Project Name: **BAGO-MARAGLE FOREST SOIL SURVEY**
Project Code: **BGM_FSS** **Site ID:** **0159** **Observation ID:** **1**
Agency Name: **CSIRO Division of Soils (ACT)**

Site Information

Desc. By:	P. Ryan	**Locality:**	
Date Desc.:	09/04/97	**Elevation:**	1037 metres
Map Ref.:	Sheet No. : 8526 DGPS	**Rainfall:**	No Data
Northing/Long.:	6026294 AMG zone: 55	**Runoff:**	No Data
Easting/Lat.:	619568 Datum: AGD66	**Drainage:**	No Data

Geology

ExposureType:	Undisturbed soil core	**Conf. Sub. is Parent. Mat.:**	No Data
Geol. Ref.:	Dga	**Substrate Material:**	Adamellite

Land Form

Rel/Slope Class:	No Data	**Pattern Type:**	No Data
Morph. Type:	Lower-slope	**Relief:**	No Data
Elem. Type:	Footslope	**Slope Category:**	No Data
Slope:	4 %	**Aspect:**	90 degrees

Surface Soil Condition (dry): Firm

Erosion:

Soil Classification

Australian Soil Classification:
Melacic Mesotrophic Brown Chromosol Thin Non-gravelly Peaty Clayey Giant

Mapping Unit: N/A
Principal Profile Form: Dy5.21

ASC Confidence:
All necessary analytical data are available.

Great Soil Group: Yellow podzolic soil

Site Disturbance: No effective disturbance other than grazing by hoofed animals

Vegetation:

Surface Coarse Fragments:

Profile Morphology

O2	0 - 0.03 m	Organic Layer; ;
O1	0.03 - 0.05 m	Organic Layer; ;
P1j	0.05 - 0.07 m	Very dark greyish brown (10YR3/2-Moist); Light brownish grey (10YR6/2-Dry); ; Silty clay (Fibric); Massive grade of structure; Earthy fabric; Moderately moist; Firm consistence; Very few (0 - 2 %), Ferruginous, Fine (0 - 2 mm), Root linings, weak, segregations;Field pH 5 (Raupach); Abundant, very fine (0-1mm) roots; Many, fine (1-2mm) roots; Clear change to -
A11	0.07 - 0.17 m	Black (10YR2/1-Moist); ; Silty clay (Fibric); Moderate grade of structure, 10-20 mm, Prismatic; 5-10 mm, Angular blocky; Rough-ped fabric; Moderately moist; Firm consistence; Field pH 5 (Raupach); Abundant, very fine (0-1mm) roots; Common, fine (1-2mm) roots; Clear change to -
A12	0.17 - 0.3 m	Very dark greyish brown (10YR3/2-Moist); ; Medium sandy clay; Moderate grade of structure, 10-20 mm, Prismatic; 10-20 mm, Angular blocky; Rough-ped fabric; Moist; Weak consistence; Field pH 5 (Raupach); Many, very fine (0-1mm) roots; Few, fine (1-2mm) roots; Clear change to -
A21	0.3 - 0.39 m	Dark grey (2.5Y4/1-Moist); Substrate influence, 7.5YR46, 2-10% , Faint; Coarse sandy clay loam; Moderate grade of structure, 20-50 mm, Prismatic; 10-20 mm, Angular blocky; Smooth-ped fabric; Wet; Weak consistence; Few cutans, <10% of ped faces or walls coated, faint; Very few (0 - 2 %), Ferruginous, Fine (0 - 2 mm), Root linings; Field pH 5 (Raupach); Common, very fine (0-1mm) roots; Few, fine (1-2mm) roots; Abrupt change to -
A22	0.39 - 0.48 m	Greyish brown (2.5Y5/2-Moist); Substrate influence, 10YR56, 2-10% , Faint; Light medium clay; Weak grade of structure, 20-50 mm, Subangular blocky; Rough-ped fabric; Wet; Weak consistence; 2-10%, fine gravelly, 2-6mm, subrounded, Quartz, coarse fragments; Field pH 5 (Raupach); Few, very fine (0-1mm) roots; Few, fine (1-2mm) roots; Abrupt change to -
B2t	0.48 - 0.54 m	Yellowish brown (10YR5/6-Moist); Substrate influence, 2.5Y62, 10-20% , Faint; Coarse sandy clay; Moderate grade of structure, 50-100 mm, Prismatic; Smooth-ped fabric; Wet; Weak consistence; Common cutans, 10-50% of ped faces or walls coated, distinct; Field pH 5 (Raupach); Few, very fine (0-1mm) roots; Abrupt change to -

