Australian Government
Department of the Environment

Referral of proposed action

What is a referral?

The *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) provides for the protection of the environment, especially matters of national environmental significance (NES). Under the EPBC Act, a person must not take an action that has, will have, or is likely to have a significant impact on any of the matters of NES without approval from the Australian Government Environment Minister or the Minister's delegate. (Further references to 'the Minister' in this form include references to the Minister's delegate.) To obtain approval from the Environment Minister, a proposed action should be referred. The purpose of a referral is to obtain a decision on whether your proposed action will need formal assessment and approval under the EPBC Act.

Your referral will be the principal basis for the Minister's decision as to whether approval is necessary and, if so, the type of assessment that will be undertaken. These decisions are made within 20 business days, provided sufficient information is provided in the referral.

Who can make a referral?

Referrals may be made by or on behalf of a person proposing to take an action, the Commonwealth or a Commonwealth agency, a state or territory government, or agency, provided that the relevant government or agency has administrative responsibilities relating to the action.

When do I need to make a referral?

A referral must be made for actions that are likely to have a significant impact on the following matters protected by Part 3 of the EPBC Act:

- World Heritage properties (sections 12 and 15A)
- National Heritage places (sections 15B and 15C)
- Wetlands of international importance (sections 16 and 17B)
- Listed threatened species and communities (sections 18 and 18A)
- Listed migratory species (sections 20 and 20A)
- Protection of the environment from nuclear actions (sections 21 and 22A)
- Commonwealth marine environment (sections 23 and 24A)
- Great Barrier Reef Marine Park (sections 24B and 24C)
- A water resource, in relation to coal seam gas development and large coal mining development (sections 24D and 24E)
- The environment, if the action involves Commonwealth land (sections 26 and 27A), including:
    - actions that are likely to have a significant impact on the environment of Commonwealth land (even if taken outside Commonwealth land);
    - actions taken on Commonwealth land that may have a significant impact on the environment generally;
- The environment, if the action is taken by the Commonwealth (section 28)
- Commonwealth Heritage places outside the Australian jurisdiction (sections 27B and 27C)

You may still make a referral if you believe your action is not going to have a significant impact, or if you are unsure. This will provide a greater level of certainty that Commonwealth assessment requirements have been met.

To help you decide whether or not your proposed action requires approval (and therefore, if you should make a referral), the following guidance is available from the Department's website:

- the Policy Statement titled Significant Impact Guidelines 1.1 – Matters of National Environmental Significance. Additional sectoral guidelines are also available.

- the Policy Statement titled Significant Impact Guidelines 1.2 - Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies.
- the Policy Statement titled Significant Impact Guidelines: Coal seam gas and large coal mining developments—Impacts on water resources.
- the interactive map tool (enter a location to obtain a report on what matters of NES may occur in that location).

Can I refer part of a larger action?

In certain circumstances, **the Minister may not accept a referral for an action that is a component of a larger action and may request the person proposing to take the action to refer the larger action for consideration under the EPBC Act (Section 74A, EPBC Act).** If you wish to make a referral for a staged or component referral, read 'Fact Sheet 6 Staged Developments/Split Referrals' and contact the Referrals Gateway (1800 803 772).

Do I need a permit?

Some activities may also require a permit under other sections of the EPBC Act or another law of the Commonwealth. Information is available on the Department's web site.

Is your action in the Great Barrier Reef Marine Park?

If your action is in the Great Barrier Reef Marine Park it may require permission under the *Great Barrier Reef Marine Park Act 1975* (GBRMP Act). If a permission is required, referral of the action under the EPBC Act is deemed to be an application under the GBRMP Act (see section 37AB, GBRMP Act). This referral will be forwarded to the Great Barrier Reef Marine Park Authority (the Authority) for the Authority to commence its permit processes as required under the Great Barrier Reef Marine Park Regulations 1983. If a permission is not required under the GBRMP Act, no approval under the EPBC Act is required (see section 43, EPBC Act). The Authority can provide advice on relevant permission requirements applying to activities in the Marine Park.

The Authority is responsible for assessing applications for permissions under the GBRMP Act, GBRMP Regulations and Zoning Plan. Where assessment and approval is also required under the EPBC Act, a single integrated assessment for the purposes of both Acts will apply in most cases. Further information on environmental approval requirements applying to actions in the Great Barrier Reef Marine Park is available from http://www.gbrmpa.gov.au/ or by contacting GBRMPA's Environmental Assessment and Management Section on (07) 4750 0700.

The Authority may require a permit application assessment fee to be paid in relation to the assessment of applications for permissions required under the GBRMP Act, even if the permission is made as a referral under the EPBC Act. Further information on this is available from the Authority:

Great Barrier Reef Marine Park Authority

2-68 Flinders Street PO Box 1379
Townsville QLD 4810
AUSTRALIA

Phone: + 61 7 4750 0700
Fax: + 61 7 4772 6093

www.gbrmpa.gov.au

What information do I need to provide?

Completing all parts of this form will ensure that you submit the required information and will also assist the Department to process your referral efficiently. If a section of the referral document is not applicable to your proposal enter N/A.

You can complete your referral by entering your information into this Word file.

Instructions

Instructions are provided in blue text throughout the form.

Attachments/supporting information

The referral form should contain sufficient information to provide an adequate basis for a decision on the likely impacts of the proposed action. You should also provide supporting documentation, such as environmental reports or surveys, as attachments.

Coloured maps, figures or photographs to help explain the project and its location should also be submitted with your referral. Aerial photographs, in particular, can provide a useful perspective and context. Figures should be good quality as they may be scanned and viewed electronically as black and white documents. Maps should be of a scale that clearly shows the location of the proposed action and any environmental aspects of interest.

Please ensure any attachments are below three megabytes (3mb) as they will be published on the Department's website for public comment. To minimise file size, enclose maps and figures as separate files if necessary. If unsure, contact the Referrals Gateway (email address below) for advice. Attachments larger than three megabytes (3mb) may delay processing of your referral.

Note: the Minister may decide not to publish information that the Minister is satisfied is commercial-in-confidence.

How do I pay for my referral?

From 1 October 2014 the Australian Government commenced cost recovery arrangements for environmental assessments and some strategic assessments under the EPBC Act. If an action is referred on or after 1 October 2014, then cost recovery will apply to both the referral and any assessment activities undertaken. Further information regarding cost recovery can be found on the Department's website.

Payment of the referral fee can be made using one of the following methods:

- **EFT Payments can be made to:**

  BSB: 092-009
  Bank Account No. 115859
  Amount: $7352
  Account Name: Department of the Environment.
  Bank: Reserve Bank of Australia
  Bank Address: 20-22 London Circuit Canberra ACT 2601
  Description: The reference number provided (see note below)

- **Cheque** - Payable to "Department of the Environment". Include the reference number provided (see note below), and if posted, address:

  The Referrals Gateway
  Environment Assessment Branch
  Department of the Environment
  GPO Box 787
  Canberra ACT 2601

- **Credit Card**

  Please contact the Collector of Public Money (CPM) directly (call (02) 6274 2930 or 6274 20260 and provide the reference number (see note below).

Note: in order to receive a reference number, submit your referral and the Referrals Gateway will email you the reference number.

How do I submit a referral?

Referrals may be submitted by mail or email.

Mail to:

Referrals Gateway
Environment Assessment Branch
Department of Environment
GPO Box 787
CANBERRA ACT 2601

- If submitting via mail, electronic copies of documentation (on CD/DVD or by email) are required.

Email to: epbc.referrals@environment.gov.au

- Clearly mark the email as a 'Referral under the EPBC Act'.
- Attach the referral as a Microsoft Word file and, if possible, a PDF file.
- **Follow up with a mailed hardcopy including copies of any attachments or supporting reports.**

What happens next?

Following receipt of a valid referral (containing all required information) you will be advised of the next steps in the process, and the referral and attachments will be published on the Department's web site for public comment.

The Department will write to you within 20 business days to advise you of the outcome of your referral and whether or not formal assessment and approval under the EPBC Act is required. There are a number of possible decisions regarding your referral:

The proposed action is NOT LIKELY to have a significant impact and does NOT NEED approval

No further consideration is required under the environmental assessment provisions of the EPBC Act and the action can proceed (subject to any other Commonwealth, state or local government requirements).

The proposed action is NOT LIKELY to have a significant impact IF undertaken in a particular manner

The action can proceed if undertaken in a particular manner (subject to any other Commonwealth, state or local government requirements). The particular manner in which you must carry out the action will be identified as part of the final decision. You must report your compliance with the particular manner to the Department.

The proposed action is LIKELY to have a significant impact and does NEED approval

If the action is likely to have a significant impact a decision will be made that it is a *controlled action*. The particular matters upon which the action may have a significant impact (such as World Heritage values or threatened species) are known as the *controlling provisions*.

The controlled action is subject to a public assessment process before a final decision can be made about whether to approve it. The assessment approach will usually be decided at the same time as the controlled action decision. (Further information about the levels of assessment and basis for deciding the approach are available on the Department's web site.)

The proposed action would have UNACCEPTABLE impacts and CANNOT proceed

The Minister may decide, on the basis of the information in the referral, that a referred action would have clearly unacceptable impacts on a protected matter and cannot proceed.

Compliance audits

If a decision is made to approve a project, the Department may audit it at any time to ensure that it is completed in accordance with the approval decision or the information provided in the referral. If the project changes, such that the likelihood of significant impacts could vary, you should write to the Department to advise of the changes. If your project is in the Great Barrier Reef Marine Park and a decision is made to approve it, the Authority may also audit it. (See "*Is your action in the Great Barrier Reef Marine Park,"* p.2, for more details).

For more information

- call the Department of the Environment Community Information Unit on 1800 803 772 or
- visit the web site http://www.environment.gov.au/topics/about-us/legislation/environment-protection-and-biodiversity-conservation-act-1999

All the information you need to make a referral, including documents referenced in this form, can be accessed from the above web site.

Referral of proposed action

Project title: United and Wambo Open Cut Coal Mine Project

1 Summary of proposed action

NOTE: You must also attach a map/plan(s) and associated geographic information system (GIS) vector (shapefile) dataset showing the location and approximate boundaries of the area in which the project is to occur. Maps in A4 size are preferred. You must also attach a map(s)/plan(s) showing the location and boundaries of the project area in respect to any features identified in 3.1 & 3.2, as well as the extent of any freehold, leasehold or other tenure identified in 3.3(i).

1.1 **Short description**

Use 2 or 3 sentences to uniquely identify the proposed action and its location.

The existing United and Wambo coal mines are located approximately 16 kilometres west of Singleton in the Hunter Valley region of New South Wales (NSW) (refer to **Figure 1.1**). In November 2014 a 50:50 Joint Venture between United Collieries Pty Limited (United Collieries) and Wambo Coal Pty Limited (Wambo Coal) was announced which combines the extraction and exploration rights for a number of mining tenements at the existing United Mine (United) and the existing Wambo Mine (Wambo) (refer to **Figure 1.2**). The Joint Venture proposes to develop the United and Wambo Open Cut Project (the Proposed Action) as a single open cut operation that combines the existing open cut operations at Wambo with a proposed new open cut coal mine at United.

United is currently in care and maintenance and is owned 95% by Glencore Coal Assets Australia (Glencore) and 5% by the Construction, Forestry, Mining and Energy Union (CFMEU) and is managed by Glencore. Wambo is an existing coal mining operation and is a neighbour operation to United. Wambo Coal is a subsidiary of Peabody Energy Australia Pty Limited (Peabody).

The United and Wambo coal mining operations were established in 1989 and the late 1960's, respectively. There have been a range of underground and open cut coal mining operations at both of these adjoining coal mines since that time.

The Proposed Action includes open cut mining operations in two areas, the proposed United Open Cut and modified operations generally within the approved Wambo open cut mining area (Wambo Open Cut), and associated activities. The Proposed Action will maximise resource recovery across the United and Wambo mining areas, enabling extraction of approximately an additional 150 million tonnes (Mt) of run of mine (ROM) coal over approximately 21 years. The Proposed Action will provide continued employment for the existing Wambo open cut workforce and create additional employment from the development of the Proposed Action.

The conceptual layout of the Proposed Action is provided in **Figure 1.3**, including the conceptual open cut mining extraction areas, the conceptual overburden emplacement area, the indicative surface disturbance area and the conceptual layout of key infrastructure. The Referral Area is also shown on **Figure 1.3**.

As discussed in further detail in **Section 2**, Wambo has an existing Controlled Activity Approval (EPBC No. 2003/1138) for its current mining operations. The Wambo Surface Development Area which was approved for disturbance for mining activities under this approval is shown on **Figure 1.3**. Controlled Activity Approval EPBC No. 2003/1138 also permits underground mining at Wambo.

The Proposed Action specifically excludes:

- the approved Wambo Coal Mine that is authorised by State and Commonwealth approvals (EPBC 2003/1138), including modifications; and

- the continuation of mining operations in the open cut and underground mining areas of the Wambo Coal Mine and associated surface activities that are authorised by the above State and Commonwealth approvals (including modifications).

Further details of the Proposed Action are included in **Section 2**.

1.2 **Latitude and longitude**

Latitude and longitude details are used to accurately map the boundary of the proposed action. If these coordinates are inaccurate or insufficient it may delay the processing of your referral.

	Latitude			Longitude		
location point	degrees	minutes	seconds	degrees	minutes	seconds
1	32	31	44.9	150	57	13.0
2	32	31	52.2	150	27	17.1
3	32	32	10.3	150	57	24.3
4	32	32	19.7	150	57	40.0
5	32	32	21.9	150	58	04.7
6	32	32	43.8	150	58	04.5
7	32	32	44.7	151	00	46.6
8	32	32	49.7	151	01	04.1
9	32	33	53.1	151	01	04.1
10	32	33	58.9	151	00	48.8
11	32	34	04.7	151	00	41.8
12	32	34	26.5	151	00	45.5
13	32	34	49.2	151	00	55.7
14	32	34	55.5	151	00	54.0
15	32	35	05.5	151	00	20.7
16	32	35	05.7	151	00	10.9
17	32	35	07.8	151	00	07.6
18	32	35	07.7	151	00	04.2
19	32	35	08.6	150	59	57.7
20	32	35	10.2	150	59	45.4
21	32	35	09.1	150	59	37.3
22	32	34	54.3	150	59	37.5
23	32	34	53.2	150	59	21.6
24	32	34	59.5	150	59	21.1
25	32	34	59.4	150	59	19.1
26	32	35	19.7	150	59	13.4
27	32	34	52.2	150	58	29.2
28	32	34	15.4	150	57	44.8
29	32	34	08.5	150	56	55.1
30	32	33	53.9	150	56	57.9
31	32	33	53.8	150	56	07.2
32	32	33	10.0	150	56	16.6
33	32	32	54.3	150	56	03.5
34	32	32	46.0	150	56	02.1
35	32	32	42.3	150	55	55.1
36	32	32	35.5	150	55	50.3
37	32	32	28.9	150	55	51.6

The Interactive Mapping Tool may provide assistance in determining the coordinates for your project area.

If the area is less than 5 hectares, provide the location as a single pair of latitude and longitude references. If the area is greater than 5 hectares, provide bounding location points.

There should be no more than 50 sets of bounding location coordinate points per proposal area.

Bounding location coordinate points should be provided sequentially in either a clockwise or anticlockwise direction.

If the proposed action is linear (eg. a road or pipeline), provide coordinates for each turning point.

Also attach the associated GIS-compliant file that delineates the proposed referral area. If the area is less than 5 hectares, please provide the location as a point layer. If greater than 5 hectares, please provide a polygon layer. If the proposed action is linear (eg. a road or pipeline) please provide a polyline layer (refer to GIS data supply guidelines at Attachment A).

Do not use AMG coordinates.

1.3 **Locality and property description**

Provide a brief physical description of the property on which the proposed action will take place and the project location (eg. proximity to major towns, or for off-shore projects, shortest distance to mainland).

United and Wambo coal mining operations are situated approximately 16 kilometres west of Singleton in the Hunter Valley of NSW (refer to **Figure 1.1**). The village of Warkworth is located approximately 1 kilometre to the south east of the Referral Area (refer to **Figure 1.2**). A substantial portion of Warkworth Village is owned by mining companies. The village of Jerrys Plains is located approximately 5 kilometres north west of the Referral Area (refer to **Figure 1.2**). The village of Bulga is located approximately 7 kilometres to the south of the Referral Area. The rural area of Maison Dieu is located approximately 4.5 kilometres to the north east of the Referral Area.

The Referral Area is dominated by existing coal mining areas including the previous United open cut and underground mining operation and infrastructure, and the existing Wambo Coal Mine and its associated surface facilities, along with areas of rehabilitated land and native vegetation.

The land to the north east of the Referral Area is occupied by Coal and Allied's Hunter Valley Operations coal mine (HVO South), and further to the north by agricultural land. The area south of the Referral Area is occupied by Wambo Coal owned grazing land. Land to the east of the Referral Area is privately owned by the Hunter Valley Gliding Club, surrounded by Coal and Allied owned mining buffer land. To the immediate west of the Referral Area is land owned by Wambo Coal which is utilised for grazing. The Wollombi National Park is located approximately 0.5 kilometres west of the Proposed Action at its closest point to the western boundary of the Referral Area (refer to **Figure 1.2**).

The land use within and surrounding the Referral Area is shown in **Figure 1.4**. The Referral Area is surrounded predominantly by the existing coal mining activities of Wambo's underground mine, Coal and Allied's HVO South open cut mine (including the Carrington, North Pit, Cheshunt, Riverview and South Lemington Pits) and associated mine-owned lands.

Prior to the establishment of mining operations, the Referral Area had a long history of agricultural land uses, such as grazing. Grazing and dairy operations are still wide spread throughout the surrounding area, occurring at a number of properties along the Golden Highway to the north of the Referral Area and on the outskirts of Jerrys Plains. Irrigated agriculture is currently being undertaken along the alluvial floodplains of the Hunter River to the north of the Referral Area. A small number of olive groves and vineyards are also located in the area around Jerrys Plains.

The topography of the Referral Area is characterised by an undulating and hilly landscape with lower topographic areas associated with the drainage lines (refer to **Figure 1.5**). The foothills of the Wollemi National Park lie to the west of the existing Wambo Open Cut mine (approximately 0.5 kilometres to the west of the Referral Area at the closest point) and form the dominant landscape feature of the land surrounding the Referral Area (refer to **Figure 1.2**).

A notable local topographical feature is a ridgeline to the north west of the Referral Area which extends to a height of approximately 200 mAHD. This ridgeline provides a topographic barrier between the area proposed for the open cut operations and the private land to the north west, including the township of Jerrys Plains. The remaining surrounding topography is characterised by gently sloping alluvial plains and undulating hills.

The Referral Area is located within the catchments of Redbank Creek, Wollombi Brook, North Wambo Creek, Hunter River and Waterfall Creek, all of which form part of the Hunter River catchment (refer to **Figure 1.5**).

1.4	**Size of the development footprint or work area (hectares)**	The Referral Area covers an area of approximately 3015 hectares. The area of proposed additional disturbance beyond the approved Wambo Surface Development Area is approximately 710 hectares (hereafter referred to as Conceptual Additional Disturbance Area). Refer to **Figure 1.3**.
1.5	**Street address of the site**	134 Jerrys Plains Road, Warkworth, NSW, 2330

1.6 **Lot description**

Describe the lot numbers and title description, if known.

Refer to **Attachment B** for the schedule of lands.

1.7 **Local Government Area and Council contact (if known)**

If the project is subject to local government planning approval, provide the name of the relevant council contact officer.

Singleton Council Local Government Area.

The Proposed Action is a State Significant Development as defined under the NSW *State Environmental Planning Policy (State and Regional Development) 2011* and will require development consent under Division 4.1 of Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). The Proposed Action will also require a modification to the existing Wambo development consents under Section 75W of the EP&A Act.

The NSW development application for the Proposed Action will be determined by the NSW Planning and Assessment Commission (PAC) under delegation from the NSW Minister for Planning.

The relevant contact at the NSW Department of Planning and Environment (DPE) is:

Name: Hamish Aiken
Phone: 02 9228 6419
Email: hamish.aiken@planning.nsw.gov.au

1.8 **Time frame**

Specify the time frame in which the action will be taken including the estimated start date of construction/operation.

The Proposed Action would be carried out over a period of approximately 21 years from granting of approval with final land forming and rehabilitation occurring after the life of the mine as required.

1.9	**Alternatives to proposed action** Were any feasible alternatives to taking the proposed action (including not taking the action) considered but are not proposed?		No
		X	Yes, you must also complete section 2.2
1.10	**Alternative time frames etc** Does the proposed action include alternative time frames, locations or activities?	X	No
			Yes, you must also complete Section 2.3. For each alternative, location, time frame, or activity identified, you must also complete details in Sections 1.2-1.9, 2.4-2.7 and 3.3 (where relevant).

1.11	**State assessment** Is the action subject to a state or territory environmental impact assessment?		No
		X	Yes, you must also complete Section 2.5
1.12	**Component of larger action** Is the proposed action a component of a larger action?	X	No
			Yes, you must also complete Section 2.7
1.13	**Related actions/proposals** Is the proposed action related to other actions or proposals in the region (if known)?		No
		X	Yes, provide details: The Proposed Action is separate from, but related to, the approved Wambo Mine which operates under Controlled Activity Approval (EPBC No. 2003/1138) The Wambo Mine includes operation of an open cut and underground mines, a Coal Handling and Preparation Plant (CHPP) and train loading facilities. The Proposed Action that is the subject of this referral under the EPBC Act relates to those aspects of the United and Wambo Open Cut Coal Mine Project that are not the subject of existing approvals. Further discussion of the relationship of the Proposed Action to the approved Wambo Mine is provided in **Section 2.1**.
1.14	**Australian Government funding** Has the person proposing to take the action received any Australian Government grant funding to undertake this project?	X	No
			Yes, provide details:
1.15	**Great Barrier Reef Marine Park** Is the proposed action inside the Great Barrier Reef Marine Park?	X	No
			Yes, you must also complete Section 3.1 (h), 3.2 (e)

2 Detailed description of proposed action

NOTE: It is important that the description is complete and includes all components and activities associated with the action. If certain related components are not intended to be included within the scope of the referral, this should be clearly explained in section 2.7.

2.1 Description of proposed action

This should be a detailed description outlining all activities and aspects of the proposed action and should reference figures and/or attachments, as appropriate.

The Proposed Action includes open cut mining operations for a period of approximately 21 years incorporating mining within the proposed United Open Cut and mining within the Wambo Open Cut largely within the existing approved Wambo Surface Disturbance Area to the extent that mining in this area is not approved under the existing Wambo Coal Controlled Activity Approval (EPBC No. 2003/1138). The Proposed Action also includes some changes to the layout of existing mining, public and private infrastructure within the Referral Area. The key aspects of the Proposed Action are shown on **Figure 1.3**, including the conceptual open cut mining areas, conceptual overburden emplacement areas, the indicative surface disturbance area, conceptual Golden Highway realignment and conceptual 330kV realignment. A summary of the key Proposed Action details is provided in **Table 1**.

Table 1 – Summary of Key Proposed Action Details

Key Proposed Action Components / Aspects	Proposed Operations
Key feature of the Proposed Action	The operation of a multi-seam open cut mining operation integrating the existing and approved Wambo Open Cut under a modified mine plan and the proposed United Open Cut.
Total Economically Recoverable Reserve	Approximately 110 million tonne (Mt) of ROM coal from the United Open Cut. Approximately 66 Mt of ROM coal from the Wambo Open Cut.
Extraction Rates	Up to 10 million tonne per annum (Mtpa) ROM coal.
Life-of- Mine	Approximately 21 years from the date of approval.
Operating Hours	24 hours per day, 7 days per week.
Number of Employees	Approximately 400 total operational employees.
Mining Methods	Open cut mining.
Extent of Mining Areas	Refer to **Figure 1.3** (Note: open cut mining within the Wambo Surface Disturbance Area that is authorised by State and Commonwealth approvals (EPBC 2003/1138), including modifications, is excluded from the action the subject of this referral)

Key Proposed Action Components / Aspects	Proposed Operations
Infrastructure	Initial use of existing United mine infrastructure area prior to its decommissioning and removal due to the progression of the United Open Cut. Construction of temporary facilities in the construction phase in the mining infrastructure area within the United Open Cut area. Expand and upgrade Wambo Mining Infrastructure Area. Transfer of coal from the open cut mine to the existing Wambo CHPP, coal handling facilities and train loading facility for processing and delivery to markets. (Note: the continued operation of infrastructure and surface facilities that are used by the Wambo Coal Mine and which are authorised by State and Commonwealth approvals (EPBC 2003/1138) including modifications are excluded from the action the subject of this referral)
Tailings and Rejects Strategy	Emplacement of coarse reject and tailings within the proposed open cut mining areas (including ongoing use of existing tailings storage facilities) in addition to other existing and approved emplacement areas currently used by Wambo.
External Coal Transport	Product coal will continue to be transported off site via train using the existing approved Wambo train loading facility.
Roads	Realignment of an approximately 2 kilometre section of the Golden Highway to accommodate the proposed United Open Cut. The main access points for the mine will be the existing Wambo and United access roads.
Power Infrastructure	An existing 330 kV transmission line which traverses the proposed United Open Cut mining area is proposed to be relocated as part of the Proposed Action (refer to **Figure 1.3**). Several other 66 kV and 11kV power lines will also require relocation outside of proposed mining areas.
Water Management	Construction and use of mine water management controls. Use of the United Collieries underground mining voids for water storage.

Wambo Coal (a subsidiary of Peabody) currently operates the Wambo Open Cut and Underground operations. Under the Joint Venture, it is proposed that United Collieries (majority owned by Glencore) will manage and operate the Wambo Open Cut in conjunction with the proposed United Open Cut upon receiving the required State and Federal approvals for the Proposed Action.

The Proposed Action will use available approved capacity in Wambo's existing CHPP and train loading facilities. Wambo will continue to own and operate these facilities in accordance with the approved throughput provided by its current approvals, with the Joint Venture delivering ROM coal to these facilities for coal washing, handling and loading coal onto trains for transportation. United Collieries as manager of the Proposed Action will have no operational control over these facilities as they will be managed and operated by Wambo Coal.

The Wambo Underground operations do not form part of the Joint Venture and will continue to be owned and managed by Wambo Coal.

It is noted that Wambo has an existing EPBC Controlled Activity Approval (EPBC No. 2003/1138). The Wambo Referral (dated 31 July 2003) describes the action as '*the continued development of open cut and underground mining operations at the Wambo Coal Mine and the development and operation of rail and train loading infrastructure'*. Specifically, the main activities associated with the development of the action include the following activities that are relevant to the open cut operations:

- construction and operation of a rail spur, rail loop, coal reclaim area, product coal conveyor and train load-out bin;
- continued development of open cut mining operations (including limited auger mining beyond open cut mining limits) within existing Wambo Coal mining and coal leases and into new mining lease applications areas (MLA 1 and MLA 2);
- upgrade of the existing CHPP to facilitate increased coal production;
- development of a water control system including a water control structure across North Wambo Creek at the north-western limit of the open cut operation and an associated channel;
- closure of Pinegrove Road and development of new access and internal haul roads; and
- relocation of the administration area, site offices, existing explosive magazine and construction of additional hydrocarbon storage facilities.

The term of the Wambo EPBC approval is until 31 December 2029.

The Proposed Action includes:

- open cut mining in the new United Open Cut;
- open cut mining in the Wambo Open Cut, including;
    - mining in the Wambo Open Cut within the existing approved Wambo Surface Development Area;
    - extensions to the area of open cut mining in the Wambo Open Cut beyond the existing approved Wambo Surface Development Area (refer to **Figure 1.3**); and
    - an extension to the depth of mining in the Wambo Open Cut from the base of Mining Lease (ML) No. 1572 down to the Woodlands Hill and Warkworth seams except to the extent that mining in this area is approved in the existing Wambo Controlled Activity Approval (for the avoidance of doubt, any open cut mining permitted under the current Wambo Controlled Activity Approval does not form part of the 'Action' the subject of this referral).
- progressive rehabilitation of the open cut mining area;
- use of existing approved Wambo CHPP and general coal handling and train loading facilities and other existing and approved supporting mine infrastructure to the extent that these activities are associated with mining in the United Open Cut and Wambo Open Cut which form part of the Proposed Action (New Open Cut Mining Areas);

- rail transport of up to approximately 15 Mtpa of product coal to the extent that these activities are associated with the mining in the New Open Cut Mining Areas associated with the Proposed Action;

- mining and emplacement of overburden following the commencement of mining in the New Open Cut Mining Areas associated with the Proposed Action (including deposition of overburden in the mining voids associated with the Proposed Action and the existing approved Wambo Open Cut) resulting in a revision to final landforms from those currently approved;

- construction and operation of new ancillary infrastructure in the existing approved Wambo mining infrastructure area in support of the Proposed Action;

- realignment of the Golden Highway; and

- relocation of a 330kV powerline and other public and private infrastructure to facilitate the proposed mining activity.

Current Approved Operations not the Subject of this Referral

This referral specifically excludes:

- the approved Wambo Coal Mine that is authorised by State and Commonwealth approvals (EPBC 2003/1138), including modifications; and

- the continuation of mining operations in the open cut and underground mining areas of the Wambo Coal Mine and associated surface activities that are authorised by the above State and Commonwealth approvals (including modifications).

The approved Wambo Mine operations which are not the subject of this referral include (but are not limited to):

- the Wambo Underground mining operations;

- the Wambo CHPP and associated infrastructure and coal stockpile areas (other than use of these existing approved facilities to the extent that these activities are associated with mining in the New Open Cut Mining Areas which form part of the Proposed Action);

- the Wambo train loading facility and rail line (other than use of the facility and rail line to the extent that these activities are associated with mining in the New Open Cut Mining Areas which form part of the Proposed Action;

- the approved Wambo open cut mining operations that are undertaken under State and Commonwealth approvals (EPBC 2003/1138) including modifications;

- the Wambo MIA, offices, access road and other ancillary facilities (other than use of these facilities to the extent that that use is associated with mining in the New Open Cut Mining Areas); and

- ongoing exploration activities associated with the Wambo mine.

The existing Wambo Mine surface operations are shown on **Figure 2.1**.

The approved United Collieries operations which are not the subject of this referral include (but are not limited to):

- care and maintenance activities;
- ongoing mine decommissioning activities;
- ongoing use of existing and approved facilities and completion of approved activities at the site; and
- ongoing exploration activities associated with United Collieries.

The existing United Collieries operations are shown on **Figure 2.2**.

2.2 Alternatives to taking the proposed action

This should be a detailed description outlining any feasible alternatives to taking the proposed action (including not taking the action) that were considered but are not proposed (note, this is distinct from any proposed alternatives relating to location, time frames, or activities – see section 2.3).

United has undertaken detailed studies which considered numerous alternative mine and infrastructure plans. A key alternative to the Joint Venture was to develop the United Open Cut as a standalone mining operation. A standalone mining operation for the United Open Cut would have resulted in an open cut operation without sufficient scale to justify developing the mine as infrastructure and overburden emplacement areas would have competed with mining areas in the United mine area. The formation of the Joint Venture and integration of the two open cut mining operations provides significant resource recovery and mining efficiency benefits, in addition to commercial benefits, and is therefore the preferred approach.

Utilising existing infrastructure where possible, minimising environmental and community impacts and maximising economic resource recovery have been the key sustainable development considerations in the evaluation of alternative options.

