Ravensworth Underground Mine – Longwalls 403 to 406

Transgrid Asset Management Plan

April 2025

DOCUMENT CONTROL

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Originator	Jarrod Braybon	Position Registered Surveyor Ashton Coal Operations Ltd	Signed	Date
Reviewed	Thomas Kaltschmidt	Position Technical Services Manager Ashton Coal Operations Ltd	Signed	Date
Reviewer	Dylan Clayton	Position Easements & Development Assessment Advisor Transgrid	Signed	Date
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-	1	Final for Consultation	ACOL	Dec 2024
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1 INTRODUCTION

Ashton Coal Operations Pty Ltd (ACOL), a subsidiary of Yancoal Australia Limited (Yancoal), owns the Ashton Coal Project (ACP), an underground coal mine located approximately 14 kilometres north-west of Singleton in the Hunter Valley in New South Wales (NSW) (**Figure 1**). Development of the underground mine commenced in December 2005 and is accessed through the southern wall of the Arties Pit under the New England Highway.

The ACP was granted consent on 11 October 2002 by the Minister of Planning pursuant to the provisions of the *Environmental Planning and Assessment Act 1979* (DA 309-11-2001-i). The consolidated Development Consent has been modified on eleven occasions, with the most recent amendment approved on 6 July 2022. The most recent amendment allows ACOL to access and mine coal resources at the Ravensworth Underground Mine (RUM) that are approved to be mined under Development Consent DA 104/96. The RUM is approved to produce up to 7 million tonnes per annum (Mtpa) of run of mine (ROM) coal and operate until 2032.

The RUM is approved for multi-seam longwall extraction, targeting two coal seams in descending order (Pikes Gully [PG] and Middle Liddell [MLD]) (**Figure 2**). Development Consent DA 104/96 approved mining by ACOL of six panels in the PG Seam and five panels in the MLD Seam. Following further detailed studies on the extraction layout, ACOL has decided to not mine Longwalls 401 and 402 in the PG Seam at this stage.

ACOL has prepared an Extraction Plan for mining of Longwalls 403 to 406 in the PG Seam of the RUM (**Figure 3**), varying between 177 metres (m) and 312 m below the surface. Proposed mining of Longwalls 403 to 406 is due to commence approximately September 2025 and is planned to be completed by February 2028.

The **Study Area** (**Figure 3**) is generally determined as the area within a distance equal to an angle of draw measured form the outermost goaf edge of the planned longwall panel voids of:

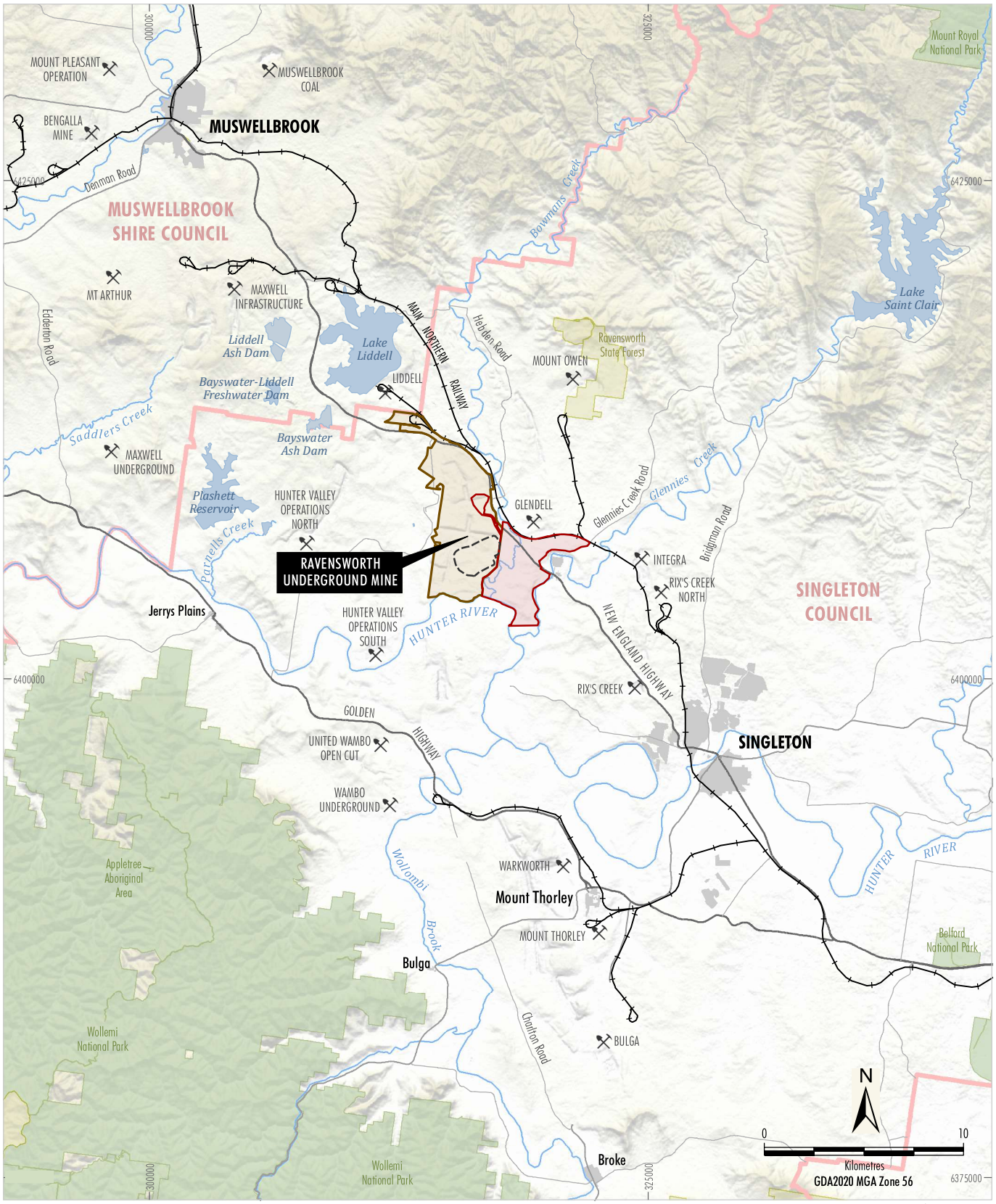
- 45 degree (°) (1 times depth of cover) over waste rock fill material; or
- 26.5° (0.5 times depth of cover) over natural ground.

