Referral of proposed action

Project title: Lynwood Quarry Extraction Area Modification

1 Summary of proposed action

1.1 **Short description**

Lynwood Quarry (the Quarry) is a hard rock quarry located west of Marulan in the Southern Tablelands region of NSW (refer to **Figures 1** and **2**). Holcim (Australia) Pty Ltd (Holcim Australia) was granted development consent in December 2005 by the NSW Minister for Planning to construct and operate the Quarry with a production rate of up to 5 million tonnes per annum (Mtpa) saleable product. Holcim Australia commenced construction of the Quarry in 2010, with Quarry operations commencing in late 2015.

Holcim Australia referred the Lynwood Quarry Project to the Commonwealth Minister for the Environment (EPBC 2012/6560) on 26 September 2012 following identification of potential ecological Matters of National Environmental Significance (MNES) at the site (being hoary sunray and White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland Critically Endangered Ecological Community). These MNES were not previously known to occur at the site despite extensive previous ecological survey. The Lynwood Quarry Project was granted Commonwealth approval as a controlled action under the EPBC Act on 13 September 2013 (refer to **Figure 3**).

Ongoing geological work and testing of the approved Lynwood Quarry resource indicate that the variability and complexity of the approved resource will challenge Holcim Australia's ability to consistently supply in-specification products from Lynwood Quarry to the market. Holcim Australia is therefore seeking approval to extract quarry resources on its land adjacent to the west of the existing Quarry. The proposed modified extraction area (referred to as the Granite Pit) is located approximately two kilometres to the northwest of the currently approved quarry pit when measured from pit centre to pit centre (refer to **Figure 4**). The Granite Pit will enable Holcim Australia to consistently produce in-specification quarry products to be delivered by Lynwood Quarry to supply the local, regional and Sydney markets. Rock from the Granite Pit will be processed and delivered to market using the existing and approved quarry infrastructure, with no changes required to these approved facilities.

The Proposed Action being referred comprises all ground disturbing activities associated with establishment of the Granite Pit, construction of haul roads and water management infrastructure, overburden emplacement and establishment of an amenity bund and vegetation buffer that are additional to those activities approved under EPBC 2012/6560 (refer to **Figure 4**). The Proposed Action also includes the ongoing operation and rehabilitation of the Granite Pit and associated activities over the proposed approval life, to 2038.

FIGURE 1

Locality Plan

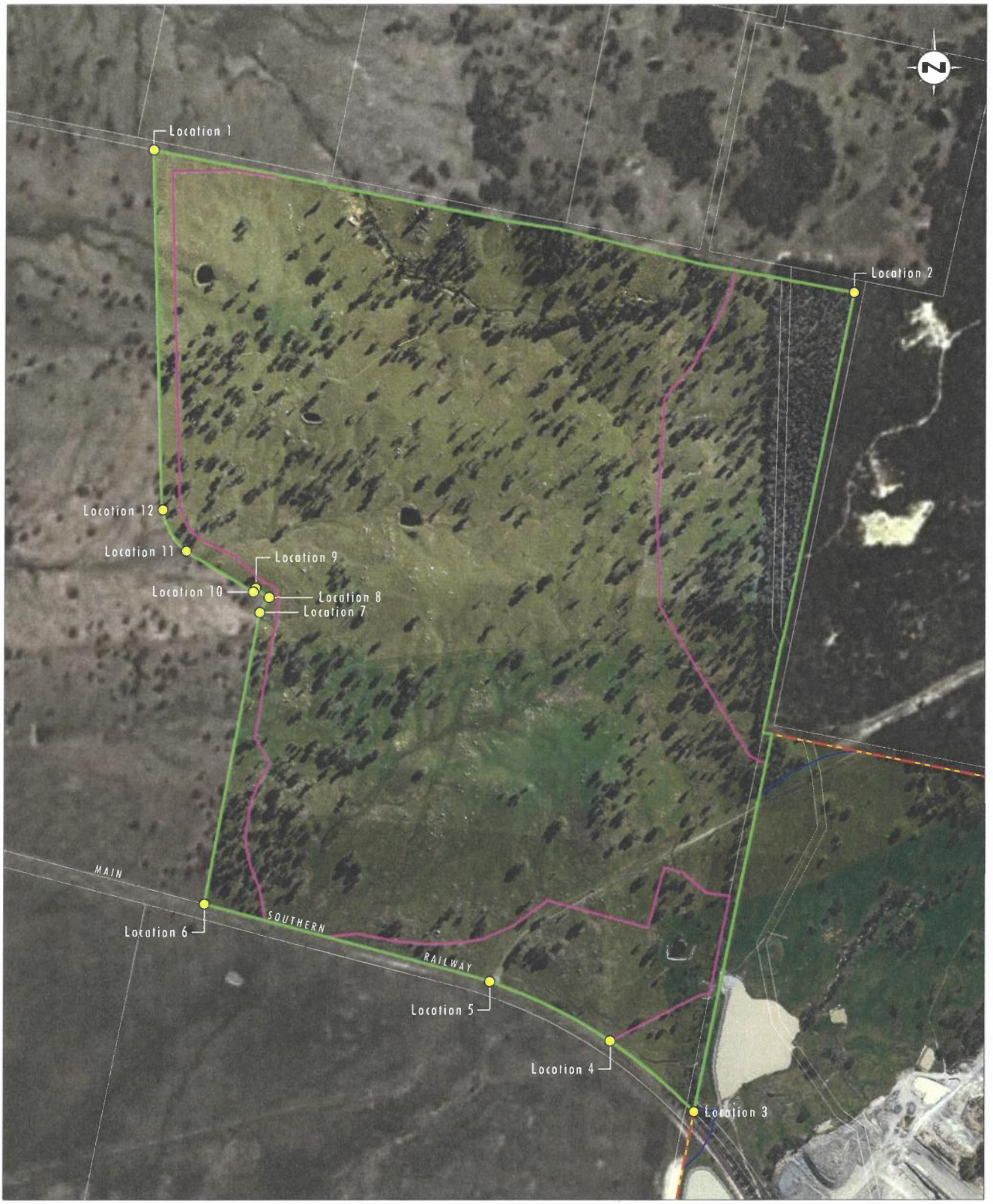

Image Source: Holcim (2014), Google Earth (2015)
Data Source: LPI (2014), Holcim Australia (2015)

0 200 400 600m
1:12 000

Legend

- Approved Project Area
- Modification Project Area
- Approved Disturbance Footprint
- Proposed Gonite Pit Disturbance Footprint
- Referral Area
- Referral Area Point Location

FIGURE 2

Referral Area

File Name (A4): R10/3330_179.dgn
20151027 14:37

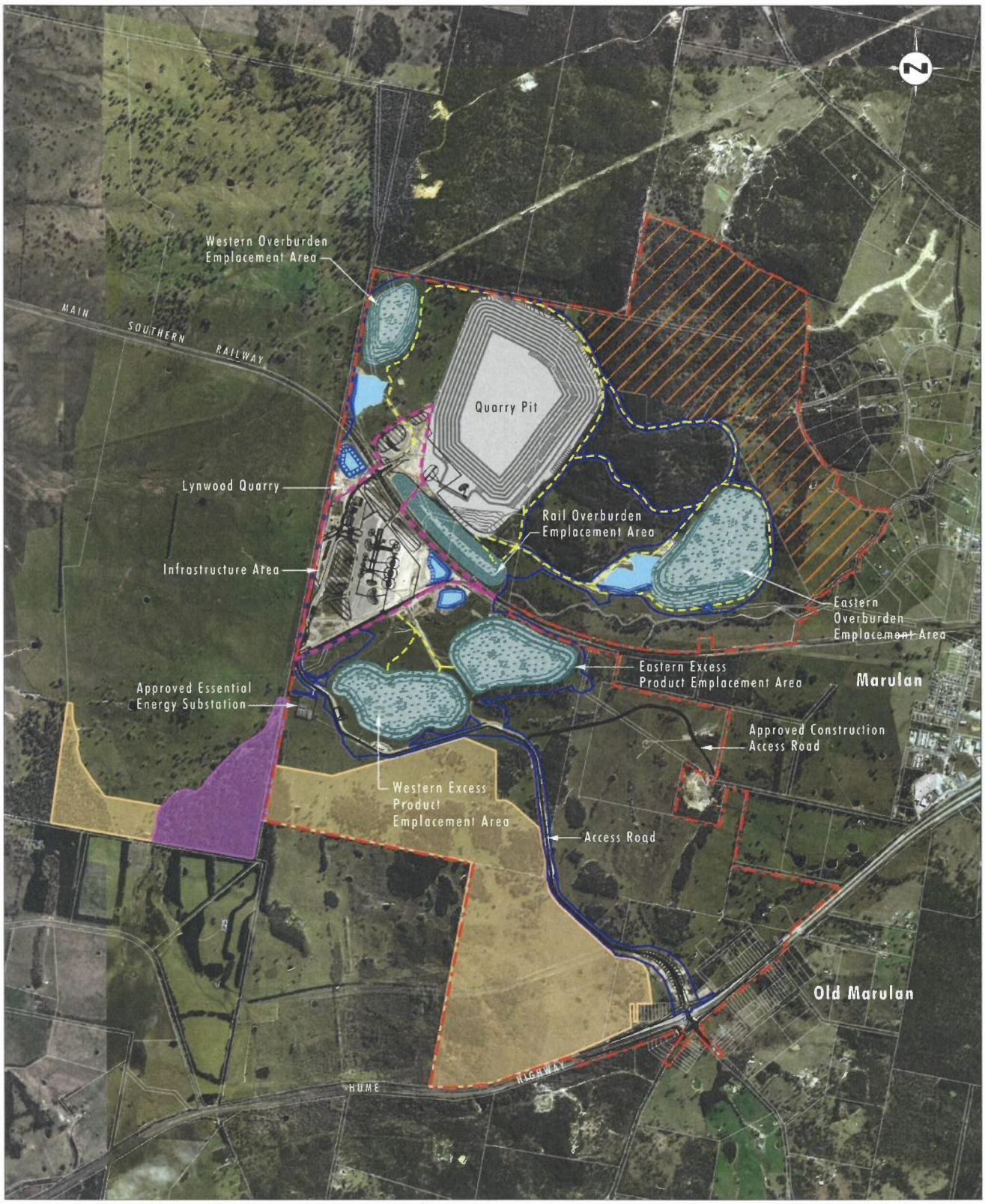

Image Source: Holcim Australia (Aerial Photo March 2012)
Data Source: LPI 2014

0 0.5 1.0 1.5km
1:30 000

Legend

- Approved Project Area
- Lynwood Infrastructure Facilities
- Haul Road
- Approved Disturbance Footprint
- Quarry Pit
- Rehabilitated Area
- Dam
- Existing Biodiversity Offset Area (EPBC)
- Existing Habitat Management Area (EPBC)
- Existing Habitat Management Area

FIGURE 3

Approved Conceptual Quarry Plan (Year 30)

File Name (A4): R10/3330_178.dgn
20151027 14:28

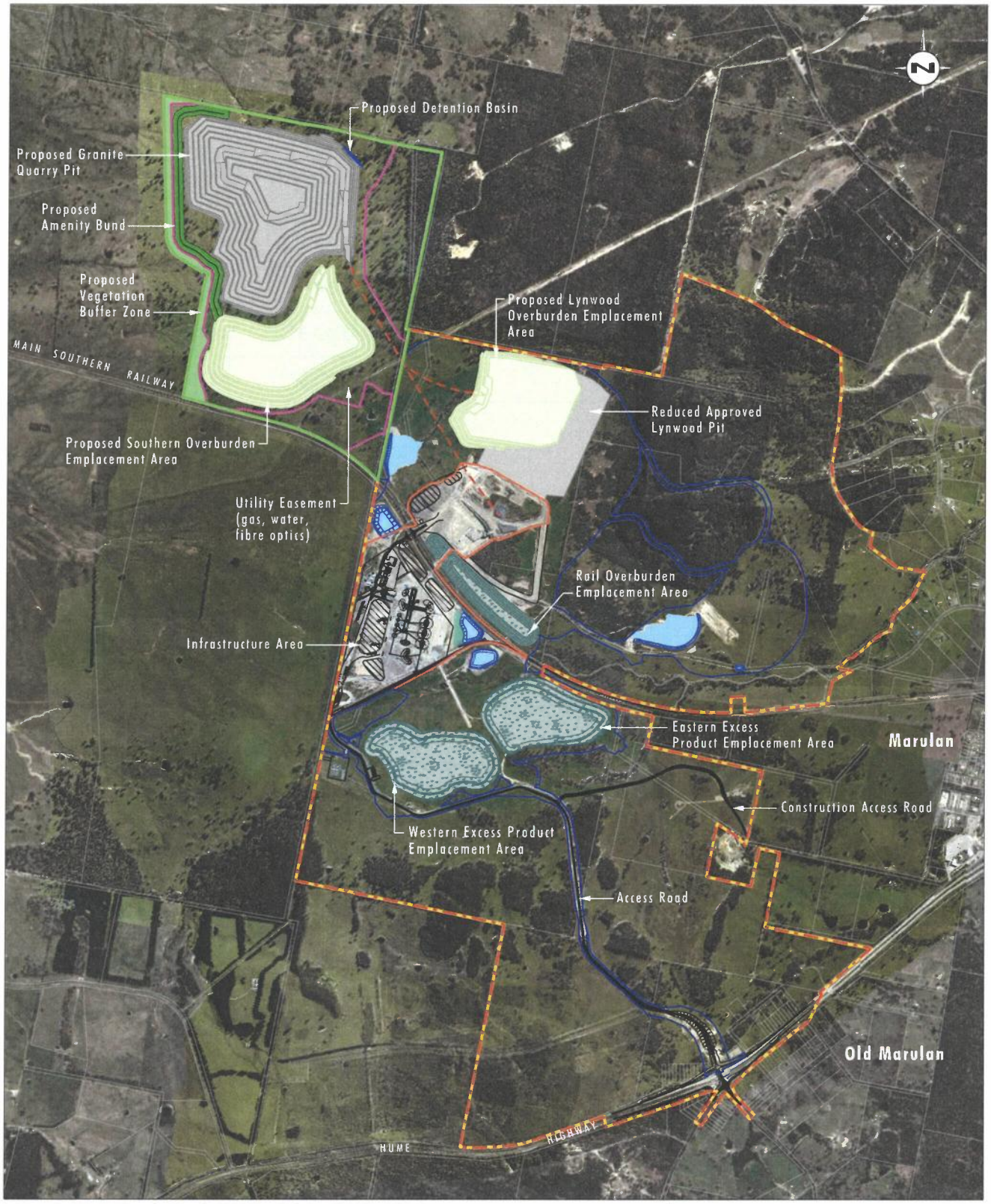

Image Source: Google Earth (2012), Holcim (2012, 2014)
Data Source: LPI (2014), Holcim Australia (2015)

0 0.5 1.0 1.5km
1:30 000

Legend

- Approved Project Area
- Modification Project Area
- Referral Area
- Lynwood Infrastructure Facilities
- Proposed Disturbance Footprint
- Proposed Granite Pit Disturbance Footprint
- Lynwood Infrastructure Layout
- Quarry Pit
- Emplacement Area
- Dam
- Proposed Overburden Emplacement Area
- Proposed Vegetation Buffer Zone
- Proposed Amenity Bund
- Proposed Haul Road

FIGURE 4

Proposed Action

File Name (A4): R10/3330_180.dgn
20151027 14.42

1.2 **Latitude and longitude**

Location Point	Latitude	Longitude
1	34°40'54.6""	149°56'42.3""
2	34°41'03.5""	149°57'44.2""
3	34°42'03.3""	149°57'32.4""
4	34°41'58.3""	149°57'24.8""
5	34°41'54.3""	149°57'14.1""
6	34°41'49.3""	149°56'48.9""
7	34°41'28.0""	149°56'52.9""
8	34°41'26.9""	149°56'53.7""
9	34°41'26.2""	149°56'52.5""
10	34°41'26.5""	149°56'52.3""
11	34°41'23.7""	149°56'46.3""
12	34°41'20.7""	149°56'44.1""

1.3 **Locality and property description**

The Referral Area is situated approximately 27 kilometres north of Goulburn and approximately 3.5 kilometres west of the township of Marulan in the Southern Tablelands region of NSW (refer to **Figure 1**). The Referral Area has been used historically for agricultural land uses, primarily grazing.

Along with the adjacent Lynwood Quarry, agriculture is also the predominant land use surrounding the Referral Area. Other land uses within the vicinity of the Referral Area include the Main Southern Railway along the southern boundary, the township of Marulan and surrounding rural residential areas to the east and north-east and smaller quarry operations to the north and north-east.

1.4 **Size of the development footprint or work area (hectares)**

The Referral Area for the Proposed Action covers a total area of approximately 227 hectares (refer to **Figure 2**).

The Proposed Disturbance Area for the Proposed Action covers a total area of approximately 175 hectares (refer to **Figure 2**).

1.5 **Street address of the site**

South Marulan Road, Marulan, 2579

1.6 **Lot description**

Lot 2 DP1107232 and an enclosed Crown Road reserve.

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

The Referral Area is located within the Goulburn Mulwaree Local Government Area. Lynwood Quarry has an existing planning approval from the NSW Minister for Planning (DA 128-5-2005), and is not subject to planning approval from Goulburn Mulwaree Council. An application to modify the existing planning approval has been made to the NSW Minister for Planning for the Granite Pit. This application is currently undergoing assessment.

1.8 **Time frame**

The Proposed Action will be undertaken within the period of the current planning approval for Lynwood Quarry, which lapses in January 2038. Construction and operation of the Granite Pit will commence as soon as the relevant NSW planning approvals (and EPBC Approval if required) are obtained. This is currently expected in mid 2016.

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?		No
		X	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: As discussed in **Section 1.1** Lynwood Quarry has an existing Controlled Activity Approval (EPBC 2012/6560) granted on 13 September 2013. The Proposed Action is related to the existing Lynwood Quarry approval as the rock extracted from the Proposed Action will be processed and transported using the existing and approved Lynwood Quarry infrastructure. Some other associated activities including emplacement of overburden material extracted from the Granite Pit will also be emplaced within the disturbance area approved by EPBC 2012/6560.
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

2.1 Description of proposed action

Lynwood Quarry is an existing hard rock quarry operated by Holcim (Australia) Pty Ltd (Holcim Australia), located west of Marulan, New South Wales (NSW) (refer to **Figure 1**). Lynwood Quarry was approved as a State Significant Development in 2005 by the NSW Minister for Planning under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Lynwood Quarry has an approved production rate of up to 5 million tonnes per annum (Mtpa) saleable product and may transport up to 1.5 Mtpa of product by truck and up to 5 Mtpa by train. Lynwood Quarry is currently approved to operate until 1 January 2038.

Additionally, Holcim Australia referred Lynwood Quarry (EPBC Referral 2012/6560) on 26 September 2012 after a MNES was identified at the site. The Lynwood Quarry Controlled Action was approved on 13 September 2013.

Holcim Australia is now seeking approval to extract quarry resources on Holcim Australia owned land that adjoins the existing Lynwood Quarry to the west (the Proposed Action) (refer to **Figure 4**). This proposed extraction area, referred to as the Granite Pit, is required to address limitations identified within the approved Lynwood Quarry resource and will enable the consistent supply of in-specification products to Holcim Australia customers. Rock extracted from the proposed Granite Pit will be transported via an internal quarry haul road to the existing approved Lynwood Quarry product handling, processing and transport infrastructure.

Holcim Australia proposes to initially develop and operate the Granite Pit concurrently with the Approved Pit at Lynwood Quarry, within the existing approved maximum production limit of 5Mtpa. Once the Granite Pit is fully operational, there will be a gradual transition of extraction operations from the Approved Pit to the proposed Granite Pit. Over the approved life of the Quarry, the Approved Pit will be progressively backfilled using overburden and any unsaleable rock from the Granite Pit.

No changes are proposed to the current approval life of Lynwood Quarry which lapses in 2038, however, it is noted that Lynwood Quarry is intended to continue beyond this time, subject to obtaining the necessary planning approvals. There will be no changes to the maximum production limit of Lynwood Quarry, or the methods or volumes of transportation of quarry products from the site. No changes to the currently approved Lynwood Quarry infrastructure are required, however, some additional features (e.g. internal haul roads, water management structures etc.) will be required for the proposed Granite Pit within the Referral Area. This is currently under assessment by the NSW Department of Planning and Environment. No changes to mobile equipment fleet are proposed, with equipment moving from one quarry pit to the other depending on product needs.

The Proposed Action

The Proposed Action comprises all clearing, ground disturbing and subsurface activities associated with establishment of the Granite Pit, construction of haul roads and water management infrastructure, overburden emplacement and establishment of the proposed amenity bund and vegetation buffer (refer to **Figure 4**). That is, it includes all quarrying and related activities within the Referral Area shown on **Figure 2**. The Proposed Action also includes the ongoing operation and rehabilitation of these activities within the Referral Area over the proposed approval life, to 2038. The Referral Area for the Proposed Action is contained within Lot 2 DP1107232 (and an enclosed Crown Road reserve) to the west of the approved Lynwood Quarry (refer to **Figure 4**).

The Proposed Action will therefore include the following key features:

The Granite Pit

The proposed Granite Pit is shown in **Figure 4**, and will produce approximately 115 Mt of quarry product. The disturbance footprint of the Granite Pit once developed will be approximately 76.5 hectares. The Granite Pit will be developed to an approximate maximum depth of 500 mAHD, which equates to a depth below the existing land surface of approximately 170 – 175 metres.

Prior to establishment of overburden emplacement areas, overburden removed from the Granite Pit will be used to construct an amenity bund and haul roads. The construction phase for the Granite Pit is expected to take approximately 18-24 months.

The Granite Pit will be progressively rehabilitated, where practicable, as quarrying progresses and final benches are established (i.e. once the available granite resource has been extracted). The initial rehabilitation focus will be the upper benches, particularly the benches on the eastern side of the quarry pit to reduce the visibility of this section of the pit from locations to the west.

Haul Roads

A main haul road will be built to provide access between the Granite Pit and Lynwood Quarry infrastructure area (refer to **Figure 4**). A spur haul road will be built to accommodate transport of material for backfilling of the Approved Pit. A permanent haul road is not required for transport of material to the Southern Overburden Emplacement Area as haulage routes will change as emplacement progresses and it is adjacent to the pit.

Water Management Infrastructure

Over the life of the project, a diversion dam will be developed on an ephemeral drainage line upslope from the Granite Pit to manage clean surface water flows and prevent runoff entering the pit. Additional surface water management infrastructure, including several detention/retention dams and swale drains, will also be implemented to manage surface water flows in and around the Granite Pit and Southern Overburden Emplacement Area and associated facilities. In addition, a new water treatment facility will be established below the existing 'Dam F' located on Lockyersleigh Creek north of the Main Southern Railway (refer to **Figure 4**) to improve water quality prior to release. The water treatment facility would be used to treat water to meet water quality parameters for release to downstream watercourses, if release is required. The water treatment facility requires detailed design but is likely to include temporary water storage dams and treatment techniques such as flocculation and settling.

Overburden Emplacement

Overburden and interburden material removed from the Granite Pit will initially be used in the construction of the main haul road and amenity bund to the west of the Granite Pit. The amenity bund has been included in the Project design as an outcome of the community engagement process; providing some screening of the Project from views from the southwest, west and northwest. The remaining overburden will be emplaced in one of two overburden emplacement areas, in order of priority: the Southern Overburden Emplacement Area to increase visual screening, or the Lynwood Overburden Emplacement Area (which will backfill the Approved Pit).

The conceptual design of the Southern Overburden Emplacement Area has a capacity of approximately 9.2 million cubic metres and a footprint of approximately 43 hectares. Following the completion of extraction operations in the Approved Pit, overburden will also be emplaced in the Approved Pit (refer to **Figure 4**). The capacity of the Approved Pit will be dependent on the extent of extraction up to the cessation of operations. The conceptual design of the Lynwood Overburden Emplacement Area shows some emplacement outside of the Approved Pit shown on **Figure 4** as an indicative maximum out-of-pit emplacement. Depending on the size of the void in the Approved Pit, this overburden area may extend above the natural ground surface. The Lynwood Overburden Emplacement Area is located within the disturbance area covered by EPBC 2012/6560.

Amenity Bund

An approximately 12 metre high earth bund (and up to 14 metres in spot locations if required) will be developed to the west and north west of the Granite Pit to reduce visual amenity impacts to the property immediately adjacent to the west and properties in the Towrang area (refer to **Figure 4**). This bund will be constructed as part of the initial extraction sequence and will be top-dressed using topsoil material from the pre-stripping operations. The bund will be revegetated and the outer face and top seeded (or planted with tube stock) with trees as soon as practicable after construction to reduce the visibility of the quarry pit from the northwest, west and southwest.

2.2 Alternatives to taking the proposed action

Extraction Location

Holcim Australia undertook detailed geological investigations both within the Approved Pit and in the surrounding area to confirm the presence of a high quality resource suitable for bulk quarrying. As part of these investigations the potentially suitable quarry resources were identified and preliminary environmental studies were undertaken to identify the environmental values of the area. In addition to the quality of the resource, key environmental and social factors considered in the decision making process were: distance to surrounding residences; haulage distances and resultant dust and noise impacts; visibility and topographic screening; ecological values; cultural and historic heritage values; drainage; and existing infrastructure locations.

Once the proposed Granite Pit was identified, detailed quarry planning was undertaken to refine the footprint and design of the Granite Pit to maximise efficient extraction of the resource and minimise the environmental and social impacts considering the above listed factors.