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B2	0.54 - 0.68 m	Yellowish brown (10YR5/6-Moist); Substrate influence, 2.5Y62, 10-20% , Faint; Light medium clay; Moderate grade of structure, 20-50 mm, Prismatic; Smooth-ped fabric; Wet; Weak consistence; 10-20%, fine gravelly, 2-6mm, subangular, Quartz, coarse fragments; Few cutans, <10% of ped faces or walls coated, distinct; Field pH 5 (Raupach); Few, very fine (0-1mm) roots; Abrupt change to -
B2t	0.68 - 0.71 m	Yellowish brown (10YR5/6-Moist); Substrate influence, 2.5Y62, 10-20% , Faint; Coarse sandy clay; Moderate grade of structure, 20-50 mm, Angular blocky; Smooth-ped fabric; Wet; Firm consistence; Common cutans, 10-50% of ped faces or walls coated, distinct; Field pH 5 (Raupach); Few, very fine (0-1mm) roots; Abrupt change to -
B2	0.71 - 0.74 m	Light brownish grey (2.5Y6/2-Moist); Substrate influence, 10YR56, 20-50% , Faint; Light medium clay; Weak grade of structure, 10-20 mm, Angular blocky; Smooth-ped fabric; Wet; Weak consistence; 10-20%, fine gravelly, 2-6mm, subangular, Quartz, coarse fragments; Few cutans, <10% of ped faces or walls coated, faint; Field pH 5 (Raupach); Few, very fine (0-1mm) roots; Abrupt change to -
B3t	0.74 - 0.97 m	Yellowish brown (10YR5/6-Moist); Substrate influence, 2.5Y61, 10-20% , Distinct; Coarse sandy clay; Moderate grade of structure, 20-50 mm, Prismatic; Smooth-ped fabric; Wet; Firm consistence; Common cutans, 10-50% of ped faces or walls coated, distinct; Field pH 5 (Raupach); Few, very fine (0-1mm) roots; Abrupt change to -
B3	0.97 - 1.11 m	Yellowish brown (10YR5/6-Moist); Substrate influence, 2.5Y62, 20-50% , Distinct; Light medium clay; Massive grade of structure; Sandy (grains prominent) fabric; Wet; Firm consistence; 20-50%, fine gravelly, 2-6mm, subangular, Quartz, coarse fragments; Field pH 5 (Raupach); Few, very fine (0-1mm) roots; Few, fine (1-2mm) roots; Abrupt change to -
B3	1.11 - 1.17 m	Light brownish grey (2.5Y6/2-Moist); Substrate influence, 10YR58, 20-50% , Distinct; Coarse sandy clay; Massive grade of structure; Earthy fabric; Wet; Firm consistence; Field pH 5 (Raupach); Sharp change to -
	1.17 - 1.42 m	Light brownish grey (2.5Y6/2-Moist); Substrate influence, 10YR56, 20-50% , Distinct; Light medium clay; Massive grade of structure; Sandy (grains prominent) fabric; Firm consistence; 20-50%, fine gravelly, 2-6mm, subangular, Quartz, coarse fragments; Field pH 5.5 (Raupach); Few, very fine (0-1mm) roots; Sharp change to -
t	1.42 - 1.46 m	Yellowish brown (10YR5/6-Moist); Substrate influence, 10YR71, 2-10% , Distinct; Coarse sandy clay; Massive grade of structure; Earthy fabric; Firm consistence; Field pH 6 (Raupach); Few, very fine (0-1mm) roots; Sharp change to -
	1.46 - 1.51 m	Yellowish brown (10YR5/8-Moist); Substrate influence, 10YR62, 20-50% , Distinct; Light medium clay; Massive grade of structure; Sandy (grains prominent) fabric; Firm consistence; 20-50%, fine gravelly, 2-6mm, subangular, Quartz, coarse fragments; Field pH 5.5 (Raupach); Few, very fine (0-1mm) roots; Abrupt change to -
	1.51 - 1.53 m	Grey (10YR6/1-Moist); Substrate influence, 10YR58, 10-20% , Distinct; Coarse sandy clay; Massive grade of structure; Earthy fabric; Firm consistence; 2-10%, fine gravelly, 2-6mm, subangular, Quartz, coarse fragments; Field pH 5.5 (Raupach); Abrupt change to -
	1.53 - 1.65 m	Grey (10YR6/1-Moist); Substrate influence, 10YR58, 20-50% , Distinct; Medium clay; Massive grade of structure; Earthy fabric; Firm consistence; 20-50%, fine gravelly, 2-6mm, subangular, Quartz, coarse fragments; Field pH 6 (Raupach); Clear change to -
	1.65 - 1.86 m	Dark yellowish brown (10YR4/6-Moist); Substrate influence, 10YR61, 10-20% , Distinct; Biological mixing, 10YR43, 2-10% , Faint; Light medium clay; Earthy fabric; Firm consistence; Field pH 5.5 (Raupach); Abrupt change to -
2A1	1.86 - 1.97 m	Dark yellowish brown (10YR3/6-Moist); Substrate influence, 10YR41, 20-50% , Distinct; Light clay; Massive grade of structure; Earthy fabric; Wet; Very firm consistence; 2-10%, fine gravelly, 2-6mm, subangular, Quartz, coarse fragments; Field pH 5.5 (Raupach); Abrupt change to -
2A21	1.97 - 2.11 m	Dark grey (10YR4/1-Moist); Yellowish brown (10YR5/8-Dry); Substrate influence, 10YR46, 2-10% , Faint; Light clay; Massive grade of structure; Earthy fabric; Wet; Very firm consistence; 0-2%, fine gravelly, 2-6mm, subangular, Quartz, coarse fragments; Field pH 5 (Raupach); Abrupt change to -
2A22	2.11 - 2.19 m	Grey (10YR5/1-Moist); Substrate influence, 10YR58, 2-10% , Faint; Coarse sandy clay; Massive grade of structure; Earthy fabric; Wet; Firm consistence; Field pH 5 (Raupach); Sharp change to -
2A23	2.19 - 2.31 m	Grey (10YR5/1-Moist); Substrate influence, 10YR58, 0-2% , Faint; Substrate influence, 10YR71, 0-2% , Faint; Light medium clay; Massive grade of structure; Sandy (grains prominent) fabric; Wet; Firm consistence; 10-20%, fine gravelly, 2-6mm, subangular, Quartz, coarse fragments; Field pH 4.5 (Raupach); Abrupt change to -