1.1 SCOPE & OBJECTIVE

This Asset Management Plan has been developed to manage risks associated with the potential subsidence impacts on the Transgrid infrastructure within the Longwalls 403 to 406 Study Area as a result of the secondary extraction of Longwalls 403 to 406 within the PG Seam.

This management plan provides a mechanism through which the potential subsidence impacts from longwall mining can be managed to maintain the safety and serviceability of the Transgrid power supply network whilst mining is in progress.

Transgrid infrastructure of relevance to the Study Area has been identified as a 330 kilovolt (kV) transmission line running roughly north-south that crosses the eastern edge of the Study Area with two towers above the main headings of Longwalls 403 and 404 (**Figure 4**).



ACO-18-03A LW403-406_EP_MT_203A

Source: NSW Spatial Services (2023)

LEGEND

- Mining Operation
- Local Government Area
- State Forest
- National Parks and Wildlife Estate
- Ravensworth Underground Mine
- Ashton Mine Complex
- Longwalls 403 to 406 Study Area

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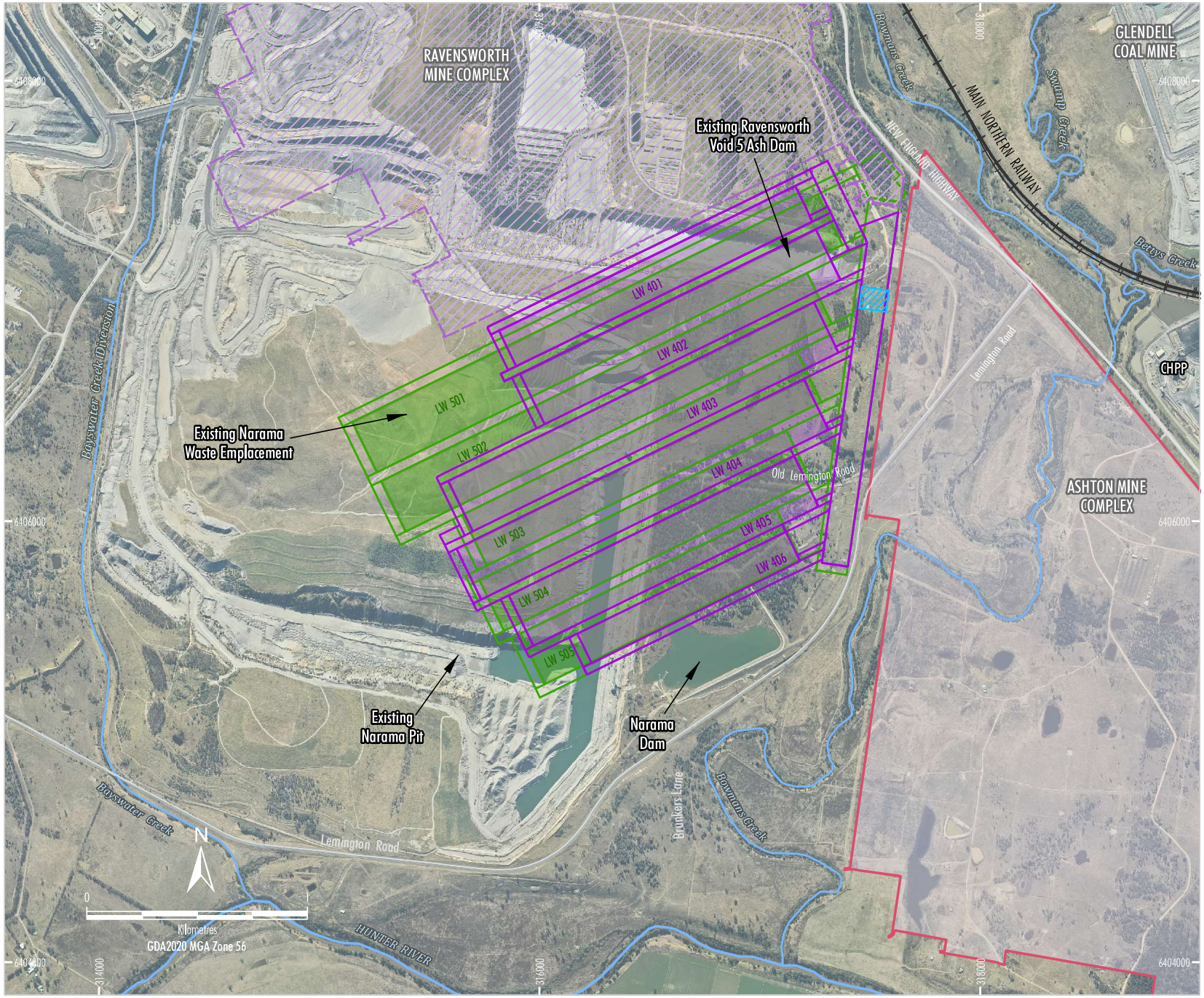
RAVENSWORTH UNDERGROUND MINE
LONGWALLS 403 TO 406 EXTRACTION PLAN

Regional Location

Figure 1



LEGEND

- Completed Pikes Gully Seam Workings
- Existing Shaft 5 Location
- Indicative Pikes Gully Seam Longwall Layout
- Indicative Middle Liddell Seam Longwall Layout
- Ashton Underground Mine

Source: SCT (2021); NSW Spatial Services (2023)
Orthophoto: Ravensworth Mine Complex (2021)

