This land system lies to the north of the main Kangaroo Island plateau, and is separated from it by the escarpment which follows the Snelling fault-line, and by the deeply incised valleys of the upper Cygnet River and a tributary. The system is bordered by a highly dissected plateau area to the east; rocky coastal slopes, gullies, cliffs, and some rubbly rises to the north; a stony escarpment slope to the southwest; and deeply incised rocky gullies to the southeast. This system is named after a major intersection located in the central-east of the system.

Area: 63.1 km²

Annual rainfall: 580 – 685 mm average

Geology: High ironstone plateau areas consist of Pliocene age ferricrete regolith; while adjacent mid-level ironstone plateaux and slopes consist of Pliocene-Quaternary age colluvium. These areas have sandy to loamy topsoil, with a layer of ironstone gravel or ferricrete (sheet laterite), over deeply weathered clayey sediments, usually with a mottled zone over a grey pallid zone. Weathered early Cambrian age North Coast, Kangaroo Island Group sedimentary rock (mostly Stokes Bay Sandstone) underlies these clayey sediments. (These sandstones have undergone little or no metamorphic deformations in comparison with the Kanmantoo Group meta-sandstones underlying the main Kangaroo Island plateau.) In many areas the ironstone has been 'dissolved', resulting in texture contrast soils without ironstone gravel.

Areas with soils formed on weathered rock occur. This rock is either Cambrian age Kangaroo Island Group sediments (mostly sandstone), or middle Cambrian age Kanmantoo Group finer grained phyllite. The phyllite occurs in areas near the Snelling fault scarp where much of this rock has been exposed to soil forming processes. The phyllite rock produces more fertile and better drained soils than the sandstone.

Sandy material has washed off plateau surfaces in the past, and been deposited as Quaternary age alluvial sediments in sluggishly drained low-lying areas; giving rise to very thick sandy soils overlying clayey substrate.

Topography: A sluggishly drained dissected plateau area. High remnant plateau surfaces occur in the east of the system; while a few prominent remnant plateaux, in the form of north-south oriented rises and low hills, survive in the west of the system. Elsewhere, mid-level plateau surfaces and drainage areas occur. The resultant topography is of plains, rises and a few low hills. Slopes are typically from 0% to 5%, with the steepest slopes reaching to 20%. Drainage is toward the west and north-west (however, the main creek line in the east of the system does a sharp turn to the south, and eventually flows into the Cygnet River), with the King George Creek being the major drainage channel to the sea. Much of the drainage of this system is sluggish, with broad drainage flats forming the upper reaches of many drainage channels.

Elevation: From near 210 m on the high remnant plateau surface in the south-east to near 55 m on the plateau surface in the very west of the system.

Relief: Relief is typically from less than 10 m to 20 m; with relief of around 30 m in the steeper parts of the system.



Main soils: **F2-F1-G4-G3-G5** Texture contrast soil
J2a Ironstone soil over clay
J2b Colluvial ironstone soil
J3 Shallow and sandy on ferricrete

Minor soils: **K4** Stony soil
I2 Very thick sands
K1-K2 Dark soil

Main features: Arable plateau surfaces and slopes, with semi-arable drainage flats, and non-arable drainage lines and creek lines. Topsoils are sandy and loamy. The main soils are sandy to loamy over sodic clay, with or without ironstone gravel.

Relatively impermeable clayey subsoils limit infiltration, resulting in waterlogged soils. Some slopes are steep enough to pose a water erosion risk. Many low-lying wet areas occur where water flow is sluggish and drainage is very poor. Infertile sandy soils are common; these can pose a wind erosion risk especially on the more exposed rises and low hills; while wetness and water repellence occur on the sands in the low-lying plains and drainage flats/depressions. The presence of ironstone in many soils reduces fertility due to the fixation of phosphorous. Acidic soils are very common, especially when sandy. Saline seepage is a problem in low-lying drainage areas where water tables are high. Better drained and more fertile non-drainage areas occur which have distinct vegetation dominated by sugar gums.

