Project Name: **Re-inventing Australian Agricultural Landscape Systems**
Project Code: **RAALS** **Site ID:** **CP403** **Observation ID:** **1**
Agency Name: **CSIRO Land and Water (ACT)**

Site Information

Desc. By:	N.J. McKenzie	**Locality:**	Charles Sturt Uni., Lucerne Paddock 12
Date Desc.:	05/05/00	**Elevation:**	No Data
Map Ref.:	GPS S.A. Off	**Rainfall:**	No Data
Northing/Long.:	6120647 AMG zone: 55	**Runoff:**	Slow
Easting/Lat.:	530809 Datum: AGD66	**Drainage:**	Well drained

Geology

ExposureType:	Soil pit	**Conf. Sub. is Parent. Mat.:**	No Data
Geol. Ref.:	No Data	**Substrate Material:**	No Data

Land Form

Rel/Slope Class:	Undulating low hills 30-90m 3-10%	**Pattern Type:**	Low hills
Morph. Type:	Mid-slope	**Relief:**	60 metres
Elem. Type:	Hillslope	**Slope Category:**	Very gently sloped
Slope:	2 %	**Aspect:**	280 degrees

Surface Soil Condition (dry): Hardsetting

Erosion:

Soil Classification

Australian Soil Classification:
Haplic Mesotrophic Red Kandosol Thin Non-gravelly Clay-loamy Clay-loamy Deep

Mapping Unit: N/A
Principal Profile Form: N/A

ASC Confidence:
All necessary analytical data are available.

Great Soil Group: N/A

Site Disturbance: Cultivation. Rainfed

Vegetation:

Surface Coarse Fragments: No surface coarse fragments

Profile Morphology

Ap	0 - 0.08 m	Dark reddish brown (5YR3/4-Moist); , 0-0% ; Sandy clay loam, fine sandy; Weak grade of structure; Earthy fabric; Moist; Weak consistence; Field pH 4.5 (Raupach); Many, medium (2-5mm) roots; Sharp, Wavy change to -
B21	0.08 - 0.28 m	Red (10R4/6-Moist); Biological mixing, 2.5YR46, 2-10% , 15-30mm, Faint; Clay loam, fine sandy; Massive grade of structure; Earthy fabric; Moderately moist; Weak consistence; Field pH 4.5 (Raupach); Many, medium (2-5mm) roots; Gradual, Smooth change to -
B22	0.28 - 0.52 m	Red (2.5YR4/8-Moist); , 0-0% ; Light clay; Massive grade of structure; Earthy fabric; Dry; Firm consistence; Field pH 6.5 (Raupach); Common, fine (1-2mm) roots; Gradual, Smooth change to -
B23	0.52 - 0.9 m	Strong brown (7.5YR5/8-Moist); Mottles, 2.5YR44, 20-50% , 15-30mm, Prominent; , 5YR2.51; Light clay; Weak grade of structure, 10-20 mm, Polyhedral; Weak grade of structure, 5-10 mm, Polyhedral; Rough-ped fabric; Dry; Very firm consistence; Common cutans, 10-50% of ped faces or walls coated, distinct; Few cutans, <10% of ped faces or walls coated, distinct; Few (2 - 10 %), Ferromanganiferous, Medium (2 -6 mm), Nodules; Field pH 4.5 (Raupach); Common, very fine (0-1mm) roots; Clear, Smooth change to -
B3	0.9 - 1.3 m	Light yellowish brown (10YR6/4-Moist); Mottles, 5YR44, 20-50% , 15-30mm, Prominent; , 7.5YR64; Medium heavy clay; Weak grade of structure, 20-50 mm, Angular blocky; Moderate grade of structure, 5-10 mm, Polyhedral; Rough-ped fabric; Dry; Strong consistence; Common cutans, 10-50% of ped faces or walls coated, distinct; Few cutans, <10% of ped faces or walls coated, distinct; Few (2 - 10 %), Ferromanganiferous, Medium (2 -6 mm), Nodules; Field pH 6.5 (Raupach); Few, very fine (0-1mm) roots;

Morphological Notes

B23 B23 is unusual - very earthy yellow material with the more familiar redder pedal clays (Yarabee). The low pH in this layer needs confirmation (see lab values).

Observation Notes

A lighter, siltier upper solum compared to CP402 250m downslope; very hard profile to excavate - limited to 1.3m due to

Site Notes

Lucerne with good cover; RAAL site east of shed/lab and lysimeter paddock (CP402).