Overburden Emplacement Areas

Several different overburden emplacement strategies were investigated as part of the design of the Proposed Action. The greater distance overburden is hauled, the greater the environmental impacts (e.g. dust, noise, energy consumption) and the greater the cost. For these reasons, new overburden emplacement areas close to the Granite Pit was determined by Holcim Australia to be the best option. The initial strategy had a much larger Southern Overburden Emplacement Area and an emplacement area adjacent to the eastern edge of the Granite Pit.

Based on the outcomes of previous and ongoing stakeholder consultation, it was determined that the initially planned height of the Southern Overburden Emplacement Area was unacceptable due to increased visual impacts. As a result, Holcim Australia reduced the height of the initial concept design for the Southern Overburden Emplacement Area by approximately half.

The initially proposed emplacement area to the east of the Granite Pit significantly increased the disturbance footprint of the project, including impacting on some of the better areas of native vegetation and was also visible from the west due to its elevated location. For these reasons it was decided not to proceed with the concept and instead emplace the balance of overburden material generated by the Granite Pit in a new overburden emplacement area, the Lynwood Overburden Emplacement Area.

With the Southern and Lynwood Overburden Emplacement Areas, the approved Eastern and Western Overburden Emplacement Areas shown on **Figure 3** are no longer required. This provides an additional benefit of reducing potential noise and dust impacts on residents in Marulan resulting from their construction.

The chosen emplacement strategy provides an overall improved environmental outcome due to refilling of the Lynwood Quarry void associated with the Approved Pit, a reduction in visual impacts and a reduction in the overall disturbance footprint of the project, but will increase costs for Holcim Australia. Holcim Australia determined that despite the increased cost, this strategy provided the most sustainable outcome and is therefore the proposed strategy.

Amenity Bund

The Proposed Action has been designed with consideration of potential visual impacts to residences located to the west and northwest. This includes the closest residence located on the adjacent property to the west (approximately 1.5 km), as well as those further to the west in the Towrang area that have longer distance views, typically in the order of 8-10 km from the site. Therefore, the concept design of the Proposed Action includes an amenity bund along the western boundary of the Referral Area and along part of the north-western boundary of the pit and emplacement areas. The commencement of construction of this bund is the first priority for overburden placement and consequently it will be constructed at the beginning of the Proposed Action, and be thereafter vegetated to further assist in shielding views of the Lynwood Quarry from the west and northwest.

As part of the design process several different bund designs and heights were investigated. The initial design was for a 5 metre high bund which was along the western boundary of the property. As part of the visual assessment process this was increased to a height of 8 metres to improve screening effectiveness. The alignment of the bund was also varied, particularly in the southern part of the site where it now merges into the Southern Overburden Emplacement Area. This change was made as it reduced the impact of the project on a State listed Endangered Ecological Community while having no impact on screening effectiveness.

Following further consultation with the Towrang community, Holcim Australia committed to increasing the bund height to 12 metres and up to 14 metres in spot locations, as required. The bund was also extended further around the northern portion of quarry pit.

The possibility of further increasing the height of the bund was also investigated. These options resulted in an increased disturbance footprint and/or significant reduction in extractable quarry resources. There were also topographic and drainage challenges in the area to the north of the Referral Area as there is a drainage line and minor valley in this area reducing the potential for an effective bund to be established. On balance, after engagement with the local community, Holcim Australia decided to proceed with the proposed 12 metre high bund (and up to 14 metres in spot locations, as required) planted with trees to provide screening of the Quarry operations from the west, with the rehabilitation strategy also designed to achieve timely rehabilitation on the exposed faces of the bund and emplacement areas to reduce the duration of visual impacts.

'Do Nothing'

The 'do nothing' alternative involves proceeding with the Lynwood Quarry as currently approved and not developing the Proposed Action. This alternative is not feasible as the variability and complexity of the approved Lynwood Quarry resource will challenge and restrict Holcim Australia's ability to consistently supply in-specification products from Lynwood Quarry to the market. Given construction of Lynwood Quarry is substantially complete and the quarry is currently operating, the substantial investment made to establish the Lynwood Quarry provides the opportunity to deliver effective and cost efficient supply of essential quarry products to the Sydney and surrounding regional markets. The 'do nothing' alternative would effectively result in the under utilisation of the existing infrastructure and impact adversely on the significant contribution of Lynwood Quarry to the local, regional and State economies through supply of high quality construction materials, ongoing expenditure and employment. Lynwood quarry will employ 115 people at full production and has a substantially positive impact on second and third tier service providers.

The Proposed Action can be undertaken without resulting in additional substantial adverse environmental impacts and in many cases, will result in reduced impacts compared to the Approved Project (e.g. reduced dust and noise impacts on Marulan township as the Granite Pit is further from the town). In these circumstances, Holcim Australia does not consider the 'do nothing' alternative is appropriate.

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

N/A

2.4 Context, planning framework and state / local government requirements

Lynwood Quarry was approved as a State Significant Development by the NSW Minister for Planning under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Development Consent DA 128-5-2005 was granted on 21 December 2005 approving the quarry to operate at up to 5 Mtpa over an operational period of 30 years (until 1 January 2038).

Since the original approval, there have been three modifications to this consent, as listed below:

1. Modification Application DA-128-5-2005 MOD 1 approved 7 May 2009 which provided for changes to the layout of quarry infrastructure including the crushing and screening plant and a reduction in the western extent of the quarry footprint;

2. Modification Application DA-128-5-2005 MOD 2 approved 22 March 2011 which provided for a change from a balloon rail loop to a rail spur and changes to various quarry infrastructure components; and

3. Modification Application DA-128-5-2005 MOD 3 approved 19 August 2011 which related to administrative changes for reporting and auditing dates in the consent.

Holcim Australia is seeking to further modify DA 128-5-2005 under the now repealed section 75W of the EP&A Act to allow for the Proposed Action. The operation of section 75W is continued under the transitional provisions provided in schedule 6A of the EP&A Act. Specifically, section 75W of Part 3A continues to apply to modifications of the development consents referred to in clause 8J (8) of the *Environmental Planning and Assessment Regulation 2000*, that being State Significant Development, and so applies whether an application for modification is made before or after the commencement of this clause.

Accordingly, DA 128-5-2005 is a transitional Part 3A project and may continue to be modified pursuant to Section 75W of the EP&A Act.

This Referral provides for consideration of the approval needs of the Proposed Action under the EPBC Act. A range of approvals are also required under NSW legislation. A summary of the NSW legislation, policies and planning instruments relevant to the Quarry is listed in **Table 1** below with a description of the approvals required or current for the Quarry.

Table 1 –State Legislation and Policies relevant to the Quarry

Planning Provision	Comments	Approvals Held	Approval Required
Environmental Planning and Assessment Act 1979	As discussed above Lynwood Quarry has a development consent under the EP&A Act and a modification of this existing approval is required for the Proposed Action. Lynwood Quarry is considered State Significant Development.	DA 128-5-2005	Yes
Water Management Act 2000	Holcim Australia holds Controlled Activity Approvals under the *Water Management Act 2000* for works within the Joarimin Creek, Lockyersleigh Creek and Marulan Creek riparian zones. An approval will be required for further works within the riparian zone of Lockyersleigh Creek associated with the Proposed Action.	CAA No. 10 ERM 2011/0446	Yes
Water Act 1912	Holcim Australia currently holds a Part 5 licence for groundwater monitoring piezometers on site. A Part 5 licence will also be required for groundwater inflows into the Granite Pit.	Lic. No. 10BL605591	Yes
National Parks & Wildlife Act 1974	Holcim Australia holds Aboriginal Heritage Impact Permits (AHIPs) under s87 and s90 of the NPW Act for Aboriginal sites within the Approved Project Area. The existing AHIP (#1100264) will be varied to incorporate the Proposed Action.	AHIP No. 1100264	Yes
Protection of the Environment Operations Act 1997	Holcim Australia holds an Environment Protection Licence (EPL) for the Approved Project Area. The EPL will need to be modified to accommodate the Proposed Action.	EPL No. 12939	Yes
Roads Act 1993	The Roads Act 1993 determines the rights of the public and adjacent land owners to	Yes	Yes

Planning Provision	Comments	Approvals Held	Approval Required
	use public roads, and establishes procedures for the opening and closing of public roads. Under the Act applications are required to be made for the closure of roads and for works in road reserves. Holcim Australia proposes to close the Crown road reserve within the Referral Area and will therefore require approval under this Act.		
Crown Lands Act 1989	The Crown Lands Act provides for the administration and management of Crown land in the eastern and central divisions of NSW. 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*. As noted above, Holcim Australia proposes to close the Crown road reserve with the Referral Area and will therefore need to follow the appropriate process under this Act.	Yes	Yes
Heritage Act 1977	Holcim Australia holds an excavation permit under s60 of the Heritage Act to disturb historic heritage items, including a section of Old Marulan Township which is listed on the State Heritage Register.	S65 Approval 2009/S65A/13	No
Local Environment Plan			
Goulburn Mulwaree Local Environment Plan 2009	The Goulburn Mulwaree Local Environment Plan (LEP) 2009 is relevant to the extent of permissibility of the Proposed Action under NSW legislation. The Proposed Action is located within an area zoned for agriculture (zoning RU1 Primary Production) and the quarry is permissible with development consent under the EP&A Act.	NA	NA

2.5 Environmental impact assessments under Commonwealth, state or territory legislation

An Environmental Impact Statement (EIS) (Umwelt 2005a) was prepared to support the original development application for the Lynwood Quarry under Part 4 of the EP&A Act.

A comprehensive Environmental Assessment (EA) has been prepared by Umwelt on behalf of Holcim Australia to accompany the application to modify DA 128-5-2005 under Section 75W of the NSW EP&A Act. The EA includes a detailed assessment of the potential environmental and social impacts of the Proposed Action and identifies the management and mitigation measures that will be implemented as part of the Proposed Action. A brief summary of the key findings of the assessment process is provided in **Table 2**.

Table 2 – Summary of the Key Environmental and Social Impact Assessment Findings

Environmental /Social Issue	Overview of Potential Impacts (after proposed Management and Mitigation)
Social Opportunities and Impacts	• A detailed stakeholder engagement strategy was implemented as part of the design and assessment process for the Proposed Action with Holcim Australia modifying aspects of the project design in response to stakeholder views and concerns to seek to minimise impacts. In particular, detailed consultation was undertaken with members of the local community to understand their perspectives and experiences and to consider these in determining how the project would be implemented. • The Social Impact and Opportunities Assessment found that from a technical social perspective, it is unlikely that the Proposed Action will result in a significant change in the local communities of Marulan and Towrang, with the specific predicted impacts noted in this assessment. • A range of mitigation measures have been proposed to address predicted impacts or enhance associated benefits. Where issues have a high and moderate level of perceived impact, as assessed by stakeholders, monitoring mechanisms have been recommended for integration into the quarry's existing community engagement plan and broader business planning processes. • The Proposed Action will provide significant ongoing benefits for local and wider communities through employment, expenditure and supply of high quality construction materials.
Air Quality	• Dust emissions are predicted to be largely consistent with those of the approved quarry operations. • The predicted dust levels are predicted to meet the relevant criteria at all residences. • An assessment of Respirable Crystalline Silica dust found that the predicted levels associated with the Proposed Action are substantially below the relevant criteria at all residences. • Comprehensive dust management controls will be implemented as part of the Proposed Action.
Noise	• The noise impacts of the Proposed Action will be consistent with those of the Approved Project. As the proposed Granite Pit is further away from Marulan township, the noise impacts on Marulan are expected to decrease as the Quarry progresses. • The noise impacts from the Proposed Action will meet the existing NSW development consent criteria at all locations except for one residence to the south under easterly wind conditions at night. Noise impacts at this location will be consistent with the project specific noise levels for the project calculated in accordance with the NSW Industrial Noise Policy (EPA, 2000). • A range of noise management measures have been incorporated into the design of the Proposed Action to minimise noise generation from the quarry operations.
Blasting	• Blasts undertaken at Lynwood Quarry will be managed so that relevant blast criteria are not exceeded at residences or other blast sensitive locations. • The assessment found that the relevant blasting criteria would be met at all residences, infrastructure locations and heritage sites.

Environmental /Social Issue	Overview of Potential Impacts (after proposed Management and Mitigation)
Visual	• With the Proposed Action visual impacts on Marulan township and surrounds (i.e. to the east of the Quarry) will be reduced as the Eastern Overburden Emplacement Area will no longer be constructed. • The Granite Pit area will increase daytime visibility of Quarry operations for some elevated residences to the southwest, west and northwest, including in the Towrang area. Views of the operations will typically be over a distance of 5 to 7 km. • To minimise potential visual impacts Holcim Australia has worked with the community to design an amenity bund that will be located to the west and northwest of the Granite Pit and has agreed on a number of management commitments with members of the affected community. These controls combined with the distance over which the views will occur reduce the extent of visual impact.
Lighting	• There will be no fixed lighting in the Granite Pit area and Holcim Australia has designed the Granite Pit to seek to avoid impacts associated with mobile lighting. • Quarry operations on the surface including topsoil stripping, overburden extraction and overburden emplacement will be daytime operations only and therefore do not have any potential to result in lighting impacts. • Quarrying within the Granite Pit will occur in the evening period (up to 10pm) but will be managed so that extraction activities are undertaken in areas that are not visible from the potential viewing locations to the southwest, west and northwest (i.e. on lower benches or on the western face of the Quarry). • A bund will be constructed along the western side of the haul road from the Granite Pit to the infrastructure area. The purpose of this bund will be to seek to screen the headlights of vehicles operating on the haul during the evening period (6pm to 10pm). • With these lighting controls in place there are not expected to be any significant lighting impacts as a result of the Proposed Action.
Ecology	• A detailed Biodiversity Assessment Report has been prepared to assess the potential ecological impacts of the Proposed Action using the Framework for Biodiversity Assessment – NSW Biodiversity Offsets Policy for Major Projects. • Impact on key ecological values has been avoided where practicable through project design. • The site of the proposed Granite Pit has been largely historically cleared and much of the area impacted is exotic grassland. • Three endangered ecological communities occur in the Referral Area, two of which will be impacted by the Proposed Action. • Several threatened fauna species were also recorded within the Referral Area. • Holcim Australia has committed to an ecological impact mitigation strategy and a biodiversity offset strategy that aims to mitigate and offset the identified ecological impacts of the Proposed Action.

Environmental /Social Issue	Overview of Potential Impacts (after proposed Management and Mitigation)
Water Resources	• The water management system for the Proposed Action will build on the existing system in place at Lynwood Quarry and will be designed in accordance with relevant guidelines. • The system is designed to divert clean water flows around the quarry where practicable and capture and treat water within the quarry area. • The Proposed Action is not predicted to substantially change the interaction of Lynwood Quarry with water resources, however, the footprint of the Quarry will increase with a consequential increase in capture of surface water runoff. • No significant impacts are predicted on downstream water users in relation to surface water and groundwater resources.
Cultural Heritage	• A comprehensive Aboriginal Cultural Heritage Assessment process was completed for the Proposed Action in consultation with the registered Aboriginal parties for Lynwood Quarry. • The Proposed Action will impact on some of the identified cultural heritage values within the Referral Area, including impact on three isolated find sites, seven artefact scatter sites and two scarred trees. • Holcim Australia has developed a comprehensive impact mitigation strategy for the Proposed Action in consultation with the registered Aboriginal parties, including salvage of the sites to be impacted and establishment of an expanded conservation area on Holcim Australia's land.
European Heritage	• No items of State or National Heritage Significance will be impacted by the Proposed Action. • The Referral Area is located approximately 1.3 km to the east of the Lockyersleigh Homestead and Gardens which is listed as a site of local heritage significance. The Proposed Action is not predicted to result in any impacts on this heritage site.
Transport	• The Proposed Action does not involve any changes to the currently approved product transport volumes or arrangements.

The EA concludes that on considering the balance of the potential impacts of the Proposed Action on the environment and community compared with the benefits of, and the strong need for the proposed changes, it would be reasonable to consider that with the implementation of the management, mitigation and offset measures proposed by Holcim Australia, the benefits of the Proposed Action outweigh the impacts.

2.6 Public consultation (including with Indigenous stakeholders)

Community Consultation

Holcim Australia has an established relationship with the surrounding community since Lynwood Quarry's original approval in 2005; and since that time has developed and implemented a program of ongoing engagement with local and regional stakeholders and residents in proximity to Lynwood Quarry. This has involved a range of engagement mechanisms including bi-annual community newsletters, Open Days, Community Information Sessions, personal meetings, Community Attitude Surveys and ongoing operation of the Lynwood Quarry Community Consultative Committee.

Holcim Australia has built on the existing community engagement program to develop a more tailored engagement program for the Proposed Action. The project specific engagement has provided Holcim Australia with valuable input from the community and other stakeholders about the impacts of its existing operations; and potential impacts associated with the conceptual project design. This has included working with community representatives on particular issues using a range of mechanisms including workshops, meetings

and, where relevant trials, to identify the best solutions to the key issues of focus for the community. This information has been actively used to inform and refine particular design elements such as the development of a visual amenity bund and the overburden emplacement strategy, including the height of the Southern Overburden Emplacement Area.

A summary of the consultation and communication methods employed for the Proposed Action is provided in **Table 3**.

Table 3 – Summary of Community and Key Stakeholder Engagement Methods

Consultation and Communication Method	Description
Near neighbour meetings and door knocks	Personal meetings with nearby residents to outline project aspects and obtain feedback on perceived issues and opportunities associated with the Proposed Action. Due to the topography and location of the Lynwood Quarry, particular residents located in the following geographic areas were proactively approached to be involved in the project due to their aspect to the site: **Marulan** • Munro Road • Graham Lane • Muclura Drive • Merino Road • Suffix Street • Loseby Avenue • Collins Street **Towrang** • Narelle Lane • Apps Lane • Towrang Road • Carrick Road
Community group briefings and consultation	Project briefings to local community groups in the Marulan and Towrang communities.
Community Consultative Committee Meetings	A total of 3 meetings held with the Lynwood Quarry CCC to discuss relevant aspects and milestones associated with the Proposed Action specifically. Regular meetings occurred outside of this also.
Regional stakeholder consultation	Personal meetings with key regional stakeholders drawn from across key community service sectors within the Marulan and Towrang LGA e.g. Local Government, education, health, transport, housing and accommodation, emergency services.
Local, State and Federal Government briefings and meetings	Briefings and personal meetings with relevant government representatives (local, state and federal) to present the Proposed Action and obtain feedback on project aspects.
Community information sheets	Development of community information sheets summarising key aspects of the Proposed Action and progress/outcomes of the environmental and social assessment program – distributed to neighbouring community residents and relevant stakeholders.

Community Information Sessions	Facilitation of 6 community information sessions in the Marulan and Towrang communities to present the Proposed Action and document perceived issues and opportunities (held in June and August 2015); and to present key outcomes of the environmental and social studies (held in November 2015). Site tours were also held to discuss the Proposed Action.
Focus Groups	3 small focus groups and personal meetings on key issues identified by key stakeholders e.g. lighting.

Indigenous Stakeholder Consultation

Consultation with the four registered Aboriginal parties for the Lynwood Quarry has been undertaken since 2004. Consultation in relation to the Proposed Action commenced on 5 June 2015 and has been continued via phone, email, two meetings and throughout a five day survey of the site. Other consultation also occurred during this time relating to the existing approved Lynwood Quarry. Consultation included the provision of information in relation to the nature of the Proposed Action and:

- the methodology proposed for undertaking an Aboriginal Cultural Heritage and Archaeological Assessment, including the methodology for the consultation process;
- the methodology proposed for the survey of the Referral Area;
- the survey timeframe;
- the Aboriginal cultural heritage values and significance of the Referral Area and the sites/potential archaeological deposits (PADs) it contains;
- requirements for subsurface testing and the undertaking of subsurface testing post approval;
- impact assessment;
- management options and recommendations for all sites/PADs and their associated archaeological terrain units;
- applying for a variation to the existing s.87/90 Aboriginal Heritage Impact Permit (AHIP) #1100264; and
- revisions to the AHMP (Umwelt 2011a) required to cover the management of Aboriginal cultural heritage and archaeological sites, PADs and their associated archaeological terrain units within the Referral Area.

Throughout the consultation process the registered Aboriginal parties have endorsed all methodologies proposed and were supportive of Holcim Australia applying for a variation to the existing s.87/90 AHIP.

2.7 A staged development or component of a larger project

As discussed in **Section 1.1** Lynwood Quarry has an existing Controlled Activity Approval (EPBC 2012/6560) granted on 13 September 2013. The Proposed Action is related to the existing Lynwood Quarry approval as the rock extracted from the Proposed Action will be processed and transported using the Lynwood Quarry infrastructure. Some other associated activities including emplacement of overburden material extracted from the Granite Pit will also be emplaced within the disturbance area approved by EPBC 2012/6560.

3 Description of environment & likely impacts

3.1 Matters of national environmental significance

3.1 (a) World Heritage Properties

Description

The Proposed Action is not located near any World Heritage Properties. No World Heritage Properties were identified in the locality of the Referral Area in the DoE Protected Matters Search. The closest World Heritage Property occurs approximately 45 kilometres to the north and northeast of the Referral Area, being the Greater Blue Mountains Area.

Nature and extent of likely impact

The Proposed Action will not impact directly or indirectly on the World Heritage values of any World Heritage properties.

3.1 (b) National Heritage Places

Description

The Proposed Action is not located near any National Heritage Places. The closest National Heritage Place occurs approximately 45 kilometres to the north of the Referral Area, being the Greater Blue Mountains Area.

Nature and extent of likely impact

The Proposed Action will not impact directly or indirectly on the National Heritage values of any National Heritage place.

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

Description

The Referral Area does not contain any Wetlands of International Importance listed under the Ramsar convention. The closest Ramsar site occurs approximately 130 kilometres north-east of the Referral Area being the Towra Point Nature Reserve Ramsar site.

Nature and extent of likely impact

The Proposed Action will not impact directly or indirectly on any Ramsar Wetlands of International Importance.

3.1 (d) Listed threatened species and ecological communities

Description

A DoE Protected Matters Search was undertaken to identify the range of EPBC Act threatened species and ecological communities that are predicted to occur within the Referral Area. Records from this database search were assessed along with records derived through the ecological surveys of the Referral Area, literature reviews and professional opinion to identify the full range of recorded or potentially occurring EPBC Act listed threatened species and ecological communities that may occur (refer to **Attachment A**). The identification of potentially occurring threatened species and communities was then used to determine those species that would be subject to an Assessment of Significance as part of this Referral (refer to **Attachment B**).

Comprehensive ecological surveys of the Referral Area have been undertaken to build on the extensive existing information from past work at the Lynwood Quarry site (Umwelt 2005b). These surveys involved full BioBanking quadrat/transect sampling and targeted threatened species surveys in accordance with the *NSW Biodiversity Offsets Policy for Major Projects* and Framework for Biodiversity Assessment.

The fauna surveys completed in February and August 2014 were designed to identify range of species occurring in the Referral Area, included:

- habitat assessment;
- diurnal bird area searches;
- diurnal reptile/amphibian area searches;
- mammal trapping including Elliot A and Elliot B trapping and hair funnel sampling targeting terrestrial and arboreal mammal species;
- nocturnal spotlight surveys;
- nocturnal call playback surveys that target species such as koala (*Phascolarctos cinerus*);
- baited remote camera surveys;
- nocturnal amphibian surveys in appropriate freshwater wetland habitat;
- nocturnal Anabat surveys targeting the range of micro-bat species; and
- winter bird surveys, specifically targeting the swift parrot (*Lathamus discolor*) and regent honeyeater (*Anthochaera phrygia*).

The flora survey program was designed to target known vegetation communities and threatened flora potentially occurring in the Referral Area and was undertaken in February and October 2014. The flora survey included:

- identification and mapping of vegetation communities throughout the proposed Referral Area. This includes surveying systematic floristic plots, rapid assessment plots and meandering transects in areas not previously surveyed. The survey also included collection of biometric site value data according to the BioBanking methodology at each of the systematic floristic plots;
- verification of the potential for the Referral Area to support any threatened flora species, endangered populations or threatened ecological communities listed under the TSC Act or EPBC Act; and
- targeted (seasonal) threatened flora surveys, including surveys for hoary sunray (*Leucochrysum albicans* var. *tricolor*) and terrestrial orchids.

