Wagga Wagga Rural Referral Hospital Stage 3 Development
Biodiversity Development Assessment Report

NSW Health Infrastructure

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Executive Summary

Eco Logical Australia (ELA) was commission by NSW Health Infrastructure to conduct a Biodiveristy Development Assessment Report (BDAR) for the proposed redevelopment of Wagga Wagga Rural Refferal Hospital (WWRRH) (Stage 3), within Wagga Wagga (the Development Site).

The redevelopment of WWRRH represents a strategic capital investment in the health infrastructure of the Local Health Network and NSW Health. The overall objective is to provide a contemporary healthcare facility suited to the current and future needs of the catchment population.

Stage 1 and 2 of the Hospital's redevelopment has already been completed. Stage 1, the Mental Health Facility, was completed in 2011. Stage 2, the Acute Services Building, was completed at the end of 2015.

Stage 3 will bring to completion the benefits of the overall hospital redevelopment for the delivery of contemporary, well-integrated health services for the people of Wagga Wagga and the wider service catchment area.

This BDAR addresses the Secretary's Environmental Assessment Requirements (SEARs) Application Number SSD 9903, under Specific Matter 8 - Biodiveristy: Biodiversity impacts related to the proposal and the preparation of a Biodiversity Development Assessment Report are to be addressed in accordance with the requirements of the Biodiversity Conservation Act 2016.

No mapped Plant Community Types (PCTs), as defined by the NSW BioNet Vegtation Classification system had previously been recorded within the Development Site. The Development site does not contain any mapped streams or wetlands and does not contribute to a Biodiversity Corridor. The Development Site is within a highly disturbed landscape, which has been subject to previous urbanisation. The site inspection undertaken by Kevin Mills and Associates (2011) solely identified scattered planted (or naturally established) native and exotic vegetation within the Development Site.

Due to the absence of PCTs within the Devleopment Site, no ecosystem credit or species credit species were predicted to occur. To determine the Likelihood of Occurrence of threatened species, a 5 km search of BioNET records of threatened species under the *Biodiveristy Conservation Act 2016* (BC Act), and 5 km Protected Matters search for threatened species under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), was conducted.

Taking a conservative approach, *Pteropus poliocephalus* (Grey-headed Flying Fox; GHFF), listed as *Vulnerable* under the BC Act and EPBC Act was identified has having the potential to occur within the Development Site intermittently. The nectar and pollen of native and exotic trees can provide potential foraging and roosting habitat for GHFF. Potential habitat for GHFF is dispersed throughout the Development Site and is represented by planted exotic and non-indigenous native species (e.g. *Grevillea robusta*). GHFF is listed as both an ecosystem and species credit species; the species credit listing relates to breeding colonies only. No GHFF breeding colonies are located within or near the Development Site, and thus no targeted survey was required for this species under the Biodiversity Assessment Methodology. According to the National Flying-fox Monitoring Program, the nearest active GHFF camp occurs approximately 5 km to the north-east of the Development Site, within Wagga Wagga alongside Murumbidgee River (DotE 2018).

The Development Site is located within a highly urbanised area and will substantially avoid biodiversity impacts (particularly threatened species and ecological communites) by redeveloping already disturbed sites and existing infrastructure. However, the development will directly impact a negligible amount of potential foraging habitat the GHFF (three planted Grevillea robusta; a non-indigenous native species).

Potential indirect imapcts of the proposed works would include sediment runoff, mitigated by using sediment barriers, and light spill to adjacent street trees, mitgated by intentional direction of lighting.

Based on the data available as discussed in Section 2.2.4, the poroposed works would not have any Serious and Irreversible Impacts (SAII).

No PCTs (ecosystem credits) or threatened species credit species were recorded within the Development Site, and thus no offsets are required under the BC Act. It is noted that the GHFF is an ecosystem credit species (for foraging and non-breeding habitat) and therefore, due to the absence of PCTs within the Development Footprint, do not require an offset.

One Matter of National Environmental Significance (MNES) was identified as potentially adversely affected by the proposed works. The Grey-headed Flying-fox is listed as *Vulnerable* under the EPBC Act, and it is considered that this species is likely to use some of the study area for foraging, such as the three *Grevilea robusta* present.

An assessment of the Commonwealth Significant Impact Criteria (Commonwealth of Australia 2013) was undertaken for the Grey-headed Flying-fox. The assessment concluded that the project would not have a significant impact on this species, and as such, a referral to the Commonwealth was not required. Furthermore, offsets for this species are not required (according to BAM), as impacts are associated with an ecosystem credit species.

All impacts to MNES have been avoided as far as practicable and all impacts have been assessed in accordance with Commonwealth guidelines. Mitigation strategies have been put into place to manage potential impacts to MNES.

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Abbreviations

Abbreviation	Description
ALA	Atlas of Living Australia
BAM	Biodiversity Assessment Methodology
BC Act	*Biodiversity Conservation Act 2016*
BDAR	Biodiversity Development Assessment Report
CBD	Central Business District
CEMP	Constrction Environmental Management Plan
DECC	Department of the Environment and Climate Change
DECCW	Department of Environment, Climate Change and Water
DotE	Department of the Environment
DotEE	Department of the Environment and Energy
EP&A Act	Environmental Planning and Assessment Act 1979
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
LGA	Local Government Area
MLHN	Murrumbidgee Local Health Network
OEH	Office of Environment and Herritage
PCT	Plant Community Type
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
TEC	Threatened Ecological Community
WWRRH	Wagga Wagga Rural Referral Hospital

1. Biodiversity Assessment

1.1 Introduction

Wagga Wagga Rural Referral Hospital (WWRRH) is a major Rural Referral hospital, located in southern central New South Wales within the Murrumbidgee Local Health Network (MLHN).

The redevelopment of WWRRH represents a strategic capital investment in the health infrastructure of the Local Health Network and NSW Health. The overall objective is to provide a contemporary healthcare facility suited to the current and future needs of the catchment population.

Stage 1 and 2 of the Hospital's redevelopment has already been completed. Stage 1, the Mental Health Facility, was completed in 2011. Stage 2, the Acute Services Building, was completed at the end of 2015.

Stage 3 will bring to completion the benefits of the overall hospital redevelopment for the delivery of contemporary, well-integrated health services for the people of Wagga Wagga and the wider service catchment area.

This Biodiversity Development Assessment Report (BDAR) has been prepared by Rebecca Ben-Haim and Matthew Dowle. Matthew is an Accredited Person (BAAS17043) under the *NSW Biodiversity Conservation Act 2016* (BC Act). The BDAR is a requirement of the NSW Secretary's Environmental Assessment Requirements (SEARS) for the State Significant Development (SSD 9033) and assessment under the BC Act. The contents of this BDAR complies with the minimum requirements outlined in Table 25 of the Biodiversity Assessment Methodology (BAM: OEH, 2017).

1.1.1 General description of the Development Site

The Development Site is located approximately 1 km from Wagga Wagga Central Business District (CBD) and is approximately 4.2 ha in area, located on Edward Street, Wagga Wagga within the Wagga Wagga Local Government Area (LGA) (Figure 1 and Figure 2). The Development Site is bounded by Edward Street to the north, Docker Street to the west and Rawson Lane to the south.

No mapped native vegetation communities, defined as Plant Community Types (PCTs) by the NSW BioNet Vegetation Classification system occur within the Development Site.

The Development Site is defined in the Site Map (Figure 1) and the Location Map (Figure 2).

1.1.2 Development Footprint

The Development Footprint is located entirely within Lot 334 (DP 1190643), situated approximately 1 km of Wagga Wagga's CBD, within the Wagga Wagga LGA (Figure 1). In this report, the Development Site and the Development Footprint are the same area, and hereafter cumulatively refered to as the Development Site. The redevelopment will be entirely within the existing WWRRH campus.