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2.31 - 2.53 m	Dark yellowish brown (10YR4/6-Moist); Substrate influence, 10YR51, 10-20% , Distinct; Substrate influence, 10YR58, 0-2% , Faint; Coarse sandy clay; Massive grade of structure; Earthy fabric; Very firm consistence; 0-2%, fine gravelly, 2-6mm, subangular, Quartz, coarse fragments; Field pH 5 (Raupach); Sharp change to -
2.53 - 2.59 m	Light brownish grey (2.5Y6/2-Moist); Substrate influence, 10YR58, 10-20% , Distinct; Substrate influence, 10YR61, 2-10% , Faint; Light medium clay; Massive grade of structure; Sandy (grains prominent) fabric; Firm consistence; 10-20%, fine gravelly, 2-6mm, subangular, Quartz, coarse fragments; Field pH 5 (Raupach); Sharp change to -
2.59 - 2.78 m	Grey (10YR6/1-Moist); Substrate influence, 10YR58, 20-50% , Distinct; Coarse sandy clay loam; Massive grade of structure; Earthy fabric; Firm consistence; Few (2 - 10 %), Ferruginous, Fine (0 - 2 mm), Root linings, weak, segregations;Field pH 4.5 (Raupach); Sharp change to -
2.05 - 3 m	Grey (10YR6/1-Moist); Substrate influence, 10YR56, 2-10% , Faint; Coarse sandy clay; Massive grade of structure; Sandy (grains prominent) fabric; Firm consistence; 20-50%, fine gravelly, 2-6mm, subangular, Quartz, coarse fragments; Field pH 4.5 (Raupach); Sharp change to -
3 - 3.27 m	Grey (2.5Y6/1-Moist); Substrate influence, 2.5Y56, 20-50% , Faint; Coarse sandy clay loam; Massive grade of structure; Earthy fabric; Firm consistence; 10-20%, fine gravelly, 2-6mm, subangular, Quartz, coarse fragments; Field pH 4.5 (Raupach); Sharp change to -
3.27 - 3.45 m	Grey (2.5Y6/1-Moist); Substrate influence, 2.5Y64, 0-2% , Faint; Sandy loam; Massive grade of structure; Sandy (grains prominent) fabric; Weak consistence; 20-50%, fine gravelly, 2-6mm, subangular, Quartz, coarse fragments; Field pH 4.5 (Raupach);
3.45 - 3.51 m	Pale red (2.5YR6/1-Moist); ; Coarse sandy loam; Massive grade of structure; Earthy fabric; Weak consistence; Field pH 5 (Raupach);
3.6 - 4.11 m	Light reddish brown (2.5YR6/3-Moist); ; Single grain grade of structure; Sandy (grains prominent) fabric; Loose consistence; 90-100%, fine gravelly, 2-6mm, subangular, Quartz, coarse fragments; Field pH 5 (Raupach);

