HUNTER VALLEY
OPERATIONS

INTEGRATED BIODIVERSITY MANAGEMENT

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1 | INTRODUCTION

Hunter Valley Operations (HVO) is an open cut coal mine complex located 24 km north-west of Singleton in the Hunter Valley region of New South Wales (NSW). It consists of two separate mining projects being; HVO North and HVO South (**Figure 1**). HVO commenced operations in 1949 and has been through a process of extending existing mines and acquiring additional mines in the area over time and amending approvals as required. HVO North and HVO South have received separate State approvals, but are managed as an integrated operation.

HVO is a joint venture between subsidiaries of Yancoal Australia Ltd (Yancoal) and Glencore. HV Operations Pty Ltd is the appointed manager of the joint venture and operator of HVO.

HVO North was granted approval on 12 June 2004 (DA 450-10-2003) for HVO North by the Minister for Infrastructure and Planning and the Minister for Natural Resources (the HVO North Approval). The most recent modification was approved on 24 April 2025.

HVO South operates in accordance with the Project Approval granted on 24 March 2009 (DA 06_0261) by the Minister for Planning (the HVO South Approval). The most recent modification was approved on 6 February 2023. The HVO South modification approved in February 2018 (Modification 5) introduced a condition (Condition 33A) requiring the preparation of a Biodiversity Management Plan (BMP) for the operation.

The HVO North development consent includes a range of requirements relating to biodiversity, including the development of strategies for the Carrington billabong and associated River Red Gum population, rehabilitation and flora and fauna management.

State approval for mining at HVO was in place prior to the commencement of the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act). HVO was referred under the EPBC Act in 2016 for the continuation of mining in areas approved by the State after commencement of the EPBC Act. The referral covered areas approved but not previously cleared. The referral was declared a ‘controlled action’ and an approval granted on 10 October 2016 (EPBC2016/7640). The EPBC approval permits disturbance to one threatened ecological community (TEC) and three listed fauna species habitats and requires the provision of direct offset sites to compensate for these impacts.

The relevant conditions in the above-mentioned approvals, and where they are addressed in this document are outlined in **Section 1.4 |**

1.1 | PURPOSE

This Integrated Biodiversity Management Plan (IBMP) has been prepared to meet the requirements of Schedule 3 Condition 33A of PA 06_0261, and to provide an overview of how biodiversity is managed across HVO and its biodiversity offsets.

The scope of the IBMP includes the identification of biodiversity values within the approved HVO mine boundaries, including those approved to be impacted and those which are being retained and managed for their conservation value.

This IBMP provides a framework for the mine to operate in accordance with the HVO South Environmental Impact Assessment (EIS) in relation to avoidance, minimisation of disturbance and rehabilitation, and the protection and management of biodiversity values as required by Condition 33A.

The IBMP also provides a framework for biodiversity monitoring and reporting that evaluates biodiversity performance against established performance and completion criteria.

1.2 | STRUCTURE

This IBMP describes the biodiversity activities across operational and non-operational land (Figure 2) and Biodiversity Areas (BAs) (Figure 3) to compensate for impacts on biodiversity values (including offset sites) and to ensure appropriate management of retained remnant vegetation and fauna habitat.

To address the requirements of Schedule 3 Condition 33A, the IBMP is structured into the following sections:

- Section 2 – Biodiversity Values: Description of biodiversity values impacted by mine operations, approved Biodiversity Offset Strategy (for HVO North and HVO South);
- Section 3 – Operational Land: Description of management and rehabilitation measures to be undertaken on operational lands (within the approved disturbance boundaries) for HVO North and HVO South;
- Section 4 –Non-Operational Land: Description of those biodiversity values which occur on non-operational land within the approved mine development boundaries, which have been identified for protection and management actions to be undertaken to ensure their biodiversity values are maintained;
- Section 5 – Overview of biodiversity offset areas and monitoring programs;
- Section 6 – GDE and riparian vegetation monitoring: Description of monitoring to be implemented for groundwater dependent ecosystems and riparian vegetation; and
- Section 6 and 7 – Monitoring and Reporting: Summary of main monitoring activities that are being implemented and a reporting program that outlines how the effectiveness of activities being undertaken will be evaluated and measured, and progressive improvements made over time.

Figure 4 has been developed to outline the applicable documents and actions that relate to the management of biodiversity values across HVO and form part of this Management Plan.

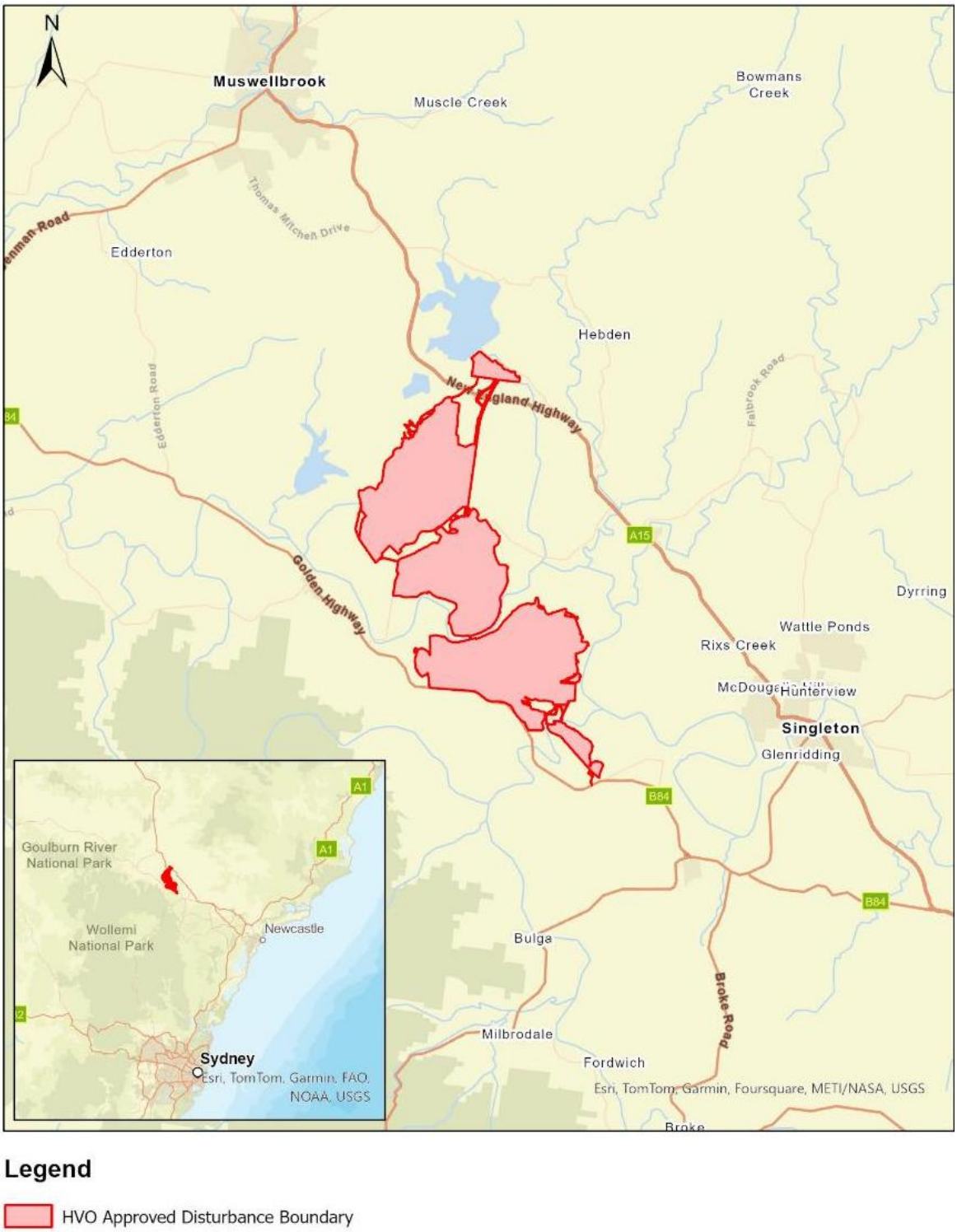


Figure 1 - HVO locality.

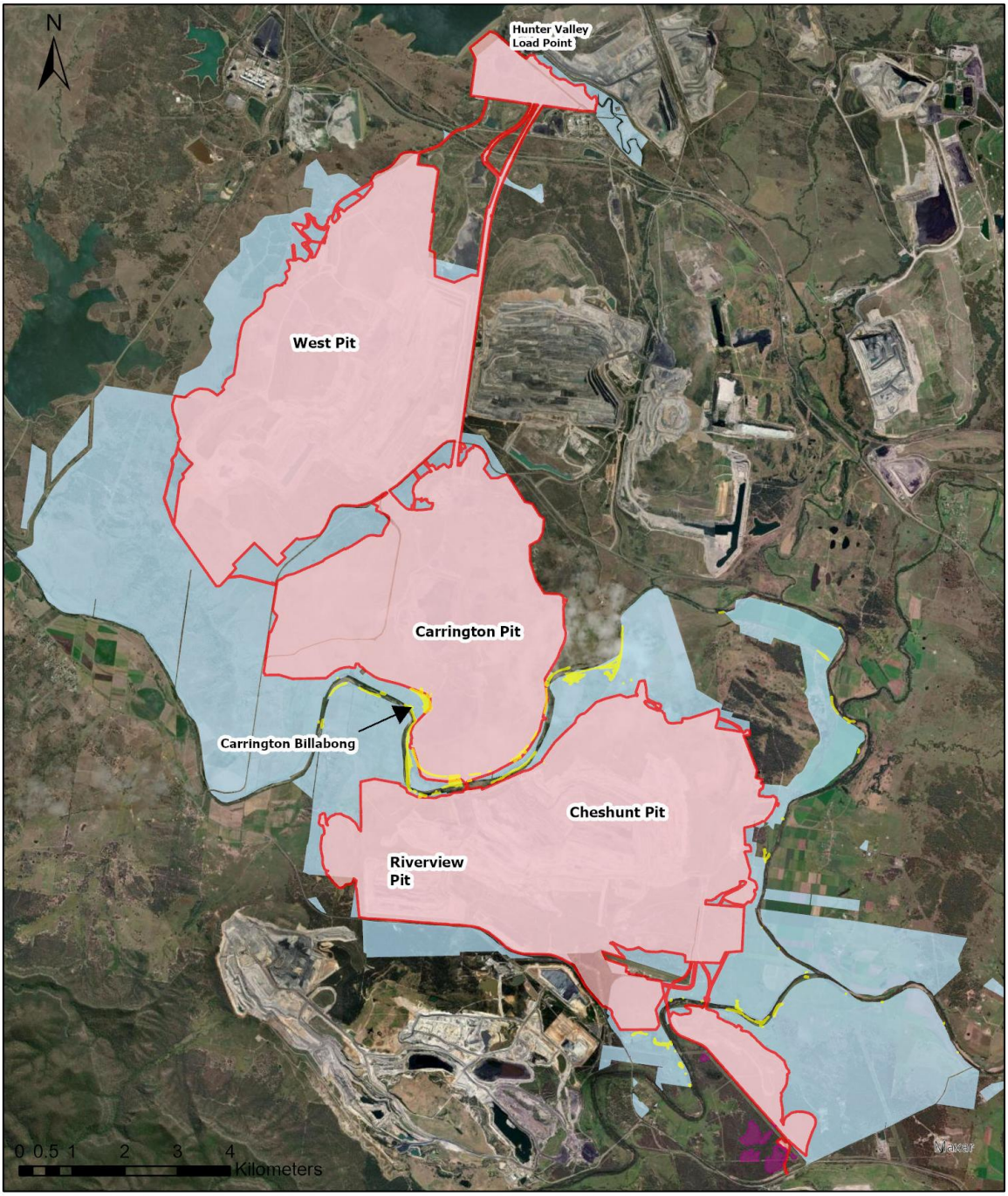


Figure 2 - HVO operational and non-operational areas

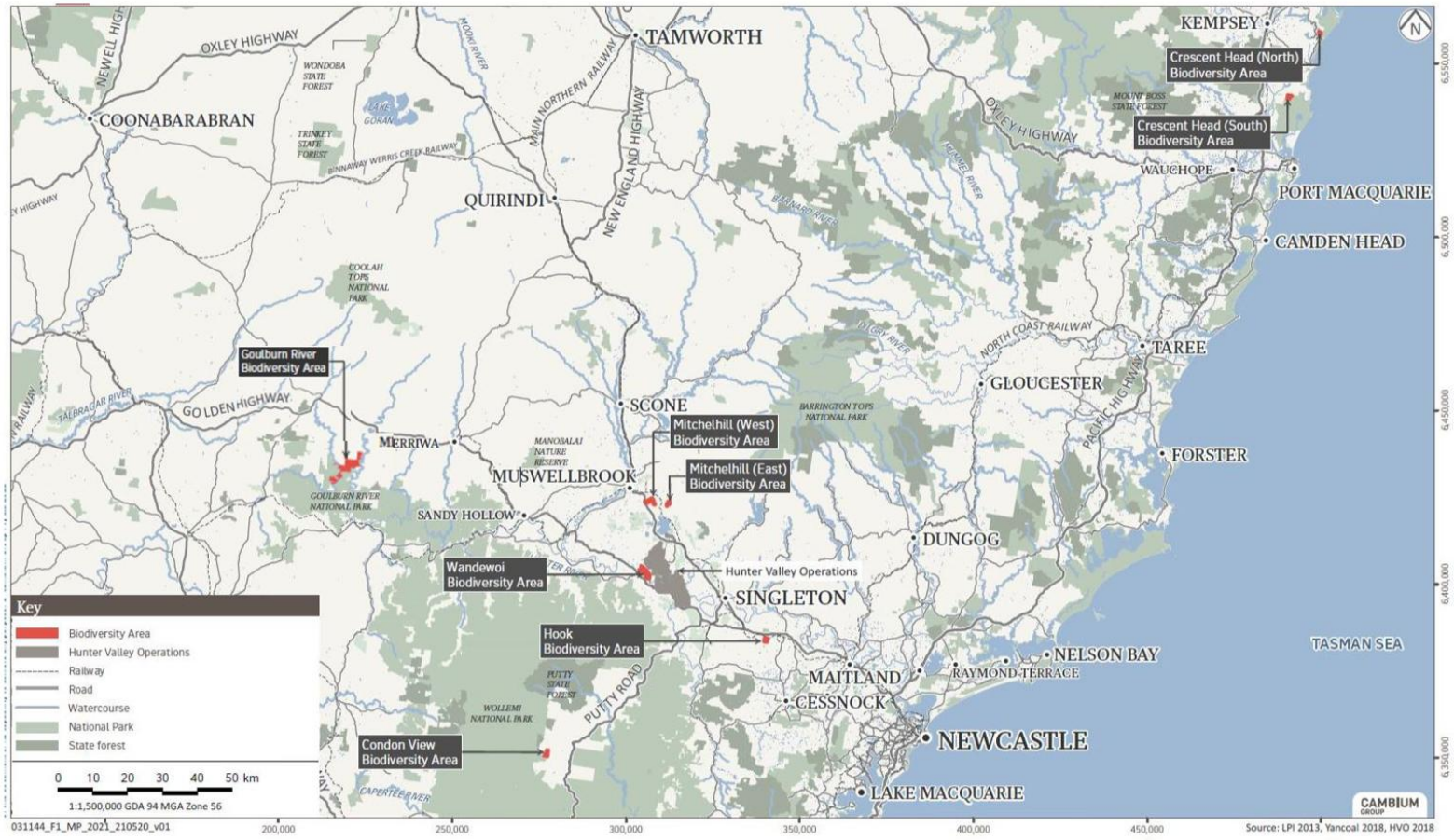


Figure 3 - Biodiversity areas.

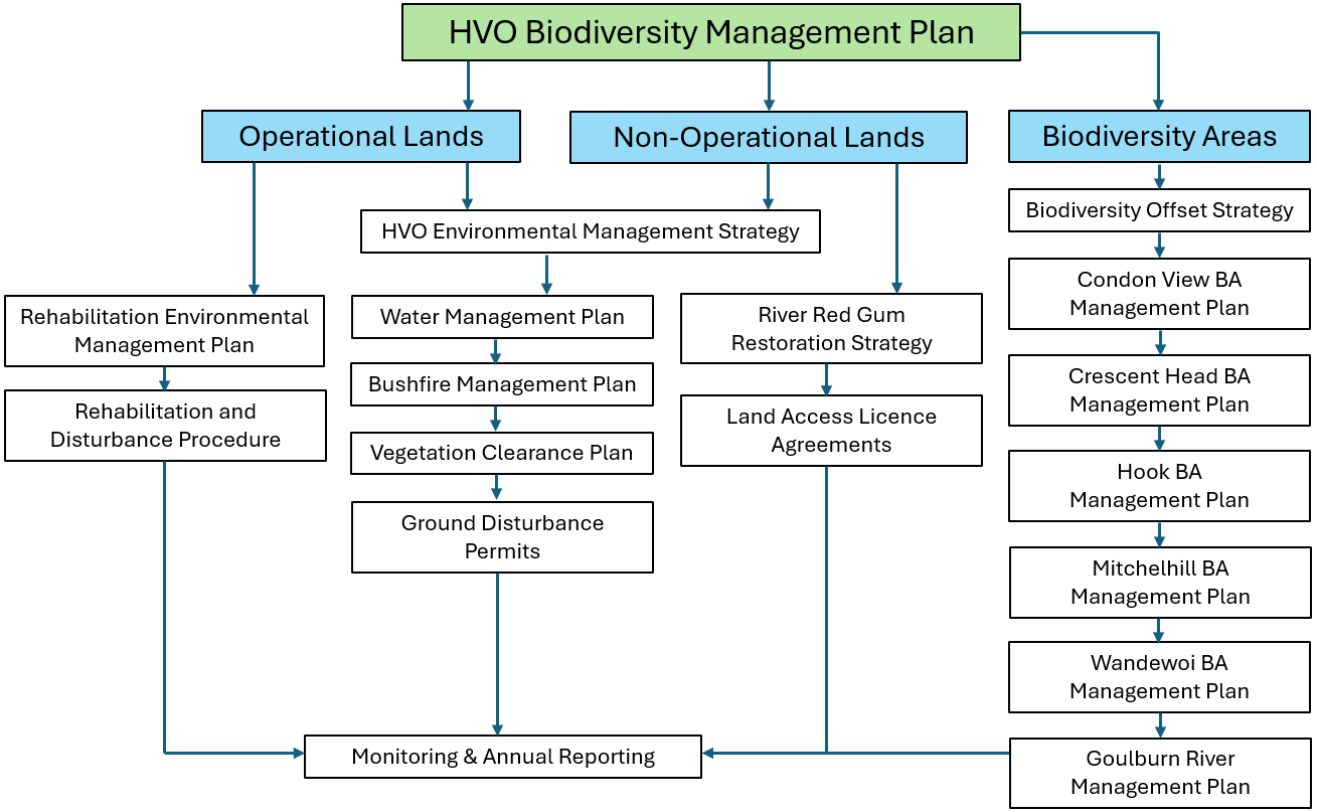


Figure 4 - HVO biodiversity document structure

1.3 | ENVIRONMENTAL LEGISLATION AND POLICY

The following relevant contemporary government legislation and policies are relevant to the management of biodiversity at HVO.

