

# INTEGRA UNDERGROUND

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GLENCORE



## **Land Management Plan Longwalls 17-20 Plan**

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**Owner:** Environment and Community Manager

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*Uncontrolled unless viewed on the intranet*

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# 1 Purpose

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The purpose of this Land Management Plan is to outline land management during mining within the Extraction Plan Area (Longwalls 17-20). This Plan has been prepared to meet the requirements of the Project Approval and Extraction Plan Guidelines.

## 1.1 Description of Area

SCT (2020) completed the subsidence assessment and provide a description of the Extraction Plan Area.

Longwalls 17-20 are located below the Glencore Mt Owen Glendell Operations (MGO) which includes the operations of the Glendell, Ravensworth East and Mt Owen open cut mines.

Much of the surface above the Extraction Plan Area for Longwalls 17-20 has been significantly modified by the mining activities associated with the MOC mines. These surface mining activities include active or idle open cut pits (Mt Owen North Pit, Ravensworth East - West Pit), partially filled tailing dams (Eastern Rail Pit - ERP, Mount Owen Rail Loop Tailings Dam – TP1 and Mt Owen Stage 5 Tailing Dam - TP2), waste rock emplacement areas (West Dump and Ravensworth East/Glendell emplacement areas), rehabilitated areas and haul roads. The landform associated with these surface mining areas is, by nature of the mining process, a changing environment.

The man-made features within the Extraction Plan Area are predominantly mining related infrastructure owned by Glencore. These include the active Mt Owen North Pit highwall, the Mt Owen Railway Line (including the rail loop, cuttings and embankments) and associated infrastructure, overhead powerlines, water supply or transfer pipelines and water treatment dams. Non-mining man-made features include survey control marks and two Aboriginal heritage sites.

Sections of natural ground remaining above Longwalls 17-20 are limited to areas adjacent to and within the Mt Owen Railway Line Loop .

Natural features within the broader Extraction Plan Area are generally located over the previously mined Longwalls 13 and 14. These features include the modified catchment of Bettys Creek, a small natural section of the Bettys Creek, various ephemeral drainage lines, and small portions of natural vegetation adjacent to the Mt Owen Railway Line, Bettys Creek middle diversion channel (MDC) and upper reaches of Bettys Creek. A small section of natural vegetation adjacent to the MDC of Bettys Creek above LW 15 is within the LW 17-20 Extraction Plan area. There are no natural dams located within the Extraction Plan Area.

LWs 17-20 mine within the Dam Safety NSW Notification Area for TP1 and LWs 18, 19 and 20 are planned to mine directly under the dam. The Ravensworth East Tailings Pit / Mt Owen Stage 5 Tailings Dam, also referred to as TP2, is located adjacent to the Mt Owen Railway Line between TP1 and the ERP. The section of TP2 above LWs 17 and 18 has been substantially backfilled, capped and largely rehabilitated to a height of approximately 15m above the original ground level.

## 1.2 Land Capability

The Extraction Plan Area falls within the Land Capability Classes IV, V, M and SF (Office of Environment and Heritage October 2012) as per **Figure 1-1**. Definitions of these land capability classes are provided in **Table 1-1** below.

Table 1-1 - Land and Soil Capability Classes (LSC) – General Definitions

| LSC class | General Definition                                                                                                                                                                                                                                                                                                                                                                    |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|           | Land capable of a variety of land uses (cropping with restricted cultivation, pasture cropping, grazing, some horticulture, forestry, nature conservation).                                                                                                                                                                                                                           |
| IV        | Moderate capability land: Land has moderate to high limitations for high-impact land uses. Will restrict land management options for regular high-impact land uses such as cropping, high-intensity grazing and horticulture. These limitations can only be managed by specialised management practices with a high level of knowledge, expertise, inputs, investment and technology. |
| V         | Moderate-low capability land: Land has high limitations for high-impact land uses. Will largely restrict land use to grazing, some horticulture (orchards), forestry and nature conservation. The limitations need to be carefully managed to prevent long-term degradation.                                                                                                          |
| M         | Mining and Quarrying                                                                                                                                                                                                                                                                                                                                                                  |
| SF        | State Forest                                                                                                                                                                                                                                                                                                                                                                          |

## 1.3 Vegetation Communities and Threatened Fauna

The ecology within the LW 17-20 Extraction Plan Area is outlined within the site *Biodiversity Management Plan* and **Figure 1-2**. Vegetation communities within the Extraction Plan Area have also been outlined in the *Land Management Plan*. The area is heavily disturbed, with most vegetation relating to mine site rehabilitation from Mount Owen. The following current vegetation communities are outlined within the Extraction Plan Area:

- Cleared Grassland or Revegetated Areas– from Mount Owen;
- Central Hunter Swamp Oak Forest;
- Central Hunter Ironbark - Spotted Gum - Grey Box Forest; and
- Planted Ironbark-Spotted Gum – Grey Box Forest.

It is noted that progressive mining and disturbance of Mount Owen will cause a reduction of some of this vegetation in the coming years.

