

8 June 2020

Ms Juliana McCosker
Manager, Business Coal Centre – Coal and Central Queensland Compliance
Department of Environment and Science
Queensland Government
99 Hospital Road
Emerald, QLD 4720

**STRICTLY CONFIDENTIAL
COMMERCIAL IN CONFIDENCE
EXEMPT FROM DISCLOSURE UNDER THE RTI ACT**

Dear Ms McCosker,

Acceptance of Retained Infrastructure by Moray Downs Station Landholder

We confirm that Adani Mining Pty Ltd (**AMPL**) holds a Pastoral Lease under the Land Act 1994 on land described as Lot 662 on PH1491. This is the cattle grazing property known as 'Moray Downs'.

AMPL is also the holder of the relevant Mining Leases overlying Moray Downs and as such cannot enter into an agreement with itself with respect to Moray Downs. We note for completeness that AMPL is also the holder of EPML01470513, being the Environmental Authority relevant to the Mining Leases (**EA**).

By this letter and in its capacity as holder of the Pastoral Lease, AMPL provides its consent to retaining the cleaned and stabilised water infrastructure (comprised of clean water runoff drains and water storage areas), roads, fencing and Labona airstrip specified in and as contemplated by the ERC Application (June 2020) lodged with the Department by AMPL for pastoral purposes.

Infrastructure Items

The table below sets out each infrastructure item for which consent to transfer is provided under this letter and are also presented in the attached figure.

Infrastructure Item	Quantity
Water Storage Areas	447.1 hectares
Roads	5.9 km
Fencing	22.0 km
Airfield	21.0 hectares

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Executed by Adani Mining Pty Ltd in its capacity as Pastoral Lease Holder, as Mining Lease Holder and as EA Holder.

Yours sincerely,

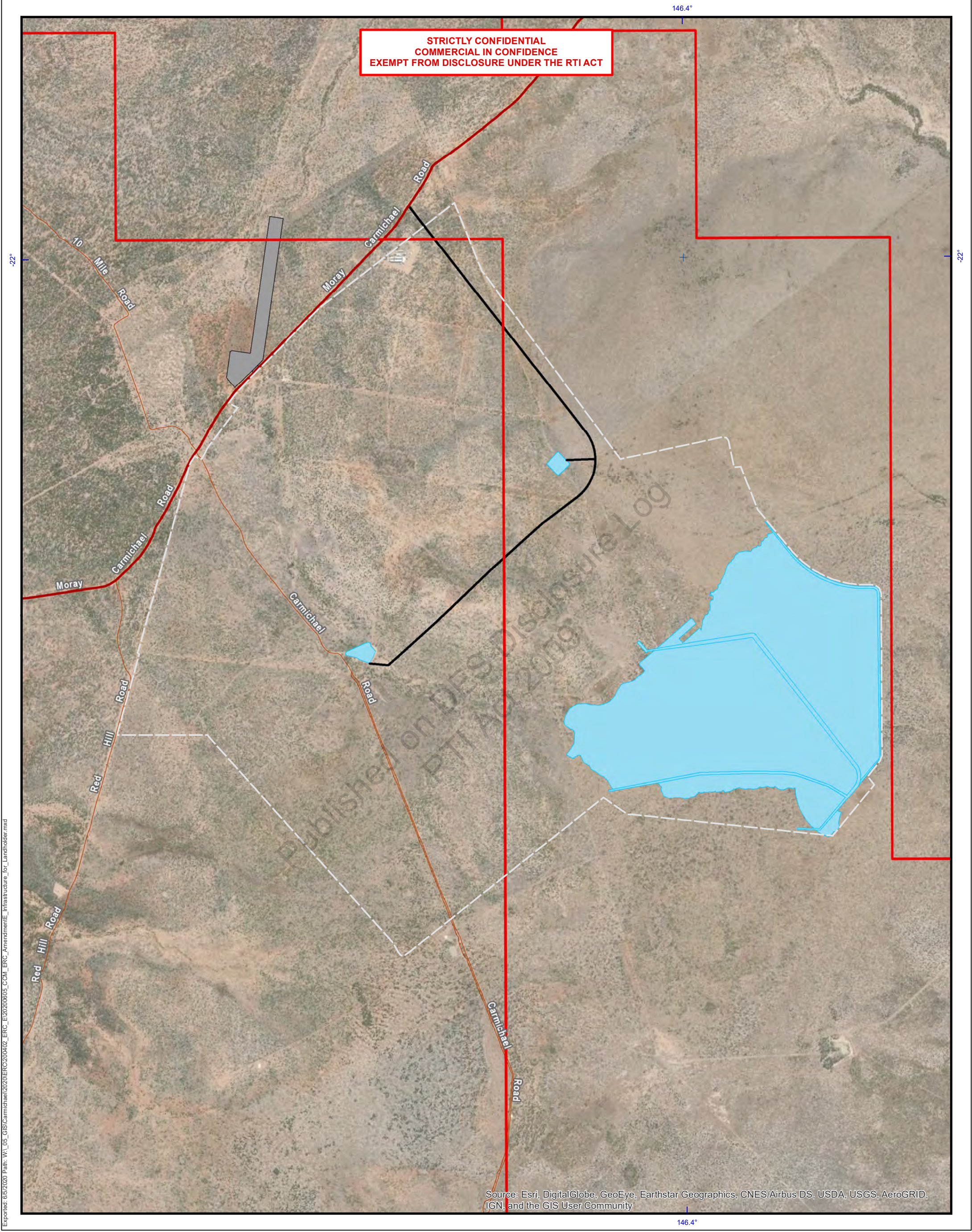
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Attachment – Assets to be Retained for Landholder

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CARMICHAEL COAL MINE PROJECT

EPML01470513

TITLE

Infrastructure for Landholder

20-208

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LOCATION MAP

© State of Queensland (Department of Natural Resources, Mines and

File A

Legend

.....Roads

.....Airfield

.....Water storage area

.....Fence Line

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STATUS

REV0

PROJECT NO CCM

DRAWING No. Infrastructure for Landholder

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Carmichael Coal Mine

Estimated Rehabilitation Cost (ERC)

Operational Plan

June 2020



Document Control & Version Control

<i>Document Title:</i>	<i>Carmichael Coal Mine – ERC Operational Plan</i>
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			<i>Originator</i>	<i>Checked</i>	<i>Approved</i>		
<i>1.0</i>	<i>04/06/2020</i>	<i>Rev 01 New Document</i>	sch4p4(6) Personal information				<i>05/06/2020</i>

Legal Disclaimer

This document contains confidential information regarding Adani's mine, rail and port projects. The information in this document is of a preliminary nature only and will be subject to change as Adani's mine, rail and port projects are further developed. While every effort has been made to ensure that the information provided in this document is correct, Adani does not make any representations or warranties as to the accuracy or completeness of that information. The User should exercise its own independent judgment (and if necessary seek independent expert advice) before relying on any of the information contained in this document.

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Appendix 1 – Summary of Changes within ERC Calculator

Appendix 2 – Material Balance Memo

1. Introduction

Adani Mining Pty Ltd is the holder of Environmental Authority EPML 01470513 (mine EA) for the Carmichael Coal Mine (CCM). This ERC Operational Plan has been prepared to provide an overview of planned activities covered during the ERC period supporting our application for ERC Decision.

A new ERC decision is required to account for additional disturbance increases being planned to develop the CCM. Planned disturbances covered by the ERC period will commence after the ERC decision is finalised.

The ERC plan period is 5 years and the year of maximum liability for this period will occur in 2024.

Further new applications for “ERC Decision” will be required in due course to include additional disturbance areas in line with mine plans to develop the CCM.

2. Project (Mine) Description

2.1 Location and Land Tenure

The CCM is located in the northern part of the Galilee Basin, Central Queensland, approximately 160 km north-west of the town of Clermont (Figure 1). The mine is accessible to the Gregory Development Road via the Elgin Moray and Moray Carmichael Roads which is a 90km unsealed road. The Gregory Development Road is a major inland highway which runs between Clermont and Charters Towers.

Figure 1: Carmichael Coal Mine Location Map



CCM is owned and operated by Adani Mining Pty Ltd.

The underlying land tenure of the CCM is Pastoral Lease located on various Lots and Plans as provided in Table 1 and shown in Figure 2 below:-

Table 1: Description of Underlying Land Tenure for each Mining Lease to which this ERC Application Applies

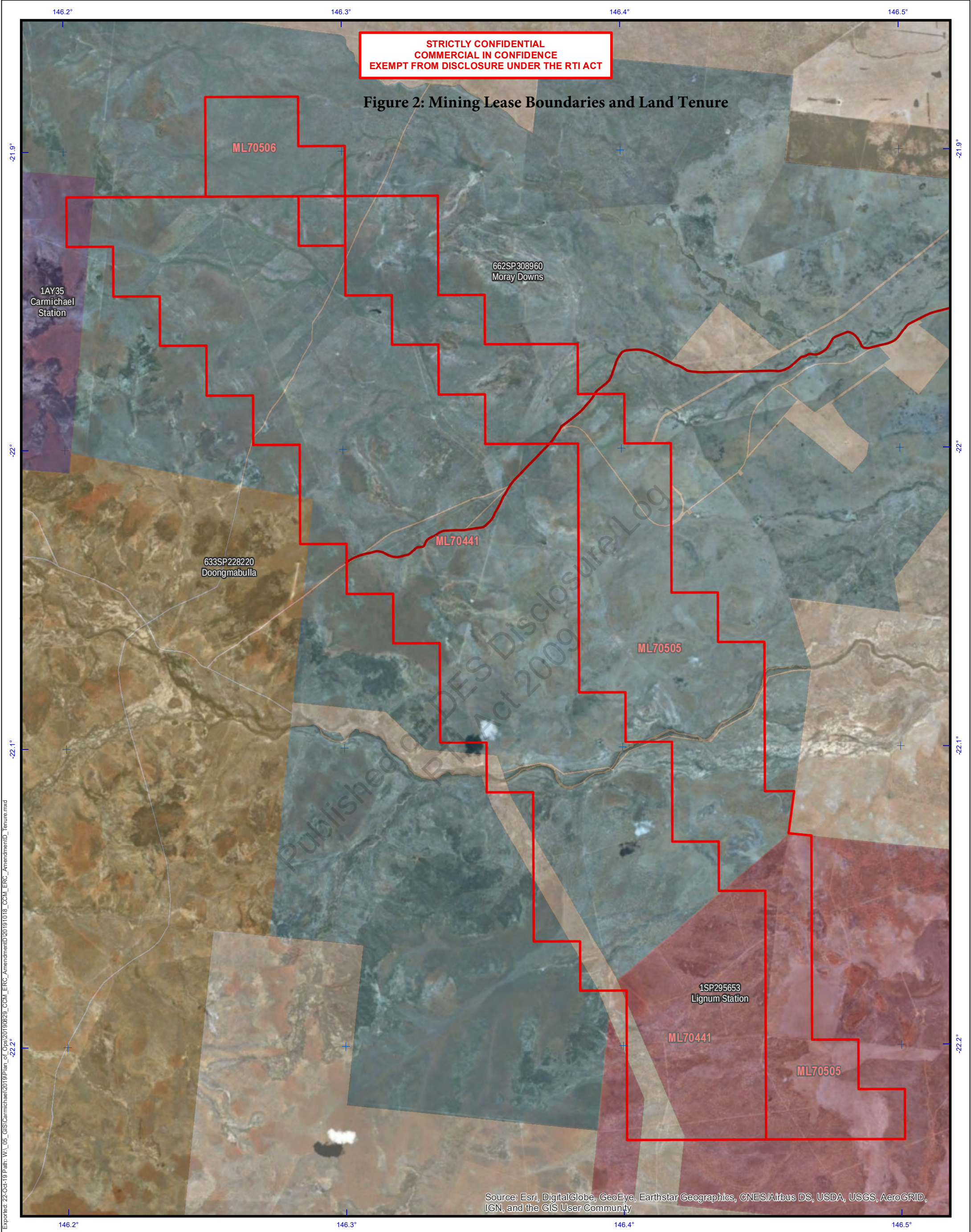
Mining Lease	Land Tenure Details
70441	<ul style="list-style-type: none"> Lot 1 on SP 295653 (Lignum Station) Lot 662 on SP 308960 Pastoral Holding (Moray Downs) Lot 1 on AY35 GHPL 12/2558 (No surface area) (Carmichael Station) Lot 633 on SP 228220 Pastoral Holding 12/663 (No surface area) (Doongmabulla)
70505	<ul style="list-style-type: none"> Lot 1 on SP 295653 Pastoral Holding (Lignum Station) Lot 662 on SP 308960 Pastoral Holding (Moray Downs)
70506	<ul style="list-style-type: none"> Lot 662 on SP 308960 Pastoral Holding (Moray Downs)

Mining Leases details relevant to the mine EA are provided in Table 2.

Table 2: CCM Mining Lease Details for the Mine EA

Mining Lease	Name	Date of Grant	Date of Expiry	Area (Ha)
ML70441	Adani Mining Pty Ltd	3/04/2016	30/04/2046	26,016
ML70505	Adani Mining Pty Ltd	3/04/2016	30/04/2046	13,524.9
ML70506	Adani Mining Pty Ltd	3/04/2016	30/04/2046	1588
Total				41,128.9

The CCM Mining Leases in relation to surrounding properties are shown in Figure 2.



CARMICHAEL COAL MINE PROJECT

EPML01470513

TITLE

Land Tenures

20-208

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LOCATION MAP

File A

Legend

Mine Lease Boundary

1AY35

1SP295653

633SP228220

662SP308960

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STATUS
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PROJECT NO
CCM
DRAWING No.
20191018_CCM_EPC_AppendmentD_Tenure
Page 13 of 67

2.2 Description of Activities Covered by ERC Period

Activities covered by previous Plan of Operation and subsequent amendments (including the last ERC final Decision received on 19th November 2019) which Adani has provided Financial Assurance are still progressing. A complete summary of activities can be seen within the previous application for ERC decision submitted to the Department on 4th October 2019.

Additional activities being planned will increase the disturbance area covered by the previous ERC Decision and are summarised in the following sections. A complete summary of changes to the Department's ERC Calculator are summarised within Appendix 1.

2.2.1 Exploration

Establishment of a pad area(s) required for installing groundwater monitoring bores.

2.2.2 Infrastructure

Labona Camp Upgrade

Further expansion of the Labona Camp involving installation of additional accommodation blocks to increase bedding capacity by another 200 to 250 beds and camp facilities. The camp footprint has increased from 14.44ha to 26.89ha.

