UG1 LONGWALLS 101 TO 105 BUILT FEATURES MANAGEMENT PLAN TRANSGRID

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1	September 2017	September 2017	Approved	MCO and MSEC	Environmental Department
2	June 2020		Inclusion of Longwalls 104-105	MCO	UG Technical Services

Approved: _____ Date: _____

Document	Version	Issue	Effective	Review	Author	Approved
MCO_BFMP_TRANSGRID	2	Jun 20		Jun 23	MCO	S. Archinal

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1.0 INTRODUCTION

The Moolarben Coal Complex is an open cut and underground coal mining operation located approximately 40 kilometres north of Mudgee in the Western Coalfield of New South Wales (NSW) (Figure 1).

Moolarben Coal Operations Pty Ltd (MCO) is the operator of the Moolarben Coal Complex on behalf of the Moolarben Joint Venture (Moolarben Coal Mines Pty Ltd [MCM], Sojitz Moolarben Resources Pty Ltd and a consortium of Korean power companies). MCO and MCM are wholly owned subsidiaries of Yancoal Australia Limited.

The UG1 Underground Mine is a component of the approved Moolarben Coal Complex (Figure 2). The UG1 Underground Mine commenced first workings in April 2016 and commenced secondary workings (longwall extraction) in October 2017 by longwall mining methods from the Ulan Seam within Mining Lease (ML) 1605, ML 1606, ML 1628, ML 1691 and ML 1715 (Figure 3).

Mining operations at the Moolarben Coal Complex are currently approved until 31 December 2038 in accordance with Project Approval (05_0117) (Moolarben Coal Project Stage 1) (as modified) and Project Approval (08_0135) (Moolarben Coal Project Stage 2) (as modified).

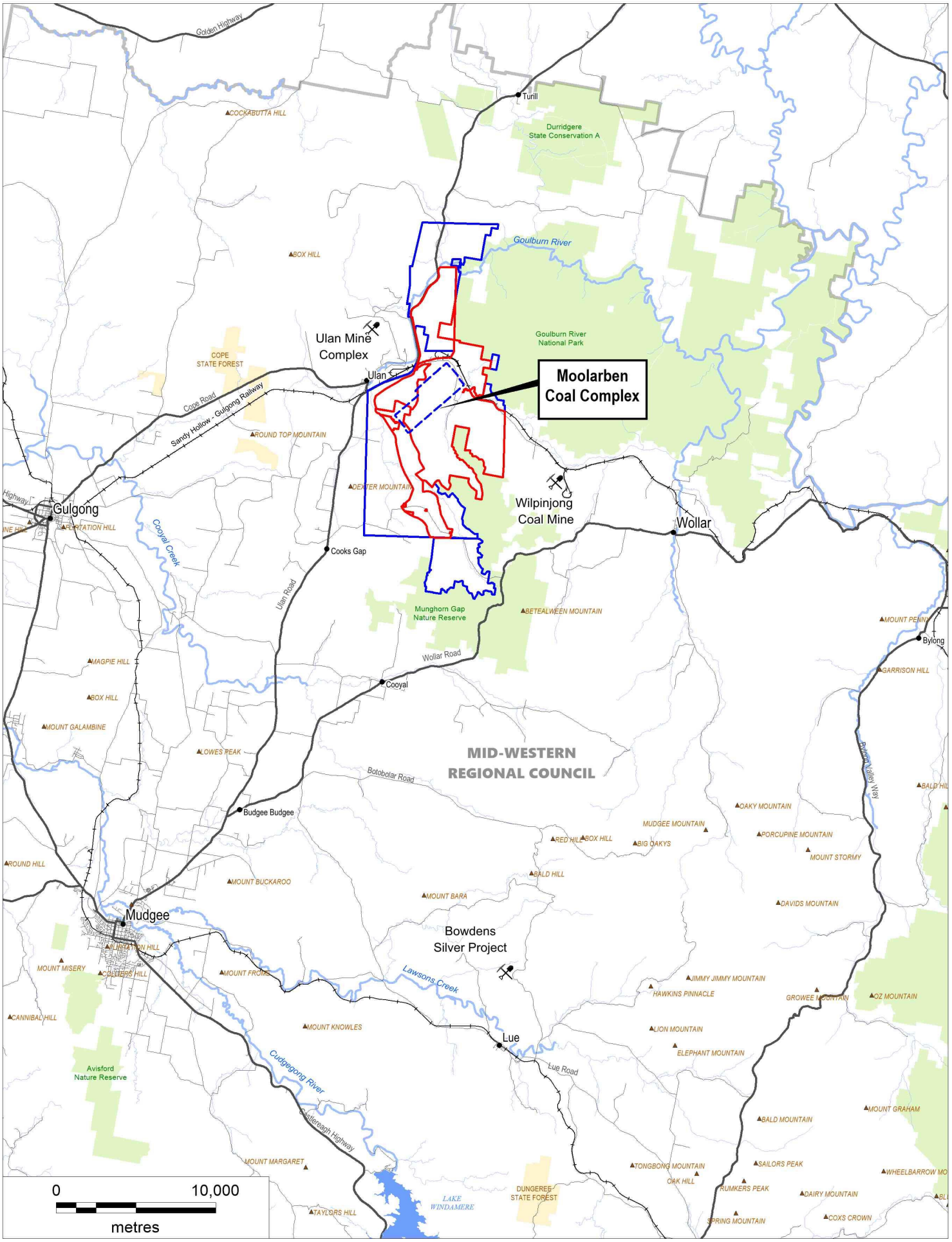
This UG1 Longwalls 101 to 105 Built Features Management Plan – TransGrid (LW101-105 BFMP-TRANSGRID) forms a part of the Extraction Plan for Longwalls 101 to 105 (herein referred to as Longwalls 101-105) of the approved UG1 Underground Mine.

1.1 PURPOSE AND SCOPE

Purpose: This LW101-105 BFMP-TRANSGRID outlines the management of potential subsidence impacts of the proposed secondary workings described in the Extraction Plan on the existing 330 kilovolt (kV) electricity transmission line (ETL).

Scope: This LW101-105 BFMP-TRANSGRID covers the section of the 330 kV ETL in the vicinity of the Study Area[1] (i.e. between Towers 102 and 111), which relates to the extent of subsidence effects resulting from the secondary extraction of Longwalls 101-105 (Figure 4).

[1] Longwalls 101-105 and the area of land within the furthest extent of the 26.5 degree (°) angle of draw and 20 millimetres (mm) predicted subsidence contour. The TransGrid assets are not located within the Study Area.



Legend

- Exploration Licence Boundary
- Mining Lease Boundary
- Local Government Area
- National Park / Nature Reserve
- State Forest
- Mining Project

