

# BNG Burrungule Land System

- Area:** 308.2 km<sup>2</sup>
- Landscape:** Complex of calcarenite ranges and corridor plains south and west of Mt. Gambier. This land system is divided by the Gambier land system into south-east & north-west portions.
- Annual rainfall:** 745 – 800 mm average
- Geology:** Calcreted aeolianite of the Pleistocene Bridgewater Formation barrier shoreline deposits on rises. Eocene-Miocene Gambier Limestone; fossiliferous marine limestone on plains.
- Main soils:** **B3** (47%) Shallow sandy loam on calcrete (Petrocalcic Red Tenosol-Kandosol-Rudosol)
- Minor soils:**
- H3** (13%) Bleached siliceous sand (sandy Bleached Tenosol)
  - RR** (9%) Rock or exposed calcrete
  - B6** (9%) Shallow loam over red-brown clay on calcrete (Petrocalcic Red Chromosol-Kandosol)
  - B7** (7%) Shallow sand over clay on calcrete (sandy Petrocalcic Sodosol-Chromosol)
  - I1** (5%) Highly leached sand (Aeric Podosol)
  - I2** (4%) Wet highly leached sand (Aquic or Semi-Aquic Podosol)
  - G3** (3%) Thick sand over clay (sandy Brown-Red Chromosol-Sodosol)
- Summary:** Shallow soils over calcreted calcarenite on dune ranges dominate. These are mostly non-arable for broad acre cropping, but the calcrete is rippable and ripping for establishment of some horticultural/tree crops can increase soil depth. Approximately 25% of the area has deep sand soils. The soils are mostly well drained.

## Soil Landscape Unit summary: Burrungule Land System (BNG)

SLU	% of area	Component	Main soils	Prop#	Notes
MBB	0.1	Rise	B3B7	V	Gently sloping rises with sandy loam grading to red sandy clay loam on calcreted calcarenite. Sand is often bleached over poorly structured clay. 10-30% thin sand over calcarenite.  Main soils: <b>Plains:</b> <u>Shallow sandy loam on calcrete - B3</u> and <u>Sand over friable brown clay on calcrete - B7</u> . <b>Swales:</b> <u>Shallow sandy loam on calcrete - B3</u> .
		Swale	B3	L	
MEB	2.5	Rise	B3	V	<b>MEB</b> Gently sloping rises with shallow sandy loam on calcreted calcarenite. 10-30% red clay subsoils. 10-20% sand dunes with moderately leached siliceous sand.
		Dune	I1H3	L	
MEC	1.3	Rise	B3	V	<b>MEC</b> As above, undulating slopes, 20-30% sand dunes.
		Dune	I1H3	C	
MEL	0.4	Plain	B3	V	<b>MEL</b> As for MEB with 10-20% swales with shallow sand over calcreted calcarenite sometimes with red clayey subsoil.
		Rise	H3	L	
MEYB	8.3	Stony range	B3RR	D	<b>MEYB</b> Undulating dune core topography of medium height with much exposed calcrete and shallow sandy loam on calcreted calcarenite, 10-30% has red clayey subsoil.  Main soils:



					<p><b>Rises and plains:</b> <u>Shallow sandy loam on calcrete</u> - <b>B3</b>.  <b>Stony ranges:</b> <u>Shallow sandy loam on calcrete</u> - <b>B3</b> and <u>Rock or exposed calcrete</u> - <b>RR</b>.  <b>Dunes:</b> <u>Highly leached sand</u> - <b>I1</b> and <u>Bleached siliceous sand</u> - <b>H3</b>.</p>
MHB	1.0	Dune	I1H3	E	<p>Stony range and deep sands in equal proportions. Bleached siliceous sands on dunes and shallow sandy loam on calcrete or rock outcrop on stony range component.</p> <p>Main soils:  <b>Dunes:</b> <u>Highly leached sand</u> - <b>I1</b> and <u>Bleached siliceous sand</u> - <b>H3</b>.  <b>Stony ranges:</b> <u>Shallow sandy loam on calcrete</u> - <b>B3</b> and <u>Rock or exposed calcrete</u> - <b>RR</b>.</p>
		Stony range	B3RR	E	
MJB	0.1	Rise	B3H3	D	<p>Gently sloping dune range with shallow sand over calcreted calcarenite and moderately deep yellow siliceous sand co-dominant.</p> <p>Main soils: <u>Shallow sandy loam on calcrete</u> - <b>B3</b> and <u>Bleached siliceous sand</u> - <b>H3</b>.</p>
MKB	0.5	Rise	G2H3	V	<p>Undulating calcreted former beach ridge with very shallow red and brown loamy over red clay soils, 10-20% deep leached sand rises and occasional swampy flat.</p> <p><b>MKB</b> Gently sloping rises and dunes.  <b>MKF</b> Steep rises.</p> <p>Main soils:  <b>Gentle Rises:</b> <u>Bleached sand over sandy clay loam</u> - <b>G2</b>, and <u>Bleached siliceous sand</u> - <b>H3</b>.  <b>Steep rises:</b> <u>Shallow sandy loam on calcrete</u> - <b>B3</b>, <u>Rock or exposed calcrete</u> - <b>RR</b> and <u>Shallow sandy loam over red-brown clay on calcrete</u> - <b>B6</b>.  <b>Dunes:</b> <u>Highly leached sand</u> - <b>I1</b>.</p>
		Dune	I1	L	
MKF	0.1	Rise	B3RRB6	D	
MLYC	13.3	Rise	B3H3	D	<p>High dune core topography with shallow sand over calcrete and high dunes with deep siliceous sand.</p> <p>Main soils: <u>Shallow sandy loam on calcrete</u> - <b>B3</b> and <u>Bleached siliceous sand</u> - <b>H3</b>.</p>
MNB	6.1	Rise	H3G3	D	<p><b>MNB</b> Gently sloping rises with deep siliceous sand and sand over brown clay.</p> <p><b>MNC</b> Undulating rises with shallow sand over calcreted calcarenite, 20-30% deep siliceous sand on dunes and &lt;10% swales with sandy loam/loam over red clay on calcreted calcarenite.</p> <p>Main soils:  <b>Rises:</b> <u>Bleached siliceous sand</u> - <b>H3</b>, <u>Shallow sandy loam on calcrete</u> - <b>B3</b> and <u>Thick sand over clay</u> - <b>G3</b>.  <b>Dunes:</b> <u>Highly leached sand</u> - <b>I1</b> and <u>Bleached siliceous sand</u> - <b>H3</b>.  <b>Swales:</b> <u>Shallow sandy loam over red-brown clay on calcrete</u> - <b>B6</b> and <u>Shallow red loam on limestone</u> - <b>B4</b>.</p>
MNC	3.5	Rise	B3	V	
		Swale	B6B4	M	
MRB	1.9	Rise	B6H3	V	<p><b>MRB</b> Gently sloping calcreted dune range with very shallow red and brown loam/red clay soils and deep leached sand or sand/clay rises.</p> <p><b>MRBF</b> As above with flinty soils.</p> <p>Main soils:  <b>Rises:</b> <u>Shallow sandy loam over red-brown clay on calcrete</u> - <b>B6</b> and <u>Bleached siliceous sand</u> - <b>H3</b>.  <b>Plains:</b> <u>Sand over friable brown clay on calcrete</u> - <b>B7</b> and <u>Thick sand over clay</u> - <b>G3</b>.</p>
		Plain	B7G3	C	
MRBF	9.1	Rise	B6H3	V	
		Plain	B7G3	C	
MSB	0.2	Rise	H3G3	V	<p><b>MSB</b> Gently sloping dune range with deep siliceous neutral to acid sands and sand over brown poorly structured clay soils. 30-60%</p>
		Swale	B3B6	E	



