YANCOAL
兖煤澳大利亚有限公司
MOOLARBEN COAL

UG4 LONGWALLS 409 TO 414 PUBLIC SAFETY MANAGEMENT PLAN

Version	Issue Date *(Month/YYYY)*	Revision Detail *(Include the main areas reviewed, trigger / why the change)*	Author *(Name/s)*	Review Team *(Name/s)*
1	October 2024	Original PSMP for the UG4 Longwalls 409-414 Extraction Plan	MCO	MCO
2	January 2025	Updated to Address Agency Consultation	MCO	MCO
3	April 2026	Minor Administrative Updates for Consistency Across the UG4 Longwalls 409 to 414 Extraction Plan	MCO	MCO

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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. MCO is a wholly owned subsidiary of Yancoal Australia Limited.

The UG4 Underground Mine (UG4) is a component of the approved Moolarben Coal Complex (**Figure 2**). First workings for UG4 commenced in October 2020 (**Figure 3**). Secondary extraction in UG4 of the first Longwall (LW) 401 commenced in July 2022. LW401 to 407 were completed in January 2026. The extraction of LW 409 to 414 (hereafter referred to as LW409-414) within UG4 is scheduled to commence in September 2026.

Mining operations at the Moolarben Coal Complex are currently approved until 31 December 2038 and continue to be carried out 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).

1.1 PURPOSE AND SCOPE

This UG4 Longwalls 409 to 414 Public Safety Management Plan (LW409-414 PSMP) has been prepared to satisfy the requirements of Condition 77(l), Schedule 3 of Project Approval (05_0117), to ensure public safety in the mining area due to secondary extraction of LW409-414.

This LW409-414 PSMP forms a part of the Extraction Plan being developed for LW409-414 of the approved UG4. This LW409-414 PSMP has been prepared by MCO, with input from suitably qualified experts Mine Subsidence Engineering Consultants (MSEC), to satisfy the requirements of Project Approval (05_0117) as modified and the *Extraction Plan Guideline* (NSW Department of Planning and Environment [DPE], 2022).

The appointment of the team of suitably qualified and experienced persons (which includes representatives of MCO and MSEC) was endorsed by the Secretary of the Department of Planning, Housing and Infrastructure (DPHI) on 9 May 2024 (**Attachment 2 of the Extraction Plan**).

Purpose: This LW409-414 PSMP outlines the management of potential consequences on public safety resulting from the extraction of LW409-414.

Scope: This LW409-414 PSMP covers MCO land within LW409-414 Study Area[1] (**Figure 3**) and non-MCO land in the vicinity of the LW409-414 Study Area (**Figure 4**).

[1]. The LW409-414 Study Area is defined as the area of land within the furthest extent of the 26.5 degree angle of draw and 20 millimetres (mm) predicted subsidence contour.

Figure 1: Regional Location

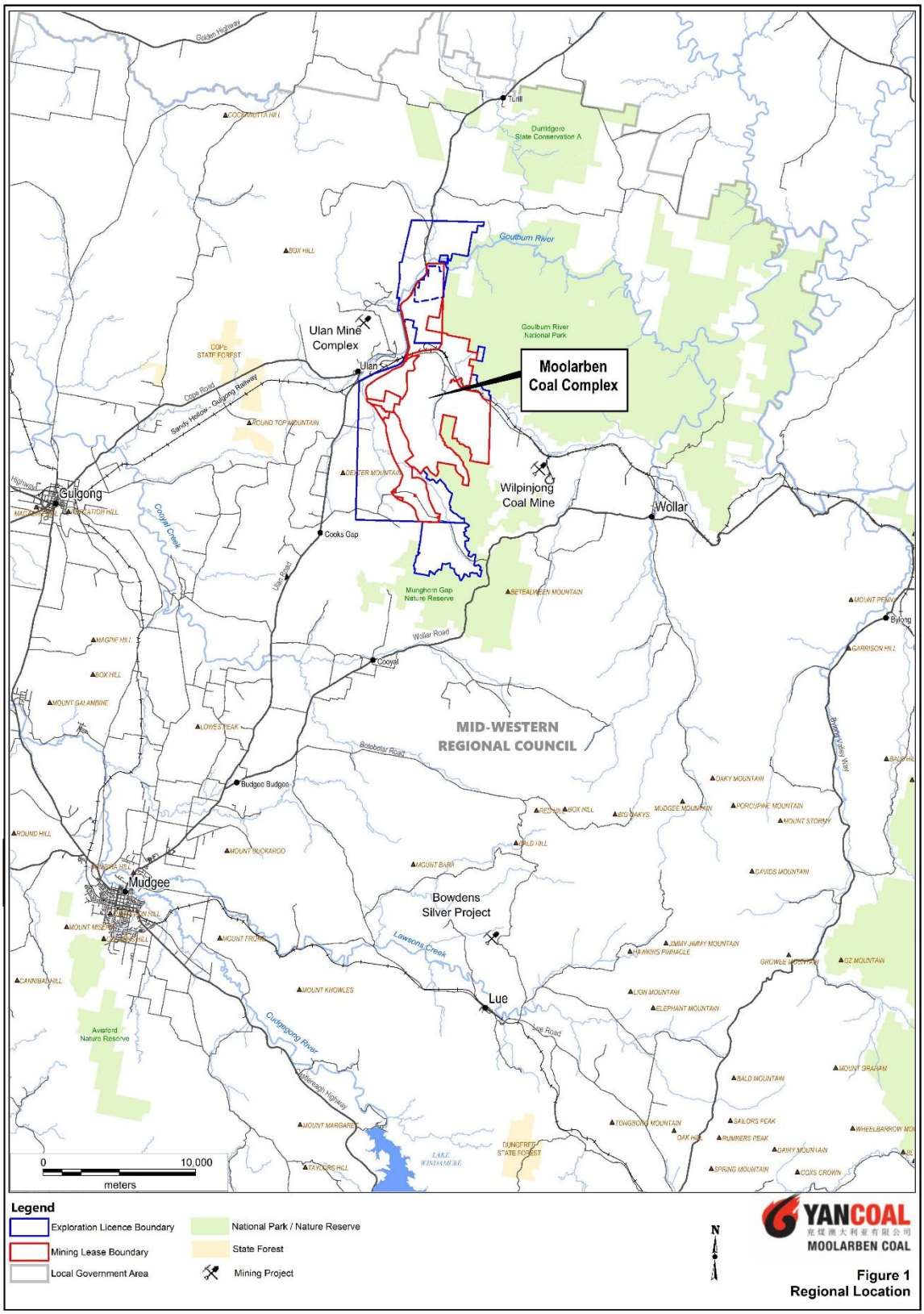

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Figure 2: Moolarben Coal Complex Layout