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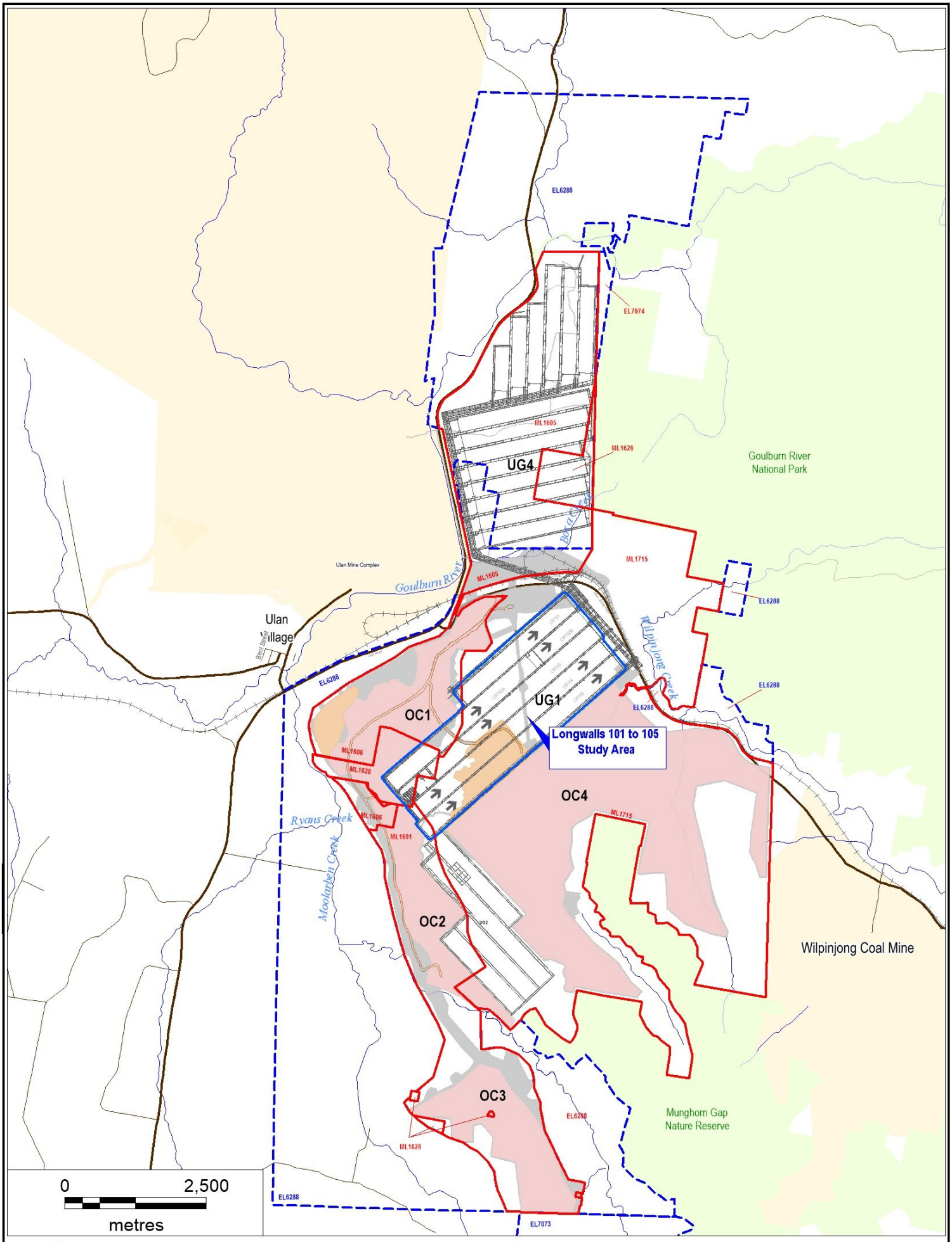
Figure 1
Regional Location



Legend

- Exploration Licence Boundary
- Mining Lease Boundary
- Haul Road
- Rail Line
- Watercourse

Existing / Approved Development

- Open Cut Mining Area
- Underground Workings
- Out-of-Pit Emplacement
- Surface Infrastructure

- Longwalls 101 to 105 Study Area
- Direction of Longwall Mining

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MOOLARBEN COAL

Figure 2
Moolarben Coal Complex Layout

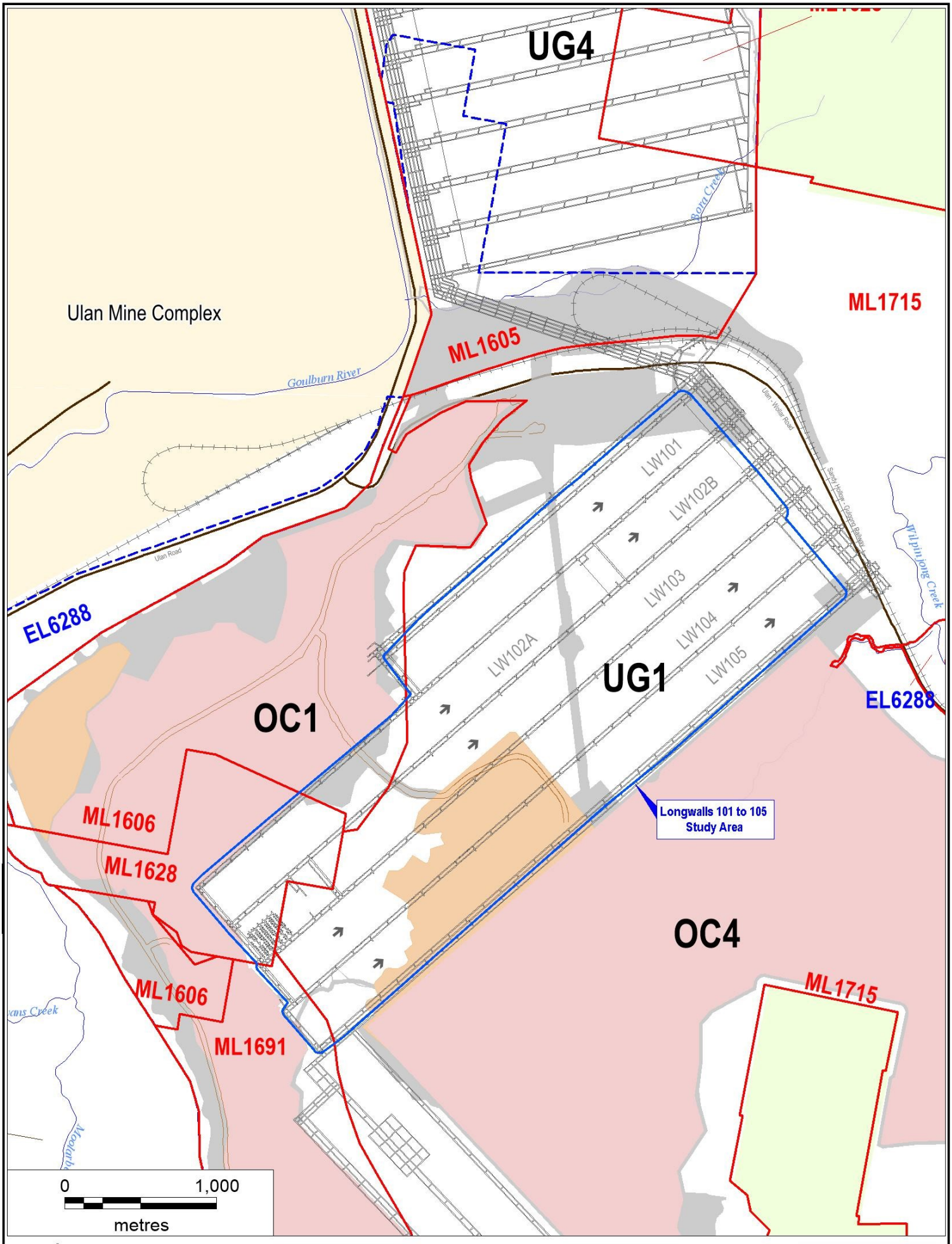
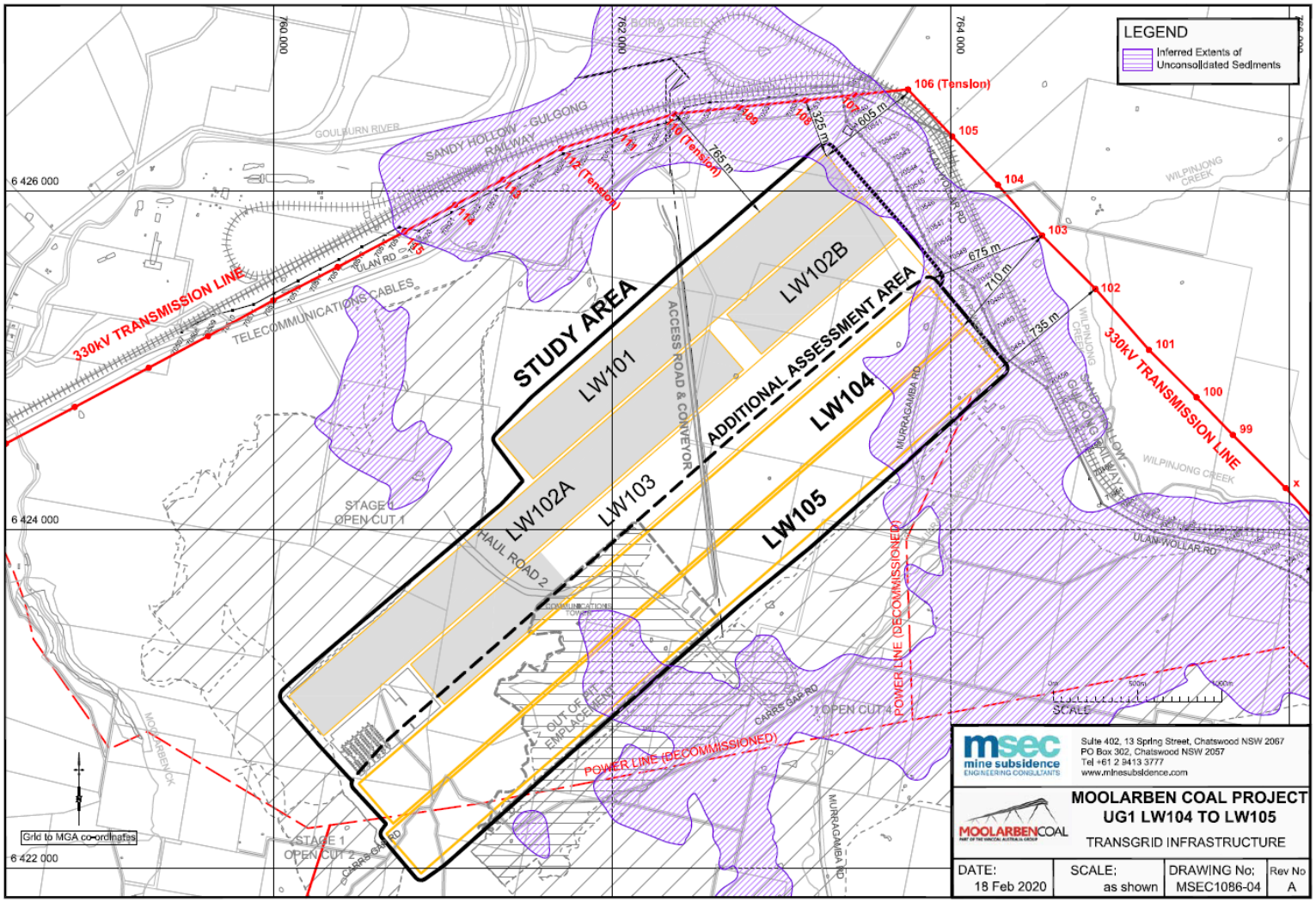