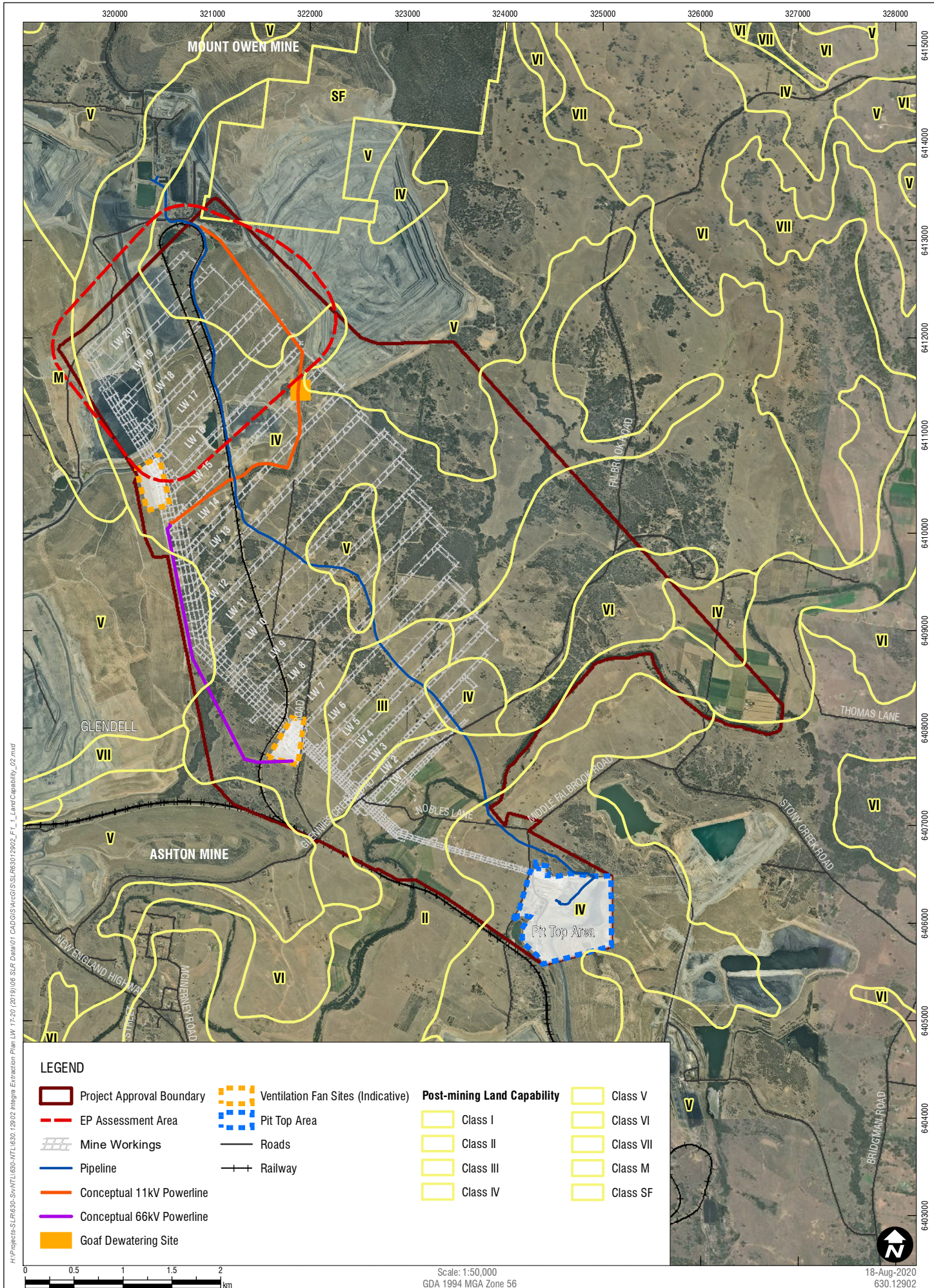
### 1.3.1 Central Hunter Swamp Oak Forest

This community was observed to be generally healthy within the Integra Underground Project Approval Boundary, although weeds were present in some areas (ERM 2009).

