## 10.1.2. DA 2023-78 Geotechnical Investigations for Upper Reservoir proposed Muswellbrook Pumped Hydro

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|---|---|
| **Attachments:** | 1. Attachment A - S4.15 Development Assessment Report [**10.1.2.1** - 18 pages]<br>2. Attachment B - DA 2023-78 Recommended conditions of Consent [**10.1.2.2** - 4 pages]<br>3. Attachment D - Redacted Submission [**10.1.2.3** - 1 page]<br>4. Attachment C - Development Proposal [**10.1.2.4** - 102 pages]<br>5. Attachment E - Applicant's response to Submissions [**10.1.2.5** - 5 pages] |
| **Responsible Officer:** | Sharon Pope - Director - Planning & Environment |
| **Author:** | Tanya Alsleben (Development Planner) |
| ***Community Plan Issue:*** | *Not Applicable* |
| ***Community Plan Goal:*** | *Not Applicable* |
| ***Community Plan Strategy:*** | *Not Applicable* |
| | Not applicable |

### PURPOSE

This report has been prepared to assist Council in the determination of DA 2023-78 for geotechnical investigations and associated land clearing related to investigations to inform the design of the upper reservoir for the proposed Muswellbrook Pumped Hydro project.

The application has been reported to Council for determination as the project is related to mining and energy generation.

### OFFICER'S RECOMMENDATION

Council grants development consent to DA 2022-78 for Geotechnical Investigations and associated works at Lot 93 DP: 752484, Lot 24 DP: 752484, Lot 84 DP: 752484, Lot 85 DP: 752484, Lot 23 DP: 752484, Lot 167 DP: 752444, Lot 5 DP: 1178473, Lot 1 DP: 134665, Lot 1 DP: 398873, Lot 100 DP: 666041, Lot 1 DP: 113760, Part Lot 126 DP: 752444, subject to the recommended conditions of consent included in Attachment B.

**Moved:** _____ **Seconded:** _____

## DESCRIPTION OF PROPOSED DEVELOPMENT

This development application seeks consent to carry out geotechnical investigations to inform a feasibility study for a possible future pumped hydro energy storage scheme.

The proposed geotechnical works would be carried out across a site that incorporates 12 Lots (the majority of which are in the ownership of Idemitsu and part of the Muswellbrook Coal Mine site).

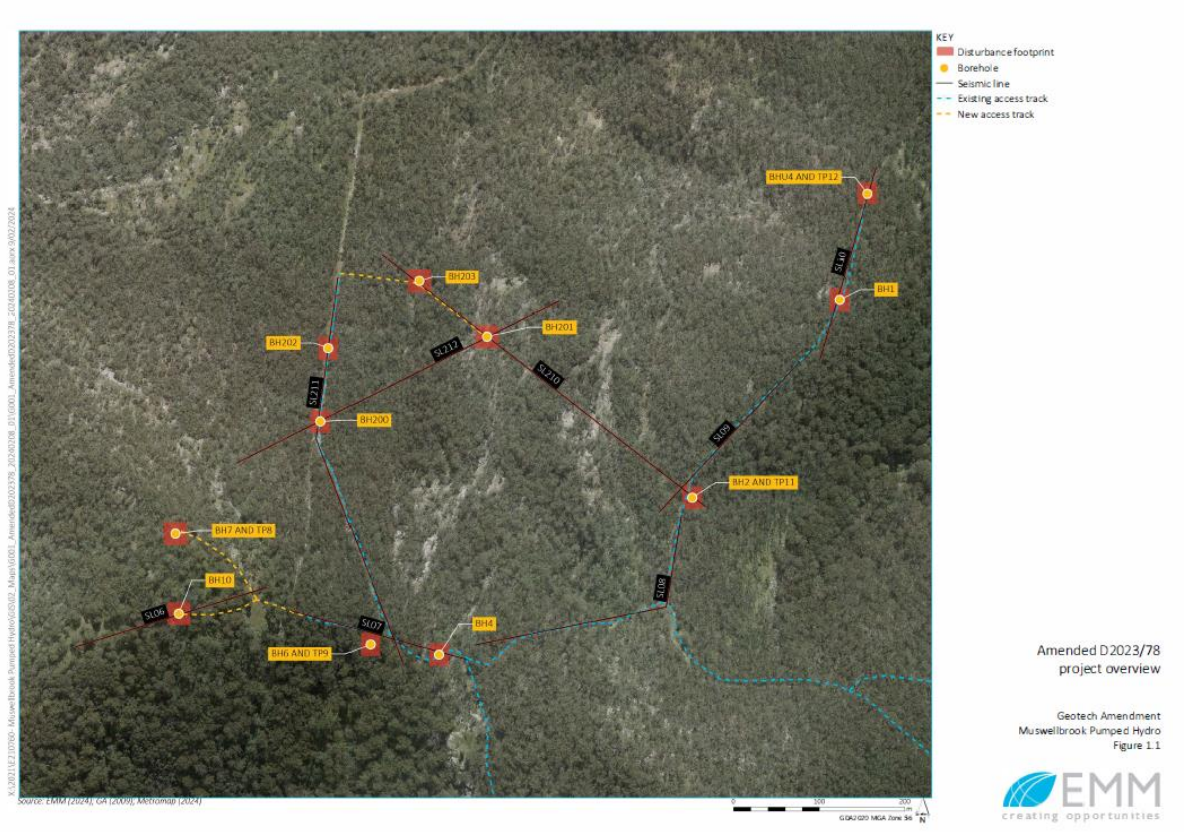
Works proposed in this application involve:

- The improvement and establishment of access tracks and seismic lines within the site to drilling locations.
- Earthworks, clearing, and site establishment works at bore hole and test pit investigation locations.
- The drilling of 11 borehole pits – boreholes would involve drilling between 200m – 300m below surface level.
- The excavation of four test pits – test pits would involve excavations up to 5m deep and 4m in length.
- Removal of investigation equipment and site restoration at the completion of the investigatory works.

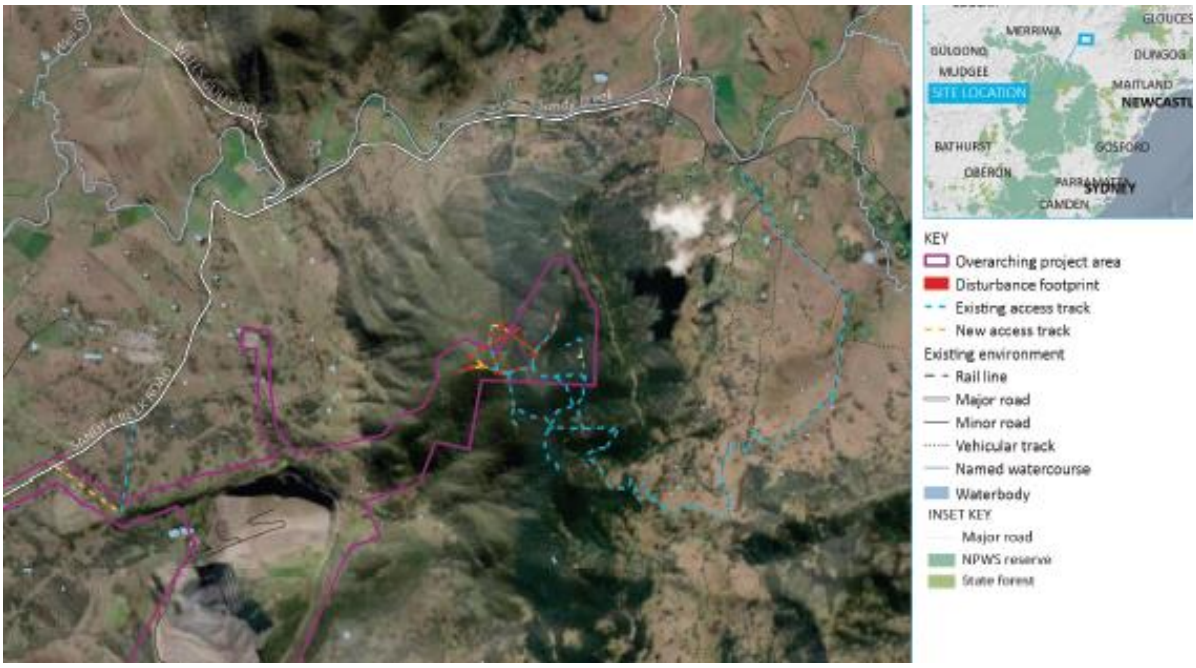
The works are proposed to be completed within a 12-week period, as a 24-hour, 7 days per week operation, as the drills do not perform efficiently if they are required to stop and restart.

Vehicle access to the site would be via the New England Highway, Sandy Creek Road, and Dolahentys Road. A Traffic Impact Assessment has been submitted in relation to the project.

The image below identifies the test pit and borehole location at the site.



Access to the site investigation area is identified by the blue dashed line in the image below.




## ASSESSMENT SUMMARY

Several technical documents were submitted as part of the proposed development. Given the size of these reports they have not been included as attachments. A summary of the reports and key findings have been included below for Council's information.

Copies of the accompanying reports can be circulated to Councillors under separate cover for their review, if requested

- Statement of Environmental Effects details the scope of the proposed development and includes an assessment of the project's impacts.
- Flora and Fauna Assessment – Examines vegetation and ecosystem disturbance associated with the proposed works against legislated criteria. The report concludes that the proposed development may proceed.
- Aboriginal Heritage Assessment – The report identifies potential cultural heritage implications of the project and concludes that the proposed development will have a low risk of harming Aboriginal objects or places, and outlines recommendations to minimise any potential impact to Aboriginal Heritage.
- Noise and Vibration Assessment – This report assesses the noise and vibration impacts for the proposed works. The report concludes that predicted noise levels will stay below the acceptable noise threshold (below 76dB(A)).
- Traffic Impact Assessment – The overall volume of traffic related to this, and the lower reservoir project, is anticipated to involve 48 heavy vehicle movements per day during both mobilisation and demobilisation, and 8 heavy vehicle movements and 16 light vehicle movements per day for the duration of the proposed works. Considering the short duration of the work, and the capacity of the road network, this traffic will have minimal impact on the road network.

Council Officers have assessed the proposal under Section 4.15 of the Environmental Planning and Assessment Act 1979 (see Attachment A). Council Officers recommend that the development application be approved subject to conditions. Key issues and findings are:

- The site is zoned partly RU1 Primary Production and partly C3 Environmental

Management under the provisions of the Muswellbrook LEP 2009. The proposed earthworks are a type of activity permissible with consent under this Environmental Planning Instrument and compatible with the relevant land use zone provisions.

- The proposed development was lodged as integrated development pursuant to the Water Management Act 1993. The Department of Planning and Environment – Water advised that the proposed works did not require a controlled activity permit under this legislation and may proceed subject to Council requirements.
- The proposed development is compliant with the relevant provisions of the Muswellbrook Development Control Plan (DCP).
- The proposed development meets the requirements of relevant State Environmental Planning Policies.
- The Noise Impact Assessment prepared in relation to the works concluded that the works may be carried out with unrestricted operating hours without generating noise emissions that would have a significant impact on adjoining residential receivers.

In 2020 Council granted development consent to a previous development application involving geotechnical work related to the pumped hydro project (DA 2020/40). That development application proposed site access via Limestone and involved site investigation works. Council has not received any complaint related to the impact of works associated with DA 2020/40.

## CONSULTATION

The Application was notified to adjoining owners from 24/08/2023 – 14/09/2023 (21-day notification period). A notice was also placed on the Council's website and Facebook page at the commencement of the notification period.

One (1) submission was received during the notification period. A redacted copy of the submission has been included in attachment D.

Matters raised in the submissions primarily relate to concerns about the detrimental impact to the environment, natural habitats, and future impact to the locality. These matters have been considered through the assessment of the development application and were not considered to present an issue that would substantiate the refusal of the proposed development.

## OPTIONS

Council may:

A. Approve the proposed development subject to the recommended conditions of consent.

B. Approve the proposed development subject to amended conditions of consent.

C. Refuse the proposed development and, in doing so, provide reasons for refusal.

## CONCLUSION

DA 2023-78 has been assessed against the provisions of Section 4.15 of the Environmental Planning and Assessment Act 1979. Council Officers recommend that the development be approved subject to the recommended conditions outlined in Attachment B.

## LEGAL IMPLICATIONS

Where the applicant is dissatisfied with the determination of the development application, they have an opportunity, under the provisions of the Environmental Planning and Assessment Act 1979, to appeal that determination at the Land and Environment Court.

**Extended**
**DEVELOPMENT ASSESSMENT REPORT**

**Attached**: Site Plan

**REPORT TO: COUNCIL**

| | |
|---|---|
| **ADDRESS**: | LOT: 93 DP: 752484, LOT: 24 DP: 752484, LOT: 84 DP: 752484, LOT: 85 DP: 752484, LOT: 1 DP: 113760, PRT: 126 DP: 752444, LOT: 23 DP: 752484, LOT: 167 DP: 752444, LOT: 5 DP: 1178473, LOT: 1 DP: 134665, LOT: 1 DP: 398873, LOT: 100 DP: 666041<br>Dolahentys Road MCCULLYS GAP, 250 Dolahentys Road MCCULLYS GAP, Muscle Creek Road MUSWELLBROOK, Limestone Road MUSWELLBROOK |
| | |
| **APPLICATION No**: | 2023/78 |
| | |
| **PROPOSAL:** | Geotechnical Drilling & minor vegetation clearing |
| | |
| **OWNER**: | Mr M H Keegan |
| | |
| **APPLICANT**: | AGL Macquarie<br>Level 24<br>200 George Street<br>SYDNEY NSW 2000 |
| | |
| **AUTHOR**: | Tanya Alsleben |
| | |
| **DATE LODGED**: | 11/08/2023 |
| | |
| **DATE OF REPORT**: | 11/03/2024 |

**1. RECOMMENDATION**

It is recommended that development consent be granted to DA 2023/78 for Geotechnical Drilling and associated works subject to the recommended conditions of consent.

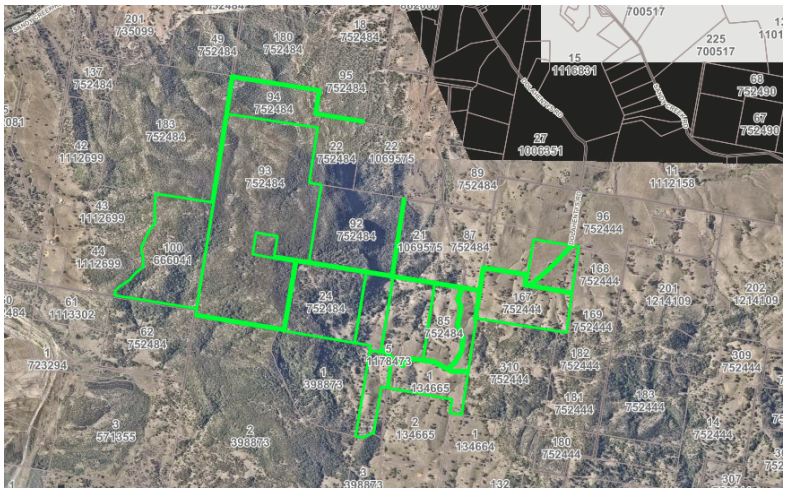
## 2. SITE LOCALITY AND DESCRIPTION

The subject site is located to the northeast of the Muswellbrook Coal Mine site. The lots are zoned as RU1 Primary Production and C3 Environmental Management. Access to the site is derived via Dolahentys Road, which terminates at Lot 167 DP 752444. The site comprises 12 Lots, most of which are located on a relatively undisturbed hill (Bells Mountain).

- LOT: 93 DP: 752484,
- LOT: 24 DP: 752484,
- LOT: 84 DP: 752484,
- LOT: 85 DP: 752484,
- LOT: 23 DP: 752484,
- LOT: 167 DP: 752444,
- LOT: 5 DP: 1178473,
- LOT: 1 DP: 134665,
- LOT: 1 DP: 398873,
- LOT: 100 DP: 666041
- LOT: 1 DP: 113760,
- PRT: 126 DP: 752444,

The entirety of the subject site is identified in the image below.

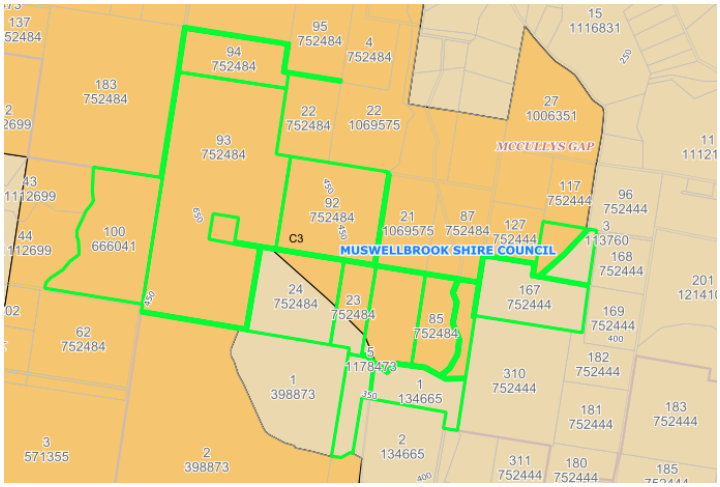
**Figure 1.** – Site Aerial Image (Source: Spectrum)



The site has a total area of approximately 500ha and is located to the North East of the town of Muswellbrook.

The site is zoned partly RU1 Primary Production and partly C3 Environmental Management Zone.

**Figure 2.** – Muswellbrook LEP Land Use Zone (Council Mapping Software).




| | |
|---|---|
| Flood Prone Land | YES ☐ NO ☒ |
| Bushfire Prone Land | YES ☒ NO ☐ |
| Terrestrial Vegetation | YES ☐ NO ☒ |
| Heritage Conservation Item | YES ☐ NO ☒ |
| Heritage Conservation Zone | YES ☐ NO ☒ |
| Contaminated Land | YES ☐ NO ☒ |
| Mine Subsidence | YES ☒ NO ☐ |
| Classified Road Frontage | YES ☐ NO ☒ |
| Council Infrastructure within Site | YES ☐ NO ☒ |
| Other | YES ☐ NO ☒ |

**3. DESCRIPTION OF PROPOSAL**

This application seeks consent to carry out geotechnical investigations to inform a feasibility study for a possible pumped hydro energy project on the land.

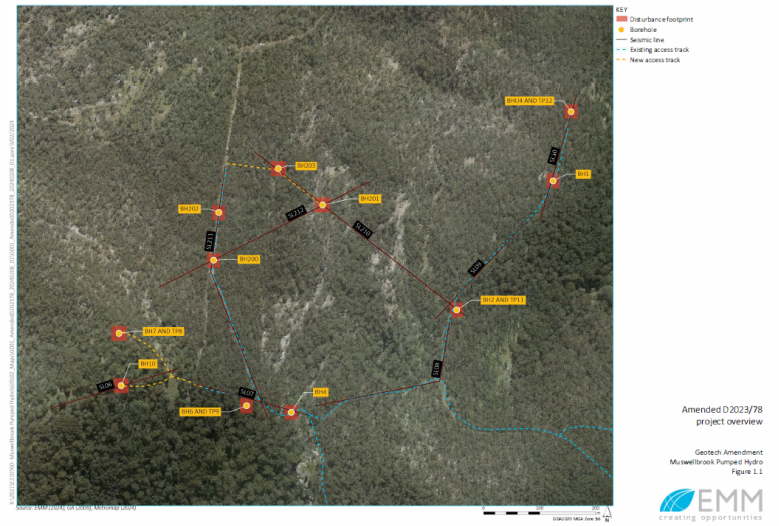
The geotechnical investigations are likely to take up to three months to complete, subject to weather and drilling progress. There are two types of investigation proposed – boreholes and test pits. Both require clearing of a relatively level pad.

The scope of the proposal and the location/number of boreholes and test pits proposed was amended by the applicant through the assessment of the development application. The amendment involved the relocated of four boreholes and associated tracks and the addition of nine (9) seismic lines 0.5m wide between the boreholes.

In terms of geotechnical investigations, the proposal now involves:

- Eleven (11) borehole pits – involving drilling between 200m – 300m below surface level
- Four (4) test pits – test pits involve excavations up to 5m deep and 4m in length with associated disturbance.

The image below illustrates the boreholes, test pits and seismic lines currently proposed.




To facilitate the geotechnical investigation works, clearing and access track construction is required.

A summary of the full scope of associated works has been included below:

**A. Creation of access tracks and seismic lines**

- Augmentation and improvement of existing farm access tracks to facilitate safe site access.
- Creation of new access tracks 4m wide.
- Creation of new seismic lines 0.5m wide.
- Ongoing Maintenance of the access tracks and seismic lines.

**B. Establishment of laydown areas**

- Creation of a level laydown area with a maximum pad size of 25m by 25m for each borehole. This equates to a total of 625m$^2$ x 11 = 6875m$^2$ = 0.69ha of vegetation clearing for the boreholes. The test pits require a level laydown area with a maximum pad size of 10m by 10m, however, the test pits will be located within the laydown area of the boreholes and therefore do not require further vegetation clearing.

**C. Borehole Creation, Use and Decommissioning**

- Borehole creation using a drilling rig, reaching depths of around 200 m – 300 m below ground surface
- Excavating the test pits using a track mounted excavator digging pits up to 5 m deep, 1 m wide and 4 m long. Test pits are backfilled immediately after reaching target depth and geotechnical logging and sampling is completed
- Boreholes would be decommissioned within 28 days of completing all drilling, testing, and imaging. This would involve either the Installation of fully grouted vibrating wire piezometers and data logger or backfilling with grout.

**D. Site rehabilitation works, including:**

- Removing all equipment and environmental controls
- Undertaking maintenance works including erosion control of temporary access tracks
- Reinstating areas where a cut/fill benches were created
- Re-seeding access track areas which are not required for future site access

**E. Geophysical Survey Work**
Geophysical survey using seismic refraction tomography (SRT) may be undertaken which involves placing a series of non-destructive geophones on the ground surface, connected by cables and collecting

**F. Survey and Mapping Works**
Minor geophysical survey works may be undertaken as exempt development, under Clause 2.30 of *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008* as part of the development.

**4. RELEVANT HISTORY**

The Assessing Officer could not find any previous approvals for the sites on Council's Mapping System.

**5. REFERRAL COMMENTS**

**Internal Referrals**
The application was refereed to Council's Roads and Drainage Section and Council's Environmental Officer.

