22 November 2013

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4 MURRAY ROSE AVENUE, SYDNEY OLYMPIC PARK - FLORA AND FAUNA IMPACT ASSESSMENT

Dear Grant,

The purpose of this letter is to provide an ecological impact assessment of the proposed development of 4 Murray Rose Ave Sydney Olympic Park Commercial Project (hereafter referred to as the "subject site"). The proposed development will be assessed as a State Significant Development (SSD) under Part 4.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The project application for the proposed development falls within the Concept Plan assessment area for 7 Parkview Concept Master Plan, which has previously been approved under Part 3A of the EP&A Act. The subject site forms part of the staged redevelopment of Parkview Drive and surrounds ("study area") as designated in the Sydney Olympic Park Master Plan 2030.

Cumberland Ecology prepared a Flora and Fauna Impact Assessment for the 7 Parkview Drive Concept Master Plan and Stage 1 developments in 2009. This impact assessment provides an addendum to the information provided in a previous report by Cumberland Ecology in 2009. It assesses potential impacts of the proposed development of the subject site on threatened species, populations and ecological communities protected under the NSW *Threatened Species Conservation Act 1995 (*TSC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The ecological impact assessment of the subject site is presented in the remainder of this letter. Accompanying figures are provided in **Appendix A**; assessments of the likelihood of occurrence of threatened species, populations and ecological communities on the subject site are provided in **Appendix B**; and Assessments of Significance prepared in accordance with Section 5A of the EP&A Act are provided in **Appendix C**. Significant impact criteria for EPBC listed species are

provided in **Appendix D**.

1. Background

The proposed development site is located at 4 Murray Rose Avenue where it joins Parkview Drive, Homebush. The subject site boundary encompasses a portion of existing road (Parkview Drive), part of an existing commercial building, existing and temporary car parks and planted vegetation. The subject site is the location of a proposed commercial building.

The site is located in between the Brickpit approximately 200 metres north-west of the site and Badu Mangroves 100 metres east (**Figure 1**). The subject site occurs in an existing commercial/industrial precinct devoid of natural vegetation communities (**Figure 2**). Number 5 Murray Rose Ave to the north of the subject site has already been developed as a commercial building, with 1-3 yet to be developed. The Master Plan is for a mixed-use development targeting 36,000m^2 NLA (3 x 12,000m^2 NLA buildings) for commercial use, 13,000m^2 NLA for residential use and approximately 500m^2 NLA for community use.

The subject site and immediate surrounds, the study area, have been considered, including the Brickpit, Sydney Olympic Park Authority (SOPA) managed lands to the north and Badu Mangroves. The Brickpit supports a large and established breeding population of the endangered Green and Golden Bell Frog (GGBF). The Badu Mangroves are known as supplementary GGBF habitat. Migratory bird species are known to occur in the study area.

2. Assessment Methods

2.1.1 Review

Information from the detailed Flora and Fauna Impact Assessment report of 7 Parkview Drive prepared for the Part 3A Concept Plan Approval was utilised for the purpose of this letter report.

2.1.2 Desktop

A database search (OEH 2013) was undertaken to identify any newly listed threatened species, endangered ecological communities or populations known or likely to occur within the subject site (see **Appendix B**).

2.1.3 Assessments of Significance

Appendix C provides Assessments of Significance (Seven Part Tests) for threatened species or communities that have potential to occur in the study area. These have since been updated as the Part 3A assessment system of the EP&A Act was repealed in 2011, and an additional species occurs in the study area. Significant impact criteria for EPBC listed species are provided in **Appendix D**.

2.1.4 Site Inspection

A site inspection was not necessary as no new threatened flora species were recorded on the subject site based on the arborist report and the database analysis.

3. Results

3.1.1 Native Vegetation

The subject site occurs in an existing commercial/industrial precinct devoid of natural vegetation communities. The only native vegetation on the Parkview site is limited to planted eucalypts and landscaped garden beds, consisting of various local and non-local species. A small number of original trees are present, namely Moreton Bay Figs (*Ficus macrophylla*) which were planted as part of the abattoir landscaping. Important conservation areas will be retained including the Brickpit and Badu Mangroves.

3.1.2 Threatened Species

Based on the very limited availability of fauna habitat on the subject site, the occurrence of and regular use of the subject site by threatened fauna species is unlikely. The only threatened species that are likely to occur at the subject site is the Grey-headed Flying-fox (*Pteropus poliocephalus*) and the Green and Golden Bell Frog (*Litoria aurea*). Migratory bird species may occur in the adjacent Badu Mangroves and Brickpit but are unlikely to use the subject site for foraging or breeding.

The GGBF may possibly move through the subject site due to its location between known habitats. However, a preferred movement corridor for GGBFs is likely to be via the existing underpass between the Brickpit and Badu Mangroves, under Bennelong Parkway. There is no typical corridor habitat including streams, drainage depressions or log piles on the subject site. GGBFs are relatively mobile species that forages and seeks shelter at distances of up to 1km or more from breeding sites during favourable weather conditions. In doing so, individuals may move through and forage within highly cleared and fragmented landscapes.