Soil Landscape Unit summary: Amen Corner Land System (AMC)

SLU	% of area	Main features #
BkA BkB BkBg BkC	0.1 5.6 3.5 0.6	Mostly arable slopes: mostly soils formed on phyllite on well-watered slopes. Often with a distinct native vegetation dominated by sugar gums. These areas are below the level of adjacent ironstone plateaux and slopes. Main soils: <u>dark soil K1-K2</u> (<i>Brown Dermosol-Sodosol</i>). And loamy <u>ironstone soils J2a-J2b</u> (<i>Ferric Brown Chromosol-Sodosol</i>); and F2-F1 texture contrast soil ; with some K4 stony soil . BkA – plain (0-1%, 1e) BkB – slopes (1-3%, 2-1e) BkBg – slopes with creek and drainage lines, with minor saline seepage in some creek lines (slopes 1-3%, 2e, 2-3s) BkC – slopes (3-6%, 3e) Summary: generally these areas are relatively fertile; waterlogging can be a problem.
CEBw CEC CED CEZ	1.3 0.4 0.7 0.2	Mostly arable slopes: mostly soils formed on sandstone. Main soils: <u>stony soil K4</u> (<i>stony Chromosol-Sodosol</i>). And loamy <u>ironstone soils J2a-J2b</u> and F2-F1 texture contrast soil . CEBw – imperfectly drained slopes (1-4%, 2e, 4-3w) CEC – slopes (3-6%, 3-2e) CED – semi-arable slopes (8-20%, 2g, 4e) CEZ – plateau/summit surface Summary: the main issues are waterlogging, acidity control, and low fertility particularly soils with ironstone.
FOB FOC	0.3 4.3	Mostly arable slopes: mostly ironstone soils, with some texture contrast soils, and some stony soils. Main soils: <u>ironstone soil over clay J2a</u> (<i>Ferric Brown Chromosol-Sodosol</i>). With <u>texture contrast soil F2-F1</u> (<i>Brown Sodosol</i>) and <u>stony soil K4</u> (<i>stony Sodosol-Chromosol</i>). FOB – slopes (1-3%, 2e) FOC – slopes (3-12%, 3-4e) Summary: the main issues are low fertility due to ironstone, acidity control, waterlogging, and some stoniness.
FUB FUBa	1.4 0.9	Mostly arable mid-level plateau surfaces and slopes: mostly ironstone soils, with some texture contrast soils.