1.3.1 | ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

Under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), any action (which includes a development, project or activity) that is considered likely to have a significant impact on Matters of National Environmental Significance (MNES) including threatened ecological communities and species, must be referred to the Commonwealth Minister for the Environment. The purpose of the referral is to allow a decision to be made about whether the action is a "controlled action" and therefore requires approval under the EPBC Act.

The HVO complex was submitted for determination under the EPBC Act to the former Department of the Environment (DoE) (now the Department of Climate Change, Energy, the Environment and Water (DCCEEW)) on 29 January 2016. On 3 March 2016, the Minister determined that the action was a controlled action under Section 75 of the EPBC Act and was required to be assessed by preliminary documentation.

The preliminary documentation was submitted to DoE on 5 May 2016 and concluded that the action was likely to result in significant impacts on the following protected matters:

- Central Hunter Valley eucalypt forest and woodland ecological community (CHVEF);
- Regent Honeyeater (*Anthochaera phrygia*);
- Swift Parrot (*Lathamus discolour*); and
- Green and Golden Bell Frog (*Litoria aurea*).

The preliminary documentation report included a preliminary strategy to provide offsets for the above protected matters. The offset requirements for the project under the EPBC Act were assessed by the Department and the action approved by the Acting Assistant Secretary on 10 October 2016, subject to conditions (EPBC 2016/7640).

A variation to EPBC 2016/7640 was approved on 30 October 2025.

Applicable approval conditions pertaining to this BMP are summarised in **Table 1-3.**

1.3.2 | ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) is the overarching planning legislation in NSW that provides for the creation of planning instruments that guide land use. The EP&A Act also provides for the protection of the environment, including the protection and conservation of native animals and plants. This includes threatened species and communities listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) and NSW *Fisheries Management Act 1994*.

1.3.3 | BIODIVERSITY CONSERVATION ACT 2016

The BC Act is the principal New South Wales law for conserving biodiversity, protecting threatened species and ecological communities, and managing activities that may damage native vegetation or habitat. It establishes frameworks for identifying threatened species, threatened ecological communities, areas of high biodiversity value and key threatening processes, while supporting biodiversity conservation programs across the state.

The Act regulates certain development and native vegetation clearing activities through biodiversity assessments, approvals and certification processes. It promotes avoiding and minimising impacts first, with residual impacts potentially addressed through biodiversity offsets, biodiversity credits or payments to the Biodiversity Conservation Fund. The Act also supports private land conservation, biodiversity stewardship agreements and conservation measures designed to protect or restore important habitat.

At the time of preparing the HVO South EIS, the *Threatened Species Conservation Act 1995* (TSC Act) was the primary piece of legislation in NSW relating to the protection and management of biodiversity. The TSC Act required consideration of whether a development (Part 4) or an activity (Part 5) is likely to significantly impact threatened species, populations, communities or their habitat.

The TSC Act was repealed and replaced by the BC Act. As the BC Act was not in effect at the time of the EIS preparation, biodiversity values were originally assessed under TSC Act. For the purposes of this IBMP we have referenced a community or species status under the BC Act.

1.3.4 | NSW BIODIVERSITY OFFSET POLICIES

The NSW biodiversity offsets policy for major projects (Policy) commenced on 1 October 2014 and has since been replaced by the NSW Biodiversity Offset Scheme (Scheme) as of 25 August 2017.

The Policy was implemented under the *EP&A* Act, while the Biodiversity Offsets Scheme comes under the BC Act.

Both the Policy and Scheme applied to State Significant Development (SSD) and was the offsets policy for major projects in force at the time of the HVO South Approval. As HVO South was declared an SSD, the assessment and delivery of state biodiversity offset requirements for the project have been consistent with the offsets policy requirements.

The policy:

- establishes a set of offsetting principles for major projects;
- defines key thresholds for when offsetting is required;
- adopts an assessment methodology to quantify and describe the offset required;
- defines preferred mechanism to establish offset sites;
- provides a range of flexible options that can be used in lieu of providing offsets including rehabilitation actions and supplementary measures; and
- sets out how payments to the NSW Biodiversity Offsets Fund can be used to acquit offset requirements.

1.4 | COMPLIANCE

An overview of approval conditions relating to this IBMP in the HVO South Project Approval (06_0261), HVO North Development Consent (DA 450-10-2003) and EPBC Approval (2016/7640) and where they are addressed in this document is provided in Table 1-1, Table 1-2 and Table 1-3.

Table 1-1 - PA 06_0261 Requirements

Schedule 3, Condition 33A Requirement	Comments
a) (The BMP must) be submitted to the Planning Secretary for approval within 3 months of determination of Modification 5, unless otherwise agreed by Planning Secretary;	Extension was granted by DPE. BMP was required to be submitted by 27 July 2018.
b) be prepared in consultation with BCD by a suitably qualified and experienced person/s;	1.4.1 and 1.4.4
c) describe the short, medium and long term measures to be undertaken to manage the remnant vegetation and fauna habitat on site and implement the Biodiversity Offset Strategy;	3.2, 4.2 and 5.2
d) describe the measures to be undertaken to avoid the Southern Biodiversity Area or Northern Biodiversity Area located within the site;	5.2.1
e) incorporate the River Red Gum Strategy	4.1.1
f) describe the measures to be undertaken to protect the Hunter Lowland Red Gum Forest endangered ecological community;	4.1.1
g) include detailed performance and completion criteria for evaluating the performance of the Biodiversity Offset Strategy and include triggers for remedial action, where the performance or completion criteria are not met;	5.3
h) include a detailed description of measures to be implemented on site and in biodiversity areas for: ▪ protecting vegetation and fauna habitat outside approved disturbance areas on site;	3.1, 3.2 and 4.2
▪ enhancing quality of existing vegetation, vegetation connectivity and fauna habitat on site and in offset areas;	3.0, 4.0, 5.0 and 6.0
▪ minimising clearing and avoid unnecessary disturbance;	3.2.1
▪ maximising salvage of resources within the approved disturbance area for beneficial reuse;	3.2.2.4
▪ collecting and propagating seed;	3.2.2.4
▪ utilising vegetation for visual screening of the site;	4.0
▪ minimising the impacts on fauna on site, including undertaking pre-clearance surveys;	3.2.2
▪ managing salinity;	4.2.5
▪ controlling weeds and feral pests;	3.2.4, 3.2.5 and 4.2.2
▪ controlling erosion;	3.2.7
▪ managing grazing and agriculture on the site;	4.2.4
▪ controlling access; and	1.4.5
▪ managing bushfire hazards	3.2.6, 4.2.3
i) be integrated with rehabilitation for the site;	3.3

j) include a seasonally based program to monitor and report on effectiveness of the above measures, progress against detailed performance and completion criteria, and any progressive improvements that could be implemented to improve biodiversity outcomes	5.3, 6.2, 7.0
k) monitor and report on the impacts of the development on groundwater dependent ecosystems and riparian vegetation consistent with Groundwater Monitoring Program, and identify trigger levels for remediation of any material impacts to these ecosystems;	6.0
l) identify the potential risks to successful implementation of the Biodiversity Offset Strategy, and include a detailed description of contingency measures to be implemented to mitigate against these risks;	5.3.3
m) include details of who would be responsible for monitoring, reviewing and implementing the plan.	1.4.3

Table 1-2 - DA 450-10-2003 Requirements

Schedule 3, Condition 35 Requirement	Comments
a) provide details on: • delineating areas of disturbance	3.1, 3.2.2
• Protecting areas outside of the disturbance areas	3.1
• identifying when pre-clearance surveys are required for fauna	3.2.2.1
• determining the best time to clear vegetation to avoid nesting/breeding activities of threatened fauna	3.2.2.2
• capturing and releasing fauna	3.2.2.1, 3.2.2.3
• relocating bat roosts	3.2.2.1, 3.2.2.2, 3.2.2.3, 3.2.2.4
• salvaging habitat resources and collecting seed	3.2.2.2, 3.2.2.4
• controlling weeds in regeneration/rehabilitation areas	3.2.4, 3.3, / RMP
• controlling access to the regeneration/rehabilitation areas	1.4.5, 3.3 / RMP
b) describe how the land in regeneration areas would be revegetated	3.3 / RMP
c) describe how the mined areas would be rehabilitated for grazing and biodiversity values	3.3 / RMP
d) identify actions to minimise the potential impacts of the development on threatened fauna	3.1, 3.2.1, 3.2.2
e) describe how the performance of the revegetation/rehabilitation strategies would be monitored over time including, as a minimum, the parameters in Table 18;	3.3 / RMP
f) identify who is responsible for monitoring, reviewing, and implementing the procedures	1.4.3
The Applicant must submit a copy of these procedures to the Secretary for approval within 6 months of the date of this consent	Flora and fauna procedure approved by Dept Planning on 24/12/2004

Table 1-3 – Summary of EPBC Approval Requirements

Condition	Comments
1. The **person taking the action** must not clear more than 54.4 hectares of the Central Hunter Valley Eucalypt Forest and Woodland (CHVEF) ecological community from the Riverview Pit and 6.6 hectares of the CHVEF ecological community from within the West Pit and must limit all vegetation clearing to within the project disturbance boundaries defined at Schedule 1, Figures 1-4.	Progressive clearance is outlined in the RMP and approved under the Ground Disturbance Permit process. This is outlined in Section 3. Clearing of EPBC areas is outlined in the Vegetation Clearance Plan.
2. The **person taking the action** must prepare and submit a Vegetation Clearance Plan (VCP) for the **Minister's** approval to mitigate impacts of the action on the CHVEF ecological community, the Regent Honeyeater, Swift Parrot and the Green and Golden Bell Frog. The action must not commence until the Vegetation Clearance Plan, required by Condition 2, has been approved by the **Minister**.	The VCP was approved on 24 October 2016. Clearing in EPBC areas is outlined in the VCP. Summary is provided in Section 3.
4. To compensate for impacts to **protected matters** the **person taking the action** must, by 31 March 2026, enter into and comply with a **Conservation Agreement** for each **offset area** that meets the requirements of the **EPBC Act Offset Policy** and must: a. include 405.8ha of CHVEF, 175.8ha of foraging habitat for Swift Parrot and 40ha of regenerating foraging habitat for Swift Parrot. b. compensate for residual significant impacts to 68.4ha of breeding and foraging habitat for the Regent Honeyeater. c. compensate for residual significant impacts to 2.6ha breeding habitat and 102.7ha foraging habitat for the Green and Golden Bell Frog.	Signing of the Conservation Agreement under Section 305(1)(a) of the EPBC Act for each offset area was completed on 27 January 2026.
9. The **person taking the action** must discontinue taking the action by 31 March 2026 unless and until the **person taking the action** has entered into the **Conservation Agreements** as required by Condition 4.	Signing of the Conservation Agreement under Section 305(1)(a) of the EPBC Act for each offset area was completed on 27 January 2026.
11. To compensate for residual impacts to the **protected matters**, the **person taking the action** must submit to the **Department**, for the **Minister's** approval, a Biodiversity Offset Management Plan (BOMP) for each of the **offset areas**.	BOMPs for each of the offset areas were approved on 30 October 2025.

1.4.1 | AUTHORS

The original IBMP was prepared by suitably qualified and experienced ecologists with expertise in the identification, assessment and management of biodiversity values of State and Commonwealth significance. The authors have extensive experience preparing management plans that outline appropriate management strategies to maintain and/or improve their conservation values, including threatened species and communities.

Berlinda Ezzy was the primary author with in excess of 20 years professional experience.

Nathan Garvey provided a technical review of the BMP. Nathan is a qualified ecologist with over 15 years' experience in conducting ecological assessments across eastern Australia.

Subsequent revisions have been undertaken by suitably qualified and experienced persons as identified in **Section 9 |**

1.4.2 | IBMP REVIEW

As required by the relevant conditions of the development consent, this plan shall be reviewed and updated to the satisfaction of the Planning Secretary of the DPHI where necessary within three months of the submission of an:

- Annual review;
- Incident report under the relevant conditions of approval;
- Independent audit under the relevant conditions of approval; or
- Modification to the conditions of consent.

If any significant modifications to the plan are required as an outcome of the review, HVO will advise the Planning Secretary of the outcomes and provide revised documents (where required) to the Planning Secretary for review and approval. The revised plan will be submitted to DPHI for approval within 6 weeks.

Where HVO determines that major amendments and a material variation or revision of this plan is required, this will be undertaken in consultation with the appropriate regulatory authorities and stakeholders.

As this IBMP is a requirement under the HVO South consent, any consultation regarding edits required to this document will only occur with the relevant State agencies. As this IBMP is largely a compilation of biodiversity-related commitments outlined in other-reviewed management plans, consultation may not occur with Departments outside the DPHI unless it is required.

The details of the activities occurring within the EPBC-related biodiversity offsets are outlined within the respective management plans and have not been duplicated in detail in this document. As such, any consultation with the Commonwealth will relate to changes in HVO's EPBC-related documents only. Any changes to the EPBC management plans arising from the consultation will be reflected in this document.

Minor changes such as formatting edits may be made with version control.

1.4.3 | KEY STAKEHOLDERS AND ROLES

The key stakeholders and roles of the entities involved in implementation of the IBMP are listed in Table 1-4.

Table 1-4 -Key stakeholders and roles

Stakeholder	Roles
Department of Planning, Housing and Infrastructure (DPHI)	NSW regulator Administers approvals granted under EP&A Act Approves the IBMP and receives Annual Review
Biodiversity Conservation Trust (BCT)	Administers the BC Act and Offset Agreements
Department of Climate Change, Energy, the Environment and Water (DCCEEW) (NSW)	NSW regulator NSW environmental operations consultation and review of IBMP Now contains the previous Biodiversity and Conservation Division (BCD)
Department of Climate Change, Energy, the Environment and Water (DCCEEW) (Commonwealth)	Commonwealth regulator Administers approvals granted under EPBC Act Approval of EPBC-related Offset Management Plans (OMPs)
Hunter Valley Operations Pty Ltd	Mine Operator Prepare and implement the IBMP including management, monitoring and reporting Review progress of Biodiversity Offset Strategy and monitor performance outcomes are being achieved Annual Reporting
Leaseholders	Leaseholders adhere to applicable requirements for the property as set out in the grazing lease. Requirements may be associated with grazing management, implementation of on-ground works, fencing maintenance etc
Independent Auditor	Audit of project's compliance with approval conditions and approved plans etc

1.4.4 | CONSULTATION

During the development and progression of the IBMP, HVO has consulted with both DPIE (now DPHI) and the BCD and DCCEEW (NSW) regarding edits made during reviews occurring following the Annual Review, consent modifications and Independent Audits (Table 1-5). A summary of the changes made to the document is outlined in the Section 9, Change Information.

The most detailed edits were made in July 2021. Following the Independent Environmental Audit, the IBMP was resubmitted to the DPHI for approval. The DPHI requested additional information prior to approving the IBMP. The requested information and HVO's response is outlined in

Table 1-6 below and the edits were applied to V1.4. The most recent consultation with DCCEEW (NSW) is outlined in **Appendix A** and **Appendix B**.

Table 1-5 - Consultation undertaken during the Plan Development

Consultation	Details
July 2018	BMP provided to Office Environment and Heritage to review. OEH unable to provide comment.
July 2018	Draft V1.2 provided to DPIE to review and approve.
July 2021	Edits provided to DPIE to review and approve. RFI provided to HVO. HVO responded July 2021 (Table 1.6).
August 2023	V1.7 provided to DPIE for assessment.
Sept 2024	V1.8 submitted to DPHI for consultation with DCCEEW (NSW).

Table 1-6 - DPHI Request for Information and HVO Response

DPIE request	HVO Response
Provide within the IBMP a detailed description of the measures to be implemented on the site and in the biodiversity area/s for collecting and propagating seed, in accordance with condition 33A h), Schedule 3 of MP 06_0261	Point 5. – Seed collection and propagation is discussed in Section 3.2.1
Confirm that the controlled burns within Biodiversity Areas and remnant vegetation patches is consistent with EIS commitments and/or Conditions of Consent and/or other relevant management plans.	The statements within the IBMP, regarding the potential to consider and utilise controlled burns within biodiversity areas, are consistent with HVO's management commitments and requirements regarding the use of various techniques to encourage the development of diverse ecosystems. The statements in the EIS and DA are broad and generic, requiring the management plans to expand on methods for managing biodiversity. They do not prohibit the use of fire as a management tool. Furthermore, prescribed burning is listed as an extraordinary event for assessing air quality exceedance criteria. The most relevant other Management Plans are the HVO Bushfire Management Plan and Air Quality Management Plan. The Bushfire Management Plan defers to specific biodiversity management plans and does not prohibit controlled fires to manage biodiversity assets. The Air Quality Management Plan does not detail or prohibit controlled burns and reflects the DA conditions which note prescribed burning as an extraordinary event.