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RAVENSWORTH UNDERGROUND MINE
LONGWALLS 403 TO 406 EXTRACTION PLAN

Ravensworth Underground Mine
Approved General Arrangement

Figure 2

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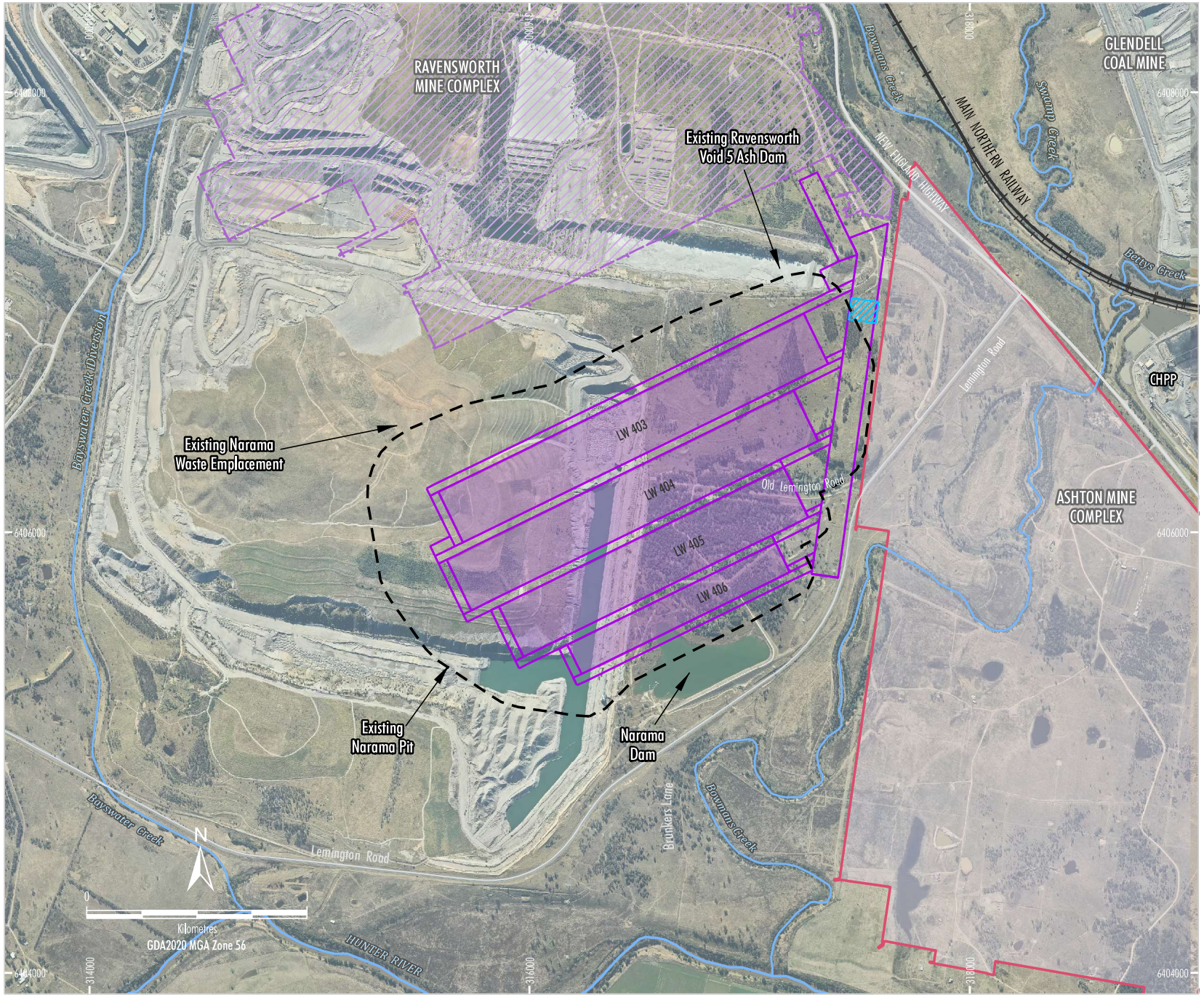

LEGEND

- Completed Pikes Gully Seam Workings
- Existing Shaft 5 Location
- Pikes Gully Seam Longwall Layout
- Ashton Underground Mine
- Longwalls 403 to 406 Study Area

Source: SCT (2021); NSW Spatial Services (2023)
Orthophoto: Ravensworth Mine Complex (2021)

