

SEL Sellicks Hill Land System

Sellicks Hill Range, including the Willunga Escarpment, extending from Kangarilla to Myponga Beach

Area: 71.9 km²

Annual rainfall: 650 – 800 mm average

Geology: The range is underlain by a sequence of steeply dipping basement rock formations. The strike of the rocks is parallel to the range. Because the beds have been tilted almost at right angles, there are frequent changes in lithology across the range from west to east. The rock formations (from west to east) include Heatherdale Shale, Fork Tree and Rapid Bay Limestones, Strangway Hill, Sellicks Hill, ABC Range Quartzite, Brachina Shale, Tarcowie Siltstone, Brighton Limestone, Tapley Hill Shale, Mitcham Quartzite and Saddleworth Formation siltstone. The rocks are partially mantled by secondary carbonates, particularly on the west facing escarpment slopes.

Topography: The land system is a linear range of moderately steep to steep hills, dominated by the steep slopes of the Willunga Escarpment on the western side. The system forms the eastern edge of the Willunga Basin and continues southward bordering the sea until the escarpment itself disappears into the sea. The escarpment has been strongly dissected by west flowing streams which occupy deep narrow gullies. Water courses are invariably eroded. The overall slope of the escarpment is 15-20% (ie from foot to crest), but actual slopes are much steeper due to water course dissection. Slopes are generally steeper than 30%, and are precipitous in places. Rocky outcrop is extensive on steeper slopes, as well as on quartzite and limestone reefs.

Elevation: 0 m at sea level in the south, to 400 m at the top of the escarpment in the north

Relief: Up to 200 m

Soils: The soils are mostly formed on basement rock, but there are significant variations according to rock type. Non calcareous fine grained rocks give rise to loamy or clay loamy surfaced texture contrast soils, while sandy loam surfaced soils form on coarser grained rocks. Associated shallow stony soils without clayey subsoils are common on steeper slopes. A range of shallow calcareous, gradational and texture contrast soils, all with abundant lime in at least the subsoils, occur on calcareous rocks, or rocks mantled by secondary carbonates.

Main soils: *Soils formed on non calcareous rocks*

- L1a** Shallow stony loam
- K2c** Loam over red clay on highly weathered rock
- K2b** Clay loam over dispersive brown clay
- L1b** Shallow stony sandy loam

Minor soils: *Soils formed on non calcareous rocks*

- K1** Gradational loam
- K2a** Loam over red clay
- K4** Sandy loam over poorly structured brown clay
- L1c** Shallow stony clay loam

Soils formed on calcareous rocks or rocks mantled by secondary carbonate

- A2** Shallow calcareous loam - on fresh rock
- B2** Shallow calcareous loam - on calcreted rock
- B4** Shallow gradational red loam on hard limestone or calcrete
- C2** Shallow gradational red loam on calcareous rock
- D1** Shallow loam over red clay on calcareous rock



Main features:

The Sellicks Hill Land System is a long range of hills forming the western edge of the Mount Lofty block. It is characterized by moderately steep to steep slopes and is dominated by the Willunga Escarpment. 98% of the land is too steep for any uses involving cultivation, and over 75% is inaccessible to machinery due to steep slopes and / or rocky outcrop. Westerly (coastal) exposure further limits land use options. The soils are generally inherently fertile although of variable depth, but many are dispersive and susceptible to rill, gully and tunnel erosion. Landslips are common in places.

Soil Landscape Unit summary: 19 Soil Landscape Units (SLUs) mapped in the Sellicks Hill Land System