The following threatened species and communities have been recorded within or adjacent to the Referral Area (refer to **Figure 5**):

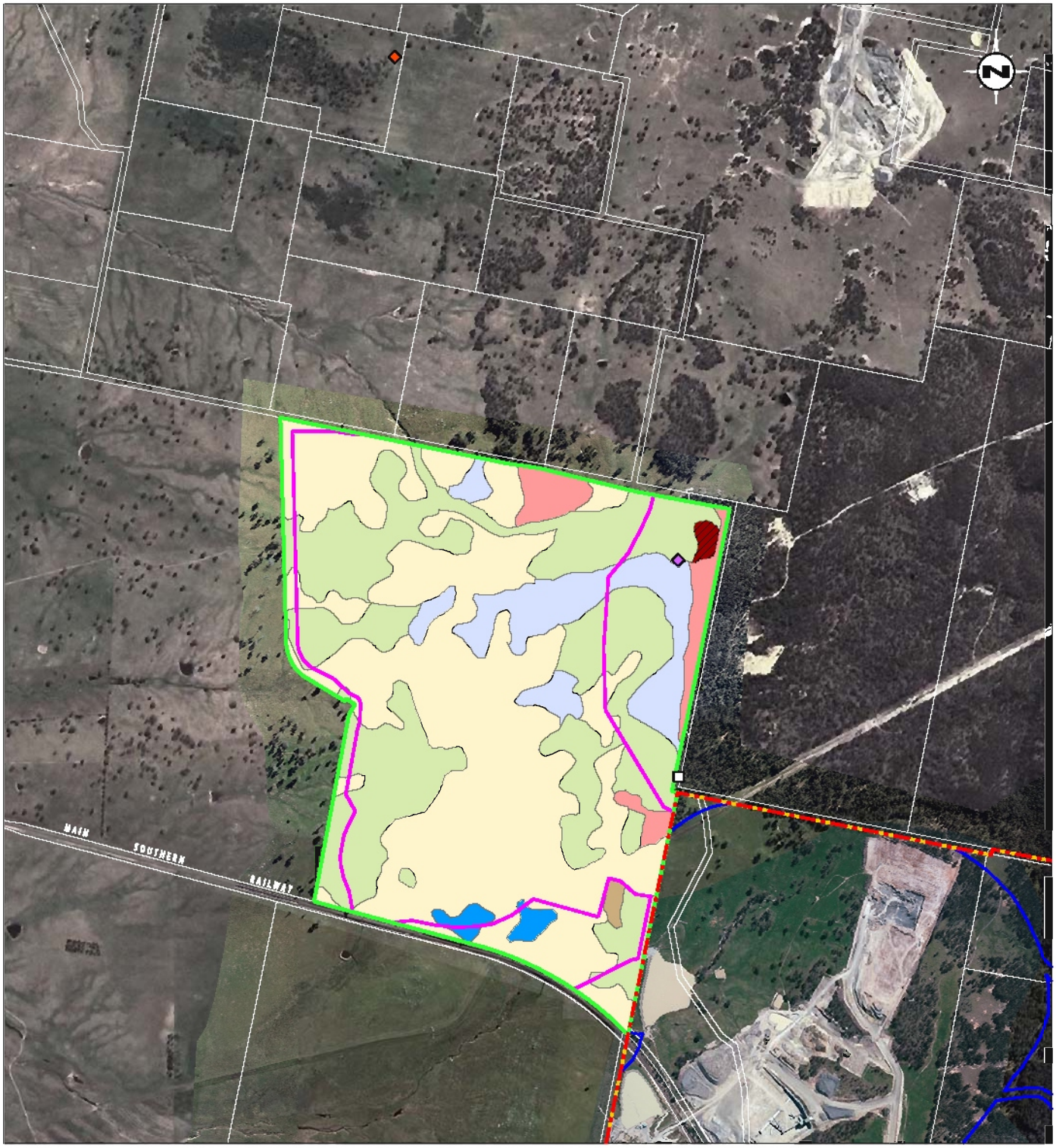

Image Source: Holcim (2014), Google Earth (2014)
Data Source: LPI (2014), Holcim Australia (2015)

0 0.25 0.5 1.0km
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Legend

- Approved Project Area
- Modification Project Area
- Approved Disturbance Footprint
- Proposed Granite Pit Disturbance Footprint
- Referral Area
- Box-Gum grassy woodland (exotic understorey)
- Exotic Pastures
- Red Stringybark Open forest (exotic understorey)
- Red Stringybark Open forest (native understorey)
- Ribbon Gum - Snow Gum riparian woodland (exotic understorey)
- Ribbon Gum - Snow Gum woodland on granitoids (exotic understorey)
- White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland (CEEC)
- Large-eared pied bat
- White-throated needletail
- *Leucochrysum albicans tricolor*

FIGURE 5

Vegetation Communities and MNES Recorded in and Around the Referral Area

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- White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland – critically endangered ecological community (CEEC) under the EPBC Act;

- hoary sunray (*Leucochrysum albicans* var. *tricolor*) – endangered under the EPBC Act (currently under consideration for delisting under the EPBC Act – see below);

- large-eared pied bat (*Chalinolobus dwyeri*) – vulnerable under the EPBC Act.

The following threatened species are considered to have the potential to occur within the Referral Area based on known distribution, nearby records and/or suitable habitat, however were not recorded during the field surveys undertaken for this assessment:

- swift parrot (*Lathamus discolor*) – endangered under the EPBC Act (preliminary assessment for critically endangered listing);

- regent honeyeater (*Anthochaera phrygia*) – critically endangered under the EPBC Act; and

- koala (*Phascolarctos cinereus*) combined populations of Qld, NSW and the ACT – vulnerable under the EPBC Act.

Further detail on these species and community in relation to the Referral Area is included below.

White Box Yellow Box Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC

White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland 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. This community occurs widely in the Goulburn district and within the southern tablelands.

Approximately 0.98 hectares of White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland CEEC was recorded in the north-eastern corner of the Referral Area. The CEEC is mapped and described as Box-Gum Grassy Woodland (native understorey) (refer to **Figure 5**) and it occurs outside the Proposed Disturbance Area of the Proposed Action and will not be impacted.

Approximately 81.2 hectares of highly disturbed Box-Gum Grassy Woodland (exotic understory) within the Referral Area was identified (refer to **Figure 5**) and a comprehensive analysis of this vegetation community was undertaken to determine if it conformed to listing advice provided by the Department of Environment under the EPBC Act (TSSC 2006) regarding White Box Yellow Box Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC. This analysis found that the community did not conform to the CEEC as discussed below.

In relation to the particular area of the 'White Box Yellow Box Blakely's Red Gum Grassy Woodland and Derived Native Grassland' CEEC, the TSSC (2006) states that the community occurs within 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

The Referral Area is situated within the South Eastern Highlands Bioregion.

There are a number of additional criteria which a box-gum remnant needs to satisfy to be considered part of the of 'White Box Yellow Box Blakely's Red Gum Grassy Woodland and Derived Native Grassland' CEEC under the EPBC Act. The following requirements must be satisfied sequentially, with each point requiring being satisfied prior to proceeding to the next:

1. Containing, or previously containing at least one of the most common overstorey species White Box,

Yellow Box or Blakely's Red Gum (or Western Grey box or Coastal Grey Box in the Nandewar Bioregion);

2. Having a predominantly native groundcover;

3. Being of a patch size of greater than or equal to 0.1 hectares (1000m^2); and

4. Containing 12 or more native understorey species present within the patch (excluding grasses). At least one of these species must be an 'important species' as defined by a list maintained on the Department of Environment website.

If the ecological community satisfies all of the above criteria it is considered to be part of the CEEC.

5. Additionally, if the ecological community satisfies criteria's 1 and 2 above but does not contain 12 or more native species (criteria 4), it may also be considered part of the CEEC if the patch is of greater than or equal to 2 hectare patch size *and* has an average of 20 or more mature trees per hectare or natural regeneration of the dominant overstorey eucalypts.

Of the above supplementary descriptors, the potential 'White Box Yellow Box Blakely's Red Gum Grassy Woodland and Derived Native Grassland' CEEC present in the Referral Area does contain the appropriate overstorey species and is of a patch size of greater than 0.1 hectares. However, the vast majority of groundcover within the Referral Area is not native vegetation and does not contain 12 or more native species. As the criteria are assessed sequentially, the 81.2 hectares of highly disturbed Box-Gum Grassy Woodland is not eligible to be part of the CEEC for the majority of the Referral Area based on a lack of native groundcover. Where there may be small patches (generally of less than 0.5 hectares) with a predominantly native groundcover, these are excluded as they do not contain 12 or more native understorey species including one important species, and are less than 2 hectares in size.

The 0.98 hectare patch of the CEEC identified in the northeast of the Referral Area (which will not be impacted by the Proposed Action) had affinities with this adjacent disturbed vegetation type but met the definition of the CEEC based on satisfying criteria 1 to 4 above. This patch contained 20 non-grass understorey species, and six important species including *Bulbine bulbosa*, *Chrysocephalum apiculatum*, *Diuris sulphurea*, *Hypericum gramineum*, *Sebaea ovata* and *Triptilodiscus pygmaeus*. Approximately 10% cover of the highly invasive serrated tussock (*Nassella trichotoma*) occurs in this patch.

As discussed in the sections below, the Proposed Action is highly unlikely to result in a significant impact on the CEEC.

Hoary sunray (*Leucochrysum albicans* var. *tricolor*)

Hoary sunray (*Leucochrysum albicans* var. *tricolor*) is currently listed as an endangered species under the EPBC Act. The species occurs primarily in the South Eastern Highlands in woodland and open forest communities. The species is known to occur in previously disturbed sites as bare ground is required for germination.

Three hoary sunray individuals were recorded immediately to the east of the Referral Area in disturbed land surrounded by Blakely's red gum (*Eucalyptus blakelyi*) and red stringybark (*Eucalyptus macrorhyncha*). In previous survey periods, large populations of hoary sunray have been recorded approximately 2 km south of the Referral Area in predominately native grassy habitat near the South Marulan Road and Hume Highway intersection (Umwelt 2011a). No hoary sunrays were recorded within the Referral Area despite surveys undertaken in the appropriate detection season and with other sites in the locality experiencing a prolific flowering event. Further, Holcim Australia has established a 185 hectare Biodiversity Offset Area for the existing Controlled Action (EPBC 2012/6560) that contains an estimated 200,000 individuals of hoary sunray.

It should be noted that hoary sunray is currently under consideration for delisting under the EPBC Act. *Leucochrysum albicans* var. *tricolor* is conventionally accepted as a variety. Varieties are not considered to be a species for the purpose of the EPBC Act and are therefore not eligible to be listed under Section 178 of the EPBC Act. The Threatened Species Scientific Committee is currently reviewing the status of listed varieties and their higher taxon for eligibility under the Act.

As discussed in the sections below, the Proposed Action is highly unlikely to result in a significant impact on hoary sunray.

Large-eared pied bat (*Chalinolobus dwyeri*)

Large-eared pied bat (*Chalinolobus dwyeri*) is listed as vulnerable under the EPBC Act. The species is mainly found in areas with extensive cliffs and caves, from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands. It is generally rare with a very patchy distribution in NSW. The species mainly roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the fairy martin (*Petrochelidon ariel).*

Large-eared pied bat was recorded in one location within the Referral Area during the surveys undertaken for this assessment. A 'confident' identification of an echolocation recording was identified in the north-eastern portion of the Referral Area on 28 August 2014. The species has also been previously recorded in the Marulan locality (OEH 2015) including a capture and release record of female adult located within quarry infrastructure in the eastern portions of the Approved Project Area (Heath, R. pers comm.). The Referral Area is considered to comprise of a small area of woodland foraging habitat on the north-eastern boundary for this species. No breeding or roosting habitat (cliffs, caves, old mine workings) occurs within the Referral Area and this habitat will not be impacted by the Proposed Action.

As discussed in the sections below, the Proposed Action is unlikely to result in a significant impact on large-eared pied bat.

Swift parrot (*Lathamus discolor*)

Swift parrot (*Lathamus discolor*) is listed as endangered under the EPBC Act (with a preliminary assessment for critically endangered listing). The swift parrot breeds in Tasmania and moves to mainland Australia for the non-breeding season (usually arriving between February and March). Most of the population migrates to Victoria and New South Wales in the winter months.

The swift parrot is a rare visitor to the Southern Highlands and is known to disperse more commonly along the NSW coast or further inland between Albury and Bathurst, with occasional records around Canberra. The closest record of the species occurs approximately 50 km to the northeast in habitat associated with Nattai National Park. The Referral Area is considered to comprise of highly degraded box-gum woodland that provides low quality but potential foraging habitat for this species. Targeted winter bird surveys undertaken in August 2014 did not record the swift parrot in the Referral Area or surrounds.

As discussed in the sections below, the Proposed Action is unlikely to result in a significant impact on swift parrot.

Regent honeyeater (*Anthochaera phrygia*)

Regent honeyeater (*Anthochaera phrygia*) is listed as critically endangered under the EPBC Act. The species inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. In NSW the species distribution is very patchy and mainly confined to the two main breeding areas and surrounding fragmented woodlands.

Although the regent honeyeater is a rare visitor to the Southern Highlands, the species has been sporadically recorded in surrounding high quality woodland habitats between August and May. The closest record of the species occurs approximately 10 km to the south of the Referral Area in habitat associated with Bungonia National Park. The Referral Area is considered to comprise highly degraded box-gum woodland that provides low quality but potential foraging habitat for this species. Diurnal bird surveys in February 2014 and targeted winter bird surveys undertaken in August 2014 did not record the regent honeyeater in the Referral Area or surrounds.

As discussed in the sections below, the Proposed Action is unlikely to result in a significant impact on regent honeyeater.

Koala (*Phascolarctos cinereus*) combined populations of Qld, NSW and the ACT

Koala (*Phascolarctos cinereus*) combined populations of Qld, NSW and the ACT is listed as a vulnerable species under the EPBC Act. The koala is known to occur in eucalypt woodlands and forests from the north-eastern Queensland, along the eastern coast of NSW, to the south-east corner of South Australia. The vulnerable listing

for the koala extends from north-eastern Queensland to the Victoria border.

Koala has not been recorded in the Referral Area, however the species has been recorded in the locality. One record from 2006 occurs approximately 5 km north of the Referral Area near the Wollondilly River, two records from 2000 and 1995 occur around the Marulan township approximately 5 km southeast of the Referral Area and one road mortality record exists from 2010 on the Hume Highway 4 km south of the Referral Area (OEH 2015). No evidence of the koala (sightings, scats, scratchings) were recorded in the Referral Area during the surveys undertaken for this assessment. The Proposed Action will result in the loss of low-quality potential foraging habitat for the species in the degraded eucalypt woodlands in the Referral Area.

As discussed in the sections below, the Proposed Action is unlikely to result in a significant impact on koala.

Nature and extent of likely impact

The Proposed Action will result in the removal of approximately 77.7 hectares of native woodland vegetation and habitat within the Referral Area. Vegetation communities impacted by the Proposed Action are listed in **Table 4**.

Table 4 – Vegetation Communities Impacted by the Proposed Action

Vegetation Community	Area in the Referral Area (ha)	Area to be Impacted (ha)
Box-Gum Grassy Woodland (exotic understorey)	80.9	58.1
Box-Gum Grassy Woodland (native understorey) – CEEC	0.98	0.0
Red Stringybark Open Forest (exotic understorey)	21.5	13.1
Red Stringybark Open Forest (native understorey)	9.0	5.3
Ribbon Gum – Snow Gum Woodland on Granitoids	2.9	1.2
Ribbon Gum – Snow Gum Riparian Woodland	0.9	0.0
Total Woodland/Forest	**116.2**	**77.7**
Exotic Pastures	110.3	97.5
Total Area	**226.5**	**175.2**

Detailed descriptions of the vegetation communities occurring within the Referral Area are provided in **Section 3.3(d)** below.

An Assessment of Significance was undertaken for the following threatened species and communities that have previously been recorded or mapped as occurring within or adjacent to the Referral Area or have the potential to occur within the Referral Area in accordance with the EPBC Act *Significant Impact Guidelines 1.1* (DotE 2013) (refer to **Attachment B**):

Critically Endangered or Endangered Ecological Communities

- White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland CEEC

Endangered Species

- hoary sunray (*Leucochrysum albicans* var. *tricolor*)
- swift parrot (*Lathamus discolor*) (preliminary assessment for critically endangered listing)
- regent honeyeater (*Anthochaera phrygia*)

Vulnerable Species

- koala (*Phascolarctos cinereus*) combined populations of Qld, NSW and the ACT
- large-eared pied bat (*Chalinolobus dwyeri*)

A summary of the Assessments of Significance (from **Attachment B**) is provided below. Those species and communities not specifically addressed below are considered unlikely to be significantly impacted as a result of the Proposed Action. Refer to **Attachment A** for a preliminary impact assessment of all EPBC Act listed threatened species and ecological communities known or predicted to occur within 10 km of the Referral Area.

White Box – Yellow Box – Blakely's Red Gum Woodland and Derived Native Grassland – Critically Endangered Ecological Community

White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland CEEC occurs in a patch located

in the northeast corner of the Referral Area outside the Proposed Disturbance Area and as a result will not be directly impacted as a result of the Proposed Action. Some minor edge effects may occur as a result of the Proposed Action being undertaken in adjacent habitats.

The Proposed Action is considered unlikely to:

- reduce the extent of the CEEC;
- result in an increase in the level of fragmentation of the CEEC;
- adversely affect habitat critical to the survival of the CEEC;
- modify or destroy abiotic factors necessary for the CEECs survival; or
- interfere with the recovery of the CEEC.

The Proposed Action is highly unlikely to result in a significant impact on White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland CEEC as the Proposed Action will not directly impact the CEEC or result in adverse impacts as described in the assessment of significance under the EPBC Act. Refer to **Attachment B** for the Assessment of Significance for the White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland CEEC.

Hoary sunray (*Leucochrysum albicans* var. *tricolor*)

The Proposed Action will result in the loss of approximately 5.3 hectares of predominately native understorey potential woodland habitat for the species. The locations of known records of this species are outside the Referral Area and Proposed Disturbance Area and will not be directly impacted as a result of the Proposed Action. Some minor edge effects may occur as a result of the Proposed Action being undertaken in adjacent habitats to known records of the species.

The Proposed Action is considered unlikely to:

- lead to a long-term decrease in the size of a population of this species;
- reduce the area of occupancy of a population of this species;
- fragment an existing population into two or more populations;
- adversely affect habitat critical to the survival of this species;
- disrupt the breeding cycle of population of these species;
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;
- introduce a disease on site that may cause this species to decline; or
- interfere with the recovery of this species.

The Proposed Action is highly unlikely to result in a significant impact on hoary sunray as the Proposed Action will not directly impact the known records of the species or result in adverse impacts as described in the assessment of significance under the EPBC Act. Refer to **Attachment B** for the Assessment of Significance for hoary sunray.

Swift parrot (*Lathamus discolor*) and regent honeyeater (*Anthochaera phrygia*)

The only key foraging tree species for these species that occurs within the Referral Area is yellow box (*Eucalyptus melliodora*). Additionally, regent honeyeaters are also known to forage in flowering Blakely's red gum (*Eucalyptus blakelyi*). Yellow box and Blakely's red gum occur within the box-gum woodland habitats of the Referral Area in low to moderate densities and noted to be in low condition, suffering from significant dieback. The Proposed Action will result in the loss of approximately 58.1 hectares of low-quality and degraded box-gum woodland

potential foraging habitat for both species. 0.98 hectares of higher quality box-gum woodland occurs in the Referral Area, but outside the Proposed Disturbance Area and will not be impacted by the Proposed Action. The Referral Area is not known as a historical or important foraging site for these species and the species have not been recorded within the Referral Area.

The Proposed Action is considered unlikely to:

- lead to a long-term decrease in the size of a population of these species;
- substantially reduce the area of occupancy of a population of these species;
- fragment an existing population into two or more populations;
- adversely affect habitat critical to the survival of these species;
- disrupt the breeding cycle of population of these species;
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that these species is likely to decline;
- introduce a disease on site that may cause these species to decline; or
- interfere with the recovery of these species.

The Proposed Action is unlikely to result in a significant impact on the populations of the swift parrot or regent honeyeater. Although the Referral Area provides low-quality potential foraging habitat for these species, they have not been recorded utilising the box-gum woodland within the Proposed Disturbance Area or in the immediate locality. Refer to **Attachment B** for the Assessment of Significance for swift parrot and regent honeyeater.

Koala (*Phascolarctos cinereus*)

Koala feed tree species (OEH 2014) occur in all woodland vegetation within the Referral Area. **Table 5** below outlines the koala habitat quality across the Referral Area per woodland vegetation community. Moderate quality vegetation occurs in areas of higher native species and complex structural composition. Areas of low quality woodlands in the Referral Area are those with predominately exotic species cover and degraded canopy trees showing signs of stress and severe dieback.

Table 5 – Koala Habitat Quality in the Referral Area

Vegetation Community	Area to be Impacted (ha)	Area to be Retained (ha)
Moderate Quality Woodlands		
Box-Gum Grassy Woodland (native understorey)	0.0	0.98
Red Stringybark Open Forest (native understorey)	5.3	3.7
Sub-total	5.3	4.7
Low Quality Degraded Woodlands		
Box-Gum Grassy Woodland (exotic understorey)	58.1	22.8
Red Stringybark Open Forest (exotic understorey)	13.1	8.4
Ribbon Gum – Snow Gum Woodland on Granitoids	1.2	1.7
Ribbon Gum – Snow Gum Riparian Woodland	0.0	0.9
Sub-total	72.4	33.8
TOTAL	**77.7**	**38.5**

The Proposed Action will result in the loss of approximately 5.3 hectares of moderate condition woodland and 72.4 hectares of low-quality woodland potential koala habitat within the Referral Area which is not considered to be critical for the survival of the species as per the Referral Guidelines for the Vulnerable Koala (DoE 2014). This species has not been recorded in the Referral Area, however the species has been recorded in the locality.

The Proposed Action is considered unlikely to:

- lead to a long-term decrease in the size of an important population of the species;
- substantially reduce the area of occupancy of an important population of the species;
- fragment an existing important population into two or more populations;
- disrupt the breeding cycle of the important population;
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;
- introduce a disease on site for the species that may cause this species to decline; or
- interfere with the recovery of the species.

The Proposed Action is unlikely to result in a significant impact on an important population of koala as the Proposed Action will not impact habitat critical to the survival for the species as described in the Referral Guidelines for the Vulnerable Koala (DoE 2014) or as presented in the assessment of significance under the EPBC Act. Refer to **Attachment B** for the Assessment of Significance for the koala, including an assessment in accordance with the Referral Guidelines for the Vulnerable Koala (DoE 2014).

Large-eared pied bat (*Chalinolobus dwyeri*)

The Proposed Action will not impact any cliffline or escarpment habitat that could be used as roosting or breeding habitat or adjacent fertile woodland valley foraging habitat, which is considered to be critical for the survival of the species as per the National Recovery Plan (DERM 2011). Modelling based on presence-only data indicates that large-eared pied bats forage in fertile valleys and plains, as well as areas with moderately-tall to taller trees along water courses (DERM 2011). The majority of records are from canopied habitat, suggesting a sensitivity to clearing, although narrow connecting riparian strips in otherwise cleared habitat are sometimes quite heavily used (DERM 2011). **Table 6** below outlines the large-eared pied bat habitat to be impacted by the Proposed Action. Moderate quality vegetation in the Referral Area occurs in areas of denser canopied habitat and woodland along riparian zones. Areas of low quality woodlands in the Referral Area are those with predominately exotic species cover and degraded canopy trees in open paddocks.

Table 6 – Large-eared Pied Bat Habitat in the Referral Area

Habitat Type	Area to be Impacted (ha)	Area to be Retained (ha)
Habitat Critical to the Survival of the Species (DERM 2011)		
Cliffline, escarpment breeding/roosting habitat	0.0	0.0
Fertile woodland valley foraging habitat (adjacent to cliff/escarpment habitat)	0.0	0.0
Sub-total	0.0	0.0
Moderate Quality Woodland Foraging Habitat		
Dense Canopied Woodlands	0.0	9.7
Riparian Woodlands	4.4	0.0
Sub-total	4.4	9.7
Low Quality Woodland Foraging Habitat		
Sparse Open Degraded Woodlands	73.4	29.0
Sub-total	73.4	29.0
TOTAL	**77.8**	**38.7**

The Proposed Action will result in the loss of approximately 4.4 hectares of moderate-quality dense canopied woodland or riparian foraging habitat and 73.4 hectares of low-quality sparse woodland foraging habitat for the species. Large-eared pied bat was recorded in one location within the Referral Area during the surveys undertaken for this assessment. A confident identification of an echolocation recording was identified in high quality woodland habitat within the north-eastern portion of the Referral Area. The species has also been previously recorded in the Marulan locality (OEH 2015) including a capture and release record of a female adult located within quarry infrastructure in the eastern portions of the Approved Project Area (Heath, R. pers comm.).

The Proposed Action is considered unlikely to:

- lead to a long-term decrease in the size of an important population of the species;
- substantially reduce the area of occupancy of an important population of the species;
- fragment an existing important population into two or more populations;
- adversely affect habitat critical to the survival of the species;
- disrupt the breeding cycle of the important population;
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;
- introduce an invasive species or a disease on site for the species that may cause this species to decline; or
- interfere with the recovery of the species.

The Proposed Action is unlikely to result in a significant impact upon an important population of large-eared pied bat as the Referral Area is not considered to support an important population of this species or contain habitat considered to be critical to the survival of the species as per the National Recovery Plan (DERM 2011). Refer to **Attachment B** for the Assessment of Significance for the large-eared pied bat.

3.1 (e) Listed migratory species

Description

A DoE Protected Matters Search was undertaken to identify the range of migratory species listed under international conventions (China-Australia Migratory Bird Agreement (CAMBA), Japan-Australia Migratory Bird Agreement (JAMBA), Republic of Korea-Australian Migratory Bird Agreement (ROKAMBA) and the Bonn Convention (Bonn)) that are predicted to occur within the Referral Area. Records from this database search were assessed along with records derived through the ecological surveys of the Referral Area, literature reviews and professional opinion to identify the full range of recorded or potentially occurring migratory species that may occur (refer to **Attachment A**). The identification of potentially occurring threatened species and communities was then used to determine those species that would be subject to an Assessment of Significance as part of this Referral (refer to **Attachment B**).

Comprehensive fauna surveys of the Referral Area have been undertaken in February and August 2014 to build on the extensive existing information from past work at the Lynwood Quarry site. These surveys included diurnal bird area searches and opportunistic sightings that capture the potential occurrence of migratory bird species in the Referral Area.