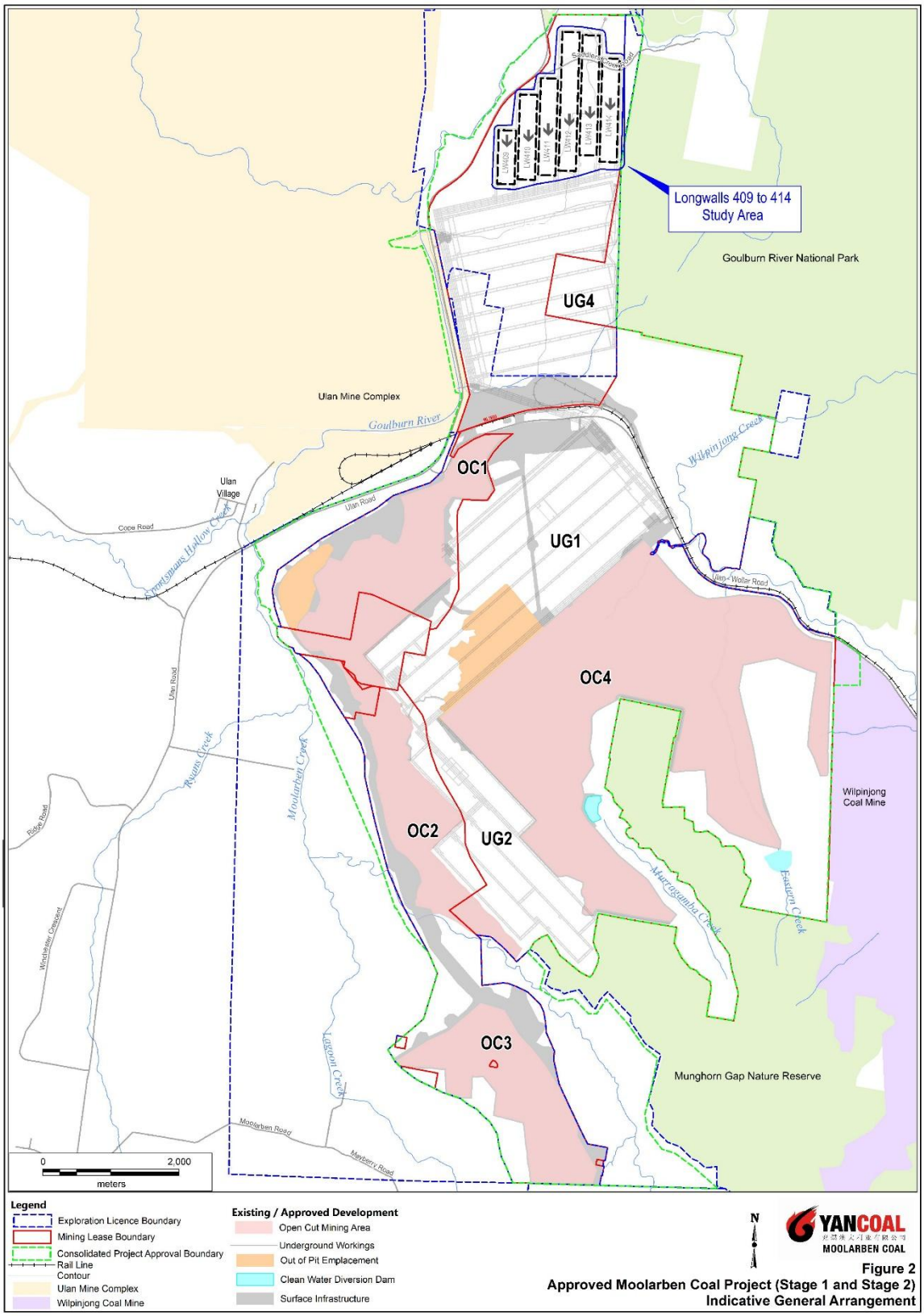

Figure 3: UG4 Longwalls 409 to 414 Layout

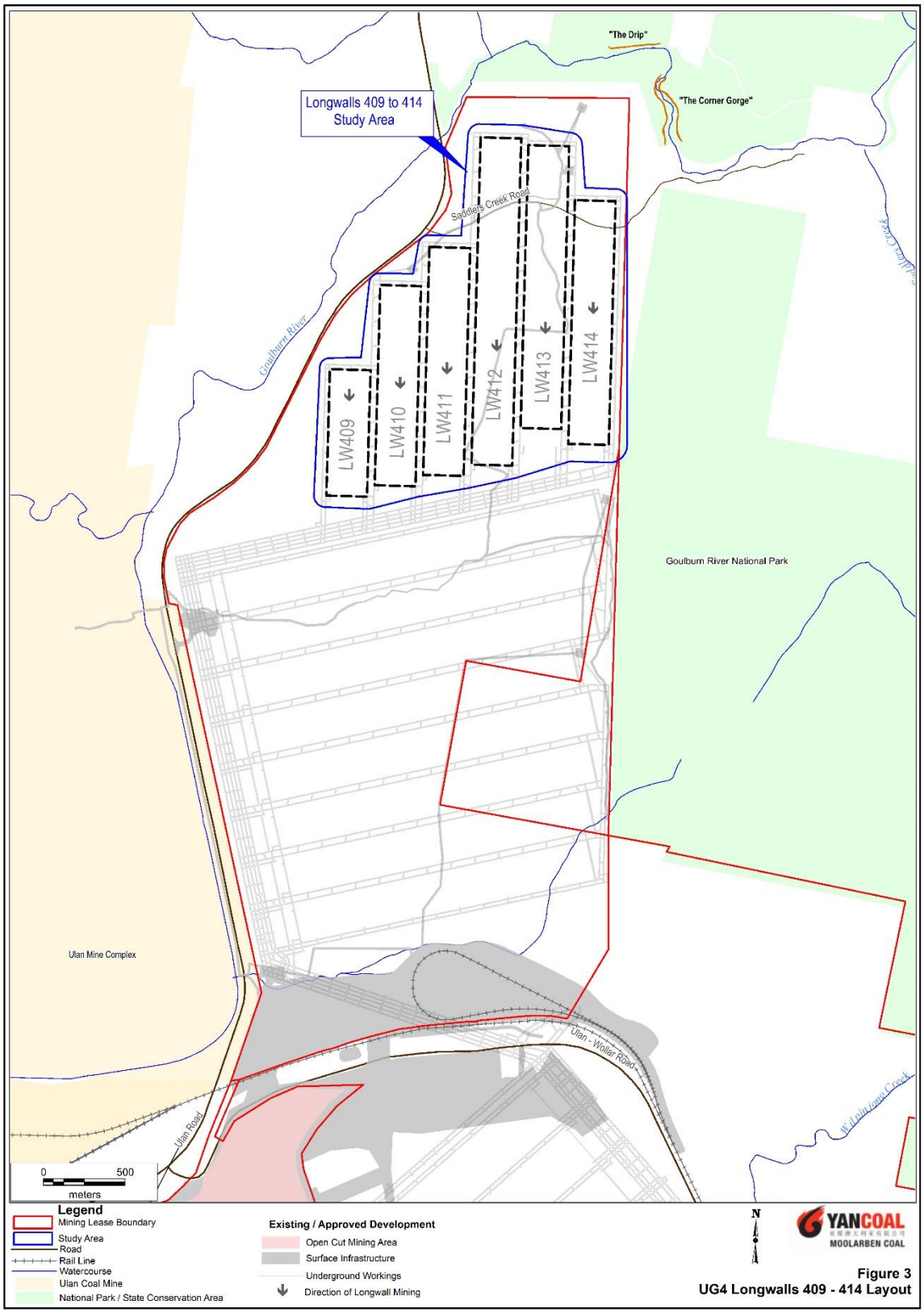

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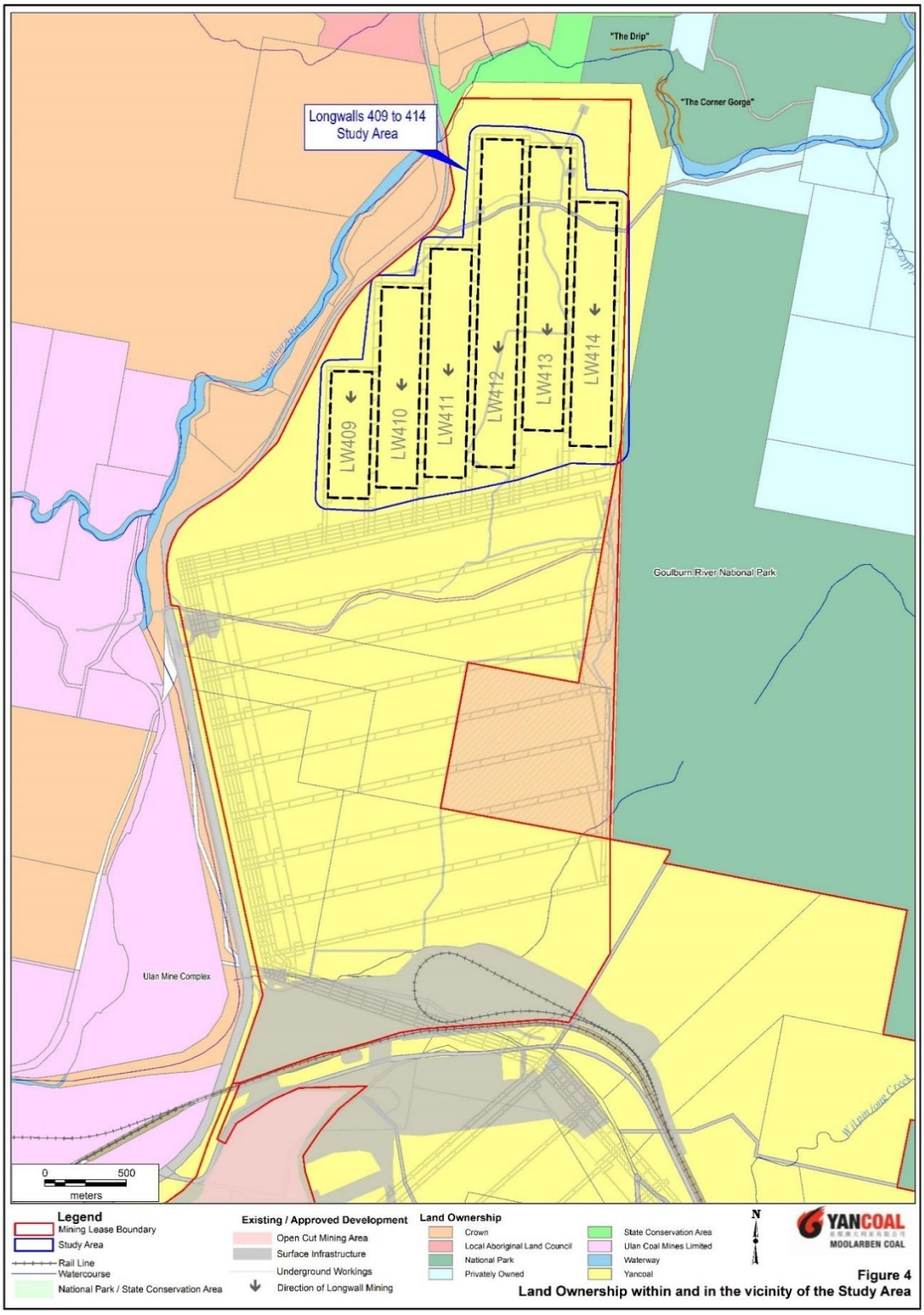
Figure 4: Land Ownership within and in the vicinity of the Study Area



Saddlers Creek Road and Telstra-owned copper cables that run along Saddlers Creek Road are the only public utilities or privately-owned built features that are located within the Study Area. Saddlers Creek Road is a public roadway connected to Ulan Road that runs east-west across the Study Area, and is directly undermined by LW412-414. All other public utilities and privately-owned built features are located outside of the Study Area.

Other features which could be subjected to far-field or valley related movements and could be sensitive to such movements have also been considered in this report. A number of natural and built features have been identified within or in the vicinity of the Study Area including: Goulburn River and ephemeral drainage lines; cliffs (including minor cliffs); the Goulburn River National Park; The Drip; Corner Gorge; the Goulburn River State Conservation Area; roads; bridges; unsealed tracks and trails; telecommunications infrastructure; bores; mine infrastructure; exploration drill holes; archaeological sites; and survey control marks. Natural Features discussed in this LW409-414 PSMP are shown on **Figure 5**.

1.2 STRUCTURE OF THE LONGWALLS 409 TO 414 PUBLIC SAFETY MANAGEMENT PLAN

The remainder of the LW409-414 PSMP is structured as follows:

Section 2 Describes the review and update of the LW409-414 PSMP.

Section 3 Outlines the statutory requirements applicable to the LW409-414 PSMP.

Section 4 Provides baseline data and the extraction schedule.

Section 5 Describes the process and outcomes of the risk assessment.

Section 6 Details the performance measures relevant to public safety.

Section 7 Describes the monitoring program.

Section 8 Describes the management measures that will be implemented.

Section 9 Details the performance indicators that will be used to assess the Project against the performance measures.

Section 10 Provides a contingency plan to manage any unpredicted impacts and their consequences.

Section 11 Describes the roles and responsibilities for MCO personnel and key contacts.

Section 12 Describes the annual review, audits, regular reporting, improvement of environmental performance and the program to collect sufficient baseline data for future Extraction Plans.

