

Appendix B

Agricultural Resource Assessment



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Agricultural Resource Assessment for Gateway Certificate Application: “Narrabri Underground Mine Stage 3 Extension Project”, Narrabri, NSW

Prepared for Narrabri Coal Operations Pty Ltd



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INFORMATION SOURCES AND REFERENCING

This report was derived from an extensive range of information sources including literature review and discussions with colleagues and landholders. The author has sought to ensure that sources for his use of text, diagrams, maps and images are provided in the report. If the author inadvertently has failed to adequately acknowledge a source of material used, he would appreciate prompt notification so that the matter can be corrected in the electronic version of the document and a full acknowledgement provided.

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EXECUTIVE SUMMARY

The Narrabri Mine is an existing underground coal mining operation situated in the Gunnedah Coalfield. The mine is located approximately 25 kilometres (km) south-east of Narrabri and approximately 60 km north-west of Gunnedah, within the Narrabri Shire Council Local Government Area, in the New England North West region of New South Wales (NSW).

Narrabri Coal Operations Pty Ltd (NCOPL) is seeking to extend the underground mining areas at the Narrabri Mine to gain access to additional areas of run-of-mine (ROM) coal reserves within Exploration Licence (EL) 6243. This extension would also include an increase in ROM coal production rate (from 11 million tonnes per annum (Mtpa) to 13 Mtpa), development of supporting infrastructure, an extension to the mine life and continued use of existing infrastructure. The proposal is herein referred to as the Narrabri Underground Mine Stage 3 Extension Project (the Project).

As part of this application, NCOPL is seeking a Gateway Certificate for the area to the south of the existing mining lease within EL 6243 (herein referred to as the Gateway Certificate Application Area).

The *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (Mining SEPP) includes mapping of lands identified as biophysical strategic agricultural land (BSAL). As the Mining SEPP shows regionally mapped BSAL within the Gateway Certificate Application Area, this Agricultural Resource Assessment has been prepared to:

- Describe the agricultural resources (focusing on soil resources) of the lands associated with the Gateway Certificate Application Area.
- Identify areas of BSAL in accordance with the *Interim Protocol for site verification and mapping of biophysical strategic agricultural land* (NSW Government, 2013) (the Interim Protocol).
- Assess the potential impacts on agricultural productivity in the Gateway Certificate Application Area as a result of the Project.
- Recommend management measures for agricultural resources, with emphasis on soil assessment and management in the Gateway Certificate Application Area.

Sixty-nine soil test pits were excavated to verify BSAL within the Gateway Certificate Application Area.

Approximately 106.5 hectares (ha) of Interim Protocol Verified BSAL is located within the approximately 3,789 ha Gateway Certificate Application Area. An additional 95.3 ha has been interpreted as BSAL using desktop methods, where access was not available for soil surveys. The remainder of the Gateway Certificate Application Area has a broad range of constraints that preclude the land from being classified as BSAL, including physical barriers (rock close to surface), impeded subsoil drainage, chemical barriers (layers with salinity, alkalinity, acidity and/or sodicity limitations) and excessive slope (>10%).

The Project would not result in subsidence to the majority of the Interim Protocol Verified BSAL identified within the Gateway Certificate Application Area.

Possible impacts to agricultural productivity as a result of the Project would be associated with temporary loss of land due to construction of mine infrastructure (e.g. surface facilities) and potential subsidence impacts.

With the implementation of subsidence management measures for surface cracking, topographical depressions and localised slope changes, and the remediation of land disturbed by surface infrastructure, it is considered that there would be no significant change to the long-term agricultural productivity of the Gateway Certificate Application Area as a result of the Project.

1 INTRODUCTION

The Narrabri Mine is an existing underground coal mining operation situated in the Gunnedah Coalfield. The mine is located approximately 25 kilometres (km) south-east of Narrabri and approximately 60 km north-west of Gunnedah, within the Narrabri Shire Council Local Government Area, in the New England North West region of New South Wales (NSW) (Figure 1).

The Narrabri Mine is operated by Narrabri Coal Operations Pty Ltd (NCOPL) (a wholly owned subsidiary of Whitehaven Coal Limited) on behalf of the Narrabri Mine Joint Venture, which consists of Whitehaven Coal Limited's wholly owned subsidiary Narrabri Coal Pty Ltd (70 percent [%]), Upper Horn Investments (Australia) Pty Ltd (7.5%), J-Power Australia Pty Limited (7.5%), EDF Trading Australia Pty Limited (7.5%), and Posco Daewoo Narrabri Investment Pty Limited and Kores Narrabri Pty Limited (7.5%).