Some of the alternative options considered and the reason for exclusion include:

<u>Alternative Mine Plans</u>

- alternative mining methods and recovery options, including underground mining of suitable seams - underground mining options were excluded due to predicted uneconomic results and geotechnical and geological issues;
- alternative open cut mine plans, such as the proposed United Open Cut mining areas being developed as a standalone entity – alternative standalone open cut mine plans for the United Open Cut were excluded due to predicted uneconomic results;
- alternative mining direction and final void location of the United Open Cut. For example, an alternative mining direction starting in the north west was investigated and would have resulted in the final void being located adjacent to the Wollombi Brook. This was less desirable as it would have required more overburden being placed in emplacement areas outside of the mine void footprint resulting in higher ex-pit emplacement areas and a much greater final void. In addition, the proximity of the final void adjacent to the Wollombi Brook may have resulted in greater risk of potential connectivity interaction between the final void and the Wollombi Brook;
- alternative overburden emplacement designs, including designs that restricted emplacement to within the United surface holdings - this was less desirable as it would result in a less desirable final landform with steeper slopes that would not blend in well with the surrounding landscape and would result in sterilisation of the coal resource; and

- alternative options for reinstatement of post mining drainage, including designs that separated the out of pit and in-pit overburden emplacements areas by a dedicated creek diversion area. This was less desirable as it would result in a less desirable final landform with higher emplacement areas that would not blend in well with the surrounding landscape.

Alternative Coal Processing and Transport Options

- alternative coal processing options, including construction of new onsite CHPP and associated facilities – onsite processing at United was less desirable due to the available capacity at the existing Wambo CHPP, the potential for additional noise impacts, physical site constraints, sterilisation of resources, duplication and inefficient use of existing resources; and

- alternative coal transport options, including construction of a dedicated rail loop to the United site – a dedicated rail loop was less desirable due to potential impacts on significant ecological species, sterilisation of coal resources, potential noise impacts, and duplication and inefficient use of existing resources where there is available approved capacity at the Wambo train loading facility.

Alternative Infrastructure Locations

- alternative options for the relocation of the Golden Highway including the option of not relocating it and reducing the mine footprint. This option was less desirable as it would have resulted in constrained mining conditions and resource sterilisation;

- alternative options for the relocation of the 330 kV transmission line, including an option where the line would be relocated to the very north eastern corner of the United Mine area, This was dismissed as it would impede take-off and landing access for the Glider Club; and

- alternative site access arrangements with alternative access locations excluded due to inadequate sight distances, impacts on mine design, the sterilisation of coal resources and the ability to maximise resource efficiency by using the existing infrastructure.

The alternative of not proceeding was also considered by the Joint Venture parties, however this option is not proposed as it would result in significant lost economic benefit, including reduced employment opportunities, taxes and flow on employment and economic benefits, as well as the failure to maximise recovery of a significant and economically viable coal resource.

2.3 Alternative locations, time frames or activities that form part of the referred action

If you have identified that the proposed action includes alternative time frames, locations or activities (in section 1.10) you must complete this section. Describe any alternatives related to the physical location of the action, time frames within which the action is to be taken and alternative methods or activities for undertaking the action. For each alternative location, time frame or activity identified, you must also complete (where relevant) the details in sections 1.2-1.9, 2.4-2.7, 3.3 and 4. Please note, if the action that you propose to take is determined to be a controlled action, any alternative locations, time frames or activities that are identified here may be subject to environmental assessment and a decision on whether to approve the alternative.

N/A

2.4 Context, planning framework and state/local government requirements

Explain the context in which the action is proposed, including any relevant planning framework at the state and/or local government level (e.g. within scope of a management plan, planning initiative or policy framework). Describe any Commonwealth or state legislation or policies under which approvals are required or will be considered against.

EPBC Strategic Assessment

A Strategic Assessment under Part 10 of the EPBC Act is currently nearing completion as part of the Upper Hunter Strategic Assessment (UHSA) and will be relevant to the Proposed Action once finalised. The Strategic Assessment is a joint Commonwealth and State assessment under Part 10 of the EPBC Act that will fulfil the ecological impact assessment requirements of the Proposed Action should the UHSA be finalised in time to include this Proposed Action. It is noted that if the UHSA is in place within the required timeframe, United Collieries intend to utilise the UHSA approval path. In the interim and as the timing of finalising the UHSA is uncertain, this Referral is being lodged for the Proposed Action.

State

The Proposed Action will require development consent under Division 4.1 of Part 4 of the EP&A Act. Being development for the purpose of coal mining, the Proposed Action is declared to be a State Significant Development (SSD) under the provisions of the *State Environmental Planning Policy (State and Regional Development) 2011* and the NSW Minister for Planning (delegated to the Planning Assessment Commission) will be the consent authority for the Proposed Action under NSW legislation. The Proposed Action will also require a modification to the existing Wambo development consents under section 75W of the EP&A Act to harmonise these approvals with the new State based approval for the Proposed Action.

In addition to approval under the EP&A Act the Proposed Action also requires approval under a number of other NSW Acts. The State Legislation and Policies under which approvals are required, or considered against, are presented below in **Table 2**.

Table 2 - NSW Legislation and Policies Relevant to the Proposed Action

Planning Provision	Comments
NSW Legislation – Acts	
Protection of the Environment Operations Act 1997 (PoEO Act)	The PoEO Act requires scheduled activities, including the mining of coal and coal works, to hold an Environment Protection Licence (EPL) to regulate pollution to the environment. Both the existing United and Wambo mines hold current EPLs for mining of coal and coal works. The EPL licences for both Wambo and United will be varied to include the Proposed Action.
Mining Act 1992	Under the *Mining Act 1992*, a Mining Lease (ML) is required before any mining operations can take place. A Mining Operations Plan (MOP) is required to be submitted to the NSW Department of Trade and Investment for approval prior to the commencement of mining. Mining leases are already held by the Joint Venture parties over the vast majority of the Referral Area, with new exploration licences and surface mining leases required over small areas of land including the current alignment of the Golden Highway and additional mining titles for access to the deeper seams below the currently approved Wambo Open Cut.
Crown Lands Act 1989 (Crown Lands Act)	Crown land may not be occupied, used, sold, leased, dedicated, reserved or otherwise dealt with unless authorised by this Act or the *Crown Land (Continued Tenures) Act 1989*. There are a number of crown road reserves and a travelling stock route (TSR) within the Referral Area. United proposes to close these road reserves and TSR in accordance with the provisions of this Act.

Planning Provision	Comments
Water Management Act 2000 (WM Act)	This Act regulates the taking, interception, storage and use of surface water and groundwater within areas subject to water sharing plans. The water sharing plans regulate the permissible take from the water sources to provide for sustainable use of the State's water resources. Licences may be required under the Act for water take from the water sources relevant to the Proposed Action including the Hunter Unregulated and Alluvial Water Sources and the Hunter Regulated River water source. The Proposed Action may also require an activity approval for aquifer interference under the WM Act. It is noted that both the existing United and Wambo mines currently hold various approvals under the WM Act for the existing mining operations.
Water Act 1912 (Water Act)	Under the Water Act, a permit and/or licence must be obtained to extract groundwater (Part 5 of the Act) not covered by a water sharing plan under the WM Act. An approval under Part 5 of the Act to intercept and extract groundwater not covered by the WM Act may be required for the Proposed Action.
Mine Subsidence Compensation Act 1961 (MSC Act)	The approval of the NSW Mine Subsidence Board (MSB) will be required for the construction of surface infrastructure associated with the Proposed Action, except where exemptions apply, as the Referral Area lies within the Patrick Plains Mine Subsidence District.
Roads Act 1993	The *Roads Act 1993* is administered by the Roads and Maritime Service (RMS), local council or the Department of Lands. The Act requires that applications for the closure of Crown roads be made to the Minister. A consent under Section 138 of the *Roads Act* is required in order to undertake works within a road reserve and to connect to a road. The Proposed Action will require approval to close crown road reserves and for the proposed realignment of the Golden Highway.
Dams Safety Act 1978 (Dams Safety Act)	This Act requires that the NSW Dams Safety Committee (DSC) periodically review large dams which may constitute a hazard to human life and property. These dams are known as prescribed dams and are listed in Schedule 1 of the Dams Safety Act. New prescribed dams for the Proposed Action will be designed to the satisfaction of the DSC.
NSW Legislation – Environmental Planning Instruments	
State Environmental Planning Policy (Mining, Petroleum Production & Extractive Industries) 2007	Regulates the permissibility of mining and related development and specifies matters that must be considered in assessing mining developments requiring consent under Part 4 of the EP&A Act.

Planning Provision	Comments
State Environmental Planning Policy 33 (Hazardous & Offensive Development) 1992	SEPP No. 33 requires the consent authority to consider whether an industrial proposal is a potentially hazardous industry or a potentially offensive industry. A hazard assessment is completed for potentially hazardous development to assist the consent authority to determine acceptability. A preliminary hazard analysis will be undertaken for the Proposed Action.
State Environmental Planning Policy 44 (Koala Habitat Protection)	SEPP No. 44 restricts a Council from granting development consent for proposals on land identified as core koala habitat without preparation of a plan of management. An assessment under the provisions of SEPP 44 will be undertaken for the Proposed Action.

Strategic Regional Land Use Plan

Part 4AA of the Mining SEPP together with Clause 50A of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) provides for the implementation of the NSW Government's Strategic Regional Land Use Plans (SRLUPs). The 'gateway process' applies to projects located on biophysical strategic agricultural land (BSAL) and critical industry cluster land (as defined by the regional mapping presented in the Mining SEPP) outside of existing mining lease areas. A project that triggers the gateway process must obtain a Gateway Certificate to inform the Secretary's Environmental Assessment Requirements (SEARs).

The Referral Area includes small portions of land within CCL775 (refer to **Figure 1.2**) for which United does not hold relevant surface mining leases, and as a result there is the potential need for a gateway certificate and further assessment in regard to this potential need is currently being undertaken. Further, the deeper mining below ML1572 (refer to **Figure 1.2**) will also require assessment, given a new mining lease is required for this activity.

The Referral Area does not include any land identified by the relevant maps in the Mining SEPP as critical industry cluster land.

A review of the relevant Mining SEPP maps has identified that approximately 31 hectares of land is mapped as BSAL within the Referral Area (northern extent of ML1572). This mapped area is located within an existing Wambo surface mining lease.

A site verification process is currently being undertaken for those components of the Referral Area that require a new mining lease and are therefore potentially subject to the gateway process. NSW DPE will be advised of the outcomes of the site verification process when complete.

2.5 Environmental impact assessments under Commonwealth, state or territory legislation

If you have identified that the proposed action will be or has been subject to a state or territory environmental impact statement (in section 1.11) you must complete this section. Describe any environmental assessment of the relevant impacts of the project that has been, is being, or will be carried out under state or territory legislation. Specify the type and nature of the assessment, the relevant legislation and the current status of any assessments or approvals. Where possible, provide contact details for the state/territory assessment contact officer.

Describe or summarise any public consultation undertaken, or to be undertaken, during the assessment. Attach copies of relevant assessment documentation and outcomes of public consultations (if available).

The Proposed Action is a State Significant Development as defined under the NSW *State Environmental Planning Policy (State and Regional Development) 2011* and will require development consent under Division 4.1 of Part 4 of the NSW EP&A Act. The Proposed Action will also require a modification to the existing Wambo development consents under section 75W of the EP&A Act.

An Environmental Impact Statement (EIS) is being prepared for the Proposed Action in accordance with the requirements for State Significant Developments under the EP&A Act and NSW *Environmental Planning and Assessment Regulation 2000*. Once prepared and submitted to the NSW Department of Planning and Environment, the EIS will be placed on public exhibition. The public will have the opportunity to make submissions as part of the public exhibition process.

The consent authority for the NSW assessment process is the NSW Minister for Planning. The project contact at NSW DPE is:

Name: Hamish Aiken
Phone: 02 9228 6373
Email: hamish.aiken@planning.nsw.gov.au

2.6 Public consultation (including with Indigenous stakeholders)

Your referral must include a description of any public consultation that has been, or is being, undertaken. Where Indigenous stakeholders are likely to be affected by your proposed action, your referral should describe any consultations undertaken with Indigenous stakeholders. Identify the relevant stakeholders and the status of consultations at the time of the referral. Where appropriate include copies of documents recording the outcomes of any consultations.

A comprehensive stakeholder engagement strategy has been developed for the Proposed Action and implementation of this strategy has commenced. The strategy identifies the stakeholders relevant to the Proposed Action, the methods of engagement to be used to most effectively engage with these stakeholders, the timing of consultation and the feedback mechanisms required.

In consulting with stakeholders, the project aims to:

- be proactive in its engagement with the community;
- be transparent and honest in dealings with the community; and
- utilise a range of consultation methods to ensure all stakeholder interests are considered and addressed in a timely manner.

The stakeholders relevant to the Proposed Action will continue to evolve as the Proposed Action and assessment process progress, with some of the key initial stakeholders to be involved including:

- local landholders – including rural landholders and residents of the villages within the local area, being Warkworth, Jerrys Plains, Bulga Village and Maison Dieu;
- community groups – including the United Community Consultative Committee (UCCC) and Wambo Community Consultative Committee (WCCC);
- Hunter Valley Gliding Club, located adjacent to the north east boundary of the Referral Area;
- environmental groups;
- Aboriginal stakeholder groups;
- other mining operations – including Coal and Allied; and
- service providers and infrastructure owners – TransGrid, Ausgrid, Australian Rail Track Corporation (ARTC), Telstra and RMS.

The consultation process for the Proposed Action will be undertaken in stages which align with the key milestones of the environmental assessment process. The key stages of the consultation process for the Proposed Action are outlined below:

Stage 1 is complete and involved stakeholder identification, consultation program planning and preliminary contact with the local community via a newsletter providing an overview of the United and Wambo Joint Venture. This newsletter provided project personnel contact details for community stakeholders interested in holding further discussions with United and Wambo. This newsletter was distributed to local communities including Warkworth, Jerrys Plains and Bulga.

Stage 2 is well progressed and includes consultation during the refinement of the concept mine plan and early phases of the preparation of the EIS for the Proposed Action. The main purpose of this stage of consultation was to inform stakeholders of the Proposed Action and the proposed environmental assessment process, to identify the issues that the stakeholders would like addressed in the refinement of the mine plan and development of the EIS and to identify how they would like to be engaged regarding the Proposed Action. Both Stage 1 and 2 have sought stakeholder feedback on aspects of the Proposed Action design, including input on the communities preferred final land use for the Referral Area. Stage 2 consultation has included one on one meetings with landholders surrounding the Referral Area, a community information session held at the Jerrys Plains Community Hall attended by approximately 50 community members and the distribution of a second community newsletter. Further consultation will occur with the workforce at both Wambo and United, Wambo and United Community Consultative Committees, Singleton Council, Rio Tinto (Hunter Valley Operations) and a range of specialist interest groups.

Stage 3 will involve consultation with stakeholders following the substantial completion of the concept mine plan studies and the environmental studies for the EIS. The main purpose of this stage of the consultation program is to update stakeholders on the status of the Proposed Action, provide feedback on the results of the environmental studies and to provide for stakeholder input into the formulation of management and mitigation measures.

Stage 4 is the final stage of consultation and will involve consultation during the EIS public exhibition phase and subsequent assessment and approval process. The main purpose of this stage of consultation will be to respond to issues raised during the public exhibition phase.

Involvement of Aboriginal stakeholders and the broader Aboriginal Community throughout this assessment is being undertaken in accordance with relevant NSW consultation guidelines, namely the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010), and is being undertaken as part of a detailed Aboriginal cultural heritage assessment being prepared for the Proposed Action. Aboriginal community involvement is an essential component of the Aboriginal heritage assessment process and a detailed engagement process with the Aboriginal community is underway as part of the Proposed Action.

2.7 A staged development or component of a larger project

If you have identified that the proposed action is a component of a larger action (in section 1.12) you must complete this section. Provide information about the larger action and details of any interdependency between the stages/components and the larger action. You may also provide justification as to why you believe it is reasonable for the referred action to be considered separately from the larger proposal (eg. the referred action is 'stand-alone' and viable in its own right, there are separate responsibilities for component actions or approvals have been split in a similar way at the state or local government levels).

N/A

3 Description of environment & likely impacts

3.1 Matters of national environmental significance

Describe the affected area and the likely impacts of the proposal, emphasising the relevant matters protected by the EPBC Act. Refer to relevant maps as appropriate. The interactive map tool can help determine whether matters of national environmental significance or other matters protected by the EPBC Act are likely to occur in your area of interest.

Your assessment of likely impacts should refer to the following resources (available from the Department's web site):

- specific values of individual World Heritage properties and National Heritage places and the ecological character of Ramsar wetlands;
- profiles of relevant species/communities (where available), that will assist in the identification of whether there is likely to be a significant impact on them if the proposal proceeds;
- *Significant Impact Guidelines 1.1 – Matters of National Environmental Significance*; and
- associated sectoral and species policy statements available on the web site, as relevant.

Your assessment of likely impacts should consider whether a bioregional plan is relevant to your proposal. The Minister has prepared four marine bioregional plans (MBP) in accordance with section 176. It is likely that the MBP's will be more commonly relevant where listed threatened species, listed migratory species or a Commonwealth marine area is considered.

Note that even if your proposal will not be taken in a World Heritage area, Ramsar wetland, Commonwealth marine area, the Great Barrier Reef Marine Park or on Commonwealth land, it could still impact upon these areas (for example, through downstream impacts). Consideration of likely impacts should include both direct and indirect impacts.

3.1 (a) World Heritage Properties

Description

A search of the EPBC Act Protected Matters Database (accessed on 30 July 2015 and covering an area of 10 kilometres from the boundary of the Referral Area) identified one declared property, the Greater Blue Mountains Area. The northern boundary of Wollemi National Park, part of the Greater Blue Mountains World Heritage Area, occurs approximately 0.5 kilometres to the west of the Referral Area at its closest point. No other World Heritage Properties occur with a 50 kilometre radius of the Referral Area.

Nature and extent of likely impact

Address any impacts on the World Heritage values of any World Heritage property.

The Referral Area occurs approximately 0.5 kilometres (at its closest point) from the boundary of Wollemi National Park, part of the Greater Blue Mountains World Heritage Area, and is down slope from the Greater Blue Mountains World Heritage Area. The Proposed Action will not result in any direct impact on the National Park as the New Open Cut Mining Area will be approximately 3 kilometres from the National Park.

The closest existing mining area (Wambo Open Cut) to the National Park is approximately 1 kilometre, with the closest section of the New Open Cut Mining Area approximately 3 kilometres from the National Park. At this distance, the potential for indirect impacts that affect matters of national environmental significance is low and will not be changed as a result of the Proposed Action. In terms of the potential for indirect impacts, the Proposed Action does not occur in the catchment of the Wollemi National Park, and no impacts relating to surface water are predicted on the National Park. The potential groundwater drawdown impacts associated with the Proposed Action will be assessed as part of groundwater modelling being undertaken, surface aquifers within the National Park are not likely to be significantly affected due to the topography and the 3 kilometre separation distance to the New Open Cut Mining Area. Furthermore, the proposed extent of mining as part of the Proposed Action will not move any closer to Wollemi National Park than the currently approved mining. The Proposed Action is not considered likely to change the nature or scale of potential indirect impacts related to noise, air qualify and vibration.

Conclusion

The Proposed Action is not predicted to result in a significant impact on the Greater Blue Mountains World Heritage Area or any other world heritage properties.

3.1 (b) National Heritage Places

Description

A search of the EPBC Act Protected Matters Database (searched on 30 July 2015) identified one listed place, the Greater Blue Mountains Area, as occurring within 10 kilometres of the boundary of the Referral Area. The northern boundary of Wollemi National Park, part of the Greater Blue Mountains National Heritage Area, occurs approximately 0.5 kilometres to the west of the Referral Area at its closest point. No other National Heritage Places occur with a 50 kilometre radius of the Referral Area.

Nature and extent of likely impact

Address any impacts on the National Heritage values of any National Heritage place.

The Referral Area occurs approximately 0.5 kilometres (at its closest point) from the Wollemi National Park, part of the Greater Blue Mountains Area National Heritage Property, and is lower in the landscape than the Greater Blue Mountains World Heritage Area. The Proposed Action will not result in any direct impact on the National Park.

In terms of the potential for indirect impacts, the Proposed Action does not occur in the catchment of the Wollemi National Park, and no impacts relating to surface water are predicted on the National Park. The proposed extent of mining as part of the Proposed Action will not move any closer to Wollemi National Park than the currently approved mining and the Proposed Action is not considered likely to change the nature or scale of potential indirect impacts related to noise, air quality and vibration. The closest existing mining area (Wambo open cut) to the National Park is approximately 1 kilometre, with the closest proposed new mining area as part of the Proposed Action approximately 3 kilometres from the National Park. At this distance, the potential for indirect impacts that affect matters of national environmental significance is low and will not be changed as a result of the Proposed Action.

Conclusion

The Proposed Action is not predicted to result in a significant impact on the Greater Blue Mountains National Heritage Area or any other national heritage places.

3.1 (c) Wetlands of International Importance (declared Ramsar wetlands)

Description

The Proposed Action occurs within the broader catchment of one listed wetland of international importance, the Hunter Estuary Wetlands listed as a Ramsar wetland. The Hunter Estuary Wetlands are located approximately 70 kilometres from the Referral Area (straight line distance), with the Referral Area draining via various tributaries (including Wollombi Brook) to the Hunter River. The Hunter Estuary Wetlands are located on the lower estuarine reaches of the Hunter River.

Nature and extent of likely impact

Address any impacts on the ecological character of any Ramsar wetlands.

As discussed above, the Hunter Estuary Wetlands Ramsar site occurs in the lower estuary of the Hunter River, approximately 70 kilometres south-east (straight line distance) of the Referral Area, and a substantially greater distance following the drainage system. The Proposed Action will not result in any direct impact on this Ramsar site with the only potential for impact relating to far-field effects on the water regime.

An action is likely to have a significant impact on the ecological character of a declared Ramsar wetland if there is a real chance or possibility that it will result in:

- *areas of the wetland being destroyed or substantially modified*;

The Proposed Action will not result in any areas of the Hunter Estuary Wetlands being destroyed or substantially modified.

- *a substantial and measurable change in the hydrological regime of the wetland, for example, a substantial change to the volume, timing, duration and frequency of ground and surface water flows to and within the wetland;*

The Proposed Action will not result in a substantial or measurable change in the hydrological regime of the Hunter Estuary Wetlands.

- *the habitat or lifecycle of native species, including invertebrate fauna and fish species, dependent upon the wetland being seriously affected*;

The Proposed Action will not result in the habitat of native species dependent on the Hunter Estuary Wetlands being seriously affected.

- *a substantial and measurable change in the water quality of the wetland – for example, a substantial change in the level of salinity, pollutants, or nutrients in the wetland, or water temperature which may adversely impact on biodiversity, ecological integrity, social amenity or human health, or*

The Proposed Action will not result in a substantial or measurable change in the water quality of the Hunter Estuary Wetlands.

- *an invasive species that is harmful to the ecological character of the wetland being established (or an existing invasive species being spread) in the wetland.*

The Proposed Action will not result in an invasive species that is harmful to the ecological character of the Hunter Estuary Wetlands being established (or an existing invasive species being spread) in the wetland.

Conclusion

The Proposed Action will not have a significant impact on the Hunter Estuary Wetlands or any other Ramsar sites.

3.1 (d) Listed threatened species and ecological communities

Description

The threatened species and ecological communities likely to occur within the Referral Area were identified by a systematic approach comprising appropriate database searches, a review of relevant literature and targeted field surveys.

Protected Matters Database Search

A Protected Matters search, 10 kilometres from the boundary of the Referral Area was completed using the EPBC Protected Matters Search Tool database (the search was undertaken on 3 August 2015) to identify threatened species and Threatened Ecological Communities (TECs) with the potential to occur within, or adjacent to, the Conceptual Additional Disturbance Area (refer to **Table 3.1**). Records from the database search were combined with records derived through various literature reviews, survey results from extensive ecological surveys across the Conceptual Additional Disturbance Area over numerous years, and professional opinion to identify the range of potentially occurring threatened species and ecological communities. Surveys were not completed over the approved Wambo Surface Disturbance Area as this area has previously been assessed and approved for disturbance.

Table 3.1 – Protected Matters Summary Table of MNES Recorded within a 10 Kilometre Radius from the Conceptual Additional Disturbance Area

Threatened Ecological Communities (TECs)			
TECs	**Name**		**Status**
	Central Hunter Valley Eucalypt Forest and Woodland		CE
	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland		CE
	Hunter Valley Weeping Myall (*Acacia pendula*) Woodland		CE
Threatened Species			
Flora	**Scientific Name**	**Common Name**	**Status**
	Species or Species Habitat Known to Occur Within Area		
	Pterostylis gibbosa	Illawarra Greenhood	E
	Species or Species Habitat Likely to Occur		
	Cynanchum elegans	White-flowered wax-plant	E
	Eucalyptus glaucina	Slaty red gum	V
	Olearia cordata		V
	Pomaderris brunnea	Rufous pomaderris	V
	Thesium australe	Austral toadflax, toadflax	V
	Pelargonium sp. *Striatellum* (G.W.Carr 10345)	Omeo storks-bill	E
	Wollemia nobilis	Wollemi pine	E
	Species or Species Habitat May Occur		
	Allocasuarina glareicola		E
	Cryptostylis hunteriana	Leafless tongue orchid	V
	Euphrasia arguta		CE
	Prasophyllum petilum	Tarengo Leek Orchid	E

	Prasophyllum sp. Wybong (C. Phelps ORG 5269)	A leek-orchid	CE
Fauna	**Species or Species Habitat Known to Occur**		
	Anthochaera phrygia	Regent honeyeater	CE
	Chalinolobus dwyeri	Large-eared pied bat	V
	Dasyurus maculates maculatus (SE Mainland Population)	Spotted-tail quoll (southeastern mainland population)	E
	Petrogale penicillata	Brush-tailed rock-wallaby	V
	Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)	Koala	V
	Species or Species Habitat May Occur		
	Litoria booroolongensis	Booroolong frog	E
	Litoria littlejohni	Littlejohns tree frog	V
	Aprasia parapulchella	Pink-tailed worm-lizard	V
	Species or Species Habitat Likely to Occur		
	Botaurus poiciloptilus	Australasian bittern	E
	Lathamus discolor	Swift parrot	E
	Litoria aurea	Green and golden bell frog	V
	Rostratula australis	Australian painted snipe	V
	Nyctophilus corbeni	Corben's long-eared bat	V
	Pseudomys novaehollandiae	New Holland mouse	V
	Pseudomys oralis	Hastings River mouse	E
	Hoplocephalus bungaroides	Broad-headed snake	V
	Foraging, Feeding or Related Behaviour May Occur Within Area		
	Pteropus poliocephalus	Grey-headed flying-fox	V

Status (EPBC Act):
CE Critically Endangered
E Endangered
V Vulnerable

Literature Review

Relevant literature was reviewed prior to vegetation survey, vegetation mapping and fauna survey in order to gain an understanding of the existing vegetation and species habitat patterns present in the Conceptual Additional Disturbance Area and surrounding areas. Extensive previous work has been undertaken within the Referral Area due to the long history of mining at the site. Previous studies which were reviewed are outlined in **Table 3.2**.

Table 3.2 – Relevant Literature

Title	Date	Author
Flora and Fauna Report Proposed Extensions to Mining Operations at United Collieries, Warkworth. A report prepared for United Collieries	2002	HLA Envirosciences
Statement of Environmental Effects – Proposed Extension	2003	Umwelt

of Longwall Mining (). A report prepared for United Collieries		
Wambo Development Project – Bat Fauna Assessment. A report prepared for Wambo Coal Pty Ltd	2003	Greg Richards and Associates
Wambo Development Project – Terrestrial Fauna Assessment. Report prepared on behalf of Wambo Coal Pty Limited	2003	Mount King Ecological Surveys
Wambo Development Project – Flora Assessment (2003). Report prepared on behalf of Wambo Coal Pty Limited.	2003	Orchid Research
Statement of Environmental Effects for Realignment of Internal Haul Road. A report prepared for United Collieries	2005	Umwelt
2005 Flora and Fauna Monitoring Report. A report prepared for United Collieries.	2005	ECOServe
The Vegetation of the Central Hunter Valley, NSW	2006	Peake
Summer Season Surveys for Vertebrate Fauna Diversity and Species of Conservation Significance – United Collieries, Warkworth. A report prepared for United Collieries.	2006	ECOServe
2006 to 2007 Flora and Fauna Monitoring Report. A report prepared for United Collieries.	2007	ECOServe
2008 Flora and Fauna Monitoring Report. A report prepared for United Collieries.	2009a	Umwelt
Ecological Assessment for the Proposed Mining Operation of Longwall 12. A report prepared for United Collieries.	2009b	Umwelt
2008 Longwalls 10 and 11 Ecological Monitoring Report. A report prepared for United Collieries.	2009c	Umwelt
2009 Flora and Fauna Monitoring Report. A report prepared for United Collieries.	2010b	Umwelt
2009 Longwalls 10 and 11 Ecological Monitoring Report. A report prepared for United Collieries.	2010	Umwelt
2009 Annual Ecological Monitoring Report. A report prepared for Wambo Coal Pty Ltd;	2010	RPS
Greater Hunter Native Vegetation Mapping (	2011	Sivertsen *et al.*
2010 Flora and Fauna Monitoring Report. A report prepared for United Collieries;	2011	Umwelt
2010 Annual Ecological Monitoring Report. A report prepared for Wambo Coal Pty Ltd.	2011	RPS
2010 Longwalls 10 and 11 Ecological Monitoring Report. A report prepared for United Collieries;	2012a	Umwelt
2011 Flora and Fauna Monitoring Report. A report prepared for United Collieries;	2012b	Umwelt
2011 Longwalls 10 and 11 Ecological Monitoring Report. A report prepared for United Collieries.	2012c	Umwelt
2011 Annual Ecological Monitoring Report. A report prepared for Wambo Coal Pty Ltd.	2012	RPS
2012 Annual Ecological Monitoring Report. A report prepared for Wambo Coal Pty Ltd;	2013	RPS
North Wambo Underground Mine – Longwall 10A Modification – Fauna Assessment. A report prepared for Wambo Coal Pty Limited.	2014	Niche Environment and Heritage
North Wambo Underground Mine Modification Environmental Assessment – Appendix E Flora Assessment. A report prepared for Wambo Coal Pty	2014	FloraSearch

Limited.		
Fauna Monitoring Program 2013 – Birds. A report prepared for Wambo Coal Pty Ltd;	2014	Niche Environment and Heritage
Wambo Coal Aquatic Monitoring Report 2013. A report prepared for Wambo Coal Pty Ltd	2014	Niche Environment and Heritage
Subsidence Monitoring: Vegetation North Wambo Underground (Niche Environment and Heritage 2014). A report prepared for Wambo Coal Pty Ltd; Draft EMP010 Monitoring 2014 Aquatic Ecosystems. A report prepared for Wambo Coal Pty Ltd.	2014	Niche Environment and Heritage
Draft EMP010 Monitoring 2014 Indicator Species (birds). A report prepared for Wambo Coal Pty Ltd.	2014	Niche Environment and Heritage
Draft EMP010 Monitoring 2014 Flora and Habitat Complexity. A report prepared for Wambo Coal Pty Ltd.	2014	Niche Environment and Heritage
Advice on Proposed Central Hunter Valley Eucalypt Woodland Complex Ecological Community. A report prepared for the Commonwealth Department of the Environment.	2015	Peake
South Bates (Wambo Seam) Underground Mine Modification – Environmental Assessment – Appendix E Flora Assessment. A report prepared for Wambo Coal Pty Limited.	2015	FloraSearch
Wambo Coal Mine – South Bates (Wambo Seam) Underground Mine Modification – Fauna Assessment. A report prepared for Wambo Coal Pty Limited.	2015	Eco Logical
2013 Ecological Monitoring Report. A report prepared for United Collieries, including a summary of all ecological monitoring undertaken since 2005.	2015	Umwelt
United Collieries 2014 Ecological Monitoring Report. A report prepared for United Collieries.	2015	Umwelt
2015 Upper Hunter Strategic Assessment – United Collieries Biodiversity Certification Assessment Report.	2015	Umwelt
2015 Upper Hunter Strategic Assessment – Wambo Coal Biodiversity Certification Assessment. Report prepared for Wambo Coal Pty Ltd.	2015	Niche Environment and Heritage

Field Surveys

Since 2009 regular field surveys have been undertaken across the United Collieries landholding focussing on the proposed Conceptual Additional Disturbance Area (refer to **Figure 1.3**) either as part of annual monitoring surveys or for potential impact assessment projects. Most recently surveys were undertaken across the Conceptual Additional Disturbance Area for the Upper Hunter Strategic Assessment which comprised vegetation mapping and targeted threatened species surveys across all suitable habitat areas of the Conceptual Additional Disturbance Area. These surveys were undertaken in accordance with the survey requirements for Upper Hunter Strategic Assessment, which were agreed upon by State and Commonwealth agencies. Surveys were also recently completed across portions of Wambo Coal landholdings for the Upper Hunter Strategic Assessment.