1.1.3 Sources of information used

Previous reporting (Kevin Mills 2011 & 2018) and the following data sources were reviewed:

- Biodiversity Assessment Methodology Calculator
- BioNet Vegetation Classification
- Bionet Atlas

Figure 1: Site Map

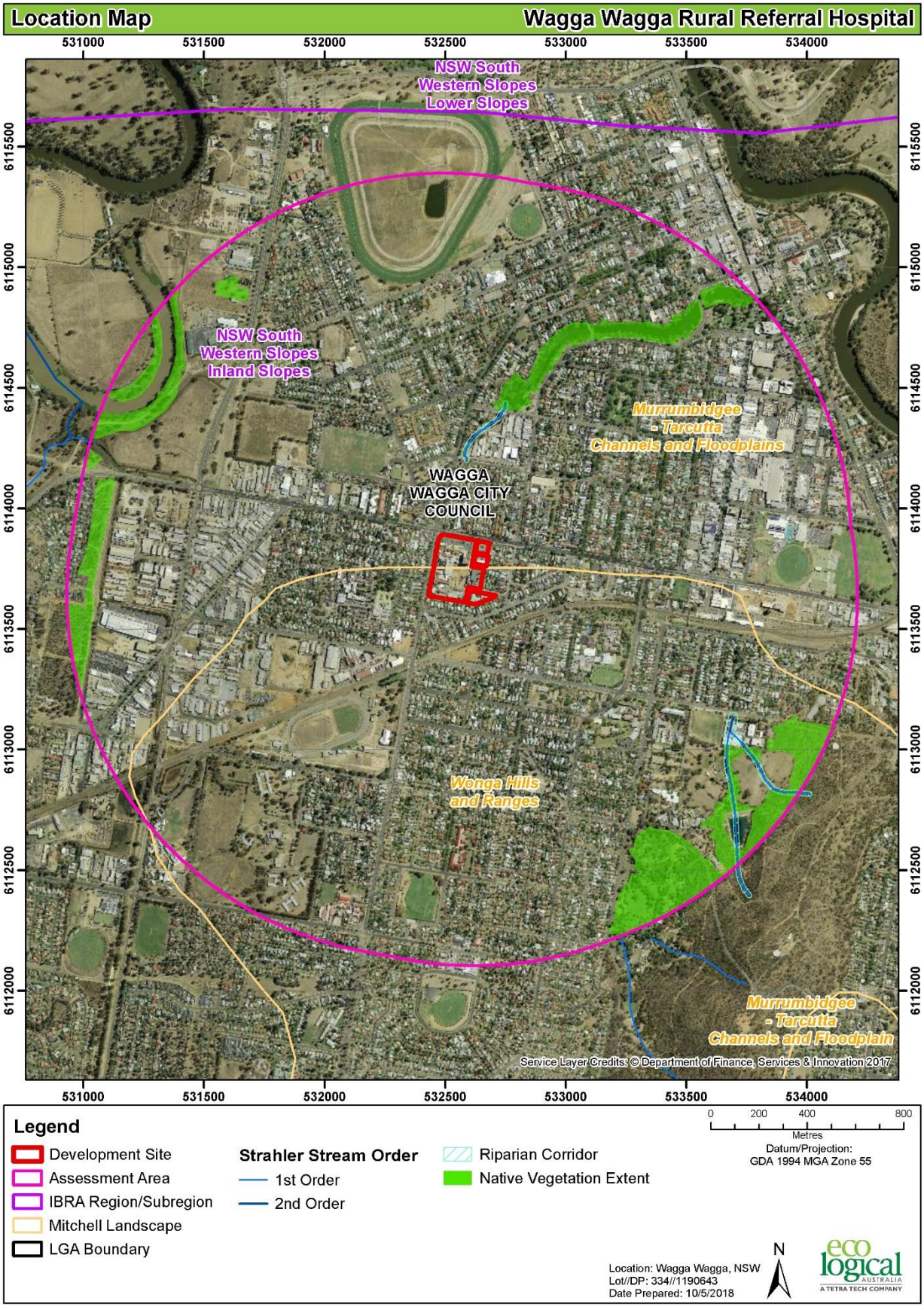

Figure 2: Location Map

1.2 Approval Strategy

Pursuant to the provisions of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and *State Environmental Planning Policy (State and Regional Development) 2011* (SEPP SRD) the redevelopment of Wagga Wagga Rural Referral Hospital (Stage 3) is State Significant Development (SSD 9033) and the Minister for Planning is the consent authority.

This BDAR Report addresses the Secretary's Environmental Assessment Requirements (SEARs) Application Number SSD 9033, under Specific Matter 8 - Biodiveristy:

- Biodiversity impacts related to the proposal and the preparation of a Biodiversity Development Assessment Report are to be addressed in accordance with the requirements of the *Biodiversity Conservation Act 2016*.

1.3 Summary of the Development

The proposal is to provide a contemporary healthcare facility suited to the current and future needs of the catchment population. In particularly, the works will include:

- Construction of a six (6) storey Ambulatory Care Building, above basement parking level containing:
  - Aged Care;
  - Rehabilitation;
  - Older Persons Mental Health;
  - Ambulatory Clinics;
  - Rehabilitation and Allied Health Therapy;
  - Education and Research; and
  - Hospital offices
- Construction of a new public entry;
- Ground Level and bridge connection to the existing hospital building;
- Site landscaping including construction of a new forecourt;
- Associated works to the internal road network; and
- Associated building services.

1.4 Landscape features

1.4.1 IBRA regions and subregions

The Development Site falls within the NSW South Western Slopes IBRA region, within the Inpand Slopes subregion (Figure 1).

1.4.2 Mitchell Landscapes

The Development Site is located within both the Murrumbidgee - Tarcutta Channels and Floodplains and Wonga Hills and Ranges Mitchell Landscapes as outlined in Table 1.

Table 1: Mitchell Landscapes

Mitchell landscape	Description	Area within Development Site (ha)
Murrumbidgee - Tarcutta Channels and Floodplains	Channels, floodplain and terraces of Murrumbidgee tributaries on Quaternary alluvium, general elevation 200 to 400m, local relief 25m. Undifferentiated organic sand and loam on the floodplain, brown gradational loam and yellow texture-contrast soils on higher terraces. River red gum (*Eucalyptus camaldulensis)* gallery woodland on banks, yellow box (Eucalyptus melliodora) and grey box (*Eucalyptus microcarpa*) open woodland on floodplain and terraces.	2.44
Wonga Hills and Ranges	Rolling hills, low rises and ridges on Ordovician siltstone, slate, quartzite and phyllite, general elevation 250 to 37 0m, local relief 50 m. Stony, thin red and brown texture-contrast soils merging to yellow harsh texture-contrast soils on valley floors. High salinity in the subsoil and some brackish flows in small creeks. Woodlands of; tumbledown red gum (*Eucalyptus dealbata*), red stringybark (*Eucalyptus macrorhyncha*) and grey box (*Eucalyptus microcarpa*) on slopes, yellow box (*Eucalyptus melliodora*), white box (*Eucalyptus albens*) and occasional Blakely's red gum (*Eucalyptus blakelyii*) on flats with kangaroo grass (*Themeda triandra)* and plains grass (*Stipa aristiglumis*).	2.88

1.4.3 Native vegetation extent

Native vegetation has the same definition as in Part 5A of the Local Land Services Act 2013. The extent of native vegetation within the Development Site is less than 0.01 ha, and the amount of native vegetation within the 1,500 m buffer is 45.27 ha. The three native trees within the site are less than 0.1 % of the vegetation within the 1,500m radius. .

1.4.4 Rivers and streams

The Development Site does not contain any rivers or streams. The nearest drainage line is approximatley 700 m north from the Development Site.

1.4.5 Wetlands

The Development Site does not contain any wetlands.

1.4.6 Connectivity features

The Development Site has not been mapped as providing a Biodiversity Corridor. Furthermore, given the urban context of the study area and the type of specific habitat provided (mostly landscape plantings and street trees), the Development Site is not thought to contain any important connectivity features.

1.4.7 Areas of geological significance and soil hazard features

The Development Site does not contain areas of geological significance recognised by the BAM. The Development Site has been mapped as a highly disturbed soil landscape, with highly urbanised areas within the vicinity (OEH 2017a).

1.4.8 Site context

1.4.8.1 Method applied

The site-based method has been applied to this development.