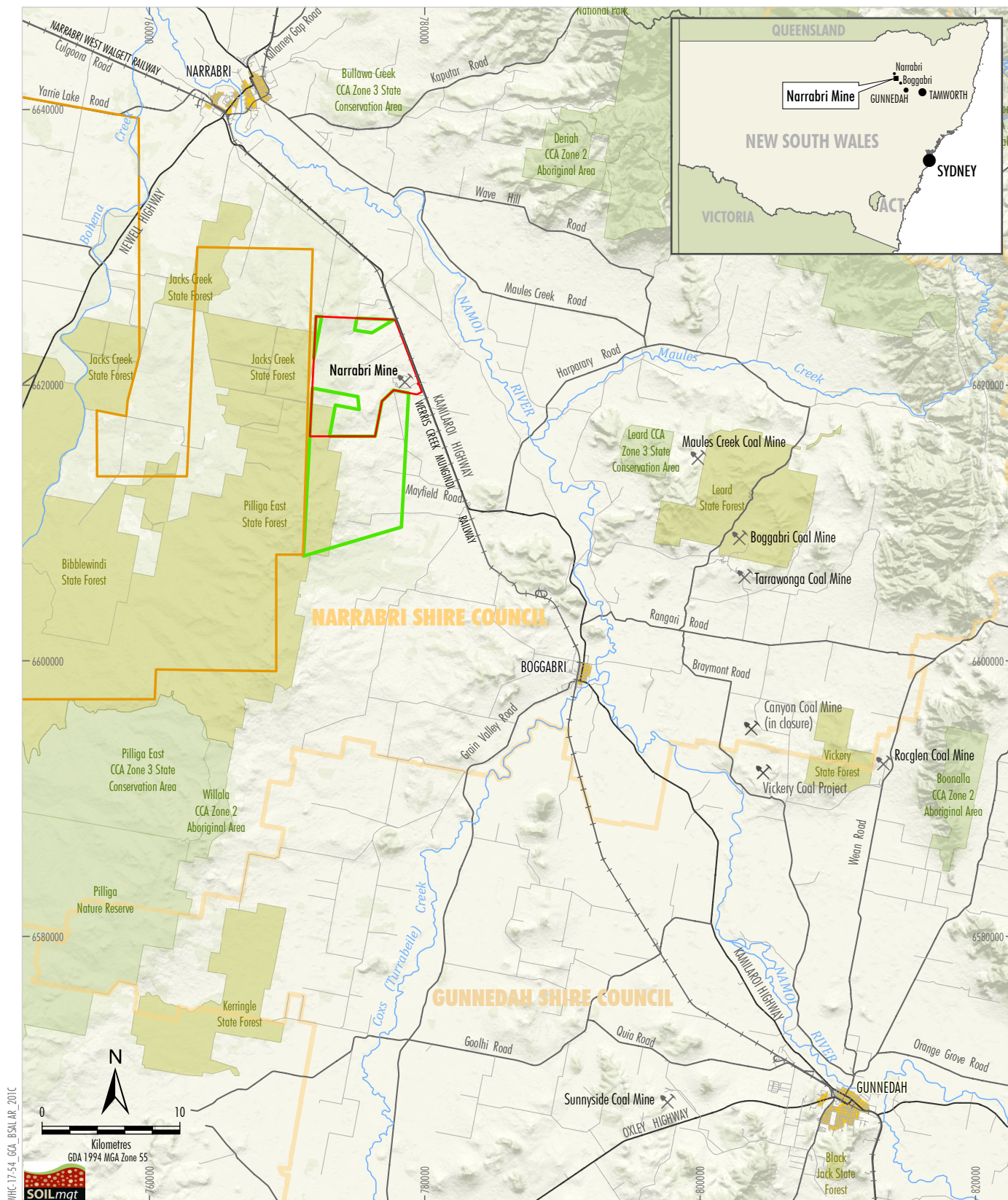
The Narrabri Mine extracts coal from the Hoskissons Seam using underground longwall mining methods. Project Approval 08_0144 allows for the production and processing of up to 11 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal until July 2031. ROM coal is processed at the Narrabri Mine coal handling and preparation plant to produce thermal and pulverised coal injection product coal. Product coal is then transported from site by rail.

NCOPL is seeking to extend the underground mining areas at the Narrabri Mine to gain access to additional areas of ROM coal reserves within Exploration Licence (EL) 6243. This extension would also include an increase in ROM coal production rate to 13 Mtpa, development of supporting infrastructure, an extension to the mine life and continued use of existing infrastructure. The proposal is herein referred to as the Narrabri Underground Mine Stage 3 Extension Project (the Project). A detailed description of the Project is provided in the Gateway Certificate Application Technical Overview.