Minor Changes to Infrastructure

Footprint area changes to proposed road connecting MIA to Ammonium Nitrate facility, MIA pad, haul roads, mine access road, pipelines and working areas around facilities to accommodate design changes and constructability requirements.

There are also a number of minor changes removing areas that were accounted for as part of the previous ERC to accommodate design changes.

2.2.3 Overburden Dump Piles

Mine Pit Overburden Waste Dump

Additional waste overburden dump footprint area to facilitate foundation establishment and progressive rehabilitation of outer batters. The dump footprint area has increased from 100.13ha to 132.50ha.

Mining operations will commence with the initial boxcut to strip and place overburden into the overburden waste dump. No coal production will occur during the ERC period and all overburden will be placed into the mine pit overburden waste dump. More detail on overburden quantities removed from the mine pit and placement into the overburden waste dump is provided in the material balance memo.

Overburden removed from the pit will consist of extremely weathered to partially weathered geological units above the groundwater table and coal seams. The regolith overburden and interburden are likely to be dominated by non acid forming (NAF) waste types. All mined overburden will be used to construct the overburden waste dump and no segregation of overburden material will be required for the use of encapsulating problematic waste from the pit or required for forming emplacement cells for coal wash fines or rejects during this ERC period.

Topsoil Stockpiles

Minor changes to topsoil storage areas have been accounted for with no overall impact on storage area availability and volume of topsoil being stripped.

2.2.4 Heap Leach Pads

No heap leach pads will be required for the Carmichael Coal Mine.

2.2.5 Tailings Storage Facilities

Future Operational Plans will account for managing co-disposal of coal washplant fines and rejects within the mine overburden waste dump.

As part of the Coal Handling Preparation Plant (CHPP), a dedicated containment system will be constructed within the plant area for directing coal washfines from the wash plant during planned and emergency maintenance activities once the CHPP becomes operational.

No coal will be mined or processed during this ERC period.

2.2.6 Pits

Additional area around the pit perimeter has been allowed for to accommodate ancillary services such as road access and perimeter bunding and survey check points in accordance with mining regulations. The additional footprint for the pit area increases from 27.01ha to 51.48ha to accommodate these ancillary services.

Pit development during the ERC period will be within the oxidised zone above the coal seams and groundwater table. Depth of pit will be up to 25m along the low wall section and up to 35m along the highwall section.

Additional details on mining schedule has been provided in the material balance memo.

2.2.7 Water Storage and Management

Area changes to a number of proposed drainage channels and the raw water dam has been accounted for to accommodate design changes and constructability requirements.

2.2.8 Process Equipment

Area changes to the proposed CHPP lay down area, ROM Pad and CHPP Plant has been accounted for to accommodate design changes and constructability requirements.

2.2.9 Underground Mines

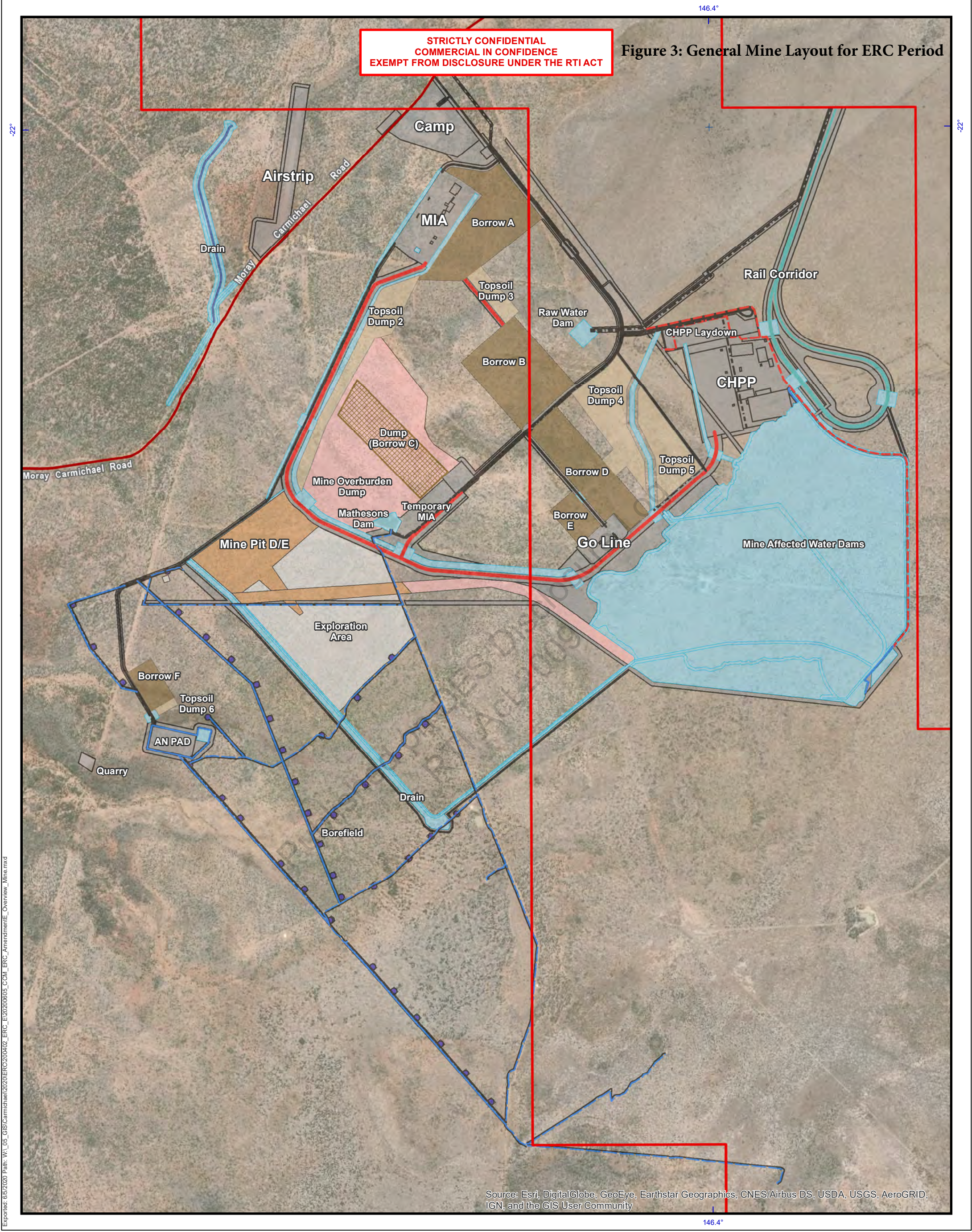
There will be no underground mines developed during the ERC period.

2.2.10 Miscellaneous Activities

There are a number of minor changes as described above that have been accounted for within the miscellaneous tab.

3. General Layout of Planned Activities

The general layout of the planned activities is depicted in Figure 3. It should be noted that depending on ground conditions and final design, the disturbance areas may vary from those marked in Figure 3, but will be consistent with approved disturbance domains under the mine EA.



CARMICHAEL COAL MINE PROJECT

EPML01470513

TITLE

General Mine Layout for ERC Period

20-208

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LOCATION MAP

© State of Queensland (Department of Natural Resources, Mines and

Legend

Access track

Fence

Mine haul road

Other

Pipeline

Rail line

Road

Drillhole

Exploration

Infrastructure

Overburden dump and piles

Pits

Water storage and management

Borrow

Borrow (then Overburden Dump)

Topsoil Dump

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STATUS

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PROJECT NO

CCM

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File A

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4. Rehabilitation and Closure Requirements

ERC Disturbance Area	Description of Rehabilitation activity for the purpose of ERC Activity	Materials Required for Rehabilitation and Closure	General Comments
Exploration	Establishment of a pad area(s) required for installing groundwater monitoring bores	No topsoil is required for the rehabilitation of pad(s).	Pads are rehabilitated by general reshaping, ripping to de-compact areas and application of native species seed mix. Monitoring bores are rehabilitated (may involve grouting if aquifers intercepted, casing cut off below ground, holes capped off).
Infrastructure	Further expansion of the Labona Camp which involves installation of additional accommodation blocks to increase bedding capacity by another 200 to 250 beds and additional facilities. Minor changes to roads and haul roads.	Included in default ERC calculator- Remove infrastructure, Rip, Grade and seed. Topsoil application to roads and haul roads, including accounting for haulage of topsoil from topsoil dumps.	150mm of topsoil has been used as a basis for rehabilitating disturbance. Laydown areas include hardstand areas created by the camp expansion, minor changes to MIA and other facilities.
Pit	Additional working area around the pit perimeter to accommodate ancillary services such as road access and perimeter bunding, survey check points in accordance with mining regulations. The additional footprint for the pit area increases from 38.29ha to 51.48ha to accommodate these ancillary services.	Overburden waste sourced from the waste overburden dump. Included in default ERC calculator Topsoil application including accounting for haulage of topsoil from topsoil dumps. Included in default ERC calculator - Remove, Rip, Grade and seed.	150mm of topsoil has been used as a basis for rehabilitating disturbance.
Overburden Dump	Overburden mined from the pit will require construction of an overburden waste dump covering a footprint area of 132.50ha and consisting of 8.5 Million BCM (10.5 Million LCM - loose cubic metres) of waste overburden. The overburden waste dump landform will be a low profile with a height of 15m and batter profiles shaped to around 7 degrees. A bund wall around the top perimeter of the waste overburden dump will be constructed using waste overburden to prevent erosion from runoff water from the top of the dump on the slopes. No rock drains on the overburden waste dump slopes will be required due to the low profile and gentle slope of the landform being created. There will be no waste overburden that has acid generating or dispersive characteristics mined from the pit during the ERC period due to mining occurring within the oxidised zone. No capping materials will be required to manage these types of waste within the overburden waste dump. No treatment of topsoil with gypsum is required due to soil surveys identifying that the soil is suitable to support proposed rehabilitation. The CHPP will be under construction and will not be processing coal or generating coal wash fines or rejects during the ERC period. There will be no requirement to source or segregate capping materials to manage these waste types within the overburden waste dump.	Included in default ERC calculator.	150mm of topsoil has been used as a basis for rehabilitating disturbance.
Water Storage and Management	All MAW drains & bunds and southern clean water drains & bunds will be cleaned, backfilled and rehabilitated.	Included in default ERC calculator.	SE MAW Dam, CHPP MAW Dam, Raw Water Dam and South Sediment Dam (including Inspection tracks for these four dams), Northern Levee and Northern clean water diversion drain will be handed over to Land owner.
Process Areas	This area includes the majority of processing equipment for CHPP infrastructure such as wash plant, sizing and feeder stations. Large pad areas will include ROM, Product, Reject and Wash Fines emergency containment cell. There will be an assortment of conveyors with varying lengths and height specifications. There will be a reclaim tunnel to transport coal from the product ROM towards the Train Load Out (TLO). Administration and warehouse buildings will be constructed. There will also be a road network connecting areas and water pipelines for dust suppression.	Included in default ERC calculator.	The process facility will be under construction during the ERC period – facilities will not be commissioned or operated during this ERC period.
Miscellaneous	Expanded Labona Camp site investigations.	Not required	Additional site investigations have been applied to the camp which will undergo initial remediation actions including the removal of 0.3m soil from the expanded footprint.



APPENDIX 1

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Carmichael Coal Mine Project – Summary of Calculation Changes to Financial Assurance (FA) from the ERC Approved 19th November 2019

Background:

Adani recently received ERC Decision from the Department on 19th November 2019 and provided relevant Financial Assurance (FA) to the Treasury Department Scheme Manager during December 2019. A new application for ERC Decision is now required to cover additional activities which will result in an increase of disturbance. A summary of the changes are provided below:-

Revised Financial Assurance (FA)

The ERC required for additional disturbances has been re-worked using the Department’s calculator and has resulted in our FA amount increasing from \$24,851,284.91 to \$ 26,298,898.13.

Disturbance Area

Area of disturbance increases from 1793.802ha to 1839.821ha.

ERC Calculator Tab Changes

The changes made within the ERC calculator tabs are summarised as follows:-

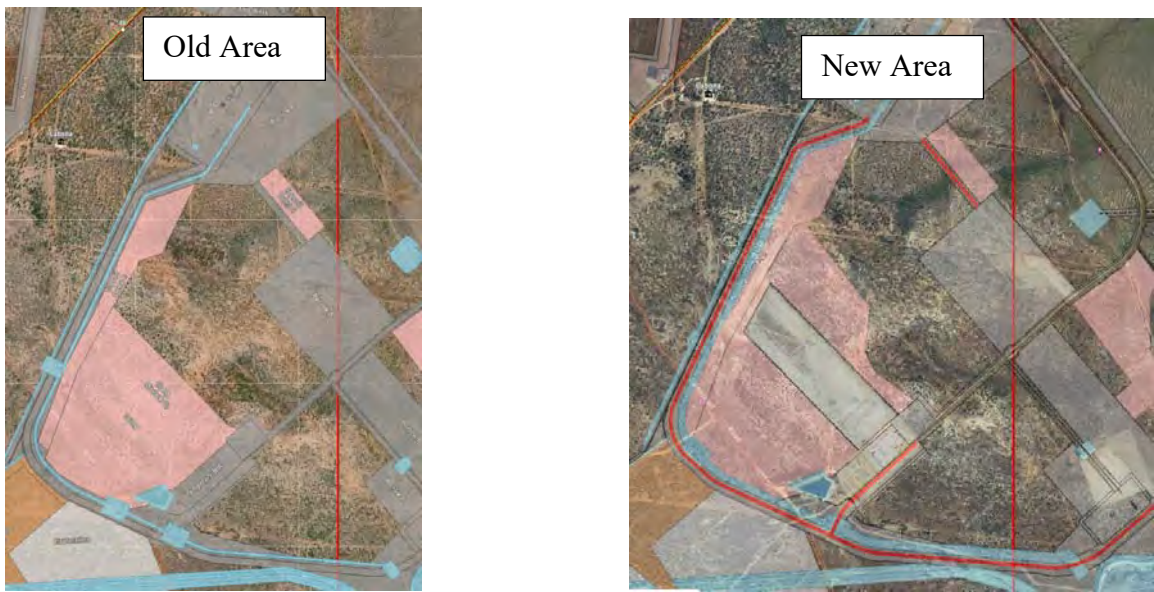
1.0 Changes to Water domain

Major changes

- i. MAW Drain between topsoil dumps 4&5 (Map ID 34) area has been increased from 2.97 ha to 6.703 ha (Corrections made to cell L114 in Infra tab);



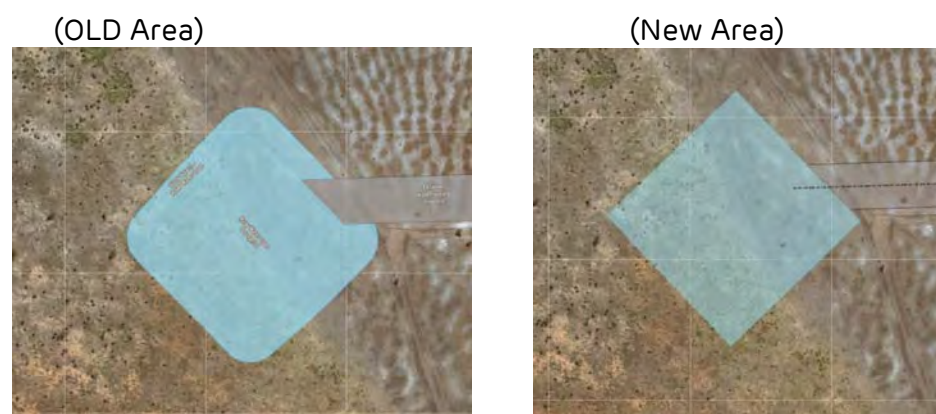
- ii. Drain between HV road and OB dump – Map Id 31 increased from 11.0967 ha to 24.85ha (Corrections made to cell L114 in Infra tab);



- iii. Water Drain from MIA along MV road (Map ID 32) increased from 4.789ha to 7.183 ha (Corrections made to cell L114 in Infra tab).

