

Supplement 4 to the 3rd Edition of the Soil Data Entry Handbook

for the NSW Soil And Land Information System (SALIS)

The 2-page Biophysical Strategic Agricultural Land Soil Data Card

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1 INTRODUCTION

1.1 Preamble

This document describes the additional additions and changes released as part of the 2-page Biophysical Strategic Agricultural Land Soil Data Card. This card has been developed to support the description of on-site soil and land information required for the process of seeking verification of whether or not land mapped as BSAL meets the BSAL criteria, as required for certain types of developments under the *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) Amendment 2013*. These requirements are documented in the *Interim Protocol for site verification and mapping of biophysical strategic agricultural land* (NSW Government 2013).

This document supplements the *Soil Data Entry Handbook*, 3rd edition (Milford *et al.* 2001) and describes only those attributes specific to the 2-page BSAL Soil Data Card. This supplement should be used together with the *Handbook*, in which the rest of the fields on the 2-page BSAL Soil Data Card are described, and with the *Interim Protocol*, which describes the process of site assessment of BSAL and its various requirements.

1.2 Standards and References

In keeping with Australian standards for scientific terminology in soil science, terms and definitions found in this document follow:

RC McDonald, RF Isbell, JG Speight, J Walker and MS Hopkins 1990, *Australian Soil and Land Survey Field Handbook* (2nd edn), Inkata Press, Melbourne, Vic., Aust.

We acknowledge permission granted by the copyright owners to use these definitions.

For ease of use, definitions of values are generally not sourced within the text. Other than Macdonald *et al.* (1990) as noted, additional sources include:

Abraham, SM and Abraham, NA 1996, *Soil Data System Site and Profile Information Handbook*, NSW Dept of Land and Water Conservation, Sydney, NSW, Aust.

Bates, RL and Jackson, JA (eds) 1984, *Dictionary of Geological Terms*, 3rd edn, Doubleday, New York, USA.

Gary, M, MacAfee, R and Wolf, CL (eds) 1972, *Glossary of Geology*, American Geological Inst., Washington DC, USA.

Moore, WG 1988, *The Penguin Dictionary of Geography*, 7th edn, Penguin, London, UK.

Morse, RJ, Atkinson, G and Craze, B 1982, *Soil Data Card Handbook*, Soil Conservation Service of NSW Technical Handbook No. 4, Sydney, NSW, Aust.

Murphy, C, Fogarty, P and Ryan, P 1998, *Soil Regolith Stability Classification for State Forests in Eastern NSW*, Technical report No. 41, DLWC, NSW, Aust.

The following publication contains a complete list of referenced work (3 References) and describes the non-unique attributes and values on the 2-page BSAL Soil Data Card:

Milford, HB, McGaw, AJE and Nixon, KJ (eds) 2001, *Soil Data Entry Handbook*, 3rd edn, NSW Dept of Land and Water Conservation, Sydney, NSW, Aust.

The following publication outlines the process for seeking verification of whether or not land mapped as BSAL meets the BSAL criteria, as required for certain types of developments under the *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) Amendment 2013*.

NSW Government 2013, *Interim protocol for site verification and mapping of biophysical strategic agricultural land*, NSW Government.

1.3 Explanation of Text Format

The text of this document is formatted into five different styles:

- ☞ Base font is used for general descriptions and explanations.
- ☞ Database terms such as ATTRIBUTE appear in SMALL CAPITALS, as do characteristics of attributes, e.g., size, type.
- ☞ Feature names are set in BOLD CAPITALS.
- ☞ The attributes of each feature are printed in **boldface**.
- ☞ The values of an attribute are printed in *italics* with a definition in smaller type following where necessary.

1.4 The 2-page BSAL Soil Data Card

This card appears as blue text on white, 1 double-sided page. This modified version of the 2-page card incorporates a number of changes and new ATTRIBUTES that support the data requirements of the *Interim Protocol for site verification and mapping of biophysical strategic agricultural land* (NSW Government 2013), including new fields for **potential BSAL**, **site type**, **microrelief depth and extent** and **photo file name/s**, plus additional values for **slope measurement method**, **rock outcrop %** and **mottle abundance**. The *Interim Protocol* should be consulted for detailed information about the requirements of site description for on-site BSAL assessment.

1.5 Numbers of Values

This card provides an indication of the maximum number of VALUES that can be recorded for each ATTRIBUTE, in parentheses following the ATTRIBUTE name. Some examples of its usage follow:

- ↳ **Site Morphology (1)** indicates that a maximum of 1 value may be recorded for this ATTRIBUTE;
- ↳ **Surface Condition (2 each)** indicates that a maximum of 2 VALUES may be recorded for each ATTRIBUTE within the **Surface Condition** section, comprising **Current**, **Expected (Wet)** and **Expected (Dry)**;
- ↳ **Sample Taken (3 per layer)** indicates that a maximum of 3 VALUES may be recorded for each **layer** described on the Soil Data Card.

2 EXPLANATION OF TERMS AND ATTRIBUTES

2.1 Biophysical Strategic Agricultural Land

ATTRIBUTES and VALUES

2.1.1 Potential BSAL

CHOICE, 1 VALUE ONLY

This field allows an appropriately qualified soil scientist to record, in their expert opinion, whether the site is likely to be in an area of BSAL—i.e., whether the site meets the definition of BSAL as defined by the *Interim Protocol* (NSW Government 2013).