1.4.8.2 Percent native vegetation cover in the landscape

The current percent native vegetation cover in the landscape was assessed in a Geographic Information System (GIS) using aerial imagery sourced from SIX Maps (LPI 2018) using increments of 5%. The extent of native vegetation within the Development Site is less than 0.01 ha, which is 0.1% of the 45.27ha of native vegetation within a 1,500 m radius.

1.5 Native vegetation

1.5.1 Survey effort

A vegetation survey was undertaken within the Development Site by Kevin Mills & Associates - Ecological and Environmental Consultants on 21 June 2011. A revised report pertaining to the BC Act was completed by Kevin Mills & Assoicates in May 2018.

Vegetation within the Development Site has been mapped in Figure 3.

No Plant Community Types (PCTs) as defined by the NSW BioNet Vegtation Classification system were identified within the Development Site, thus no vegetation integrity plots were conducted.

1.5.2 Plant Community Types present

No PCTs were identified within the Development Site. The Development Footrprint is entirely modified and disturbed, and predominantly contains exotic species, weeds and planted native or non-indigenous species.

1.5.2.1 PCT selection justification

No PCTs were mapped within Development Site (Figure 3). The entire Development Site is located on soil mapped as highly disturbed due to previous urbanisation. Therefore, it is unlikely that remnant native vegetation currently occurs within the Development Site.

All vegetation present within the Development Site was classified as 'Urban Exotic and Native Cover', consistent with the non-native vegetation mapped by OEH (2011; Central-Southern New South Wales Vegetation Mapping project) and was considered to be in a very low condition. This vegetation type could not be attributed to a Plant Community Type (PCT), as defined by the NSW BioNet Vegtation Classification system, and is therefore not required to be further assessed using the BAM (Section 10.4, BAM) and was thus excluded from any credit or offset calculations.

The Development Site includes scattered native and exotic vegetation which has been either planted or naturally established (Figure 3).

Vegetation Mapping

Vegetation within the Development Site includes native canopy species *Casuarina cunninghamiana* (River Oak) and *Grevillea robusta* (Silky Oak), and exotic canopy species *Alnus jorullensis* (Evergreen Alder), *Cupresus glabra* (Arizona Cypress) and numerous *Fraxinus* species (Calret Ash, Desert Ash, Golden Ash and American Ash). Mid-storey and groundcover species include *Bromus cartharticus* (Prairie Grass), *Cirsium vulgare* (Spear Thistle) and *Poa bulbosa* (Bulbous Bluegrass) (Figure 4) (see **Appendix B:** for detailed flora list).

Figure 3: Vegetation within the Development Site

Figure 4 Exotic vegetation within Development Site (Kevin Mills & Associates, 2011)

1.5.2.2 Threatened Ecological Communities Justification

No threatened ecological communities (TECs) were identified within the Development Site.

1.5.3 Vegetation integrity assessment

No PCTs were identified within the Development Site, and thus a vegetation integrity assessment as part of the BAM has not been conducted.

1.5.4 Use of local data

Use of local data instead of benchmark integrity scores is not proposed.

1.6 Threatened species

1.6.1 Ecosystem credit species

The BDAR requires that a list of threatened species that can be reliably predicted by habitat surrogates are identified. These species are called ecosystem credit species and they are automatically generated based on the PCT, the IBRA subregion of the project footprint, the condition and patch size of vegetation. The BDAR allows an assessor to determine whether any of the habitat components for the predicted threated species are present or not. If they are not present, an assessor does not need to identify the ecosystem credit species present in the vegetation zone.

However, due to the lack of PCTs within the Development Site, no ecosystem credit species were predicted to occur.

1.7 Species credit species

1.7.1 Candidate Species credit species

Species credit species are typically predicted by the assessment tool based on the PCTs present within the project footprint, and a series of habitat and geographic location questions formulated by the assessment tool. Once the species credit species are identified, they undergo a second filtering step to determine whether they are filtered into the assessment for consideration as a species credit species.

However, no species credit species were identified from the tool, and therefore no species credit species were considered for further assessment.

1.8 Final candidate species

As no PCT's were identified within the Development Site, no candidate species were predicted by the tool. However, some species have habitat requirements that cannot be predicted by PCTs, and therefore cannot be predicted by the assessment tool. Particularly those species that can utilise man-made or exotic environments. These species that can not be predicted by the tool are included for further assessment under 'prescribed impacts' (**Section 2.1.2** of this report).

A conservative list of final candidate species was developed (Table 2). This list is based on the species Likelihood of Occurrence (**Appendix A**), which was informed from database searches, previous studies, and specific habitat features present within the Development Site.

The list of final candidate species is then used to determine whether or not the species requires further assessment in the tool and whether targeted surveys are required.

Furthermore, it is noted that a candidate species is typically not considered present by the BDAR where:

- The habitat is substantially degraded
- An expert report states that the species is unlikely to be present
- The species is a vagrant and is unlikely to frequently use habitat in the project footprint
- Records of the species are at least 20 years old or have doubtful authenticity.

Table 2: Final candidate species list

Species	Common Name	Species Type	Habitat Constraints	Geographic limitations	Sensitivity to gain class	BC Act	EPBC Act
Pteropus poliocephalus	Grey-headed Flying-fox	Ecosystem (foraging) and Species Credit (breeding) Species	Breeding colonies		High Sensitivity to Potential Gain	Vulnerable	Vulnerable

1.8.1.1 Targeted surveys

Targeted surveys are required for species which are listed as species credit species. No targeted surveys were undertaken during this assessment.

Grey-headed Flying Fox (GHFF) is listed as both an ecosystem and species credit species; the species credit listing relates to breeding colonies only. No GHFF breeding colonies are located within or near the Development Site, and thus no targeted survey was conducted (Section 2.2.6).

According to the National Flying-fox Monitoring Program, no GHFF camps currently occur or have ever been recorded within the Development Site (DotE 2018). The nearest active GHFF camp occurs 5 km to the north-east of the Development Site alongside the Murrumbidgee River (DotE 2018).

1.8.1.2 Potential habitat for threatened species.

Pteropus poliocephalus (Grey-headed Flying Fox - GHFF*)*

The nectar and pollen of native trees provide potential foraging and roosting habitat for GHFF, especially species in the families of Myrtaceae (e.g. *Lophostemon confertus*, *Angophora constata*) and Proteaceae (e.g. *Grevillea robusta*) (Eby and Law 2008). The fruit of fig trees (Moraceae family) are another important food source for GHFF. Potential foraging habitat for GHFF present within the Development Site inludes potential feed trees such as three *G*revillea *robusta*. However, these are scattered across the Development Site and are limited in number and occur as individual trees (i.e. not in stands).

1.8.2 Use of local data

Use of local data is not proposed.

1.8.3 Expert reports

Expert reports have not been used as part of this BDAR.

2. Stage 2: Impact assessment (biodiversity values)

2.1 Avoiding impacts

2.1.1 Locating a project to avoid and minimise impacts on vegetation and habitat

The development has been located in a way which substantially avoids and minimises impacts to biodiversity values, as outlined in Table 3.

Table 3: Locating a project to avoid and minimise impacts on vegetation and habitat

Approach	How addressed	Justification
locating the project in areas where there are no biodiversity values	The Development Site has been located in an aread containing very low biodiversity value.	The placement of the Development Site has primarily occurred on areas of existing development and urban infrastructure, containing no biodiversity values.
locating the project in areas where the native vegetation or threatened species habitat is in the poorest condition	The Development Site has been located in an area containing very low density of potential habitat for threatened species and species of local conservation significance. The Development Site utilises already disturbed sites and existing infrastructire	The Development Site has been located within a highly urbanised area, subject to previous disturbance. There is minimial native vegetation or threatened species habitat. Potential foraging habitat (three *Grevilla robusta*) for the GHFF is present within the Development Site however, impact to these individual feed trees is negligible. Furthermore, there is a higher proportion of potential habitat for threatened species and species of local conservation significance within the local area (Figure 2).
locating the project in areas that avoid habitat for species and vegetation in high threat categories (e.g. an TEC or CEEC), indicated by the biodiversity risk weighting for a species	No PCTs or TECs have been maped within the Development Site.	No PCTs or TECs have been maped within the Development Site.
locating the project such that connectivity enabling movement of species and genetic material between areas of adjacent or nearby habitat is maintained	The Development Site is not mapped as a Biodiversity Corridor. Furthermore, there are currently very low biodiversity values within the Development Site. Thus, the removal of vegetation within this area will have a minimal impact on connectivity.	There is a larger extent of native vegetation to the north and south-east of the Development Site (Figure 2) and this is more likely to facilitate connectivity in the region.

