MEMO

TO:	Hindmarsh
FROM:	WSP Australia
SUBJECT:	**Review of Submissions**
OUR REF:	2271185PA-ECO-MEM-SUBMISSONSREVIEW-001 RevA.docx
DATE:	**18 September 2018**

1. INTRODUCTION

Purdon Planning Pty Ltd on behalf of Hindmarsh constructions submitted a Development Application (DA) for Section 66 in Deakin for a proposed storage facility. This memo is in response to the submissions received on the DA with ecological concerns.
Submissions reviewed included:

- EPSDD – Conservator Comment
- Friends of Grasslands
- Conservation Council ACT Region
- Larry O'Loughlin
- Samantha Nerrie
- George Wilson – Deakin Residents Association (DRA)
- Roslyn Engledow
- Ruth Cully – Hughes Residents Association
- Michael Mulvaney
- Wayne Fletcher – Garran and Hughes Residents

These submissions can be grouped around the following key issues relating to ecology:

- Conservation value of woodland within the site
- Potential impacts to wildlife.

This memo provides a response to the key issues raised in these submissions.

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2. CONSERVATION VALUE OF WOODLAND

2.1 CONSERVATION SIGNIFICANCE

2.1.1 BOX GUM WOODLAND

Several submissions to the DA stated that the vegetation within the site is consistent with the Threatened Box Gum Woodland community.

A number of surveys and vegetation mapping projects have been undertaken of/including the site over the years and in different seasons. These are summarised in Table 2.1.

Table 2.1 Summary of vegetation mapping and surveys of the site

REFERENCE	SURVEY TIMING	NOTES	THREATENED ECOLOGICAL COMMUNITY IDENTIFIED WITHIN SITE?
Geoff Butler and associates	October 2004	Assessment concluded that the vegetation in the site was "substantially modified lowland woodland" as defined by ACT Government (ACT Government, 2004).	No.
Geoff Butler and associates	October 2007	Update of 2004 report, following the listing of White Box Yellow Box Blakelys Red Gum Grassy Woodlands and Derived Native Grasslands as a Critically Endangered Community	No. Vegetation did not meet the Commonwealth criteria for definition of the EPBC Act listed community.
ACTmapi and ACT Lowland Woodland Conservation Strategy	Unknown if site was surveyed	Broad-scale vegetation mapping	Yes, Mapping identifies vegetation community as occurring within the adjacent Red Hill Nature reserve and also within the southern and eastern sections of the site. This includes identification of the southern section of the site as containing vegetation consistent with the EPBC Act listing.
WSP	July 2017	Consistency with EPBC Act listing is further outlined in report.	No. Although important species were recorded, species diversity within two 20 by 20 m plots was not sufficient to meet threshold for EPBC Act listed community.

REFERENCE	SURVEY TIMING	NOTES	THREATENED ECOLOGICAL COMMUNITY IDENTIFIED WITHIN SITE?
ACT Government Ecologist	2017 (unknown date)	Government ecologist stated that "the proposal does not appear to pose any significant adverse environmental impact"	No.
Local ecologist	14 December 2017	Data for two plots submitted as part of a submission opposing the DA	Yes, data provided is consistent with thresholds for EPBC Act community.
Senior ACT Government Ecologist	21 June 2018	Based conclusion on data provided by local ecologist as part of their submission.	Yes, but was unable to confirm species diversity required to meet threshold for EPBC Act listing.

Analysis of the floristic diversity and species cover abundance collected from our surveys undertaken in accordance with standard survey guidelines indicated that the area of vegetation did not meet the specific condition thresholds of the EPBC Act listed Box Gum Woodland community as outlined in the EPBC guidelines (Department of Environment and Heritage, 2006b, Department of Environment and Heritage, 2006a, Department of the Environment and Heritage, 2006, Department of the Environment Water Heritage and the Arts, 2006). WSP acknowledged within Section 6 of the report (WSP, 2017), limitations to the surveys and further acknowledges the timing of surveys in winter is outside of the optimal time of year for survey to record native species diversity. The EPBC Act Box Gum woodland threatened ecological advice states that late autumn is the best time of year to determine perennial native vegetation (Department of the Environment and Heritage, 2006).