Flora Surveys

A total of 35 days of flora survey have been completed across the Conceptual Additional Disturbance Area since 2009 for the Proposed Action. The individual dates of each survey area are provided in **Table 3.3** below.

Table 3.3 – Flora Survey Dates

9 to 12 February 2009	26 to 28 February 2013
21 to 24 April 2009	18 to 20 March 2013
5 May 2009	23 and 24 September 2013
29 September 2009	9 and 10 October 2013
25 to 27 November 2009	5 to 7 March 2014
8 October 2010	26 February 2015
29 and 30 September 2011	27 May 2015
20 and 21 October 2011	9 and 10 July 2015

.Flora surveys were undertaken using a range of techniques as detailed below:

- systematic plot-based survey;
- rapid vegetation assessments;
- targeted threatened flora transects;
- determination of threatened ecological communities; and
- plant identification and taxonomic review.

As a result of all botanical surveys, the following total sampling effort was conducted:

- ninety six 20 x 20 metre plots sampled;
- four 10 x 40 metre plots sampled;
- twenty four rapid vegetation assessment points; and
- significant threatened flora search transects.

The locations of all flora plots, rapid vegetation assessment points and the location of threatened flora walking transects completed since 2009 within the Conceptual Additional Disturbance Area are illustrated in **Figure 3.1**.

Plots surveyed in 2009 were revisited during the 2013 field surveys to validate the flora plot data as well as to collect Biometric data (ten site attributes required for BioBanking and BioCertification assessments). New transect/plot sites were established during October 2013, March 2014 and May 2015 surveys as part of the Upper Hunter Strategic Assessment surveys. Floristic (species composition measures) and Biometric data (predominantly structural measures) were collected at each of these sites.

At each plot/transect data were recorded according to Appendix 2 of the NSW BioBanking Assessment Methodology (BBAM) and Credit Calculator Operational Manual (DECC 2009). This involved setting out nested 20 x 50 metre and 20 x 20 metre plots, and a 50 metre transect.

Each plot was positioned at a standardised bearing (north/south and east/west, with the longer side running north/south) and the location marked from the north-east corner with a handheld GPS.

Ten condition attributes were recorded and comprised:

- indigenous plant species richness (including a list of all species recorded);
- native overstorey foliage cover;
- native midstorey foliage cover;
- native ground (grasses) foliage cover;
- native ground (shrubs) foliage cover;
- native ground (other) foliage cover;
- exotic plant cover;
- number of trees with hollows;
- regeneration; and
- total length of fallen timber.

At each plot/transect, generally 45 to 60 minutes was spent searching for all vascular flora species present within the 20 x 20 metre plot. Searches of each 20 x 20 metre plot were generally undertaken through parallel transects from one side of the plot to another. Most effort was spent on examining the groundcover, which usually supported well over half of the species present, however the composition of the shrub, mid-storey, canopy and emergent layers were also thoroughly examined. Effort was made to search the tree canopy and tree trunks for mistletoes, vines and epiphytes.

In addition to the data collected for each of the ten condition attributes, species within the plot were also assigned a cover-abundance value to reflect their relative cover and abundance in the plot. Species located outside the plot (recorded to assist in vegetation community identifications and mapping) were marked as present but were not assigned a cover-abundance value. A modified Braun-Blanquet 6-point scale (Braun-Blanquet 1927, with selected modifications sourced from Poore 1955 and Austin *et al.* 2000) was used to estimate cover-abundances of all plant species within each 20 x 20 metre plot. **Table 3.4** shows the cover-abundance categories used.

Table 3.4 – Modified Braun-Blanquet Crown Cover-abundance Scale

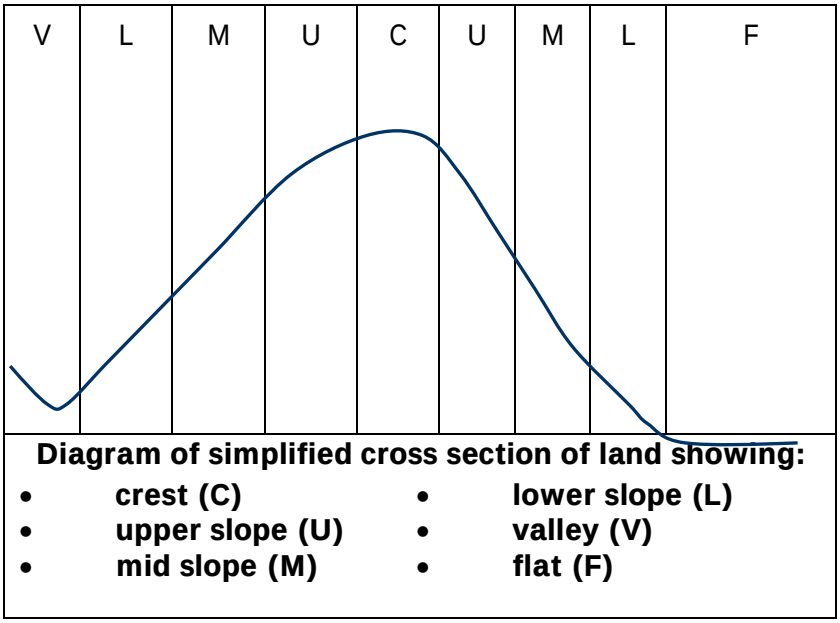
Class	Cover-abundance*	Notes
1	Few individuals (less than 5 per cent cover)	Herbs, sedges and grasses: <5 individuals Shrubs and small trees: <5 individuals
2	Many individuals (less than 5 per cent cover)	Herbs, sedges and grasses: 5 or more individuals Shrubs and small trees: 5 or more individuals Medium-large overhanging tree
3	5 – less than 20 per cent cover	–
4	20 – less than 50 per cent cover	–
5	50 – less than 75 per cent cover	–
6	75 – 100 per cent cover	–

Note: * Modified Braun–Blanquet scale (Poore 1955; Austin *et al.*. 2000)

All flora species that were readily identified in the field were recorded on pro forma field survey datasheets. All flora species that could not be immediately identified, and samples of potential threatened flora species, were collected, dried and identified or sent to the National Herbarium of NSW for identification.

In addition, information was gathered on the condition of the vegetation at each of the survey sites, including fire history and the density of weeds and evidence of disturbance such as feral animals.

Plot/transect sites were selected by considering a range of attributes that were considered to influence or determine the type of vegetation communities present. This stratification was done intuitively, but based on existing topographic, soil, vegetation (as mapped by Peake 2006, Umwelt 2010, Sivertsen *et al.* 2011) and geological mapping (Mineral Resources NSW 2003). Other factors considered included the spacing of sites across the Conceptual Additional Disturbance Area, as well as topographic position (see **Schematic 3.1** below) and aspect.



Schematic 3.1 – Topographic Positions

Data on topography, soil type and geology were sourced from existing maps. Not all stratification was done *a priori*, as the selection of survey sites in the field was undertaken to ensure that obvious variability in aspect, slope, elevation and micro-terrain was sampled.

Photographic records were taken at each plot from the north-east corner looking along the short side of the plot, diagonally along the plot and then along the long side of the plot.

Vegetation Mapping

Vegetation mapping of the Conceptual Additional Disturbance Area was largely undertaken in 2014 by Umwelt for the Upper Hunter Strategic Assessment (UHSA) United Collieries Biodiversity BioCertification Assessment Report (Umwelt 2015), and completed in 2015 to include areas not covered by the 2014 surveys. The 2014 vegetation mapping built upon previous vegetation mapping surveys conducted between 2009 and 2014. Vegetation mapping was undertaken using best-practice techniques to delineate vegetation communities across the Conceptual Additional Disturbance Area, consistent with the protocols in the UHSA. Vegetation mapping involved the following key steps:

- review of existing vegetation mapping (Peake 2006, Sivertsen et al. 2011, HLA Envirosciences 2002, Niche 2015) within and surrounding the Referral Area;

- ground-truthing of existing vegetation maps based on plot and transect survey results;
- aerial photograph interpretation on the basis of colour, texture, location in the landscape, soil and vegetation structure (dominant growth form, canopy density and height); and
- revision of vegetation community floristic delineations based on review of plot data.

Vegetation communities in the Conceptual Additional Disturbance Area were mapped on-screen overlaying a March 2012 high resolution aerial photograph provided by Glencore. Mapping was undertaken using the Manifold System 8.0 Enterprise Edition GIS in a 32 bit mode. Use of GIS allowed zooming to a relatively large scale.

Generally the minimum mapping unit for a vegetation zone was 0.1 hectare, however mapping was completed at a finer scale in order to map the small stands of weeping myall woodland and narrow bands of disturbed land along access tracks and haul roads.

Vegetation communities were delineated through the identification of repeating patterns of plant species assemblages in each of the identified strata. Communities were then compared to those vegetation communities identified in the *Vegetation of the Central Hunter Valley* (Peake 2006), the *Greater Hunter Native Vegetation Mapping – Geodatabase Guide* (Version 4.0) (Sivertsen *et al.* 2011) and Biometric Vegetation Type (BVT) descriptions from the Vegetation Information System (VIS) Classification exported from the online NSW Office of Environment and Heritage (OEH) website (OEH 2013e).

The vegetation community profiles provided in Peake (2006), Sivertsen *et al.* (2011) and OEH (2013e) were interrogated to identify communities that contained similar species and structural compositions to ensure that, where possible, the communities identified in the Conceptual Additional Disturbance Area were aligned with similar communities/BVTs known to occur in the region.

The vegetation mapping process was used to determine the presence of TECs in the Conceptual Additional Disturbance Area. The potential for occurrences of White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland Critically Endangered Ecological Community (CEEC), Central Hunter Valley Eucalypt Woodland and Forest CEEC, and Hunter Valley Weeping Myall (*Acacia Pendula*) Woodland CEEC were specifically targeted. An assessment of these three communities potential to occur is included in **Attachment C** of this referral.

Vegetation communities identified in the Conceptual Additional Disturbance Area were compared to TECs listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and NSW *Threatened Species Conservation Act 1995* (TSC Act). The assessment of similarity with TECs was made using the following approach:

- comparison with published species lists, including lists of 'important species', for the EPBC Act and TSC Act listed TECs;
- comparison with habitat descriptions and distributions for the EPBC Act and TSC Act listed TECs;
- assessment using guidelines published by the Commonwealth Department of the Environment (DoE) and OEH;
- collection of 'box' eucalypt specimens to determine if white box (*Eucalyptus albens*) or the white box/grey box intergrades (*Eucalyptus albens—moluccana*) were present in the Conceptual Additional Disturbance Area; and

- comparison with Final Determinations, guidelines, Listing/Conservation Advice statements, recovery plans and conservation advice provided for each TEC, particularly those from the NSW Scientific Committee and the Commonwealth Threatened Species Scientific Committee.

Fauna Survey

Detailed systematic fauna surveys were undertaken in 2009, 2010, 2011, 2012 and 2013. Additionally targeted winter bird surveys for the regent honeyeater and swift parrot were undertaken in 2010, 2011, 2012, 2013 and 2014. **Figure 3.2** details the location of all fauna surveys undertaken in the Conceptual Additional Disturbance Area from 2009 to 2014. A summary of the fauna survey effort undertaken for the Proposed Action is provided in **Table 3.5**.

Table 3.5 – Summary of 2009 to 2014 Fauna Survey Effort

Survey Method	Season	Survey Effort
Terrestrial Elliot A	Autumn 2009	200 trap nights
Terrestrial Elliot B	Autumn 2009	200 trap nights
Terrestrial cage traps	Autumn 2009	24 trap nights
Arboreal Elliot B	Autumn 2009	80 trap nights
Terrestrial hair funnels	Autumn 2009 Autumn 2010 Summer 2012/13 Spring 2013 Spring 2014	560 trap nights 560 trap nights 1960 trap nights 840 trap nights 1680 trap nights
Arboreal hair funnels	Autumn 2009 Autumn 2010 Summer 2012/13 Spring 2013 Spring 2014	280 trap nights 280 trap nights 980 trap nights 420 trap nights 840 trap nights
Harp traps	Autumn 2009	4 trap nights
Spotlighting searches	Autumn 2009 Autumn 2011 Summer 2012/13 Spring 2013 Autumn 2014 Spring 2014	4 hrs walking & 1 kilometres of driving 2 hrs walking 8 hrs walking 6 hrs walking & 2 kilometres driving 50 kilometres of driving 12 person hours
Reptile and amphibian searches	Autumn 2009 Spring 2009 Autumn 2010 Summer 2012/13 Spring 2013 Autumn 2014 Spring 2014	10 person hours 1 person hour 2 person hours 14 person hours 6 person hours 8 person hours 12 person hours

Bird surveys	Autumn 2009 Autumn 2010 Summer 2012/13 Spring 2013 Autumn 2014 Spring 2014	4 person hours 2 person hours 14 person hours 6 person hours 4 person hours 12 person hours
Micro-bat echolocation	Autumn 2009 Autumn 2010 Summer 2012/13 Spring 2013 Autumn 2014 Spring 2014	4 Anabat nights 2 Anabat nights 14 Anabat nights 4 Anabat nights 16 Anabat nights 12 Anabat nights
Nocturnal call playback	Autumn 2009 Autumn 2010 Summer 2012/13 Spring 2013 Spring 2014	4 sessions 2 sessions 3 sessions 6 sessions 12 sessions
Regent honeyeater and swift parrot surveys (comprising call playback session and 20 minute area search)	Winter 2011 Winter 2012 Winter 2013	14 sessions 7 sessions 10 sessions
Remote Infrared Motion Sensing Cameras	Autumn 2014	80 camera nights
Tracks, scats and signs of presence	All survey periods	Throughout all surveys
SEPP 44 koala habitat surveys (each plot was 20 by 20 metres)	Summer 2009 Autumn 2009 Spring 2009 Spring 2010	23 sites 19 sites 11 sites 3 sites
SAT koala scat searches	Summer 2013 Spring 2013 Autumn 2014	4 sites 30 sites 20 sites
Habitat searches for grey-headed flying-fox	All survey periods	Opportunistically undertaken during all other survey activities

In addition to the fauna survey effort detailed in **Table 3.5**, a large number of previous fauna surveys have also been undertaken both within the Conceptual Additional Disturbance Area and in adjacent and nearby landholdings (within 4 kilometres of the Conceptual Additional Disturbance Area) as part of previous studies. These previous fauna surveys include methods such as terrestrial and arboreal Elliott trapping, terrestrial cage trapping, terrestrial and arboreal hair funnels, harp trapping, spotlight searches, reptile and amphibian searches, birds surveys, micro-bat echolocation surveys, call playback surveys, migratory winter bird surveys, remote infrared motion sensing camera surveys, SEPP 44 koala surveys and habitat searches for grey-headed flying-fox camps. Collectively, the Proposed Action

specific fauna surveys combined with the extensive previous survey work within and nearby to the Conceptual Additional Disturbance Area, provide a very comprehensive data set on which to assess the potential impacts of the Proposed Action on fauna species.

Habitat Assessment

A total of 44 habitat assessments have been undertaken across the Conceptual Additional Disturbance Area, as shown on **Figure 3.2** and **Figure 3.2a**. These surveys were undertaken during six separate field trips, undertaken over the following periods:

- 24 April and 5 to 7 May 2009
- 19 May 2010;
- 2 to 6 September and 9 to 10 October 2013, and;
- 5 to 7 March 2014.

The habitat assessments targeted potential habitat and resources for fauna species, particularly threatened fauna species. Records of a number of habitat features were made at each site, including:

- evidence of disturbance such as fire, weeds, feral animals, dumping, erosion and logging;
- presence of fallen timber/logs;
- presence of stumps and stags;
- presence of groundcover features such as rock, litter, grasses, logs, boulder, soil and lichen;
- presence of dieback and/or insect attack;
- mistletoe presence;
- presence of perch sites, fallen and loose bark;
- vegetation strata and composition;
- tree size class (trunk diameter), and age (old growth, mature, regenerating, saplings);
- presence of other specific feed tree species (such as for cockatoos and honeyeaters); and
- collection of detailed hollow data, including tree species and height, hollow size, orientation, position and height.

In addition to these general habitat features, searches for specific habitat requirements for threatened fauna species with potential to occur in the area were also made including the presence of winter-flowering eucalypt species for the regent honeyeater (*Anthochaera phrygia*) and the swift parrot (*Lathamus discolor*). Habitat features such as tree hollows and fallen logs were inspected for any evidence of fauna occupation such as scratches on the trunks of trees, chewed entrances to hollows, scratchings or diggings near logs and scats at the base of trees or near logs.

Results

Results of database searches, reviews and surveys are presented below.

Listed Threatened Ecological Communities

Three TECs were identified in the Protected Matters Search Tool database as potentially occurring in the Conceptual Additional Disturbance Area; each listed as a Critically Endangered Ecological Community (CEEC):

- Central Hunter Valley Eucalypt Forest and Woodland;
- White Box – Yellow box – Blakely's Red Gum Grassy Woodland and Derived Native Grasslands; and
- Hunter Valley Weeping Myall (Acacia Pendula) Woodland.

The potential presence of these TECs was assessed in detail as part of the comprehensive flora survey undertaken for the Proposed Action.

A total of 212 hectares of Central Hunter Valley Eucalypt Forest and Woodland CEEC (Central Hunter Valley CEEC) was identified within the Conceptual Additional Disturbance Area. Components of the following communities present within the Conceptual Additional Disturbance Area conform to the Central Hunter Valley CEEC (refer to **Figure 3.3**):

- Narrow-leaved Ironbark – Grey Box Grassy Woodland of the Central and Upper Hunter,
- Planted/Rehabilitated Spotted Gum - Narrow-leaved Ironbark Shrub - Grass Open Forest of the Central and Lower Hunter;
- Grey Box - Slaty Box Shrub - Grass Woodland on Sandstone Slopes of the Upper Hunter and Sydney Basin;
- Bull Oak Grassy Woodland of the Central Hunter Valley, and;
- Derived native grasslands forms of the above mentioned vegetation communities.

Following the change in listing of this community to a CEEC in 2015, further targeted surveys for the Central Hunter Valley CEEC were conducted across the Conceptual Additional Disturbance Area. The detailed vegetation map produced as part of the United Collieries Upper Hunter Strategic Assessment (Umwelt 2015) (mapped prior to the listing of the Central Hunter Valley CEEC) was used to identify areas of potential Central Hunter Valley CEEC. A rapid assessment proforma was developed to capture the key diagnostic features and condition thresholds at each of the sample points.

The majority of the Central Hunter Valley CEEC in the Conceptual Additional Disturbance Area was represented by the Narrow-leaved Ironbark – Grey Box Grassy Woodland of the Central and Upper Hunter. The woodland form of this community has a canopy dominated by grey box (*Eucalyptus moluccana*), narrow-leaved ironbark (*Eucalyptus crebra*) and bulloak (*Allocasuarina luehmannii*). In addition, a regenerating form of this community was identified in the north-eastern portion of the Conceptual Additional Disturbance Area which was dominated by young grey box (*Eucalyptus moluccana*), narrow-leaved ironbark (*Eucalyptus crebra*) and bulloak (*Allocasuarina luehmannii*).

A small amount of Grey Box - Slaty Box Shrub - Grass Woodland on Sandstone Slopes of the Upper Hunter and Sydney Basin was included in the Central Hunter Valley CEEC, this area of woodland was dominated solely by slaty box (*Eucalyptus dawsonii*). A small patch of the Planted/Rehabilitated Spotted Gum - Narrow-leaved Ironbark Shrub - Grass Open Forest of the Central and Lower Hunter which was dominated by Spotted Gum (*Corymbia maculata*) was found to conform to the Central Hunter Valley CEEC in the southern portion of the Conceptual Additional Disturbance Area. Although the vast of the Bull Oak Grassy Woodland of the Central Hunter Valley was excluded from the Central Hunter Valley CEEC listing due to the dominance of bulloak (*Allocasuarina luehmannii*), a small area in the northern portion of the Conceptual Additional Disturbance Area was found to contain greater than 50 percent of the narrow-leaved ironbark (*Eucalyptus crebra*) projected canopy cover and therefore satisfied the key diagnostic characteristic for canopy species dominance. Derived native grasslands within 30 metres of the woodland/forest edges were also included in the Central Hunter Valley CEEC where the perennial understorey vegetative cover was 50 percent or more, as per the Conservation Advice for the Central Hunter Valley CEEC. The derived native grasslands were dominated by a mixture of native grasses and herbs.

Areas of vegetation were excluded from the Central Hunter Valley CEEC in the Conceptual Additional Disturbance Area (as per the Conservation Advice for the Central Hunter Valley CEEC) when:

- patches were less than the minimum 0.5 hectare (woodland component) condition threshold;
- the key diagnostic characteristic for the canopy was not met, in which the canopy was not dominated by one or more of the four characteristic species;
- bulloak (*Allocasuarina luehmannii*) dominated the canopy, in which the foliage cover of this species was greater than 50 percent of the projected canopy cover;
- the perennial understorey vegetative cover was less than 50 per cent; and
- the derived native grassland 30 metre buffer from the woodland/forest edge was dissected by a major track, road or woodland/forest vegetation not consistent with the Central Hunter Valley CEEC listing.

White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC and Hunter Valley Weeping Myall (*Acacia Pendula*) Woodland CEEC have not been identified in the Conceptual Additional Disturbance Area despite extensive, targeted surveys by experienced botanists. Two patches of Weeping Myall (*Acacia pendula*) occur in the Conceptual Additional Disturbance Area (refer to **Figure 3.3**) however both patches were too small to conform with the Hunter Valley Weeping Myall (*Acacia Pendula*) Woodland CEEC listing.

Listed Threatened Flora Species

No EPBC Act listed threatened flora species have been identified or are likely to occur in the Conceptual Additional Disturbance Area.

Listed Threatened Fauna Species

Four threatened fauna species listed under the EPBC Act have been recorded in the Conceptual Additional Disturbance Area and are listed in **Table 3.6**. The location of these species is illustrated in **Figures 3.3**.

Table 3.6 – Listed Threatened Fauna Species Recorded in the Conceptual Additional Disturbance Area

Species	EPBC Act Status	Number of Records	Source
Large-eared pied bat (*Chalinolobus dwyeri*)	V	15	Field surveys
Grey-headed flying-fox (*Pteropus poliocephalus*)	V	5	Field surveys
Koala (*Phascolarctos cinereus*)	V	1	2006 annual monitoring survey (ECOServe 2006)
Spotted-tailed quoll (*Dasyurus maculatus maculatus*)	V	1	Mine site infrared motion sensing camera

Notes: V = vulnerable

Details on the records of EPBC listed threatened fauna species identified within the Conceptual Additional Disturbance Area are provided below.

Large-eared pied bat (*Chalinolobus dwyeri*)

The large-eared pied bat has been recorded at 15 locations within Conceptual Additional Disturbance Area between 2009 and 2014 (see **Figure 3.4**). The OEH Atlas of NSW Wildlife contains 37 large-eared pied bat records within 10 kilometres of the Conceptual Additional Disturbance Area. No roosting habitat for this cave-roosting species has been identified within the Conceptual Additional Disturbance Area.

Grey-headed flying-fox (*Pteropus poliocephalus*)

The grey-headed flying-fox was recorded in the Conceptual Additional Disturbance Area on five occasions between 2009 and 2014 (see **Figure 3.4**). The OEH Atlas of NSW Wildlife contains 7 grey-headed flying-fox records within 10 kilometres of the Conceptual Additional Disturbance Area.

All eucalypt-dominated woodland vegetation in the Conceptual Additional Disturbance Area, as well as the significant areas of woodland in the region provide potential foraging habitat for this species. Roosting camp sites were not identified within the Conceptual Additional Disturbance Area and are considered highly unlikely to occur. Any individuals recorded in the local area are likely to be from a known camp in Burdekin Park located in the centre of Singleton, approximately 20 kilometres east of the centre of the Referral Area.

Spotted-tailed quoll (*Dasyurus maculatus maculatus*)

The spotted-tailed quoll has been recorded in the Conceptual Additional Disturbance Area; recorded in 2013 by a remote camera set by United personnel while assessing feral animal control measures (refer to **Figure 3.4**). However subsequent camera trapping in the Conceptual Additional Disturbance Area (two cameras, including one at the same location) and the surrounding area (seven cameras) in 2014 failed to record the species. It is likely that all woodland vegetation within the Conceptual Additional Disturbance Area provides potential foraging habitat for this species. This species is dependent on hollow-bearing trees, hollow logs, rocky outcrops or caves for denning. The Conceptual Additional Disturbance Area is likely to contain some limited denning resources for this species, however, there is a relatively low proportion of hollow-bearing trees, no escarpments and limited outcropping occurring in

the Conceptual Additional Disturbance Area. The OEH Atlas of NSW Wildlife contains 4 spotted-tailed quoll records within 10 kilometres of the Conceptual Additional Disturbance Area.

Koala (*Phascolarctos cinereus*)

A single 2006 record of the koala is known from the Conceptual Additional Disturbance Area (see Figure 3.4). The koala was identified from old scats under a single tree likely to be from a single animal by ECOServe in 2006. The scats were not sent for expert identification. ECOServe concluded that the scats may have been from a dispersing individual and that the site did not support a resident population. No other records of the koala have been made since 2006 despite numerous SAT searches and several spotlighting surveys of the Conceptual Additional Disturbance Area between 2009 and 2014 (see Table 3.2 above). The OEH Atlas of NSW Wildlife contains 3 koala records within 10 kilometres of the Conceptual Additional Disturbance Area. The koala is not present as a resident species in the Conceptual Additional Disturbance Area and the 2006 record is likely a record of a dispersing individual moving through the landscape. See the following section for an assessment of the potential level of impact on the koala as assessed using the EPBC Act Referral Guidelines for the Vulnerable Koala (DoE 2014).

Nature and extent of likely impact

Address any impacts on the members of any listened threatened species (except a conservation dependent species) or any threatened ecological community, or their habitat.

As discussed in **Sections 1** and **2**, there has been active open cut and underground mining within the Referral Area since the 1960s and a large proportion of the Referral Area has been previously subject to or is approved for disturbance. As indicated on **Figure 1.3**, the Approved Wambo Surface Development Area (approved for impact under EPBC Controlled Activity Approval ref: 2003/1138) occupies a significant portion of the total Proposed Disturbance Area for the Proposed Action. As this area has previously been assessed and approved for impact, the following discussion of the nature and extent of likely impact focuses on the new impacts proposed within the Conceptual Additional Disturbance Area.

Listed Threatened Ecological Communities

A total of approximately 212 hectares of Central Hunter Valley Eucalypt Forest and Woodland CEEC (Central Hunter Valley CEEC) was identified within the Conceptual Additional Disturbance Area. An Assessment of Significance (**Attachment C**) has been undertaken to determine the significance of the potential impact on the Central Hunter Valley CEEC. The assessment of significance identified that the loss of 212 hectares of Central Hunter Valley CEEC is likely to have a significant impact on the CEEC as it will reduce the extent of the community, adversely impact some areas of critical habitat of the ecological community and interfere with the recovery of the ecological community.

Listed Threatened Flora Species

No flora species listed under the EPBC Act have been recorded in the Conceptual Additional Disturbance Area and none are expected to occur. Therefore the Proposed Action is not predicted to result in any impacts on listed threatened flora species.

Listed Threatened Fauna Species

An assessment of threatened species which occur, and have the potential to occur, in the Conceptual Additional Disturbance Area has been undertaken and is presented in **Attachment C**. For those species considered to have potential to be impacted by the Proposed Action, an Assessment of Significance (**Attachment D**) has been undertaken to determine the significance of the potential impact. **Attachment D** contains an assessment of the potential impacts of the Proposed Action based on the Significant Impact Criteria for each listing category. A summary of the potential impacts of the Proposed Action on each species is provided in the following sections, as well as the conclusions of the Assessment of Significance.

Regent honeyeater

The regent honeyeater has not been recorded in the Conceptual Additional Disturbance Area by targeted surveys undertaken for the Proposed Action or during annual ecological monitoring, despite over five years of monitoring and survey. The regent honeyeater has been recorded four times between 1987 and 2002 on the Atlas of NSW Wildlife (OEH 2015) within a 10 kilometre radius from the boundary of the Conceptual Additional Disturbance Area. The loss of approximately 227 hectares of eucalypt dominated woodland habitat from the Conceptual Additional Disturbance Area (including 29 hectares of mine rehabilitation) will result in the loss of potentially suitable foraging habitat, which if utilised, is likely to be used for a small number of days (or less) during years when eucalypt trees flower during winter. There are no records of this species breeding within the central Hunter and therefore the Conceptual Additional Disturbance Area is considered unlikely to contain breeding habitat for this species. The loss of 227 hectares of potential foraging habitat that is likely to be sporadically used for short periods is considered unlikely to be a significant impact on the regent honeyeater. There

is unlikely to be a significant impact on a population of the regent honeyeater as a result of direct or indirect impacts from the Proposed Action (**Attachment D**).

Swift parrot

The swift parrot has not been recorded in the Conceptual Additional Disturbance Area by targeted surveys undertaken for the Proposed Action or during annual ecological monitoring, despite over five years of monitoring and survey. The swift parrot has been recorded three times between 2000 and 2002 on the Atlas of NSW Wildlife (OEH 2015) within a 10 kilometre radius from the boundary of the Conceptual Additional Disturbance Area. The loss of approximately 227 hectares of eucalypt dominated woodland habitat from the Conceptual Additional Disturbance Area (including 29 hectares of mine rehabilitation) will result in the loss of potentially suitable foraging habitat, which if utilised, is likely to be used for a small number of days (or less) during years when eucalypt trees flower during winter. The loss of 227 hectares of potential foraging habitat that is likely to be sporadically used for short periods is considered unlikely to be a significant impact on the swift parrot. There is unlikely to be a significant impact on a population of the swift parrot as a result of direct or indirect impacts from the Proposed Action (**Attachment D**).

Large-eared pied bat

The large-eared pied bat has been recorded on 15 occasions within the Conceptual Additional Disturbance Area (refer to **Figure 3.3**), from the recording of echolocation calls. The large-eared pied bat is a cave roosting species and there is no cave or escarpment habitat present within the Conceptual Additional Disturbance Area that may provide suitable breeding habitat for the species. A disused mine portal located adjacent to a small dam where the large-eared pied bat has been recorded is considered unlikely to provide suitable habitat for the species. The large-eared pied bat has been recorded widely across the Conceptual Additional Disturbance Areaand is likely a resident species. Approximately 462 hectares of potential foraging habitat occurs in the Conceptual Additional Disturbance Area, comprising all woodland and regeneration areas (including approximately 29 hectares of mine rehabilitation). Large areas of potential foraging habitat, in the form of woodland and forest areas, occur in the surrounding landscape, particularly to the west and south-west in Wollemi National Park, where large areas of potential breeding habitat also occurs. There is unlikely to be a significant impact on a population of the large-eared pied bat as a result of direct or indirect impacts from the Proposed Action (**Attachment D**).

