

DEL Delamere Land System

Irregular undulating to steep land between Second Valley and Cape Jervis

Area: 66.1 km²

Annual rainfall: 525 – 785 mm average

Geology: More than 80% of the area is underlain by basement rock at shallow depth. The rocks are variable, and belong to several formations of the Kanmantoo Group. A significant feature is the relatively high proportion of calcareous rocks. The various rocks include:

- Calcified metasiltsstones, metasandstones and marbles of the Strangway Hill, Wangkonda and Sellicks Hill Formations.
- Metasiltsstones, calcareous metasiltsstones and marbles of the Delamere Formation.
- Highly calcified metamorphosed siltstones, limestones and dolomites of the Fork Tree and Rapid Bay Formations.
- Metamorphosed sandstones of the Backstairs Passage Formation.

Most of the remainder comprises glacial valley sediments - sandy clays and clays. These are the last remnants of more extensive deposits of indeterminate age, laid down in ancient glacial valleys and subsequently eroded. There are small areas of relatively recent alluvial clays on outwash fans and mixed coarse to medium textured materials in creek flats.

Topography: The topography is irregular. Near the coast are moderately steep to steep hills, usually with well defined and commonly eroded water courses. Further inland, the landscape becomes more subdued, but is nevertheless characterized by rolling low hills with slopes in the 10-30% range. In the Cape Jervis area there are escarpment slopes grading down to the coastal plain. Elsewhere on the western side, the land falls sharply into the sea, with eroded cliffs a feature. The land generally drains in a north westerly or westerly direction, via closely spaced water courses. The upper reaches of two of these, viz. Yohoe Creek and No Where Else Creek occupy a partially exhumed glacial valley. There are minor (less than 5% of the area) alluvial flats and outwash slopes.

Elevation: 0 - 310 m

Relief: Up to 200 m

Soils: Most soils are shallow to moderately deep over basement rock or calcareous materials overlying basement rock. These are mostly loamy to clay loamy with well structured subsoils. Sandy loam soils are less common. Minor soils include a range of types formed on glacial valley and recent alluvial sediments.

Main soils

Soils formed on calcareous basement rocks

D1 Loam over red calcareous clay

C2 Clay loam over soft carbonate

Soils formed on non calcareous basement rocks

K2a Loam over brown clay

K2b Loam over red clay



Minor soils

Soils formed on non calcareous basement rocks

K4 Sandy loam over brown clay

L1a Shallow stony loam

L1b Shallow stony sandy loam

Soils formed on calcareous basement rocks

A2 Calcareous loam

B4 Gradational clay loam over calcareous rock

Soils formed on glacial valley sediments

E3/E1 Grey/black cracking clay

F2a Sandy loam over brown clay

F2b Clay loam over poorly structured brown clay

G3a Loamy sand over brown clay

G3b Thick sand over clay

Soils formed on alluvium

D2 Loam over red clay

F1 Sandy loam over brown clay

M1 Deep sandy loam

Main features:

The Delamere Land System comprises a mixture of land forms and soils. Moderately steep to steep strongly dissected hills dominate the coastal strip on the western side. The soils are mainly moderately shallow loamy types, usually with well structured clayey subsoils, and formed on calcareous or non calcareous rocks. Although fertile and well drained, the uneven and often steep topography, and coastal exposure, limit land use options. Most water courses are eroded. The inland areas include mainly rolling to undulating slopes, where the soils are also loamy and fertile, but the proportion of non calcareous types increases. Sporadic occurrences of clay loam, sandy loam and sand over clay soils over clayey subsoil, or cracking clays, are typical of the remnant glacial valleys deposits. Some of these are badly eroded. Most of the land is used for grazing, as slopes and associated erosion potential are too great for cultivated uses. Horticultural, viticultural and floricultural potential is high where the land is sheltered, slopes are not too steep and water is available.