As part of this application, NCOPL is seeking a Gateway Certificate for the area to the south of the existing mining lease within EL 6243 (Figure 2) (herein referred to as the Gateway Certificate Application Area).

This Agricultural Resource Assessment accompanies the Gateway Certificate Application and the objectives of the assessment presented in this report were to:

- Describe the agricultural resources (focusing on soil resources) of the lands associated with the Gateway Certificate Application Area.
- Identify areas of biophysical strategic agricultural land (BSAL) in accordance with the *Interim Protocol for site verification and mapping of biophysical strategic agricultural land* (NSW Government, 2013) (the Interim Protocol).
- Assess the potential impacts on agricultural productivity in the Gateway Certificate Application Area as a result of the Project.
- Recommend management measures for agricultural resources, with emphasis on soil assessment and management in the Gateway Certificate Application Area.



WHITEHAVEN COAL

NARRABRI STAGE 3 PROJECT

Regional Location

Figure 1

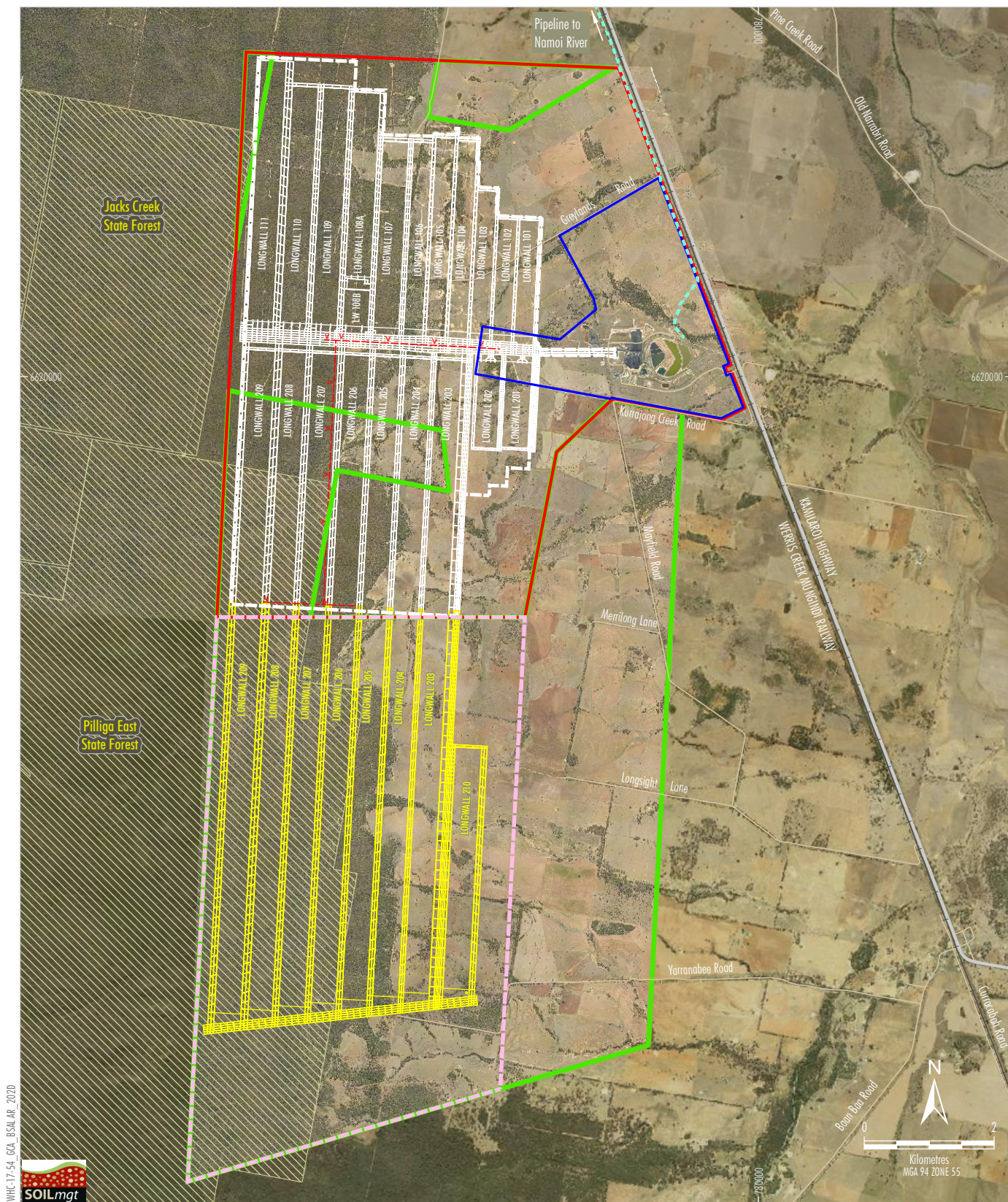


Figure 2

2 SITE DESCRIPTION AND EXISTING INFORMATION

2.1 Site Description

The Narrabri Mine is located in the New England North West region of NSW, which includes the Namoi River valley and associated agricultural land uses and elevated, vegetated country managed as State Forests and National Parks.

Topography in the vicinity of the Narrabri Mine is characterised by the vegetated, hilly country of Jacks Creek State Forest and Pilliga East State Forest to the west, grading down to the alluvial plains associated with the Namoi River approximately 7 km to the east.

At the Narrabri Mine site, topography ranges from approximately 370 metres (m) Australian Height Datum (AHD) in the south-west to approximately 240 m AHD in the east.

Land use at the Narrabri Mine (apart from coal mining) varies from east to west, reflecting topography and increasing vegetation cover. The eastern portion of the Narrabri Mine is predominantly cleared (except for some remnant riparian vegetation in some places) with land uses including grazing of cattle, sheep and horses and some limited cereal cropping and horticulture (R. W. Corkery & Co. Pty Ltd, 2009).

