

## HARD GRADATIONAL RED CLAY

**General Description:** *Hard clay loam to light clay grading to a poorly structured red clay, calcareous with depth*

**Landform:** Undulating plains and rises.

**Substrate:** Gravelly alluvial outwash fan clay.

**Vegetation:**



**Type Site:** Site No.: CU007  
 Hundred: Yarrah  
 Section: 104  
 Sampling date: 3/09/1991

1:50,000 mapsheet: 6533 - 4 (Willochra)  
 Easting: 220750  
 Northing: 6428400  
 Annual rainfall: 335 mm average

Lower slope of outwash fan. 4% slope. Hard setting surface with 2-10% quartzite (60-200 mm).

### Soil Description:

Depth (cm)	Description
0-15	Dark reddish brown firm sandy light clay with fine polyhedral structure and 2-10% quartzite gravel (60-200 mm). Clear to:
15-35	Dark reddish brown friable slightly calcareous medium clay with strong polyhedral structure. Gradual to:
35-50	Dark reddish brown firm moderately calcareous medium heavy clay with strong polyhedral structure and minor fine carbonate segregations. Diffuse to:
50-100	Reddish yellow firm highly calcareous medium clay with strong coarse subangular blocky structure and 20-50% fine carbonate segregations. Diffuse to:
100-180	Red very hard moderately calcareous heavy clay with strong coarse subangular blocky structure, 10-20% gypsum crystals and minor manganiferous veins.



**Classification:** Sodic, Calcic, Red Dermosol; medium, slightly gravelly, clayey / clayey, very deep



## Summary of Properties

**Drainage:** Moderately well drained. Soil rarely remains wet for more than a week following heavy or prolonged rainfall.

**Fertility:** Inherent fertility is high, as indicated by the exchangeable cation data. However, regular phosphorus applications are needed (levels are very low at sampling site). Relatively low organic carbon levels suggest low nitrogen reserves as well. Zinc levels become marginally low over time.

**pH:** Alkaline at the surface, strongly alkaline with depth.

**Rooting depth:** Not recorded. Estimate 35 cm in pit, but most roots will be in the top 15 cm.

### Barriers to root growth:

**Physical:** Hard consistence throughout impedes root growth to some extent.

**Chemical:** High pH from 15 cm, high boron concentrations and high sodicity severely restrict root growth.

**Waterholding capacity:** Approximately 30 mm in potential rootzone. Profile holds considerably more, but most not accessible to agricultural plants. Native perennials are adapted to these soil conditions.

**Seedling emergence:** Fair due to hard setting sealing surface.

**Workability:** Fair. Surface soil becomes sticky when wet and shatters when dry.

### Erosion Potential:

**Water:** Moderate

**Wind:** Low.

## Laboratory Data

Depth cm	pH H <sub>2</sub> O	pH CaCl <sub>2</sub>	CO <sub>3</sub> %	EC1:5 dS/m	ECe dS/m	Org.C %	Avail. P mg/kg	Avail. K mg/kg	SO <sub>4</sub> mg/kg	Boron mg/kg	Trace Elements mg/kg (DTPA)				CEC cmol (+)/kg	Exchangeable Cations cmol(+)/kg				ESP
											Cu	Fe	Mn	Zn		Ca	Mg	Na	K	
0-15	8.2	7.9	1.2	0.44	1.9	1.03	5	439	-	2.7	1.3	10.4	4.0	0.3	25.9	18.9	4.3	0.87	0.94	3.4
15-35	9.3	8.5	6.9	0.30	0.9	0.30	<4	182	-	4.8	1.5	5.5	5.3	0.1	31.0	16.7	9.8	5.02	0.54	16.2
35-50	9.4	8.7	6.8	0.52	1.7	0.23	<4	207	-	15.2	1.9	4.7	5.7	0.2	31.0	12.1	11.3	8.47	0.61	27.3
50-100	9.1	8.6	4.4	1.43	7.6	0.21	<4	257	-	39.5	1.6	3.0	4.2	0.2	30.8	11.2	12.1	11.98	0.79	38.9
100-180	8.2	8.1	3.3	4.83	13.0	0.09	<4	251	-	32.8	1.1	1.1	3.6	0.2	33.9	14.0	11.6	12.68	0.71	37.4

**Note:** CEC (cation exchange capacity) is 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.

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