Minor Changes

- iv. Raw water dam area (Map ID 56) is increased from 2.248 ha to 3.2399 ha (No adjustment required in ERC, as Raw water dam will be handed over to Landowner).



- v. Work area SE MAW dam (Map ID 108) – area reduced from 6.47 ha to 6.19 ha. Changes made to *cell I39 in Mob tab*;
- vi. Clean water Southern Drain B: Diversion Channel (Map ID 28) area increased from 11.637 ha o 13.646 ha (Corrections made to *cell L114 in Infra tab*);
- vii. Bund for Clean water Southern Drain B: Diversion Channel (Map ID 29) area decreased from 10.647 ha o 10.633 ha (Corrections made to *cell L114 in Infra tab*);
- viii. Drain connecting MAW dam to CHPP ROM Pad (Map Id 30) Increased from 1.766 ha to 3.86 ha (Corrections made to *cell L114 in Infra tab*);
- ix. Work area around CHPP MAW Dam (Map ID 110) increased from 11.01 ha to 11.43 ha (Changes made to *cell I39 in Mob tab*);
- x. Work space (Map ID 97) of 1.48 ha around RAW water dam not required and deleted (Changes made to *cell I39 in Mob tab*);
- xi. Work space (Map ID 107) of 2.95 ha around drain between Topsoil dumps 4&5 to CHPP MAW dam not required and deleted (Changes made to *cell I39 in Mob tab*);
- xii. Workspace map ID 100 area decreased from 4.732 ha to 4.66 ha (Changes made to *cell I39 in Mob tab*);
- xiii. Clean water diversion (South) drain-A area of 9.26 ha (Map ID 151) is now converted to Pit-pre-strip area (Map ID 164) (Corrections made to *cell L114 in Infra tab*);
- xiv. Bund area of 8.65 ha (Map ID 151) clean water diversion drain-A (South) is now converted to Pit-pre-strip area (Map ID 164) (Corrections made to *cell L114 in Infra tab*); and
- xv. Clean water diversion drain (Map ID 17) work area 19.52 ha is not required and converted to Pit –pre-strip domain (Map Id 164) (Changes made to *cell I39 in Mob tab*).

2.0 Changes to Overburden dump and Topsoil area

Major Changes

- i. Overburden area (Map ID 18) increased from 100.13ha to 132.50 ha (Corrections made to *cell E52, F52 and O52 in Overburden dump piles tab*).



Minor Changes

- i. Topsoil dump-5 near CHPP (Map ID 68) decreased from 25.52 Ha to 24.43 ha due to increase in width of Haul road connecting ROM Pad to Mine. (No impact on Topsoil storage area and volume of topsoil to be stripped) (Corrections made to *cell E67 in Overburden dump piles tab*);
- ii. Topsoil -2 (Map ID 67) area increased from 27.01 ha to 27.98 ha (Corrections made to *cell E66 in Overburden dump piles tab*); and
- ii. Topsoil area -1 northern drain (map ID 72) 5.15 ha not required. As top soil is reutilised for rehabilitating northern drain bund. (Corrections made to *cell E70 in Overburden dump piles tab*).

3.0 Changes to Pit area

Major Changes

- i. Pit area Map ID 88 increased from 38.29 ha to 51.48 ha to accommodate pit services facilities like inspection tracks, pumping infrastructure, bunds and monitoring equipment. Work area around pit (Map Id 148) for an area of 14.97 ha is not required and deleted.



- ii. New area included for pit & dump pre cleared area (Map ID 164 & 165) with an area of 20.679 ha and 16.01 ha respectively totalling to 36.689 ha. This area is previously presented as diversion drain and bund with some work area (Changes made to cell I44 in Mob tab).

Minor Changes

- i. Work area around pit (Map Id 160) decreased from 122.678 ha to 121.94 ha (Changes made to cell I 44 in Mob tab).

4.0 Changes to Infrastructure domain

Major Changes

- i. Laydown area North (map ID 118) 9.814 ha is increased to 15.1254 ha (Changes made to cell G97 in Infra tab);

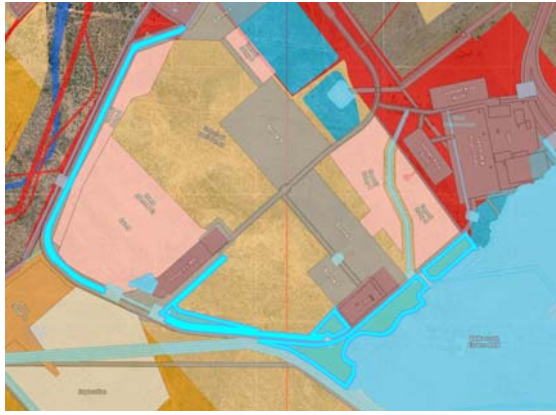


- ii. The accommodation camp area (Map ID 111) is increased from 14.439 ha to 26.898 ha (Changes made to cell G97 in Infra tab, Changes made to cells J160, I209 and H297 in Infra tab to accommodate removal of camp, disconnect services and sewage treatment plant area);



- iii. Mine Haul road width –Map Id 60 has increased from 35.5144 ha to 55.78 ha. HV road connecting to temporary MIA (Map ID 99) decreased from 10.48 ha to 8.575 ha. Mine haul road Map Id 80 area 0.7 ha not required (Changes made to Cell I64 in Infra tab).

- iv. Work area between HV road and Drain (map Id 147) reduced from 48.5148 ha to 33.8675 ha (Changes made to *cell I30 in Infra Tab*);



Minor Changes

- v. MIA area (Map Id 48) increased from 27.59 ha to 30.96 ha (Changes made to *cell L113 in Infra Tab*);



- vi. Clean water bund at CHPP-Rail (Map Id 33) increased from 3.639 to 3.652 ha (Changes made to *cell I30 in Infra tab*);
- vii. The External Raw water pipe line corridor (Map ID 79) has been reduced to 13.23 ha from 13.39 ha (Changes made to *cell I31 in Infra tab*);
- viii. Work area between Access road to Mine from Moray-Carmichael road (Map ID 83) decreased from 0.65 ha to 0.06 ha (Changes made to *cell I30 in Infra Tab*);
- ix. MV Road from Gate house to MIA (Map ID 65) is increased from 1.87 Ha to 2.87 ha (Changes made to *cell I31 in Infra tab*);
- x. MAW bund inspection track (Map Id 47) area decreased from 4.26 ha to 1.43 ha. Not included in ERC as MAW dam is handed over to landholder;
- xi. MV road connecting to Go-Line (Map ID 63) area increased from 3.406 ha to 5.55 ha (Changes made to *cell I31 in Infra tab*);
- xii. GO Line area (Map Id 41) area increased from 6.89 ha to 9.58 ha (Changes made to *cell G97 in Infra tab*);
- xiii. MV Road between MIA to AN Pad (Map ID 64) is increased from 14.448 ha to 14.974 ha (Changes made to *cell I31 in Infra tab*);
- xiv. MV Road Gate House to MIA area (Map ID 65) increased from 1.87 ha to 2.87 ha (Changes made to *cell I31 in Infra tab*);
- xv. Work area around Go-line (Map ID 42) decreased from 2.809 ha to 1.525 ha (Changes made to *cell I30 in Infra tab*);
- xvi. Fencing work corridor (Map Id 76) area increased from 60.509 ha to 64.40 ha. No Impact on ERC as fencing will be handed over to landholder;
- xvii. Camp work area (map ID 154) decreased from 12.27 ha to 4.26 ha (Changes made to *cell I30 in Infra tab*);
- xviii. Work space MIA (Map ID 49) area 7.75 ha is now merged into Borrow pit A and now not required (Changes made to *cell I30 in Infra tab*);
- xix. Borrow Pit –A (Map Id 9) area is increased from 47.43 ha to 50.13 ha (Changes made to *cell H125 in Infra Tab*);
- xx. Borrow pits areas (Map Id 159 and Map Id 8) decreased from 49.90 ha to 49.67 ha (Changes made to *cell H123 in Infra Tab*);

- xxi. Road between topsoil 4 & 5 connecting to CHPP increased from 2.69 ha to 2.72 Ha (Map Id 161) (Changes made to *cell I31 in Infra tab*);
- xxii. MV Access road to CHPP (Map Id 62) increased from 3.909 ha to 4.573 ha (Changes made to *cell I31 in Infra tab*);
- xxiii. Work area within rail loop (Map ID 54) increased from 34.86 to 35.12 ha (Changes made to *cell I30 in Infra tab*);
- xxiv. Work area (Map ID 115) increased from 8.613 ha to 8.73 ha. (Changes made to *cell I30 in Infra tab*). **Note:** In ERC –D (previous ERC, approved in November 2019), the Map Id is entered as 147 by error, now Map Id corrected to 115 instead of 147. The area is now amended from 48.51 ha to 8.73 ha. In ERC D the area is supposed to be 8.613 ha, however accounted as 49.51ha;
- xxv. Access Road –MIA-Go Line-CHPP work area –(Map Id 85) decreased from 13.2378 ha to 7.584 Ha (Changes made to *cell I30 in Infra tab*);
- xxvi. Lay down Area –South (Map Id 117) of 10.23 ha not required and deleted (Changes made to *cell G97 in Infra tab*);
- xxvii. Access road to Laydown down area south (Map Id 121) area of 0.66 ha not required and deleted (Changes made to *cell I31 in Infra tab*);
- xxviii. Access road to North-South Laydown down areas (Map Id 123) area of 0.42 ha not required and deleted (Changes made to *cell I31 in Infra tab*);
- xxix. Work area between HV road and OB dump area (Map Id 11) area of 7.43 ha is not required and deleted (Changes made to *cell I30 in Infra tab*);
- xxx. Work area between MV road and Haul Road (Map Id 153) area of 0.615 ha is not required and deleted (Changes made to *cell I30 in Infra tab*);
- xxxi. Work area for MV road connecting Gate house to MIA (Map Id 129) area of 0.99 ha is not required and deleted (Changes made to *cell I30 in Infra tab*);
- xxxii. Fence work corridor increased from 60.51 ha to 64.76 ha (No Impact on FA- area handed over to Land Owner);
- xxxiii. Work areas Laydown access to TLO (Map ID 124) 0.27 ha and Laydown access to CHPP (Map ID 122) 0.266 ha is not required and deleted (Changes made to *cell I30 in Infra tab*);
- xxxiv. *Cell G 96 in Infra tab* – the area increased from 9.97 ha to 12.605 ha (error corrected from previous ERC which omitted an area of 2.62 ha against Map Id 98);
- xxxv. Additional pipe line 4000m added for raw water supply (Changes made to *cell I147 in Infra Tab*);
- xxxvi. *Work area for Off-site water pipe line corridor (Map ID 105) reduced from 1.24 ha to 1.11 ha (Changes made to Cell I30 in Infra Tab); and*
- xxxvii. The mine access road Map ID 01 area increased from 13.52 ha to 15.722 ha. There is no change to ERC, as this access road is handed over to Landholder.

5.0 Changes to CHPP area:

- i. Map Id 103 CHPP Work area is reduced from 7.948 ha to 1.11 ha (Changes made to *cell I30 in Infra tab*) and reduced area of 5.393 ha is now added to CHPP –Plant and Process plant area –map ID 82;



- ii. CHPP- Process plant and Equipment area –Map ID 82 is increased from 19.387 ha to 26.768ha (Changes made to *cell L113 in Infra tab*); and



- iii. CHPP- ROM pad and Product Pad (Map ID 134) increased from 31.37 ha to 33.59 ha (Changes made to cell I 37 in Mob & demob tab).

6.0 Changes to Miscellaneous tab

- i. Rehabilitated area maintenance increased from 434.07 ha to 464.50 ha (Changes made to cell E30 in Misc tab); and
- ii. Investigations increased from 1 event to 2 events (Changes made to cell E81 in Misc tab).

7 Mob and user added items

- i. Volume of topsoil carting required for rehab of HV road increased from 70,170 m³ to 96,630 m³ (Changes made to cell I45 in Mob tab);
- ii. Volume of topsoil carting for borrow pit areas increased from 221,955m³ to 237,369 m³ (Changes made to cell I40 in Mob tab);
- iii. Rehabilitation of borrow pit area and Haul road area increased from 194.77 to 222.866 ha (Changes made to cell I46 in Mob tab); and
- iv. Map ID 131 Area changed from 11.496 ha to 11.482 ha. Map Id 95 the bore track area reduced from 11.21 ha to 11.05 ha (Corrections made to cell I44 in Mob tab).

