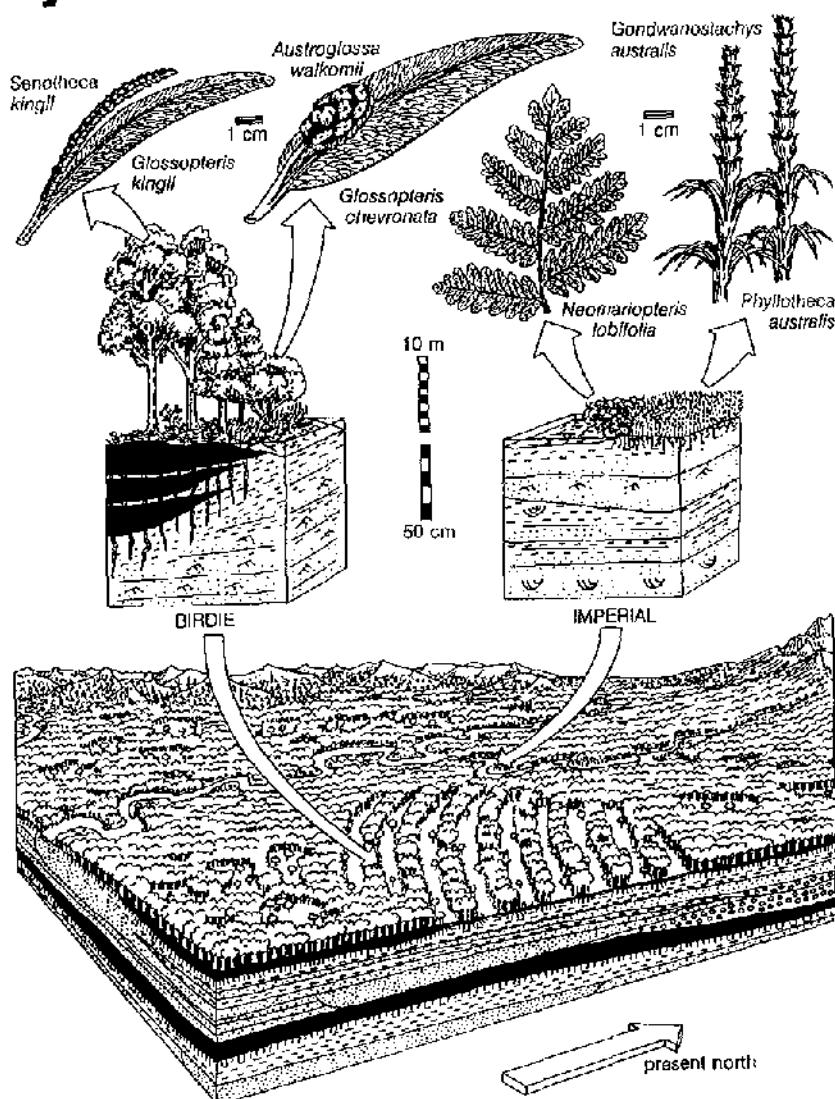


# CHEMICAL AND PETROGRAPHIC DATA FOR PALEOSOLS ACROSS THE PERMIAN-TRIASSIC BOUNDARY IN THE SYDNEY BASIN, AUSTRALIA

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**APPENDIX 1. Individual named Permian and Triassic paleosols in the Sydney Basin, Australia**

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Measured section	Section Level (m)	Paleosol Name
Coal Cliff	17.5	type Imperial clay
Wybung Head	19.8	type Birdie coal
Coal Cliff	19.8	Birdie coal
Wybung Head	20.2	type Wybung silty clay
Coal Cliff	20.2	Wybung clay
Wybung Head	20.6	type Frazer clay
Wybung Head	30.0	type Bongon clay
Wybung Head	30.3	Frazer clay thin surface phase
Wybung Head	31.5	Bongon clay eroded phase
Wybung Head	32.2	Frazer clay
Coxs Gap	32.5	type Kerrabee clay
Coxs Gap	33.3	type Wollemi clay
Coxs Gap	33.9	type Cox clay

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## APPENDIX 2 Description of the paleosol type profiles

Depth (cm)	Hz	Rock	Color	Other features	Micromorphology	Contact
<i>type Birdie coal paleosol at Wybung Head</i>						
-	-	Claystone breccia above	Dark olive gray (5Y3/2)	Common coal chips black (5Y-2 5/2); fine root traces and joint stain yellowish brown (10YR-5/6); noncalcareous	Agglomeroplastic inundic, with scattered illuviation argillans	Abrupt smooth to
0	O	Coal	Black (5Y2 5/2)	Banded with bright and dull layers, some small (2-7 mm) claystone clasts yellowish brown (10YR5/6); noncalcareous	Unistrial porphyroskeletal undulic; few angular claystone clasts in upper 20 cm only	Abrupt wavy ( $\pm 10$ cm over 80-120 cm) to
126	A	Silty claystone	Dark gray (5Y4/1)	Common black (5Y2 5/1) carbonaceous roots of <i>Vertebraria</i> up to 3 cm diameter; few carbonized logs up to 118 mm wide and 3 mm thick; joint stain yellowish brown (10YR5/6); noncalcareous	Unistrial mosepic agglomeroplastic, with common carbonized organic matter and very poorly sorted rock fragments; lesser quartz and feldspar	Gradual irregular to
134	Bw	Clayey siltstone	Gray (5Y5/1)	Common black <i>Vertebraria</i> as above, taper to only 12 mm diameter in lower part; platy pedes and discontinuous slickensides, clear relict beds of sandstone, noncalcareous	Unistrial mosepic intertectic, abundant rock fragment grains, few opaque and quartz, common organans and argillans	Gradual wavy to
208	C	Coarse-grained sandstone, with shaley interbeds	Gray to light gray (5Y6/1)	Shaly interbeds of gray (5Y-5/1); grains white (5Y8/1), dark gray (5Y4/1) and black (5Y-2 5/1); joint stain yellowish brown (10YR5/4); noncalcareous	Silasepic in sandy horizons, insepic in shaly horizons, granular with abundant rock fragments	Gradual smooth to
<i>type Bongon clay paleosol at Wybung Head</i>						
-	-	Fine-grained sandstone above	Greenish gray (5GY5/1)	Massive to weakly bedded, joint stain dark yellowish brown (10YR4/6); weakly calcareous	Silasepic intertectic; lithic sandstone, with local displacive siderite cement	Abrupt wavy (load casts $\pm 6-8$ cm by 12-15 cm) to
0	A	Silty claystone	Olive (5Y5/3)	Common root traces up to 2 mm diameter of light olive gray (5Y6/2); indistinct platy pedes; noncalcareous	Agglomeroplastic clino-bimasepic; with varvelike relict bedding, disrupted by ferruginized root traces	Clear smooth to
3	A	Fine sandy siltstone	Olive gray (5Y5/2)	Common root traces of light olive gray (5Y6/2); mangans of yellowish brown (10YR5/8); mottles from siderite oxidation of strong brown (7 5YRS/6), noncalcareous	Silasepic granular, with abundant rock fragments in weakly ferruginized siderite cement	Abrupt smooth to
8	A	Carbonaceous silty claystone	Dark greenish gray (5Y4/1)	Common root traces up to 3 mm diameter of very dark gray (5Y3/1), fine blocky pedes defined by slickensided clay skins of dark greenish gray (5GY4/1); noncalcareous	Porphyroskeletal clino-bimasepic, with sideritic root traces within sesqui-organans, common rock fragments, some quartz, feldspar, siderite	Gradual wavy ( $\pm 5$ cm) to

## APPENDIX 2 continued

Depth (cm)	Hs	Rock	Color	Other features	Micromorphology	Contact
<i>type Bongor clay paleosol at Wybung Head continued</i>						
34	Bg	Claystone	Bluish gray (5G5/1)	Common root traces up to 5 mm diameter of dark brown (7 5YR3/2), irregular mottles 2-3 cm across of brown to dark brown (7 5YR4/2), coarse blocky angular peds, defined by discontinuous slickensided clay skins; noncalcareous	Porphyroskeletal to mosepic agglomeroplastic, with siderite filled siccus-organans after root traces as above, common rock fragments, quartz and feldspar	Gradual smooth to
52	C	Siltstone with shale interbeds	Olive gray (5Y5/2)	Shaly interbeds dark olive gray (5Y3/2); silty laminae and wavy bedding, non-calcareous	Insepic agglomeroplastic, few clay skins; common rock fragments	Abrupt smooth to
<i>type Cox clay paleosol at Cox Gap</i>						
-	-	Siltstone above	Light gray (5Y7/1)	Shaly laminae dark gray (5Y4/1) and sideritic layers oxidized to brown (7 5YR5/2) and strong brown (7 5YR5/6); noncalcareous	Insepic intertextic with common rock fragments and opaque grains; some opaque mottles	Abrupt smooth to
0	A	Carbonaceous silty claystone	Dark grayish brown (2 5Y4/2)	Common root traces and coal chips of black (5Y2 5/1); platy peds indistinct; noncalcareous	Mosepic to clinobimasepic agglomeroplastic, with laminated argillans and ferruginized root traces	Gradual irregular ( $\pm 8$ cm) to
18	AB	Clayey medium-grained sandstone	Grayish brown (2 5Y5/2)	Common root traces of very dark grayish brown (2 5Y5/2) and sand-sized sphaerosiderite oxidized to reddish brown (5YR4/3); some grains very dark gray (5Y3/1); coarse angular blocky peds, noncalcareous	Agglomeroplastic clinobimasepic, with opaque neosesquians on ped faces and around sphaerosiderite and some opaque mottles	Gradual highly irregular to
28	Bg	Medium-grained sandstone	Weak red (10R4/2)	Common drab-haloed root traces light olive gray (5Y6/2) and pyrolusite dendrites black (5Y2 5/1), indistinct relict bedding; noncalcareous	Agglomeroplastic mosepic, with common sand-sized clasts and equant opaque mottles	Gradual smooth to
54	C	Medium-grained sandstone	Weak red (10R4/2)	Indistinct relict bedding, noncalcareous	Agglomeroplastic insepic common rock fragments	Abrupt smooth to
<i>type Frazer clay paleosol at Wybung Head</i>						
-	-	Coarse-grained sandstone above	Gray (5Y5/1)	Sand grains strong brown (7 5YR4/6), olive (5Y5/3), white (5Y8/2); pebbles to 18 cm reddish brown (5YR4/4) and very dark gray (5Y3/1) chert, and pale olive (5Y6/4) mafic volcanic fragments; trough cross bedding; basal contact ferruginized brownish yellow (10YR6/8), noncalcareous	Intertextic silasepic; a poorly sorted sandstone with abundant rock fragments, and common quartz and opaque grains	Abrupt smooth to

## APPENDIX 2 continued

Depth (cm)	Hz	Rock	Color	Other features	Micromorphology	Contact
<i>type Frazer clay at Wybung Head continued</i>						
0	A	Silty claystone	Olive gray (5Y4/2)	Root traces to 3 mm diameter dark grayish brown (2.5Y3/2), weathering pinkish gray (7.5YR-6/2); coarse blocky angular peds and joints stained brownish yellow (10YR5/8); noncalcareous	Agglomeroplastic mo-sepic, with thick laminated clay skins after root traces; common rock fragments, some quartz and feldspar	Gradual smooth to
9	C	Silty fine-grained sandstone	Gray (5Y5/1)	Common root traces up to 6 mm diameter dark grayish brown (2.5Y4/2), weathering as above, laminae and joints stained strong brown (7.5YR-5/8); noncalcareous	Intertextic insepic, poorly sorted, with scattered laminated clay skins; common rock fragments, some quartz	Abrupt smooth to
25	C	Sandy siltstone	Olive gray (5Y5/2)	Laminae of fine-grained sandstone light gray (5Y7/1); relict wavy bedding; noncalcareous	Intertextic insepic, with few laminated clay skins; abundant rock fragments	Gradual smooth to
<i>type Imperial clay paleosol at Coalcliff</i>						
-	-	Fine-grained sandstone	Light gray (5Y7/2)	Shale interbeds and laminae very dark gray (5Y4/1); common ripple marks and scour-and-fill; noncalcareous	Agglomeroplastic insepic unistrial; common rock fragments, some quartz and feldspar	Abrupt smooth to
0	A	Shaly siltstone	Very dark gray (5Y4/1)	Common black (5Y3/1) fine root traces and disrupted laminae of gray (5Y5/1) siltstone; common horsetails ( <i>Paracalanites australis</i> ) and rare fragments of <i>Glossopteris</i> ; noncalcareous	Intertextic argillasepic unistrial, with varvelike graded laminae	Gradual smooth to
3	A	Siltstone	Very dark gray (5Y4/1)	Root traces and silty laminae as above; indistinct platy peds, noncalcareous	Intertextic argillasepic unistrial, with varvelike graded laminae	Abrupt smooth to
15	C	Medium-grained sandstone	Gray to light gray (5Y6/1)	Common ripple marks and wavy beds, shaly interbeds of dark gray (5Y4/1), grains of white (5Y8/1) and dark gray (5Y4/1); noncalcareous	Granular silasepic, with abundant rock fragments, common quartz and opaque grains	Abrupt smooth to
<i>type Kerrabee clay paleosol at Coxs Gap</i>						
-	-	Fine-grained sandstone	Weak red (10R5/2)	Crude relict bedding, common iron-manganese nodules of reddish black (10R2.5/1) to 1 cm in size, some oxidized from siderite, noncalcareous	Agglomeroplastic mo-sepic; with common siderite-filled cracks; opaque nodules and neosesquans	Abrupt smooth to
0	A	Silty claystone	Weak red (10R5/2)	Abundant drab-haloed root traces to 3 cm across of olive gray (5Y5/2); common small (less than 3 mm) nodules of reddish brown (5YR4/3); fine blocky peds; noncalcareous	Porphyroskeric mosepic, with peds defined by nearly opaque neosesquans and quasisesquans	Gradual smooth to