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RAVENSWORTH UNDERGROUND MINE
LONGWALLS 403 TO 406 EXTRACTION PLAN

Pikes Gully Seam Longwall Layout

Figure 3

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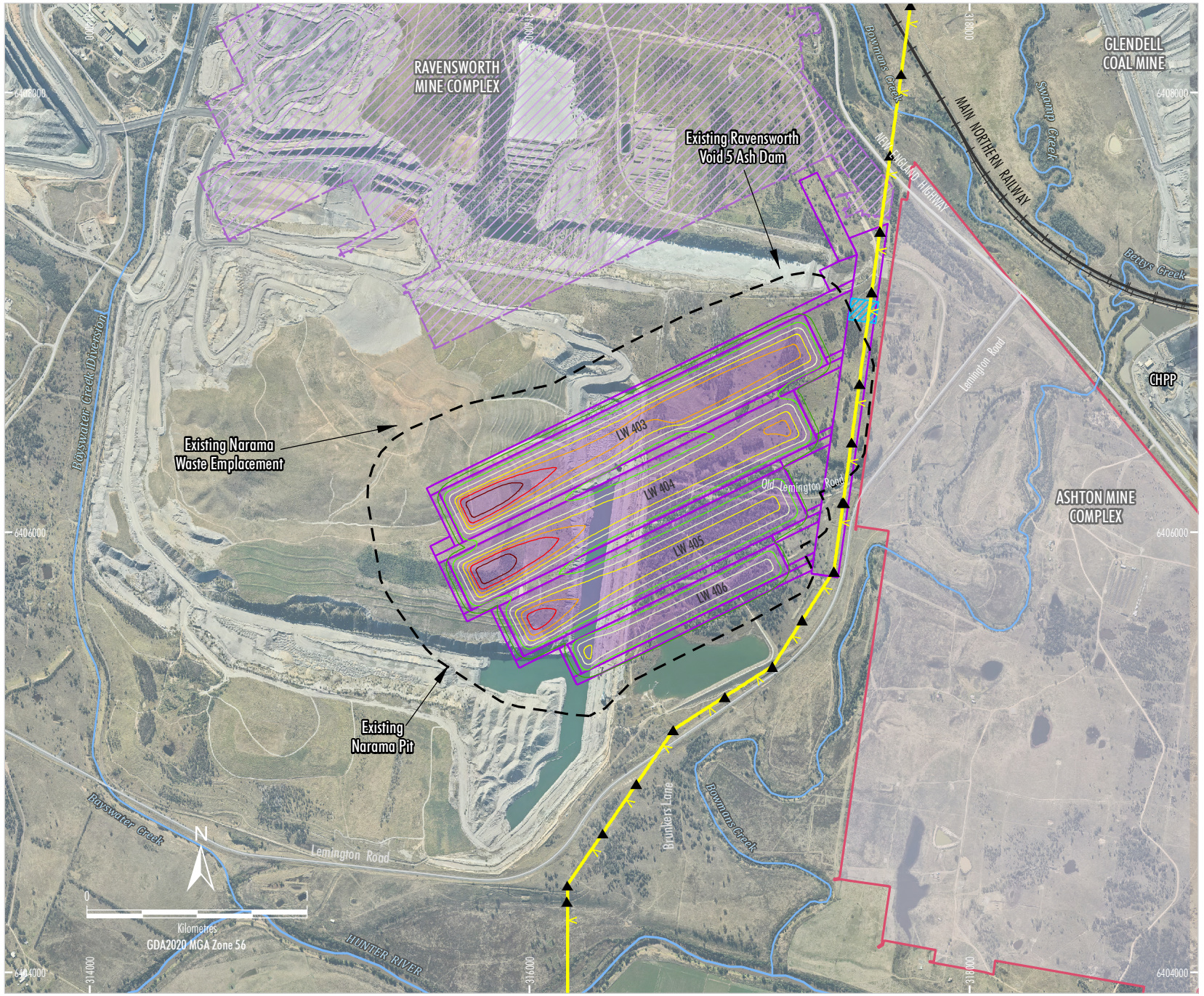

LEGEND

- Completed Pikes Gully Seam Workings
- Existing Shaft 5 Location
- Pikes Gully Seam Longwall Layout
- Ashton Underground Mine
- Longwalls 403 to 406 Study Area
- 330 kV Transmission Line
- 330 kV Transmission Line Tower Base

Estimated Vertical Subsidence (m)

- 0.1
- 0.5
- 1
- 1.5
- 2
- 2.5
- 3

Source: SCT (2024); NSW Spatial Services (2023)
Orthophoto: Ravensworth Mine Complex (2021)

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RAVENSWORTH UNDERGROUND MINE
LONGWALLS 403 TO 406 EXTRACTION PLAN

Location of Transgrid Infrastructure in the Vicinity of Longwalls 403 to 406

Figure 4

This Asset Management Plan forms part of the Longwalls 403 to 406 Extraction Plan and should not be read in isolation.

2 ASSETS AND IMPACTS

The Transgrid 330 kV transmission line is located west of Lemington Road and traverses along the Eastern boundary of the Study Area. Two steel lattice towers (#38 and #39) that support the conductors are within the Study Area (**Plate 1**).

Plate 1: Transgrid 330 kV Transmission Line along Eastern boundary of the Study Area