Soil Landscape Unit summary: 21 Soil Landscape Units (SLUs) mapped in the Delamere Land System:

SLU	% of area	Main features #
-Q-	0.8	Rapid Bay quarries.
AAC	9.4	Moderately steep dissected slopes of the escarpment east of Cape Jervis formed on calcified metasiltsstones of the Strangway Hill Formation. Hillslopes are up to 30%, rounding off near the crests to 8%. Maximum relief is 150 metres. Water courses are well defined and eroded in places. Most soils are shallow to moderately deep, with loamy surfaces overlying soft to semi-hard carbonate or reddish clay. Main soils: <u>Loam over red calcareous clay</u> - D1 (E) <u>Clay loam over soft carbonate</u> - C2 (C) <u>Calcareous loam</u> - A2 (L) <u>Loam over red clay</u> - K2b (L) These soils are moderately deep to shallow, well drained and inherently fertile, but moderately steep slopes and severe exposure restrict land use options to grazing or revegetation. The slopes can be easily bared off by overgrazing, leading to high erosion hazard.
ACC	8.0	Rolling low hills with relief of 50-100 m and slopes of 18-30% formed on metasiltsstones, calcareous metasiltsstones and marbles of the Delamere Formation. Most soils have loamy surfaces with subsoils varying from red or brown clays to soft carbonate. Main soils: <u>Loam over brown or red clay</u> - K2a / K2b (E)



		<p><u>Clay loam over soft carbonate</u> - C2 (E) <u>Gradational clay loam over calcareous rock</u> - B4 (C)</p> <p>These soils are moderately deep, well drained and fertile. Although non arable (due to moderate slopes), they are suitable for perennial crops where water is available and slopes are protected from the wind.</p>
ADC ADD	3.4 4.5	<p>Moderately steep to steep slopes formed on highly calcified metamorphosed siltstones, limestones and dolomites of the Fork Tree and Rapid Bay Formations. Unmapped coastal cliffs are also included. Rock outcrop is very extensive on steeper slopes. Water courses are well defined and generally eroded.</p> <p>ADC Moderately steep slopes and rolling low hills with relief to 100 m and slopes of 20-30%.</p> <p>ADD Steep rocky hillslopes and ridges with relief to 150 m and slopes of 30-50%. The soils are shallow and overlie thick soft, semi-hard, rubbly and occasionally sheet-rock carbonate, grading to calcareous weathering rock. The soils may be medium textured and calcareous throughout, non-calcareous in the surface, or have a well defined red clay subsoil.</p> <p>Main soils: <u>Calcareous loam</u> - A2 (E) <u>Clay loam over soft carbonate</u> - C2 (C) <u>Gradational clay loam over calcareous rock</u> - B4 (C)</p> <p>These soils are shallow and stony, and too steep for cropping. They would usually be considered as excellent viticultural soils, but in this situation, steep slopes and coastal exposure severely restrict potential. The slopes are readily over-grazed leading to excessive runoff and erosion, as has apparently occurred in the past.</p>
AEC AED	11.8 20.3	<p>Moderately steep to steep hills formed on metasiltstones, metasandstones and marbles, weakly calcified, of the Strangway Hill, Wangkonda and Sellicks Hill Formations. The hills are characterized by narrow sinuous ridges which fall away sharply to strongly dissected hillslopes. Surface stone is common, and rocky outcrops occur sporadically on gentler slopes and extensively on steep slopes. Water courses are very well defined and often eroded, particularly on steeper slopes.</p> <p>AEC Rolling low hills with relief of 50-150 m and slopes of 20-30%.</p> <p>AED Steep to very steep hillslopes with relief of 70-200 m and slopes of 30-150%. Most soils have loamy surfaces. About half are non calcareous, some with red or brown clayey subsoils, and some shallow over rock. The calcareous soils usually have red clayey subsoils.</p> <p>Main soils: <u>Loam over red calcareous clay</u> - D1 (E) <u>Loam over brown or red clay</u> - K2a / K2b (E) <u>Shallow stony loam</u> - L1a (L) <u>Clay loam over soft carbonate</u> - C2 (L)</p> <p>The soils are generally moderately deep, but the land is too steep for cropping. Exposure limits horticultural potential, so grazing is the predominant land use.</p>
AiC AiD	6.8 1.3	<p>Moderately steep to steep dissected slopes formed on metamorphosed sandstones of the Backstairs Passage Formation.</p> <p>AiC Moderate slopes of 10-30% to 100 m high, and rounded crests.</p> <p>AiD Steep slopes of 30-50%, up to 100 m high.</p> <p>In contrast to the soils formed on basement rock elsewhere in the System, the soils are significantly sandier.</p> <p>Main soils: <u>Sandy loam over brown clay</u> - K4 (E) <u>Shallow stony sandy loam</u> - L1b (E)</p> <p>These soils are shallow to moderately deep, infertile and highly erodible. There is some potential for perennial crops on more sheltered slopes of AiC, but the land is best suited to grazing.</p>
DCC DCZ	0.6 5.7	<p>Gentle slopes and crests formed on metasiltstones, metasandstones and marbles, weakly calcified, of the Strangway Hill, Wangkonda and Sellicks Hill Formations.</p> <p>DCC Gentle slopes of 5-12%.</p> <p>DCZ Rounded crests, falling away on their margins to steeper slopes.</p> <p>Most soils have loamy surfaces. About half are non calcareous, some with red or brown clayey subsoils, and some shallow over rock. The calcareous soils usually have red clayey subsoils.</p> <p>Main soils: <u>Loam over red calcareous clay</u> - D1 (E) <u>Loam over brown or red clay</u> - K2a / K2b (E) <u>Shallow stony loam</u> - L1a (L)</p>