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Laboratory Test Results:

Depth	pH	1:5 EC	Exchangeable Cations Ca	Mg	K	Na	Exchangeable Acidity	CEC	ECEC	ESP
m		dS/m				Cmol (+)/kg				%
0 - 0.08	4.9C	0.07A	5.53D	0.79	0.69	0.08		8.5L	7.1D	0.94
0.01 - 0.08	5.6A									
0.08 - 0.28	5.2C	0.01A	5.17D	1.86	0.49	0.12		9.5L	7.6D	1.26
0.28 - 0.52	6.2A 6.2C	0.01A	5.72D	3.63	0.34	0.18		10.7L	9.9D	1.68
0.3 - 0.5	7.2A									
0.52 - 0.9	5C	0.03A	3.63D	4.67	0.33	0.39		11L	9D	3.55
0.6 - 0.8	5.9A									
0.9 - 1.3	6C	0.01A	5.3E	5.74	0.67	0.98		17.6B	12.7D	5.57
1 - 1.2	7.7A									

Depth	CaCO3	Organic C	Avail. P	Total P	Total N	Total K	Bulk Density	Particle Size Analysis GV	CS	FS	Silt	Clay
m	%	%	mg/kg	%	%	%	Mg/m3			%		
0 - 0.08		1.28C			0.1D			0				
0.01 - 0.08							1.61					
							1.63					
							1.61					
							1.64					
							1.61					
0.08 - 0.28		0.38C			0.04D			2				
0.28 - 0.52	<0.1D	0.24C			0.04D			0				
0.3 - 0.5							1.33					
							1.25					
0.52 - 0.9		0.17C			0.03D			0				
0.6 - 0.8							1.36					
							1.61					
							1.45					
0.9 - 1.3	<0.1D	0.06C			0.02D			0				
1 - 1.2							1.74					
							1.68					
							1.72					

Depth	COLE	Gravimetric/Volumetric Water Contents Sat.	0.05 Bar	0.1 Bar	0.5 Bar	1 Bar	5 Bar	15 Bar	K sat	K unsat
m					g/g - m3/m3				mm/h	mm/h
0 - 0.08										
0.01 - 0.08			0.31F	0.29I		0.18E	0.16F	0.13F	292.3E	1.5C
			0.31F	0.29I		0.18E	0.16F	0.12F	8.2E	4.2C
			0.33F	0.3I		0.19E	0.16F	0.13F	7.1E	2.2C
			0.31F	0.28I		0.18E	0.16F	0.12F	4.4E	3.9C
			0.3F	0.28I		0.18E	0.16F	0.12F	6.6E	3C
0.08 - 0.28										
0.28 - 0.52										

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0.3 - 0.5	0.3E	0.29E	0.22E	0.18F	0.17F	1173D	101.9B
	0.35E	0.31E	0.2E	0.17F	0.16F	300.6D	90B
						765D	78.7B
0.52 - 0.9							
0.6 - 0.8	0.37E	0.34E	0.26E	0.23F	0.21F	178.2D	26.2B
	0.32E	0.3E	0.23E	0.2F	0.19F	46.2D	52.9B
	0.35E	0.32E	0.25E	0.22F	0.2F	27.6D	46.1B
0.9 - 1.3							
1 - 1.2	0.32E	0.31E	0.26E	0.27F	0.26F	279D	0.4B
	0.34E	0.33E			0.27F	0.6D	1.5B
	0.32E	0.3E			0.25F	0.4D	

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Laboratory Analyses Completed for this profile