Grey-headed flying-fox

The grey-headed flying-fox has been recorded on several occasions within the Conceptual Additional Disturbance Area. The Conceptual Additional Disturbance Area contains suitable foraging habitat for the species, however no camp sites have been identified and they are considered highly unlikely to occur. The loss of approximately up to 227 hectares of woodland habitat from the Conceptual Additional Disturbance Area (including 29 hectares of mine rehabilitation) will result in the loss of potential foraging habitat for this species. However given this species highly mobile nature and ability to travel tens of kilometres each night, the Proposed Action is considered unlikely to significantly impact on a population of the grey-headed flying-fox. There is unlikely to be a significant impact on a population of the grey-headed flying-fox as a result of direct or indirect impacts from the Proposed Action (refer to **Attachment C**).

Spotted-tailed quoll

The spotted-tailed quoll has been recorded on one occasion in 2013 in the Conceptual Additional Disturbance Area. Given the spotted-tailed quoll has not been recorded on any other occasions during surveys undertaken for the Proposed Action or during annual monitoring surveys, the species is unlikely to be a resident species and it is unlikely that any individuals rely solely on the Conceptual Additional

Disturbance Area for their needs. It is more likely that the Conceptual Additional Disturbance Area forms part of a large home range area for one, or a small number of spotted-tailed quolls, that forage within the Conceptual Additional Disturbance Area on an occasional or rare basis. Extensive areas of potentially suitable foraging and breeding habitat occur approximately 1 kilometre to the west of the Referral Area in Wollemi National Park. As the Conceptual Additional Disturbance Area is likely to provide 462 hectares of occasional habitat for the spotted-tailed quoll and there are large highly suitable areas for the species in the nearby Wollemi National Park, the Proposed Action is considered unlikely to significantly impact on a population of the spotted-tailed quoll (refer to **Attachment C**).

Koala

A single 2006 record of the koala is known from the Conceptual Additional Disturbance Area. The koala was identified from old scats under a single tree by ECOServe in 2006. No other records of the koala have been made since 2006 despite numerous SAT searches and several spotlighting surveys of the Conceptual Additional Disturbance Area between 2009 and 2014 (refer to **Table 3.5**). The koala is considered unlikely to occur in the Conceptual Additional Disturbance Area and the 2006 record is likely a record of a dispersing individual moving through the landscape. There is not a resident koala population in the Conceptual Additional Disturbance Area. Approximately 227 hectares of potentially suitable habitat, in the form of eucalypt dominated woodlands (including 29 hectares of mine rehabilitation), occurs across the Conceptual Additional Disturbance Area. As the koala has not been recorded since 2006, despite numerous recent surveys, and there is not a resident koala population in the Conceptual Additional Disturbance Area, the Proposed Action is considered unlikely to significantly impact on a population of the koala.

Assessment of the koala's presence using the Koala Habitat Assessment Tool of the *EPBC Act Referral Guidelines for the Vulnerable Koala* (DoE 2014) identifies the Proposed Action as containing habitat critical for the survival of the koala, scoring 7 out of 10. The single scat record in 2006 (1 point), the presence of 2 or more feed trees (2 points), a high level of connectivity (2 points) and the absence of recorded threats to koalas (2 points) resulted in a score greater than 4 which identifies the site as containing habitat critical for the survival of the koala. However landscapes with no records of the koala can also score higher than 4 if there are 2 or more known food trees present (2 points) in a connected landscape (>1000 hectares)(2 points) and there is no record of threats to koalas (e.g. vehicle strike or dog attack records) (2 points).

While the *EPBC Act Referral Guidelines for the Vulnerable Koala* (DoE 2014) identifies the Proposed Action as containing habitat critical for the survival of the koala, survey history and the lack of records suggests that the koala is not a resident species of the Conceptual Additional Disturbance Area and at best occurs on very rare occasions during large movements by dispersing individuals.

3.1 (e) Listed migratory species

Description

A 10 kilometre radius search from the outer-most points of the Referral Area was completed using the EPBC Protected Matters Search Tool database to identify migratory species with the potential to occur within, or adjacent to, the Referral Area. Records from the database search were combined with records derived through various literature reviews, professional opinion and field surveys, to identify the range of potentially occurring migratory species. An assessment of the potential for each of those migratory species to occur within the habitats of the Referral Area is provided in **Attachment C**, as well as an assessment of the significance of the potential impacts on each species (refer to **Attachment D**). **Table 3.7** below lists the migratory species that were identified by the Protected Matters Database and their likelihood of occurrence.

Table 3.7 – Protected Matters Summary Table – Migratory Species

Migratory Species		
Scientific Name	**Common Name**	**Status**
Species or Species Habitat Known to Occur		
Ardea alba	Great egret	
Monarcha melanopsis	Black-faced monarch	
Hirundapus caudacutus	White-throated needletail	
Myiagra cyanoleuca	Satin flycatcher	
Rhipidura rufifrons	Rufous fantail	
Species or Species Habitat May Occur		
Gallinago hardwickii	Lathams snipe	
Merops ornatus	Rainbow bee-eater	
Ardea ibis	Cattle egret	
Species or Species Habitat Likely to Occur		
Apus pacificus	Fork-tailed swift	
Rostratula benghalensis s. lat.	Painted snipe	E
Pandion cristatus	Eastern osprey	

Status (EPBC Act):
E Endangered

Nature and extent of likely impact

Address any impacts on the members of any listed migratory species, or their habitat.

An assessment of the significance of the impact of the Proposed Action on each of the migratory species listed above is included below. The assessments are in accordance with the *Significant Impact Guidelines 1.1* (DoE 2013b). In relation to this assessment, the DoE considers an area of *important habitat* for migratory species to be:

- habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species; and/or
- habitat that is of critical importance to the species at particular life-cycle stages, and/or
- habitat utilised by a migratory species which is at the limit of the species range; and/or
- habitat within an area where the species is declining.

The Referral Area is not considered to comprise *important habitat* for any of the occurring and potentially occurring listed migratory species, based on the criteria described above. The Referral Area does not support an ecologically significant proportion of a population of any of the migratory species listed in **Table 3.7**. Nor are any of the migratory species listed in **Table 3.7** at the limit of their range in the Referral Area. There is no evidence to suggest that any of the migratory species listed in **Table 3.7** are declining in the region in which the Referral Area occurs.

An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- **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 Conceptual Additional Disturbance Area is not considered to comprise important habitat for any of the occurring or potentially occurring listed migratory species, based on the criteria described above. Therefore the Proposed Action is unlikely to substantially modify, destroy or isolate an area of important habitat for any of the species listed in **Table 3.6** above.

- **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**

The Conceptual Additional Disturbance Area is not considered to comprise important habitat for any of the occurring or potentially-occurring migratory species listed in **Table 3.7**, based on the criteria described above. The Proposed Action is unlikely to result in an invasive species that is harmful to any of the migratory species (listed in **Table 3.7)** becoming established in an area of important habitat.

- **seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.**

The Conceptual Additional Disturbance Area is not considered to comprise an ecologically significant proportion of the population for any of the occurring or potentially occurring migratory species listed in **Table 3.7**. Therefore the Proposed Action is unlikely to seriously disrupt the lifecycle of an ecologically significant proportion of a population of any of the species listed in **Table 3.7** above.

Conclusion

The Proposed Action is unlikely to result in a significant impact on any EPBC Act migratory species.

3.1 (f) Commonwealth marine area

(If the action is in the Commonwealth marine area, complete 3.2(c) instead. This section is for actions taken outside the Commonwealth marine area that may have impacts on that area.)

Description

No Commonwealth marine areas were identified in the EPBC Act Protected Matters Report, based on a 10 kilometre search from of the boundary of the Referral Area and additionally no marine areas are known to occur within 80 kilometres of the Referral Area.

Nature and extent of likely impact

Address any impacts on any part of the environment in the Commonwealth marine area.

N/A

3.1 (g) Commonwealth land

(If the action is on Commonwealth land, complete 3.2(d) instead. This section is for actions taken outside Commonwealth land that may have impacts on that land.)

Description

If the action will affect Commonwealth land also describe the more general environment. The Policy Statement titled *Significant Impact Guidelines 1.2 - Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies* provides further details on the type of information needed. If applicable, identify any potential impacts from actions taken outside the Australian jurisdiction on the environment in a Commonwealth Heritage Place overseas.

The Protected Matters Report identified that two potential areas of Commonwealth land occur within a 10 kilometre radius of the Referral Area. The two areas identified are Australian Telecommunications Commission land and Telstra Corporation Land. No Commonwealth land occurs within the Referral Area.

Searches of land ownership within proximity of the Referral Area identified three small areas of land owned by Telstra Corporation (assumed to be related to telecommunications services) being:

- 409 m^2 of land to the north of Warkworth village approximately 310 metres from the closest point of the Project Disturbance Area;
- 147m^2 of land in Warkworth village approximately 865 metres from the closest point of the Project Disturbance Area; and
- 607m^2 of land in Bulga village approximately 7.5 kilometres from the closest point of the Project Disturbance Area.

No areas of Australian Telecommunications Commission land were identified in the land searches of properties within the vicinity of the Referral Area.

Nature and extent of likely impact

Address any impacts on any part of the environment in the Commonwealth land. Your assessment of impacts should refer to the *Significant Impact Guidelines 1.2 - Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies* and specifically address impacts on:

- ecosystems and their constituent parts, including people and communities;
- natural and physical resources;
- the qualities and characteristics of locations, places and areas;
- the heritage values of places; and
- the social, economic and cultural aspects of the above things.

As noted above, three small areas of land owned by Telstra Corporation are located within approximately 7.5 kilometres of the Project Disturbance Area, two of which are within 1 kilometre. The Proposed Action will not directly impact these areas of Commonwealth land and is not expected to result in any significant indirect impacts to any areas of Commonwealth land.

3.1 (h) The Great Barrier Reef Marine Park

Description

The Proposed Action will not directly or indirectly impact on the Great Barrier Reef Marine Park.

Nature and extent of likely impact

Address any impacts on any part of the environment of the Great Barrier Reef Marine Park.

N/A

Note: If your action occurs in the Great Barrier Reef Marine Park you may also require permission under the *Great Barrier Reef Marine Park Act 1975* (GBRMP Act). If so, section 37AB of the GBRMP Act provides that your referral under the EPBC Act is deemed to be an application under the GBRMP Act and Regulations for necessary permissions and a single integrated process will generally apply. Further information is available at www.gbrmpa.gov.au

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3.1 (i) A water resource, in relation to coal seam gas development and large coal mining development

Description

If the action is a coal seam gas development or large coal mining development that has, or is likely to have, a significant impact on water resources, the draft *Policy Statement Significant Impact Guidelines: Coal seam gas and large coal mining developments—Impacts on water resources* provides further details on the type of information needed.

Regional / local geology / soils

The Proposed Action is located within the Hunter Coalfields of the Sydney Sedimentary Basin. The stratigraphy in the area comprises the Permian coal measures, Triassic Narrabeen Group and recent (Quaternary) alluvial deposits associated with major surface waterways.

The Permian coal measures form a regular layered westerly dipping sedimentary sequence with the Wittingham Coal Measures containing the main economic coal seams. The Wittingham Coal Measures include the Jerrys Plains subgroup, which is underlain by Archerfield Sandstone, the Vane Subgroup and the Saltwater Creek Formation.

Alluvial sediments are primarily associated with, and close to, major surface waterways and generally consist of sand, gravel and silty and clayey sands, often with coarser and cleaner sand/gravel zones towards the base of the channel. The Referral Area is located in proximity to gently sloping floodplains and alluvial flats associated with the Hunter River, Wollombi Brook, North Wambo Creek, Wambo Creek, Stony Creek and Redbank Creek (refer to **Figure 1.5**).

As discussed in **Section 3.3(c)**, six soil types occur within the Referral Area and are mapped on the Singleton 1:250,000 Soil Landscapes Map Sheet and described in Kovac and Lowrie (1991). The majority of the Referral Area is covered by soils that have a very high susceptibility to erosion and poor fertility.

Drainage

The main drainage features of the area surrounding the Referral Area are Wollombi Brook and the Hunter River (refer to **Figure 1.5**). Wollombi Brook, which flows in a northerly direction, discharges into the Hunter River approximately 5 kilometres to the east north-east of the Referral Area. The main stream channel of Wollombi Brook is approximately 100 metres wide and contains a broad sand base with intermittent waterholes. When flowing, North Wambo Creek, a ephemeral tributary of Wollombi Brook, flows from the north-west of the Referral Area and joins Wollombi Brook south-east of the Referral Area. Redbank Creek, another ephemeral tributary of Wollombi Brook, flows through the existing United approved mining area and joins Wollombi Brook east of the Referral Area.

A further tributary of the Hunter River, Waterfall Creek, is located to the north of the Referral Area and flows in a northerly direction to the Hunter River.

These watercourses are generally characterised by ephemeral and semi-perennial flow regimes. The catchment areas consist of both National Park and cleared farmlands.

Redbank Creek and the broader Redbank Creek catchment has been the subject of previous historical approved works associated with United. Currently, approximately 26 per cent of the original Redbank Creek catchment remains. The majority of the remaining catchment area flows into a dam within the United water management system (WMS) and is extracted under licence for use.

Similarly North Wambo Creek and the North Wambo Creek catchment has been the subject of historical approved works associated with Wambo. As part of historical mining operations the North Wambo Creek diversion has been constructed by Wambo (refer to **Figure 1.5**).

Hydrogeology

Regionally, groundwater is recognised as occurring within the Permian Whittingham Coal Measures and the unconsolidated alluvial sediments of the Hunter River and Wollombi Creek.

In the central Hunter Valley region, water quality, hydraulic conductivity and storativity of the Permian coal measures is variable. The Permian coal measures can be categorised into the following hydrogeological units:

- hydrogeologically "tight" and hence very low yielding sandstone, siltstone and conglomerate that comprise the majority of the Permian interburden/overburden; and

- low to moderately permeable coal seams, typically ranging in thickness from 0.5 metres to 10 metres, which are the prime water bearing strata within the Permian coal measures.

The local hydrogeology has been impacted by historic underground and open cut mining, with further approved mining (both open cut and underground) to occur both within the Referral Area (Wambo Open Cut) and around the Referral Area (Wambo Underground, Hunter Valley Operations and other mining operations to the south and northeast). The impact consists of a change in hydraulic conductivity during and post mining and depressurisation of the coal measures through the removal of aquifers, and associated impacts on surrounding alluvial and other aquifers.

Groundwater salinity for coal seams in the central Hunter Valley Region range from brackish to saline. Groundwater discharge at coal seam subcrops can increase the salinity of overlying alluvium and surface water bodies.

The NSW Aquifer Interference Policy (AIP) (2012) divides all groundwater sources within NSW into highly productive and less productive. Highly productive groundwater is defined as a groundwater source that is declared in the Regulations and based on the following criteria:

- has total dissolved solids (TDS) of less than 1,500 mg/L; and

- can yield water at a rate greater than 5 L/sec.

The AIP classifies the Hunter River alluvium and parts of the Wollombi Creek alluvium as highly productive. Local alluvial groundwater TDS is generally greater than 1,500 mg/L.

Water Use

Surface water runoff from the catchment areas and watercourses surrounding the Referral Area is managed by the NSW Government as part of Water Sharing Plans regulated under the NSW *Water Management Act 2000*. This Act regulates the taking, interception, storage and use of surface water and groundwater within areas subject to water sharing plans. The water sharing plans regulate the permissible take from the water sources to provide for sustainable use of the State's water resources.

Two Water Sharing Plans apply to the water management associated with the Proposed Action. The Water Sharing Plan for the Hunter Regulated River Water Source for abstractions from the Hunter River and associated alluviums; and the Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources for surface water and connected alluvial waters in the surrounding catchment areas, North Wambo Creek, Redbank Creek, Wollombi Brook and Waterfall Creek.

Groundwater extraction in the hard rock aquifers associated with the coal measures is currently licensed under the NSW *Water Act 1912*.

Eight private agricultural bores/wells are located between 5 kilometres and 10 kilometres from the proposed United Open Cut and Wambo Open Cut. United is undertaking a local bore census to confirm the status and productivity of these bores. Groundwater abstraction volumes from bores outside of the Hunter River alluvial zone are expected to be low and predominantly for stock watering. The greatest density of licensed bores is in the alluvium along the Hunter River approximately 1.7 kilometres north of the Referral Area. They are generally used for irrigation along the river floodplain.

Water licences will be required under the *Water Management Act 2000* and *Water Act 1912* for water take from the water sources relevant to the Proposed Action. It is noted that both the existing United and Wambo mines currently hold various Water Access Licences (WALs) under the *Water Management Act 2000* and groundwater licences under the *Water Act 1912* for the existing mining operations and the modelling and assessment work currently being undertaken for the Proposed Action will confirm if these existing water licences are sufficient for the water take predicted for the Proposed Action or if further licences are required. As discussed above, any water take from surface water sources or alluvial groundwater sources will require licences from within the allocations within the relevant Water Sharing Plans developed by the NSW government. The Water Sharing Plans set the sustainable take levels for these water sources and therefore any take associated with the Proposed Action would not affect environmental flows in these water sources.

Groundwater Dependant Ecosystems

Potential groundwater dependent ecosystems (GDEs) within the Conceptual Additional Disturbance Area comprise the Swamp Oak – Weeping Grass Grassy Riparian Forest and Forest Red Gum Grassy Open Forest on Floodplains vegetation types. Both occur along Redbank Creek, an ephemeral creek line. Both communities have a patchy distribution along Redbank Creek. The remaining vegetation within the riparian zone (e.g. grassland communities) are unlikely to be GDEs. These vegetation types extend out of the riparian zone onto lower slopes and beyond, and are not characteristic vegetation types of riparian zones. Outside of the Conceptual Additional Disturbance Area GDEs are likely to be present within the riparian, floodplain and alluvial zones of Wollombi Brook, Redbank Creek and the Hunter River. Smaller creek lines in the surrounding area have potential to contain potential GDE vegetation within their riparian and floodplain zones. Detailed mapping and investigation of GDEs is currently being completed as part of the groundwater and ecological assessment for the Proposed Action.

Mining history

Open cut mining commenced in the area in 1969 at Wambo and subsequently development consents were issued for a range of open cut and underground operations, including:

- United – underground and open cut pits;
- Wambo – underground and open cut pits;
- Mt Thorley Warkworth - Open Cut;
- Lemington – underground and open cut pits; and
- Hunter Valley Operations (HVO) – open cut - Riverview and Cheshunt pits.

In the Referral Area the Whybrow, Redbank Creek, Wambo and Whynot Seams were primarily mined by open cut methods and open cut mining is currently on-going. Underground mining has been undertaken in the Whynot, Wambo and Woodlands Hill (United) seams, underground mining is also approved in the Arrowfield and Bowfield Seams, underground mining is on-going at Wambo Underground.

Both United and Wambo have extensive existing water management systems (WMS). Part of the existing water management measures is to share water between the two operations to maximise water reuse in mining and minimise external water take and water discharge.

Management of water is currently undertaken in accordance with the existing site Water Management Plans for United and Wambo. One of the key objectives of the water management systems is to divert upslope runoff from higher in the catchment around the operational mine area through a series of clean water drains, dams and approved creek diversions to the downstream watercourses, thus minimising the volume of water entering the mine water management systems.

Water entering the open cut pit, either through groundwater interception or rainfall and runoff from disturbed areas is currently captured in the mine water management systems. The inflows to the water management systems include rainfall, runoff, groundwater inflow, licensed extraction (Hunter River and Wollombi Brook) and a licensed water supply dam located on Redbank Creek. Water is also recovered from tailings water and re-used in the mine water management systems.

Water usages in the mines include CHPP use, haul road dust suppression and evaporation from storage dams.

Discharges of excess water from the mining operations into the Hunter River and Wollombi Brook are required by NSW legislation to be undertaken in accordance with the Hunter River Salinity Trading Scheme (HRSTS) and the NSW *Protection of the Environment Operations Act 1997* (POEO Act). The NSW Government has determined the sustainable salt load for the Hunter River, considering the assimilative capacity of the Hunter River under high flow conditions to carry excess salt whilst minimising impacts on the environment. The HRSTS is managed such that discharges can only occur in suitable conditions. Wambo has approval to discharge surplus water when required in accordance with its Environment Protection Licence via the HRSTS. The water management systems for the Proposed Action will be integrated, in terms of water sharing, with the water management system for the approved Wambo operations. This will allow water to be shared across the United/Wambo complex (i.e. covering the approved operations at Wambo and United and the Proposed Action), maximising reuse and reducing the need for discharge via the HRSTS.

Historical and current mining operations have caused depressurisation of coal seams through mining. The area has been the subject of numerous hydrogeological assessments. A detailed groundwater model is currently being developed in accordance with relevant NSW and Commonwealth guidelines to assess the impact of the Proposed Action on the local groundwater regime.

Nature and extent of likely impact

Address any impacts on water resources. Your assessment of impacts should refer to the draft *Significant Impact Guidelines: Coal seam gas and large coal mining developments—Impacts on water resources*.

Avoidance of Potential Water Impacts

Environmental studies have been used to inform the proposed conceptual design for the Proposed Action. Specifically in relation to minimising the impact on water resources this has included:

- The extent of the United Open Cut has been designed with a standoff in excess of 370 metres from Wollombi Brook at its closest point. This is nearly double the minimum distance of 200 metre standoff from the high bank of a watercourse in accordance with the NSW Aquifer Interference Policy (2012).
- Construction of a flood levee adjacent to the United Open Cut to ensure protection from flooding associated with flood flows in Wollombi Brook and backflows into Redbank Creek.
- Minimal infrastructure placed within the floodplain of Wollombi Brook to reduce the potential for impacts on flow conveyance during flood events.
- Use of existing coal transport options and access routes to the mining operations so no additional road, rail or conveyor crossings are required over Wollombi Brook.
- Extension of the existing site water management systems to capture, treat and reuse runoff from the mining areas to minimise risk of pollution to downstream watercourses.
- Overburden emplacement area designs that consider regional drainage characteristics and associated topography to maximise final landform stability and minimise erosion associated with runoff.
- Development of an integrated Water Management System for the Proposed Action to maximise water reuse, minimising water imports and discharges from the Proposed Action. All discharges from the Proposed Action will be managed in accordance with the HRSTS and as such are not likely to result in significant cumulative impact on the Hunter River.

A consolidated assessment of the impacts on water resources as a result of the Proposed Action will be undertaken against the *Significant Impact Guidelines: Coal Seam Gas and Large Coal Mining Developments* as outlined in **Table 3.8**. Further details on potential water resources impacts are provided in the sections following this table.

Table 3.8 – Proposed Assessment against Significant Impact Guidelines: Coal Seam Gas and Large Coal Mining Developments – Impacts on Water Resources

Aspect	Impact
Flow Regimes	The footprint of mining operations will increase with the Proposed Action and water from this increased area will be captured, treated and reused within the water management system. As described above the Proposed Action includes placement of a flood levee adjacent to the United Open Cut to provide protection from flooding associated with flood flows in Wollombi Brook and backflows into Redbank Creek. The assessment will consider changes to downstream flow regimes including flood flow velocities and depths, and associated potential impacts on downstream landholders and watercourse stability.

Recharge Rates; Aquifer pressure or pressure relationships between aquifers; Groundwater table levels	A detailed groundwater impact assessment will be completed for the Proposed Action. As described above the United Open Cut has been specifically designed such that it is located in excess of 370 metres from Wollombi Brook. The groundwater modelling and impact assessment will assess potential impacts of the Proposed Action on hard rock and alluvial aquifer systems and will assess impacts on groundwater levels, pressures, water quality, connectivity, groundwater users and groundwater dependent ecosystems.
Groundwater/surface water interactions	As discussed above, the assessment of the Proposed Action will consider changes to groundwater connectivity and associated impacts on baseflows in surface drainage systems. Groundwater seepage into the mining voids will be managed within the water management system and reused by the Proposed Action.
River/floodplain connectivity	Any potential impacts on to river/floodplain will be assessed for the Proposed Action.
Inter-aquifer connectivity	As discussed above, the detailed groundwater assessment for the Proposed Action will consider inter-aquifer connectivity.
Coastal Processes	No impacts on coastal process as predicted as a result of the Proposed Action.
Impact on water users	As discussed above, the detailed groundwater assessment for the Proposed Action will consider impacts on water users. All water take associated with the Proposed Action will be licensed in accordance with the *NSW Water Management Act 2000* (WM Act) and *NSW Water Act 1912*.
State Water Resource Plans	The surface water and alluvial water sources within the Project Area are managed under the *Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009*. In addition, water extraction from the Hunter River is managed under the *Water Sharing Plan for the Hunter Regulated River Water Source 2003*. Both the *Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009* and the *Water Sharing Plan for the Hunter Regulated River Water Source 2003* are State Water Resource Plans and are governed under the WM Act. The NSW Government Water Sharing Plans provide a regional water balance for these water sources and consider cumulative water use. The coal measure aquifers in the Project Area are not covered by a water sharing plan and as such are governed under the *Water Act 1912*. Water take for the Proposed Action will comply with the above listed water sharing plans and Acts which are designed to provide for the sustainable use of NSW's water resources.
Water Quality	Both United and Wambo have comprehensive water management systems in place to manage the potential impacts of the existing mining operations on water resources. The water management system for the Proposed Action will be designed in accordance with relevant government standards to limit potential impacts on downstream water qualities by managing water that has the potential to cause environmental harm. To manage water quality during construction, operation and rehabilitation phases of the Proposed Action, erosion and sediment control measures and other water quality control measures in accordance with the relevant government standards will be implemented to minimise any potential impact on water quality. Monitoring results will be assessed against the relevant ANZECC trigger values. The JV proposes to continue to discharge surplus water from the water

	management system in accordance with relevant approvals. The quality of such discharges will be in accordance with relevant Environment Protection Licences (EPL's) and consistent with the provisions of the Hunter River Salinity Trading Scheme (HRSTS). As part of the development of the HRSTS, the NSW Government has determined the sustainable salt load for the Hunter River, considering the impacts on the environment. The HRSTS is managed such that discharges from industrial operations can only occur in suitable conditions. Discharges from the Proposed Action will be monitored prior to release to ensure compliance with the requirements of the HRSTS; discharges are also therefore not considered likely to result in significant cumulative impacts. The assessment will also consider potential impacts on groundwater quality or surface water quality as a result of the Proposed Action.

Surface Water

The Proposed Action has the potential to impact on existing surface water resources through alterations to existing natural catchments mainly through the further development of open cut mining and overburden emplacement areas. The potential surface water impacts that will be considered for the Proposed Action include impacts on the following creek systems and their associated catchment areas:

- North Wambo Creek;
- Redbank Creek;
- Wollombi Brook;
- Waterfall Creek; and
- Hunter River.

A detailed surface water assessment is being prepared for the Proposed Action and will include the following:

- likely surface water impacts as a result of open cut mining including catchment changes and the potential implications of these impacts on mine water management, downstream watercourses, water users and water licensing;
- required surface water control measures, including diversion drains and mine water management controls;
- potential for changes to surface water quality and potential erosion and sediment control measures required;
- an assessment of the potential impacts on downstream water users, environments and watercourse stability;
- potential changes on the flooding regime due to the Proposed Action;
- assessment of post mining surface water impacts;
- cumulative surface water impacts due to the Proposed Action and other existing and approved developments;

- a review of the Proposed Action against the Independent Expert Scientific Committee (IESC) Information Guidelines and NSW State water policies and regulations; and

- identification and description of impact mitigation measures required for the Proposed Action.

The detailed findings from the surface water assessment are not yet available, however, in terms of potential impacts:

- all water take will be in accordance with NSW legislation and Water Sharing Plans which are designed to provide for sustainable water use;

- all discharges of minewater from the Proposed Action will be in accordance with Environment Protection Licence limits and the HRSTS in accordance with NSW Protection of the Environment Operations Act 1997, providing for protection of water quality in the downstream environment;

- there will be some additional capture of surface water due to increased footprint of Proposed Action during the life of the mine;

- there will be the gradual return of water captured by the existing water management systems for Wambo and United to the environment as rehabilitation of these existing mining areas is completed as part of the Proposed Action;

- the Proposed Action has been designed to minimise works within the floodplain of Wollombi Brook, minimising the potential for impacts on flood behaviour in Wollombi Brook; and

- the water management system for the Proposed Action is being designed in accordance with relevant standards to meet NSW government requirements and manage erosion, sedimentation, flows and water quality impacts.

Groundwater

The primary effects of mining on the groundwater systems are changes to aquifer permeability and the depressurisation of aquifer bodies. These changes can cause the following impacts:

- lowering (drawdown) of alluvial and coal measure groundwater levels, potentially reducing availability of groundwater to groundwater users and receptors;

- reduced recharge to the Hunter River and Wollombi Creek alluvium aquifers leading to reduced baseflow in the Hunter River and Wollombi Creek; and

- changes to water quality through changes in aquifer recharge and discharge regimes.

A detailed groundwater impact assessment is being carried out for the Proposed Action including the development of a numerical groundwater model in accordance with relevant Commonwealth and NSW guidelines, and the completion of a detailed peer review. The model will utilise a hydrogeological conceptualisation (geology, hydraulic properties, baseline water levels, groundwater stressors, 'baseline' mining progress and proposed mine progression) and a high level numerical groundwater model to assess the potential impacts of the Proposed Action.

The current conceptual understanding of the hydrogeological regime is that groundwater from coal measures contributes a small amount of recharge to the alluvial aquifers, and subsequently to the baseflow of surface water bodies in the area (primarily the Hunter River and Wollombi Brook). Changes to the groundwater water levels and quality therefore has the theoretical potential to impact the quantity and quality of water in the Hunter River and Wollombi Brook. The 2012 NSW Aquifer Interference Policy (AIP) lists minimal impact considerations for aquifer interference activities for water table, pressure and quality. The AIP stipulates a minimum distance of 200 metres from AIP classified highly productive alluvium water source and all of the Proposed Action mine plans are well outside this 200 metre limit for each of the nearby AIP classified highly productive water sources (approximately 370 metres from Wollombi Brook and approximately 1.7 kilometres from the Hunter River).

These changes to groundwater also have the potential to impact on any local GDEs with the potential for impacts to be assessed as part of the groundwater assessment.

The Hunter River and Wollombi Brook alluvial aquifers are a known groundwater source used primarily for agricultural purposes. Eight bores on private land are located within 10 kilometres of the Referral Area. The closest non-alluvial (GW060780) and alluvial (GW078577) bores on private land are located approximately 5 kilometres to the north-east and 6.5 kilometres to the south, respectively, of the final open cut mining limit. Impacts on groundwater therefore have the potential to reduce the availability and use of water for stock watering and irrigation and will be investigated through the groundwater model to be developed for the Proposed Action.

There is extensive historical, current and approved open cut and underground mining within and surrounding the Referral Area. As such the potential for the Proposed Action to result in significant incremental impact on groundwater is reduced due to the existing and approved impacts and aquifer depressurisation surrounding the Proposed Action. The current open cut and underground mining at Wambo has both NSW and Commonwealth approval, with the Proposed Action involving only a minor addition to the Wambo Open Cut footprint and the mining of two additional deeper seams (the Woodlands Hill and Warkworth Seams) when compared with what is currently approved. The United Open Cut is a new development and will extend to the Vaux Seam. The area proposed for the United open cut pit contains first and secondary underground workings and a longwall panel associated with United Collieries. This, together with the adjacent HVO South open cut mine to the north and the Wambo underground mine to the south, has also contributed to depressurisation of the hard rock coal measures in the area, reducing the potential for significant change to the existing groundwater regime as a result of the Proposed Action.

Summary of the Nature and Extent of Impact on Water Resources

As discussed above, the detailed surface water and groundwater assessment processes for the Proposed Action are in the early stages and the detailed assessment findings are not yet available. The potential for the Proposed Action to result in a significant impact on water resources is reduced by:

- the extent of existing and approved open cut and underground mining within and surrounding the Referral Area, with this mining having already altered the surface water environment and resulting in depressurisation of the coal seam aquifers;

- the management of impacts from the Proposed Action within the regime established by NSW water and pollution control legislation, which provides for sustainable water take from water sources, management of water quality by imposition of discharge quality criteria and management of salt loads within sustainable targets by managing water discharges to the environment;

- by maintaining substantial buffer distances to Wollombi Brook (approximately 370 metres) and the Hunter River (approximately 1.7 kilometres) when compared to the recommended 200 metre offset in the NSW Aquifer Interference Policy;

- design of the water management system to meet legislative requirements and relevant guidelines (e.g. guidelines for treatment of runoff from disturbed areas);

- minimisation of works within the floodplain of Wollombi Brook to minimise the potential to impact on flood behaviour; and

- maximised water recycling and sharing across the United and Wambo mine complex to minimise import of water to the complex and to minimise discharges of excess water from the complex.