The transmission line was previously relocated into the corridor along the lease boundary between the Ashton Underground Coal Mine and Ravensworth Underground Mine (RUM) as part of the Ravensworth North Open Cut expansion to minimise the impacts from future mining. The two steel lattice towers located within the Study Area are positioned on waste rock fill material within the boundary of the Ravensworth No 2 Bayswater Pit outside the 26.5° angle of draw from the east of the corners of Longwalls 403 and 404 (SCT, 2024).

Tower foundations are designed and built to accommodate the combined subsidence movements associated with both the Ashton Underground Coal Mine and RUM (SCT, 2024).

2.1 SUBSIDENCE PARAMETER DEFINITIONS

Subsidence, tilt and strain are the subsidence parameters commonly used to define the extent of surface movements that will occur as mining proceeds.

Subsidence is the vertical distance (usually measured in millimetres) that the ground surface lowers as a result of mining, and depends on the depth of the coal seam, the thickness of the seam, the width of the extraction area and the characteristics of the overburden.

Tilt is calculated as the change in subsidence between two points divided by the distance between those points (i.e. change in slope of the surface landform as a result of mining). The maximum tilt, or the steepest portion of the subsidence profile, occurs approximately 50 m from the edge of the longwall panel. Tilt is usually expressed in millimetres per metre (mm/m).