Include summary text of the relevant sections of the Groundwater Monitoring Program relating to trigger levels for the remediation of any material impacts to groundwater dependent ecosystems and riparian vegetation, in accordance with condition 33A k), Schedule 3 of MP 06_0261.	Water Management Plan states that groundwater dependent ecosystems are limited to river red gum stands along the Hunter River and Wollombi Brook. It is not anticipated that groundwater drawdown as a result of the project will result in stress to the associated vegetation communities. The species relies on flooding regimes for recruitment. The River Red Gum Rehabilitation and Restoration Strategy assesses impacts to this community. The trigger levels for remediation of any material impacts to GDEs are described in Section 5.1.1 (now section 6) of the IBMP. This section refers to the groundwater impact assessment criteria and the reduction in piezometric levels.
Update Table 1.2 to describe where each dot point of condition 33A h) is addressed.	Updated
Include within the IBMP a protocol for managing and reporting any incidents, complaints, non-compliances within statutory requirements and exceedances of the impact assessment criteria and/or performance criteria in accordance with condition 33A g), Schedule 3 of MP 06_0261.	Section 7 added.
Update the document control template on the front cover to include the document version number and effective date.	This version is completed once a document has been entered into Sharepoint following approval. There is no current document number and document version as it has been transferred to a new template since the last approval. This will be added once the plan is approved, and the final version provided to DPIE. Effective date cannot be updated as this version of the plan is not yet approved.
Check the new text in Section 1.1 makes sense.	Updated
The Vegetation Clearance Plan has been referred to throughout this IBMP. The Vegetation Clearance Plan is available on the company website and is dated 2016. Update the IBMP to include references to the specific relevant sections of the Vegetation Clearance Plan, and include a summary of the relevant sections such that the IBMP is a stand-alone plan.	The Vegetation Clearance Plan relates to works within EPBC areas, and summary of these requirements is included in the IBMP. Clarification has been added to the IBMP on which matters the Vegetation Clearance Plan relates to. The rest of the clearance actions are managed in accordance with the HVO Mining Operations Plan (now Rehabilitation Management Plan) and the Ground Disturbance Permit process. These references are added.
The updated IBMP has several changes related to vegetation clearing. Please ensure relevant changes are made to the 2016 Vegetation Clearance Plan referred to in the IBMP if required.	The Vegetation Clearance Plan was reviewed and found to be appropriate, noting this is not a plan required under either DA.

1.4.5 | ACCESS

Access to HVO North and HVO South operational areas, non-operational areas and BA's is restricted and visitation is monitored through site induction processes. Clear signage is in place to identify the location of BA's, and HVO lands, and entry is not allowed without prior permission.

All requests for visitation to biodiversity areas must come through the HVO environmental personnel. This is to ensure safety and environmental protocols are followed and all activities are in accordance with the applicable site management plans.

2 | BIODIVERSITY VALUES

Each of the various HVO North and HVO South Environmental Impact Statements (EIS) and Environmental Assessments (EA) describe the biodiversity values that occur within the approved project disturbance areas, and residual impacts that will occur to native flora and fauna as a result of proposed mining activities. The assessments focused particularly, but not exclusively, on threatened ecological communities (TECs) and flora and fauna species protected under the NSW *Biodiversity Conservation Act 2016* (BC Act) or its precursors, and the Commonwealth EPBC Act.

Sections below outline the confirmed biodiversity values and extent of approved impacts.

2.1 | NATIVE VEGETATION COMMUNITIES

An examination of historical aerial photos illustrate that the majority of HVO was extensively cleared and under grazing land use prior to mining development. As such, vegetation within the approved disturbance areas of HVO North and HVO South are predominantly characterised by exotic and native pasture. While native and exotic vegetation will need to be removed from the HVO North and South extension areas, only a small proportion consists of remnant, intact native vegetation. The vegetation occurring within the approved mine advance areas at HVO North and HVO South can be seen in **Figure 5, Figure 6 and Figure 7.** Four types of vegetation communities were confirmed within HVO's extension areas which were typically small patches (<0.5ha), isolated and in poor condition (<50% native species present).

The native vegetation communities confirmed within the impact areas, their conservation status, and approved extent of impact is described in **Table 2-1.**

Table 2-1 - Ecological communities and approved impacts

Ecological community	Likely plant community type (PCT)	Status (BC Act/EPBC Act)	Approved impact area (ha)
Narrow-leaved Ironbark Grey Box Woodland (CEEC)	PCT 1603 Narrow-leaved Ironbark - Bull Oak - Grey Box shrub- grass open forest of the central and lower Hunter	Endangered / Critically Endangered	54.4
Narrow-leaved Ironbark Woodland (CEEC)	PCT 1603 Narrow-leaved Ironbark - Bull Oak - Grey Box shrub- grass open forest of the central and lower Hunter	Endangered / Critically Endangered	6.6
Narrow-leaved Ironbark Woodland (poor condition)	PCT 1603 Narrow-leaved Ironbark - Bull Oak - Grey Box shrub- grass open forest of the central and lower Hunter	Endangered / Nil	3.4
Grey Box Bull Oak Regeneration	PCT 1603 Narrow-leaved Ironbark - Bull Oak - Grey Box shrub- grass open forest of the central and lower Hunter	Endangered / Nil	0.2
Rough-barked Apple Woodland	PCT 1658 Rough-barked Apple - Narrow-leaved Ironbark - Blakely's Red Gum - Bull Oak - Coast Banksia woodland on sands of the Warkworth area	Endangered / Nil	1.3
Forest Red Gum Woodland	PCT 42 River Red Gum/ River Oak grassy riparian woodland of the Hunter Valley	Endangered / Nil	1
Derived native grassland	Unknown	Nil	104.7

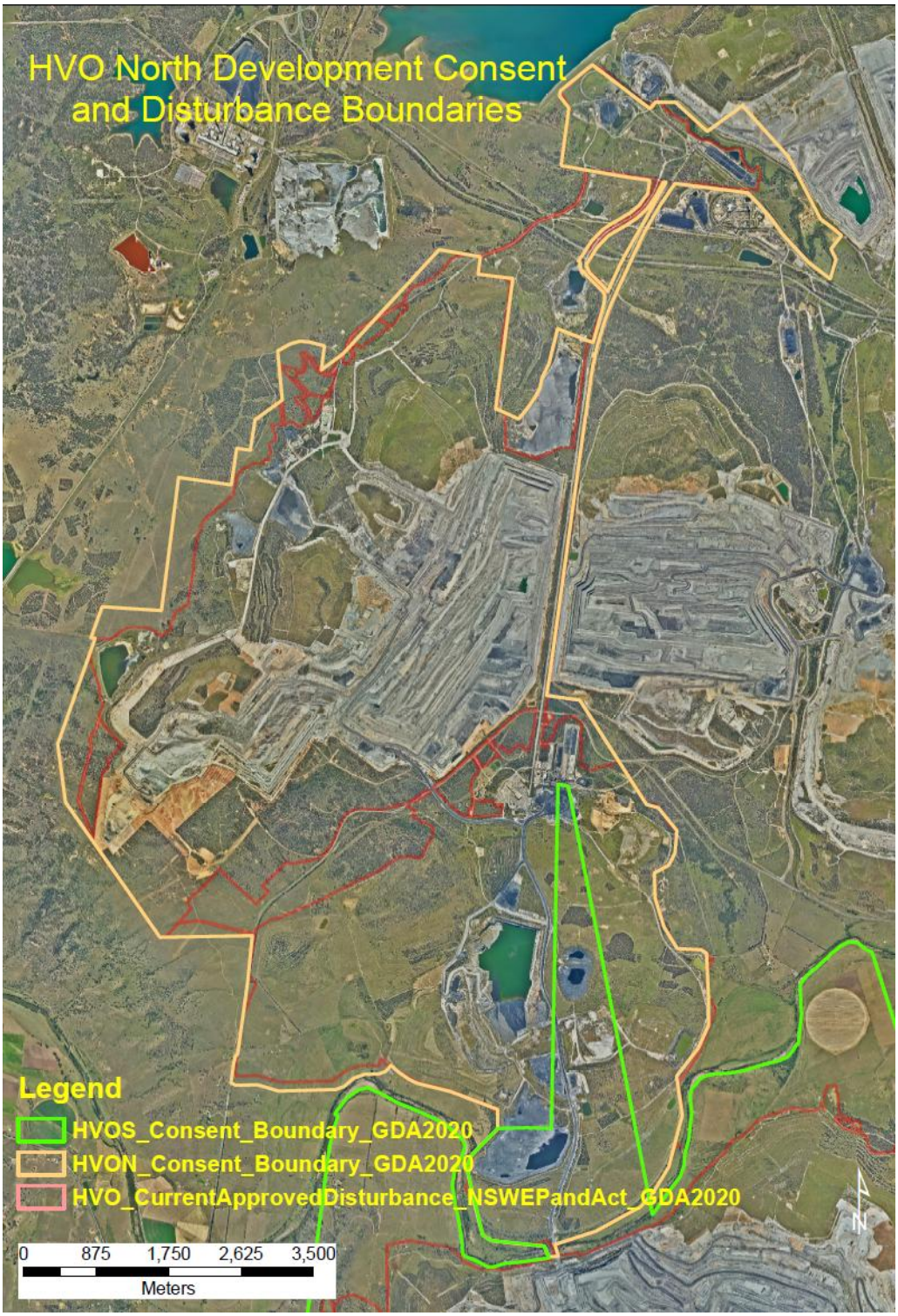


Figure 5 -HVO North development consent boundary and approved disturbance area.

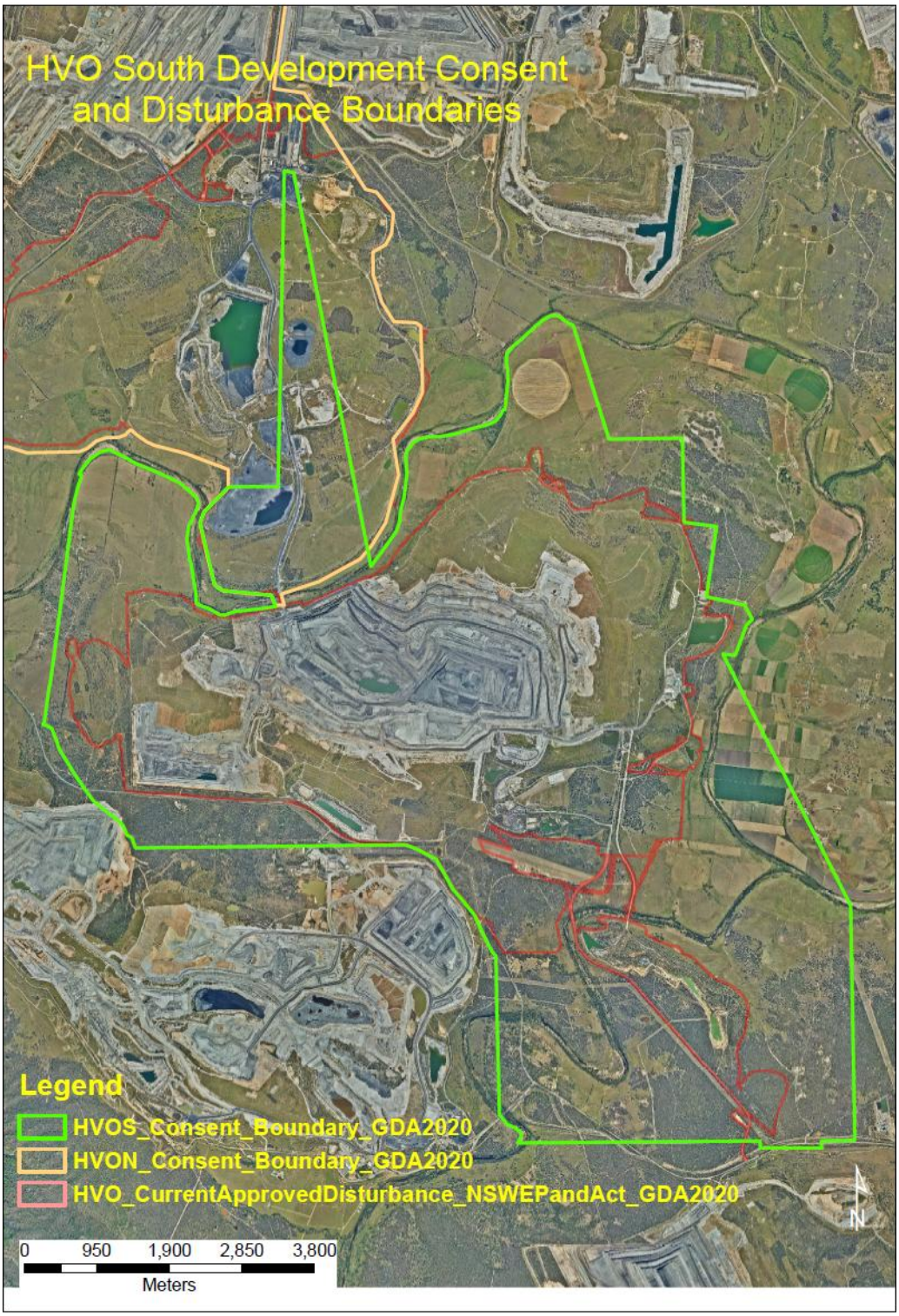


Figure 6 - HVO South development consent boundary and approved disturbance area.

2.1.1 | THREATENED ECOLOGICAL COMMUNITIES

Only one threatened ecological community (TEC) will be impacted by the HVO North and South projects. Central Hunter Valley Grey Box-Ironbark Woodland was confirmed within the HVO North and HVO South project boundaries. It is listed as the Central Hunter Valley eucalypt forest and woodland (CHVEF) Critically Endangered Ecological Community (CEEC) under the EPBC Act and the Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions Endangered Ecological Community (EEC) under the BC Act. The TEC was listed in February 2010 under the BC Act and in May 2015 under the EPBC Act due to its significant decline (>70%) resulting in a highly fragmented and restricted distribution (DoEE 2016).

The TEC is a eucalypt woodland/open forest that occurs in the Hunter River catchment in north-eastern NSW, predominantly found in the Central Hunter Valley around Muswellbrook, Singleton and Cessnock local government areas (DoEE 2016). This ecological community can be valuable as a source of winter-flowering eucalypts for transient threatened species such as Regent Honeyeater (*Lathamus discolour*).

Various classifications and thresholds need to be assessed for a vegetation community to meet the CEEC definition. These include, but are not limited to, the patch being at least 0.5ha in size, and at least 50% of perennial understorey vegetation cover being due to native plants. Diversity of native understorey species is also a consideration in whether a patch of vegetation meets the CEEC requirements.

Based on the vegetation surveys that have been completed for HVO it was confirmed that impacts would occur to 54.4ha of CHVEF in high condition (score of 7/10) and 6.6ha of CHVEF in poor condition (score of 3/10). Distribution of CHVEF in HVO North and HVO South project areas is shown in **Figure 7.**

A description of this Critically Endangered (CE) woodland community, the associated NSW PCT that occurs within HVO North and South boundaries, and its characteristics is provided below in **Table 2-2.**



Figure 7 - CHVEF areas.

Table 2-2 - TEC Community attributes

Attribute type	Attribute description
NSW Veg type IDs	PCT1603*
Common name	Central Hunter Valley Grey Box-Ironbark Woodland
Vegetation description	Canopy dominated by one or more of the following eucalypt species; narrow-leaved ironbark (*E. crebra*), spotted gum (*Corymbia citriodora*), slaty gum (*E. dawsonii*) and grey box (*E. moluccana*). A number of other tree species may be subdominant including; rough-barked apple (*Angophora floribunda*), Blakely's red gum (*E. blakelyi*), slaty red gum (*E. glaucina*) and forest red gum (*E. tereticornis*). A ground layer is present, although it may vary in development and composition. A sparse to thick layer of native grasses and/or other predominantly native groundcover (small shrubs and ferns, daisies, orchids)
Vegetation formation	Grassy Woodlands
Vegetation class	Coastal Valley Grassy Woodlands

* Assessed using Eastern New South Wales PCT Classification Version 1.0

2.2 | THREATENED FAUNA SPECIES

During the various environmental impact assessments that have been completed across HVO North and HVO South project areas to date, a number of threatened fauna species have been reported or their associated breeding and/or foraging habitats stated as occurring within HVO as summarised in **Table 2-3.**

Table 2-3 - Threatened fauna species known to occur

Species	BC Act Status	EPBC Act Status
Grey-crowned Babbler (*Pomatostomus temporalis*)	Vulnerable	-
Brown Treecreeper (*Climacteris picumnus victoriae*)	Vulnerable	-
Speckled Warbler (*Pyrrholaemus sagittatus*)	Vulnerable	-
Black Bittern (*Ixobrychus flavicollis*)	Vulnerable	-
Squirrel Glider (*Petaurus norfolcensis*)	Vulnerable	-
Eastern Freetail Bat (*Mormopterus norfolkensis)*	Vulnerable	-
Yellow-bellied Sheathtail Bat (*Saccolaimus flaviventris)*	Vulnerable	-
Eastern Bent-wing Bat (*Miniopterus schreibersii oceanensis*)	Vulnerable	-
Large-footed Bat (*Myotis macropus*)	Vulnerable	-
White-throated Needletail (*Hirundapus caudacutus*)	-	Vulnerable
Spotted-tail Quoll (*Dasyurus maculatus maculatus*)	Vulnerable	Endangered
Large-eared Pied Bat (*Chalinolobus dwyeri*)	Vulnerable	Vulnerable
Striped Legless Lizard (*Delma impar*)	Vulnerable	Vulnerable
Black-chinned Honeyeater (*Melithreptus gularis gularis*)	Vulnerable	-
Diamond Firetail (*Stagonopleura guttata*)	Vulnerable	-
Eastern Falsistrelle (*Falsistrellus tasmaniensis*)	Vulnerable	-
Glossy Black-cockatoo (*Calyptorhynchus lathami*)	Vulnerable	-
Greater Broad-nosed Bat (*Scoteanax rueppellii*)	Vulnerable	-
Green and Golden Bell Frog (*Litoria aurea*)	Endangered	-
Little Bentwing-bat (*Miniopterus australis*)	Vulnerable	-
Masked Owl (*Tyto novaehollandiae*)	Vulnerable	-
Painted Honeyeater (*Grantiella picta*)	Vulnerable	-
Pale-headed Snake (*Hoplocephalus bitorquatus*)	Vulnerable	-
Pink-tailed Worm Lizard (*Aprasia parapulchella*)	Vulnerable	Vulnerable
Regent Honeyeater (*Xanthomyza phrygia*)	Critically endangered	Endangered
Swift Parrot (*Lathamus discolor*)	Endangered	Endangered
Hunter Valley delma (*Delma vescolineata*)	Vulnerable	-
Brush-tailed phascogale (*Phascogale tapoatafa*)	Vulnerable	-
White-throated needletail (*Hirundapus caudacutus*)	Vulnerable	Vulnerable
Spotted-tailed quoll (*Dasyurus maculatus*)	Vulnerable	Endangered

Those threatened fauna species where a significant impact was found to occur as a result of the proposed mining activities, and approved extent of impact, are summarised in **Table 2-4.** Biodiversity offsets have been provided for these impacts and a summary of each species is provided in Sections 2.2.1 | to 2.2.3 | below.