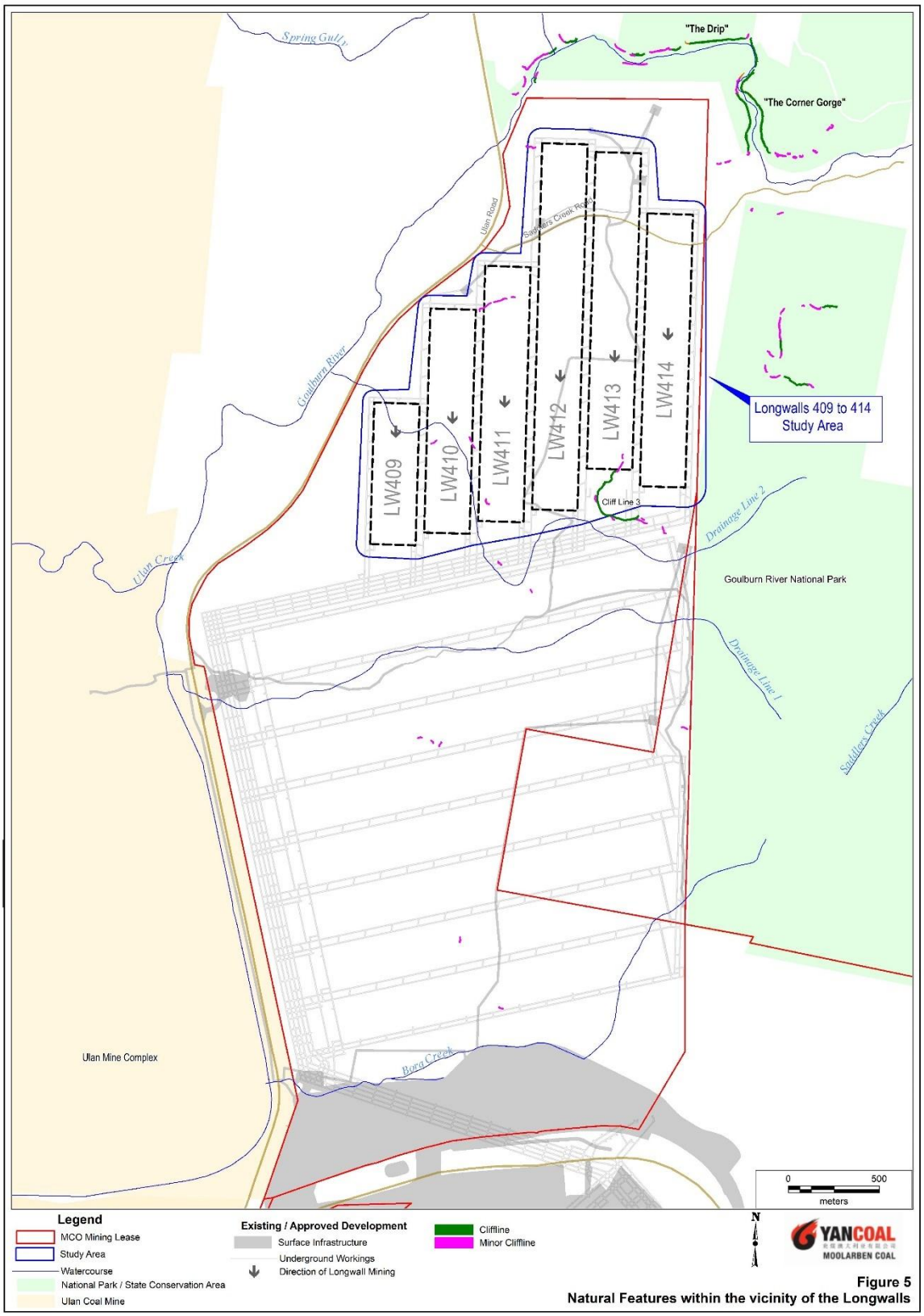
Section 13 Outlines the management and reporting of incidents.

Section 14 Outlines the management and reporting of complaints.

Section 15 Outlines the management and reporting of non-compliances with statutory requirements.

Section 16 Lists the references cited in this LW409-414 PSMP.

Figure 5: Natural Features within the Vicinity of the Longwalls



2.0 LONGWALLS 409 TO 414 PUBLIC SAFETY MANAGEMENT PLAN REVIEW AND UPDATE

In accordance with Condition 5, Schedule 5 of Project Approval (05_0117), this LW409-414 PSMP 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 of this approval,*
>
> *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 5 of Project Approval (05_0117), MCO will make the approved LW409-414 PSMP publicly available on the Yancoal's website.

3.0 STATUTORY REQUIREMENTS

MCO's statutory obligations are contained in:

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

Obligations relevant to this LW409-414 PSMP are described below.

3.1 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979 APPROVAL

Condition 77(l), Schedule 3 of Project Approval (05_0117), requires the preparation of a Public Safety Management Plan as a component of the Extraction Plan. In addition, Conditions 75, 77(n), 77(p) and 78, Schedule 3 and Condition 3, Schedule 5 of Project Approval (05_0117) outline general management plan requirements that are applicable to the preparation of this LW409-414 PSMP.

Table 1 presents the relevant Project Approval requirements and indicates where they are addressed within this LW409-414 PSMP.

Table 1: Public Safety Management Plan Requirements

Project Approval (05_0117) Condition	LW409-414 PSMP Section
Condition 77, Schedule 3	
77. The Proponent shall prepare and implement an Extraction Plan for all second workings on site to the satisfaction of the Secretary. Each extraction plan must:	
...	
(l) include a Public Safety Management Plan, which has been prepared in consultation with DRE, to ensure public safety in the mining area;	**This document**
...	
(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 14 and 15, or where any such exceedances seem likely;	**Section 10**
...	
(p) include a program to collect sufficient baseline data for future Extraction Plans.	**Section 12.3**
Condition 78, Schedule 3	
78. The Proponent shall ensure that the management plans required under conditions 77(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	**Section 4**
(b) a detailed description of the measures that would be implemented to remediate predicted impacts.	**Section 8**
Condition 3, Schedule 5	
3. The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:	
(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**
• *any relevant limits or performance measures/criteria;*	**Section 6**
• *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 9**
(c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	**Sections 8 and 10**
(d) a program to monitor and report on the:	**Sections 7 and 12**
• *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 10**
(f) a program to investigate and implement ways to improve the environmental performance of the project over time;	**Sections 7 and 12**
(g) a protocol for managing and reporting any:	
• *incidents;*	**Section 13**
• *complaints;*	**Section 14**
• *non-compliances with statutory requirements; and*	**Section 15**
• *exceedances of the impact assessment criteria and/or performance criteria; and*	**Sections 9 and 10**
(h) a protocol for periodic review of the plan.	**Section 2**

3.2 OTHER LEGISLATION

MCO operates the Moolarben Coal Complex consistent with Project Approval (05_0117) (as modified) and Project Approval (08_0135) (as modified) and any other legislation that is applicable under the *Environmental Planning and Assessment Act 1979*.

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

- *Crown Land Management Act 2016;*
- *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 BASELINE DATA AND EXTRACTION SCHEDULE

4.1 BASELINE DATA

Baseline data in relation to the potential consequences of mining is provided in the various management plans prepared under the Extraction Plan. The plans of relevance to public safety include:

- UG4 Longwalls 409 to 414 Land Management Plan (LW409-414 LMP) (**Appendix B of the Extraction Plan**) which outlines the management of potential environmental consequences on land in general and cliffs;
- UG4 Longwalls 409 to 414 Built Features Management Plans (LW409-414 BFMPs) (**Appendix E of the Extraction Plan**) which describe potential consequences on surface infrastructure. LW409-414 BFMPs have been prepared for the following infrastructure owners and assets:
  - Mid-Western Regional Council (MWRC) assets (e.g. Ulan Road including road pavement, embankments, tunnels and culverts, Ulan Road bridge over the Goulburn River and Saddlers Creek Road [maintained by MWRC]);
  - Crown Land assets (e.g. Saddlers Creek Road);
  - Telstra assets (e.g. copper cables); and
- UG4 Longwalls 409 to 414 Drip, Corner Gorge and Goulburn River Monitoring and Reporting Program (the Monitoring Program) (**Appendix H of the Extraction Plan**) which outlines the management of potential environmental consequences on the Drip and Corner Gorge.