An additional endangered flora species (*Zannichellia palustris*) was recorded within the study area since the desktop assessment in 2009 (see **Appendix C**). Records of this species are from Bennelong Pond, located approximately 100m east of the subject site. The species will not be directly impacted by the proposed development as none are found on the subject site. No threatened flora are likely to be present on the subject site based on the lack of suitable habitat and the degree of existing disturbance.

No other threatened species are likely to occur on the subject site based on the lack of available habitat (see likelihood of occurrence in **Appendix B**).

4. Impact Assessment

4.1 Direct Impacts

The development of the subject site at Murray Rose Avenue will not result in any direct impacts. The development site occurs over an existing car park and is devoid of natural vegetation communities. Only plantings are present on the subject site.

4.2 Indirect Impacts

4.2.1 Stormwater/Water Quality

Potential increases in stormwater run-off and a decrease in water quality, with potential to impact Coastal Saltmarsh and Swamp Oak Floodplain Forest EECs and also Mangrove habitat for associated threatened fauna. However, such impacts will be managed sufficiently to result in no net increase in nutrient loads or stormwater volume.

4.2.2 Movement Corridors

Modification to movement corridors for Green and Golden Bell Frogs, although the new parklands proposed for the SOPA lands to the north of the subject site will in fact increase the area of vegetated corridors.

4.2.3 Shadowing and Lightspill

Contribute to cumulative impacts from development of the study area, including increase shadowing and lightspill effects on Badu Mangroves, with the potential to disrupt roosting and foraging sites for EPBC listed migratory bird species. However, building heights are below or within height specifications of SOPA. Lightspill is not likely to be significantly increased from levels already experienced from existing development.

4.2.4 Indirect Impacts on Threatened Species

The few trees that may be removed would only provide potential foraging habitat for the Grey-headed Flying-fox. The planting of fruiting and flowering trees, particularly figs as part of landscaping will increase habitat for the Grey-headed Flying-fox.

No Green and Golden Bell Frog habitat will be removed or affected by the proposed development. A Green and Golden Bell Frog Sub-plan will be required for the construction of the subject site in order to provide recommendations on preventing impacts on the species.

Migratory bird species found in the study area, including the Badu Mangroves and Brickpit should not be affected as building height specifications are within SOPA recommendations, lightspill will not be increased and stormwater and water quality will be managed.

4.3 Assessments of Significance

Assessments of the likelihood of occurrence of threatened species, populations and ecological communities in **Appendix B** suggest that no significant impacts will result from the proposed action.

Assessments of Significance prepared in accordance with Section 5A of the EP&A Act are provided in **Appendix C**. No further assessments are required.

No referral to the Minister for the Environment is required, as no significant impacts under the EPBC Act on matters of National Environmental Significance are considered likely to occur as a result of the proposal. The only species with the potential to occur on the subject site is the Green and Golden Bell Frog and the Grey-headed Flying-fox. However, these species would only occur on occasion and no habitat will be removed as a result of the proposed development.

5. Conclusion

The subject site occurs in an existing commercial/industrial precinct devoid of natural vegetation communities. No significant impacts on flora or fauna are likely to occur from the proposed development based on our assessments of significance.

Yours sincerely,

David Robertson
Director
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References

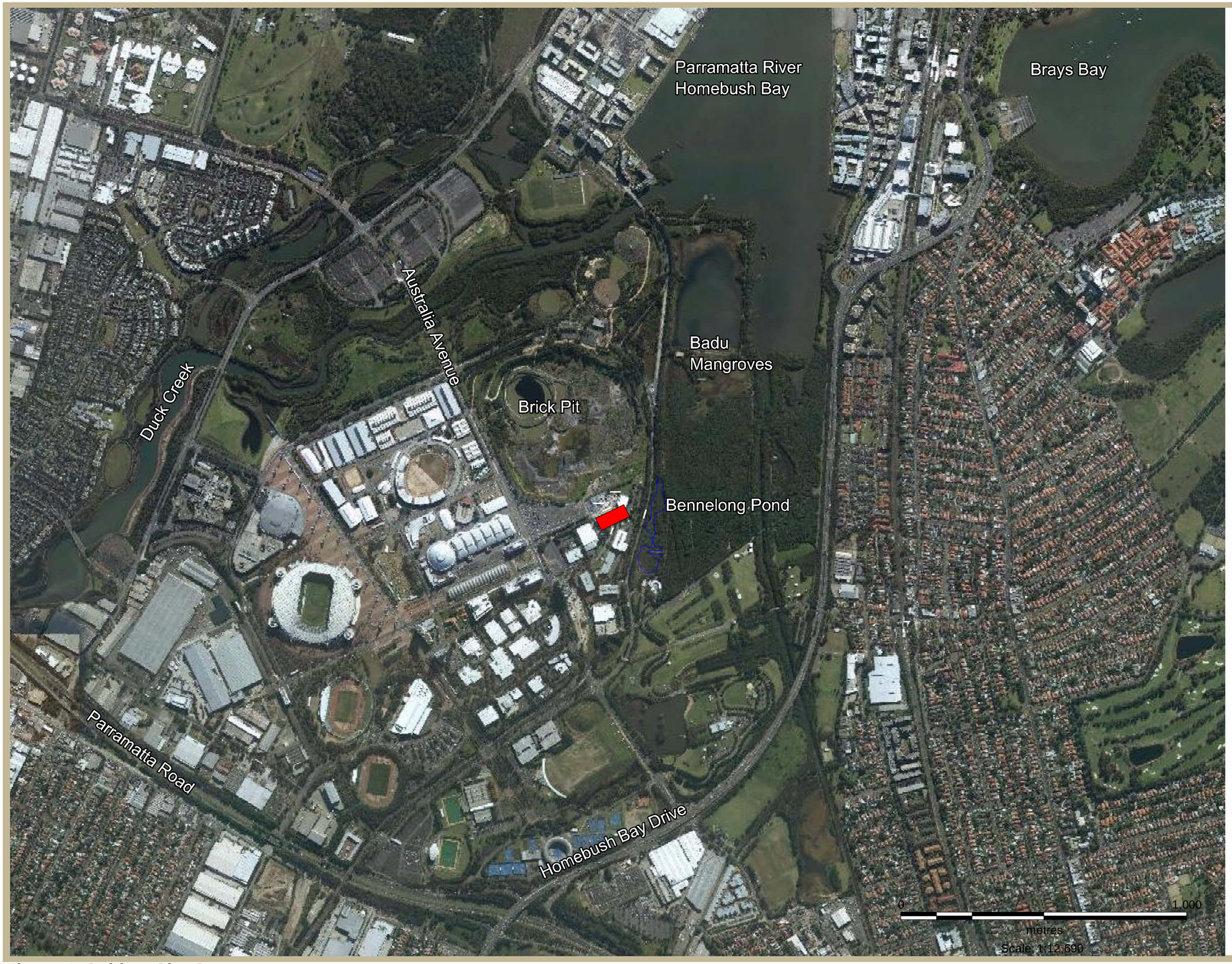
Cumberland Ecology (2009) **7 Parkview Drive, Homebush: Flora and Fauna Impact Assessment for a Part 3A Project Application**. Cumberland Ecology, Sydney.