Figure 3
UG1 Longwalls 101-105 Layout



Source; MSEC (2020)

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Transgrid Assets

Figure 4

1.2 SUITABLY QUALIFIED AND EXPERIENCED PERSONS

In accordance with Condition 5(a), Schedule 4 of Project Approval (08_0135), the suitably qualified and experienced persons that have prepared this LW101-105 BFMP-TRANSGRID, namely representatives from Mine Subsidence Engineering Consultants (MSEC) and MCO were endorsed by the Secretary of the Department of Planning, Industry and Environment (DPIE).

This LW101-105 BFMP-TRANSGRID has been prepared in consultation with TransGrid (Section 4.4).

A list of the key responsibilities of MCO personnel in relation to this LW101-105 BFMP-TRANSGRID, and a list of key contacts, is provided in Section 11.

1.3 STRUCTURE OF THE LONGWALLS 101-105 BFMP-TRANSGRID

The remainder of the LW101-105 BFMP-TRANSGRID is structured as follows:

Section 2: Describes the review and update of the LW101-105 BFMP-TRANSGRID.
Section 3: Outlines the statutory requirements applicable to the LW101-105 BFMP-TRANSGRID.
Section 4: Provides baseline data, extraction schedule, revised assessment of the potential subsidence impacts and environmental consequences for Longwalls 101-105, as well as the outcomes of the risk assessment.
Section 5: Details the performance measures relevant to TransGrid assets.
Section 6: Describes the monitoring program.
Section 7: Describes the management measures that will be implemented.
Section 8: Details the performance indicators that will be used to assess against the performance measures.
Section 9: Provides a contingency plan to manage any unpredicted impacts and their consequences.
Section 10: Describes the Trigger Action Response Plan (TARP) management tool.
Section 11: Describes the roles and responsibilities for MCO personnel and key contacts.
Section 12: Describes the program to collect sufficient baseline data for future Extraction Plans.
Section 13: Describes the Annual Review, audits, regular reporting and improvement of environmental performance.
Section 14: Outlines the management and reporting of incidents.
Section 15: Outlines the management and reporting of complaints.
Section 16: Outlines the management and reporting of non-compliances with statutory requirements.
Section 17: Lists the references cited in this LW101-105 BFMP-TRANSGRID.

2.0 LONGWALLS 101 TO 105 BFMP-TRANSGRID REVIEW AND UPDATE

In accordance with Condition 5, Schedule 6 of Project Approval (08_0135), this LW101-105 BFMP-TRANSGRID will be reviewed as follows:

> *5. Within 3 months of the submission of:*
> *(a) the submission of annual review under condition 4 above;*
> *(b) the submission of an incident report under condition 7 below;*
> *(c) the submission of an audit under condition 9 below; or*
> *(d) any modification to the conditions of this approval or MP 05_0117 (unless the conditions require otherwise),*
>
> *the Proponent shall review and, if necessary, revise the strategies, plans, and programs required under this approval to the satisfaction of the Secretary. Where this review leads to revisions in any such document, then within 4 weeks of the review the revised document must be submitted to the Secretary for approval.*

2.1 ACCESS TO INFORMATION

In accordance with Condition 11, Schedule 6 of Project Approval (08_0135), MCO will make the approved LW101-105 BFMP-TRANSGRID publicly available on the MCO website.

3.0 STATUTORY REQUIREMENTS

MCO's statutory obligations are contained in:

- the conditions of the NSW Project Approval (05_0117) (as modified) and NSW Project Approval (08_0135) (as modified);
- the conditions of Commonwealth Approvals (EPBC 2007/3297, EPBC 2013/6926, EPBC 2008/4444 and 2017/7974;
- relevant licences and permits, including conditions attached to the Environment Protection Licence (EPL) No. 12932 and MLs (i.e. ML 1605, ML 1606, ML 1628, ML 1691 and ML 1715); and
- other relevant legislation.

Obligations relevant to this LW101-105 BFMP-TRANSGRID are described below.

3.1 EP&A ACT PROJECT APPROVAL

Condition 5(g), Schedule 4 of Project Approval (08_0135) requires the preparation of a Built Features Management Plan as a component of the Extraction Plan. In addition, Conditions 3, 5(n), 5(p) and 6, Schedule 4 and Condition 3, Schedule 6 of Project Approval (08_0135) outline general management plan requirements that are applicable to the preparation of this LW101-105 BFMP-TRANSGRID.

Table 1 presents these requirements and indicates where they are addressed within this LW101-105 BFMP-TRANSGRID.

Table 1: Management Plan Requirements

Project Approval (08_0135) Condition	LW101-105 BFMP-TRANSGRID Section
Condition 3, Schedule 4	
Notes: *...* • *The Proponent will be required to define more detailed performance indicators for each of these performance measures in Built Features Management Plans or Public Safety Management Plan (see condition 5 below).* • *Measurement and/or monitoring of compliance with performance measures and performance indicators is to be undertaken using generally accepted methods that are appropriate to the environment and circumstances in which the feature or characteristic is located. These methods are to be fully described in the relevant management plans. In the event of a dispute over the appropriateness of proposed methods, the Secretary will be the final arbiter.* *...* • *Requirements under this condition may be met by measures undertaken in accordance with the Mine Subsidence Compensation Act 1961.* *...*	Section 8 Sections 5, 6 & 8 Section 9
Condition 5(g), Schedule 4	
(g) include a Built Features Management Plan, which has been prepared in consultation with DRE and the owners of affected public infrastructure, to manage the potential subsidence impacts and/or environmental consequences of the proposed second workings, and which: • *addresses in appropriate detail all items of key public infrastructure and other public infrastructure and all classes of other built features;* • *has been prepared following appropriate consultation with the owner/s of potentially affected feature/s;* • *recommends appropriate remedial measures and includes commitments to mitigate, repair, replace or compensate all predicted impacts on potentially affected built features in a timely manner; and* • *in the case of all key public infrastructure, and other public infrastructure except roads, trails and associated structures, reports external auditing for compliance with ISO 31000 (or alternative standard agreed with the infrastructure owner) and provides for annual auditing of compliance and effectiveness during extraction of longwalls which may impact the infrastructure;*	Section 4.1 Section 4.4 Sections 7 & 9 Section 13.1
Condition 5(n), Schedule 4	
(n) include a contingency plan that expressly provides for adaptive management where monitoring indicates that there has been an exceedance of any performance measure in Tables 18 and 19, or where any such exceedance appears likely; ...	Section 9
Condition 5(p), Schedule 4	
(p) include a program to collect sufficient baseline data for future Extraction Plans.	Section 12
Condition 6, Schedule 4	
6. The Proponent shall ensure that the management plans required under conditions 5(g)-(l) above include: *a) an assessment of the potential environmental consequences of the Extraction Plan, incorporating any relevant information that has been obtained since this approval; and* *b) a detailed description of the measures that would be implemented to remediate predicted impacts.*	Section 4 and 6.3 Section 7