The conclusion within the submissions that the site contains the threatened ecological community is largely based on the data supplied by a local resident and ecologist as part of their submission opposing development. The diversity recorded was unable to be confirmed by WSP or the Government ecologist, however, the species list provided as part of this submission was reviewed and found to be meet the EPBC Act listing thresholds.

Following the precautionary principal and assuming that the data provided by the local resident accurately records the species diversity in accordance with the EPBC Act condition guidelines, approximately 0.9 ha of vegetation within the study area would be considered to meet the EPBC Act listed Box Gum Woodland community.

2.1.2 PLANTINGS

A small area of *Eucalyptus pauciflora* occurred within the site near Kent Street. Based on historic aerial imagery taken in 1955, these trees were not present in 1955 and have either been planted or regenerated naturally since then. Based on their position and isolation in the landscape, it is considered likely that these have been planted, although it is possible that these have regenerated naturally.

It should also be noted that the ecological values report (WSP 2017) assessed only the ecological values of the site, with a focus on biodiversity protected under legislation, and did

not consider other environmental values such as heritage values of the site including the heritage value of plantings.

3. HOLLOW BEARING TREES AND IMPACTS TO WILDLIFE

The following species/ groups were identified in submissions as being potentially impacted by the proposed development:

- Non-threatened hollow dependent species:
  - Sugar glider- not listed under NC Act or EPBC Act. Identified in Canberra Nature Map as "not sensitive"
  - Microbats- none listed under the NC Act
  - Gang-gang Cockatoo- not listed under the NC Act or EPBC Act.
- foraging habitat of threatened woodland birds including the Scarlet Robin and Speckled Warbler as well as Little Eagle.

The significance of the fauna and habitat within the site is discussed below as well as potential impacts and additional mitigation measures.

4. POTENTIAL IMPACTS

The proposed development (Section 66 Deakin) is adjacent to the Red Hill Nature Reserve. The Reserve contains a large remnant woodland which is home to a diversity of flora and fauna species including those listed above, and as such practicable mitigation measures for the development will be taken to reduce impacts to the surrounding environment.

The proposed development poses potential impacts to threatened ecological community and three threatened bird species that have a low-moderate likelihood of occurring within the site, and other species of non-threatened biodiversity in the area. These impacts may include:

- Loss of habitat;
- Noise and light associated with construction and ongoing operation and maintenance;
- Direct impact with vehicles and machinery;
- Indirect impacts to the adjacent reserve and open space; and
- Impacts to habitat connectivity.

4.1 LOSS OF HABITAT

As part of the proposed development, clearing of vegetation and habitat will occur within the boundaries of Section 66.

Following the precautionary principal and assuming that the data provided by the local resident accurately records the species diversity in accordance with the EPBC Act condition guidelines, approximately 0.9 ha of vegetation within the study area would be considered to meet the EPBC Act listed Box Gum Woodland community. Some of this vegetation would be retained within the asset protection zone on the boundary of the site adjacent to other woodland areas and as such the clearing of vegetation would be less than 0.9 ha.

During field surveys there were eight habitat trees identified within the site boundaries. These trees have been retained within the development with a minimum two-meter buffer between the canopies and buildings. The proposed site layout includes retention of the two trees that are used by sugar gliders and microbats. One has also been a nesting site for the Gang Gang

Cockatoos in the past. The habitat trees will be retained on the site and the loss of a small area of marginal foraging habitat is unlikely to significantly impact these species, as better quality habitat occurs directly adjacent the site to the north, east and south.