The following migratory species were recorded within the Referral Area during the surveys undertaken for this assessment (refer to **Figure 5**):

- white-throated needletail (*Hirundapus caudacutus*) – CAMBA, JAMBA, ROKAMBA.

The following migratory species are considered to have the potential to occur within the Referral Area based on known distribution, nearby records and/or suitable habitat:

- rainbow bee-eater (*Merops ornatus*) – JAMBA;
- satin flycatcher (*Myiagra cyanoleuca*) – Bonn;
- eastern great egret (*Ardea modesta*) – JAMBA; and
- cattle egret (*Ardea ibis*) – JAMBA.

Nature and extent of likely impact

The Proposed Action will result in the removal of approximately 72.4 hectares of low quality woodland vegetation and 5.3 hectares of moderately good native woodland habitat within the Referral Area. Vegetation communities impacted by the Proposed Action are listed in **Table 4**. An Assessment of Significance was undertaken for the migratory species listed above that have been recorded in the Referral Area or are considered to have the potential to occur.

A summary of the Assessment of Significance for migratory species is provided below (refer to **Attachment B**). Those species and communities not specifically addressed below are considered unlikely to be significantly impacted as a result of the Proposed Action.

Migratory Species

The Proposed Action is not considered likely to result in a significant impact on migratory species as it will not:

- substantially modify and/or destroy an area of important habitat for a migratory species;
- seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species; and/or
- result in an invasive species that is harmful to the migratory species becoming established in an area of

important habitat for the migratory species.

White-throated needletail (*Hirundapus caudacutus*) was recorded north of the Referral Area during the surveys undertaken for this assessment. The species is almost exclusively aerial and is unlikely to utilise the habitat within the Referral Area. According to the Draft *Referral Guideline for 14 birds listed as migratory species under the EPBC Act* (DoE 2015), important habitat for the white-throated needletail includes large tracts of native vegetation and tree hollows for roosting. A nationally ecologically significant proportion of the population is 10 individuals (or 0.1% of the population) according to Table 3 of the Draft Referral Guideline (DoE 2015). The habitats of the Referral Area are unlikely to be important for the species and the Proposed Action is unlikely to seriously disrupt the lifecycle of an ecologically significant proportion of the population the species. No invasive species that are harmful to white-throated needletail are known in Australia (DoE 2015).

Rainbow bee-eater (*Merops ornatus*), satin flycatcher (*Myiagra cyanoleuca*), eastern great egret (*Ardea modesta*) and cattle egret (*Ardea ibis*) have not been recorded within the Referral Area, but have the potential to occur based on suitable habitat and known distribution. The habitats of the Referral Area are unlikely to be important for the species. These species are not referenced in the Draft *Referral Guideline for 14 birds listed as migratory species under the EPBC Act* (DoE 2015).

The Referral Area is not considered to comprise *important habitat* for any of the identified migratory species listed above, and therefore the Proposed Action is not likely to substantially modify or destroy important migratory species habitat. Similarly, the Proposed Action will not seriously disrupt the lifecycle of an ecologically significant proportion of the population of a migratory species; or result in an invasive species that is harmful to migratory species becoming established within the Referral Area.

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

The Proposed Action is not located near any Commonwealth Marine Areas. The closest Commonwealth Marine Area occurs approximately 80 kilometres to the east of the Referral Area, in the Tasman Sea.

Nature and extent of likely impact

The Proposed Action will not impact directly or indirectly on any Commonwealth Marine Areas.

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

There is no Commonwealth land within the Referral Area. The EPBC Protected Matters Report identified three areas of Commonwealth land within 10 kilometres of the Referral Area:

- Commonwealth Land – Airservices Australia;
- Commonwealth Land – Australian Telecommunications Corporation; and
- Commonwealth Land – Telstra Corporation Limited.

Nature and extent of likely impact

The Proposed Action will not impact directly or indirectly on any Commonwealth land.

3.1 (h) The Great Barrier Reef Marine Park

Description

The Great Barrier Reef Marine Park is not in the vicinity of the Referral Area.

Nature and extent of likely impact

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

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

Description
The Proposed Action is not a coal seam gas or large coal mining development.

Nature and extent of likely impact

The Proposed Action is not a coal seam gas or large coal mining development and will not result in any direct or indirect impacts to any water resources under those categories of development.

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

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

3.3 (a) Flora and fauna

Flora

A total of 163 plant species were identified in the Referral Area and its vicinity during surveys in February and October 2014 (Umwelt 2015). Plants were recorded from two major vascular plant classes, being flowering plants (Magnoliopsida) and ferns (Filicopsida) and included trees, shrubs, forbs, grasses, sedges, rushes, reeds, ferns, and mistletoes. A total of 48 plant families were recorded. Poaceae (grasses) was the most well-represented family with 53 species recorded, followed by Asteraceae (daisies) with 26 species, Fabaceae (Faboideae) (pea flowers) with 15 species and Cyperaceae (sedges) with 11 species recorded.

Of the 163 species recorded, 59 (36 per cent) were introduced species. Dominant introduced species recorded include numerous bromes (*Bromus* spp.), serrated tussock (*Nassella trichotoma*), barley grass (*Hordeum leporinum*), rat's-tail fescue (*Vulpia myuros*), spear thistle (*Cirsium vulgare*), cats ear (*Hypochaeris radicata*), variegated thistle (*Silybum marinum*), Chilean whitlow wort (*Paronychia brasiliana*) and sheep sorrel (*Acetosella vulgaris*).

Floristic diversity of the Referral Area is regarded as moderate. It is considered likely that floristic diversity is representative of similar disturbed woodlands and derived pastures occurring widely across the Southern Highlands.

One EPBC Act-listed threatened flora species, hoary sunray (*Leucochrysum albicans* var. *tricolor*) was recorded in habitats adjacent the Referral Area during the surveys undertaken by Umwelt.

Fauna

A total of 82 fauna species were recorded in the Referral Area and surrounds during the surveys undertaken for this assessment (Umwelt 2015). This included 55 bird species, 5 reptile species, 2 amphibian species and 20 mammal species. Of these recorded species, 6 (7.3%) were introduced species (mammals and birds). Commonly recorded fauna included woodland birds, birds of prey, arboreal mammals and common frog species. This species list was compiled from data recorded during field surveys undertaken by Umwelt in February and August 2014.

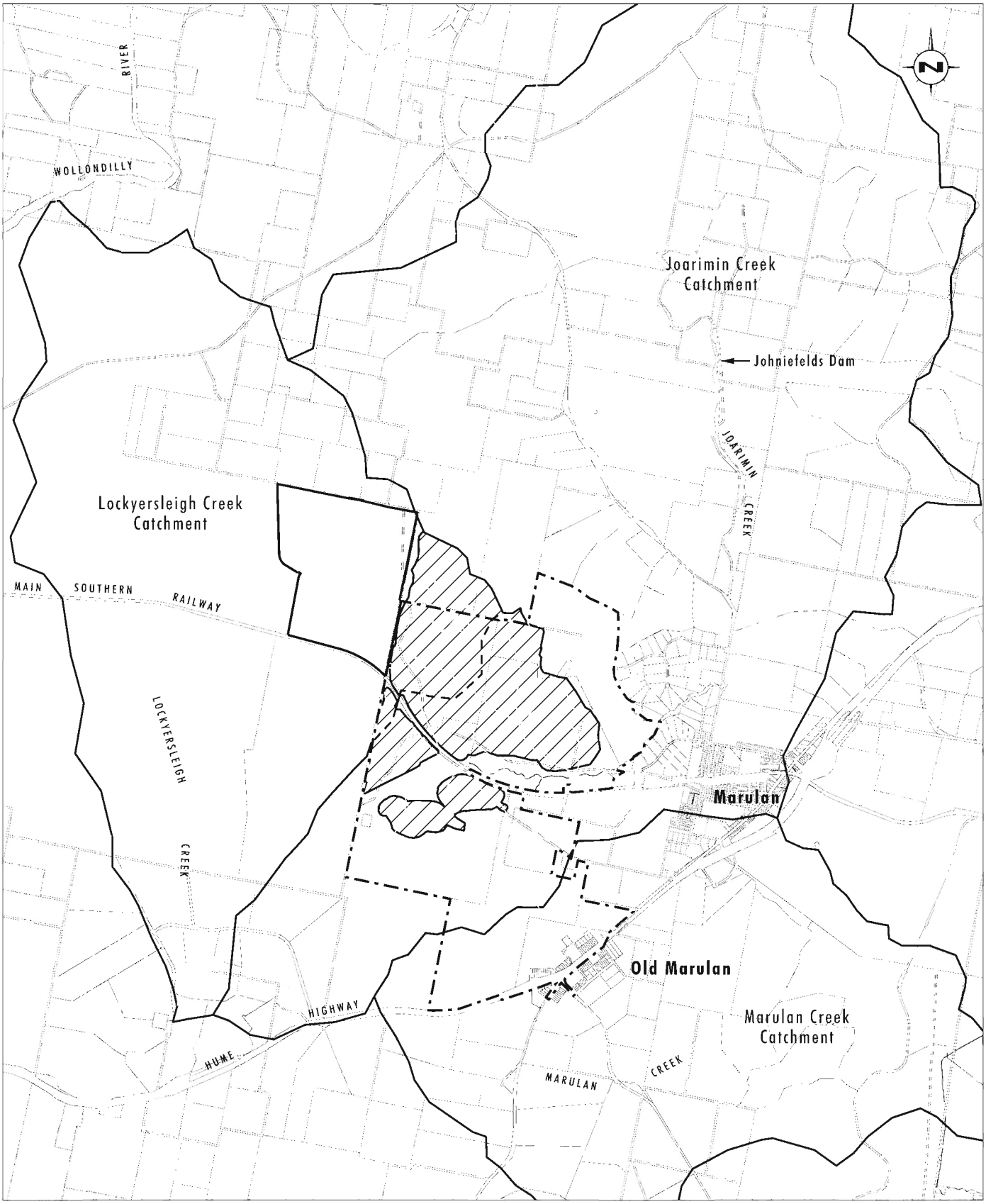
One EPBC Act-listed threatened fauna species, large-eared pied bat (*Chalinolobus dwyeri*) and one migratory species listed under international conventions, white-throated needletail (*Hirundapus caudacutus*) were recorded in habitats adjacent the Referral Area during the surveys.

3.3 (b) Hydrology, including water flows

The Referral Area lies within the catchments of Jaorimin, Lockyersleigh and Marulan Creeks (refer to **Figure 6**). Jaorimin and Lockyersleigh Creeks drain to the Wollondilly River, which is part of the Warragamba Dam catchment area, forming part of Sydney's drinking water supply. Marulan Creek is part of the Shoalhaven River system which also contributes to Sydney's drinking water supplies. The Referral Area, which includes the proposed Granite Pit and overburden emplacement area are located wholly within the Lockyersleigh Creek catchment. This Referral Area includes several first order and second tributaries of Lockyersleigh Creek, with a third order tributary present along the northern boundary.

Parts of the catchments of Jaorimin, Lockyersleigh and Marulan Creeks also occur within the existing Lynwood Quarry area that is approved under EPBC 2012/6560.

3.3 (c) Soil and Vegetation characteristics



Data Source: LPI (2014), Holcim Australia (2015)
Note: 5m Contour Interval

0 1.0 2.0 3.0km
1:60 000

Legend

- Approved Project Area
- Modification Project Area
- Referral Area
- Catchment Boundary
- Approved Water Management System

Topography and Drainage

Soil Characteristics

Soil landscape mapping of the Marulan region has been undertaken by DIPNR (2003) at 1:100,000 scale. Soil landscape mapping of the Marulan region identifies three soil landscapes within the Referral Area being the Lockyersleigh, Bindook Road and Bindook Road variant A soil landscapes.

The soils within the Referral Area are generally characterised as having a weak sandy loam material in the A1 horizon, with the subsoil being clayey in nature. The soils are generally moderately to highly erodible and some subsoils within these landscape groups are dispersive. The fertility of the soil over the majority of the Referral Area is low, with some small patches having moderate fertility. Lower slopes are generally poorly drained with soils generally having moderate to high salinity. The plant available water holding capacity of the soils is moderate to low across the site.

Vegetation Characteristics

The Referral Area lies within the South Eastern Highlands Bioregion which lies just inland of the Coastal South East Corner and Sydney Basin bioregions. The South Eastern Highlands Bioregion is characterised by a temperate climate with warm summers and no obvious dry season.

The vegetation communities in the Referral Area have been heavily modified by past and current agricultural activities. The broad vegetation types include box-gum woodlands, low open forests, riparian woodlands, derived native grasslands and disturbed pasture. Grazing, which has been widespread across the Referral Area, has resulted in the fragmentation and subsequent high disturbance and degradation of these communities.

As outlined in **Table 4**, Umwelt surveys of the Referral Area (Umwelt 2015) identified seven broad vegetation communities (refer to **Figure 5**) being:

Box-Gum Grassy Woodland (exotic understorey)

This community is a tall woodland that occupies more fertile lower parts of the landscape where resources such as water and nutrients are more available. While the overstorey is intact, this community is considered highly disturbed due to a dominance of annual and perennial exotic grasses and a lack of native herbaceous groundcover or recruitment of overstorey species. These conditions indicate that the area has been subjected to a high level of historic grazing resulting in a loss of native understorey diversity and partial loss of A-horizon soils (refer to **Plate 1**).

The majority of the woodland area is dominated by yellow box (*Eucalyptus melliodora*) and Blakely's red gum (*E. blakelyi*) with isolated occurrences of snow gum (*E. pauciflora* subsp. *pauciflora*), with an understorey dominated by exotic annual pasture species including soft brome (*Bromus hordeaceus)*, prairie grass (*Bromus catharticus*), *Bromus brevis*, rat's-tail fescue (*Vulpia myuros*) and exotic perennials including cocksfoot (*Dactylis glomerata*) and serrated tussock (*Nassella trichotoma*). Common exotic forbs include spear thistle (*Cirsium vulgare*), flatweed (*Hypochaeris radicata*) and Chilean whitlow wort (*Paronychia brasiliana*). Native understorey species are scattered throughout the exotic pastures, with grasses including rough speargrass (*Austrostipa scabra subsp. falcata*) and snowgrass (*Poa sieberiana*), and forbs including wattle mat-rush (*Lomandra filiformis* subsp. *coriacea*) and climbing saltbush (*Einadia nutans* subsp. *nutans*).

Box-Gum Grassy Woodland (native understorey)

This community is a tall woodland that occupies more fertile lower parts of the landscape where resources such as water and nutrients are more available (refer to **Plate 2**). The majority of the woodland area is dominated by yellow box (*Eucalyptus melliodora*) and Blakely's red gum (*E. blakelyi*) with an understorey dominated by rough speargrass (*Austrostipa scabra subsp. falcata*), snowgrass (*Poa sieberiana*), weeping grass (*Microlaena stipoides* var. *stipoides*), numerous wallaby grasses (*Rytidosperma* spp.) and blown grass (*Lachnagrostis filiformis*), and forbs including wattle mat-rush (*Lomandra filiformis* subsp. *coriacea*) and climbing saltbush (*Einadia nutans* subsp. *nutans*). This vegetation zone also contains a range of native non-grass understorey species including six 'important' species in Appendix 1 of the National Recovery Plan for White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC under the EPBC Act including *Bulbine bulbosa*, *Chrysocephalum apiculatum*, *Diuris sulphurea*, *Hypericum gramineum*, *Sebaea ovata* and *Triptilodiscus pygmaeus*. Approximately 10% cover of the highly invasive serrated tussock (*Nassella trichotoma*) occurs in this patch.

As discussed above, this community conforms to White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC under the EPBC Act.

Red Stringybark Open Forest (exotic understorey)

This community occupies loamy low ridges and rises. The overstorey is generally intact; however much of the understorey is highly degraded due to a dominance of annual and perennial exotic grasses and a lack of native herbaceous groundcover (refer to **Plate 3**).

The tall open forest is dominated by red stringybark (*Eucalyptus macrorhyncha*), with infrequent yellow box (*E. melliodora*) and Blakely's red gum (*E. blakelyi*), and an understorey dominated by perennial exotic grasses including serrated tussock (*Nassella trichotoma*). A sparse midstorey contains species such as Parramatta wattle (*Acacia parramattensis*) while the understorey is dominated by serrated tussock, there are native elements including sub-shrubs such as urn-heath (*Melichrus urceolatus*) and honeypots (*Acrotriche serrulata*), grasses including foxtail speargrass (*Austrostipa densiflora*), rough speargrass (*Austrostipa scabra* subsp. *falcata*) and ringed wallaby grass (*Rytidosperma caespitosa*), and forbs including wattle mat-rush (*Lomandra filiformis* subsp. *coriacea*) and climbing saltbush (*Einadia nutans* subsp. *nutans*).

Red Stringybark Open Forest (native understorey)

This community occupies loamy low ridges and rises (refer to **Plate 4**). The overstorey is generally intact and is dominated by red stringybark (*Eucalyptus macrorhyncha*), with infrequent yellow box (*E. melliodora*) and Blakely's red gum (*E. blakelyi*). A sparse midstorey contains species such as Parramatta wattle (*Acacia parramattensis*) while the understorey is dominated by serrated tussock, there are native elements including sub-shrubs such as urn-heath (*Melichrus urceolatus*) and honeypots (*Acrotriche serrulata*), grasses including foxtail speargrass (*Austrostipa densiflora*), rough speargrass (*Austrostipa scabra* subsp. *falcata*) and ringed wallaby grass (*Rytidosperma caespitosa*), and forbs including wattle mat-rush (*Lomandra filiformis* subsp. *coriacea*) and climbing saltbush (*Einadia nutans* subsp. *nutans*). Other forbs include *Gonocarpus tetragynus*, *Poranthera microphylla*, *Cymbonotus* spp., *Hydrocotyle laxiflora* and *Stypandra glauca* as well as the fern *Cheilanthes sieberi* subsp. *sieberi*. Serrated tussock is also present within this area.

Ribbon Gum – Snow Gum Woodland on Granitoids

This community occurs on low rises associated with granite outcrops. The overstorey is sparse due to reduced natural recruitment adjacent to a frost hollow and grazing disturbance, or potentially due to historic partial clearing. The understorey is highly degraded due to a dominance of annual and perennial exotic grasses, although patches of native groundcover are evident (refer to **Plate 5**).

The sparse tree layer is dominated by ribbon gum (*Eucalypts viminalis*), with isolated occurrences of snow gum (*E. pauciflora* subsp. *pauciflora*), apple box (*E. bridgesiana*) and Blakely's red gum (*E. blakelyi*). The midstorey layer is absent, with the understorey dominated by exotic grasses including barley grass (*Hordeum leporinum*), serrated tussock (*Nassella trichotoma*), rat's-tail fescue (*Vulpia myuros*) and brome (*Bromus* spp.) and exotic forbs such as Chilean whitlow wort (*Paronychia brasiliana*), sheep sorrel (*Acetosella vulgaris*) and catsear (*Hypochaeris radicata*). Native elements include rough speargrass (*Austrostipa scabra* subsp. *falcata*), weeping grass (*Microlaena stipoides* var*. stipoides*), snow grass (Poa sieberiana), wallaby grass (*Rytidosperma laeve*), climbing saltbush (*Einadia nutans* subsp. *nutans*), common woodruff (*Asperula conferta*) and variable glycine (*Glycine tabacina*).

Ribbon Gum – Snow Gum Riparian Woodland

This community occurs within a damp drainage depression in the south east of the Referral Area. While small in extent, based on landform features this community was likely to be uncommon within the Referral Area prior to clearing (refer to **Plate 6**).

The overstorey is dominated by ribbon gum (*Eucalyptus viminalis*), with infrequent Blakely's red gum (*E. blakelyi*) to a height of 20 metres. The midstorey is absent, and the understorey is dominated by exotic grasses and forbs. Exotic grasses include soft brome (*Bromus molliformis)*, rat's tail fescue (*Vulpia myuros*), serrated tussock (*Nassella trichotoma*) and barley grass (*Hordeum leporinum*) as well as exotic forbs such as spear thistle (*Cirsium vulgare*), variegated thistle (*Silybum marinum*), Chilean whitlow wort (*Paronychia brasiliana*),

sheep sorrel (*Acetosella vulgaris*) and catsear (*Hypochaeris radicata*). Native elements include rough speargrass (*Austrostipa scabra* subsp*. falcata*), common wheatgrass (*Elymus scaber*), climbing saltbush (*Einadia nutans* subsp*. nutans*) and *Geranium solanderi* var. *solanderi*.

Exotic Pastures

Exotic pastures occupies a large portion (49%) of the Referral Area. It is highly degraded from extensive sheep grazing, with a high dominance of exotic flora species (refer to **Plate 7**). Within this community, exotic pasture grasses such as rat's-tail fescue (*Vulpia myuros*), soft brome (*Bromus hordeaceus*), *Bromus brevis* and serrated tussock (*Nassella trichotoma*) are dominant, along with exotic forbs such as saffron thistle (*Carthamus lanatus*), spear thistle (*Cirsium vulgare*), buchan weed (*Hirschfeldia incana*), catsear (*Hypochaeris radicata*), Chilean whitlow wort (*Paronychia brasiliana*), sheep sorrel (*Acetosella vulgaris*) and red-flowered mallow (*Modiola caroliniana*).

3.3 (d) Outstanding natural features

There are no outstanding natural features within the Referral Area or in its immediate vicinity.

3.3 (e) Remnant native vegetation

The Referral Area is located in a region that has been heavily altered and used for agricultural purposes for many years. Traditionally, much of the vegetation on private land has been cleared or underscrubbed and used for grazing sheep and cattle. Such practices have led to the remaining vegetation remnants being highly disturbed and fragmented. The Referral Area contains sparse woodland fragments amongst a mainly exotic grassland.

On a local scale, the Referral Area contains a number of scattered vegetated fragments. In the northern section of the Referral Area, these fragments are comparatively large and join to a large fragment to the north. This vegetation becomes scattered and the corridor potential decreases. A large patch of vegetation to the northeast is separated from the vegetation within the Referral Area by a large area of highly scattered vegetation which would offer little by way of protective cover for dispersing fauna species. Vegetation within the Referral Area is highly fragmented and dominated by exotic grazing pastures and derived grasslands. A small strip of woodland vegetation occurs on the eastern edge of the Referral Area which is in relatively good condition and is connected to the large woodland area to the east of the Referral Area.

In general, fauna movement through the Referral Area would be most suitable for large mobile animals such as macropods. The small, close patches of vegetation may provide cover for small birds when dispersing, however, success for this group would be limited by the distance between these fragments, and the habitat provided within each. It is unlikely that the landscape is suitable to the successful large-scale dispersal of small terrestrial mammals such as *Antechinus* spp.

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

N/A.

3.3 (g) Current state of the environment

The Referral Area has historically been used for sheep grazing. The majority of the Referral Area comprises cleared grazing land with scattered patches of remnant vegetation, however large patches of remnant woodland exist in the north of the Referral Area. The vegetation of the Referral Area is generally heavily modified by past agricultural activities and is considered representative of regional vegetation communities and conditions. In areas, the land is highly degraded, with gully erosion present within many of the drainage lines.

Construction of Lynwood Quarry commenced on site in late 2010 with operations commencing in late 2015. These works have involved construction of quarry infrastructure and the initial phases of quarrying. The design of the quarry incorporated measures to minimise ecological impacts (e.g. avoiding areas with higher biodiversity values where practicable) and Holcim Australia has also committed significant areas of land to conservation to offset the loss of biodiversity values that could not be avoided.

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

No Commonwealth Heritage Places occur within the Referral Area.

No items of State or National Heritage Significance will be impacted by the Proposed Action.

A detailed historic heritage assessment was undertaken of the Referral Area and surrounds to identify any historic heritage values that could be impacted by the Proposed Action. Three potential heritage items were located within the Referral Area being culverts under the Main Southern Railway, stockyards and a garden area, however, these items have been assessed as having no significance with no research potential and therefore do not require any further heritage assessment.

The Referral Area is located approximately 1.3 kilometres to the east of the Lockyersleigh Homestead and Gardens which is listed as a site of local heritage significance. The Proposed Action is not predicted to result in any impacts on this heritage site.

3.3 (i) Indigenous heritage values

A comprehensive Aboriginal Cultural Heritage Assessment process was completed for the Proposed Action in consultation with the registered Aboriginal parties for Lynwood Quarry.

The Proposed Action will impact on some of the identified cultural heritage values within the Referral Area, including impact on three isolated find sites, seven artefact scatter sites and two scarred trees.

Holcim Australia has developed a comprehensive impact mitigation strategy for the Proposed Action in consultation with the registered Aboriginal parties, including salvage of the sites to be impacted and establishment of an expanded conservation area on Holcim Australia's land.

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

There are no other important or unique values of the environment affected by, or in proximity to the Proposed Action. The closest national park is Bungonia National Park located approximately 25 kilometres to the south and the Proposed Action will not impact directly or indirectly on this park.

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

All of the land within the Referral Area is freehold land owned by Holcim Australia with the exception of an enclosed Crown Road reserve which is Crown land.

3.3 (l) Existing land/marine uses of area

The Referral Area has historically, and is currently been used for agricultural land uses, primarily sheep grazing.

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

The primary proposed land use within the Referral Area is for quarry extraction and associated operations.

4 Environmental outcomes

As discussed in **Section 3.0** above, the Proposed Action is not predicted to result in a significant impact on MNES. Assessments of Significance were undertaken for MNES that have been recorded within or adjacent to the Referral Area or have the potential to occur within the Referral Area (refer to **Attachment B**). It was determined that the Proposed Action is unlikely to have a significant impact on all of these MNES.