OEH (2013) “BioNet” from http://www.environment.nsw.gov.au/atlaspublicapp/UI_Modules/ATLAS_/AtlasSearch.aspx

Appendix A

Figures

Coordinate System: MGA Zone 56 (GDA 94)



Legend

Subject Site

Grid North

Image © 2013
NSW Land and Property
Management Authority,
SIX Viewer (dated 15/5/2011)

CUMBERLAND ECOLOGY

I:\...\7109\Figures\Let7\Figure 1. Subject Site Context

Figure 1. Subject Site Context

250 0 250 500 750 1000 m

Coordinate System: MGA Zone 56 (GDA 94)

Legend

- Site Boundary
- Buildling Area

Vegetation

- Planted Vegetation
- Planted Swamp Oak

Grid North

CUMBERLAND ECOLOGY

I:\...\7109\Figures\Let7\Figure 2. Location and Vegetation of 4 Murray Rose Avenue

Figure 2. Location and Vegetation of 4 Murray Rose Avenue

12.5 0 12.5 25 37.5 50 m

Appendix B

Likelihood of Occurrence for Threatened Fauna and Flora

Table 1 Threatened fauna and flora recorded within a 5km radius of the subject site

Common Name	Scientific Name	TSC Status	Comm. Status	Presence of Suitable Habitat in Study Area and Likelihood of Occurrence of Species
Amphibia				
Green and Golden Bell Frog	*Litoria aurea*	E1,P	V	Known habitat occurs in the study area, primarily in the Brickpit. The perimeters of the subject land may act as part of a movement corridor between the Brickpit and Supplementary Habitat such as Badu Mangroves.
Aves				
Freckled Duck	*Stictonetta naevosa*	V,P		Unlikely to occur in the study area.
White-throated Needletail	*Hirundapus caudacutus*	P	C,J,K	Unlikely to occur in the study area.
Cattle Egret	*Ardea ibis*	P	C,J	No habitat present on the subject site.Unlikely to occur in the study area.
Australasian Bittern	*Botaurus poiciloptilus*	E1,P	E	Potential habitat may occur in the study area, in Badu Mangroves, although this is not ideal habitat as they prefer freshwater wetlands with dense reeds. This species has not been recorded during any surveys of SOP land.
Glossy Ibis	*Plegadis falcinellus*	P	C	Potential habitat may occur in the study area, in Badu Mangroves and Bicentennial Park where they have been previously recorded.
Spotted Harrier	*Circus assimilis*	V,P		Unlikely to occur in the study area.
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	P	C	No habitat present on the subject site. Potential habitat may occur in the study area.
Little Eagle	*Hieraaetus morphnoides*	V,P		Unlikely to occur in the study area.