		<p><u>Clay loam over soft carbonate</u> - C2 (L)</p> <p>The soils are generally moderately deep, but except for the broader slopes of DCC, the land occurs as narrow strips with steep rocky margins, which are not practicable to farm. Exposure limits horticultural potential.</p>
DkD	2.2	<p>Gently rolling rises with relief to 20 m and slopes of 8-18%, formed on metasiltstones, calcareous metasiltstones and marbles of the Delamere Formation. Most soils have loamy surfaces with subsoils varying from red or brown clays to soft carbonate.</p> <p>Main soils: <u>Loam over brown or red clay</u> - K2a / K2b (E) <u>Clay loam over soft carbonate</u> - C2 (E) <u>Gradational clay loam over calcareous rock</u> - B4 (C)</p> <p>These soils are moderately deep, well drained and fertile. The land is semi arable, but suitable for perennial crops where water is available and slopes are protected from the wind.</p>
EGD	5.1	<p>Moderately inclined footslopes of the escarpment east of Cape Jervis formed on calcified metasiltstones of the Strangway Hill Formation. Slopes are 8-20%. Water courses are well defined and commonly eroded, and often have short steep rocky banks. Most soils are shallow to moderately deep, with loamy surfaces overlying either soft to semi-hard carbonate or reddish clay.</p> <p>Main soils: <u>Loam over red calcareous clay</u> - D1 (E) <u>Clay loam over soft carbonate</u> - C2 (C) <u>Calcareous loam</u> - A2 (L) <u>Loam over red clay</u> - K2b (L)</p> <p>Although often shallow, these soils are well drained and inherently fertile, but only semi arable due to a combination of slope (and associated erosion potential), frequency of deeply incised water courses, and exposure.</p>
HYC HYD HYI	3.3 0.7 1.5	<p>Gentle to moderate slopes formed on glacial valley sandy clays and clays.</p> <p>HYC Gentle slopes of 3-8%. HYD Moderate slopes of 8-18%. HYI Moderate slopes of 8-18% with eroded water courses and swampy flats.</p> <p>The soils are mostly clay loamy to clayey, with some sandy soils. Subsoils are invariably heavy dispersive clays.</p> <p>Main soils: <u>Clay loam over poorly structured brown clay</u> - F2b (E) <u>Grey/black cracking clay</u> - E3/E1 (E) <u>Loamy sand over brown clay</u> - G3a (L)</p> <p>These soils are generally deep and inherently fertile (except G3a), but dispersive subsoils impede drainage and predispose the soils to erosion. The gentler slopes (HYC) are arable, but the instability of the land restricts intensive uses on the rest of the land. The scars of gully and sheet/rill erosion from the past are still evident in places.</p>
JAC	1.0	<p>Outwash fan formed on clayey sediments. Slopes are 5-12%.</p> <p>Main soil: <u>Loam over red clay</u> - D2 (D)</p> <p>These soils are deep, fertile and moderately well drained. Although prone to erosion due to run off from adjacent steep slopes, the land has potential for a range of cropping and horticultural uses.</p>
KXJ	2.8	<p>Valley flats and adjacent lower slopes formed on miscellaneous alluvium. Water courses are commonly eroded with occasional swampy areas. The soils are deep and typically coarse to medium textured and multi-layered.</p> <p>Main soil: <u>Deep sandy loam</u> - M1 (D)</p> <p>These soils are generally moderately well drained and reasonably fertile, and although localized erosion, waterlogging and salinity are problems, the land is generally suitable for most uses, although areas are limited.</p>
LNJ	0.6	<p>Creek flats formed on sandy clay alluvium derived from glacial valley sediments. The water courses in the flats are generally eroded, and are swampy in places.</p> <p>Main soil: <u>Sandy loam over brown clay</u> - F1 (D)</p> <p>These soils are deep and moderately fertile but prone to waterlogging due to perching of water on subsoil clays, and due to shallow groundwater in places. Considerable seepage water from upslope exacerbates the problem. Although these areas can provide useful green feed in summer, and may be irrigated for fodder production, horticultural potential is low.</p>
PuD PuF	0.8 7.6	<p>Moderate slopes formed on glacial valley sediments, mainly sandy clays.</p> <p>PuD Rises and low hills, up to 40 m high, with slopes of 6-12%. PuF Low hills up to 80 m high with slopes of 12-25%.</p>