Roads and Drainage Section

Advised that overall, the proposed development is considered unlikely to have any significant impact on Council's Road network as the proposal only involves geotechnical investigations conducted over a limited duration with limited heavy vehicle or operational traffic within that period.

Development Compliance Officer

Made recommendations related to conditions of consent and management practices to minimise the environmental impact of the investigation works. These recommendations have been considered in preparing the recommended conditions of consent.

**External Referrals**
The application was referred to NSW Subsidence Advisory and the Department of Planning and Environment-Water (also known as Natural Resources & Access Regulator).

Subsidence Advisory

The subject site is located within a 'subsidence district' identified as being potentially impacted by mine subsidence under the Coal Mine Subsidence Compensation Act 2017. Accordingly, the proposed development is integrated development under the Environmental Planning and Assessment Act 1979 and requiring referral to NSW Subsidence Advisory.

NSW Subsidence Advisory responded to the referral noting that the proposed works do not require the approval of Subsidence Advisory NSW.

Department of Planning and Environment-Water

**Commented [TA1]:** waiting to dept updated comments, thought i would forward to review as this will not take very long to update

The proposed development was lodged as integrated development pursuant to the provisions

of the Water Management Act 1993. The proposed development was referred to the Department of Planning and Environment – Water who advised that the proposed works did not require a controlled activity permit under this legislation and may proceed subject to Council requirements.

**6. ASSESSMENT - Section 4.15 Matters for Consideration**

An assessment of the material presented in the Application against the relevant State and local planning legislation and policy has been undertaken.

**Section 4.15(1)(a)(i) The provisions of any Environmental Planning Instrument (EPI)**

**A. Muswellbrook Local Environmental Plan 2009 (MLEP 2009)**

**Part 2 Permitted or prohibited development**

| | |
|---|---|
| Land use Zone | C3 Environmental Management |
| Proposed Use | Earthworks |
| Permissibility | **Permitted with Consent** |
| Zone Objective | **Complies with Objective** |

Land Use Zone and Permitted Land Use

The development does not propose the establishment of a land use at the site, only the carrying out of geotechnical investigation works as earthworks.

Earthworks are not deemed development types under the Standard Instrument and are therefore not subject to the Land Use Table of the MLEP 2009. The proposed geotechnical investigations are therefore permissible with consent at the Site, as these are works that are not prohibited. Council Officers are satisfied that the proposed works are permissible with consent.

Land use zone objectives

In addition to the land use permissibility the Muswellbrook LEP also requires consideration of the related land use zone objectives. The subject site is zoned a mixture of RU1 Primary Production and C3 Environmental Management.

The objectives under the RU1 Primary Production Zone are as follows:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To encourage diversity in primary industry enterprises and systems appropriate for the area.
- To minimise the fragmentation and alienation of resource lands.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.
- To protect the agricultural potential of rural land not identified for alternative land use, and to minimise the cost to the community of providing, extending and maintaining public amenities and services.
- To maintain the rural landscape character of the land in the long term.
- To ensure that development for the purpose of extractive industries, underground mines (other than surface works associated with underground mines) or open cut mines (other than open cut mines from the surface of the flood plain), will not—

(a) destroy or impair the agricultural production potential of the land or, in the case of underground mining, unreasonably restrict or otherwise affect any other development on the surface, or

(b) detrimentally affect in any way the quantity, flow and quality of water in either subterranean or surface water systems, or
(c) visually intrude into its surroundings, except by way of suitable screening.

- To protect or conserve (or both)—

(a) soil stability by controlling development in accordance with land capability, and
(b) trees and other vegetation, and
(c) water resources, water quality and wetland areas, and their catchments and buffer areas, and
(d) valuable deposits of minerals and extractive materials by restricting development that would compromise the efficient extraction of those deposits.

The proposed development is a temporary use (investigation) and not contrary to the objectives under the RU1 Primary Production Zone.

The objectives under the C3 Environmental Management Zone are as follows:

- To protect, manage and restore areas with special ecological, scientific, cultural or aesthetic values.
- To provide for a limited range of development that does not have an adverse effect on those values.
- To maintain, or improve in the long term, the ecological values of existing remnant vegetation of significance including wooded hilltops, river valley systems, major scenic corridors and other local features of scenic attraction.
- To limit development that is visually intrusive and ensure compatibility with the existing landscape character.
- To allow agricultural activities that will not have an adverse impact on the environmental and scenic quality of the existing landscape.
- To promote ecologically sustainable development.
- To ensure that development in this zone on land that adjoins land in the land zoned C1 National Parks and Nature Reserves is compatible with the objectives for that zone.

The proposed development is a temporary use (investigation) and not contrary to the objectives under the C3 Environmental Management Zone.

**Part 4 Principal Development Standards**

The provisions set out in this Part of Muswellbrook LEP 2009 do not include any controls which affect the carrying out of the proposed development.

**Part 5 Miscellaneous Provisions**

The provisions set out in this Part of Muswellbrook LEP 2009 do not include any controls which affect the carrying out of the proposed development.

**Part 6 Urban Release Area**

The provisions set out in this Part of Muswellbrook LEP 2009 do not include any controls which affect the carrying out of the proposed development.

**Part 7 Additional Local Provisions**

*7.6 Earthworks*

The proposed development involves extensive earthworks for the preparation of the site and the geotechnical investigation. Clause 7.6 of the Muswellbrook LEP states that

(3) Before granting development consent for earthworks, the consent authority must consider the following matters—

*(a) the likely disruption of, or any detrimental effect on, existing drainage patterns and soil stability in the locality,*
*(b) the effect of the proposed development on the likely future use or redevelopment of the land,*
*(c) the quality of the fill or of the soil to be excavated, or both,*
*(d) the effect of the proposed development on the existing and likely amenity of adjoining properties,*
*(e) the source of any fill material or the destination of any excavated material,*
*(f) the likelihood of disturbing relics,*
*(g) the proximity to and potential for adverse impacts on any watercourse, drinking water catchment or environmentally sensitive area.*

Drainage Patterns and Soil Stability - The development involves minor above ground works that will have erosion control measures imposed in accordance with an approved erosion and sediment control plan. The development is unlikely to have any significant impact on the overland flow of rainwater. The underground penetration of the development has been referred to the Department of Planning and Environment-Water who has issued general terms of approval requiring a water licensing approval. This requirement has been included in the recommended condition of consent should the application be approved.

Future Use and redevelopment of the land – The proposed development is part of the initial preliminary works to investigate the potential for future development of the land for the purposes of the Muswellbrook Pumped Hydro Scheme.

Quality of Soil to be excavated – The drilling involved for the geotechnical investigation has been estimated to create around 60 tonnes of dirty water and drill cuttings. A condition has been included requiring drilling waste to be disposed of by a licensed contractor in accordance with the NSW requirements. The Assessing Officer recommends including a condition requiring receipts to be provided to Council confirming that the material has been disposed of to a licensed facility.

Impact on Adjoining properties – Discussed in detail later in this report.

Source or destination of any fill material – Discussed in points above. Condition Imposed.

Likelihood of disturbing relics – A standard Heritage NSW condition has been imposed in relation to uncovering relics:

***Archaeological deposits or Relics***

*The applicant must ensure that if any unexpected archaeological deposits or relics not identified and considered in the supporting documents for this approval are discovered, work must cease in the affected area(s) and the Environmental Protection and Regulation Group of the OEH must be contacted.*

*Additional assessment and approval may be required prior to works continuing in the affected area(s) based on the nature of the discovery.*

Adverse impacts on any watercourse etc – Considered under DPE-Water License.

**B. State Environmental Planning Policies Relevant to Muswellbrook Shire**

| SEPP (Biodiversity and Conservation) 2021 |
|---|
| Satisfactory: ☐ Yes ☐ No ☐ NA |

Chapter 2 Vegetation in non-rural areas

This chapter aims to protect the biodiversity values of trees and other vegetation in non-rural areas of the State, and to preserve the amenity of non-rural areas of the State through the preservation of trees and other vegetation by outlining the types of clearing permitted with or without consent and relevant provisions for the same.

The proposal does not involve the clearing of any native vegetation in a non-rural area and therefore this section of the SEPP does not need to be considered further.

Chapter 3 Koala habitat protection 2020

This Chapter applies in the Muswellbrook Shire Council local government area. This environmental planning instrument encourages the conservation and management of natural vegetation areas that provide habitat for koalas.

Under Schedule 2 of this SEPP, the Central Coast Koala Management Plan is applicable within the Muswellbrook Shire Council. This Chapter applies to land in the following land use zones:

(a) Zone RU1 Primary Production,
(b) Zone RU2 Rural Landscape,
(c) Zone RU3 Forestry.

The land subject to this development application has been identified as RU1 Primary Production and C3 Environmental Management and therefore, this chapter under the SEPP applies if:

i. the land has an area of more than 1ha or
ii. has, together with adjoining land in the same ownership, an area of more than 1 hectare.

The proposed development will require the removal of 0.91 hectares of potential Koala habitat. While this does not trigger the Koala SEPP, the applicant has provided a Biodiversity Assessment considering the potential impacts to flora and fauna caused by the development (discussed later in this report)

Chapter 4, 5 & 13 Koala habitat protection 2021

These Chapters of the SEPP does not apply to Muswellbrook Shire Council.

SEPP (Building Sustainability Index: BASIX) 2004

Satisfactory: ☐ Yes ☐ No ☒ NA

The proposed development is not defined as BASIX Affected Development

SEPP (Housing) 2021

Satisfactory: ☐ Yes ☐ No ☐ NA

The proposal does not involve any affordable or diverse housing as defined under this SEPP and therefore does not need to be considered further.

SEPP (Industry and Employment) 2021

Satisfactory: ☐ Yes ☐ No ☒ NA

Not Applicable

Chapter 3 Advertising and signage

The proposal does not involve any signage and therefore, this chapter under the SEPP does not

need to be considered further.

SEPP No 65—Design Quality of Residential Apartment Development

Satisfactory: ☐ Yes ☐ No ☒ NA

The proposal does not involve any residential apartment development and therefore, this chapter under the SEPP does not need to be considered further.

SEPP (Planning Systems) 2021

Satisfactory: ☐ Yes ☐ No ☒ NA

Chapter 2 State and regional development

The DA will be determined by MSC as the capital investment value is $ 1,888,600.00 and does not meet the requirements for designation as State Significant Development or Regionally Significant Development under the State Environmental Planning Policy (Planning Systems) 2021.

Chapter 3 Aboriginal land

The proposed development is not located within the Aboriginal Land Application Map and therefore this section of the SEPP does not need to be considered further.

SEPP (Primary Production) 2021

Satisfactory: ☐ Yes ☐ No ☒ NA

The proposal does not involve any Primary Production use as defined under this SEPP and therefore does not need to be considered further.

SEPP (Resilience and Hazards (2021)

Satisfactory: ☐ Yes ☐ No ☒ NA

Chapter 2 Coastal Management

The proposed development is not located in a coastal zone and therefore this section of the SEPP is not applicable.

Chapter 3 Hazardous and offensive development

The proposal does not involve any hazardous or offensive development and will not be impacted by any such nearby development and therefore this section of the SEPP does not need to be considered further.

Chapter 4 Remediation of Land

This chapter under the SEPP requires that a consent authority must not consent to the carrying out of any development on land unless:

*(a) It has considered whether the land is contaminated, and*
*(b) If the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out, and*
*(c) If the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.*

Council Officers are unaware of any activities which have carried out on the site likely to have caused the contamination of the land. Furthermore, there are no known previous investigations regarding contamination on the subject land or land use restrictions issued by the EPA. The site seems to be virgin land that has not had any previous development on the site and is therefore unlikely to have any significant contamination.

It is considered that the subject site is unlikely to be affected by contamination requiring remediation in accordance with the SEPP due to the nature of the proposed works. The proposed development may therefore proceed without the need to further consider the provisions of this SEPP

| SEPP (Resources and Energy) 2021 |
|---|
| Satisfactory: ☐ Yes ☐ No ☒ NA<br><br>Chapter 2 Mining, petroleum production and extractive industries<br><br>The proposal does not involve any development outlined under this SEPP.<br><br>Chapter 3 Extractive industries in Sydney area<br><br>Not within applicable area. |

| SEPP (Transport and Infrastructure) 2021 |
|---|
| Satisfactory: ☐ Yes ☐ No ☒ NA<br><br>Chapter 2 Infrastructure<br><br>The proposed development application does not involve any such development as outlined under part 2.3 of this SEPP and therefore does not need to be considered further.<br><br>Chapter 3 Educational establishments and child care facilities<br><br>The proposal does not involve any educational establishments or child care facilities and therefore does not need to be considered further.<br><br>Chapter 4 Major infrastructure corridors<br><br>This chapter applies to all land:<br>➢ in a future infrastructure corridor; or<br>➢ within 25 in any direction of a future infrastructure corridor<br><br>The proposal does not involve any development on the land to which this SEPP applies and therefore does not need to be considered further. |

**Section 4.15(1)(a)(ii) the provisions of any draft EPI.**

There are no draft EPIs relevant to the subject Application.

**Section 4.15(1)(a)(iii) the provisions of any development control plan**

**Muswellbrook DCP 2009**

| **Section 3 Site Analysis** |
|---|
| Satisfactory: ☒ Yes ☐ No ☐ NA |

| | |
|---|---|
| A site and other relevant documentation has been provided with the application. | |
| **Section 5 Subdivision** | |
| Satisfactory: ☐ Yes ☐ No ☒ NA | |
| **Section 6 Residential Development** | |
| Satisfactory: ☐ Yes ☐ No ☒ NA | |
| **Section 7 Village Zones** | |
| Satisfactory: ☐ Yes ☐ No ☒ NA | |
| **Section 8 Rural and Environmental Zones** | |
| *8.2 Built Form* | |
| *8.2.1 Scenic Protection and Building Location* | The controls under this section of the DCP relate to new buildings constructed in rural zones and minimisation of their impact on the natural landscape. The proposed development does not involve any new buildings, however, there will heavy machinery on the site for 12 weeks. The subject site is located away from any residential dwellings and screened by trees and therefore is not expected to have a significant impact on the scenic qualities of the locality. |
| *8.2.2 Setbacks* | No buildings proposed, development will be over 50m from any public road. **Complies** |
| *8.2.3 Colours and Materials* | No buildings proposed, not applicable. |
| *8.2.4 Car Parking and Access* | The development will increase the number of heavy vehicles accessing Dolahentys Road for a period of 12 weeks. This has been discussed in detail later in this report. **Conditions Imposed for management.** |
| *8.2.5 Temporary Dwellings* | **Not applicable.** |
| 8.3 Environmental Matters | |
| *8.3.1 Topography* | The development will involve laydown areas for:<br>11 boreholes (11 x 25m x 25m = 6875m$^2$)<br><br>In addition to this, access tracks will be created which will require minor filling around existing culverts to provide safe access.<br><br>A condition is proposed requiring the submission of a detailed soil erosion and sediment control plan to be approved by Council prior to the commencement of the work. |
| *8.3.2 Vegetation* | The development will involve clearing of trees and vegetation for the establishment of the level pads and the access tracks. The applicant has provided a Biodiversity Assessment assessing the impacts of the development against the relevant legislation and found to be compliant. The report also outlines measures to mitigate or minimise damage to vegetation and species habitat.<br><br>Council's Assessing Officer has reviewed the Biodiversity Assessment and found the proposed measures to be satisfactory and recommend a condition of consent requiring the development to be carried out in accordance with the measures outlined in the Biodiversity Assessment. |
| *8.3.3 Riparian Buffers* | The development will require a controlled activity approval from DPE-Water, discussed earlier in this report. |

| | |
|---|---|
| *8.3.4 Management of Rivers, Creeks, Streams and Drainage* | As above. |
| *8.3.5 Services* | Not relevant. |

**Section 9 - Local Centre Development**

Satisfactory: ☐ Yes ☐ No ☒ NA

**Section 10 – Industrial Development**

Satisfactory: ☐ Yes ☐ No ☒ NA

**Section 11 – Extractive industry**

Satisfactory: ☐ Yes ☐ No ☒ NA

**Section 12 – tourist facilities and accommodation**

Satisfactory: ☐ Yes ☐ No ☒ NA

**Section 13 – Flood Prone Land**

Satisfactory: ☐ Yes ☐ No ☒ NA

**Section 14 Outdoor Signage**

Satisfactory: ☐ Yes ☐ No ☒ NA

**Section 15 Heritage Conservation**

Satisfactory: ☐ Yes ☐ No ☒ NA

**Section 16 Car Parking and Access**

Satisfactory: ☐ Yes ☐ No ☒ NA

**Section 17 – sex services and restricted premises**

Satisfactory: ☐ Yes ☐ No ☒ NA

**Section 18 – Child Care Centres**

Satisfactory: ☐ Yes ☐ No ☒ NA

**Section 19 – Use of Public Footpaths**

Satisfactory: ☐ Yes ☐ No ☒ NA

**Section 20 – Erosion and Sediment Control**

Satisfactory: ☐ Yes ☐ No ☒ NA

Soil Erosion and Sediment control plan conditioned to be provided.

**Section 21 – Contaminated land**

Satisfactory: ☐ Yes ☐ No ☐ NA

Discussed under remediation SEPP considerations.

**Section 22 – Land use Buffers**

Satisfactory: ☐ Yes ☐ No ☒ NA

**Section 23 – On-Site Sewage Management**

Satisfactory: ☐ Yes ☐ No ☒ Not Applicable

**Section 24 – Waste Minimisation and Management Systems**

Satisfactory: ☐ Yes ☐ No ☒ Not Applicable

The following waste is expected to be created by the development:

Table 6-5: Expected waste streams associated with the geotechnical investigations

| Waste Stream | Description |
|---|---|
| Green waste | From the clearing of vegetated areas including both native and exotic vegetation species for access tracks and test pit and borehole sites. |
| Excavation waste /spoil | Spoil material generated from geotechnical investigation works. |
| Wastewater | Approximately 60 tonnes of liquid wastewater from the geotechnical investigation drilling works will be generated and potential for stormwater runoff. |
| General wastes | This includes site work area waste, scrap materials, recyclables (aluminium cans, glass etc.) and putrescible waste. |

| |
|---|
| Other than general construction waste, there will be additional excavation waste and waste water.<br><br>The management of this waste is regulated by the state and therefore Council's Assessing Officer has included a condition requiring the drilling waste to be disposed of by a licensed contractor in accordance with the NSW requirements. The Assessing Officer recommends including a condition requiring receipts to be provided to Council confirming that the material has been disposed of to a licensed facility. |
| **Section 25 – Stormwater Management** |
| Satisfactory: ☒ Yes ☐ No ☐ Not Applicable |
| The development does not involve any construction works that will increase hardstand space on the site. The development does, however, involve earthworks that can change the natural flow of stormwater on the site and the site is suitably setback from any nearby development and therefore is not likely to impact these developments. The Assessing Officer has included a condition for a Soil Erosion and Sediment control plan to be prepared for the site to ensure that the stormwater flow does not cause soil erosion issues in the locality due to the development. |
| **Section 26 – Site Specific Controls** |
| Satisfactory: ☐ Yes ☐ No ☒ Not Applicable |
| **Section 27 – West Denman Urban Release Area** |
| Satisfactory: ☐ Yes ☐ No ☒ Not Applicable |
| **Section 28 – Muswellbrook Showground** |
| Satisfactory: ☐ Yes ☐ No ☒ Not Applicable |

**Section 4.15(1)(a) (iiia) the provisions of any planning agreement**

There are no planning agreements relevant to the subject Application.

**Section 4.15(1)(a)(iv) the provisions of the regulations**

Division 8A of the Environmental Planning and Assessment Regulation 2000 applies to the development.

Development Contributions

The cost of works for the proposed development is $1,888,600.00. A developer contribution under s 7.12 of the EP&A Act of $18,886.00 will apply to the proposed development should the Application be approved.

**Section 4.15(1)(a)(v) the provisions of any coastal zone management plan**

Not applicable - The Application does not relate to a coastal area.

**Section 4.15(1)(b) the likely impacts of that development**

**Context and Setting**
The application does not involve the construction of any buildings. Visual impacts of clearing and access track construction related to these works would be limited and would present no significant long-term impact on the existing context and setting.

**Potential Impact on Adjacent Properties**
The proposed development would have a limited impact on the amenity of neighbouring properties. The proposed works would be carried out over 12 weeks. During this period there is the potential for noise, lighting and traffic impacts in the locality related to the construction work. Noise, Vibration and Traffic Impact Assessment's prepared in relation to the application indicate that related impacts would not have a significant adverse impact on the amenity of neighbouring properties.

**Access, Transport and Traffic**

A Traffic Impact Assessment has been prepared for the development. The table below identifies the number of traffic movements anticipated for the upper and lower geotech investigation works for the duration of mobilisation and demobilisation parts of their work programme – more limited traffic volumes were expected outside these peak periods.

Table 2-1: Estimated Heavy and Light Vehicle Movements (one-way)

| Task Name | Vehicle Type | No. of one-way vehicle movements per day- Lower Reservoir | No. of one-way vehicle movements per day- Upper Reservoir | Total no. of one-way heavy vehicle movements per day |
|---|---|---|---|---|
| Site mobilization and demobilisation (first/ last few days) | Medium Rigid Truck | 12 | 12 | 24 |
| Geotechnical investigation works | Light Vehicles | 8 | 8 | 16 |
| | Medium Rigid Truck (water cart plus sucker truck) | 4 | 4 | 8 |

Vehicles would access the site via New England Highway onto Sandy Creek and Dolahentys Road and then a private property located at 250 Dolahentys Road, McCullys Gap.

Council Officers are satisfied that the traffic described in that report could be accommodated by and is unlikely to have any significant impact on the local road network.

**Air/Microclimate**
The proposed works will be physically separated from residential receivers in the locality. The works would involve the disturbance of soil and related dust exposures. The applicant has outlined the following measure below to reduce the development impact on air quality:

*When accessing the Site along unsealed roads:*
- *Maintain a speed that limits dust generation behind moving vehicles. If dust plumes are observed, slow down*
- *Accelerate and decelerate slower than on sealed roads, to avoid wheel spinning that could generate dust*

*During construction and maintenance of the drilling cut/fill pad:*
- *Limit the size of exposed material within practicable safe limits*
- *During periods of hot, windy weather, spray clean water on the exposed material to limit dust generation potential*

Where carried out in accordance with the above and best practice sediment and erosion control management, the project is not anticipated to have significant air quality impacts.