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APPENDIX 2

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Carmichael Coal Project Material Balance Memo for ERC Application 5th June 2020

1.0 Pit

Area of the Pit: 38.3 Ha + Pit services area: 13.18Ha (see figure 1 below)

Volume of Overburden to be excavated during this ERC Period: 8.5 Million BCM (loose BCM: 10.5 Million Cu.m)

Input to Pit excavation volume: Schedule obtained from Spry

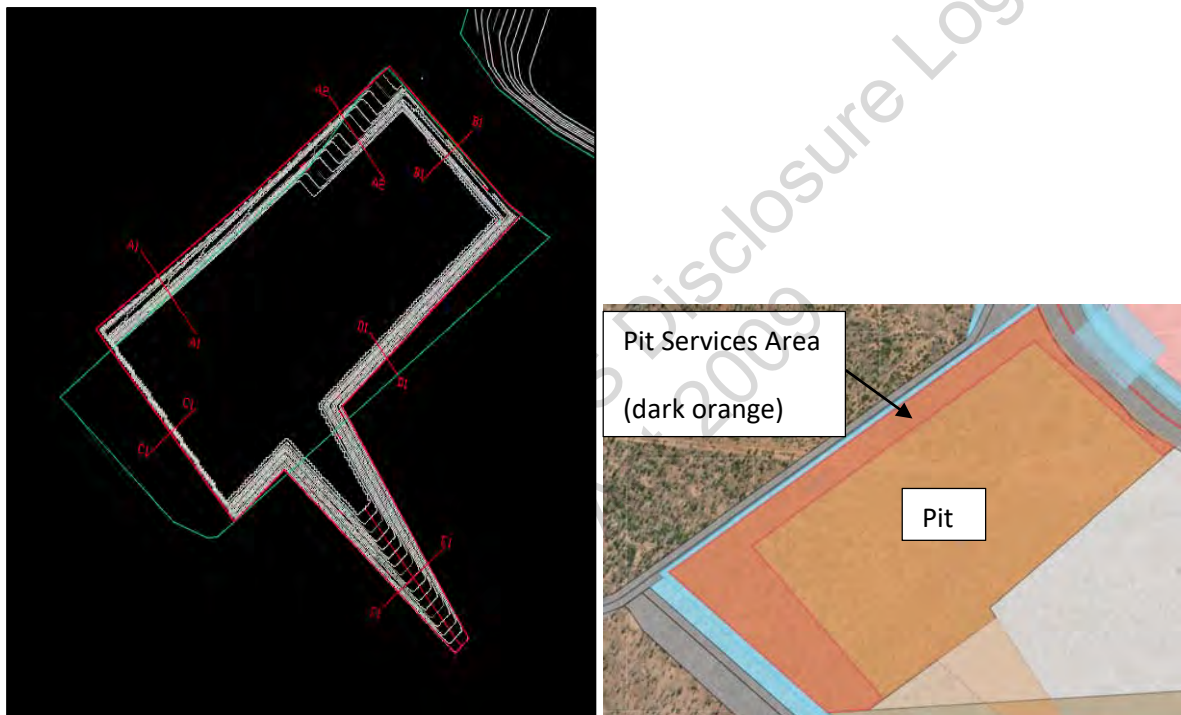
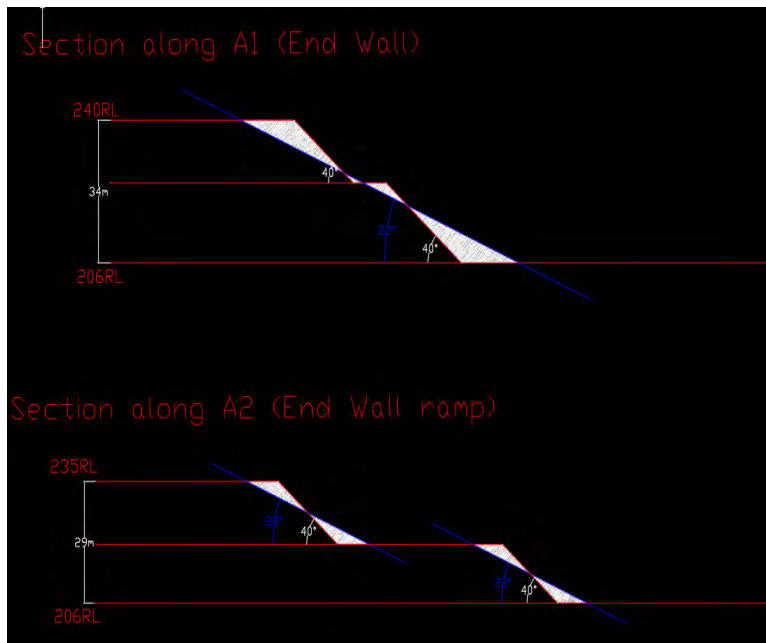


Figure 1: Pit and Pit Services Area

Sections showing Bulk push for re-shaping end walls, low walls and high walls

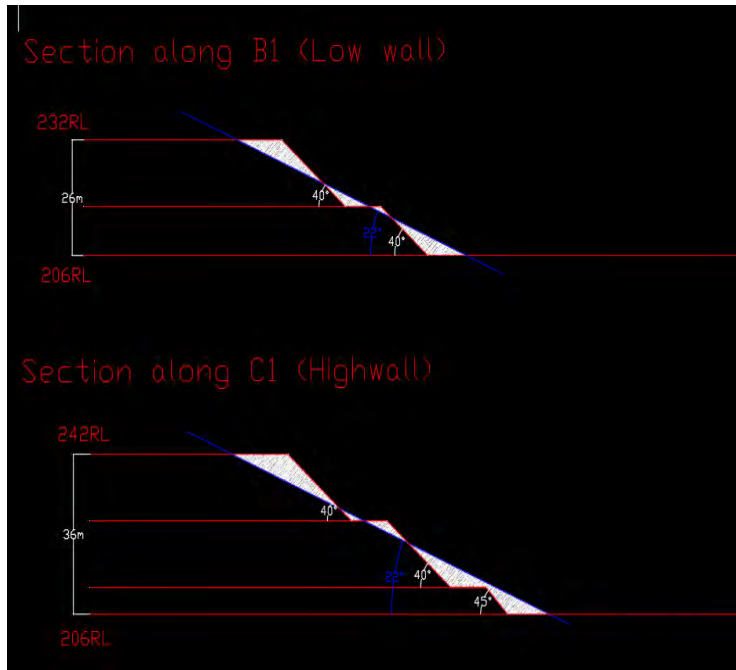
Pit X-Sections A1 and A2 (End wall and End wall ramp)



Section along A1	End wall		
	Area 1	Area 2	Area 3
Cut Area (m2)	102	19	
Fill Area (m2)	118	4	
Length (m)	500		
Volume (m3)	61,000		
Volume (m3)(loose)	76,250.00		

Section along A2	End wall ramp		
	Area 1	Area 2	Area 3
Cut Area (m2)	36	31	
Fill Area (m2)	36	31	
Length (m)	286		
Volume (m3)	19,448		
Volume (m3)(loose)	24,310		

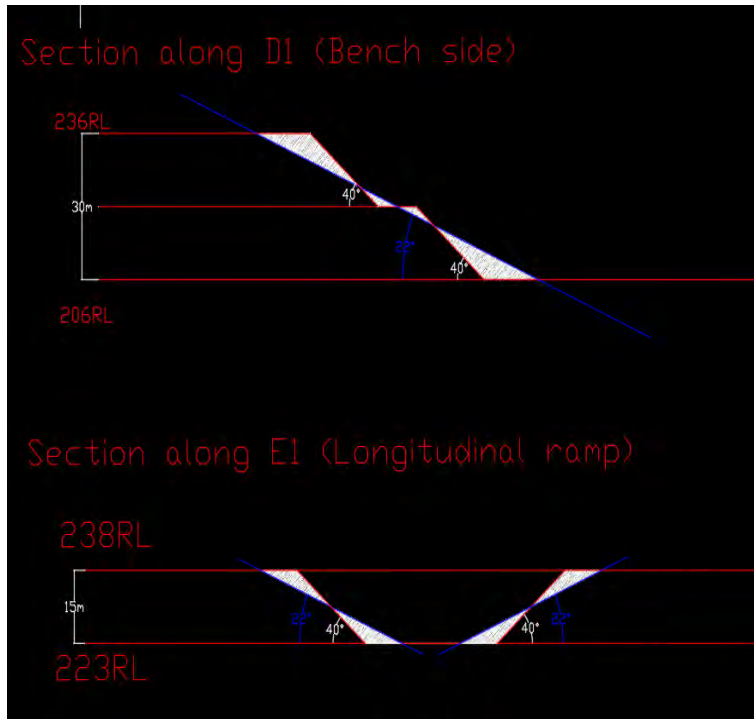
Pit X-Sections B1 and C1 (Low wall and High wall)



Section along B1	Low wall		
	Area 1	Area 2	Area 3
Cut Area (m2)	61	4	
Fill Area (m2)	46	18	
Length (m)	339		
Volume (m3)	22,035		
Volume (m3)(Loose)	27,544		

Section along C1	High wall		
	Area 1	Area 2	Area 3
Cut Area (m2)	96	16	
Fill Area (m2)	107	5	
Length (m)	450		
Volume (m3)	50,400		
Volume (m3)(Loose)	63,000		

Pit X-Sections D1 and E1 (Pre-strip Bench slopes and Longitudinal ramp)



Section along D1	Bench side		
	Area 1	Area 2	Area 3
Cut Area (m2)	79	10	
Fill Area (m2)	80	10	
Length (m)	997		
Volume (m3)	88,733		
Volume (m3)(Loose)	110,916		

Section along E1	Longitudinal Ramp		
	Area 1	Area 2	Area 3
Cut Area (m2)	36	36	
Fill Area (m2)	36	36	
Length (m)	300		
Volume (m3)	21,600		
Depth (m)	30	max @ 1 in 10	
Width (m)	35	bottom	
Volume (m3)(Loose)	27,000		

2.0 Overburden Dump

Area of the Overburden Dump: 132.5 Ha (after rehabilitation) (See figure below)

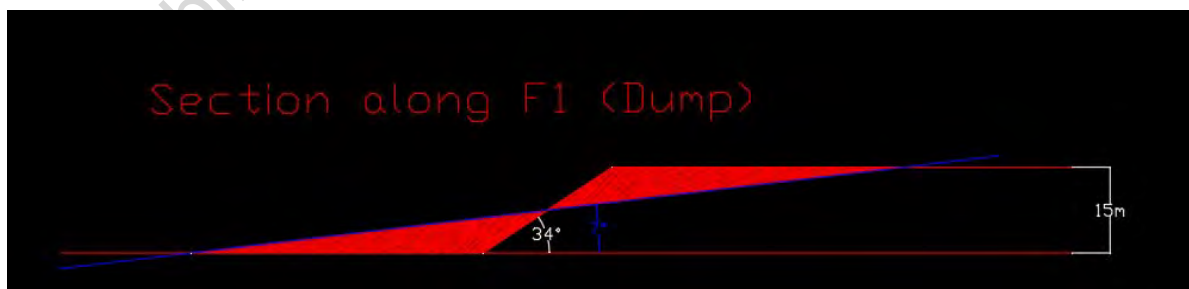
Volume of Overburden to be dumped: 10.5 Million Cu.m (Loose volume as dumped)

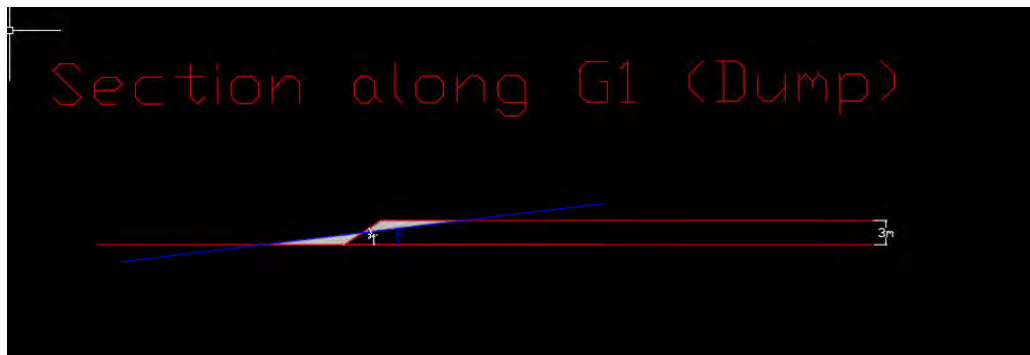
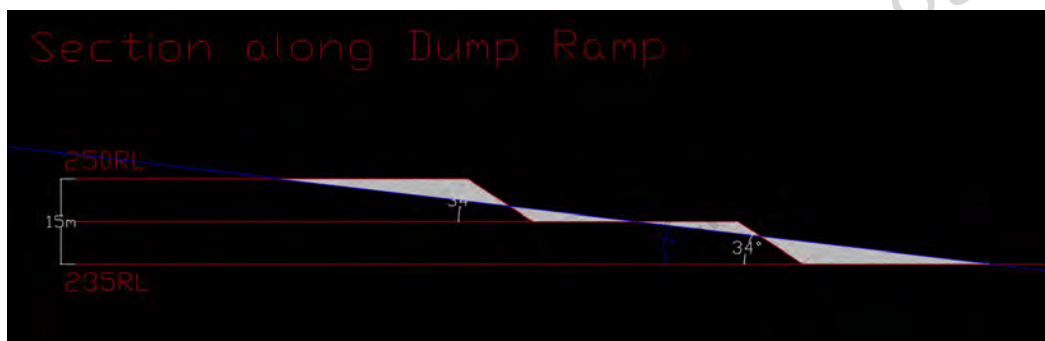


Figure 2: Overburden Dump foot print

Sections showing Cut and fill volume for reshaping overburden dump slopes

X-section along D1 and G1 along Overburden bench slope and dump ramp





Section along F1	Dump	
	Area 1	Area 2
Cut Area (m2)	187	
Fill Area (m2)	187	
Length (m)	3384	
Volume (m3)(loose)	632,808	

Section along G1	Dump	
	Area 1	Area 2
Cut Area (m2)	7.5	
Fill Area (m2)	7.5	
Length (m)	1464	
Volume (m3)(loose)	10,980	

Section of Dump Ramp		
	Area 1	Area 2
Cut Area (m2)	79	23
Fill Area (m2)	79	23
Length (m)	150	
Volume (m3)(loose)	15,300	

**Total Overburden push
volume (loose m3) 659,088**

	Area (m2)	Perimeter (m)
Before rehab	123.41	4530
After rehab	132.40	4998

3.0 Mining Schedule

Table 1 below provides detail of overburden volume excavated from Pit area during the ERC period. The following figures below show the progress of pit and overburden waste dump development.