2.1.2 Prescribed biodiversity impacts and other impacts

The proposed works would remove approximately 0.01 ha of potential foraging habitat (three *Grevillea robusta*) for GHFF (Table 4). The Development Site is located within a highly urbanised area and has substantially avoided biodiversity impacts to GHFF by utilising already disturbed sites and existing infrastructure.

2.2 Assessment of Impacts

2.2.1 Direct impacts

The direct impacts of the development as assessed using the BAM is outlined below:

- No PCTs were identified within the Development Site during the site inspection, and thus no PCTs or ecosystem credit species will be cleared during the proposed works
- A total of 0.06 ha of Urban Native and Exotic Cover would be removed by the proposed works, which includes:
  - Approximatley 0.01 ha of predominantly non-indigenous native species, which has been planted or naturally established would be removed by the proposed works
  - Approximately 0.05 ha of exotic species would be removed by the proposed works
- Direct impacts including the final project footprint (construction and operation) are shown in Table 4.

Table 4: Direct impacts on threatened species, threatened species habitat, and species of local conservation significance

Species	Common Name	Direct impact number of individuals / habitat (ha)	BC Act	EPBC Act
Pteropus poliocephalus	Grey-headed Flying-fox	0.01 ha potential foraging habitat (three *Grevillea robusta*)	Vulnerable	Vulnerable

2.2.2 Change in vegetation integrity

No PCTs were identified within the Development Site, and thus a vegetation integrity assessment has not been conducted.

2.2.3 Indirect impacts

The potential indirect impacts of the development, if no mitigation measures are in place, are outlined in Table 5. Indirect impact zones are shown on Figure 5 and includes a 10 m indirect impact area surrounding the Development Site boundary.

Table 5: Indirect impacts if not mitigated

Indirect impact	Project phase	Nature of impact if not mitigated	Extent	Frequency	Duration	Timing
Sedimentation and contaminated and/or nutrient rich run-off	Construction	Runoff during construction works	10 m from Development Site boundary	During heavy rainfall or storm events	During rainfall events	Short-term impacts
Noise, dust or light spill	Construction / operation	Noise and dust created from machinery.	Noise, dust, and light are likely to carry further than 10 m from	Daily/nightly, during construction works	Sporadic throughout construction period	Short-term impacts during construction

Indirect impact	Project phase	Nature of impact if not mitigated	Extent	Frequency	Duration	Timing
		Potential light spill from Development into adjacent areas.	Development Site boundary			Long-term impacts from Development
Inadvertent impacts on adjacent habitat or vegetation	Construction	Damage to adjacent habitat or vegetation	10 m from Development Site boundary	Daily/nightly, during construction works	Throughout construction period	Short-term impacts
Transport of weeds and pathogens from the site to adjacent vegetation	Construction	Spread of weed seed or pathogens	Potential for spread into adjacent habitat	Daily, during construction works	Sporadic throughout construction period	Short-term impacts
Vehicle strike	Construction / operation	Potential for native fauna to be struck by working machinery and moving vehicles	Within Development Site	Daily, during both construction works	During working hours for construction	During working hours for construction
Rubbish dumping	Construction / operation	Illegal dumping by local residents/ construction crews	Potential for rubbish to spread via wind into adjacent vegetation	Potential to occur at any time throughout construction or operational phases	During working hours for construction	During working hours for construction

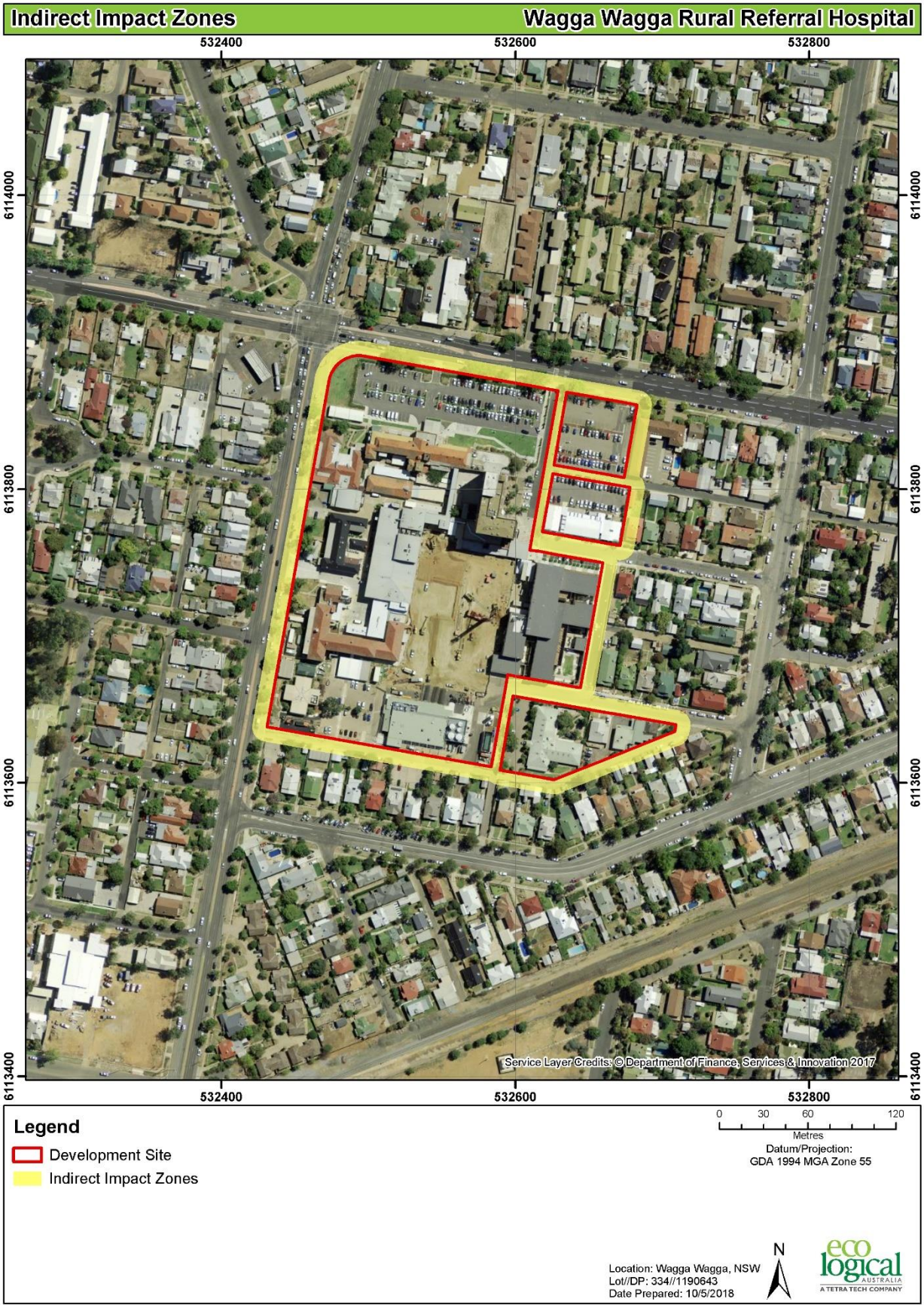

Figure 5: Indirect impact zones within the Development Site

2.2.4 Serious and Irreversible Impacts (SAII)

Grey-headed Flying Fox is listed as a dual credit species, occurring as an ecosystem credit species when foraging habitat is present, and a species credit species and potential candidate Serious and Irreversible Impacts (SAII) species when breeding colonies / camps are present. According to the National Flying-fox Monitoring Program, no GHFF camps currently occur or have ever been recorded within the Development Site (DotE 2018). The nearest active GHFF camp occurs approximately 5 km to the north-east of the Development Site, within Wagga Wagga alonside Murumbidgee River (DotE 2018).