Table 1 Threatened fauna and flora recorded within a 5km radius of the subject site

Common Name	Scientific Name	TSC Status	Comm. Status	Presence of Suitable Habitat in Study Area and Likelihood of Occurrence of Species
Eastern Osprey	*Pandion cristatus*	V,P,3		No nest sites known from the study area, although this species is known from the Parramatta River Catchment. May occur in the study area unlikely owing to the low number of records.
Black Falcon	*Falco subniger*	V,P		Unlikely to occur in the study area.
Greater Sand-plover	*Charadrius leschenaultii*	V,P	C,J,K	Unlikely to occur in the study area.
Pacific Golden Plover	*Pluvialis fulva*	P	C,J,K	Known to occur in the study area.
Grey Plover	*Pluvialis squatarola*	P	C,J,K	Potential habitat may occur in the study area.
Common Sandpiper	*Actitis hypoleucos*	P	C,J,K	Known to occur in the study area.
Ruddy Turnstone	*Arenaria interpres*	P	C,J,K	Known to occur in the study area.
Sharp-tailed Sandpiper	*Calidris acuminata*	P	C,J,K	Known to occur in the study area.
Red Knot	*Calidris canutus*	P	C,J,K	Known to occur in the study area.
Curlew Sandpiper	*Calidris ferruginea*	E1,P	C,J,K	Known to occur in the study area.
Pectoral Sandpiper	*Calidris melanotos*	P	J,K	Known to occur in the study area.
Red-necked Stint	*Calidris ruficollis*	P	C,J,K	Known to occur in the study area.
Latham's Snipe	*Gallinago hardwickii*	P	C,J,K	Known to occur in the study area.
Australian Painted Snipe	*Rostratula australis*	E1,P	E, C	Potential habitat may occur in the study area.
Bar-tailed Godwit	*Limosa lapponica*	P	C,J,K	Known to occur in the study area.
Black-tailed Godwit	*Limosa limosa*	V,P	C,J,K	Potential habitat may occur in the study area. Has not been recorded in recent surveys of SOP lands.

Table 1 Threatened fauna and flora recorded within a 5km radius of the subject site

Common Name	Scientific Name	TSC Status	Comm. Status	Presence of Suitable Habitat in Study Area and Likelihood of Occurrence of Species
Eastern Curlew	*Numenius madagascariensis*	P	C,J,K	Known to occur in the study area.
Whimbrel	*Numenius phaeopus*	P	C,J,K	Potential habitat may occur in the study area.
Ruff	*Philomachus pugnax*	P	C,J,K	
Grey-tailed Tattler	*Tringa brevipes*	P	C,J,K	Potential habitat may occur in the study area.
Wood Sandpiper	*Tringa glareola*	P	C,J,K	Potential habitat may occur in the study area.
Common Greenshank	*Tringa nebularia*	P	C,J,K	Known to occur in the study area.
Marsh Sandpiper	*Tringa stagnatilis*	P	C,J,K	Known to occur in the study area.
Terek Sandpiper	*Xenus cinereus*	V,P	C,J,K	Potential habitat may occur in the study area.
White-winged Black Tern	*Chlidonias leucopterus*	P	C,J,K	Unlikely to occur in the study area.
Caspian Tern	*Hydroprogne caspia*	P	C,J	Unlikely to occur in the study area.
Common Tern	*Sterna hirundo*	P	C,J,K	Unlikely to occur in the study area.
Little Tern	*Sternula albifrons*	E1,P	C,J,K	Unlikely to occur in the study area.
Little Lorikeet	*Glossopsitta pusilla*	V,P		Unlikely to occur in the study area.
Swift Parrot	*Lathamus discolor*	E1,P,3	E	Unlikely to occur in the study area.
Powerful Owl	*Ninox strenua*	V,P,3		Unlikely to occur in the study area.
Eastern Grass Owl	*Tyto longimembris*	V,P,3		Unlikely to occur in the study area.
Rainbow Bee-eater	*Merops ornatus*	P	J	Unlikely to occur in the study area.
Regent Honeyeater	*Anthochaera phrygia*	E4A,P	E	Unlikely to occur in the study area.
White-fronted Chat	*Epthianura albifrons*	V,P		Potential habitat may occur in the study area.

Table 1 Threatened fauna and flora recorded within a 5km radius of the subject site

Common Name	Scientific Name	TSC Status	Comm. Status	Presence of Suitable Habitat in Study Area and Likelihood of Occurrence of Species
White-fronted Chat population in the Sydney Metropolitan Catchment Management Area	*Epthianura albifrons*	E2,V,P		Potential habitat may occur in the study area.
Mammalia				
Grey-headed Flying-fox	*Pteropus poliocephalus*	V,P	V	Known to occur in the study area. May forage on scattered trees on the subject site, such as Figs.
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	V,P		Unlikely to occur in the study area.
Eastern Freetail-bat	*Mormopterus norfolkensis*	V,P		Unlikely to occur in the study area.
Eastern Bentwing-bat	*Miniopterus schreibersii oceanensis*	V,P		Potential habitat may occur in the study area.
Flora				
Tadgell's Bluebell in the local government areas of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield	*Wahlenbergia multicaulis*	E2		No suitable habitat on the subject site. Records located near Rookwood Cemetary.
Narrow-leafed Wilsonia	*Wilsonia backhousei*	V,P		No suitable habitat on the subject site. Known habitat occurs in the study area within the Saltmarsh community in Badu Mangroves.
	Epacris purpurascens var. purpurascens	V,P		No suitable habitat is present. Not known to occur in the study area.
	Dillwynia tenuifolia	V,P		No suitable habitat is present. This species does not occur in

Table 1 Threatened fauna and flora recorded within a 5km radius of the subject site