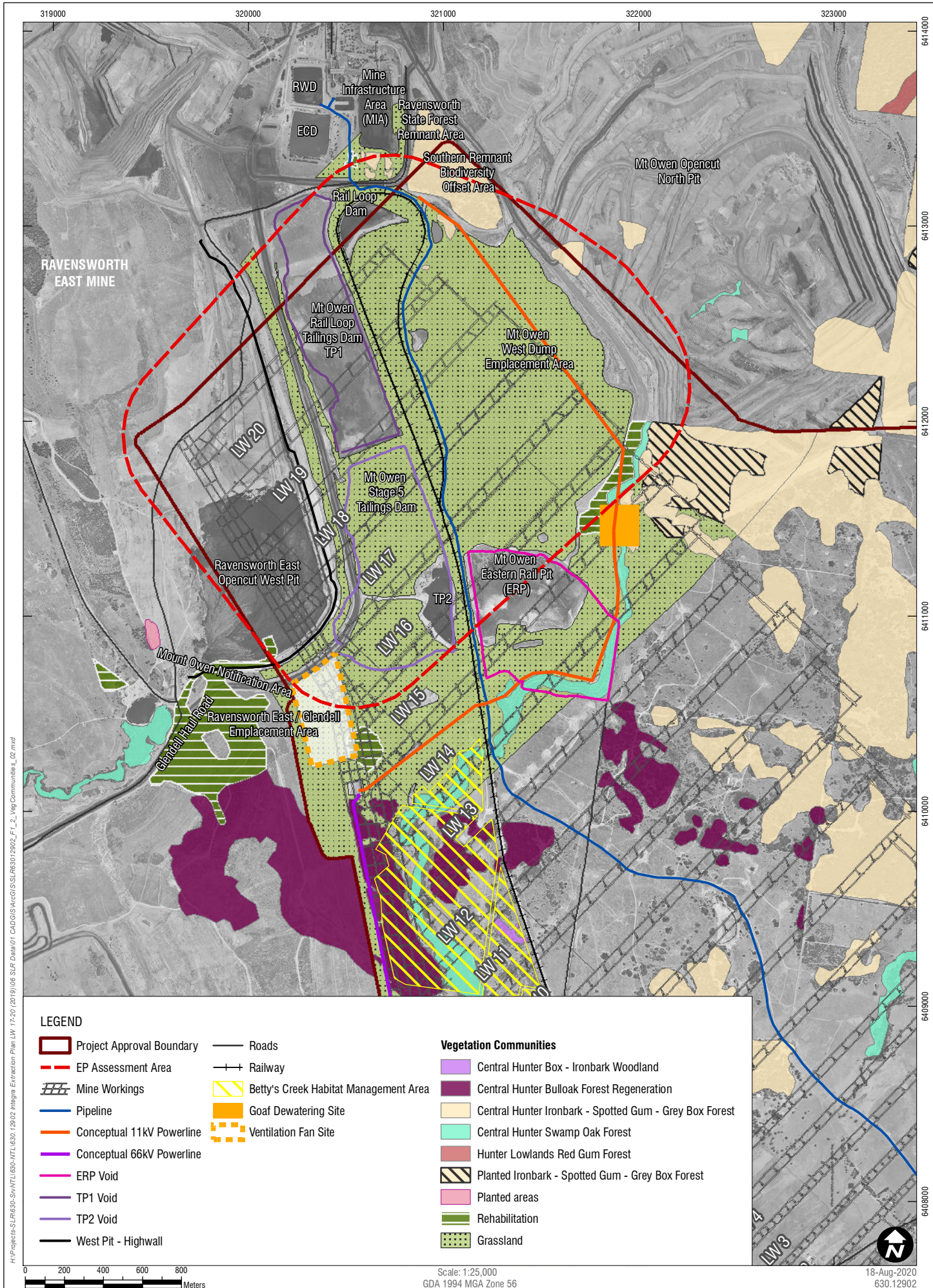
Swamp Oak Forest is generally restricted to lower-lying locations along drainage lines and creeks. Swamp Oak dominates the canopy, with the occasional *Angophora floribunda* (Rough-barked Apple) and Forest Red Gum trees present.

This community is located above the north eastern section of LW 15. There is no other recording of this vegetation community elsewhere within the Extraction Plan Area.











### 1.3.2 Central Hunter Ironbark-Spotted Gum-Grey Box Forest

The Central Hunter Ironbark - Spotted Gum - Grey Box Forest corresponds to the “*Central Hunter Grey Box - Ironbark Woodland in the NSW North Coast and Sydney Basin Bioregions*”, which is an Endangered Ecological Community (EEC) under the *NSW Biodiversity Conservation Act 2016* (BC Act). This community is also listed as a Critically Endangered Ecological Community under the federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The community is characterised by a canopy of *Corymbia maculata* (Spotted Gum), *Eucalyptus moluccana* (Grey Box), *Eucalyptus crebra* (Narrow-leaved Ironbark) and *Eucalyptus fibrosa* (Broad-leaved Ironbark). *Eucalyptus tereticornis* (Forest Red Gum) and *Eucalyptus melliodora* (Yellow Box) become co-dominant along the ridges and valleys. The shrub layer includes species such as *Pittosporum angustifolium* (Butterbush), *Daviesia genistifolia* (Broom Bitter-pea), *Pultenaea retusa*, *Cassinia aculeata*, and *Acacia amblygona* (Fan Wattle). The ground cover varies in density across this community and includes *Sporobolus creber* (Slender Rats Tail Grass), *Eragrostis cilianensis*, *Solanum cinereum* (Narrawa Burr), *Wahlenbergia gracilis* (Native Bluebell), *Lomandra longifolia*, *Cymbopogon refractus* (Barbed Wire Grass), *Stipa sp.*, *Cheilanthes sieberi* (Mulga Fern) and *Dichondra repens* (Kidney Weed). This community is recognised as having high regional significance due to extensive historical clearing and poor reservation (Peake 2006).

This community is located above the north eastern section of LW 15 and LW 20, as well as in the Southern Remnant Biodiversity Offset Area and north of the rail loop.

### 1.3.3 Cleared and Revegetated Areas/Grassland

The cleared areas within the Integra Underground project area are a result of previous clearing and grazing by stock (ERM 2009). Natural and assisted regeneration and revegetation is also occurring within the Extraction Plan Area, with vegetation management and rehabilitation occurring along the Bettys Creek diversion in a small area towards the eastern Extraction Plan boundary and an even smaller area south-east of LW17. The rehabilitated land from the Mount Owen Mine is predominately grassland.