SLU	% of area	Main features #
ACd	3.9	<p>Steep to very steep hillslopes dissected by water courses flowing directly into the sea. Underlying rocks are metasilstones, metasandstones and marbles (sometimes calcified), of the Strangway Hill and Sellicks Hill Formations. Relief is 70-150 m and slopes are 30-150%. There are sporadic landslips. Rock outcrop is extensive. Water courses are very well defined and eroded. Most soils are shallow stony loams, but deeper profiles with clayey subsoils are common. Sporadic soft carbonate occurs in lower subsoils. On calcareous rock strata, loamy surface soils overlie massive soft to semi-hard carbonate.</p> <p>Main soils: <u>Shallow stony loam</u> - L1a (E) } on non calcareous rocks <u>Acidic loam over red or brown clay</u> - K2a/K2b/K2c (E) } <u>Shallow calcareous loam</u> - A2 (M) } on calcareous rocks <u>Shallow gradational red loam</u> - C2/B4 (M) }</p> <p>These soils are inherently fertile, although often shallow. The steep terrain, most of which is inaccessible to machinery, limits land use to grazing. There is severe potential for erosion including landslips if the surface is disturbed or bared off by over grazing.</p>
ADC ADD	4.9 3.6	<p>Moderately steep to steep hillslopes and ridges with slopes to 50% formed on highly calcified metamorphosed siltstones, limestones and dolomites of the Fork Tree and Rapid Bay Formations. Rock outcrop is very extensive on steeper slopes. There is extensive surface calcrete, lime coated siltstone and limestone.</p> <p>ADC Moderately steep slopes of 20-30%. ADD Steep rocky hillslopes with slopes of 30-50%.</p> <p>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>Shallow calcareous loam</u> - A2/B2 (E) <u>Shallow gradational red loam</u> - C2/B4 (E)</p> <p>These soils are all fertile and well drained, although often shallow. However, the moderately steep to steep slopes and westerly exposure limit land use options - grazing in the predominant use.</p>
AOC	5.0	<p>Moderately steep footslopes of the Willunga Escarpment formed on slates and shales of the Heatherdale Shale Formation, variably capped by secondary carbonates. The slopes are strongly dissected by water courses. Slopes range from 18% to 30%. Most soils have loamy surfaces with subsoils varying from reddish clays to soft carbonate. There are some shallow soils formed in rock.</p> <p>Main soils: <u>Loam over red clay</u> - K2a (E) } on non calcified rocks <u>Shallow stony loam</u> - L1a (C) } <u>Shallow gradational red loam</u> - C2/B4 (E) on calcified rocks</p> <p>These soils are fertile, moderately deep to shallow and generally well drained. Although the slopes are trafficable, the westerly exposure restricts land use to mainly grazing. There is limited horticultural potential on some sheltered slopes in dissection valleys.</p>
AZo	1.4	<p>Steep sided dissection gullies with extensive rock outcrop and eroded water courses. These are fragile areas with no productive potential.</p>
AaI AaK	3.1 36.9	<p>Moderately steep to steep dissected slopes of the Willunga Escarpment formed on siltstones, slates, calcareous siltstones and quartzites of the Tapley Hill, Saddleworth and Brighton Formations. Water courses occupy well defined and eroded channels in narrow depressions. Rock outcrop is extensive on steeper slopes. There are minor landslips.</p> <p>AaI Moderate slopes with relief to 80 m and slopes of 16-30%.</p>



		<p>AaK Steep to very steep hillslopes with relief to 200 m and slopes of 30-75%. Soils are loamy and usually gravelly and stony, with red clay subsoils grading to weathering rock. On calcareous rock strata, soft carbonates occur in the subsoils. Shallow loams formed directly on rock or soft carbonate are common. A further important soil has a dispersive brown clay subsoil formed in quartzitic shale.</p> <p>Main soils: <u>Loam over red clay</u> - K2a (L) } on hillslopes with non calcareous rocks <u>Shallow stony loam</u> - L1a (E) } <u>Loam over red clay on highly weathered rock</u> - K2c (L) } on upper slopes <u>Gradational loam</u> - K1 (L) } <u>Shallow gradational red loam</u> - C2/B4 (L) } on calcareous rocks <u>Shallow loam over red clay</u> - D1 (M) }</p> <p>The soils are inherently fertile and generally moderately deep, but the topography and exposed position limit land use options. The main soils are highly erodible and subject to rill, gully and tunnel erosion. Soil disturbance and over grazing must be avoided.</p>
AdI Add	3.9 14.1	<p>Moderately steep to steep slopes formed on shales, quartzitic shales and minor limestones of the Tapley Hill Slate, Brachina Shale, Tarcowie Siltstone and Brighton Limestone Formations. Rock outcrop is minor on moderate slopes but extensive on steeper slopes. Surface quartzite is common throughout. Water courses occupy very narrow valleys, are well defined and usually eroded. Landslips and tunnel erosion are particularly prevalent on the steeper slopes.</p> <p>AdI Moderately steep hillslopes with relief to 80 m and slopes of 12-30%. Add Steep, rocky hillslopes with relief to 100 m and slopes of 30-100%. The most common soils have dark clay loamy surfaces overlying brown dispersive clay subsoils forming in weathering quartzitic shale. Shallow variants have no clay subsoil. Other soils are redder, with loamy surfaces over red clay subsoils. Associated with these are shallow red loams over soft carbonate overlying calcareous rocks.</p> <p>Main soils: <u>Clay loam over dispersive brown clay</u> - K2b (C) } on quartzitic shales <u>Shallow stony clay loam</u> - L1c (C) } <u>Loam over red clay on highly weathered rock</u> - K2c (C) } on shales <u>Shallow stony loam</u> - L1a (C) } <u>Shallow gradational red loam</u> - C2/B4 (M) on calcareous rocks</p> <p>This land is highly susceptible to erosion due to its dispersive soils and steep slopes. Rill, gully and tunnel erosion are common and there are sporadic landslips.</p>
AsJ	7.7	<p>Steep rocky escarpment slopes formed on a band of Mitcham Quartzite. Slopes are 30-50%. Rock outcrop is very extensive. Soils have stony and gravelly sandy surfaces, weakly developed or absent subsoils and hard rock at shallow depth.</p> <p>Main soil: <u>Shallow stony sandy loam</u> - L1b (D)</p> <p>This land is steep and very rocky with no agricultural potential other than rough grazing.</p>
Asd	8.5	<p>Steep to very steep hillslopes and ridges formed on quartzites and quartzitic shales of the ABC Range Formation. Slopes are 30% to 75% and relief is up to 200 metres. Water courses are very well defined in narrow valleys. They are commonly severely eroded. There is extensive quartzite outcrop, most common on steeper slopes. The most common soils have dark clay loamy surfaces overlying brown dispersive clay subsoils grading to weathering bedrock. These are associated with shallow stony soils and deep sandy loam texture contrast soils over highly weathered rock.</p> <p>Main soils: <u>Clay loam over dispersive brown clay</u> - K2b (E) <u>Shallow stony clay loam</u> - L1c (E) <u>Sandy loam over poorly structured brown clay</u> - K4 (L)</p> <p>This land is highly susceptible to gullying, tunnelling and landslip.</p>
AuC AuD	0.6 0.6	<p>Steep low hills and hills developed on medium to coarse grained sandstones and quartzites. Slopes generally range from 12% to 75% and relief is up to 130 metres. The slopes are rough and very rocky.</p> <p>AuC Rolling moderately rocky low hills with relief to 80 m and slopes of 12-30%. AuD Rocky, steep hills with relief to 130 m and slopes of 30-75%. Drainage depressions are narrow and deeply incised.</p> <p>The main soil features are shallow profiles over bedrock and grey, sandy surfaces which are gritty and stony. Subsoils are often not present.</p> <p>Main soils: <u>Acidic gradational sandy loam</u> - K5 (E) <u>Acidic sandy loam over brown clay</u> - K4 (C)</p>



