EPBC Significant Impact Criteria

Common name	Scientific name	EPBC Act	Significant Impact
Ecological Communities			
Not applicable. PCT 1082, recorded on the Proposal Site, is not associated within any TECs listed under the EPBC Act.			
Flora			
Not applicable. No EPBC Act listed threatened flora has been recorded on the Proposal Site.			
Fauna			
Grey-headed Flying-fox (recorded on the Proposal Site)	*Pteropus poliocephalus*	Vulnerable	Unlikely
Large-eared Pied Bat (recorded as 'probable' on the Proposal Site and assumed present)	*Chalinolobus dwyeri*	Vulnerable	Unlikely

Detailed desktop and field studies were undertaken by Shoalhaven City Council (SCC) and presented in their Biodiversity Assessment Report (BAR) (SCC 2017).

Based on these investigations conducted by SCC, it was concluded that two EPBC listed fauna species, the Grey-headed Flying-fox and Large-eared Pied Bat, were recorded on the Proposal Site.

The *Matters of National Environmental Significance: Significant impact guidelines 1.1* (DoE 2013) are used to determine the significance of impacts on EPBC listed species. A detailed assessment against significant impact criteria from DoE (2013) is shown below. All relevant resources used in these assessments are outlined in the Bibliography.

Fauna Species

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

The Grey-headed Flying-fox *Pteropus poliocephalus* is listed as vulnerable under the EPBC Act and TSC Act. The species generally occurs within 200 kilometres of the east coast of Australia, ranging from Rockhampton in Queensland to Adelaide in South Australia. They inhabit subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps, as well as urban gardens and cultivated fruit crops. They are a highly nomadic species, and movement patterns are largely unpredictable.

Grey-headed Flying-fox roost and breed in large aggregations known as camps, which are situated in the exposed branches of trees, and can support numbers greater than 70,000. Site fidelity to camps is very high; with some being used for over a century (DoEE, 2017). Camps are generally located within 20 kilometres of regular food sources and are commonly located in gullies, close to water, and in vegetation with a dense canopy (DoEE, 2017).

The species can travel up to 50 kilometres from the camp to forage, frequently making movements greater than 20 kilometres. Grey-headed Flying-fox forage on nectar and pollen of native trees, preferring *Eucalyptus*, *Melaleuca* and *Banksia* species. They also forage on fruits of rainforest trees and crops, vines and cultivated gardens (DoEE, 2017) (OEH, 2018).

Annual mating commences in January, but conception normally occurs in early autumn. Young are usually born between September and October after a gestation period of approximately six months. The young are initially carried around by the mother, but after several weeks are left in the camp while the mother forages. Young normally leave the camp in late summer to begin foraging for themselves.

Key threats to the species include (OEH, 2018):

- Loss of roosting and foraging sites.
- Electrocution on powerlines, entanglement in netting and on barbed-wire.
- Heat stress.
- Conflict with humans.
- Incomplete knowledge of abundance and distribution across the species' range.

BioNet (OEH, 2018) lists numerous records across the study area and wider locality. These records are most likely fly-overs and opportunistic records of the species foraging. Clumping of records occur at known camps. According to the National Flying-fox monitoring viewer with data from 2012 (DoE, 2018), there are no recorded Flying-fox camps within a five kilometre radius of the study area. The nearest camps are located about 5.5 kilometres north-east of the site at Bomaderry Creek (ID 233) and Brinawarr Street, Nowra (ID 913).

Grey-headed Flying-fox were recorded on the Proposal Site. As there is no breeding habitat on the Proposal Site, the Proposal will result in clearing up to 9.87 hectares of potential foraging habitat for the Grey-headed Flying-fox. The clearing of potential Grey-headed Flying-fox habitat will be offset in accordance with the Framework for Biodiversity Assessment (FBA).

a) *Will the project lead to a long-term decrease in the size of an important population of a species?*

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

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

Key source populations either for breeding or dispersal

The Grey-headed Flying-fox has no separate or distinct populations, the important population is the population of flying foxes in Australia. As such, there are no key source populations on the Proposal Site or within the wider study area. Locations of current and historical breeding camps have been mapped for the National Flying-fox Monitoring Program (NFFMP) (DoE, 2018). No Flying-fox camps exist on the Proposal Site. However, two camps are located about 5.5 kilometres north-east of the site at Bomaderry Creek (ID 233) and Brinawarr Street, Nowra (ID 913). The wider study area, including the Proposal Site, could be utilised by individuals from these camps for foraging, as the species can travel up to 50 kilometres from the camp to forage, frequently making movements greater than 20 kilometres (DoEE, 2017). However, they do not currently use the Proposal Site or wider study area for permanent roosting or as a maternity camp.