In terms of vegetation, the most dominant community within the Extraction Plan Area consists of revegetation from the Mount Owen Mine.

### 1.3.4 Threatened and Vulnerable Fauna

As per Section 2.3 of the *Biodiversity Management Plan*, no threatened fauna species were recorded within the assessment boundary during the MOD 8 ecological assessment (Hansen Bailey 2017). A number of other threatened species that have been recorded to the north of Integra Underground in the Mt Owen Complex area and Ravensworth State Forest are likely to occur in habitats within the Integra Underground project area. No threatened flora species were recorded within the Integra Underground project area (Hansen Bailey 2017).



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## 2      Scope

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The objective of this *Land Management Plan* will be achieved by the following scope:

- Identifying, and implementing as appropriate, a monitoring and management regime to reduce the identified subsidence risks;
- Implementing a review and auditing process to provide feedback on the implemented monitoring and management regime;
- Implementing mitigation measures for land management including ponding and the management of subsidence remediation;
- Completion of remedial works for subsidence impacts; and
- In terms of subsidence levels, the goal is for no greater than the environmental consequences predicted in the Underground Project Environmental Assessment.

## 3 Planning

### 3.1 Project Approval

Schedule 3, Condition 20(g) of the PA 08\_0101 outlines the requirement to prepare a *Land Management Plan* for the Extraction Plan Area.

The land within the Extraction Plan Area is owned by Glencore, with consultation undertaken with Mount Owen Glendell Operations (MGO) for the overall Extraction Plan.

Subsidence performance measures are specified in PA 08\_0101. Performance measures relevant to land management of LW17-20 are outlined in **Table 3-1**. All performance measures and their monitoring program summary are provided in Table 3-4 of the Extraction Plan Main Document.

*Table 3-1 – Subsidence performance measures applicable to Land Management of LW 17-20*

| Water                                                              |                                                                                                                                                            |
|--------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Glennies Creek alluvial aquifer                                    | Negligible impact                                                                                                                                          |
| Natural watercourses on site (Main Creek and Bettys Creek)         | No greater environmental consequences than predicted in the Underground Project Environmental Assessment                                                   |
| Mount Owen Bettys Creek Diversions                                 | No greater than the environmental consequences predicted in the Underground Project Environmental Assessment, unless the owner agrees otherwise in writing |
| Underground Project Creek Diversions                               | Remain hydraulically and geomorphologically stable                                                                                                         |
| Other water storages and drainage lines                            | No greater than the environmental consequences predicted in the Underground Project Environmental Assessment                                               |
| Biodiversity                                                       |                                                                                                                                                            |
| Threatened species, populations, habitat or ecological communities | Negligible impact                                                                                                                                          |

### 3.2 Extraction Plan Requirements

**Table 3-2** outlines the requirements for the preparation of component plans which form part of the Extraction Plan.

*Table 3-2 - Extraction Plan – Component Plan Requirement*

| Requirement                                                                                                                                                                                                        | Section Addressed in Document                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| Overview of all landscape features, heritage sites, environmental values, built features or other values to be managed under the component plan.                                                                   | Covered under site environmental management plans. |
| Setting out all performance measures included in the consent or project approval relevant to the features or values to be managed under the component plan.                                                        | Section 3.2                                        |
| Setting out clear objectives to ensure the delivery of the performance measures and all other relevant statutory requirements (including the <i>Work Health and Safety (Mines and Petroleum Sites) Act 2013</i> ). | Section 2                                          |

| Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Section Addressed in Document                                                                                                                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Proposing performance indicators to establish compliance with these performance measures and statutory requirements.                                                                                                                                                                                                                                                                                                                                                                    | Section 5.5                                                                                                                                                                                               |
| Describing the landscape features, heritage sites and environmental values to be managed under the component plan, and their significance. It should be noted that a full description of such features, sites and values would commonly have been provided and considered in a recent environmental impact assessment (i.e. an environmental assessment or EIS). Consequently, this section can be relatively brief, and focus on the presentation of appropriate figures and/or plans. | Section1<br>See site management plans: <i>Aboriginal Heritage Management Plan</i> ; <i>Historical Heritage Management Plan</i> ; <i>Biodiversity Management Plan</i> ; and <i>Water Management Plan</i> . |
| Fully describing all currently-predicted subsidence impacts and environmental consequences relevant to the features, sites and values to be managed under the component plan.                                                                                                                                                                                                                                                                                                           | Section 5.1<br>See SCT Report                                                                                                                                                                             |
| Fully describing all measures planned to remediate these impacts and/or consequences, including any measures proposed to ensure that impacts and/or consequences comply with performance measures and/or the mine's commitments.                                                                                                                                                                                                                                                        | Section 4.4                                                                                                                                                                                               |
| Describing the existing baseline monitoring network and the current baseline monitoring results, including pre-subsidence photographic surveys of key landscape features and key heritage sites which may be subject to significant subsidence impacts (such as significant watercourses, swamps and Aboriginal heritage sites).                                                                                                                                                        | Section 5.4<br>See other specific Environmental Management Plans                                                                                                                                          |
| Fully describing the proposed monitoring of subsidence impacts and environmental consequences.                                                                                                                                                                                                                                                                                                                                                                                          | Section 5.4                                                                                                                                                                                               |
| Describing the proposed monitoring of the success of remediation measures following implementation.                                                                                                                                                                                                                                                                                                                                                                                     | Section 4.5                                                                                                                                                                                               |
| Fully describing adaptive management proposed to avoid repetition of unpredicted subsidence impacts and/or environmental consequences.                                                                                                                                                                                                                                                                                                                                                  | Section 4.6                                                                                                                                                                                               |
| Fully describing contingency plans proposed to prevent, mitigate or remediate unpredicted subsidence impacts and/or environmental consequences which substantially exceed predictions or which exceed performance measures.                                                                                                                                                                                                                                                             | Appendix A<br>Note there is also a specific TARP within the <i>Mt Owen Glendell Mines Key Features Asset Management Plan</i> and <i>Mount Owen Railway Infrastructure Asset Management Plan</i> .         |
| Listing responsibilities for implementation of the plan.                                                                                                                                                                                                                                                                                                                                                                                                                                | Section 6.1                                                                                                                                                                                               |
| An attached Trigger, Action, Response Plan (effectively a tabular summary of most of the above).                                                                                                                                                                                                                                                                                                                                                                                        | Appendix A                                                                                                                                                                                                |