## APPENDIX 2 continued

Depth (cm)	Hz	Rock	Color	Other features	Micromorphology	Contact
<i>type Kerrabee clay continued</i>						
6	Co	Clayey siltstone	Weak red (10R5/2)	Common irregular fine root traces of light brownish gray (2.5Y6/2) and some burrows up to 6 mm diameter of reddish brown (5YR4/3); thick relict beds of silty fine-grained sandstone; noncalcareous	Agglomeroplastic insep; with common opaque mottles and scattered clay skins	Gradual irregular to
<i>type Wollemi clay paleosol at Coxs Gap</i>						
-	-	Medium-grained sandstone above	Weak red (10R4/2)	Indistinct relict bedding, noncalcareous	Agglomeroplastic insep with common rock fragments, some quartz, feldspar and opaque grains	Abrupt smooth to
0	A	Silty Claystone	Reddish brown (SYR4/3)	Abundant drab-haloes 2-3 mm wide of light olive gray (5Y6/2) around root traces up to 4 mm diameter; medium blocky subangular peds defined by stickensided clay skins; noncalcareous	Porphyroskeletal clinobimasepic, common sideritic siltstone filled sesqui-organans after root traces, opaque mottles, some thick laminated clay skins	Gradual irregular to
9	Bw	Silty claystone	Dusky red (10R3/2)	Common drab-haloed root traces of light olive gray (5Y6/2), indistinct platy peds, noncalcareous	Agglomeroplastic clinobimasepic, common clay-filled tubules after root traces; opaque mottles	Gradual irregular to
59	Cg	Fine-grained sandstone	Weak red (10R5/2)	Crude relict bedding; common iron-manganese nodules of reddish black (10R2.5/1) up to 1 cm in size, some of them oxidized from siderite; noncalcareous	Agglomeroplastic mosepic; with common siderite filled cracks; opaque nodules and neosquans	Abrupt smooth to
<i>type Wybung clay paleosol at Wybung Head</i>						
-	-	Medium-grained sandstone above	Light gray (5Y7/1)	Prominent relict bedding; mottles yellowish brown (10YR-5/4), grains dark gray (5Y4/1), white (5Y8/1), basal ferruginized surface strong brown (7.5YR-5/6); noncalcareous	Granular silasepic, with abundant sand-size rock fragments, many with clayey and oxidized rims that predate deposition	Abrupt smooth to
0	A	Siltstone	Grayish brown (2.5Y5/2)	Root traces to 3 mm diameter olive brown (2.5Y4/4); indistinct clay skins dark grayish brown (2.5Y4/2) define fine subangular blocky peds, noncalcareous	Agglomeroplastic mosepic, with sesqui-organans after fossil plant debris, common rock fragments and quartz	Gradual irregular to

## APPENDIX 2 continued

Depth (cm)	Hz	Rock	Color	Other features	Micromorphology	Contact
<i>type Wybung paleosol continued</i>						
11	Bw	Clayey siltstone	Dark grayish brown (2.5Y4/2)	Common root traces of olive brown (2.5Y4/2) and clay skins of very dark grayish brown (2.5YR3/2), defining fine subangular blocky peds; joint stain strong brown (7.5YR5/6); non-calcareous	Agglomeroplastic mosepic, with scattered clay skins and disrupted bedding, common rock fragments, quartz; intertextic silasepic metagranotubules after burrows	Gradual smooth to
29	C	Claystone breccia above	Dark olive gray (5Y3/2)	Common coal chips black (5Y2.5/2); fine root traces and scsquans along joints of yellowish brown (10YR5/6), noncalcareous	Agglomeroplastic inundulic, with scattered illuviation argillans	Abrupt smooth to

Note Descriptive terminology is after Brewer (1976), Munsell Color Company (1975) and Soil Survey Staff (1990)

## APPENDIX 3. Munsell colors of selected Permian and Triassic paleosols in the Sydney Basin, Australia

Paleosol	Hoz	Spec #	Fresh Color	Minor Colors
<b>Coalcliff section</b>				
sandstone, 0 2 m	-	-	gray (5Y5/1)	-
sandstone, 0 5 m	-	-	gray 5Y5/1)	-
sandstone, 1 2 m	-	-	light brownish gray (2 5Y6/2)	carbonaceous streaks very dark gray (5Y3/1)
Imperial, 1 8 m	A	-	very dark gray (5Y3/1)	root traces black (5Y2 5/1)
	C	-	very dark gray (5Y3/1)	sandy ripple marks gray (5Y5/1)
sandstone, 2 7 m	-	-	light gray (2 5Y7/2)	claystone clasts very dark gray (5Y3/1), quartz pebbles gray (5Y5/1), iron stain yellowish brown (10YR5/8)
siltstone, 3 7 m	-	-	dark grayish brown (2 5Y4/2)	-
sandstone, 4 5 m	-	-	light gray (5Y7/2)	-
sandstone, 5 5 m	-	-	light gray (5Y7/2)	-
siltstone, 6 2 m	-	-	very dark gray (5Y3/1)	-
sandstone, 6 6 m	-	-	light gray (5Y7/1)	siltstone interbeds very dark gray (5Y3/3), iron stain dark yellowish brown (10YR4/4)
sandstone, 7 2 m	-	-	light gray (5Y7/1)	-
siltstone, 7 5 m	-	-	very dark gray (5Y3/1)	sandy laminae of light gray (5Y7/1)
sandstone, 7 7 m	-	-	light gray (5Y7/1)	quartz clasts white (5Y8/1)
siltstone, 8 m	-	-	very dark gray (5Y3/1)	sandy ripple marks (5Y7/1)
sandstone, 8 2 m	-	-	light olive brown (2 5Y5/4)	ferruginized base dark yellowish brown (10YR4/6)
siltstone, 8 3 m	-	-	very dark gray (5Y3/1)	-
sandstone, 8 5 m	-	-	light brownish gray (2 5Y6/2)	sandy laminae light gray (5Y7/1) iron stain dark yellowish brown (10YR4/4)
siltstone, 8 7 m	-	-	dark gray (5Y4/1)	-
sandstone, 9 3 m	-	-	light brownish gray (2 5Y6/2)	sandy ripple marks light gray (5Y7/1) carbonaceous laminac dark grayish brown (2 5Y3/2)
siltstone, 9 5 m	-	-	grayish brown (2 5Y5/2)	-
sandstone, 9 7 m	-	-	light brownish gray (2 5Y6/2)	claystone clasts dark olive gray (5Y3/2) and light yellowish brown (10YR6/6)
shale, 10 m	-	-	dark gray (5Y4/1)	siltstone interbeds gray (5Y5/1)
Birdie, 12 m	O	R1704, R1705	black (5Y2 5/1)	joint stain strong brown (7 5YR5/6)
	A	R1706, R1707	very dark gray (5Y3/1)	<i>Vertebraria</i> black (5Y2 5/1)
	Bw	R1708, R1709, R1710	dark gray (5Y4/1)	joint stain yellowish brown (10YR5/6)
	C	R1711, R1712	dark gray (5Y4/1)	sandstone interbeds (2 5Y5/2)
sandstone, 12 5 m	-	R1703	light gray (5Y7/2)	-
sandstone, 13 5 m	-	-	grayish brown (2 5Y5/2)	clasts very dark gray (2 5Y3/1), olive gray (5Y5/2) and brown (7 5YR5/4)
shale, 15 2 m	-	-	dark gray (5Y4/1)	carbonaceous debris black (5Y2 5/1), mica light gray (5Y7/2)
sandstone, 15 5 m	-	-	light gray (2 5Y7/2)	-

## APPENDIX 3 Munsell colors continued

Paleosol	Hoz	Sperm #	Fresh Color	Minor Colors
type Imperial clay	A	R1699	very dark gray (5Y4/1)	silty laminae gray (5Y5/1), root traces black (5Y3/1)
	C	R1700	gray (5Y5/1)	shale interbeds very dark gray (5Y4/1)
	-	R1701	gray to light gray (5Y6/1)	clasts of white (5Y8/1) and dark gray (5Y4/1); shale interbeds gray (5Y5/1)
	-	R1702	gray to light gray (5Y6/1)	shale interbeds gray (5Y5/1) and dark gray (5Y4/1)
	-	-	gray to light gray (5Y6/1)	-
Birdie coal, 20 m	O	R1690, R1691, R1692, R1693, R1688	black (5Y2 5/1)	joint stain light olive brown (2.5Y5/6)
	A	R1694	black (5Y2 5/1)	joint stain brownish yellow (10YR6/6) and dark yellowish brown (10YR4/4)
	Bw	R1695, R1696	dark gray (5Y4/1)	<i>Vertebraria</i> black (5Y2 5/1), joint stain dark yellowish brown (10YR3/4)
	C	R1697	gray (5Y5/1)	silstone interbeds light gray (5Y7/1)
	-	R1698	dark gray (5Y4/1)	sandstone interbeds and ripple trains light gray (2.5Y7/2)
conglom., 20 m	-	R1689	brownish yellow (10YR6/6)	siderite pebbles dark grayish brown (2.5Y4/2), with weathering rinds yellowish brown (10YR5/8), other clasts yellow (2.5Y8/6) and white (2.5Y8/2), sandstone matrix light gray (5Y7/2) with grains of white (5Y8/2) and olive gray (5Y5/2)
Wybung clay	A	R1682, R1683	gray to light gray (5Y6/1)	root traces and clay skins very dark gray (5Y3/1)
	Bw	R1684, R1685	gray (5Y5/1)	sphaerosiderite reddish brown (5YR4/3) and brown (7.5YR5/4)
	C	R1686	dark grayish brown (2.5Y4/2)	sphaerosiderite brown (7.5YR5/4)
	C	R1687	black (5Y2 5/1)	-
sandstone, 21 m	-	-	gray (5Y5/1)	shale interbeds dark gray (5Y6/1); siderite nodules and bands dark brown (7.5YR3/2), weathering strong brown (7.5YR5/6)
sandstone, 22 m	-	-	gray (5Y5/1)	-
conglom. 23.5 m	-	-	gray (5Y5/1)	siderite nodules very dark gray (5Y7/3), with inner weathering rind very dark gray (5YR3/4), outer rind (7.5YR4/6)
sandstone, 25 m	-	-	gray to light gray (5Y6/1)	grains light gray (5Y7/1), very dark gray (5Y3/1), reddish brown (5YR4/3)
sandstone, 26 m	-	-	gray to light gray (5Y6/1)	laminae very dark gray (5Y3/1)
sandstone, 26.5 m	-	-	gray to light gray (5Y6/1)	laminae brown to dark brown (7.5YR4/2)
claystone, 27 m	-	-	gray (5Y7/1)	inner weathering rind brownish yellow (10YR6/6), outer rind reddish brown (5YR4/4)
shale, 27.5 m	-	-	gray (5Y5/1)	sideritic bands gray (5Y4/1), with inner weathering rind brownish yellow (10YR6/6) and outer rind of strong brown (7.5YR4/6)
shale, 27.7	-	-	dark gray (5Y4/1)	grading down to gray (5Y5/1), siderite bands gray (5Y4/1), weathering brownish yellow (10YR6/6)

## APPENDIX 3 Munsell colors continued

Paleosol	Hoz	Spec #	Fresh Color	Minor Colors
siltstone, 28.2 m	-	-	gray (5Y5/1)	clayey siltstone interbeds dark gray (5Y4/1), sideritic claystone gray (5Y5/1), with weathering rind brownish yellow (10YR6/6) and strong brown (2.5YR4/6)
siltstone, 28.7 m	-	-	dark gray (5Y4/1)	siderite bands gray (5Y5/1), with inner weathering rind brownish yellow (10YR6/6) and outer rind strong brown (7.5YR5/6)
sandstone, 29 m	-	-	light gray (5Y7/1)	siderite band yellowish brown (10YR5/6)
claystone, 29.2 m	-	-	dark gray (5Y4/1)	siderite band yellowish brown (10YR5/6)
sandstone, 29.5 m	-	-	light gray (5Y7/1)	carbonaceous laminae brown to dark brown (7.5YR4/4)
shale, 30 m	-	-	gray (5Y5/1)	siderite band gray (5Y5/1), weathering dark yellowish brown (10YR4/4)
sandstone, 30.3 m	-	-	light gray (5Y7/1)	shale interbeds gray to light gray (5Y6/1), siderite band gray (5Y7/1), weathering yellowish brown (10YR5/6)
shale, 30.7 m	-	-	gray (5Y5/1)	siderite bands gray (5Y5/1), inner weathering rind brown (10YR5/3) and outer rind strong brown (7.5YR4/6)
sandstone, 31.3 m	-	-	gray to light gray (5Y6/1)	laminae strong brown (7.5YR4/6)
siltstone, 31.5 m	-	-	gray (5Y5/1)	-
sandstone, 31.7 m	-	-	gray to light gray (5Y6/1)	-
siltstone, 31.8 m	-	-	gray (5Y5/1)	-
sandstone, 32 m	-	-	gray to light gray (5Y6/1)	-
Frazer, 32.4 m	A	R1904	dark gray (5Y4/1)	root traces very dark gray (5Y3/1)
Bongon, 33.6 m	A	R1913,	very dark gray (5Y3/1)	root traces black (5Y2.5/1)
		R1914		
	Bw	R1915,	gray (5Y5/1)	root traces very dark gray (5Y3/1)
		R1916		
	Bw	R1917,	gray (5Y5/1)	mottles brown to dark brown (7.5YR4/2)
	C	R1918,	gray (5Y5/1)	siderite nodules and bands weathering yellowish brown (10YR5/6)
		R1903		
Frazer, 33.8 m	A	R1910,	dark gray (5Y4/1)	-
		R1911		
	C	R1912	gray (5Y5/1)	laminae gray to light gray (5Y6/1), siderite nodules dark gray (5Y4/1), weathering to yellowish brown (10YR5/6)
Frazer, 34.3 m	A	R1906	dark gray (5Y4/1)	root traces very dark gray (5Y3/1)
	C	R1907	gray (5Y5/1)	laminac and siderite nodules dark gray (5Y4/1), weathering yellowish brown (10YR5/4)
	-	R1908,	gray to light gray (5Y6/1)	-
siltstone, 34.4 m	-	R1909		
	-	R1905	gray to light gray (5Y6/1)	laminae and joint stain dark yellowish brown (10YR4/4), sideritic lower part gray (5Y5/1), weathering yellowish brown (10YR4/4)
shale, 34.7 m	-	-	dark gray (5Y4/1)	siderite bands dark gray (5Y4/1), weathering yellowish brown (10YR5/4)
Frazer, 34.9 m	A	-	gray (5Y5/1)	root traces dark yellowish brown (10YR4/4)
shale, 35.2 m	-	-	dark gray (5Y4/1)	-