Morphological Notes

P1j	Peat - like material.
A11	OM - rich material.
A12	Coarse sand increasing.
A21	Mottle coarse sand.
A22	Orange clay.
B2t	Orange mottle coarse sand.
B2	Orange clay.
B2t	Mottle coarse sand.
B2	Orange mottle clay. Ped surfaces related to vertical root planes.
B3t	Mottle coarse sand. Loss of structure - possible new depositional system.
B3	Orange mottle clay. Estimated field texture.
B3	Mottled coarse sandy clay.

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	Orange mottled clay.
t	Mottled coarse sandy clay.
	Grey mottled sandy clay.
	Orange mottled sandy clay.
	Brown mottled clay. Increased organic content. Mottled organic-rich layer buried A horizon.
2A1	Less OM - grey mottled clay.
2A21	Decrease in sand content and OM. Grey clay.
2A22	Increased sand content - grey sandy clay.
2A23	Orange mottled clay. Orange mottle associated with old root channels. Increased coarse sand content. Mottles associated with old root channels. Orange mottled clay - mottling associated with old root channels. Increase in coarse sand.
	Alternating depositional bands of coarse sand and clay - too thin and indiscriminate to separate. Six clay bands obvious. A thicker coarse sandy band of the layer 3 sequence. A thicker clay band - no sand fraction.
	A disconnected layer from the one above (10cm). Unconsolidated sand grading with depth to coarser size. Some clay in patches.

Observation Notes

Site is an open grassy patch within snow gum flat. Along Lees Rd from BM158.

Site Notes

LEES RD - EAST. OPEN LAND

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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 - 0.03										
0.05 - 0.07	4.39C		8.96H	3.32	0.29	0.49	2.97J 0K		16.02E	
0.07 - 0.17	4.54C		12.65H	4.79	0.2	0.35	2.62J 0K		20.6E	
0.17 - 0.3	4.45C		4.83H	2.74	0.04	0.16	2.24J 0K		10.01E	
0.3 - 0.39	4.42C		1.55H	1.39	0.04	0.05	1.15J 0K		4.18E	
0.39 - 0.48	4.44C		0.71H	0.83	0.04	0	0.56J 0K		2.15E	
0.48 - 0.54	4.4C		1.69H	2.32	0.03	0.08	1.13J 0K		5.25E	
0.54 - 0.68	4.42C		1.57H	2.33	0.07	0.07	1.05J 0K		5.08E	
0.68 - 0.71	4.47C		2.8H	4.35	0.08	0.14	1.21J 0K		8.57E	
0.71 - 0.74	4.49C		1.52H	2.28	0.06	0.04	0.71J 0K		4.61E	
0.74 - 0.97	4.54C		2.94H	4.5	0.08	0.14	0.93J 0K		8.58E	
0.97 - 1.11	4.58C		1.49H	2.31	0.09	0.04	0.37J 0K		4.3E	
1.11 - 1.17	4.67C		2.85H	4.4	0.07	0.14	0.44J 0K		7.9E	
1.17 - 1.42										
1.42 - 1.46										
1.46 - 1.51										
1.51 - 1.53										
1.53 - 1.65										
1.65 - 1.86										
1.86 - 1.97										
1.97 - 2.11										
2.11 - 2.19										
2.19 - 2.31										
2.31 - 2.53										
2.53 - 2.59										
2.59 - 2.78										
2.05 - 3										
3 - 3.27										
3.27 - 3.45										
3.45 - 3.51										
3.6 - 4.11										