Table 1 (Continued): Management Plan Requirements

Project Approval (08_0135) Condition	LW101-105 BFMP-TRANSGRID Section
Condition 3, Schedule 6	
3. The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:	Sections 3 and 4.4
a) detailed baseline data;	Section 4.1
b) a description of:	
• *the relevant statutory requirements (including any relevant approval, licence or lease conditions);*	Section 3
• *the relevant limits or performance measures/criteria;*	Section 5
• *the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;*	Section 8
c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	Sections 7 & 9
d) a program to monitor and report on the:	Sections 6, 8 & 13
• *impacts and environmental performance of the project;*	
• *effectiveness of any management measures (see c above);*	
e) a contingency plan to manage any unpredicted impacts and their consequences;	Section 9
f) a program to investigate and implement ways to improve the environmental performance of the project over time;	Sections 6 & 13
g) a protocol for managing and reporting any:	
• *incidents;*	Section 14
• *complaints;*	Section 15
• *non-compliances with statutory requirements; and*	Section 16
• *exceedances of the impact assessment criteria and/or performance criteria; and*	Section 9
h) a protocol for periodic review of the plan.	Section 2

3.2 OTHER LEGISLATION

The Acts which may be applicable to the conduct of the Moolarben Coal Complex includes, but are not limited to, the:

- *Crown Lands Act, 1989;*
- *Fisheries Management Act, 1994;*
- *Heritage Act, 1977;*
- *Coal Mine Subsidence Compensation Act 2017;*
- *Mining Act, 1992;*
- *National Parks and Wildlife Act, 1974;*

- *Biodiversity Conservation Act, 2016;*
- *Protection of the Environment Operations Act, 1997;*
- *Roads Act, 1993;*
- *Water Act, 1912;*
- *Water Management Act, 2000;*
- *Work Health and Safety Act, 2011;* and
- *Work Health and Safety (Mines and Petroleum Sites) Act, 2013.*

Relevant licences or approvals required under these Acts will be obtained as required.

4.0 TRANSGRID 330 KV ELECTRICITY TRANSMISSION LINE

4.1 BASELINE DATA

A 330 kV ETL (Wollar-Wellington 330 kV High Voltage Line) owned by TransGrid runs adjacent to Ulan-Wollar Road and the Sandy Hollow Gulgong Railway Line and is shown on Figure 4.

The 330 kV ETL and towers are located to the north and east of Longwalls 101-105 and the longwalls will not pass beneath these electrical services. The distances from the towers to the nearest longwalls are summarised in Table 2 below.

Table 2: Transmission Towers Distance to Longwalls 101-105

Tower Number	Tower Type	Nearest Longwall	Approximate Distance of the Transmission Towers Centrelines from the Nearest Longwalls (m)	Distance Divided by Depth of Cover
102	Suspension	Longwall 105	735	8.2
103	Suspension	Longwall 103	675	6.3
104	Suspension	Longwall 103	650	5.9
105	Suspension	Longwall 102	635	5.3
106	Tension	Longwall 101	605	4.8
107	Suspension	Longwall 101	390	3.0
108	Suspension	Longwall 101	325	2.6
109	Suspension	Longwall 101	550	4.2
110	Tension	Longwall 101	765	5.9
111	Suspension	Longwall 101	910	7.0

m = metres

Photographs of the 330 kV suspension tower and tension tower types are shown in Plates 1 and 2. The nearest tension tower is located 605 m to the north-east of the northern corner of Longwall 101. The nearest suspension tower is located approximately 325 m to the north of the northern corner of Longwall 101.


Plates 1 & 2: 330 kV Suspension Tower (Left) and Tension Tower (Right)
[Source: MSEC (2016)]

4.2 LONGWALLS 101-105 EXTRACTION SCHEDULE

The 330 kV ETL is located to the north and east of the Study Area for Longwalls 101-105 (Figure 4) and will be subject to small far field subsidence effects.

Longwalls 101-105 and the area of land within the furthest extent of the 26.5° angle of draw and 20 mm predicted subsidence contour (i.e. the Longwalls 101-105 Study Area) are shown on Figures 3 and 4. Longwall extraction will occur from the west to the east. The longwall layout includes approximately 311 m panel widths (void) with 20 m pillars (solid).

The provisional extraction schedule for Longwalls 101-105 is provided in Table 3.

Table 3: Provisional Extraction Schedule

Longwall	Estimated Start Date	Estimated Duration	Estimated Completion Date
101	-	-	Complete
102 (A+B)	-	-	Complete
103	-	-	June2020
103 Plunge	-	-	Complete
104	July 2020	12 months	June 2021
105	July 2021	11 months	May 2022

Following approval of the UG1 Optimisation Modification in April 2016, MCO has delineated geological features in Longwall 102 and 103 that prevented economic mining of these sections, and has subsequently revised the longwall layout to avoid these features. The subsequent barrier pillar separating Longwalls 102A and 102B is approximately 140 m in length and the LW103 commencing end was shortened by 660m and replaced by a first workings only production panel. LW104 was also shortened at the commencing end by 70m to allow for a rear of panel shaft. In addition, following further detailed design, Longwalls 101-103 have been shortened by approximately 70 m to provide safe operational conveyor distance between the end of the longwalls and main headings. With the exception of these changes, the longwall geometry is the same as that for the approved UG1 Optimisation Modification, and MSEC (2017a and 2020) concludes that the overall impact assessments for the natural and built features are unchanged or reduced.

4.3 REVISED SUBSIDENCE AND IMPACT PREDICTIONS

Subsidence and impact predictions for Longwalls 101-105 in relation to the TransGrid assets was conducted by MSEC (2015) as part of the Moolarben Coal Complex UG1 Optimisation Modification Environmental Assessment (EA) and was summarised as follows:

> *As the 330kV transmission line is located well outside the UG1 Study Area, no systematic subsidence parameters are provided for the 330kV transmission line. However, some of the 330kV towers may experience small far field horizontal movements of up to 120 mm. These far-field horizontal movements tend to be bodily movements towards the extracted goaf area and are accompanied by very low levels of strain. Hence, the differential far field movements due to the proposed extraction of the UG1 longwalls between the legs of the towers are expected to be very small and are unlikely to adversely impact on the towers.*

Revised subsidence and impact predictions specifically for the extraction of Longwalls 101-105 on TransGrid assets were conducted by MSEC and reported in MSEC (2020). Subsequent to the preparation of MSEC (2016), the longwall layout was revised to incorporate a reduced longwall length and shorter barrier pillar (Section 4.2). MSEC (2017a) includes updated subsidence predictions for the revised layout. As the asset is located further from Longwalls 101-103, a reduced impact is predicted by MSEC (2017a) compared to MSEC (2016).

In relation to subsidence predictions, MSEC (2016; 2017a,2020) makes the following conclusions:

- Cables can be affected by changes in bay lengths (i.e. the distances between the towers at the level of the cables) which result from differential movements.
- The stability of the tower structures can be affected by mining induced tilts, curvatures and ground strains and by changes in the catenary profiles of the cables.

- Given the nearest tower of the 330 kV ETL is approximately 340 m or more from the finishing end of Longwalls 101-105, the towers will not be subjected to measurable conventional vertical mine subsidence ground movements (i.e. less than limits of survey accuracy [<20 mm]).
- As the towers will not be subjected to measurable conventional vertical subsidence, tilt, curvature or strain, it is unlikely that conventional movements would result in adverse impacts on the transmission line.
- The tower structures may, however, experience some far-field horizontal movements of up to 70 mm towards Longwalls 101-103. Far-field horizontal movements due to Longwalls 104 and 105 are greater than 700 m distance will be in the order of survey accuracy.
- With the alignment of the towers around the northern corner of the longwalls at the nearest point, the predicted horizontal movements are expected to result in a net shortening of the distances between the towers, with a maximum predicted shortening between Towers 107 and 108 of 50 mm. The towers located the furthest distances from the longwalls may experience minor net opening.
- The existing open cut (OC1) will significantly reduce the potential for far-field movements.
- The presence of unconsolidated Tertiary sediments (in the north-east) should result in further reducing the potential for far-field movements to develop at the tower structures.
- Notwithstanding, even very low tilts and strains at the base of the 330 kV ETL tower structures may induce a greater arc of travel at the top of the towers, and thus monitoring and management measures have been developed (Sections 6 and 7, respectively).