**Flora and Fauna**
The proposed development would involve vegetation clearing related to the establishment of access tracks and set down areas for the geotechnical investigations. An Ecological Assessment has been prepared to quantify the clearing and consider its likely impacts on significant and threatened species.

This report has identified that the proposed clearing would not have a significant impact on ecological communities and would not exceed trigger levels within the Biodiversity Conservation Act 2016 that require additional investigations or the establishment of off-sets under that legislation.

**Waste**
Commentary has been included under the DCP Waste minimisation management heading

related to the waste generation and management associated with the proposed development. Where the development is carried out in accordance with proposed waste management strategies it is unlikely to have an adverse related impact on the environment.

**Noise & Vibration**
A noise and vibration assessment has been carried out to assess the potential noise and vibration impacts that may be generated by the geotechnical investigation work.

The report identifies potentially affected noise and vibration sensitive receivers. There are no exceedances of the standard hours noise management levels predicted at any sensitive receivers for any bore hole locations. Construction noise levels are predicted to be well below the highly affected NML of 75 dB(A).

The report has outlined best-practice standard noise mitigation measures to be implemented. Council Officers have reviewed this information and is satisfied that the proposed mitigation measures are satisfactory.

**Natural Hazards**
The site has been identified to Bushfire prone. The proposed works are temporary in nature and therefore no specific bushfire requirements are outlined in Planning for Bushfire Protection 2019. The Assessing Officer recommends including a condition to restrict any works on days identified on the Bushfire Danger index as Extreme or Catastrophic.

**Social and Economic Impact on the Locality**
The proposed development is temporary in nature and not expected to have any long term social or economic impact in the locality.

**Cumulative Impacts**
The proposed development will assist with the design of a potential pumped hydro battery storage system on Bell's Mountain. The impacts of that development are not within the scope of the development at this stage and will need to be considered at the later stages of the development, should it proceed.

**Section 4.15(1)(c) the suitability of the site for the development**

The proposed development is compatible with surrounding land uses and site characteristics, subject to consent conditions.

**Section 4.15(1)(d) any submissions made**

The Application was notified to adjoining owners from 18/08/2023 – 14/09/2023. A notice was also placed on Council's website and Facebook page at the commencement of the notification period.

One (1) submission was received during the notification period.

The applicant has submitted a response to the concerns raised. In addition to this document, Council Officers have completed their own review ad provide the following comments:

| Submitter Concern | Planning Comment |
|---|---|
| The project will have a detrimental impact to the environment and natural habitats | The environmental impacts raised were associated with the full Bells Mountain Pumped Hydro Project not just this development application.<br><br>It is important to recognise that that Council is not determining an application for a pumped Hydro project. |

| | |
|---|---|
| | The applicant has engaged appropriately qualified consultants to undertake ecological, aboriginal due diligence, noise and traffic impact assessments. Each of these investigations identify that the proposed development would not have significant adverse environmental impacts. Council Officers have had regard to these reports and completed their own review of associated environmental impacts and are satisfied that development application may be supported with conditions. |
| Concerns relating to Dust and noise having a detrimental impact to the residents | The applicant has proposed several measures to minimise noise dust such as speed limits and operational limits. The proposed development is located over 250 to the nearest dwelling.<br><br>The development is only for geotechnical drilling and expected to last for around 12 weeks. Noting the physical separation of drill rigs from adjoining properties and the limited duration of works dust associated with the works are anticipated to be limited. |
| Opposition to the Pumped Hydro Project as it will destroy the integrity of Bell's Mountain | Council is required to assess and determine the development before it.<br><br>Council does not have full details of the Pumped Hydro Project to assess impacts – this will be the subject of a further Development Application.<br><br>Refusal of the application for reasons associated with the concept of a future pumped hydro project could be challenged through the Land and Environment Court. |

Council Officers have considered the matters raised in the submissions and consider that the proposal may be approved subject to conditions

**Section 4.15(1)(e) the public interest.**

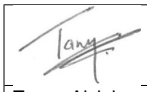
It is considered that the proposal is in the public interest.

**7. CONCLUSION**

The proposed development has been assessed against the relevant heads of consideration of Section 4.15 of the Environmental Planning and Assessment Act 1979. As outlined above it is considered that the proposed development would be in accordance with the relevant planning provisions.

Accordingly, it is recommended the application be approved subject to conditions of consent.

| | |
|---|---|
| Signed by: | |

| | |
|---|---|
|  | |
| Tanya Alsleben | |
| **Development Planner** | |
| Date: 11/03/2024 | |

**IDENTIFICATION OF APPROVED PLANS**

**(1) Approved Plans and Supporting Documents**

Development must be carried out in accordance with the following approved plans and supporting documentation (stamped by Council), except where the conditions of this consent expressly require otherwise.

| Document Title. | Ver. No. | Prepared By. | Dated. |
|---|---|---|---|
| Statement of Environmental Effects (As amended by DA Amendment) | 1 | SMEC Australia Pty Ltd | 11/06/2023 |
| Letter requesting amendment to DA | | EMM Consulting | 09/02/2024 |
| Traffic Impact Assessment | | SMEC Australia Pty Ltd | 0906/2023 |
| Revised Noise and Vibration Assessment | F | Resonate | 17/01/2024 |
| Flora and Fauna Assessment | 1 | EMM Consulting | 09/02/2024 |
| Aboriginal Heritage Management | - | Extent Heritage Pty Ltd | 08/06/2023 |

In the event of any inconsistency between the approved plans and the supporting documentation, the approved plans prevail. In the event of any inconsistency between the approved plans and a condition of this consent, the condition prevails.

***Note***: an inconsistency occurs between an approved plan and supporting documentation or between an approved plan and a condition when it is not possible to comply with both at the relevant time.

*Reason: To ensure all parties are aware of the approved plans and supporting documentation that applies to the development*

**(2) General Terms of Approval**

The development is to be carried out in accordance with the General Terms of Approval issued by the following approval bodies and referenced below:

a) NSW Subsidence Advisory, General Terms of Approval reference No TBA23-02653, dated 21 August 2023.

These General Terms of Approval have been stamped with Council's Approval Stamp and form part of this Notice of Determination.

Note: the application was referred to Department of Planning and Environment – Water, who advised the works did not require General Terms of Approval under the Water Management Act 2000.

*Reason: prescribed, legislated.*

**CONDITIONS THAT MUST BE ADDRESSED PRIOR TO COMMENCEMENT**

**(3) Environmental Management Plan (EMP)**

Prior to the commencement of works, an environmental management plan (EMP) must be submitted to and approved by Council. The plan must include the following matters identified in Table 6-6 Safeguards and management measures in the approved Statement of Environmental Effects.

*Reason: To require details of measures that will protect the public, and the surrounding environment, during site works and construction.*

**(4) Section 7.12 Contributions**

Pursuant to section 4.17(1) of the Environmental Planning and Assessment Act 1979, and the Muswellbrook Shire Council Section 94A Development Contributions Plan 2010, a contribution of $18,886.00 shall be paid to Muswellbrook Shire Council.

The amount to be paid is to be adjusted at the time of the actual payment, in accordance with the provisions of the Muswellbrook Shire Council Section 94A Development Contributions Plan 2010. The contribution is to be paid prior to the commencement of works.

*Reason: Prescribed by legislation through Section 7.11 of the Environmental Planning and Assessment Act 1979 and Council's Section 94A Contribution Plan*

**(5) Section 138 Permit**

Prior to commencing of any works, a permit must be obtained from Council, under Section 138 of the Roads Act 1993.

A traffic Management Plan is to be submitted to Council with any Section 138 application detailing traffic management controls to be implemented through the development for the management of traffic. The Traffic Management Plan is to be developed by a suitably qualified Traffic Engineer.

*Reason: ensure safe movement of heavy vehicles and comply with Roads Act requirements.*

**(6) Site Sign**

A sign must be erected in a prominent position at any entry point to the work site work site:

a) stating that unauthorised entry to the work site is prohibited,
b) showing the name of the principal contractor (or person in charge of the work site), and a telephone number at which that person may be contacted at any time for business purposes and outside working hours, and
c) showing the name, address and telephone number of the Council.

Any such sign must be maintained while to building work or demolition work is being carried out but must be removed when the work has been completed.
This condition does not apply to building works being carried out inside an existing building.

*Reason: Prescribed Condition under Clause 70 of EP&A Regulation*

**(7) Complaints Management**

The person acting with this consent is to prepare a complaint management procedure in relation to noise and dust complaints associated with the works. The procedure must detail a process for receiving, investigating, acting on and the reporting of complaints received during the carrying out of works.

Prior to the commencement of works a written notice is to be provided to neighbouring property owners and nearby residential receivers identified in the documentation accompanying this development application advising those individuals of the phone number and any other relevant contact information for making complaints related to the works. A site sign is also to be installed at a prominent position at the Limestone Road site access displaying this contact information.

A copy of the complaint management procedure is to be submitted to Muswellbrook Shire Council prior to the commencement of works along with evidence demonstrating compliance with the other requirements of this condition.

*Reason: ensure the development incorporates measures to address impacts on adjoining properties where they arise through the carrying out of work.*

**CONDITIONS THAT MUST BE COMPLIED WITH DURING THE CARRYING OUT OF WORKS**

**(8) Archaeological deposits or Relics**

The applicant must ensure that if any unexpected archaeological deposits or relics not identified and considered in the supporting documents for this approval are discovered, work must cease in the affected area(s) and the Environmental Protection and Regulation Group of the OEH must be contacted.

Additional assessment and approval may be required prior to works continuing in the affected area(s) based on the nature of the discovery.

*Reason: Prescribed by legislation*

**(9) Erosion and Sediment Controls**

At all times erosion and sediment controls are to be maintained across the site in accordance with the Construction Environmental Management Plan and the requirements of this approval.

*Reason: manage soil erosion impacts.*

**(10) Damage to Adjoining Properties**

All precautions must be taken to prevent any damage likely to be sustained to adjoining properties. Adjoining owner property rights must be observed at all times. Where damage occurs to adjoining property all necessary repair or suitable agreement for necessary repairs are to be undertaken by the applicant in consultation with, and with the consent of, the affected property owner.

*Reason: To ensure that the development does not have any lasting negative impact on adjoining properties*

**(11) Damage to Public Infrastructure**

The applicant shall bear the cost of all restoration works to Council property damaged during this development. The applicant shall submit to Council, in writing and/or photographic record, evidence of any existing damage to Council property before commencement of work.

Note: This documentation will be used to resolve any dispute over damage to infrastructure. If no documentation is received prior to commencement of work, it will be assumed that the infrastructure was undamaged, and the applicant will be required to restore all damaged infrastructure at their expense.

*Reason: Protection of Council infrastructure*

**(12) Rehabilitation**

Prior to the completion of works rehabilitation of the site including bore holes and test pits is to be completed in accordance with the Statement of Environmental Effects and industry best practice.

*Reason: ensure the site is appropriately remediated and left in safe condition at the completion of works.*

**Bush Fire Mangement**

Drilling and excavations activities that may generate sparks are not to occur on declared total fire ban days or on days identified on the Bushfire Danger index as Extreme or Catastrophic.
*Reason: to minimise the potential for bush fire resulting from undertaking the works.*

[redacted]

To whom it may concern

Development Application number : 2023/78

I am putting in writing my OBJECTION to the proposed 'Geotechnical Drilling & Minor Vegetation Clearing'

My Family has lived in McCullys Gap since the mid 1970's. We have put up with the noise and dust pollution from Muswellbrook Coal for that entire time.

I was elated to hear that Muswellbrook Coal shut down operations!! But then utterly enraged to hear the proposed idea of a 'Hydro Scheme' to go on top of our beautiful mountain 'Bells'.

So first you allowed for Bells mountain to be dug under and next to, wasn't that enough to hurt the heart of Bells? But no, now you are proposing to damage it from above as well. I could not think of a more idiotic idea.

This will destroy the integrity of our mountain, you will open it up and damage it beyond belief.

The noise from further work will be constant, as well will be dust.

All of this should have been taken into consideration before shutting down our coal powered power stations, you do know that we are about the only country shutting these down? A lot of countries are building more! The amount of environmental damage that Australia is doing to world is very minimal, sustainable energy is a load of codswallop .

Why is it that McCullys Gap has to have not only this idiotic proposed 'Hydro Scheme', but solar panels as well as the flaming windfarm at opposite ends of the valley????? Please answer that.

I OBJECT, I OBJECT, I OBJECT, I OBJECT, I OBJECT, I OBJECT, I OBJECT, I OBJECT, I OBJECT, I OBJECT!

To any work that is detrimental to Bells Mountain and is associated with proposed Hydro Scheme on Bells Mountain!!

From a local that is greatly concerned

[redacted]

Level 3 175 Scott Street
Newcastle NSW 2300
02 4907 4800
www.emmconsulting.com.au

9 February 2024

Sharon Pope
Director Environment and Planning
Muswellbrook Shire Council
via email

**Re: Muswellbrook Pumped Hydro Energy Storage Upper Reservoir Geotechnical Investigation (DA2023/78) - Amendment**

Dear Sharon,

# 1 Introduction

A Geotechnical Investigation Development Application (DA2023/78) was lodged on 11 August 2023 to Muswellbrook Shire Council (MSC) by the Muswellbrook Pumped Hydro Company Pty Ltd (MPH) to facilitate geotechnical investigations within the upper reservoir area of the proposed Muswellbrook Pumped Hydro Energy Storage Project (the project) which is currently subject of prefeasibility and environmental assessment.

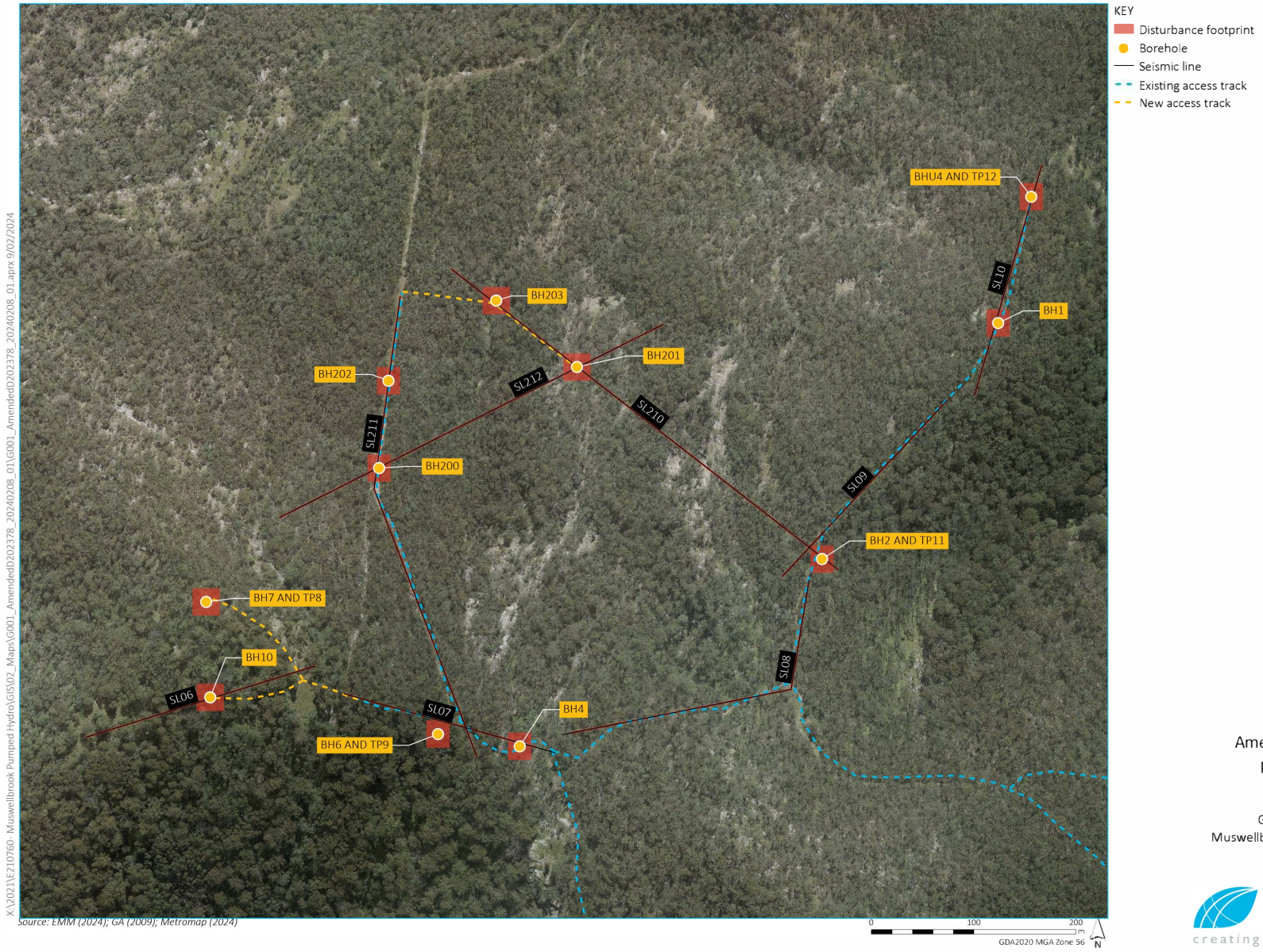
DA2023/78 and the supporting Statement of Environmental Effects (SMEC 2023; SoEE), was publicly exhibited by MSC between 17 August 2023 and 14 September 2023.

Since this time, further design assessment has been completed and MPH seek an amendment to the project in accordance with Division 2, Section 37 (1) of the *Environmental Planning and Assessment Regulation 2021* (EP&A Regulation) which allows an applicant to apply to the consent authority for an amendment to the development application at any time prior to its determination.

The proposed amendment project is outlined below and identified in

Figure 1.1:

- Removal of four boreholes and associated tracks proposed in the SoEE, including BHU1, BHU2, BHU3 and BHU5
- Addition of four new boreholes and associated tracks, identified as BH200, BH201, BH202 and BH203
- Addition of nine seismic lines (SL, 0.5m wide) between the boreholes, identified as SL 211, SL212, SL210, SL06, SL07, SL08, SL09 and SL10
- Boreholes BH1, BH2, BH4, BH6, BH7 and BH10 are maintained under the amended project as per the SoEE
- All test pits (TP) proposed within the SoEE are maintained under the amended project including TP8, TP9, TP11 and TP12. All test pits are located on borehole pads.




Amended D2023/78
project overview

Geotech Amendment
Muswellbrook Pumped Hydro
Figure 1.1

EMM
creating opportunities

# 2 Planning and strategic context

The planning context and strategic context remain unchanged to that presented in Section 2 of the SoEE, and as such is not duplicated within this document.

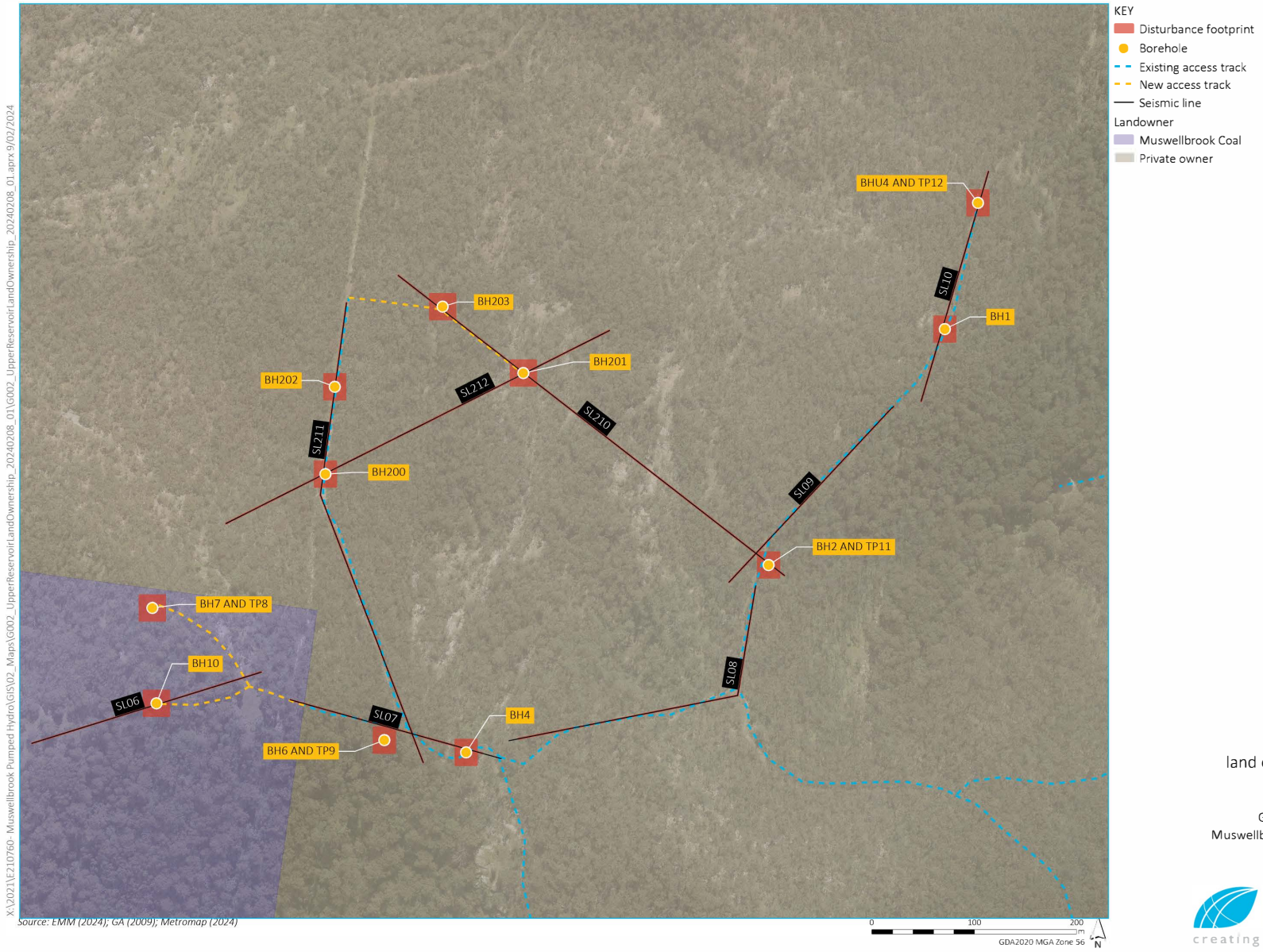
# 3 Site description

The addition of four new boreholes and seismic lines will increase the number of land parcels within the project area. The geotechnical investigations comprise works within, or access gained via the land parcels under the amended project are outlined in Table 3.1 below.