At the time of writing this BDAR, the thresholds for SAII had not been set by OEH. It is unlikely that the proposed works within the Development Site will exceed the thresholds for impacts on GHFF camps, as the thresholds is likely to be limited to breeding camps only.

2.2.5 Prescribed biodiversity impacts and other impacts

The proposed works would remove approximately 0.01 ha of potential foraging habitat (three *Grevillea robusta*) for GHFF (Table 4). The GHFF is listed as vulernable under the BC and EPBC Acts.

As no PCTs were recorded within the Development Site thus, no ecosystem credit species habitat, such as habitat that may be utilised by the GHFF are thought to occur. However, Section 6.1 of the *Biodiversity Conservation Regulation 2017* requires prescribed impacts, such as development on 'human made structures' and 'non-native vegetation', which may provide habitat for threatened species to be assessed in accordance with the BOS. Thus, a habitat assessment and Likelihood of Occurrence (Appendix A) was undertaken, which indicated that this species has the potential to forage on a limited number of feed trees (three planted native non-indigenous species) within the Development Site and potentially be impacted by the proposed works. There is a known GHFF camp 5 km north-east of the Development Site alongside the Murumbidge River, and therefore was assumed to be present. Further details including level of impacts, project specific mitigation measures and required offsets are discussed in Section 2.2.7 and Section 2.5.2.

2.2.6 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

Additional matters relating to impacts on flora and fauna which are not covered by the BC Act must also be addressed for the proposed development. Potential impacts on “Matters of National Environmental Significance‟ (MNES) in accordance with the EPBC Act have been addressed below.

The EPBC Act establishes a process for assessing the environmental impact of activities and developments where “Matters of National Environmental Significance‟ (MNES) may be affected. Under the Act, any action which “has, will have, or is likely to have a significant impact on a matter of MNES” is defined as a “controlled action”, and requires approval from the Commonwealth Department of the Environment (DotE), which is responsible for administering the EPBC Act (DotE 2013).

The process includes conducting an Assessment of Significance for listed threatened species and ecological communities that represent a matter of NES that will be impacted as a result of the proposed action. Significant impact guidelines (DotE 2013) that outline a number of criteria have been developed by the Commonwealth, to provide assistance in conducting the Assessment of Significance and help decide whether or not a referral to the Commonwealth is required.

A habitat assessment and Likelihood of Occurrence have been completed (Appendix D) and one MNES was assessed under the act; Grey-headed Flying Fox (*Pteropus poliocephalus*).

An assessment in accordance with the Commonwealth Significant Impact Guidelines (Commonwealth of Australia 2013) for the Grey-headed Flying-fox is provided in Appendix C. This assessment concluded that a significant impact on the Grey-headed Flying-fox is unlikely to occur as a result of the works. Consequently, an EPBC Act referral is not required.

Due to the removal of only three potential foraging trees (representing less than 0.1% of mapped potential foraging habitat within a 1,500-meter radius), and considering the vast amount of similar, and higher quality potential foraging in the local area and beyond (GHFF can travel up to 50 km to forage), an important population of a GHFF would not depend on the habitat within the Development Site for its survival. The proposed works would not cause a significant imapct to the GHFF and would better be described as negligible.

2.2.7 Mitigating and managing impacts

Measures proposed to minimise impacts at the Development Site before, during and after construction are outlined in Table 6.

Table 6: Measures proposed to minimise impacts

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
Displacement of resident fauna	Moderate	Minor	• If fauna is located within the Development Site during the proposed works a qualified ecologist/licensed wildlife handler must be contacted during tree removal in accordance with best practise methods	Relocation of fauna in a sensitive manner	Prior to and during clearing works	Project Manager
Sediment barriers or sedimentation ponds to control the quality of water released from the site into the receiving environment	Minor	Negligible	• Appropriate controls will be utilised to manage exposed soil surfaces and stockpiles to prevent sediment discharge into waterways • Ensure all works within proximity to the drainage lines have adequate sediment and erosion controls • Commence revegetation as soon as practicable to minimise the risks of erosion	Erosion and sedimentation will be controlled	For the duration of construction works	Project Manager
Adaptive dust monitoring programs to control air quality	Minor	Negligible	• Dust suppression measures will be implemented during construction works to limit dust on site • Commence revegetation as soon as practicable to minimise areas likely to create dust	Mitigate dust created during construction activities	For the duration of construction works	Project Manager

2.3 Risk assessment

A risk assessment has been undertaken for any residual impacts likely to remain after the mitigation measures have been applied (Table 10). Likelihood criteria, consequence criteria and the risk matrix are provided in Table 7**,** Table 8**,** and Table 9 respectively and the risk assessment outcome is presented in Table 10.

Table 7: Likelihood criteria

Likelihood criteria	Description
Almost certain (Common)	Will occur, or is of a continuous nature, or the likelihood is unknown. There is likely to be an event at least once a year or greater (up to ten times per year). It often occurs in similar environments. The event is expected to occur in most circumstances.
Likely (Has occurred in recent history)	There is likely to be an event on average every one to five years. Likely to have been a similar incident occurring in similar environments. The event will probably occur in most circumstances.
Possible (Could happen, has occurred in the past, but not common)	The event could occur. There is likely to be an event on average every five to twenty years.
Unlikely (Not likely or uncommon)	The event could occur but is not expected. A rare occurrence (once per one hundred years).
Remote (Rare or practically impossible)	The event may occur only in exceptional circumstances. Very rare occurrence (once per one thousand years). Unlikely that it has occurred elsewhere; and, if it has occurred, it is regarded as unique.

Table 8: Consequence criteria

Consequence category	Description
Critical (Severe, widespread long-term effect)	Destruction of sensitive environmental features. Severe impact on ecosystem. Impacts are irreversible and/or widespread. Regulatory and high-level government intervention/action. Community outrage expected. Prosecution likely.
Major (Wider spread, moderate to long term effect)	Long-term impact of regional significance on sensitive environmental features (e.g. wetlands). Likely to result in regulatory intervention/action. Environmental harm either temporary or permanent, requiring immediate attention. Community outrage possible. Prosecution possible.
Moderate (Localised, short-term to moderate effect)	Short term impact on sensitive environmental features. Triggers regulatory investigation. Significant changes that may be rehabilitated with difficulty. Repeated public concern.
Minor (Localised short-term effect)	Impact on fauna, flora and/or habitat but no negative effects on ecosystem. Easily rehabilitated. Requires immediate regulator notification.
Negligible (Minimal impact or no lasting effect)	Negligible impact on fauna/flora, habitat, aquatic ecosystem or water resources. Impacts are local, temporary and reversible. Incident reporting according to routine protocols.

Table 9: Risk matrix

Consequence	Likelihood				
	Almost certain	**Likely**	**Possible**	**Unlikely**	**Remote**
Critical	Very High	Very High	High	High	Medium
Major	Very High	High	High	Medium	Medium
Moderate	High	Medium	Medium	Medium	Low
Minor	Medium	Medium	Low	Low	Very Low
Negligible	Medium	Low	Low	Very Low	Very Low

Table 10: Risk assessment

Potential impact	Project phase	Risk (pre-mitigation)	Risk (post mitigation)
Vegetation clearing	Construction / operation	Medium	Low
Sedimentation and contaminated and/or nutrient rich run-off	Construction	Medium	Very Low
Dust generation	Construction	Medium	Very Low
Inadvertent impacts on adjacent habitat or vegetation	Construction	Low	Very Low
Vehicle strike	Construction / operation	Low	Very Low
Rubbish dumping	Construction / operation	Low	Very Low

2.4 Adaptive management strategy

This section is required for those impacts that are infrequent, cumulative or difficult to predict. Impacts associated with the proposed development have been considered and addressed in Section 2.2 and no further impacts are considered to be addressed.