## 4 Implementation

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### 4.1 Notification

The majority of the Extraction Plan Area is managed by MGO with access given to Integra Underground. Integra Underground and MGO meet regularly to discuss the interactions between the operations.

Other stakeholders such as the ARTC have an interest in the Mount Owen Rail Line, with consultation and notification for this outlined in the *Mount Owen Rail Infrastructure Asset Management Plan*.

### 4.2 Hazard Warning

Signs will be installed within the Extraction Plan Area to inform others of the potential for subsidence impacts. Access to the Extraction Plan Area controlled through signage, gates and fencing.

### 4.3 Inundation/Ponding

In accordance with Section 7.3 of the *Water Management Plan*, ponding of surface water due to subsidence will be remediated by the installation of minor remedial drainage earthworks to re-establish free drainage, where practical.

### 4.4 Remediation and Restoration

The Integra Underground will carry out any works that are required to return the land surface, including surface water drainage systems to a similar state as existed prior to subsidence. This may include, but is not limited to, filling in of cracks, stabilising slopes, draining ponded areas, re-establishing drainage paths or diverting surface water flows from areas of potential ponding. Seeding may be required for areas affected by subsidence.

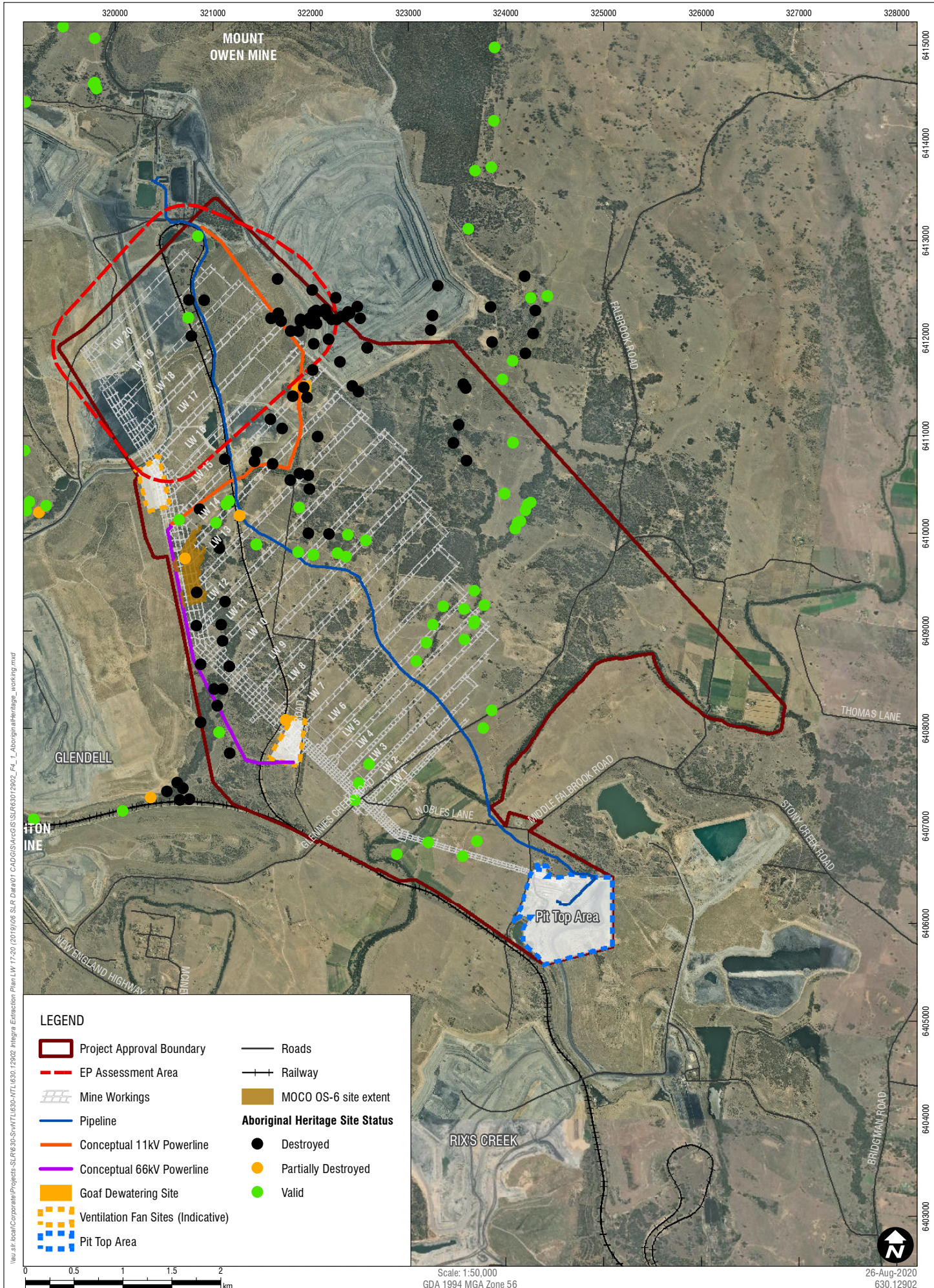
The location of known heritage sites and management measures are outlined within the *Aboriginal Heritage Management Plan* for the site. Remedial earthworks will be undertaken in accordance with the *Aboriginal Heritage Management Plan*, including legislative and permit requirements.