Common Name	Scientific Name	TSC Status	Comm. Status	Presence of Suitable Habitat in Study Area and Likelihood of Occurrence of Species
				the locality, but is known from the Penrith and north western Sydney areas, with the nearest record approximately 20km away. However, this species is listed for consideration in the DGRs and has therefore been considered.
Matted Bush-pea	*Pultenaea pedunculata*	E1,P		No suitable habitat is present. Not known to occur in the study area.
Downy Wattle	*Acacia pubescens*	V,P	V	No suitable habitat is present. Not known to occur in the study area.
	Darwinia biflora	V,P	V	No suitable habitat is present. Not known to occur in the study area.
Narrow-leaved Black Peppermint	*Eucalyptus nicholii*	V,P	V	No suitable habitat is present. Not known to occur in the study area.
Wallangarra White Gum	*Eucalyptus scoparia*	E1,P	V	No suitable habitat is present. Not known to occur in the study area.
Magenta Lilly Pilly	*Syzygium paniculatum*	E1,P	V	No suitable habitat is present. Not known to occur in the study area.
P. prunifolia in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas	*Pomaderris prunifolia*	E2		No suitable habitat is present. Not known to occur in the study area.
	Zannichellia palustris	E1,P		Several records at Bennelong Pond (included in the study area). Would not occur on the subject site as it requires fresh or slightly saline water and is an aquatic plant.

Appendix C

Section 5A Assessments of Significance

C.1 Coastal Saltmarsh EEC

Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions is listed an endangered ecological community under the TSC Act. The community occurs in the intertidal zone on the shores of estuaries and lagoons that are permanently or intermittently open to the sea. It is frequently found as a zone on the landward side of mangrove stands. Characteristic plants include *Baumea juncea, Juncus krausii, Sarcocornia quinqueflora, Sporobolus virginicus, Triglochin striata, Isolepis nodosa, Samolus repens, Selliera radicans, Suaeda australis* and *Zoysia macrantha*. Occasionally mangroves are scattered through the saltmarsh. Tall reeds may also occur, as well as salt pans (OEH 2011).

This community occurs in the study area, north-east of the Brickpit, within the Badu Mangroves. This community occurs approximately 200m from the subject site.

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

Not applicable.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

Not applicable.

c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

No Coastal Saltmarsh vegetation will be removed or directly affected.

The composition of the community will not be modified by the proposed development.

d) In relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

No habitat for Coastal Saltmarsh will be removed.

There is a potential for the proposed development to impact on water quality from run-off during construction and operation of the proposed commercial building. All surface water run-off is either discharged or diffuses in to Badu Mangroves, downslope of Parkview Drive. Stormwater run-off post construction has been predicted to result in a negligible increase in volume and velocity, as demonstrated by the stormwater assessment (Hughes and Trueman 2009). Water quality changes are expected to be minimal through the implementation of measures such as installation of Water Sensitive Urban Design (WSUD) detention ponds. The row of Swamp Oaks and tiered garden beds on the slope between the subject site and Bennelong Parkway below, will be retained for filtration of surface water run-off and the maintenance of water quality. Water quality guidelines will be adhered to, including the implementation of a monitoring program.

With such measures in place, it is not expected that habitat for Coastal Saltmarsh will be impacted by any stage of the proposal.

The habitat will not be fragmented or isolated as a result of the proposed action.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No critical habitat for Coastal Saltmarsh has been declared by the Director-General of OEH.

f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plans,

No recovery plan has been prepared for this community.

g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

The main potential threat to the community from the proposed development is the alteration of salinity and increasing nutrient levels resulting from the discharge of stormwater into the saltmarshes. However, mitigation measures are proposed and will help reduce any potential impact on this community.

Conclusion:

No habitat for this EEC will be removed or modified from the proposed development. Mitigation measures proposed as part of the development are sufficient to minimise potential impacts on water quality which may affect its habitat. No further assessments are required.

C.2 Swamp Oak Floodplain Forest EEC

Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East

Corner bioregions is listed as an endangered ecological community under the TSC Act. The community is associated with grey-black clay-loams and sandy loams, where the groundwater is saline or sub-saline, on waterlogged or periodically inundated flats, drainage lines, lake margins and estuarine fringes associated with coastal floodplains (OEH 2011).

Swamp Oak Floodplain Forest occurs in the study area between Bennelong Parkway and the Coastal Saltmarsh community, within Badu Mangroves. This EEC is approximately 300m from the subject site.

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

Not applicable.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

Not applicable.

c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

No Swamp Oak Floodplain Forest vegetation will be removed or directly affected.

The EEC community will not be modified.

d) In relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

No habitat for Swamp Oak Floodplain Forest will be removed.

There is a potential for the proposed development to impact on water quality from run-off during construction and operation of the proposed commercial building. All surface water run-off is either discharged or diffuses in to Badu Mangroves, downslope of Parkview Drive. Stormwater run-off post construction has been predicted to result in a negligible increase in volume and velocity, as demonstrated by the stormwater assessment (Hughes and Trueman 2009). Water quality changes are expected to be minimal through the implementation of measures such as installation of Water Sensitive Urban Design (WSUD) detention ponds. The row of planted Swamp Oaks and tiered garden beds on the slope between the subject site and Bennelong Parkway below, will be retained for filtration of surface water run-off and the maintenance of water quality. Water quality guidelines will be adhered to, including the implementation of a monitoring program.