## APPENDIX 3 Munsell colors continued

Paleosol	Hoz	Spem #	Fresh Color	Minor Colors
shale, 35 5 m	-	-	gray (5Y7/1)	siderite bands gray (5Y5/1), weathering yellowish brown (10YR5/4)
sandstone, 35 8 m	-	-	gray (5Y5/1)	sideritic base weathered yellowish brown (10YR5/6)
Frazer, 36 2 m	-	-	dark gray (5Y4/1)	root traces very dark gray (5Y3/1)
sandstone, 36 4 m	-	-	light gray (5Y6/1)	sideritic stain brown (7 5YR5/4)
Bongon, 37 5 m	A	-	olive gray (5Y4/2)	root traces and plant debris brown to dark brown (7 5YR4/2)
	Bw	-	light olive gray (5Y5/2)	mottles brown to dark brown (7 5YR4/2)
	C	-	olive gray (5Y5/2)	-
sandstone, 37 7 m	-	-	light gray (5Y7/1)	sideritic stain brownish yellow (10YR6/6)
Bongon, 38 7 m	A	-	greenish gray (5GY6/1)	root traces light gray (5Y7/1), mottles brown (7 5YR5/4)
	Bw	-	greenish gray (5GY5/1)	root traces light gray (5Y3/1), mottles brown (7 5YR5/4)
	C	-	gray (5Y5/1)	root traces light gray (5Y7/1), sphacosiderite brown (7 5YR5/4)
sandstone, 38 8 m	-	-	dark gray (5Y4/1)	grains very dark gray (5Y3/1), sideritic stain weathering brown to dark brown (7 5YR4/2)
Frazer, 39 1 m	A	-	gray (5Y7/1)	root traces dark gray (5Y4/1)
shale	-	-	gray (5Y5/1)	sideritic bands dark gray (5Y4/1), weathering brownish yellow (10YR6/6)
Frazer, 39 8 m	A	-	gray (5Y5/1)	root traces light brown (7 5YR4/4), siltstone laminae light gray (5Y7/1)
sandstone, 40 m	-	-	dark gray (5Y4/1)	-
Frazer, 40 3 m	A	-	very dark gray (5Y3/1)	root traces black (5Y2 5/1) and gray to light gray (5Y6/1)
	C	-	gray (5Y7/1)	-
siltstone, 40 4 m	-	-	gray (5Y5/1)	siderite bands dark gray (5Y4/1), weathering brown (7 5YR3/4)
sandstone, 40 8 m	-	-	gray to light gray (5Y6/1)	-
siltstone, 41 2 m	-	-	gray (5Y5/1)	-
sandstone, 41 3 m	-	-	gray to light gray (5Y6/1)	-
shale, 41 4 m	-	-	dark gray (5Y3/1)	siltstone laminae gray to light gray (5Y6/1)
Frazer, 41 6 m	A	-	dark gray (5Y4/1)	root traces black (5Y2 5/1)
	C	-	gray to light gray (5Y6/1)	-
sandstone, 41 8 m	-	-	light gray (5Y7/1)	-
Frazer, 42 6 m	A	-	dark gray (5Y4/1)	root traces very dark gray (5Y5/1)
	C	-	gray (5Y5/1)	siderite nodules gray (5Y5/1), weathering yellowish brown (10YR5/6)
siltstone, 42 7 m	-	-	gray (5Y5/1)	siltstone ripple trains grayish brown (2 5Y5/2)
siltstone, 43 m	-	-	gray to light gray (5Y6/1)	-
<b>Wybung Head section</b>				
conglom , 0 2 m	-	-	greenish gray (5G6/1)	pebbles of red (2 5YR4/6) jasper, greenish gray (5GY5/1) conglomerate, grayish green (5G4/2) and very dark gray (5Y3/1) chert, light gray (2 5Y7/2) tuff, and light gray (5Y7/1) vein quartz
sandstone, 1 m	-	-	greenish gray (5GY6/1)	fossil logs black (5Y2 5/1) and dark yellowish brown (10YR6/6)

## APPENDIX 3 Munsell colors continued

Paleosol	Hoz	Spec #	Fresh Color	Minor Colors
conglom , 1 7 m	-	-	greenish gray (5GY6/1)	-
conglom , 2 7 m	-	-	greenish gray (5GY6/1)	-
sandstone, 3 3 m	-	-	greenish gray (5GY6/1)	-
conglom , 4 m	-	-	greenish gray (5GY6/1)	-
conglom , 5 m	-	-	greenish gray (5GY6/1)	-
sandstone, 5 7 m	-	-	greenish gray(5GY6/1)	grains of white (5Y8/1) and dark gray (5Y4/1); pebbles red (2 5YR4/6) jasper, very dark gray (2 5Y3/1) chert, white (2 5Y8/2) tuff and white (5Y8/1) vein quartz
conglom , 6 7 m	-	-	bluish gray (5G5/1)	pebbles of dark red (2 5YR5/6) jasper, olive gray (5Y4/2) sandstone and dark greenish gray (5BG4/1) chert
sandstone, 8 7 m	-	-	greenish gray (5G6/1)	-
conglom , 9 2 m	-	-	bluish gray (5G5/1)	-
conglom , 10 2 m	-	-	bluish gray (5G5/1)	-
conglom , 11 2 m	-	-	bluish gray (5G5/1)	-
conglom , 11 7 m	-	-	bluish gray (5G5/1)	pebbles dark red (2 5YR3/6) jasper, olive gray (5Y4/2) and brown to dark brown (7 5YR4/2) sandstone, white (10YR8/2) tuff, bluish gray (5G5/1) conglomerate and very dark gray (2 5Y3/1)
sandstone, 13 7 m	-	-	greenish gray (5G6/1)	grains white (5Y8/1) and black (5Y2 5/1); fossil logs dark brown (7 5YR3/2)
conglom , 14 2 m	-	-	bluish gray (5G5/1)	-
sandstone, 14 7 m	-	-	greenish gray (5GY5/1)	grains white (5Y8/1)and black (5Y2 5/1)
conglom , 15 7 m	-	-	greenish gray (5GY5/1)	-
sandstone, 16 m	-	-	greenish gray (5Y5/1)	pebbles dark greenish gray (5Y4/1)
sandstone, 16 7 m	-	-	greenish gray (5Y5/1)	-
type Birdie coal	O	R1668, R1669, R1670	black (5Y2 5/1)	cleat stain yellowish brown (10YR5/6)
	A	R1671, R1672	dark gray (5Y4/1)	<i>Vertebraria</i> black (5Y2 5/1)
	Bw	R1673, R1674	gray (5Y5/1)	<i>Vertebraria</i> black (5Y2 5/1)
	C	R1675, R1676, R1677	gray (5Y5/1)	<i>Vertebraria</i> black (5Y2 5/1), sandstone interbeds gray to light gray (5Y6/1)
	-	R1678, R1679, R1680	gray to light gray (5Y6/1)	grains white (5Y8/1) and dark gray (5Y4/1); plant debris black (5Y2 5/1), shale interbeds (5Y5/1); joint stain yellowish brown (10YR5/4)
type Wybung silty	A	R1662, R1663	grayish brown (2 5Y5/2)	root traces olive brown (2 5Y4/4), clay skins dark grayish brown (2 5Y4/2)
clay	Bw	R1664, R1665	dark grayish brown (2 5Y4/2)	root traces olive brown (2 5Y4/4), clay skins very dark grayish brown (2 5YR3/2); joint stain strong brown (7 5YR5/6)
	C	R1666, R1667	dark olive gray (5Y3/2)	coal chips black (5Y2 5/2); joint stain yellowish brown (10YR5/6)
type Frazer clay	A	R1657	olive gray (5Y4/2)	root traces very dark grayish brown (2 5Y3/2), weathering pinkish gray (7 5YR6/2), outcrop stain brownish yellow (10YR5/8)

## APPENDIX 3 Munsell colors continued

Paleosol	Hoz	Spem #	Fresh Color	Minor Colors
	C	R1658, R1659	gray (5Y5/1)	root traces dark grayish brown (2.5Y4/2), weathering purplish gray (7.5YR6/2); iron stained laminac strong brown (7.5YR5/8)
	-	R1660	olive gray (5Y5/2)	weathering rind yellowish brown (10YR5/6)
	-	R1661	light gray (5Y7/1)	grains white (5Y8/1) and dark gray (5Y4/1); mottles yellowish brown (10YR5/4)
sandstone, 20.9 m	-	R1656	gray (5Y5/1)	grains white (5Y8/2), olive (5Y5/3), and strong brown (7.5YR4/6); pebbles reddish brown (5YR4/4) jasper, pale olive (5Y6/4) rock fragments and very dark gray (5Y3/1) chert; basal iron stain brownish yellow (10YR6/8)
sandstone, 21.7 m	-	-	greenish gray (5GY6/1)	pebbles of strong brown (7.5YR4/6) jasper, white (2.5Y8/1) and very dark gray (5Y3/1) vein quartz
sandstone, 23.3 m	-	-	greenish gray (5GY6/1)	-
conglom 23.9 m	-	-	greenish gray (5GY6/1)	pebbles red (2.5YR4/6) jasper, grayish green (5G5/2) and very dark gray (5Y3/1) chert; weathering brownish yellow (10YR6/6)
sandstone, 25.1 m	-	-	greenish gray (5GY6/1)	weathering brownish yellow (10YR6/6)
sandstone, 26.4 m	-	-	greenish gray (5GY6/1)	weathering brownish yellow (10YR6/6)
type Bangon clay	A	R1644	olive (5Y5/3)	root traces light olive gray (5Y6/2)
	A	R1645	olive gray (5Y5/2)	root traces light olive gray (5Y6/2); mangans black (5Y2.5/1), joint stain yellowish brown (10YR5/8)
	A	R1646,	dark greenish gray	root traces very dark gray (5Y3/1); clay skins dark
		R1647	(5Y4/1)	greenish gray (5GY4/1)
	Bw	R1648,	bluish gray (5G5/1)	root traces dark brown (7.5YR3/2), mottles brown to dark brown (7.5YR4/2)
		R1649,		
		R1650		
	C	R1651,	olive gray (5Y3/2)	shale interbeds dark olive gray (5Y3/2)
		R1652,		
		R1653		
	-	R1654,	light gray (5Y7/1)	shale interbeds light olive gray (5Y6/2)
		R1655		
Frazer clay thin surface phase	A	R1642	olive (5Y5/3)	weathering yellowish brown (10YR5/8)
Bongon clay eroded phase	C	R1643	greenish gray (5GY5/1)	-
	A	R1636	olive gray (5Y5/2)	root traces dark olive gray (5Y3/2)
	A	R1637	olive gray (5Y4/2)	root traces dark olive gray (5Y3/2)
	Bw	R1638,	dark olive gray (5Y3/2)	clay skins dark brown (7.5YR3/2); sphacosiderite dark brown (7.5YR3/2) and dark yellowish brown (10YR4/6)
		R1639		
	C	R1640	olive gray (5Y4/2)	joint stain dark yellowish brown (10YR4/6)
	-	R1641	greenish gray (5GY5/1)	-
Frazer clay	A	R1632	greenish gray (5GY5/1)	root traces dark grayish brown (2.5Y4/2)
	A	R1633	gray (5Y5/1)	plant debris black (5Y2.5/1); silstone laminac gray to light gray (5Y6/1)
	C	R1634	gray (5Y5/1)	joint stain reddish brown (10YR5/8)
	-	R1635	greenish gray (5G6/1)	-
sandstone, 32.3 m	-	R1631	greenish gray (5G6/1)	weathering rind strong brown (7.5YR5/8)
sandstone, 32.7 m	-	-	greenish gray (5GY6/1)	-
Bongon, 34.5 m	A	-	dark olive gray (5Y3/2)	root traces black (5Y2.5/2)