### 4.5 Monitoring of the Success of Remediation Measures

Any significant subsidence remediation completed by Integra Underground will be added to the Integra Underground rehabilitation monitoring program and reported in the Integra Underground Annual Review.

Regular inspections will be undertaken following the implementation of remediation measures.







## 4.6 Adaptive Management

The Integra Underground's approach to managing subsidence and environmental impacts at the mine includes using past performance to guide and improve future monitoring, as well as management actions.

Monitoring of the environment and the subsequent response to mining induced subsidence has been in place at Integra Underground prior to mining and has led to an improved understanding of the environment and site-specific subsidence behaviour. Updated information from monitoring is then considered in preparation and review of Integra Underground management plans to improve preventative and remedial actions.

## 4.7 Other Land Management

Other aspects relating to land management are covered within existing site environmental management plans, including:

- Bushfire management – covered within *Biodiversity Management Plan*;
- Weed control – *Biodiversity Management Plan*; and
- Erosion control and slope stability – *Water Management Plan* and *Mt Owen Glendell Mines Key Features Asset Management Plan*.

## 5 Measurement and Evaluation

### 5.1 Subsidence Predictions

Detailed subsidence predictions are outlined within the SCT Subsidence Assessment (2020) (**Volume 3**) and the Extraction Plan Main Document.

Previous monitoring indicates that the subsidence from LWs 17-20 are likely to represent typical subcritical width behaviour with the maximum subsidence controlled primarily by panel geometry consistent with consideration of the subsidence mechanics (Mills 1998).

Predictions of strains and tilts are based on the empirical relationships developed by Holla (1991) adjusted for the Integra Underground site-specific subsidence monitoring results. Previous monitoring experience provides a cross-check on the values determined and the approach appears to provide a reasonable basis for estimating the maximum values likely to occur.

**Table 5-1** summarises the main subsidence parameters expected above the four panels in the Extraction Plan Area as a basis for developing performance indicators.

*Table 5-1 - Predicted Subsidence*

| Longwall Panel                                                        | Max Subsidence (m) | Maximum Tilt (mm/m) | Maximum Strain Tension (mm/m) | Maximum Strain Compression (mm/m) |
|-----------------------------------------------------------------------|--------------------|---------------------|-------------------------------|-----------------------------------|
| Natural or Undisturbed Ground                                         |                    |                     |                               |                                   |
| LW 17-20                                                              | 2.0                | 14                  | 7                             | 10                                |
| Disturbed or Modified Overburden (fill material or emplacement areas) |                    |                     |                               |                                   |
| LW 17-20                                                              | 2.5                | 14                  | 14                            | 20                                |

### 5.2 Ponding and Flood Risk

#### 5.2.1. Bettys Creek and Middle Diversion Channel

As per Section 7.1 of the *Water Management Plan*, subsidence impacts on the natural section of Bettys Creek and tributary drainage lines from the planned mining of Longwalls 17-20 are expected to involve some ponding following heavy rain. These impacts are not expected to be greater than impacts described in GCUC Project Environmental Assessment and less than those detailed in the original Underground Project Environmental Assessment.

As per Section 3.1.1.1 of the *LW 17-20 Surface Water Assessment (Volume 3)*, a portion of the middle Bettys Creek Diversion (approximately 330 m) falls within a distance equal to the overburden depth around the proposed mining voids (i.e. a 45° angle of draw) but is outside the half depth zone (26.5° angle of draw). The Subsidence Assessment (SCT, 2020) notes that no significant impacts are expected to occur outside the half depth zone.

The bed of the Middle Bettys Creek Diversion was predicted to be lowered by undermining from LW13 to 15. This was expected to result in a shallow depression within the channel of up to approximately 1 m deep and 400 m long. The previous assessment concluded that this section of the diversion would likely be removed and/or substantially modified as part of the approved operations at MGO (resulting from final landform and mine closure arrangements) (Engeny, 2020).



