

BAL Balaklava Land System

Alluvial plains, outwash fans and river flats associated with the River Wakefield in the Balaklava area.

Area: 151.4 km²

Annual rainfall: 345 – 420 mm average

Geology: The Land System is formed on fine grained alluvial sediments. These tend to become silty near the river. There are remnants of an old capping of Woorinen Formation carbonates confined to very low rises scattered across the plains. Carbonate from these deposits has been redistributed over the plains and invariably occurs in the lower soil profile, except in the younger alluvial soils where it is usually absent.

Topography: The Balaklava Land System is the upper section of the flood plain of the River Wakefield between the Mt. Lofty Ranges and Gulf St. Vincent. It is a very gently undulating plain with an overall westerly gradient of less than 0.5%. However, near the range on the eastern margin the plains grade to gently inclined outwash fans with slopes of up to 3%. The river itself flows along or near to the northern boundary of the Land System in a well defined channel. The channel occupies an alluvial flat up to 500 m wide which lies below the level of the adjacent plains. The depth of entrenchment of the flat into the plains decreases with distance downstream. Toward the western end of the System (where it grades to the Wakefield Land System), meander plains with gypseous rises become common.

Elevation: 100 m in the east to 30 m in the west

Relief: 10 m (maximum depth of entrenchment of the river)

Soils: The soils are mostly deep and loamy with well structured clayey subsoils. Many are calcareous.

Main soils

C3 Gradational red clay loam - plains

A6 Calcareous clay loam - plains and low rises

D4 Loam over friable red clay - meander plains

D2a Loam over red clay - plains

Minor soils

A4 Rubbly calcareous loam - low rises

C1 Gradational sandy loam - plains and river flats

D2b Silty loam over red clay - upper river flats

A8 Gypseous loam - gypsum rises

M2 Gradational black silty clay loam - lower river flats

M4 Gradational red silty loam - lower river flats

Main features: The Balaklava Land System is the upper alluvial plain of the Wakefield River. Most of the land is very gently undulating with deep, inherently fertile and generally well structured soils. Low stony rises on the plain may have restricted water holding capacity and some nutrition problems, but overall the land is potentially highly productive. Towards the west, the rainfall decreases and soils become increasingly saline. The land surface is characterized by meander channels and gypsum rises. Although the soils are deep, well structured and fertile, productivity potential is diminished. The flats of the River Wakefield are characterized by deep silty soils which are fertile but prone to compaction and flooding.



Soil Landscape Unit summary: 7 Soil Landscape Units (SLUs) mapped in the Balaklava Land System:

SLU	% of area	Main features #
JLA JLP	16.9 1.0	Flood plains of the River Wakefield, with meander channels, formed on gypseous clays. JLA Plains with occasional low gypsum rises. JLP Marginally saline plains with about 30% gypsum rises. Main soils: <u>loam over friable red clay - D4</u> (V) with <u>gradational red clay loam - C3</u> (L) and <u>gypseous loam - A8</u> (L) on rises. These soils are deep, well structured and moderately fertile. Productivity is mainly limited by the decreasing rainfall and associated moderate salinity levels in the soil (lack of leaching). This problem is more pronounced in JLP. The gypsum rises have limited productive potential due to low fertility and moisture deficiency.
KHA KHB	67.1 8.5	Flats and outwash fans formed on clayey alluvial sediments with about 25% very low rises formed on highly calcareous Woorinen Formation deposits. KHA Flats with slopes of less than 1% and very gently undulating rises. KHB Fans with slopes of 1-3% and weakly defined drainage depressions. Main soils on flats: <u>gradational red clay loam - C3</u> (E), <u>loam over red clay - D2a</u> (C), <u>calcareous clay loam - A6</u> (C) and <u>gradational sandy loam - C1</u> (L). Main soils on rises are <u>calcareous clay loam - A6</u> (V) and <u>rubbly calcareous loam - A4</u> (E). The soils are generally deep, moderately fertile and well structured, although hard setting surfaces may be a problem in places, especially on D2 soils. Subsoil salinity levels are sporadically high, but should not be a problem overall. Some rises with rubbly soils may have reduced moisture holding capacity and lime induced nutrient deficiencies. Overall productive potential is high.
XJJ	4.3	Flats adjacent to and including the River Wakefield (upstream of Balaklava). The flats are below the level of the adjacent alluvial plains. Main soils: <u>silty loam over red clay - D2b</u> (V), <u>gradational red silty loam - M4</u> (L), and <u>gradational sandy loam - C1</u> (L). These soils are: deep and fertile, their main limitation being poor surface structure - their silty surfaces are hard setting and highly susceptible to compaction. The flats are subject to flooding.
XMJ XMM	2.0 0.2	River Wakefield flats, downstream of Balaklava. XMJ Flats adjacent to and including the River Wakefield, generally slightly lower than the surrounding alluvial plains. XMM Saline flat of an abandoned river channel. Main soil: <u>gradational black silty clay loam - M2</u> . These soils are deep and fertile and generally better structured than the redder less clayey soils on the upstream flats (XJJ). The flats are subject to flooding.

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:

- A4** Rubbly calcareous loam (Regolithic, Supracalcic / Lithocalcic Calcarosol)
10 - 15 cm calcareous sandy loam to clay loam grading to a Class III B or III C carbonate rubble layer at 35 cm, becoming less rubbly with depth and overlying clayey sediments from 85 cm.
- A6** Calcareous clay loam (Pedal, Hypercalcic Calcarosol)
10 - 20 cm calcareous clay loam to loam grading to a very highly calcareous light clay with abundant soft carbonate from 35 cm over alluvial clay from 90 cm.
- A8** Gypseous loam (Gypsic, Hypercalcic Calcarosol)
15 - 20 cm calcareous fine sandy loam grading to a very highly calcareous brown silty loam with abundant soft gypsum from 60 cm.
- C1** Gradational sandy loam (Calcic / Hypercalcic, Red Kandosol)
10 - 20 cm hard sandy loam grading to a massive sandy clay loam over a red weakly structured sandy clay, calcareous from about 70 cm.
- C3** Gradational red clay loam (Hypercalcic, Red Dermosol)
10 - 30 cm clay loam grading to a well structured red clay, calcareous from 45 cm over clayey alluvium from 90 cm.
- D2a** Loam over red clay (Calcic, Red Chromosol)
10 - 25 cm sandy loam to loam abruptly overlying a well structured red clay, calcareous from 55 cm grading to alluvial clay from 90 cm.
- D2b** Silty loam over red clay (Calcic, Red Chromosol)
15 - 25 cm hard silty loam abruptly overlying a well structured red clay, calcareous from 65 cm grading to silty alluvium from 100 cm.
- D4** Loam over friable red clay (Calcic, Pedaric, Red Sodosol)
5 - 15 cm loam to clay loam abruptly overlying a very well structured friable red clay, calcareous from 35 cm grading to a gypseous clay from 70 cm.
- M2** Gradational black silty clay loam (Hypocalcic, Black Dermosol)
15 - 25 cm black silty clay loam grading to a well structured black clay.
- M4** Gradational red silty loam (Sodic, Calcic, Red Kandosol / Dermosol)
15 - 30 cm hard setting fine sandy loam to silty loam grading to a red brown sandy clay loam to sandy clay with weak to moderate polyhedral structure and minor soft carbonate from about 75 cm over medium textured alluvium.

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