The Proposed Action will impact areas of mainly low-quality habitats for some of the ecological MNES. As a result, a range of avoidance, mitigation and offsetting measures have been proposed to minimise and compensate for these losses in biodiversity (refer to **Section 5.0**). **Table 6** below outlines a range of environmental outcomes from these measures and why they are beneficial for the MNES relevant to the Proposed Action. These measures have been designed based on the detailed ecological data collected for the site (discussed in **Section 3**) and the outcomes of the ecological impact assessment process. Similar measures have been successfully implemented for the existing Lynwood Quarry operations providing a high degree of confidence in the ability for these measures to be appropriately implemented.

Table 6 – Environmental Outcomes for MNES

Measure	Environmental Outcome	Protected Matters Benefited
Clearly defined disturbance area	Avoidance of impact on areas outside disturbance area assessed in this Referral	• White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland CEEC • hoary sunray • swift parrot • regent honeyeater • large-eared pied-bat • koala • migratory species
Pre-clearance surveys and detailed tree felling procedure	Minimisation of fauna death and injury as a result of vegetation clearance.	• large-eared pied-bat • koala
Targeted weed control programs	Minimisation of weed spread into native vegetation communities and habitats.	• White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland CEEC • hoary sunray • swift parrot • regent honeyeater • large-eared pied-bat • koala • migratory species
Targeted feral animal control programs	Reduction in predation and competition for resources with native species.	• hoary sunray • swift parrot • regent honeyeater • large-eared pied-bat • koala • migratory species
Nest box establishment in surrounding retained vegetation	Increase in habitat resources for hollow-dependant species	• general fauna habitat value
Quarry rehabilitation	Re-establishment of native vegetation communities and fauna habitats. Reconnection of the habitat areas to the north and south of the Referral Area with a vegetated corridor.	• White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland CEEC • hoary sunray • swift parrot • regent honeyeater • large-eared pied-bat • koala • migratory species

These measures will be further detailed in the revised Lynwood Quarry Rehabilitation and Landscape Management Plan. The revision of this Plan will include the above measures with environmental outcomes that will be detailed with reference to the SMART (specific, measureable, achievable, relevant and time-bound) criteria as outlined in the draft *Outcomes-based Conditions Policy 2015* and *Outcomes-based Conditions Guidance 2015* (DoE 2015).

5 Measures to avoid or reduce impacts

Measures to Avoid Matters of National Environmental Significance

Holcim Australia undertook a detailed constraints study to guide the development and detailed design of the Proposed Action. Through this process, alternative quarry design options were considered and Holcim Australia sought to minimise the environmental and community impacts associated with the Proposed Action whilst maximising the resource extraction. Key factors in selecting the location of Lynwood Quarry included the likely impacts on significant ecological features, including threatened species, TECs and/or their habitats.

Ecological field surveys were undertaken in 2014 within the current Referral Area and within lands surrounding the Referral Area provide information on the early site selection process for Lynwood Quarry. The final location of the proposed Granite Pit was determined with consideration of the biodiversity values of the potential development sites. It was found that the area north of the final Referral Area contained higher value vegetation and fauna habitat in structured woodland areas than the lower quality scattered woodland trees and exotic groundcovers dominating the Referral Area.

Once the pit location was selected, Holcim Australia then assessed the biodiversity values in the Referral Area (as identified in the 2014 surveys) to guide the detailed design of the Proposed Action. Alternative quarry design and overburden emplacement options were considered and Holcim Australia has sought to minimise the biodiversity impacts associated with the Proposed Action whilst also maximising resource efficiency.

Key factors in project design have been amended to ameliorate the impacts on significant ecological features, including threatened species TECs and/or their habitats. The approach to this has been to avoid ecological impact and maximise use of existing disturbed areas as much as possible. The specific location and size of the quarry pit, emplacement areas and associated developments such as water management structures were determined with consideration of avoiding higher quality woodland habitats to the east of the Referral Area. This included a specific reduction in the size of the proposed disturbance footprint to avoid the identified high quality woodland habitat and presence of White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland CEEC to the east of the current Granite Pit. As a result, this CEEC will not be impacted by the Proposed Action.

Other predominately native woodland communities have been largely avoided by this design and in doing so the Proposed Action will retain the higher quality threatened species habitats and structurally diverse vegetation communities that have not been subject to ongoing disturbances as a result of extensive sheep grazing. This has resulted in approximately half of the moderate quality woodlands in the Referral Area being entirely avoided by the Proposed Action and the majority of the impacts occurring on poorer condition vegetation and exotic pastures. This has effectively reduced habitat loss, connectivity loss and minimised the amount of clearing required for the Proposed Action.

Existing Mitigation and Management Measures

Based on the outcomes of the original environmental impact assessment for Lynwood Quarry, Holcim Australia has developed and implemented a detailed impact mitigation and site management strategy to maintain and enhance ecological values in areas unaffected by the Quarry. The primary principle guiding this approach has been to avoid ecological impacts, or where impacts are unavoidable, minimise and mitigate those unavoidable impacts.

This process of avoidance, minimisation and mitigation is being guided by the existing Lynwood Quarry Rehabilitation and Landscape Management Plan Revision 2 (Umwelt 2011b). The Rehabilitation and Landscape Management Plan provides a framework for site rehabilitation, as well as management requirements for the Habitat Management Area, riparian areas and ongoing management of remnant vegetation, habitat values and property management issues. The Plan is also a 'live document' that incorporates measures based on adaptive management principles which will enable future management actions to be tailored to the changing needs of the site in response to changing circumstances.

A range of management strategies are currently being implemented by Holcim Australia to limit impacts on endemic flora and fauna at the Lynwood Quarry site. The scope of these existing management strategies are outlined in the Lynwood Quarry Rehabilitation and Landscape Management Plan Revision 2 (Umwelt 2011b), and include:

- exclusion of stock from operational and sensitive areas, including the Habitat Management Area, Cultural Heritage Management Zone and core riparian areas. The exclusion of stock from these areas to date has assisted in the recovery of local native species, including hoary sunray;
- feral animal and noxious weed control;
- management of erosion and sedimentation to ensure that adjoining vegetation communities and aquatic systems are not disturbed;
- management of fire regimes;
- rehabilitation of disturbed areas with local indigenous species;
- use of local indigenous species in landscaped areas and the linkage and integration of new areas with existing vegetated areas to improve ecological function and provide habitat;
- management of surface water to ensure that adjoining vegetation communities, aquatic systems and associated fauna are not disturbed;
- adaptive management, as required, if a previously unrecorded or assessed threatened species is identified in the Referral Area during construction or operation;
- ongoing monitoring and maintenance of all revegetation works and habitat enhancement activities; and
- creation of habitat corridors linking isolated remnant vegetation stands.

The Rehabilitation and Landscape Management Plan (Umwelt 2011b) also establishes the ecological monitoring and maintenance requirements for the Quarry. This includes the following key components:

- weed and feral animal monitoring on a six monthly basis, with control measures implemented on an as-needs basis;
- riparian corridor monitoring on a six monthly basis;
- ecological monitoring of retained vegetation annually for the first five years, then three yearly thereafter. This includes monitoring of permanent vegetation plots within the Habitat Management Area, along Joarimin Creek north of the Main Southern Railway and in the Cultural Heritage Management Zone;
- ecological monitoring of revegetated areas three monthly for the first three years following completion of rehabilitation works;
- fauna monitoring on a three yearly basis;
- nest box monitoring annually for the first five years following installation. Note that as outlined in the EIS (Umwelt 2005a) nest boxes are being erected as part of the Lynwood Quarry to offset the loss of hollows as a result of clearing; and
- condition monitoring of aquatic habitat on a three yearly basis.

Existing Conservation and Management Areas

As part of the existing management and mitigation measures implemented at Lynwood Quarry, Holcim Australia has established several existing conservation and management areas for both biodiversity and cultural heritage. These areas are shown on **Figure 7** and include:

- a 185 hectare biodiversity offset area in the southern portion of the Lynwood Quarry site and adjoining land to the west. This area was established as an outcome of the existing Controlled Activity Approval for Lynwood Quarry and contains significant area of White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland CEEC and substantial numbers of hoary sunray;

- a 130 hectare habitat management area in the north-east portion of the Lynwood Quarry site;

- a 51 hectare cultural heritage management zone in the southern portion of the Lynwood Quarry site which is incorporated into the biodiversity offset area. This area was established in consultation with Traditional

Owners to conserve the most significant Aboriginal site (and a range of other sites) at Lynwood Quarry; and

- an 8.7 hectare habitat management area along Joarimin Creek (the Joarimin Creek Corridor) which provides for the management of areas of significant biodiversity and Aboriginal cultural heritage values.

These conservation and management areas collectively provide significant areas of land managed to protect and enhance biodiversity and cultural heritage values.

Proposed Mitigation and Management Measures

Holcim Australia has committed to the design and implementation of a comprehensive strategy to mitigate adverse impacts during the construction and operations phases of the Proposed Action. This includes specific measures to manage potential impacts on fauna and flora species in the Referral Area during vegetation clearing and construction of Lynwood Quarry including:

- Clearly demarcating the disturbance area and restricting direct impacts to this area;
- A pre clearing procedure will continue be implemented to minimise the potential for impacts on native fauna species (focusing on threatened species) as a result of the clearing of hollow-bearing trees. The pre-clearing procedure is designed to minimise impacts to hollow-dependent and ground-dwelling fauna, particularly the NSW listed threatened squirrel glider and hollow-dependent micro-bats;
- Nest box establishment in retained vegetation in proximity to the Referral Area to mitigate the loss of hollow-bearing trees;
- Targeted weed management measures including regular weed inspections and weed control and eradication techniques such as herbicides, physical removal and prompt revegetation of disturbed areas where natural regeneration will not occur within the short term;
- Targeted feral animal management measures in accordance with Holcim Australia's existing Landscape Management Plan;
- Erosion and sedimentation control in accordance with the Lynwood Erosion and Sediment Plan (ESCP) (Holcim, 2013);
- Progressive rehabilitation of overburden emplacement areas over the life of the Lynwood Quarry;
- Appropriate lighting controls to minimise impacts will be implemented (providing that these actions do not compromise site safety issues).

Proposed Biodiversity Offset Strategy

A Biodiversity Offset Strategy is proposed as part of the NSW approval process so that the development maintains or improves the biodiversity values of the region in the medium to long term and compensates for those impacts to threatened species and ecological communities that cannot be adequately avoided or mitigated as part of the Proposed Action. Holcim Australia is committed to delivering a Biodiversity Offset Strategy as part of the NSW approval process that appropriately compensates for the unavoidable loss of ecological values as a result of the Proposed Action under the NSW *Biodiversity Offsets Policy for Major Projects* (OEH 2014).

The NSW *Biodiversity Offset Policy for Major Projects* commenced on 1 October 2014 and is now in an 18 month transitional implementation. Fulfilling offset requirements under the Policy will be undertaken using one or a combination of the following offset strategies:

- On-site in-perpetuity conservation of applicable credits.
- Securing required credits through the open credit market, off site.

- Offsetting through a site secured by a BioBanking Agreement.
- If suitable offsets are unavailable, contributing money to supplementary measures in accordance with relevant conservation or recovery actions.
- Contributing to the Offsets Fund.

As a priority, Holcim Australia is investigating the available lands within and surrounding the Holcim Australia landholdings around the Referral Area for potential BioBanking Agreement offsetting opportunities. Holcim Australia will also investigate a range of available properties in the locality that contain the appropriate biodiversity features to offset the impacts of the Proposed Action.

Further to this, Holcim Australia will investigate, in consultation with the NSW OEH, the application of the Offsets Fund (when available) and the monetary contribution required in lieu of or in addition to the proposed offset sites through the use of a BioBanking Agreement.

6 Conclusion on the likelihood of significant impacts

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

X	No, complete section 5.2
	Yes, complete section 5.3

6.2 Proposed action IS NOT a controlled action.

The Proposed Action has been determined to be highly unlikely result in a significant impact on the EPBC listed MNES due to the range of factors outlined in this Referral including the absence of any impact on listed communities and the general poor quality of much of the habitat proposed to be impacted due to past land uses (including a largely exotic understorey).

The EPBC Act impact assessment guidelines outline seven criteria that indicate whether an action has, will have or is likely to have a significant impact on threatened species. As discussed in **Section 3**, the Proposed Action is highly unlikely to have a significant the following impacts on the following MNES recorded or considered to potentially occur within the Referral Area:

- White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland – critically endangered ecological community (CEEC) under the EPBC Act – the small occurrence of this community within the Referral Area is outside the proposed disturbance area;
- hoary sunray (*Leucochrysum albicans* var. *tricolor*) – endangered under the EPBC Act – no hoary sunrays have been recorded within the proposed disturbance area;
- large-eared pied bat (*Chalinolobus dwyeri*) – vulnerable under the EPBC Act – some foraging habitat will be impacted, however, this loss is not predicted to result in a significant impact on the species. Breeding habitats do not occur within the Referral Area;
- swift parrot (*Lathamus discolor*) – endangered under the EPBC Act – the species has not been recorded within or in the vicinity of the Referral Area. Some areas of relatively poor quality potential foraging habitat will be removed, however, this loss is not predicted to result in a significant impact on the species;
- regent honeyeater (*Anthochaera phrygia*) – critically endangered under the EPBC Act – the species has not been recorded within or in proximity to the Referral Area. Some areas of relatively poor quality potential foraging habitat will be removed, however, this loss is not predicted to result in a significant impact on the species;
- koala (*Phascolarctos cinereus*) combined populations of Qld, NSW and the ACT – vulnerable under the EPBC Act – the species has not been recorded within the Referral Area. Some areas of relatively poor quality potential habitat will be removed, however, this loss is not predicted to result in a significant impact on the species; and
- Migratory species listed under international conventions.

Assessments of Significance were undertaken for the above threatened species, communities and migratory species, that have been recorded within or adjacent to the Referral Area or have the potential to occur within the Referral Area (refer to **Attachment B**). These assessments concluded that the Proposed Action would not result in a significant impact on any of the above MNES.

6.3 Proposed action IS a controlled action

	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)
	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)
	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)

7 Environmental record of the responsible party

		Yes	No
7.1	**Does the party taking the action have a satisfactory record of responsible environmental management?** **Provide details** Holcim (Australia) is dedicated to sustainable development and the continual improvement of our environmental performance. We realise our activities can impact on the environment and we make it our responsibility to manage those impacts. Holcim (Australia) operated under a national Environment Management System (EMS) that has been closely modelled on the international standard for EMS ISO 14001.	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?** **If yes, provide details of environmental policy and planning framework** The action will be taken in accordance with the Holcim (Australia) Environmental Policy (please see attached) and Safety, Health and Environment Management System (SHE MS). The SHE MS is an inter-related collection of policies, processes, programs, procedures, responsibilities and activities designed to provide the foundation for successful safety, health and environment management. The management system has been developed in alignment with the fundamental management principles as set out in the Australian and International Standards ISO 14001, AS/NZS ISO 14004 and AS/NZS ISO 31000.	X	
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?**	X	

Provide name of proposal and EPBC reference number (if known) 2014/7387 Holcim (Australia) Pty Ltd/Mining/Lot 249 Cooney Road, Bli Bli/QLD/Bli Bli Quarry expansion project, Qld 2013/6915 Holcim (Australia) Pty Ltd/Mining/MT 47/306, 309, 331 & 353, Burrup Peninsula, 3kms SE Dampier/WA/Nickol Bay Quarry Eastern Extension Proposal, Burrup Peninsula, WA 2012/6560 Holcim (Australia) Pty Ltd/Mining/West of Marulan/NSW/Lynwood Quarry Project/Marulan, NSW 26 September 2012 2010/5709 Holcim (Australia) Pty Ltd/Natural resources management/National Heritage Place Burrup Peninsula/WA/Relocation of 2 heritage sites to National Heritage Place 27 Oct 2010 2009/4849 Holcim (Australia) Pty Limited/Mining/Chiltern/VIC/Development of new Chiltern Quarry 15 Apr 2009 2007/3902 CEMEX Australia Pty Limited/Transport - land/4 Arnold Drive, Nerimbera, 10km east of Rockhampton/QLD/Nerimbera Quarry haul road 10 Dec 2007 2006/3003 Rinker Australia Pty Ltd/Mining/Colac /VIC/basalt quarry extension on the Ondit-Warrian Road 17 Aug 2006 2005/2067 Readymix Holdings Pty Ltd/Manufacturing/Rooty Hill/NSW/Concrete Batching Plant and Associated Facilities 01 Apr 2005 2003/949 CSR Readymix/Manufacturing/Rooty Hill/NSW/Rooty Hill Concrete Batching Plant and associated facilities 04 Feb 2003 2001/437 CSR Readymix/Mining/Mt Shamrock Road, Pakenham/VIC/Quarry Extension 11 Sep 2001 2001/329 CSR Limited/Mining - sand/Donnybrook/QLD/Donnybrook Sand Extraction Operation 25 Jun 2001		

8 Information sources and attachments

8.1 References

Department of Environment and Resource Management (DERM) (2011) National Recovery Plan for the large-eared pied bat *Chalinolobus dwyeri*. Report to the Department of Sustainability, Environment, Water, Population and Communities, Canberra.

Department of Environment, Climate Change and Water NSW (2011) National Recovery Plan for White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland. Department of Environment, Climate Change and Water NSW, Sydney.

Department of the Environment (DotE) (2013) Matters of National Environmental Significance Significant Impact Guidelines 1.1. Commonwealth of Australia.

Department of the Environment (DoE) (2014) EPBC Act Referral Guidelines for the Vulnerable Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory). Commonwealth of Australia.

Department of the Environment (DotE) (2016) SPRAT Species Profiles, accessed February 2016.

Department of the Environment (DotE) (2016) Protected Matters Search Tool, accessed February 2016.

Department of the Environment (DotE) (2015) Draft *Referral Guideline for 14 birds listed as migratory species under the EPBC Act*, September 2015.

Department of the Environment (DotE) (2015) Draft Outcomes-based Conditions Policy 2015 and Outcomes-based Conditions Guidance 2015, July 2015.

Menkhorst, P., Schedvin, N. and Geering, D. (1999) Regent Honeyeater Recovery Plan 1999-2003, prepared on behalf of the Regent Honeyeater Recovery Team, Department of Natural Resources, Victoria.

Office of Environment and Heritage (OEH) (2016) Threatened Species Profiles, accessed February 2016.

Office of Environment and Heritage (OEH) (2015) BioNet Atlas of NSW Wildlife, accessed July 2015.

Office of Environment and Heritage (OEH) (2014) Koala Habitat Feed Trees by Koala Management Areas, accessed July 2015 < http://www.environment.nsw.gov.au/animals/koalahabitat.htm#centraland>

Saunders, D.L. and Tzaros, C.L. (2011) *National Recovery Plan for the Swift Parrot Lathamus discolor*, Birds Australia, Melbourne.

Sinclair, S (2010) National recovery Plan for the Hoary Sunray *Leucochrusum albicans var.tricolor*. Department of Sustainability and Environment, Melbourne.

Umwelt (Australia) Pty Limited (2005a) Environmental Impact Statement Readymix Holdings Pty Ltd Proposed Lynwood Quarry, Marulan.

Umwelt (Australia) Pty Limited (2005b) Ecological Assessment Proposed Lynwood Quarry, Marulan.

Umwelt (Australia) Pty Limited (2011a) Lynwood Quarry Project Inspection and Assessment of Hoary Sunray. Report prepared for Minter Ellison Lawyers.

Umwelt (Australia) Pty Limited (2011b) Lynwood Quarry Rehabilitation and Landscape Management Plan Revision 2. Report prepared for Holcim (Australia) Pty Limited.

8.2 Reliability and date of information

The sources of all information contained within **Section 3** have been referenced within **Section 3** and all references are listed in **Section 7.1** above. The dates of all information sources have been listed within **Section 3**. Any uncertainties in the information in **Section 3** have been listed and discussed within **Section 3**.

8.3 Attachments

		✓ attached	Title of attachment(s)
You must attach	figures, maps or aerial photographs showing the project locality (section 1)	✓	Figure 1 Figure 2 Figure 3 Figure 4
	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)	✓	Figure 5
If relevant, attach	copies of any state or local government approvals and consent conditions (section 2.5)	✓	A copy of the Consolidated consent for Lynwood Quarry is attached.
	copies of any completed assessments to meet state or local government approvals and outcomes of public consultations, if available (section 2.6)	✓	All environmental assessments relevant to Lynwood Quarry are available from the DP&E Major Projects website: http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=7093
	copies of any flora and fauna investigations and surveys (section 3)	✓	A copy of the Biodiversity Assessment Report prepared under NSW legislative requirements for the Granite Pit is also attached.
	technical reports relevant to the assessment of impacts on protected matters that support the arguments and conclusions in the referral (section 3 and 4)	**N/A**	
	report(s) on any public consultations undertaken, including with Indigenous stakeholders (section 3)	✓	All environmental assessments relevant to Lynwood Quarry are available from the Major Projects website: http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=7093

9 Contacts, signatures and declarations

Project title: Lynwood Quarry Extraction Area Modification

9.1 Person proposing to take action [1].

1. Name and Title:	Lisa Honan on behalf of Holcim (Australia) Pty Ltd, Planning Approvals Manager
2. Organisation (if applicable):	Holcim (Australia) Pty Ltd
3. EPBC Referral Number (if known):	
4: ACN / ABN (if applicable):	ABN 87 099 732 297
5. Postal address	PO Box 5697 West Chatswood NSW 1515
6. Telephone:	02 9412 6531
7. Email:	Lisa.honan@holcim.com
8. Name of designated proponent (if not the same person at item 1 above and if applicable):	As above
9. ACN/ABN of designated proponent (if not the same person named at item 1 above):	As 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

[1] *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.*

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 15 FEB 2016

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

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 12 February 2016

REFERRAL CHECKLIST

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 – MNES Assessment

Matters of National Environmental Significance (MNES) identified through searches of the Department of the Environment (DoE) Protected Matters Database and the Office of Environment and Heritage (OEH) Atlas of NSW Wildlife for a 10 kilometre radius of the Referral Area are listed in **Table 1** below.

Table 1 contains the relevant ecological details of each listing (including their habitat requirements, known range and reservation within conservation reserves), as well as an assessment as to whether there may be an impact on any recorded or potentially occurring threatened and migratory species or TECs as a result of the Proposed Action. It should be noted that some species are listed under both threatened species legislation and international migratory species conventions. In these cases the information presented is repeated, except for the legal listing (which is relevant to the table under which it is listed).This assessment is based on specific habitat requirements of each threatened and migratory species or TEC.

An Assessment of Significance was prepared in accordance with the requirements of the DoE (2013) Matters of National Environmental Significance Significant Impact Guidelines 1.1 for each threatened and migratory species or ecological community recorded or for which there is the potential for impact as a result of the Proposed Action (refer to **Attachment B**).