It is expected that any potential impacts on the 330 kV ETL could be managed using typical mitigation and management techniques for such ETLs (Section 7). Following the risk assessment held on 24 March 2017, MSEC provided a supplementary report incorporating additional detailed predictions that were requested by TransGrid. MSEC (2017b) makes the following conclusions:

- The 330 kV ETL is not expected to experience measurable conventional vertical subsidence, tilt and curvature resulting from the extraction of Longwalls 101 to 103.
- Predicted far-field horizontal movements at the towers based on a 95% confidence level range from less than 25 mm to 43 mm.
- The predicted total strains at the towers based on a 95% confidence level are 0.4 mm/m tensile and 0.3 mm/m compressive. It is noted that these predicted strains include a component of survey tolerance, which is in the order of 0.1 to 0.3 mm/m.
- Monitoring is recommended for potential far-field horizontal movements and non-conventional movements.
- It is expected that the potential impacts on the 330 kV ETL can be managed with the implementation of the necessary monitoring and management strategies.

It should be noted that as the TransGrid 330 kV ETL is located further from Longwalls 101-103 than was considered in MSEC (2017b), a reduced impact is predicted by MSEC (2017a). Impact due to Longwall104 and 105 will be further reduced due to the increasing distance of the towers from the longwall finishing ends.

4.4 RISK ASSESSMENT MEETING

In accordance with the draft *Guidelines for the Preparation of Extraction Plans* (DP&E and DRE, 2015), potential risks and potential risk control measures and procedures have been considered at a risk assessment for the TransGrid infrastructure in the vicinity of Longwalls 101-103, held on 24 March 2017. Attendees at the risk assessment meeting included representatives from MCO, TransGrid, MSEC, Resource Strategies and a risk assessment facilitator (AXYS Consulting Pty Ltd [AXYS]). This was subsequently reviewed by MCO and MSEC representatives for Longwall 104 and 105 in January 2020.

The investigation and analysis methods used during the risk assessment review included (AXYS, 2020):

- Confirmation of relevant TransGrid assets.
- Review of the revised subsidence predictions and potential impacts on TransGrid assets (including consideration of past experience in Longwall 101 and 102 and in the Western Coalfield).
- Consideration and discussion of the proposed monitoring program, management measures and contingency measures.

The following potential risks were identified during the risk assessment (AXYS, 2020):

- Longwall mining impacts the 330 kV ETL and MCO are required to compensate TransGrid to make repairs.
- Longwall mining impacts the 330 kV ETL and customers are affected.

A number of risk control measures and procedures were identified prior to and during the risk assessment and are summarised as follows:

Baseline Data / Validation

1. TransGrid to advise the most recent and proposed maintenance inspections dates and processes for the 330 kV ETL.
2. MCO to arrange for a baseline survey and dilapidation audit (if required) of the 330 kV ETL in the area that may be affected by the mining of Longwalls 101-105. A baseline survey and dilapidation audit would not be considered to be required if TransGrid has, or will, complete a routine inspection of the 330 kV ETL that would be representative of the state of the 330 kV ETL prior to the commencement of longwall mining.
3. Installation of the subsidence monitoring program.

Management / Monitoring / Response Measures

4. Establish a key contacts list between MCO and TransGrid to provide a regular update of status of mining activities, and for ongoing liaison.
5. Include in the LW101-105 BFMP-TRANSGRID a schedule of times/frequency of communication with TransGrid for the status of mining of Longwalls 101-105.
6. Develop a TARP and include triggers for conditions that may need to be actioned by MCO and/or TransGrid.

MCO considers all risk control measures and procedures to be feasible to manage all identified risks.

The proposed risk control measures and procedures have been incorporated where relevant in this LW101-105 BFMP-TRANSGRID and the program for implementation is summarised in Table 3.

Table 3: Program for Implementation of Proposed Risk Control Measures and Procedures

	Risk Control Measure / Procedure	LW101-105 BFMP-TRANSGRID Section	Proposed Timing
Baseline Data / Validation			
1	TransGrid to advise the most recent and proposed maintenance inspection dates and processes for the 330 kV ETL.	Section 6.2	Prior to Longwall 104
2	MCO to arrange for a baseline survey and dilapidation audit (if required) of the 330 kV ETL in the area that may be affected by the mining of Longwalls 101-105.	Section 6.2	Prior to Longwall 104 being within 400m
3	Installation of the subsidence monitoring program.	Section 6.2	Prior to Longwall 104
Management / Monitoring / Response Measures			
4	Establish key contacts list in the LW101-105 BFMP-TRANSGRID.	Section 11.1	Complete
5	Include in the LW101-105 BFMP-TRANSGRID a schedule of times/frequency of communication with TransGrid for the status of mining of Longwalls 101-105.	Section 7 and Table 6	Complete
6	Develop a TARP and include triggers for conditions that may need to be actioned by MCO and/or TransGrid.	Section 10 and Attachment 1	Complete

5.0 PERFORMANCE MEASURES

The performance measures specified in Table 19, Schedule 4 of Project Approval (08_0135) relevant to the 330 kV ETL, as a built feature, are listed in Table 5.

Table 5: Built Features Subsidence Impact Performance Measures

Feature	Subsidence Impact Performance Measure
Key public infrastructure:	
Gulgong-Sandy Hollow Railway Line Ulan-Wollar Road	Always safe and serviceable. Damage that does not affect safety or serviceability must be fully repairable, and must be fully repaired.
Other infrastructure:	
Murragamba Road Low voltage electricity power line *	Always safe. Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated. Damage must be fully repairable, and must be fully repaired or else fully replaced or fully compensated.

Source: Table 19 in Schedule 4 of Project Approval (08_0135).

* Essential Energy 66 kV/22 kV dual circuit powerline as per Project Approval (08_0135).

It is recognised that the 330 kV ETL is 'key public infrastructure' and therefore the same subsidence impact performance measures applicable to the Sandy Hollow Gulgong Railway Line and Ulan-Wollar Road will apply.

In accordance with Condition 3, Schedule 4 of Project Approval (08_0135), MCO must ensure that there is no exceedance of the performance measures listed in Table 19, Schedule 4, to the satisfaction of the Secretary of the DPIE.

Section 6 outlines the monitoring that will be undertaken to assess the impact of Longwalls 101-105 against the performance measures in relation to the 330 kV ETL. Management measures for the 330 kV ETL are outlined in Section 7 and performance indicators for the performance measures are summarised in Section 8.

6.0 MONITORING

A monitoring program will be developed in order to monitor the impacts of the extraction of Longwalls 101-105 on the 330 kV ETL to identify unsafe conditions or loss of serviceability during or after mining. Key components of the monitoring program are summarised in Table 6.

Table 6: 330 kV ETL Monitoring Program Overview

Monitoring Component	Parameter	Timing/Frequency	Responsibility
Pre-mining			
330 kV ETL – Visual inspection / baseline audit (between Towers 102 to 111).	Condition of existing 330 kV ETL (e.g. land clearance, vegetation clearance, road clearance, integrity and function of support clamps or other items). Photo points (including baseline photographic record).	Prior to commencement of Longwall 104 extraction. *[Unless a suitable inspection has been or will be completed by TransGrid prior to commencement of Longwall 104 extraction]*	Underground Technical Manager / TransGrid
UG1 subsidence monitoring lines, as described in the UG1 Longwalls 101 to 105 Subsidence Monitoring Program (LW101-105 SMP).	Ground survey based on FF monitoring line along the Ulan-Wollar Road easement.	Prior to commencement of Longwall 101 extraction and extended prior Longwall 104 extraction.	Underground Technical Manager / Registered Mine Surveyor
330 kV ETL – Towers 102 to 111.	Tower survey – 4 x leg mounted prisms at each tower (measuring differential separation), target (bolt) locations on both earth peaks of each tower and ground survey marks at the base of each tower.	Prior to commencement of Longwall 101 extraction.	Underground Technical Manager / Registered Mine Surveyor

Table 6: 330 kV ETL Monitoring Program Overview (continued)

