

BLACK CLAY OVER BURIED CLAY LOAMY DUPLEX SOIL

General Description: *Variable thickness well structured black clay over a buried soil (typically duplex i.e. loamy topsoil over a clayey subsoil)*

Landform: Gently sloping alluvial fans and valley floors.

Substrate: Clayey outwash sediments with gravel seams.

Vegetation: Eucalyptus woodland.



Type Site: Site No.: CH148

1:50,000 sheet:	6627-4 (Noarlunga)	Hundred:	Willunga
Annual rainfall:	600 mm	Sampling date:	17/01/05
Landform:	Lower slopes of a gently inclined alluvial fan, 1% slope		
Surface:	Hard and seasonally cracking with no stones		

Soil Description:

<i>Depth (cm)</i>	<i>Description</i>
0-10	Very dark grey very hard light clay with moderate granular structure. Gradual to:
10-25	Very dark greyish brown hard light medium clay with moderate coarse blocky (breaking to fine polyhedral) structure. Gradual to:

Buried soil	
25-42	Dark greyish brown, light grey and yellowish brown mottled firm clay loam with moderate polyhedral structure. Abrupt to:
42-85	Light grey with light brown and yellowish brown mottles very hard massive sandy clay loam with 2-10% ferromanganiferous nodules. Clear to:
85-110	Strong brown and light yellowish brown firm medium clay with weak coarse prismatic (breaking to strong medium angular blocky) structure, and 2-10% soft manganese segregations. Gradual to:
110-160	Light brownish grey, yellowish brown and reddish yellow mottled very hard heavy clay with weak coarse lenticular structure.



Classification: Melanic, Eutrophic, Black Dermosol; medium, non-gravelly, clayey/clayey, shallow overlying: Bleached-Vertic, Eutrophic, Brown Chromosol; very thick, non-gravelly, clay loamy/clayey, deep

Summary of Properties

Drainage: Moderately well drained. Water saturates the clayey surface for a few days (and / or perches on top of the clayey subsoil for up to a week) following heavy or prolonged rainfall.

Fertility: Inherent fertility is high, as indicated by the exchangeable cation data. Black clay soils are among the most fertile soils, in terms of nutrient retention capacity, although they have a tendency to zinc deficiency. Concentrations of all tested elements are satisfactory.

pH: Neutral at the surface, slightly alkaline with depth.

Rooting depth: 160 cm in sampling pit, but few roots below 110 cm.

Barriers to root growth:

Physical: The massive bleached layer (42-85 cm depth) and the poorly structured clay subsoil below impede root growth to some extent. The lenticular structured heavy clay from 110 cm presents a much more severe limitation.

Chemical: There are no apparent chemical barriers.

Water holding capacity: (Estimates for potential root zone of grape vines)

Total available: 185 mm
Readily available: 85 mm

Seedling emergence: Fair due to the high wilting point of the surface soil, and its tendency to seal, set hard and crack.

Workability: Fair. Clayey surface is hard when dry and sticky when wet.

Erosion Potential

Water: Low.

Wind: Low.

Laboratory Data

Depth cm	pH H ₂ O	pH CaCl ₂	CO ₃ %	EC 1:5 dS/m	ECe dS/m	Org.C %	Avail. P mg/kg	Avail. K mg/kg	Cl mg/kg	SO ₄ -S mg/kg	Boron mg/kg	Trace Elements mg/kg (EDTA)				Sum cations cmol (+)/kg	Exchangeable Cations cmol(+)/kg				Est. ESP
												Cu	Fe	Mn	Zn		Ca	Mg	Na	K	
0-10	7.2	6.5	0	0.147	0.77	2.61	277	656	24	13.8	1.0	19.6	514	273	10.5	24.4	19.1	3.46	0.27	1.60	1.1
10-25	7.2	6.1	0	0.048	0.35	1.11	63	384	11	5.6	0.8	5.42	231	300	2.10	20.7	16.8	2.63	0.26	1.00	1.3
25-42	7.3	6.4	0	0.04	0.31	1.24	22	201	12	4.6	0.6	3.12	208	174	0.80	18.3	15.2	2.37	0.25	0.45	1.4
42-85	7.5	6.4	0	0.025	0.29	0.08	3	73	10	1.5	0.3	0.84	55	64.2	0.30	4.2	3.34	0.54	0.10	0.18	2.4
85-110	7.7	6.7	0	0.053	0.37	0.08	2	168	19	6.3	0.6	1.26	54	32.1	0.33	16.6	11.8	3.86	0.50	0.46	3.0
110-160	7.7	6.7	0	0.061	0.42	0.11	2	219	24	13.5	1.0	2.12	54	205	0.31	25.0	15.5	8.43	0.55	0.58	2.2

Note: Sum of cations, in a neutral to alkaline soil, approximates the CEC (cation exchange capacity), a measure of the soil's capacity to store and release major nutrient elements.

ESP (exchangeable sodium percentage) is derived by dividing the exchangeable sodium value by the CEC, in this case estimated by the sum of cations.