		<p>The soils are mainly sandy surfaced with clayey subsoils. Main soils: <u>Thick sand over clay - G3b</u> (E) <u>Sandy loam over brown clay - F2a</u> (E) <u>Loamy sand over brown clay - G3a</u> (L)</p> <p>These soils are generally infertile and acidic, highly susceptible to erosion (both water and wind), and imperfectly drained in places. Land use options are consequently limited. The land is too steep and erodible for safe cropping, but where waterlogged areas can be avoided, there is potential for horticulture and floriculture.</p>
WB-	1.8	Coastal cliffs, severely eroded in places.

PROPORTION codes assigned to soils within Soil Landscape Units (SLU):

(D) Dominant in extent (>90% of SLU)	(C) Common in extent (20–30% of SLU)
(V) Very extensive in extent (60–90% of SLU)	(L) Limited in extent (10–20% of SLU)
(E) Extensive in extent (30–60% of SLU)	(M) Minor in extent (<10% of SLU)

Detailed soil profile descriptions:

- A2** Calcareous loam (Paralithic, Lithocalcic Calcarosol)
15 - 45 cm dark brown calcareous loam to clay loam with increasing fine and nodular carbonate, overlying weakly cemented nodular calcrete or a massive calcrete pan, grading to softer carbonate underlain by calcareous weathering siltstone by 100 cm.
- B4** Gradational clay loam over calcareous rock (Petrocalcic, Red Dermosol)
20 - 40 cm dark reddish brown crumbly clay loam grading to a well structured red clay overlying limestone or dolomite, sometimes with a thin calcrete capping, at about 60 cm.
- C2** Clay loam over soft carbonate (Hypercalcic, Red Dermosol)
15 - 40 cm dark reddish brown granular loam to clay loam, slightly more clayey with depth, overlying up to 50 cm pale brown to white massive very highly calcareous clay loam with up to 50% metasiltstone fragments, grading to soft weathering rock as shallow as 35 cm, but usually between 50 and 100 cm.
- D1** Loam over red calcareous clay (Hypercalcic, Red Chromosol)
10 - 40 cm firm weakly structured red brown loam overlying a well structured red clay with massive soft carbonate at depths of between 30 and 60 cm, grading to weathering metasiltstone at about 80 cm.
- D2** Loam over red clay (Calcic, Red Chromosol)
25 - 55 cm dark reddish brown hard massive fine sandy loam to loam, with a paler and more clayey A2 layer, over a red brown medium clay with strong polyhedral structure and firm consistence, highly calcareous with up to 20% soft carbonate segregations from about 60 cm.
- E3/E1** Grey/black cracking clay (Massive / Epipedal, Grey/Black Vertosol)
10 - 25 cm black to dark grey strongly structured light clay grading to a black or dark grey and yellowish brown mottled heavy clay with strong coarse blocky structure and variable carbonate content, overlying a hard greenish heavy clay with slickensides from about 100 cm.
- F1** Sandy loam over brown clay (Bleached, Eutrophic, Brown Chromosol)
25 - 75 cm hard grey brown loamy sand to sandy clay loam with a strongly bleached A2 layer, over a yellowish brown and grey mottled clay with strong coarse blocky structure, grading to fine grained alluvium.
