CLAY LOAM OVER COARSELY STRUCTURED RED CLAY

General Description: *Hard setting clay loam over a coarsely structured red clay, calcareous with depth*

Landform: Gently sloping pediments below undulating low hills.

Substrate: Gravelly clay formed from the decomposition of fine grained basement rock (Bethel Formation phyllite at this site).

Vegetation: -

Type Site:

Site No.:	CL044E	1:50,000 mapsheet:	6628-1 (Barossa)
Hundred:	Nuriootpa	Easting:	306450
Section:	101	Northing:	6180260
Sampling date:	22/04/08	Annual rainfall:	500 mm average

Lower slope of gently inclined pediment (5% slope). Hard setting surface with 2-10% quartz stones to 20 mm.

Soil Description:

Depth (cm)	*Description*
0-14 (inter-row)	Dark reddish brown hard massive clay loam (relatively undisturbed except for compaction).
0-14 (row)	Dark reddish brown firm light clay with moderate polyhedral structure (resulting from mixing of original surface with subsoil clay). Abrupt to:
14-43	Dusky red very hard medium heavy clay with strong coarse prismatic, breaking to strong medium angular blocky structure. Clear to:
43-75	Red very hard highly calcareous medium clay with strong medium angular blocky structure, 10-20% fine carbonate segregations, and 2-10% phyllite fragments. Gradual to:
75-110	Red hard slightly calcareous medium clay with strong fine angular blocky structure, 2-10% fine carbonate segregations and 10-20% phyllite fragments. Gradual to:
110-145	Dark reddish brown hard light medium clay with strong fine angular blocky structure, 2-10% fine carbonate segregations and 20-50% phyllite fragments.

Classification: Calcic, Subnatric, Red Sodosol; medium, non-gravelly, clay loamy / clayey, deep

Summary of Properties

Drainage: Moderately well drained. The clayey subsoil perches water, saturating the lower part of the topsoil for a week or at a time following heavy or prolonged rainfall. This is only likely to affect grape vines in the event of heavy summer rain.

Fertility: Inherent fertility is moderately high, as indicated by the exchangeable cation data. Both topsoil and subsoil have ample nutrient retention capacity. Data indicate satisfactory levels of all tested nutrients.

pH: Slightly alkaline at the surface, strongly alkaline with depth.

Rooting depth: There are some roots to 110 cm, moderate growth between 43 and 75 cm, with most growth in the upper 43 cm.

Barriers to root growth:

Physical: The coarsely structured subsoil clay prevents uniform proliferation of roots.

Chemical: High pH and boron concentrations from 43 cm restrict deeper root growth

Waterholding capacity: (Estimates for potential rootzone of irrigated crops)
Total available: 125 mm
Readily available: 50 mm

Seedling emergence: Fair due to hard setting sealing surface.

Workability: Fair. Surface tends to shatter if worked too dry, and puddle if worked too wet.

Erosion Potential:

Water: Moderate.

Wind: Low.

Laboratory Data

Depth cm	pH H_2O	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	
0-14 I	7.4	6.8	0	0.10	0.93	1.17	80	485	42	8.5	1.3	8.32	105	248	2.93	13.4	9.84	2.15	0.26	1.17	1.9
0-14 R	8.2	7.4	0	0.08	0.72	1.14	37	472	51	7.6	1.3	18.8	90	207	5.27	15.8	9.57	4.29	0.78	1.11	5.0
14-43	8.0	7.1	0	0.14	1.00	0.71	6	219	108	12.9	2.9	4.84	75	122	0.40	25.1	12.9	9.62	1.99	0.60	7.9
43-75	9.3	8.3	15.7	0.24	0.99	0.31	2	220	75	29	7.5	1.31	10	8.36	0.24	28.8	13.2	11.9	3.07	0.57	10.7
75-110	9.5	8.6	3.9	0.24	1.16	0.16	1	256	81	36.1	7.8	0.88	10	8.99	0.26	27.8	10.1	13.1	4.04	0.56	14.5
110-145	9.6	8.6	7.5	0.32	1.60	0.14	3	273	104	30.1	6.5	0.56	9	5.20	0.23	23.6	8.25	10.2	4.35	0.75	18.4

Note: 0-14 I is the surface soil from the undisturbed (although compacted) inter-row.
0-14 R is the surface soil from the row, where pre-plant ripping has caused considerable mixing with subsoil. Down-profile samples are from under the row.

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.

Further information: DEWNR Soil and Land Program