With such measures in place, it is not expected that habitat for Swamp Oak Floodplain Forest will be impacted by any stage of the proposal.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No critical habitat for Swamp Oak Floodplain Forest has been declared by the Director-General of OEH.

f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plans,

No recovery plan has been prepared for this community.

g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process

Clearing of native vegetation is the key threatening process but the community will not be affected by the proposed development.

Conclusion:

No habitat for this EEC will be removed or modified by the proposed development. Mitigation measures proposed as part of the development are sufficient to minimise potential impacts on water quality which may affect its habitat. No further assessments are required.

C.3 Narrow-leaf Wilsonia (*Wilsonia backhousei*)

In NSW Narrow-leaf Wilsonia is found on the coast between Mimosa Rocks National Park and Wamberal north of Sydney (Nelson's Lake, Potato Point, Sussex Inlet, Wowly Gully, Parramatta River at Ermington, Clovelly, Voyager Point, Wollongong and Royal National Park). It occurs at the margins of salt marshes and lakes, both coastal and inland (OEH 2012).

Narrow-leaf Wilsonia has been recorded in Badu Mangroves area, within the Coastal Saltmarsh EEC. No habitat will be removed by the proposal.

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

The proposed development will not have an effect on the life cycle of the species. There is the potential for water quality to be altered, however, this species is tolerant to fluctuations in freshwater and nutrients. Water quality controls will be implemented and the proposal is not expected to decrease water quality.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

Not applicable.

c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

Not applicable.

d) In relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

No areas of habitat will be removed for this species.

There is a potential for the proposed development to impact on water quality from run-off during construction and operation of the proposed commercial building. All surface water run-off is currently either discharged or diffuses in to Badu Mangroves, downslope of Parkview Drive. Stormwater run-off post construction has been determined to result in a negligible increase in volume and velocity, as demonstrated by the stormwater assessment (Hughes and Trueman 2009). Water quality changes are expected to be minimal through the implementation of measures such as installation of Water Sensitive Urban Design (WSUD) detention ponds. The row of planted Swamp Oaks and tiered garden beds on the slope between the subject site and Bennelong Parkway below, will be retained for filtration of surface water run-off and the maintenance of water quality. Water quality guidelines will be adhered to, including the implementation of a monitoring program.

With such measures in place, it is not expected that habitat for Narrow-leaf Wilsonia will be impacted by any stage of the proposal.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No critical habitat has been declared by the Director-General of OEH.

f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plans,

No recovery plan has been prepared for the species.

g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process

The species will not be impacted by the proposed development as it is located in the Badu Mangroves which is being conserved, along with mitigation measures to maintain water quality.

Conclusion:

No habitat for this species will be removed or modified. Mitigation measures proposed as part of the development are sufficient to minimise potential impacts on water quality which may affect its habitat. No further assessments are required.

C.4 *Zannichellia palustris*

In NSW this species is known from Sydney Olympic Park and the lower Hunter. It is an aquatic plant that occurs in fresh or slightly saline stationary or slow flowing water (OEH 2013). There are several known records at Bennelong Ponds.

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

The proposed development will not have an adverse effect on the life cycle of the species. Water quality will be maintained through mitigation measures.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

Not applicable.

c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

Not applicable.

d) In relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

No habitat for the species will be removed.

No habitat will be fragmented or isolated from the proposed development.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No critical habitat has been declared by the Director-General of OEH.

f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plans,

No recovery plan has been prepared for the species.

g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process

Changes in water quality could adversely affect the species. However, mitigation measures have been proposed as part of the development.

Conclusion:

No habitat for this species will be removed or modified. Mitigation measures proposed as part of the development are sufficient to minimise potential impacts on water quality which may affect its habitat. No further assessments are required.

C.5 Green and Golden Bell Frog (*Litoria aurea*)

Green and Golden Bell Frog habitat typically consists of four functional types:

- Breeding habitat: shallow, sunlit water bodies, either permanent or temporary, natural or artificial, particularly those with emergent vegetation (typically *Typha* and *Eleocharis* spp.), which lack predatory fish such as the Plague Minnow *Gambusia holbrooki*.
- Foraging habitat: areas of low vegetation, typically dominated by grasses and other grass-like plants usually within one kilometre of breeding habitat,
- Overwintering habitat: features such as rocks, logs and other debris, including non-natural materials that provide moist conditions and a relatively stable temperature range during winter when the frogs are inactive,

Corridor habitat: areas with appropriate environmental conditions (e.g. moisture, temperature) that act as movement corridors between breeding, foraging and overwintering habitat where these are not adjacent to one another – typically streams, ditches and drainage depressions (DEC 2005).

The Green and Golden Bell Frog is often considered to be a colonising species that is tolerant of a wide range of environmental conditions but does not compete favourably with other frog species and tends to be displaced from newly created or disturbed habitats in a form or ecological succession as environmental conditions change and additional frog species establish in such areas (DEC 2005).