MCO assets and mine infrastructure will be considered in the Subsidence Principal Hazard Management Plan that addresses safety of mine workers under the Work Health and Safety (Mines and Petroleum) legislation.

4.2 LONGWALLS 409 TO 414 EXTRACTION SCHEDULE

LW409-414 and the area of land within the Study Area are shown on **Figure 3**. Longwall extraction will occur from the north to the south for each panel. The longwall layout includes approximately 260 metre (m) panel widths (void) with 35 m width pillars (solid). The provisional extraction schedule for LW409-414 is provided in **Table 2**.

Table 2: Provisional Extraction Schedule

Longwall	Estimated Start Date	Estimated Duration (months)	Estimated Completion Date
LW409	September 2026	3	November 2026
LW410	December 2026	3	March 2027
LW411	April 2027	3	July 2027
LW412	August 2027	4	December 2027
LW413	January 2028	4	May 2028
LW414	June 2028	4	September 2028

Note: In June 2026, the extraction timing was administratively updated to ensure consistency with the approved June versions of the LW409-414 Water Management Plan and LW409-414 Subsidence Monitoring Program. This update does not otherwise amend the approved April version of this Plan.

4.3 REVISED SUBSIDENCE AND IMPACT PREDICTIONS

Revised subsidence predictions of the potential subsidence effects, subsidence impacts and environmental consequences of the proposed second workings, have been prepared by MSEC (2024) incorporating any relevant information obtained since approval (e.g. additional data from underground mining in UG1 and LW401-408 to date), in accordance with Condition 77(e), Schedule 3 of Project Approval (05_0117).

The LW409-414 PSMP has incorporated the revised subsidence predictions and impacts from the *Moolarben Project Stage 1 – Longwalls 409 to 414 – Subsidence Predictions and Impact Assessments for the Natural and Built Features in Support of the Extraction Plan* (MSEC, 2024) which is summarised in **Sections 4.3.1** to **4.3.4.**

4.3.1 Subsidence Predictions and Impacts on Land

Longwall mining can result in surface cracking, heaving, buckling, humping and stepping at the surface. The extent and severity of these mining-induced ground deformations are dependent on a number of factors, including the mine geometry, depth of cover, overburden geology, locations of natural joints in the bedrock, the presence of near surface geological structures and mining conditions (MSEC, 2024).

The depths of cover over the underground mining areas vary from 120 m to 215 m. At the shallow depths of cover above LW409-414, surface cracking is expected to be typically in the order of 150 mm to 200 mm wide, however in some instances could be up to 500 mm wide where the depths of cover are the shallowest. Where the depths of cover are greater, the surface crack widths are expected to be typically in the order of 100 mm to 150 mm wide. The surface crack widths are likely to be smaller where the depths of cover are greater, or where the surface cracks result from the travelling wave (MSEC, 2024).

The surface cracking and deformation within the Study Area could result in safety issues (i.e. trip hazards), affect vehicle access (i.e. large deformations in access tracks), or result in increased erosion (especially along the drainage lines and the steeper slopes) (MSEC, 2024).

MCO have developed monitoring and management strategies in this LW409-414 PSMP (**Sections 7 and 8**) to manage the potential hazards associated with potential impacts to land in general.

4.3.2 Subsidence Predictions and Impacts on Cliffs

A detailed assessment to identify all possible cliffs and minor cliffs[2] within and in the vicinity of the Study Area was completed by MSEC (2024) using 1 m surface level contours generated from a Light Detection and Ranging (LiDAR) survey and from site investigations.

[2] The definitions of cliffs provided in the NSW DPE *Standard and Model Conditions for Underground Mining* (DPE, 2012) are: *Continuous rock face, including overhangs, having a minimum length of 20 m, a minimum height of 10 m and a minimum slope of 2 to 1 (>63.4º)*

The assessment of cliffs and minor cliffs included identification of cliffs features within the Goulburn River National Park (GRNP) and Goulburn River State Conservation Area (GRSCA) within the vicinity of the longwalls. The nearest minor cliff within the GRNP is located 313 m from the commencing end of LW414. There are no other cliffs or minor cliffs within the GRNP within 400 m of the longwalls. Within the GRSCA, the nearest cliff is 330 m from LW412 and the nearest minor cliff is 300 m from LW412 (MSEC, 2024).

A summary of cliffs confirmed within the Study Area is provided in **Table 3**. The locations of the cliffs within the Study Area, as well as those identified during an assessment of cliffs and minor cliffs in the vicinity of the Study Area are shown in **Figure 5**.

Table 3: Classification of Cliffs Within the Study Area

Cliff Line Area ID	Maximum Height (m)	Maximum Length (m)	Classification
CL1	10	60	Minor Cliff
CL2	8	30	Minor Cliff
CL3	15	500	Cliff
CL4	10	30	Minor Cliff

Source: After MSEC (2024)

Based on the summary in **Table 3**, only CL3 is classified as a cliff. CL3 is located adjacent to the southern end of LW413, which has been shortened to reduce the predicted subsidence parameters and potential impacts at CL3. MCO has developed monitoring and management strategies in this LW409-414 PSMP (**Sections 7** and **8**) for UG4 to manage the potential hazards associated with potential impacts to minor cliffs. Monitoring and management strategies for CL3 are described in the LW409-414 LMP.

4.3.3 Subsidence Predictions and Impacts on the Drip and Corner Gorge

The Drip and Corner Gorge are natural cliff features located on the Goulburn River, outside of the LW409-414 Study Area. The Drip is located approximately 645 m from the commencing end of LW413 and is 770 m from the commencing end of LW412. The Corner Gorge is located 450 m from LW414 and is 575 m from LW413.

The Drip and Corner Gorge will not experience measurable conventional tilts, curvatures or strains from the extraction of LW409-414 (MSEC, 2024). Existing GNSS monitoring data identified the Drip and Corner Gorge currently experience a level of baseline natural movements. Whilst far-field movements are predicted, there have been no known cases of mining-related physical impacts to cliff lines at the distances. Valley closure movements greater than survey tolerance are unlikely to be observed at the Drip and Corner Gorge (MSEC, 2025). Further information on monitoring and management methods for the Drip and Corner Gorge is presented in the Monitoring Program (**Appendix H**).

4.3.4 Public Utilities & Privately-owned Built Features

Each of the LW409-414 BFMPs (**Section 4.1**) includes the collection of baseline data (e.g. by visual audit/inspection/survey) in relation to the integrity of the built features, subsidence predictions, and considering safety, serviceability and the ability to repair. Baseline subsidence survey and monitoring for each infrastructure asset is described in each of the LW409-414 BFMPs (**Appendix E of the Extraction Plan**) and outlined in the UG4 Longwalls 409 to 414 Subsidence Monitoring Program (LW409-414 SMP) (**Appendix G of the Extraction Plan**).