Some foraging habitat for fauna species including the threatened Little Eagle, Speckled Warbler and Scarlet Robin will be lost as a result of the proposed development. These species are mobile and the Little Eagle in particular is shown to use a wide area range for foraging and other activity. This suggests that the minimal impacts to foraging habitat for the species in the study area are unlikely to have significant impacts for the individuals using the area. The species are likely to utilise better quality habitat that is adjacent to the site.

Given the highly modified and disturbed nature and small area of the vegetation within the site, and the high quality of vegetation surrounding the site, clearing within the site is not considered likely to have a significant detrimental impacts for flora and fauna in the area. The site is adjacent to a 298 hectare Nature Reserve with extensive foraging habitat and numerous hollow-bearing trees for fauna species.

4.2 ARTIFICIAL LIGHT AND NOISE

Biodiversity in urban and peri-urban environments are affected by developments associated with expanding urban areas (Newport, Shorthouse and Manning, 2014). Artificial illumination and noise are two disturbances that can impact on biodiversity in these settings. Understanding and mitigating the effects of noise and light pollution on biodiversity is becoming increasingly important as our cities continue to grow. Limited research has been undertaken into the impacts of artificial light and noise on ecosystems, and species. Despite this, it is understood that light and noise pollution have effects on species physiology, behaviour and reproduction (Newport, Shorthouse and Manning, 2014).

As the habitat trees within the study area will not be directly impacted upon and habitat clearing is minimal, it is likely that the main disturbances to fauna will come from activity associated with the construction and operation of the proposed development. It should be noted that the proposed development is within or is directly adjacent to current operational buildings and is in close proximity to other facilities and residences. There is also heavy pedestrian and bike activity within the Reserve and there are tracks currently passing through the area of Section 66 Deakin which pass directly adjacent or under the habitat trees. Due to the activity in this area and the species utilisation of habitat close to humans, it is likely that any individuals using this site are habituated to humans and associated disturbance.

The fauna identified as utilising the study area or with potential habitat within the study area have large home ranges, with Sugar Gliders using multiple den sites. Light and noise is likely to have minimal impact to the species as they would be utilising many other resources in the surrounding area, likely of better quality.

4.3 INJURY AND MORTALITY

Direct impact (injury and mortality) to fauna species could result from increased traffic within the site, and during vegetation clearing. Given the location of the development, and no main roads being constructed, speed limits for vehicle entering and driving around the site will be relatively low. This will reduce the risk to fauna as vehicles travelling at low speeds will have more time to stop in case of an animal crossing its path. Further, an ecologist spotter/ catcher will be onsite during vegetation clearing to reduce injury and mortality risk to fauna. Impact during clearing is expected to be low after the implementation of Flora and Fauna Construction Environmental Management and the presence of an ecologist on site during clearing.

4.4 INDIRECT IMPACTS TO ADJACENT RESERVE

There are potential indirect impacts to the Reserve adjacent to the proposed development site. These impacts include the potential for weed invasion and light spill into the Reserve areas immediate adjacent to the site. Landscaping of the site will be consistent with the adjacent reserve and open space and will consist of locally indigenous species. Further mitigation measures would be implemented to minimise the likelihood of invasive species and pathogen spread.

4.5 HABITAT CONNECTIVITY

The proposed development is expected to have some minimal impacts to habitat connectivity. The connectivity link provided by the site would be predominantly utilised by high mobile species such as birds and kangaroos. It is likely that vegetation clearing of the site, with the retention of habitat trees, and locally indigenous plantings would maintain the connectivity for birds. Connectivity for kangaroos and other fauna would be maintained with the retention of woodland connectivity link to the south of the site, zoned as urban open spaces.

5. MITIGATION MEASURES

The proposed development (Section 66 Deakin) is adjacent to the Red Hill Nature Reserve. The Reserve contains a large remnant woodland which is home to a diversity of flora and fauna species including those listed above, and as such practicable mitigation measures for the development will be taken to reduce impacts to the surrounding environment.

Mitigation measures have been discussed in the Ecological Value Assessment Report written for the site. The mitigation measures discussed below are additional or offer more detail to the ones previously discussed for the site.