The following abbreviations or acronyms are used in **Table 1**:

EPBC	*Environment Protection and Biodiversity Conservation Act 1999*
CEEC	Critically Endangered Ecological Community
EEC	Endangered Ecological Community
CE	Critically Endangered
E	Endangered
V	Vulnerable
CAMBA	China-Australia Migratory Bird Agreement
JAMBA	Japan-Australia Migratory Bird Agreement
ROKAMBA	Republic of Korea-Australia Migratory Bird Agreement
Bonn	Bonn Convention
subsp.	subspecies
var.	variety
NP	National Park
NR	Nature Reserve
SCA	State Conservation Area

Table 1 – Ecological Protected Matters under the EPBC Act

Species	EPBC Status	Suitable Habitat	Distribution in Relation to the Referral Area	Reservation in the Region	Potential to Occur/Potential for Impact	Further Assessment Required?
THREATENED ECOLOGICAL COMMUNITIES						
Natural Temperate Grassland of the Southern Tablelands of NSW and the Australian Capital Territory	EEC	This community occurs on ridges, crests, hillsides, undulating plains, valleys and lower slopes, creeks, drainage lines and river flats. The vegetation is associated with a range of geological substrates, including Cainozoic sediments, Silurian and Ordovician volcanics, mudstones, shales and limestones, Quaternary sediments, and Eocene basalt and granite.	This community's distribution generally corresponds with the Monaro, Murrumbateman, Bungonia and Crookwell subregions of the South Eastern Highlands bioregion.	This community is not known to occur in any conservation reserves in the region.	Based on the findings of detailed vegetation surveys and site characteristics, this community is not considered to be present in the Referral Area or in any way affected by the Proposed Action.	No

Species	EPBC Status	Suitable Habitat	Distribution in Relation to the Referral Area	Reservation in the Region	Potential to Occur/Potential for Impact	Further Assessment Required?
Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion	EEC	This community is generally a tall open eucalypt forest found on igneous rock, most often dominated by brown barrel (*Eucalyptus fastigata*), ribbon gum (*E. viminalis*) and narrow-leaved peppermint (*E. radiata* subsp*. radiata*). It typically occurs as an open to tall open forest with a sparse, dense layer of shrubs and vines and a diverse understorey.	This community is known in the Sydney Basin Bioregion on basalt derived soils.	Morton NP	The Referral Area is situated in the South Eastern Highlands Bioregion and while this does not preclude the community's presence, the Referral Area does not support soils derived from basalt and basalt-like substrates. Based on the findings of detailed vegetation surveys and site characteristics, this community is not considered to be present or in any way affected by the Proposed Action.	No

Species	EPBC Status	Suitable Habitat	Distribution in Relation to the Referral Area	Reservation in the Region	Potential to Occur/Potential for Impact	Further Assessment Required?
White Box – Yellow Box – Blakelys Red Gum Grassy Woodland and Derived Native Grassland	CEEC	This community can occur as either a woodland or derived grassland (grassy woodland from which trees have been removed). The groundlayer consists of native tussock grasses and herbs, and a sparse, scattered shrub layer. White box (*Eucalyptus albens*), yellow box (*E. melliodora*), or Blakelys red gum (*E. blakelyi*), dominate, where trees remain. Sites dominated by other tree species that do not have white box, yellow box, or Blakelys red gum as co-dominants are not considered to be part of the community, except in the Nandewar bioregion. In the Nandewar Bioregion, grey box (*E. moluccana* or *E. microcarpa*) may also be dominant or co-dominant in the community.	This community occurs along the western slopes and tablelands of the Great Dividing Range from southern Queensland through NSW to central Victoria.	Bungonia SCA Bangadilly NP	Based on the findings of detailed vegetation surveys and site characteristics, this community was identified in the north-eastern corner of the Referral Area where it is mapped and described as Box-Gum Grassy Woodland (native understorey). This area is not within the disturbance footprint and will not be directly impacted by the Proposed Action. A comprehensive analysis of other areas of degraded Box-Gum Grassy Woodland was undertaken to determine if it conformed to listing advice provided by the Department of Environment under the EPBC Act (refer to Section 3.1(d) of the Referral).	No

Species	EPBC Status	Suitable Habitat	Distribution in Relation to the Referral Area	Reservation in the Region	Potential to Occur/Potential for Impact	Further Assessment Required?
THREATENED SPECIES - FLORA						
hoary sunray *Leucochrysum albicans* var. *tricolor*	E Preliminary determination to be delisted from the EPBC Act	In NSW and ACT, this species occurs in grasslands, grassy areas in woodlands and dry open forests, and modified habitats, on a variety of soil types including clays, clay loams, stony and gravely soil. Bare ground is required for germination.	This species occurs at relatively high elevations in woodland and open forest communities, in an area roughly bounded by Goulburn, Albury and Bega.	This species is not known to occur in any conservation reserves in the region.	Three hoary sunray individuals were recorded immediately to the east of the Referral Area. This species has been previously recorded in grassy habitat near the South Marulan Road and Hume Highway intersection. No hoary sunrays were recorded within the Referral Area despite surveys undertaken in the appropriate detection season and with other sites in the locality experiencing a prolific flowering event. It is unlikely that this species will be impacted as a result of the Proposed Action.	No
thick-lipped spider orchid *Caladenia tessellata*	V	This species is known to favour low, dry sclerophyll woodland (for example open *Kunzea* woodland) with a heathy or sometimes grassy understorey on clay loams or sandy soils.	This species is endemic to mainland south-east Australia. It is distributed from the central coast of NSW to the Westernport region of southern Victoria. This includes the South East Coastal Plain, South East Corner, and Sydney Basin bioregions.	This species is not known to occur in any conservation reserves in the region.	This species has not been recorded in the Referral Area and no potential habitat is present. Based on this and the known range of the species, it is considered unlikely that this species would be impacted by the Proposed Action.	No

Species	EPBC Status	Suitable Habitat	Distribution in Relation to the Referral Area	Reservation in the Region	Potential to Occur/Potential for Impact	Further Assessment Required?
yellow gnat-orchid *Genoplesium baueri*	E	This species grows in dry sclerophyll forest and moss gardens over sandstone and flowers between February and March.	The species is known from just over 200 plants across 13 sites. The species has been recorded at locations now likely to be within Berowra Valley Regional Park, Royal National Park and Lane Cove National Park.	This species is not known to occur in any conservation reserves in the region.	This species has not been recorded in the Referral Area and no potential habitat is present. Based on this and the known range of the species, it is considered unlikely that this species would be impacted by the Proposed Action.	No
Tarengo leek orchid *Prasophyllum petilum* (Note: *Prasophyllum* sp. Wybong is now included in *P. petilum*)	E	This species occurs on relatively fertile soils in grassy woodland or natural grassland.	This species is known from four populations in NSW being at Captains Flat, Ilford, Delegate and Boorowa.	This species is not known to occur in any conservation reserves in the region.	This species has not been recorded in the Referral Area and no potential habitat is present. Based on this and the known range of the species, it is considered unlikely that this species would be impacted by the Proposed Action.	No
square raspwort *Haloragis exalata* subsp. *exalata*	V	The species is known from a range of vegetation types, all of which appear to have a history of recurrent disturbance. It appears to be a post-disturbance coloniser, based on observations of large numbers of plants on disturbed roadsides, cleared power-line easements, and recently burnt or flooded areas.	In NSW this species is known from the areas of western Sydney, Kosciuszko National Park, the Bega Valley, Bungonia Gorge east of Goulburn on the Central Tablelands, the Shoalhaven River and Lake Illawarra on the Central Coast, the North Coast and the Northern Tablelands.	Bungonia SCA	This species has not been recorded in the Referral Area. The closest record of the species occurs 120 km south of Marulan near Cobargo NSW. It is considered unlikely that this species would be impacted by the Proposed Action.	No

Species	EPBC Status	Suitable Habitat	Distribution in Relation to the Referral Area	Reservation in the Region	Potential to Occur/Potential for Impact	Further Assessment Required?
Kunzea cambagei	V	This species is restricted to damp, sandy soils in wet heath or mallee open scrub on higher altitudes on sandstone outcrops.	This is species is known mainly from Mt Werong and Berrima.	Tarlo River NP	This species has not been recorded in the Referral Area. Due to a lack of preferred habitat, it is considered unlikely that this species would be impacted by the Proposed Action.	No
basalt peppercress *Lepidium hyssopifolium*	E	This species is known to establish on open, bare ground with limited competition from other plants. Recently recorded localities have predominantly been in weed-infested areas of heavy modification, high degradation and high soil disturbance such as road and rail verges, on the fringes of developed agricultural land or within small reserves in agricultural land.	In NSW, the species is known from near Bathurst and Bungendore, in the South Eastern Highlands Bioregion.	This species is not known to occur in any conservation reserves in the region.	This species has not been recorded in the Referral Area. Based on this and the known range of the species, it is considered unlikely that this species would be impacted by the Proposed Action.	No
Omeo stork's bill *Pelargonium* sp. *Striatellum* (G.W. Carr 10345)	E	It has a narrow habitat that is usually just above the high-water level of irregularly inundated or ephemeral lakes, in the transition zone between surrounding grasslands or pasture and the wetland or aquatic communities.	Known from only three locations in NSW, with two on lake-beds on the basalt plains of the Monaro and one at Lake Bathurst.	This species is not known to occur in any conservation reserves in the region.	This species has not been recorded in the Referral Area and no potential habitat is present. Based on this and the known range of the species, it is considered unlikely that this species would be impacted by the Proposed Action.	No

Species	EPBC Status	Suitable Habitat	Distribution in Relation to the Referral Area	Reservation in the Region	Potential to Occur/Potential for Impact	Further Assessment Required?
black gum *Eucalyptus aggregata*	V	Black gum grows on alluvial soils in, poorly-drained flats and hollows adjacent to swamps, creeks and small rivers and up adjoining slopes. It is usually found in open woodland with a grassy understory dominated by river tussock (*Poa labillardierei*) or kangaroo grass (*Themeda triandra*) and with few shrubs present.	Black gum is endemic to south-eastern Australia and is found in the ACT, NSW and in a small isolated sub-population in Victoria. In NSW, the species occurs predominantly in the South Eastern Highlands IBRA bioregion with the most eastern part of the distribution being located just within the Sydney Basin IBRA bioregion	Morton NP Bungonia SCA	This species has not been recorded in the Referral Area. The closest record of the species occurs 10 km to the southeast in Marulan South. It is considered unlikely that this species would be impacted by the Proposed Action.	No
Camden woollybutt *Eucalyptus macarthurii*	- Preliminary determination to be listed as endangered under the EPBC Act	This species occurs in grassy woodland on relatively fertile soils on broad, cold flats (Hill 2002) and near swamps and streams.	This species is indigenous to NSW, where it is recorded from two areas: the Southern Highlands/Wingecarribee Shire, and on the Boyd Plateau in the southern Blue Mountains area. In the Southern Highlands it occurs mainly on private agricultural land, often as isolated individuals in, or on the edges of, modified pastures.	Penrose SF	This species has not been recorded in the Referral Area, however the species has been previously recorded in an isolated 0.2 hectare stand approximately two km south of the Referral Area. It was determined in consultation with OEH as part of the assessment process for Lynwood Quarry in 2005 that this species was planted on Lynwood Quarry site. The species does not occur within the Referral Area and would not be impacted by the Proposed Action.	No

Species	EPBC Status	Suitable Habitat	Distribution in Relation to the Referral Area	Reservation in the Region	Potential to Occur/Potential for Impact	Further Assessment Required?
contoneaster pomaderris *Pomaderris cotoneaster*	E	The species can occur in forests with deep, friable soil, amongst rock beside a creek, on rocky forested slopes and in steep gullies between sandstone cliffs.	The species has a very disjunct distribution, known from the Nungatta area south into Victoria.	Morton NP Bungonia SCA	This species has not been recorded in the Referral Area and no potential habitat is present. It is considered unlikely that this species would be impacted by the Proposed Action.	No
Kangaloon sun orchid *Thelymitra kangaloonica*	CE	This species is found in swamps in sedgelands over grey silty or grey loam soils.	This species is only known to occur on the southern tablelands of NSW in the Moss Vale/ Kangaloon / Fitzroy Falls area at 550-700 m above sea level.	This species is not known to occur in any conservation reserves in the region.	This species has not been recorded in the Referral Area and no potential habitat is present. Based on this and the known range of the species, it is considered unlikely that this species would be impacted by the Proposed Action.	No
plumed midge-orchid *Genoplesium plumosum*	E	This species grows in heathland, dry sclerophyll forest, and in moss gardens over sandstone sheets. It can also grow on roadside verges.	This species was originally described from Kurnell, NSW but had not been seen since, despite much searching, until it was rediscovered in the Marulan area. The species is presently known from six colonies, all located on private property near Tallong, east of Marulan on the southern boundary of the NSW Central Tablelands.	Morton NP	This species has not been recorded in the Referral Area. It is considered unlikely that this species would be impacted by the Proposed Action.	No

Species	EPBC Status	Suitable Habitat	Distribution in Relation to the Referral Area	Reservation in the Region	Potential to Occur/Potential for Impact	Further Assessment Required?
Wingello grevillea *Grevillea molyneuxii*	E	This species occurs in association with flat sandstone rock platforms at the base of moderate to steep slopes, in very open to somewhat closed heathland bordered by *Eucalyptus stricta*/*Allocasuarina paludosa* woodland.	This species is restricted to the Tallong-Wingello area, on the southern highlands of NSW.	Morton NP	This species has not been recorded in the Referral Area and no potential habitat is present. It is considered unlikely that this species would be impacted by the Proposed Action.	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 nutrient 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.	This species is not known to occur in any conservation reserves in the region.	This species has not been recorded in the Referral Area. Based on this and the known range of the species, it is considered unlikely that this species would be impacted by the Proposed Action.	No
THREATENED SPECIES - FAUNA						
Littlejohn's tree frog *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.	Morton NP	This species has not been recorded in the Referral Area and preferred habitat was not identified. Based on this and the known range of the species, it is considered unlikely that this species would be impacted by the Proposed Action.	No

Species	EPBC Status	Suitable Habitat	Distribution in Relation to the Referral Area	Reservation in the Region	Potential to Occur/Potential for Impact	Further Assessment Required?
pink-tailed worm-lizard *Aprasia parapulchella*	V	This species shelters under small rocks in primary and secondary grassland, grassy woodland and woodland communities including mallee, and box-ironbark forest.	This species is known from a patchy distribution along the foothills of the western slopes of the Great Dividing Range, between Bendigo in Victoria and Gunnedah in NSW.	This species is not known to occur in any conservation reserves in the region.	This species was not been recorded in the Referral Area during targeted surveys and only marginal habitat is present. Based on this and the known range of the species, it is considered unlikely that this species would be impacted by the Proposed Action.	No
striped legless lizard *Delma impar*	V	This species occurs in temperate grassland habitats but also near Natural Temperate Grassland and occasionally in open Box-Gum Woodland.	In NSW, the species occurs at sites near Goulburn, Yass, Queanbeyan, Cooma and Tumut areas.	This species is not known to occur in any conservation reserves in the region.	This species was not been recorded in the Referral Area during targeted surveys and only marginal habitat occurs at the site. Based on this and the known range of the species, it is considered unlikely that this species would be impacted by the Proposed Action.	No
broad-headed snake *Hoplocephalus bungaroides*	V	This species shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring and moves to shelters in hollows in large trees within 200 m of escarpments in summer.	This species 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 km of Sydney.	Morton NP	This species has not been recorded in the Referral Area or the locality and no suitable habitat occurs at the site. It is considered unlikely that this species would be impacted by the Proposed Action.	No

Species	EPBC Status	Suitable Habitat	Distribution in Relation to the Referral Area	Reservation in the Region	Potential to Occur/Potential for Impact	Further Assessment Required?
regent honeyeater *Anthochaera phygia*	CE	This species is semi-nomadic, generally occurs in temperate eucalypt woodlands and open forests, commonly recorded from box-ironbark eucalypt associations, wet lowland coastal forests dominated by swamp mahogany, spotted gum and riverine *Casuarina* woodlands.	Patchily distributed across the eastern states of Australia, from Adelaide, to Dalby, Queensland, and from the coast to the western foothills of the Great Dividing Range.	Morton NP Wollondilly River NR Bungonia NP	This species has not been recorded in the Referral Area, however the Proposed Action will result in the loss of low-quality box-gum woodland potential foraging habitat for the species.	Yes – refer to Assessment of Significance in Attachment B.
painted honeyeater *Grantiella picta*	V	The species inhabits mistletoes in eucalypt forests/woodlands, riparian woodlands of black box and river red gum, box-ironbark-yellow gum woodlands, acacia-dominated woodlands, paperbarks, casuarinas, callitris, and trees on farmland or gardens. The species prefers woodlands which contain a higher number of mature trees, as these host more mistletoes.	The species is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory.	This species is not known to occur in any conservation reserves in the region.	This species has not been recorded in the Referral Area or the immediate locality. No suitable habitat occurs at the site. It is considered unlikely that the species would be impacted by the Proposed Action.	No

Species	EPBC Status	Suitable Habitat	Distribution in Relation to the Referral Area	Reservation in the Region	Potential to Occur/Potential for Impact	Further Assessment Required?
Australasian bittern *Botaurus poiciloptilus*	E	This species favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (*Typha* spp.) and spikerushes (*Eleoacharis* spp.).	This species may be found over most of the state except for the far north-west.	Bungonia NP	This species has not been recorded in the Referral Area or the immediate locality. No suitable habitat occurs at the site. It is considered unlikely that the species would be impacted by the Proposed Action.	No
swift parrot *Lathamus discolor*	E Preliminary determination to be listed as critically endangered under the EPBC Act.	This species often visits box-ironbark forests, feeding on nectar and lerp. In NSW, typical feed species include mugga ironbark, grey box, swamp mahogany, spotted gum, red bloodwood, narrow-leaved red ironbark, forest red gum and yellow box.	Breeds in Tasmania, migrating to the mainland in May to August, mainly foraging in Victoria and NSW. In NSW, it 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.	This species is not known to occur in any conservation reserves in the region.	This species has not been recorded in the Referral Area, however the Proposed Action will result in the loss of low-quality box-gum woodland potential foraging habitat for the species.	Yes – refer to Assessment of Significance in Attachment B.
Australian painted snipe *Rostratula australis*	E	This species 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 a scattered distribution throughout the state.	This species is not known to occur in any conservation reserves in the region.	This species has not been recorded in the Referral Area or the immediate locality. No suitable habitat occurs at the site. It is considered unlikely that the species would be impacted by the Proposed Action.	No

Species	EPBC Status	Suitable Habitat	Distribution in Relation to the Referral Area	Reservation in the Region	Potential to Occur/Potential for Impact	Further Assessment Required?
large-eared pied bat *Chalinolobus dwyeri*	V	This species is generally found in a variety of drier habitats, including the dry sclerophyll forests and woodlands, however probably tolerates a wide range of habitats. Tends to roost in the twilight zones of mines and caves.	This species is distributed from south western Queensland to Bungonia in southern NSW, from the coast to the western slopes of the Great Dividing Range.	Morton NP	This species was identified through a 'confident' echolocation recording in the north-eastern portion of the Referral Area during the surveys undertaken for this assessment. The species has also been recorded in the locality. The Proposed Action will result in the loss of low-quality potential foraging habitat for the species.	Yes – refer to Assessment of Significance in Attachment B.
spotted-tailed quoll *Dasyurus maculatus maculatus* (SE mainland population)	E	This species occurs in a range of habitats, ranging from sclerophyll forest, woodlands, coastal heathlands and rainforests. Records exist from open country, grazing lands and rocky outcrops. Suitable den sites including hollow logs, tree hollows, rocky outcrops or 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. It occurs from the coast to the snowline and inland to the Murray River.	Morton NP Bangadilly NP	This species has not been recorded in the Referral Area and no suitable habitat is present. Based on this, it is considered unlikely that this species would be impacted by the Proposed Action.	No

Species	EPBC Status	Suitable Habitat	Distribution in Relation to the Referral Area	Reservation in the Region	Potential to Occur/Potential for Impact	Further Assessment Required?
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. It 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 basks during the day in rock crevices, caves and overhangs and is most active at night.	In NSW, this species is known to occur from the Queensland border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit.	Morton NP	This species has not been recorded in the Referral Area and no suitable habitat is present. Based on this, it is considered unlikely that this species would be impacted by the Proposed Action.	No

Species	EPBC Status	Suitable Habitat	Distribution in Relation to the Referral Area	Reservation in the Region	Potential to Occur/Potential for Impact	Further Assessment Required?
koala *Phascolarctos cinereus* (combined populations of Qld, NSW and the ACT)	V	This species inhabits eucalypt forest and woodland, with suitability influenced by tree species and age, soil fertility, climate, rainfall and fragmentation patterns. The species is known to feed on a large number of eucalypt and non-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. It is known to occur along inland rivers on the western side of the Great Dividing Range.	Tarlo River NP Morton NP Bungonia NP Bungonia SCA Kerrawary NR Bangadilly NP	This species has not been recorded in the Referral Area, however the species has been recorded in the locality (OEH 2015). The Proposed Action may result in the loss of low-quality potential foraging habitat for the species.	Yes - refer to Assessment of Significance in Attachment B.
New Holland mouse *Pseudomys novaehollandiae*	V	This species is known to inhabit open heathlands, open woodlands with a heathland understorey and vegetated sand dunes. The species peaks in abundance during early to mid stages of vegetation succession typically induced by fire.	This species has a fragmented distribution across Tasmania, Victoria, NSW and Queensland. The species is now largely restricted to the coast of central and northern NSW, with one inland occurrence near Parkes.	Morton NP	This species has not been recorded in the Referral Area and no suitable habitat is present. Based on this and the known range of the species, it is considered unlikely that this species would be impacted by the Proposed Action.	No

Species	EPBC Status	Suitable Habitat	Distribution in Relation to the Referral Area	Reservation in the Region	Potential to Occur/Potential for Impact	Further Assessment Required?
grey-headed flying fox *Pteropus poliocephalus*	V	This species feeds on a variety of flowering and fruiting plants, including native figs and palms, blossoms from eucalypts, angophoras, tea-trees and banksias. Camps sites are usually formed in gullies, usually in vegetation with a dense canopy and not far from water.	This species is known to occur along the eastern coastal plain from Bundaberg in Queensland, through NSW and south to eastern Victoria.	Morton NP	This species has not been recorded in the Referral Area and no suitable habitat is present. Based on this and the known range of the species, it is considered unlikely that this species would be impacted by the Proposed Action.	No
Macquarie perch *Macquaria australasica*	E	This species is a riverine, schooling species. It prefers clear water and deep, rocky holes with lots of cover. As well as aquatic vegetation, additional cover may comprise of large boulders, debris and overhanging banks.	The species was once widespread through the cooler upper reaches of the southern tributaries of the Murray-Darling river system. It now considered isolated to the upper reaches of the Lachlan and Murrumbidgee Rivers in southern NSW.	Morton NP	This species has not been recorded in the Referral Area and no suitable aquatic habitat is present. Based on this, it is considered unlikely that this species would be impacted by the Proposed Action.	No

Species	EPBC Status	Suitable Habitat	Distribution in Relation to the Referral Area	Reservation in the Region	Potential to Occur/Potential for Impact	Further Assessment Required?
Australian grayling *Prototroctes maraena*	V	This species is diadromous, spending part of its lifecycle in freshwater and at least part of the larval and/or juvenile stages in coastal seas. Adults (including pre spawning and spawning adults) inhabit cool, clear, freshwater streams with gravel substrate and areas alternating between pools and riffle zones.	This species occurs in streams and rivers on the eastern and southern flanks of the Great Dividing Range, from Sydney, southwards to the Otway Ranges of Victoria and in Tasmania.	Morton NP	This species has not been recorded in the Referral Area and no suitable aquatic habitat is present. Based on this, it is considered unlikely that this species would be impacted by the Proposed Action.	No
MIGRATORY SPECIES LISTED UNDER INTERNATIONAL CONVENTIONS						
fork-tailed swift *Apus pacificus*	CAMBA JAMBA ROKAMBA	This species is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher. In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas.	The fork-tailed swift can be found throughout Australia during migration. In Australia it is most common west of the Great Dividing Range. This species is uncommon in Tasmania.	Morton NP	This species has not been recorded in the Referral Area. The species is almost exclusively aerial and is unlikely to utilise the habitat within the Referral Area. It is considered unlikely that the species would be impacted by the Proposed Action.	No

Species	EPBC Status	Suitable Habitat	Distribution in Relation to the Referral Area	Reservation in the Region	Potential to Occur/Potential for Impact	Further Assessment Required?
white-throated needletail *Hirundapus caudacutus*	CAMBA JAMBA ROKAMBA	This species only occurs in Australia between the months of October and May. It forages on 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.	Morton NP	This species was recorded north of the Referral Area during the surveys undertaken for this assessment. The species is almost exclusively aerial and is unlikely to utilise the habitat within the Referral Area. There is potential that the species would be impacted by the Proposed Action.	Yes
rainbow bee-eater *Merops ornatus*	JAMBA	This species prefers open forests and woodlands, shrublands, and cleared or semi-cleared areas (commonly farmland). These areas are usually in 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. It is not found in Tasmania and has only been identified in a thin strip in the most arid regions of central WA.	Morton NP	This species has not been recorded in the Referral Area or in the immediate locality, however the site may provide marginal habitat for the species. There is potential that the species would be impacted by the Proposed Action.	Yes

Species	EPBC Status	Suitable Habitat	Distribution in Relation to the Referral Area	Reservation in the Region	Potential to Occur/Potential for Impact	Further Assessment Required?
black-faced monarch *Monarcha melanopsis*	Bonn	This bird occurs in coastal scrub, damp gullies, eucalypt woodlands and rainforests. It can be seen foraging for insects amongst foliage, and builds a deep, cup-shaped nest in a tree fork (3 to 6 m above the ground) which is made up 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.	Morton NP	This species has not been recorded in the Referral Area or in the immediate locality and no suitable habitat occurs at the site. It is considered unlikely that the species would be impacted by the Proposed Action.	No
satin flycatcher *Myiagra cyanoleuca*	Bonn	This species typically inhabits wet areas of tall forests, particularly in gullies. The satin flycatcher moves north in the winter and is seldom seen in NSW, Tasmania, Victoria or SA during these times. It nests in loose colonies in broad-based cup-shaped nests on a bare horizontal branch. These nests are constructed from bark, grass, lichen and cobwebs.	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.	Tarlo River NP Morton NP	This species has not been recorded in the Referral Area or in the immediate locality, however the site may provide marginal habitat for the species. There is potential that the species would be impacted by the Proposed Action.	Yes

Species	EPBC Status	Suitable Habitat	Distribution in Relation to the Referral Area	Reservation in the Region	Potential to Occur/Potential for Impact	Further Assessment Required?
rufous fantail *Rhipidura rufifrons*	Bonn	This species typically inhabits areas of dense wet forest, mangrove, rainforest or swamp woodlands. It 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. Nests are about 5 m from the ground in a small cup shape and constructed from thin grasses held together by cobwebs.	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.	Tarlo River NP Morton NP	This species has not been recorded in the Referral Area and no suitable habitat occurs at the site. It is considered unlikely that the species would be impacted by the Proposed Action.	No
yellow wagtail *Motacilla flava*	CAMBA JAMBA ROKAMBA	Important habitat for the species in Australia includes well-watered open grasslands and the fringes of wetlands. The species roosts in mangroves and other dense vegetation.	This species breeds in Europe and Asia and overwinters in the southern hemisphere including Australia. The species is recorded occasionally and sporadically mainly in northern Australia.	This species is not known to occur in any conservation reserves in the region.	This species has not been recorded in the Referral Area and no suitable habitat occurs at the site. It is considered unlikely that the species would be impacted by the Proposed Action.	No
eastern great egret *Ardea modesta*	JAMBA	This species typically inhabits areas of shallow, flowing waters, but also uses damp grasslands and other watered areas. It 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.	Nattai NP	This species has not been recorded in the Referral Area and only marginal suitable habitat occurs at the site. There is potential that the species would be impacted by the Proposed Action.	Yes

Species	EPBC Status	Suitable Habitat	Distribution in Relation to the Referral Area	Reservation in the Region	Potential to Occur/Potential for Impact	Further Assessment Required?
cattle egret *Ardea ibis*	JAMBA	This species can be found in grasslands, wetlands and woodlands and has never been identified in arid areas. These birds are commonly sighted at garbage dumps and pastures in 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. It has also been identified in Tasmania.	Morton NP	This species has not been recorded in the Referral Area or the immediate locality and only marginal suitable habitat occurs at the site. There is potential that the species would be impacted by the Proposed Action.	Yes
Lathams snipe *Gallinago hardwickii*	Bonn JAMBA ROKAMBA	This species can be found in permanent and ephemeral wetlands up to 2000 m above sea level. These water bodies are usually freshwater with low, dense vegetation. It forages in areas of mud with some vegetation cover and roosts nearby. Lathams snipe does not breed in Australia, only passing through for migration.	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. Richmond River, NSW is a favourite area for non-breeding birds.	This species is not known to occur in any conservation reserves in the region.	This species has not been recorded in the Referral Area or the immediate locality no suitable habitat occurs at the site. It is considered unlikely that the species would be impacted by the Proposed Action.	No

Species	EPBC Status	Suitable Habitat	Distribution in Relation to the Referral Area	Reservation in the Region	Potential to Occur/Potential for Impact	Further Assessment Required?
eastern osprey *Pandion haliaetus*	Bonn	This species occurs in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They require extensive areas of open fresh, brackish or saline water for foraging.	In NSW the species is known to occur along the entire coastline.	This species is not known to occur in any conservation reserves in the region.	This species has not been recorded in the Referral Area or the immediate locality no suitable habitat occurs at the site. It is considered unlikely that the species would be impacted by the Proposed Action.	No

Attachment B – Assessment of Significance under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires an Assessment of Significance relating to the potential impacts of an Action (the Proposed Action) on listed matters of national environmental significance (MNES).