## APPENDIX 3 Munsell colors continued

Paleosol	Hoz	Spec #	Fresh Color	Minor Colors
Frazer, 34.2 m	Bw	-	dark greenish gray (5GY4/1)	root traces and clay skins dark olive gray (5Y3/2), mottles brown to dark brown (7.5YR4/2)
	C	-	greenish gray (5GY6/1)	shale interbeds greenish gray (5GY5/1)
	A	-	greenish gray (5GY5/1)	root traces brown (7.5YR5/2)
	C	-	greenish gray (5GY6/1)	root traces brown (7.5YR5/2)
conglom., 35 m	-	-	pale brown (10YR6/3)	pebbles of red (2.5YR4/8) jasper, very pale brown (10YR7/3) tuff, and dark greenish gray (5GY4/1) and dark olive gray (5Y7/3) chert
sandstone, 36 m	-	-	pale brown (10YR6/3)	-
conglom., 37.2 m	-	-	pale brown (10YR6/3)	pebbles yellowish red (5YR4/6) jasper, olive gray (5Y4/2) chert, very pale brown (10YR7/4) tuff, and white (2.5Y8/1) vein quartz
sandstone, 38.2 m	-	-	pale brown (10YR6/3)	-
conglom., 39.5 m	-	-	pale brown (10YR6/6)	-
<b>Coxs Gap section</b>				
siltstone, 0.3 m	-	-	gray to light gray (5Y6/1)	joint stain strong brown (7.5YR5/8)
sandstone, 0.5 m	-	-	white (5Y8/1)	plant debris laminac dark gray (5Y4/1)
sandstone, 1 m	-	-	white (5Y8/1)	-
sandstone, 1.3 m	-	-	light gray (5Y7/1)	siltstone interbeds gray to light gray (5Y6/1)
sandstone, 2 m	-	-	light gray (5Y7/1)	-
Birdie coal, 3.8 m	O	-	black (5Y2.5/1)	shale laminac brown (7.5YR5/2), weathering brownish yellow (10YR6/6)
	A	-	gray (5Y5/1)	<i>Vertebraria</i> black (5Y2.5/1)
	Bw	-	gray to light gray (5Y6/1)	shale interbeds dark gray (5Y4/1)
	C	-	light gray (5Y7/1)	-
sandstone, 4 m	-	-	white (5Y8/1)	-
sandstone, 5 m	-	-	white (5Y8/1)	-
Imperial, 5.8 m	A	-	dark gray (5Y4/1)	root traces very dark gray (5Y3/1); plant debris black (5Y2.5/1)
sandstone, 6 m	-	-	white (5Y8/1)	grains gray (5Y5/1) and light brown (7.5YR6/4), weathering rind yellow (10YR7/6)
sandstone, 7.3 m	-	-	gray (5Y5/1)	siltstone interbeds dark gray (5Y4/1)
Imperial, 7.8 m	A	-	dark gray (5Y4/1)	plant debris black (5Y2.5/1)
	C	-	light gray (5Y7/1)	root traces very dark gray (5Y3/1)
siltstone, 8.3 m	-	-	gray (5Y5/1)	shale interbeds dark gray (5Y4/1)
Birdie coal, 9.4 m	O	-	black (5Y2.5/1)	weathering brown (7.5YR5/4)
	A	-	dark gray (5Y4/1)	<i>Vertebraria</i> light brown (7.5YR6/4)
	Bw	-	gray (5Y5/1)	shale interbeds dark gray (5Y4/1)
Birdie coal, 10.8 m	O	-	black (5Y2.5/1)	shale interbeds grayish brown (10YR5/2); weathering (7.5YR5/2)
	A	-	light brownish gray (10YR6/2)	<i>Vertebraria</i> very dark grayish brown (10YR3/2)
sandstone, 11 m	-	-	light gray (5Y7/1)	-
sandstone, 12.5 m	-	-	light gray (5Y7/1)	-
sandstone, 14 m	-	-	light gray (5Y7/1)	-
siltstone, 14.5 m	-	-	dark gray (5Y4/1)	sandstone interbeds light gray to gray (5Y6/1)
sandstone, 15 m	-	-	light gray (5Y7/1)	-
sandstone, 16 m	-	-	light gray (5Y7/1)	weathering yellowish brown (10YR5/6)
sandstone, 17 m	-	-	white (5Y8/1)	weathering yellowish brown (10YR5/6)

## APPENDIX 3 Munsell colors continued

Paleosol	Hoz	Spec #	Fresh Color	Minor Colors
siltstone, 17.3 m	-	-	gray to light gray (5Y6/1)	shale interbeds gray (5Y5/1)
sandstone, 17.6 m	-	-	white (5Y8/1)	weathering yellowish brown (10YR5/6)
Birdie coal, 20 m	O	-	black (5Y2.5/1)	claystone interbeds brown (7.5YR5/4); weathering light brown (7.5YR5/4)
	A	-	white (5Y8/2)	<i>Vertebraria</i> brown (7.5YR5/2); interbeds of shale light gray (2.5Y7/2); weathering pinkish gray (7.5YR6/2)
	Bw	-	light brownish gray (2.5Y6/2)	-
	Bw	-	gray (5Y5/1)	fossil logs black (5Y2.5/1)
	Bw	-	light brownish gray (2.5Y7/2)	weathering light brown (7.5YR6/4)
	Bw	-	light gray (5Y7/1)	laminae dark grayish brown (10YR4/4)
	Bw	-	gray (5Y7/1)	-
	C	-	white (5Y8/1)	plant debris very dark gray (5Y3/1)
sandstone, 20.2 m	-	-	light gray (5Y7/1)	siltstone interbeds gray (5Y5/1); quartz pebbles white (5Y8/1); weathering light yellowish brown (10YR6/4)
Frazer, 20.6 m	A	-	gray (5Y5/1)	root traces black (5Y2.5/1)
siltstone, 20.7 m	-	-	gray to light gray (5Y6/1)	fossil leaves black (5Y2.5/1)
sandstone, 21 m	-	-	light gray (5Y7/1)	plant debris black (5Y2.5/1)
Frazer, 21.7 m	A	-	gray (5Y5/1)	root traces black (5Y2.5/1); laminae gray to light gray (5Y6/1)
	C	-	gray (5Y5/1)	weathering rind reddish brown (5YR4/3)
sandstone, 21.8 m	-	-	light gray (5Y7/1)	weathering brownish yellow (10YR6/6) and brown (7.5YR5/4)
shale, 22 m	-	-	dark gray (5Y4/1)	-
sandstone, 22.3 m	-	-	light gray (5Y7/1)	weathering yellow (2.5Y7/6)
siderite, 22.4 m	-	-	strong brown (7.5YR4/6)	-
shale, 22.5 m	-	-	dark gray (5Y4/1)	-
siltstone, 22.6 m	-	-	light gray (5Y7/1)	-
shale, 22.7 m	-	-	gray to light gray (5Y6/1)	plant debris black (5Y2.5/1)
Frazer, 23.2 m	A	-	gray (5Y5/1)	root traces very dark gray (5Y2.5/1)
	C	-	light gray (5Y7/1)	clay drapes on ripples gray to light gray (5Y6/1); weathering yellow (2.5Y7/6)
conglom., 23.4 m	-	-	light gray (2.5Y7/2)	pebbles reddish brown (5YR5/3) jasper, dark brown (7.5YR3/2) chert, white (2.5Y8/1) tuff and olive gray (5Y5/2) volcanic
conglom., 24 m	-	-	light gray (2.5Y7/2)	-
sandstone, 24.6 m	-	-	light gray (2.5Y7/1)	weathering yellow (2.5Y7/6)
conglom., 24.8 m	-	-	light gray (2.5Y7/1)	-
sandstone, 25 m	-	-	light gray (2.5Y7/1)	-
sandstone, 25.5 m	-	-	light gray (5Y7/1)	-
siltstone, 25.9 m	-	-	gray to light gray (5Y6/1)	-
sandstone, 26 m	-	-	light gray (5Y7/1)	-
siltstone, 26.3 m	-	-	gray to light gray (5Y6/1)	-
Frazer, 26.7 m	A	-	light olive gray (5Y6/2)	weathering yellowish brown (2.5Y6/4)
	C	-	olive gray (5Y5/2)	root traces dark grayish brown (10YR4/2)
	C	-	light gray (5Y7/1)	-
conglom., 26.9 m	-	-	light gray (5Y7/1)	-

## APPENDIX 3. Munsell colors continued

Paleosol	Hoz	Spem #	Fresh Color	Minor Colors
sandstone, 27 1 m	-	-	light gray (5Y7/1)	-
conglom , 27 5 m	-	-	light gray (2 5Y7/1)	pebbles of red (2 5YR4/6) jasper, grayish green (5G5/2) chert, white (2 5Y8/1) tuff, and olive gray (5Y5/2) volcanics
conglom , 28 5 m	-	-	light gray (2 5Y7/1)	-
siltstone, 28 8 m	-	-	gray to light gray (5Y6/1)	sandstone interbeds light gray (5Y7/1)
Bongon, 30 m	A	-	dark gray (5Y5/1)	root traces dark olive gray (5Y3/2)
	Bw	-	olive gray (5Y5/2)	mottles brown (7 5YR5/2)
	C	-	olive gray (5Y4/2)	laminae gray (5Y5/1)
Kerrabee, 30 5 m	A	-	olive gray (5Y5/2)	root traces dark olive gray (5Y3/2)
	C	-	reddish gray (5YR6/2)	siltstone interbeds olive gray (5Y6/2)
Kerrabee, 30 7 m	A	-	dark gray (5Y4/1)	grades up to shale gray (5Y5/1)
	C	-	reddish brown (5YR4/4/)	sphaerosiderite gray (5YR5/1), weathering strong brown (7 5YR5/8); root haloes olive gray (5Y5/2) and strong brown (7 5YR5/6); manganese stain black (5Y2 5/1)
siltstone, 30 8 m	-	-	gray (5YR5/1)	-
shale, 30 9 m	-	-	very dark gray (5Y3/1)	-
siltstone, 31 m	-	-	light gray (5Y7/2)	plant debris black (5Y2 5/2), weathering pinkish gray (7 5YR7/2)
sandstone, 31 4 m	-	-	light gray (5Y7/1)	-
sandstone, 31 5 m	-	-	light gray (5Y7/1)	siltstone interbeds gray (5Y5/1)
Kerrabee, 31 8 m	A	-	light olive gray (5Y6/2)	mottles dusky red (2 5YR3/2)
	C	-	dusky red (2 5YR3/2)	mottled light olive gray (5Y6/2)
type Kerrabee clay	A	R1626	weak red (10R5/2)	drab-haloed root traces olive gray 5Y5/2); nodules reddish brown (5YR4/3)
	Co	R1627, R1628	weak red (10R6/2)	root traces light brownish gray (2 5Y6/2), burrows reddish brown (5YR4/3)
	C	R1629, R1630	light gray (5Y7/1)	manganese dendrites black (5Y2 5/1); weathering brown (7 5YR5/4)
type Wollemi clay	A	R1622	reddish brown (5YR4/3)	drab-haloed root traces light olive gray (5Y6/2)
	Bw	R1623, R1624	dusky red (10R3/2)	drab-haloed root traces light olive gray (5Y6/2)
	Cg	R1625	weak red (10R5/2)	sphaerosiderite reddish black (10R2 5/1)
type Cox clay	A	R1617, R1618	dark grayish brown (2 5Y4/2)	root traces and plant debris black (5Y2 5/1)
	AB	R1619	grayish brown (2 5Y5/2)	root traces very dark grayish brown (2 5Y3/2)
	Bg	R1620	weak red (10R4/2)	mottles light olive gray (5Y6/2); manganese dendrites black (5Y2 5/1)
	C	R1621	weak red (10R4/2)	manganese dendrites black (5Y2 5/1)
siltstone, 34 m	-	R1616	light gray (5Y7/1)	shale interbeds dark gray (5Y4/1); sideritic layers weathering to brown (7 5YR5/2)
sandstone, 34 4 m	-	-	gray to light gray (5Y6/1)	siltstone interbeds light olive (5Y6/4), mottles weak red (10R4/2), manganese dendrites black (5Y2 5/1)
Cox, 34 8 m	A	-	very dark gray (5Y3/1)	-
	Bg	-	dusky red (2 5YR3/2)	drab-haloed root traces light olive gray (5Y6/2)
Kerrabee, 35 3 m	A	-	weak red (10R4/2)	root traces light olive gray (5Y6/2)
	C	-	light gray (5Y7/2)	pebbles dark gray (5Y4/1) shale, dark grayish brown (10YR4/2), and pink (7 5YR7/4) tuff
Cox, 35 9 m	A	-	very dark gray (5Y3/1)	root traces black (5Y2 5/1)