Figure 3.2 provides a map of land ownership within the upper reservoir portion of the overall proposed PHES project. The proposed geotechnical investigations will not traverse any crown land lots; however, access will be gained to the test sites along tracks which are in the near vicinity of mapped crown lands.

**Table 3.1 Parcel details**

| Nature of works | Parcel details |
|---|---|
| Access | Lot 126 DP752444, 250 Dolahentys Road McCullys Gap 2333<br>Lot 5 DP1178473, 250 Dolahentys Road McCullys Gap 2333<br>Lot 1 DP113760, 250 Dolahentys Road McCullys Gap 2333<br>Lot 167 DP752444, 250 Dolahentys Road McCullys Gap 2333<br>Lot 85 DP752484, 250 Dolahentys Road McCullys Gap 2333<br>Lot 84 DP752484, 250 Dolahentys Road McCullys Gap 2333<br>Lot 23 DP752484, 250 Dolahentys Road McCullys Gap 2333<br>Lot 24 DP752484, 250 Dolahentys Road McCullys Gap 2333<br>Lot 1 DP134665 Muscle Creek Road Muscle Creek 2333<br>Lot 1 DP398873 Muscle Creek Road Muscle Creek 2333 |
| Geotechnical works | Lot 93 DP752484, 250 Dolahentys Road McCullys Gap 2333<br>Lot 100 DP666041, Coal Road Muswellbrook 2333<br>Lot 183 DP752484, 820 Sandy Creek Road McCullys Gap 2333<br>Lot 5 DP1178473, 250 Dolahentys Road McCullys Gap 2333 |




Upper reservoir
land ownership detail

Geotech Amendment
Muswellbrook Pumped Hydro
Figure 3.1

EMM
creating opportunities

# 4 Amendment description

The geotechnical drilling will be undertaken in the same manner as described in the SoEE. The site access, work hours, traffic movements, decommissioning and rehabilitation will remain unchanged.

A comparison of the original proposed project and the proposed amendment is provided in Table 4.1 and presented in

Figure 1.1.

**Table 4.1 Amended project details**

| Element | Original project | Amended project |
|---|---|---|
| Number of boreholes and test pits | Eleven boreholes and four test pits:<br>• BH1<br>• BH2 and TP11<br>• BH4<br>• BH6 and TP9<br>• BH7 and TP8<br>• BH10<br>• BHU1<br>• BHU2<br>• BHU3<br>• BHU4 and TP12<br>• BHU5. | Eleven boreholes and four test pits:<br>• BH1<br>• BH2 and TP11<br>• BH4<br>• BH6 and TP9<br>• BH7 and TP8<br>• BH10<br>• BHU4 and TP12<br>• BH200<br>• BH201<br>• BH202<br>• BH203. |
| Seismic lines | Geophysical surveys utilising seismic refraction tomography profiling between boreholes within existing and cleared access tracks. | Revised seismic lines, inclusive of eight defined seismic lines between boreholes located on both existing access tracks and vegetation, up to 835m in length and 0.5m wide: SL 211, SL212, SL210, SL06, SL07, SL08, SL09 and SL10 |
| Upper reservoir access tracks | Approximately 750 m of access tracks to be developed for access to borehole locations. | Approximately 675 m of access tracks to be developed for access to borehole locations, being approximately 4m wide. |
| Clearing area – native vegetation | 0.9875 ha | 0.91 ha |

# 5 Statutory Assessment

The statutory assessment remains unchanged to that presented in Section 5 of the SoEE.

Noting, Division 2, Section 37 (1) of the EP&A Regulation allows an applicant to apply to the consent authority for an amendment to the development application at any time prior to its determination. As such facilitating this amendment.

## 5.1 Muswellbrook Local Environment Plan 2009

The site is subject to the provisions of the *Muswellbrook Local Environment Plan 2009*. The amended site includes two additional lots, both of which are zoned as C3 Environmental Management. The objectives of this zone are detailed in the SoEE and the conclusion that the proposed investigations are consistent with these objectives remains the same.

# 6 Evaluation of impacts

## 6.1 Impact assessment summary

As described in Section 4, the amended project is smaller in scope than that assessed in the SoEE. As such, a substantial change in impacts is not anticipated. The potential impacts of the proposed amendment is provided in Table 6.1.

As result of the amended project, biodiversity and noise assessment were revised to consider relevant changes as documented in Section 1. These environmental elements are considered in Table 6.1, with key assessment outcomes discussed in the following sections.

**Table 6.1 Summary of impacts**

| Environmental element | Potential impacts |
|---|---|
| Biodiversity | The amended project would result in a decrease in the area of clearing, from 0.94 ha in the SoEE to 0.91 ha.<br>The amended project disturbance area in relation to biodiversity impacts were assessed, see Flora and Fauna Assessment (FFA, EMM 2024), available within Appendix A and further discussed in Section 6.2 of this report.<br>The residual impacts of the amended project are summarised below:<br>• clearing of 0.91 ha of native vegetation and fauna habitat<br>• impacts to potential habitat for 1 threatened flora species and 1 endangered population, 20 threatened fauna species and one migratory species<br>• indirect impacts to retained vegetation and fauna habitat<br>**No additional mitigation measures are required.** |
| Aboriginal heritage | As identified in the SoEE, the study area was overgrown with thick vegetation. Ground surface visibility was reduced in some areas due to vegetation cover. Some borehole locations could not be accessed during survey efforts.<br>The report concluded that there was low potential for Aboriginal archaeology to exist in areas that were surveyed. For the areas that were not surveyed, given that they are in directly analogous environments to those locations that were accessed, and where no artefacts were identified, it is reasonable to conclude that these locations also have low potential for Aboriginal artefacts to exist there.<br>The proposed amendments to the project will decrease the area of surface impact required for the geotechnical investigations.<br>The mitigation measures identified in the SoEE remain applicable:<br>• A Change Find Procedure be adopted during works and monitoring by a qualified archaeologist.<br>• If unexpected artefacts are identified during project works at any of these locations, an AHIP may be required to proceed with the works.<br>In addition to the above controls and as discussed with consulted Aboriginal parties, Aboriginal cultural monitors will be present at site during any clearing activities to monitor activities and provide advice should cultural materials be identified, both within areas identified within the SoEE and the amended project activity areas. |
| Non-Aboriginal heritage | No non-Aboriginal heritage items will be disturbed as part of the proposed amendments.<br>**No additional mitigation measures are required.** |

**Table 6.1 Summary of impacts**

| Environmental element | Potential impacts |
|---|---|
| Noise and vibration | The Noise Assessment and Vibration Assessment (Resonate, 2023) which informed the SoEE was updated to reflect the amended project and is available as Appendix B of this report.<br>The revised noise assessment (Resonate, 2024) assessed geotechnical borehole drilling works with a piling rig (bored), water cart and light vehicles. It identified that noise levels are not predicted to exceed the standard hours noise management levels at sensitive receivers for any of the bore hole locations. The proposed amendments result in some activities being located approximately 200m closer to residential receptors, however residential receptors are in excess of 1km away.<br>The proposed amendments include out-of-hours work. No exceedances of the day, evening, or night out-of-hours criteria are predicted to occur at any residential receivers.<br>The assessment also considered vibration impacts associated with drilling and access track development works. The works were assessed to comply with safe working distances for potential building damage and not result in vibration levels above human comfort criteria.<br>**No additional mitigation measures are required.** |
| Traffic and access | There would be no change in the site access point for the proposed works, and no change in the number of vehicles movements.<br>**No additional mitigation measures are required.** |
| Waste | The proposed amendments would result in a decrease in vegetation clearing, and therefore a decrease in green waste. All other waste streams would be similar to that assessed in the SoEE.<br>The management of waste generated streams generated from the upper reservoir geotechnical investigation will be defined in the geotechnical investigations works Environmental Management Plan (EMP) inclusive of waste disposal options.<br>**No additional mitigation measures are required.** |
| Surface Water | The proposed amendments would not result in any significant changes to the surface water environment.<br>An erosion and sediment control plan would be prepared in accordance with Managing Urban Stormwater: Soils and Construction (Landcom, 2004) and included in the EMP.<br>A Controlled Activity approval would also be sought for these works under the *Water Management Act 2000* for works within the C3 Environmental Management Zone as mapped on the *Muswellbrook Local Environment Plan 2009*.<br>**No additional mitigation measures are required.** |
| Groundwater | The proposed amendments would not result in any significant changes to the groundwater environment to that identified within the SoEE.<br>**No additional mitigation measures are required.** |

## 6.2 Biodiversity

A new FFA has been prepared for the amended project, and is available as Appendix A.

### 6.2.1 Direct impacts

The amended project requires clearing for boreholes, access tracks and the installation of seismic lines. The works would result in the removal of shrubs and groundcovers, while avoiding the removal of any trees greater than 10 cm diameter at breast height (DBH).

Direct impacts to native vegetation are identified in Table 6.2.

**Table 6.2 Direct impacts to native vegetation**

| Plant community types (PCT) | Original area (ha) | Amended area (ha) |
|---|---|---|
| PCT 3439 Hunter Escarpment Grey Gum Forest<br>PCT 3525 Upper Hunter Box-Blakely's Red Gum Grassy Forest | 0.94 | |
| PCT 3525 Upper Hunter Box-Blakely's Red Gum Grassy Forest | - | 0.91 |
| Total change in clearing compared to original project | | -0.03 |

### 6.2.2 Threatened and migratory species

The biodiversity assessment for the original project identified four threatened flora species with a moderate likelihood of occurring in the study area, none of which were recorded during field survey. In addition, the assessment identified 32 threatened or migratory fauna species with a moderate to high likelihood of occurrence.

The assessment for the amended project identified one threatened flora species and one endangered population with moderate to high likelihood of occurrence. In addition, the assessment identified 21 threatened or migratory fauna species with a moderate to high likelihood of occurrence.

Assessments of significance under the *Biodiversity Conservation Act* (BC Act) and *Environment Protection and Biodiversity Conservation* (EPBC Act) were prepared for species with a moderate to high likelihood of occurrence in the study area for both the original and amended project areas. These assessments concluded that the project would not result in a significant impact to threatened or migratory fauna.

### 6.2.3 Indirect impacts

Indirect impacts associated with the original and amended project will remain substantially unchanged, and include:

- weed introduction and spread
- potential inadvertent disturbance of retained habitats
- removal of habitat resources for threatened fauna
- temporary increased noise, vibration and dust levels resulting in disturbance of fauna species, and consequent abandonment of habitat, or changes in behaviour (including breeding behaviour)
- temporary change to surface runoff and sedimentation.

### 6.2.4 Summary

The hierarchy of avoid, minimise and mitigate has been used in the development of the disturbance footprint. This has included avoidance (wherever feasible) of key biodiversity values identified during the field investigations. Habitat trees (dead stags) have been avoided.

Assessments of significance were prepared under the BC Act and EPBC Act. These assessments determined that the project will not result in a significant impact to threatened species and communities and preparation of a BDAR or referral of the project under the EPBC Act is not required.

No additional biodiversity mitigation measures are required for the amended project.

## 6.3 Noise

### 6.3.1 Overview and assessment outcomes

The Noise and Vibration Assessment (NVA, Resonate 2023) prepared for the SoEE was reviewed in appreciation of the amended Geotechnical Investigation program described in Section **Error! Reference source not found.**, and is available as Appendix B.

The revised NVA (Resonate 2024, see Appendix B) determined the below in respect of the Interim Construction Noise Guideline (ICNG, Department of Environment and Climate Change 2009) criteria:

- There are no exceedances of the standard hours noise management levels predicted at any receivers for any of the test pit and bore hole works during standard hours work.
- There are no exceedances of the out of hours noise management levels predicted at any receivers for any of the test pit and bore hole works during out of hours work.
- Bore hole works noise levels are predicted to be well below the highly affected NML of 75 dB(A) at all receivers.

It is noted that the location of the sensitive receivers considered within the revised NVA (Resonate 2024) are available in Figure 1 of Appendix B, detailed predicted construction noise levels are similarly available in Appendix B of the revised NVA.

### 6.3.2 Summary

Noise mitigation measures as outlined in the SoEE would continue to be adopted by the amended geotechnical drilling program. A summary of the proposed mitigation measures noted in the SoEE is provided below:

- Fixed and mobile construction plant and equipment shall be located to maximise separation distance from nearest noise and vibration sensitive and residential receivers
- Construction plant shall be orientated away from nearest receivers where possible
- Where practical, simultaneous operation of dominant noise generating plant shall be managed to reduce noise impacts, such as operating at different times or increasing the distance between the plant
- Where possible and in compliance with occupational safety and health standards, reversing beepers on trucks would be replaced with low pitch non-tonal beepers (quackers). Alternatives to reversing beepers include the use of spotters and designing the site to reduce the need for reversing may assist in minimising the use of reversing beepers

- Ensure that all works comply with the ICNG standard daytime period's start and finish times (noting this will be adopted for the test pits, this amendment seeks approval of OOHs works)
- Where feasible and practicable, surrounding residences shall be notified of potential construction works at least two weeks prior to the commencement of works
- Construction noise and vibration management practices are to be provided to all staff and contractors and be included during site inductions and daily tool-box talks. The tool-box talks should include as a minimum, the permitted hours of construction work, work site locations, site ingress/egress and the required noise management measures for each construction phase.

## 6.4 Environmental management

The amended project will reduce direct environmental impacts as a result of the decreased disturbance footprint when compared to that originally proposed.

In summary, no additional mitigation measures as outlined in Section 6.9 of the SoEE, are required based on the amendments proposed. With the exception of Aboriginal cultural monitors, present at site during any clearing activities. As to monitor activities and provide advice should cultural materials be identified.

# 7 Justification and conclusion

The geotechnical investigations demonstrate compliance with the relevant environmental planning instruments and would allow MPH to fully consider its option to develop a pumped hydro energy storage (PHES) scheme at Bells Mountain. The amended project will not result in any substantial change in the assessment outcomes presented in the SoEE and will decrease disturbance of native vegetation to that originally proposed.

The geotechnical investigations are considered critical if MPH is to meet its responsibilities for relevant actions under the Hunter Regional Plan 2026 (DPE 2016) for diversifying and growing the energy sector. The geotechnical investigations are also considered to be wholly aligned with the Pumped Hydro Roadmap (DPE 2018). It is also a direct response to Action 1 of the Pumped Hydro Roadmap, which is bringing forward private investment, described as "supporting the commercialisation of new, large-scale on-demand electricity projects."

The geotechnical investigations would assist MPH in verifying the site's suitability to for a pumped hydro project, by providing a range of geotechnical data which are prerequisite to finalising feasibility assessments. The geotechnical investigations would, therefore, allow MPH to better understand how to direct its resources into future planning to meet the needs of NSW's energy demand. Moreover, the geotechnical investigations can be undertaken with only minimal environmental impacts. Overall, the geotechnical investigations are considered to be in the public interest and are therefore recommended for MSC's approval.

The site is considered to be suitable to support the current geotechnical investigations as:

- The geotechnical investigations constitute earthworks, a deemed development type which is permitted in any land zone
- There are no relevant matters under SEPP (Resilience and Hazards) 2021 which require further considerations to support the geotechnical investigations
- The geotechnical investigations comprise a temporary package of works which would not create lasting amenity impacts or other land use conflicts within the locality
- The geotechnical investigations can be undertaken with minimal environmental impacts, and a comprehensive EMP setting out the mitigation measures outlined in the SoEE
- The potential environmental and amenity impacts of the geotechnical investigations are also considered to be minimal while its public benefit holds great significance. The site is moreover considered to be suitable for the geotechnical investigations.

Accordingly, it is recommended that MSC grants favourable consideration to the amended geotechnical investigations.

Yours sincerely

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# References

Department of Planning and Environment 2016. Hunter Regional Plan 2026

Department of Planning and Environment 2018. Pumped Hydro Roadmap

EMM 2024. Muswellbrook Pumped Hydro Project - Geotech Amendment, Flora and Fauna Assessment

Resonate 2023. Muswellbrook Pump Hydro Upper Reservoir - Geotechnical Investigation Noise and Vibration Assessment

Resonate 2024. Muswellbrook Pump Hydro Upper Reservoir - Geotechnical Investigation Noise and Vibration Assessment

SMEC 2023. Muswellbrook Pumped Hydro Energy Storage Upper Reservoir Geotechnical Investigation Statement of Environmental Effects. Prepared for: Muswellbrook Pumped Hydro Company Pty Ltd

# Appendix A
## Flora and fauna assessment

# Muswellbrook Pumped Hydro Project - Geotech Amendment

## Flora and fauna assessment

Prepared for Muswellbrook Pumped Hydro Pty Ltd

February 2024

# Muswellbrook Pumped Hydro Project - Geotech Amendment

## Flora and fauna assessment

Muswellbrook Pumped Hydro Pty Ltd

E210760 RP1

February 2024

| Version | Date | Prepared by | Reviewed by | Comments |
|---|---|---|---|---|
| V1 | 9 February 2023 | P. Fagan | T. Frankham | |
| | | | | |
| | | | | |

Approved by

**Tom Frankham**
Associate Environmental Scientist
09 February 2024

Level 3 175 Scott Street
Newcastle NSW 2300

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# 1 Introduction

Muswellbrook Pumped Hydro Pty Ltd as trustee for the Muswellbrook Pumped Hydro Trust (MPH) is proposing to develop the Muswellbrook Pumped Hydro Energy Storage Project (the project). The Proponent is a joint venture (JV) partnership between AGL Energy Pty Ltd (AGL) and Idemitsu Renewable Developments Australia Pty Ltd (Idemitsu).

The Proponent is proposing to design, construct and operate a pumped hydroelectric energy storage (PHES) facility partly within the Muswellbrook Coal Company Ltd (MCC) mine site and on land on top of Bells Mountain located approximately four kilometres north-east from Muswellbrook, New South Wales. Figure 1.1 shows the location of the project.

The overarching Project will provide up to 500 MW of electricity-generating capacity and up to eight hours of deep energy storage, feeding into the NEM with direct transmission links to Newcastle and Sydney demand centres. The overarching Project will also be used to augment existing gaps in the NSW renewable energy market by providing electricity during times of peak needs and grid support services, and otherwise as needed.

Preliminary design of the project requires four exploration boreholes and seismic lines to be installed, in order to finalise the footprint for the overarching Project. This report addresses the biodiversity impacts resulting from these Geotech works, hereafter referred to as 'the project'.

The project would result in the removal of areas of native vegetation and habitats for local fauna, including matters of national environmental significance (MNES).

## 1.1 Description of the proposed development

The project subject to this flora and fauna assessment will involve:

- installation of eleven Geotech boreholes, each at 625 $m^2$
- new access tracks, each at 4 m wide
- installation of seismic lines at 0.5 m wide
- removal of shrubs and groundcovers, while avoiding the removal of any trees greater than 10 cm diameter at breast height (DBH).

## 1.2 Development location

The proposed development is located within the Muswellbrook Local Government Area (LGA), north-east of the Muswellbrook City Centre (Figure 1.1) on Bells Mountain.

## 1.3 Purpose of this report

The purpose of this report is to assess the likely impacts of the proposed development on biodiversity, and to determine whether there is likely to be a significant impact on threatened species or ecological communities, or on their habitats.

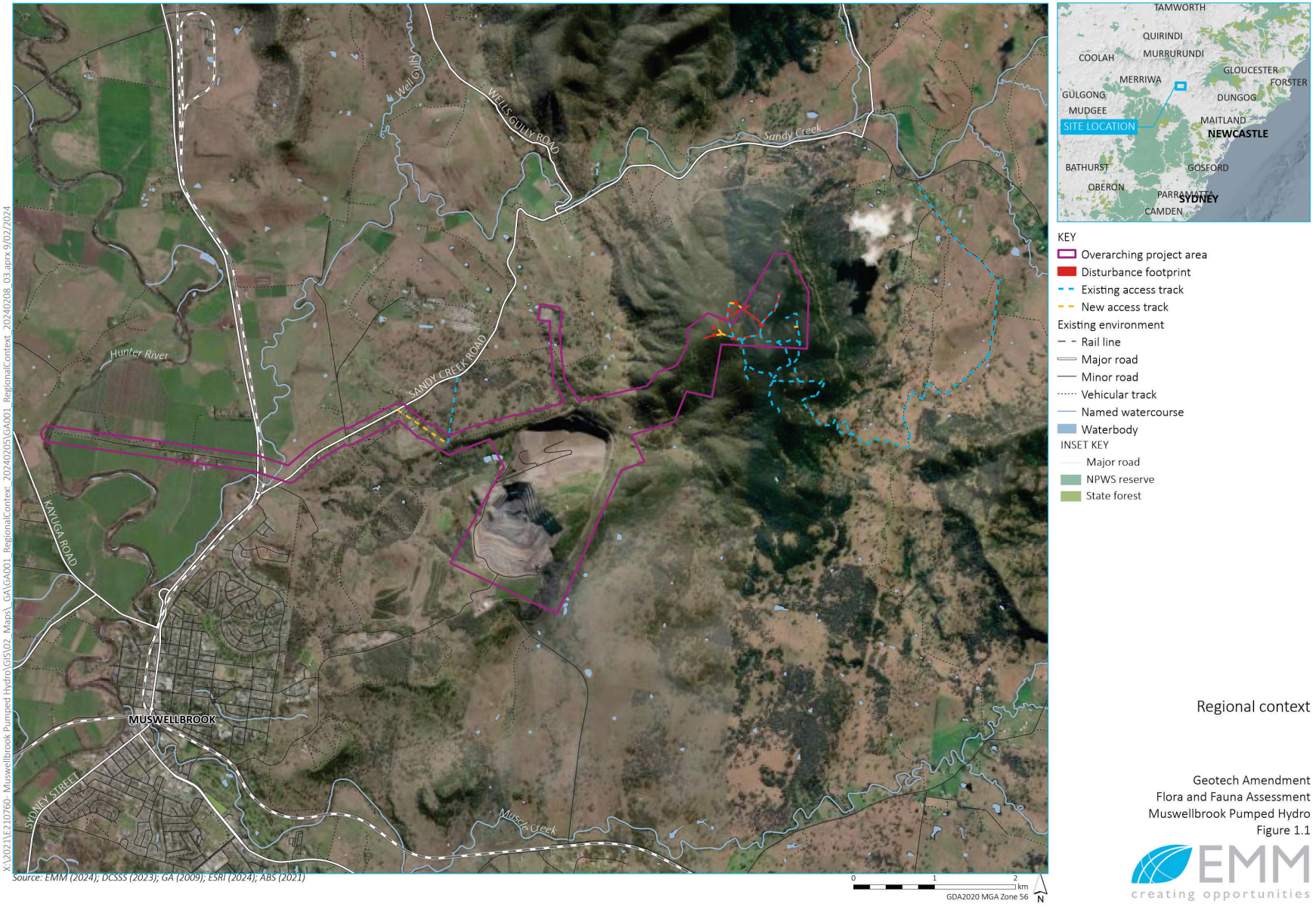
Threatened species or ecological communities, or their habitats, refers to those threatened biota listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), NSW *Biodiversity Conservation Act 2016* (BC Act) and NSW *Fisheries Management Act 1994* (FM Act).

