Our Ref: 16002 Additional Ecological Information – Trinity Point Helipad
Via: email

Date: 20th May 2019

Attn: Bryan Garland
Johnson Property Group
PO Box A1308
Sydney South NSW 1235

Dear Bryan,

RE: ADDITIONAL ECOLOGICAL INFORMATION LETTER, TRINITY POINT HELIPAD, TRINITY POINT

Additional ecological information has been requested by Johnson Property Group (JPG) in relation to MJD Environmental (2018) *Ecological Assessment Trinity Point Helipad Trinity Point* prepared for JPG to inform ecological impacts related to the construction and operation of a proposed helipad to be included as part of the concept approved marina and mixed-use development at Trinity Point.

The additional ecological information contained herein is intended to be read in conjunction with the MJD (2018) Ecological Assessment. The results of additional habitat assessments and avifauna surveys are presented, together with a summary of relevant findings of the Ecological Assessment and updated database searches for threatened species in the locality. The methodology used for additional avifauna surveys is consistent with methods accepted on consultation with OEH for the Ecological Assessment, only the area of habitat survey and locations of avifauna census have been expanded.

MJD Environmental (2018) Aims & Scope

The Ecological Assessment was prepared to:

- Accompany the Part 3A Concept Plan Section 75W Modification Application known as MOD 3 currently being assessed by the NSW Department of Planning & Environmental (DPE). The modification application proposes the addition of a helipad to the Part 3A Concept Plan;
- to address the Secretary's Environmental Assessment Requirements (SEARs) for the proposed, Modification (SEARS MP06_0309 MOD3); and
- accompany an Environmental Impact Statement (EIS) that will form part of DA 1176/2014 (Lodged with Lake Macquarie City Council (LMCC)) for the construction and operation of the proposed helipad, which this application is a designated development. Requirements for the EIS are in the SEARs issued by the NSW DPE (SEAR 846) in July 2016.

The assessment aimed to examine the likelihood of the proposed helipad having a significant effect on any threatened species, populations or ecological communities listed under the *NSW Threatened Species Conservation Act 1995* (TSC Act). The assessment recognises the relevant requirements of the EP&A Act 1979 as amended by the *NSW Environmental Planning and Assessment Amendment Act 1997*. Preliminary assessment was also made with regard to those threatened entities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

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Introduction

This report has been prepared as a supplementary report to address proposed changes to the application made during proceedings in the Land and Environment Court. Generally the changes involve:

(a) Flights being restricted over residential areas of Bardens Bay, identified as an "exclusion area" for all helicopters using the helipad.

(b) Specific flight paths being removed and a take-off and landing area provided to the south and east of the helipad.

(c) A reduction in the number of flight movements to a maximum of six movements per day and 38 movements per week.

Attachment 1 shows the revised proposal. The additional information in this letter addresses ecological impacts of the revised helicopter take off and landing area, in the same vicinity as the majority of flight paths assessed in the MJD Environmental (2018) Ecological Assessment. Aside from the additional flight areas, the details of the proposed development and the ecological survey methodology remain unchanged. Details of the updated helicopter flight areas are presented below.

Site Details

Locality	**Operations Area:** The proposed helicopter take off and landing area within which helicopter movements will mostly be at or below 500 ft. The helicopteraltitiude above land will be at a minimum of 1,000ft. **Study Area:** The Study Area as follows (refer to **Attachment 1**): ▪ A 1km buffer surrounding the Operations Area (Incl. Operation Area).
Boundaries	The Study Area is bound to the north by Brightwaters, Sunshine, Bardens Bay, and Sugar Bay, to the west by Bluff Point, to the south by Vales Point, and to the south east by Summerland Point. All other boundaries consist of open waters of Lake Macquarie.
Current Land Use	The Study Area consists of open waters of Lake Macquarie with a marina and moored boats in Barden's Bay. Recreational activities such as fishing, jet skiing, and sailing occur within the Study Area. Land borders generally consist of existing residential areas.
Topography	The Study Area consists of the waters of Lake Macquarie and shorelines generally less than 4m in elevation.

Methodology

The updated Study Area includes the new proposed take-off and landing area, together with a 1km buffer surrounding that area. See **Attachment 2** showing the proposed helicopter take-off and landing area and the Study Area (1km buffer) which is the subject of this updated ecological information letter.