The previous assessment also concluded that the impacts would likely be short term due to the likely infilling of these depressions during flow events. As such it was concluded that the predicted subsidence would be expected to have limited or no regional impact on geomorphic processes in Bettys Creek and that impacts would be short term and limited to a local scale (Engeny, 2020).

### 5.2.2. Natural Ponds

SCT (2020) assessed potential impacts on natural ponding. There is increased potential for ponding across the maintenance road in the centres of longwall panels following heavy rain. A culvert located under the rail embankment in the centre of LW 14 is expected to be effective in managing ponding in this area. There is also some potential for cracks, compression humps and local changes in grade, both along and across access roads and four-wheel drive tracks that may result in minor ponding. These impacts would not be significantly out of context with the general nature of the terrain and other hazards that may exist unrelated to subsidence impacts. Some minor repair work may be required to smooth out irregularities, fill any open cracks that may form and restore drainage.

The lowest point in the rail loop is on the western incoming track adjacent to the northern edge of the filled section of TP2 near the southern end of TP1. This point is above Longwall 18 and is expected to be lowered by up to 1.8m at the completion of mining Longwalls 18 to 20. This change in reduced level may affect drainage to the west and around the rim of the West Pit to the dam above the south-western corner of this pit. If a suitable gradient cannot be re-established, pumping equipment in conjunction with the adjacent TP1 and TP2 installations may need to be installed at the low point to avoid temporary ponding (SCT, 2020).

## 5.3 Risk Assessment

A risk assessment was completed for the LW 17-20 Extraction Plan Area on 4 March 2020. A copy of the full risk assessment and methodology is included as Volume 1 Appendix A.

Key aspects such as water management, heritage and flora and fauna are covered within site Environmental Management Plans. The *Land Management Plan* has been prepared based on the outcomes of the subsidence assessment and risk assessment.

## 5.4 Monitoring

In terms of land management, a component of this monitoring relates to the Bettys Creek Diversion and Bettys Creek (Engeny, 2020). Management of Bettys Creek is undertaken within the *Water Management Plan*. The components of the surface water monitoring program (Engeny, 2020) for the Extraction Plan Area include monitoring of:

- Surface water quality;
- Channel stability;
- Ponding;
- Erosion;
- Riparian vegetation; and
- Dams.

The complete description of surface water monitoring locations, frequency and parameters measures for each of these components of the monitoring program are provided in the *Water Management Plan*.

In summary, pre-mining, during mining and post mining monitoring for land management will comprise:

- Establishment of subsidence monitoring as per the *Subsidence Monitoring Program*;
- Weekly surface inspections in accordance with the *Public Safety Management Plan*;
- Monitoring as per the *Water Management Plan* including:
  - Stream level;
  - Water quality;
  - CSIRO Ephemeral Stream Assessment;
  - Rapid Appraisal of Riparian Condition;
  - Visual inspections and photographs; and
  - Monitoring of cross sections.

## 5.5 Performance Measures Indicators and Criteria

Specific performance measures within the PA 08\_0101 relating to general land management have been outlined in **Section 3.1**. A full list of performance measures are outlined within Section 3.6 of the Extraction Plan.

Key criteria relating to aspects such as water management, heritage, and flora and fauna are covered in site's Environmental Management Plans. **Table 5-2** below outlines a series of performance measures, indicators and criteria developed for land management.

*Table 5-2 - Performance Measures and Indicators for Land Management*

| Performance Measures                         | Performance Indicator                                                                                                                                                                                                            | Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inspections and identification of subsidence | Subsidence monitoring and inspections to identify ponding, erosion, cracking or slope instability.                                                                                                                               | Implementation of the Subsidence Monitoring Program.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Assessment of subsidence impacts             | Assessment of subsidence impacts based on results of the <i>Subsidence Monitoring Program</i> and <i>Mt Owen Glendell Mines Key Features Asset Management Plan</i> .<br>Review of results by surveyor and subsidence specialist. | No subsidence impacts greater than the environmental consequences predicted in the Integra Underground Mod 8 Environmental Assessment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Remedial Measures for Land Management        | Evidence of effective remediation based on monitoring results and inspections.<br>Landform is generally free – draining.                                                                                                         | Completion of remedial measures for land management as per <b>Section 4</b> .<br>This may include, but is not limited to, filling in of cracks, stabilising slopes, draining ponded areas, re-establishing drainage paths or diverting surface water flows from areas of potential ponding. Seeding may be required for areas affected by subsidence.<br>Criteria from the approved MOP states: <ul style="list-style-type: none"> <li>• Any surface cracking due to subsidence has been rehabilitated by re-grading to seal cracks.</li> <li>• Drainage lines are restored and there is no evidence of ponding.</li> </ul> |

## 6 Review and Improvement

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### 6.1 Review

Review of this *Land Management Plan* will occur where significant unpredicted impacts to land management features are identified through the monitoring and management strategies in this Plan and when required under Schedule 5 Condition 6 of PA 08\_0101.

Any revision to the Extraction Plan including component sub-plans must be completed to the satisfaction of the Secretary of the DPIE where required.

### 6.2 Reporting

The success of subsidence remediation will be recorded in the Annual Review provided to stakeholders and Government departments (including Department of Regional NSW – NSW Resources Regulator and Department of Planning, Industry and Environment [DPIE]).