Table 1 - Schedule of Overburden removal

Month	Monthly Overburden (bcm)	Cumulative Overburden (bcm)
Month-0	0	0
Month-1	667,460	667,460
Month-2	645,949	1,313,410
Month-3	835,348	2,148,758
Month-4	809,350	2,958,108
Month-5	835,781	3,793,889
Month-6	838,751	4,632,640
Month-7	817,040	5,449,680
Month-8	1,478,433	6,928,114
Month-9	1,513,778	8,441,891
Total	8,441,891	

Note: This mine schedule has been developed from a combination of geology data within the MineScape Geological model and openpit pit design information using inputs to SPRY schedule. The monthly overburden volumes are reported from SPRY mine scheduling model.

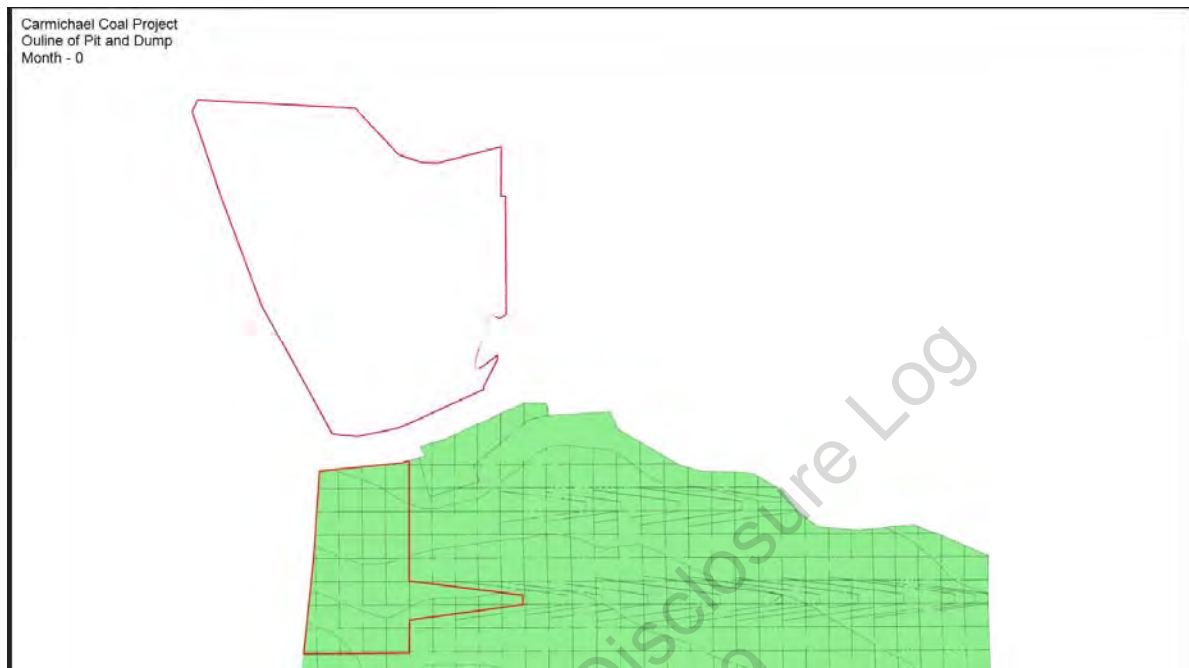


Figure 3: Initial areas of disturbance for Pit and OB dump piles

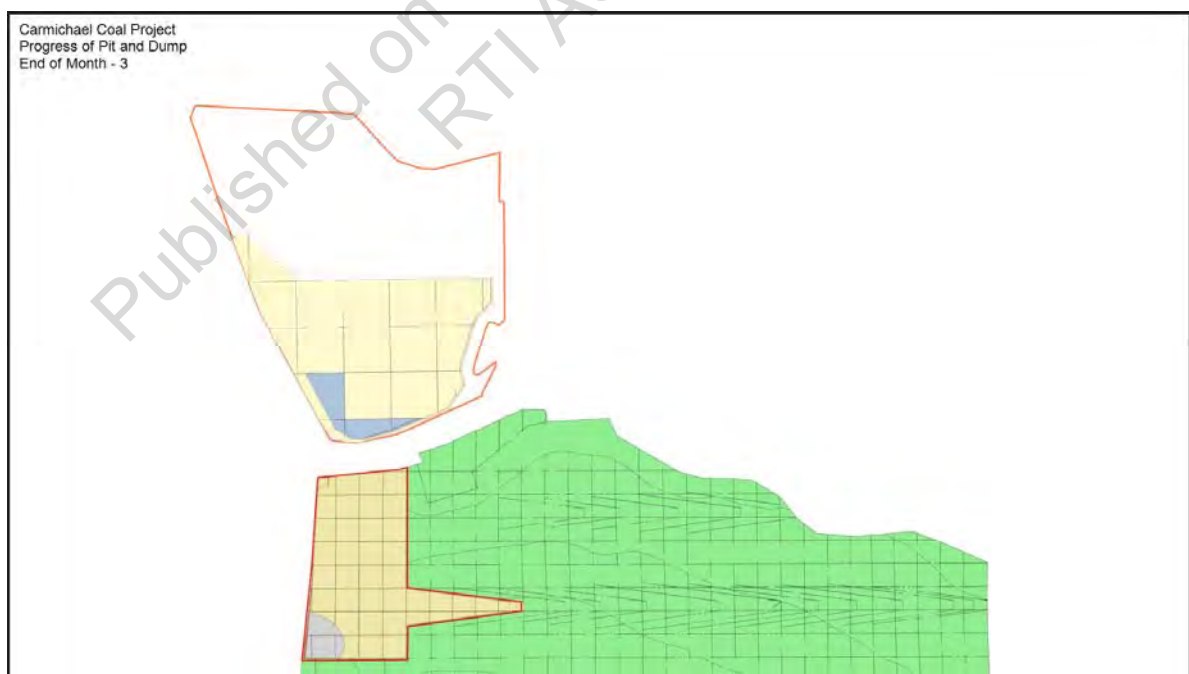


Figure 4: Month 3 areas of disturbance for Pit and OB dump piles

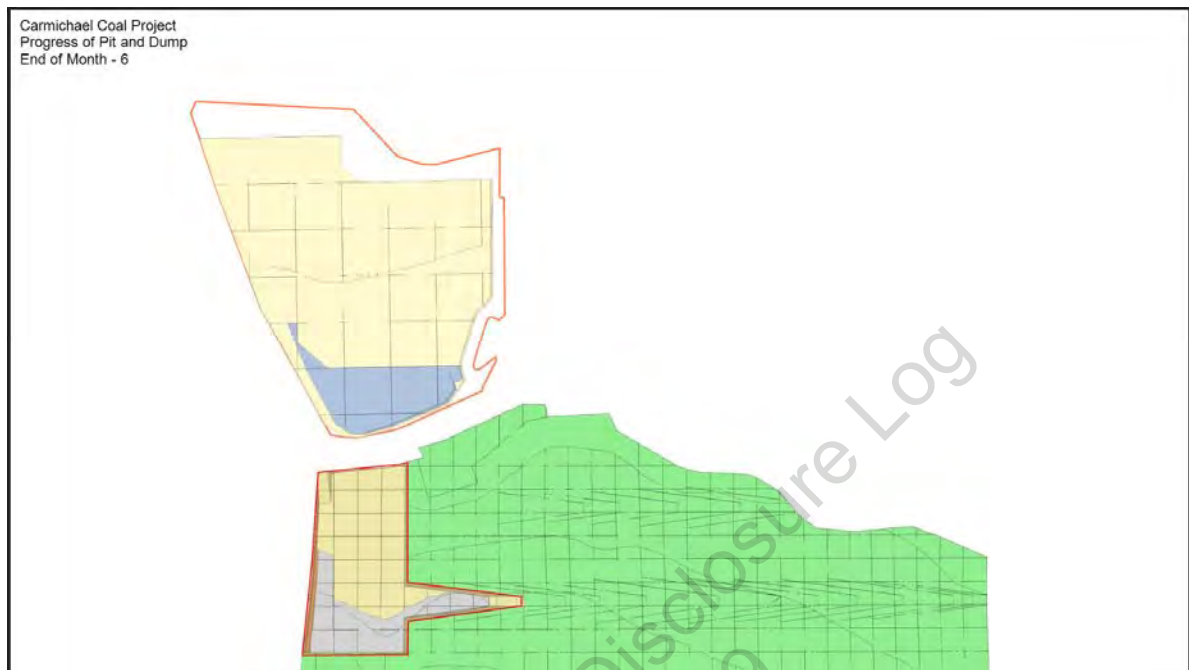


Figure 5: Month 6 areas of disturbance for Pit and OB dump piles

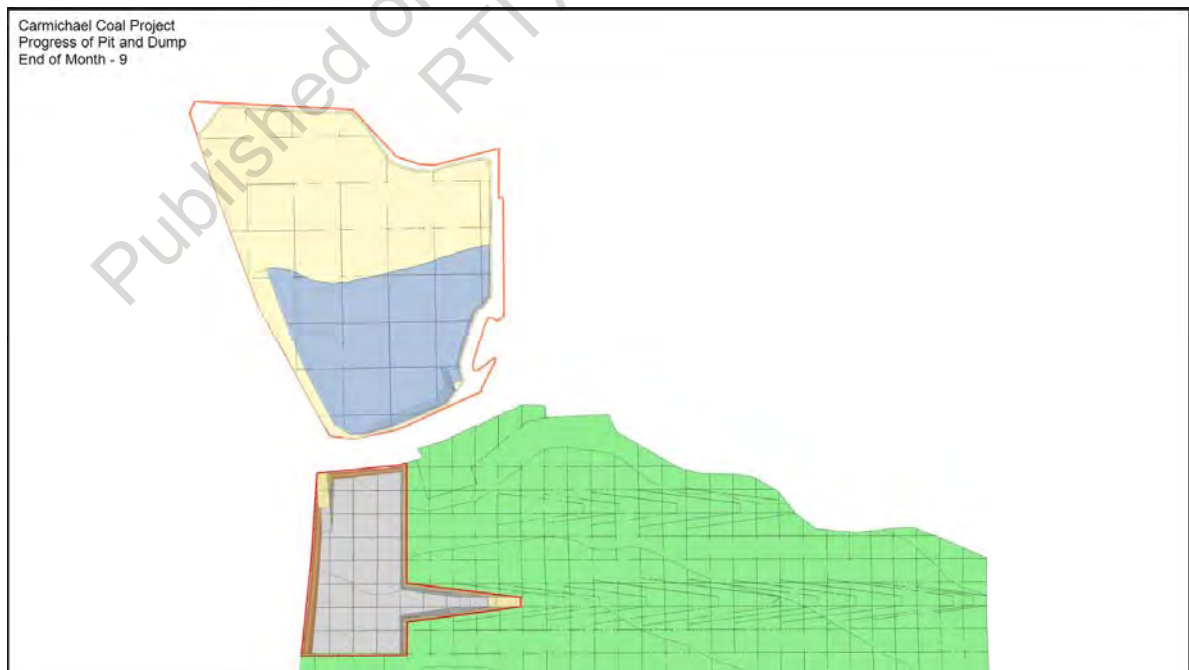


Figure 6: Month 9 areas of disturbance for Pit and OB dump piles

4.0 Topsoil

There are six top soil dumps located in different areas of disturbance (refer to General Arrangement Map within ERC Operational Plan):-

- Topsoil Dump 2 (Pit and Dump area) - 27.98 Ha
- Topsoil Dump 3 (Borrow pit A area) – 8.51 Ha
- Topsoil Dump 4 – 32.90 Ha
- Topsoil Dump 5- 24.43 Ha
- Topsoil Dump 6 (AN Pad Area) – 1.38 Ha

A soil survey has been undertaken within the proposed disturbance area to find the quality and suitability of topsoil for future rehabilitation purpose. Topsoil which is suitable for rehabilitation will only be stripped and stored for future use as shown in figure 7 below. Volume details of topsoil to be stripped that will be made available for rehabilitation is provided in Table 2 below.

Table 2 -Topsoil volume

OBJECTID	Single Stage stripping depth	Shape Area (m2)	Topsoil (Loose Volume) (m3)
1	0.30 m	69346.63	36,060.25
2	0.40 m	3829032.43	1,991,096.70
3	0.70 m	236.32	215.05
Total Topsoil volume (m3) available			2,048,661.90
Total Topsoil volume (m3) required			1,269,620.00

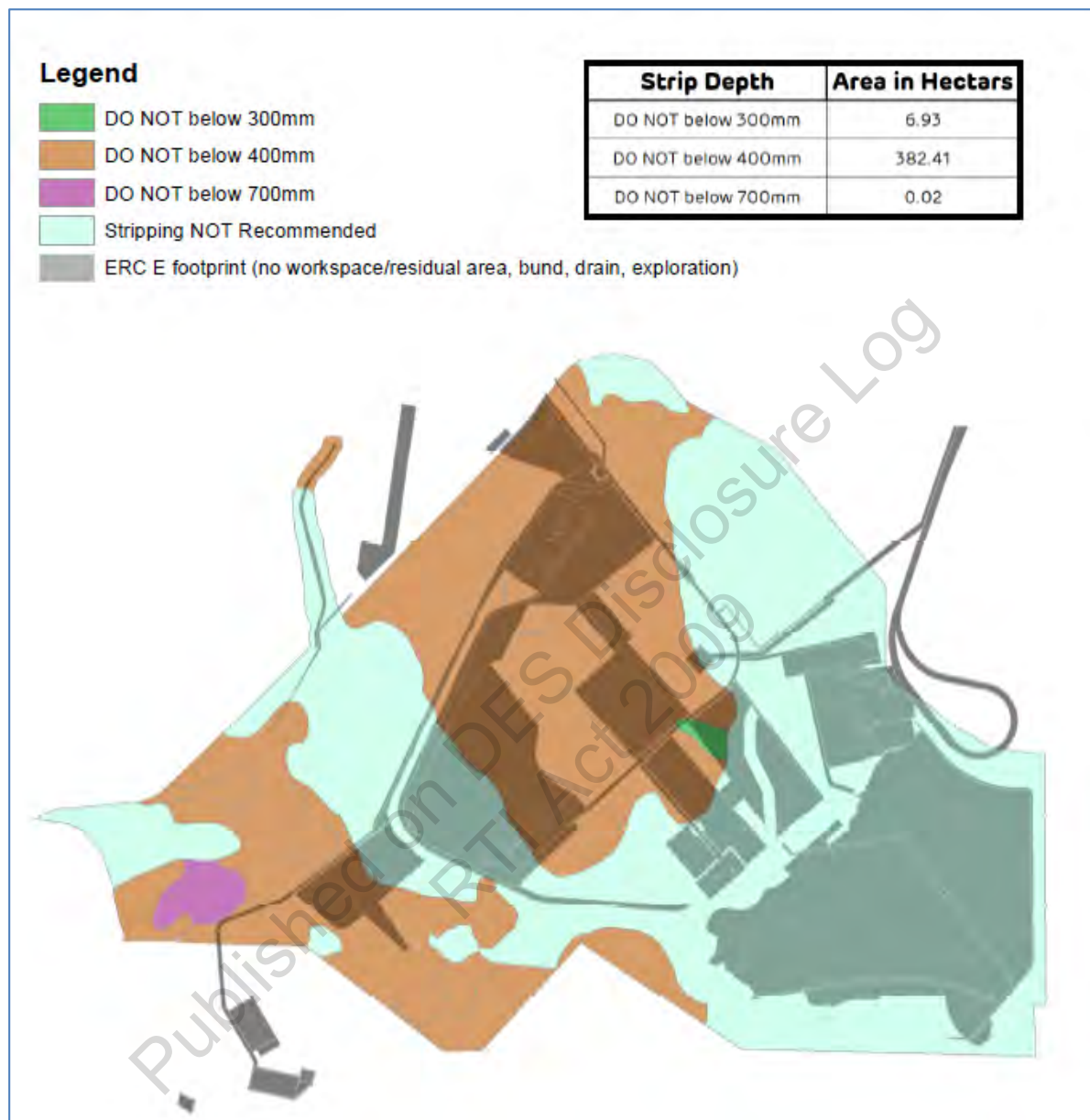


Figure 7: Topsoil Zones and stripping area within proposed disturbance



Adani Mining Pty Ltd

Carmichael Coal Mine - Topsoil Management Plan

January 2020



environmental
consultants

Topsoil Management Plan

Project Ref:

JW191267

Document Title

Topsoil Management Plan

Client Name

Adani Mining Pty Ltd

Project Manager

sch4p4(6) Personal information

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Document history and status

Revision	Date	Description
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0.1	11/01/2019	Revised following comments
0.2	16/01/2019	Final draft
1.0	17/01/2019	Final for release
2.0	03/02/2020	Amended draft – Stage 2 survey update.

sch4p4(6) Personal information

Approval for Issue

Name and position	Signature	Date
Nicholas Baker, Director	sch4p4(6) Personal information	03/02/2020

Suitably Qualified Person Statement

sch4p4(6) Personal information

Organisation: Wild Environmental Consultants

Date: 3 February 2020

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1. Purpose

The purpose of this plan is to outline the requirements for the recovery, handling, stockpiling and management of soil resources to maximise soil recovery while ensuring viability of soil resources for Carmichael rehabilitation programs and to fulfil condition H8 of EA EPML01470513.

This plan applies to any disturbance on the Adani Carmichael Coal Mine leases during which topsoil and subsoil will be removed, stockpiled, replaced or otherwise significantly disturbed. This plan applies to all employees and contractors of the Adani Carmichael Coal Mine.

This plan describes the overall requirements and responsibilities relating to managing soil resources, being:

- Planning;
- Recovery;
- Stockpiling;
- Respreading; and
- Monitoring and Reporting.

This plan details the management principles required for soil management and regular review of this document is required to ensure that practices are consistent with industry and regulatory expectations.

2. Background

Soils play an important role in rehabilitation outcomes and preserving the uppermost layer (commonly referred to as topsoil) is of importance to ensure rehabilitation success outcomes are achieved. The scope of this plan is to provide guidance and management requirements for soil resources associated with the Carmichael Coal Mine.

Previous studies of the Carmichael site (Mining Lease [ML] 70441, previously Exploration Permit Coal [EPC] 1690) have been undertaken to provide greater detail on soil units within mine disturbances. As mining activities advance, additional surveys are to be progressively undertaken at a more refined scale and within areas not previously surveyed to ensure that suitable soil resources are recovered and stockpiled.

2.1 Summary of Soils at the Carmichael Coal Mine

Soils of the Carmichael Coal Mine have previously been assessed during the Environmental Impact Statement process to determine each soil unit's distribution and characteristics. North Queensland Soil Assessment (NQSA) conducted the assessment across ML 70441, prior to inclusion of ML 70505 and as such, the soils within ML 70505 have not yet been assessed. Progressive assessment of these soils shall be undertaken prior to disturbance to ensure that appropriate recovery measures are implemented.

19 soil types were identified within ML 70441 by NQSA and broadly, the tenement is dominated by moderately deep to deep (0.5m to < 1.5m) yellow, brown or red gradational or uniform sandy soils over hard sandstone or manganese hard pan¹. Most soils have no structure throughout the tenement and fit the Australian Soil Classification category of Kandosol or Chromosol. The surface of most soils contains moderate to high proportions of fine sand, which, because of its lack of structure will form 'bulldust' when disturbed. Other soils mapped over the ML 70441 area include texture contrast soils with similar soil surface prone to forming bulldust, as well as areas of cracking clay soils within brigalow/gidgee vegetation¹.

¹ North Queensland Soil Assessment (NQSA). (2011). Soils, Pre-mining Land Suitability and Stripping Recommendations for Carmichael Coal Mine, Central Queensland. Prepared by [redacted] for Adani Mining Pty Ltd

3. Definitions

Exchangeable Sodium Percentage (ESP) is the percentage of exchangeable sodium within the Cation Exchange Capacity of a soil. ESP provides an indication of the dispersive nature of a soil. Soils are considered sodic when ESP is > 6 , however soil dispersion problems may occur at higher or lower ESP depending on the clay type.

Growth Media is a matrix or structure capable of supporting plant growth. Growth media is typically a soil matrix but can also include examples such as mulch, biosolids, etc.

pH is a figure expressing the acidity or alkalinity of a soil based on a logarithmic scale of 1 to 14 (1 being acid and 14 being basic).

Primary Growth Media is the interval of soil within a soil profile of which the primary soil resource may be collected for vegetative growth. Primary Growth Media is typically inclusive of the O and A horizons of a soil profile and contains the most favourable properties for establishing vegetative growth (e.g. seed bank and organics). Also referred to as topsoil resource.

Secondary Growth Media is the interval of soil within a soil profile of which the secondary soil resource may be collected for vegetative growth. Secondary Growth Media is typically inclusive of B horizons of a soil profile and also referred to as subsoil resource.

Seed Bank is the interval of a soil profile which holds the majority of seed for plant establishment.

Sodicity is the amount of exchangeable sodium within the soil and relates to the expected dispersion of soil upon wetting.

Soil Name is the categorical name of soil as defined by the Australian Soil Classification.

Soil Texture refers to the proportion of sand, silt and clay particles that make up the mineral fraction of a soil.

Soil Unit is the defined area of land mapped as representative of a particular soil type and name (as defined by the Australian Soil Classification).

Subsoil is typically referred to as the B horizon of a soil profile which can be clay rich but often is less fertile than topsoil. May also be referred to as Secondary Growth Media.

Topsoil is typically referred to as the O and A horizon where most plants, roots and microbes are active. May also be referred to as Primary Growth Media.

4. Procedure

4.1 Soil Management Process and Major Steps

Collection and storage of soil resources shall be undertaken where ever possible to ensure sufficient growth media is available for rehabilitation activities. Careful planning and preparation of soil stripping activities is required to ensure the longevity of materials which may remain stockpiled for significant periods of time (e.g. ten years or more).

Below details the major steps for soil management at the Carmichael Coal Mine. Table 1 details requirements for soil resource management and associated accountabilities.

4.1.1 Soil Recovery Planning

Selection of soil materials are based on assessment work undertaken initially by NQSA (2011)² and will progressively be updated by additional soil surveys. Soil stripping activities should not only account for depth of available soil resources, but also the appropriate post-mine landform designs for that soil. Prior to disturbance, the following is required:

- Detailed soil surveys (1:25,000 scale) undertaken for all areas (including previously mapped areas which were completed at 1:100,000 scale) requiring significant disturbance to be undertaken.
- Expected recovery outcomes and suitability for rehabilitation areas are taken into account when planning soil recovery and stockpiling.
- An approved permit to disturb has been obtained prior to commencement of activities (refer to CCMP-000000-PER-CH-000100).

During planning, the following should be considered:

- Soil type to be encountered;
- Soil depth to be recovered;
- Hazards (e.g. erosion potential);
- Soil quality recovery and stockpile recommendations; and
- Recovery viability and method (e.g. one stage stripping vs two stage stripping) as recommended in the Soil Survey Register (Appendix E).

² North Queensland Soil Assessment (NQSA). (2011). Soils, Pre-mining Land Suitability and Stripping Recommendations for Carmichael Coal Mine, Central Queensland. Prepared by (6) Personal info for Adani Mining Pty Ltd.

4.1.2 Soil Recovery Procedure

Where soil is viable to recover, it will be undertaken via either one stage or two stage stripping, depending on the soil type and recommendations detailed in Table 2. Two stage stripping allows for the selective handling of primary growth media over secondary growth media. However single stage stripping may be more practical where the thinnest layer that can be reliably handled includes part of the upper horizon of secondary growth media, which is suitable for rehabilitation purposes.

Where two stage stripping is undertaken, the following procedures apply:

- Primary growth media should be stockpiled separately from secondary growth media where practical and appropriate to achieve rehabilitation goals.
- Appropriate plant and equipment is to be used to maintain soil structure and maximise recovery of topsoil.
- Recovery of soil shall conform to recovery depths outlined in Appendix E.
- Topsoil is to be recovered to approved stockpiling locations or directed to rehabilitation areas as defined by the mine plan.
- Form 1 of the Soil Data Sheet in Appendix B shall be completed and provided to the Adani Environment Team.

Single stage stripping typically results in the mixing of topsoils and subsoils with differing characteristics.

Where single stage stripping is undertaken, the following procedures apply:

- Appropriate plant and equipment is to be used to maintain soil structure and maximise recovery of soil.
- Recovery of soil shall conform to recovery depths outlined in Appendix E.
- Soil is to be recovered to approved stockpiling locations or directed to rehabilitation areas as defined by the mine plan.
- Form 1 of the Soil Data Sheet in Appendix B shall be completed and provided to the Adani Environment Team.

4.1.3 Soil Stockpiling

Stockpiling of soil shall be undertaken in such a way as to preserve to the maximum extent possible, the inherent quality of the soil recovered. Soils shall be stockpiled in the approved, designated soil stockpile area as defined in the mine plan.

The following shall be undertaken when stockpiling:

- Soil resource shall be stockpiled up to a height of 3 m so as to maximise the viability of the resource.

- Stockpiles which are to be retained for long-term use (e.g. greater than 12 months) shall be stabilised as soon as practicable.
- Form 1 of the Soil Data Sheet (including stockpile location and volume stored) shall be completed and provided to the Adani Environment Team.
- Installation of signage with an appropriate identifier for the stockpile (e.g. CCM – TS – 01) and date the stockpile was established.

4.1.4 Stockpile Management

Appropriate stockpile management ensures long-term viability of soil resources for future use in rehabilitation activities. **Note: It is preferential that soil resources be utilised to final landform as soon as possible.**

The following stockpile management measures shall be undertaken:

- Revegetation with native grass species is the preferred method of stockpile stabilisation however other methods that can be considered include (but are not limited to) use of mulch obtained from clear and grub activities, soil binders / polymers (e.g. Hydromulch), sterile cover crops (e.g. Japanese Millet or Rye Grass) or use of coir netting / mesh.
- Personnel and machinery access to the stockpile shall be minimised.
- Livestock shall be excluded from the stockpiles.
- Stockpiles are to be surveyed and inspected annually (as a minimum) to ensure erosion controls are adequate and that no weeds or pests have impacted the stockpiles.
- A soil stockpile register shall be prepared and maintained by the Adani Environment Team.
- Form 1 of the Soil Data Sheet (including stockpile location and volume stored) shall be completed and provided to the Adani Environment Team.

4.1.5 Soil Respreading

Respreading of soil shall be undertaken in such a way as to ensure the maximum use of soil resources across identified reuse areas. The following shall apply when respreading soil:

- When recovering stockpiles where the topsoil and the subsoil are stockpiled separately, they should be recovered separately to avoid mixing prior to application.
- Soils should be transported to the completed rehabilitation area and spread to a minimum depth of 200mm or as instructed by the Adani Environment Team.
- Soil depth will depend on the amount of topsoil and subsoil available; the type of material being covered and the size of the area it is to cover. Consideration should be given to the Adani Rehabilitation Plan.
- If insufficient topsoil/subsoil is available, placement should be in priority areas in strips as determined by the Adani Environmental Team.

- The Soil Data Sheet should be filled out on the completion of soil application and forwarded to the Adani Environmental Team.
- Form 2 of the Soil Data Sheet (including stockpile location and volume stored) shall be completed and provided to the Adani Environment Team.
- Consideration to amelioration requirements detailed in the Soil Survey Register (Appendix E) should be made prior to resspreading.

4.1.6 Monitoring and Reporting

The following shall be undertaken to ensure appropriate monitoring and reporting of soil use and reuse:

- A Soil Data Sheet must be filled out whenever soil is recovered, stockpiled, relocated or resspread. Updates shall be recorded by the Supervisor and the Adani Environmental Team.
- Soil management issues, volumes and current deficit volumes (if applicable) shall be communicated and tracked onsite at appropriate meetings and reflected in the mine plan (e.g. quarterly production meetings).
- Annual reviews of soil media balances shall be undertaken to ensure integrity of stockpiles is maintained and that sufficient volumes are available for forward rehabilitation planning.
- Overview of soil management is to be included in Annual Environment reporting including:
 - o Areas stripped of topsoil/subsoil;
 - o Quantity of topsoil/subsoil stockpiled;
 - o Quantity of stockpiled topsoil/subsoil utilised for rehabilitation; and
 - o Quantity of topsoil/subsoil directly returned onto rehabilitation.