A large and viable population of Green and Golden Bell Frogs occurs at the SOP site. Extensive areas of Green and Golden Bell Frog habitat have been constructed in the Brickpit, which has become a strong hold primary breeding site. Supplementary and “overwintering” habitat occurs close to the subject site, north in SOPA managed lands adjoining the Brickpit, east in Bennelong Pond within Badu Mangroves. Additional primary habitat occurs further north of the Brickpit including Wentworth Common and Kronos Hill, which are large and well connected areas, and also smaller Supplementary Habitat areas to the south, including the Southern Water Quality Control Pond and Lake Belvedere.

The proposed development will not remove any area of primary or supplementary habitat for Green and Golden Bell Frogs. It is likely that these species move through the subject land and study area on occasion, due to the proximity to an underpass located south of the subject site. This underpass links Bennelong Pond with the vegetation on the western slope of Bennelong Parkway. This connective vegetation will remain along Bennelong Parkway towards the SOPA lands north of the subject site and further north to the Brickpit.

Landscaping has been designed with this species in mind, and will contribute to the north-south connectivity via long garden beds with appropriate grasses and shrubs, as recommended by DECCW (DECC (NSW), 2008a).

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

No areas of breeding habitat will be modified or removed by the proposal. Therefore no impacts on the lifecycle of this species are expected.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

Not applicable.

c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

Not applicable.

d) In relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

No areas of habitat will be removed for this species. The proposal involves construction of new buildings in the location of an existing one.

There is a potential for the proposed development to impact on water quality from run-off during construction and operation of the proposed commercial building. All surface water run-off is currently either discharged or diffuses in to Badu Mangroves, downslope of Parkview Drive. Stormwater run-off post construction has been determined to result in a negligible increase in volume and velocity, as demonstrated by the stormwater assessment (Hughes and Trueman 2009). Water quality changes are expected to be minimal through the implementation of measures such as installation of Water Sensitive Urban Design (WSUD) detention ponds. The row of planted Swamp Oaks and tiered garden beds on the slope between the subject site and Bennelong Parkway below, will be retained for filtration of surface water run-off and the maintenance of water quality. Water quality guidelines will be adhered to, including the

implementation of a monitoring program. With such measures in place, it is not expected that habitat for the Green and Golden Bell Frog will be impacted be any stage of the proposal.

Presently, movement between the subject land, SOPA lands to the north and Badu Mangroves is fragmented by Bennelong Parkway. A preferred movement corridor for Green and Golden Bell Frogs is likely to be via the existing underpasses between the Brickpit and Badu Mangroves, under Bennelong Parkway. The landscape design as part of the proposal includes linear garden beds which will be planted with suitable grasses for sufficient cover to allow for movement by Green and Golden Bell Frogs. It is not anticipated that the proposed development will significantly reduce the movement of this species between areas of adjoining habitat.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

The proposed development will have no adverse effect on critical habitat.

f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plans,

No final recovery plan has been prepared for the species.

g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process

The proposed development will not remove any habitat suitable for the species.

Conclusion:

No habitat for the Green and Golden Bell Frog will be removed or modified. Mitigation measures proposed as part of the development are sufficient to minimise potential impacts on water quality which may affect its habitat. No further assessments are required.

C.6 Waterbirds

A large number of waterbirds inhabit in the study area. The combination of saltmarsh, intertidal and freshwater wetlands around Homebush Bay, including the Badu Mangroves, provides one of the most important sites in the Sydney basin for native waterbirds, including migratory shorebirds covered by the JAMBA (Japan-Australia Migratory Birds Agreement) and CAMBA (China-Australia Migratory Birds Agreement) treaties.

Two of the bird species known to occur in the Homebush area, and are likely in the study area, are listed under the TSC Act. Those species which are of relevance to both the TSC Act and EPBC Act are addressed in both assessments below.

This assessment is for water birds listed under the TSC Act, namely;

- Australia Painted Snipe (endangered); and
- Australian Bittern (endangered)

Various other species have the potential to occur or are known from the study area. No potential habitat will be removed from the proposed development.

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

No areas of breeding or roosting habitat will be removed by the proposal. Therefore no impacts on the lifecycle of these species are expected.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

Not applicable.

c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

Not applicable.

d) In relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

No areas of habitat will be removed for these species. The proposal involves construction of new buildings in the location of an existing buidling and carparks. Habitat connectivity will not be impacted by the proposal. All areas of Badu Mangroves and adjoining areas associated with Parramatta River will remain unaltered.

There is a potential for the proposed development to impact on water quality from run-off during construction and operation of the proposed commercial building. All surface water run-off is currently either discharged or diffuses in to Badu Mangroves, downslope of Parkview Drive. Stormwater run-off post construction has been determined to result in a negligible increase in volume and velocity, as demonstrated by the stormwater assessment (Hughes and Trueman 2009). Water quality changes are expected to be minimal through the implementation of measures such as installation of Water Sensitive Urban Design (WSUD) detention ponds. The row of planted Swamp Oaks and tiered garden beds on the slope between the subject site and Bennelong Parkway below, will be retained for filtration of surface water run-off and the maintenance of water quality. Water quality guidelines will be adhered to, including the implementation of a monitoring program.

With such measures in place, it is not expected that habitat for these water birds will be impacted by any stage of the proposal.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No critical habitat for either bird species has been declared by the Director-General of OEH.

f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plans,

No recovery plans have been finalised for these species.

g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process

Waterbirds will not be affected by the proposed development as no habitat will be removed and various mitigation measures will be undertaken in order prevent the reduction in water quality at potential habitat.