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 - 0.03												
0.05 - 0.07		7.36B		407.9B	0.46A		0.68	0				
0.07 - 0.17		7.85B		1004.6B	0.46A		0.76	0				
0.17 - 0.3		2.81B		236.8B	0.21A		1.10	1.22				
0.3 - 0.39		1.13B		117.7B	0.08A		1.36	4.03				

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0.39 - 0.48	0.4B	42.8B	0.04A	19.11
0.48 - 0.54	0.8B	83.9B	0.07A	7.01
0.54 - 0.68	0.42B	58.3B	0.04A	10.39
0.68 - 0.71	0.63B	101.5B	0.06A	4.12
0.71 - 0.74	0.3B	58.3B	0.03A	10.47
0.74 - 0.97	0.47B	110.3B	0.05A	3.51
0.97 - 1.11	0.18B	58.8B	0.02A	22
1.11 - 1.17	0.31B	148.4B	0.03A	0
1.17 - 1.42				21.04
1.42 - 1.46				0
1.46 - 1.51				0.88
1.51 - 1.53				3.02
1.53 - 1.65				19.65
1.65 - 1.86				3.35
1.86 - 1.97				4.51
1.97 - 2.11				6.21
2.11 - 2.19				0.43
2.19 - 2.31				10.54
2.31 - 2.53				3.85
2.53 - 2.59				15.37
2.59 - 2.78				4.19
2.05 - 3				11.99
3 - 3.27				8.88
3.27 - 3.45				19.47
3.45 - 3.51				8.72
3.6 - 4.11				15.78

Depth	COLE	Gravimetric/Volumetric Water Contents							K sat	K unsat
		Sat.	0.05 Bar	0.1 Bar	0.5 Bar	1 Bar	5 Bar	15 Bar		
m		g/g - m3/m3							mm/h	mm/h
0 - 0.03										
0.05 - 0.07										
0.07 - 0.17										
0.17 - 0.3										
0.3 - 0.39										
0.39 - 0.48										
0.48 - 0.54										
0.54 - 0.68										
0.68 - 0.71										
0.71 - 0.74										
0.74 - 0.97										
0.97 - 1.11										
1.11 - 1.17										
1.17 - 1.42										
1.42 - 1.46										
1.46 - 1.51										
1.51 - 1.53										
1.53 - 1.65										
1.65 - 1.86										
1.86 - 1.97										
1.97 - 2.11										
2.11 - 2.19										
2.19 - 2.31										
2.31 - 2.53										
2.53 - 2.59										
2.59 - 2.78										
2.05 - 3										
3 - 3.27										

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3.27 - 3.45
3.45 - 3.51
3.6 - 4.11

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Laboratory Analyses Completed for this profile

13C1_AL	Citrate/dithionite-extractable iron, aluminium, Manganese and Silicon
13C1_FE	Citrate/dithionite-extractable iron, aluminium, Manganese and Silicon
15_NR	Sum of Ex. cations + Ex. acidity - Not recorded
15E1_AL	Exchangeable Al - by compulsive exchange, no pretreatment for soluble salts
15E1_CA	Exchangeable bases (Ca2+,Mg2+,Na+,K+) by compulsive exchange, no pretreatment for soluble
15E1_H	Exchangeable H - by compulsive exchange, no pretreatment for soluble salts
15E1_K	Exchangeable bases, CEC and AEC by compulsive exchange, no pretreatment for soluble salts
15E1_MG	Exchangeable bases, CEC and AEC by compulsive exchange, no pretreatment for soluble salts
15E1_NA	Exchangeable bases, CEC and AEC by compulsive exchange, no pretreatment for soluble salts
2A1	Air-dry moisture content
4B2	pH of 1:5 soil/0.01M calcium chloride extract - following Method 4A1
6B2	Total organic carbon - high frequency induction furnace, volumetric
7A2	Total nitrogen - semimicro Kjeldahl , automated colour
9A3	Total Phosphorus (ppm) - semimicro kjeldahl, automated colour
P10_GRAV	Gravel (%)
P3A1	Bulk density - g/cm3