Table 2-4 - Fauna species and approved impacts

Threatened Fauna Species	Status (BC Act/EPBC Act)	HVO Approved Impact Area (ha)
Regent Honeyeater (*Anthochaera phrygia*)	Critically Endangered/Critically Endangered	68.4 (breeding and foraging habitat)
Green and Golden Bell Frog (*Litoria aurea)*	Endangered/Vulnerable	2.6 (breeding) 102.7 (foraging)
Swift Parrot (*Lathamus discolour*)	Endangered/Critically Endangered	68.1 (foraging)

2.2.1 | REGENT HONEYEATER

The Regent Honeyeater is listed as CE under both the EPBC Act and BC Act.

Potential habitat for the Regent Honeyeater was identified in the West Pit and Carrington Pit extension areas of HVO North and Cheshunt Pit and Riverview Pit extension areas for HVO South.

The Regent Honeyeater is a medium sized bird with distinct yellow and black colouration and a curved bill. Adults are generally between 20-24 cm long with a wingspan of 30 cm. Regent Honeyeaters typically inhabit open Eucalypt forests and woodlands; particularly box-ironbark woodlands. Generally favouring wetter more fertile sites with reliable nectar products, key Eucalypt species include Yellow Box, Blakely's Red Gum, Grey Box, Narrow-leaved Ironbark, Spotted Gum and Rough-barked Apple. The Regent Honeyeaters current known range extends from north-eastern Victoria and south-eastern Queensland. Their distribution has dramatically declined within the last thirty years, having once been recorded between Adelaide and the central QLD coast. Regent Honeyeaters are nomadic species, travelling large distances even hundreds of kilometres in search of their main food source nectar. The flowering events of key Eucalypt species are an influential factor in the Regent Honeyeater's movement (DoEE 2018b) (OEH 2018d).

2.2.2 | SWIFT PARROT

The Swift Parrot is listed as Critically Endangered under the EPBC Act and Endangered under the BC Act.

Potential habitat for Swift Parrot was identified in the Carrington Pit and West Pit and Cheshunt Pit extension areas for HVO North and Riverview Pit extension area for HVO South.

Swift Parrots are one of only three migrating parrot species in the world. Males feature bright green and red colouration with a blue patch on their head, whereas females are slightly duller. The most distinguishable feature of the Swift Parrot is their long, thin pointed tail featuring scarlet red underneath (OEH 2018e).

Between September and January, Swift Parrots breed in colonies within blue gum forest in eastern Tasmania (PWST 2012).The Swift Parrot nests within dead and live eucalypt trees, mostly favouring the Tasmanian Blue Gum (*Eucalyptus globulus*), stringybark (*E.obliqua*) and white peppermint (*E.delegatensis*) (IUCN 2018). Following the breeding season during Autumn, the migratory birds make their way to mainland Australia where they spend their winter as semi-nomadic (PWST 2012). During this time the parrots disperse across a broad landscape, foraging on nectar and lerps amongst eucalypts mainly in Victoria and New South Wales. Small numbers of Swift Parrots are also recorded in the Australian Capital Territory, south eastern South Australia and southern Queensland (Saunders and Tzaros 2011). Their distribution across the landscape during winter greatly depends upon the climate and consequent food availability (IUCN 2018) Within the winter months the most favourable trees to feed from are flowering species such as Swamp Mahogany (*E. robusta*), Spotted Gum (*Corymbia maculata*) and Mugga Ironbark (*E. sideroxylon*), and those infested with lerps including Grey Box (*E. macrocarpa*) and Blackbutt (*E. pilularis*) (OEH 2018e).

Based on current knowledge of the ecology and distribution of the Swift Parrot, one of the most prevalent and persistent threats facing the Swift Parrot's population is habitat loss and alteration, particularly within breeding and drought refuge habitats (IUCN 2018). The main causes of habitat loss are from forestry activities including firewood harvesting, clearing for residential, agricultural and industrial developments, attrition of old growth trees in the agricultural landscape, suppression of forest regeneration, and frequent fire. Another significant threat towards the Swift Parrot is nest predation by Sugar Gliders, an introduced species to Tasmania (IUCN 2018). Previous surveys have revealed that almost 79% of Swift Parrot nests were predated on the mainland of Tasmania (IUCN 2018).

Swift Parrots also face a number of other threats including climate change causing changes in habitat phenology, reduced food availability due to drought conditions, competition for resources, Psittacine Beak and Feather Disease, predation from cats and the illegal capture and trading (OEH 2018e).

A national recovery plan for Swift Parrots was first created in 2001 and revised in 2011. The plan consists of conservation requirements of the species across its range and identifies actions to be taken to ensure its survival. The National Recovery Plan accounts for the direct benefits of Swift Parrot populations but also the benefit for the biodiversity within their dependent forest and woodlands. The primary action for the plan is to prevent further habitat destruction from land clearance in high quality breeding and nesting habitats (Saunders and Tzaros 2011).

2.2.3 | GREEN AND GOLDEN BELL FROG

The Green and Golden Bell Frog is listed as Endangered under the BC Act and Vulnerable under the EPBC Act.

Green and Golden Bell Frog habitat was identified in the West Pit extension area for HVO North.

The Green and Golden Bell Frog is relatively large, ranging from 45mm to 100mm (snout to vent), and has a distinct gold or creamish white stripe with a dark brown stripe below extending from the upper eyelid to the lower back (OEH 2018f). The colour of its body can vary but is often a vivid green with brown or golden splotches (OEH 2018f). The Green and Golden Bell frog mainly occurs within lowland areas of eastern NSW and Victoria; and are known on three offshore islands, Bowen Island, Koorangang Island and Broughton Island (DoEE 2018d). There have been approximately fifty records of the species in NSW since 1990 along the coast (OEH 2018f). Most populations of the rare frog consist of 20 adults, however there are large populations within NSW with approximately 100 adults at Captains Flat and over 1000 in Homebush (DoEE 2018d). Within Sydney there are eight key populations that include some of the largest but also most isolated populations (ELA 2016).

The Green and Golden Bell frog is often associated with marshes, dams, stream-sides, coastal swamps and other estuarine wetlands (OEH 2018f). The habitat of the Green and Golden Bell frog can often change depending on their life cycle as well as seasonal changes. They may occupy natural, artificial habitats and some within highly disturbed areas. Favourable water-bodies are those with a grassy area that are unshaded and free from predation (OEH 2018f). Breeding will generally occur between September to February favouring warm and wet conditions, and peak during January and February. The male frogs will call floating in the water whilst the female produces a raft of floating eggs, eventually these settle to the bottom.

The Green and Golden Bell frog is highly mobile and may travel large distances between breeding sites (ELA 2016). Like most other pond-breeding frogs, their population can fluctuate depending on weather conditions (DoEE 2018d). Generally, other similar species of frogs will recolonise following a local population extinction. The Green and Golden Bell frog, however, is unlikely to undertake similar processes due to the extent of habitat fragmentation (DoEE 2018d). The most common and major threats facing the Green and Golden Bell frog are habitat removal, habitat degradation and fragmentation, reduction in water quality, diseases, predation and the direct threat of human occurrence (DoEE 2018d). Habitat reduction is a result of development projects such as dam constructions, pasture conversion, sewage treatment plants, industrial and residential development, golf courses and landfill disposal.

2.3 | THREATENED FLORA SPECIES

HVO North studies confirmed either the presence of the threatened flora species listed in Table 2-5 or their habitat.

Table 2-5 - Threatened Flora Species

Species	BC Act Status	EPBC Act Status
Tiger Orchid (*Cymbidium canaliculatum*)	Endangered population in the Hunter Catchment	-
Diuris tricolor (*syn. D. sheaffiana*)	Vulnerable	-
Illawarra Greenhood Orchid (*Pterostylis gibbosa*)	Endangered	Endangered
Lobed Blue Grass (*Bothriochloa biloba*)	-	-
River Red Gum (*Eucalyptus camaldulensis*)	Endangered population in the Hunter Catchment	-

These species, or their habitat, were located in a proposed expansion area for HVO North (and HVO South in the case of River Red Gum) and their occurrences were isolated, in a highly fragmented landscape at the edge of the existing Carrington Pit, therefore their long-term viability was low. As avoidance was not possible, mitigation measures included translocation of the Tiger Orchid. Mitigation measures for impacts to River Red Gums is through implementation of the River Red Gum Strategy including restoration and management of River Red Gums and communities across HVO project areas. Details are provided in Section 4 |

3 | OPERATIONAL LANDS

This section of the BMP details the processes, mitigation measures and rehabilitation that will be implemented in operational areas to mitigate the site's impact upon biodiversity values. These actions are consistent with commitments detailed within the HVO Rehabilitation Management Plan (RMP) and, for areas specified under the EPBC approval (EPBC 2016-7640), HVO Vegetation Clearance Plan (HVO, 2023). The operational areas are those that are contained with an area approved for mining development that will be progressively cleared, mined and then rehabilitated (Figure 5 and Figure 6).

3.1 | GROUND DISTURBANCE PERMITS

A Ground Disturbance Permit (GDP) is required to be approved prior to undertaking any disturbance activities within previously undisturbed areas, or areas that have been rehabilitated.

The GDP process ensures that the potential impact to species, populations or communities on land managed by HVO has been assessed and is permitted. Any works proposed under the GDP system must be undertaken in accordance with the conditions of the GDP approval and any relevant Management Plans for the applicable area.

The GDP process includes assessment of the following potential impacts:

- cultural heritage – determine if there are any present from available sources;
- land ownership and tenement – ensure action is located on land owned and/or managed by HVO;
- environment- identify the presence of any listed ecological communities, flora or fauna both state and federal;
- regulatory approval – legal authority is in place;
- offsets – is the proposed area an offset or are there offsets required;
- rehabilitation – is area required for rehabilitation; and
- water – identify any potential water impacts, implement any necessary soil and erosion controls.

3.2 | MITIGATION AND MANAGEMENT MEASURES

The following is a summary of key management and mitigation measures to be implemented in the operational areas to ensure direct and indirect impacts to remaining biodiversity values are avoided and minimised.

3.2.1 | PROGRESSIVE CLEARING

All vegetation clearing is progressive, that is a staged operation in advance of mining operations. Only areas required to be disturbed for mining and coal production or related infrastructure are cleared. Vegetation clearing is forecast annually as part of the Forward Work Programme submitted to the NSW Resources Regulator. The area of clearing is assessed as part of submitted GDP's.

The area of vegetation cleared ahead of mining operations is kept to a minimum. The clearing area allows for the establishment of mine infrastructure, such as haul roads and access tracks, power lines, pipelines, transformers and drainage control structures.

3.2.2 | VEGETATION CLEARING PROCEDURES

3.2.2.1 | PRE-CLEARING SURVEYS

Pre-clearance surveys may be undertaken at HVO prior to native vegetation clearance in accordance with the HVO Rehabilitation and Disturbance Procedure and HVO Vegetation Clearance Plan.

Generally, a pre-clearance survey will be undertaken in areas that have not previously been assessed by a qualified ecologist, or where significant time has elapsed between surveys (5 years). For areas that have been assessed within 5 years, an Environmental Officer may conduct the survey at their discretion; otherwise, an ecologist is to be engaged to conduct the survey.

The purpose of pre-clearance surveys is to determine if any threatened fauna, nests, tree hollows or burrows occupied by fauna are present in the area to be cleared, and require management during clearing operations. Trees containing nests and/or tree hollows are referred to as habitat trees.

Habitat trees, burrows or bat roosts will be identified ahead of mining and will be clearly marked for further inspection prior to clearing. Pre-clearance surveys will be conducted within 24 hours before removal of habitat trees for the Regent Honeyeater.

In accordance with the HVO Vegetation Clearance Plan, if the Regent Honeyeater and/or Swift Parrot are recorded during pre-clearance surveys, a two-stage clearance protocol will be implemented.

Within the Green and Golden Bell Frog breeding habitat areas identified within the West Pit EPBC extension area, pre-clearance surveys are undertaken to detect whether any individuals may be located. Surveys will be undertaken in accordance with the HVO Vegetation Clearance Plan.

The HVO River Red Gum Rehabilitation and Restoration Strategy will be consulted prior to any works within areas identified as containing River Red Gums.

Prior to vegetation removal and soil stripping, a GDP must be obtained from the Environment & Community team by the relevant job coordinator or HVO person responsible for the project, in accordance with the GDP Procedure.

3.2.2.2 | VEGETATION REMOVAL

There may be additional requirements for areas of listed species, populations and communities and where fauna is identified prior to clearing. Pre-clearance protocols for CHVEF, the Regent Honeyeater, Swift Parrot and Green and Golden Bell Frog must be implemented prior to vegetation removal.

Trees are to be felled in accordance with Tree Felling work instruction (**Appendix E - Tree Felling Procedure**) under the direction of the Environment & Community team.

Where possible, timber clearing should be undertaken outside of the breeding periods of threatened fauna known to occur at the site (**Appendix E - Threatened Species Information**), however, the pre-clearance survey will determine whether any resident fauna occur within the designated area, and appropriate management activities and approvals implemented should resident fauna be identified.

Where practical, timber that can be repurposed will be identified by the Environmental Officer and salvaged by an approved contractor. Where appropriate, hollow bearing logs may be collected and used for habitat in rehabilitation and non-disturbed areas, as directed by the Environmental Officer.

Lighter timber is mulched and incorporated in the topsoil on removal.

The potential for Aboriginal artefacts to be located within an area are considered and addressed prior to disturbance and during the GDP process. However, should any Aboriginal artefacts be discovered during the clearing and soil removal operations, work is to cease and notifications carried out in accordance with HVO's Cultural Heritage Management Procedures.

3.2.2.3 | FAUNA REMOVAL

Fauna removal will not be undertaken unless strictly required. Most fauna will move on if works are undertaken in accordance with **Appendix C -Tree Felling** Procedure

Procedure, whereby fauna will be encouraged to move from habitat areas by degrading the habitat site. In the event of nesting threatened species that are actively breeding at the habitat location, these sites should be left until the breeding season has ended or the breeding site is no longer active.

Should bat roosts be identified during pre-clearing surveys, advice will be sought from a qualified person regarding relocation prior to any disturbance associated with the roost.

If the location of the breeding threatened species is an impediment to mining and viewed as a critical pathway, a biodiversity conservation licence for relocation works may be requested from the applicable Government Department. The application for the biodiversity conservation licence would be sought under Division 3 of the *Biodiversity Conservation Act 2016*.

3.2.2.4 | TRANSLOCATION OF SALVAGED RESOURCES

Resources salvaged from areas to be cleared for mining activity such as topsoil, timber mulch and plant material are of value for the re-establishment of vegetation communities. Reuse provides an opportunity to transfer ecological characteristics to the re-establishment site such as seed sources and microbial soil organisms and support natural regeneration. The use of these materials is dependent upon availability and opportunities for safe and practical collection and reuse.

Where the opportunity is not available for the direct placement of salvaged resources into land under rehabilitation, the resources are stockpiled, marked for identification, their location and details recorded, and the resources are reused as soon as possible.

The following outlines critical factors in the use and management of these resources:

- topsoil management (detailed in the RMP):
    - recovery of upper profile soils (topsoil) to support translocation of the majority of seed (approximately ten centimetres in depth);
    - direct placement of stripped topsoil to reuse areas occurs where possible;
    - long-term stockpiling of materials is to be avoided where possible and materials placed to stockpile are reused as soon as practicable;
    - where stockpiling cannot be avoided, ongoing management occurs until reuse (e.g. vegetation establishment, inspection, maintenance)
- mulch:
    - mulching of overstorey and understorey vegetation at the disturbance site to provide organic matter and a potential seed source at the re-establishment site;
- plant material:
    - seeds, plants or suitable habitat materials may be salvaged from the disturbance area for dispersal in re-establishment areas. This assists with the development of vegetation communities and ecological characteristics as determined by the approved end landuse; and
    - seeds, and seed mixes, are purchased from reputable suppliers to supplement seed stocks maintained in HVO's seed storage facility. The species' selected is dependant on the final landuse of the area being rehabilitated. Where available, consideration is given to the use of local or endemic provenances over those sourced from more distant sources unless genetic testing suggests otherwise.

3.2.3 | PATHOGEN MANAGEMENT

Control measures will be implemented in EPBC areas to reduce the risk of introducing and spreading fungal pathogens including Root Rot Fungus (*Phytophthora cinnamomi*) which can affect native vegetation and Amphibian Chytrid Fungus (*Batrachochytrium dendrobatoides*) which can affect populations of amphibians including the Green and Golden Bell frog.

Control measures to be implemented will include; any machinery involved in vegetation clearing within the EPBC areas identified by the EPBC 2016/7640 approval (West Pit and Riverview Pits) will be washed of soil and mud prior to leaving the EPBC areas.

Equipment used during the pre-clearance surveys, such as dip nets, will be cleaned and disinfected prior to use and at the end of each day, and frog-handling hygiene procedures as detailed in the *HVO Vegetation Clearance Plan* will be followed.

3.2.4 | WEED CONTROL

Across the operational areas the weed species targeted for control include those listed as Weeds of National Significance (WoNS), priority weeds under NSW *Biosecurity Act 2015* and/or environmental weeds.

Weed management occurs in rehabilitation areas as well as biodiversity areas across site, including the Carrington Billabong and River Red Gum populations.

Weed control treatments are conducted frequently as determined by observations or monitoring assessments that indicate control is warranted, or seasonal conditions being experienced that promote excessive weed growth. The weed management methods depend on the species being targeted but can include spraying, slashing and manual removal.

If spraying is required:

- the chemicals to be used on-site must be approved and the SDS obtained prior to spraying;
- records of area sprayed, the product used, dilution rates, weather conditions and other criteria as required under the *Pesticides Act 1999* must be kept.

The success of weed spraying is examined visually by the Environmental Officer as they make their way around site and assess and plan for future management activities. Although not documented, the works are examined to determine the effectiveness of the contractor and the likelihood of re-infestation requiring a follow up activity.

Areas where weed management has occurred are documented and reported in the Annual Review.