- F2a** Sandy loam over brown clay (Calcic, Brown Chromosol)
15 - 50 cm firm dark brown sand to fine sandy loam, with a bleached A2 layer, over a brown, yellowish brown and red fine sandy clay to heavy clay with strong angular blocky structure and up to 50% soft calcareous segregations from about 70 cm.



- F2b** Clay loam over poorly structured brown clay (Eutrophic / Calcic, Brown Sodosol)
15 - 35 cm dark brown hard setting clay loam with a strongly bleached A2 layer, over a dark greyish brown and yellowish brown mottled very firm medium to heavy clay with strong coarse prismatic structure and variable soft carbonate from about 75 cm, grading to a light grey, reddish brown and yellowish brown mottled massive very firm sandy clay to clay, lithified in places to a weak shaly rock.
- G3a** Loamy sand over brown clay (Bleached-Mottled, Eutrophic, Brown Chromosol)
20 - 50 cm dark greyish brown soft loamy sand to sandy loam with a bleached A2 layer, over a yellowish brown, grey and red mottled very firm medium to heavy clay with strong coarse prismatic to angular blocky structure, becoming sandier and massive with depth.
- G3b** Thick sand over clay (Bleached, Brown Kurosol)
35 - 95 cm soft grey loamy sand with a bleached A2 layer, over a brown, red and grey mottled medium to heavy acidic clay, continuing below 100 cm.
- K2a** Loam over brown clay (Eutrophic, Brown Chromosol)
30 - 55 cm dark grey loam to clay loam with a paler and gravelly A2 horizon, overlying a dark brown, yellowish brown and red mottled clay with strong blocky structure, and increasing rock fragments with depth. The clay grades to weathering metasiltstone or phyllite at about 100 cm.
- K2b** Loam over red clay (Eutrophic, Red Chromosol)
20 - 50 cm dark brown loam to clay loam with a paler coloured and gravelly A2 horizon, overlying a dark reddish brown to brown heavy clay with strong blocky structure, grading to weathering metamorphosed siltstone or schist, usually deeper than 100 cm.
- K4** Sandy loam over brown clay (Bleached, Eutrophic, Brown Kurosol)
10 - 35 cm loamy sand to sandy clay loam with a gravelly and bleached A2 horizon, overlying a yellow brown or brown well structured clay grading to weathering metasandstone by 100 cm.
- L1a** Shallow stony loam (Paralithic, Leptic Tenosol)
20 - 45 cm dark brown loam with a paler brown clay loam A2 horizon containing up to 50% rock fragments, grading to metamorphosed siltstone or phyllite by 50 cm.
- L1b** Shallow stony sandy loam (Paralithic, Bleached-Leptic Tenosol)
30 - 55 cm stony sandy loam with a very stony bleached A2 horizon, grading to weathering metasandstone.
- M1** Deep sandy loam (Regolithic, Brown-Orthic Tenosol / Eutrophic, Brown Kandosol)
Thick brown sandy loam, overlying a grey to brown silty sand to silty clay loam with weak prismatic structure, grading to variable sandy, gritty and clayey alluvial sediments.

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