## 1.4 Terminology

Terminology used in this report is listed in Table 1.1.

**Table 1.1 Terminology**

| Term | Definition |
|---|---|
| Disturbance footprint (Figure 1.2) | The area directly impacted by the project/activity. |
| The Project | The activity proposed to be undertaken within the Disturbance Footprint. |
| Overarching Project | The larger Project encompassing the proposed Pumped Energy Hydro Storage Facilities. |
| Locality | 10 km radius centred on the Disturbance Footprint, in which threatened species records database searches were conducted (Figure 1.1). |

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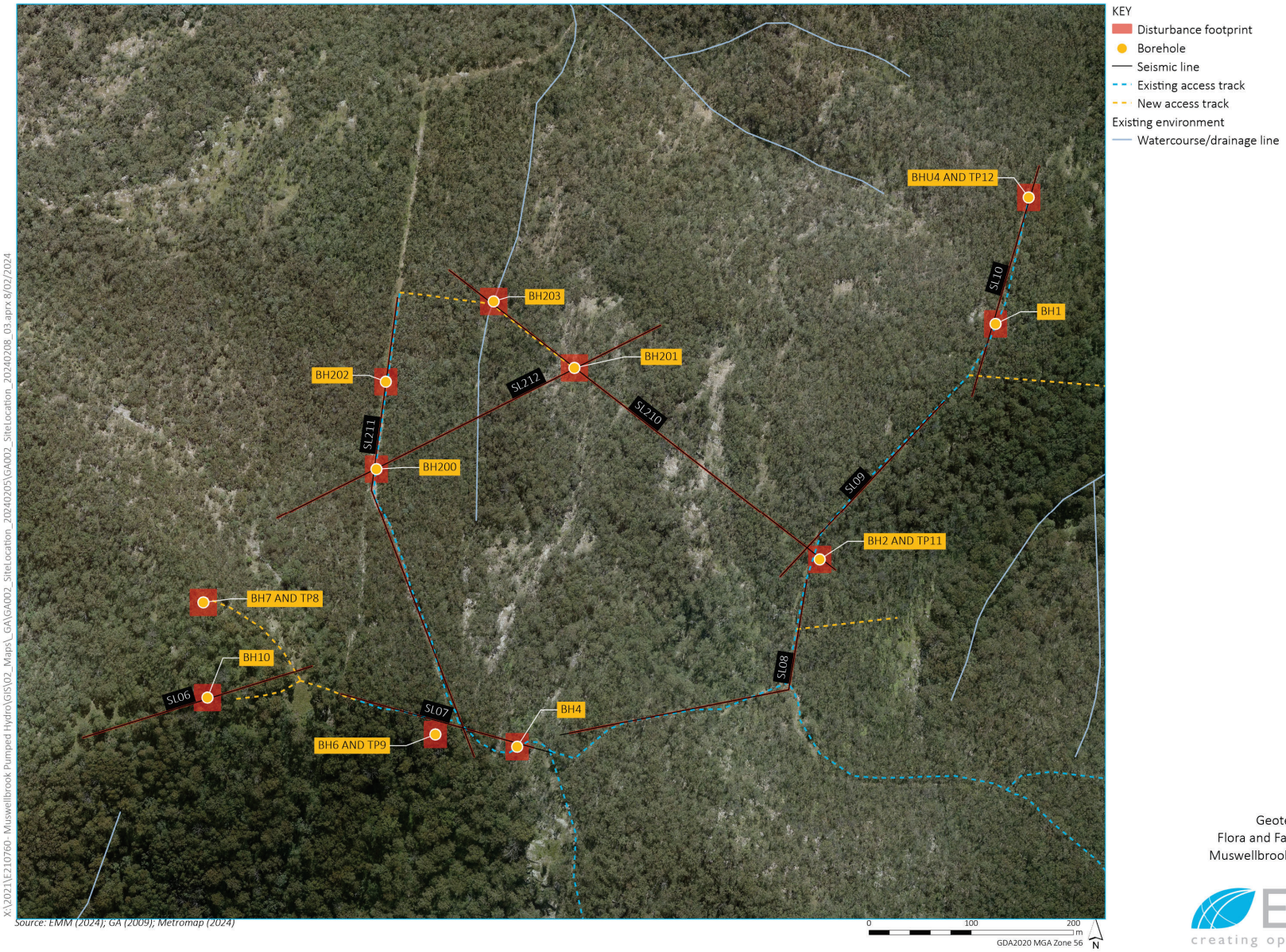
Source: EMM (2024); DCSSS (2023); GA (2009); ESRI (2024); ABS (2021)

Regional context

Geotech Amendment
Flora and Fauna Assessment
Muswellbrook Pumped Hydro
Figure 1.1

EMM
creating opportunities




Site location

Geotech Amendment
Flora and Fauna Assessment
Muswellbrook Pumped Hydro
Figure 1.2

EMM
creating opportunities

# 2 Legislative context

This project has been assessed against key biodiversity legislation and government policy, including:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- *Environmental Planning and Assessment Act 1979* (EP&A Act)
    - State Environmental Planning Policies
- *Biodiversity Conservation Act 2016* (BC Act)
- *Fisheries Management Act 1994* (FM Act)
- *Biosecurity Act 2015* (BS Act).

An assessment of the project against relevant legislation is provided in Section 6.

## 2.1 *Environment Protection and Biodiversity Conservation Act 1999*

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities, heritage places and water resources which are defined as Matters of National Environmental Significance (MNES) under the EPBC Act. These are:

- world heritage properties
- places listed on the National Heritage Register
- Ramsar wetlands of international significance
- threatened flora and fauna species and ecological communities
- migratory species
- Commonwealth marine areas
- the Great Barrier Reef Marine Park
- nuclear actions (including uranium mining)
- water resources, in relation to coal seam gas or large coal mining development.

Under the EPBC Act, an action that may have a significant impact on a MNES is deemed to be a 'controlled action' and can only proceed with the approval of the Commonwealth Minister for the Environment. An action that may have a significant impact on a MNES is to be referred to the Department of Climate Change, Energy, Environment and Water (DCCEEW) for determination as to whether or not it is a controlled action. If deemed a controlled action, the project is assessed under the EPBC Act and a decision made as to whether or not to grant approval.

An assessment of the project against the EPBC Act is provided in Section 6.1.

## 2.2 *Environmental Planning and Assessment Act 1979*

The NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) was enacted to encourage the consideration and management of impacts of proposed development or land-use changes on the environment and the community. The EP&A Act is administered by the NSW Department of Planning and Environment (DPE).

The EP&A Act provides the overarching structure for planning in NSW; however, it is supported by other statutory environmental planning instruments (EPIs) including State Environmental Planning Policies (SEPPs). EPIs relevant to the natural environment are outlined further below.

### 2.2.1 State Environmental Planning Policy (Biodiversity and Conservation) 2021: Koala Habitat Protection

Chapters 3 and 4 of the *State Environmental Planning Policy (Biodiversity and Conservation) 2021* aim to encourage the proper conservation and management of areas of natural vegetation that provide habitat for Koalas (*Phascolarctos cinereus*) to ensure a permanent free-living population over their present range and reverse the current trend of Koala population decline.

If development occurs within an area to which an approved Koala plan of management (KPoM) applies the Koala SEPP must be considered and the determination of the project must be consistent with this KPoM. The Disturbance Footprint is not located within an area to which an approved KPoM applies.

As the Disturbance Footprint is not located within an area to which an approved KPoM applies, a review of the development process set out in Clause 9 of the Koala SEPP is provided below:

- The Disturbance Footprint is located in the Muswellbrook LGA, which is an LGA listed in Schedule 1 of the Koala SEPP.
- The land on which the Disturbance Footprint is located is greater than 1 ha in size.
- The Disturbance Footprint is identified on the Koala Development Application Map checked on 7 February 2024.

Based on the above, the Koala SEPP applies to the project. An assessment of impacts to the Koala has been prepared in accordance with the requirements of the *Koala Habitat Protection Guideline* (DPIE 2020).

An assessment of the project against the Koala SEPP is provided in Section 6.2.1.

## 2.3 *Biodiversity Conservation Act 2016*

The *Biodiversity Conservation Act 2016* (BC Act) is the legislation responsible for the conservation of biodiversity in NSW through the protection of threatened flora and fauna species, populations and ecological communities. The BC Act, together with the Biodiversity Conservation Regulation 2017 (BC Regulation), established the Biodiversity Offsets Scheme (BOS).

The BOS includes establishment of the *Biodiversity Assessment Method* (the BAM, OEH 2020) for use by accredited persons in biodiversity assessment under the scheme. The purpose of the BAM is to assess the impact of actions on threatened species and threatened ecological communities, and their habitats and determine offset requirements. For major projects, use of the BAM is mandatory, unless a BDAR waiver is granted.

The BAM sets out the requirements for a repeatable and transparent assessment of terrestrial biodiversity values on land in order to:

- identify the biodiversity values on land subject to proposed development area
- determine the impacts of a proposed development, following all measures to avoid, minimise and mitigate impacts
- quantify and describe the biodiversity credits required to offset the residual impacts of proposed development on biodiversity values.

The proposed development does not trigger automatic entry into the BOS based on the trigger thresholds (refer to Section 6.3.). This report assesses whether the proposed development is likely to significantly affect threatened species or ecological communities, or their habitats, according to the BC Act Section 7.3 test of significance.

### 2.3.1 Biodiversity assessment pathway

Criteria for entry into the BOS, thereby triggering the requirement for a Biodiversity Development Assessment Report (BDAR) under the BAM, have been outlined in Table 2.1.

**Table 2.1 Assessment of whether the project will trigger entry into the BOS**

| Criterion | Assessment |
|---|---|
| The proposed development is likely to significantly affect threatened species or ecological communities, or their habitats, according to the test in Section 7.3 of the BC Act. | Assessments of significance have been prepared in accordance with OEH (2018a) and are provided in Appendix A. These assessments have determined that the project will not result in a significant effect on threatened species or communities. |
| The development exceeds the biodiversity offsets scheme thresholds outlined in Section 7.1 of the BC Regulation:<br>• it involves clearing of native vegetation that exceeds the threshold for clearing | The minimum lot size gazetted for the Disturbance Footprint is 80 ha. The clearing threshold for this minimum lot size is 1 ha or more. The project will result in clearing of less than 1 ha and thus does not exceed this threshold. |
| • clearing of native vegetation on land included in the Biodiversity Values Map | The Disturbance Footprint is not located on land mapped on the Biodiversity Values Map. |
| The site is a declared area of outstanding biodiversity value. | The Disturbance Footprint is not located in an area of outstanding biodiversity value. |

The project will not significantly affect threatened species or communities and, thus, preparation of a BDAR is not required.

## 2.4 *Fisheries Management Act 1994*

The *Fisheries Management Act 1994* (FM Act) contains provisions for the conservation of fish stocks, key fish habitat, biodiversity, threatened species, populations and ecological communities. It regulates the conservation of fish, vegetation and some aquatic macroinvertebrates and the development and sharing of the fishery resources of NSW for present and future generations. The FM Act lists threatened species, populations and ecological communities, key threatening processes (KTPs) and declared critical habitat. Assessment guidelines to determine whether a significant impact is expected are detailed in section 220ZZ and 220ZZA of the FM Act.

Another objective of the FM Act is to conserve key fish habitat (KFH). These are defined as aquatic habitats that are important to the sustainability of recreational and commercial fishing industries, the maintenance of fish populations generally and the survival and recovery of threatened aquatic species. KFH is defined in Section 3.2.1 and 3.2.2 of the *Policy and Guidelines for Fish Conservation and Management* (DPI 2013).

No aquatic habitats are present and do not need to be further considered.

## 2.5 *Biosecurity Act 2015*

The primary objective of the Biosecurity Act is to provide a framework for the prevention, elimination and minimisation of biosecurity risks posed by biosecurity matter, dealing with biosecurity matter, carriers and potential carriers, and other activities that involve biosecurity matter, carriers or potential carriers.

The Biosecurity Act stipulates management arrangements for weed biosecurity risks in NSW, with the aim to prevent, eliminate and minimise risks. Management arrangements include:

- any land managers and users of land have a responsibility for managing weed biosecurity risks that they know about or could reasonably be expected to know about
- applies to all land within NSW and all waters within the limits of the State
- local strategic weed management plans will provide guidance on the outcomes expected to discharge duty for the weeds in that plan.

The Disturbance Footprint is located within the Hunter Local Land Services (LLS) region and is subject to the Hunter Regional Strategic Weed Management Plan 2023–2027.

The provisions of the Biosecurity Act are discussed further in Section 6.4.

# 3 Method

## 3.1 Desktop assessment

To determine the field investigation scope, a desktop assessment was undertaken. The desktop assessment comprised database searches and review of relevant information, including:

- Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) Protected Matters Search Tool (PMST) for Matters of National Environmental Significance (MNES) likely to occur within the subject lands (DCCEEW 2024) (a copy of the search results is provided in Appendix B)
- NSW Biodiversity and Conservation Division (BCD) BioNet Atlas of NSW Wildlife, for items listed under the BC Act and EPBC Act (EES (Environment Energy and Science) 2021)
- NSW Plant Community Types (PCTs), as held within the BioNet Vegetation Classification database (DPIE 2022)
- regional vegetation mapping, *State Vegetation Type Map: Muswellbrook LGA Vegetation Map.*
- a review of NSW Vegetation Information System (VIS), managed by BCD, to review plant community types (PCTs) that may occur
- a review of the NSW Weedwise website to determine priority weeds for the Hunter LLS region (LLS 2017)
- a review of aerial imagery for the survey area and locality
- data obtained and ecological observations throughout the EMM surveys for overarching Project.

Base map data were obtained from NSW Department of Finance, Services and Innovation (DFSI) databases, with cadastral data obtained from DFSI digital cadastral database. Mapping for stream orders was obtained from NSW Department of Primary Industries (DPI). Spatial data encompassing the Disturbance Footprint and the Disturbance Footprint itself were provided by AGL.

The following spatial datasets were utilised during the development of this report:

- Mitchell Landscapes Version V3.1 (DAWE 2018)
- Interim Biogeographic Regionalisation of Australia (IBRA) Version 7 (DoEE 2018)
- NSW Department of Primary Industries (Fisheries) Freshwater threatened species distribution maps (DPI 2021)
- Australian Ramsar Wetlands (DAWE 2021).

Mapping undertaken during the assessment was conducted using Field Maps for ArcGIS™ and aerial photo interpretation. Accuracy is subject to accuracy of GPS devices, generally ±5 m. Mapping has been produced using a Geographic Information System (GIS; ArcGIS 10.5).

## 3.2 Field investigations

Field investigations within the Disturbance Footprint were conducted on 18 January 2024 by one EMM ecologist, accompanied by an AGL representative, and included:

- vegetation assessment: vegetation mapping and condition assessment and identification of flora species, including priority weeds
- habitat assessment: identification of potential habitat for threatened flora and fauna species to assess the value of habitat resources within the Disturbance Footprint and to assess the potential for threatened species to occur and recording incidental fauna observations.

No targeted flora surveys were undertaken; however, field surveys provided the opportunity for identification of conspicuous threatened plant species and assess habitat for threatened flora not readily detectable during the survey. Targeted surveys already completed by EMM ecologists for the overarching Project provided suitable background into the availability of habitats and presence of threatened species in the Disturbance Footprint. The survey methods are outlined below.

### 3.2.1 Vegetation and threatened flora habitat assessment

A site walk-over was undertaken to identify PCTs within the Disturbance Footprint through observation and recording of dominant plant species, landscape, terrain, and soil characteristics. Photographs were taken to assist with evaluation of vegetation type and condition.

Rapid data points (RDP) were recorded at various locations and notes taken of the dominant (i.e. most frequently recorded and/or apparent) species at these locations. Focus was given to species that are characteristic of threatened ecological communities (TECs) known to occur in the search area to evaluate the likely presence of such TECs within the Disturbance Footprint.

### 3.2.2 Threatened fauna habitat assessment

Concurrent with vegetation mapping, a habitat assessment was undertaken seeking to identify the presence and abundance of the following fauna habitat features within the Disturbance Footprint:

- habitat trees including large hollow-bearing trees and trees containing large stick nests
- availability of flowering shrubs and feed tree species
- waterways
- ground litter and fallen logs
- rock outcrops, cliffs, and caves that may provide roosting habitat for microbats or other threatened fauna.

### 3.2.3 Targeted fauna survey

Targeted fauna surveys have been conducted in the overarching Project area by EMM during 2023. The species detected to date, and methods used include:

- Large-eared Pied Bat (*Chalinolobus dwyeri*) – acoustic detectors and roost search
- Southern Myotis (*Myotis macropus*) – acoustic detectors
- Little Bent-wing Bat (*Miniopterus australis*) – acoustic detectors and roost search

- Large Bent-wing Bat (*Miniopterus orianae-oceanensis*) – acoustic detectors and roost search
- Koala (*Phascolarctos cinereus*) – spotlighting, searches for scat and signs
- Hunter Valley delma (*Delma vescolineata*) – pitfall trapping and searches under rocks, cow pats
- Masked Owl (*Tyto novaehollandiae*) – spotlighting and songmeters
- *Cymbidium canaliculatum* population in the Hunter Catchment – targeted parallel searches.

## 3.3 Likelihood of occurrence assessment

Matters considered in determining the likelihood of occurrence include:

- known natural distributions including prior records (database searches) and site survey results
- geological/soil preferences
- specific habitat requirements (e.g. aquatic environs, seasonal nectar resources, tree hollows)
- climatic considerations (e.g. wet summers and snow fall)
- home range size and habitat dependence
- topographical preferences (e.g. coastal headlands, ridgetops, midslopes, gilgai and wetlands).

The criteria for assessing likelihood of occurrence for threatened species, used to inform the impact assessment of the proposed development is listed in Table 3.1.

**Table 3.1 Likelihood of occurrence criteria**

| Likelihood | Description | Further assessment conducted? |
|---|---|---|
| Negligible | • The potential for the species to occur is considered so low as to not be worth considering. | No |
| Low | • Based on data collected during field investigations, it was considered that the species was unlikely to occur in the investigation envelope or use habitats in the Disturbance Footprint. A species may utilise the Disturbance Footprint on rare occasions.<br>• The species is considered vagrant in the bioregion and is thus considered unlikely to occur in the Disturbance Footprint. | No |
| Moderate | • The species is known to occur in the bioregion, and the Disturbance Footprint provides some habitat value for the species. This includes species for which optimal habitat is present that have not been recorded in the locality, as well as species that have been recorded in the locality for which habitat on site is considered suboptimal. | Yes |
| High | • The species is known to occur in the bioregion, the Disturbance Footprint supports optimal habitat features for the species and it has been recorded in the locality. | Yes |
| Recorded | • The species was recorded during site visit or reliable, recent, and spatially accurate records of the species strongly indicate its presence in the Disturbance Footprint. | Yes |

## 3.4 Limitations

While the biodiversity assessments outlined above provide a reasonable assessment of the biodiversity values, the assessment is subject to a number of limitations outlined below. These limitations are not considered to represent a significant limitation on this survey:

- Field surveys were only completed over a one-day site visit. However, the work done previously by EMM for the overarching Project provides a solid understanding of the habitats available on site, as well as the threatened species detected to date.
- While some species have been assessed as having a low likelihood of occurrence, it is acknowledged that this does not indicate the species will never occur. Rather, it means that based on data collected during desktop and field surveys, it was considered that the species may only utilise the Disturbance Footprint on rare occasions.
- Pelagic and marine species have been excluded from the assessment due to the absence of habitat within the Disturbance Footprint.

# 4 Results

## 4.1 Vegetation

The Disturbance Footprint consists of a native woodland vegetation, that appears to have been historically cleared for agriculture in some areas (indicated by regrowth vegetation). The Disturbance Footprint consists entirely of regrowth woodland vegetation. As such, the site is dominated by trees that are a small to moderate size (<40 cm DBH), with few hollows within the immediate vicinity. Leaf litter and fallen logs are present within the Disturbance Footprint. An existing dirt track is present within the Disturbance Footprint and is cleared of native vegetation, aside from outlying groundcovers that have recolonised the track.

A summary of vegetation types within the Disturbance Footprint is included in Table 4.1 and Figure 4.1. A description of these is provided in Sections 4.1.1. to 4.1.2.

### 4.1.1 Plant community types

Field investigations, including determination of vegetation communities using the methods described in Section 3.2.1, identified the presence of one PCT within the Disturbance Footprint. This PCT is uniform in condition across the Footprint and was therefore stratified into one vegetation zone. The remainder of the Disturbance Footprint falls on the existing track and does not require vegetation removal. This is summarised in Table 4.1 and shown in Figure 4.1. The PCT is described in further detail within the following section and in Table 4.2.

**Table 4.1 PCT 3525 – Upper Hunter Box-Blakelys Red Gum Grassy Forest**

| Zone | Plant community type | Area (ha) |
|---|---|---|
| 1 | 3525 - Upper Hunter Box-Blakelys Red Gum Grassy Forest | 0.91 |

As described in Section 2.3, the clearance of native vegetation does not equate to 1 ha or more and, therefore, entry into the BOS is not required.