3.2.5 | PEST CONTROL

Sighting of feral animals are to be reported to the Environmental Officer. Coordination of pest control will be at the direction of the Environmental Officer and will include the following:

- Seasonal baiting programs across sites and offsets coordinated with LLS where possible;
- commercial kangaroo harvesting under NPWS tag system (year round based on tag availability);
- opportune shooting of key pest species (i.e. dog, pig, deer, hare etc) during commercial kangaroo harvests; and
- specific and targeted additional programs on a needs basis.

The pest animal management activities undertaken at HVO are reported in the HVO Annual Review.

3.2.6 | BUSHFIRE MANAGEMENT

Bushfire management is undertaken in accordance with the *HVO Bushfire Management Plan*. The Bushfire Management Plan is reviewed regularly in consultation with the NSW Rural Fire Services (RFS). It addresses both operational and non-operational lands under ownership and control of HVO. Bushfire management has objectives for both managing the safety of personnel and infrastructure, as well as biodiversity to ensure remnant patches and BAs are protected from hot, intense fires and can receive controlled burns when needed for regenerative purposes.

Fuel hazard reduction burns are planned and implemented in consultation with the RFS. Burns are implemented at appropriate times of the year either via cooler, cultural burns, or with the assistance of the local RFS.

Prior to implementation, a risk assessment is undertaken and burn plans are developed that considers the Bush Fire Environmental Assessment Code for New South Wales (NSW Rural Fire Service 2021) and the vegetation type that occurs onsite. The recommendations under the code for the main listed vegetation communities that occur at HVO are:

- Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions – no fire more than once every eight years;
- Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregions – no fire;
- Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions - no fire more than once every ten years; and
- Warkworth Sands Woodland in the Sydney Basin Bioregion - no fire more than once every ten years.

The following controls may be implemented to control the risk associated with bushfire:

- fuel reduction requirements will be assessed ahead of the bushfire season;
- controls, including mowing, slashing, ploughing, flailing and manual removal as required to reduce fuel loads and fire risk in peak seasons;
- grazing licences have been established to allow strategic grazing in rehabilitation areas and other on-site areas to reduce fuel loads;
- establishment and maintenance of fire breaks, including around critical infrastructure; and
- water carts to be available in the event of fires.

3.2.7 | EROSION AND SEDIMENT CONTROL

Erosion and sediment controls are a consideration in the GDP process ahead of any disturbance activities. Prior to disturbance, appropriate erosion and sediment controls consistent with current best practice standards will be established. Where ground conditions allow, erosion and sediment controls will be designed generally in accordance with the 'Blue Book': Managing Urban Stormwater: soils and construction (Volume 1 and 2E – Mines and Quarries) (Department of Environment and Climate Change 2008).

3.3 | REHABILITATION

The pre-mining (pre-1960) environment at HVO was heavily cleared (approximately 90% of Project Application area). The cumulative effects of agriculture, along with more recent mining activities, have resulted in a significant reduction of native vegetation and the removal of habitat for native fauna.

The progressive rehabilitation at HVO aims to deliver a final landform that achieves outcomes for sustainable agriculture, conservation and biodiversity by integrating the rehabilitation of mined areas into the surrounding landscape, in consultation with the community. The long-term vision is to create a network of vegetation corridors connecting mine rehabilitation areas and existing remnant vegetation with vegetation outside the mine boundary. Final rehabilitation areas at HVO are shown in **Figure 8**. This will deliver conservation and biodiversity outcomes by assisting with habitat connectivity.

Rehabilitation at HVO is being undertaken in accordance with strategies outlined in the HVO RMP to achieve the commitments made in the environmental impacts statement and environmental assessment for HVO.

Where the final rehabilitation differs between the IBMP and the RMP, the RMP is to be taken as the correct document until the IBMP can be altered to reflect the approved RMP.

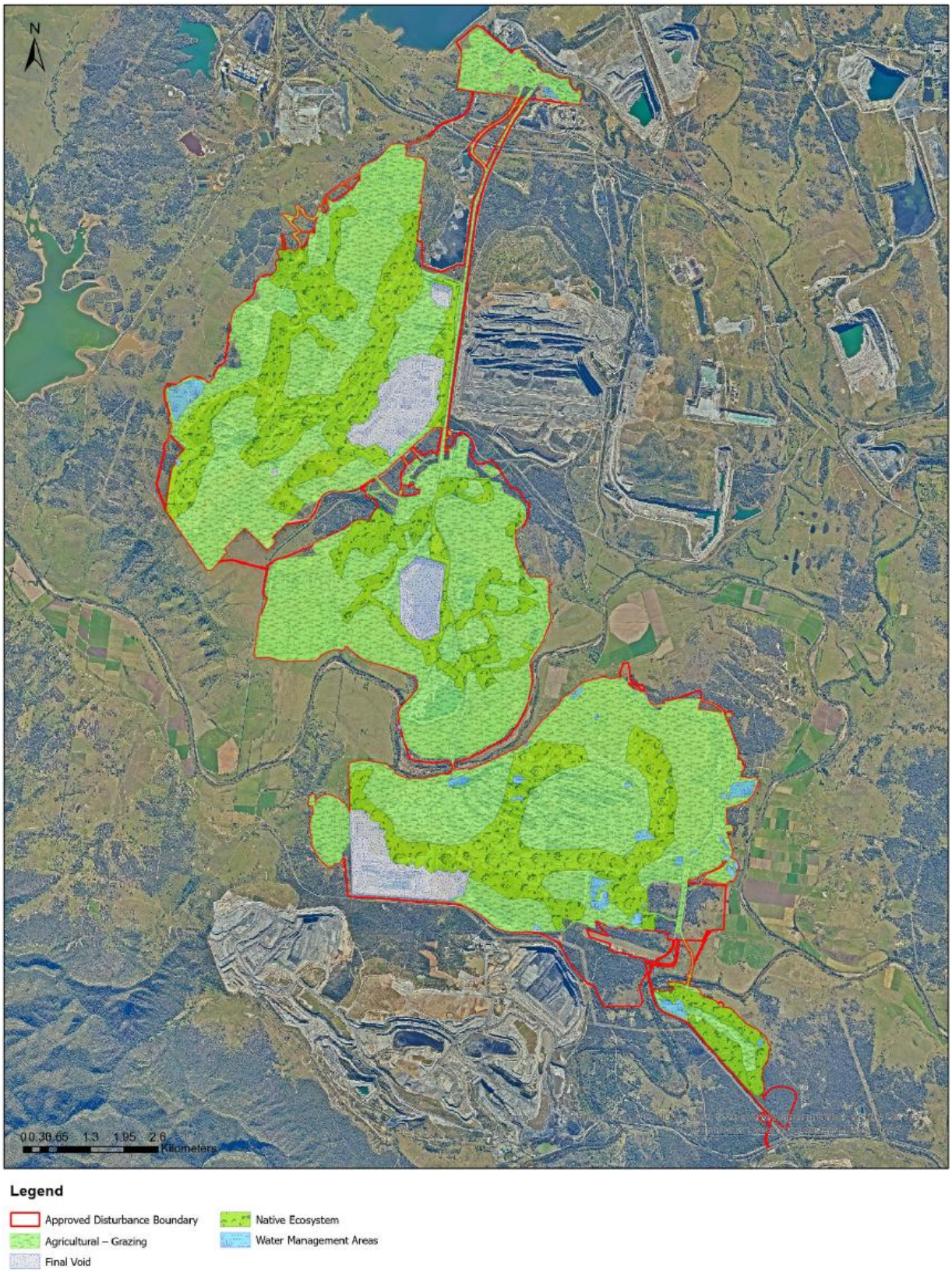


Figure 8 - HVO final landuse domains.

4 | NON-OPERATIONAL LAND

There are a range of native vegetation and fauna habitats in non-operational areas within the HVO North and South project approval boundaries. These areas are owned and controlled by HVO and, based on historical aerial photographs, the majority are areas that have been allowed to regenerate to their current condition and act as a buffer to mining operations.

The non-operational land has a number of land uses including agriculture, grazing, patches of native vegetation and individual trees through to BAs (which are a more formal conservation area with statutory requirements for conservation and management as discussed in **Section 5 |**).

Vegetated areas can act as a visual screen to the operation from public areas depending on the surrounding topography. Where appropriate, HVO will maintain the existing native vegetation within non-operational areas, and expand the vegetation extent for specific communities where required under the various management plans. Should clearing be necessary for the operation, the internal GDP process (as described in **Section 3.1 |**) will be applied to ensure the biodiversity values of vegetation are assessed and all applicable approvals and mitigation measures are in place.

As discussed, progressive rehabilitation on disturbed areas is undertaken as quickly as possible to reduce the visual contrast of the operation from adjacent areas.

This section outlines the various biodiversity values and management activities that will be implemented across the non-operational lands to ensure operations do not indirectly impact on these areas.

4.1 | BIODIVERSITY FEATURES

Below is a summary of the key biodiversity features that occur in the non-operational lands at HVO.

4.1.1 | RIVER RED GUM FORESTS & CARRINGTON BILLABONG

River Red Gums (*Eucalyptus camaldulensis*) are widespread riparian and floodplain trees that have become increasingly rare in the Hunter Valley, to the extent the entire population of the trees occurring in Hunter Valley are now listed as an endangered population under the NSW BC Act. Naturally occurring River Red Gums are thought to be largely dependent on groundwater for the majority of their water requirements, occurring mostly in shallow alluvial groundwater systems in Hunter Valley (Umwelt 2010).

The River Red Gum Forest is associated with the TEC Hunter Lowland Red Gum Forest in the Sydney Basin and New South Wales North Coast Bioregions, protected under the BC Act.

The River Red Gum Rehabilitation and Restoration Strategy (RRGRRS) was originally prepared by Umwelt in 2010 to meet HVO's development consent approval requirements and outline the management of River Red Gum communities across HVO. The strategy addressed the management of the Carrington Billabong as well as the River Red Gums at HVO occurring along the Hunter River and Wollombi Brook. The influence of HVO's mining and management activities on these populations are examined through comparative monitoring at a reference site located elsewhere in the Hunter Valley.

The location of Carrington Billabong, River Red Gums and Hunter Lowlands Redgum Forest are shown in **Figure 2.**

The RRGRRS has since been updated in 2020 with the primary trigger being the end of the 10 year monitoring programme. The Strategy has been revised to contemporise the format, extended the monitoring format for another 10 year term, and include a summary of the monitoring results of the initial 10 year monitoring period.

Many variables operate at catchment or regional scales outside the influence of HVO, such as river flows and pest outbreaks. Other factors that operate at continental or even global scales, such as climatic influences (including floods or droughts brought about by La Niña and El Niño events), could significantly influence the long-term viability of the river red gum stands. To this end, the completion and performance criteria are designed to provide an appropriate benchmark against which to assess the management of the Carrington Billabong river red gums and HVO South priority sites and the resulting improvements.

The goals and objectives that were presented in the 2010 Strategy have been adopted for the updated 2020 Strategy. The management actions will continue to aid the establishment of the appropriate conditions to promote the health of the river red gum populations.

The three tier management approach that was adopted in the 2010 Strategy will continue to be utilised in the revised 2020 Strategy to dedicate resources for restoration and management of River Red Gum remnants based on level of impact and probability of success. The classifications are:

- High level intervention: Carrington Billabong has been identified as a high level site;
- Intermediate level intervention: these comprise 11 other remnants where vegetation is in relatively better condition, such as those with more native recruitment, connectivity and floristic and structural diversity. Moderate level management of these sites will be undertaken; and
- Low level intervention: these comprise remaining remnants in poor condition where restoration would require significant amounts of time and resources. These sites will be managed largely in the same way that other areas of non-operational land will be managed. Management will include regular weed control, pest control, grazing management and monitoring. If monitoring suggests intervention is appropriate, HVO will reassess the Strategy and consider redirecting resources to improve their recovery.

No intermediate or low level intervention River Red Gum remnants will be impacted by mining-related activities outside of those approved by the DPHI. These stands will be protected for their conservation value. Carrington Billabong may experience some minor impacts from operations which is why it has been given a higher intensity of management effort.

Detailed performance objectives and management commitments in the short, medium and long terms for River Red Gum remnants is provided in the RRGRRS.

4.1.2 | GROUNDWATER DEPENDENT ECOSYSTEMS

Known groundwater dependent ecosystems (GDEs) and ecosystems that potentially use groundwater are identified by the National Atlas of Groundwater Dependent Ecosystems. Riverine vegetation along the Hunter River has been classified as having a high potential for groundwater interaction, while known GDEs have been identified along Wollombi Brook.

Site-specific assessments of potential GDEs nearby HVO operations and the surrounding area have been conducted as part of environmental assessments for the complex. The following potential GDEs have been identified:

- Subterranean fauna within aquifer ecosystems (e.g. stygofauna) of the Hunter River, Wollombi Brook and associated tributary aquifers, which are known to occur throughout the Hunter River;
- River Red Gum populations at Carrington Billabong, and along the Hunter River and Wollombi Brook;
- River Oak Grassy Riparian Woodland of the Hunter River riparian zone; and
- Warkworth Sands Woodland community, present in South Lemington Pits area, considered to intermittently rely on a perched watertable.

River Red Gums are thought to be largely dependent on groundwater for the majority of their water requirements, occurring mostly in shallow alluvial groundwater systems in Hunter Valley (Umwelt 2010). The species relies on flooding regimes for recruitment (ERM 2008). Their habitats, therefore, are considered to be GDEs (Umwelt 2010).

Cumberland Ecology (2014) also identified the Hunter Valley River Oak Forest as a GDE, which is present in a thin riparian zone along Wollombi Brook and likely accesses shallow alluvial groundwater. Previous ecology surveys (ERM 2008) identified GDEs along the Hunter River and Wollombi Brook. Presence of GDEs in proximity to the HVO mines are illustrated in **Figure 9 and Figure 10.**

The Groundwater Assessment Report (ERM 2008b) concluded that primary drawdown impacts from mining in the Riverview and Cheshunt Pits were likely to be localised to the pit areas and that impacts to shallow groundwater in alluvium would be minimal. Drawdown in the vicinity of the River Red Gums (potentially reliant on groundwater) was predicted to be 1m. This was not predicted to adversely impact River Red Gums as they are reliant on flooding for germination, and no changes to the flooding or flow regimes were expected to occur.

4.1.3 | WARKWORTH SANDS WOODLAND

Areas of Warkworth Sands Woodland (WSW) growing on Aeolian sands which overlie areas of the Permian coal measures are found within HVO South non-operational area. They occur within the dedicated Northern BA and small patches in adjacent areas. Other large patches also occur to the south including within the Southern BA. Both of these areas have been established as biodiversity offsets for the Mount Thorley Warkworth Mine and are protected from mining by HVO. The known distribution of WSW at HVO is shown in **Figure 10.**

Vertical flow of groundwater is impeded by a layer of clay at the base of the sands forming a thin ephemeral perched water table, which is recharged from rainfall through the sandy soils. WSW would access this perched water table during low rainfall periods. The perched aquifer is reliant on rainfall and not the groundwater within the Permian fractured rock.

WSW was listed as Critically Endangered under the EPBC Act on 5 May 2016 and is listed as an Endangered Ecological Community (EEC) under BC Act. WSW is a unique vegetation community due to the presence of sand substrate and its confined distribution across Aeolian sand deposits in the vicinity of Warkworth, south-east of Singleton in mid Hunter Valley, NSW (Rio Tinto 2017).



Figure 9 - Identified vegetation communities within HVO North.

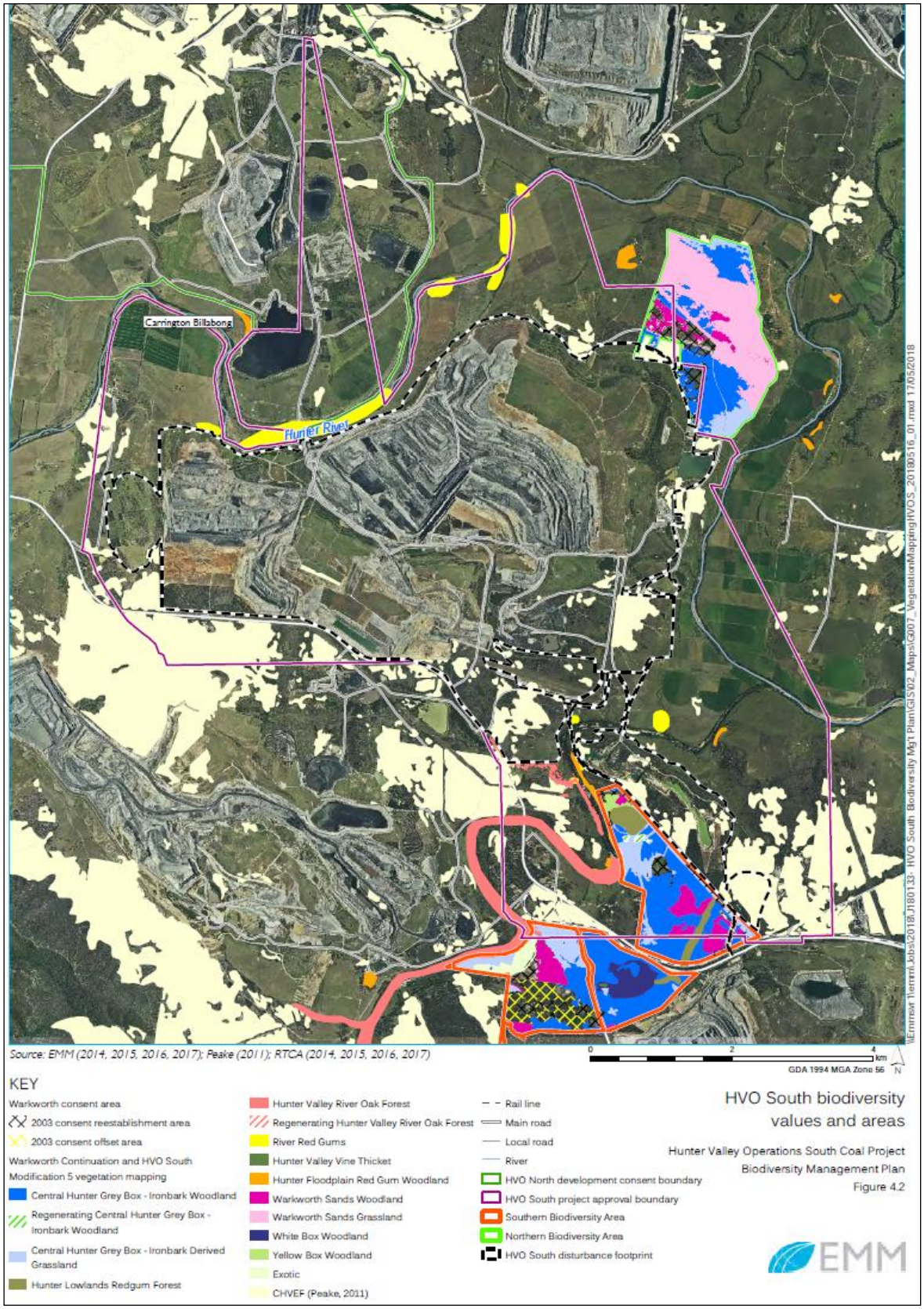


Figure 10 - Identified vegetation communities within HVO South.