15B2_CA	Exchangeable bases (Ca2+,Mg2+,Na+,K+) - 1M ammonium chloride at pH 7.0, pretreatment for soluble salts
15B2_CEC	CEC - 1M ammonium chloride at pH 7.0, pretreatment for soluble salts
15B2_K	Exchangeable bases and CEC - 1M ammonium chloride at pH 7.0, pretreatment for soluble salts
15B2_MG	Exchangeable bases and CEC - 1M ammonium chloride at pH 7.0, pretreatment for soluble salts
15B2_NA	Exchangeable bases and CEC - 1M ammonium chloride at pH 7.0, pretreatment for soluble salts
15C1_CA	Exchangeable bases (Ca2+,Mg2+,Na+,K+) - alcoholic 1M ammonium chloride at pH 8.5, pretreatment for soluble salts
15C1_CEC	CEC - alcoholic 1M ammonium chloride at pH 8.5, pretreatment for soluble salts
15C1_K	Exchangeable bases and CEC - alcoholic 1M ammonium chloride at pH 8.5, pretreatment for soluble salts
15C1_MG	Exchangeable bases and CEC - alcoholic 1M ammonium chloride at pH 8.5, pretreatment for soluble salts
15C1_NA	Exchangeable bases and CEC - alcoholic 1M ammonium chloride at pH 8.5, pretreatment for soluble salts
15J_BASES	Sum of Bases
19C1	Carbonates - Collins Calcimeter
2A1	Air-dry moisture content
3A1	EC of 1:5 soil/water extract
4A1	pH of 1:5 soil/water suspension
4B2	pH of 1:5 soil/0.01M calcium chloride extract - following Method 4A1
6B3	Total organic carbon - high frequency induction furnace, infrared
7A5	Total nitrogen - high frequency induction furnace, thermal conductivity
P10_GRAV	Gravel (%)
P10_S_0.48	0.48 micron (cumulative %) - Sedigraph
P10_S_1	1 micron (cumulative %) - Sedigraph
P10_S_1000	1000 micron (cumulative %) - Sedigraph
P10_S_125	125 micron (cumulative %) - Sedigraph
P10_S_15.6	15.6 micron (cumulative %) - Sedigraph
P10_S_2	2 micron (cumulative %) - Sedigraph
P10_S_20	20 micron (cumulative %) - Sedigraph
P10_S_2000	2000 micron (cumulative %) - Sedigraph
P10_S_250	250 micron (cumlative %) - Sedigraph
P10_S_3.9	3.9 micron (cumulative %) - Sedigraph
P10_S_31.2	31.2 micron (cumulative %) - Sedigraph
P10_S_500	500 micron (cumulative %) - Sedigraph
P10_S_53	53 micron (cumulative %) - Sedigraph
P10_S_63	63 micron (cumulative %) - Sedigraph
P10_S_7.8	7.8 micron (cumulative %) - Sedigraph
P3A1	Bulk density - g/cm3
P3B2VL_1	1 BAR Moisture m3/m3 - Volumetric using disturbed sample on pressure plate
P3B2VL_15	15 BAR Moisture m3/m3 - Volumetric using disturbed sample on pressure plate
P3B2VL_5	5 BAR Moisture m3/m3 - Volumetric using disturbed sample on pressure plate
P3B3VLb001	0.01 BAR Moisture m3/m3 - Volumetric using undisturbed 73mm diameter and 75mm height core on suction plate taken from center of large core (CSIRO Div of Soil, DR 125, McKenzie and Jacquier, 1996)
P3B3VLb003	0.03 BAR Moisture m3/m3 - Volumetric using undisturbed 73mm diameter and 75mm height core on suction plate taken from center of large core (CSIRO Div of Soil, DR 125, McKenzie and Jacquier, 1996)
P3B3VLb005	0.05 BAR Moisture m3/m3 - Volumetric using undisturbed 73mm diameter and 75mm height core on suction plate taken from center of large core (CSIRO Div of Soil, DR 125, McKenzie and Jacquier, 1996)
P3B3VLb01	0.1 BAR Moisture m3/m3 - Volumetric using undisturbed 73mm diameter and 75mm height core on suction plate taken from center of large core (CSIRO Div of Soil, DR 125, McKenzie and Jacquier, 1996)
P3B3VLb03	0.33 BAR Moisture m3/m3 - Volumetric using undisturbed 73mm diameter and 75mm height core on suction plate taken from center of large core (CSIRO Div of Soil, DR 125, McKenzie and Jacquier, 1996)
P3B3VLb06	0.66 BAR Moisture m3/m3 - Volumetric using undisturbed 73mm diameter and 75mm height core on suction plate taken from center of large core (CSIRO Div of Soil, DR 125, McKenzie and Jacquier, 1996)

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P3B3VLc001	0.01 BAR Moisture m3/m3 - Volumetric using undisturbed 98mm diameter core on suction plate
P3B3VLc003	0.03 BAR Moisture m3/m3 - Volumetric using undisturbed 98mm diameter core on suction plate
P3B3VLc005	0.05 BAR Moisture m3/m3 - Volumetric using undisturbed 98mm diameter core on suction plate
P3B3VLc01	0.1 BAR Moisture m3/m3 - Volumetric using undisturbed 98mm diameter core on suction plate
P3B3VLc03	0.3 BAR Moisture m3/m3 - Volumetric using undisturbed 98mm diameter core on suction plate
P3B3VLc06	0.6 BAR Moisture m3/m3 - Volumetric using undisturbed 98mm diameter core on suction plate
P4_100DMcK	Unsaturated Hydraulic Conductivity - 100mm potential - Using disk permeameter with method CSIRO Div of Soil, DR 125, McKenzie and Jacquier, 1996
P4_10DMcK	Unsaturated Hydraulic Conductivity - 10mm potential - Using disk permeameter with method CSIRO Div of Soil, DR 125, McKenzie and Jacquier, 1996
P4_30_LOV	Unsaturated Hydraulic Conductivity - 30mm potential Loveday falling head method using 98mm diameter cores
P4_50DMcK	Unsaturated Hydraulic Conductivity - 50mm potential - Using disk permeameter with method CSIRO Div of Soil, DR 125, McKenzie and Jacquier, 1996
P4_sat_LOV	Saturated Hydraulic Conductivity - Modified (no de-aired water) Loveday falling head method using 98mm diameter cores
P4_sat_McK	Saturated Hydraulic Conductivity (CSIRO Div of Soil, DR 125, McKenzie and Jacquier, 1996)