**Table 4.2 PCT 3525 – Upper Hunter Box-Blakelys Red Gum Grassy Forest**

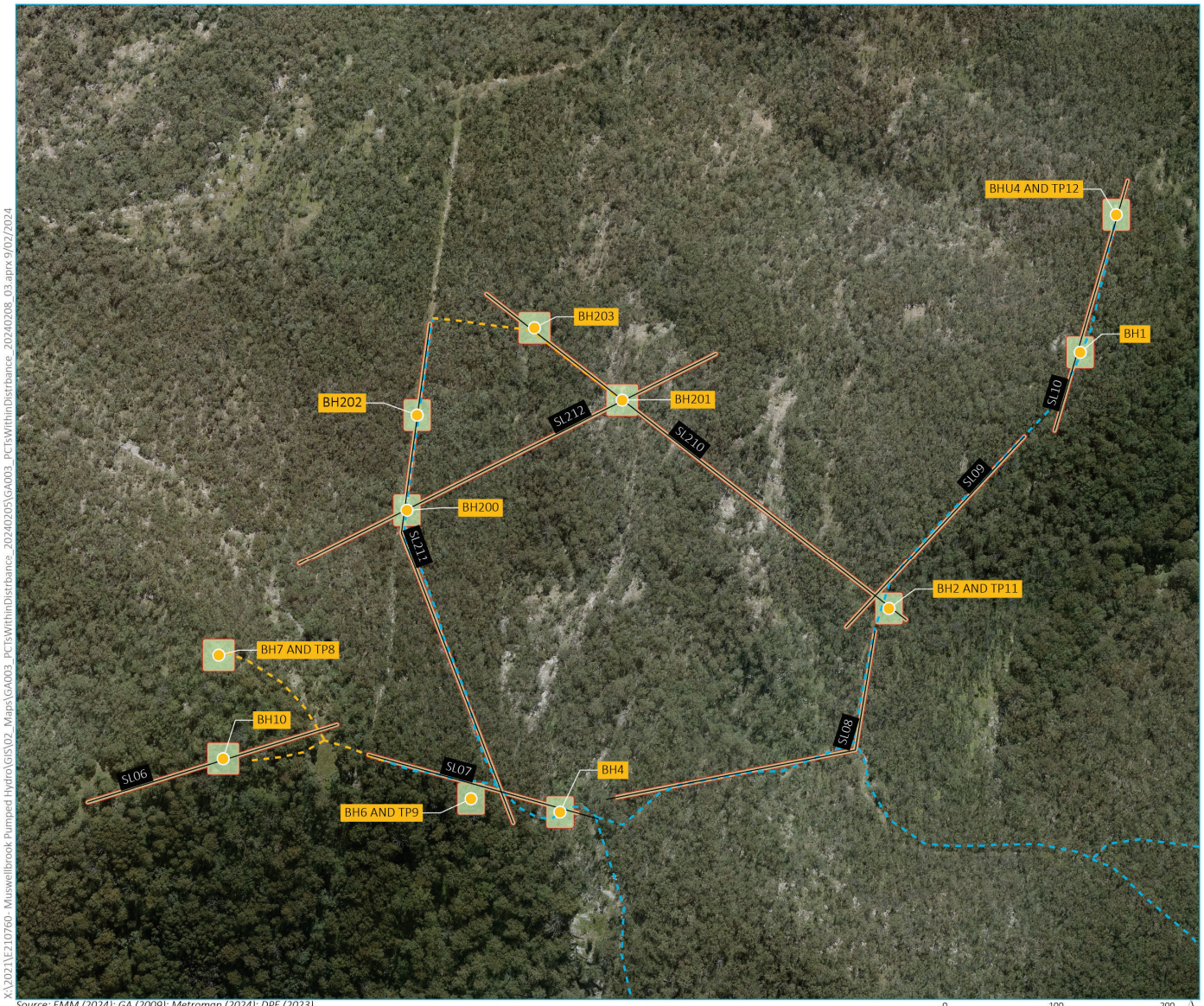
| PCT 3525 – Upper Hunter Box-Blakelys Red Gum Grassy Forest | |
|---|---|
| PCT ID | 3525 |
| Common name | Upper Hunter Box-Blakelys Red Gum Grassy Forest |
| Condition class and extent within the Disturbance Footprint | **Vegetation zone** / **Extent in the Disturbance Footprint (ha)**<br>VZ1 – 3525_moderate / 0.91 |
| Description | The canopy is co-dominated by Narrow-leaved Ironbark (*Eucalyptus crebra*) with Blakely's Red Gum (*Eucalyptus blakelyi*) and Grey Box (*Eucalyptus moluccana*) also present. Very occasional individuals of Grey Gum (*Eucalyptus punctata*) and Kurrajong (*Brachychiton populneus*) are also present but sparsely distributed.<br>The midstorey is dense and dominated by Mock Olive (*Notelaea macrocarpa*) and Sticky Daisy Bush (*Olearia elliptica*), with occasional violet nightshade (*Solanum brownii*), *Cassinia quinquefaria*, Sticky Hop-bush (*Dodonaea viscosa*) and *Hibbertia linearis*.<br>Across the Disturbance Footprint the groundlayer is co-dominated by a mix of native herbs and grass species. Dominant species include Ringed Wallaby Grass (*Rytidosperma caespitosum*), Brown's Lovegrass (*Eragrostis brownii*), Barbed Wire Grass (*Cymbopogon refractum*), Native St. John's Wort (*Hypericum gramineum*), Many-flowered Mat-rush (*Lomandra multiflorum*), Poison Rock Fern (*Cheilanthes sieberi*), *Lepidosperma laterale,* Sprawling Bluebell (*Wahlenbergia gracilis*) and Large Tick-trefoil (*Oxytes brachypoda*). |

**Table 4.2 PCT 3525 – Upper Hunter Box-Blakelys Red Gum Grassy Forest**

| PCT 3525 – Upper Hunter Box-Blakelys Red Gum Grassy Forest | |
|---|---|
| Condition description | The Disturbance Footprint is in relatively high condition, with very few weeds and a high diversity of native species in all strata. There is, however, a general lack of large trees, and much of the canopy exist as young trees less than 20 cm DBH. This suggests that the area has been subject to historic clearing practices, and conversations with the landholder confirm this, as well as confirmation that the mountain top was used for heavy sheep and cattle grazing in the past. |
| Status | PCT 3525 is not consistent with any threatened ecological community listed under the BC Act or EPBC Act. |

**Photograph 4.1 PCT 3525 in moderate condition, representative of the Disturbance Footprint**

Approximately 0.09 ha the Disturbance Footprint is unvegetated / cleared, consisting of existing dirt access track.




X:\2021\E210760- Muswellbrook Pumped Hydro\GIS\02_Maps\GA003_PCTsWithinDistrbance_20240205\GA003_PCTsWithinDistrbance_20240208_03.aprx 9/02/2024

PCTs within the disturbance footprint

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Figure 4.1

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### 4.1.2 Threatened ecological communities

No threatened ecological communities are present within the Disturbance Footprint.

## 4.2 Threatened species

### 4.2.1 Habitat description

Bells Mountain supports dry sclerophyll forests with a dense, shrubby understorey. Narrow-leaved Ironbark and Blakely's Red Gum dominate the overstorey, with a moderately dense herbaceous and grassy groundcover. Weed species are very few and the habitat is in good condition.

Due to historical clearing and grazing activities, hollows are extremely rare within the Disturbance Footprint, as no large old trees remain. Several dead stags are present that contain small to medium hollows. Large logs and coarse woody debris are also uncommon, providing limited habitat for fauna species, although macropods and smaller mammals would be common, such as wallabies, antechinus and possums. When flowering, the canopy species would provide copious nectar for nectarivorous birds and mammals, such as the grey-headed flying-fox. Watercourses are present on steep slopes but are ephemeral and only flow for brief periods after heavy rains. Leaf litter is abundant in the forested areas, providing excellent habitat for insects and smaller skinks and amphibians. A large cliff line exists on the eastern slopes of Bells Mountain, providing excellent habitat for microbats and reptiles. This cliff line is greater than 300 metres from the Disturbance Footprint.

Database searches were conducted as per Section 3.1. A likelihood of occurrence assessment was undertaken in accordance with Section 3.1. The results are presented in Appendix A. Of the species assessed, the following are considered likely to occur.

### 4.2.2 Threatened flora

Based on the desktop assessment, 18 threatened flora species listed under the BC Act and/or the EPBC Act are known or have potential to occur in the Disturbance Footprint (Appendix A).

No threatened flora species have been recorded in the Disturbance Footprint previously or during targeted surveys

Based on the presence of suitable habitat, one threatened flora species and one threatened population is considered to have a moderate to high likelihood of occurrence (Appendix A). Table 4.3 provides a summary of the species considered likely to occur in the Disturbance Footprint.

**Table 4.3 Threatened flora species known or likely to occur in the Disturbance Footprint**

| Scientific name | Common name | BC Act status | EPBC Act status | Habitat/potential habitat in Disturbance Footprint |
|---|---|---|---|---|
| *Diuris tricolor* | Pinke Donkey Orchid | V | - | Species known from the locality and could potentially occur within Disturbance Footprint. |
| *Diuris tricolor* | Pink Donkey Orchid population in the Muswellbrook local government area | EP | - | Species known from the locality and could potentially occur within Disturbance Footprint. |

Notes: CE = critically endangered, E = endangered, V = vulnerable, EP = Endangered Population

Significance assessments have been completed for these species under the BC act (Appendix B).

### 4.2.3 Threatened fauna

Based on the desktop assessment, 56 threatened fauna species listed under the EPBC Act and/or BC Act are known or have potential to occur in the Disturbance Footprint (Appendix A).

No threatened fauna species have been recorded in the Disturbance Footprint previously, though several have been detected in the vicinity during surveys for the overarching Project (Section 3.2.3).

Based on the presence of suitable habitat, 21 threatened and/or migratory fauna species are considered to have a moderate to high likelihood of occurrence (Appendix A). Table 4.4 provides a summary of the species considered likely to occur in the Disturbance Footprint.

**Table 4.4 Threatened fauna species known or likely to occur in the Disturbance Footprint**

| Scientific name | Common name | BC Act status | EPBC Act status | Habitat/potential habitat in Disturbance Footprint |
|---|---|---|---|---|
| *Artamus cyanopterus cyanopterus* | Dusky Woodswallow | V | - | Suitable habitat in the Disturbance Footprint. Species known from the locality. |
| *Daphoenositta chrysoptera* | Varied Sittella | V | - | Potential foraging and breeding habitat in the Disturbance Footprint. |
| *Glossopsitta pusilla* | Little Lorikeet | V | - | Species may forage in canopy species when flowering. Known from locality. |
| *Monarcha melanopsis* | Black-faced Monarch | | Mi | Species may utilise the Disturbance Footprint for foraging and breeding. |
| *Tyto novaehollandiae* | Masked Owl | V | - | Species recorded during surveys for the overarching Project. May occasionally forage over the Disturbance Footprint. |
| *Chalinolobus dwyeri* | Large-eared Pied Bat | V | V | Species recorded during surveys for the overarching Project. May forage over the Disturbance Footprint. |
| *Dasyurus maculatus* | Spotted-tailed Quoll | V | E | Suitable denning habitat nearby in the form of rocks. May occasionally forage in the Disturbance Footprint. |
| *Falsistrellus tasmaniensis* | Eastern False Pipistrelle | V | - | May forage within the Disturbance Footprint. No hollows in Disturbance Footprint. |
| *Micronomus norfolkensis* | Eastern Coastal Free-tailed Bat | V | - | Potential foraging and roosting habitat within Disturbance Footprint. |
| *Miniopterus australis* | Little Bent-winged Bat | V | - | Species recorded during surveys for the overarching Project. May forage over the Disturbance Footprint. |
| *Miniopterus orianae oceanensis* | Large Bent-winged Bat | V | - | Species recorded during surveys for the overarching Project. May forage over the Disturbance Footprint. |
| *Myotis macropus* | Southern Myotis | V | - | Species recorded during surveys for the overarching Project. May forage over the Disturbance Footprint. |
| *Notamacropus parma* | Parma Wallaby | V | V | May occur within the Disturbance Footprint. |
| *Nyctophilus corbeni* | Corben's Long-eared Bat | V | V | Potential foraging and roosting habitat within Disturbance Footprint. |
| *Petaurus norfolkensis* | Squirrel Glider | V | - | Many records in the locality. No suitable hollows within Disturbance Footprint but foraging habitat available. |

**Table 4.4 Threatened fauna species known or likely to occur in the Disturbance Footprint**

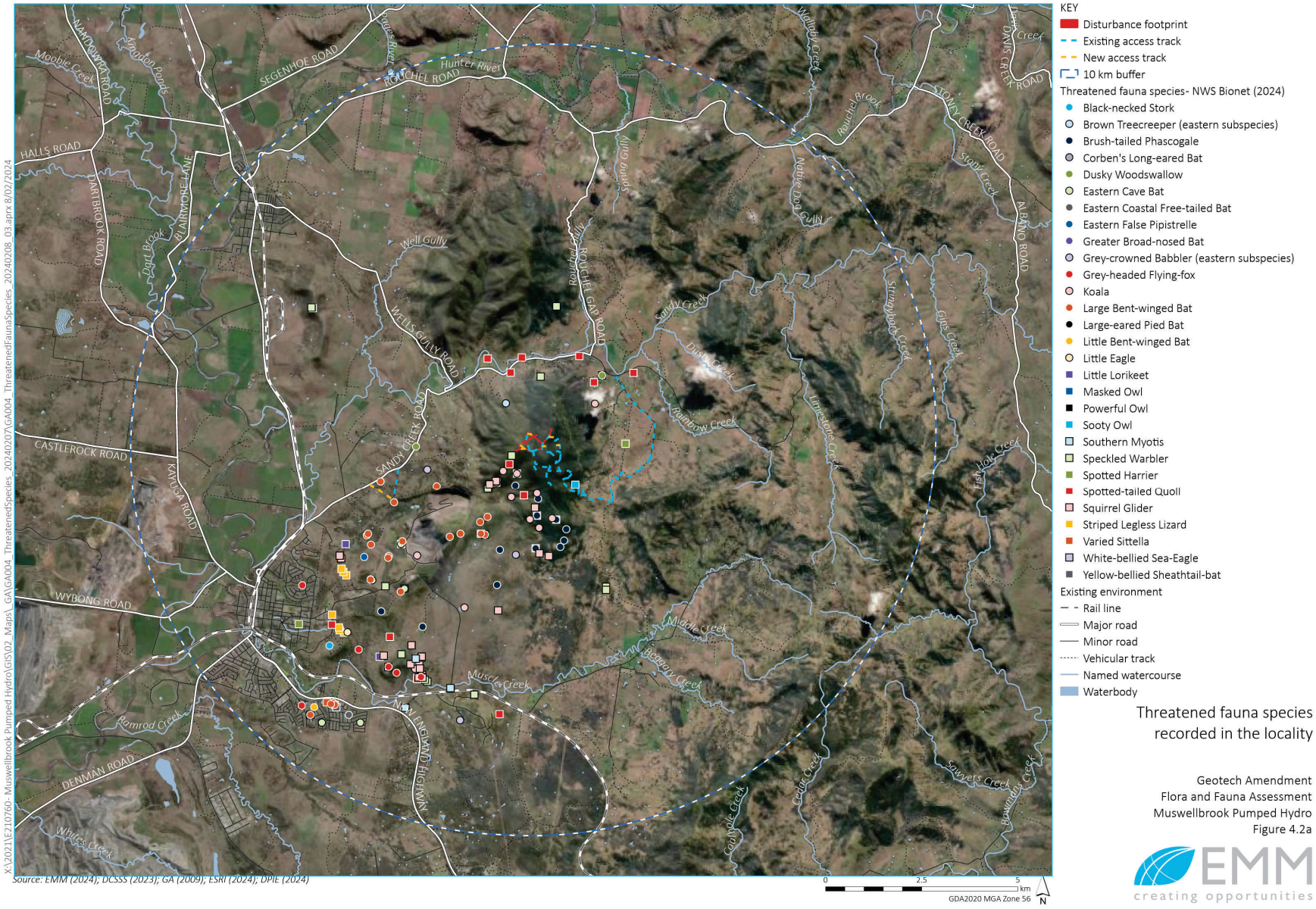
| Scientific name | Common name | BC Act status | EPBC Act status | Habitat/potential habitat in Disturbance Footprint |
|---|---|---|---|---|
| *Phascogale tapoatafa* | Brush-tailed Phascogale | V | - | Many records in the locality. No suitable hollows within Disturbance Footprint but foraging habitat available. |
| *Phascolarctos cinereus* | Koala | V | E | Recorded during surveys for the overarching Project. |
| *Pteropus poliocephalus* | Grey-headed Flying-fox | V | V | Species may forage within the Disturbance Footprint when canopy in flower. Species known from area with a camp present in Muswellbrook. |
| *Saccolaimus flaviventris* | Yellow-bellied Sheathtail-bat | V | - | Potential foraging habitat within Disturbance Footprint. |
| *Scoteanax rueppellii* | Greater Broad-nosed Bat | V | - | Potential foraging habitat within Disturbance Footprint. |
| *Vespadelus troughtoni* | Eastern Cave Bat | V | - | Recorded during surveys for the overarching Project. |

Notes: CE = critically endangered, E = endangered, V = vulnerable, Mi = migratory

Significance assessments have been completed for these species under the BC act and EPBC Act (Appendix B).

### i Koala habitat

Koalas were recorded on songmeters during surveys for the overarching Project in 2023. While the habitat in the Disturbance Footprint is likely to of low quality for the Koala, due to its regenerating nature, there are two secondary feed tree species present, including Grey Gum (*Eucalyptus punctata*) and Grey Box (*Eucalyptus moluccana*). Habitat elsewhere in the locality is likely to provide more suitable habitat where there are preferred tree species present, such as Swamp Mahogany (*Eucalyptus robusta*).




Threatened fauna species recorded in the locality

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Figure 4.2a

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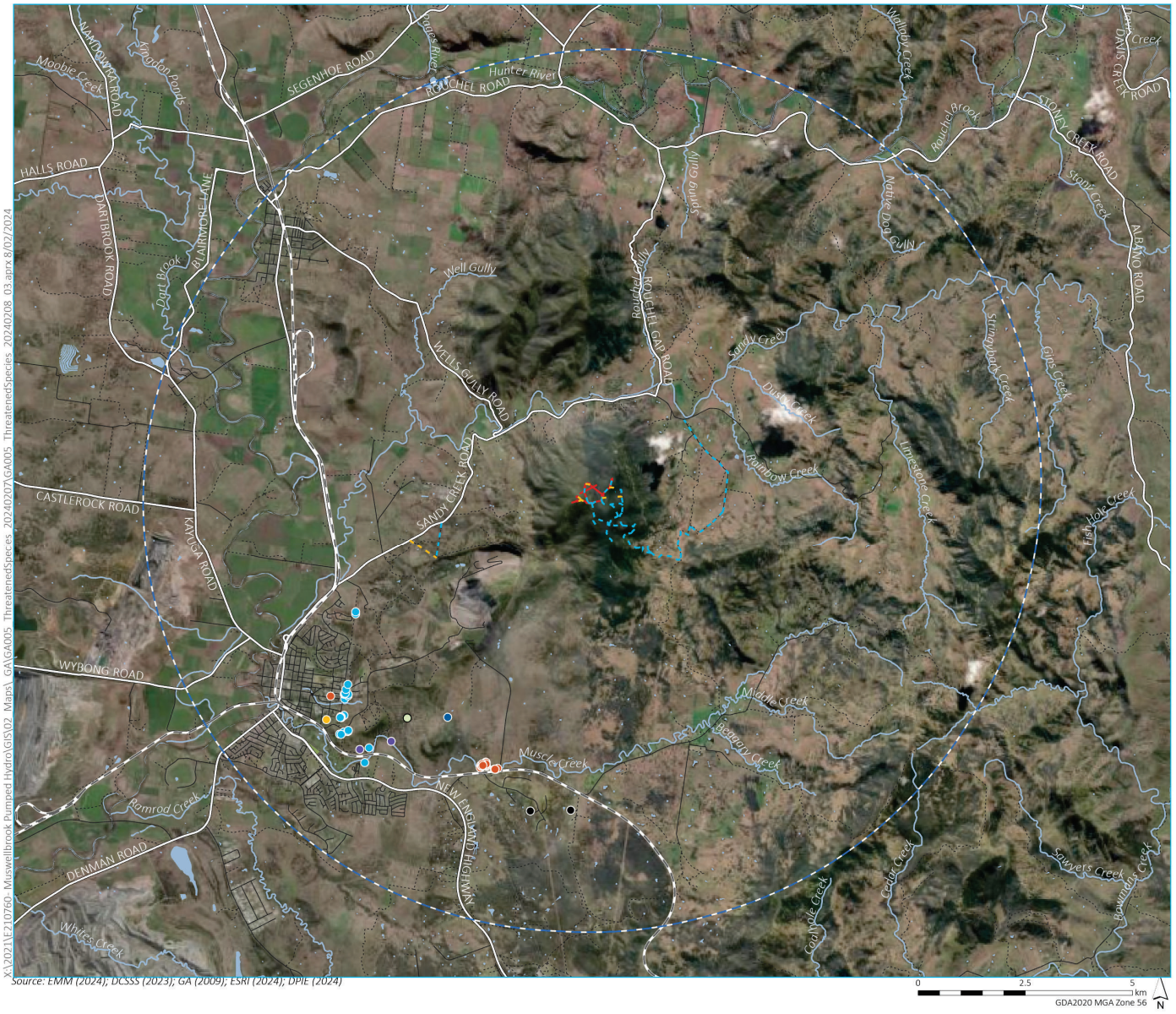


Threatened flora species recorded in the locality

Geotech Amendment
Flora and Fauna Assessment
Muswellbrook Pumped Hydro
Figure 4.2b

EMM
creating opportunities

# 5 Impact assessment

## 5.1 Avoidance, minimisation and mitigation

The hierarchy of avoid, minimise and mitigate has been used in the development of the Disturbance Footprint. This has included avoidance (wherever feasible) of key biodiversity values identified during the field investigations.

The process below has been followed to ensure impacts are avoided and minimised to the greatest extent possible, within the design and other limitations of the project:

- identification of biodiversity values through an ecological site visit; values to be avoided (dead stags and hollows) were discussed and agreed with the AGL representative on site
- communication of identified values to the project team
- consultation between the project team and project ecologists on various elements to consider both direct and indirect impacts; wherever possible, the Disturbance Footprint was placed within the existing cleared access track, to avoid further vegetation clearance
- finalisation of measures to avoid, minimise and mitigate impacts within this document.