5.1 RETENTION OF HABITAT TREES AND NEST BOXES

Loss of hollow-bearing trees from landscapes is a world-wide threat to cavity-dependent vertebrate wildlife (Rueegger, 2017). Loss of hollow-bearing trees has been nominated as a key threatening process in the ACT.

The recommendations for the proposed development includes the retention of identified habitat trees where possible within the site and a minimum two-meter buffer between building and the canopy. The current concept plan includes retention of the eight identified habitat trees. Five of these habitat trees are on the southern side of the site and will be directly connected to vegetation to the south of the proposed development. The other three trees are incorporated near the edges of the proposed development adjacent to car parking space.

If any hollow-bearing trees do need to be removed as part of the development, nest boxes would be provided in appropriate locations in nearby trees. Alternative methods to nest boxes will also be considered and recommended if a more beneficial outcome is expected. Alternative methods include:

- Reuse of any hollows - impacted hollow-bearing trees or individual hollows could be remounted within the adjacent Reserve (in consultation with ACT Government ecologists) or nearby areas.
- Carving of hollows directly into tree trunks using chainsaws. This method is described in *Artificial tree hollow creation for cavity-using wildlife – trialling an alternative method to that of nest boxes* (Rueegger, 2017) which demonstrated the method as having potential to become an additional tool for land restoration.

The potential provision of additional nest boxes in trees adjacent to the site would be discussed with the Reserve Manager as a way to provide additional habitat for species that may be displaced due to the development. Plantings within the development will consist of locally indigenous species and considerations for species with the potential to produce hollows in the future will be made.

5.2 NOISE

It is anticipated that noise will be generated on site during the construction works of the proposed development and during operation. The highest volumes of noise are expected to be generated during the construction phase.

It is important investigation and planning is undertaken for the anticipated noise generated by the operation and maintenance of the proposed development. Considerations in the design phase will have the best outcome in minimising any noise associated with the ongoing operation of the facility.

In the ACT, rules governing noise generated during construction are given in the *ACT Environment Protection Regulation 2005.* For the project location, the regulation states that all relevant noise reduction measures mentioned in Australian Standard 2436 should be implemented. Additionally, construction noise is to be emitted during the hours of 7:00am and 6:00pm on Monday to Saturday only, excluding public holidays.

Standard mitigation measure to reduce construction, maintenance and ongoing noise would be implemented and outlined in the Construction Environment Management Plan and should consider the following measures:

- Education to workers on noise sensitivities of the site and responsibilities
- Selecting less noisy equipment
- Barriers, screens and parapets
- Installing noise control equipment on machinery and tools
- Enclosure (temporary or permanent) of suitable material surrounding operation area and equipment for stationary work
- Avoid noisy plant working close together
- Maintenance programs for equipment, as poorly maintained equipment often emits more noise
- Switching off noisy equipment when not in use
- Monitoring noise levels during construction.

5.3 FENCING

Barbed wire fencing is commonly used but has implications for wildlife as it can cause injury and/ or death to a variety of susceptible fauna species. A study by Rodney van der Ree (1999) in *barbed wire fencing as a hazard for wildlife,* found gliding marsupials, flying-foxes, aquatic birds, night birds and birds of prey entangled in barbed wire. Sugar Gliders were noted as a species that was commonly encountered on fences within its known locality of the study areas. Any fencing structures erected as a part of the proposed development should not be barbed and would consider the potential influence on animal behaviour.

5.4 LIGHTING DESIGN

The site is located within the urban Canberra area and is therefore subject to sky glow, and additionally the bright lighting and unconfined light spill from existing developments on site and in neighbouring areas and roads.