2.5 Impact summary

Following implementation of the BAM, the following impacts have been determined.

2.5.1 Serious and Irreversible Impacts (SAII)

Based on the data available as discussed in Section 2.2.4, the development does not have any Serious and Irreversible Impacts (SAII).

2.5.2 Impacts requiring offsets

No PCTs, ecosystem credit species or species credit species were recorded within the Development Site, and therefore, no offsets are required under the BAM.

2.5.3 Impacts not requiring offsets

Impacts from the proposed works that do not require offset are mapped in Figure 6 and detailed Table 11.

Table 11: Impacts within the Development Site Footprint not requiring offset

Species	Common Name	Direct impact number of individuals / habitat (ha)	BC Act	EPBC Act
Pteropus poliocephalus	Grey-headed Flying-fox	0.01 ha potential foraging habitat (three *Grevillea robusta*)	Vulnerable	Vulnerable

2.5.4 Areas not requiring assessment

The Development Site includes large warves and land-based structures such as buildings, gates and roads. These areas do not require assessment under the BAM and have been mapped in Figure 7.

2.5.5 Credit summary

The proposed works does not require any offsets under the BAM, and thus no ecosystem credits or speceis credits are required.

Figure 6: Impacts not requiring offset under the BAM within the Development Site

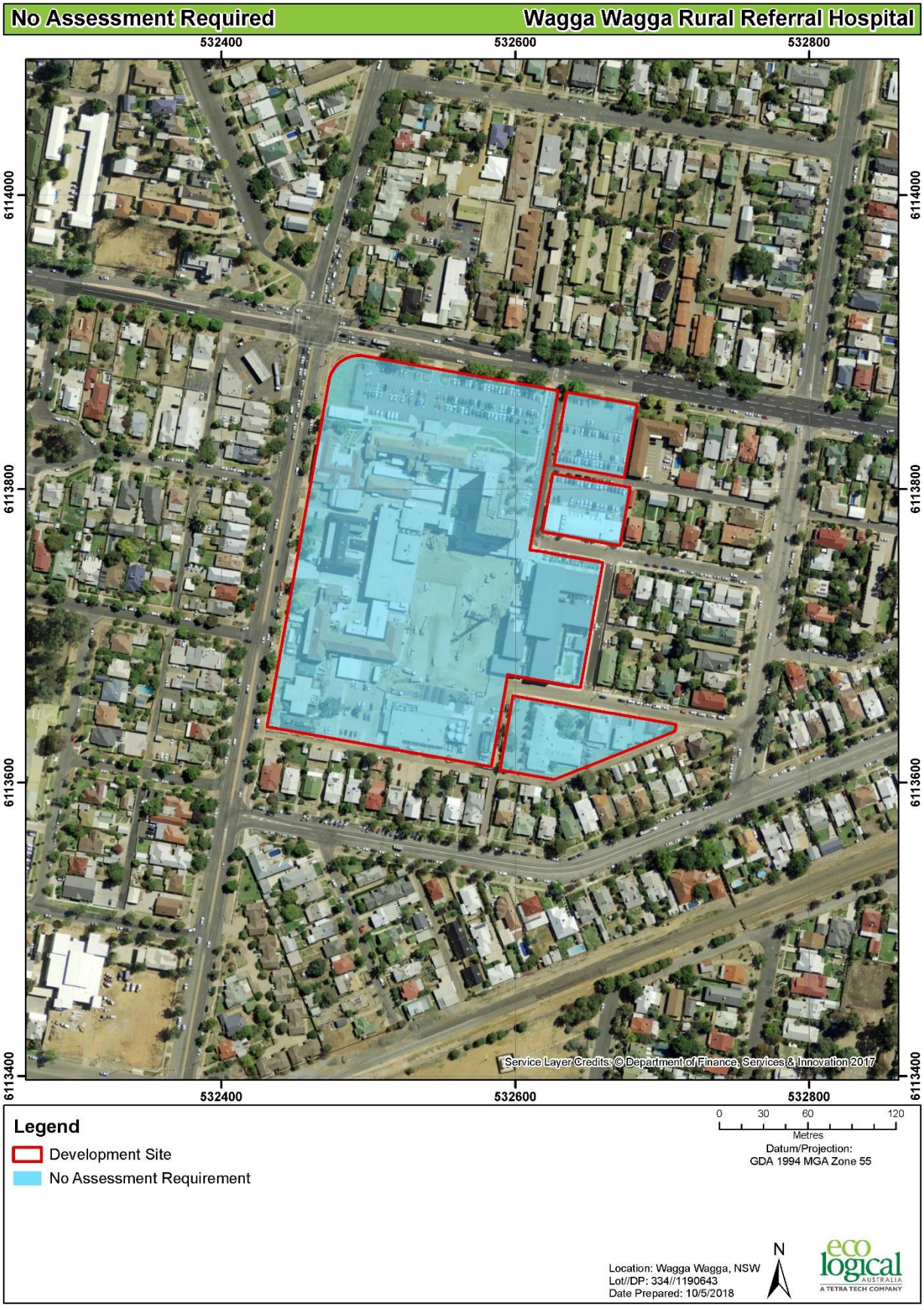

Figure 7: Areas within the Development Site where no assessment is required, in accordance with BAM Section 10.4

3. References

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Appendix A: Likelihood of Occurrence Assessment

An assessment of likelihood of occurrence was made for threatened species, migratory species, and species of local conservation significance (referred to in UESAP and SSROC CCB), as identified from the literature review. The literature review included records from Bionet Search (OEH 2017b) and EPBC Act Protected Matters Search (DotEE 2017a). Five terms for the likelihood of occurrence of species are used in this report. This assessment was based on database or other records, presence or absence of suitable habitat, features of the proposal site, results of the site inspection and professional judgement. Some Migratory or Marine species identified from the Commonwealth database search have been excluded from the assessment, due to lack of habitat. The terms for likelihood of occurrence are defined below:

- "known" = the species was or has been observed on the site
- "likely" = a medium to high probability that a species uses the site
- "potential" = suitable habitat for a species occurs on the site, but there is insufficient information to categorise the species as likely to occur, or unlikely to occur
- "unlikely" = a very low to low probability that a species uses the site
- "no" = habitat on site and in the vicinity is unsuitable for the species.

An assessment of significance was conducted for threatened species or ecological communities that were recorded within the study area or had a higher likelihood of occurring and were not recorded during the site visit. It is noted that some threatened fauna species that are highly mobile, wide ranging and vagrant may use portions of the study area intermittently for foraging.

Information provided in the habitat associations' column has primarily been extracted (and modified) from the Commonwealth Species Profile and Threats Database (DotEE 2017b), the NSW Threatened Species Profiles (OEH. 2017b), the Atlas of Living Australia (ALA 2017), and BirdLife Australia (BLA 2017).

Table 12: Likelihood of occurrence and requirement of impact assessment for threatened fauna species