The measures outlined in Table 5.1 have been incorporated into the project to avoid, minimise and mitigate impacts.

**Table 5.1 Measures incorporated into the project to avoid, minimise ad mitigate impacts**

| Step | Measure |
|---|---|
| Avoid and minimise | • Disturbance Footprint placed in area of regrowth forest, and all dead stags are to be avoided.<br>• Where possible, Disturbance Footprint incorporated into existing access track to minimise clearing.<br>• Vegetation clearance for seismic lines will not result in removal of any trees, and consists of brush-cutting of shrub layer only. |
| Mitigate | • A pre-clearing inspection of all vegetation has been conducted prior to clearing. Habitat trees (dead stags) avoided.<br>• Ensure works vehicles are washed down prior to entering the works area if weed seed is likely to be present. |

Table 5.1. provides a summary of the mitigation measures proposed to avoid, minimise and mitigate impacts to biodiversity.

## 5.2 Residual impacts

The residual impacts of the project, after application of the hierarchy of avoid, minimise and mitigate, are described here and were used to inform the assessments of impact significance for threatened flora and fauna (Appendix B).

Clearing of native vegetation can result in a range of direct and indirect impacts including:

- reduction in the extent of vegetation communities
- loss of local populations of species
- fragmentation of remnants of vegetation communities or local populations of individual species

- increased edge effects and habitat for invasive species
- reduction in the viability of ecological communities resulting from loss or disruption of ecological functions (e.g. increased desiccation, light penetration, increased herbivore activity, weed invasion, increased predation, and loss of animals that are seed dispersers and pollinators)
- destruction of flora and fauna habitat and associated loss of biological diversity
- soil exposure and altered water flow patterns resulting in increased erosion and sedimentation.

These direct and indirect impacts are discussed below.

### 5.2.1 Direct impacts

This section outlines the project's direct impacts, following the implementation of avoidance, minimisation and mitigation measures outlined in Section 5.1. Direct impacts for the project comprise:

- loss of 0.91 ha native vegetation
- loss and degradation of native fauna habitats.

The project will result in the direct impacts shown in Table 5.2. As discussed previously, as less than 1 ha of native vegetation is being impacted, entry into the BOS is not triggered. No BDAR is required.

**Table 5.2 Direct impact area**

| Zone | Plant community type | Ancillary code | Area (ha) |
|---|---|---|---|
| 1 | 3525 - Upper Hunter Box-Blakelys Red Gum Grassy Forest | | 0.91 |
| 2 | Cleared/disturbed track | | 0.09 |
| **Total** | | | **1.0** |

#### i Impacts on threatened or migratory species

#### a Flora and Fauna

No threatened or migratory species were recorded during the site visit within the Disturbance Footprint. However, based on surveys for the Overarching Project and desktop studies, 23 species or endangered populations are considered a moderate to high likelihood of occurrence in the Disturbance Footprint as described in Section 4.2.

Assessments of significance have been prepared for these species under the BC Act and EPBC Act (Appendix B) for these species. These assessments concluded that the project would not result in a significant impact to threatened or migratory fauna.

### 5.2.2 Indirect impacts

This section outlines the project's indirect impacts, following the implementation of avoidance, minimisation and mitigation measures outlined in Section 5.1. Indirect impacts relating to the project comprise:

- weed introduction and spread
- potential inadvertent disturbance of retained habitats
- removal of habitat resources for threatened fauna
- temporary increased noise, vibration and dust levels resulting in disturbance of fauna species, and consequent abandonment of habitat, or changes in behaviour (including breeding behaviour).

Excavation and earthworks undertaken for the boreholes may expose soils that have the potential to enter surrounding areas of vegetation, possibly resulting in sedimentation and dispersal of weeds, if not properly managed. Erosion and sediment controls are recommended to be included during activities.

In addition to the loss of total habitat area, the process of fragmentation can affect species within the newly created fragments in a number of ways, including barrier effects, genetic isolation, and edge effects. The degree to which these potential impacts affect the flora and fauna within the newly created fragments depends on a number of variables, including distance between the fragments, local environmental conditions, the species present and any proposed mitigation measures. However, given the extremely minor nature of the works and the short distances between disturbance areas (25 x 25 m for a borehole and 4-metre-wide tracks), the effects of fragmentation are considered to be unlikely to affect local species.

# 6 Assessment against key legislation and policy

## 6.1 *Environment Protection and Biodiversity Conservation Act 1999*

The project has been assessed against the requirements of the EPBC Act. No species or communities listed under the EPBC Act were recorded within the Disturbance Footprint. However, several species have potential to occur.

Assessments of significance have been prepared in accordance with Matters of National Environmental Significance: Significant impact guidelines 1.1 (DoE 2013). These assessments concluded that the project was unlikely to result in a significant impact to threatened species or communities. Referral of the project to the Commonwealth Minister for the Environment for assessment is not required.

## 6.2 *Environmental Planning and Assessment Act 1979*

### 6.2.1 State Environmental Planning Policy (Biodiversity and Conservation) 2021: Koala Habitat Protection

An assessment of impacts to the Koala has been prepared in accordance with the requirements of the *Koala Habitat Protection Guideline* (DPIE 2020). As the project involves clearing of native vegetation, it does not meet the requirements for Tier 1 – Low or no impact development under the Koala SEPP and a Tier 2 assessment is required.

An assessment of Koala habitat was undertaken in accordance with Appendix C of DPIE (2020; see Section 4.2.3i). Tree species composition was assessed using a series of plots for the overarching project and against the list of Koala use trees identified in Appendix A of DPI (2020) for the Central Coast Koala Management Area (KMA). These surveys determined that the Disturbance Footprint does support highly suitable Koala habitat, especially considering the Koala was detected during surveys for the overarching project. Highly suitable Koala habitat was mapped across the Disturbance Footprint; however, the trees are in a state of regrowth and are fairly small in size (<20 cm DBH).

Surveys were undertaken for the Koala (see Section 3.2.2) for the overarching Project. These surveys determined that the Koala is present within the vicinity.

Based on the above, the Disturbance Footprint is identified as core Koala habitat under the Koala SEPP, based on the presence of highly suitable Koala habitat and the presence of Koalas. The following measures have been taken to avoid impacts to core Koala habitat:

- no large trees (>10 cm DBH) to be removed
- activities are temporary and minor in nature.

## 6.3 *Biodiversity Conservation Act 2016*

Assessments of significance have been prepared in accordance with OEH (2018a). These assessments determined that the project will not result in a significant effect on threatened species or communities. The project will not exceed the biodiversity offsets scheme thresholds outlined in Section 7.1 of the BC Regulation and is not located in an area of outstanding biodiversity value.

As outlined in Section 4.2, the project will not significantly affect threatened species or communities and thus preparation of a BDAR is not required.

## 6.4 *Biosecurity Act 2015*

No weeds of national significance (WoNS) were identified within the Disturbance Footprint.

## 6.5 *Water Management Act 2000*

The project will not occur on waterfront land and a controlled activity permit is not required.

# 7 Conclusions

This biodiversity assessment has been completed to assess potential impacts of the project on species and communities listed under the BC Act and EPBC Act.

Biodiversity surveys were undertaken to understand the biodiversity values of the Disturbance Footprint (Section 4) and inform measures to avoid, minimise and mitigate these impacts (Section 5.1). Residual impacts arising from the project, following all measures to avoid, minimise and mitigate impacts, include:

- clearing of 0.91 ha of native vegetation and fauna habitat
- impacts to potential habitat for 1 threatened flora species and 1 endangered population, 20 threatened fauna species and one migratory species
- indirect impacts to retained vegetation and fauna habitat.

Assessments of significance were prepared under the BC Act and EPBC Act (Appendix B).

These assessments determined that the project will not result in a significant impact to threatened species and communities and preparation of a BDAR or referral of the project under the EPBC Act is not required.

Provided the proponent implements the measures outlined in Section 5.1, the project is predicted to result in minor impacts to biodiversity values within the Disturbance Footprint.

# References

DEC 2004, Threatened Biodiversity Survey and Assessment: Guidelines for Development and Activities, Department of the Environment and Conservation.

DECC 2009, Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna Amphibians, Department of Environment and Climate Change.

DoE, 2013. Matters of National Environmental Significance Significant impact guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999.

DPIE 2020, Koala Habitat Protection Guideline, Department of Planning, Industry and Environment.

OEH 2020a, Biodiversity Assessment Method, Office of Environment and Heritage.

OEH 2018a, Threatened Species Test of Significance Guidelines, Office of Environment and Heritage.

# Appendix A
## Likelihood of Occurrence table

**Table A.1 Likelihood of Occurrence table**

| Class | Scientific name | Common name | BC Act Status | EPBC Act status | Habitat and geographic distribution | Likelihood of occurrence | Justification | Bionet records |
|---|---|---|---|---|---|---|---|---|
| Bird | *Anseranas semipalmata* | Magpie Goose | V | - | Mainly found in shallow wetlands (less than 1 m deep) with dense growth of rushes or sedges. Equally at home in aquatic or terrestrial habitats; often seen walking and grazing on land; feeds on grasses, bulbs and rhizomes. | None | No habitat available within the Disturbance Footprint. | 1 |
| Bird | *Anthochaera phrygia* | Regent Honeyeater | E | CE | The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. These birds are also found in drier coastal woodlands and forests in some years. Every few years non-breeding flocks are seen foraging in flowering coastal Swamp Mahogany (Eucalyptus robusta) and Spotted Gum (*Corymbia maculata*) forests, particularly on the central coast and occasionally on the upper north coast. Birds are occasionally seen on the south coast. Mistletoe is a favoured food source. | Low | Few feed trees available in the Disturbance Footprint. Narrow-leaved ironbark unlikely to provide copious nectar, and no mistletoe species observed. No records in the locality. Species would be likely to be passing through at best. | 0 |
| Bird | *Aphelocephala leucopsis* | Southern Whiteface | V | V | Usually found in dry open forests and woodland and inland scrubs of mallee, mulga and saltbush are the preferred habitat of Southern Whiteface, especially areas with fallen timber or dead trees and stumps. | Low | Marginal habitat in the Disturbance Footprint. Species generally found further west towards the arid zone. | 1 |
| Bird | *Apus pacificus* | Fork-tailed Swift | - | Mi | In Australia, the Fork-tailed Swift mostly occurs over inland plains but sometimes above foothills or in coastal areas. This species can also occur over cliffs and beaches and also over islands and sometimes well out to sea. | Negligible | Species may forage aerially over the Disturbance Footprint but unlikely to land within. | 0 |
| Bird | *Artamus cyanopterus cyanopterus* | Dusky Woodswallow | V | - | The species occurs throughout most of NSW, but is sparsely scattered in, or largely absent from, much of the upper western region. Most breeding activity occurs on the western slopes of the Great Dividing Range. The most common habitat for this species is in woodlands and dry open sclerophyll forests, usually dominated by eucalyptus, including mallee associations. The species has also been recorded in shrublands and heathlands and various modified habitats, including regenerating forests, very occasionally in moist forests or rainforests. Understorey is typically open with sparse Eucalyptus saplings, Acacia and other shrubs, including heath. The ground cover may consist of grasses, sedges or open ground, often with coarse woody debris (OEH 2018). | Moderate | Suitable habitat in the Disturbance Footprint. Species known from the locality. | 1 |
| Bird | *Botaurus poiciloptilus* | Australasian Bittern | E | E | The Australasian Bittern is widespread and found over most of NSW except for far north-west. Preferred habitat is composed of wetlands with tall dense vegetation, where it forages in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water. It favours permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes and reeds or cutting grass (*Gahnia* sp.) growing over a muddy or peaty substrate (OEH 2018). | None | No habitat available within the Disturbance Footprint. | 0 |
| Bird | *Callocephalon fimbriatum* | Gang-gang Cockatoo | V | E | In summer, the Gang-gang Cockatoo is generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In winter, they may occur at lower altitudes in drier more open eucalypt forests and woodlands, and often found in urban areas. | Low | No habitat available within the Disturbance Footprint. | 0 |
| Bird | *Calyptorhynchus lathami* | Glossy Black-Cockatoo | V | - | The Glossy Black Cockatoo inhabits open forest and woodlands of the coast and the Great Dividing Range up to 1000 m in which stands of She-oak species, particularly Black She-oak (*Allocasuarina littoralis*), Forest She-oak (*A. torulosa*) or Drooping She-oak (*A. verticillata*) occur. | Low | Disturbance Footprint lacks heavily timbered areas and she-oak species. No hollow-bearing trees suitable for breeding within the Disturbance Footprint.<br>Not recorded within the locality. | 0 |
| Bird | *Chthonicola sagittata* | Speckled Warbler | V | - | The Speckled Warbler lives in a wide range of Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area. | Low | While the species is known from the area, Disturbance Footprint is entirely regrowth forest with dense shrubbery. Species may pass through at best but habitat largely unsuitable. | 14 |
| Bird | *Circus assimilis* | Spotted Harrier | V | - | Occurs in grassy open woodland including *Acacia* and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. | Low | While the species is known from the locality, it generally occurs within and nearby grassland, which is not present in the Disturbance Footprint. | 1 |

**Table A.1 Likelihood of Occurrence table**

| Class | Scientific name | Common name | BC Act Status | EPBC Act status | Habitat and geographic distribution | Likelihood of occurrence | Justification | Bionet records |
|---|---|---|---|---|---|---|---|---|
| Bird | *Climacteris picumnus* | Brown Treecreeper | V | V | Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and River Red Gum (*Eucalyptus camaldulensis*) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging; also recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains. | Low | Species not known from the locality and habitat within the Disturbance Footprint consists of regrowth ironbark and redgum, rather than stringy barks or box-gum associations. Typically found west of the Great Dividing Range. | 0 |
| Bird | *Daphoenositta chrysoptera* | Varied Sittella | V | - | Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees and small branches and twigs in the tree canopy. Builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years. | Moderate | Potential foraging and breeding habitat in the disturbance footprint | 5 |
| Bird | *Erythriotriocrhis radiatus* | Red Goshawk | E | E | Red Goshawks inhabit open woodland and forest, preferring a mosaic of vegetation types, a large population of birds as a source of food, and permanent water, and are often found in riparian habitats along or near watercourses or wetlands. In NSW, preferred habitats include mixed subtropical rainforest, *Melaleuca* swamp forest and riparian *Eucalyptus* forest of coastal rivers. | Low | No suitable habitat and not recorded from the locality. Extremely rare in NSW. | 0 |
| Bird | *Falco hypoleucos* | Grey Falcon | E | V | The Grey Falcon is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. The species is usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey (OEH 2018). | Low | No suitable habitat and not recorded from the locality. Extremely rare in NSW. | 0 |
| Bird | *Gallinago hardwickii* | Latham's Snipe | - | Mi | Latham's Snipe is a non-breeding visitor to south-eastern Australia, and is a passage migrant through northern Australia. Latham's Snipe occurs in permanent and ephemeral wetlands up to 2,000 m above sea-level. They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies) | None | No suitable wetland habitat. | 0 |
| Bird | *Glossopsitta pusilla* | Little Lorikeet | V | - | Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Isolated flowering trees in open country (e.g. paddocks, roadside remnants and urban trees) also help sustain viable populations of the species. Feeds mostly on nectar and pollen, occasionally on native fruits such as mistletoe, and only rarely in orchards. | Moderate | Species may forage in canopy species when flowering. Known from locality. | 8 |
| Bird | *Grantiella picta* | Painted Honeyeater | E | V | The species is sparsely distributed from south-eastern Australia to north-western Queensland, with its greatest concentrations and breeding locations occurring on the inland slopes of the Great Dividing Range in NSW. It inhabits mistletoes in eucalypt forests/woodlands, riparian woodlands of Black Box (*E. largiflorens*) and River Red Gum (*E. camaldulensis*), Box-Ironbark-Yellow Gum woodlands, Acacia-dominated woodlands, Paperbarks, Casuarina, Callitris, and trees on farmland or gardens. The species prefers woodlands which contain a higher number of mature trees, as these host more mistletoes. | Low | No records of this species within the locality. Strongly associated with mistletoe species, which were not recorded in Disturbance Footprint. | 0 |
| Bird | *Haliaeetus leucogaster* | White-bellied Sea-Eagle | V | - | The White-bellied Sea-Eagle is found in coastal habitats (especially those close to the sea-shore) and around terrestrial wetlands in tropical and temperate regions of mainland Australia and its offshore islands. The habitats occupied by the sea-eagle are characterised by the presence of large areas of open water (larger rivers, swamps, lakes and the sea). | Low | Disturbance Footprint lacks large trees suitable for breeding. No suitable foraging habitat within the Disturbance Footprint. | 1 |
| Bird | *Hieraaetus morphnoides* | Little Eagle | V | - | The Little Eagle is found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. It occurs as a single population throughout NSW. This species occupies open eucalypt forest, woodland or open woodland. She-oak or Acacia woodlands and riparian woodlands of interior NSW are also used. | Low | Disturbance Footprint lacks large trees suitable for breeding. No potential foraging habitat within the Disturbance Footprint as forest is closed and dense. | 3 |

**Table A.1 Likelihood of Occurrence table**

| Class | Scientific name | Common name | BC Act Status | EPBC Act status | Habitat and geographic distribution | Likelihood of occurrence | Justification | Bionet records |
|---|---|---|---|---|---|---|---|---|
| Bird | *Hirundapus caudacutus* | White-throated Needletail | - | Mi | The White-throated Needletail is widespread in eastern and south-eastern Australia. In NSW this species extends inland to the western slopes of the Great Divide and occasionally onto the adjacent inland plains. In Australia, the White-throated Needletail is almost exclusively aerial, recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland (DoEE 2018). | Negligible | This species may forage aerially over the Disturbance Footprint, however, is unlikely to be impacted by the project. | 4 |
| Bird | *Lathamus discolor* | Swift Parrot | E | CE | This species migrates in the autumn and winter months to south-eastern Australia. In NSW, it mostly occurs on the coast and south-west slopes in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations (OEH 2018). Favoured feed trees include winter flowering species such as Swamp Mahogany, Spotted Gum, Red Bloodwood, Mugga Ironbark and White Box. Commonly used lerp infested trees include Inland Grey Box, Grey Box and Blackbutt. | Low | Species unlikely to forage within the Disturbance Footprint. Marginal habitat available when canopy in flower, but no prolifically winter-flowering species present (when species is present on mainland). | 0 |
| Bird | *Melanodryas cucullata* | South-eastern Hooded Robin | E | E | Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. Often perches on low dead stumps and fallen timber or on low-hanging branches, using a perch-and-pounce method of hunting insect prey. | Low | Habitat marginal at best. Forest is dense and closed with thick shrubbery and Disturbance Footprint not close to open grassy areas. Species not known from locality. | 0 |
| Bird | *Monarcha melanopsis* | Black-faced Monarch | | Mi | The Black-faced Monarch is found in rainforests, eucalypt woodlands, coastal scrub and damp gullies. It may be found in more open woodland when migrating. | Moderate | Species may utilise the Disturbance Footprint for foraging and breeding. | 0 |
| Bird | *Myiagra cyanoleuca* | Satin Flycatcher | | Mi | The Satin Flycatcher is found in tall forests, preferring wetter habitats such as heavily forested gullies, but not rainforests. | Low | No suitable habitat and not recorded from the locality. | 0 |
| Bird | *Neophema chrysostoma* | Blue-winged Parrot | V | V | In NSW, populations are found in the western arid zones. It inhabits a range of habitats from coastal, sub-coastal and inland areas, right through to semi-arid zones. Throughout their range, they favour grasslands and grassy woodlands. They are often found near wetlands both near the coast and in semi-arid zones. | None | Typically found in the arid zone in NSW, and habitat marginal at best. | 0 |
| Bird | *Ninox strenua* | Powerful Owl | V | - | In NSW, the Powerful Owl is widely distributed throughout the eastern forests from the coast inland to tablelands, with scattered, mostly historical records on the western slopes and plains. This species roosts by day in dense vegetation comprising species such as Turpentine (*Syncarpia glomulifera*), Black She-oak (*Allocasuarina littoralis*), Blackwood (*Acacia melanoxylon*), Rough-barked Apple (*Angophora floribunda*), Cherry Ballart (*Exocarpus cupressiformis*) and a number of eucalypt species. | Low | Disturbance Footprint lacks suitable tree hollows for breeding and would not provide a suitable foraging habitat due to a lack of prey in the regenerating forest. May pass over the area occasionally but unlikely to specifically use the regenerating forest in the Disturbance Footprint. | 2 |
| Bird | *Pandion cristatus* | Eastern Osprey | V | - | Favour coastal areas, especially the mouths of large rivers, lagoons and lakes. Feed on fish over clear, open water. Breed from July to September in NSW. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea. | None | No suitable habitat present. | 0 |
| Bird | *Polytelis swainsonii* | Superb Parrot | V | V | Inhabit Box-Gum, Box-Cypress-pine and Boree woodlands and River Red Gum forest in the Riverina, South-west Slopes and Southern Tablelands. | None | Species does not occur in the region. | 0 |
| Bird | *Pomatostomus temporalis temporalis* | Grey- crowned Babbler | V | - | Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Woodlands on fertile soils in coastal regions. | Low | While the species is known from the locality and likely to be present nearby, the Disturbance Footprint provides very little habitat, being too dense and of a regenerating nature. | 6 |
| Bird | *Rostratula australis* | Australian Painted Snipe | E | E | The Australian Painted Snipe generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. The species also uses inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains (OEH 2018). | None | Disturbance Footprint lacks shallow freshwater wetland areas of suitable quality to be utilised by this species. PMST; Species or species habitat known to occur within area. | 0 |