## APPENDIX 3. Munsell colors continued

Paleosol	Hoz	Spem #	Fresh Color	Minor Colors
sandstone, 36 m	Bg	-	weak red (10R4/2)	root traces pale yellow (2.5Y6/4), with haloes of light gray (5Y6/2)
	C	-	light gray (5Y7/1)	manganese dendrites black (5Y2.5/1); laminae dark gray (5Y3/1)
	-	-	light gray (5Y7/2)	siltstone interbeds gray (5Y5/1)
Cox, 36.9 m	A	-	dark grayish brown (2.5Y4/2)	silty areas light olive gray (5Y6/2)
siltstone, 37 m	Bg	-	weak red (10R3/2)	-
	-	-	gray to light gray (5Y6/1)	-
Wollemi, 38.5 m	A	-	dark reddish brown (5YR3/3)	drab-haloed root traces (light olive gray (5Y6/2)); concretions dark red (2.5YR3/6)
Kerrabee, 39.5 m	Bw	-	dark reddish brown (5YR3/3)	concretions dark red (2.5YR3/6); manganese nodules black (5YR5/1)
	A	-	weak red (10R4/3)	drab-haloed root traces light olive gray (5Y6/2)
	C	-	light olive gray (5Y6/2)	shale interbeds dusky red (10R3/3)
Kerrabee, 39.9 m	A	-	weak red (10R4/3)	drab-haloed root traces light olive gray (5Y6/2)
Wollemi, 40.5 m	C	-	light gray (5Y7/1)	-
	A	-	dusky red (2.5YR3/2)	drab-haloed root traces olive gray (5Y5/2)
	Bw	-	weak red (10R4/2)	mottles dark greenish gray (5G.Y4/1)
Cox, 41.2 m	Bw	-	dark gray (5Y4/1)	-
	A	-	weak red (10R4/2)	drab-haloed root traces olive gray (5Y5/2)
	Cg	-	light gray (5Y7/1)	siltstone interbeds weak red (10R4/2), drab-haloed root traces light olive gray (5Y6/2)
sandstone, 41.4 m	-	-	light gray (5Y7/1)	siltstone interbeds gray to light gray (5Y6/1)
Wollemi, 42.2 m	A	-	dark reddish brown (2.5YR3/4)	drab-haloed root traces light olive gray (5Y6/2), clay skins and mottles (weak red (10R4/3))
sandstone, 42.3 m	Bw	-	weak red (10R4/2)	drab-haloed root traces light gray (5Y7/2)
	-	-	light gray (2.5Y7/2)	-
	A	-	very dark gray (5Y3/1)	-
Cox, 42.9 m	AB	-	olive gray (5Y5/2)	-
	Bg	-	weak red (10R4/2)	drab-haloed root traces light gray (5Y7/1); concretions yellowish brown (10YR5/6); manganese spots black (5Y2.5/1)
	-	-	light gray (5Y3/1)	-
Murrays run bore section				
shale, 777 m	-	-	black (5Y2.5/1)	-
shale, 776 m	-	-	black (5Y2.5/1)	-
paleosol, 775 m	A	-	light gray (5Y7/2)	root traces and mottles dusky red (2.5YR3/2)
	C	-	gray (5Y5/1)	-
shale, 774 m	-	-	black (5Y2.5/1)	-
shale, 773 m	-	-	black (5Y2.5/1)	-
shale, 772 m	-	-	black (5Y2.5/1)	-
Imperial, 769.3 m	A	-	dark grayish brown (2.5Y4/2)	root traces including <i>Vertebraria</i> black (5Y2.5/1)
	C	-	black (5Y2.5/1)	-
	-	-	dark gray (5Y4/1)	-
Imperial, 768.2 m	A	-	dark grayish brown (2.5Y4/2)	<i>Vertebraria</i> black (5Y2.5/1)

## APPENDIX 3 Munsell colors continued

Paleosol	Hoz	Spem #	Fresh Color	Minor Colors
shale, 767 7 m	-	-	black (5Y2 5/1)	-
Imperial, 767 2 m	A	-	very dark gray (2 5Y3/1)	-
shale, 766 8 m	-	-	black (5Y2 5/1)	siltstone interbeds gray to light gray (5Y6/1)
shale, 766 m	-	-	black (5Y2 5/1)	-
Imperial, 765 2 m	A	-	very dark gray (5Y3/1)	<i>Vertebraria</i> black (5Y2 5/1)
	C	-	very dark gray (5Y3/1)	-
shale, 765 2 m	-	-	very dark gray (5Y3/1)	-
Birdie at 764 2 m	O	-	black (5Y2 5/1)	-
	A	-	very dark gray (5Y3/1)	<i>Vertebraria</i> black (5Y2 5/1)
	Bw	-	very dark gray (2 5Y3/1)	-
Birdie at 758 2 m	O	-	black (5Y2 5/1)	-
	A	-	black (5Y2 5/1)	-
	Bw	-	black (5Y2 5/1)	-
	C	-	gray to light gray (5Y6/1)	shale interbeds black (5Y2 5/1)
sandstone, 758 m	-	-	light gray (2 5Y7/2)	siltstone interbeds gray (5Y5/1)
sandst , 757 5 m	-	-	white (5Y8/1)	claystone clasts dark gray (5Y7/1), plant debris black (5Y2 5/1)
sandst , 756 3 m	-	-	white (5Y8/1)	-
sandst , 755 7 m	-	-	white (5Y8/1)	laminac very dark gray (5Y3/1)
sandst , 755 m	-	-	white (5Y8/1)	fossil logs black (5Y2 5/1)
paleosol, 754 2 m	-	-	gray (5Y5/2)	-
sandst , 753 7	-	-	white (5Y8/1)	-
sandst , 753 m	-	-	gray (5Y5/1)	-
sandst , 752 3 m	-	-	white (5Y8/1)	claystone clasts dark gray (5Y4/1)
sandst , 750 7 m	-	-	gray to light gray (5Y6/1)	-
sandst , 749 8 m	-	-	white (5Y8/1)	-
sandst , 748 7 m	-	-	light gray (5Y7/2)	-
sandst , 747 5 m	-	-	gray to light gray (5Y6/1)	-
shale, 746 8 m	-	-	dark gray (5Y4/1)	-
sandst , 746 5 m	-	-	white (5Y8/1)	-
shale, 745 5 m	-	-	gray (5Y5/1)	-
sandst , 745 4 m	-	-	white (5Y8/1)	-
shale, 744 8 m	-	-	very dark gray (5Y3/1)	-
Imperial, 744 4 m	A	-	very dark gray (5Y3/1)	root traces black (5Y2 5/1)
	C	-	light gray (5Y7/2)	-
shale, 744 m	-	-	very dark gray (5Y3/1)	-
Imperial, 742 3 m	A	-	very dark gray (5Y3/1)	-
	C	-	very dark gray (5Y3/1)	-
shale, 742 m	-	-	dark gray (5Y4/1)	-
shale, 741 m	-	-	very dark gray (5Y3/1)	-
shale, 740 m	-	-	black (5Y2 5/1)	-
shale, 739 2 m	-	-	very dark gray (5Y3/1)	-
shale, 738 8 m	-	-	black (5Y2 5/1)	-
Wybung, 737 6 m	A	-	gray (5Y5/1)	root traces very dark gray (5Y3/1)
	Bw	-	dark gray (5Y4/1)	-
Frazer, 737 2 m	A	-	gray (5Y5/1)	-
	C	-	light gray (5Y7/1)	mottles very pale brown (10YR7/3)
sandstone, 737 m	-	-	light gray (5Y7/1)	-
sandst , 736 6 m	-	-	light gray (5Y7/1)	-
Frazer, 735 9 m	A	-	dark gray (5Y4/1)	root traces very dark gray (5Y3/1)

## APPENDIX 3 Munsell colors continued

Paleosol	Hoz	Spec #	Fresh Color	Minor Colors
siltstone, 735 8 m	C	-	gray (5Y5/1)	-
Bongon, 734 8 m	-	-	gray (5Y5/1)	-
Bongon, 734 8 m	A	-	gray to dark gray (5Y6/1)	-
	Bw	-	gray (5Y5/1)	mottles brown (7.5YR5/4)
sandst, 734 5 m	-	-	white (5Y8/1)	laminae very dark gray (5Y3/1)
shale, 734 2 m	-	-	gray (5Y5/1)	-
Bongon, 733 3 m	A	-	dark gray (5Y4/1)	-
	Bw	-	gray (5Y5/1)	mottles reddish brown (5YR4/3)
siltstone, 733 2 m	C	-	light gray (5Y7/2)	-
Frazer, 731 9 m	-	-	light gray (5Y7/2)	shale interbeds very dark gray (5Y3/1)
Frazer, 731 9 m	A	-	gray (5Y5/1)	root traces dark gray (5Y4/1)
	C	-	light gray (5Y7/2)	-
siltstone, 731 5 m	-	-	gray to light gray (5Y6/1)	-
shale, 731 3 m	-	-	dark gray (5Y4/1)	-
Frazer, 730 8 m	A	-	gray to light gray (5Y6/1)	-
	C	-	gray (5Y5/1)	-
Bongon, 730 1 m	A	-	gray (5Y5/1)	-
	Bw	-	gray to light gray (5Y6/1)	mottles reddish brown (5YR4/3)
sandstone, 730 m	-	-	light gray (5Y7/1)	laminae very dark gray (5Y3/1)
Frazer, 729 2 m	A	-	dark gray (5Y4/1)	-
	C	-	gray (5Y5/1)	-
sandstone, 729 m	-	-	white (5Y8/1)	claystone clasts dark gray (5Y4/1)
Frazer, 728 6 m	A	-	dark gray (5Y4/1)	-
sandst, 728 5 m	-	-	white (5Y8/1)	-
Frazer, 726 8 m	A	-	gray (5Y5/1)	root traces black (5Y2.5/1)
	C	-	white (5Y8/1)	laminae very dark gray (5Y3/1)
sandst, 726 5 m	-	-	light gray (5Y7/2)	grains reddish yellow (7.5YR6/6)
sandst, 726 m	-	-	gray (5Y5/1)	laminae very dark gray (5Y3/1)
sandst, 725 5 m	-	-	light gray (5Y7/2)	-
sandst, 724 8 m	-	-	light gray (5Y7/2)	-
Bongon, 723 8 m	A	-	dark gray (5Y6/1)	-
	Bw	-	gray to light gray (5Y6/1)	-
	C	-	light gray (5Y7/2)	mottles reddish brown (5YR4/3), stain reddish yellow (7.5YR6/6)
Bongon, 723 2 m	A	-	dark gray (5Y4/1)	-
	Bw	-	gray (5Y5/1)	mottles dark reddish brown (5YR3/3)
	C	-	gray (5Y5/1)	laminae gray to light gray (5Y6/1)
Frazer, 722 4 m	A	-	dark gray (5Y4/1)	-
	C	-	light olive gray (5Y6/2)	-
shale, 722 3 m	-	-	very dark gray (5Y3/1)	siltstone interbeds gray to light gray (5Y6/1)
Bongon, 721 6 m	A	-	dark gray (5Y4/1)	-
	Bw	-	gray (5Y5/1)	mottles reddish brown (5YR4/4)
	C	-	light gray (5Y7/2)	-
Bongon, 720 6 m	A	-	dark gray (5Y4/1)	root traces very dark gray (5Y3/1)
	Bw	-	gray (5Y5/1)	mottles reddish brown (5YR4/3)
	C	-	gray (5Y5/1)	shale laminac dark gray (5Y4/1)
sandst, 720 5 m	-	-	white (5Y8/1)	-
sandst, 719 8 m	-	-	white (5Y8/1)	-
shale, 719 5 m	-	-	dark gray (5Y4/1)	-
sandst, 719 2 m	-	-	light gray (5Y7/2)	-

## APPENDIX 3 Munsell colors continued

Palcosol	Hoz	Spem #	Fresh Color	Minor Colors
shale, 719 m	-	-	gray (5Y5/1)	-
Frazer, 718 2 m	A	-	very dark gray (5Y3/1)	-
	C	-	gray to light gray (5Y6/1)	-
Bongon, 717 5 m	A	-	dark gray (5Y4/1)	-
	Bw	-	gray to light gray (5Y6/1)	mottles reddish brown (5YR4/3)
	C	-	gray to light gray (5Y6/1)	-
Frazer, 717 2 m	A	-	light olive gray (5Y6/2)	-
Bongon, 716 6 m	A	-	gray (5Y5/1)	-
	Bw	-	gray (5Y5/1)	mottles (5YR4/3)
	C	-	gray to light to gray (5Y6/1)	shale interbeds gray (5Y5/1)
siltstone, 716 5 m	-	-	dark gray (5Y4/1)	-
Bongon, 715 6 m	A	-	gray (5Y5/1)	-
	Bw	-	gray (5Y5/1)	mottled reddish brown (5YR4/3)
<b>Bunnerong bore section</b>				
sandst , 824 5 m	-	-	bluish gray (5B6/1)	-
siltstone, 824 m	-	-	dark gray (5Y4/1)	shale interbeds very dark gray (5Y3/1)
sandst , 823 6 m	-	-	bluish gray (5B6/1)	-
conglom , 823 m	-	-	bluish gray (5G6/1)	pebbles grayish green (5G5/2) and bluish gray (5B6/1) volcanics, dark gray (5Y4/1) chert, and white (5Y8/2) vein quartz
				laminae black 5Y4/1)
sandst , 822 5 m	-	-	gray (5Y5/1)	-
shale, 821 5 m	-	-	dark gray (5Y4/1)	-
sandstone, 821 m	-	-	greenish gray (5G6/1)	-
shale, 820 5 m	-	-	dark gray (5Y4/1)	-
sandstone, 820 m	-	-	greenish gray (5G6/1)	-
siltstone, 819 4 m	-	-	gray (5Y5/1)	shale interbeds dark gray (5Y4/1)
shale, 819 2 m	-	-	dark gray (5Y4/1)	siltstone interbeds gray (5Y5/1)
Birdie, 816 6 m	O	-	black (5Y2 5/1)	-
	A	-	black (5Y2 5/1)	-
	Bw	-	dark gray (5Y4/1)	Vertebraria black (5Y2 5/1)
	C	-	gray (5Y5/1)	-
breccia, 816 5 m	-	-	gray (5Y5/1)	clasts of coal black (5Y2 5/1) and of shale very dark gray (5Y3/1)
				-
sandst , 816 4 m	-	-	greenish gray (5GY6/1)	clay-filled burrows dark gray (5Y4/1)
sandst , 816 2 m	-	-	gray (5Y5/1)	laminae black (5Y2 5/1)
sandst , 815 8 m	-	-	greenish gray (5GY6/1)	pebbles gray (5Y5/1) and greenish gray (5GY6/1)
conglom , 815 3 m	-	-	light gray (5Y7/2)	volcanics and white (5Y8/2) vein quartz
				laminae back (5Y2 5/1)
siltstone, 815 2	-	-	gray to light gray (5Y6/1)	-
conglom , 815 m	-	-	light gray (5Y7/2)	-
conglom , 814 1 m	-	-	light gray (5Y7/2)	-
conglom , 813 5 m	-	-	light gray (5Y7/2)	-
sandstone, 813 m	-	-	gray to light gray (5Y6/1)	-
sandstone, 812 m	-	-	gray to light gray (5Y6/1)	-
siltstone, 811 8 m	-	-	gray (5Y5/1)	laminac of black (5Y2 5/1)
sandst , 811 5 m	-	-	gray to light gray (5Y6/1)	shale laminac very dark gray (5Y3/1), plant chaff black (5Y2 5/1)