Populations that are necessary for maintaining genetic diversity

The Grey-headed Flying-fox constantly exchanges genetic information between camps throughout its geographic range. The flying foxes that forage within the wider study area would be moving among at least three camps within 15 kilometres. The clearing of up to 9.87 hectares of foraging habitat on the Proposal Site will not interfere with genetic exchange among nearby camps.

Populations that are near the limit of the species range

The Grey-headed Flying-fox has historically occupied forests and woodlands in the coastal lowlands, tablelands and slopes of south-eastern Australia, from Bundaberg in Queensland to Geelong in Victoria, with rare sightings outside its range. More recently, camps have established in South Australia (Adelaide), the Australian Capital Territory and inland areas of central and southern New South Wales and Victoria. As such, individuals or local populations found on the Proposal Site or within the wider study area would not be near the limit of the species range.

Considering all the above information, members of an important population (the Australian population) utilise the Proposal Site for foraging habitat only. Due to the large range and high mobility of the species, the clearing of up to 9.87 hectares of foraging habitat as a result of the Proposal is unlikely to lead a long-term decrease in the size of the Australian Grey-headed Flying-fox population.

b) *Will the project reduce the area of occupancy of an important population?*

The Proposal will clear up to 9.87 hectares of foraging resources for the Grey-headed Flying-fox, however this area will be offset in accordance with the FBA. As there will be no

net loss of resources, the Proposal will not significantly impact on an important population, and therefore will not significantly reduce the area of occupancy of an important population.

c) *Will the project fragment an existing important population into two or more populations?*

The Proposal Site represents foraging habitat only, clearing of a part of this may have some impact on the foraging behaviour of local individuals but will not fragment an existing important population.

d) *Will the project adversely affect habitat critical to the survival of a species?*

Not applicable. No critical habitat has been declared for the Grey-headed Flying-fox.

e) *Will the project disrupt the breeding cycle of an important population?*

There are no camps on or within five kilometres of the Proposal Site, therefore the Proposal will not disrupt the breeding cycle of an important population.

f) *Will the project modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?*

The Proposal would result in the clearing of up to 9.87 hectares of foraging habitat for the Grey-headed Flying-fox that will be offset in accordance with the FBA. The Proposal Site does not contain any camps and foraging resources are still plentiful within the wider study area. In addition, other tracts of woodland are available for foraging within the immediate vicinity. Furthermore, Grey-headed Flying-fox are highly mobile and are known to forage widely (up to 50 kilometres from their camp). As such, it is unlikely that the clearing of up to 9.87 hectares of potential foraging habitat will lead to a decline in the species.

g) *Will the project result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?*

Sections of the wider study area and Proposal Site are highly disturbed and modified and contain evidence of invasive fauna (i.e.- European Red Fox, European Rabbit, Feral Cat) and weeds. As such, the project is highly unlikely to result in significant additional invasive species impacts within foraging habitat for the Grey-headed Flying-fox.

h) *Will the project introduce disease that may cause the species to decline?*

Grey-headed Flying-foxes are known to carry a number of diseases, some of which have been found to be dangerous to humans (e.g.- Hendra and Lyssa virus). Impacts of disease is not well understood in the Grey-headed flying-fox population, although incidence of disease in the population is low (DoEE 2017). The clearing of up to 9.87 hectares of foraging habitat is unlikely to introduce disease that may cause the Grey-headed Flying-fox to decline.

i) *Will the project interfere substantially with the recovery of the species?*

The Draft Recovery Plan for the Grey-headed Flying-fox (*Pteropus poliocephalus*) (DoEE, 2017) lists two recovery objectives for the species. These are:

- To improve the Grey-headed flying-fox national population trend by reducing the impact of threatening processes on Grey-headed Flying-foxes through habitat identification, protection, restoration and monitoring, and;
- To assist communities and Grey-headed flying-fox to coexist through better education, stakeholder engagement, research, policy and continued support to fruit growers.