FUBw FUC FUD FUZ FUZa FUZw FUE	2.3 6.0 1.5 1.6 6.9 11.1 0.4	<p>Main soils: <u>ironstone soil over clay J2a</u> and <u>colluvial ironstone soil J2b</u> (<i>Ferric Brown Chromosol-Sodosol</i>). With <u>texture contrast soil F2-F1</u> (<i>Brown Sodosol</i>). And minor areas of <u>stony soil K4</u> (<i>stony Sodosol-Chromosol</i>) and/or <u>dark soil K1-K2</u> (<i>Brown Dermosol-Sodosol</i>).</p> <p>FUB – slopes (1-3%, 2e) FUBa – slopes with dominantly sandy topsoils (1-4%, 2e) FUBw – imperfectly drained slopes (1-3%, 2e, 4w) FUC – slopes (3-10%, 3e) FUD – semi-arable steeper slopes (8-13%, 4-3e) FUZ – mid-level plateau surface. FUZa – mid-level plateau surfaces/plains with dominantly sandy topsoils. With minor to limited <u>shallow and sandy soil on ferricrete J3</u>. FUZw – mid-level plateau surfaces/plains with imperfect drainage (slopes 0-2%, 1-2e, 4-3w) FUE – low-lying poorly drained colluvial/alluvial flats, mostly sandy, with raised subsoil salinity levels (2-3s, 5w). <u>Colluvial ironstone soil J2b</u> and <u>texture contrast soil G3-G4</u>. Summary: the main issues are waterlogging, low fertility due to ironstone, acidity control, and water repellence with sandy topsoils.</p>
FVB FVZ	1.2 7.9	<p>Mostly arable slopes, low rises, and high-level to mid-level plateau surfaces: mostly ironstone soils, with some stony soils. Main soils: <u>ironstone soil over clay J2a</u> (<i>Ferric Brown Chromosol-Sodosol</i>). With some <u>stony soil K4</u> (<i>stony Sodosol-Chromosol</i>). FVB – slopes and low rises (slopes 2-5%, 2-3e). FVZ – plateau surfaces. Summary: the main issues are low fertility due to ironstone, acidity control, and waterlogging.</p>
FtB FtC FtD FtZ	1.2 7.2 0.2 1.5	<p>Semi-arable to non-arable plateau, slopes and rises: mostly sandy soils on ferricrete or very thick to thick ironstone gravel. Native vegetation is dominated by stunted stringybarks. Main soils: on plateau surfaces, a ferricrete layer almost always underlies the sandy topsoil - <u>shallow and sandy on ferricrete J3</u> (<i>Petroferric Tenosol</i>); on many slopes and low rises the sandy topsoil is underlain by a very thick to thick layer of ironstone gravel (<i>Ferric Tenosol</i>) on a clay substrate. Other, usually sandy <u>ironstone soils</u> occur, especially on slopes and low rises – <u>ironstone soil over clay J2a</u> and <u>colluvial ironstone soil J2b</u> (<i>Ferric Brown Sodosol-Chromosol</i>). A few soils with minor accumulations of iron organic compounds above an ironstone gravel layer occur on some lower slopes I2 (<i>Podosol</i>) FtB – low rises (slopes 1-3%, 2-1e) FtC – slopes and rises (slopes 3-12%, 3-2e). FtD – semi-arable slopes (12-16%, 4e) FtZ – plateau surfaces Summary: the main issues are very low fertility due to leached sandy soils, low water holding capacity due to shallow and sandy soils, wind erosion risk, and acidic conditions.</p>
HCE HCO	0.9 9.7	<p>Mostly semi-arable to non-arable drainage depressions and lower slopes. Native vegetation is dominated by sugar gums in the better drained areas, and by swamp wattles and melaleucas in the very poorly drained upper reaches of drainage depressions. Main soils: loamy <u>texture contrast soil F2-F1</u> (<i>Brown Sodosol</i>). With soils formed on weathered phyllite - <u>dark soil K1-K2</u> (<i>Brown Dermosol-Sodosol</i>), and possibly some <u>stony soil K4</u> (<i>stony Sodosol</i>). Also with minor occurrences of <u>ironstone soils J2a-J2b</u>. HCE – upper drainage depression areas (2-1e, 2-1g, 1-2s, 5-4w) HCO – creek lines, drainage flats, and lower slopes associated with drainage depressions, with minor saline seepage along creek lines (3-2e, 2g, 2-3°s, 5-7w). Summary: relatively fertile areas; the main issues are flooding, wetness, and minor saline seepage.</p>
HKZ HKZw	4.0 0.3	<p>Mostly arable plateau surfaces. Native vegetation is often dominated by sugar gums. These areas are closely related to ironstone plateau areas (F** land units) but are generally more fertile; also closely related to Bk* areas. These areas are below the level of adjacent ironstone plateaux and slopes. Main soils: mostly loamy <u>texture contrast soil F2-F1</u> (<i>Brown Sodosol</i>). And loamy <u>ironstone soils J2a-J2b</u>. And with soils formed on weathered phyllite - <u>dark soil K1-K2</u> (<i>Brown Dermosol-Sodosol</i>), and possibly some formed on sandstone - <u>stony soil K4</u> (<i>stony Chromosol-Sodosol</i>).</p>