Strain results from horizontal movements in the strata. Strain is determined from monitoring survey data by calculating the change in the horizontal length of a section of a subsidence profile and dividing this by the initial horizontal length of that section. If the section has been extended, the ground is in tension and the change in length and resulting strain are both positive. If the section has been shortened, the ground is in compression and the change in length and strain are both negative. Strain is usually expressed in mm/m.

2.2 MAXIMUM PREDICTED SUBSIDENCE

Table 1 below describes the maximum predicted subsidence estimates detailed in the subsidence assessment for Longwalls 403 to 406 (SCT Operations, 2024).

Table 1. Maximum Predicted Subsidence Parameters for PG Seam Longwall Panels

PG Seam Longwall Panels	Longwalls 403 to 406 Forecast		
	Maximum Subsidence (m)	Maximum Strain (mm/m)	Maximum Tilt (mm/m)
LW403	3.2	55	25
LW404	3.3	60	25
LW405	2.7	55	25
LW406	1.6	55	30

2.3 PREDICTED SUBSIDENCE IMPACTS

Absolute vertical and horizontal movements at the Transgrid 330 kV transmission line towers are expected to be less than 100 mm and imperceptible for all practical purposes (SCT, 2024). The tower foundations are expected to be able to accommodate, through design, any small differential movements that may occur (SCT, 2024).

No impacts to this transmission line that would interrupt the continued operation of the 330 kV powerline are expected from the planned mining of Longwalls 403 to 406 in the PG Seam (SCT, 2024).

2.4 PROPOSED MONITORING/MANAGEMENT MEASURES

A program of regular monitoring during the period of active subsidence near each of the towers is recommended, as well as survey measurements of the full three-dimensional subsidence movements at the towers after each longwall panel (SCT, 2024).

3 PERFORMANCE MEASURES

ACOL will aim to ensure that all built features owned by Transgrid within the Study Area are always maintained as safe and serviceable. Any subsidence damage from ACOL's mining activities will be repaired as necessary, or else replaced and/or fully compensated or dealt with under the terms of an access or compensation agreement.

The subsidence impact performance measures relevant to Transgrid assets under Condition 29, Schedule 3, of DA 104/96 are summarised in **Table 2**, while more specific objectives and performance measures developed by ACOL are listed in **Table 3**.

Table 2. Subsidence Impact Performance Measures

Built Features	
Other public infrastructure (including dams and voids; roads and tracks; active mining areas and infrastructure; electricity transmission lines; gas pipelines; telecommunications networks and fibre optic cables; water supply pipelines, etc.) Houses, industrial premises, swimming pools, farm dams and other built features or improvements	• Always safe. • Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated. • Damage must be fully repaired or replaced, or else fully compensated.
Public Safety	
Public safety.	Negligible additional risk.

Table 3. Transgrid Electricity Transmission and Distribution Line Management Objectives

Objective	**Performance Measure**
• To ensure unplanned disruption to power supply do not occur as a result of subsidence related damage to transmission lines. • To prevent public safety hazards from damaged transmission lines.	• All infrastructure is assessed in consultation with Transgrid and any required mitigation / relocation works carried out prior to undermining. • No power shortages occur due to subsidence induced damage to transmission lines. • Where subsidence related impacts are realised and transmission lines and towers within the site to remain structurally sound and serviceable at all times. • Safety – Line clearances appropriately managed and maintained.

4 MONITORING AND MANAGEMENT

The management actions that ACOL undertakes to satisfy the performance measures outlined in Section 3 are outlined in **Table 4**. These actions include monitoring, management and incident reporting.

Table 4. Transgrid Asset Monitoring and Management

Item	Feature	Action/Response	Trigger/Timing
1.0	**Monitoring**		
1.01	330 kV Transmission Line	• Pre-subsidence survey of 330 kV towers 208T to 210X bases to obtain xyz coordinates. The survey is to be undertaken in accordance with the approved Subsidence Monitoring Program and the proposed methods therein. • No power shortages occur due to subsidence induced damage to transmission lines.	• Prior to mining LW404.
1.02		• Assets to be monitored in accordance with the Subsidence Monitoring Program. • Visual inspections conducted during subsidence (see Section 5.1).	• During active subsidence. • Towers 209X and 209Y will be monitored monthly for the first six months post mining, and every two months for the following year.
2.0	**Management**		
2.01	330 kV Transmission Line	• Monitoring as per requirements above. • It should be noted that the 330kV transmission line has been designed to tolerate subsidence.	• Monitoring as per timing above.
3.0	**Incident Response**		
3.01	330 kV Transmission Line	• Notify Transgrid on 1800 027 253 of any fallen/damaged electrical assets and take appropriate measures to prevent potential injury (e.g. signage, fencing).	• If required as a result of subsidence impacts (i.e. either through inspections or service disruptions), as soon as practicable.
4.0	**Reporting**		
4.01	Item 1.01	• Provide a copy to Transgrid.	• Once completed.
4.02	Item 1.02	• Notify Transgrid and provide copies of monitoring results.	• If subsidence monitoring results are greater than predicted or if potential impacts are identified. • As requested by Transgrid.