## APPENDIX 3 Munsell colors continued

Paleosol	Hoz	Spem #	Fresh Color	Minor Colors
Birdie, 804.8 m	O	-	black (5Y2 5/1)	dolerite intrusion light greenish gray (5GY7/1) with chilled margin white (5GY8/1)
	A	-	very dark gray (5Y3/1)	<i>Vertebraria</i> black (5Y2 5/1)
	Bw	-	gray (5Y5/1)	shale interbeds very dark gray (5Y3/1)
	C	-	gray (5Y5/1)	laminae black (5Y2 5/1)
Frazer, 804.3 m	A	-	very dark gray (5Y3/1)	root traces black (5Y2 5/1)
	C	-	very dark gray (5Y3/1)	laminae dark gray (5Y4/1)
siltstone, 804 m	-	-	gray (5Y5/1)	shale interbeds dark gray (5Y4/1)
sandst , 803.5 m	-	-	greenish gray (5GY5/1)	-
Frazer, 803.1 m	A	-	dark gray (5Y4/1)	-
	C	-	gray (5Y5/1)	-
siltstone, 803 m	-	-	dark gray (5Y4/1)	-
shale, 802.8 m	-	-	very dark gray (5Y4/1)	-
Frazer, 801.9 m	A	-	gray (5Y5/1)	root traces black (5Y2 5/1)
	C	-	gray (5Y5/1)	-
Frazer, 801.2 m	A	-	dark gray (5Y4/1)	root traces black (5Y2 5/1)
	C	-	gray (5Y5/1)	shale (5Y5/1)
sandstone, 801 m	-	-	greenish gray (5GY6/1)	-
conglom , 800.6 m	-	-	greenish gray (5GY6/1)	clasts of sideritic claystone grayish brown (10YR5/2) and shale dark gray (5Y4/1), granules of greenish gray (5GY5/1) volcanics and white (5Y8/2) quartz
conglom , 800 m	-	-	greenish gray (5GY6/1)	-
sandst , 799.5 m	-	-	greenish gray (5GY6/1)	-
sandst , 798 m	-	-	greenish gray (5GY6/1)	-
conglom , 797.7 m	-	-	greenish gray (5GY6/1)	-
sandstone, 797 m	-	-	greenish gray (5GY6/1)	log black (5Y2 5/1) and dark grayish brown (10YR4/2)
conglom , 796.8 m	-	-	greenish gray (5GY6/1)	-
sandst , 795.5 m	-	-	greenish gray (5GY6/1)	-
sandst , 794.5 m	-	-	greenish gray (5GY6/1)	-
sandst , 794.8 m	-	-	greenish gray (5GY6/1)	-
shale, 794.5 m	-	-	gray (5Y5/1)	-
sandst , 794.5 m	-	-	greenish gray (5GY6/1)	-
sandst , 794.3 m	-	-	greenish gray (5GY6/1)	granules gray (5Y5/1) chert, greenish gray (5GY5/1) volcanic and white (5Y8/2) quartz pebble
sandstone, 792 m	-	-	greenish gray (5GY6/1)	-
sandst , 790.5 m	-	-	greenish gray (5GY6/1)	-
sandst , 789.5 m	-	-	greenish gray (5GY6/1)	-
siltstone, 788.6 m	-	-	dark gray (5Y4/1)	-
siltstone, 788.5 m	-	-	gray (5Y5/1)	-
siltstone, 788.3 m	-	-	dark gray (5Y4/1)	-
Rongon, 787.2 m	A	-	dark gray (5Y4/1)	-
	A	-	gray (5Y5/1)	slickensides and root traces dark gray (5Y4/1)
	Bw	-	gray (5Y4/1)	mottles yellowish brown (10YR5/6)
	C	-	gray (5Y5/1)	-
Frazer, 786.5 m	A	-	gray (5Y5/1)	root traces very dark gray (5Y3/1)
	C	-	gray (5Y5/1)	shale interbeds very dark gray (5Y3/1)
sandst , 786.2 m	-	-	greenish gray (5GY6/1)	siderite clasts grayish brown (5Y5/2)
sandst , 784.7 m	-	-	greenish gray (5GY6/1)	-
Bongon, 783.9 m	A	-	very dark gray (5Y4/1)	root traces very dark gray (5Y4/1)

## APPENDIX 3. Munsell colors continued

Paleosol	Hoz	Spec #	Fresh Color	Minor Colors
	Bw	-	greenish gray (5GY5/1)	mottles dark grayish brown (10YR4/2)
	C	-	dark gray (5Y4/1)	mottles dark grayish brown (10YR4/2)
siltstone, 783.8 m	-	-	grayish brown (2.5Y5/2)	-
shale, 783.7 m	-	-	dark gray (5Y4/1)	-
Frazer, 783.2 m	A	-	gray to light gray (5Y6/1)	slickensides and root traces dark gray (5Y4/1)
	C	-	greenish gray (5GY6/1)	-
sandstone, 783 m	-	-	greenish gray (5GY6/1)	-
shale, 782.9 m	-	-	gray (5Y5/1)	-
Frazer, 782.5 m	A	-	gray (5Y5/1)	root traces dark gray (5Y4/1)
	C	-	greenish gray (5GY5/1)	-
Bongon, 781.9 m	A	-	greenish gray (5GY5/1)	root traces and slickensides dark gray (5Y4/1); mottles dark greenish gray (5GY4/1)
	Bw	-	gray (5Y5/1)	slickensides and mottles dark grayish brown (10YR4/2)
	C	-	greenish gray (5GY5/1)	-
sandst., 781.9 m	-	-	greenish green (5GY6/1)	-
conglom., 781.5 m	-	-	greenish gray (5GY6/1)	granules greenish gray (5GY6/1) volcanics, white (5GY8/2) vein quartz, and bluish gray (5BS/1) and gray (5Y5/1) chert
Frazer, 781.1 m	A	-	dark gray (5Y4/1)	root traces and slickensides very dark gray (5Y3/1)
siltstone, 781 m	-	-	gray to light gray (5Y6/1)	-

Note: All colors were taken using a Munsell Color (1975) chart on rock samples within minutes of excavation  
 Paleosols are listed in stratigraphic order

**APPENDIX 4** Textures (volume percent) from point counting petrographic thin sections and calcareousness from reaction with dilute acid of Permian and Triassic paleosols of the Sydney Basin, Australia

Paleosol	Horizon	Spec # R-	Calcar-eous-ness	Percent Clay	Percent Silt	Percent Sand	Percent Gravel	Texture
type Imperial clay	A	1699	1	52.6	20.6	26.8	0	clay
	C	1700	1	54.0	30.8	15.2	0	clay
	-	1701	1	69.6	13.0	17.4	0	clay
	-	1702	1	69.0	16.0	15.0	0	clay
type Birdie coal	O	1668	1	2.0	11.6	67.2	19.2	loamy sand
	O	1669	1	0.8	16.8	77.0	5.4	loamy sand
	O	1670	1	1.0	10.8	77.2	11.0	sand
	A	1671	1	68.8	20.0	11.2	0	clay
	A	1672	1	57.8	27.6	14.6	0	clay
	A	1673	1	49.2	21.8	29.0	0	clay
	C	1674	1	50.6	30.0	19.4	0	clay
	C	1675	1	55.4	18.2	26.4	0	clay
	C	1676	1	27.2	25.0	47.8	0	sandy clay loam
	-	1677	1	26.4	29.8	43.8	0	loam
Birdie coal	-	1678	1	31.8	27.4	40.8	0	clay loam
	-	1679	1	20.4	27.8	51.8	0	loam
	-	1680	1	18.8	10.8	70.4	0	sandy loam
	O	1688	1	5.8	25.6	49.2	19.4	loamy sand
	O	1690	1	12.0	24.4	63.0	0.6	sandy loam
	O	1691	1	6.8	22.6	70.6	0	loamy sand
	A	1695	1	57.2	26.0	16.8	0	clay
	Bw	1696	1	19.2	35.8	45.0	0	loam
	Bw	1697	1	15.8	29.8	54.4	0	sandy loam
	C	1698	1	14.0	26.2	59.8	0	sandy loam
sandstone above Birdie	-	1689	1	4.4	21.6	59.6	14.4	loamy sand
type Wybung silty clay	A	1662	1	43.6	48.6	7.8	0	silty clay
	A	1663	1	45.2	41.2	13.6	0	silty clay
	Bw	1664	1	45.0	36.6	18.4	0	clay
	Bw	1665	1	38.4	33.4	28.2	0	clay loam
	C	1666	1	21.2	12.4	50.1	16.0	sandy clay loam
	C	1667	1	29.6	8.8	30.0	31.6	sandy clay loam
Wybung clay	A	1682	1	70.2	20.6	9.2	0	clay
	A	1683	1	62.6	27.0	10.4	0	clay
	Bw	1684	1	36.2	28.8	35.0	0	clay loam
	Bw	1685	1	36.8	30.8	32.4	0	clay loam
	C	1686	1	28.6	39.4	32.0	0	clay loam
	C	1687	1	21.4	11.8	12.2	54.6	sandy clay loam

## APPENDIX 4 textures continued

Paleosol	Horizon	Spec # R-	Calcar-eous-ness	Percent Clay	Percent Silt	Percent Sand	Texture
sandstone on Wybung type Frazer clay	-	1681	2	12.8	8.6	78.6	0 sandy loam
	A	1657	1	43.2	34.6	22.2	0 clay
	A	1658	1	43.0	36.0	21.0	0 clay
	C	1659	1	27.0	38.4	34.6	0 loam
	C	1660	1	23.6	30.8	45.6	0 loam
	-	1661	1	14.4	17.0	68.6	0 sandy loam
sandstone above type Frazer	-	1656	1	22.8	20.2	57.0	0 sandy clay loam
type Bongon clay	A	1644	1	63.4	29.4	7.4	0 clay
	A	1645	1	29.4	7.0	63.6	0 sandy clay loam
	A	1646	1	62.2	23.6	14.2	0 clay
	Bw	1647	1	59.2	32.4	8.4	0 clay
	Bw	1648	1	63.2	34.6	2.2	0 clay
	Bw	1649	1	58.0	33.4	8.6	0 clay
	C	1650	1	51.4	39.0	9.6	0 clay
	C	1651	1	51.4	41.4	7.2	0 silty clay
	-	1652	1	31.0	52.2	16.8	0 silty clay loam
	-	1653	1	38.2	50.8	11.0	0 silty clay loam
	-	1654	2	25.8	48.8	25.4	0 loam
	-	1655	2	9.0	3.6	87.4	0 sandy loam
Frazer clay thin surface	A	1642	1	55.2	30.2	14.6	0 clay
	C	1643	1	32.6	12.2	55.2	0 sandy clay loam
Bongon clay eroded	A	1636	1	73.0	21.6	5.4	0 clay
	A	1637	1	55.4	35.0	9.6	0 clay
	A	1638	1	59.8	36.2	4.0	0 clay
	Bw	1639	1	59.4	27.6	13.0	0 clay
	C	1640	2	50.6	38.6	10.8	0 clay
	C	1641	2	50.8	35.2	14.0	0 clay
Frazer clay	A	1632	1	55.8	26.4	17.8	0 clay
	A	1633	1	57.6	39.0	3.4	0 clay
	C	1634	1	56.0	41.0	3.0	0 clay
	C	1635	1	26.6	29.8	47.6	0 loam
sandstone above Frazer type Kerrabee clay	-	1631	1	40.6	15.6	43.8	0 silty clay
	A	1626	1	64.4	13.8	21.8	0 clay
	A	1627	1	44.4	24.4	31.2	0 clay
	C	1628	1	46.0	29.4	24.6	0 clay
	C	1629	1	46.4	23.6	30.0	0 clay
	-	1630	1	35.8	20.6	43.6	0 clay loam
type Wollemi clay	A	1622	1	75.6	18.4	6.0	0 clay

## APPENDIX 4 textures continued

Paleosol	Horizon	Spec # R-	Calcar-eous-ness	Percent Clay	Percent Silt	Percent Sand	Texture
type Cox clay	Bw	1623	1	68.4	28.2	3.4	0 clay
	Cg	1624	1	59.0	29.0	12.0	0 clay
	Cg	1625	1	60.6	20.4	19.0	0 clay
	A	1617	1	70.4	27.4	2.2	0 clay
	A	1618	1	74.0	21.0	5.0	0 clay
	AB	1619	1	62.8	22.4	14.8	0 clay
	Bg	1620	1	57.4	30.6	12.0	0 clay
	Bg	1621	1	60.4	22.6	17.0	0 clay
shale above type Cox clay	-	1616	1	78.6	16.2	5.2	0 clay

Note: Sphaerosiderite was counted as sand although probably authigenic rather than clastic in origin. Relative scale of calcareousness (1-5) by reaction with 1.2M (10% of standard solution) HCl is from Retallack (1988, 1990). Standard error ( $\pm 1\sigma$ ) of these 500-point counts is about 2 volume % (Van der Plas & Tobi 1965; Murphy 1983). Counts were made with a Swift automatic point counter by G J Retallack. Textures of peaty samples (all those with more than 10% organic carbon) reflect size distribution of coal macerals as well as mineral grains.