4.2 | MITIGATION AND MANAGEMENT MEASURES

The following is a summary of key mitigation and management measures to be implemented in the non-operational areas to ensure direct and indirect impacts to biodiversity values are avoided and minimised. This section does not apply to the MTW Northern and Southern Biodiversity Areas, which are managed by MTW under the applicable approved management plan.

4.2.1 | ACCESS MANAGEMENT

Access to HVO non-operational areas and remnant vegetation within the approved project boundaries is restricted access, and visitation is monitored through a site induction process. Clear signage is in place to identify the location of BAs and entry is not allowed without prior permission. Signage has also been installed on HVO's external land boundaries and gates to assist with location identification and prevent inadvertent access between land ownership areas.

All requests for visitation to BAs must come through HVO environmental personnel. This is to ensure safety protocols are followed and all actions are consistent with the conservation strategies outlined within the various BA management plans.

4.2.2 | WEED AND VERTEBRATE PEST CONTROL

Weed management occurs in BAs (as per approved management plans) and other targeted areas, including the Carrington Billabong, River Red Gum populations and within riparian areas along the Hunter River and Wollemi Brook. As with weed management in operational areas outlined in **Section 3.2.4 |,** within non-operational areas, weed management is undertaken should monitoring assessments indicate that control is warranted, or seasonal conditions are such that excessive weed growth is likely. Primary species targeted for control are those weed species listed as Weeds of National Significance (WoNS), priority weeds under NSW *Biosecurity Act 2015* and/or environmental weeds.

The weed management methods depend on the species being targeted but can include spraying, slashing, mulching and manual removal.

The management activities undertaken at HVO are reported in the HVO Annual Environmental Report.

HVO also undertakes vertebrate pest management in accordance with HVO's ongoing pest control management works across non-operational areas as discussed in **Section 3.2.5 |**. Within BAs, vertebrate pest management will occur in accordance with specific requirements set out in applicable management plans for that area.

4.2.3 | BUSHFIRE MANAGEMENT

Remnant vegetation areas within HVO are managed in accordance with the HVO Bushfire Management Plan which is outlined in **Section 3.2.6 |**. As grazing is restricted within the BAs (and prohibited in the Crescent Head BAs), fuel loads are managed by physical methods or ecological burns in strategic areas, as outlined in the relevant BA Management Plan.

4.2.4 | GRAZING AND AGRICULTURE

Grazing in rehabilitation and non-operational areas that contain grasslands will be controlled through formal licence agreements with the graziers involved. All grazed areas are appropriately fenced to prevent cattle from entering rehabilitation or high biodiversity value areas. The typical arrangements under HVO include:

- licence conditions requiring the Licensee to manage the property in accordance with approved management plans or best agricultural and environmental practice i.e. grazing management, bushfire management, weed management and avoidance of vegetation clearing;
- property inspections by the HVO environmental personnel to audit quality of property management.

4.2.5 | SALINITY

Dryland salinity occurs where salt in the landscape is mobilised and redistributed closer to the soil surface or into waterways. This typically occurs along creek lines and in bare paddocks where vegetation clearing or over grazing exposes bare soils. There is potential for dryland salinity to occur on some non-operational land owned by HVO, including leased grazing areas.

Visual assessments of land can provide an indication of the presence of salinity. Salinity within the non-operational lands will become apparent during the regular property inspections by HVO environmental personnel. Should it be detected, the appropriate salinity remediation measures will be undertaken as required. Management options for salinity control include excluding grazing and active re-establishment of trees and shrubs where salinity impacts are identified.

5 | BIODIVERSITY OFFSET AREAS

5.1 | OVERVIEW

5.1.1 | STATE BIODIVERSITY AREAS

Under Schedule 3 Conditions 29, 29A and 29B of PA 06_0261, HVO must:

- implement the Biodiversity Offset Strategy as described in the Warkworth EIS, which includes establishing the 140ha Goulburn River Biodiversity Area
- identify a mechanism for the long-term security of the Goulburn River Biodiversity Area; and
- not undertake any activities other than conservation activities in the Southern and Northern Biodiversity Areas (which have been established to offset impacts by Warkworth Mine).

Investigations into security mechanisms for the Goulburn River offset have concluded that the best mechanism to secure the offset is to include the property with the adjacent land held by Mount Thorley Warkworth. This is discussed further in **Section 5.2.2 |.**

5.1.2 | COMMONWEALTH BIODIVERSITY AREAS

Under the HVO EPBC Act approval, EPBC 2016/7640, residual impacts to MNES are to be compensated for by the provision of biodiversity offsets. HVO has offset sites that meet the project's offset requirements for CHVEF, and the threatened fauna species Swift Parrot, Regent Honeyeater and Green and Golden Bell Frog.

The biodiversity areas of Condon View, Crescent Head, Hook, Mitchelhill and Wandewoi address HVO's offset requirements. Conservation Agreements under s305 of the EPBC Act for each of the offset areas were finalised on 27 January 2026. More detailed information on the background of these BAs, and what each BA addresses, are discussed in **Section 5.2 |**and presented in the management plans for each site.

5.1.3 | BIODIVERSITY AREA MANAGEMENT

A Biodiversity Areas Management Plan for each EPBC offset has been prepared and submitted to the Commonwealth for their approval. The Plans include comprehensive information for each offset including:

- conservation objectives, key performance indicators and completion criteria;
- management actions including weed control, grazing management, fire management, infrastructure improvement, revegetation, feral animal control etc;
- for each management area performance criteria for short and medium term and triggers for corrective actions, actions and response;
- monitoring programme including monitoring sites, data collection methods, analysis and interpretation to measure the key performance indicators and completion criteria and identify if corrective actions are required. Monitoring will also guide adaptive management and identify where improvements or efficiencies could be made; and
- risk assessment to identify risks in implementing the offset management plan and attainment of objectives.

HVO is responsible for ensuring the offset management plan is being implemented including management actions, monitoring activities and submission of annual reports. The EPBC Annual Compliance Reports that are submitted to the Commonwealth include a summary of management actions completed and any notable management outcomes, analysis of monitoring data collected in the reporting period, assessment of any new risks or threats to the area and actions to be undertaken to manage those risks. These Compliance Reports are publicly available on the HVO website.

Details of each offset site, including the biodiversity values they are offsetting and how much, is provided in the applicable BA management plan. The location of each offset site in proximity to HVO is shown in **Figure 3.**

5.2 | BIODIVERSITY AREAS

This section discusses each of the offset areas relevant to HVO approvals. For the purposes of this plan, a short description of the BAs and how HVO will ensure they are not impacted by mining operations is described. Further details on each BA can be found in the relevant BA Management Plan.

5.2.1 | NORTHERN AND SOUTHERN BIODIVERSITY AREAS

The Northern and Southern BA's are situated on, or adjacent to land owned by HVO (**Figure 10**), but are statutory requirements for Warkworth Mine.

The Northern BA is located in the north-eastern portion of the HVO South project approval boundary. The BA is situated on the western side of a loop on the Hunter River, near the confluence with Glennies Creek and accessed via Comleroi Road. The land subject to the Northern BA is not owned by HVO but is adjacent to HVO activities.

The Southern BA is accessible from Putty Road, Wallaby Scrub Road and the private Lemington Haul Road. The land surrounding the Southern BA is owned by different parties; some of which is owned by HVO.

The management and monitoring of both BA's is detailed in Mount Thorley Warkworth's (MTW) Northern Biodiversity Area Management Plan and the Southern Biodiversity Area Management Plan. These areas are not permitted to be developed and a number of activities are prohibited as outlined in the management plan for each site. Development and use of water management infrastructure is permitted within the Southern BA as described in the Modification Report for HVO South Modification 7.

The avoidance and mitigation measures to protect the Northern and Southern BA's from mining activities and other threats include those undertaken by MTW as the manager of the site, and HVO as an adjacent land owner include:

- the areas will be legally secured by MTW on title in perpetuity to ensure it cannot be developed or cleared in the future;
- the areas will be managed and monitored by MTW in accordance with the approved management plan;
- the areas will be fenced by MTW to ensure livestock cannot access the area, and there are locked gates to allow access to be managed by MTW;
- the areas will be appropriately signed by MTW so that all parties recognise it is a conservation area; and
- HVO-owned or managed land adjacent to the BA's will be managed to minimise threats to the BA's including weed control, grazing management and bushfire management where required.

5.2.2 | GOULBURN RIVER BIODIVERSITY AREA

The Goulburn River biodiversity offset is located 30 kilometres (km) west of Merriwa and approximately 100km northwest of HVO (**Figure 3**). The HVO portion comprises 140ha and is immediately adjoining private farmland and a 1066 ha biodiversity area owned and managed by MTW.

Goulburn River biodiversity offset is situated strategically within a number of important conservation areas and these are:

- Goulburn River National Park directly adjacent to the south and west;
- Munmurra Nature Reserve approximately 1.6 km to the west; and
- Durridgere State Conservation Area approximately 12 km to the north-west.

The protection and enhancement of the offset will help facilitate the movement of fauna across the landscape and extend broad areas of suitable habitats for threatened fauna species.

Due to the recognised synergies, HVO's Goulburn River Biodiversity Area is managed by MTW in conjunction with their BA. Management is outlined in the Yancoal Goulburn River Management Plan. The Plan outlines the management priorities, completion criteria, monitoring methods and conservation management actions that apply across both HVO's and MTW's offsets.

5.2.3 | CONDON VIEW BA

Condon View BA is located approximately 4 km west of Putty (**Figure 3).** The Condon View BA has been approved as an offset for impacts on the Regent Honeyeater.

Further details are provided in the HVO BOS and HVO Condon View BA Management Plan.

5.2.4 | CRESCENT HEAD BA

The Crescent Head BA comprises two separate properties: North and South.

Crescent Head (north) is an HVO-owned property, approximately 16 km east of Kempsey (**Figure 3**). The property contains habitat for the Green and Golden Bell Frog. It is proposed that Crescent Head (north) is used to provide a portion of the residual Green and Golden Bell Frog offsets for the action with the remainder met by Crescent Head (south).

Crescent Head (south) is a HVO-owned property, approximately 18 km north of Port Macquarie (**Figure 3)**. The property contains habitat for the Green and Golden Bell Frog. It is proposed that Crescent Head (south) is used to provide a portion of the residual Green and Golden Bell Frog offsets for the proposed action.

Further details on these two properties are provided in the HVO BOS and HVO Crescent Head BA Management Plan.

5.2.5 | MITCHELHILL BA

The Mitchelhill BA comprises two separate properties: East and West, which are separated by approximately 3.5km.

Mitchelhill West BA is an HVO-owned property in Muscle Creek, approximately 6 km south- east of Muswellbrook (**Figure 3**). The property contains CHVEFW and habitat for the Regent Honeyeater. It is proposed that Mitchelhill BA is used to provide the residual offset for CHVEFW and a portion of the residual offset for the Regent Honeyeater. A section is also used as compliance for the HVO Enforceable Undertaking and provides an offset and rehabilitation area for the CHVEF, Regent Honeyeater and Swift Parrot.

The Mitchelhill East BA addresses the HVO Enforceable Undertaking and provides an offset and rehabilitation area for the CHVEF, Regent Honeyeater and Swift Parrot.

Further details are provided in the HVO BOS and HVO Mitchelhill BA Management Plan.

5.2.6 | WANDEWOI BA

Wandewoi is a HVO-owned property, approximately 2 km northeast of Jerrys Plains and is located within 2 km of HVO (**Figure 3**). The property contains potential foraging habitat for the Swift Parrot and substantial areas of CHVEFW.

Further details are provided in the HVO BOS and HVO Wandewoi BA Management Plan.

5.2.7 | HOOK BA

The Hook property is located on Pothana Lane, Belford NSW and is 156 ha in size. As HVO-owned land, the property is located approximately 20 km to the east of HVO's mine and associated impact areas (**Figure 3**). The BA contains foraging habitat for the Swift Parrot and substantial areas of CHVEFW.

Further details are provided in the HVO BOS and HVO Hook BA Management Plan.

5.3 | BIODIVERSITY AREA MONITORING

HVO are required to implement various monitoring programs that relate to the conservation and restoration of biodiversity values and areas as per State and Commonwealth approval requirements. The specific monitoring requirements are outlined in each specific management plan which includes monitoring actions to be undertaken, schedule as to when the monitoring will occur, performance outcomes to be achieved against which monitoring results will be evaluated, and triggers for remedial action to ensure progression towards the completion criteria.

A summary of the main biodiversity values and areas that HVO undertake monitoring include:

- Biodiversity Areas, including:
  - Wandewoi BA;
  - Crescent Head BA;
  - Mitchelhill BA;
  - Condon View BA;
  - Hook BA; and
  - Goulburn River BA;
- River Red Gum communities;
- groundwater monitoring including GDEs and riparian vegetation;
- land management including weed control, feral animal management and bushfire management; and
- revegetation areas.

5.3.1 | BIODIVERSITY AREA MONITORING PROGRAMS

The HVO BAs relate to either the State approval (Goulburn River BA) or the Commonwealth approval (Condon View, Crescent Head, Hook, Mitchelhill and Wandewoi BAs). Each approval requires the development of specific strategy and planning documents that outline the actions implemented and monitoring undertaken.

The HVO South Project Approval (PA 06_0261) Sch3 cond 29 requires a biodiversity offset strategy to be implemented which refers to the MTW Goulburn River Biodiversity Area management plan.

The HVO EPBC 2016/7640 requires the monitoring commitments and schedules to be outlined within the management plans for each BA.

Further details regarding the Goulburn River BA is discussed below.

5.3.1.1 GOULBURN RIVER

HVO undertakes ecological condition and bird assemblage monitoring within the Goulburn River BA. The frequency of monitoring activities will vary according to the monitoring schedule outlined in **Table 5-1** and is intended to continue across future years under the indicated frequency unless a variation to the schedule is approved.

Note that the management plan is being reviewed by MTW during 2026. Once approved, the monitoring schedule below will be updated.

Table 5-1 - Goulburn River monitoring schedule.

	2020	2021	2022	2023	2024	2025	2026
Landscape							
Aerial photo interpretation							X
Ecological							
Habitat Restoration	Sept-Nov		Sept-Nov		Sept-Nov		
Bird Assemblage	July-Aug		July-Aug		July-Aug		
Management							
Rapid Condition Assessment	Sept-Nov	Sept-Nov	Sept-Nov	Sept-Nov	Sept-Nov	Sept-Nov	Sept-Nov
Property Inspection	Apr/Nov	Apr/Nov	Apr/Nov	Apr/Nov	Apr/Nov	Apr/Nov	Apr/Nov

Landscape Monitoring

Aerial photographic imagery baseline photography captured 2013 will be updated in 2026. This imagery will be analysed and the findings ground-truthed to assess the extent of canopy regeneration within the BA.

The analysis of tree canopy cover will be used to map changes in the distribution and condition of woodland habitats and the connectivity of vegetation remnants. An increase in the extent and condition of woodland habitats will be indicative of successful management of the offset areas towards the Key Performance Indicators.

Ecological Monitoring

Habitat restoration and bird assemblage monitoring aims to assess changes in the condition and extent of the woodland habitats within the BAs and the ongoing usage of these habitats by woodland birds.

The objectives of the habitat restoration monitoring are to demonstrate:

- a change in degraded habitats towards benchmark values; and
- recruitment of canopy species through transition up age classes.

Four habitat restoration plots have been established within the HVO Goulburn River BA to assess changes in habitat values within the BAs through time and relative to the benchmark values presented in the BioMetrics Vegetation Types Database (NSW DEH 2013). These benchmark values relate to species richness and percent cover of native plants in the various vegetation layers as well as counts of tree hollows and the length of fallen timber. Additional habitat features will also be included in this monitoring programme to track canopy regeneration and health.

Bird Assemblage Monitoring

The objectives of the bird assemblage monitoring are to:

- demonstrate ongoing habitat usage by woodland birds and a decrease in the relative abundance of bird species typical of forest margins and grasslands; and
- assess the presence of Swift Parrot and Regent Honeyeater within the offset areas and collect information regarding their movements and habitat usage.

Specific detail regarding monitoring techniques for these monitoring events is outlined in the Goulburn River Biodiversity Areas Management Plan.

5.3.2 | PERFORMANCE AND COMPLETION CRITERIA FOR THE BIODIVERSITY OFFSET STRATEGY

The performance and completion criteria for the biodiversity offset strategy, which relates to the Goulburn River BA, is outlined in **Table 5.2**. The objectives will be deemed to be attained when the Completion Criteria defined in **Table 5.2** have been met to the satisfaction of the DPHI.

5.3.3 | MONITORING PERFORMANCE OF THE BIODIVERSITY OFFSET STRATEGY

The findings of the annual monitoring activities, which includes a comparison of the condition status to previous monitoring events, are presented in the HVO Annual Review that is available on the HVO website.

5.3.4 | RISKS TO DELIVERY OF THE BIODIVERSITY OFFSET STRATEGY

A summary of the identified risks to successful implementation of the BOS and appropriate corrective actions to be implemented to reduce the likelihood of risks occurring are outlined in **Table 5-3**.