Table 4 (Continued). Transgrid Asset Monitoring and Management

Item	Feature	Action/Response	Trigger/Timing
4.03	Item 2.01	• Consult with Transgrid regarding potential management measures.	• If required.
4.04	Item 3.01	• Notify stakeholders. Notify Resources Regulator if deemed a reportable incident.	• Reporting as per Extraction Plan requirements.

4.1 SUBSIDENCE INSPECTIONS

Subsidence inspections will be carried out by mine staff pre-mining prior to the start of LW403 and at the completion of mining of LW403, LW404 and LW405.

The inspections will be carried out to assess impact on the ground surface adjacent to the towers, tower footings, wires and conductors. Observed impacts on the ground surface may indicate an impact on the transmission line. The inspection checklist used for this task is shown in **Appendix B**.

4.1.1 Scope of Inspections

Regular surface inspections will cover a zone defined as being 200 m behind and 100 m in front of the current face position. The inspections will cover the full subsidence bowl out to the 45° angle of draw. Inspections will be carried out by trained persons and will follow the inspection checklist. Inspections will identify the following subsidence impacts:

- surface cracking – edges of extraction void and start and travelling abutments particularly in rock outcrop areas;
- surface humps (compression) – near centre of extracted panels and travelling abutment;
- step change in land surface – associated with cracking;
- damage to towers, conductors, transmission lines;
- reduced ground clearances of conductors;
- tilting of towers, increased/decreased tension in conductors; and
- bent crossarms or insulators.

4.1.2 Public and/or Transmission Line Safety Issues Identified During Inspections

If any public safety issue is identified during inspections the person conducting the inspection shall:

- immediately notify the Technical Services Manager and/or Environment & Community Superintendent;
- erect “NO ROAD” or barrier tape and warning signs if immediate remediation is not possible; and
- the Mine Engineering Manager shall immediately notify the NSW Resources Regulator, Landholder and the infrastructure owner (contact details in **Appendix A**).

4.1.3 Remediation of Transmission Line Safety Issues

If any public safety issue is identified during inspections or other public safety issue is identified during assessment of monitoring or inspection results that person shall:

- immediately contact Transgrid and advise the identified impact;
- arrange for Transgrid to implement immediate repairs if necessary; and
- liaise with Mine Management to arrange long term repairs.

4.2 CONTINGENCY PLANS

Should interruption of power supply to a user occur as a result of, or suspected to be related to, subsidence impacts to the network, ACOL will attempt to provide auxiliary power supply to affected users where the interruption cannot be immediately repaired or if there is a medical or safety reason the user needs continued power supply.

4.3 REPORTING

The results of inspections will be recorded and filed. Monitoring results will be reported annually in the Annual Review (AR) where relevant. Other communications will be as detailed in the Public Safety Management Plan.

5 RESPONSIBILITIES

5.1 ASHTON MINE ENGINEERING MANAGER

The Mine Engineering Manager must:

- promptly notify the Resources Regulator of any identified public safety issue via telephone to the central reporting number 1300 814 609; and
- complete a written notification using the online incident notification form via the Regulator Portal at https://www.resourcesregulator.nsw.gov.au/safety-and-health/notifications/incident-or-injury.

5.2 TECHNICAL SERVICES MANAGER

The Technical Services Manager must:

- authorise the Plan and any amendments;
- ensure that the required personnel and equipment are provided to enable this Plan to be implemented effectively;
- inform the Mine Engineering Manager of impacts requiring notification to the NSW Resources Regulator and/or Transgrid; and
- liaise with officers of Transgrid and remediation consultants and contractors as required.

5.3 ASHTON ENVIRONMENT & COMMUNITY SUPERINTENDENT

The Environment & Community Superintendent must:

- inform the landholders of impacts requiring remediation; and
- report monitoring results in the AR.