Table 1: Requirements and Accountabilities

Step	Requirements	Accountabilities
Planning	<p>Prior to disturbance, an assessment of soils shall be undertaken to determine the availability and suitability of soil resources prior to disturbance. The assessment must at a minimum measure and document the following characteristics:</p> <ul style="list-style-type: none"> • Soil units present. • Soil texture, depth and structure (topsoil and subsoil). • Soil parameters (e.g. pH, salinity, soil nutrients.). <p>This information shall be mapped and stored in Adani's document management and GIS systems. Soils that do not comply with the minimum requirements outlined in Table 2 and Appendix E shall not be stripped. The following should be referred to when determining soil stripping depths:</p> <ul style="list-style-type: none"> • Table 2. • Appendix E (soil survey register). 	Environmental Team
	Topsoil and subsoil volumes to be recovered should be included in the Estimated Rehabilitation Cost (ERC) and considered in financial assurance assessments (as reviewed from time to time).	Environmental Team
	Carmichael must identify long-term storage locations for soil storage and record these in the Adani document management and GIS systems. Site selection should ideally include flat terrain, away from future mining activities, and should facilitate future rehabilitation activities (i.e. close to areas to be rehabilitated).	Environmental Team/ Mine Planning Team
	Opportunities for return of soil resources directly onto rehabilitation areas should be prioritised in accordance with the mine plan and progressive rehabilitation schedule.	Environmental Team/ Mine Planning Team/ Project Construction Manager
	The identification and recovery of soil must be planned prior to the commencement of land disturbance. Topsoil and subsoil stripping and haulage shall be incorporated into the mining schedule.	Mine Planning Team / Project Construction Manager
	Soil stripping should ideally be conducted prior to the wet season (i.e. December - March) soil should only be handled when dry or slightly moist so as to minimise soil structure degradation and maximise seed bank.	Technical services / Mining Operations / Project Construction Manager

Step	Requirements	Accountabilities
	If the soil storage area is undisturbed then existing topsoil and vegetation must be removed prior to dumping of any material. No subsoil needs to be disturbed.	Mining Operations
	Prior to any ground disturbance you must obtain a Permit to Disturb.	Mining Operations / Project Construction Manager / Environment Team
	Ensure that topsoil and subsoil is recovered from the entire disturbance footprint (where required).	Mining Operations / Project Construction
	All areas to be cleared shall be assessed for weeds prior to recovery. Topsoil and subsoil recovered from areas that are weed infested must be kept separate where practicable (or buried within the stockpile) to prevent the spread of weeds. Direction shall be sought from the Adani Environmental Team on appropriate management prior to disturbance.	Mining Operations / Project Construction Manager / Environment Team
	The Adani Environmental Team shall be informed and participate in all stages of planning for soil recovery, movement and maintenance of data and records.	Environment Team / Project Construction Manager / Mine Planning Team
Recovery	Areas where soil will be recovered from shall be demarcated through appropriate means (e.g. surveyor pegs or GPS maps)	Mining Operations / Construction Supervisor
	During collection of soil, any surface vegetation should also be collected and mulched and included with the topsoil/subsoil.	Mining Operations / Construction Supervisor
	Soil must be recovered to the depth recommended in Appendix E.	Mining Operations / Construction Supervisor
	Subsoil must be recovered to the depth recommended in Appendix E.	Mining Operations / Construction Supervisor
	Appropriate plant and equipment is to be used to maintain soil structure and maximise recovery of soil.	Mining Operations / Construction Supervisor
	The Soil Data Sheet shall be completed following activities and provided to the Adani Environmental Team and recorded on the site stockpile register.	Environment Team

Step	Requirements	Accountabilities
Stockpile Management	Opportunities for returning of soil resources directly onto rehabilitation areas should be prioritised in accordance with the mine plan and progressive rehabilitation schedule.	Mining Operations / Construction Supervisor
	When stockpiling the following applies: <ul style="list-style-type: none"> Two stage recovered topsoil and subsoil should not be mixed. Where required separate stockpiles for topsoil and subsoil will be established. Stockpile locations are to remain accessible. Soil resource shall be stockpiled up to a height of 3 m so as to maximise the viability of the resource. The sides of soil stockpiles should be designed so as to reduce the risk of erosion, slopes should be 20 degrees or less. 	Mining Operations
	Stockpile locations are to be determined and approved prior to stockpiling and recorded in the Mine Plan and GIS system.	Mining Operations / Project Construction / Environment Team
	Revegetation with native grass species is the preferred method of stockpile stabilisation however other methods that can be considered include (but are not limited to) use of mulch obtained from clear and grub activities, soil binders / polymers (e.g. hydroseeding), sterile cover crops (e.g. Japanese Millet or Rye Grass) or use of coir netting / mesh.	Mining Operations / Project Construction
	The location of stockpiles shall be signposted. Signs can be obtained by contacting the Adani Environmental Team.	Mining Operations / Project Construction
	New and additional stockpile volumes are to be picked up by survey and provided to Technical Services/GIS Team.	Survey Team
	A current register of stockpiles must be maintained with spatial data updated in the GIS system.	Environment Team
	The Soil Data Sheet shall be filled out on the completion of stockpiling activities and provided to the Adani Environmental Team.	Mine Operations / Project Construction / Environment Team
	Stockpiles are to be inspected annually (as a minimum) to ensure erosion controls are adequate and that weeds or pests have not impacted the stockpiles.	Environment Team
Re-spreading	The application of soils to rehabilitation areas will be in accordance with the rehabilitation plan (recommended minimum depth of 200mm).	Mining Operations / Project Construction

Step	Requirements	Accountabilities
	When recovering stockpiles the topsoil and the subsoil stockpiles shall be recovered separately to avoid mixing.	Mining Operations / Project Construction
	Avoid undertaking recovery and dispersal when the stockpiles are wet so as to minimise impact to soil structure.	Mining Operations / Project Construction
	Soils should be transported to the rehabilitation area and spread to a maximum depth of 200mm or as instructed by the Adani Environment Team.	Mining Operations / Project Construction
	If insufficient soil is available, placement should be in priority areas in strips as determined by the Adani Environmental Team.	Mining Operations / Project Construction
	The Soil Data Sheet should be filled out on the completion of soil application and forwarded to Adani Environmental Team.	Mining Operations / Project Construction / Environment Team
Monitoring and Reporting	A Soil Data Sheet must be filled out whenever soil is recovered, stockpiled, relocated or re-spread. Updates should be recorded by the Adani Environmental Team.	Mining Operations / Project Construction / Environment Team
	Soil management issues, recovered volumes and current deficit volumes (if applicable) should be communicated and tracked onsite at appropriate meetings and reflected in the mine plan (e.g. quarterly production meetings).	Technical Services / Mining Operations / Environment Team
	Annual reviews of soil media balances shall be undertaken to ensure integrity of stockpiles is maintained and that sufficient volumes are available for forward rehabilitation planning.	Technical Services
	Active monitoring of stockpiles for weed control, erosion etc. is recommended to ensure long-term viability of the storage area. A Soil Data Sheet should be filled out whenever an inspection is conducted by the Adani Environment Team. Completed forms should be recorded by the Adani Environmental Team and actions for management discussed.	Environment Team
	Overview of soil management is to be included in the Annual Environment reporting including: <ul style="list-style-type: none"> • Areas stripped of topsoil/subsoil; • Quantity of topsoil/subsoil stockpiled; • Quantity of stockpiled topsoil/subsoil utilised for rehabilitation; and • Quantity of topsoil/subsoil directly returned onto rehabilitation. 	Technical Services / Environment Team

5. Soil Reuse Recommendation for ML 70441 area from NQSA

Appendix D outlines soil reuse recommendations made by NQSA (2011) during the EIS process. Recommendations are based on results of a medium intensity scale soil survey (1:100,000). More detailed soil surveys will be undertaken on specific areas to be disturbed to provide sufficient data for appropriate soil planning. An example soil survey map is available in Appendix A however the latest mapped soil survey units should be obtained from the Adani GIS system. Reference should be made to the soil survey register (Appendix E) for detailed soil recovery depth requirements.

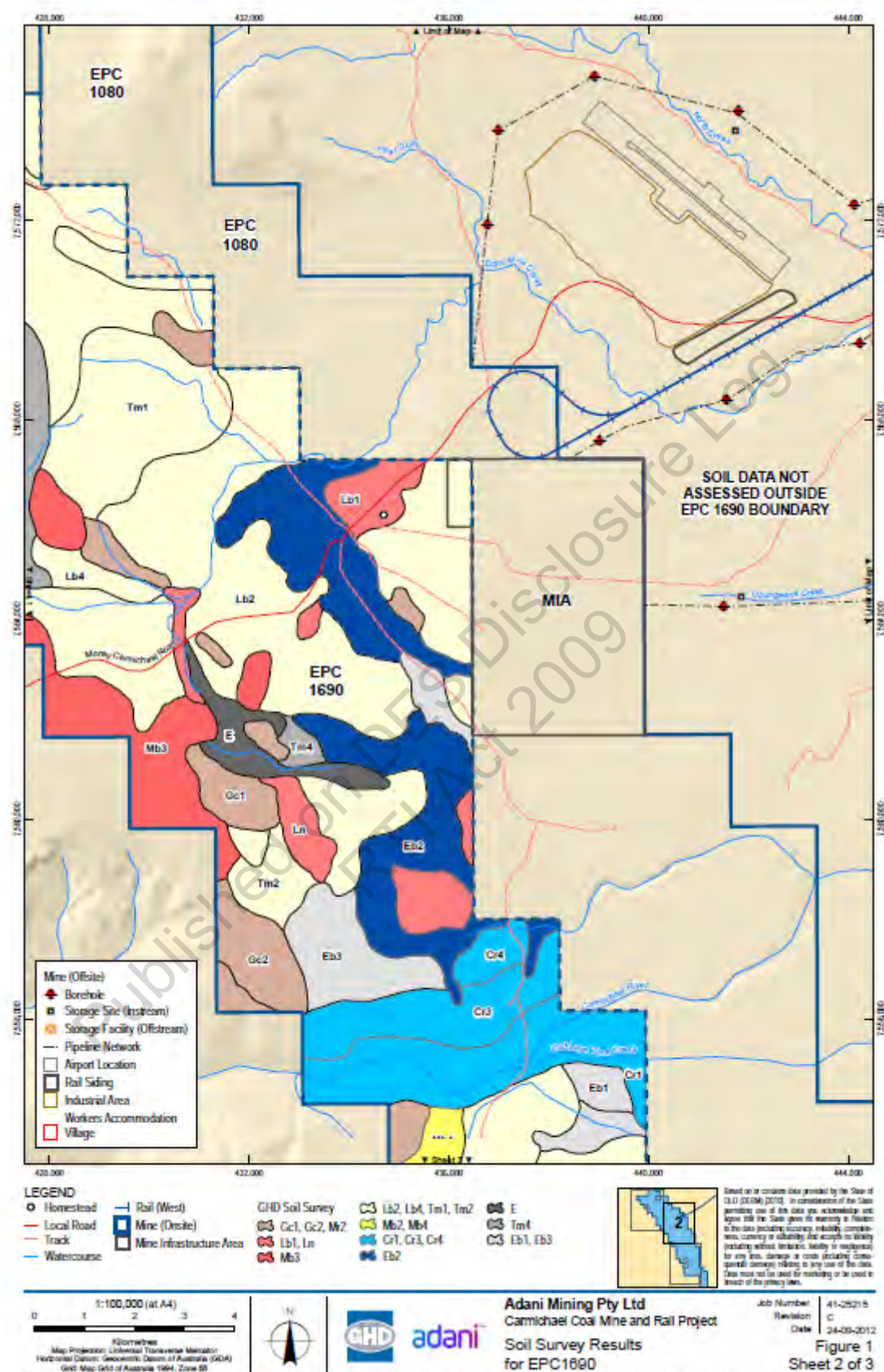
Note: All soils except Gc1 and Eb2 have high fine sand contents throughout the recommended maximum depth of reuse. Any salvaged material is likely to be subject to slaking, sealing and have poor physical properties due to the very high fine sand content and is therefore recommended for reuse only on level to very low slopes.

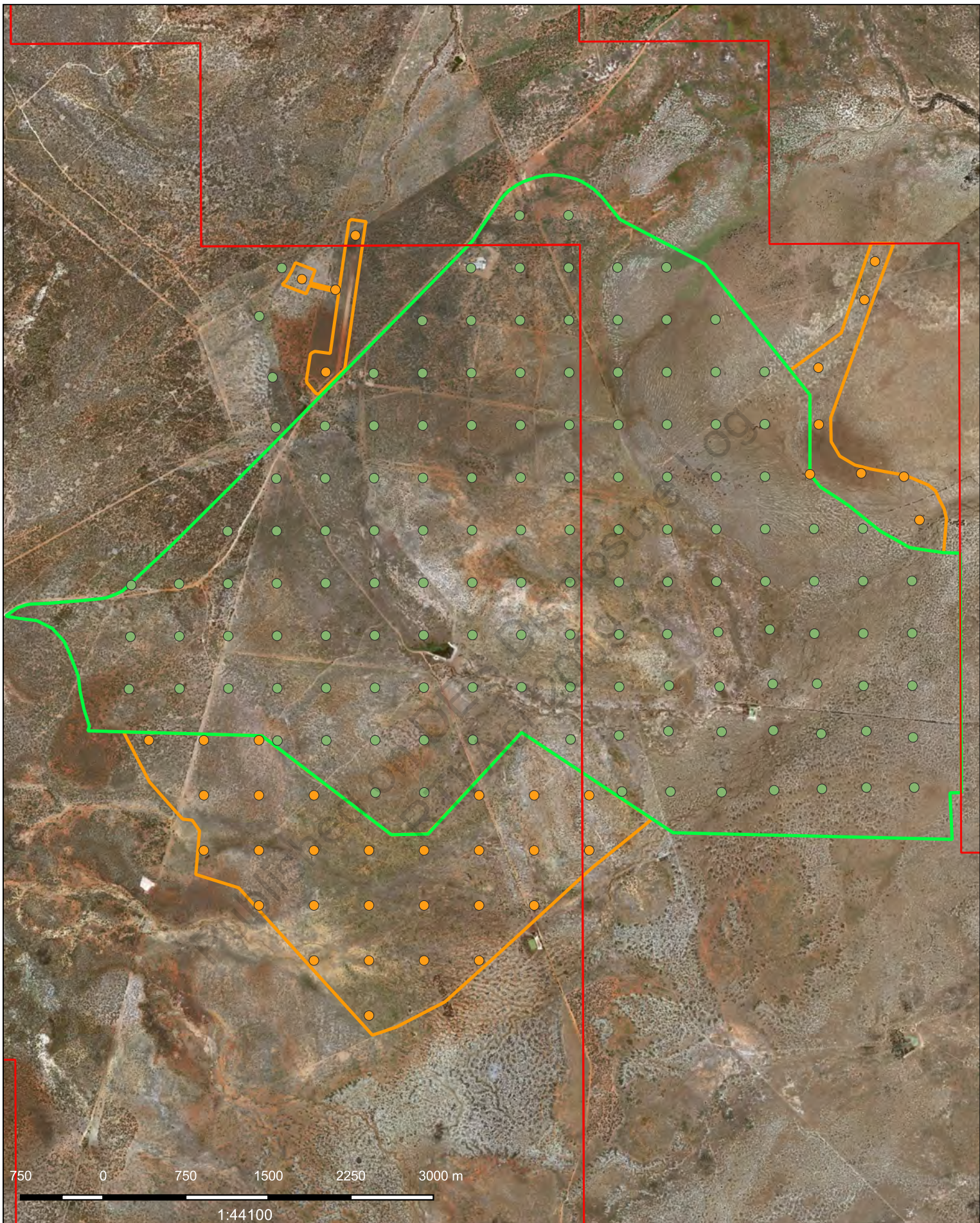
6. Review and Improvement

The effectiveness of soil management practices in this procedure will be assessed regularly in conjunction with overall rehabilitation assessments and operational requirements.