Conclusion:

No habitat for these species will be removed or modified. Mitigation measures proposed as part of the development are sufficient to minimise potential impacts on water quality which may affect its habitat. No further assessments are required.

C.7 Grey-headed Flying-fox (*Pteropus poliocephalus*)

The Grey-headed Flying-fox is the largest bat in Australia, distributed along the east coast from Bundaberg in Queensland to Melbourne, Victoria. It occurs as far west as the western slopes of the Great Dividing Range in northern NSW. It occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps. Grey-headed Flying-foxes migrate according to the availability of native fruits, nectar and pollen. They roost in large "camps" which are generally within 20km of a food source. The Grey-headed Flying-fox is listed as Vulnerable on Schedule 2 of the TSC Act and Vulnerable under the EPBC Act.

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

No areas of breeding or roosting habitat will be removed by the proposal. Therefore no impacts on the lifecycle of the species is expected.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

No endangered populations of the subject bat species are currently listed on Schedule 1 of the TSC Act.

c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

Not applicable.

d) In relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

No areas of habitat will be removed for these species. The proposal involves construction of new buildings in the location of an existing buidling and carparks.

No habitat will become fragmented or isolated as no native vegetation communities are present.

The few trees that may be removed would only provide a potential foraging habitat. The planting of fruiting and flowering trees, particularly figs as part of landscaping will increase habitat for the Grey-headed Flying-fox.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No critical habitat for the subject bat species has currently been listed in the critical habitat registry by the Director-General of the DEC.

f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plans,

No recovery plans have been finalised or drafted for any of these bat species to date (only a Draft National Recovery Plan for the Grey-headed Flying-fox dated July 2009) is available.

No threat abatement plans are relevant to these species.

g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Native vegetation clearance that results in the loss of habitat is a listed threatening process under the TSC Act. A relatively small number of plantings may be removed prior to construction.

Conclusion:

The subject site will not involve the removal of important potential foraging or breeding habitat. No significant impact is likely on this species and no Species Impact Statement is required.

Appendix D

Significant Impact Criteria

Significant impact criteria for EPBC listed species, including migratory species (occuring within the study area but not the subject site), Green and Golden Bell Frog and the Grey-headed Flying-fox (potential to occur on subject site) were considered

D.1 Migratory Species

Migratory bird species have the potential, or are known to occur in the study area. These are the Greater Sand-plover, Pacific Golden Plover, Grey Plover, Common Sandpiper, Ruddy Turnstone, Sharp-tailed Sandpiper, Red Knot, Curlew Sandpiper, Pectoral Sandpiper, Red-necked Stint, Latham's Snipe, Australian Painted Snipe, Bar-tailed Godwit, Black-tailed Godwit, Eastern Curlew, Whimbrel, Ruff, Grey-tailed Tattler, Wood Sandpiper, Common Greenshank, Marsh Sandpiper, Terek Sandpiper, White-winged Black Tern, Caspian Tern, Common Tern and Little Tern.

Will the action:

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

No habitat will be directly affected by the proposed action. Mitigation measures will ensure that stormwater run-off and water quality will not result in negative impacts through a net increase in nutrient loads or stormwater volume.

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

No.

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

No. The available habitat in the study area is not a known prominent roosting site for migratory birds. The continuation of plantings of tall screening vegetation, as currently exists, will greatly reduce lightspill impact, as well as the implementation of additional measures such as light timers in the buildings at night. Shadowing effects of the proposed action will not be an issue as building heights are below or within height specifications of SOPA.

D.2 Green and Golden Bell Frog (*Litoria aurea*)

Will the action:

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

No. The subject site is not the location of habitat. Primary and supplementary habitat is present in the study area and supports a large and established breeding population of the GGBF.

- *reduce the area of occupancy of the species*

No. The subject site exists on a currently existing commercial/industrial precinct. Areas of occupancy (namely the Brickpit and Badu Mangroves) will not be impacted by the proposed action.

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

No. The large and established population is found in the Brickpit north of the subject site which will not be impacted by the proposed action.

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

No critical habitat will be affected.

- *disrupt the breeding cycle of a population*

No.

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

No. The subject site is already in an area that has previously been a commercial/industrial precinct and no quality habitat is present where the proposed action is proposed. Mitigation measures will ensure that any adjacent habitat is not compromised.

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

No.

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

No. Hygiene protocols will be implemented via a specific sub-plan for the subject site.

- *interfere with the recovery of the species.*

No.

D.3 Grey-headed Flying-fox (*Pteropus poliocephalus*)

Will the action:

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

No. The species would only occur on occasion to forage on the subject site.

- *reduce the area of occupancy of the species*

No.

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

No.

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

No critical habitat is present on the subject site.

- *disrupt the breeding cycle of a population*

No breeding habitat is present on the subject site.

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

The few trees that may be removed would only provide potential foraging habitat. The planting of fruiting and flowering trees, particularly figs as part of landscaping will increase habitat for the Grey-headed Flying-fox.

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

No.

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

No.

- *interfere with the recovery of the species*.

No.