These factors reduce the potential for the Proposed Action to result in a significant impact on existing water resources, however, until the detailed water assessment findings are available, the impact on water resources cannot be predicted. On this basis and in accordance with the precautionary principal, as it cannot be ruled out at this stage of the assessment that the Proposed Action could result in a significant impact on water resources; on a precautionary basis, it is concluded that the Proposed Action may have the potential to result in a significant impact on water resources as defined under the *Significant Impact Guidelines 1.3: Coal seam gas and large coal mining developments - impacts on water resources* (DoE 2013).

3.2 Nuclear actions, actions taken by the Commonwealth (or Commonwealth agency), actions taken in a Commonwealth marine area, actions taken on Commonwealth land, or actions taken in the Great Barrier Reef Marine Park

You must describe the nature and extent of likely impacts (both direct & indirect) on the whole environment if your project:
- is a nuclear action;
- will be taken by the Commonwealth or a Commonwealth agency;
- will be taken in a Commonwealth marine area;
- will be taken on Commonwealth land; or
- will be taken in the Great Barrier Reef marine Park.

Your assessment of impacts should refer to the *Significant Impact Guidelines 1.2 - Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies* and specifically address impacts on:
- ecosystems and their constituent parts, including people and communities;
- natural and physical resources;
- the qualities and characteristics of locations, places and areas;
- the heritage values of places; and
- the social, economic and cultural aspects of the above things.

3.2 (a)	**Is the proposed action a nuclear action?**	X	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment

3.2 (b)	**Is the proposed action to be taken by the Commonwealth or a Commonwealth agency?**	X	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment

3.2 (c)	**Is the proposed action to be taken in a Commonwealth marine area?**	X	No
			Yes (provide details below)
	If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(f))		

3.2 (d)	**Is the proposed action to be taken on Commonwealth land?**	X	No
			Yes (provide details below)
	If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(g))		

3.2 (e)	**Is the proposed action to be taken in the Great Barrier Reef Marine Park?**	X	No
			Yes (provide details below)
	If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(h))		

3.3 Other important features of the environment

Provide a description of the project area and the affected area, including information about the following features (where relevant to the project area and/or affected area, and to the extent not otherwise addressed above). If at Section 2.3 you identified any alternative locations, time frames or activities for your proposed action, you must complete each of the details below (where relevant) for each alternative identified.

3.3 (a) Flora and fauna

Flora

Plot-based floristic surveys and targeted threatened flora species searches have been undertaken across the Conceptual Additional Disturbance Area. A total of 300 plant species have been recorded in the Conceptual Additional Disturbance Area during surveys undertaken for the Proposed Action, 67 (22 per cent) of these are identified as being non-native species. Plants were recorded from two of the four major vascular plant classes: ferns and flowering plants, and included trees, shrubs, forbs, grasses, sedges, rushes, reeds, ferns, epiphytes, mistletoes, vines and twiners. The most speciose families recorded in the Conceptual Additional Disturbance Area include Poaceae (grasses), Asteraceae (daisies), Fabaceae (peas and wattles) and Chenopodiaceae (saltbushes), respectively. This species list includes all species recorded by Umwelt during surveys for the Proposed Action undertaken between 2009 and 2015. Please note that this does not include species recorded in the Conceptual Additional Disturbance Area from work undertaken pre 2009 or records from the OEH Atlas of NSW Wildlife.

No threatened flora species listed under the EPBC Act have been recorded in the Conceptual Additional Disturbance Area despite targeted searches being undertaken.

Fauna

Systematic and targeted fauna surveys have been undertaken across the Conceptual Additional Disturbance Area since autumn 2009, building on earlier survey work undertaken for mining and other projects.

A total of 200 vertebrate fauna species have been identified in the Conceptual Additional Disturbance Area to date from Proposed Action specific survey work. This comprises 121 bird species, 21 reptile species, 17 amphibian species and 41 mammal species. Of these recorded species, 7 (3.5 per cent) were introduced species (mammals and birds). This listed was compiled from data collected during field surveys undertaken by Umwelt for the Proposed Action between 2009 and 2015. It does not include any records from the Atlas of NSW Wildlife (OEH 2015), Birds Australia Database or

Australian Museum Database or other previous work undertaken in the Conceptual Additional Disturbance Area.

As discussed in **Section 3.1**, four threatened fauna species listed under the EPBC Act were recorded in the Conceptual Additional Disturbance Area during field surveys, or by the Atlas of NSW Wildlife (OEH 2015), comprising the large-eared pied bat; grey-headed flying-fox; koala; and spotted-tailed quoll. In addition to these, five migratory species listed under the EPBC Act have been recorded by Umwelt in the Conceptual Additional Disturbance Area, white-throated needletail (*Hirundapus caudacutus*), eastern osprey (*Pandion cristatus*) Latham's snipe (*Gallinago hardwickii*), rufous fantail (*Rhipidura rufifrons*) and the rainbow bee-eater (*Merops ornatus*). In addition to this, 21 other fauna species listed as threatened under the NSW TSC Act, comprising birds and mammals, have been recorded in the Conceptual Additional Disturbance Area.

3.3 (b) Hydrology, including water flows

A discussion of hydrology is provided in **Section 3.1(i)**.

3.3 (c) Soil and Vegetation characteristics

Soil Characteristics

The soils types occurring within the Conceptual Additional Disturbance Area are mapped on the Singleton 1:250,000 Soil Landscapes Map Sheet and described in Kovac and Lowrie (1991). Six soil landscapes occur within the Conceptual Additional Disturbance Area. The Jerrys Plains soil landscape unit is the dominant soil type, followed by the Bulga soil landscape unit and the Benjang soil landscape unit. The Warkworth soil landscape unit, the Wollombi soil landscape unit and the Hunter soil landscape unit are present in small patches. The majority of the Conceptual Additional Disturbance Area is covered by soils that have a very high susceptibility to erosion and poor fertility.

Vegetation Characteristics

Eleven native vegetation zones have been mapped across the Conceptual Additional Disturbance Area, including one derived native grassland zone. Each of these is listed in **Table 3.5**, along with the legal status of each community, and their approximate extent within the Conceptual Additional Disturbance Area. The vegetation zones present in the Conceptual Additional Disturbance Area are shown in **Figure 3.3**.

Table 3.5 – Vegetation Zones within Additional Disturbance Area

Vegetation Zone	Legal Status	Area Within the Conceptual Additional Disturbance Area (ha)[8]
1 – HU652 - Weeping Myall - Coobah - Scrub Wilga Shrubland of the Hunter Valley	EEC[5] (TSC Act) and Endangered Population[6] (TSC Act)	0.10
2 – HU812 – Moderate to Good Condition – Forest Red Gum Grassy Open Forest on Floodplains of the Lower Hunter	EEC[1] (TSC Act)	0.29

Vegetation Zone	Legal Status	Area Within the Conceptual Additional Disturbance Area (ha)[8]
3 – HU816 – Moderate to Good Condition – Plantation – Spotted Gum - Narrow-leaved Ironbark shrub - Grass Open Forest of the Central and Lower Hunter	EEC[2] (TSC Act) 1.17 ha CEEC[7] (EPBC Act)	28.25
4 – HU869 – Moderate to Good Condition – Grey Box - Slaty Box Shrub - Grass Woodland on Sandstone Slopes of the Upper Hunter and Sydney Basin	VEC[3] (TSC Act) 1.13 ha CEEC[7] (EPBC Act)	1.56
5 – HU905 – Moderate to Good Condition - Narrow-leaved Ironbark - Grey Box Grassy Woodland of the Central and Upper Hunter	EEC[4] (TSC Act) 164 ha CEEC[7] (EPBC Act)	169.51
6 – HU905 – Moderate to Good Condition – Narrow-leaved Ironbark - Grey Box Grassy Woodland of the Central and Upper Hunter – Thinned Canopy	EEC[4] (TSC Act) 0.08 ha CEEC[7] (EPBC Act)	0.08
7 – HU905 – Moderate to Good Condition – Narrow-leaved Ironbark - Grey Box Grassy Woodland of the Central and Upper Hunter - Regeneration	EEC[4] (TSC Act) 22.76 ha CEEC[7] (EPBC Act)	26.52
8 – HU905 – Moderate to Good Condition – Narrow-leaved Ironbark - Grey Box Grassy Woodland of the Central and Upper Hunter - Cooba Open Shrubland		80.89
9 – HU905 – Low Condition – Narrow-leaved Ironbark - Grey Box grassy woodland of the central and upper Hunter - Derived Native Grassland	18.76 ha CEEC[7] (EPBC Act)	101.05
10 – HU906 – Moderate to Good – Bull Oak Grassy Woodland of the Central Hunter Valley	3.1 ha EEC[4] (TSC Act) 4.10 ha CEEC[7] (EPBC Act)	121.60
11 – HU945 – Moderate to Good – Swamp Oak - Weeping Grass Grassy Riparian Forest of the Hunter Valley		31.61
Native Vegetation Sub Total		**562.65 ha**
12 – Cleared Land (including disturbed land, mixed species revegetation plantation and water bodies)		148.00
Cleared Land Sub Total		**148.00 ha**
Total		**710.65 ha**

EEC = endangered ecological community

VEC = vulnerable ecological community

TSC Act = NSW *Threatened Species Conservation Act 1995*

EPBC Act = Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

1 = Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregions EEC

2 = Central Hunter Ironbark - Spotted Gum - Grey Box Forest in the New South Wales North Coast and Sydney Basin Bioregions EEC

3 = Hunter Valley Footslopes Slaty Gum Woodland in the Sydney Basin Bioregion VEC
4 = Central Hunter Grey Box - Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions EEC
5 = Hunter Valley Weeping Myall Woodland of the Sydney Basin Bioregion EEC
6 = *Acacia pendula* population in the Hunter catchment
7 = Central Hunter Valley Eucalypt Woodland and Forest CEEC
8 = A rounding protocol has been applied. All numbers less than 1.0 have two decimal places, all numbers from 1.0 to less than 10.0 have one decimal place, all numbers from 10.0 and above have zero decimal places. Subtotals and Totals are calculated from the un-rounded numbers, and the total is then rounded.

As identified in **Table 3.5**, one CEEC listed under the Commonwealth EPBC Act is known to occur within the Conceptual Additional Disturbance Area, the Central Hunter Valley Eucalypt Forest and Woodland CEEC.

As also identified in **Table 3.5**, five EECs listed under the NSW TSC Act are known to occur within the Conceptual Additional Disturbance Area. These are:

- Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregions (EEC under the TSC Act);
- Central Hunter Ironbark - Spotted Gum - Grey Box Forest in the New South Wales North Coast and Sydney Basin Bioregions (EEC under the TSC Act);
- Hunter Valley Footslopes Slaty Gum Woodland in the Sydney Basin Bioregion (VEC under the TSC Act);
- Central Hunter Grey Box - Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions (EEC under the TSC Act); and
- Hunter Valley Weeping Myall Woodland of the Sydney Basin Bioregion EEC.

Widespread past clearing has resulted in most woodland areas in the Conceptual Additional Disturbance Area being less than approximately 55 years in age, with most areas dominated by regenerating and middle-aged trees of less than 32 years of age.

As shown in **Figure 3.3**, of the vegetation areas listed in **Table 3.5** include vegetation in two approved and active mining areas, including areas approved for disturbance at United (around the existing United underground mining infrastructure) and rehabilitation associated with United and Wambo mines (refer to **Figure 3.3**). These areas may be subject to disturbance under existing approvals before the Proposed Action is approved. For the purposes of this referral, the vegetation within these areas has been included in the area of vegetation that will be impacted by the Proposed Action as detailed in **Table 3.5**.

3.3 (d) Outstanding natural features

Remnant vegetation in the Referral Area currently provides a poor landscape connection between reserved land at Wollemi National Park to the west and remnant woodland areas south-east. The current westward connection is progressively being further intersected due to the progression of the approved Wambo open cut mine. The Proposed Action will also impact on the landscape connection to the south-east, with remnant woodland areas to the north of the Referral Area becoming almost surrounded by disturbed land during the operational phase of the mine with connectively to be re-established as part of the rehabilitation of the mine. The medium term impact on landscape connectivity is likely to be of local significance due to the general lack of connectivity and remnant vegetation on the Hunter valley floor.

No other outstanding natural features not discussed elsewhere in this referral occur in the Referral Area or adjoining areas.

3.3 (e) Remnant native vegetation

The remnant native vegetation present in the Referral Area provides a poor landscape connection for species between other remnant native vegetation areas to the west (that further to the west link to Wollemi National Park) and to the south-east link to narrow strips of riparian vegetation along the Wollombi Brook and to other remnant woodland areas to the south around Warkworth and Bulga.

Remnant riparian habitat within the Conceptual Additional Disturbance Area is limited to along Redbank Creek. The swamp oak (*Casuarina glauca*) dominated creek line (refer to **Figure 3.3**) forms patches of riparian habitat along the creek, which provides a local corridor or potential stepping stones of riparian habitat, as the surrounding vegetation is dominated by derived native grassland and areas of remnant woodland. This vegetation is generally less than approximately 55 years in age and most woodland areas are dominated by regenerating and middle-aged trees of less than 32 years of age.

Further detailed discussion of the native vegetation within the Referral Area is provided in **Section 3.3 (c)**.

3.3 (f) Gradient (or depth range if action is to be taken in a marine area)

The Referral Area is characterised by an undulating and hilly landscape with lower topographic areas associated with drainage lines. Approximately 0.5 kilometres to the west of the Referral Area lie the foothills of the Wollemi National Park, which form the dominant landscape feature of the land surrounding the Referral Area.

A notable local topographical feature is a ridgeline to the north of the Referral Area which extends to a height of approximately 200 mAHD. This ridgeline provides a topographic barrier between the area proposed for the open cut mining areas and the private land to the northwest, including Jerrys Plains. The remaining surrounding topography is characterised by gently sloping alluvial plains and undulating hills. The topography of much of the Referral Area has been previously affected by open cut mining. The topography and drainage of the Referral Area and surrounds is provided in **Figure 1.5**.

The Proposed Action is not to be undertaken in a marine area.

3.3 (g) Current state of the environment

Include information about the extent of erosion, whether the area is infested with weeds or feral animals and whether the area is covered by native vegetation or crops.

A large proportion of the Referral Area has been impacted by a combination of past mining operations, associated mining infrastructure, existing rehabilitation, infrastructure corridors and past agricultural clearing. Substantial areas of regenerating remnant vegetation are also present within the Referral Area. As described in **Section 3.3(a)**, the Referral Area contains large areas of cleared and disturbed land, and nine vegetation communities providing woodland, riparian, shrubland, grassland habitat and rehabilitated communities. Farm dams and ephemeral watercourses, which are typically dry, provide drinking water for fauna species.

Prior to the establishment of mining operations, the primary land use in the Referral Area was a long history of agricultural land uses. Grazing is still wide spread throughout the surrounding area, and irrigated agriculture is also currently being undertaken along the alluvial floodplains of the Hunter River to the north of the Golden Highway, approximately 2 kilometres north of the Referral Area.

Due to widespread clearing within the local area, the vegetation within the Referral Area is fragmented from other stands of vegetation within the landscape. Wollemi National Park is the closest conservation reserve, approximately 0.5 kilometres west of the Referral Area at its nearest point and approximately 3 kilometres from the New Open Cut Mining Area. Widespread past clearing has also resulted in most woodland areas being less than approximately 55 years in age and most woodland areas are dominated by regenerating and middle-aged trees of less than 32 years of age.

Of the 300 plant species recorded in the Referral Area, at least 67 are not native to the local area. Of these, introduced species known to occur in the Referral Area include galenia (*Galenia pubescens*), sharp rush (*Juncus acutus* subsp*. acutus*), Rhodes grass (*Chloris gayana*) and fireweed (*Senecio madagascariensis*). This includes the declared Class 4 noxious weed species Bathurst burr (*Xanthium spinosum*) and prickly pear (*Opuntia* spp.).

Of the 200 fauna species recorded in the Referral Area, seven were non-native species. Of these, the species known to occur in the Referral Area were the house mouse (*Mus musculus*), black rat (*Rattus rattus*), hare (*Lepus capensis*), rabbit (*Oryctolagus cuniculus*), dog (*Canis lupus*), fox (*Vulpes vulpes*), cat (*Felis cattus*) and pig (*Sus scrofa*).

3.3 (h) Commonwealth Heritage Places or other places recognised as having heritage values

In order to identify if any places with heritage values are located within the Referral Area, desktop searches were conducted of the Australian Heritage Database (including Commonwealth and National Heritage lists and the Register of the National Estate), NSW State Heritage Register and State Heritage Inventory, and local planning instruments. No Commonwealth Heritage Places or other items subject to any form of statutory heritage listing were identified by these searches within the Referral Area.

A historical heritage assessment is being undertaken as part of the Proposed Action in accordance with relevant guidelines. Should the assessment identify any heritage items of significance they will be recorded and reported as part of the NSW assessment and approval process for the Proposed Action.

3.3 (i) Indigenous heritage values

The Proposed Action will result in disturbance of some previously undisturbed areas, including areas known to contain Aboriginal sites due to archaeological survey work undertaken at the site. United Collieries has commenced a detailed consultation, engagement and survey process with the Registered Aboriginal Parties and Knowledge Holders for the Proposed Action to identify the cultural significance of the proposed Referral Area. This process is being undertaken in accordance with *National Parks and Wildlife Act 1974 (NSW)* and the following guidelines to facilitate the development of an Aboriginal Cultural Heritage Assessment Report (ACHAR):

- *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation*;
- *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010);
- *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW 2010a);
- *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010b); and

- *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011).

The preparation of the Aboriginal Cultural Heritage Assessment (ACHA) being facilitated by an anthropologist will also include an Aboriginal archaeological values assessment for inclusion in the EIS.

The Proposed Action has the potential to impact both known Aboriginal sites and unidentified Aboriginal sites and areas of cultural heritage value. Potential impacts will be identified and addressed as part of the Aboriginal archaeological and cultural heritage assessments, in consultation with the Registered Aboriginal Parties.

As part of the archaeological and cultural heritage assessment, a comprehensive field survey has been completed by archaeologists, including field assistance by Aboriginal stakeholders to provide data to augment the extensive data held for the area from previous surveys.

The ACHAR will be compiled with detailed input from each Knowledge Holder group and in consultation with the Registered Aboriginal Parties. The assessment will outline areas and places of cultural significance in addition to any potential impacts associated with the Proposed Action. The archaeological assessment report will be integrated with the cultural heritage assessment report, both of which will outline mitigation and management measures proposed to be implemented on site, in addition to a consideration of cultural heritage conservation outcomes.

There are no known Aboriginal sites/places of Commonwealth heritage significance known within the Referral Area.

3.3 (j) Other important or unique values of the environment

Describe any other key features of the environment affected by, or in proximity to the proposed action (for example, any national parks, conservation reserves, wetlands of national significance etc).

The Referral Area is located on the periphery of the heavily cleared landscape of the Hunter Valley. The majority of the native vegetation of the Hunter Valley floor has been historically cleared for agricultural purposes and more recently for mining activities. The Referral Area is located in proximity to other coal mining operations, such as Wambo Underground Mine, Hunter Valley Operations (open cut) and Mt Thorley Warkworth (open cut). There are few dedicated conservation reserves present on the Hunter Valley floor and consequently the native vegetation of the region is poorly represented in conservation reserves.

Wollemi National Park occurs approximately 0.5 kilometres to the west of the Referral Area at its closest point. Wollemi National Park forms part of the Greater Blue Mountains Area NSW World Heritage Area (identified on the Protected Matters Search Tool Database – refer to **Section 3.1 (a)**).

There are no other important or unique values of the environment within or adjoining the Referral Area that are not discussed elsewhere in this referral.

3.3 (k) Tenure of the action area (eg freehold, leasehold)

Land ownership in the Referral Area and surrounds is shown on **Figure 3.5**. The land immediately surrounding and including the Referral Area is dominated by mining operations which are major landholders within the area. United Collieries' land interests in the area are held by the CFMEU on behalf of United Collieries. United Collieries and Wambo Coal own the majority of freehold land within the Referral Area other than road reserves, some small parcels of land owned by Coal and Allied, and two small parcels of land at the intersection of the Golden Highway and Comleroi Road. A TSR is also located within the Referral Area.

3.3 (l) Existing land / marine uses of area

The land use within and surrounding the Referral Area is shown on **Figure 1.4**. The existing land use of the Referral Area is for underground and open cut coal mining activity. A section of the Golden Highway also exists within the Referral Area along with other services (e.g. electricity transmission lines).

The Referral Area is surrounded predominantly by the existing mining activities of Wambo's underground operations, Coal and Allied's Hunter Valley Operations including Carrington, North Pit, Cheshunt, Riverview and South Lemington Pits and their associated buffer lands. A number of mines are located further south including Mt Thorley Warkworth and Bulga Coal.

Prior to the establishment of mining operations, the primary land use in the Referral Area was a long history of agricultural land uses, such as grazing. Grazing and dairy operations are still wide spread throughout the surrounding area, occurring at a number of properties along the Golden Highway and the outskirts of Jerrys Plains (refer to **Figure 3.5**). Irrigated agriculture is currently being undertaken along the alluvial floodplains of the Hunter River to the north of the Golden Highway. A small number of olive groves and vineyards are also located south of Jerrys Plains.

Warkworth Village is located approximately 800 metres from the south-eastern corner of the Referral Area (refer to **Figure 3.5**), with a number of rural residences located to the south-east and north-west of the Referral Area. The village of Jerrys Plains is located approximately 5 kilometres to the north-west of the Referral Area and the community of Maison Dieu is located approximately 4.5 kilometres to the north-east of the Referral Area.

3.3 (m) Any proposed land / marine uses of area

The proposed land use of the area is for the proposed open cut mining operations, as described in **Section 2** of this Referral. The Proposed Action includes the rehabilitation of the Conceptual Additional Disturbance Area including establishment of areas of native vegetation. The proposed final land use for the site will be determined as part of the detailed assessment process for the Proposed Action and in consultation with relevant stakeholders, however it is expected that it will include an extensive area of revegetated native woodland for habitat purposes, in addition to areas of re-established pasture for ongoing grazing.

4 Environmental outcomes

Provide descriptions of the proposed environmental outcomes that will be achieved for matters of national environmental significance as a result of the proposed action. Include details of the baseline data upon which the outcomes are based, and the confidence about the likely achievement of the proposed outcomes. Where outcomes cannot be identified or committed to, provide explanatory details including any commitments to identify outcomes through an assessment process.

If a proposed action is determined to be a controlled action, the Department may request further details to enable application of the draft *Outcomes-based Conditions Policy 2015* and *Outcomes-based Conditions Guidance 2015* (http://www.environment.gov.au/epbc/consultation/policy-guidance-outcomes-based-conditions), including about environmental outcomes to be achieved, details of baseline data, milestones, performance criteria, and monitoring and adaptive management to ensure the achievement of outcomes. If this information is available at the time of referral it should be included.

General commitments to achieving environmental outcomes, particularly relating to beneficial impacts of the proposed action, CANNOT be taken into account in making the initial decision about whether the proposal is likely to have a significant impact on a matter protected under the EPBC Act. (But those commitments may be relevant at the later assessment and approval stages, including the appropriate level of assessment, and conditions of approval, if your proposal proceeds to these stages).

5 Measures to avoid or reduce impacts

Note: If you have identified alternatives in relation to location, time frames or activities for the proposed action at Section 2.3 you will need to complete this section in relation to each of the alternatives identified.

Provide a description of measures that will be implemented to avoid, reduce, manage or offset any relevant impacts of the action. Include, if appropriate, any relevant reports or technical advice relating to the feasibility and effectiveness of the proposed measures.

For any measures intended to avoid or mitigate significant impacts on matters protected under the EPBC Act, specify:

- what the measure is,
- how the measure is expected to be effective, and
- the time frame or workplan for the measure.

Examples of relevant measures to avoid or reduce impacts may include the timing of works, avoidance of important habitat, specific design measures, or adoption of specific work practices.

Provide information about the level of commitment by the person proposing to take the action to achieve the proposed environmental outcomes and implement the proposed mitigation measures. For example, if the measures are preliminary suggestions only that have not been fully researched, or are dependent on a third party's agreement (e.g. council or landowner), you should state that, that is the case.

Note, the Australian Government Environment Minister may decide that a proposed action is not likely to have significant impacts on a protected matter, as long as the action is taken in a particular manner (section 77A of the EPBC Act). The particular manner of taking the action may avoid or reduce certain impacts, in such a way that those impacts will not be 'significant'. More detail is provided on the Department's web site.

For the Minister to make such a decision (under section 77A), the proposed measures to avoid or reduce impacts must:

- clearly form part of the referred action (eg be identified in the referral and fall within the responsibility of the person proposing to take the action),
- be must be clear, unambiguous, and provide certainty in relation to reducing or avoiding impacts on the matters protected, and
- must be realistic and practical in terms of reporting, auditing and enforcement.

More general commitments (eg preparation of management plans or monitoring) and measures aimed at providing environmental offsets, compensation or off-site benefits CANNOT be taken into account in making the initial decision about whether the proposal is likely to have a significant impact on a matter protected under the EPBC Act. (But those commitments may be relevant at the later assessment and approval stages, including the appropriate level of assessment, if your proposal proceeds to these stages).

Changes to Avoid and Minimise Impacts

A number of design changes were implemented during the early stages of designing the Proposed Action that ameliorated the impacts of the Proposed Action on significant ecological features, such as threatened species, endangered populations, ecological communities, and/or their habitats. As discussed in **Section 2.2**, United has undertaken detailed studies which considered numerous alternative mine and infrastructure plans. A key alternative considered was to develop the United Open Cut as a standalone mining operation which would have resulted in more disturbance to native vegetation and drainage systems than the Proposed Action due to the need to develop stand alone coal processing facilities, mine infrastructure (workshops etc.) and transportation infrastructure (rail line, rail loop and train loading facility). These design decisions reduced the overall impact of the Proposed Action on matters of national environmental significance (MNES).

Biodiversity Mitigation Measures

As discussed above, the primary approach to impact mitigation is to initially avoid ecological impacts. Where an impact is unavoidable, attempts will be made to minimise impacts, and then provision will be made to mitigate those unavoidable impacts. In doing so, the impact mitigation strategy will seek to achieve the overall goal to maintain or improve the biodiversity values of the surrounding region in the medium to long term.

Two types of biodiversity impact mitigation strategy will be developed: a Biodiversity Management Plan to provide for the appropriate management of biodiversity within the Referral Area; and a Biodiversity Offset Strategy to offset the impact of the Proposed Action on the recognised significant ecological features within the Conceptual Additional Disturbance Area.

The Biodiversity Management Plan will include strategies for the rehabilitation and revegetation of the post-mining landscape, as well as general management strategies for fencing/access control, weed control, feral animal control and bushfire management. This strategy will also include a detailed tree felling procedure to minimise impacts on hollow-dependent fauna species over the life of the Proposed Action. Further details of these strategies are provided below.

Actions to Maintain Biodiversity Value

The following specific control measures are considered to be integral to the protection and preservation of the ecological features of the Referral Area:

- appropriate management of biodiversity values in the portions of the Referral Area that are not proposed to be disturbed by the Proposed Action to provide for the maintenance (and where appropriate, enhancement) of the biodiversity values of these areas;
- implementation of clearing procedures to minimise the impacts of the clearing process and maximise the recovery of any valuable biodiversity resources (e.g. seed collection, reuse of hollow logs and hollows where appropriate);
- rehabilitation of disturbed and mined land as soon as practical, including re-establishment of areas of native vegetation communities with a focus on the vegetation communities impacted by the Proposed Action;
- ensuring appropriate environmental management measures are in place as part of the mining operations to minimise the potential for indirect impacts including:
    - water management systems seeks to minimise the potential for damage to flora and fauna and their habitats from erosion and unnatural flooding events;

- noise control systems to minimise noise impacts;
- dust control measures to minimise air quality impacts;
- lighting controls to minimise night light impacts; and
- blasting controls to minimise blast overpressure and vibration impacts; and

- the implementation of an appropriately designed biodiversity monitoring program.

Each of these control measures will contribute to the maintenance of habitat quality across the Referral Area.

In addition to the above, weed management currently occurs across the Referral Area in accordance with the United Weed Management Plan and Wambo Flora and Fauna Management Plan with these aspects to be incorporated into the Biodiversity Management Plan to be developed as part of the implementation of the Proposed Action. Feral animal management also occurs across the Referral Area on an as needs basis and is undertaken in accordance with all relevant government approvals.

A Rehabilitation Management Plan, or similar, will be developed as part of the implementation of the Proposed Action, in consultation with relevant authorities, which will direct the rehabilitation of the Referral Area.

Actions to Improve Ecological Value

A number of specific actions will be undertaken as part of the implementation of the Proposed Action to actively improve habitat features and quality of the areas of retained vegetation within the Referral Area. These will act in addition to the above maintenance actions and may include:

- revegetation and regeneration actions to increase the extent of native vegetation communities (including threatened ecological communities) outside the proposed disturbance area;
- removal or control of existing impacts such as weeds from areas of retained vegetation to allow native vegetation to regenerate naturally;
- habitat enhancement of retained vegetation such as provision of nest boxes, salvaged hollows, fallen timber, hollow logs and boulders, as deemed necessary; and
- other ecological management works as deemed necessary arising from the recommendations of biodiversity monitoring.

General Ecological Management Strategies

A range of management strategies will be implemented throughout the life of the Proposed Action to limit impacts on native flora and fauna in the Referral Area. These strategies will include:

- feral animal and noxious weed control;
- rehabilitation of disturbed areas with species characteristic of extant vegetation communities;

- use of local native species in revegetation where possible, and the linkage and integration of rehabilitation areas with existing vegetated areas to improve ecological function and provide appropriate fauna habitat;

- ongoing monitoring and maintenance of all revegetation works and habitat enhancement activities; and

- adaptive management, as required, if a previously unrecorded or assessed threatened species or Endangered Population is identified in the Referral Area during operations.

Fencing

Fencing may be used to demarcate vegetation where required. Any new fencing used within the Referral Area adjacent to native vegetation areas will use non-barbed (plain) wire, as these areas are to be managed specifically for biodiversity purposes. The exclusion of barbed wire from such fencing will minimise potential injury to or death of fauna species, particularly macropods and gliding or flying mammals, such as the grey-headed flying-fox (*Pteropus poliocephalus*) and threatened micro-bats. The use of as few wire strands as practical will be considered to reduce potential for fauna entanglement, particularly macropods.

Weed Control

Weed species could be inadvertently brought into the Referral Area with imported materials, or could invade naturally through removal of native vegetation. The presence of weed species has the potential to be an impediment to revegetation and regeneration activities. In addition to this, the presence of weed species has the potential to decrease the value of vegetation for native species, particularly threatened species.

Existing weed management controls at United and Wambo will be incorporated into the Biodiversity Management Plan. Weed control will be undertaken in accordance with current mine practices and, for noxious weed species, with NSW control guidelines.

Biannual weed inspections will be undertaken across the Referral Area by the environmental officer and appropriate weed control methods will be implemented.

Feral Animal Control

Introduced fauna species such as foxes, rabbits, pigs, dogs and feral cats could increase within the Referral Area due to the alteration in existing land uses. Clearing, thinning of vegetation and the creation of tracks through existing dense vegetation could assist the penetration of introduced fauna species such as pigs, cats and foxes, and allow them to establish in new areas. An increase in feral species within the Referral Area has the potential to increase impacts on existing native species, particularly via predation and habitat destruction.