**APPENDIX 5.** Mineral composition (volume percent) by point counting petrographic thin sections of Permian and Triassic paleosols of the Sydney Basin, Australia

Paleosol	Horizon	Spec # R-	Clay	Red stain	Siderite	Feldspar	Mica	Rock Frag	Clay-stone	Opa-que	Quartz
type Imperial clay	A	1699	53.2	0	0	1.0	0.8	41.6	0	1.8	1.6
	C	1700	15.0	0	0.6	3.0	0.8	64.2	0	13.0	3.4
	-	1701	18.2	0	0	0.4	1.0	63.4	0	4.8	12.2
	-	1702	14.8	0	0	0.2	0.2	65.4	0	7.0	12.4
type Birdie	O	1668	1.6	0	0	0	0	0.2	88	87.6	1.8
	O	1669	1.0	0	0	0	0	0.2	9.6	88.4	0.8
	O	1670	1.4	0	0	0	0	0.2	10.4	86.6	1.4
	A	1671	69.4	0	0	4.2	0.8	21.8	0	0	3.8
	A	1672	57.6	0	0	3.8	2.0	23.6	0	3.4	9.6
	A	1673	48.4	0	0	0.4	1.4	36.2	0	3.2	10.4
	C	1674	52.6	0	0	2.4	0.2	33.8	0	3.8	7.2
	C	1675	56.2	0	0	2.2	0.8	30.2	0	1.6	9.0
	C	1676	28.8	0	0	0.8	0.4	58.0	0	4.4	7.6
	-	1677	27.0	0	0	2.6	1.0	57.0	0	2.2	10.2
	-	1678	31.8	0	0	1.2	0.4	53.2	0	3.2	10.2
	-	1679	20.6	0	0	0.8	1.2	57.2	0	5.4	14.8
	-	1680	17.6	0	0	0.2	0.2	63.6	0	2.8	15.6
Birdie coal	O	1688	6.4	0	0	0.8	0	0	29.8	60.4	2.6
	O	1690	14.4	0	0	0	0	12.4	0	70.6	2.6
	O	1691	6.8	0	0	0	0	8.0	0	83.6	1.6
	A	1695	56.8	0	0	3.0	0.2	32.2	0	4.4	3.4
	Bw	1696	20.8	0	0	0.8	2.2	56.6	0	6.0	13.6
	Bw	1697	14.4	0	0	3.6	0.4	57.8	0	15.8	8.0
	C	1698	13.4	0	0.6	4.2	0.2	69.0	0	9.6	3.0
sandstone above Birdie	-	1689	4.2	0	47.4	0	0.2	32.4	0	12.4	3.4
type Wybung silty clay	A	1662	43.6	0	0	3.0	0.4	28.2	0	2.6	22.2
	A	1663	45.0	0	0	9.6	0	24.0	0	1.0	19.4
	Bw	1664	46.2	0	0	5.4	1.6	41.4	0	1.4	4.0
	Bw	1665	38.8	0	0	7.6	1.0	42.2	0	3.6	6.8
	C	1666	22.2	0	0	4.6	0	29.0	0	0	2.8
	C	1667	30.8	0	0	0.6	0	2.4	59.4	5.4	1.4
	A	1682	71.2	0	0	4.8	0.2	19.0	0	2.0	2.8
Wybung clay	A	1683	62.4	0	0	7.0	0	24.0	0	3.2	3.4
	Bw	1684	36.8	0	3.6	5.8	0.6	31.6	0	16.8	4.8
	Bw	1685	36.8	0	7.6	4.4	0.4	42.6	0	4.2	4.0
	C	1686	31.0	0	7.4	5.0	0.4	39.0	0	9.8	7.4
	C	1687	20.2	0	0	0.6	0	0	74.8	4.0	0.4
	-	1681	13.8	0	0	0.2	0	59.8	0	7.6	18.6
type Frazer clay	A	1657	46.4	0	0	4.4	0.2	30.2	0	4.0	14.8
	A	1658	44.2	0	0	1.2	0.6	34.8	0	4.0	15.2
	C	1659	26.6	0	0	1.2	1.8	51.8	0	2.4	16.2
	C	1660	22.0	0	0	1.2	0.4	47.6	0	2.6	26.2

## APPENDIX 5. Mineral composition continued

Paleosol	Horizon	Spec # R-	Clay	Red stain	Siderite	Feldspar	Mica	Rock Frag	Clay-stone	Opa-que	Quartz
sandst on type Frazer	-	1661	13.8	0	0	0	0	33.4	0	60	46.8
	-	1656	24.0	0	0	0	0.4	59.2	0	42	12.2
type Bongon clay	A	1644	66.0	0	0	2.8	0.6	23.6	0	12	5.8
	A	1645	27.6	0	0	2.2	0	27.6	0	82	12.0
	A	1646	63.8	0	0	6.2	0.8	22.2	0	24	4.6
	Bw	1647	60.8	0	0	4.8	1.0	25.2	0	32	5.0
	Bw	1648	63.6	0	0	12.8	1.0	11.8	0	0.8	10.0
	Bw	1649	60.6	0	0	7.4	0.2	19.8	0	40	8.0
	C	1650	53.6	0	12.4	6.0	0.2	20.2	0	44	3.2
	C	1651	49.8	0	0	13.8	1.2	25.6	0	12	8.4
	-	1652	33.0	0	0	4.8	0.8	53.4	0	16	6.4
	-	1653	38.4	0	0	4.0	0.6	49.4	0	0.6	7.0
	-	1654	24.6	0	0	0.8	0.6	59.2	0	44	10.4
	-	1655	8.4	0	0	0.2	0.2	66.4	0	10.8	14.0
Frazer clay thin surface	A	1642	56.0	0	0	3.8	0.4	30.6	0	14	7.8
	C	1643	33.2	0	0	0.6	0	50.2	0	5.8	10.2
Bongon clay eroded	A	1636	72.0	0	0	2.0	0.6	16.6	0	4.4	4.4
	A	1637	55.2	0	0	2.4	0.8	27.0	0	5.4	9.2
	A	1638	62.4	0	0	12.8	0	15.8	0	3.4	5.6
	Bw	1639	59.8	0	0	4.4	0.4	24.8	0	2.8	7.8
	C	1640	51.2	0	0	5.8	0.6	35.0	0	0.6	6.8
	C	1641	51.2	0	0	1.6	0	32.8	0	5.0	9.4
Frazer clay	A	1632	55.0	2.4	0	0.8	0	33.4	0	4.2	4.2
	A	1633	59.0	0	0	4.4	0.2	30.0	0	4.8	1.6
	C	1634	56.6	0	0	3.8	0.8	31.2	0	3.2	4.4
	C	1635	20.8	0	0	1.6	0.4	60.4	0	5.2	11.6
sandstone on Frazer clay-		1631	40.2	0	0	1.8	1.0	41.0	0	7.6	8.4
type Kerrabee clay	A	1626	63.4	0	0.2	1.8	0	15.2	0	18.6	0.8
	A	1627	45.4	0	0	0.8	0.2	30.4	0	17.2	6.0
	C	1628	46.4	0	0	0.4	0.4	27.6	0	19.8	5.4
	C	1629	46.4	0	0	3.6	0.8	5.8	0	34.8	8.6
	-	1630	35.4	0	0	0.6	0.6	39.0	0	12.8	11.6
type Wollemi clay	A	1622	75.2	0	0	1.8	0	6.4	0	8.8	6.0
	Bw	1623	70.4	0	0	5.8	1.0	10.2	0	6.6	6.0
	Cg	1624	60.8	0	0	3.0	0.2	9.6	0	24.4	2.0
	Cg	1625	61.0	0	6.4	2.6	0.6	11.2	0	16.2	2.0
type Cox clay	A	1617	71.2	0	0	8.4	13.8	0.2	0	0.6	5.8
	A	1618	74.8	0	0	3.6	2.4	8.4	0	2.2	8.6
	AB	1619	61.4	0	0	1.0	0	12.2	0	22.8	2.6
	Bg	1620	59.2	0	0	0.8	1.8	12.4	0	20.0	5.8
	Bg	1621	61.0	0	0	3.0	0.8	16.0	0	16.0	1.6
shale on type Cox clay	-	1616	65.2	14.8	0	0.8	0	9.0	0	9.0	1.2

Note Paleosol names and error as for App 3 Mica is mainly muscovite, rock fragments mainly volcanic, with some schist and chert

**APPENDIX 6 Major element chemical analyses by AA and ICP, loss on ignition (LOI), and bulk density ( $\text{g cm}^{-3}$ ) of Permian and Triassic paleosols from the Sydney Basin, Australia (for details see appendix 7)**

Paleosol	#	Hz	Spem	$\text{SiO}_2$	$\text{TiO}_2$	$\text{Al}_2\text{O}_3$	$\text{Fe}_2\text{O}_3$	$\text{FeO}$	$\text{MnO}$	$\text{MgO}$	$\text{CaO}$	$\text{Na}_2\text{O}$	$\text{K}_2\text{O}$	$\text{P}_2\text{O}_5$	LOI	Total	$\text{g cm}^{-3}$
type Birdie coal	O	1668	5 45	0 12	3 40	0	0 26	0 01	0 07	0 11	0 01	0 05	0 03	90 32	99 74	1 37	
	O	1669	5 57	0 12	3 23	0	0 36	0 01	0 15	0 34	0 01	0 05	0 06	89 87	99 70	1 33	
	O	1670	3 93	0 13	2 65	0	0 17	0 01	0 04	0 05	0 01	0 05	0 03	92 82	99 82	1 33	
	A	1671	64 11	1 20	12 99	1 12	0	0	0 72	0 04	0	2 39	0 01	17 74	100 32	2 30	
	A	1672	66 40	1 13	18 19	1 61	0	0 01	0 87	0 04	0	2 19	0 01	9 58	100 03	2 38	
	A	1673	64 91	0 90	21 98	1 02	0	0 02	0 55	0 03	0	1 67	0	9 38	100 48	2 48	
	C	1674	67 38	0 91	20 06	0 28	0 70	0 01	0 55	0 03	0	1 89	0	8 41	100 23	2 47	
	C	1675	67 23	0 94	20 13	0 44	0 58	0	0 56	0 04	0	1 87	0 01	8 42	100 22	2 50	
	C	1676	65 73	0 96	20 76	0 17	0 88	0	0 59	0 03	0	2 01	0 01	8 87	100 01	2 39	
	-	1677	68 00	0 89	19 52	0 30	0 88	0 01	0 60	0 03	0	2 08	0 01	7 98	100 29	2 53	
	-	1678	67 43	0 89	18 96	0 11	1 44	0 01	0 79	0 03	0 07	2 55	0 01	7 55	99 84	2 57	
	-	1679	69 32	0 78	17 76	0 50	1 20	0 02	0 86	0 04	0 27	2 67	0 01	6 80	100 23	2 56	
	-	1680	70 86	0 74	15 94	0 65	2 01	0 03	1 06	0 04	0 27	2 67	0	5 98	100 15	2 59	
type Wybung silty clay	A	1662	66 58	0 98	19 46	0 96	0 84	0	0 61	0 05	0 23	2 27	0 02	8 20	100 19	2 52	
	A	1663	66 87	1 02	19 83	0 98	0 52	0 01	0 53	0 11	0 02	2 03	0 01	8 55	100 46	2 52	
	Bw	1664	66 40	1 08	20 28	0 75	0 58	0	0 49	0 04	0 41	1 77	0 01	8 39	100 21	2 51	
	Bw	1665	65 49	1 09	20 48	0 52	0 72	0	0 46	0 03	0 32	1 15	0 01	9 70	99 98	2 51	
	C	1666	61 56	1 15	21 58	1 32	0	0	0 43	0 03	0 29	0 86	0	12 86	100 09	2 23	
	C	1667	44 46	2 07	23 93	0 40	0	0	0 14	0 04	0 10	0 19	0 01	28 74	100 09	2 36	
type Frazer clay	A	1657	62 73	0 97	20 39	1 35	2 08	0 03	0 88	0 13	0 05	2 73	0 03	8 66	100 03	2 42	
	A	1658	71 65	0 68	15 13	1 14	1 16	0 01	0 50	0 06	0 25	2 60	0	6 65	99 84	2 51	
	C	1659	67 29	0 96	17 95	0 87	1 34	0	0 65	0 03	0 26	2 48	0 01	7 91	99 78	2 54	
	C	1660	72 02	0 79	15 88	0 87	0 85	0 01	0 53	0 04	0 27	2 54	0	6 51	100 32	2 52	
	-	1661	79 10	0 43	11 81	0 69	0 72	0 01	0 27	0 05	0 16	2 06	0	4 95	100 25	2 52	
sandst on type Frazer	-	1656	80 05	0 34	9 49	0 94	1 74	0 04	0 87	0 16	0 61	1 77	0 06	4 05	100 12	2 42	
type Bongon clay	A	1645	43 72	0 60	12 76	10 92	9 92	2 02	1 62	0 81	0 04	1 82	0 08	14 52	98 83	2 65	
	A	1646	63 97	0 86	17 92	2 02	2 82	0 03	1 32	0 13	0	2 84	0 03	7 99	99 92	2 47	
	Bw	1647	62 21	0 83	18 61	2 07	3 51	0 06	1 46	0 13	0	2 88	0 02	8 11	99 90	2 54	
	Bw	1648	60 23	0 89	18 49	2 15	5 10	0 05	1 76	0 11	0 02	3 25	0 02	7 84	99 92	2 58	
	Bw	1649	61 27	0 81	16 07	2 43	5 52	0 60	1 43	0 20	0	2 67	0 05	8 47	99 52	2 55	
	C	1650	56 29	0 80	16 30	2 59	7 90	0 74	1 83	0 25	0	2 92	0 06	9 52	99 20	2 53	
	C	1651	61 16	0 82	18 89	2 19	3 83	0 02	1 68	0 12	0 02	3 10	0 02	8 28	99 96	2 51	
	-	1652	65 22	0 83	16 66	1 74	3 90	0 03	1 46	0 11	0 14	2 86	0 02	7 15	100 11	2 51	
type Kerrabec clay	A	1626	59 73	0 86	17 55	5 43	0 56	0 02	1 14	0 58	0 09	3 22	0 06	8 02	97 34	2 44	
	A	1627	59 07	0 91	17 48	6 49	0 21	0 03	1 58	1 22	0 16	3 13	0 16	8 87	99 31	2 43	
	C	1628	63 06	0 91	17 58	5 50	0 52	0 02	0 83	0 04	0 11	3 17	0 12	7 14	99 05	2 51	
	C	1629	56 09	0 85	16 90	10 08	0 07	0 26	1 25	1 18	0 18	2 33	0 08	9 14	98 41	2 38	
type Wollemi clay	A	1622	58 99	0 87	16 24	10 14	0 35	0 08	1 16	0 44	0 11	3 24	0 12	7 64	98 67	2 50	
	Bw	1623	58 94	0 95	17 67	7 79	0 35	0 08	0 87	0 19	0 15	2 85	0 18	8 01	97 50	2 51	
	Cg	1624	56 01	0 89	16 17	13 05	0 28	0 04	0 99	0 32	0 22	2 97	0 13	7 99	98 15	2 49	
	Cg	1625	46 26	0 74	14 41	19 87	< 0 05	0 50	1 01	3 69	0 10	2 39	2 11	8 77	99 90	2 56	
type Cox clay	A	1617	62 49	0 99	19 48	1 90	0 56	0 01	0 94	0 02	0 14	2 99	0 10	7 75	97 25	2 48	
	A	1618	64 11	1 04	19 39	1 67	0 43	< 0 01	0 79	< 0 01	0 08	2 50	0 10	7 42	97 43	2 50	
	AB	1619	53 38	0 86	15 53	15 94	0 07	0 40	0 98	0 06	0 13	2 11	0 13	8 61	97 08	2 47	
	Bg	1620	66 08	0 98	17 14	3 78	0 49	0 02	0 75	0 07	0 19	2 39	0 05	7 33	99 01	2 51	
	Bg	1621	50 61	0 77	14 20	14 79	< 0 05	0 42	2 24	2 17	0 14	2 25	0 23	10 88	97 72	2 55	
error for AA ( $\sigma$ )	-	-	0 17	0 01	0 13	0 02	0 005	0 01	0 04	0 02	0 08	0 02	0 01	-	-	0 03	
error for ICP ( $\sigma$ )	-	-	0 01	0 007	0 04	0 08	-	< 0 01	0 02	0 02	0 007	0 006	0 02	0 01	-	0 03	