5.4 ASHTON REGISTERED MINING SURVEYOR

The Registered Mining Surveyor must:

- ensure that subsidence inspections are conducted to the required schedule and that the persons conducting the inspection are trained in the requirements of this plan and understand their obligations;
- review and assess subsidence monitoring results and inspection checklists; and
- promptly notify Technical Services Manager and/or the Environment and Community Superintendent of any identified public safety issue.

5.5 ASHTON TECHNICAL SERVICES TEAM

The Ashton Technical Services Team members must:

- conduct the subsidence inspection within the applicable subsidence zone to the standard required and using the subsidence inspection checklist;
- take actions to remediate any public safety issue identified during inspections; and
- where actions are beyond their capabilities immediately attempt to notify the landowner or infrastructure owner and Technical Services Manager.

5.6 TRANSGRID

Transgrid must arrange repairs as necessary through consultation between Transgrid and ACOL.

5.7 PAYMENT OF COSTS IN RELATION TO REPAIRS

ACOL will liaise with Transgrid in relation to payment for any necessary repairs such that no cost will be borne by Transgrid.

6 TRAINING

All personnel who conduct inspections will be trained in the requirements of the Longwalls 403 to 406 Built Features Management Plan, Longwalls 403 to 406 Subsidence Monitoring Program and the Longwalls 403 to 406 Transgrid Asset Management Plan.

Training will be conducted on the identification of the various subsidence impacts detailed in the Longwalls 403 to 406 Public Safety Management Plan and will include any safety aspects of those inspections.

7 AUDIT AND REVIEW

7.1 AUDIT

The requirements of the Longwalls 403 to 406 Transgrid Asset Management Plan are to be audited as required.

7.2 REVIEW

A review of this plan will be undertaken:

- if the mine design criteria are changed;
- if subsidence impacts are greater than predicted;
- if required by Transgrid; and
- following each audit.

8 REFERENCES

SCT Operations Pty Limited (2024) S*ubsidence Assessment for the Extraction Plan for Longwalls 403 – 406 in the Pikes Gully Seam*, Report Number ASH5749.

Appendices

Appendix A

Stakeholder Contact Details

Longwalls 403 to 406 Extraction Plan Stakeholder List

Position	Name	Phone
ASHTON		
Mine Engineering Manager	Justin Peterkin	65709212
Technical Services Manager	Thomas Kaltschmidt	6570 9110
Environment and Community Superintendent	Phillip Brown	6570 9219
Mine Surveyor	Jarrod Braybon	6570 9125
Senior Mining Engineer	Ben Tockuss	6570 9124
After Hours	Ashton Control Room	6570 9166
GOVERNMENT		
Subsidence Advisory NSW	Newcastle Office	4908 4300
Resources Regulator		1300 814 609
TRANSGRID		
LANDHOLDERS		
Refer to Ashton internal contact register.		

Appendix B

Subsidence Inspection Checklist

SUBSIDENCE INSPECTION CHECKLIST		
Longwall Panel		
Date		
Face Position		
Subsided Inspection Zone		
Pre-Subsidence Inspection Zone		
Area Inspected by (Print Name and sign)		
INSPECTION ITEM	**CHECKED**	**COMMENTS**
Surface cracking		
Surface humps (compression)		
Hunter River, Mine Water and Gas drainage pipelines		
Access roads and tracks		
Fences, gates, cattle grids		
Damage to Power-poles, Cross-arms, Insulators and Conductors e.g. leaning poles, increased sag in conductors, reduced ground clearance		
Dams		
Structures (houses, outbuildings)		
Other (den and/or nest trees)		

SUBSIDENCE INSPECTION CHECKLIST

Where to Inspect:

200 metres behind and 100 metres in front of the current face position.

Cover the full subsidence bowl out to the 45 degree angle of draw.

What to look for:

- surface cracking - edges of extraction void and start and travelling abutments particularly in rock outcrop areas and topographic high;
- surface humps (compression) - near centre of extracted panels, the travelling abutment and topographic lows if adjacent to steep terrain;
- step change in land surface - associated with cracking;
- slope, boulder and tree instability;
- surface slumping, erosion;
- serviceability of access tracks;
- changes to creeks, ponding, sediment load;
- general vegetation condition (in particular dieback of vegetation);
- change in conditions of 'right-of-way' access track or surrounding verges including drainage culverts and water flows as well as road cutting stability; and
- power poles and wires – adverse tilts on poles and ground clearances for wires, especially when crossing access tracks.

Actions if there is damage to non-ACOL infrastructure:

Immediately notify the:

- Mine Engineering Manager;
- Technical Services Manager and/or Environment & Community Superintendent; and
- relevant infrastructure owner/operator.

If repairs or remediation work are required these will be undertaken by Transgrid.