Monitoring Component	Parameter	Timing/Frequency	Responsibility
During and After Mining			
UG1 subsidence monitoring lines, as described in the LW101-105 SMP.	Ground survey based on FF monitoring line. Monitoring parameters include: • subsidence; • tilt; • tensile strain; • compressive strain; and • absolute horizontal translation.	When mining reaches the "A" Line for Longwall 101. At 100 m intervals determined by the longwall chainage marks while the active mining face is within 400 m of the longwall take-off point. *[Inspection sheets to be provided to TransGrid for Longwall 101 monitoring. This requirement is to be reviewed following completion of Longwall 101]* At any time in case of fault or emergency and where requested by TransGrid.	Underground Technical Manager / Registered Mine Surveyor
330 kV ETL – Towers 102 to 111.	Tower survey – 4 x survey stations at each tower (measuring differential separation), target (bolt) locations on both earth peaks of each tower and ground survey marks at the base of each tower. Calculation of differential leg movement.	When mining reaches the "A" Line for Longwall 101. When horizontal movement at Line FF is >15mm, commence monitoring towers at 100 m intervals determined by the longwall chainage marks. *[Inspection sheets to be provided to TransGrid for Longwall 101 monitoring. This requirement is to be reviewed following completion of Longwall 101]* At any time in case of fault or emergency and where requested by TransGrid.	Underground Technical Manager / Registered Mine Surveyor
330 kV ETL – Routine Inspections of Towers 102 to 111.	Condition of existing 330 kV ETL (e.g. land clearance, vegetation clearance, road clearance, integrity and function of support clamps or other items).	Routinely as per TransGrid requirements.	TransGrid

Table 6: 330 kV ETL Monitoring Program Overview (continued)

Monitoring Component	Parameter	Timing/Frequency	Responsibility
Post-Mining			
UG1 subsidence monitoring lines, as described in the LW101-105 SMP.	Ground survey based on FF monitoring line. Monitoring parameters include: • subsidence; • tilt; • tensile strain; • compressive strain; and • absolute horizontal translation.	Within two weeks following completion of longwall recovery from each Longwall Within three months following completion of longwall recovery from each Longwall	Underground Technical Manager / Registered Mine Surveyor
330 kV ETL – Towers 102 to 111.	Tower survey – 4 x leg mounted prisms at each tower (measuring differential separation), target (bolt) locations on both earth peaks of each tower and ground survey marks at the base of each tower. Calculation of differential leg movement.	Within two weeks following completion of longwall recovery from each of Longwalls Within three months following completion of longwall recovery from each Longwall	Underground Technical Manager / Registered Mine Surveyor

The frequency of monitoring will be reviewed either:

- in accordance with the Annual Review; or
- if triggered as a component of the Contingency Plan as outlined in Section 9 of this LW101-105 BFMP-TRANSGRID.

6.1 SUBSIDENCE PARAMETERS

Subsidence parameters (i.e. subsidence, tilt, tensile strain, compressive strain and absolute horizontal translation) associated with mining will be measured in accordance with the LW101-105 SMP.

In summary, surveys will be conducted to measure subsidence movements in three dimensions using a total station survey instrument. Subsidence movements (i.e. subsidence, tilt, tensile strain and compressive strain) will be measured along subsidence lines that have been positioned across the general landscape.

Monitoring of subsidence parameters specific to the TransGrid 330 kV ETL will be measured by a survey line ('FF Line') along the Ulan-Wollar Road, and by survey of tower structures (Towers 102 to 111).

Surveys of the FF Line and Towers 102 to 111 will be conducted prior to extraction of Longwall 101, when mining reaches the mid-point of Longwall 101, and at 100 m intervals based on longwall chainage marks when mining is within 400 m of the longwall take-off position (e.g. at a frequency of approximately one to two weeks based on expected longwall progression). Surveys will also be conducted following completion of longwall recovery (the first within two weeks and the second within three months). Additional opportunistic observations of subsidence impacts will be conducted during routine works by MCO and its contractors. Surveys of Towers 102 to 111 will include measurement of differential separation between tower legs, monitoring of both earth peaks and ground survey.

Inspection sheets detailing the outcomes of the subsidence impact monitoring program will be provided to TransGrid during mining of Longwall 101 (requirement to be reviewed following completion of Longwall 101).

6.2 SUBSIDENCE IMPACTS

A visual inspection / baseline audit of the 330 kV ETL will be conducted prior to commencement of Longwall 101 and 104 unless TransGrid has completed, or will complete, a suitable inspection prior to commencement of Longwall 101. Where relevant, inspections of subsidence impacts will include photographic record of the impacts from nominated photo points for comparison with baseline photographic records.

It is understood that TransGrid conducts routine inspections (including fault and emergency patrols) which would be used for monitoring of potential subsidence impacts if conducted during the course of mining Longwalls 101-105.

Information will be recorded in the LW101-105 BFMP-TRANSGRID Subsidence Impact Register (Attachment 2) and reported in accordance with Project Approval (08_0135) (Section 13).

6.3 ENVIRONMENTAL CONSEQUENCES

MCO and TransGrid will compare the results of the subsidence impact monitoring against the built features performance measure and indicators (Sections 5 and 8). In the event the observed subsidence impacts from the Moolarben Coal Complex exceed the performance measure or indicators, MCO and TransGrid will assess the consequences of the exceedance in accordance with the Contingency Plan described in Section 9.

7.0 MANAGEMENT MEASURES

A number of potential management measures in relation to the 330 kV ETL are considered to be applicable. These include:

- alteration of conductor tensions;
- installation of temporary structures;
- modification to attachment points such as placement of stringing sheaves to earth wires and/or phase conductors; and
- strengthening of tower structures through installation of cruciform footings.

The requirement for these management measures will be determined by TransGrid during the pre-mining inspection / baseline audit and if required, implemented prior to mining within 400 m of the relevant feature.

A summary of management measures will be reported in the Annual Review.

Key management actions and timing is summarised in Table 7.

Table 7: 330 kV ETL Key Management Actions

Management Measure	Timing/Frequency	Responsibility
Pre-mining		
Notification to TransGrid prior to commencement of secondary extraction.	Prior to secondary extraction of Longwall 101 and 104.	Underground Technical Manager
Baseline audit and survey of 330 kV ETL towers to identify management measures potentially required pre-subsidence.	Prior to secondary extraction of Longwall 101 and 104.	Underground Technical Manager
During Mining		
Notification to TransGrid prior to subsidence effects on the 330 kV ETL.	Prior to mining within 400 m of the longwall take-off position.	Underground Technical Manager
Provision of **inspection sheets** detailing the outcome of the subsidence impact monitoring program to TransGrid.	At 100 m intervals when mining within 400 m of the longwall take-off position (if required).	Underground Technical Manager
Ensure **safe access** to 330 kV ETL is available such that routine inspections and maintenance and remediation works are able to be undertaken.	During Longwall 101-105 extraction.	Underground Technical Manager
Implement TARP (Attachment 1).	During Longwall 101-105 extraction.	Underground Technical Manager

Table 7: 330 kV ETL Key Management Actions (Continued)

Management Measure	Timing/Frequency	Responsibility
Post-mining		
Audit and survey of 330 kV ETL towers to identify any post-mining remediation works required.	Following completion of active mining at UG1.	Underground Technical Manager

8.0 ASSESSMENT OF PERFORMANCE INDICATORS AND MEASURES

In accordance with Condition 5(d), Schedule 4 of Project Approval (08_0135), performance indicators have been developed for the performance measures listed in Table 5 (Section 5).

The performance indicators proposed to ensure that the performance measures are achieved include:

- the structural integrity of the 330 kV ETL (towers and transmission lines) is maintained;
- the electrical clearance from land, vegetation and roads is maintained; and
- the serviceability of the access roads/tracks is maintained.

Monitoring conducted to inform the assessment of secondary extraction of Longwalls 101-105 against the performance indicators for the performance measures relevant to the 330 kV ETL as a built feature is outlined in Section 6.

If a performance measure is considered to have been exceeded, the Contingency Plan outlined in Section 9 of this LW101-105 BFMP-TRANSGRID will be implemented.

9.0 CONTINGENCY PLAN

In the event the performance measures relevant to the 330 kV ETL as a built feature, summarised in Table 5, are considered to have been exceeded or are likely to be exceeded, MCO will implement the following Contingency Plan:

- The observation will be reported to the Underground Technical Manager or the Environmental and Community Manager within 24 hours.
- The observation will be recorded in the Subsidence Impact Register (Attachment 2).
- The likely exceedance will be reported in an Incident Report (refer to the Extraction Plan).
- MCO will provide the Incident Report to relevant stakeholders (i.e. DPI&E, DRE and TransGrid).
- MCO will conduct an investigation to identify and evaluate contributing factors to the exceedance, including re-survey of the relevant subsidence monitoring lines, analysis of predicted versus observed subsidence parameters and a review of the subsidence monitoring program with updates to the program where appropriate.
- An appropriate course of action will be developed in consultation with relevant stakeholders and government agencies including proposed contingency measures (Section 9.1), and a program to review the effectiveness of the contingency measures.
- The course of action will be approved by, and implemented to the satisfaction of, TransGrid and DRE.
- This LW101-105 BFMP-TRANSGRID and the performance indicators will be reviewed to adequately manage future potential impacts within the limits of Project Approval (08_0135).