Saddlers Creek Road and the associated Telstra-owned copper cables are the only public utilities within the Study Area. Other public utilities and all privately-owned built features are located outside of the Study Area. With the exception of Saddlers Creek Road and the associated Telstra-owned copper cables, adverse subsidence impacts on public utilities and privately-owned built features are not expected to occur. As described by MSEC (2024), there is a potential for far-field horizontal movements of a minor nature to occur, however these far-field movements are unlikely to cause adverse impacts.

A summary of consultation undertaken with relevant built feature owners is provided in **Attachment 2 of the Extraction Plan**. Consultation with each built feature owner/manager was generally conducted in accordance with the protocol in Section 2.3.2 of the Extraction Plan.

4.3.5 MCO Assets

Dewatering infrastructure is located within the Study Area. The dewatering infrastructure includes dewatering bores, water pipelines and electrical cables. The polyethylene pipelines and cables are flexible and laid on the ground surface. Potential impacts could occur as a result of irregular movements such as ground heave, stepping, large cracks, rock falls or tree falls (MSEC, 2024).

Exploration drill sites are located directly above and adjacent to the proposed longwalls and, therefore, could experience the full range of predicted subsidence movements. It is likely, therefore, that fracturing and shearing would occur in the drill holes as the result of mining (MSEC, 2024).

Fences are located within the Study Area and are constructed in a variety of ways, generally using either timber or metal materials. All fences are on MCO owned lands. The fences could experience the full range of predicted subsidence movements. Fences are generally flexible in construction and can usually tolerate significant tilts and strains.

There are three farm dams owned by MCO that have been identified in the Study Area (D1, D3 and D4). The dams are shallow and are no longer in use.

There are a number of MCO owned four wheel drive tracks through the Study Area. These tracks are not publicly accessible. The tracks could experience the full range of predicted subsidence movements. Impacts are expected to include cracking, stepping and rippling of the track surfaces (MSEC, 2024).

The control of MCO assets, infrastructure and personnel will be undertaken in accordance with the Subsidence Principal Hazard Management Plan. The MCO assets and mine infrastructure relevant to LW409-414 are shown on Plan 7 in the LW409-414 SMP.

4.4 LAND OWNERSHIP

A land ownership plan is provided in **Figure 4**. In summary, all land within the LW409-414 Study Area is MCO owned, with the exception of Saddlers Creek Road and a small portion of a parcel of land owned by the State of New South Wales (Crown Lands).

MCO has consulted with Crown Lands in relation to the LW409-414 LMP and the UG4 Longwalls 409 to 414 Built Features Management Plan for Saddlers Creek Road (LW409-414 BFMP-SCR). A summary of the consultation with Crown Lands and other government agencies is provided in **Attachment 2 of the Extraction Plan**.

5.0 RISK ASSESSMENT

In accordance with the *Extraction Plan Guideline* (DPE, 2022), potential risks and potential risk control measures and procedures have been considered at a risk assessment for public safety for LW409-414. The public safety risk assessment was completed on 1 May 2024.

Attendees at the risk assessment meeting included representatives from MCO (including the Underground Technical Services Manager and Environment and Community Manager), MSEC and a risk assessment facilitator (AXYS Consulting Pty Ltd, 2024). The investigation and analysis methods used during the risk assessment reviewed potential safety hazards to the public for LW409-414 including:

- Longwall mining impacts on public roads (e.g. cracking, stepping, rippling or ponding along Saddlers Creek Road and Ulan Road) resulting in a risk to members of the public using the road; and
- Longwall mining impacts on local landforms (e.g. cracking, rock fall, cliff failure, etc.) resulting in a risk to members of the public that may be in the vicinity.

The risk assessment included consideration of the environmental risk assessment relevant to the LW409-414 LMP, the Monitoring Program (**Appendix H**) and the risk assessments conducted for the LW409-414 BFMPs with each relevant infrastructure owners (**Section 4.1**).

A number of risk control and management measures were identified during the risk assessment which considered in the management measures in **Section 8**. Monitoring of potential risks to public safety is described in **Section 7**.

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

6.0 PERFORMANCE MEASURES

The performance measure specified in Table 15, Schedule 3 of Project Approval (05_0117) relevant to public safety, is listed in **Table 4.**

Table 4: Public Safety Subsidence Impact Performance Measure

Feature	Subsidence Impact Performance Measure
Public Safety:	
Public safety	Negligible additional risk

Source: Table 15 in Schedule 3 of Project Approval (05_0117).

In accordance with Condition 75, Schedule 3 of Project Approval (05_0117), MCO must ensure that there is no exceedance of the performance measures listed in Table 15, Schedule 3 of Project Approval (05_0117), to the satisfaction of the Secretary of the DPHI.

Section 7 outlines the monitoring that will be undertaken to assess the impact of LW409-414 against the performance measures in relation to the public safety. Management measures are outlined in **Section 8** and performance indicators for the performance measures are summarised in **Section 9**.

7.0 MONITORING

As described in **Section 5.0**, the investigation and analysis methods used during the risk assessment reviewed potential safety hazards to the public and built feature owners for LW409-414. MCO have developed the following monitoring program to address the key risks identified from the public safety risk assessment, including impacts to cliffs and land in general.

The components of the program to monitor subsidence parameters are illustrated in Plan 7 of the LW409-414 SMP (**Appendix G of the Extraction Plan**), prepared in accordance with the *Extraction Plan Guideline* (DPE, 2022).

Elements of the subsidence monitoring program, including the monitoring layout for assessment of impacts on built and natural features are summarised below and in the LW409-414 SMP.

7.1 THE DRIP AND CORNER GORGE

A monitoring program will be implemented to monitor subsidence impacts and environmental performance of the Drip and Corner Gorge during extraction of LW409-414.

The monitoring program includes:

- measurement of subsidence parameters; and
- visual inspections.

Further detail on the monitoring program is provided in the Monitoring Program (**Appendix H**).

7.2 CLIFFS

A monitoring program will be implemented to monitor subsidence impacts and environmental performance on CL3 and cliffs and minor cliffs in the GRNP and GRSCA within 400 m of LW409-414 during extraction of LW409-414.

The monitoring program for CL3 includes:

- measurement of subsidence parameters as outlined in the LW409-414 SMP;
- visual inspections will be conducted prior to the secondary extraction to photographically record the baseline condition of CL3; and
- visual inspections at the completion of mining will be carried out with comparisons made against the pre-mining baseline condition of CL3.

If subsidence impact(s) are observed during an inspection, the following details will be noted and/or photographed:

- the date of the inspection;
- the location of longwall extraction (i.e. the longwall chainage);
- the location of the impact;
- the nature and extent of the impact;
- other relevant aspects such as water seepage (which can indicate weaknesses in the rock);

- whether any actions are required (e.g. implementation of management measures, initiation of the Contingency Plan, incident notification, implementation of appropriate safety controls, review of public safety etc); and
- any other relevant information.