**APPENDIX 7.** Trace element analyses (ppm) by AA and ICP of Permian and Triassic paleosols from the Sydney Basin, Australia (for details see appendix 7)

Paleosol	Hz Spcm	Ba	Cr	Cu	Ga	Nb	Ni	Pb	Rb	Sr	Th	U	V	Y	Zn	Zr	
	# R-																
type	O	1668	24	-	-	2	-	-	4	25	-	-	-	11	-	40	
Birdie	O	1669	64	-	-	2	-	-	4	66	-	-	-	10	-	43	
coal	O	1670	35	-	-	2	-	-	3	38	-	-	-	11	-	44	
A	1671	311	108	59	27	14	11	24	163	37	16	1	141	24	22	255	
A	1672	267	94	42	25	13	11	21	125	40	14	3	115	17	27	224	
A	1673	223	84	22	19	11	6	15	88	32	10	3	85	14	22	203	
C	1674	273	98	25	21	11	5	14	86	34	12	3	94	14	32	235	
C	1675	265	94	35	21	12	5	17	86	34	14	1	95	15	27	233	
C	1676	300	103	39	21	12	9	19	94	37	13	2	103	15	51	225	
-	1677	326	96	22	20	11	18	11	86	35	12	3	97	13	56	215	
-	1678	418	107	40	21	11	15	17	101	42	14	3	108	14	132	235	
-	1679	478	95	17	20	8	14	13	98	41	10	1	96	12	166	200	
-	1680	536	99	15	18	8	26	12	98	42	10	2	96	12	150	169	
type	A	1662	371	113	26	24	14	20	18	116	39	15	2	136	41	95	372
Wybung	A	1663	364	109	23	23	16	13	24	108	41	17	2	141	42	55	403
silty	Bw	1664	292	121	45	23	16	15	28	99	34	18	4	152	41	46	376
clay	Bw	1665	205	102	38	25	16	14	24	69	26	18	4	133	37	37	392
C	1666	176	106	34	25	17	12	27	51	24	19	3	137	35	35	418	
C	1667	129	90	61	38	20	10	42	8	21	28	7	165	60	17	380	
type	A	1657	363	114	26	24	14	23	15	139	61	14	2	150	42	54	297
Frazer	A	1658	485	90	17	15	9	13	16	97	44	10	0	84	26	67	339
clay	C	1659	435	119	21	21	12	19	17	111	48	13	3	112	35	95	420
C	1660	473	79	19	17	12	14	19	105	43	14	5	104	32	87	378	
-	1661	433	47	7	9	6	13	10	71	32	7	3	64	17	67	301	
sandst	-	1656	327	27	17	15	4	19	7	62	51	6	0	94	22	63	102
type	A	1645	319	61	24	18	8	35	18	85	70	9	2	116	39	49	140
Bongon	A	1646	391	92	32	21	11	40	22	134	71	15	0	142	36	107	212
clay	Bw	1647	371	77	31	22	11	35	17	139	58	14	1	134	36	85	170
Bw	1648	406	96	42	23	11	44	21	151	72	13	0	155	40	98	178	
Bw	1649	382	84	34	20	10	45	24	117	60	10	0	131	37	161	176	
C	1650	400	77	38	20	10	54	47	128	55	17	0	146	40	184	162	
C	1651	405	95	46	23	11	46	69	150	66	14	1	150	38	79	171	
-	1652	417	90	31	20	11	38	19	120	66	12	0	130	36	147	204	
type	A	1626	343	-	-	7	-	-	210	89	-	-	-	47	-	246	
Kerra-	A	1627	336	-	-	5	-	-	200	87	-	-	-	49	-	245	
bee	C	1628	380	-	-	9	-	-	209	98	-	-	-	43	-	277	
clay	C	1629	583	-	-	6	-	-	116	66	-	-	-	31	-	218	
type	A	1622	420	-	-	6	-	-	214	120	-	-	-	42	-	231	
Woll-	Bw	1623	349	-	-	7	-	-	185	82	-	-	-	44	-	224	
emi	Cg	1624	341	-	-	6	-	-	169	69	-	-	-	34	-	198	
clay	Cg	1625	693	-	-	<1	-	-	138	239	-	-	-	272	-	174	
type	A	1617	367	-	-	10	-	-	200	89	-	-	-	47	-	301	
Cox	A	1618	360	-	-	11	-	-	188	136	-	-	-	50	-	328	
clay	A	1619	423	-	-	8	-	-	138	81	-	-	-	33	-	248	
Bg	1620	290	-	-	9	-	-	158	77	-	-	-	41	-	294		
Bg	1621	840	-	-	6	-	-	138	81	-	-	-	32	-	208		
AA ( $\sigma$ )	-	-	115	18	11	15	08	18	14	05	13	09	08	20	09	09	40
ICP ( $\sigma$ )	-	-	16	-	-	06	-	-	1	3	-	-	-	06	-	7	

## APPENDIX 8 Molecular weathering ratios of Permian and Triassic paleosols, Sydney Basin, Australia

Paleosol	Hz	Specimen No	Na <sub>2</sub> O K <sub>2</sub> O	CaO+MgO Al <sub>2</sub> O <sub>3</sub>	Al <sub>2</sub> O <sub>3</sub> SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub> CaO+MgO+Na <sub>2</sub> O+K <sub>2</sub> O	Ba Sr	FeO Fe <sub>2</sub> O <sub>3</sub>
type Birdie coal	O	1668	0.30	0.11	0.37	7.60	0.61	0
	O	1669	0.30	0.31	0.34	3.02	0.62	0
	O	1670	0.30	0.07	0.40	10.09	0.59	0
	A	1671	0	0.15	0.12	2.90	5.36	0
	A	1672	0	0.12	0.16	3.92	4.26	0
	A	1673	0	0.07	0.20	6.76	4.45	0
	C	1674	0	0.07	0.18	5.75	5.12	5.56
	C	1675	0	0.07	0.18	5.73	4.97	2.93
	C	1676	0	0.07	0.19	5.78	5.17	11.51
	-	1677	0	0.08	0.17	5.11	5.94	6.52
	-	1678	0.04	0.11	0.17	3.85	6.44	29.10
	-	1679	0.15	0.13	0.15	3.18	7.44	5.33
	-	1680	0.09	0.17	0.13	2.71	8.15	6.87
type Wybung silty clay	A	1662	0.15	0.08	0.17	4.35	6.07	1.94
	A	1663	0.01	0.08	0.17	5.26	5.66	1.18
	Bw	1664	0.35	0.06	0.18	5.20	5.48	1.72
	Bw	1665	0.42	0.06	0.18	6.85	5.03	3.08
	C	1666	0.51	0.05	0.21	8.46	4.68	0
	C	1667	0.80	0.02	0.32	30.03	3.92	0
type Frazer clay	A	1657	0.03	0.12	0.19	3.71	3.80	3.42
	A	1658	0.15	0.09	0.12	3.29	7.03	2.26
	C	1659	0.16	0.09	0.16	3.73	5.78	3.42
	C	1660	0.16	0.09	0.13	3.44	7.02	2.17
	-	1661	0.12	0.07	0.09	3.62	8.63	2.32
	-	1656	0.52	0.26	0.07	1.75	4.09	4.11
type Bongon clay	A	1645	0.03	0.44	0.17	1.68	2.91	2.02
	A	1646	0	0.20	0.17	2.70	3.51	3.10
	Bw	1647	0	0.21	0.18	2.64	4.08	3.77
	Bw	1648	0.01	0.25	0.18	2.25	3.60	5.27
	Bw	1649	0	0.25	0.15	2.34	4.06	5.05
	C	1650	0	0.14	0.17	2.97	4.64	6.78
type Kerrabee clay	C	1651	0.01	0.24	0.18	2.38	3.91	3.89
	-	1652	0.07	0.23	0.15	2.31	4.03	4.98
	A	1626	0.04	0.22	0.17	2.32	2.46	0.23
	A	1627	0.08	0.36	0.17	1.77	2.46	0.07
	C	1628	0.05	0.12	0.16	3.04	2.47	0.21
	C	1629	0.12	0.31	0.18	2.08	5.64	0.02
type Wollemi clay	A	1622	0.05	0.23	0.16	2.19	2.23	0.08
	Bw	1623	0.08	0.14	0.18	3.01	2.72	0.10
	Cg	1624	0.11	0.19	0.17	2.43	3.15	0.05
	Cg	1625	0.06	0.64	0.18	1.20	1.85	0.01
type Cox clay	A	1617	0.07	0.12	0.18	3.31	2.63	0.66
	A	1618	0.05	0.10	0.18	4.00	1.69	0.57
	AB	1619	0.09	0.17	0.17	3.05	3.33	0.01
	Bg	1620	0.12	0.12	0.15	3.48	2.40	0.29
	Bg	1621	0.09	0.68	0.17	1.16	6.62	0.01

Note For Appendices 5, 6, and 7, dashes (-) signify analyses not attempted and zeroes (0) are values beyond

detection Analyses R1631-R1680 are from atomic absorption by Carol Lawson at Macquarie University and R1617-R1629 from inductively coupled plasma-atomics fusion at Bondar Clegg Inc, Vancouver Bulk density was calculated by weighing clods coated in paraffin of known bulk density (0.8639) in and out of water at the University of Oregon, Eugene, by Timothy Tate Errors were estimated from 59 analyses of granodiorite GSP-1 for AA major elements and 83 analyses of AHV-1 and 59 analyses of GSP-1 for AA trace element data, of standards 1989 CANMET SY-3 and CANMET SO-2 for ICP, and from 10 replicates of specimen R1614 for bulk density Molecular weathering ratios were calculated by converting weight percent values (from Appendices 5 and 6) to moles using molecular weights (Retallack, 1990, 1997)

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