Nine additional, specific objectives are detailed within the plan. While the project is inconsistent with some of the objectives of the draft recovery plan, the area of habitat to be cleared will be offset with similar vegetation that will provide, maintain and enhance foraging resources for the species through the ongoing management of the offset site.

Conclusion

The project will result in the clearing of up to 9.87 hectares of foraging habitat for the Grey-headed Flying-fox that will be offset in accordance with the FBA. While the Proposal will impact on foraging resources for the Grey-headed Flying-fox, this impact is unlikely to be significant, as there will still be significant resources remaining both within the wider study area and within reach of the camps within 15 kilometres of the Proposal Site.

In conclusion, the proposed works are unlikely to have a significant impact on the Grey-headed Flying-fox as:

- The proposed works will not impact upon an important population.
- The proposed works will not adversely affect habitat critical to the survival of the species.
- The proposed works will not modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
- The proposed works will not result in the establishment of invasive species harmful to the species.
- The proposed works will not introduce disease that may cause the species to decline, and,
- The proposed works will not interfere substantially with the recovery of the species.

Large-eared Pied Bat (*Chalinolobus dwyeri*)

The Large-eared Pied Bat *Chalinolobus dwyeri* is listed as vulnerable under the EPBC Act and TSC Act. It is found in areas with extensive cliffs and caves, from Rockhampton in Queensland to Bungonia in the NSW Southern Highlands. In general, the species is rare and has a patchy distribution within NSW. The species roosts predominately on sandstone escarpments in disused mine shafts, caves, overhangs and abandoned fairy martin nests.

The species is found in well-timbered areas containing gullies. Large-eared Pied Bat forage for insects in and around forest canopies in fertile woodlands and forests. Breeding habitat is in caves and appears to require a specific structure (arch caves with dome roosts) (DERM, 2011). Breeding habitat is not present on the Proposal Site.

Important populations for this species occur in the sandstone escarpments of the Hunter Valley, Sydney Basin and Southern Tablelands of NSW (DERM, 2011). If Large-eared Pied Bat are utilising the Proposal Site and wider study area, they are unlikely to form an important population as they do not contain any sandstone escarpments described in the draft recovery plan, there is limited roosting and breeding habitat in the locality, and the Proposal Site and wider study area does not occur at the limit of the species range.

Key threats to the species include (OEH, 2018):

- Clearing and isolation of forest and woodland habitats near cliffs, caves and old mine workings for agriculture or development.
- Loss of foraging habitat close to cliffs, caves and old mine workings from forestry activities and too-frequent burning, usually associated with grazing.
- Damage to roosting and maternity sites from mining operations, and recreational caving activities.
- Use of pesticides.
- Disturbance to roosting areas by goats.

Targeted surveys, using Anabat echolocation call recording, were undertaken and the Large-eared Pied Bat was recorded as ‘probable’. As such, it is assumed present on the Proposal Site. As there is no breeding habitat on the Proposal Site, the Proposal will result in the clearing of up to 9.87 hectares of potential foraging habitat for the species. The clearing of potential Large-eared Pied Bat foraging habitat will be offset in accordance with the FBA.

a) *Will the project lead to a long-term decrease in the size of an important population of a species?*

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

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

Key source populations either for breeding or dispersal

Within NSW, the largest concentration of this species appears to be in the sandstone escarpments of the Sydney basin and northwest slopes of NSW. The species has also been recorded from a few locations in the sandstone escarpments of the Morton National Park at the southern end of its range. Further survey is required throughout

its known range to determine the size and distribution of existing populations. It is unlikely that a key source population exists on the Proposal Site or within the wider study area as it does not contain suitable roosting or breeding habitat for the species.

Populations that are necessary for maintaining genetic diversity

Detailed genetic information is lacking for the Large-eared Pied Bat. It is thought that small, fragmented sub-populations may be at greater risk of extinction from random events due to loss of genetic variability. No populations of Large-eared Pied Bat exist on the Proposal Site or within the wider study area, and therefore are not necessary for maintaining genetic diversity.

Populations that are near the limit of the species range

No populations of Large-eared Pied Bat exist on the Proposal Site or within the wider study area. Individuals have the potential to be found to occasionally forage in the area, however the species is distributed from Queensland to NSW. Therefore, any potential Large-eared Pied Bat located on the Proposal site or within the wider study area would not be near the limit of the species range.