Scientific Name	Common Name	BC Status	EPBC Status	Habitat	Likelihood of Occurrence	Impact Assessment Required
Amphibia						
Litoria raniformis	Southern Bell Frog	E1	V	Permanent or ephemeral Black Box/Lignum/Nitre Goosefoot swamps, Lignum/Typha swamps and River Red Gum swamps or billabongs along floodplains and river valleys. Also found in irrigated rice crops.	Unlikely. No suitable habitat on or near the Development Site	No. Not recorded within Development Site.
Aves						
Anthochaera phrygia	Regent Honeyeater	E4A	CE	Eucalypt woodland and open forest, wooded farmland and urban areas with mature eucalypts, and riparian forests of Casuarina cunninghamiana (River Oak).	Unlikely. No suitable habitat on or near the Development Site	No. Not recorded within Development Site.
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V		Woodlands and dry open sclerophyll forest, usually eucalypts and mallee associations. Also have recordings in shrub and heathlands and various modified habitats, including regenerating forests. In western NSW, this species is primarily associated with River Red Gum/Black Box/Coolabah open forest/woodland and associated with larger river/creek systems.	Unlikely. No suitable habitat on or near the Development Site	No. Not recorded within Development Site.
Botaurus poiciloptilus	Australasian Bittern	E1	E	Permanent freshwater wetlands with tall, dense vegetation, particularly Typha spp. (bullrushes) and Eleocharis spp. (spikerushes).	Unlikely. No suitable habitat on or near the Development Site	No. Not recorded within Development Site.
Burhinus grallarius	Bush Stone-curlew	E		In NSW, it occurs in lowland grassy woodland and open forest.	Unlikely. No suitable habitat on or near the Development Site	No. Not recorded within Development Site.
Calidris ferruginea	Curlew Sandpiper	E1	CE	Littoral and estuarine habitats, including intertidal mudflats, non-tidal swamps, lakes and lagoons on the coast and sometimes inland.	Unlikely. No suitable habitat on or near the Development Site	No. Not recorded within Development Site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat	Likelihood of Occurrence	Impact Assessment Required
Callocephalon fimbriatum	Gang-gang Cockatoo	V		Tall mountain forests and woodlands in summer; in winter, may occur at lower altitudes in open eucalypt forests and woodlands, and urban areas.	Unlikely. No suitable habitat on or near the Development Site	No. Not recorded within Development Site.
Chthonicola sagittata	Speckled Warbler	V		Eucalyptus-dominated communities with a grassy understorey and sparse shrub layer, often on rocky ridges or in gullies.	Unlikely. No suitable habitat on or near the Development Site	No. Not recorded within Development Site.
Climacteris picumnus victoriae	Brown Treecreeper	V		Eucalypt woodlands and dry open forest.	Unlikely. No suitable habitat on or near the Development Site	No. Not recorded within Development Site.
Epthianura albifrons	White-fronted Chat	V		Saltmarsh vegetation, open grasslands and sometimes low shrubs bordering wetland areas.	Unlikely. No suitable habitat on or near the Development Site	No. Not recorded within Development Site.
Falco subniger	Black Falcon	V		Woodland, shrubland and grassland, especially riparian woodland and agricultural land. Often associated with streams or wetlands.	Unlikely. No suitable habitat on or near the Development Site	No. Not recorded within Development Site.
Glossopsitta pusilla	Little Lorikeet	V		Dry, open eucalypt forests and woodlands, including remnant woodland patches and roadside vegetation.	Unlikely. No suitable habitat on or near the Development Site	No. Not recorded within Development Site.
Grantiella picta	Painted Honeyeater	V	V	Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests.	Unlikely. No suitable habitat on or near the Development Site	No. Not recorded within Development Site.
Hieraaetus morphnoides	Little Eagle	V		Open eucalypt forest, woodland or open woodland, including sheoak or Acacia woodlands and riparian woodlands of interior NSW.	Unlikely. No suitable habitat on or near the Development Site	No. Not recorded within Development Site.
Lathamus discolor	Swift Parrot	E1	CE	Box-ironbark forests and woodlands.	Unlikely. No suitable habitat on or near the Development Site	No. Not recorded within Development Site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat	Likelihood of Occurrence	Impact Assessment Required
Leipoa ocellata	Malleefowl	E1	V	Predominantly mallee communities. Less frequently found in other eucalypt woodlands, such as Inland Grey Box, Ironbark or Bimble Box Woodlands, or other woodlands dominated by Mulga or native Cypress Pine species.	Unlikely. No suitable habitat on or near the Development Site	No. Not recorded within Development Site.
Melithreptus gularis gularis	Black-chinned Honeyeater	V		Open forests or woodlands dominated by box and ironbark eucalypts, or by smooth-barked gums, stringybarks, river sheoaks and tea-trees.	Unlikely. No suitable habitat on or near the Development Site	No. Not recorded within Development Site.
Ninox connivens	Barking Owl	V		Woodland and open forest, including fragmented remnants and partly cleared farmland, wetland and riverine forest.	Unlikely. No suitable habitat on or near the Development Site	No. Not recorded within Development Site.
Numenius madagascariensis	Eastern Curlew		CE	Estuaries, bays, harbours, inlets and coastal lagoons, intertidal mudflats or sandflats, ocean beaches, coral reefs, rock platforms, saltmarsh, mangroves, freshwater/brackish lakes, saltworks and sewage farms.	Unlikely. No suitable habitat on or near the Development Site	No. Not recorded within Development Site.
Petroica boodang	Scarlet Robin	V		Dry eucalypt forests and woodlands, and occasionally in mallee, wet forest, wetlands and tea-tree swamps.	Unlikely. No suitable habitat on or near the Development Site	No. Not recorded within Development Site.
Petroica phoenicea	Flame Robin	V		Breeds in upland tall moist eucalypt forests and woodlands. In winter uses dry forests, open woodlands, heathlands, pastures and native grasslands. Occasionally occurs in temperate rainforest, herbfields, heathlands, shrublands and sedgelands at high altitudes.	Unlikely. No suitable habitat on or near the Development Site	No. Not recorded within Development Site.
Polytelis swainsonii	Superb Parrot	V	V	Box-gum woodland, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest.	Unlikely. No suitable habitat on or near the Development Site	No. Not recorded within Development Site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat	Likelihood of Occurrence	Impact Assessment Required
Rostratula australis	Australian Painted Snipe	E1	E	Swamps, dams and nearby marshy areas.	Unlikely. No suitable habitat on or near the Development Site	No. Not recorded within Development Site.
Mammals						
Macrotis lagotis	Bilby	E4	V	Occur in fragmented populations in mulga shrublands and spinifex grasslands.	Unlikely. No suitable habitat on or near the Development Site	No. Not recorded within Development Site.
Myotis macropus	Southern Myotis	V		Foraging habitat is waterbodies (including streams, or lakes or reservoirs) and fringing areas of vegetation up to 20m.	Unlikely. No suitable habitat on or near the Development Site	No. Not recorded within Development Site.
Nyctophilus corbeni	Corben's Long-eared Bat	V	V	Mallee, Allocasuarina luehmannii (bulloke) and box eucalypt- dominated communities, especially box/ironbark/cypress-pine vegetation.	Unlikely. No suitable habitat on or near the Development Site	No. Not recorded within Development Site.
Petaurus norfolcensis	Squirrel Glider	E2, V		Open forest, woodland and riverine forest habitats.	Unlikely. No suitable habitat on or near the Development Site	No. Not recorded within Development Site.
Phascolarctos cinereus	Koala	V	V	Eucalypt woodlands and forests.	Unlikely. No suitable habitat on or near the Development Site	No. Not recorded within Development Site.
Pteropus poliocephalus	Grey-headed Flying Gox		V	Subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.	Potential. Minimal foraging habitat present within Development Site. Recorded camp within 5 km of Development Site.	Yes - EPBC Act.

^BC Act: E1 = Endangered, E2 = Endangered Population, E4 = Extinct, E4A = Critically Endangered, V = Vulnerable;

EPBC Act: M = Migratory, E = Endangered, CE – Critically Endangered, Mar = Marine

Table 13: Likelihood of occurrence and requirement of impact assessment for threatened flora species

Scientific Name	Common Name	BC Status	EPBC Status	Habitat	Likelihood of Occurrence	Impact Assessment Required
Austrostipa wakoolica		E1	E	Grows on floodplains of the Murray River tributaries, in open woodland. Habitats include the edges of a lignum swamp with box and mallee; open Cypress Pine forest and a low, rocky rise.	Unlikely. No known records within 5 km of Development Site.	No. Not recorded within Development Site.
Brachyscome muelleroides	Claypan Daisy	V	V	Grows in damp areas on the margins of claypans in moist grassland and along the Murray River floodplain, swampy River Red Gum (*Eucalyptus camaldulensis*) Forest and damp depressions.	Unlikely. Known records within 5 km of Development Site. However, no habitat present.	No. Not recorded within Development Site.
Prasophyllum petilum	Tarengo Leek Orchid	E1	E	Grows in open sites with Natural Temperate Grassland and in grassy woodland in association with River Tussock.	Unlikely. No known records within 5 km of Development Site. However, no habitat present.	No. Not recorded within Development Site.
Senecio garlandii	Wooly Ragwort	V		Occurs on sheltered slopes of rocky outcrops.	Unlikely. Known records within 5 km of Development Site. However, no habitat present.	No. Not recorded within Development Site.
Swainsona recta	Small Purple-pea	E1	E	Occurs in the grassy understorey of woodlands and open-forests dominated by Blakely's Red Gum *Eucalyptus blakelyi*, Yellow Box *E. melliodora*, Candlebark Gum *E. rubida* and Long-leaf Box *E. goniocalyx*.	Unlikely. Known records within 5 km of Development Site. However, no habitat present.	No. Not recorded within Development Site.