		<p><u>Shallow sandy loam</u> - L1a (L)</p> <p><u>Acidic sandy loam over red clay</u> - K3 (L)</p> <p><u>Acidic gradational brown loam</u> - K1 (M) on fine grained rocks</p> <p>This land has very limited productive potential due to the combination of steep terrain, rocky land surface and shallow infertile soils. Virtually all the steep slopes are uncleared, while the gentler slopes are usually partially cleared and used for light grazing, often in a rural living situation.</p>
AvI	2.7	<p>Rolling to steep low hills with eroded water courses formed on interbedded sandstones and siltstones of the Stonyfell and Balhannah Formations.</p> <p>AvC Rolling low hills with relief to 80 m and slopes of 16-30%.</p> <p>Main soils are texture contrast types on weathering rock. They are:</p> <p><u>Acidic loam over red mottled clay</u> - K2c (E)</p> <p><u>Acidic sandy loam over brown clay</u> - K4 (C)</p> <p><u>Acidic gradational brown loam</u> - K1b (C)</p> <p><u>Acidic gradational red loam</u> - K1c (L)</p> <p><u>Shallow loam and sandy loam</u> - L1a/L1b (M) on steeper and rocky slopes</p> <p><u>Ironstone soils</u> - J2a/J2b (M) on crests</p> <p><u>Loam over thick brown clay</u> - F1a (M) on lower slopes</p> <p>Although most soils are moderately deep and relatively fertile, the land is too steep for cultivated agriculture. It is well suited to perennial crops and pastures.</p>
DID	1.0	<p>Dissected footslopes of the Willunga Escarpment formed on slates and shales of the Heatherdale Shale Formation, variably capped by secondary carbonates. Slopes range from 8-18%. Most soils have loamy surfaces with subsoils varying from reddish clays to soft carbonate. There are some shallow soils formed in rock.</p> <p>Main soils: <u>Loam over red clay</u> - K2a (E)</p> <p><u>Shallow stony loam</u> - L1a (C) on non calcified rocks</p> <p><u>Shallow gradational red loam</u> - C2/B4 (E) on calcified rocks</p> <p>These soils are fertile, moderately deep to shallow and generally well drained. They have some potential for horticulture, provided that exposure is not a problem. Erosion potential is high.</p>
EID	1.0	<p>Moderate slopes of 12-20% formed on highly calcified metamorphosed siltstones, limestones and dolomites of the Fork Tree and Rapid Bay Formations. 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>Shallow calcareous loam</u> - A2/B2 (E)</p> <p><u>Shallow gradational red loam</u> - C2/B4 (E)</p> <p>These soils are all fertile and well drained, although often shallow. The slopes are semi arable, and there is some potential for cropping and viticulture. The shallow limestone and coastal exposure limit horticultural options.</p>
JBj	0.3	<p>Narrow gullies on the western margin of the range. Eroded water courses dominate the land. These continue on across the outwash fans of the Willunga Land System. Stream bank protection is the main management issue.</p>
LtE	0.2	<p>Narrow drainage depressions formed on variable locally derived alluvium. Soils have thick sandy to loamy surfaces overlying mottled clayey subsoils, or are deep sandy loams or clay loams.</p> <p>Main soils: <u>Sandy loam over brown clay</u> - F1b and F1c (V)</p> <p><u>Deep sandy loam</u> - M1 (L)</p> <p><u>Deep black clay loam</u> - M2 (L)</p> <p>These soils are deep and moderately fertile, but prone to waterlogging. Water courses are susceptible to erosion if banks are exposed. Although potentially productive, small contiguous areas, and the predominance of water courses, effectively limit production.</p>
WB-	0.6	Coastal cliffs.