MCO will comply with the NSW *Coal Mine Subsidence Compensation Act, 2017* (formerly NSW *Mine Subsidence Compensation Act, 1961)* in the event that property damages occur as a result of mining Longwalls 101-105.

9.1 CONTINGENCY MEASURES

Contingency measures will be developed in consideration of the specific circumstances of the feature (e.g. the location, nature and extent of the impact, and the assessment of environmental consequences).

TransGrid designs its network with full redundancy provision (i.e. n-1 capability). In the unlikely event that the 330 kV ETL became unserviceable due to a subsidence impact, TransGrid can potentially switch around the 330 kV ETL for a period of time to effect emergency works, continuing to provide power to its customers (unless there are planned outages/faults in other connected parts of the transmission network).

Potential contingency measures that could be considered in the event the performance measure for the 330 kV ETL is exceeded are summarised in Table 8.

Table 8: Potential Contingency Measures

Environmental Consequence	Potential Contingency Measures	
	Measure	Description
Impact on:		
Towers	Stabilisation techniques	Installation of tower supports such as cruciform elements.
	Repair/replace	Repair/replace tower(s) or construct emergency structures. Emergency structures, such as temporary wooden poles, deployed to re-establish line operations within 72 hours (depending on the amount of towers requiring replacement).
Transmission Wires	Stabilisation techniques	Sheaving of conductors and/or earth wires.
	Repair/replace	Repair/replace transmission lines.

In the event that contingency measures in Table 8 are still expected to exceed performance measures, adaptive management will be considered, including: reduction in extraction height; modification to longwall layout; or shortening (finishing) the longwall panel earlier than planned.

10.0 TRIGGER ACTION RESPONSE PLAN – MANAGEMENT TOOL

The framework for the various components of this LW101-105 BFMP-TRANSGRID are summarised in the TARP shown in Attachment 1. The TARP illustrates how the various predicted subsidence impacts, monitoring components, performance measures, and responsibilities are structured to achieve compliance with the relevant statutory requirements, and the framework for management and contingency actions.

The TARP comprises:

- baseline conditions;
- predicted subsidence impacts;
- trigger levels from monitoring to assess performance; and
- triggers that flag implementation of contingency measures.

The TARP system provides a simple and transparent snapshot of the monitoring of environmental performance and the implementation of management and/or contingency measures.

11.0 ROLES AND RESPONSIBILITIES

Key responsibilities of MCO personnel in relation to this LW101-105 BFMP-TRANSGRID are summarised in Table 9. Responsibilities may be delegated as required.

Table 9: Longwalls 101 to 105 Built Features Management Plan – TransGrid
Responsibility Summary

Responsibility	Task
General Manager	• Ensure resources are available to MCO personnel to facilitate the completion of responsibilities under this LW101-105 BFMP-TRANSGRID.
Underground Technical Manager	• Ensure the LW101-105 SMP is implemented. • Ensure monitoring required under this LW101-105 BFMP-TRANSGRID is carried out within specified timeframes, adequately checked and processed and prepared to the required standard. • Undertake relevant monitoring and implementation of management measures summarised in Tables 6 and 7 respectively.
Environmental and Community Manager	• Liaise with relevant stakeholders regarding subsidence impact management and related environmental consequences.
Registered Mine Surveyor	• Undertake all subsidence monitoring to the required standard within the specified timeframes and ensure data are adequately checked, processed and recorded.

11.1 KEY CONTACTS

The details of key contacts and phone numbers in relation to this LW101-105 BFMP-TRANSGRID are summarised in Table 10.

Table 10: Longwalls 101 to 105 Built Features Management Plan – TransGrid
Key Personnel Contact Details

Organisation	Position	Contact Name	Phone Number
MCO	Underground Technical Manager	Mr Liam Mildon	02 6376 1614
	Environmental and Community Manager	Mr Graham Chase	02 6376 1407
	Moolarben Coal Hotline		1800 556 484
TransGrid	Development Assessment Officer	Kylie O'Brien Pratt	02 9284 3174
	Senior Structural Engineer	Sanu Maharjan	02 9284 3446

12.0 FUTURE EXTRACTION PLANS

In accordance with Condition 5(p), Schedule 4 of Project Approval (08_0135), MCO will collect baseline data for the future Extraction Plan (e.g. for the next Underground Mine). However, for the 330 kV ETL, the baseline (and post-mining) data collected for Longwalls 101-103 will be used as baseline for Longwalls 104-105 as longwall mining progressively moves further south of the TransGrid assets.

In addition to the baseline data collection, consideration of the environmental performance and management measures, in accordance with the review(s) conducted as part of this LW101-105 BFMP-TRANSGRID, will inform the appropriate type and frequency of monitoring of the assets relevant to the next Extraction Plan.

13.0 ANNUAL REVIEW, REGULAR REPORTING AND IMPROVEMENT OF ENVIRONMENTAL PERFORMANCE

In accordance with Condition 4, Schedule 6 of Project Approval (08_0135), MCO will conduct an Annual Review of the environmental performance of the Project by the end of March each year, or as otherwise agreed by the Secretary of the DPIE.

The Annual Review will:

- describe the works carried out in the previous calendar year, and the development proposed to be carried out over the current calendar year;
- include a comprehensive review of the monitoring results and complaints records of the Project over the previous calendar year, including a comparison of these results against the:
  - relevant statutory requirements, limits or performance measures/criteria;
  - monitoring results of previous years; and
  - relevant predictions in the EA;
- identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;
- identify any trends in the monitoring data over the life of the Project;
- identify any discrepancies between the predicted and actual impacts of the Project, and analyse the potential cause of any significant discrepancies; and
- describe what measures will be implemented over the next year to improve the environmental performance of the Project.

In accordance with Condition 11, Schedule 6 of Project Approval (08_0135), the Annual Review will be made available on the MCO website.

As described in Section 2, this LW101-105 BFMP-TRANSGRID will be reviewed within three months of the submission of an Annual Review, and revised where appropriate.

In accordance with Condition 8, Schedule 6 of Project Approval (08_0135), MCO will also provide regular reporting on the environmental performance of the Project on the MCO website.

13.1 AUDITS

In accordance with Condition 9, Schedule 6 of Project Approval (08_0135), an independent environmental audit was conducted by the end of December 2015 and again in 2018, and will be undertaken every three years thereafter. A copy of the independent environmental audit will be provided to the Secretary of the DPIE and made available on the MCO website.

The independent environmental audit will be conducted by suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary of the DPIE.

The independent environmental audit will assess the environmental performance of the Project and assess whether it is complying with the requirements of Project Approval (08_0135), and any other relevant approvals, and recommend measures or actions to improve the environmental performance of the Project.

Further to the above, audits to ISO 31000 Risk Management standard are conducted on elements of the Moolarben UG Safety Management System annually, with internal and external audits being undertaken on alternate years. Additionally, an annual auditing of compliance and effectiveness on built features is captured as part of the Annual Review process.

14.0 INCIDENTS

An incident is defined in Project Approval (08_0135) as a set of circumstances that:

- causes or threatens to cause material harm to the environment; and/or
- breaches or exceeds the limits or performance measures/criteria in Project Approval (08_0135).

In the event that an incident which causes, or threatens to cause, material harm to the environment occurs, the incident will be managed in accordance with the Pollution Incident Response Management Plan.

The reporting of incidents will be conducted in accordance with Condition 7, Schedule 6 of Project Approval (08_0135).

MCO will notify the Secretary of the DPIE, and any other relevant agencies immediately after MCO becomes aware of the incident which causes or threatens to cause material harm to the environment. For any other incident associated with the project, MCO will notify the Secretary and any other relevant agencies as soon as practicable after becoming aware of the incident. Within seven days of the date of the incident, MCO will provide the Secretary of DPIE and any relevant agencies with a detailed report on the incident. The report will:

- describe the date, time and nature of the exceedance/incident;
- identify the cause (or likely cause) of the exceedance/incident;
- describe what action has been taken to date; and
- describe the proposed measures to address the exceedance/incident.

15.0 COMPLAINTS

MCO maintains a Community Complaints Line (Phone Number: 1800 556 484) that is dedicated to the receipt of community complaints. The Community Complaints Line is publicly advertised and operates 24 hours per day, seven days a week, to receive any complaints from neighbouring residents or other stakeholders.