		<p>HKZ - plateau surfaces HKZw – wetter plateau areas (4w) Summary: relatively fertile areas, however, fertility is reduced where ironstone gravel occurs; and waterlogging can be a problem.</p>
LOE LOO	6.0 5.5	<p>Outwash depositional drainage areas: with mostly very thick sandy topsoils. Sand has washed off plateau surfaces and deposited in these low-lying areas. Main soils: very thick sandy <u>texture contrast soil</u> G5 (Brown Sodosol). And <u>very thick sands</u> with accumulations of iron/organic compounds in the subsoil, underlain by clay, and sometimes with ironstone layer overlying the clay substrate I2 (Podosol). Some sandy <u>ironstone soils</u>, in particular <u>colluvial ironstone soil</u> J2b, occur. LOE – outwash drainage flat/low-lying plain with raised subsoil salinity levels (3-2s, 5w). This unit has the deepest sands. LOO – outwash drainage flat/depression, with marginal salinity, and some drainage lines with saline patches (4s-3s*, 7w). Summary: the main issues are wetness, low fertility, acidity, saline seepage due to high groundwater levels, and water repellence.</p>
LSB LSE	1.6 1.9	<p>Outwash depositional plain and lower slopes: with mostly sandy topsoils. Sand has washed off plateau surfaces and deposited in these low-lying areas. The water table is at less than 2m in the low-lying plain area. Main soils: thick to very thick sandy, with some light sandy loam, <u>texture contrast soil</u> with a sodic subsoil G5 (Brown Sodosol). With <u>colluvial ironstone soil</u> J2b (Ferric Brown Sodosol). LSB – lower slopes (0-3%, 2-1e, 2s, 5w). Can have sandy loam topsoils. LSE - low-lying outwash plain (2-3s, 5w). This area remains green throughout summer due to underground water. Summary: the main issues are water repellence on sandy soils, low fertility, acidity, and wind erosion risk due to sandy soils; also wetness/waterlogging; and salinity is a potential problem due to the high water table levels.</p>
LoE	0.2	<p>Outwash depositional flat: with mostly clayey to clay loamy soils. Sandy topsoils have mostly been removed by water movement over this area. Main soils: uniform yellow-brown to light grey clays with mottled colours, often with a thin clay loamy topsoil M4 (Brown Dermosol). With thin to medium thickness sandy <u>texture contrast soil</u> G4 (Brown Sodosol). [Description based on local knowledge and Northcote's 'Dewrang' soil map in CSIR Bulletin No. 233, 1948] LoE - low-lying outwash flat (2-3s, 5w) Summary: the main issues are wetness, raised subsoil salinity levels, topsoil acidity, and surface condition because of heavy soil textures.</p>
PdE	1.5	<p>Mostly non-arable creek line and associated slopes: mostly sandy soils over clay. Dominated by sugar gum trees on better drained soils, especially along drainage line and on steeper slopes, but with more stunted growth in the sluggishly drained drainage slopes with shallow clayey subsoil. Main soils: medium thickness to thick sandy <u>texture contrast soil</u> G4-G3 (Brown Sodosol). With some depositional <u>very thick sands</u> I2 (Podosol) along drainage line. Some stony texture contrast soils formed on weathered rock occur on steeper slopes K4. PdE – creek line and associated slopes (1-20%, 3e, 7w, 2s) Summary: wetness is the main issue.</p>

Classes in the 'Soil Landscape Unit summary' table (eg. 2-1e, 3w, 2y, etc) describe the predominant soil and land conditions, and their range, found in Soil Landscape Units. The number '1' reflects minimal limitation, while increasing numbers reflect increasing limitation. Letters correspond to the type of attribute:

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|-----------------------|-------------------|------------------|--------------|
| a - wind erosion | e - water erosion | f - flooding | g - gullying |
| r - surface rockiness | s - salinity | w - waterlogging | y - exposure |