Reference List of VALUES

- 1 *yes*
- 2 *no*

2.1.2 Site Type

CHOICE, 1 VALUE ONLY

This field allows the type of site being described to be recorded, using the three types defined in the *Interim Protocol* (NSW Government 2013), from which the following definitions are drawn.

Reference List of VALUES

- 1 *checked* These **sites** are to be examined in sufficient detail to allow their allocation to a soil type and soil map unit. They are typically used to accurately position the boundaries of soil map units, to describe the variability within a soil map unit and to validate soil predictions.
- 2 *detailed* These **sites** are to be examined in sufficient detail to allow all major landscape and physical and chemical soil features of relevance to BSAL to be clearly identified. Their location should be representative of the soil type being assessed and each site should have attributes that are typical for that soil. Their description should be accompanied by a photograph of the site and of the soil profile (or soil material) being described.
- 3 *exclusion* These are observation sites used only within areas that fail the obvious landscape requirements of the BSAL classification, e.g., slope, rock outcrop, surface rockiness or gilgai microrelief. Neither detailed soil profile description nor soil survey is necessary.

2.2 Topography

ATTRIBUTES and VALUES

2.2.1 Slope Percent

PERCENTAGE, 1 VALUE ONLY, RIGHT JUSTIFIED

The slope of the **land** at each **site** is the tangent of the ground surface, from the horizontal angle, an incline upwards or downwards expressed as a percentage (Morse *et al.* 1982). If the **site** is an excavation, record the probable natural **slope** prior to disturbance.

The **slope** field on the BSAL Soil Data Card allows **VALUES** to be recorded to 1 decimal place—e.g., 19.5%.

2.2.2 Slope Measurement Method

CHOICE, 1 VALUE ONLY

Indicate which method was used to measure the slope at the **site**.

Reference list of VALUES

- 3 *inclinometer* A basic hand-held instrument used for visually measuring inclines of slope, usually known as a clinometer.
- 4 *Abney level* A surveying instrument consisting of a fixed sighting tube, moveable spirit level connected to a pointing arm, and a protractor scale, providing a more accurate measurement of slope than a hand-held instrument.
- 5 *total station* An electronic/optical instrument that typically includes an electronic theodolite integrated with an electronic distance meter; capable of greater accuracy of measurement than purely optical instruments, modern total stations typically log survey information to internal or external data storage.

- | | | |
|---|----------------|---|
| 6 | <i>RTK GPS</i> | Real-Time Kinematics (RTK) provides enhanced accuracy of location and measurement to a Global Positioning System (GPS) by deploying carrier phase tracking via a fixed base station and several mobile stations, allowing relative calculation of location to potentially millimetric accuracy. |
| 7 | <i>LIDAR</i> | Laser Imaging Detection and Ranging (LIDAR) provides highly accurate landform imaging capable of detecting subtle topographic features and providing accurate measurements of slope across a surveyed area. LIDAR imagery is typically collected by airborne sensors and requires a Geographic Information System (GIS) for analysis and display. |

2.2.3 Microrelief Depth and Extent

CHOICE, 1 VALUE EACH FOR DEPTH AND EXTENT

These paired fields allow the user to describe the depth and extent of gilgai microrelief features using the threshold values defined by the *Interim Protocol* (NSW Government 2013) as being significant for determination of BSAL.

Reference list of VALUES

Depth

- | | | |
|---|-------------------------|---|
| 1 | <i>≤500 mm depth</i> | The gilgai microrelief features observed at the site are less than or equal to 500 mm deep beneath the prevailing land surface at their deepest point. |
| 2 | <i>>500 mm depth</i> | The gilgai microrelief features observed at the site are greater than 500 mm deep beneath the prevailing land surface at their deepest point. |

Extent

- | | | |
|---|---------------------|--|
| 1 | <i>≤50% area</i> | The gilgai microrelief features observed at the site cover less than or equal to 50% of the land surface. |
| 2 | <i>>50% area</i> | The gilgai microrelief features observed at the site cover more than to 50% of the land surface. |

2.3 Lithology

ATTRIBUTES and VALUES

2.3.1 Rock Outcrop

Rock in this context refers specifically to outcrop of the *in situ* material, i.e., **substrate**, within a radius of 10 m from the **profile**, and not to loose rocks (or 'floaters') which may be of a colluvial origin. Surficial rock fragments, partially buried boulders and other stones are identified in **COARSE FRAGMENTS**.

Additional **VALUES** have been added to this field to match the threshold values of rock outcrop for definition of BSAL as defined by the *Interim Protocol* (NSW Government 2013).

Reference list of VALUES

- | | |
|---|-----------------|
| 1 | <i>nil</i> |
| 2 | <i><2%</i> |
| 3 | <i>2 – 10%</i> |
| 4 | <i>10 – 20%</i> |
| 7 | <i>20 – 30%</i> |
| 8 | <i>30 – 50%</i> |
| 6 | <i>>50%</i> |

2.4 Site Field Notes

ATTRIBUTES and VALUES

2.4.1 Photo File Name/s

ALPHANUMERIC FIELD, UP TO 100 CHARACTERS

This field allows the surveyor to record the file name/s of the photograph/s they took to support their description of the site.

2.5 Mottles

ATTRIBUTES and VALUES

2.5.1 Mottle Abundance

CHOICE, 1 VALUE ONLY

A minor change to the VALUES for this field has been incorporated into the BSAL Soil Data Card to allow the user to definitively record the absence of mottles.

Reference list of VALUES

- 6 *not evident*
- 2 <2%
- 3 2 – 10%
- 4 10 – 20%
- 5 20 – 50%
- 6 >50%