MCO has developed a Community Complaints Procedure which details the process to be followed when receiving, responding to and recording community complaints. The Community Complaints Procedure is supported by a Complaints Database.

The Community Complaints Procedure is a component of the MCO Environmental Management Strategy which requires the recording of relevant information including:

- the nature of complaint;
- method of the complaint;
- relevant monitoring results and meteorological data at the time of the complaint;
- site investigation outcomes;
- any necessary site activity and activity changes;
- any necessary actions assigned; and
- communication of the investigation outcome(s) to the complainant.

In accordance with Condition 11, Schedule 6 of Project Approval (08_0135), the complaints register will be updated monthly and made available on the MCO website.

16.0 NON-COMPLIANCES WITH STATUTORY REQUIREMENTS

A protocol for the managing and reporting of non-compliances with statutory requirements has been developed as a component of MCO's Environmental Management Strategy and is described below.

Compliance with all approvals, plans and procedures will be the responsibility of all personnel (staff and contractors) employed on or in association with the Moolarben Coal Complex.

The Environmental and Community Manager (or delegate) will undertake regular inspections, internal audits and initiate directions identifying any remediation/rectification work required, and areas of actual or potential non-compliance.

As described in Section 14, MCO will notify the Secretary of the DPIE, and any other relevant agencies, of any incident associated with MCO.

A review of MCO's compliance with all conditions of Project Approval (08_0135), mining leases and all other approvals and licenses will be undertaken prior to (and included within) each Annual Review. The Annual Review will be made publicly available on the MCO website.

As described in Section 13.1, an independent environmental audit was conducted by the end of December 2015 and again in 2018, and will be undertaken every three years thereafter. A copy of the audit report will be submitted to the Secretary of the DPIE and made publicly available on the MCO website.

17.0 REFERENCES

AXYS Consulting Pty Ltd (2017) *Potential Impact of Longwall 101 to 103 on TransGrid Infrastructure – Risk Assessment Report.*

Department of Planning and Environment and NSW Trade & Investment – Division of Resources and Energy (2015) *Guidelines for the Preparation of Extraction Plans Required under Conditions of Development Consents, Project Approvals and Mining Lease Conditions for Underground Coal Mining*. Version 5. Draft.

Mine Subsidence Engineering Consultants (2015) *Moolarben Coal Complex: Revised Predictions of Subsidence Parameters and Revised Assessments of Subsidence Impacts resulting from the Proposed UG1 Mine Layout Optimisation Modification*.

Mine Subsidence Engineering Consultants (2016) *Moolarben Coal Operations: Longwalls 101 to 103 – Subsidence Predictions and Impact Assessments for the TransGrid Infrastructure.* December 2016.

Mine Subsidence Engineering Consultants (2017a) *Moolarben Coal Complex: Moolarben Project Stage 2 – Longwalls 101 to 103 – Subsidence Predictions and Impact Assessments for the Natural and Built Features in Support of the Extraction Plan.* Report number MSEC867.

Mine Subsidence Engineering Consultants (2017b) *Supplementary Report – Moolarben Coal Operations – Longwalls 101 to 103 - Subsidence Predictions and Impact Assessments for the TransGrid Infrastructure.* March 2017.

Mine Subsidence Engineering Consultants (2020) Moolarben Project Stage 2- *Longwalls 104 to 105 Subsidence Predictions and Impacts Assessments for the Natural and Built Features In Support of the Extraction Plan.*

ATTACHMENT 1

UG1 LONGWALLS 101 TO 105 BUILT FEATURES MANAGEMENT PLAN – TRANSGRID
TRIGGER ACTION RESPONSE PLAN

Condition	Normal		Level 1	Level 2
	Baseline Conditions	**Predicted Impacts**	**Implement Management Measures**	**Restoration/Contingency Phase**
Trigger	TransGrid 330 kilovolt (kV) electricity transmission line (ETL) is safe, serviceable and repairable (or as otherwise identified by pre-mining inspection).	Small far field subsidence effects on the TransGrid 330 kV ETL. Impacts are considered to be within acceptable limits if monitoring identifies (limits as advised by TransGrid): • No observable surface deformations. • Less than 4 millimetres (mm) of differential separation between tower legs. • Less than 15 mm of incremental horizontal movement at Line FF.	Monitoring identifies impacts that are greater than predicted, but the performance measure has not been exceeded and is not likely to be exceeded. Management measures are considered to be required if monitoring identifies (limits as advised by TransGrid): • Observable surface deformations. • Between 4 and 10 mm of differential separation between tower legs. • Between 15 and 30 mm of horizontal movement at towers.	If the Performance Measure relevant to the TransGrid 330 kV ETL has been exceeded, or is likely to be exceeded (i.e. loss of serviceability). Contingency measures are considered to be required if monitoring identifies (limits as advised by TransGrid): • Observable surface deformations. • Greater than 10 mm of differential separation between tower legs. • Greater than 30 mm of horizontal movement at towers.
Action	Establish baseline data, including: • Baseline inspection / audit (including baseline photographic record). • Ground survey as per the UG1 Longwalls 101 to 105 Subsidence Monitoring Program. • Survey of Towers 102 to 111 (monitoring of tower legs, both earth peaks and ground survey).	Conduct monitoring as described in **Section 6**, including: • Ground survey. • Survey of Towers 102 to 111 (monitoring of tower legs, both earth peaks and ground survey).	In the event monitoring identifies greater than predicted/allowable impacts, TransGrid and the Principal Subsidence Engineer (DRE) will be notified within 24 hours. Management measures will be implemented as described in **Section 7** (with regard to the specific circumstances of the subsidence impact [e.g. the nature and extent of the impact]). Follow-up inspections will be conducted to assess the effectiveness of the management measures implemented and the requirement for any additional management measures.	In the event monitoring identifies greater than predicted/allowable impacts, TransGrid and the Principal Subsidence Engineer (DRE) will be notified within 24 hours. Contingency Plan implemented (with regard to the specific circumstances of the subsidence impact). In summary: • The observation will be reported to the Underground Technical Manager and the Environmental and Community Manager within 24 hours. • The observation will be recorded in the Subsidence Impact Register. • The exceedance or likely exceedance will be reported in an incident report. • An investigation will be conducted to identify and evaluate contributing factors to the exceedance. • An appropriate course of action will be developed in consultation with TransGrid, relevant stakeholders and government agencies. • The course of action will be approved by, and implemented to the satisfaction of TransGrid, relevant stakeholders and government agencies. • The Built Features Management Plan – TransGrid and the performance indicators will be reviewed to adequately manage future potential impacts. • Additional surveys will be completed, with results compared against pre-mining monitoring data and predictions. • Adaptive management will be considered.
Frequency	Prior to commencement of extraction of Longwall 101. The baseline inspection/audit will not be required in the event that a suitable inspection has been, or will be, conducted by TransGrid prior to commencement of extraction of Longwall 101.	Ground and tower surveys: • When mining reaches the "A" Line for Longwall 101. • At 100 m intervals determined by the longwall chainage marks while the active mining face is within 400 m of the longwall 101 take-off point. • Within two weeks following completion of longwall recovery from each Longwall • Within three months following completion of longwall recovery from each Longwall • When triggered by Line FF monitoring (>15mm horizontal movement) • At any time in case of fault or emergency and where requested by TransGrid.	To be implemented as required (i.e. if monitoring identifies impacts that are greater than predicted, but the performance measure has not been exceeded and is not likely to be exceeded).	To be implemented following identification of an exceedance of the performance measure, or if the performance measure is likely to be exceeded (i.e. unsafe or loss of serviceability).

Position of Decision Making	• Underground Technical Manager. • TransGrid. • Principal Subsidence Engineer (Division of Resources and Energy [DRE]).	• Underground Technical Manager. • TransGrid. • Principal Subsidence Engineer (DRE).	• Underground Technical Manager. • TransGrid. • Principal Subsidence Engineer (DRE).	• Underground Technical Manager. • TransGrid. • Principal Subsidence Engineer (DRE).

ATTACHMENT 2

UG1 LONGWALLS 101 TO 103 BUILT FEATURES MANAGEMENT PLAN – TRANSGRID
SUBSIDENCE IMPACT REGISTER

UG1 Longwalls 101 to 105 Built Features Management Plan – TransGrid
Subsidence Impact Register

Impact Register Number	Built Feature	Impact Description	Does Impact Exceed the Built Feature Performance Measure/Indicators? (Yes/No)	Management Measures Implemented	Were Management Measures Effective? (Yes/No)