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

- F2-F1-G4-G3-G5** Texture contrast soil (most commonly a *Brown Sodosol*; less commonly a *Grey Sodosol*, or a *Brown Chromosol-Kurosol*). Medium thickness to very thick sandy loam to loamy sand topsoil, often with a bleached sub-surface layer; over yellow-brown, olive-brown, occasionally pale olive, or grey (in some drainage depressions) clay subsoil with some mottled colours (particularly in the lower subsoil). The bleached subsurface layer can be as coarsely textured as a heavy sand. Sandy topsoils, can be very thick where they occur in drainage depressions, and are often water repellent. Ironstone nodules sometimes occur in the topsoil and/or subsoil. The clay subsoil is usually dispersive (sodic), especially in the upper subsoil. The lower the topographic position of a soil the more sodic the subsoil is likely to be. Soil pHs vary from neutral to strongly acidic. Found in drainage depressions, on lower slopes, on some other slope areas, and on a few mid-level plateau surfaces.
- J2a** Ironstone soil over clay (most commonly a *Ferric Brown Chromosol-Sodosol*; less commonly a *Ferric Brown Kurosol*). Medium thickness to thick (Very occasionally very thick) sandy loam, with some sandy, with a sub-surface layer of ironstone gravel; over yellow-brown to olive-brown clay with some mottled colours, particularly in the lower subsoil. Bleached sub-surface layers occur especially with sandy topsoils. The subsoil clay can be dispersive (sodic), particularly in the upper subsoil. Occasionally sandstone substrate underlies these soils at less than one metre depth. Soil pHs are usually acidic. Usually of a sedentary (non-colluvial) origin: found on plateau surfaces, slopes, and in a few lower-lying situations. [When unbleached these soils match Northcote's Seddon gravelly soil.]
- J2b** Colluvial ironstone soil (most commonly *Ferric Brown Sodosol*; less commonly *Ferric Brown Dermosol-Chromosol*). Medium thickness to thick sandy loam, with some loamy sand (or occasionally loam) topsoil; over a transitional yellow-brown, olive-brown to olive clay loamy to light clayey layer; over olive-brown to olive clay with mottled colours, particularly in the lower subsoil. Ironstone gravel can occur as a sub-surface layer in the topsoil, and occurs in the transitional layer below the topsoil (occasionally the ironstone gravel layer is even deeper in drainage depressions). Bleached sub-surface topsoil and bleached transitional layers often occur. The transitional layer is often dispersive (sodic). Soil pHs are usually acidic. Of colluvial/alluvial origin: found on mid-level plateau surfaces, slopes, and some drainage depressions.
- J3** Shallow and sandy on ferricrete (*Petroferric-Ferric Tenosol*). Medium thickness to thick loamy sand to sand with a bleached subsurface layer; either directly overlying a layer of ferricrete, or overlying an ironstone gravel layer on a ferricrete layer, or overlying a thick to very thick layer of ironstone gravel. Mottled and usually sodic clay underlies the ironstone layers. Soil pHs acidic to strongly acidic. Of sedentary origin: found on remnant sandy plateau surfaces and some slopes. [Northcote's Eleanor sand.]

Minor soils:

- K4** Stony soil (*stony Chromosol-Sodosol*). Medium thickness sandy loam, with some sandy topsoil, with sandstone fragments and often some quartz fragments and/or ironstone nodules/fragments; overlying olive-brown to yellow-brown clay; overlying weathered sandstone. Often with a bleached subsurface layer. The clay subsoil can be sodic, particularly in the upper subsoil. Of sedentary origin: found on some slopes and plateau surfaces.
- I2** Very thick sands (*Podosol*). Very thick sandy soil with a bleached sub-surface layer; overlying a sandy to loamy subsoil layer with accumulations of iron/organic compounds (usually only minor segregations/soft nodules; occasionally a layer of 'coffee-rock'). This is often underlain by a thin to medium thickness layer of ironstone gravel or ferricrete. Underlying this can be either be a



sandy layer on a clay substrate; or a transitional sodic and bleached clay loamy layer on a clay substrate; or a clay substrate. An alluvial/wet soil: found in drainage flats, and on a few lower slopes.

K1-K2 Dark soil (*Brown Dermosol-Sodosol*). Medium thickness to thin dark loam, fine sandy loam, or even sandy loam; over brown clay loam; overlying brown silty clay loam to light clay, usually grading into weathered phyllite at moderate depth. Ironstone often occurs in the sub-surface layer. Soil pHs are acidic to neutral. Found on areas underlain by phyllite. Areas with these soils are characterised by a distinct vegetation dominated by sugar gums. Soils formed on phyllite are similar morphologically to those formed on sandstone, however, those formed on sandstone are much less fertile (with coarser and lighter coloured topsoil textures since they are derived from rock which provides a less nutrient rich soil), less well drained (having finer and less permeable subsoil), and have much poorer native vegetation. [Northcote's Dewrang soil.]

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