## 7 Document Information

This *Land Management Plan* forms part of the overall Extraction Plan documentation, with this including a main document and other management plans. A list of the full documentation is outlined in the *Extraction Plan Main Document*.

Relevant legislation, standards and other reference information must be regularly reviewed and monitored for updates and should be included in the site management system. Related documents and reference information in this section provides the linkage and source to develop and maintain site compliance information.

### 7.1 Related Documents

Related documents, listed in **Table 7-1** below, are *documents* directly related to or referenced from within this document.

Table 7-1 – Related documents

| Number               | Title                                                                     |
|----------------------|---------------------------------------------------------------------------|
| INTUG-793190785-3013 | Extraction Plan for Longwalls 17 to 20                                    |
| INTUG-263795162-713  | <i>Biodiversity Management Plan</i>                                       |
| INTUG-793190785-68   | <i>Water Management Plan</i>                                              |
| INTUG-793190785-3012 | Public Safety Management Plan Longwall 17-20                              |
| INTUG-793190785-3021 | Mount Owen Rail Infrastructure Asset Management Plan Longwalls 17-20      |
| INTUG-793190785-3020 | Mt Owen Glendell Mines Key Features Asset Management Plan Longwalls 17-20 |

### 7.2 Reference Information

Reference information, listed in **Table 7-2** below, is *information* that is directly referred to for the development of this document.

Table 7-2 – Reference information

| Reference            | Title                                                                                                        |
|----------------------|--------------------------------------------------------------------------------------------------------------|
| Hansen Bailey (2017) | Integra Underground Mine Longwall Extension Modification Environmental Assessment for HV Coking Coal Pty Ltd |
| SCT (2020)           | Integra Underground Mine: Subsidence Assessment for LW17-20 Extraction Plan                                  |
| Engeny (2020)        | Extraction Surface Water Assessment                                                                          |

## 7.3 Change Information

Full details of the document history are recorded in the document control register, by version. A summary of the current change is provided in **Table 7-3** below. Example detail shown below.

*Table 7-3 – Change information*

| Version | Date        | Change Details                      |
|---------|-------------|-------------------------------------|
| 1.0     | August 2020 | New document for Longwalls 17 to 20 |

## Appendix A - Trigger Action Response Plan – Land Management

### A.1 Feature: Subsidence impacts to land - ponding, erosion, cracking and slope instability.

|                                     |                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Normal State</b>                 | <i>Normal – Subsidence as expected.</i><br><i>Continued implementation of Subsidence Monitoring Program.</i><br><i>Implementation of remedial measures (Environment and Community Manager).</i> |                                                                                                                                                                                                                                                                                                                                                         |
| <b>Trigger Action Response Plan</b> | <b>Level 1 Trigger – Alert / Investigate</b>                                                                                                                                                    | <b>Level 3 Triggers – Stop – Withdrawal / Removal</b>                                                                                                                                                                                                                                                                                                   |
|                                     | Some subsidence impacts greater than predicted.                                                                                                                                                 | Large sections of the Extraction Plan area has subsidence impacts (eg. Large amount of ponding) greater than Environmental Assessment predictions.                                                                                                                                                                                                      |
| <b>Persons affected</b>             | <b>Action / Response</b>                                                                                                                                                                        | <b>Action / Response</b>                                                                                                                                                                                                                                                                                                                                |
| Environment and Community Manager   | Continued implementation of <i>Subsidence Monitoring Program</i> .<br><br>Liaison with subsidence specialist.<br><br>Implementation of remedial measures.                                       | Continued implementation of <i>Subsidence Monitoring Program</i> .<br><br>Liaison with subsidence specialist.<br>Review of subsidence predictions.<br><br>Implementation of remedial measures. Consultation with landowner.<br><br>Determine if an incident has occurred.<br><br>Reporting of Incident in accordance with Project Approval and WHS Act. |

## A.2 Feature: Subsidence Repair – Land Management

|                                     |                                                                                                                                                    |                                                                                                                                                                                                                                                                    |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Normal State</b>                 | <i>Minor subsidence, with subsidence repair successful</i><br><i>Continue monitoring of remedial measures (Environment and Community Manager).</i> |                                                                                                                                                                                                                                                                    |
| <b>Trigger Action Response Plan</b> | <b>Level 1 Trigger – Alert / Investigate</b>                                                                                                       | <b>Level 3 Triggers – Stop – Withdrawal / Removal</b>                                                                                                                                                                                                              |
|                                     | Subsidence repair has been mostly successful, with some additional work.                                                                           | Subsidence repair has not been successful. Large scale impacts of ponding, cracking, erosion and slope instability.                                                                                                                                                |
| <b>Persons affected</b>             | <b>Action / Response</b>                                                                                                                           | <b>Action / Response</b>                                                                                                                                                                                                                                           |
| Environment and Community Manager   | <p>Continue monitoring of remedial measures.</p> <p>Further remedial measures required.</p>                                                        | <p>Additional subsidence monitoring and inspections.</p> <p>Continue monitoring of remedial measures.</p> <p>Liaison with subsidence specialist. Review subsidence predictions.</p> <p>Consultation with landowner.</p> <p>Further remedial measures required.</p> |