Under the EPBC Act, the approval of the Commonwealth Minister responsible for the Department of the Environment (DoE) is required for any action that may have a significant impact on MNES. These matters are:

- listed threatened species and ecological communities;
- migratory species protected under international agreements;
- Ramsar wetlands of international importance;
- the Commonwealth marine environment;
- World Heritage properties;
- National Heritage places;
- Great Barrier Reef Marine Park;
- nuclear actions; and
- a water resource, in relation to coal seam gas development and large coal mining development.

A search of the DoE Protected Matters Search Tool (undertaken in February 2016) and collated information from literature reviews identified three threatened ecological communities (TECs), 30 threatened species and 11 migratory species known to occur, or considered to have the potential to occur on the basis of habitat modelling, within and around the Referral Area. Each of these has been included in tables in **Attachment A**, together with an indication of those species that warrant further assessment by way of an Assessment of Significance.

As outlined in **Attachment A**, the following EPBC Act listed species and communities are considered to have the potential to be significantly impacted by the Proposed Action and are subject to an Assessment of Significance below:

Critically Endangered or Endangered Ecological Communities

- White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland CEEC.

Critically Endangered and Endangered Species

- regent honeyeater (*Anthochaera phrygia*);
- swift parrot (*Lathamus discolor*); and
- hoary sunray (*Leucochrysum albicans* var. *tricolor*).

Vulnerable Species

- koala (*Phascolarctos cinereus*); and
- large-eared pied bat (*Chalinolobus dwyeri*).

Migratory Species listed under International Conventions

- white-throated needletail (*Hirundapus caudacutus*);
- rainbow bee-eater (*Merops ornatus*);
- satin flycatcher (*Myiagra cyanoleuca*);
- eastern great egret (*Ardea modesta*); and
- cattle egret (*Ardea ibis*).

The Assessments of Significance below were prepared in February 2016, with all listing statuses and document references accurate at the time of writing.

Critically Endangered and Endangered Ecological Communities

One critically endangered or endangered ecological community has the potential to be impacted by the Proposed Action:

- White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland CEEC.

Species descriptions, in the Assessments of Significance below, are referenced from the Office of Environment and Heritage (OEH 2016) and Department of the Environment (DoE 2016) online species profiles, unless otherwise noted.

White Box - Yellow Box - Blakely's Red Gum Woodland and Derived Native Grassland

White Box - Yellow Box - Blakely's Red Gum Woodland and Derived Native Grassland CEEC was recorded in the northeast corner of the Referral Area during targeted flora surveys undertaken for this assessment. This CEEC is mapped as community Box-Gum Grassy Woodland (native understorey). The site was surveyed using 20 x 50 m floristic plots.

0.98 hectares of Box-Gum Grassy Woodland (native understorey) was recorded in far northeast corner of the Referral Area (refer to **Figure 5**). This area contains a native understorey, and is dominated by yellow box (*Eucalyptus melliodora*) and Blakely's red gum (*E. blakelyi*) as well as a range additional non-grass understorey species. This includes six 'important' species under the EPBC Act including *Bulbine bulbosa*, *Chrysocephalum apiculatum*, *Diuris sulphurea*, *Hypericum gramineum*, *Sebaea ovata* and *Triptilodiscus pygmaeus*. This community is considered to conform to White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland CEEC.

Other areas of the Referral Area contain a degraded variant of this community being Box-Gum Grassy Woodland (exotic understorey). This area is dominated by yellow box (*Eucalyptus melliodora*) and Blakely's red gum (*E. blakelyi*) with isolated occurrences of snow gum (*E. pauciflora* subsp. *pauciflora*), with an understorey dominated by exotic annual pasture species including soft brome (*Bromus hordeaceus)*, prairie grass (*Bromus catharticus*), *Bromus brevis*, rat's-tail fescue (*Vulpia myuros*) and exotic perennials including cocksfoot (*Dactylis glomerata*) and serrated tussock (*Nassella trichotoma*). This community is not considered to conform to White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland CEEC due to the predominately exotic understorey.

An assessment of the above vegetation communities was undertaken against the key diagnostic characteristics and condition thresholds outlined in the *Commonwealth Listing Advice on White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland CEEC* (TSSC 2006) as shown in **Table 1** below.

Table 1 - Key Diagnostic and Condition Criteria

Key Diagnostic Characteristic	Box-Gum Grassy Woodland (native understory)	Box-Gum Grassy Woodland (exotic understory)
Distribution of the ecological community occurs within the Brigalow Belt South, Nandewar, New England Tableland, South Eastern Queensland, Sydney Basin, NSW North Coast, South Eastern Highlands, South East Corner, NSW South	Yes (Referral Area is within the South Eastern Highlands bioregion)	Yes (Referral Area is within the South Eastern Highlands bioregion)

Key Diagnostic Characteristic	Box-Gum Grassy Woodland (native understory)	Box-Gum Grassy Woodland (exotic understory)
Western Slopes, Victorian Midlands and Riverina Bioregions.		
The ecological community contains, or previously contained at least one of the most common overstorey species White Box, Yellow Box or Blakely's Red Gum (or Western Grey box or Coastal Grey Box in the Nandewar Bioregion)	Yes (the ecological community contains yellow box (*Eucalyptus melliodora*) and Blakely's red gum (*E. blakelyi*))	Yes (the ecological community contains yellow box (*Eucalyptus melliodora*) and Blakely's red gum (*E. blakelyi*))
The ecological community has a predominantly native groundcover (i.e. more than 50% of the perennial vegetative groundlayer must comprise native species).	Yes (the ecological community has more than 50% native groundcover species)	No (the ecological community has less than 50% native groundcover species)
The ecological community patch size is 0.1 hectare (ha) or greater in size.	Yes (the patch is approximately 0.98 ha in size)	Yes (the patches range from approximately 0.3 ha to 22.3 ha in size)
The patch containing 12 or more native understorey species (excluding grasses), including one or more identified 'important species' as defined by a listed maintained by the DoE website.	Yes (the patch contains 20 non-grass native understorey species including six 'important species')	No (the patch does not contain 12 non-grass native understorey species)
Additionally, if the ecological community satisfied the criteria for overstorey species and native groundcover thresholds, but does not contain 12 or more native species, it may also be considered part of the CEEC if the patch is of greater than or equal to 2 hectare patch size *and* has an average of 20 or more mature trees per hectare or natural regeneration of the dominant overstorey eucalypts.	NA (the ecological community satisfies criteria's 1 to 4 and does not require this supplementary criteria)	No (the ecological community does not satisfy the criteria for predominately native groundcover)
Conclusion	**Conforms**	**Does not Conform**

Based on the floristic data from the surveys undertaken for this assessment as outlined in **Table 1** above, it is considered that the 0.98 hectares of Box-Gum Grassy Woodland (native understorey) in the Referral Area conforms to White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland CEEC. Although this occurs entirely outside the Proposed Disturbance Area, for completeness, an Assessment of Significance is provided for this community below.

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;**

It is considered that over 90% of the original extent of this ecological community has been cleared since European settlement. Of the remaining area, a large proportion of it has been modified and occurs as trees over a predominantly exotic understorey.

The location of this CEEC in the Referral Area is outside the Proposed Disturbance Area and will not be directly impacted as a result of the Proposed Action. The Proposed Action will not result in the reduction in the extent of White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland CEEC within the Referral Area or in the wider regional and national context.

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

This ecological community has been heavily cleared across most of its range. The remaining extent of the ecological community is highly fragmented, occurring in small isolated patches within a cleared environment, or within a landscape of other disturbed woodlands.

The location of this community in the Referral Area is outside the Proposed Disturbance Area and will not be directly impacted as a result of the Proposed Action. The Proposed Action will not result in the fragmentation of White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland CEEC within the Referral Area or in the wider regional and national context.

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

The National Recovery Plan for this CEEC states that all areas of Box-Gum Grassy Woodland which meet the minimum condition criteria for the community should be considered critical to the survival of this ecological community. This CEEC is located outside the Proposed Disturbance Area for the Proposed Action and will not be directly impacted as a result of the Proposed Action. The Proposed Action will not adversely affect habitat critical to the survival of White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland CEEC.

- **modify or destroy abiotic factors necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns;**

The location of this community in the Referral Area is outside the Proposed Disturbance Area and will not be directly impacted as a result of the Proposed Action. No substantial alteration of drainage patterns are expected to occur outside the Proposed Disturbance Area in the vicinity of the CEEC which is upslope of the Proposed Disturbance Area. The Proposed Action will not modify or destroy abiotic factors necessary for the survival of White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland CEEC.

- **cause substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species; or**

Degradation and fragmentation can involve the loss of suites of species, such as woodland birds, understorey plant species and soil crusts. These can sometimes be replaced, functionally, by more common or exotic species, such as the aggressive noisy miner (*Manorina melanocephala*).

Although the Proposed Action will not directly impact this CEEC, the Action will result in impacts on degraded woodland habitats in areas adjacent to this CEEC in the Referral Area. This may result in a change of native fauna species in the locality which may alter the composition of species in this adjacent CEEC. There is potential for the Proposed Action to indirectly impact the CEEC in adjacent lands by reducing the overall species diversity and composition currently supported by surrounding woodland habitats. It is noted that the surrounding vegetation communities are already in low condition, therefore any indirect impacts on the CEEC are likely to be minimal. The Proposed Action is unlikely to cause a

substantial change in the species composition that would cause a decline or loss of functionality of important species associated with White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland CEEC.

- **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**

Weed invasion is, and continues to be one of the key mechanisms and indicators of degradation of White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland CEEC. Weeds have invaded most of the remaining areas of the original pre-1750 extent of this ecological community. Austin et al (2000) found that only 8% of Yellow Box – Red Gum Woodland sites had greater than 50% cover of native species. Although the White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland CEEC within the Referral Area contains a predominantly native understorey, approximately 10% groundcover includes the highly invasive serrated tussock (*Nassella trichotoma*).

Although the Proposed Action will not directly impact this CEEC, the Action will result impacts on degraded woodland habitats adjacent to this CEEC in the Referral Area. There is potential for the Proposed Action to cause edge effects into White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland CEEC adjacent to the Proposed Disturbance Area and facilitate the spread of invasive weed species. The occurrence of White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland CEEC in the landscape is upslope from the Proposed Disturbance Area and therefore the Proposed Action is not expected to cause regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the surrounding extent of the CEEC.

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

A National Recovery Plan has been prepared for White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland CEEC (DECCW 2011). The objectives of this plan includes achieving no net loss in the extent and condition of the CEEC, increasing protection of sites with high recovery potential, increasing landscape functionality through management and restoration of degraded sites and increasing transitional areas around remnants and linkages between remnants.

The location of this community in the Referral Area is outside the Proposed Disturbance Area and will not be directly impacted as a result of the Proposed Action. The Proposed Action will not interfere with the recovery of White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland CEEC within the Referral Area or in the wider regional and national context.

Conclusion

The Proposed Action is not predicted to result in a significant impact on White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland CEEC as the Proposed Action will not directly impact the CEEC or result in adverse impacts as described in the assessment of significance under the EPBC Act.

Critically Endangered and Endangered Species

Three critically endangered or endangered species have the potential to be impacted by the Proposed Action:

- hoary sunray (*Leucochrysum albicans* var. *tricolor*);
- regent honeyeater (*Anthochaera phrygia*); and
- swift parrot (*Lathamus discolor*).

Species descriptions, in the Assessments of Significance below, are referenced from the Office of Environment and Heritage (OEH 2016) and DoE (2016) online species profiles, unless otherwise noted.

It is noted that the swift parrot is currently under a listing assessment with the Threatened Species Scientific Committee to determine the species as 'critically endangered' under the EPBC Act. At the time of writing, the species was listed as 'endangered' under the EPBC Act and has been assessed as such.

Hoary sunray (*Leucochrysum albicans* var. *tricolor*)

Hoary sunray occurs at relatively high elevations in woodland and open forest communities, in an area roughly bounded by Goulburn, Albury and Bega. In the Southern Highlands it occurs primarily in woodland and open forest communities. The species is known to occur in previously disturbed sites as bare ground is required for germination.

Three hoary sunray individuals were recorded immediately to the east of the Referral Area in disturbed land surrounded by Blakely's red gum (*Eucalyptus blakelyi*) and red stringybark (*Eucalyptus macrorhyncha*). In previous survey periods, a large local population of hoary sunray has been recorded approximately 2 km south of the Referral Area in predominately native grassy habitat near the South Marulan Road and Hume Highway intersection (Umwelt 2011a). No individuals were recorded within the Referral Area despite surveys undertaken in the appropriate detection season and with other sites in the locality experiencing a prolific flowering event.

It should be noted that hoary sunray is currently under consideration for delisting under the EPBC Act. *Leucochrysum albicans* var. *tricolor* is conventionally accepted as a variety. Varieties are not considered to be a species for the purpose of the EPBC Act and are therefore not eligible to be listed under Section 178 of the EPBC Act. The Threatened Species Scientific Committee is currently reviewing the status of listed varieties and their higher taxon for eligibility under the Act.

In this case, a *population* means:

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

It has been estimated that approximately 558,000 plants occur in the Marulan locality around the South Marulan Road and Hume Highway intersection and this is highly likely to form part of a distinct local population of the species (Umwelt 2011a). Reviews of other known occurrences of the species in NSW show that the estimated population of 558,000 specimens around Marulan as the most substantial documented population known. The

recent appearance of this large population is considered likely due the combination of factors, including removal of grazing stock and subsequent favourable weather conditions.

It is likely that the three individuals recorded adjacent to the Referral Area are likely to be part of the wider Marulan distinct local population of this species.

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**

The location of the three known hoary sunray individuals is immediately adjacent the eastern boundary of the Referral Area in native woodland habitat and will not be directly impacted as a result of the Proposed Action. The Proposed Disturbance Area contains 5.3 hectares of predominately native understorey woodland habitat that may provide habitat for the species. However the species has not been recorded in the Referral Area despite targeted surveys undertaken during a prolific flowering event in other areas in the locality.

The Proposed Action is not expected to lead to a long-term decrease in the size of the Marulan local population of hoary sunray.

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

Hoary sunray has not been recorded within the Referral Area. The Proposed Action will result in the loss of approximately 5.3 hectares of predominately native understorey woodland habitat for the species. While the Proposed Action will remove potential habitat for the species, it is not likely to lead to a significant reduction in known habitat in the region. Substantial areas of known habitat for this species occurs in other areas of the locality including within biodiversity conservation areas associated with the Lynwood Quarry.

The Proposed Action is not expected to reduce the area of occupancy for the Marulan local population of hoary sunray or the species in a national context.

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

Hoary sunray has not been recorded within the Referral Area. The Proposed Action will result in the loss of approximately 5.3 hectares of predominately native understorey woodland habitat for the species. The core habitat and location of the Marulan local population of hoary sunray is located approximately 2 km to the south of the Referral Area and the loss of potential habitat within the Referral Area will not impact the individuals recorded in the locality or fragment areas of habitat for the species.

It is unlikely that the Proposed Action will fragment the Marulan local population of hoary sunray into two or more populations.

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

The loss of approximately 5.3 hectares of predominately native understorey woodland habitat within the Referral Area is unlikely to affect habitat that is critical to the survival of the species as significantly larger and more intact areas of habitat where the majority of the local population occurs will not affected by the action.

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

Hoary sunray seeds are wind dispersed and the species does not rely on long lived soil seed banks for germination. The species produces many small, short-lived seeds that are dependent on the presence of bare ground, or inter-tussock spaces, free from heavy competition. The species is entirely dependent on the transfer of pollen between individuals for successful reproduction. Seed can probably disperse over many kilometres, will germinate fairly rapidly under a wide range of conditions, and can remain viable in the soil for at least a few months.

The Proposed Action will result in the loss of approximately 5.3 hectares of predominately native understorey woodland potential habitat for the species. The Proposed Action unlikely to disrupt the breeding cycle of the Marulan local population of hoary sunray

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

The Proposed Action will result in the loss of approximately 5.3 hectares of predominately native understorey woodland potential habitat for the species. The majority of the habitats within the Referral Area are degraded as a result of intensive grazing. Higher quality woodland habitat for the species occurs in the north-eastern portion of the Referral Area is outside the Proposed Disturbance Area and will not be impacted as a result of the Proposed Action.

It is considered unlikely that the Proposed Action will modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the hoary sunray is 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;**

As this species is usually restricted to small remnants often surrounded by agricultural land, populations are highly susceptible to weed invasion. Weeds currently threatening the taxon include paspalum (*Paspalum dilatatum*), cocksfoot (*Dactylus glomerata*) and onion-grass (*Romulea rosea*).

Although the Proposed Action will not directly impact known records of this species, the Action will result impacts on degraded woodland habitats adjacent to known habitat outside the Referral Area. There is potential for the Proposed Action to cause edge effects into potential habitat adjacent to the Proposed Disturbance Area and facilitate the spread of invasive weed species. However, due to the small number of individuals in close proximity to the Proposed Action and the controls proposed as part of the Proposed Action, the risk associated with indirect impacts is considered to be low.

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

No diseases are known to affect hoary sunray. The Proposed Action will not introduce a disease that may cause the species to decline.

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

A National Recovery Plan has been prepared for hoary sunray (Sinclair 2010). The overall objective of this plan is to minimise the probability of extinction of hoary sunray in the wild and to increase the probability of populations becoming self-sustaining in the long term.

The location of known records of this species is outside the Referral Area and Proposed Disturbance Area and will not be directly impacted as a result of the Proposed Action. The Proposed Action will not result interfere with the recovery of hoary sunray within the Referral Area or in the wider regional and national context.

Conclusion

The Proposed Action is not predicted to result in a significant impact on hoary sunray as the Proposed Action will not directly impact the known records of the species or result in adverse impacts as described in the assessment of significance under the EPBC Act.

Swift Parrot (*Lathamus discolor*) and Regent Honeyeater (*Anthochaera phrygia*)

The swift parrot and regent honeyeater have not been recorded within the Referral Area or surrounds. The Proposed Disturbance Area contains 58.1 hectares of low-quality and degraded box-gum woodland habitat that may provide marginal foraging habitat for these species. 0.98 hectares of higher quality box-gum woodland occurs in the Referral Area, but outside the Proposed Disturbance Area and will not be impacted by the Proposed Action. Due to the significant decrease in habitat for these species' throughout their range, and the importance of potential habitat conservation, the removal of approximately 58.1 hectares of degraded box-gum woodland within the Referral Area may reduce potential foraging habitat for the species in the local area.

The swift parrot breeds in Tasmania and moves to mainland Australia for the non-breeding season (usually arriving between February and March). Most of the population winters in Victoria and New South Wales. Until recently it was believed that in New South Wales, swift parrots forage mostly in the western slopes region along the inland slopes of the Great Dividing Range but are patchily distributed along the north and south coasts including the Sydney region. However, evidence is gathering that the forests on the coastal plains from southern to northern NSW are also important. They return to Tasmania in spring (September-October). The movements of this species on the mainland are poorly understood, but it is considered to be nomadic and irruptive, moving in response to food supply. Upon reaching their core non-breeding range there is no known geographical pattern of movement. During the non-breeding season, the home-range varies tremendously between individuals and between years.

The regent honeyeater inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. There are only three known key breeding regions remaining; in north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra-Barraba region. Regent honeyeaters tend to disperse once breeding is complete. Dispersal begins with short distance movements (up to 30 kilometres) into forests on adjacent talus slopes during November and December. More extensive movements begin to occur in February, but the distances and destinations of these movements have yet to be documented. In NSW the species distribution is very patchy and mainly confined to the two main breeding areas and surrounding fragmented woodlands. In some years flocks converge on flowering coastal woodlands and forests.

In this case, a *population* means:

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

The swift parrot occurs as a single population, although it migrates annually from breeding grounds in Tasmania to the winter foraging grounds on the coastal plains and slope woodlands of mainland eastern Australia (Saunders 2002). The swift parrot is a rare visitor to the Southern Highlands and is known to disperse more commonly along the NSW coast or further inland between Albury and Bathurst, with occasional records around Canberra. The Referral Area is not considered to form part of a regional dispersal route in proximity to any important winter foraging areas for the species.

Despite minor differences between regent honeyeaters in the three main areas inhabited by the species and the direction and extent of movements, the lack of discernable genetic differences suggest that the regent honeyeater occurs as a single, contiguous population. In 2011, the overall population was estimated at 350–400 mature birds. Although the regent honeyeater is a rare visitor to the Southern Highlands, the species has been sporadically recorded in surrounding high quality woodland habitats between August and May. The Referral Area is not considered to form part of an important foraging or breeding area for the species.

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**

No populations of swift parrot or regent honeyeater have been recorded within the Referral Area. The Proposed Action will result in the loss of approximately 58.1 hectares of low-quality and degraded box-gum woodland potential foraging habitat for both species. The Referral Area is not known as a historical or important foraging site for these species, however due to the reduction in habitat integrity elsewhere across the species range, it is acknowledged that other areas of box-gum woodlands may become important resources for the two species. However, it is considered unlikely that the Proposed Action will lead to a decrease in the size of a *population* (as defined above) of the swift parrot or regent honeyeater.

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

The swift parrot and regent honeyeater have not been recorded within the Referral Area. The Proposed Action will result in the loss of approximately 58.1 hectares of low-quality and degraded box-gum woodland potential foraging habitat for both species. While the Proposed Action will remove potential habitat for these species, it is not likely to lead to a significant reduction in known habitat in the region. Substantial areas of higher quality habitats for these species are protected within a large expanse of vegetation in conservation areas such as Morton National Park and Nattai National Park.

The loss of approximately 58.1 hectares of low-quality potential box-gum woodland foraging habitat will result in a reduction of the potential area of occupancy for the swift parrot and regent honeyeater, however this is unlikely to reduce the area of known occupancy.

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

The swift parrot and regent honeyeater have not been recorded within the Referral Area. Both species are highly dispersive and it is unlikely that the Proposed Action will create a significant change to the species' dispersal capacity or create a significant barrier the movement of the species'.

It is unlikely that the Proposed Action will result in the fragmentation of an existing *population* into two or more *populations*.

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

According to the National Recovery Plan for the Swift Parrot (Saunders and Tzaros 2011) and the Regent Honeyeater (Menkhorst, Schedvin and Geering 1999), the only key foraging tree species for these species that occurs within the Referral Area is yellow box (*Eucalyptus melliodora*). Additionally, regent honeyeaters are also known to forage in flowering Blakely's red gum (*Eucalyptus blakelyi*). Yellow box and Blakely's red gum occur within the box-gum woodland habitats of the Referral Area in low to moderate densities and noted to be in low condition, suffering from significant dieback.

The loss of approximately 58.1 hectares of low-quality and degraded potential box-gum woodland habitat within the Referral Area is unlikely to affect habitat that is critical to the survival of the species due to the presence of known habitat for the species within south-eastern Australia and in the case of the swift parrot, in Tasmania.

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

The swift parrot breeds and nests exclusively in Tasmania and migrates to mainland Australia during the non-breeding season. There is no potential for breeding habitat to occur in the Referral Area.

The regent honeyeater mainly breeds in three key sites from the Bundarra-Barraba area in NSW, the Capertee Valley in NSW, and north-eastern Victoria. The regent honeyeater has not been recorded breeding or nesting in the Referral Area or in any areas in the locality.

The Proposed Action is not expected to disrupt the breeding cycle of the swift parrot or 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**

The Proposed Action will involve the removal of approximately 58.1 hectares of low-quality box-gum woodland that provides potential foraging habitat for these species. The majority of the box-gum woodlands within the Referral Area are degraded as a result of intensive grazing. The woodlands within the Referral Area are sparse with many mature trees suffering from dieback. The higher quality box-gum woodlands occurring in the north-eastern portion of the Referral Area is outside the Proposed Disturbance Area and will not be impacted as a result of the Proposed Action.