Table 5-2 - Performance and Completion Criteria for the Biodiversity Offset Strategy (Goulburn River)

Conservation Values	Key Performance Indicators	Completion Criteria
Woodland	Extent and condition of 1,169ha over 10 years.	Observed and measured increase and / or maintained Rapid Condition Assessment scores over 10 years (measured annually) in MZ2, MZ3, MZ4, MZ5 and MZ7.
Habitat	Improved habitat condition over 10 years.	Observed trajectory towards and/ or attainment of benchmark values at MZ2, MZ3, MZ6 and MZ7 (Table 10) over 10 years (measured biennially).
	Bird usage over 10 years.	Observed increased or maintained species richness and usage by woodland birds over 10 years (measured biennially)

Note: HVO area comprises MZ4 only so improved habitat condition does not apply.

Table 5-3 - Risks to delivering Goulburn River Offset Strategy

Objective	Scenario	Likelihood	Consequence	Risk Level	Trigger	Corrective Action
To protect the conservation values of the offset area within 10 years at the BA	Delay in securing the offset area under a legally binding mechanism	Likely	Minor	Low	NSW biodiversity reforms not providing a fit for purpose mechanism to legally secure offset area	Additional consultation with Regulators
	Unable to attach the Plan to the land title	Likely	Minor	Low	NSW government requires different plan to be attached to the land title	Ensure that a new plan is equivalent to this Plan
	Illegal access to offset causing significant residual impact	Unlikely	Moderate	Low	Failure to access control captured in management monitoring and reported in the Annual Report	Review access control and improve security measures. Consider relocation of the offset area.
	Uncontrolled bushfire impact offset area	Possible	High	Medium	Bushfire on extreme or catastrophic fire danger day impacts offset	Implement Post Fire Event recovery with NSW Rural Fire Service. Complete post fire survey, map the damaged areas then revise the Plan.
To enhance the condition of conservation values measured by the Habitat Restoration Monitoring and Rapid Condition Assessment	No enhancement of condition in the conservation values measured by the Habitat Restoration Monitoring and Rapid Condition Assessment	Possible	Moderate	Medium	Review of Annual Reports and Monitoring data.	Review external factors (climate) and monitoring effort. Revise Plan and consider new Conservation Management Action. Assess influence on success from other factors such as extreme climatic conditions. Consider relocation of offset area.
	No increase in extent of woodland from the active restoration of grassland as measured by the Landscape and Habitat Restoration Monitoring	Possible	Moderate	Medium	Review of Annual Reports and Monitoring data	Review external factors (climate) and monitoring effort. Revise Plan and consider new Conservation Management Action. Assess influence on success from other factors such as extreme climatic conditions. Consider relocation of offset area.
To enhance and maintain the habitat values of the offset areas within 10 years at the BA	Observed decrease in species richness and usage of the offset area as measured by the Bird Assemblage Monitoring	Possible	Moderate	Medium	Review of Annual Reports and Monitoring data.	Review external factors (climate / disease) and monitoring effort. Revise Plan and consider new Conservation Management Action.

6 | GROUNDWATER DEPENDENT ECOSYSTEMS AND RIPARIAN VEGETATION MONITORING

6.1 | GROUNDWATER MONITORING

An HVO Water Management Plan (WMP) has been prepared that addresses the management and monitoring of both surface water and groundwater across HVO North and HVO South. In particular the WMP includes a program to monitor:

- groundwater inflows to the open cut mining operations;
- impacts of the project on the region's aquifers, any groundwater bores, and surrounding watercourses, and in particular, the Hunter River and Wollombi Brook and adjacent alluvium;
- impacts of the project on groundwater dependent ecosystems (GDEs), riparian vegetation and River Red Gum populations; and
- a plan to respond to any exceedances of the performance criteria or surface water impact assessment criteria, and repair, mitigate and/or offset any adverse groundwater impacts of the project.

The purpose of the WMP is to provide reasonable and feasible measures to address potential water impacts of the Project as identified in approvals and satisfy the relevant conditions. An integrated management approach is employed at HVO to mitigate the potential impacts of mining on the groundwater environment and other groundwater users, including dependent ecosystems.

Groundwater monitoring will be undertaken in accordance with the Groundwater Monitoring Programme in the WMP.

The groundwater monitoring programme includes over 100 groundwater monitoring locations which will be sampled on a regular basis as detailed in the programme and assessed against groundwater trigger limits as summarised in Table 2 of the WMP.

6.2 | GDE MONITORING

The identified GDEs at HVO were outlined in **Section 4.1.2 |.**

The impact on these GDEs has been assessed through the approved environmental impact statement and environmental assessment documentation. As outlined in the HVO water management plan, it is not anticipated that groundwater drawdown (as a result of this project) will result in stress to the associated vegetation communities. Whilst these vegetation communities utilise groundwater, river levels can have a larger impact on the sustainability of these stands. For example, *Eucalyptus camaldulensis* (River Red Gum) relies on flooding regimes for recruitment. Flooding regimes in the Hunter River have been effected by broadscale catchment management including flow regulation from the construction of Glenbawn dam. Current flooding regimes are not predicted to be significantly affected as a result of the project.

The HVO Water Management Plan outlines the ground and surface water monitoring location, frequencies and trigger levels for additional assessments or actions to be implemented.

The HVO RRGRRS outlines the management and monitoring regime to ensure these communities are maintained. The RRGRRS stipulates that groundwater monitoring data will be made available to the persons undertaking the ecological monitoring in order to assess the impact that fluctuating groundwater levels may have on the health of the Carrington Billabong and the Priority Sites listed in the strategy document.

Performance criteria for groundwater and GDEs is contained in the HVO WMP and approved version is summarised in **Table 6-1.**

Table 6-1 - Groundwater Impact Assessment Criteria

Criteria	Description
1	The groundwater level does not decline more than 2m at any privately owned bores and wells identified in the HVO complex EA's (with the exception of a single bore on land owned by the Ravensworth mine (10011459) which is predicted to decline by a maximum of 2.7m.)
2	Water quality does not lower the beneficial use category of the groundwater source beyond 40m from the mining pit. This will be identified using groundwater triggers (EC) for individual monitoring bores specified in the Groundwater Monitoring Programme.
3	The alluvial groundwater source within 40m of the recognised GDE communities does not experience more than a 10% reduction in piezometric levels predicted in the EA's for HVO North and HVO South (allowing for typical climatic variation).

Monitoring associated with River Red Gums as a GDE community is outlined in the current version of HVO RRGRRS. In summary, the monitoring methodology established across the previous 10 year monitoring period will continue for a subsequent 10 year period, or until the vegetation community in the Carrington Billabong demonstrates strong signs of recovery and self-sustainability.

Monitoring, focussing on the Carrington Billabong, the identified priority sites and the river red gum reference site near Scone, will occur annually for the first four years, then biennially until year 10 with additional events occurring following significant environmental triggers. No specific monitoring is planned for low priority sites, however, HVO does regular inspections of all lands managed by the site, including annual inspections of all river red gum stands along the Hunter River and Wollombi Brook. These inspections identify:

- prevalence of weeds and significant environmental weeds, including abundance and threats posed;
- presence of signs of pest species and threats posed to river red gums by their activity;
- presence of significant erosion that might threaten the viability of river red gums;
- any significant recruitment or senescence of river red gums; and
- the condition of fencing, where present, and the need for any maintenance works.

6.2.1 | RIPARIAN VEGETATION MONITORING

A programme to monitor surface water flows on stream and riparian vegetation health in the Hunter River potentially affected by HVO operations has been included in the latest revision of the Water Management Plan. The Rapid Appraisal of Riparian Condition (RARC) method is used for this monitoring. The results of monitoring will be used to develop and assess against performance criteria.

6.2.2 | MANAGEMENT OF INPREDICTED IMPACTS TO GROUNDWATER

Contingency measures will be implemented commensurate with the degree of impacts determined by the investigation. Depending on the outcomes of an investigation, one or a number of remedial actions may be taken. Remedial actions for groundwater may include:

- more intensive monitoring and/or seeking professional advice in regards to model predictions; and/or
- geotechnical investigations; and/or
- structural assessments; and/or
- contingency measures to ensure the long term viability of recognised GDE's, as guided by suitable professionals, (to the satisfaction of the Minister, as required in the AIP) and/or.
- consideration of changes to the mine plan if required.

Monitoring and reporting would be continued to demonstrate the effectiveness of the remedial actions.

7 | REPORTING

Annual reports are prepared that summarise the management actions that have been completed in these areas, results of monitoring activities, and how the management and restoration activities are progressing towards performance objectives. The reports identify if there are any areas for improvement, or issues occurring where progress may not be meeting completion criteria. Any corrective actions required are identified and outlined for implementation. This adaptive management approach ensures that the best available information and approach to management is being applied, and issues are identified early.

The applicable annual reports, biodiversity values and information they include are summarised in **Table 7-1.**

Table 7-1 - Annual Reporting

Annual Report Type	Applicable Biodiversity Areas	Information Addressed
EPBC 2016-7640 Annual Compliance Report	Wandewoi BA, Condon View BA Crescent Head BA Mitchelhill BA Hook BA	• Describes management actions completed in 12 month period • Monitoring activities completed in 12 month period • Progress against completion criteria • Corrective actions that may be required
Enforceable Undertaking Annual Compliance Report	Mitchelhill Enforceable Undertaking area	• Management actions undertaken • Monitoring activities completed in 12 month period • Expenditure against enforceable undertaking requirement
HVO Annual Environmental Review	Groundwater Rehabilitation Land management (including weed control and pest animal management) Goulburn River BA	• Applicable approvals and management plans/programs • Operations Summary • Ecological monitoring results • Groundwater monitoring activities and results • Rehabilitation activities and rehabilitation performance • Restoration activities • Weed control actions/annual weed survey results • Vertebrate pest control activities • Audit results (if required)

HVO has conditions of approval relating to a potential incident, complaint or a potential non-compliance with statutory requirements. The relevant conditions relating to reporting of incidents and potential non-compliances within the HVO approvals are:

PA06_0261:

Incidents and non -compliances will be reported in accordance with Schedule 5, condition 2 &3 of PA_06_0261. HVO will:

> *immediately notify the Department and any other relevant agencies after it becomes aware of an incident. The notification must be in writing via the Department's Major Projects Website and identify the development (including the development application number and name) and set out the location and nature of the incident.*

> *Within seven days of becoming aware of a non-compliance, HVO will notify the Department of the non-compliance. The notification will be in writing via the Department's Major Projects Website and identify the development, set out the condition of the consent that the development is non-compliant with, why it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance.*

DA 450-10-2003:

In accordance with Schedule 5, Condition 7 of DA 450-10-2003, HVO will

> *immediately notify the Secretary and any other relevant agencies of any incident. Within 7 days of the date of the incident, HVO must provide the Planning Secretary and any other relevant agencies with a detailed report on the incident, and such further reports as may be requested.*

Following the receipt of information regarding an incident, complaint, potential non-compliance with statutory requirements or potential exceedance of the impact assessment and/or performance criteria, HVO will undertake an investigation to determine the accuracy of the information and confirmation of an incident.

If required, an incident report will include actions to be implemented to remediate, rectify or additional monitoring to be undertaken following the development of such actions.

8 | REFERENCES

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OEH 2014. NSW Biodiversity Offsets Policy for Major Projects. NSW Office of Environment and Heritage, Sydney.

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Umwelt 2010. Hunter Valley Operations. River Red Gum Rehabilitation and Restoration Strategy. Report prepared by Umwelt on behalf of EMGA Mitchell McLennan (report dated March 2010, report reference 2730/R01/Final).

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9 | 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 below.

REGULATOR VERSION	HVO SHAREPOINT VERSION	DATE	CHANGE DETAILS	REVIEW TEAM	REGULATOR APPROVAL DATE
	V0.1	May 2018	*Draft*	Berlinda Ezzy Nathan Garvey	
	V1.2	June 2018	*Final*	Berlinda Ezzy Cassandra Kottaras Nathan Garvey	2/08/2018
	V1.3	July 2020	*Contemporise template and update management with respect to updated management plans and actions relating to rehabilitation and pathogen management activities arising from Independent Environmental Audit findings*	Trescinda Brown Michael Lloyd	
	V1.4	July 2021	*Update plan to incorporate DPIE review requests*	Michael Lloyd	
	V1.5	April 2022	*Update following approval of PA 06_0261 Mod 6*	Michael Lloyd	
	V1.6	Oct 2022	*Update following approval of PA 06_0261 Mod 7*	Michael Lloyd	
	V1.7	Aug 2023	*Update following Audit to include Consultation and Change Information sections*	Michael Lloyd	
V1.8	V2.0	Aug 2024	*Update following Annual Review to revise format, updates to legislation and agencies, corrected management and monitoring activities, inclusion of EPBC BAs and consolidate flora and fauna procedures for DA450-10-2003 Sch3 Cond35. DCCEEW comments included.*	Michael Lloyd	11/04/2025

	V3.0	Aug 2025	*Minor edits. Revision following submission of 2024 AR and DA 450-10-2003 Mod 8 Approval*	Michael Lloyd	
	V4.0	Aug 2026	*Minor edits and updates to information sourced from updated approvals, management plans, legislation and policies.*	Michael Lloyd	8/10/2026

APPENDIX A - DCCEEW (NSW) COMMENTS

Department of Climate Change, Energy, the Environment and Water

Your ref: PAE-78559962
Our ref: DOC24/1024194

Michael Lloyd
Environment & Community Coordinator
Hunter Valley Operations

By email: Michael.Lloyd@hvo.com.au

Dear Michael,

HVO South Integrated Biodiversity Management Plan

Thank you for your Major Projects Portal request dated 11 December 2024 seeking advice from the Conservation Programs, Heritage & Regulation Group (CPHR) Group of the NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) on HVO South.

CPHR has reviewed the provided information and has comments for minor amendments regarding the draft Integrated Biodiversity Management Plan (IBMP). The IBMP includes updates to Mitigation and Management Measures to the following:

- Vegetation clearing procedures,
- Pathogen management,
- Pest control, and
- Salinity.

As well as Biodiversity Offset Areas to the:

- Northern and Southern Biodiversity Areas (BAs),
- Condon View BA
- Crescent Head BA
- Mitchelhill BA
- Wandewoi BA, and
- Hook BA.

CPHR has two recommendations which are provided in Attachment 1.

If you have any further questions about this issue, please contact our Hunter Central Coast Planning Team at huntercentralcoast@environment.nsw.gov.au.

Yours Sincerely

Level 3, 6 Stewart Ave, Newcastle West 2302 | Locked Bag 1002 Dangar NSW 2309 | dcceew.nsw.gov.au

Joe Thompson
Director Hunter Central Coast
Conservation Programs, Heritage & Regulation Group

20 February 2025

Enclosure – Attachment 1

Attachment 1 - BCS Comments

HVO South Integrated Biodiversity Management Plan (MP06_0261-PA-159)

In preparing this advice CPHR has reviewed the following documents:

- Hunter Valley Operations, Integrated Biodiversity Management Plan V1.8 (13.09.2024)
- Hunter Valley Operations, Vegetation Clearance Plan V2.1 (22.10.2020)

Key Assessment Issues

1.	*Ensure species listed within IBMP are accurate*	CPHR notes that *Myotis adversus* is listed within Table 2.3 the IBMP as an additional species. BCS advises that only *Myotis macropus* is recognised as occurring in Australia under NSW legislation (as per Cooper et all. 2001). The species detected was therefore *M. macropus* and should be treated accordingly. Cooper, S., Day, P., Reardon, T., and Schulz, M. 2001. Assessment of species boundaries in Australian Myotis (Chiroptera: Vespertilionidae) using Mitochondrial DNA. Journal of Mammalogy, 82(2): 328-338. **Recommended action:** *Update to Table 2.3 of the IBMP to recognise that Myotis adversus is Myotis macropus.*

2.	*Ensure pre-clearance surveys are conducted within 24 hours of clearance works*	Section 3.2.2.1 of the IBMP states that pre-clearance surveys will be undertaken in areas 'where significant time has elapsed between surveys (5 years)'. The IBMP references the HVO Vegetation Clearance Plan, which states that pre-clearance surveys should be conducted within 24 hours prior to commencement of removal of potential foraging, nesting and breeding habitat for Regent Honeyeater. Pre-clearance surveys should be conducted as per the HVO Vegetation Clearance Plan which CPHR considers to align with best-practice, being that pre-clearance surveys are conducted within 24 hours of works. **Recommended action:** *Update to Section 3.2.2.1 to outline that pre-clearance surveys will be conducted within 24 hours before removal of habitat for the Regent Honeyeater.*

APPENDIX B - HVO RESPONSE TO DCCEEW COMMENTS

Key Assessment Issue	Response
1. Ensure species listed within IBMP are accurate.	HVO notes that both *Myotus adversus* and *Myotus macropus* were listed in Table 2.3. *Myotus adversus* has been removed from the table and there are no other references to this within the IBMP.
2. Ensure pre-clearance surveys are conducted within 24hrs of clearance works.	Section 3.2.2.1 updated as requested.

APPENDIX C - DPHI APPROVAL

Department of Planning, Housing and Infrastructure

NSW GOVERNMENT

Our ref: MP06_0261-PA-185

Ben de Somer
Manager Environment and Community
1011 Lemington Road
Lemington, New South Wales, 2330

08/10/2026

Subject: Integrated Biodiversity Management Plan

Dear Mr de Somer

I refer to the Integrated Biodiversity Management Plan (the Plan) which has been revised following the submission of an Annual Review in accordance with Condition 4, Schedule 5 of the consent for HVO North – West Pit Consent 2003 (DA450-10) and Condition 4A, Schedule 5 of the consent for HVO South (MP06-0261).

I note the revisions to the Plan are administrative and the Plan contains the information required by the conditions of consent.

Accordingly, as nominee of the Planning Secretary, I approve the Integrated Biodiversity Management Plan (Submitted 11 August 2026).

You are reminded that if there are any inconsistencies between the Plan and the conditions of consent, the conditions prevail.

Please ensure you make the document publicly available on the project website at the earliest convenience.

If you wish to discuss the matter further, please contact Patrick Worthington at patrick.worthington@dphi.nsw.gov.au.

Yours sincerely

Jack Turner
Team Leader
Resource Assessments

As nominee of the Planning Secretary

4 Parramatta Square, 12 Darcy Street, Parramatta NSW 2150 www.dphi.nsw.gov.au 1
Locked Bag 5022, Parramatta NSW 2124

APPENDIX D - TREE FELLING PROCEDURE

Habitat Tree Identification

Trees containing nests and/or tree hollows are referred to as habitat trees. Habitat trees may be identified through;

- Historical flora and fauna impact assessments as part of new or additional mining areas.
- Pre-clearance surveys.
- During the Ground Disturbance Permit process.