**Table A.1 Likelihood of Occurrence table**

| Class | Scientific name | Common name | BC Act Status | EPBC Act status | Habitat and geographic distribution | Likelihood of occurrence | Justification | Bionet records |
|---|---|---|---|---|---|---|---|---|
| Bird | *Stagonopleura guttata* | Diamond Firetail | V | V | Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum Eucalyptus pauciflora Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland. Feeds exclusively on the ground, on ripe and partly-ripe grass and herb seeds and green leaves, and on insects (especially in the breeding season). | Low | Dense shrubbery does not provide the grassy understorey required for these species. While some native grasses are present, this species typically inhabits more open grasslands. | 1 |
| Bird | *Tyto novaehollandiae* | Masked Owl | V | - | Lives in dry eucalypt forests and woodlands from sea level to 1,100 m. A forest owl, but often hunts along the edges of forests, including roadsides. The typical diet consists of tree-dwelling and ground mammals, especially rats. Pairs have a large home-range of 500 to 1,000 hectares. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting. Extends from the coast where it is most abundant to the western plains. Overall records for this species fall within approximately 90% of NSW, excluding the most arid north-western corner. There is no seasonal variation in its distribution. | Known | Species recorded during surveys for the overarching Project. May occasionally forage over the Disturbance Footprint. | 1 |
| Bird | *Tyto tenebricosa* | Sooty Owl | V | - | Occurs in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests. Roosts by day in the hollow of a tall forest tree or in heavy vegetation; hunts by night for small ground mammals or tree-dwelling mammals such as the Common Ringtail Possum (*Pseudocheirus peregrinus*) or Sugar Glider (*Petaurus breviceps*). Nests in very large tree-hollows. Occupies the easternmost one-eighth of NSW, occurring on the coast, coastal escarpment and eastern tablelands. Territories are occupied permanently. | Low | Habitat is not suitable for this species, which typically requires tall, wet forest. | 1 |
| Mammal | *Chalinolobus dwyeri* | Large-eared Pied Bat | V | V | In NSW this species has been recorded from a large range of vegetation types including dry and wet sclerophyll forest; Cyprus Pine (Callitris glauca) dominated forest; tall open eucalypt forest with a rainforest sub-canopy; sub-alpine woodland; and sandstone outcrop country. The species requires a combination of sandstone cliff/escarpment to provide roosting habitat that is adjacent to higher fertility sites, particularly box gum woodlands or river/rainforest corridors which are used for foraging. Roosting has also been observed in disused mine shafts, caves, overhangs and disused Fairy Martin (*Hirundo ariel*) nests, also possibly roosts in the hollows of trees. | Known | Species recorded during surveys for the overarching Project. May forage over the Disturbance Footprint. | 7 |
| Mammal | *Dasyurus maculatus* | Spotted-tailed Quoll | V | E | This species has been recorded from a wide range of habitats, including coastal heathlands, open and closed eucalypt woodlands, wet sclerophyll and lowland forests (OEH 2018). Unlogged forest or forest that has been less disturbed by timber harvesting is preferable. Habitat requirements include suitable den sites such as hollow logs, tree hollows, rock outcrops or caves. Individuals require an abundance of food, such as birds and small mammals, and large areas of relatively intact vegetation through which to forage. Home ranges are estimated to be 620–2,560 ha for males and 90–650 ha for females (DoEE 2018). | Moderate | Suitable denning habitat nearby in the form of rocks. May occasionally forage in the Disturbance Footprint. | 16 |
| Mammal | *Falsistrellus tasmaniensis* | Eastern False Pipistrelle | V | - | Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings. Hunts beetles, moths, weevils and other flying insects above or just below the tree canopy. Hibernates in winter. Females are pregnant in late spring to early summer. The Eastern False Pipistrelle is found on the south-east coast and ranges of Australia, from southern Queensland to Victoria and Tasmania. | Moderate | May forage within the Disturbance Footprint. No hollows in Disturbance Footprint. | 4 |
| Mammal | *Micronomus norfolkensis* | Eastern Coastal Free-tailed Bat | V | - | Occurs in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. 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. The Eastern Freetail-bat is found along the east coast from south Queensland to southern NSW. | Moderate | Potential foraging and roosting habitat within Disturbance Footprint. | 4 |
| Mammal | *Miniopterus australis* | Little Bent-winged Bat | V | - | The Little Bent-wing Bat is distributed on the East coast and ranges of Australia from Cape York in Queensland to Wollongong in NSW. It is generally found in well-timbered areas. Little Bent-wing 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. | Known | Species recorded during surveys for the overarching Project. May forage over the Disturbance Footprint. | 1 |

**Table A.1 Likelihood of Occurrence table**

| Class | Scientific name | Common name | BC Act Status | EPBC Act status | Habitat and geographic distribution | Likelihood of occurrence | Justification | Bionet records |
|---|---|---|---|---|---|---|---|---|
| Mammal | *Miniopterus orianae oceanensis* | Large Bent-winged Bat | V | - | Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. This species hunts in forested areas, catching moths and other flying insects above the tree tops. Eastern Bent-wing-bats occur along the east and north-west coasts of Australia. | Known | Species recorded during surveys for the overarching Project. May forage over the Disturbance Footprint. | 30 |
| Mammal | *Myotis macropus* | Southern Myotis | V | - | The Southern Myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km inland, except along major rivers. They generally roost in groups of 10–15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Southern Myotis forage over streams and pools catching insects and small fish by raking their feet across the water surface. | Known | Species recorded during surveys for the overarching Project. May forage over the Disturbance Footprint. | 10 |
| Mammal | *Notamacropus parma* | Parma Wallaby | V | V | Preferred habitat is moist eucalypt forest with thick, shrubby understorey, often with nearby grassy areas, rainforest margins and occasionally drier eucalypt forest. Typically feed at night on grasses and herbs in more open eucalypt forest and the edges of nearby grassy areas. During the day they shelter in dense cover. | Moderate | May occur within the Disturbance Footprint. | 0 |
| Mammal | *Nyctophilus corbeni* | Corben's Long-eared Bat | V | V | Inhabits a variety of vegetation types, including mallee, bulloke *Allocasuarina leuhmanni* and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland. Roosts in tree hollows, crevices, and under loose bark. | Moderate | Potential foraging and roosting habitat within Disturbance Footprint. | 2 |
| Mammal | *Petauroides volans* | Greater Glider | - | V | Largely restricted to eucalypt forests and woodlands. It is primarily folivorous, with a diet mostly comprising eucalypt leaves, and occasionally flowers. It is typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. The greater glider favours forests with a diversity of eucalypt species, due to seasonal variation in its preferred tree species. | Low | Disturbance Footprint lacks mature forest and hollows and habitat unsuitable. | 0 |
| Mammal | *Petaurus australis australis* | Yellow-bellied Glider (south-eastern) | V | - | Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. The Yellow-bellied Glider is found along the eastern coast to the western slopes of the Great Dividing Range, from southern Queensland to Victoria. | Low | Disturbance Footprint lacks mature forest and hollows and habitat unsuitable. | 0 |
| Mammal | *Petaurus norfolkensis* | Squirrel Glider | V | - | Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia midstorey. | Moderate | Many records in the locality. No suitable hollows within Disturbance Footprint but foraging habitat available. | 25 |
| Mammal | *Petrogale penicillata* | Brush-tailed Rock-wallaby | E | V | In NSW the Brush-tailed Rock Wallaby occurs from the Queensland border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit. This species occupies rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north. The Brush-tailed Rock Wallaby browse on vegetation in and adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees. | Low | Disturbance Footprint lacks rocky areas required by this species. | 0 |
| Mammal | *Phascogale tapoatafa* | Brush-tailed Phascogale | V | - | Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. Also inhabit heath, swamps, rainforest and wet sclerophyll forest. | Moderate | Many records in the locality. No suitable hollows within Disturbance Footprint but foraging habitat available. | 24 |
| Mammal | *Phascolarctos cinereus* | Koala | V | E | The Koala inhabits eucalypt woodlands and forests and feeds on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species (OEH 2018). Large populations of koalas occur on the western slopes and plains, in particular the Pilliga region (Kavanagh and Barrott 2001) and in Gunnedah (Smith 1992) and Walgett LGAs (J. Callaghan, Australian Koala Foundation, pers. comm.). Primary feed trees within the Western Slopes and Plains Koala Management Area (KMA) are River Red Gum (*E. camalduensis*) and Coolabah (*E. coolabah*). | Known | Recorded during surveys for the overarching Project. | 15 |

**Table A.1 Likelihood of Occurrence table**

| Class | Scientific name | Common name | BC Act Status | EPBC Act status | Habitat and geographic distribution | Likelihood of occurrence | Justification | Bionet records |
|---|---|---|---|---|---|---|---|---|
| Mammal | *Potorous tridactylus trisulcatus* | Long-nosed Potoroo | V | V | The long-nosed potoroo is found on the south-eastern coast of Australia, from Queensland to eastern Victoria and Tasmania, including some of the Bass Strait islands. There are geographically isolated populations in western Victoria. In NSW it is generally restricted to coastal heaths and forests east of the Great Dividing Range, with an annual rainfall exceeding 760 mm. Inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a common feature. | None | There are no records of this species within the locality and the Disturbance Footprint does not contain suitable foraging or breeding habitat. | 0 |
| Mammal | *Pseudomys novaehollandiae* | New Holland Mouse | - | V | Found from coastal areas and up to100 km inland on sandstone country. Known to inhabit a range of habitats including open heathland, open woodland with a heathland understory and vegetated sand dunes. Soil type may be an important indicator of suitability of habitat with deeper top soils and softer substrates being preferred for digging burrows. Other factors such as slope, geology and the amount of sun received in an area may also influence site selection. | Low | There are no records of this species within the locality and the Disturbance Footprint does not contain suitable foraging or breeding habitat. | 0 |
| Mammal | *Pteropus poliocephalus* | Grey-headed Flying-fox | V | V | Grey-headed Flying foxes occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. 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. | Moderate | Species may forage within the Disturbance Footprint when canopy in flower. Species known from area with a camp present in Muswellbrook. | 16 |
| Mammal | *Saccolaimus flaviventris* | Yellow-bellied Sheathtail-bat | V | - | Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory. Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. | Moderate | Potential foraging habitat within Disturbance Footprint. | 3 |
| Mammal | *Scoteanax rueppellii* | Greater Broad-nosed Bat | V | - | The Greater Broad-nosed Bat is found mainly in the gullies and river systems that drain the Great Dividing Range, from north-eastern Victoria to the Atherton Tableland. It extends to the coast over much of its range. In NSW it is widespread on the New England Tablelands, however, does not occur at altitudes above 500 m. This species utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. | Moderate | Potential foraging habitat within Disturbance Footprint. | 3 |
| Mammal | *Vespadelus troughtoni* | Eastern Cave Bat | V | - | A cave-roosting species that is usually found in dry open forest and woodland, near cliffs or rocky overhangs; has been recorded roosting in disused mine workings, occasionally in colonies of up to 500 individuals. Occasionally found along cliff-lines in wet eucalypt forest and rainforest. | Known | Recorded during surveys for the overarching Project. | 10 |
| Reptile | *Aprasia parapulchella* | Pink-tailed Worm Lizard | | V | Inhabits sloping, open woodland areas with predominantly native grassy groundlayers, particularly those dominated by Kangaroo Grass (*Themeda australis*). Sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks. | None | No suitable habitat in Disturbance Footprint. | 0 |
| Reptile | *Delma impar* | Striped Legless Lizard | V | V | Found mainly in Natural Temperate Grassland but has also been captured in grasslands that have a high exotic component. Also found in secondary grassland near Natural Temperate Grassland and occasionally in open Box-Gum Woodland. Species in the Hunter is *Delma vescolineata.* | None | No suitable habitat in Disturbance Footprint. | 11 |

# Appendix B
## Assessments of significance

## B.1 Assessments of significance under the NSW BC Act

### B.1.1 Pine Donkey Orchid, Dusky Woodswallow, Varied Sittella, Little Lorikeet, Masked Owl, Large-eared Pied Bat, Spotted-tailed Quoll, Eastern False Pipistrelle, Eastern Coastal Free-tailed Bat, Little Bent-winged Bat, Large Bent-winged Bat, Southern Myotis, Parma Wallaby, Corben's Long-eared Bat, Squirrel Glider, Brush-tailed Phascogale, Koala, Grey-headed Flying-fox, Yellow-bellied Sheathtail-bat, Greater Broad-nosed Bat and Eastern Cave Bat

**Table B.1 Assessment of significance for woodland birds**

| Criteria | Assessment |
|---|---|
| **a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,** | Based on the *Threatened Species Test of Significance Guidelines* the local populations of fauna species '*comprises those individuals known or likely to occur in the study area, as well as any individuals occurring in adjoining areas (contiguous or otherwise) that are known or likely to utilise habitats in the study area'* (OEH 2018). Therefore, local populations of the above are assumed present within the vicinity due to the presence of suitable habitat, as well as adjoining areas of contiguous habitat.<br>The Disturbance Footprint is considered likely to provide occasional foraging habitat for the fauna species subject to this test of significance. Due to the extremely minor nature of the works, removing 0.91 ha of habitat, it is considered unlikely that any breeding habitat for these species would be impacted, however this test of significance errs on the side of caution. No hollow-bearing trees will be impacted.<br>In the case of the pine donkey orchid, the Disturbance Footprint is considered to provide habitat for the species, considering it is found in relatively large numbers in the locality (162 records within 10 km).<br>Impacts to habitat for these flora and fauna species totals 0.91 ha. Therefore, despite the direct loss of foraging and breeding woodland habitat, the proposal is extremely unlikely to adversely affect the lifecycle processes of these species, given the minor and temporary impacts. While construction noise and an increase in dust will discourage these species from inhabiting the disturbance area at the time of the works, these activities are temporary only. Flora and fauna species will continue to persist in the vast tract of surrounding vegetation and can move back into the Disturbance Footprint at the cessation of the works. The surrounding habitats are also likely to be more suitable for these species, as they consist of remnant forests rather than younger regrowth.<br>Given the availability of suitable vegetation outside the subject land in which to complete their lifecycle processes, and the temporary nature of the disturbance, the proposal is unlikely to adversely affect the life cycles of these species, such that viable local populations would be placed at risk of extinction. |
| **b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity—**<br>**i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**<br>**ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,** | Not applicable. |

**Table B.1 Assessment of significance for woodland birds**

| Criteria | Assessment |
|---|---|
| **c) in relation to the habitat of a threatened species or ecological community—**<br>**i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and**<br>**ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and**<br>**iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,** | i) The extent to which habitat will be removed or modified as a result of the project is 0.91 ha. This is an extremely minor area, when considering the entire mountain itself encompasses approximately 1,000 ha of native vegetation. Therefore, the removal of 0.91 ha of habitat is unlikely to significantly impact upon any of these species.<br>ii) Native vegetation within the Disturbance Footprint may become fragmented from surrounding vegetation as a result of these works. However, fragmentation is considered to be relatively minor, being a 25 x 25 m area for boreholes and 4 m for tracks. Regarding fauna species, all are highly mobile and will not be impacted by these minor areas of fragmentation. In the case of the pine donkey orchid, fragmentation may result in minor impacts to the species, however there is ample suitable contiguous habitat over the remainder of the mountain, totalling approximately 1,000 ha, as well as within the grassland areas surrounding the mountain. Fragmentation effects are considered to be negligible.<br>iii) It is not expected that the proposal will remove habitat important to the long-term survival of these species, as the proposal will remove a relatively small area of suitable habitat for these species (approximately 0.91 ha). |
| **d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),** | No areas of outstanding biodiversity values are present within, or adjacent to, the subject land (DPE 2023b). Therefore, the proposed development would not have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly). |
| **e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.** | The proposal will contribute to the following key threatening process relevant to these species:<br>• *Clearing of native vegetation*<br>The impact of vegetation clearing on the loss, fragmentation, and degradation of habitat for these species are discussed under the responses to parts a and c. |
| **Conclusion** | The project is unlikely to have a significant impact on these threatened flora and fauna species due to the following:<br>• The extent to which habitat will be removed from the native vegetation extent is minor at 0.91 ha.<br>• While there is potential for habitat to become fragmented, this is likely to be negligible especially regarding the highly mobile fauna species.<br>• It is not expected that the proposal will remove habitat important to the long-term survival of these species, given the minor extent to be removed, being 0.91 ha.<br>In conclusion, the proposed development is unlikely to result in a significant impact on any threatened species. |

## B.2 Assessments of significance under the Commonwealth EPBC Act

### B.2.1 Endangered species

**Table B.2 Assessment of significance for the Koala and Spotted-tailed Quoll**

| Assessment question | Response |
|---|---|
| **1. lead to a long-term decrease in the size of a population** | The project will remove 0.91 ha of habitat for these species. The habitat is not considered to be important to these species, given the very minor nature of the works, and the fact that the forest is in a state of regeneration and regrowth following historical clearing. |
| **2. reduce the area of occupancy of the species** | The project will remove 0.91 ha of habitat that is potentially occupied by these species. Given the very large area of habitat surrounding the Disturbance Footprint, that is arguably more suitable for these species due to its remnant state, it is unlikely that the area of occupancy would be reduced for these species such that they would be impacted. |
| **3. fragment an existing population into two or more populations** | The project will not fragment any existing populations of these highly mobile species. |
| **4. adversely affect habitat critical to the survival of a species** | It is extremely unlikely that the forested habitat within the Disturbance Footprint comprises habitat that is critical to the survival of these species. There are no large trees present within the Disturbance Footprint, no denning areas for spotted-tailed quolls, and no preferred feed tree species for the koala to be removed. |
| **5. disrupt the breeding cycle of a population** | The project is unlikely to disrupt the breeding cycle of any population of these species. While there will be temporary human activity, noise and potential dust in the Disturbance Footprint during the works, these will not be long term disruptions. These species may temporarily move away from the area, which is feasible given the large area of arguably better habitat in the immediate vicinity of the works. |
| **6. modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline** | The project will result in the removal of 0.91 ha of habitat for these species. Given the availability of more suitable habitat in the immediate vicinity, and the very minor area of habitat to be removed, it is highly unlikely that the removal of this habitat would cause either species to decline.<br>Mitigation measures such as weed control and weed hygiene protocols will also be implemented to ensure habitat condition is not decreased. |
| **7. result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat** | The clearing of vegetation and construction activities has the potential to result in the spread of exotic species. This will be mitigated by weed hygiene measures such as vehicle and machinery wash downs and weed control prior to clearing.<br>The proposed activity is unlikely to result in an increase in invasive species into the adjacent vegetation and habitats. |
| **8. introduce disease that may cause the species to decline, or** | The proposed activity is unlikely to introduce disease such as *Chlamydia* or koala Retrovirus to the Disturbance Footprint that could impact koalas, or any other disease harmful to spotted-tailed quolls. |
| **9. interfere with the recovery of the species.** | While the proposed works do not assist in the recovery of these species, the removal of 0.91 ha is considered negligible. |
| **Conclusion** | The project will remove 0.91 ha of habitat for these species. While all habitat removal is considered a loss, the removal of this extremely minor area in a much larger tract of contiguous and better quality remnant forest is considered negligible.<br>Based on the above considerations, the project is unlikely to result in a significant impact on these species. |

### B.2.2 Vulnerable species

**Table B.3 Assessment of significance for the Corben's Long-eared Bat, Large-eared Pied Bat, Parma Wallaby and Grey-headed Flying-fox**

| Assessment question | Response |
|---|---|
| **1. lead to a long-term decrease in the size of an important population of a species** | No known important populations are present within the Disturbance Footprint. These species all have a broad distribution and generally inhabit a wide range of habitat types. As 0.91 ha of regrowth vegetation is proposed to be removed, it is not considered likely that this activity would result in the decrease in size of any important populations of these species, should they occur in the locality. |
| **2. reduce the area of occupancy of an important population** | The area of occupancy to be removed for these species is 0.91 ha. No important populations of any species are considered to occur in the Disturbance Footprint, however, if they were present, the removal of this very minor area would not reduce their overall viability in the locality or immediate vicinity of the Disturbance Footprint. |
| **3. fragment an existing important population into two or more populations** | All of these species are extremely mobile, and no fragmentation of populations would occur as a result of the removal of 0.91 ha. |
| **4. adversely affect habitat critical to the survival of a species** | The removal of 0.91 ha of regrowth forest is not considered to be critical to the survival of any of these species. As they are highly mobile, these species would be well-equipped to move into other, more suitable areas of habitat that are present nearby. |
| **5. disrupt the breeding cycle of an important population** | Human activity, noise and potentially dust are likely to be increased over a short period during the activity. While this will discourage local fauna from being near to the Disturbance Footprint, it is temporary only and it is extremely unlikely that breeding cycles of any important population would be disrupted. |
| **6. modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline** | The removal of 0.91 ha of regrowth forest is extremely unlikely to lead to the decline of any species. The Disturbance Footprint is immediately adjacent to a vast tract of contiguous remnant vegetation greater than 1,000 ha in area. These species can reliably move into these areas to forage and breed. |
| **7. result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat** | Hygiene protocols such as washing down all vehicles, machinery, and equipment, and appropriate weed management is recommended during construction to minimise the potential introduction or spread of weeds. Therefore, the proposal is considered unlikely to result in invasive species that are harmful becoming established. |
| **8. introduce disease that may cause the species to decline, or** | As mentioned above, hygiene protocols such as washing down all vehicles, machinery, and equipment should be undertaken, appropriate weed management is recommending during construction to minimise the potential introduction or spread of pathogens. Therefore, the proposed pipeline is not expected to introduce disease that may cause the species to decline. |
| **9. interfere substantially with the recovery of the species.** | While the proposed works do not assist in the recovery of these species, the removal of 0.91 ha is considered negligible. |
| **Conclusion** | The project will remove 0.91 ha of habitat for these species. While all habitat removal is considered a loss, the removal of this extremely minor area in a much larger tract of contiguous and better-quality remnant forest is considered negligible.<br>Based on the above considerations, the project is unlikely to result in a significant impact on these species. |

### B.2.3 Migratory species

**Table B.4 Assessment of significance for the black-faced monarch**

| Assessment question | Response |
|---|---|
| **1. substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species** | The Black-faced Monarch may inhabit much of the forested area present within the immediate vicinity of the project, as well as within the wider locality. While 0.91 ha of habitat will be removed, it is considered negligible given the large area of suitable habitat available for the species immediately adjacent. The activity will not isolate any habitat for the species, given its highly mobile nature. |
| **2. result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or** | Hygiene protocols such as washing down all vehicles, machinery, and equipment, and appropriate weed management is recommended during construction to minimise the potential introduction or spread of weeds. Therefore, the proposal is considered unlikely to result in invasive species that are harmful becoming established. |
| **3. seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species** | No ecologically significant proportion of this species is likely to exist within an area of 0.91 ha of regrowth forest. Therefore, the lifecycle of any significant population is unlikely to be impacted by the activity. |
| **Conclusion** | The project will remove 0.91 ha of habitat for these species. While all habitat removal is considered a loss, the removal of this extremely minor area in a much larger tract of contiguous and better-quality remnant forest is considered negligible.<br>Based on the above considerations, the project is unlikely to result in a significant impact on these species. |

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# Appendix B

## Geotechnical Investigation Noise and Vibration Assessment