Database Searches

Database searches were conducted of the NSW BioNet Atlas and Commonwealth Protected Matters Search Tool on 20-5-2019.

The database search results are presented as **Attachment 5**.

Field Survey

Field surveys were undertaken over three days from 4th to 7th February 2019. The survey period coincides with the summer period when migratory shorebirds are predicted to be present in the Lake Macquarie area. The prevailing weather condition and tides during the survey are presented in **Attachment 4**. Habitat Surveys and formal avifauna census were carried out in a three-stage process as detailed in Section 2.3.2 and Section 2.3.3 of the Ecological Assessment (MJD 2018).

Results

Stage 1 Desktop Appraisal

The Stage 1 desktop habitat appraisal identified a total of three survey sites that were considered to contain potential habitat for target avifauna groups. The Stage 1 desktop survey site locations are shown in **Attachment 2**.

Stage 2 Habitat Validation Field Survey

The Stage 2 habitat validation field survey was undertaken to ground truth the potential habitat and survey locations identified during the Stage 1 desktop habitat appraisal. The habitat validation survey was undertaken over a two-day period, where information collected was used to refine the selection of formal avifauna census survey sites within the Study Area (to be conducted as Stage 3 works).

Section 3.2.2 of the Ecological Assessment describes results of the Stage 2 habitat validation field survey. Sites which fall within the updated Study Area include Trinity Point & Barden's Bay, Mannering Point, and Summerland Point. Note that additional surveys detailed below cover parts of Summerland Point not previously surveyed. The following section provides a description of all additional sites identified during the Stage 1 desktop habitat appraisal based on the results of the Stage 2 habitat validation field survey works. Photographs of each habitat assessment site are provided in **Attachment 7**.

Sugar Bay – West

Sugar Bay lies north of the proposed operations area, with the western end of the bay greater than 500m from the operations area. The topography inland from the bay slopes gently within a LMCC managed foreshore reserve. The terrestrial environment is characterised by high levels of human disturbance and activity, with mown grasses extending almost to the water's edge, and open canopy trees such as *Eucalyptus tereticornis* and *Angophora floribunda* in the grassy park, and *Casuarina glauca* along the shore. The immediate shoreline environment generally consists of steep banks dropping from the grassed parkland to a substrate of large pebbles in the very limited intertidal area. In some places the stony substrate is covered with mats of dead seagrass. The intertidal zone in this part of the bay is very small to non-existent, and the substrate has very poor foraging potential. Moreover, the high levels of disturbance in the terrestrial environment, including back yards with domestic dogs adjacent to the foreshore park, and recreational activity within the park, limit the potential of this area to be used by roosting shorebirds. On this basis, this site was not selected for formal avifauna surveys.

Sugar Bay - East

Sugar Bay lies north of the proposed operations area, with the eastern end of the bay greater than 500m from the helicopter operations area. The topography inland from the bay slopes somewhat more steeply in the east, with a flat, grassy parkland in foreshore areas. The terrestrial environment is characterised by high levels of human activity to the west, becoming less disturbed to the east adjacent to forested Council lands of Fishery Point. The highest quality potential foraging habitat found within the additional Study Area is located in the east of Sugar Bay. At low tide, some rock shelves and sandy

beaches are exposed. However, generally rock shelfs were observed to be bare, lacking molluscs and other invertebrates that otherwise provide forage on intertidal rocks. Some sandy areas and small inlets were covered by sediment and could potentially support benthic invertebrates on which shorebirds could forage; however, such habitats covered only very small, limited sections of shoreline. On this basis, this site was selected for formal avifauna surveys.

Fishery Point

Fishery Point lies from 500m to 1km north east of the proposed operations area. The Fishery Point peninsula is characterised by steeply sloping topography, steep slopes and cliff faces meet the water's edge at the end of the peninsula. Below the cliffs, a narrow sandy strip is exposed on very low tides in some places, while most of the peninsula's shoreline consists of rocky rubble and a steep rocky interface with the lake. This area offers limited foraging potential for shorebirds, as the sandy substrate, where present, is poor in organic material and is unlikely to support large numbers of invertebrates. However, due to the protection offered by steep cliff faces, this area has potential to provide roosting habitat for shorebirds at high tide. On this basis, this site was selected for Stage 3 formal avifauna surveys.