To the west, vegetation cover increases with topography to the Pilliga East State Forest and Jacks Creek State Forest, which are managed by the Forestry Corporation of NSW.

The Namoi River Valley is situated between the tropical and temperate climatic zones. The long term mean annual rainfall at the nearby meteorological station of Narrabri West Post Office is 658.5 millimetres (mm) (Bureau of Meteorology, 2018).

The *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (Mining SEPP) includes mapping of lands identified as BSAL. There is regionally mapped BSAL in the Mining SEPP within the Gateway Certificate Application Area (Figure 3).



- LEGEND**
- State Forest
 - Mining Lease Boundary (ML 1609)
 - Exploration Licence (EL 6243)
 - Gateway Certificate Application Area
 - Mining SEPP Potential BSAL
 - Low Risk to Agricultural Resources
 - Moderate to High Risk to Agricultural Resources
 - Soil Test Pit

WHITEHAVEN COAL

NARRABRI STAGE 3 PROJECT

Regionally Mapped BSAL within the Gateway Certificate Application Area

Figure 3

2.2 Existing Information

The following existing information was reviewed as part of this assessment:

- Soil Profile Attribute Data Environment (SPADE) soil profiles (part of the NSW Natural Resource Atlas);
- Gunnedah Coalfield (north) Regional 1:100,000 Geology Map (Pratt, 1998);
- Regional Australian Soil Classification (ASC) Mapping;
- Regional Land and Soil Capability (LSC) Mapping;
- Regional BSAL mapping; and
- Critical Industry Cluster mapping.

A brief summary of relevant information from these sources is provided in the following subsections.

Geology/Parent Materials for Soil Formation

The Gunnedah Coalfield (north) Regional 1:100,000 Geology Map (Pratt, 1998) shows the rock types that are the parent material for soil formation in the vicinity of the Gateway Certificate Application Area (Figures 4a and 4b).

The age of the parent materials decreases from east to west in the Gateway Certificate Application Area. Dark grey siltstone-sandstone (Napperby Formation; Triassic) is overlaid by a broad range of volcanic materials including basalt, trachyte and pyroclastics (Garawilla Volcanics; Jurassic), which, in turn, are overlaid by Pilliga sandstone that currently underlies the western part of the Gateway Certificate Application Area.