This plan is to be reviewed annually or, when the Carmichael Coal Mine enters the next stage of operation. The review will reflect any changes in operation, construction, or environmental requirements.

Appendix A – Soil Location Maps





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Legend

Mining Leases

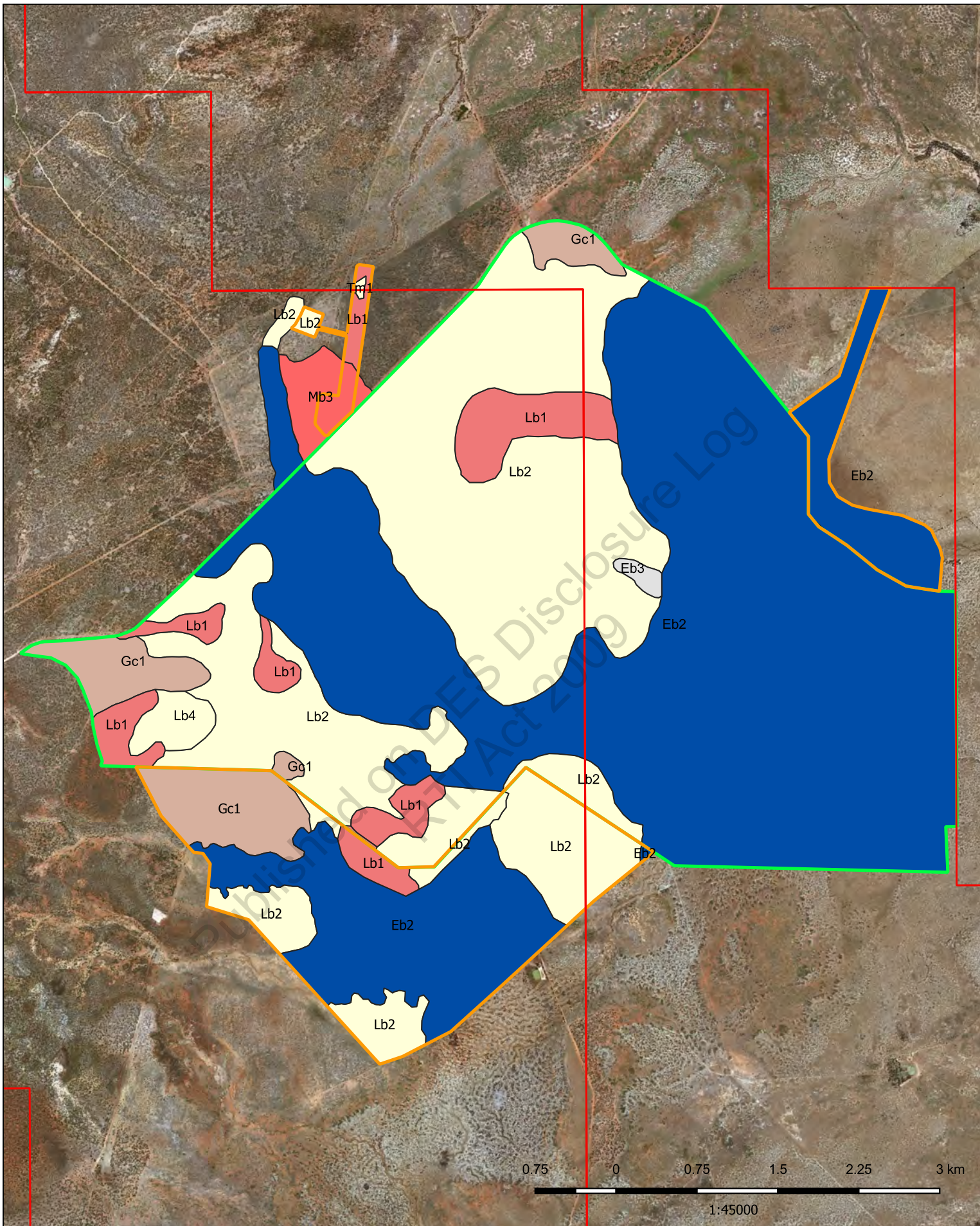
Stage 1 Survey Area

Stage 2 Survey Area

● Stage 1 Survey Locations

● Stage 2 Survey Locations

Figure 2: Survey effort



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Figure 3: Soil Types of the Stage 1 and Stage 2 mine Development Area

20-208

Legend

	Mining Leases		Eb2		Lb2
	Stage 1 Survey Area		Gc1		Mb3
	Stage 2 Survey Area		Lb1		Tm1

File A

Job number: JW191267
Coordinate reference system: GDA 94
Date: 3 February 2020



Appendix B – Soil Data Sheet

Form 1 - Soil Data Sheet

Soil Recovery Details

Date recovered: _____

Area recovered from: _____ ha

Location (attach plan with coordinates GDA 94): _____, _____

Was there evidence of weeds? ☐ Yes ☐ No If yes, this material must be stored separately see Environment Team

Topsoil depth recovered: _____ mm (approx.) Topsoil Volume Recovered: _____ m³ (approx.)

Subsoil depth recovered: _____ mm (approx.) Subsoil Volume Recovered: _____ m³ (approx.)

Recovery method: ☐ Dozer ☐ Grade ☐ Loader ☐ Shovel ☐ Scraper

Destination (attach plan with coordinates GDA 94): _____

Soil Storage Location

Date stockpiled: _____ ID (e.g. CCM-TS-XX): _____

Stockpile Location: _____

Approved Stockpile Location: ☐ Yes ☐ No

Total Volume: Topsoil _____ m³ (approx) Subsoil _____ m³ (approx)

Stockpile recorded on GIS system: ☐ Yes ☐ No

Stockpile Signed: ☐ Yes ☐ No

Seeding Details (e.g. species, rate etc.): _____

Please forward this form to Adani Environment Team when complete

Form completed by: _____

Date: _____

Form approved by: _____

Date: _____

Form 2 - Soil Data Sheet

Soil Rehandle (i.e. stockpile relocation)

Date: _____ Reason for Rehandle: _____
Initial Location (attach plan with coordinates GDA 94): _____ Stockpile ID: _____
Final Location (attach plan with coordinates GDA 94): _____ Stockpile ID: _____
Rehandle Volume: Topsoil: _____ m³ (approx.) Subsoil: _____ m³ (approx.)

Rehabilitation

Date: _____ Soil application area: _____ ha
Application location (attach plan with coordinates GDA 94): _____
Topsoil respread depth: _____ mm (approx.) Subsoil respread depth: _____ mm (approx.)
Topsoil Volume Used: _____ m³ (approx.) Subsoil Volume used: _____ m³ (approx.)
Source Location (attach plan with coordinates GDA 94): _____
Stockpile ID: _____ GIS system updated: ☐ Yes ☐ No *Please*
forward this form to Adani Environment Team when complete

Form completed by: _____ Date: _____

Form approved by: _____ Date: _____

Appendix C – Soil Stockpile Inspection

Soil Stockpile Inspection

Desktop

Review of Soil Survey Register.

Confirm there is sufficient soil resources for progressive rehabilitation activities identified in the mine plan and Plan of Operations.

Field

All stockpiles are signposted with the ID and year completed visible and legible.

Weeds

Inspect the stockpile for Weeds of National Significance and Declared Weeds.

Where weeds are observed, follow up control methods are required (grubbing/spraying). Ensure the area is added to the annual Weed and Pest Management program. Stockpiles covered in weeds should be noted in the stockpile register notes.

Seeding

Inspect stockpiles for ground cover, where cover is not established (e.g. minimum 80% ground cover), an assessment of soil constraints may be required to determine growth limiting factors.

Stockpiles that are greater than 12 months old and show limited vegetation cover (less than 5%) may require seeding and the Environment Team should be consulted for management actions and advice.

Stability

Stockpiles showing significant erosion (large rills and gullies) may require remedial works or bunding installed to contain the soil. Inspect to ensure that livestock are excluded from the stockpiles.

Drainage lines and minor diversions of water should be kept well away from stockpile locations, remedial actions may be required to divert water away from stockpile toes (flowing or ponding).

Location

Stockpiles should be located in areas where they are not going to be impacted by future mining and rehabilitation operations. Access to the stockpile location is to be maintained to ensure that stockpile can be utilised in future rehabilitation.

Appendix D – Soil Units and Recovery Recommendations

Table 2: Soil unit descriptions and recovery recommendations (derived from NQSA (2011))

Note: Depths within the table are measured from original surface level prior to stripping. This means that secondary growth medium actual depth will be less the primary growth medium depth. E.g. Gc2 secondary growth medium depth of 0.40m is 0.2m – 0.4m (primary growth medium) = 0.2m depth of secondary growth medium.

Soil Type	ASC	Description	Two Stage Recovery		Single Stage Recovery	Comments
			Primary Growth Medium	Secondary Growth Medium		
Gc1	Leptic Rudosol	Very shallow (<0.25 m), gravelly, acid to neutral, brown loam to clay loam.	N/A	N/A	N/A	Topsoil stripping is not recommended due to shallow soil depth and the amount of surface cobbles, stones and rock outcrop.
Gc2	Bleached-Leptic Tenosol	Shallow to moderately deep, gravelly, acid to neutral, bleached loam to clay loam.	0.20m	0.40m	0.40m	Avoid stripping below 0.40 m depth due to variable depths of the underlying rock.
Lb1	Red Kandosol	Moderately deep soil with medium to thick clay loamy surface grading to red massive fine sandy clay subsoil.	0.20m	0.40m	0.40m	Avoid stripping below 0.40 m depth due to variable depths of the underlying rock.
Lb2	Yellow or brown Kandosol	Moderately deep to deep soil with moderately thick clay loamy surface grading to yellow to brown, massive, fine sandy clay subsoil.	0.20m	0.40m	0.40m	Avoid stripping below 0.40 m depth due to variable depths of the underlying rock.
Lb4	Yellow-Orthic or brown-orthic Tenosol	Moderately deep, acid to neutral, yellow to brown, massive sand to loam.	0.20m	0.70m	0.70m	Avoid stripping below 0.70 m depth due to variable depths of the underlying rock.
Ln	Red Dermosol	Shallow to moderately deep, slightly gravelly, acid to neutral, red well-structured clay.	0.20m	0.40m	0.40m	Avoid stripping below 0.40 m depth due to variable depths of the underlying rock.
Tm1	Yellow or brown Chromosol	Deep texture contrast soils with thick, bleached sandy to loamy surface over acid to neutral, massive, yellow to brown fine sandy light to light medium clay subsoil.	0.20m	0.90m	0.90m	Avoid stripping below 0.9 m to avoid sodic/dispersive soil and underlying rock.

Tm2	Yellow or brown Chromosol	Deep texture contrast soil with thick clay loamy surface over acid to neutral, well structured, yellow to brown fine sandy light to light medium clay subsoil.	0.20m	1.00m	1.00m	Avoid stripping below 1.0 m depth due to variable depths of the underlying rock.
Tm4	Yellow or brown Sodosol or Chromosol	Deep texture contrast soil with thick, bleached, sandy to clay loamy surface over alkaline, mostly mottled, yellow to brown light medium to medium clay subsoil.	0.10m	0.30m	0.30m	Avoid stripping below 0.3 m to avoid alkaline, sodic/saline soils.
Mr2	Bleached-Leptic Tenosol	Moderately deep, gravelly, acid to neutral, bleached sand to loam.	0.20m	0.60m	0.60m	Avoid stripping below 0.60 m depth due to variable depths of the underlying rock.
Eb1	Yellow or brown Sodosol	Very deep, texture contrast soil with thick, bleached sandy to clay loamy surface over alkaline, mottled, yellow to brown fine sandy to medium clay subsoil.	0.20m	0.40m	0.40m	Avoid stripping below 0.4 m to avoid sodic/saline soils.
Eb2	Red, brown or grey Vertosol	Very deep, grey, brown or red cracking clay with moderate to strong gilgai or melon holes and hard-setting surface.	N/A	N/A	N/A	Topsoil stripping is not recommended due to shallow saline/sodic subsoil and the frequency of melon holes.
Eb3	Yellow or brown Chromosol or Sodosol	Moderately deep to deep, texture contrast soil with moderately thick, bleached clay loamy surface over alkaline, mottled, yellow to brown medium clay subsoil.	0.10m	0.30m	0.30m	Topsoil stripping is not recommended below 0.3 m due to potential saline/sodic subsoil.
Mb2	Bleached-Orthic Tenosol	Very deep, yellow to brown, acid to neutral, bleached sand to loam.	0.30m	0.90m	0.90m	Stripping not recommended below 0.9 m due to high fine sand content.
Mb3	Red-Orthic Tenosol	Very deep, red, acid, massive sand to loam.	0.30m	0.90m	0.90m	Stripping not recommended below 0.9 m due to high fine sand content.
Mb4	Yellow-Orthic and Brown-Orthic Tenosol	Sandy red or yellow-brown Tenosol.	0.30m	0.90m	0.90m	Stripping not recommended below 0.9 m due to high fine sand content.

Cr1	Yellow-Orthic and Brown Orthic Tenosol	Very deep, acid to neutral, yellow to brown, massive and loose, sand to loam.	0.30m	0.90m	0.90m	Stripping not recommended below 0.9 m due to high fine sand content.
Cr3	Red Chromosol	Very deep texture contrast soil with moderately thick clay loamy surface over alkaline, red, well-structured light medium to medium clay subsoil.	0.90m	0.70m	0.70m	Stripping not recommended below 0.7 m due to strongly alkaline subsoil.
Cr4	Brown Chromosol	Very deep texture contrast soil with moderately thick sandy to loamy surface over acid to neutral, brown, massive to weakly structured light medium to medium clay subsoil.	0.30m	0.90m	0.90m	Stripping not recommended below 0.9 m due to high fine sand content.

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Appendix E – Soil Survey Register