Regular monitoring of revegetation areas, regeneration areas and retained areas will be undertaken to assess the level of impact by feral animals, particularly on vegetation establishment. Feral animal control works will be undertaken periodically to ensure the suppression of feral animals, and this will be undertaken in a manner that is sympathetic to ecological outcomes.

Bushfire Management

The vegetation that will be retained within the Referral Area will require appropriate bushfire management to protect life and property, while providing necessary protection to the significant ecological features identified in the Referral Area. Appropriate bushfire management controls will be considered in the development of the Biodiversity Management Plan and where appropriate will include the application of fire research knowledge to generate ecological outcomes through the appropriate use of fire as an ecological management tool.

Bushfire management will consider:

- exclusion of planned bushfire from revegetation and regeneration areas to allow replanted and regenerating communities to mature to a stage where they are able to withstand bushfire and regenerate naturally following such an event (nominally at least 15 years, but dependent on the success of plant establishment and the vegetation community present);
- consideration of the sensitivities of threatened species and TECs to bushfire and appropriate bushfire planning and management in relation to known occurrences of these;
- the use of ecologically appropriate fire regimes (be they related to burn frequency, duration or intensity), as these have the potential to impact negatively on significant ecological features;
- asset protection; and
- appropriate incorporation of all relevant ecological requirements into bushfire management plans.

Fauna Habitat Re-instatement

Following the completion of revegetation works in rehabilitation areas, the Proposed Action will re-establish ground fauna habitat through the relocation of cleared vegetation and rocks to targeted rehabilitation areas. This will contribute to the more rapid development of fauna species diversity in the medium to long term as vegetation re-establishment progresses.

Dams will be constructed in the post-mining landform to facilitate the re-colonisation of woodland fauna communities. Dams provide a source of permanent water in the landscape and associated fauna species such as frogs and invertebrates will constitute suitable prey for many additional fauna species such as reptiles. Increasing the habitat complexity and range of micro-habitats occurring in the post-mining landscape will result in the increased utilisation of the rehabilitation by a much wider range of fauna species in the post-mining land form.

Biodiversity Offsetting

A Biodiversity Offset Strategy will be required to offset the loss of significant biodiversity values as a result of the Proposed Action. The Biodiversity Offset Strategy will be developed in accordance with the Upper Hunter Strategic Assessment (UHSA) methodology. The development of the Biodiversity Offset Strategy will incorporate the following offset principles of the EPBC Act Environmental Offset Policy:

- Deliver an overall conservation outcome that improves or maintains the viability of the biodiversity related MNES (the protected matter) impacted by the Proposed Action;

- Be built around direct offsets (i.e. land based offsets) but may include other compensatory measures;
- Be in proportion to the level of statutory protection that applies to the protected matter;
- Be of a size and scale proportionate to the residual impacts on the protected matter;
- Effectively account for and manage the risks of the offset not succeeding;
- Be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs;
- Be efficient, effective, timely, transparent, scientifically robust and reasonable; and
- Have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced

The offset package will be determined through detailed ecological values assessment to be undertaken as part of the ecological assessment being completed for the Proposed Action. This will include detailed ecological surveys of potential offset areas to determine suitability of these areas to form an effective offset of the potential impacts of the Proposed Action.

The development of the Biodiversity Offset Strategy will be undertaken in consultation with relevant government agencies.

The use of biodiversity offsetting has not been taken in account when assessing whether the Proposed Action is likely to have a significant impact on MNES under the EPBC Act.

Water Resources Mitigation Measures

The Water Management System (WMS) for the Proposed Action will be designed to achieve the following objectives:

- diversion of clean water around mining operations to minimise capture of upslope runoff and separate clean water runoff from undisturbed and revegetated areas to runoff from mining activities;
- progressive rehabilitation of mined areas to minimise the timeframe for return of clean catchment runoff to the surrounding catchments;
- ;
- reuse of mine impacted water within the WMS to reduce reliance on raw/clean water (e.g. extraction from Wollombi Brook and Hunter River);
- minimising adverse effects on downstream waterways (i.e. hydraulic and water quality impacts); and
- reducing the discharge of pollutants from the Proposed Action to the environment.

Water management for the Proposed Action will consider three categories of water, each with different potential to cause impact. The target design criteria for each of the three categories of water are summarised in **Table 4.1**.

Table 4.1- Water Categories of the WMS

Water Category	Water Description	Target Design Criteria
Clean	Runoff from undisturbed or rehabilitated areas	Convey, where practicable, to downstream environment.
Dirty	Runoff from disturbed areas (does not include water captured in mining pit areas or runoff from mine infrastructure areas).	Managed in line with the NSW Government Standard, i.e. the Blue Book (*Managing Urban Stormwater: Soils and Construction Volume 1* and *Volume 2E Mines and Quarries*).
Mine	Runoff from areas exposed to coal, water used in coal processing or from coal stockpile areas or groundwater recovered from mining areas.	Contained for events up to and including the 1% annual exceedance probability (AEP) 24 hour storm event.

Dirty water (i.e. runoff from disturbed areas outside the mining pit and infrastructure areas, such as overburden emplacement areas (both active and under rehabilitation) captured in the sediment dams is pumped to the mine water management system.

Minewater (i.e. runoff from areas exposed to coal) is also managed as part of the mine water management system. Pollution in NSW is regulated the *Protection of the Environment Operations Act* 1997 (POEO Act) with discharges from the mine water management system required to be licensed by an Environment Protection Licence (EPL). The current Wambo EPL authorises specified water discharges to the environment from the WMS.

It is proposed to continue to utilise the existing WMSs for the Proposed Action incorporating upgrades where necessary. That is, water in the mine water management system will continue to be shared across the United / Wambo complex. Water sharing across the site will assist in minimising the demand for raw/clean water. In addition, excess water that cannot be reused at the mining or processing operations will be discharged in accordance with the HRSTS and EPL regulatory arrangements.

6 Conclusion on the likelihood of significant impacts

Identify whether or not you believe the action is a controlled action (ie. whether you think that significant impacts on the matters protected under Part 3 of the EPBC Act are likely) and the reasons why.

6.1 Do you THINK your proposed action is a controlled action?

	No, complete section 5.2
X	Yes, complete section 5.3

6.2 Proposed action IS NOT a controlled action.

Specify the key reasons why you think the proposed action is NOT LIKELY to have significant impacts on a matter protected under the EPBC Act.

6.3 Proposed action IS a controlled action

Type 'x' in the box for the matter(s) protected under the EPBC Act that you think are likely to be significantly impacted. (The 'sections' identified below are the relevant sections of the EPBC Act.)

	Matters likely to be impacted
	World Heritage values (sections 12 and 15A)
	National Heritage places (sections 15B and 15C)
	Wetlands of international importance (sections 16 and 17B)
X	Listed threatened species and communities (sections 18 and 18A)
	Listed migratory species (sections 20 and 20A)
	Protection of the environment from nuclear actions (sections 21 and 22A)
	Commonwealth marine environment (sections 23 and 24A)
	Great Barrier Reef Marine Park (sections 24B and 24C)
X	A water resource, in relation to coal seam gas development and large coal mining development (sections 24D and 24E)
	Protection of the environment from actions involving Commonwealth land (sections 26 and 27A)
	Protection of the environment from Commonwealth actions (section 28)
	Commonwealth Heritage places overseas (sections 27B and 27C)

Specify the key reasons why you think the proposed action is likely to have a significant adverse impact on the matters identified above.

Approximately 212 hectares of the recently listed Central Hunter Valley CEEC will be removed as part of the Proposed Action. An Assessment of Significance found that the Proposed Action will reduce the extent of the community by approximately 212 hectares, adversely impact some areas of critical habitat of the ecological community and interfere with the recovery of the ecological community. On this basis, the removal of approximately 212 hectares of the Central Hunter Valley CEEC is likely to comprise a significant impact on the Central Hunter Valley CEEC.

In regard to impacts on a water resource by a coal mining development, as discussed in **Section 3**, detailed water resource studies are currently being undertaken for the Proposed Action and until the detailed water assessment findings are available, the predicted impact on water resources cannot be determined. On this basis and in accordance with the precautionary principal, as it cannot be ruled out at this stage of the assessment that the Proposed Action could result in a significant impact on water resources;, it is concluded that the Proposed Action may have the potential to result in a significant impact on water resources as defined under the *Significant Impact Guidelines 1.3: Coal seam gas and large coal mining developments - impacts on water resources* (DoE 2013).

7 Environmental record of the responsible party

NOTE: If a decision is made that a proposal needs approval under the EPBC Act, the Environment Minister will also decide the assessment approach. The EPBC Regulations provide for the environmental history of the party proposing to take the action to be taken into account when deciding the assessment approach.

		Yes	No
7.1	**Does the party taking the action have a satisfactory record of responsible environmental management?** **Provide details** United has an Environmental Management System (EMS) in place for its existing mining operation in Care and Maintenance. The EMS is developed to meet Glencore requirements and is generally in accordance with ISO 14001. The EMS provides a risk based platform on which relevant environment and community controls, procedures and management plans have been established and are regularly reviewed. As part of its EMS, United conducts regular environmental monitoring and auditing to gauge performance, compliance with regulatory requirements, and to minimise impacts on the surrounding community and the environment. United Collieries Pty Limited has not been convicted of any environmental protection legislation. No approvals under environmental protection legislation or other relevant legislation have been revoked or suspended in the five (5) years immediately prior to this application being lodged.	X	
7.2	**Has either (a) the party proposing to take the action, or (b) if a permit has been applied for in relation to the action, the person making the application - ever been subject to any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources?** **If yes, provide details**		X
7.3	**If the party taking the action is a corporation, will the action be taken in accordance with the corporation's environmental policy and planning framework?**	X	

	If yes, provide details of environmental policy and planning framework The Glencore Values and Code of Conduct policies are available on the Glencore Xstrata plc Web site (www.glencorexstrata.com). The following statement is an excerpt from the Code of Conduct: *"Our managers are required to:* *1. Identify, assess and monitor environmental impacts.* *2. Comply with applicable regulatory requirements and monitor relevant regulations for changes.* *3. Implement appropriate environmental management programmes and controls, including appropriate measures for emergency preparedness.* *4. Ensure competent staff and sufficient resources for environmental management.* *5. Involve contractors and service providers where appropriate.* *6. Implement programmes and targets for continuous improvement of our:* • *Efficient use of resources (eg energy, water and land).* • *Protection of biodiversity.* • *Climate change impact.* • *Pollution prevention (by addressing management of fresh water and effluent, waste, air emissions, hazardous materials and rehabilitation of land).* *7. Track actual environmental performance."*		
7.4	**Has the party taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?** **Provide name of proposal and EPBC reference number (if known)**		X

8 Information sources and attachments

(For the information provided above)

8.1 References

- List the references used in preparing the referral.
- Highlight documents that are available to the public, including web references if relevant.

Austin, M, P, Cawsey, E, M, Baker, B, L, Yialeloglou, M, M, Grice, D, J, and Briggs, S, V, (2000) *Predicted Vegetation Cover in the Central Lachlan Region*. Final report of the Natural Heritage Trust Project AA 1368.97. CSIRO Wildlife and Ecology, Canberra.

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Niche Environment and Heritage (2014c). Wambo Coal Aquatic Monitoring Report 2013. A report prepared for Wambo Coal Pty Ltd

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Niche Environment and Heritage (2014e). Draft EMP010 Monitoring 2014 Aquatic Ecosystems. A report prepared for Wambo Coal Pty Ltd

Niche Environment and Heritage (2014f). Draft EMP010 Monitoring 2014 Indicator Species (birds) A report prepared for Wambo Coal Pty Ltd

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Niche (2015). 2015 Upper Hunter Strategic Assessment – Wambo Coal Biodiversity Certification Assessment. Report prepared for Wambo Coal Pty Ltd.(OEH) Office of Environment and Heritage (2015) BioNet Atlas of NSW Wildlife, accessed August 2015.

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8.2 Reliability and date of information

For information in section 3 specify:

- source of the information;
- how recent the information is;
- how the reliability of the information was tested; and
- any uncertainties in the information.

8.3 Attachments

Indicate the documents you have attached. All attachments must be less than three megabytes (3mb) so they can be published on the Department's website. Attachments larger than three megabytes (3mb) may delay the processing of your referral.

		✓ attached	Title of attachment(s)
You must attach	figures, maps or aerial photographs showing the project locality (section 1)	✓	Attachment B
	GIS file delineating the boundary of the referral area (section 1)		
	figures, maps or aerial photographs showing the location of the project in respect to any matters of national environmental significance or important features of the environments (section 3)	✓	
If relevant, attach	copies of any state or local government approvals and consent conditions (section 2.5)		
	copies of any completed assessments to meet state or local government approvals and outcomes of public consultations, if available (section 2.6)		
	copies of any flora and fauna investigations and surveys (section 3)		
	technical reports relevant to the assessment of impacts on protected matters that support the arguments and conclusions in the referral (section 3 and 4)		
	report(s) on any public consultations undertaken, including with Indigenous stakeholders (section 3)		

9 Contacts, signatures and declarations

NOTE: Providing false or misleading information is an offence punishable on conviction by imprisonment and fine (s 489, EPBC Act).

Under the EPBC Act a referral can only be made by:

- the person proposing to take the action (which can include a person acting on their behalf); or
- a Commonwealth, state or territory government, or agency that is aware of a proposal by a person to take an action, and that has administrative responsibilities relating to the action[1].

Project title: United and Wambo Open Cut Coal Mine Project

9.1 Person proposing to take action

This is the individual, government agency or company that will be principally responsible for, or who will carry out, the proposed action.

If the proposed action will be taken under a contract or other arrangement, this is:

- the person for whose benefit the action will be taken; or
- the person who procured the contract or other arrangement and who will have principal control and responsibility for the taking of the proposed action.

If the proposed action requires a permit under the Great Barrier Reef Marine Park Act[2], this is the person requiring the grant of a GBRMP permission.

The Minister may also request relevant additional information from this person.

If further assessment and approval for the action is required, any approval which may be granted will be issued to the person proposing to take the action. This person will be responsible for complying with any conditions attached to the approval.

If the Minister decides that further assessment and approval is required, the Minister must designate a person as a proponent of the action. The proponent is responsible for meeting the requirements of the EPBC Act during the assessment process. The proponent will generally be the person proposing to take the action[3].

1. Name and Title:	Gary Wills, Project Manager – United Complex
2. Organisation (if applicable):	United Collieries Pty Limited
3. EPBC Referral Number (if known):	
4: ACN / ABN (if applicable):	67 0019 90209
5. Postal address	Private Mailbag 13, Singleton NSW 2330
6. Telephone:	02 6578 9403
7. Email:	gary.wills@glencore.com.au
8. Name of designated proponent (if not the same person at item 1 above and if applicable):	

[1] *If the proposed action is to be taken by a Commonwealth, state or territory government or agency, section 8.1 of this form should be completed. However, if the government or agency is aware of, and has administrative responsibilities relating to, a proposed action that is to be taken by another person which has not otherwise been referred, please contact the Referrals Gateway (1800 803 772) to obtain an alternative contacts, signatures and declarations page.*

[2] *If your referred action, or a component of it, is to be taken in the Great Barrier Reef Marine Park the Minister is required to provide a copy of your referral to the Great Barrier Reef Marine Park Authority (GBRMPA) (see section 73A,* EPBC Act*). For information about how the GBRMPA may use your information, see http://www.gbrmpa.gov.au/privacy/privacy_notice_for_permits.*

[3] *If a person other than the person proposing to take action is to be nominated as the proponent, please contact the Referrals Gateway(1800 803 772) to obtain an alternative contacts, signatures and declarations page.*

9. ACN/ABN of designated proponent (if not the same person named at item 1 above):

COMPLETE THIS SECTION ONLY IF YOU QUALIFY FOR EXEMPTION FROM THE FEE(S) THAT WOULD OTHERWISE BE PAYABLE

I qualify for exemption from fees under section 520(4C)(e)(v) of the EPBC Act because I am:

□ an individual; OR

□ a small business entity (within the meaning given by section 328-110 (other than subsection 328-119(4)) of the *Income Tax Assessment Act 1997*); OR

□ not applicable.

If you are small business entity you must provide the Date/Income Year that you became a small business entity:

Note: You must advise the Department within 10 business days if you cease to be a small business entity. Failure to notify the Secretary of this is an offence punishable on conviction by a fine (regulation 5.23B(3) *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth)).

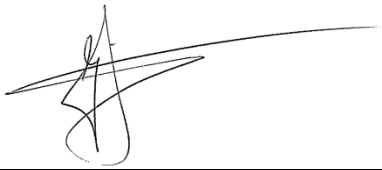
COMPLETE THIS SECTION ONLY IF YOU WOULD LIKE TO APPLY FOR A WAIVER

I would like to apply for a waiver of full or partial fees under Schedule 1, 5.21A of the EPBC Regulations. Under sub regulation 5.21A(5), you must include information about the applicant (if not you) the grounds on which the waiver is sought and the reasons why it should be made:

□ not applicable.

Declaration

I declare that to the best of my knowledge the information I have given on, or attached to this form is complete, current and correct.
I understand that giving false or misleading information is a serious offence.
I agree to be the proponent for this action.
I declare that I am not taking the action on behalf of or for the benefit of any other person or entity.

Signature 

Date 29 October 2015

9.2 Person preparing the referral information (if different from 8.1)

Individual or organisation who has prepared the information contained in this referral form.

Name	John Merrell
Title	Group Manager Environment and Community NSW
Organisation	Umwelt (Australia) Pty Limited
ACN / ABN (if applicable)	18 0595 19041
Postal address	75 York Street Teralba NSW 2284
Telephone	02 4950 5322
Email	jmerrell@umwelt.com.au
Declaration	I declare that to the best of my knowledge the information I have given on, or attached to this form is complete, current and correct. I understand that giving false or misleading information is a serious offence.
Signature	 Date 29 October 2015

REFERRAL CHECKLIST

NOTE: This checklist is to help ensure that all the relevant referral information has been provided. It is not a part of the referral form and does not need to be sent to the Department.

HAVE YOU:

- ❑ Completed all required sections of the referral form?
- ❑ Included accurate coordinates (to allow the location of the proposed action to be mapped)?
- ❑ Provided a map showing the location and approximate boundaries of the project area?
- ❑ Provided a map/plan showing the location of the action in relation to any matters of NES?
- ❑ Provided a digital file (preferably ArcGIS shapefile, refer to guidelines at Attachment A) delineating the boundaries of the referral area?
- ❑ Provided complete contact details and signed the form?
- ❑ Provided copies of any documents referenced in the referral form?
- ❑ Ensured that all attachments are less than three megabytes (3mb)?
- ❑ Sent the referral to the Department (electronic and hard copy preferred)?

Attachment A

Geographic Information System (GIS) data supply guidelines

If the area is less than 5 hectares, provide the location as a point layer. If the area greater than 5 hectares, please provide as a polygon layer. If the proposed action is linear (eg. a road or pipline) please provide a polyline layer.

GIS data needs to be provided to the Department in the following manner:

- Point, Line or Polygon data types: ESRI file geodatabase feature class (preferred) or as an ESRI shapefile (.shp) zipped and attached with appropriate title
- Raster data types: Raw satellite imagery should be supplied in the vendor specific format.
- Projection as GDA94 coordinate system.

Processed products should be provided as follows:

- For data, uncompressed or lossless compressed formats is required - GeoTIFF or Imagine IMG is the first preference, then JPEG2000 lossless and other simple binary+header formats (ERS, ENVI or BIL).
- For natural/false/pseudo colour RGB imagery:
    - If the imagery is already mosaiced and is ready for display then lossy compression is suitable (JPEG2000 lossy/ECW/MrSID). Prefer 10% compression, up to 20% is acceptable.
    - If the imagery requires any sort of processing prior to display (i.e. mosaicing/colour balancing/etc) then an uncompressed or lossless compressed format is required.

Metadata or 'information about data' will be produced for all spatial data and will be compliant with ANZLIC Metadata Profile. (http://www.anzlic.org.au/policies_guidelines#guidelines).

The Department's preferred method is using ANZMet Lite, however the Department's Service Provider may use any compliant system to generate metadata.

All data will be provide under a Creative Commons license (http://creativecommons.org/licenses/by/3.0/au/)

Attachment B – Schedule of Lands

Lot Sec DP	Hectares	Status
1//1174490	2.46	Wambo Coal
1//1177768	19.33	CFMEU
1//241316	2.31	Wambo Coal
1//300990	3.03	CFMEU
1//583524	2.95	Coal and Allied
1//616303	326.11	CFMEU
1//709722	56.79	CFMEU
1//720683	0.40	Coal and Allied
1//720705	2.34	Wambo Coal
1//783484	21.84	Coal and Allied
1//857021	21.60	Coal and Allied
100//753792	15.97	CFMEU
101//753792	16.86	CFMEU
103//753792	16.72	Wambo Coal
104//753792	16.03	Wambo Coal
109//753792	15.39	Wambo Coal
11//843432	40.82	Coal and Allied
110//753792	14.90	Wambo Coal
111//753792	16.24	Wambo Coal
112//753792	15.61	Wambo Coal
113//753817	534.46	Wambo Coal
118//753792	50.04	Wambo Coal
131//1089157	0.49	Wambo Coal
134//566275	8.19	CFMEU
134//753792	31.93	CFMEU
135//753792	16.01	CFMEU
147//753792	0.26	Johnson Woods & Co
148//753792	3.26	CFMEU
149//753792	27.20	CFMEU
160//753817	71.23	Wambo Coal
161//753817	16.67	Wambo Coal
170//823775	21.90	State of NSW
175//823775	32.34	State of NSW
179//823775	386.66	Coal and Allied
18//753817	59.31	Wambo Coal
2//1085145	66.32	Wambo Coal
2//1174490	4.21	Wambo Coal
2//1177768	0.22	Wambo Coal
2//300990	13.72	CFMEU
2//583524	5.37	Wambo Coal
2//616303	167.93	Wambo Coal
2//617852	90.46	CFMEU
2//709722	208.88	Wambo Coal
2//720705	3.57	Wambo Coal
2//783484	89.30	Coal and Allied
22//753817	16.83	Wambo Coal

Lot Sec DP	Hectares	Status
3//1085145	82.35	Wambo Coal
3//1177768	0.73	Wambo Coal
3//720705	0.57	Wambo Coal
38//753792	41.06	CFMEU
39//753792	32.62	CFMEU
4//1085145	10.49	Wambo Coal
4//542226	14.26	Wambo Coal
4//635392	4.75	CFMEU
4//720705	1.66	Wambo Coal
43//753792	16.13	CFMEU
45//753792	18.88	Wambo Coal
46//753792	18.31	Wambo Coal
49//753792	15.86	Wambo Coal
5//1085145	136.65	Coal and Allied
5//247239	10.75	CFMEU
5//542226	51.75	Wambo Coal
50//753792	15.87	Wambo Coal
51//753792	15.64	Wambo Coal
52//753792	38.89	Wambo Coal
53//753792	16.47	CFMEU
54//753792	15.88	CFMEU
55//753792	16.04	CFMEU
56//753792	40.86	CFMEU
57//1074788	123.82	Wambo Coal
58//753792	40.38	Wambo Coal
6//247239	10.89	CFMEU
60//753792	65.39	CFMEU
61//753792	16.29	CFMEU
62//753792	16.38	Wambo Coal
63//753792	16.20	Wambo Coal
64//753792	16.06	Wambo Coal
66//753817	40.06	Wambo Coal
67//753817	19.79	Wambo Coal
7//247239	10.22	CFMEU
7//3030	79.96	Wambo Coal
7//753792	16.21	CFMEU
71//753817	49.49	Wambo Coal
79//1074787	39.51	Wambo Coal
8//247239	12.68	CFMEU
83//548749	1150.32	Wambo Coal
9//835812	40.48	CFMEU
91//733895	6.74	Coal and Allied
95//753792	10.56	Wambo Coal
A//33149	64.08	Wambo Coal
B//33149	32.55	Wambo Coal
C//33149	171.07	Wambo Coal
Road reserves		

Attachment C – Threatened Species, Endangered Populations, TECs and Migratory Species and their Potential to occur within the Conceptual Additional Disturbance Area

Tables 1 and 2 identify the threatened flora and fauna species, threatened ecological communities (TECs) and migratory species that have potential to occur within a 10 kilometre radius of the Referral Area. This information was obtained from searches undertaken of the Office of Environment and Heritage (OEH) Atlas of NSW Wildlife (2015), the Department of the Environment (DoE) Protected Matters database (3 August 2015), the NSW OEH Threatened Species website (search for the Hunter CMA subregion) and literature reviews.

Tables 1 and **2** identify the status, specific habitat requirements, distribution, source of information, reservation within the region, potential for occurrence in the Conceptual Additional Disturbance Area and any requirement for an assessment of significance under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999.* Where species were identified in **Tables 1** and **2** below as requiring an assessment of significance under the EPBC Act, they have been assessed within **Attachment D**.

Table 1 – Likelihood of Occurrence Assessment of Threatened Flora Species and Threatened Ecological Communities Known or Predicted to Occur within the Referral Area

Species	**EPBC Status**	**Specific Habitat**	**Distribution in Relation to the Referral Area**	**Reservation Within the Region[1] (BioNet 2015)**	**Occurrence** in Conceptual Additional Disturbance Area **and Potential for Significant Impact**	**Detailed Assessment of Significance Required?**
THREATENED FLORA SPECIES						
Allocasuarina glareicola	E	This species grows on soils of low fertility that are strongly to very strongly acidic. It is only known to grow in association with the Castlereagh open woodland community in association with the following species, *Eucalyptus parramattensis*, *Eucalyptus fibrosa*, *Eucalyptus sclerophylla*, *Angophora bakeri* and *Melaleuca decora*	This species is only known to occur in and around Castlereagh NR, north-east of Penrith and NSW	This species is not known to occur in any conservation reserves in the region in which the Action will be undertaken.	The Conceptual Additional Disturbance Area does not provide suitable habitat for this species and it has not been recorded in the Conceptual Additional Disturbance Area. There is no potential for a significant impact on this species.	No
White-flowered wax plant *Cynanchum elegans*	E	The species has been recorded from rainforest gullies and scree slopes,	*Cynanchum elegans* is restricted to eastern NSW from Yabbra State Forest in the	Wollemi NP	The Conceptual Additional Disturbance Area does not provide	No

Species	**EPBC Status**	**Specific Habitat**	**Distribution in Relation to the Referral Area**	**Reservation Within the Region[1] (BioNet 2015)**	**Occurrence** in Conceptual Additional Disturbance Area **and Potential for Significant Impact**	**Detailed Assessment of Significance Required?**
		but is thought to mainly occur at the ecotone between dry rainforest and sclerophyll forest or woodland. The species has been recorded in dry subtropical rainforest, littoral rainforest, coastal scrub, open forest and woodland and open scrub.	north to Gerroa in the south and Merriwa in the west.		suitable habitat for this species and it has not been recorded in the Conceptual Additional Disturbance Area. There is no potential for a significant impact on this species.	
Leafless tongue-orchid *Cryptostylis hunteriana*	V	This species appears to favour moist soils on the flat coastal plains. Occupies swamp heath, but also in sclerophyll forest and woodland, often on sandy soils. Typically found in communities containing *Eucalyptus haemastoma, E. capitellata* and *Corymbia gummifera*.	This species is known to occur in the Karuah Manning and Wyong Catchment Management Area sub-regions in the Hunter Central Rivers region.	This species is not known to occur in any conservation reserves in the region in which the Action will be undertaken.	The Conceptual Additional Disturbance Area does not provide suitable habitat for this species and it has not been recorded in the Conceptual Additional Disturbance Area. There is no potential for a significant impact on this species.	No
Slaty red gum *Eucalyptus glaucina*	V	This species grows in grassy woodland and dry eucalypt forest on deep, moderately fertile and well-watered soils.	Found in the Hunter Valley and North Coast from near Cessnock to Taree. There are records extending west to near Denman, Dungog and Gloucester. There is an outlying record near Gosford on the Central Coast. A separate population of the species also occurs from south of Grafton north to the Queensland border.	Belford NP Singleton Military Training Area (ERM 2004).	This species has not been recorded within the Conceptual Additional Disturbance Area; however potentially suitable habitat is present. Based on surveys undertaken in the Conceptual Additional Disturbance Area, if this species is present it would only likely occur in low numbers.	Yes

Species	**EPBC Status**	**Specific Habitat**	**Distribution in Relation to the Referral Area**	**Reservation Within the Region[1] (BioNet 2015)**	**Occurrence** in Conceptual Additional Disturbance Area **and Potential for Significant Impact**	**Detailed Assessment of Significance Required?**
Euphrasia arguta	CE	This species grows in grassy areas near rivers (PlantNet 2015).	This species is presumed to be extinct. When present, it was recorded from as far south as Bathurst and as far north as Walcha. It was believed to occur in the botanical subdivisions of the North Coast, Northern Tablelands, Central Tablelands, North Western Slopes and Central Western Slopes (PlantNet 2015).	This species is not known to occur in any reserves in the region.	The Conceptual Additional Disturbance Area does not provide suitable habitat for this species and it has not been recorded in the Conceptual Additional Disturbance Area. There is no potential for a significant impact on this species.	No
Olearia cordata	V	Populations are typically small and scattered. This species grows in dry open sclerophyll forest within open shrubland and on sandstone ridges.	This species is a NSW endemic with a scattered distribution generally restricted to the south-western Hunter Plateau, eastern Colo Plateau, and the far north-west of the Hornsby Plateau near Wisemans Ferry east of Maroota.	Yengo NP Wollemi NP	The Conceptual Additional Disturbance Area does not provide suitable habitat for this species and it has not been recorded in the Conceptual Additional Disturbance Area. There is no potential for a significant impact on this species.	No
Omeo storks bill *Pelargonium* sp. Striatellum	E	Typically occurs just above the high water level of irregularly inundated or ephemeral lakes. During dry periods it is known to colonise dry lake beds.	This species is known to occur in both Victoria and NSW. It occurs within the south-eastern highlands and South East Corner IBRA Bioregions and the Hawkesbury-Nepean, Murrumbidgee, Southern Rivers and North East Natural Resource Management Regions.	This species is not known to occur in conservation reserves in the region in which the Action will be undertaken.	The Conceptual Additional Disturbance Area does not provide suitable habitat for this species and it has not been recorded in the Conceptual Additional Disturbance Area. There is no potential for a significant impact on this species.	No

Species	**EPBC Status**	**Specific Habitat**	**Distribution in Relation to the Referral Area**	**Reservation Within the Region[1] (BioNet 2015)**	**Occurrence** in Conceptual Additional Disturbance Area **and Potential for Significant Impact**	**Detailed Assessment of Significance Required?**
Leek orchid *Prasophyllum* sp. Wybong (C.Phelps ORG 5269) Tarengo Leek Orchid *Prasophyllum petilum* **Note:** *Prasophyllum* sp. Wybong has recently been reclassified as *Prasophyllum petilum.*	CE E	This species generally occurs in grassy and scrubby habitats in open eucalypt woodland and grasslands.	This species is endemic to NSW, from which there are only seven known populations from near NSW near Ilford, Premer, Muswellbrook, Wybong, Yeoval, Inverell and Tenterfield. It is not known to occur outside the Sydney Basin, New England Tablelands, Brigalow Belt South and NSW South Western Slopes bioregions. Its area of occupancy is estimated at 1500 square metres.	This species is not known to occur in conservation reserves in the region in which the Action will be undertaken.	This species has not been recorded within the Conceptual Additional Disturbance Area in spite of extensive surveys; however potentially suitable habitat is present. Based on surveys undertaken in the Conceptual Additional Disturbance Area, if this species is present it would only likely occur in low numbers.	Yes
Illawarra greenhood *Pterostylis gibbosa*	E	All known populations grow in open forest or woodland, on flat or gently sloping land with poor drainage. The only known population in the Hunter is at Milbrodale where it occurs on soils derived from Triassic sandstone. It is found in association with narrow-leaved ironbark (*Eucalyptus crebra*), grey box (*E. moluccana*), black cypress pine (*Callitris endlicheri*) and a dense shrub layer.	Known from a small number of populations in the Hunter region (Milbrodale), the Illawarra region (Albion Park and Yallah) and the Shoalhaven region (near Nowra).	This species is not known to occur in any reserves in the region in which the Action will be undertaken.	This species has not been recorded within the Conceptual Additional Disturbance Area in spite of extensive surveys; however potentially suitable habitat is present. Based on surveys undertaken in the Conceptual Additional Disturbance Area, if this species is present it would only likely occur in low numbers.	Yes