Frying Pan Bay – Western Shore

The western shore of Frying Pan Bay extending from Frying Pan Point to the area of the boat ramp and jetty is almost entirely lacking in habitat for target avifauna groups. Except for a few, limited areas of exposed sand, the entire shoreline environment consists of modified structures with a steep interface with water, or steep banks, which result in an intertidal environment that does not become exposed even during low tides. Much of the shoreline is covered by dead seagrass. Further inland, mown lawns extend almost to the water's edge, and there are high levels of human recreational activity, including dogs off-leads. Due to the high levels of human disturbance and lack of exposed intertidal foraging habitats, this area is not likely to be utilised for foraging or roosting by target avifauna groups. On this basis, this site was not selected for formal avifauna surveys.

Frying Pan Bay – Boat Ramp and Jetty

The Summerland Point Boat Ramp and a public jetty is located at the head of Frying Pan Bay, approximately 1km from the proposed operations area. The boat ramp accesses a small lagoon which is connected to Frying Pan Bay by a narrow inlet. The parts of the lagoon are lined by muddy mangrove flats, which may provide foraging habitat. However, the area of exposed mud is relatively narrow. In other areas, the lagoon contains small sandy beaches. The inlet is heavily modified by stone retaining walls and riprap. The surrounding areas are heavily affected by human activity, including the boat ramp, park lands, car parks, and a nearby shopping centre. At the head of Frying Pan Bay outside the lagoon, the shoreline is heavily modified, with only a narrow, stony intertidal area exposed at low tide, bordered in many areas by timber or concrete structures. Small sandy beaches are present along limited stretches of the eastern shore of the bay. Further north toward Summerland Point, the shoreline is modified by many private jetties and associated structures, interspersed with a few small sandy beaches. Despite high levels of human disturbance, the presence of mudflats in the small lagoon, resulted in this site being selected for formal avifauna surveys.

<u>Stage 3 Avifauna Survey</u>

Avifauna survey results are provided below. A full list of bird species recorded within the Study Area is provided as **Attachment 8**. Avifauna surveys were undertaken over 5 person-hours across the Study Area. Surveys were undertaken at both high and low tide at each survey location. Surveys took place during the summer, when migratory shorebird species are in Southeast Australia. Weather conditions were partly cloudy and warm with a light breeze during the afternoons when low-tide surveys were

carried out. During high-tide surveys, conditions were sunny and warm, with strong winds in the early afternoon at the time of high-tide surveys.

Birds observed either opportunistically during habitat assessments, or recorded during formal avifauna surveys detailed below, where primarily common species seen throughout the Lake Macquarie area and foreshores. Species common to woodlands and parklands such as Rainbow Lorikeets, Sulphur Crested Cockatoos, Magpie Larks, and Noisy Miners were seen throughout the study area. The species most commonly sighted on the shores or the open waters of the lake were Wood Ducks, Pacific Black Ducks, Masked Lapwings and Crested Terns.

The shorelines throughout the Study Area are generally low in potential foraging or refuge habitat.

A summary of the formal avifauna survey results for the three survey sites is provided below.

Sugar Bay - East

- No threatened bird species were recorded during surveys at this site
- Common terrestrial bird species observed at this survey site included Noisy Miners, Rainbow Lorikeets, Sulphur-crested Cockatoos, Little Corella, Pied Butcherbird, Australian Magpie, Magpie Lark, Crested Pigeon, Welcome Swallow, and White-breasted Woodswallow
- Common waterbirds and shorebirds observed included Pacific Black Ducks, Australian Wood Ducks, Silver Gulls, and Masked Lapwings

Fishery Point

- No threatened bird species were recorded during surveys at this site
- Common terrestrial bird species observed at this survey site included Rainbow Lorikeets and Australian Magpies
- Common waterbirds observed included Crested Terns, Little Black Cormorants, and Australian Pelicans