eSPADE Soil Profile Database

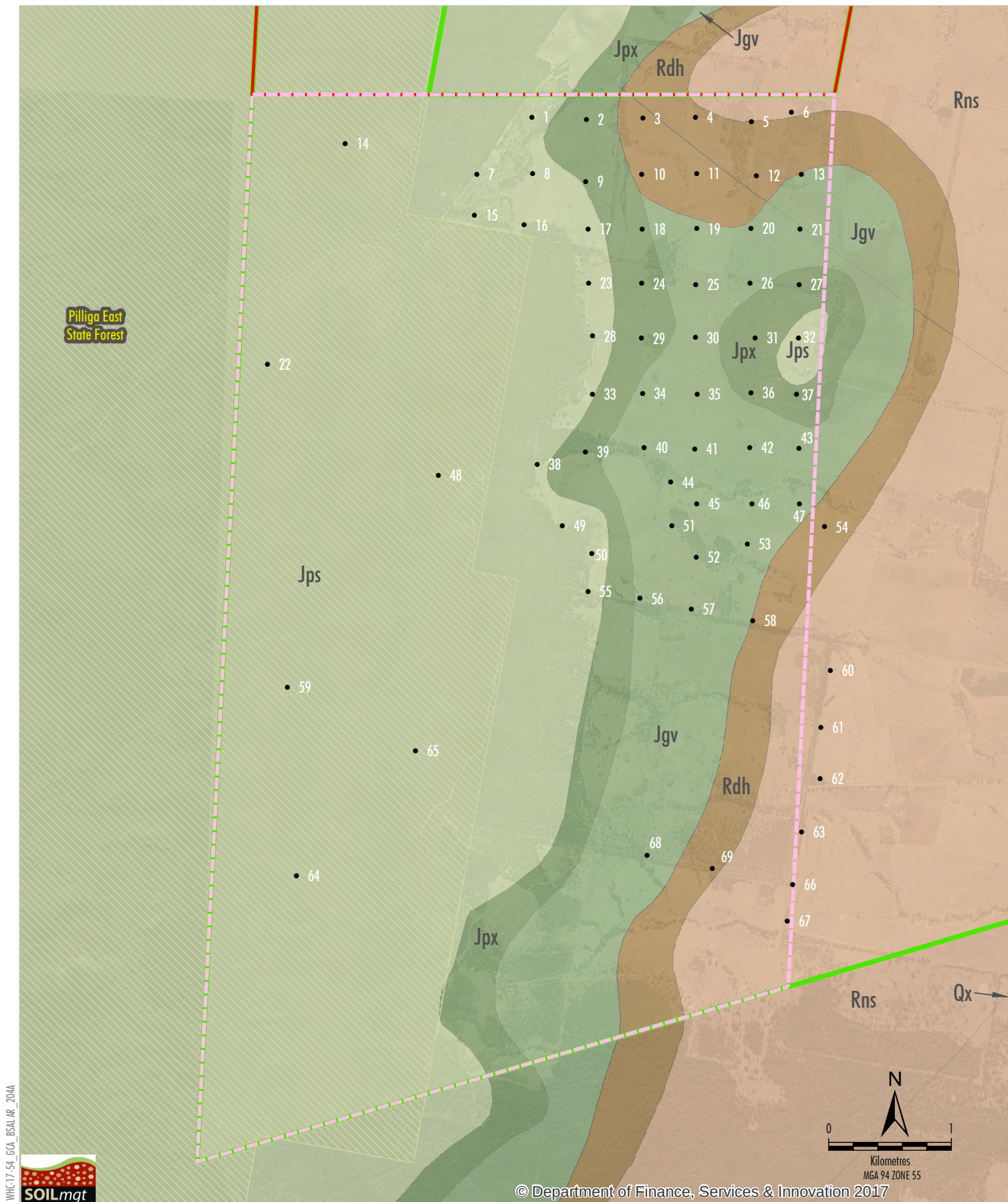
A search of the NSW Government's 'eSPADE' website (part of the NSW Natural Resource Atlas) was conducted to identify any existing soil profile information in the Gateway Certificate Application Area.

There are no eSPADE soil profiles located in the Gateway Certificate Application Area.

Soil Types and Landscapes

Regional ASC mapping available from the NSW Office of Environment and Heritage (OEH) (2017) identifies Vertosols, Sodosols, Rudosols and Tenosols, Ferrosols, and Chromosols in the Gateway Certificate Application Area (Figure 5).

There are no soil landscape maps from the NSW Government for the Gateway Certificate Application Area.



WHC-17-54_GGA_BSAL_AR_204A



LEGEND

- State Forest
- Mining Lease Boundary (ML 1609)
- Exploration Licence (EL 6243)
- Gateway Certificate Application Area
- Soil Test Pit
- Quaternary Undifferentiated Sediments (Qx)
- Pilliga Sandstone (Jps)
- Purlawugh Formation (Jpx)
- Garrawilla Volcanics (Jgv)
- Napperby Formation (Rns)
- Deriah Formation (Rdh)

Note: Refer Figure 4b for Regional Surface Geology Legend

Source: Orthophotos - Whitehaven Coal (2017); R.W. Corkery & Co Pty Ltd (2009); NSW Trade & Investment (2017); NCOPL (2017)



NARRABRI STAGE 3 PROJECT

Regional Surface Geology

Figure 4a