Species	**EPBC Status**	**Specific Habitat**	**Distribution in Relation to the Referral Area**	**Reservation Within the Region[1] (BioNet 2015)**	**Occurrence** in Conceptual Additional Disturbance Area **and Potential for Significant Impact**	**Detailed Assessment of Significance Required?**
Siah's Backbone, Sia's Backbone, Isaac Wood *Streblus pendulinus*	E	This species occurs in warmer rainforest, mostly along watercourses, north from Milton. Listing advice for this species indicates that the species is endangered on Norfolk Island.	There are a number of known records of this species occurring in the Muswellbrook and Singleton areas.	This species is not known from any conservation reserves in the region in which the Action will be undertaken.	The Conceptual Additional Disturbance Area does not provide suitable habitat for this species and it has not been recorded in the Conceptual Additional Disturbance Area. There is no potential for a significant impact on this species.	No
Austral toadflax *Thesium australe*	V	This species occurs in grassland or grassy woodland and is often found in damp sites in association with kangaroo grass (*Themeda australis*). This species is a root parasite that takes water and some nutrients from other plants, especially kangaroo grass.	This species is found in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. It is also found in Tasmania, Queensland and in eastern Asia. Occurs also at Mangoola, west of Muswellbrook, NSW.	This species is not known to occur in conservation reserves in the region in which the Action will be undertaken.	This species has not been recorded within the Conceptual Additional Disturbance Area in spite of extensive surveys; however potentially suitable habitat is present. Based on surveys undertaken in the Conceptual Additional Disturbance Area, if this species is present it would only likely occur in low numbers.	Yes
Wollemi pine *Wollemia nobilis*	E	Occurs in warm-temperate rainforest and rainforest margins on remote sandstone canyons.	This species has a distribution which is limited to remote canyons of Wollemi NP which is to the north-west of Sydney. There are no NSW Wildlife Atlas records of this species within 10 kilometres of the centre of the Referral Area.	Wollemi NP	The Conceptual Additional Disturbance Area does not provide suitable habitat for this species and it has not been recorded in the Conceptual Additional Disturbance Area. There is no potential for a significant impact on this species.	No

Species	**EPBC Status**	**Specific Habitat**	**Distribution in Relation to the Referral Area**	**Reservation Within the Region[1] (BioNet 2015)**	**Occurrence** in Conceptual Additional Disturbance Area **and Potential for Significant Impact**	**Detailed Assessment of Significance Required?**
CRITICALLY ENDANGERED ECOLOGICAL COMMUNITIES						
Central Hunter Valley Eucalypt Forest and Woodland	CEEC	This CEEC consists of eucalypt woodlands and open forests; typically with a shrub layer of variable density and /or a grassy ground layer. It generally occurs on soils derived from Permian sedimentary bedrock occurring on valley floors, lower slopes and lower ridges. Typical canopy species include *Eucalyptus crebra*, *Corymbia maculata*, *Eucalyptus dawsonii* and *Eucalyptus moluccana*.	This CEEC primarily occurs in the Central Hunter Valley region within the Sydney Basin IBRA Bioregion.	This CEEC is not known to occur in any conservation reserves in the region.	This CEEC is present in the Conceptual Additional Disturbance Area. There is potential for the proposed action to have a significant impact on this CEEC.	Yes
Hunter Valley Weeping Myall (*Acacia Pendula*) Woodland	CEEC	This CEEC consists of weeping myall (*Acacia pendula*) with coobah (*Acacia salicina*) and scrub wilga (*Geijera salicifolia*). Yarran (*Acacia omalophylla*) and stiff canthium (*Canthium buxifolium*) are also present in the small tree/shrub layer. The ground stratum is dense and primarily grassy. Grasses include kangaroo grass (*Themeda triandra/australis*), wallaby grass (*Austrodanthonia* spp.),	The CEEC occurs in a small stand on heavy, brown clay soil at Jerrys Plains in the Hunter Valley, in the South Hunter Province of the Sydney Basin Bioregion.	This CEEC is not known to occur in any conservation reserves in the region in which the Action will be undertaken.	The Conceptual Additional Disturbance Area provides potential habitat for this TEC however; it has not been recorded in the Referral Area. Two stands of *Acacia pendula* occur within the Conceptual Additional Disturbance Area however both are less than the minimum size requirement of the CEEC listing.	No

Species	EPBC Status	Specific Habitat	Distribution in Relation to the Referral Area	Reservation Within the Region[1] (BioNet 2015)	**Occurrence** in Conceptual Additional Disturbance Area **and Potential for Significant Impact**	**Detailed Assessment of Significance Required?**
		snow grass (*Poa sieberiana*) and barbed wire grass (*Cymbopogon refractus*).				
White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grasslands	CEEC	This CEEC can occur as either woodland or derived grassland. The groundlayer consists of native tussock grasses and herbs, and a sparse, scattered shrub layer. White box (*Eucalyptus albens*), yellow box (*E. melliodora*), or Blakely's red gum (*E. blakelyi*), dominate, where trees remain. This ecological community occurs in areas where rainfall is between 400 and 1200 millimeters per annum, on moderate to highly fertile soils at altitudes of 170 metres to 1200 metres.	This CEEC occurs in an arc along the western slopes and tablelands of the Great Dividing Range from Southern Queensland through NSW to central Victoria. It occurs in the Brigalow Belt South, Nandewar, New England Tableland, South Eastern Queensland, Sydney Basin, NSW North Coast, South Eastern Highlands, South East Corner, NSW South Western Slopes, Victorian Midlands and Riverina Bioregions.	Towarri NP Goulburn River NP	This CEEC has not been identified in the Conceptual Additional Disturbance Area despite extensive surveys. While yellow box (*E. melliodora*) is present, it is in low numbers and does not form a common overstorey tree. Grey box (*E. moluccana*) is widespread, however there is little evidence of hybridisation with white box (*E. albens*). Likewise, other key elements of the CEEC are absent.	No

Notes:

CE	Critically endangered
CEEC	Critically endangered ecological community
E	Endangered
EEC	Endangered ecological community
EP	Endangered population
EPBC	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
LGA	Local Government Area
NP	National Park
NR	Nature Reserve
ROTAP	Rare or Threatened Australian Plants
SF:	State Forest
TSC:	NSW *Threatened Species Conservation Act 1995*
V	Vulnerable
X	Extinct

1 The following conservation areas, national parks and nature reserves were searched for record s of each species, population or community: Belford NP, Goulburn River NP, Manobalai NR, Towarri NP, Watagans NP, Werakata NP, Werakata SCA, Wingen Maid NR, Wollemi NP, Yengo NP

Table 2 – Threatened Fauna Species, Threatened Fauna Populations and Marine and Migratory Species Known or Predicted to Occur within the Referral Area

Species	EPBC Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region (BioNet 2015)	Occurrence in Conceptual Additional Disturbance Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
THREATENED FAUNA SPECIES						
AMPHIBIANS						
Green and golden bell frog *Litoria aurea*	V	Occurs amongst emergent aquatic or riparian vegetation and amongst vegetation, fallen timber, including grassland, cropland and modified pastures. Breeds in still or slow flowing waterbodies with some vegetation such as *Typha* spp. and *Eleocharis* spp.	This species occurs from NSW North Coast near Brunswick Heads, southwards along the NSW Coast to Victoria where this species extends into east Gippsland. The Referral Area is close to the inland limit of this species' known distribution.	This species is not known to occur in any reserves in the region in which the Proposed Action will be undertaken.	The green and golden bell frog was not recorded during targeted surveys within the Conceptual Additional Disturbance Area. There are no known records of this species occurring within the Conceptual Additional Disturbance Area. The OEH Atlas of NSW Wildlife contains a single record of the species within 10 kilometres of the Conceptual Additional Disturbance Area. The water bodies (and particularly those with dense reed beds) within the Conceptual Additional Disturbance Area provide potential habitat for the green and golden bell frog but the absence of historical records of this species indicate that the Conceptual Additional Disturbance Area is unlikely to provide habitat for the species.	Yes

Species	EPBC Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region (BioNet 2015)	Occurrence in Conceptual Additional Disturbance Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
Booroolong frog *Litoria booroolongensis*	E	This species lives along permanent streams with some fringing vegetation cover such as ferns, sedges or grasses. Adults occur on or near cobble banks and other rock structures within stream margins. Shelter under rocks or amongst vegetation near the ground on the stream edge.	The Booroolong frog is restricted to NSW and north-eastern Victoria, predominantly along the western-flowing streams of the Great Dividing Range. It has disappeared from the Northern Tablelands and is now rare throughout most of the remainder of its range. Most recent records are from the south-west slopes of NSW.	Mt Royal NP	The Conceptual Additional Disturbance Area and its surrounds do not provide suitable habitat for this species and it has not been recorded in the Conceptual Additional Disturbance Area. There is no potential for a significant impact on this species.	No
Littlejohns treefrog *Litoria littlejohni*	V	Occurs along permanent rocky streams with thick fringing vegetation associated with eucalypt woodlands and heaths among sandstone outcrops.	Distribution includes the plateaus and eastern slopes of the Great Dividing Range from Watagan State Forest south to Buchan in Victoria.	This species is not known to occur in any reserves in the region in which the Proposed Action will be undertaken.	The Conceptual Additional Disturbance Area or its surrounds do not provide suitable habitat for this species and it has not been recorded in the Conceptual Additional Disturbance Area. There is no potential for a significant impact on this species.	No
REPTILES						

Species	EPBC Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region (BioNet 2015)	Occurrence in Conceptual Additional Disturbance Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
Broad-headed snake *Hoplocephalus bungaroides*	V	The broad-headed snake is nocturnal, and shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring. Moves from the sandstone rocks to shelters in hollows in large trees within 200 metres of escarpments in summer.	The broad-headed snake is largely confined to Triassic and Permian sandstones, including the Hawkesbury, Narrabeen and Shoalhaven groups, within the coast and ranges in an area within approximately 250 kilometres of Sydney. The Referral Area lies approximately 2.5 kilometres west of Wollemi NP, which is the northern limit for the distribution of this species.	Wollemi NP Yengo NP	The Conceptual Additional Disturbance Area does not provide suitable habitat for this species and it has not been recorded in the Conceptual Additional Disturbance Area. There is no potential for a significant impact on this species.	No

Species	EPBC Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region (BioNet 2015)	Occurrence in Conceptual Additional Disturbance Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
BIRDS						
Australasian bittern *Botaurus poiciloptilus*	E	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (*Typha* spp.) and spikerushes (*Eleoacharis* spp.).	This species may be found over most of NSW except for the far north-west.	This species is not known to occur in any reserves in the region in which the Proposed Action will be undertaken.	The Conceptual Additional Disturbance Area or its surrounds do not provide suitable habitat for this species and it has not been recorded in the Conceptual Additional Disturbance Area. There is no potential for a significant impact on this species.	No
Australian painted snipe, painted snipe *Rostratula australis, Rostratula benghalensis* s. lat	V	Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber.	In NSW, this species has been recorded at the Paroo wetlands, Lake Cowal, Macquarie Marshes and Hexham Swamp. Most common in the Murray-Darling Basin.	This species is not known to occur in any reserves in the region in which the Proposed Action will be undertaken.	Water bodies in the Conceptual Additional Disturbance Area provide potentially suitable habitat for this species, although it has not been recorded within this area. There is potential for this species to be sensitive to the development and therefore an assessment of significance has been undertaken.	Yes

Species	EPBC Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region (BioNet 2015)	Occurrence in Conceptual Additional Disturbance Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
Swift parrot *Lathamus discolor*	E	This species often visits box-ironbark forests, feeding on nectar and lerps. In NSW, typical tree species in which this species forages include mugga ironbark (*Eucalyptus sideroxylon*), grey box (*E. moluccana*), swamp mahogany (*E. robusta*), spotted gum (*Corymbia maculata*), red bloodwood (*C. gummifera*), narrow-leaved red ironbark (*E. crebra*), forest red gum (*E. tereticornis*) and yellow box (*E. melliodora*). This species is a migratory species that breeds in Tasmania during the spring and summer, and migrates to the mainland during the cooler months of the year.	In NSW this species has been recorded from the western slopes region along the inland slopes of the Great Dividing Range, as well as forests along the coastal plains from southern to northern NSW. The Referral Area is within the known distribution of this species.	Wollemi NP	This species has not been identified in the Conceptual Additional Disturbance Area; however potentially suitable habitat is present. This species may occur in the Conceptual Additional Disturbance Area on a rare basis during periods of eucalypt flowering in winter months. There is potential for this species to be sensitive to the development and therefore an assessment of significance has been undertaken.	Yes

Species	EPBC Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region (BioNet 2015)	Occurrence in Conceptual Additional Disturbance Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
Regent honeyeater *Anthochaera Phrygia*	CE	This species generally occurs in temperate eucalypt woodlands and open forests of south eastern Australia. It is commonly recorded from box-ironbark eucalypt associations, wet lowland coastal forests dominated by swamp mahogany, spotted gum and riverine *Casuarina* woodlands. An apparent preference exists for the wettest, most fertile sites within these associations, such as creek flats, river valleys and foothills.	Once recorded between Adelaide and the central coast of Queensland, this species range has contracted dramatically in the last 30 years to between north-eastern Victoria and south-eastern Queensland.	Wollemi NP Yengo NP	This species has not been identified in the Conceptual Additional Disturbance Area; however potentially suitable habitat is present. This species may occur in the Conceptual Additional Disturbance Area on a rare basis during periods of eucalypt flowering in winter months. There is potential for this species to be sensitive to the development and therefore an assessment of significance has been undertaken.	Yes
MAMMALS						
Spotted-tailed quoll (SE mainland population) *Dasyurus maculates maculatus*	E	Habitat for this species is highly varied, ranging from sclerophyll forest, woodlands, coastal heathlands and rainforests. Records exist from open country, grazing lands and rocky outcrops. Suitable den sites include hollow logs, tree hollows, rocky outcrops and caves.	In NSW this species occurs on both sides of the Great Dividing Range, with the highest densities occurring in the north east of the State. This species occurs from the coast to the snowline and inland to the Murray River.	Wollemi NP Yengo NP Mt Royal NP Belford NP Barrington Tops NP Watagans NP	This species has been identified in the Conceptual Additional Disturbance Area and is potentially sensitive to the proposed development and therefore an assessment of significance has been undertaken.	Yes

Species	EPBC Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region (BioNet 2015)	Occurrence in Conceptual Additional Disturbance Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
Koala *Phascolarctos cinereus*	V	This species inhabits eucalypt forests and woodlands. The species is known to feed on a large number of eucalypt species; however it tends to specialise on a small number in different areas. *Eucalyptus tereticornis, E. punctata, E. cypellocarpa, E. viminalis, E. microcorys, E. robusta, E. albens, E. camaldulensis* and *E. populnea* are some preferred species.	This species has a fragmented distribution throughout eastern Australia, with the majority of records from NSW occurring on the central and north coasts, as well as some areas further west. This species is known to occur along inland rivers on the western side of the Great Dividing Range.	Wollemi NP Yengo NP Mt Royal NP Manobalai NR Barrington Tops NP	The Conceptual Additional Disturbance Area provides suitable habitat for this species and there is once record (via an old scat under a tree) within the Conceptual Additional Disturbance Area. This species has been recorded 3 times in a 10 kilometre radius of the Referral Area boundary on the NSW Atlas of Wildlife. This species is potentially sensitive to the proposed development and therefore an assessment of significance has been undertaken.	Yes
Brush-tailed rock-wallaby *Petrogale penicillata*	V	This species occupies rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges facing north. This species browses on vegetation in and adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees. This species shelters or bask during the day in rock crevices, caves and overhangs and is most active at night.	The brush-tailed rock-wallaby was once abundant and ubiquitous throughout the mountainous country of south-eastern Australia. This species distribution roughly followed the Great Dividing Range for 2500 kilometres from the Grampians in West Victoria to Nanango in south-east Queensland, with outlying populations in coastal valleys and ranges to the east of the divide, and the slopes and plains as far west as Cobar in NSW and Injune (500 kilometres NW of Brisbane) in Queensland.	Wollemi NP Yengo NP Manobalai NR Barrington Tops NP Watagans NP	The Conceptual Additional Disturbance Area does not provide suitable habitat for this species and it has not been recorded in the Conceptual Additional Disturbance Area. There is no potential for a significant impact on this species.	No

Species	EPBC Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region (BioNet 2015)	Occurrence in Conceptual Additional Disturbance Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
Grey-headed flying-fox *Pteropus poliocephalus*	V	This species occurs 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 kilometres of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.	This species is found within 200 kilometres of the eastern coast of Australia, from Bundaberg in Queensland to Melbourne in Victoria.	Yengo NP Wollemi NP Barrington Tops NP	This species has been identified in the Conceptual Additional Disturbance Area and is potentially sensitive to the development and therefore an assessment of significance has been undertaken.	Yes
Eastern long-eared bat (SE form) , greater long-eared bat *Nyctophilus timoriensis* (also known as *Nyctophilus corbeni*)	V	This species inhabits a variety of vegetation types, including mallee, bulloak (*Allocasuarina luehmannii*) 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. This species roosts in tree hollows, crevices, and under loose bark.	The distribution of the south eastern form of this species coincides approximately with the Murray Darling Basin with the Pilliga Scrub region a distinct stronghold for this species. This species has been recorded throughout NSW with the exception of the extreme north-west of the state, and most areas east of the Great Dividing Range (with the exception of the areas around Sydney).	Manobalai NR Wollemi NP	The Conceptual Additional Disturbance Area provides suitable habitat for this species, although it has not been recorded there. This species is potentially sensitive to the proposed development and therefore an assessment of significance has been undertaken.	Yes

Species	EPBC Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region (BioNet 2015)	Occurrence in Conceptual Additional Disturbance Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
Large-eared pied bat *Chalinolobus dwyeri*	V	This species is generally found in a variety of drier habitats, including dry sclerophyll forests and woodlands however, it probably tolerates a wide range of habitats. This species tends to roost in the twilight zones of mines and caves, generally in colonies or common groups.	This species has a distribution from south western Queensland to NSW from the coast to the western slopes of the Great Dividing Range. In NSW this species is not known to occur further west than Warrumbungle NP.	Wollemi NP Yengo NP Manobalai NR Watagans NP	This species occurs in the Conceptual Additional Disturbance Area and is potentially sensitive to the development and therefore an assessment of significance has been undertaken.	Yes
New Holland mouse *Pseudomys novaehollandiae*	V	This species inhabits a range of habitats from open heathlands, open woodlands with a heath understorey, as well as vegetated dunes. This species lives in a burrow which is shared with other individuals.	This species has a disjunct distribution across Tasmania, Victoria, Queensland and NSW.	This species is not known to occur in any reserves in the region in which the Proposed Action will be undertaken.	The Conceptual Additional Disturbance Area provides potentially suitable habitat for this species, however it has not been recorded in the Conceptual Additional Disturbance Area. This species has been recorded once (1981) in a 10 kilometre radius of the Referral Area on the NSW Atlas of Wildlife. This species is potentially sensitive to the proposed development and therefore an assessment of significance has been undertaken.	Yes

Species	EPBC Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region (BioNet 2015)	Occurrence in Conceptual Additional Disturbance Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
Hastings River mouse *Pseudomys oralis*	E	This species is known to inhabit a variety of dry open forest types with dense, low ground cover and a diverse mixture of ferns, grass, sedges and herbs. Access to seepage zones, creeks and gullies is important, as is permanent shelter such as rocky outcrops. Nests may be in gully areas or ridges and slopes.	This species has a patchy distribution along the east side of the Northern Tablelands and great escarpment of north-east NSW. This species usually but not always exists at elevations between 500 metres and 1100 metres above sea level.	Mt Royal NP Barrington Tops NP	The Conceptual Additional Disturbance Area or its surrounds do not provide suitable habitat for this species and it has not been recorded in the Conceptual Additional Disturbance Area. There is no potential for a significant impact on this species.	No
Migratory Species Listed Under International Conventions						
Great egret *Ardea modesta* (formerly known as *Ardea alba*)	CAMBA JAMBA	This species typically inhabits areas of shallow, flowing waters, but also uses damp grasslands and other watered areas. This species can be observed both in flocks and on its own, and roost during the night in groups.	This species is distributed throughout the world, and is common throughout most areas of Australia, with the exception of extremely arid areas.	This species is not known to occur in any reserves in the region in which the Proposed Action will be undertaken.	The Conceptual Additional Disturbance Area provides potentially suitable habitat for this species, although it has not been recorded there. This species is potentially sensitive to the proposed development.	Yes
Cattle egret *Ardea ibis*	CAMBA JAMBA	The cattle egret can be found in grasslands, wetlands and woodlands. This species is commonly sighted at garbage dumps, pastures and croplands (especially where poor drainage is present).	This species is distributed throughout Asia, Africa, Europe and Australia. It is most commonly found in north-eastern WA, the NT and in south-eastern Australia from Bundaberg Queensland through to Port Augusta SA.	Lake Glenbawn Recreation Area	The Conceptual Additional Disturbance Area provides potentially suitable habitat for this species, however it has not been recorded there. This species has been recorded in the local area. This species is potentially sensitive to the proposed development.	Yes

Species	EPBC Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region (BioNet 2015)	Occurrence in Conceptual Additional Disturbance Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
Australian painted snipe, painted snipe *Rostratula australis, Rostratula benghalensis* s. lat	CAMBA	Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber.	In NSW, this species has been recorded at the Paroo wetlands, Lake Cowal, Macquarie Marshes and Hexham Swamp. Most common in the Murray-Darling Basin.	This species is not known to occur in any reserves in the region in which the Proposed Action will be undertaken.	The Conceptual Additional Disturbance Area provides potentially suitable habitat for this species, although it has not been recorded there. This species is potentially sensitive to the proposed development.	Yes
White-throated needletail *Hirundapus caudacutus*	CAMBA JAMBA ROKAM	This species is only in Australia approximately between the months of October and May. This species forages upon flying insects and drinks whilst in flight. Feeding is typically associated with rising thermal currents typical with storm fronts and bushfires.	This species is distributed over eastern and northern Australia.	Manobalai NR Mt Royal NP Yengo NP Wollemi NP Ravensworth SF	This species has been previously recorded within the Conceptual Additional Disturbance Area. This species is potentially sensitive to the proposed development.	Yes
Fork-tailed swift *Apus pacificus*	CAMBA JAMBA ROKAM	This species is mostly found in Australia through the months of October through to April. This species spends most of its time when in flight ahead of storm fonts and updraughts.	This species can be found throughout mainland Australia during October to April. In Australia this species is most common west of the Great Dividing Range.	This species is not known to occur in any reserves in the region in which the Proposed Action will be undertaken.	The Conceptual Additional Disturbance Area provides potentially suitable habitat for this species, although it has not been recorded there. This species is potentially sensitive to the proposed development.	Yes

Species	EPBC Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region (BioNet 2015)	Occurrence in Conceptual Additional Disturbance Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
Rainbow bee-eater *Merops ornatus*	JAMBA	The preferred habitat of this species is open forests and woodlands, shrublands, and cleared or semi-cleared areas (commonly farmland). These areas are usually in close proximity to permanent water, however, during migration this bird may fly over areas of non-preferential habitat.	This species is distributed throughout most of mainland Australia as well as several near-shore islands.	Manobalai NR Wollemi NP Yengo NP Ravensworth SF	This species has been recorded within the Conceptual Additional Disturbance Area. This species is potentially sensitive to the proposed development.	Yes
Eastern osprey *Pandion cristatus*	Bonn	This species is mostly found in coastal and littoral habitats as well as terrestrial wetlands of tropical and temperate Australia (including offshore islands).	This species is known from Australia, Indonesia, Philippines, Palau Islands, New Guinea, Solomon Islands and New Caledonia. In Australia, this species is known to occur around the north coast from Albany in WA, and as far south as Lake Macquarie in NSW.	This species is not known to occur in any reserves in the region in which the Proposed Action will be undertaken.	A single record of this species has been identified within the Conceptual Additional Disturbance Area. This species is potentially sensitive to the development.	Yes
Lathams snipe, Japanese snipe *Gallinago hardwickii*	Bonn CAMBA JAMBA ROKAM	This species can be found in permanent and ephemeral wetlands up to 2000 metres above sea level. These water bodies are usually freshwater with low, dense vegetation. This species forages in areas of mud with some vegetation cover and roosts nearby to these areas. This species does not breed in Australia.	This species has been recorded from Cape York through to south-east SA. The range of this species extends from inland of the eastern tablelands in south-east Queensland to west of the Great Dividing Range in NSW.	This species is not known to occur in any reserves in the region in which the Proposed Action will be undertaken.	The Conceptual Additional Disturbance Area provides potentially suitable habitat for this species, although it has not been recorded there. This species is potentially sensitive to the proposed development.	Yes

Species	EPBC Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region (BioNet 2015)	Occurrence in Conceptual Additional Disturbance Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
Black-faced monarch *Monarcha melanopsis*	Bonn	This species can be identified in coastal scrub, damp gullies, eucalypt woodlands and rainforests. This species can be seen foraging for insects amongst foliage, and builds a deep, cup-shaped nest in a tree fork which is made of cobwebs, casuarinas needles, bark, moss and roots.	This species is distributed along the eastern coast of Australia, gradually becoming less common towards the south.	Wollemi NP Yengo NP Mt Royal NP Belford NP	The Conceptual Additional Disturbance Area does not provide suitable habitat for this species and it has not been recorded in the Conceptual Additional Disturbance Area. There is no potential for a significant impact on this species.	No
Satin flycatcher *Myiagra cyanoleuca*	Bonn	This species typically inhabits wet areas of tall forests, particularly in gullies. This species moves north in the winter and is seldom seen in NSW, Tasmania, Victoria or SA during these times.	This species can be found in both Australia and New Guinea. In Australia it is distributed along the east coast from Cape York through to Tasmania, also covering parts of south-eastern SA.	Mt Royal NP	The Conceptual Additional Disturbance Area provides suitable habitat for this species, although it has not been recorded there. This species is potentially sensitive to the proposed development.	Yes
Rufous fantail *Rhipidura rufifrons*	Bonn	This species typically inhabits areas of dense wet forest, mangrove, rainforest or swamp woodlands. This species prefers areas where there is intense shade available and is often seen close to ground. In winter it is seldom found in NSW or Victoria.	This species is distributed across the north and eastern coast of Australia, but is also found in Guam, New Guinea, the Solomon Islands and Sulawesi.	Wollemi NP Mt Royal NP Belford NP Yengo NP	This species has been identified in the Conceptual Additional Disturbance Area. This species is potentially sensitive to the proposed development.	Yes

Notes:

Bonn	Bonn Convention
CAMBA	China-Australia Migratory Bird Agreement
CE	Critically Endangered
E:	Endangered
EPBC:	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
EX	Extinct
JAMBA	Japan-Australia Migratory Bird Agreement

LGA:	Local Government Area
MIG:	Migratory
NP:	National Park
NR:	Nature Reserve
ROKAMBA	Republic of Korea-Australia Migratory Bird Agreement
SF:	State Forest
SCA:	State Conservation Area
V:	Vulnerable

Appendix D – Assessment of Significance under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires the completion of an Assessment of Significance relating to the potential impacts of a Proposed Action on listed Matters of National Environmental Significance (MNES). A search of the Department of the Environment (DoE) Protected Matters Database (undertaken on 3 August 2015) identified threatened and migratory species and threatened ecological communities (TECs) known to occur or considered likely to occur, on the basis of habitat modelling, within 10 kilometres of the boundary of the Referral Area. A likelihood of occurrence assessment of each of the identified species has been undertaken in Attachment C to identify the threatened and migratory species and TECs that require an assessment of significance test.

Table 1 presents the threatened species, migratory species and TECs identified in Attachment C as requiring an Assessment of Significance test.

Table 1 - Threatened and Migratory Species Considered in the Following Assessments

Common Name	Scientific Name
Critically Endangered Species	
Leek orchid / Tarengo leek orchid	*Prasophyllum* sp. Wybong (C. Phelps ORG 5269) / *Prasophyllum petilum*
Regent honeyeater	*Anthochaera phrygia*
Endangered Species	
Illawarra greenhood	*Pterostylis gibbosa*
Swift parrot	*Lathamus discolor*
Spotted-tailed quoll (SE mainland population)	*Dasyurus maculatus maculatus*
Green and golden bell frog	*Litoria aurea*
Vulnerable Species	
Slaty red gum	*Eucalyptus glaucina*
Eastern long-eared bat (SE form) , greater long-eared bat	*Nyctophilus timoriensis*
Large-eared pied bat	*Chalinolobus dwyeri*
Koala	*Phascolarctos cinereus*
New Holland mouse	*Pseudomys novaehollandiae*
Grey-headed flying-fox	*Pteropus poliocephalus*
Australian painted snipe, painted snipe	*Rostratula australis, Rostratula benghalensis s. lat*
Austral toadflax	*Thesium australe*
Migratory Species Listed under International Conventions	
Great egret	*Ardea alba*
Cattle egret	*Ardea ibis*
Australian painted snipe, painted snipe	*Rostratula australis, Rostratula benghalensis s. lat*
Eastern osprey	*Pandion cristatus*
White-throated needletail	*Hirundapus caudacutus*
Fork-tailed swift	*Apus pacificus*
Rainbow bee-eater	*Merops ornatus*
Lathams snipe, Japanese snipe	*Gallinago hardwickii*

Satin flycatcher	*Myiagra cyanoleuca*
Rufous fantail	*Rhipidura rufifrons*
Critically Endangered Ecological Communities	
Central Hunter Valley Eucalypt Forest and Woodland	

An Assessment of Significance (according to the significant impact criteria for each MNES) is provided below for those MNES identified within the Conceptual Additional Disturbance Areas, or considered to be potentially impacted by the Proposed Action (as assessed within **Attachment C**).

Critically Endangered Species

The following EPBC Act listed endangered species are considered in this assessment:

- Leek orchid/Tarengo Leek Orchid (*Prasophyllum* sp. Wybong (C. Phelps ORG 5269) / *Prasophyllum petilum*)

- Regent honeyeater (*Anthochaera phrygia*);

An assessment in accordance with the DoE (2013) Significant impact guidelines 1.1 is provided below for this species.

In this case, a '*population of a species'* is defined as an occurrence of the species in a particular area. Occurrences include but are not limited to:

- **A geographically distinct regional population, or collection of local populations, or**
- **A population, or collection of local populations, that occurs within a particular bioregion.**

Prasophyllum sp. Wybong / *Prasophyllum petilum* has not been recorded in the Conceptual Additional Disturbance Area or within 20 kilometres of the Referral Area. However, given the protection status afforded to this species, an assessment of significance has been undertaken as a precautionary approach. It is subsequently considered that if this species were to occur it would likely be in very low numbers. While it has not been recorded within the Conceptual Additional Disturbance Area, if it did occur it may form a population as defined by the Significant Impact Guidelines 1.1 of the EPBC Act.

The regent honeyeater was not recorded within the Conceptual Additional Disturbance Area despite targeted survey and annual winter bird survey monitoring.

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:

- **lead to a long-term decrease in the size of a population, or;**

Prasophyllum sp. Wybong / *Prasophyllum petilum* is considered unlikely to occur given that extensive surveys over many years have not identified this species. The Proposed Action is considered unlikely to lead to a long-term decrease of a population of these species.