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

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| (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:

Soils formed on calcareous rocks or rocks mantled by secondary carbonate

- A2** Shallow calcareous loam over basement rock (Paralithic, Hypercalcic Calcarosol)
Calcareous dark brown loam to clay loam, overlying a highly calcareous brown clay loam to light clay grading to a Class III A carbonate layer in weathering metasiltstone or limestone at about 50 cm.
- B2** Shallow calcareous loam on calcreted basement rock (Paralithic, Petrocalcic Calcarosol)
Medium to thick reddish brown calcareous loam to clay loam with increasing fine and nodular carbonate, overlying nodular to massive sheet calcrete, grading to softer carbonate underlain by calcareous weathering siltstone or limestone by 100 cm.
- B4** Shallow gradational red loam on hard limestone or calcrete (Eutrophic, Red Dermosol)
Medium thickness well structured loam to clay loam grading to a red friable clay loam to clay over hard limestone, marble or dolomite, or other calcreted basement rock within 70 cm.
- C2** Shallow gradational red loam on calcareous rock (Hypercalcic, Red Dermosol)
Medium to thick dark reddish brown granular loam to clay loam, grading to pale brown massive soft carbonate with clay loam texture and abundant siltstone fragments, over soft weathering calcareous siltstone at about 70 cm.
- D1** Shallow loam over red clay on calcareous rock (Hypercalcic, Red Chromosol)
Thick reddish brown well structured loam over a reddish brown very well structured clay, abruptly overlying either soft very highly calcareous clay, or semi- hard carbonate, grading to calcareous siltstone deeper than 100 cm.

Soils formed on non calcareous rocks

- K1** Gradational loam (Eutrophic, Brown Kandosol)
Medium to thick hard loam with a pale coloured and gravelly A2 horizon, overlying a reddish yellow to brown massive clay loam, grading to a yellow light clay, with abundant rock fragments throughout. Highly weathered siltstone occurs between 50 and 100 cm.
- K2a** Loam over red clay (Eutrophic, Red Chromosol)
Medium thickness dark brown loam to clay loam with a paler coloured and gravelly A2 horizon, overlying a dark red medium to heavy clay with strong polyhedral to blocky structure, grading to weathering metamorphosed siltstone or schist at about 100 cm.
- K2b** Clay loam over dispersive brown clay (Eutrophic, Brown Sodosol)
Thick dark clay loam with a bleached quartz gravelly A2 horizon, overlying a brownish yellow and brown coarsely prismatic dispersive heavy clay, grading to weathering quartzitic shale at about 100 cm.
- K2c** Loam over red clay on highly weathered rock (Eutrophic, Red Chromosol / Sodosol)
Medium thickness hard brown loam with a paler gravelly subsurface layer overlying a coarsely structured (sometimes dispersive) red, brown and yellow clay grading to highly weathered basement rock continuing below 200 cm.
- K4** Sandy loam over poorly structured brown clay (Eutrophic, Brown Chromosol)
Thick loamy sand to loam with a bleached and quartz gravelly A2 horizon, overlying a very firm, brownish yellow heavy clay over deeply weathered quartzitic rock.
- L1a** Shallow stony loam (Paralithic, Leptic Tenosol)
Thick, 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 (Lithic, Bleached-Leptic Tenosol)
Thick, greyish, very gravelly loamy sand to sandy loam with a bleached A2 horizon, grading to hard metasandstone by 50 cm.
- L1c** Shallow stony clay loam (Paralithic, Leptic Tenosol)
Thick dark clay loam with abundant shaly and quartzite fragments, overlying weathering quartzitic shale within 50 cm.

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