Habitat trees should be identified by visual canopy inspections to determine if hollows or nests are present. Animal activity such as scratch marks or whitewash can be good indications of habitation by fauna. Assessment should be undertaken by an Environmental Officer or Ecologist.

The distinction between habitat trees and non-habitat trees is important in determining the method of felling which will be applied.

Trees containing nests and/or tree hollows are referred to as habitat trees. They will be clearly marked for further inspection prior to clearing.

Non-Habitat Trees

Once an assessment has been made of the canopy and it is determined that there are no nesting or threatened species present, clearing of non-habitat trees can occur.

Ideally clearing of non-habitat and habitat trees should take place as close in time as possible. Clearing non-habitat trees may be an effective method of reducing the desirability of habitat trees, therefore encouraging nesting/threatened species displacement.

Habitat Trees

1. Prior to felling

Prior to the felling of habitat trees, a visual canopy inspection should be undertaken as described above, to identify nesting birds or native fauna.

If threatened species are actively using a habitat tree/s during a breeding season, expert advice should be sought by means of a qualified ecologist to determine if the habitat tree is able to be disturbed.

In the event that there is no breeding activity, all habitat trees will be vigorously nudged the day prior to felling.

The advice of an ecologist may be sought to determine an appropriate strategy if required.

Clearing should be undertaken in a way that can encourage fauna to migrate to nearby suitable vegetation, but should be discouraged from reaching other habitat trees that are intended to be cleared. Machinery can be positioned in a way to discourage this by being positioned between the tree and the mine and not blocking access to other habitat, as well as removing other non-habitat vegetation progressively.

2. Day of Felling

Prior to felling, all habitat trees should be visually inspected by the Environmental Officer or an ecologist, to survey for threatened species or hollow utilising species. If species are present, the tree can be nudged to encourage the animal to move on. If the fauna fails to relocate, additional steps may be taken to encourage fauna to move on.

Trees with no record of occupancy from previous nudging should be shaken again, and felled if no fauna emerge.

When hollow bearing trees are felled, they should be carefully pushed over with machinery.

All reasonable attempts will be made to reduce the impact of felling on any resident species.

3. Additional Steps (If Fauna Do Not Move on)

If fauna continue to remain in trees after they have been shaken, the following actions may be undertaken to encourage them to relocate:

- Work can be delayed until a breeding season lapses;
- Shake the tree daily;
- Reduce the habitat quality of the tree by removing branches around the hollow/nest;
- Capture and/or remove the animal with a trained wildlife handler; and
- Contact an ecologist for guidance.

4. Post Felling

After habitat trees have been felled they should be inspected for remaining or injured fauna species. Hollows of felled trees should not be blocked against the ground where possible. If practicable trees can be rolled to ensure animals are able to escape.

Felled trees should be left overnight to ensure any remaining fauna are able to move on.

5. Injured Fauna

During the process of felling trees fauna may be injured, injured fauna should be taken to the nearest veterinary clinic or wildlife carer for assessment and treatment. Orphaned young will be treated in a similar manner.

6. Process Flowchart

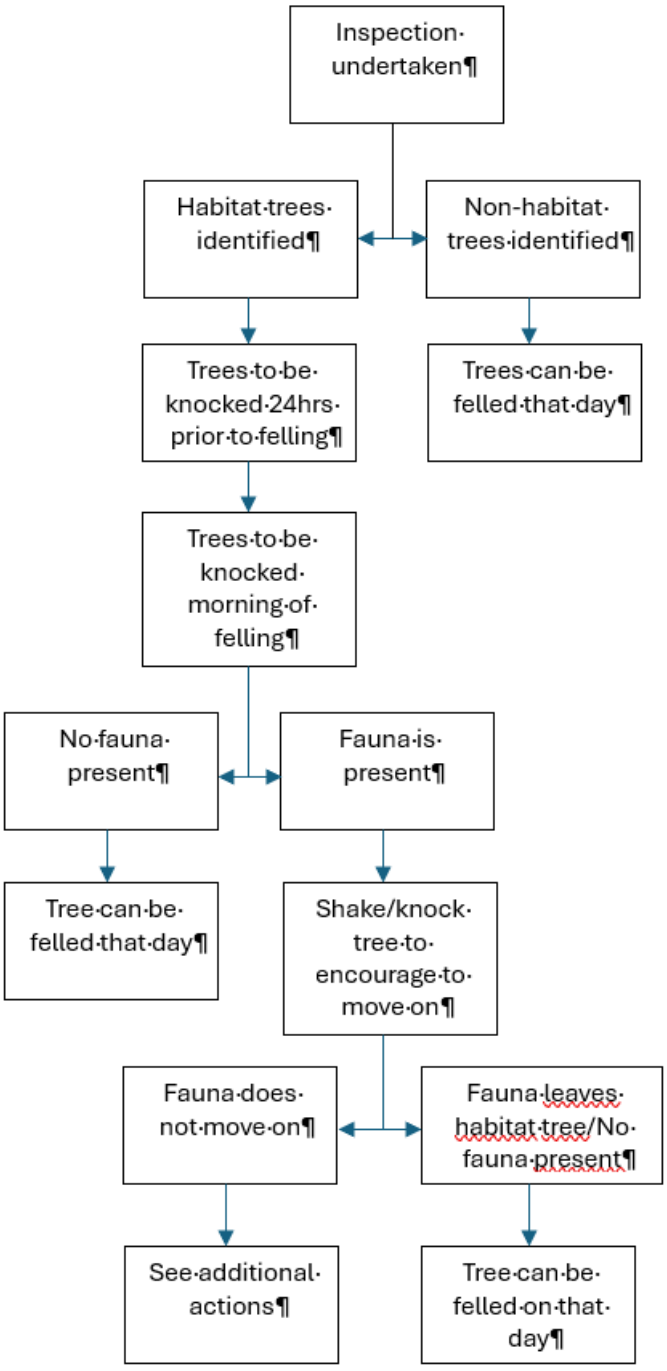


Figure 11 – Tree Felling Process Flowchart

APPENDIX E - THREATENED SPECIES INFORMATION

Listed species, population or community	Flowering[1]/breeding season[2]												Status[3]	Site	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		HVO North (West Pit and Carrington Pit)	HVO South (Riverview and Cheshunt Pit)
Listed plant species and populations															
Tiger Orchid population in the Hunter Catchment *Cymbidium canaliculatum*													E- Biodiversity Conservation Act 2016	✓	
River Red Gum population in the Hunter Catchment *Eucalyptus camaldulensis*													E- Biodiversity Conservation Act 2016		✓
Slaty Red Gum *Eucalyptus glaucina*													V- Biodiversity Conservation Act 2016 V - EPBC Act		✓
Listed ecological communities															
CHVEF	Variable, depending on flowering periods of representative species												E- Biodiversity Conservation Act 2016 CE - EPBC Act		
Warkworth Sands Woodland	Variable, depending on flowering periods of representative species												E- Biodiversity Conservation Act 2016 CE - EPBC Act		

Listed species, population or community	Flowering[1]/breeding season[2]												Status[3]	Site	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		HVO North (West Pit and Carrington Pit)	HVO South (Riverview and Cheshunt Pit)
Listed fauna species															
Brown Treecreeper *Climacteris picumnus victoriae*	■	■					■	■	■	■	■	■	V - Biodiversity Conservation Act 2016		✓
Swift Parrot *Lathamus discolor*	N/A - This species breeds in Tasmania												CE - Biodiversity Conservation Act 2016 CE - EPBC Act	✓	✓
Grey-crowned Babbler *Pomatostomus temporalis temporalis*	■	■					■	■	■	■	■	■	V - Biodiversity Conservation Act 2016	✓	✓
Speckled Warbler *Chthonicola saggitata*	■							■	■	■	■	■	V - Biodiversity Conservation Act 2016	✓	✓
Regent Honeyeater *Anthochaera phrygia*	■						■	■	■	■	■	■	CE - Biodiversity Conservation Act 2016 CE - EPBC Act	✓	

Listed species, population or community	Flowering[1]/breeding season[2]												Status[3]	Site	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		HVO North (West Pit and Carrington Pit)	HVO South (Riverview and Cheshunt Pit)
Hooded Robin *Melanodryas cucullata cucullata*							■	■	■	■	■		V - Biodiversity Conservation Act 2016		
Diamond Firetail *Stagnopleura guttata*	■							■	■	■	■	■	V - Biodiversity Conservation Act 2016		
Glossy Black-cockatoo *Calyptorhychus lathami*			■	■	■	■	■	■					V - Biodiversity Conservation Act 2016		
Little Lorikeet *Glossopsitta pusilla*					■	■	■	■	■				V - Biodiversity Conservation Act 2016		
Spotted Harrier *Circus assimilis*	■								■	■	■	■	V - Biodiversity Conservation Act 2016		
Black Bittern *Ixobrychus flavicollis*	■	■	■									■	V - Biodiversity Conservation Act 2016		✓

Listed species, population or community	Flowering[1]/breeding season[2]												Status[3]	Site	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		HVO North (West Pit and Carrington Pit)	HVO South (Riverview and Cheshunt Pit)
Powerful Owl *Ninox strenua*													V - Biodiversity Conservation Act 2016	✓	
Little Bentwing Bat *Miniopterus australis*							Only breeds in caves						V - Biodiversity Conservation Act 2016		✓
Eastern Bentwing Bat *Miniopterus schreibersii oceanensis*					Only breeds in caves								V - Biodiversity Conservation Act 2016	✓	✓
Eastern Freetail Bat *Mormopterus norfolkensis*													V - Biodiversity Conservation Act 2016	✓	✓
Large-eared Pied Bat *Chalinolobus dwyeri*	N/A. Foraging habitat only.												V - Biodiversity Conservation Act 2016 V- EPBC Act	✓	✓
Large-footed Myotis *Myotis macropus*													V - Biodiversity Conservation Act 2016	✓	

Listed species, population or community	Flowering[1]/breeding season[2]												Status[3]	Site	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		HVO North (West Pit and Carrington Pit)	HVO South (Riverview and Cheshunt Pit)
Yellow-bellied Sheathtail Bat *Saccolaimus flaviventris*	■	■	■									■	V - Biodiversity Conservation Act 2016		✓
Corben's Long-eared Bat *Nyctophilus corbeni*			■	■	■	■	■	■	■	■	■	■			✓
Squirrel Glider *Petaurus norfolcensis*	■					■	■	■	■	■	■	■	V - Biodiversity Conservation Act 2016		✓
Brush-tailed Phascogale *Phascogale tapoatafa*					■	■	■	■	■				V - Biodiversity Conservation Act 2016		✓
Grey-headed Flying-fox *Pteropus poliocephalus*	N/A. Foraging habitat only.														✓
Spotted-tail Quoll *Dasyurus maculatus*													E - Biodiversity Conservation Act 2016 V - EPBC Act	✓	✓
Green and Golden Bell Frog	■	■								■	■	■	E - Biodiversity Conservation Act 2016	✓	

Listed species, population or community	Flowering[1]/breeding season[2]												Status[3]	Site	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		HVO North (West Pit and Carrington Pit)	HVO South (Riverview and Cheshunt Pit)
Litoria aurea													V- EPBC Act		

Listed plant species and populations	
Tiger Orchid population in the Hunter Catchment *Cymbidium canaliculatum*	 2x known plant locations at HVO, Carrington and Archerfield
River Red Gum population in the Hunter Catchment *Eucalyptus camaldulensis*	 Multiple populations across HVO

Slaty Red Gum *Eucalyptus glaucina*	

CHVEF	Refer to listing.
Warkworth Sands Woodland	Refer to listing.

Brown Treecreeper *Climacteris picumnus victoriae*	 The nest is a collection of grasses, feathers and other soft material, placed in a suitable tree hollow or similar site. Both sexes build the nest, but the female alone incubates the eggs. Pairs often have two broods during each breeding season. Occasionally, other birds ("helpers") assist the breeding pair with building of nest and feeding the young chicks.

Swift Parrot *Lathamus discolor*	

Grey-crowned Babbler Pomatostomus temporalis temporalis	  Groups normally consist of a primary breeding pair along with several non-breeding birds (sometimes groups may contain two breeding pairs or two females that both breed). Most members of the group help to build nests, with the primary female contributing the most effort. Two types of nest are built: roost-nests (usually larger and used by the whole group) and brood-nests (for the breeding females), and often old nest sites are renovated and re-used from year to year. The large domed nests are placed in a tree fork 4 m - 7 m high and are made of thick sticks with projections that make a hood and landing platform for the entrance tunnel. The nest chamber is lined with soft grass, bark, wool and feathers.

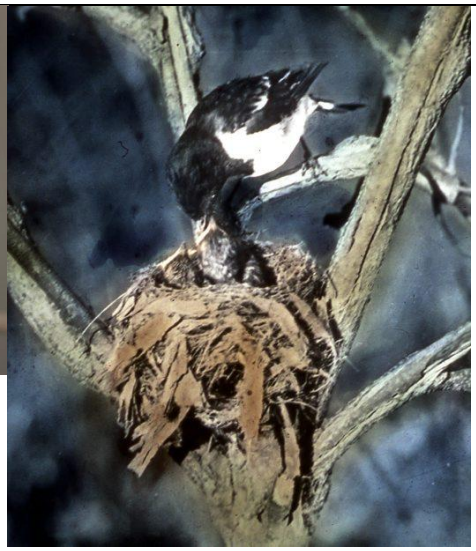


Speckled Warbler

Chthonicola saggitata



The Speckled Warbler breeds either in pairs or trios of one female and two males, although the second male does not help at the nest. The group defends a territory and the pair bond usually lasts several years. Sometimes several family groups form small flocks over the winter.

Regent Honeyeater *Anthochaera phyrgia*	 The Regent Honeyeater breeds in individual pairs or, sometimes, in loose colonies, with the female incubating the eggs and both sexes feeding the young. The cup-shaped nest is thickly constructed from bark, lined with soft material, and is placed in a tree fork 1 m to 20 m from the ground.
Hooded Robin *Melanodryas cucullata cucullata*	  The Hooded Robin breeds in monogamous pairs. They construct a cup-shaped nest of leaves and bark, bound with spiders' web, placed in a crevice, hollow or hole in a tree or stump. The female incubates the eggs.

Diamond DiaFiretail *Stagnopleura guttata*	 The Diamond Firetail builds a nest with green grass blades and stems and lines it with fine grasses and feathers. The nest can be found in trees and shrubs with dense foliage and has sometimes been known to build in the base of a hawk's nest. The nest is built by both partners but only the female does the weaving. Both partners incubate the eggs and care for the young. Usually only one clutch is laid per season.
Glossy Black-cockatoo *Calyptorhychus lathami*	 The Glossy Black-Cockatoo mates for life, with pairs maintaining their bond all year round. The female prepares the nest hollow and incubates the eggs, only leaving the nest to feed herself after the newly hatched nestling is a week old. Males feed the female and nestling throughout the incubation and brooding period. Once fledged, the young bird is fed by both parents for up to four months and remains with them until the next breeding season.

Little Lorikeet *Glossopsitta pusilla*	 The Little Lorikeet nests in holes in tree limbs or in the main trunk of a tree, in for example, River Red Gums, Eucalyptus camaldulensis, Flooded Gums, E. grandis, or River Oaks, Casuarina cunninghamiana. The eggs are lain on decayed wood in the tree hollow. Both members of a pair clean out the hollow, but only the female does the incubation. However, the male roosts in the hollow at night and sometimes during the day.
Spotted Harrier *Circus assimilis*	 The nest is built in trees in open or remnant woodland and is a large flimsy platform of twigs and sticks, lined with green leaves. The female Spotted Harrier incubates the eggs, broods and guards the young. The male hunts and brings food to the female.

Black Bittern *Ixobrychus flavicollis*	 Black Bitterns nest in trees over water. The nest is a loose platform with a shallow depression in the centre.
Powerful Owl *Ninox strenua*	 The Powerful Owl mates for life (over 30 years in some cases) and pairs defend an all-purpose territory year-round. The male prepares the nest, which is usually a vertical hollow in a large old tree, and provides the female and young with a constant supply of food during the early part of the nesting period. The female incubates the eggs and broods the young, emerging later in the nesting period to hunt for food as well. Young birds remain with the parents for several months after fledging and may stay within their parents' territory for over a year.

Little Bentwing Bat *Miniopterus australis*	 Little Bentwing-bats roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats.
Eastern Bentwing Bat *Miniopterus schreibersii oceanensis*	 Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures

Eastern Freetail Bat *Mormopterus norfolkensis*	 Roost mainly in tree hollows but will also roost under bark or in man-made structures. Usually solitary but also recorded roosting communally, probably insectivorous.
Large-eared Pied Bat *Chalinolobus dwyeri*	 Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (Petrochelidon ariel), frequenting low to mid-elevation dry open forest and woodland close to these features. Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January in roof domes in sandstone caves and overhangs. They remain loyal to the same cave over many years.

Large-footed Myotis *Myotis macropus*	 Generally roost in groups of 10 - 15 close to water in caves, mineshafts, hollow-bearing trees, and storm water channels, buildings, under bridges and in dense foliage.
Yellow-bellied Sheathtail Bat *Saccolaimus flaviventris*	 Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows.

Corben's Long-eared Bat *Nyctophilus corbeni*	 Roosts in tree hollows, crevices, and under loose bark.
Squirrel Glider *Petaurus norfolcensis*	 Require abundant tree hollows for refuge and nest sites.

Brush-tailed Phascogale *Phascogale tapoatafa*	 Nest and shelter in tree hollows with entrances 2.5 - 4 cm wide and use many different hollows over a short time span. Mating occurs May - July; males die soon after the mating season whereas females can live for up to three years but generally only produce one litter.
Grey – Headed flying fox *Pteropus poliocephalus*	 Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.

Spotted-tail Quoll *Dasyurus maculatus*	 Breeding season is between April and July. Females breed about once a year, and have a gestation period of 21 days, producing an average litter size of five. The young are kept in a rudimentary pouch until they are large enough to be left behind in the den while their mother forages for food. Both sexes mature at about one year of age.
Green and Golden Bell Frog *Litoria aurea*	 Adults are usually found close to, or in water or very wet areas in forests, woodlands, shrub lands and open or disturbed areas. The eggs and tadpoles can be found in permanent lakes, swamps and dams with still water.