While 227 hectares of potentially suitable foraging habitat exists within the Conceptual Additional Disturbance Area for the regent honeyeater, this habitat is likely to only be sporadically used for short periods of time. In most years a small proportion of the eucalypts present in the Conceptual Additional Disturbance Area will flower and may provide a small short term foraging resource for the species. If utilised by the regent honeyeater in a particular year, the small numbers of flowering trees are likely to be used for between a few days and a few weeks. The regent honeyeater has not been recorded in the Conceptual Additional Disturbance Area despite targeted annual winter bird surveys. Therefore, the Proposed Action is unlikely to lead to a long-term decrease in the size of a population of the regent honeyeater.

- **reduce the area of occupancy of the species, or;**

As *Prasophyllum* sp. Wybong / *Prasophyllum petilum* is considered unlikely to occur given that extensive surveys over many years which have not identified the species, it is considered unlikely that the Proposed Action would reduce the area of occupancy of this species.

The regent honeyeater has not been recorded in the Conceptual Additional Disturbance Area despite targeted annual winter bird surveys. Nevertheless, the regent honeyeater may be a rare visitor to the Conceptual Additional Disturbance Area during winter months when eucalypt tree species flower. The Proposed Action will remove 227 hectares of potential habitat for the regent honeyeater. Therefore the Proposed Action would reduce the potential area of occupancy for the species. .

- **fragment an existing population into two or more populations, or;**

As *Prasophyllum* sp. Wybong / *Prasophyllum petilum* is considered highly unlikely to occur within the Conceptual Additional Disturbance Area, it is considered unlikely that the Proposed Action would fragment any existing populations of this potentially occurring species.

As the regent honeyeater is a highly mobile species that forages over large distances in search of nectar resources, the removal of 227 hectares of potential habitat is considered unlikely to fragment any regent honeyeater population into two or more populations.

- **adversely affect habitat critical to the survival of a species, or;**

The habitat within the Conceptual Additional Disturbance Area is not considered to be critical to the survival of *Prasophyllum* sp. Wybong / *Prasophyllum petilum* therefore the Proposed Action is unlikely to adversely affect habitat critical to the survival of this species.

The habitat within the Conceptual Additional Disturbance Area is not considered to be critical to the survival of the regent honeyeater and therefore the Proposed Action is unlikely to adversely affect habitat critical to the survival of the species.

- **disrupt the breeding cycle of a population, or;**

As *Prasophyllum* sp. Wybong / *Prasophyllum petilum* is considered unlikely to occur given that extensive survey undertaken has not identified the species within the Conceptual Additional Disturbance Area, the Proposed Action is considered unlikely to disrupt the breeding cycle of any population of this species.

The regent honeyeater may occur within the Conceptual Additional Disturbance Area on a rare basis and for short periods of time. It is considered unlikely that the Proposed Action would disrupt the breeding cycle of any population of the regent honeyeater.

- **modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or;**

As the presence of potentially suitable habitat for *Prasophyllum* sp. Wybong / *Prasophyllum petilum* is considered to be marginal within the Conceptual Additional Disturbance Area, the Proposed Action is considered unlikely to modify, destroy, remove, isolate, or decrease the availability or quality of habitat for these potentially occurring species to the extent that it would be likely to decline.

Although potential habitat for the regent honeyeater (approximately 227 hectares) would be removed within the Conceptual Additional Disturbance Area, the Proposed Action is considered unlikely to modify, destroy, remove, isolate, or decrease the availability or quality of habitat for these potentially occurring species to the extent that the regent honeyeater would be likely to decline.

- **result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species habitat, or;**

As only potentially suitable habitat for *Prasophyllum* sp. Wybong / *Prasophyllum petilum* was identified within the Conceptual Additional Disturbance Area, the Proposed Action is considered unlikely to result in invasive species that are harmful to *Prasophyllum* sp. Wybong / *Prasophyllum petilum* becoming established in its habitat.

The Proposed Action is not likely to result in invasive species that are harmful to the regent honeyeater becoming established in its habitat.

- **introduce disease which may cause the species to decline, or;**

The Proposed Action is not likely to introduce a disease which may cause a decline in *Prasophyllum* sp. Wybong / *Prasophyllum petilum* or the regent honeyeater.

- **interfere with the recovery of the species.**

The Proposed Action is unlikely to interfere substantially with the recovery of *Prasophyllum* sp. Wybong / *Prasophyllum petilum* or the regent honeyeater.

Conclusion

The Proposed Action is unlikely to result in a significant impact on *Prasophyllum* sp. Wybong / *Prasophyllum petilum* or the regent honeyeater.

Endangered Species

The following EPBC Act listed endangered species are considered in this assessment:

- Illawarra greenhood (*Pterostylis gibbosa*);
- Green and golden bell frog (*Litoria aurea*);
- Swift parrot (*Lathamus discolor*); and
- Spotted-tailed quoll (SE mainland population) (*Dasyurus maculatus maculatus*).

An assessment in accordance with the DEWHA (2009) significant impact guidelines 1.1 is provided below for these species.

In this case, a '*population of a species'* is defined as an occurrence of the species in a particular area. Occurrences include but are not limited to:

- **A geographically distinct regional population, or collection of local populations, or**
- **A population, or collection of local populations, that occurs within a particular bioregion.**

Pterostylis gibbosa is known to occur at five recorded locations within 20 kilometres of the Referral Area. While it has not been recorded within the Conceptual Additional Disturbance Area, if it did occur it may form a 'population' as defined by the Significant Impact Guidelines 1.1 of the EPBC Act.

The green and golden bell frog was not been recorded in the Conceptual Additional Disturbance Area despite the presence of potentially suitable habitat. The green and golden bell frog has been recorded once within 10 kilometres of the boundary of the Referral Area on the NSW Atlas of Wildlife. It is considered that the green and golden bell frog, if present, would constitute a 'population' as defined by the Significant Impact Guidelines 1.1 of the EPBC Act.

The swift parrot has been recorded 3 kilometres from the Referral Area based on records from the Atlas of NSW Wildlife (OEH 2015). While it has not been recorded within the Conceptual Additional Disturbance Area, if it did occur it may form a 'population' as defined by the Significant Impact Guidelines 1.1 of the EPBC Act.

The spotted-tailed quoll (SE mainland population) has been recorded on a single occasion in the east of the Conceptual Additional Disturbance Area. This record was made by way of baited (i.e. a food source to attract animals) remote camera in an area of swamp oak vegetation during 2013. This species has not been recorded prior to this event or since this point of time despite subsequent targeted survey. There are few recent records of this species occurring from the floor of the Hunter Valley. It is considered unlikely that the spotted-tailed quoll is breeding within the Conceptual Additional Disturbance Area, however it is likely that the spotted-tailed quoll utilises the habitats available as part of a wider territory. The spotted-tailed quoll has been recorded once in 2013 by a remote camera set by United personnel. While it has not been recorded within the Conceptual Additional Disturbance Area since then, if it did occur it may form a 'population' as defined by the Significant Impact Guidelines 1.1 of the EPBC Act.

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:

- **lead to a long-term decrease in the size of a population, or;**

Pterostylis gibbosa is considered unlikely to occur given the survey did not identify the species and no potentially suitable habitat was identified within the Conceptual Additional Disturbance Area. The Proposed Action is therefore unlikely to lead to a long-term decrease of the population size of these species.

While potentially suitable habitat exists within the Conceptual Additional Disturbance Area for the green and golden bell frog, it is considered unlikely to occur given the extended period of survey (by Umwelt and other previous ecological surveyors) has not identified the species and there are no known occurrences within 10 kilometres of the Referral Area. The Proposed Action is unlikely to lead to a long-term decrease in the size of a population of the green and golden bell frog.

While 227 hectares of potentially suitable foraging habitat exists within the Conceptual Additional Disturbance Area for the swift parrot, this habitat is likely to be sporadically used for short periods of time when eucalypt trees flower during winter. In most years a small proportion of the eucalypts present flower and may provide a small short term foraging resource for the species. If utilised by the swift parrot in a particular year, the small numbers of flowering trees are likely to be used for between a few days and a few weeks. Additionally swift parrots may also forage for lerps in eucalypt foliage and typically remain in foraging areas for between a few days and a few weeks, before moving to the next foraging area. The swift parrot has not been recorded in the Conceptual Additional Disturbance Area despite targeted annual winter bird surveys. Therefore, the Proposed Action is unlikely to lead to a long-term decrease of the size of a population of the swift parrot.

While habitat exists within the Conceptual Additional Disturbance Area for the spotted-tail quoll, the species has been recorded only once, in 2013. It is likely that the Conceptual Additional Disturbance Area forms part of a large home range area for one or a small number of spotted-tailed quolls that forage within in the Conceptual Additional Disturbance Area on an occasional basis. As the Conceptual Additional Disturbance Area is unlikely to support a significant component of a resident population of the spotted-tailed quoll, the Proposed Action is unlikely to lead to a long-term decrease of the size of a population of the spotted-tail quoll.

- **reduce the area of occupancy of the species, or;**

As *Pterostylis gibbosa* is considered unlikely to occur given the survey did not identify the species and no potentially suitable habitat was identified within the Conceptual Additional Disturbance Area, it is considered unlikely that the Proposed Action would reduce the area of occupancy of this species.

As the green and golden bell frog has not been recorded within the Conceptual Additional Disturbance Area, it is considered unlikely that the Proposed Action would reduce the area of occupancy of the green and golden bell frog.

The swift parrot may be a rare visitor to the Conceptual Additional Disturbance Area during winter months when eucalypt tree species flower and as a result the Proposed Action would reduce the potential area of occupancy. The Proposed Action will remove 227 hectares of potential habitat for the swift parrot. The swift parrot has not been recorded in the Conceptual Additional Disturbance Area despite targeted annual winter bird surveys.

The spotted-tailed quoll has been recorded once in the Conceptual Additional Disturbance Area in 2013 and may occur on an occasional or rare basis. If present, the Proposed Action would result in a 462 hectare reduction of the potential area of occupancy of the spotted-tailed quoll.

- **fragment an existing population into two or more populations, or;**

As *Pterostylis gibbosa* has not been recorded within the Conceptual Additional Disturbance Area, it is considered unlikely that the Proposed Action would fragment any existing populations of any of these species into two or more populations.

As the green and golden bell frog has not been recorded within the Conceptual Additional Disturbance Area, it is considered unlikely that the Project would fragment any existing populations into two or more populations.

As the swift parrot is a highly mobile species that forages over large distances in search of nectar resources, the removal of 227 hectares of potential habitat is considered unlikely to fragment any swift parrot populations into two or more populations.

The spotted-tailed quoll has been recorded once within the Conceptual Additional Disturbance Area. The spotted-tailed quoll recorded in the Conceptual Additional Disturbance Area is likely to belong to a local population of the spotted-tailed quoll that predominantly occurs in Wollemi National Park and extends occasionally onto the valley floor. The spotted-tailed quoll has not been recorded in adjacent habitat areas of Wambo Coal Mine and has only once been recorded in the Warkworth Mine associated habitat areas to the south of the Proposed Action, recorded as a 1979 scat record. Habitat areas of the Conceptual Additional Disturbance Area and surrounds are likely to provide suboptimal habitat for the species given the level of surrounding disturbance from mining and agriculture. The disturbance of the Proposed Action may reduce the ability of individuals in Wollemi National Park to disperse or move to suboptimal habitat areas within the Conceptual Additional Disturbance Area, leaving only a narrow connection of riparian vegetation along Wollombi Brook. Additional areas of woodland habitat occur to the south and east of Wollombi Brook that may also provide a connection between the areas east of the Conceptual Additional Disturbance Area and Wollemi National Park. The reduction of the ability of the species to disperse or move to the east is considered unlikely to fragment an existing population into two or more populations.

- **adversely affect habitat critical to the survival of a species, or;**

The habitat within the Conceptual Additional Disturbance Area is not considered to be critical to the survival of *Pterostylis gibbosa* therefore the Proposed Action is unlikely to adversely affect habitat critical to the survival of this species.

The habitat within the Conceptual Additional Disturbance Area is not considered to be critical to the survival of the green and golden bell frog, swift parrot or spotted-tailed quoll and therefore the Proposed Action is unlikely to adversely affect habitat critical to the survival of any of these species.

- **disrupt the breeding cycle of a population, or;**

As *Pterostylis gibbosa* has not been recorded within the Conceptual Additional Disturbance Area, the Proposed Action is considered unlikely to disrupt the breeding cycle of any population of this species.

While potentially suitable habitat exists within the Conceptual Additional Disturbance Area for the green and golden bell frog, it is considered unlikely to occur given that the extended

period of survey (by Umwelt and other previous ecological surveyors) has not identified the species and that only one record of this species occurs within 10 kilometres of the Conceptual Additional Disturbance Area. The Proposed Action is unlikely to disrupt the breeding cycle of any population of the green and golden bell frog.

The swift parrot may occur within the Conceptual Additional Disturbance Area on a rare basis and large areas of potentially suitable habitat occur nearby and well within the mobility range of the species. As the swift parrot breeds in Tasmania and visits the mainland only during the non-breeding season, the potential reduction of up to 227 hectares of potential foraging habitat is considered unlikely to disrupt the breeding cycle of the National swift parrot population.

While recorded within the Conceptual Additional Disturbance Area, the spotted-tailed quoll is likely to occur on an occasional or rare basis when dispersing or moving east from high quality habitat areas in Wollemi National Park. As only a very small portion of the spotted-tailed quoll population that occurs in the very large Wollemi National Park is likely to occur on an occasional or rare basis in the Conceptual Additional Disturbance Area, the Proposed Action is unlikely to disrupt the breeding cycle of the species.

- **modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or;**

As no potentially suitable habitat for *Pterostylis gibbosa* was identified within the Conceptual Additional Disturbance Area, the Proposed Action is considered unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat for *Pterostylis gibbosa* to the extent that it would be likely to decline.

Although potential habitat for the swift parrot (approximately 227 hectares of woodland vegetation), green and golden bell frog (farm dams) and spotted-tailed quoll (approximately 462 hectares of woodland and grassland habitats) would be removed within the Conceptual Additional Disturbance Area, the Proposed Action is considered unlikely to modify, destroy, remove, isolate, or decrease the availability or quality of habitat for these potentially occurring species to the extent that any of the four species would be likely to decline.

Nearby large potential habitat areas for the regent honeyeater, swift parrot and spotted-tailed quoll occur in the nearby Wollemi National Park (approximately 488,620 hectares), providing alternative habitat areas for the highly mobile species.

- **result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species habitat, or;**

As no potentially suitable habitat for *Pterostylis gibbosa* was identified within the Conceptual Additional Disturbance Area, the Proposed Action is considered unlikely to result in invasive species that are harmful to *Pterostylis gibbosa* becoming established in its habitat.

The Proposed Action is not likely to result in invasive species that are harmful to the swift parrot, green and golden bell frog or spotted-tailed quoll, becoming established in their habitat.

- **introduce disease which may cause the species to decline, or;**

The Proposed Action is not likely to introduce a disease which may cause a decline in *Pterostylis gibbosa*.

The Proposed Action is not likely to introduce a disease which may cause a decline in the

swift parrot, green or golden bell frog or spotted-tailed quoll.

- **interfere with the recovery of the species.**

The Proposed Action is unlikely to interfere substantially with the recovery of *Pterostylis gibbosa*.

The Proposed Action is unlikely to interfere substantially with the recovery of the swift parrot, green and golden bell frog or spotted-tailed quoll.

Conclusion

The Proposed Action is unlikely to result in a significant impact on *Pterostylis gibbosa*.

The green and golden bell frog has not been recorded within the Conceptual Additional Disturbance Area and is considered unlikely to occur in this area. The Proposed Action is unlikely to result in a significant impact on the green or golden bell frog.

The Proposed Action is likely to reduce the potential area of occupancy of the spotted quoll by 462 hectares and the swift parrot by 227 hectares. However, as there has only been one record of one individual spotted quoll and no occurrences of the swift parrot at the site, and given the likely rare and short (days not weeks) visits to the Conceptual Additional Disturbance Area by a likely small number of individuals of each species, combined with the occurrence of abundant similar potential habitat areas in the nearby Wollemi National Park, the Proposed Action is considered unlikely to result in a significant impact on the spotted-tail quoll or swift parrot.

Vulnerable Species

The following EPBC Act listed vulnerable species are considered in this assessment:

- Slaty red gum (*Eucalyptus glaucina*);
- Austral toadflax (*Thesium australe*).
- Eastern long-eared bat (SE form) , greater long-eared bat (*Nyctophilus timoriensis*)
- Large-eared pied bat (*Chalinolobus dwyeri*)
- Koala (*Phascolarctos cinereus*)
- New Holland mouse (*Pseudomys novaehollandiae*)
- Grey-headed flying-fox (*Pteropus poliocephalus*) and
- Australian painted snipe (*Rostratula australis*, *Rostratula benghalensis s. lat*)

An assessment in accordance with the DoE (2013) significant impact guidelines 1.1 is provided below for these species.

In this case, an *important population* is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- **key source populations either for breeding or dispersal; or**
- **populations that are necessary for maintaining genetic diversity, and/or**
- **populations that are near the limit of the species range.**

Eucalyptus glaucina and *Thesium australe* were not recorded within the Conceptual Additional Disturbance Area. As these species have not been recorded within the Conceptual Additional Disturbance Area and are not likely to occur within the Conceptual Additional Disturbance Area it is considered unlikely that an *important population* of these species as defined by the Significant Impact Guidelines 1.1 of the EPBC Act occurs within the Conceptual Additional Disturbance Area.

The large-eared pied bat has been recorded within the Conceptual Additional Disturbance Area; however as this species is a cave-dwelling bat species (and no potential roost sites are present), it is likely that the Conceptual Additional Disturbance Areas provides only foraging habitat for the species. The presence of this species in the Conceptual Additional Disturbance Area is not at the known distributional limit for this species and is unlikely to be important for the maintenance of genetic diversity. Consequently, the record of this species within the Conceptual Additional Disturbance Area is not likely to constitute an *important population* of this species.

The grey-headed flying-fox has been recorded within the Conceptual Additional Disturbance Area; however, roosting sites for this species are readily identifiable and have not been identified within the Conceptual Additional Disturbance Area. As a consequence, it is likely that the grey-headed flying-fox, would only use the habitat of the Conceptual Additional

Disturbance Area as part of a much larger foraging range. Consequently, the presence of the grey-headed flying-fox in the Conceptual Additional Disturbance Area is not likely to constitute an important population for this species.

The koala has been identified within the Conceptual Additional Disturbance Area, however, this record was identified from old scats under a single tree in 2006. No other records of the koala have been made since 2006 despite numerous Spot Assessment Technique (SAT) searches and several spotlighting surveys of the Conceptual Additional Disturbance Area between 2009 and 2015. The koala is considered unlikely to occur in the Conceptual Additional Disturbance Area and the 2006 record is likely to be a record of a dispersing individual moving through the landscape. There is not an important resident population of the koala in the Conceptual Additional Disturbance Area.

The New Holland mouse, eastern long-eared bat (SE Form) and Australian painted snipe, have not been recorded within the Conceptual Additional Disturbance Area, however potential habitat is present for each species and they could potentially occur. Despite this, the potential presence of any of these species would be unlikely to comprise part of an *important population* as they would not be at the known limits of their ranges and consequently would be unlikely to be important for maintaining genetic diversity or be key populations for breeding or dispersal.

An action has, will have, or is likely to have a significant impact on threatened species if it does, will, or is likely to:

- **lead to a long-term decrease in the size of an important population of a species;**

The Conceptual Additional Disturbance Area is unlikely to comprise an important population of *Eucalyptus glaucina* and *Thesium australe*. It is therefore unlikely that the Proposed Action would lead to a long-term decrease in an important population of these species.

The large-eared pied bat, New Holland mouse, grey-headed flying-fox, koala, eastern long-eared bat (SE Form) and Australian painted snipe, are unlikely to comprise *important populations* of these species.

It is unlikely that the Proposed Action will lead to a long-term decrease to any important populations of large-eared pied bat, New Holland mouse, grey-headed flying-fox, koala, eastern long-eared bat (SE Form) or Australian painted snipe.

- **reduce the area of occupancy of an important population, or;**

Eucalyptus glaucina and Thesium australe were not identified during field surveys of the Conceptual Additional Disturbance Area and therefore it is considered unlikely to occur in the Conceptual Additional Disturbance Area. The Proposed Action is therefore unlikely to reduce the area of occupancy of an important population of the *Eucalyptus glaucina* or *Thesium australe*.

The potential presence of the New Holland mouse, koala, eastern long-eared bat (SE Form) and Australian painted snipe are unlikely to comprise *important populations* of these species.

The Proposed Action may potentially reduce the availability of foraging habitat available to the large-eared pied bat and grey-headed flying-fox, however the extent of the reduction is not likely to be significant to the populations of these species.

The Proposed Action is unlikely to reduce the area of occupancy of any *important populations* of large-eared pied bat, New Holland mouse, grey-headed flying-fox, koala, eastern long-eared bat (SE Form) and Australian painted snipe.

- **fragment an existing important population into two or more populations, or;**

Eucalyptus glaucina and Thesium australe were not identified during field surveys of the Conceptual Additional Disturbance Area and therefore are considered unlikely to occur in the Conceptual Additional Disturbance Area. The Proposed Action is therefore unlikely to fragment an existing important population of *Eucalyptus glaucina or Thesium australe* into two or more populations.

The New Holland mouse, koala, eastern long-eared bat (SE Form) and Australian painted snipe, are unlikely to comprise *important populations* of these species.

The Conceptual Additional Disturbance Area may potentially fragment foraging habitat for the large-eared pied bat and the grey-headed flying-fox; however, these species are highly mobile and unlikely to be significantly impacted by the extent of habitat fragmentation.

The Proposed Action is unlikely to fragment *important populations* of large-eared pied bat, New Holland mouse, grey-headed flying-fox, koala, eastern long-eared bat (SE Form) or Australian painted snipe.

- **adversely affect habitat critical to the survival of a species, or;**

As *Eucalyptus glaucina and Thesium australe* are unlikely to occur within the Conceptual Additional Disturbance Area, the Proposed Action is unlikely to adversely affect habitat critical to the survival of these species.

Potential habitat occurs for the New Holland mouse, koala, eastern long-eared bat (SE Form) and Australian painted snipe. The loss of the potential habitat for each of these species is unlikely to affect the survival of each of the species.

While the Conceptual Additional Disturbance Area provides foraging habitat for both the large-eared pied bat and grey-headed flying-fox the habitat is unlikely to be critical to the survival of either species.

The Proposed Action is unlikely to adversely affect habitat critical to the survival of the large-eared pied bat, New Holland mouse, grey-headed flying-fox, koala, eastern long-eared bat (SE Form) and Australian painted snipe.

- **disrupt the breeding cycle of an important population, or;**

Eucalyptus glaucina and Thesium australe are considered unlikely to occur and therefore unlikely to comprise important populations. The Proposed Action is unlikely to disrupt the breeding cycle of an important population of these species.

The large-eared pied bat, New Holland mouse, grey-headed flying-fox, koala, eastern long-eared bat (SE Form) and Australian painted snipe are unlikely to comprise *important populations* of these species.

The large-eared pied bat is a cave-roosting bat species and there are no appropriate areas in the Conceptual Additional Disturbance Area for this species to roost. The grey-headed

flying-fox roosts in camps; no camps have been identified in the Conceptual Additional Disturbance Area, and given the level of survey effort in the Conceptual Additional Disturbance Area and that these camps are typically readily observable when present, it is unlikely that there are any camp sites for this species present.

The Proposed Action is unlikely to disrupt the breeding cycle of an *important population* of the large-eared pied bat, New Holland mouse, grey-headed flying-fox, koala, eastern long-eared bat (SE Form) or Australian painted snipe.

- **modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or;**

As no potentially suitable habitat for *Eucalyptus glaucina or Thesium australe* was identified within the Conceptual Additional Disturbance Area, the Proposed Action is considered unlikely to modify, destroy, remove, isolate, or decrease the availability or quality of habitat for these potentially occurring species to the extent that any of these species would be likely to decline.

The Proposed Action is unlikely to modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline for the large-eared pied bat, New Holland mouse, grey-headed flying-fox, koala, eastern long-eared bat (SE Form) or Australian painted snipe.

- **result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat, or;**

The Proposed Action is unlikely to result in an invasive species that is harmful to *Eucalyptus glaucina and Thesium australe* becoming established in their habitat.

The Proposed Action is unlikely to result in an invasive species becoming established that is harmful to large-eared pied bat, New Holland mouse, grey-headed flying-fox, koala, eastern long-eared bat (SE Form) or Australian painted snipe.

- **interferes substantially with the recovery of the species.**

The Proposed Action is unlikely to interfere substantially with the recovery of *Eucalyptus glaucina or Thesium australe.*

It is unlikely that the Proposed Action would interfere substantially with the recovery of the large-eared pied bat, New Holland mouse, grey-headed flying-fox, koala, eastern long-eared bat (SE Form) or Australian painted snipe.

Conclusion

The Proposed Action is unlikely to result in a significant impact on an important population of *Eucalyptus glaucina or Thesium australe.*

The Proposed Action is unlikely to result in a significant impact on an *important population* of the large-eared pied bat, New Holland mouse, grey-headed flying-fox, koala, eastern long-eared bat (SE Form) or Australian painted snipe.

Migratory Species

The following EPBC Act listed migratory species are considered in this assessment:

- Great egret (*Ardea alba*);
- Cattle egret (*Ardea ibis*);
- Australian painted snipe (*Rostratula australis*);
- Eastern osprey (*Pandion cristatus*);
- White-throated needletail (*Hirundapus caudacutus*);
- Fork-tailed swift(*Apus pacificus*);
- Rainbow bee-eater (*Merops ornatus*);
- Lathams snipe (*Gallinago hardwickii*);
- Satin flycatcher (*Myiagra cyanoleuca*); and
- Rufous fantail (*Rhipidura rufifrons*).

An assessment in accordance with the DoE (2013) significant impact guidelines 1.1 is provided below for these species.

An area of *important habitat* is:

- **habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species; or**
- **habitat utilised by a migratory species which is at the limit of the species range; or**
- **habitat within an area where the species is declining.**

The only migratory species that have identified in the Conceptual Additional Disturbance Area are the eastern osprey (*Pandion cristatus*), rainbow bee-eater (*Merops ornatus*), white-throated needletail (*Hirundapus caudacutus*), Lathams snipe (*Gallinago hardwickii*) and rufous fantail (*Rhipidura rufifrons*). Of these species, the eastern osprey, Latham's snipe and white-throated needletail have only been recorded on a single occasion and it is considered that these species may rarely utilise the habitats of the Conceptual Additional Disturbance Area while passing between areas of more appropriate habitat. The rufous fantail has been recorded on two separate occasions and it likely that this species is a regular visitor during the warmer months of the year; however it is not considered that the numbers recorded would comprise an ecologically significant proportion as numbers recorded were two individuals (or less) on each occasion. The rainbow bee-eater is regularly identified in the Conceptual Additional Disturbance Area and there is potential that it could breed onsite; however the numbers of this species recorded during any one occasion have are low.

The great egret (*Ardea alba*), cattle egret (*Ardea ibis*), Australian painted snipe (*Rostratula australis*), fork-tailed swift (*Apus pacificus*), and satin flycatcher (*Myiagra cyanoleuca*), have

not been recorded within the Conceptual Additional Disturbance Area despite extensive survey over many years. However, the Conceptual Additional Disturbance Area is considered to have potentially suitable habitat for these species to occur. If these species were to occur it is considered that it would be rarely and only for short periods of time.

The Conceptual Additional Disturbance Area is not regarded to comprise *important habitat* or an ecologically significant proportion of a population for any of the occurring and potentially occurring listed migratory species, based on the criteria described above.

An action is likely to have a significant impact on a migratory species if there is a real chance of possibility that it will:

- **substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles of altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species**

The Conceptual Additional Disturbance Area is not regarded to comprise important habitat for any of the occurring and potentially occurring listed migratory species, based on the criteria described above. As such, no further assessment is required.

- **Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species**

The Conceptual Additional Disturbance Area is not regarded to comprise important habitat for any of the occurring and potentially-occurring listed migratory species, based on the criteria described above. As such, the Proposed Action will not result in invasive species becoming established in any areas of important habitat for any listed migratory species.

- **Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species**

The Conceptual Additional Disturbance Area is not regarded to comprise an ecologically significant proportion of the population for any of the occurring and potentially-occurring listed migratory species. As such, the Proposed Action will not seriously disrupt the lifecycle of any ecologically significant proportion of any of the above listed migratory species.

Conclusion

The Proposed Action is unlikely to result in a significant impact on any EPBC Act listed migratory species.

Critically Endangered Ecological Communities

The following EPBC Act listed critically endangered ecological communities were considered in this assessment:

- Central Hunter Valley Eucalypt Forest and Woodland;

An assessment in accordance with the DoE (2013) significant impact guidelines 1.1 is provided below for these ecological communities.

A total of approximately 212 hectares of the Central Hunter Valley Eucalypt Forest and Woodland CEEC (Central Hunter Valley CEEC) has been recorded in the Conceptual Additional Disturbance Area.

An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:

- **Reduce the extent of an ecological community**

The removal of approximately 212 hectares of the Central Hunter Valley CEEC as a result of the Proposed Action will reduce the extent of the community, however the level of the reduction is considered minor given the current extent of 37,000 hectares of the community (i.e. 0.57%).

- **Fragment or increase fragmentation of an ecological community;**

The removal of approximately 212 hectares of the Central Hunter Valley CEEC will result in an increase in the fragmentation of the community. The level of fragmentation will increase in the local area with the removal of remnants totalling approximately 212 hectares however, given the current occurrence of approximately 37,000 hectares of the community, the level of increase in fragmentation is considered to be negligible.

- **adversely affect habitat critical to the survival of an ecological community;**

The conservation advice for the Central Hunter Valley CEEC identifies area of moderate quality condition class as being areas critical to the survival of the community. Areas of moderate quality condition occur within the Conceptual Additional Disturbance Area, however given the current approximate 37,000 hectare extent of the community, the removal of the moderate quality condition areas from the Conceptual Additional Disturbance Area is considered unlikely to affect the survival of the Central Hunter Valley CEEC.

- **modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns;**

The removal of approximately 212 hectares of the Central Hunter Valley CEEC will remove the community from the Conceptual Additional Disturbance Area, however, the Proposed Action is unlikely to modify or destroy the abiotic factors that affect the survival of the ecological community in surrounding areas.

- **cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting;**

The removal of approximately 212 hectares of the Central Hunter Valley CEEC will remove this ecological community from the Conceptual Additional Disturbance Area although it is unlikely to result in a substantial change in the species composition in the surrounding areas or region.

- **cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:**
    - **assisting invasive species, that are harmful to the listed ecological community, to become established, or**
    - **causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or;**

The removal of approximately 212 hectares of the Central Hunter Valley CEEC will substantially reduce the quality and integrity of the ecological community in the Conceptual Additional Disturbance Area. However the removal of approximately 212 hectares of the Central Hunter Valley CEEC is unlikely to result in a substantial reduction in the quality or integrity of the surrounding or nearby occurrences of the ecological community.

The removal of approximately 212 hectares of the Central Hunter Valley CEEC is unlikely to result in assisting an invasive species that is harmful to the Central Hunter Valley CEEC becoming established. It is also unlikely to cause regular mobilisation of fertilizers, herbicides or other chemicals or pollutants into the ecological community which would kill or inhibit the growth of species in the Central Hunter Valley CEEC.

- **interfere with the recovery of an ecological community.**

The removal of 212 hectares of the Central Hunter Valley CEEC will remove the ecological community from the Conceptual Additional Disturbance Area and will make a minor contribution to interfering with the recovery of the ecological community.

Conclusion

The Proposed Action is likely to have a significant impact on the Central Hunter Valley CEEC. The Proposed Action will reduce the extent of the community by approximately 212 hectares, negligibly increase the level of fragmentation of the ecological community, adversely impact some areas of critical habitat of the ecological community and interfere with the recovery of the ecological community.