^BC Act: E1 = Endangered, E2 = Endangered Population, E4 = Extinct, E4A = Critically Endangered, V = Vulnerable;

EPBC Act: M = Migratory, E = Endangered, CE – Critically Endangered, Mar = Marine

Appendix B: Flora and fauna species list

Table 14: Flora species recorded within the Development Site (Kevin Mills & Associates, 2011)

Species Name	Common Name	Exotic (*)	Priority Weed / WoNS
Acer negundo	Box Elder	*	
Alnus jorullensis	Evergreen Alder	*	
Arctotheca calendula	Capeweed	*	
Arbutus unedo	Irish Strawberry Tree	*	
Bromus cartharticus	Prairie Grass	*	
Casuarina cunninghamiana	River Oak		
Cirsium vulgare	Spear Thistle	*	
Cotula australis	Common Cotula		
Cupressus funebris	Weeping Chinese Cypress	*	
Cupressus macrocarpa	Monterey Cypress	*	
Cupresus glabra	Arizona Cypress	*	
Dichondra repens	Kidney Week		
Eucalyptus sp.	Gum		
Fraxinus angustifolia	Calret Ash	*	
Fraxinus excelsior	Golden Ash	*	
Fraxinus sp.	American Ash	*	
Gamochaeta americana	American Cudweed	*	
Grevileea robusta	Silky Oak		
Hypochaeris radicata	Flatweed	*	
Liquidambar styraciflua	Liquidambar	*	
Liriodendron tulipifera	Tulip Tree	*	
Modiola caroliniana	Ref-flowered Mallow	*	
Paronychia brasiliensis	Chilean Whitlow Wort	*	
Phoenix canariensis	Canary Island Date Palm	*	
Poa bulbosa	Bulbous Bluegrass	*	
Polygonum aviculare	Wireweed	*	
Prunus blireana	Flowering Plum	*	
Quercus rubra	Red Oak	*	
Salix chilensis	Chilean Willow	*	
Sonchus asper subsp. glaucescens	Prickly Sowthistle	*	
Sporobolus africanus	Parammata Grass	*	
Stellaria media	Chickweed	*	
Taraxacum officinale	Dandelion	*	

Species Name	Common Name	Exotic (*)	Priority Weed / WoNS
Trifolium repens	**White Clover**	*	

WoNS - Weed of National Significance

Table 15: Fauna species recoreded within the Development Site

Species Name	Common Name	Introduced (*)
Anthochaera carunculata	Red Wattlebird	
Cacatua roseicapilla	Galah	
Gymnorhina tibicen	Australian Magpie	
Ocyphaps lophotes	Crested Pigeon	
Passer domesticus	House Sparrow	*
Sturnus vulgaris	Common Starling	*

Appendix C: Signficance Assessment (EPBC Act)

Pteropus poliocephalus (Grey-headed Flying-fox)

The Grey-headed Flying-fox (GHFF) is listed as a *Vulnerable* species under the EPBC Act.

This species utilises a wide variety of habitats (including disturbed areas) for foraging, and have been recorded travelling long distances on feeding forays. Fruits and flowering plants of a wide variety of species are the main food source. The species roosts in large 'camps' of up to 200 000 individuals. Camps are usually formed close to water and along gullies, however, the species has been known to form camps in urban areas (DECCW 2009).

Grey-headed Flying-fox has not been recorded within the Development Site but is known from the locality within close proximity to the study area. (OEH 2017b). The vegetation within the study area provides marginal potential foraging habitat in the form of three *Grevillea robusta* (total of 0.01 ha). It is considered likely that this species would use the site on occasion for foraging purposes. According to the National Flying-fox Monitoring Program, no GHFF camps currently occur or have ever been recorded within the Development Site (DotE 2018). The nearest active GHFF camp occurs approximately 5 km to the north-east of the Development Site, within Wagga Wagga alonside Murumbidgee River (DotE 2018).

Criterion a: lead to a long-term decrease in the size of an important population of a species

The Matters of National Environmental Significance Impact Guidelines 1.1 (Commonwealth of Australia, 2013) defines an important population as:

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

- *Key source popoulations either for breeding or dispersal*
- *Populations that are necessary for maintaining genetic diversity, and/or*
- *Populations that are near the limit of the species range*

No important populations have been recorded within the Development Site. The site does not support key source populations for breeding or dispersal, populations necessary for maintaining genetic diversity, or populations near the limit of the species range. According to the National Flying-fox Monitoring Program, no GHFF camps currently occur or have ever been recorded within the Development Site (DotE 2018). The nearest active GHFF camp occurs approximately 5 km to the north-east of the Development Site, within Wagga Wagga alonside Murumbidgee River (DotE 2018).

Criterion b: reduce the area of occupancy of an important population

No important populations have been recorded within the Development Site. Therefore, the proposed works would not reduce the area of occupancy of an important population.

Criterion c: fragment an existing important population into two or more populations

No important populations have been recorded within the Development Site. The potential foraging habitat to be removed is marginal relative to adjacent potential habitat within the region.

Whilst the potential foraging habitat may contribute as a 'stepping stone' for this highly mobile species to other more substantial foraging habitat sites, this function is unlikely to be significantly inhibited by the proposed works.

Furthermore, this species has been recorded in urban environments and is likely to continue to forage adjacent to the site and across the broader locality.

Criterion d: adversely affect habitat critical to the survival of a species

The potential foraging habitat to be removed includes includes three *Grevillea robusta* (total of 0.01 ha).

These individual trees represent a negligible amount of potential foraging resources in the locality. Potential foraging habitat will persist in close proximity to the Development Site in alongside Murumbidgee River, and across the locality, and that this species is highly mobile (traveling up to 50 km to forage), it is considered unlikely that the works would adversely affect habitat critical to the survival of this species.

Criterion e: disrupt the breeding cycle of an important population

According to the National Flying-fox Monitoring Program, no GHFF camps currently occur or have ever been recorded within the Development Site (DotE 2018). The nearest active GHFF camp occurs approximately 5 km to the north-east of the Development Site, within Wagga Wagga alonside Murumbidgee River (DotE 2018). Thus, no important population of GHFF occurs within the Development Site, and the proposed works is unlikely to disrupt the breeding cycle of an important population.

Criterion f: Adversely affect habitat critical to the survival of a species; modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

The potential foraging habitat to be removed includes includes three *Grevillea robusta* (total of 0.01 ha). This potential foraging habitat is marginal and of low quality.

Given the small amount of potential foraging habitat to be removed, that potential foraging habitat will persist adjacent to the Development Site and across the locality, and that this species is highly mobile, it is unlikely that the habitat to be removed would cause the species to decline.

Furthermore, according to the National Flying-fox Monitoring Program, no GHFF camps currently occur or have ever been recorded within the Development Site (DotE 2018). The nearest active GHFF camp occurs approximately 5 km to the north-east of the Development Site, within Wagga Wagga alonside Murumbidgee River (DotE 2018). Therefore, no known GHFF roosting camps for this species will be impacted by the proposed works.

Criterion g: Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat

The proposed works will not result in the establishment of an invasive species that is harmful to GHFF.

Criterion h: Introduce disease that may cause the species to decline

The proposed works will not result in the introduction of a disease that is harmful to the GHFF.

Criterion i: Interfere substantially with the recovery of the species

Considering the above factors, the proposed works will not interfere substantially with the recovery of the species.

Conclusion

In consideration of the above, the proposed works are not considered likely to have a significant impact on the Grey-headed Flying-fox, and therefore, an EPBC Act referral is not required.

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