Considering all the above information, there are no important populations of Large-eared Pied Bat on the Proposal Site or within the wider study area.

b) *Will the project reduce the area of occupancy of an important population?*

Not applicable. There are no important populations of Large-eared Pied Bat on the Proposal Site or within the wider study area.

c) *Will the project fragment an existing important population into two or more populations?*

Not applicable. There are no important populations of Large-eared Pied Bat on the Proposal Site or within the wider study area.

d) *Will the project adversely affect habitat critical to the survival of a species?*

Not applicable. No critical habitat has been declared for the Large-eared Pied Bat.

e) *Will the project disrupt the breeding cycle of an important population?*

Not applicable. There are no important populations of Large-eared Pied Bat on the Proposal Site or within the wider study area.

f) *Will the project modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?*

The project would result in the clearing of up to 9.87 hectares of potential foraging habitat for the Large-eared Pied Bat that will be offset in accordance with the FBA. Woodland on the Proposal Site and within the wider study area is already heavily fragmented, and the landscape has been extensively modified. Given that there are no important populations or critical habitat on site, and there is more suitable habitat within 10 kilometres of the Proposal Site, the clearing of up to 9.87 hectares of potential foraging habitat is unlikely to lead to a decline in the species.

g) *Will the project result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?*

Sections of the wider study area are highly disturbed and modified and contain evidence of invasive fauna (i.e.- European Red Fox, European Rabbit, Feral Cat) and weeds. As such,

the project is highly unlikely to result in additional invasive species becoming established that are harmful to the Large-eared Pied Bat or its habitat.

h) ***Will the project introduce disease that may cause the species to decline?***

There are no known diseases for the Large-eared Piet Bat. As such, the project is highly unlikely to introduce disease that may cause the Large-eared Pied Bat to decline.

i) ***Will the project interfere substantially with the recovery of the species?***

The National Recovery Plan for the Large-eared Pied Bat lists five specific objectives for the species (DERM, 2011). These include:

- Identify priority roost site and maternity sites for protection.
- Implement conservation and management strategies for priority sites.
- Educate the community and industry to understand and participate in the conservation of the Large-eared Pied Bat.
- Research the Large-eared Pied Bat to augment biological and ecological data to enable conservation management.
- Determine the meta-population dynamics throughout the distribution of the Large-eared Pied Bat.

The project does not conflict with the recovery objectives listed for this species.

Conclusion

The project will result in the clearing of up to 9.87 hectares of potential foraging habitat for the Large-eared Pied Bat that will be offset in accordance with the FBA. Given that the species is highly dependent on the presence of roosting and breeding sites, and none occur on the Proposal Site or within the wider study area, it is unlikely that the project will adversely affect habitat critical to the survival of the species. Further, no important populations of the species have been identified on the Proposal Site or within the wider study area.

In conclusion, the proposed works are unlikely to have a significant impact on Large-eared Pied Bat as:

- The proposed works will not impact upon an important population.
- The proposed works will not adversely affect habitat critical to the survival of the species.
- The proposed works will not modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
- The proposed works will not result in the establishment of invasive species harmful to the species.
- The proposed works will not introduce disease that may cause the species to decline, and,
- The proposed works will not interfere substantially with the recovery of the species.

Bibliography

Department of the Environment, 2013. *Matters of National Environmental Significance, Significant impact guidelines 1.1,* Canberra: Department of the Environment.

DERM, 2011. *National Recovery Plan for the Large-eared Pied Bat Chalinolobus dwyeri,* Brisbane: Department of Environment and Resource Management.

DoE, 2018. *National Flying-fox monitoring viewer.* [Online]
Available at: http://www.environment.gov.au/webgis-framework/apps/ffc-wide/ffc-wide.jsf

DoEE, 2017. *Draft Recovery Plan for the Grey-Headed Flying-fox Pteropus poliocephalus,* Sydney: Department of Environment and Energy .

OEH, 2018. *BioNet Atlas.* [Online]
Available at: http://www.bionet.nsw.gov.au/

OEH, 2018. *Saving our Species database.* [Online]
Available at: http://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/saving-our-species-program/saving-our-species-database

SCC, 2017. *Biodiversity Assessment Report: Landfill extension of West Nowra Recycling & Waste Facility.* Shoalhaven: Shoalhaven City Council.