- Lighting can be designed to minimise illumination surrounding the habitat trees and further to reduce light spill into surrounding woodland areas. This will help to mitigate the impacts of artificial illumination on nocturnal species. Lighting design measures outlined below will be considered:
- Minimise lighting:
  - Reduce the number of lights – use only where required;
  - Turn lights off when not required – an effective way of ensuring this measure may be automated lights working on a timer or a senor system;
  - Seasonal lighting restrictions to be considered. E.g. turning lights off during the breeding season when species are most vulnerable to predation;
- Confine light spill:
  - Lower the height of light fittings, including lights embedded in the ground rather than on poles;
  - Use light fittings that direct and confine the spread of light downwards, with full, cut-off shielded fixtures (that ensure no light is emitted horizontally or upward), that require less wattage, provide more light to the ground and reduce light waste;
  - Maintaining canopy cover within habitat trees sufficient to restrict excess light and appropriate understorey (Barber-Mayer, 2007);
  - With design that minimised windows facing the reserve, incorporates blinds, curtains, and/ or window tinting;
  - Design surfaces of structures and ground coverings to be non-reflective (e.g. dark surfaces);
  - In designing the site layout, consider using building structures to shield light.
- Substitute lights:
  - Use different wavelength/ colour of light. Longer wavelength light (yellow-orange 630-700 nm) which is less likely to attract many species (Gleeson and Gleeson 2012; Jones and Francis 2003). This could be achieved by using low-pressure sodium bulbs, longer wavelength LEDs or by fitting filters to light fittings;
  - Selecting energy efficient lamps and fixtures;
  - Use lowest intensity (wattage) lights appropriate.

6. CONCLUSION

While the site is adjacent to the Red Hill Reserve and provides some biodiversity values, the site has been highly modified.

Analysis of the floristic diversity and species cover abundance collected from WSP surveys in 2017 undertaken in accordance with standard survey guidelines indicated that the area of vegetation did not meet the specific condition thresholds of the EPBC Act listed Box Gum Woodland community as outlined in the EPBC guidelines. WSP acknowledges the timing of surveys in winter is outside of the optimal time of year for survey to record native species diversity. Data supplied by a local resident and ecologist as part of their submission opposing development was reviewed and found to be meet the EPBC Act listing thresholds. The diversity recorded was unable to be confirmed by WSP or the Government ecologist. However, following the precautionary principal and assuming that the data provided by the local resident accurately records the species diversity in accordance with the EPBC Act condition guidelines, approximately 0.9 ha of vegetation within the study area would be considered to meet the EPBC Act listed Box Gum Woodland community. Some of this vegetation would be retained within the asset protection zone on the boundary of the site

adjacent to other woodland areas and as such the clearing of vegetation would be less than 0.9 ha. The clearing of this small area of disturbed vegetation is unlikely to result in a significant impact to the community or associated species.

The site layout has been designed to retain habitat trees identified within the site. The majority of which will remain connected to adjacent woodland areas. The habitat trees are utilised by non-threatened species with relatively widespread distributions which are likely to be habituated to human activity considered unlikely to be significantly impacted by the proposed development.

The site provides foraging habitat for Little Eagle as well as marginal habitat for Speckled Warbler and Scarlet Robin. Given the highly modified and disturbed nature and small area of the vegetation within the site, and the high quality of vegetation surrounding the site, clearing within the site is not considered likely to have a significant detrimental impacts for fauna species in the area. The site is adjacent to a 298 hectare Nature Reserve with extensive foraging habitat for fauna species.

Given the highly modified and disturbed nature and small area of the vegetation within the site, and the high quality of vegetation surrounding the site, clearing within the site is not considered likely to have a significant detrimental impacts for flora and fauna in the area. The site is adjacent to a 298 hectare Nature Reserve with extensive foraging habitat and numerous hollow-bearing trees for fauna species.

Additional mitigation measures have been provided in this memo to further minimise impacts to the biodiversity values of the area. Although the development is unlikely to significantly impact threatened biodiversity due to the small area of impact, it is recommended that significance assessment be undertaken and a referral is submitted to Department of Environment and Energy as a non-controlled action due to public interest and submissions provided.

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REFERENCES

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