It is considered unlikely that the Proposed Action will modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the swift parrot and regent honeyeater 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;**

The Proposed Action is not expected to result in invasive species that are harmful to the swift parrot or regent honeyeater becoming established in the species' habitat.

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

Beak and feather disease is an infectious disease affecting parrots, caused by the beak and feather disease circovirus. This common disease is capable of causing very high death rates

in nestlings, and the potential effects of the disease on parrot populations vary from inconsequential to devastating, depending on environmental conditions, and the general health and immunity of the parrots. The beak and feather disease virus can be introduced to parrots via the movements of common species carrying the disease. Lesions suggestive of the virus have been reported in the swift parrot. No diseases are related to the decline in the regent honeyeater.

It is considered unlikely that the Proposed Action will introduce beak and feather disease or any other disease that may cause the swift parrot or regent honeyeater to decline.

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

The National Recovery Plan for the Swift Parrot (Saunders and Tzaros 2011) contains an overall objective to prevent the further decline of the population and to achieve a sustained improvement in the quality and quantity of swift parrot habitat to increase the carrying capacity for the species.

The Recovery Plan for the Regent Honeyeater (Menkhorst, Schedvin and Geering 1999) contains long term objectives such as ensuring that the species persists in the wild, achieving a down-listing from nationally endangered to vulnerable by stabilising population decline and securing habitat extent and quality in the main areas of occupancy.

The Proposed Action will involve the removal of approximately 58.1 hectares of low-quality box-gum woodland that provides potential foraging habitat for these species. No significant effect on the recovery of the swift parrot or regent honeyeater is expected to occur as a result of the Proposed Action.

Conclusion

The Proposed Action is not predicted to result in a significant impact on the populations of the swift parrot or regent honeyeater. Although the Referral Area provides low-quality potential foraging habitat for these species, they have not been recorded utilising the box-gum woodland within the Proposed Disturbance Area or in the immediate locality.

Vulnerable Species

Two vulnerable species have been recorded in and around the Referral Area that have the potential to be impacted by the Proposed action:

- koala (*Phascolarctos cinereus*); and
- large-eared pied bat (*Chalinolobus dwyeri*).

Species descriptions, in the Assessments of Significance below, are referenced from the Office of Environment and Heritage (OEH 2016) and DoE (2016) online species profiles, unless otherwise noted.

Koala (*Phascolarctos cinereus*)

Koala has not been recorded in the Referral Area, however the species has been recorded in the locality. One record from 2006 occurs approximately 5 km north of the Referral Area near the Wollondilly River, two records from 2000 and 1995 occur around the Marulan township approximately 5 km southeast of the Referral Area and one road mortality record exists from 2010 on the Hume Highway 4 km south of the Referral Area (OEH 2015). No evidence of the koala (sightings, scats, scratchings) were recorded in the Referral Area during the surveys undertaken for this assessment. The Proposed Disturbance Area contains approximately 72.4 hectares of degraded eucalypt woodland that may provide potential habitat for the koala.

The Assessment of Significance for the koala has been prepared in consideration of the EPBC Act Referral Guidelines for the Vulnerable Koala (DoE 2014).

The Referral Guidelines advise that the assessment of significant impacts on the koala is undertaken primarily through the assessment of habitat critical to the survival of the koala and actions that interfere substantially with the recovery of the koala. This approach aims to avoid and address habitat loss as well as promote a streamlined assessment and approval process.

In accordance with the Referral Guidelines, the habitat assessment tool was applied to the Referral Area which determined that the extent of vegetation that contains at least one known koala food tree within the Central and Southern Tablelands CMA. Koala feed trees for the Central and Southern Tablelands CMA (OEH 2014) that occur in the Referral Area include:

Primary Food Tree Species:

- ribbon gum (*Eucalyptus viminalis*).

Secondary Food Tree Species:

- snow gum (*Eucalyptus pauciflora*);
- yellow box (*Eucalyptus melliodora*);
- apple box (*Eucalyptus bridgesiana*); and
- Blakely's red gum (*Eucalyptus blakelyi*).

Supplementary Species:

- red stringybark (*Eucalyptus macrorhyncha*).

These species occur in all woodland vegetation within the Referral Area. **Table 2** below outlines the koala habitat quality across the Referral Area per woodland vegetation community. Moderate quality vegetation occurs in areas of higher native species and complex structural composition. Areas of low quality woodlands in the Referral Area are those with predominately exotic species cover and degraded canopy trees showing signs of stress and severe dieback. **Table 2** shows that approximately 5.3 hectares of moderate condition woodlands will be impacted as a result of the Proposed Action. 72.4 hectares of low quality woodlands will be impacted. Overall, 77.7 hectares of potential koala habitat will be disturbed as a result of the Proposed Action.

Table 2 – Koala Habitat Quality in the Referral Area

Vegetation Community	Area to be Impacted (ha)	Area to be Retained (ha)
Moderate Quality Woodlands		
Box-Gum Grassy Woodland (native understorey)	0.0	0.98
Red Stringybark Open Forest (native understorey)	5.3	3.7
Sub -total	5.3	4.7
Low Quality Degraded Woodlands		
Box-Gum Grassy Woodland (exotic understorey)	58.1	22.8
Red Stringybark Open Forest (exotic understorey)	13.1	8.4
Ribbon Gum – Snow Gum Woodland on Granitoids	1.2	1.7
Ribbon Gum – Snow Gum Riparian Woodland	0.0	0.9
Sub –total	72.4	33.8
TOTAL	**77.7**	**38.5**

Table 3 below applies the Koala Habitat Assessment Tool as outlined in Table 3 of the Referral Guidelines.

Table 3 – Assessment of Koala Habitats

Koala Habitat Assessment Tool (Table 3 from DoE 2014)			Referral Area Assessment	
Attribute	**Score**	**Inland**	**Allocated Score**	**Score Justification**
Koala occurrence	+2 (high)	Evidence of one or more koalas within the last 5 years.	**0**	**Desktop:** EPBC PMST report identified the koala or koala habitat as 'known to occur' in the Proposed action Area. Atlas of NSW Wildlife point buffer search identified 2 koala records within 10 km of the Proposed action Area and none within 2 km within the last 10 years. **On-ground:** No evidence of the koala was recorded
	+1 (medium)	Evidence of one or more koalas within 2 km of the edge of the impact area within the last 10 years.		
	0 (low)	None of the above.		

Koala Habitat Assessment Tool (Table 3 from DoE 2014)			Referral Area Assessment	
Attribute	**Score**	**Inland**	**Allocated Score**	**Score Justification**
				during the Umwelt surveys of the Referral Area in 2014.
Vegetation composition	+2 (high)	Has forest or woodland or shrubland with emerging trees with 2 or more known koala food tree species in the canopy. **OR** 1 food tree species that alone accounts for >50% of the vegetation in the relevant strata.	**+2**	**Desktop:** Tozer *et al.* (2010) mapping predicted the occurrence of Tableland Grassy Box-Gum Woodland within the Referral Area, which is likely be suitable habitat for the species. **On-ground:** This Referral Area contains known koala feed trees for the Southern Highlands region including Blakelys red gum (*Eucalyptus blakelyi*), yellow box (*Eucalyptus melliodora*), snow gum (*Eucalyptus pauciflora*) and ribbon gum (*Eucalyptus viminalis*).
	+1 (medium)	Has forest or woodland or shrubland with only 1 species of known koala food tree present in the canopy.		
	0 (low)	None of the above.		
Habitat connectivity	+2 (high)	Area is part of a contiguous landscape ≥ 1000 hectares.	**+1**	The Referral Area is within an area of degraded agricultural land with scattered woodland trees. The wider locality contains quarry infrastructure to the southeast and the Main Southern Railway to the south.
	+1 (medium)	Area is part of a contiguous landscape < 1000 hectares, but ≥ 500 hectares.		
	0 (low)	None of the above.		
Key existing threats	+2 (low)	Little or no evidence of koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for koala occurrence.	**0**	**Desktop:** One BioNet Wildlife Atlas record notes one koala road mortality in 2010 approximately 4 km south of the Referral Area on the Hume Highway (OEH 2015). **On-ground:** It is expected that any local koala populations could be substantially affected by vehicle strike associated with the Hume Highway, local roads, and the Main Southern Railway. Additionally, the agricultural land uses in the locality would likely expose any local koala population to dog attack.
	+1 (medium)	Evidence of infrequent or irregular koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for koala occurrence, OR areas which score 0 for koala occurrence are likely to have some degree of dog or vehicle threat present.		
	0 (high)	Evidence of frequent or regular koala mortality from vehicle strike or dog attack in the study area at present, OR areas which score 0 for koala occurrence and have a significant dog or vehicle		

Koala Habitat Assessment Tool (Table 3 from DoE 2014)			Referral Area Assessment	
Attribute	**Score**	**Inland**	**Allocated Score**	**Score Justification**
		threat present.		
Recovery value	+2 (high)	Habitat is likely to be important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.	**0**	**Desktop:** Table 1 of the Draft Referral Guidelines (DoE 2014) prescribes, that for coastal areas, the interim recovery objective(s) are to: *"Protect and conserve large, connected areas of koala habitat, particularly large, connected areas that support koalas that are:-of sufficient size to be genetically robust/operate as a viable sub-population OR free of disease or have a low incidence of disease OR breeding and to maintain corridors and connective habitat that allow movement of koalas between large areas of habitat."* **On-ground:** The clearing of approximately 77.7 hectares of potential degraded koala habitat will not result in fragmentation of retained habitats and is not likely to influence the interim recovery objectives. Preferred/primary koala habitat will not be directly impacted by the Proposed action.
	+1 (medium)	Uncertainty exists as to whether the habitat is important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.		
	0 (low)	Habitat is unlikely to be important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.		
TOTAL SCORE			**3**	**≥ 5 indicates habitat critical for the survival of the koala.**

As these habitats scored lower than five using the Referral Guidelines habitat assessment tool, the Referral Area is not considered to contain habitat critical to the survival of the koala (DoE 2014).

As the Referral Guidelines indicates that the Referral Area does not contain habitat critical to the survival of the koala, the impacts of the Proposed Action are not expected to result in substantial interference to the recovery of the koala. Further consideration of the impacts of the Proposed Action is detailed in the Assessment of Significance below.

In this case, an *important population* is a population that is necessary for a species' long-term survival and recovery. This may include populations 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.

The koala is known to occur in eucalypt woodlands and forests from the north-eastern Queensland, along the eastern coast of NSW, to the south-east corner of South Australia. The vulnerable listing for the koala extends from north-eastern Queensland to the Victoria border. Koala populations are known to occur in the Central and Southern Tablelands of NSW, including populations in Bathurst, in parts of the Goulburn LGA, in Bungonia State Recreation Area and in the Mundoonen Nature Reserve. In the wider locality of the Referral Area, scattered records occur around Marulan with substantial records in Morton National Park to the south and Bangadily National Park in the northeast. This species has not been recorded in the Referral Area, however the species has been recorded in the locality. One record from 2006 occurs approximately 5 km north of the Referral Area near the Wollondilly River, two records from 2000 and 1995 occur around the Marulan township approximately 5 km southeast of the Referral Area and one road mortality record exists from 2010 on the Hume Highway 4 km south of the Referral Area (OEH 2015). No evidence of the koala (sightings, scats, scratchings) were recorded in the Referral Area during the surveys undertaken for this assessment.

The scarcity of evidence of koala occupation in the wider area suggests that the species has a relatively low population density in the locality. The known records around the Referral Area are unlikely to be key source populations for breeding or dispersal, necessary for maintaining genetic diversity or at the limit of the known range of the species. It is unlikely that any potential population around the Referral Area constitute part of an important population that occurs in the Southern Highlands.

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 Proposed Action will result in the loss of approximately 5.3 hectares of moderate quality and 72.4 hectares of low quality eucalypt woodland potential koala habitat within the Referral Area. Koalas have not been recorded in the Referral Area despite multiple survey periods on the site. Evidence of their previous occupation, such as scratches and scats, has not been recorded. It is considered that the Referral Area contains some marginal habitat for the species, however it is not known to be utilised by the individuals that may occur in the locality. The Proposed Action is not expected to lead to a long-term decrease in the size of an important population of the species.

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

The Proposed Action will result in the loss of approximately 5.3 hectares of moderate quality and 72.4 hectares of low quality eucalypt woodland potential koala habitat within the Referral Area. Koalas have not been recorded in the Referral Area despite multiple survey periods on the site. Evidence of their previous occupation, such as scratches and scats, has not been recorded. It is considered that the Referral Area contains some marginal habitat for the species, however it is not known to be utilised by the individuals that may occur in the locality. The Proposed Action is not expected to reduce the area of occupancy of an important population of the species.

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

Allen (2010) provided population estimates for the Southern Highlands (southern section) being at a minimum 160 and a maximum of 640. No koalas or evidence of koalas have been recorded in the Referral Area despite multiple survey periods on the site (and of the broader Lynwood Quarry area). Few and scattered records of the species do occur in the wider

locality. The Proposed Action will not sever an area of important dispersal habitat for the species. It is unlikely that the Proposed Action will fragment an important population into two or more populations.

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

The Proposed Action will result in the loss of 5.3 hectares of moderate quality and 72.4 hectares of low quality potential koala habitat that is not considered to be critical to the survival of the species in accordance with the Koala Habitat Assessment Tool outlined in the Koala Draft Referral Guidelines (DoE 2013) (refer to **Table 1** above). The Proposed Action will not affect habitat critical to the survival of the species.

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

No koalas or evidence of koalas have been recorded in the Referral Area and therefore there is no evidence of breeding or territorial behaviour to indicate the Referral Area is important for the breeding cycle of an important population of the koala. It is likely that surrounding records are dispersed individuals from other quality habitats in the wider locality including within Bungonia State Recreation Area and Morton National Park. The reduction of 5.3 hectares of moderate quality and 72.4 hectares of low quality potential habitat is unlikely to disrupt the breeding cycle of an important population of the species.

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

The Proposed Action will result in the loss of 5.3 hectares of moderate quality and 72.4 hectares of low quality potential koala habitat in the Referral Area. The koala is expected to occur in low densities surrounding the Referral Area and the loss of 1.4 hectares of moderate quality and 72.4 hectares of low quality habitat is considered unlikely to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

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

No invasive species are likely to become established as a result of the Proposed Action that may impact upon any habitat relevant to the koala.

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

The koala is known to contract strains of *Chlamydia* and the koala retrovirus. Chlamydia infections are known to cause reduced female fertility and are expected to reduce the reproductive potential of koala populations. It is likely that most of the Southern Highlands populations have Chlamydia. The koala retrovirus can cause a range of conditions including leukaemia and immunodeficiency syndrome. It is estimated that up to 100 per cent of koala populations in Queensland and New South Wales have the koala retrovirus (TSSC 2012).

The Proposed Action does not involve any processes that are likely to introduce a disease on site for the koala or that may cause this species to decline.

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

The Approved Recovery Plan for the Koala (DECC 2008) contains specific recovery objectives and performance criteria including maintaining existing populations, improving the extent and quality of priority habitat areas, increasing numbers of breeding females,

increasing the health of individuals in the wild, expanding the distribution of the species and increasing community reports of sightings.

The Proposed Action will result in the loss of approximately 5.3 hectares of moderate quality and 72.4 hectares of low quality potential koala habitat, which is not an area known to contain breeding females. It is considered that the species occurs in low numbers in the wider Southern Highlands locality. No significant effect on the recovery of the koala is expected to occur as a result of the Proposed Action.

Conclusion

The Proposed Action is not predicted to result in a significant impact on an important population of koala as the Proposed Action will not impact habitat critical to the survival for the species as described in the Referral Guidelines (DoE 2014) or as presented in the assessment of significance under the EPBC Act.

Large-eared pied bat *(Chalinolobus dwyeri)*

Large-eared pied bat was recorded in one location within the Referral Area during the surveys undertaken for this assessment. A 'confident' identification of an echolocation recording was identified in moderate quality woodland habitat within the north-eastern portion of the Referral Area. The species has also been previously recorded in the Marulan locality (OEH 2015) including a capture record of an individual located within mining infrastructure in the eastern portions of the existing Proposed Action Area (Heath, R. pers comm.). The Referral Area is considered to comprise low-quality woodland foraging habitat for the species.

The National Recovery Plan for the large-eared pied bat (DERM 2011) states that habitat critical for the survival of the species requires the presence of diurnal roosts and shelter habitat, usually in the form of sandstone cliffs and adjacent fertile woodland valley foraging habitat. The majority of records of the species occur within several kilometres of clifflines or caves. Records of the species mainly occur approximately 35 kilometres northeast of the Referral Area along the escarpment habitat associated with Nattai and Kanangra-Boyd National Parks and 20 kilometres to the southeast in Morton National Park. No evidence exists of the large-eared pied bat roosting in tree hollows (DERM 2011). Due to the absence of suitable cliffline or cave roosting habitat near the Referral Area and the infrequency of records of the species within the wider locality, the Referral Area is not considered to contain important habitat for the species.

Table 4 below outlines the large-eared pied bat foraging habitat quality across the Referral Area per woodland vegetation community. Modelling based on presence-only data indicates that bats forage in fertile valleys and plains, as well as areas with moderately-tall to taller trees along water courses (DERM 2011). The majority of records are from canopied habitat, suggesting a sensitivity to clearing, although narrow connecting riparian strips in otherwise cleared habitat are sometimes quite heavily used (DERM 2011). Moderate quality vegetation in the Referral Area occurs in areas of denser canopied habitat and woodland along riparian zones. Areas of low quality woodlands in the Referral Area are those with predominately exotic species cover and degraded open canopy trees. Approximately 4.4 hectares of moderate condition woodland foraging habitat will be impacted as a result of the Proposed Action. Approximately 73.4 hectares of low quality degraded woodland foraging habitat will be impacted. Overall, 77.8 hectares of potential large-eared pied bat habitat will be disturbed as a result of the Proposed Action.

Table 4 – Large-eared Pied Bat Habitat in the Referral Area

Habitat Type	Area to be Impacted (ha)	Area to be Retained (ha)
Habitat Critical to the Survival of the Species (DERM 2011)		
Cliffline, escarpment breeding/roosting habitat	0.0	0.0
Fertile woodland valley foraging habitat (adjacent to cliff/escarpment habitat)	0.0	0.0
Total	0.0	0.0
Moderate Quality Woodland Foraging Habitat		
Dense Canopied Woodlands	0.0	9.7
Riparian Woodlands	4.4	0.0
Total	4.4	9.7
Low Quality Woodland Foraging Habitat		
Sparse Open Degraded Woodlands	73.4	29.0
Total	73.4	29.0
TOTAL	**77.8**	**38.7**

In the case of a vulnerable species, an *important population* is a population that is necessary for a species' long-term survival and recovery. This may include populations 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.

The one 'confident' record of large-eared pied bat within the Referral Area and one capture record in the wider Lynwood Quarry area does not constitute the presence of an 'important population' as defined by the criteria listed above, as the records of the species in the Referral Area do not represent a key source population either for breeding or dispersal and the Referral Area is not important for the maintenance of genetic diversity of the species. Records of the species around the Referral Area occur on the western limits of the species distribution in the Southern Highlands. The National Recovery Plan for the species (DERM 2011) identifies an important population within the escarpment habitat within Morton National Park approximately 30 km to the southeast of the Referral Area. It is unlikely that the Referral Area contains an important population of the large-eared pied bat, however there is potential that the scattered records form part of the important population known in the surrounding conservation reserves.

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 Proposed Action will result in the loss of approximately 4.4 hectares of moderate quality and 73.4 hectares of low-quality woodland foraging habitat for the species and will not impact any cliffline or escarpment habitat that could be used as roosting or breeding habitat. It is unlikely that the Proposed Action will lead to a long-term decrease in the size of the Morton National Park *important population* of this species.

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

The Proposed Action will result in the loss of approximately 4.4 hectares of moderate quality and 73.4 hectares of low-quality woodland foraging habitat for the species and will not impact any cliffline or escarpment habitat that could be used as roosting habitat. The record large-eared pied bat was identified in high quality woodland habitat within the north-eastern portion of the Referral Area, which will not be impacted as a result of the Proposed Action. It is unlikely that the Proposed Action will reduce the area of occupancy of the Morton National Park *important population* of this species.

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

The Proposed Action will result in the loss of approximately 4.4 hectares of moderate quality and 73.4 hectares of low-quality woodland foraging habitat for the species which would not fragment this highly dispersive species. The Proposed Action will not result in the fragmentation of the Morton National Park *important population* of this highly mobile species.

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

The National Recovery Plan for the large-eared pied bat (DERM 2011) states that habitat critical for the survival of the species requires the presence of diurnal roosts and shelter habitat, usually in the form of sandstone cliffs and adjacent fertile woodland valley foraging habitat. Sandstone cliffs and fertile woodland valley habitat within proximity of each other is habitat of importance to the species. The habitat in the Referral Area does not contain overhanging clifflines or adjacent fertile woodland valley habitat.

The Referral Area is not considered to contain critical habitat for the large-eared pied bat and consequently the Proposed Action is not expected to adversely affect habitat critical to the survival of this species.

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

No important populations of the large-eared pied bat are likely to occur in the Referral Area, nor have any breeding populations or roosting habitat for this species been recorded. The Proposed Action is not expected to disrupt the breeding cycle of an important population of this species.

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

The Proposed Action will result in the loss of approximately 4.4 hectares of moderate quality and 73.4 hectares of low-quality woodland foraging habitat for the species and will not impact any cliffline or escarpment habitat that could be used as roosting habitat.

Given the lack of core habitat in the Referral Area for large-eared pied bat, the Proposed Action will not modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that this species are likely to decline.

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

There are not any invasive species that are likely to become established as a result of the Proposed Action that may have an impact upon any habitat relevant to the large-eared pied bat.

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

There are no diseases associated with the decline of the large-eared pied bat. The Proposed Action is not expected to introduce or exacerbate any diseases that may cause this species to decline.

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

The Recovery Plan for the Large-eared Pied Bat (DERM 2011) has an overall objective to ensure the persistence of viable populations of the species throughout its geographic range.

The Proposed Action will result in the loss of approximately 4.4 hectares of moderate quality and 73.4 hectares of low-quality woodland foraging habitat. It is not considered that an important population of the species occurs within the Referral Area. No significant effect on the recovery of the large-eared pied bat is expected to occur as a result of the Proposed Action.

Conclusion

The Proposed Action is not predicted to result in a significant impact upon an important population of large-eared pied bat as the Referral Area is not considered to support an important population of this species or contain habitat considered to be critical to the survival of the species as per the National Recovery Plan (DERM 2011).

Migratory Species listed under International Conventions

Five migratory species listed under international migratory species conventions have been recorded (white-throated needletail) in the Referral Area or are considered to have the potential to occur:

- white-throated needletail (*Hirundapus caudacutus*);
- rainbow bee-eater (*Merops ornatus*);
- satin flycatcher (*Myiagra cyanoleuca*);
- eastern great egret (*Ardea modesta*); and
- cattle egret (*Ardea ibis*).

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 habitats within the Referral Area for migratory species listed under international migratory species conventions are not considered to meet the criteria listed above, and important habitat is not likely to occur. The EPBC Act lists additional criteria that are used to determine whether an action is likely to have a significant impact on migratory species. A Proposed Action is considered likely to result in a significant impact on migratory species if there is a real chance or possibility that it will:

- substantially modify and/or destroy an area of important habitat for a migratory species;
- seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species; and/or
- result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species.

Five white-throated needletails (*Hirundapus caudacutus*) were recorded north of the Referral Area during the surveys undertaken for this assessment. The species is almost exclusively aerial and is unlikely to utilise the habitat within the Referral Area. According to the Draft *Referral Guideline for 14 birds listed as migratory species under the EPBC Act* (DoE 2015), important habitat for the white-throated needletail includes large tracts of native vegetation and tree hollows for roosting. A nationally ecologically significant proportion of the population is 10 individuals (or 0.1% of the population) according to Table 3 of the Draft Referral Guideline (DoE 2015). The habitats of the Referral Area are unlikely to be important for the species and the Proposed Action is unlikely to seriously disrupt the lifecycle of an ecologically significant proportion of the population the species. No invasive species that are harmful to white-throated needletail are known in Australia (DoE 2015).

Rainbow bee-eater (*Merops ornatus*), satin flycatcher (*Myiagra cyanoleuca*), eastern great egret (*Ardea modesta*) and cattle egret (*Ardea ibis*) have not been recorded within the Referral Area, but have the potential to occur based on suitable habitat and known distribution. The habitats of the Referral Area are unlikely to be important for the species. These species are not referenced in the Draft *Referral Guideline for 14 birds listed as migratory species under the EPBC Act* (DoE 2015).

The Referral Area is not considered to comprise *important habitat* for any of the identified migratory species listed above, and therefore the Proposed Action is not likely to substantially modify or destroy important migratory species habitat. Similarly, the Proposed Action will not seriously disrupt the lifecycle of an ecologically significant proportion of the population of a migratory species; or result in an invasive species that is harmful to migratory species becoming established within the Referral Area.

Conclusion

The Proposed Action is not predicted to result in a significant impact on any migratory species listed under the EPBC Act or international migratory species conventions as the Proposed Action will not result in impacts that are likely to disrupt the lifecycle of an ecologically significant proportion of the population of a migratory species as described in the assessment of significance under the EPBC Act.