The monitoring program for the cliffs and minor cliffs in GRNP and GRSCA within 400 m of LW409-414 and the 'natural rock arch feature' along the Drip walking track includes:

- visual inspections will be conducted prior to the secondary extraction within 400 m of cliffs and minor cliffs in GRNP and GRCSA and the 'natural rock arch feature' along the Drip walking track to photographically record the baseline conditions of the cliffs, minor cliffs and the 'natural rock arch feature' along the Drip walking track; and
- visual inspections at the completion of mining will be carried out with comparisons made against the pre-mining baseline condition of the cliffs and minor cliffs in GRNP and GRSCA and the 'natural rock arch feature' along the Drip walking track.

Further detail on the monitoring program is provided in the LW409-414 LMP.

7.3 LAND IN GENERAL

A monitoring program will be implemented to monitor subsidence parameters and impacts on the land in general, and environmental performance during extraction of LW409-414, as outlined in the LW409-414 LMP.

The monitoring program includes:

- measurement of subsidence parameters as outlined in the LW409-414 SMP; and
- monitoring of subsidence impacts on surface features as discussed below.

Land in general includes other land features such as fire trails and vehicular tracks. Unsealed vehicular tracks and fire trails are located throughout the Study Area and above LW409-414. Visual inspections of land in general including MCO's vehicular tracks and surrounds will be conducted opportunistically during mining.

Where relevant, inspections of subsidence impacts on other surface features will include detailed measurement and photographic record of the impact.

The monitoring results will be used to assess and inform regarding the potential environmental consequences of the subsidence impacts and identify management measures, where appropriate.

7.4 PUBLIC UTILITIES & PRIVATELY OWNED BUILT FEATURES

Each of the LW409-414 BFMPs details the relevant monitoring program to be implemented to ensure that the performance measure in relation to the infrastructure asset is achieved. These include monitoring impacts to:

- MWRC assets (e.g. Ulan Road including road pavement, embankments, tunnels and culverts, Ulan Road bridge over the Goulburn River and Saddlers Creek Road [maintained by MWRC]) – (LW409-414 BFMP-MWRC and LW409-414 BFMP-SCR);
- Crown Land assets (e.g. Saddlers Creek Road) – (LW409-414 BFMP-SCR); and

- Telstra assets (e.g. copper cables) – (LW409-414 BFMP-TELSTRA).

7.5 MCO OWNED BUILT FEATURES

Inspections of mine infrastructure and assets (**Section 4.3.5**) within the Study Area will be conducted by MCO as described in the LW409-414 SMP, and include routine and opportunistic visual inspections of security measures including gates and fences, dewatering infrastructure, pipelines, electrical cables, roads, tracks, fences and farm dams during active mining to identify subsidence-related impacts, particularly for those assets that are expected to experience the full range of subsidence movements within the Study Area.

MCO will compare the results of the subsidence impact monitoring against the performance measure and indicators (**Sections 6** and **9**). In the event the observed subsidence impacts exceed the performance measure or indicators, MCO will assess the consequences of the exceedance in accordance with the Contingency Plan described in **Section 10**.

8.0 MANAGEMENT MEASURES

Risk controls and management measures applicable to public safety are described in **Sections 8.1** to **8.4** below. Follow-up inspections will be conducted to assess the effectiveness of the management measures implemented and the requirement for any additional management measures. Management measures for public safety will be reported in the Annual Review.

8.1 RESTRICTED PUBLIC ACCESS

With the exception of Saddlers Creek Road and a small portion of a parcel of land (Lot 31, DP755439) owned by the State of NSW (Crown Lands), all other land within the LW409-414 Study Area is owned or controlled by MCO (**Figure 4**). Management measures specific to Saddlers Creek Road are described in **Section 8.3** below.

The majority of the Study Area is considered remote undeveloped bushland, with vehicular access points providing entry. Access to the Study Area via vehicular access points (other than Saddlers Creek Road) will be restricted through locked gates and boundary fencing, with appropriate signage where reasonable.

Access to surface areas subject to subsidence impacts (other than Saddlers Creek Road) will be controlled by Underground (surface) works personnel who will undertake inspections before providing access to personnel.

8.2 LAND MANAGEMENT PLAN

A number of potential management measures are available to mitigate/remediate subsidence impacts to land features (i.e. cliffs and land in general) resulting from the extraction of LW409-414. Potential management measures that will be considered to mitigate/remediate environmental consequences are detailed in the LW409-414 LMP, and include:

- stabilisation techniques;
- erosion and sediment control techniques;
- remediation of surface tension cracks; and
- site access control and signage.

The requirement and methodology for any subsidence remediation techniques will be determined in consideration of:

- potential impacts of the unmitigated impact, including potential risks to public safety and the potential for self-healing or long-term degradation; and
- potential impacts of the remediation technique, including site accessibility.

Potential management measures in relation to subsidence impacts on land include additional signage to warn persons accessing the area of safety hazard, and construction of barriers to restrict access to unsafe areas.

Follow-up inspections will be conducted to assess the effectiveness of implemented management measures and the requirement for any additional management measures.

8.3 PUBLIC UTILITIES & PRIVATELY OWNED BUILT FEATURES

Where subsidence impacts on infrastructure items that may impact on public safety are detected or at any time MCO or the asset owner considers that the integrity of the asset and/or public safety may be compromised, repair works and/or contingency measures will be implemented in accordance with the relevant LW409-414 BFMP.

Each LW409-414 BFMP describes the potential repair works and/or contingency measures to ensure the relevant performance measure in relation to the infrastructure asset is achieved in relation to subsidence impacts to:

- MWRC assets (e.g. Ulan Road including road pavement, embankments, tunnels and culverts, Ulan Road bridge over the Goulburn River and Saddlers Creek Road [maintained by MWRC]) – (LW401-408 BFMP-MWRC and LW409-414 BFMP-SCR);
- Crown Land assets (e.g. Saddlers Creek Road) – (LW409-414 BFMP-SCR); and
- Telstra assets (e.g. copper cables) – (LW401-408 BFMP-TELSTRA).

Monitoring and management of subsidence impacts on Saddlers Creek Road are described in the LW409-414 BFMP-SCR.

Saddlers Creek Road would be monitored regularly while it is being directly undermined (i.e. the duration of time from when the longwall face is 100 m prior to undermining Saddlers Creek Road until the longwall face is 300 m post-mining Saddlers Creek Road) to identify if repairs are required. A stand-by work crew and equipment will undertake regular visual inspection (i.e. prior to each vehicle passing as well as at regular intervals during a 24 hour period, informed by location of longwall and observed impacts from previous monitoring) and maintenance as required to ensure the performance indicator is achieved *(i.e. maintain Saddlers Creek Road in a safe and serviceable condition*). Public access to Saddlers Creek Road will be controlled while it is being directly undermined to ensure it is safe before allowing traffic to pass.

Other general potential management measures in relation to public safety include the erection of additional signage at access points to the Study Area.