MSC	2.3	Rise	H3B3	V	swales with shallow sandy loam, often on red clay, over calcrete. <b>MSC</b> Undulating dune range with deep and shallow yellow to bleached sands over calcreted calcarenite.  Main soils: <b>Rises:</b> <u>Bleached siliceous sand - H3</u> , <u>Shallow sandy loam on calcrete - B3</u> and <u>Thick sand over clay - G3</u> . <b>Swales:</b> <u>Shallow sandy loam on calcrete - B3</u> and <u>Shallow sandy loam over red-brown clay on calcrete - B6</u> . <b>Dunes:</b> <u>Highly leached sand - I1</u> .
		Dune	I1	C	
m-A	0.8	Plain	B3RR	D	Calcrete capped Miocene limestone. Very shallow red loam on clay loam over rock. <b>m-A</b> Plain <b>m-CK</b> Undulating dune forms with karst features.  Main soils: <b>Rises and plains:</b> <u>Shallow sandy loam on calcrete - B3</u> and <u>Rock or exposed calcrete - RR</u> .
m-CK	0.4	Rise	B3RR	D	
mUA	6.4	Plain	B3	D	<b>mUA</b> Plain with very dark brown sandy loam on brown sandy clay loam over Miocene limestone. <b>mUEK</b> As above, karstic depression.  Main soils: <u>Shallow sandy loam on calcrete - B3</u> .
mUEK	0.5	Depression	B3	D	
mYA	11.5	Plain	B3	D	<b>mYA</b> Plain with shallow sandy loam over red clay on calcreted Miocene limestone. Clay subsoil is often brown and poorly structured and impermeable/poorly drained. 10-30% rock outcrop. <b>mYB</b> Gently undulating rises with deep bleached acid sands, co-dominant with shallow soils on plains as above.  Main soils: <b>Plains:</b> <u>Shallow sandy loam on calcrete - B3</u> . <b>Rises:</b> <u>Highly leached sand - I1</u> .
mYAK	0.2	Plain	B3	D	
mYB	2.9	Rise	I1	E	
		Plain	B3	E	
NnO	0.1	Plain	A7E1M2	E	Plain with shallow dark, calcareous clay loam over calcrete and deeper cracking clay soils. 20-30% sandy rises, <10% swamps with both peaty and other wet soils.  Main soils: <b>Plains:</b> <u>Calcareous clay loam on marl - A7</u> , <u>Black cracking clay - E1</u> and <u>Deep friable gradational clay loam - M2</u> . <b>Sandy rises:</b> <u>Thick sand over clay - G3</u> . <b>Stony rises:</b> <u>Rubby calcareous loam on clay - A5</u> and <u>Shallow calcareous loam on calcrete - B2</u> . <b>Swamps:</b> <u>Wet clay loam - N3</u> and <u>Peaty soil - N1</u> .
		Sandy rise	G3	C	
		Stony rise	A5B2	L	
		Swamp	N3N1	M	
OFC	0.2	Dune	I1	D	<b>OFB</b> Deep moderately to highly leached siliceous sands on dunes, 10-20% shallow loamy sand, often over red-brown sandy clay loam/clay on calcreted calcarenite. <b>OFD</b> As above, low dunes. <b>OFq</b> As above, low dunes & rises with non-saline, wet swales with dark clays, often calcareous on marl.  Main soils: <b>Dunes:</b> <u>Highly leached sand - I1</u> . <b>Swales:</b> <u>Calcareous clay loam on marl - A7</u> and <u>Shallow dark clay loam on limestone - B5</u> .
OFD	0.1	Low dune	I1	D	
OFq	0.3	Low dune	I1	V	
		Swale	A7B5	L	
OHD	1.3	Low dune	H3I1	D	<b>OHD</b> Low dunes with siliceous bleached sand, <10% swale with shallow sandy loam over redclay on calcarenite. <b>OHq</b> As above, low dunes and rises with non-saline, wet swales with deep wet sand soils. <10% stony rises.  Main soils: <b>Dunes:</b> <u>Bleached siliceous sand - H3</u> , <u>Highly leached sand - I1</u> and
		Plain	B3B6	M	
OHq	1.5	Dune	I2H3	V	
		Plain	I1I2	L	
		Stony range	B3	M	



					<p><u>Wet highly leached sand</u> - <b>I2</b>.</p> <p><b>Stony plains:</b> <u>Shallow sandy loam on calcrete</u> - <b>B3</b> and <u>Shallow sandy loam over red-brown clay on calcrete</u> - <b>B6</b>.</p> <p><b>Stony ranges:</b> <u>Shallow sandy loam on calcrete</u> - <b>B3</b>.</p> <p><b>Sandy plains:</b> <u>Highly leached sand</u> - <b>I1</b> and <u>Wet highly leached sand</u> - <b>I2</b>.</p>
OLD	0.6	Dune	H3G5	D	<p>Low dunes with moderately deep to shallow, bleached acid to neutral sand over calcarenite.</p> <p>Main soils:</p> <p><b>Dunes:</b> <u>Bleached siliceous sand</u> - <b>H3</b> and <u>Sand over acidic clay</u> - <b>G5</b>.</p> <p><b>Stony rises:</b> <u>Shallow sandy loam on calcrete</u> - <b>B3</b>.</p>
		Stony rise	B3	M	
PBA	0.1	Plain	I1	D	<p>Sand plain with well-drained, deep, leached siliceous sands.</p> <p>Main soils: <u>Highly leached sand</u> - <b>I1</b>.</p>
XuC	<0.1	Swamp	N3	D	<p>Swamp with wet, non-peat soils.</p> <p>Main soils: <u>Wet clay loam</u> - <b>N3</b>.</p>

# PROPORTION codes assigned to Soil Landscape Unit (SLU) components:

- D Dominant in extent (>90% of SLU)
- V Very extensive in extent (60–90% of SLU)
- E Extensive in extent (30–60% of SLU)
- C Common in extent (20–30% of SLU)
- L Limited in extent (10–20% of SLU)
- M Minor in extent (<10% of SLU)

### Detailed soil profile descriptions:

- A5** Rubbly calcareous loam on clay (Supracalcic-Lithocalcic Calcarosol on clay)  
 Calcareous sandy-clay loamy topsoil grading into loamy-clay loamy subsoil on a clayey substrate. Usually (always?) rubbly. Clayey substrate (Blanchetown Clay equivalent: Imc or heavier) occurs at >60 cm(?) and <120 cm.
- A7** Calcareous clay loam on marl (Marly Calcarosol)  
 Dark calcareous clay with a marly subsoil (often saline in Upper SE). Often with shells and a peaty surface.
- B2** Shallow calcareous sandy loam on calcrete (Petrocalcic Calcarosol)  
 Up to 40 cm calcareous loamy sand to sandy loam with variable calcrete rubble overlying calcreted calcarenite - rises.
- B3** Shallow sandy loam on calcrete (Petrocalcic Rudosol)  
 Medium thickness non calcareous sandy loam, often having a slight clay increase with depth, over calcreted calcarenite shallower than 50 cm - rises.
- B4** Red sandy loam over calcrete (Petrocalcic, Red Dermosol)  
 Medium thickness red sandy loam grading to friable red clay loam over calcreted calcarenite within 50 cm - rises.
- B5** Shallow dark clay loam on limestone (Petrocalcic, Black Dermosol)  
 Black clay loam to light clay over calcreted limestone at shallow depth, grading to highly calcareous clay - flats.



- B6** Shallow sandy loam over red-brown clay on calcrete (Petrocalcic, Red Kandosol)  
Medium thickness sandy loam with slight ironstone gravel overlying a weakly structured reddish brown sandy clay on calcarenite within 50 cm - rises.
- B7** Shallow sand over sandy clay on calcrete (Petrocalcic, Brown Chromosol)  
Medium thickness sand overlying brown friable sandy clay to clay on limestone or calcreted sandy clay within 50 cm - flats.
- E1** Black cracking clay (Black Vertosol)
- G2** Bleached sand over sandy clay loam (sandy Brown-Red Chromosol)  
Sandy texture contrast soil with a bleached A2 and a friable brown-red sandy clay loam to sandy loam subsoil.
- G3** Thick sand over clay (Hypercalcic, Brown Sodosol/ Chromosol)  
Thick bleached sand with an organically darkened surface abruptly overlying a massive to coarsely structured brown to reddish yellow sandy clay to clay, calcareous with depth - rises.
- G5** Sand over acidic clay (Sandy Brown Kurosol)  
Sandy texture contrast soil with a friable brown strongly acidic clayey to clay loamy subsoil. Very acidic soil; incipient Bh horizons; moderate depth topsoils. Some with ironstone.
- H3** Deep bleached sand (Basic, Arenic, Bleached-Orthic Tenosol)  
Grey sand over a very thick bleached sand grading to yellow sand continuing below 100 cm.
- I1** Highly leached sand (Fragic, Pipey, Aeric Podosol)  
Grey sand with a very thick bleached A2 layer, over dark brown and yellow massive soft to semi-hard clayey sand (coffee rock), grading to softer yellow and brown sand to sandy clay loam from about 80 cm.
- I2** Wet highly leached sand (Fragic, Humic, Aquic Podosol)  
Grey sand with a thick bleached A2 horizon, overlying a thin to thick layer of coffee rock, grading to pale brown sand sharply overlying a grey, brown and yellow mottled sandy clay loam to light clay.
- M2** Deep friable gradational clay loam (Red-Brown-Grey- Black Dermosol)  
Deep well structured red clay loamy soil.
- N1** Peat (Organosol)  
Peaty soil
- N3** Seasonally waterlogged, non to marginally saline equivalents of soils listed above, viz.:  
**N3c** Wet **G3**  
**N3d** Wet **B5**  
**N3e** Wet **B7**
- RR** Bare rock

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