8.4 OTHER LANDOWNERS

With the exception of Saddlers Creek Road and a small portion of a parcel of land (Lot 31, DP755439) owned by Crown Lands, all other land within the LW409-414 Study Area is owned or controlled by MCO (**Figure 4**).

Should any subsidence impacts be identified that pose a risk to public safety, MCO will implement management measures in consultation with Crown Lands and/or MWRC and/or the affected private landholder.

9.0 ASSESSMENT OF PERFORMANCE INDICATORS AND MEASURES

In accordance with Condition 77(d), Schedule 3 of Project Approval (05_0117), performance indicators have been developed for the performance measures listed in **Section 6**.

MCO will assess LW409-414 against the public safety performance measure of "negligible additional risk" in the event that any hazard to the general public arising from subsidence impacts becomes evident.

Specific performance indicators have also been developed with each asset owner and are described in the individual LW409-414 BFMPs.

Monitoring conducted to inform the assessment of secondary extraction of LW409-414 against the performance indicator for the performance measure is outlined in **Section 7**.

If the performance measure is considered to have been exceeded, the Contingency Plan outlined in **Section 10** of this LW409-414 PSMP will be implemented.

10.0 CONTINGENCY PLAN

In the event the relevant performance measure to public safety of "negligible additional risk" is considered to have been exceeded or is likely to be exceeded, MCO will implement the following Contingency Plan:

- The observation will be reported to the Underground Technical Services Manager or the Environment and Community Manager within 24 hours.
- The likely exceedance will be reported in an Incident Report (refer to the Extraction Plan).
- MCO will provide the Incident Report to relevant stakeholders.
- 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 10.1**), 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 the DPHI and the Department of Regional NSW – Resources Regulator.
- This LW409-414 PSMP and the performance indicators will be reviewed to adequately manage future potential impacts within the limits of Project Approval (05_0117).

10.1 CONTINGENCY MEASURES

Potential contingency measures for an exceedance of the performance measure for public safety include:

- The conduct of additional monitoring (e.g. increase in monitoring frequency or additional sampling) to inform the proposed contingency measures.
- The repair or replacement of the damaged asset.
- The implementation of adaptive management measures. Examples of adaptive management measures include reducing the thickness of the coal seam extracted, narrowing of the longwall panels and/or increasing the setback of the longwalls from the affected area.

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).

11.0 ROLES AND RESPONSIBILITIES

Key responsibilities of MCO personnel in relation to this LW409-414 PSMP are summarised in **Table 5**. Responsibilities may be delegated as required.

Table 5: LW409-414 PSMP Responsibility Summary

Responsibility	Task
General Manager	• Ensure resources are available to MCO personnel to facilitate the completion of responsibilities under this LW409-414 PSMP.
Underground Technical Services Manager	• Ensure the LW409-414 SMP is implemented. • Ensure monitoring required under this LW409-414 PSMP 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 **Sections 7** and **8** respectively.
Environment and Community Manager	• Ensure the LW409-414 PSMP is implemented. • 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 LW409-414 PSMP are summarised in **Table 6**.

Table 6: LW409-414 PSMP Key Personnel Contact Details

Organisation	Position	Phone Number
MCO	**Underground Technical Services Manager**	02 6376 1500
	Environment and Community Manager	02 6376 1500
	Safety Manager	02 6376 1500
	Moolarben Coal Hotline	1800 556 484
Resources Regulator	**Principal Inspector – Subsidence Engineering**	0422 551 293

12.0 REVIEW AND IMPROVEMENT OF ENVIRONMENTAL PERFORMANCE

12.1 ANNUAL REVIEW

In accordance with Condition 4, Schedule 5 of Project Approval (05_0117), (as modified), MCO will conduct an Annual Review of operations conducted at the Moolarben Coal Complex (including the performance of the LW409-LW414 PSMP) prior to 31 March for the preceding calendar year, or as otherwise agreed by the Secretary of the DPHI.

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 Environmental Assessment;
- 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 5 of Project Approval (05_0117), the Annual Review will be made available on the Yancoal's website. As described in **Section 2**, this LW409-414 PSMP will be reviewed within three months of the submission of an Annual Review, and, if necessary, revised to ensure the plan is updated on a regular basis and to incorporate any recommended measures to improve environmental performance.

12.2 AUDITS

In accordance with Condition 9, Schedule 5 of Project Approval (05_0117), the most recent independent environmental audit of the Moolarben Coal Complex was conducted in July 2024, and will continue to be conducted every three years. A copy of the independent environmental audit will be provided to the Secretary of the DPHI and made available on the Yancoal's 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 DPHI. The independent environmental audit will assess the environmental performance of the Project and assess whether it is complying with the requirements of Project Approval (05_0117), and any other relevant approvals, and recommend measures or actions to improve the environmental performance of the Project.

12.3 FUTURE EXTRACTION PLANS

In accordance with Condition 77(p), Schedule 3 of Project Approval (05_0117), MCO will collect baseline data for future Extraction Plans (e.g. for the next underground mining domain). 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 LW409-414 PSMP, will inform the appropriate type and frequency of monitoring of the assets relevant to any future Extraction Plan at the Moolarben Coal Complex.

13.0 INCIDENTS

An incident is defined in Project Approval (05_0117) 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 (05_0117) (as modified).

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 5 of Project Approval (05_0117).

MCO will notify the Secretary of DPHI and any other relevant agencies of any incident associated with LW409-414 which causes or threatens to cause material harm to the environment immediately after MCO confirms that an incident has occurred. For any other incident associated with mining of LW409-414, 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 DPHI 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.

14.0 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 5 of Project Approval (05_0117), the complaints register will be updated monthly and made available on the Yancoal's website.

15.0 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 Environment 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 13**, MCO will notify the Secretary of the DPHI, and any other relevant agencies, of any incident associated with LW409-414 immediately after MCO becomes aware of the incident. Within seven days of the date of the incident, MCO will provide the Secretary of the DPHI, and any relevant agencies, with a detailed report on the incident.

A review of MCO's compliance with all conditions of Project Approval (05_0117), 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 Yancoal's website.

As described in **Section 12.2**, the most recent independent environmental audit was conducted in July 2024, and will be conducted every three years thereafter. A copy of the independent environmental audit will be provided to the Secretary of the DPHI and made available on the Yancoal's website.

16.0 REFERENCES

AXYS Consulting (2024) *Moolarben Coal Operations – Potential Impact of Longwalls 409 to 414 on Public Safety.* Report Number AR3865.

Department of Planning and Environment (2012) *Standard and Model Conditions for Underground Mining.*

Department of Planning and Environment (2022) *Extraction Plan Guideline*.

Mine Subsidence Engineering Consultants (2024) *Moolarben Project Stage 1 – Longwalls 409 to 414 – Subsidence Predictions and Impact Assessments for the Natural and Built Features in Support of the Extraction Plan*.

Mine Subsidence Engineering Consultants (2025) *Moolarben Coal Operations – Longwalls 409 to 414 - Subsidence predictions and impact assessments for the Drip and Corner Gorge.*