Frying Pan Bay – Boat Ramp and Jetty

- No threatened bird species were recorded during surveys at this site
- Common terrestrial bird species observed at this survey site included Noisy Miners, Rainbow Lorikeets, Galahs, Sulphur-crested Cockatoos, Magpie Lark, Tree Martin, Welcome Swallows, and Crested Pigeons
- Common waterbirds and shorebirds observed included Little Pied Cormorants, Silver Gulls, Australian Wood Ducks, Pacific Black Ducks, and Masked Lapwings

Impact Assessment

Impacts within the Study Area are detailed in Section 4.1 of the Ecological Assessment. The additional survey areas will be subject to the same indirect impacts, with bird mortality as a result of striking helicopters in flight and low levels of noise impacts due to helicopter operations being the primary potential impact. Direct impacts as described in the Ecological Assessment will not occur in the additional survey areas which are the subject of this letter.

The likelihood of occurrence and potential for impact on threatened flora and fauna species considered within this assessment are provided in **Attachment 5**. Species where potential for impact is considered have been nominated for further assessment under an Assessment of Significance in **Attachment 6**.

The additional survey areas which are the subject of this letter did not contain any significant habitats, or habitats different from those recorded in the Ecological Assessment, and no additional threatened flora or fauna species were recorded.

The Ecological Assessment and 7-Part Test considered whether the proposed helipad to be included as part of the concept approved marina and mixed-use development at Trinity Point, would have the potential to constitute a significant impact on known threatened species (particularly Avifauna), and populations from the locality such that a local extinction may occur.

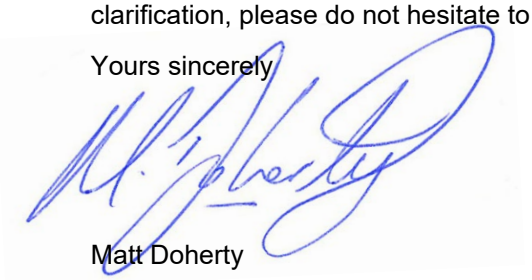
The assessment concluded that the proposal was unlikely to have a significant impact on the threatened entities assessed. This assessment remains accurate within the additional areas surveyed and assessed in this additional ecological information letter.

Conclusion

This ecological assessment has considered the potential for impacts to threatened flora and fauna species arising from the designated helicopter take-off and landing area associated with the proposed helipad which will be integrated into the concept approved marina and mixed-use development at Trinity Point. The results of this assessment, including survey of additional areas not included in MJD Environmental (2018) *Ecological Assessment Trinity Point Helipad Trinity Point*, concluded that the proposal is unlikely to have a significant impact on threatened species, populations, or ecological communities listed under the TSC Act (as repealed, in force at the time of lodgement) or the EPBC Act.

We trust this is sufficient for your purposes; however should you require any further information or clarification, please do not hesitate to contact Bret Stewart (Ecologist) or the undersigned.

Yours sincerely



Matt Doherty
Director
MJD Environmental Pty Limited

Encl: Attachment 1 – Site Plan
Attachment 2 – Stage 2 Habitat Survey Sites
Attachment 3 – Stage 3 Avifauna Survey Sites
Attachment 4 – Prevailing Weather Conditions and Tides During Survey Period
Attachment 5 – Database Search Results and Likelihood of Occurrence Assessment
Attachment 6 – Assessment of Significance 7-Part Test
Attachment 7 – Habitat Assessment Site Photographs
Attachment 8 – Avifauna Species List

References:

Acoustic Group (2008) *Acoustic Assessment : Trinity Point and Mixed Development* The Acoustic Group; Prepared for Johnson Property Group ; October 2008

Acoustic Group (2016) *Acoustic Assessment Proposed Helipad Trinity Point -46.4732.R7B :MSC.* The Acoustic Group; Prepared for Johnson Property Group ; October 2016

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MJD Environmental (2018) *Ecological Assessment Trinity Point Helipad Trinity Point*. Prepared for Johnson Property Group

MPR (2014) *Trinity Point Lake Macquarie: Aquatic Investigations Report.* Marine Pollution Research Pty Ltd. September 2014.

MPR (2016) *Trinity Point Lake Macquarie: Trinity Point Helipad Aquatic Ecology Impact Report.* Marine Pollution Research Pty Ltd. October 2016.

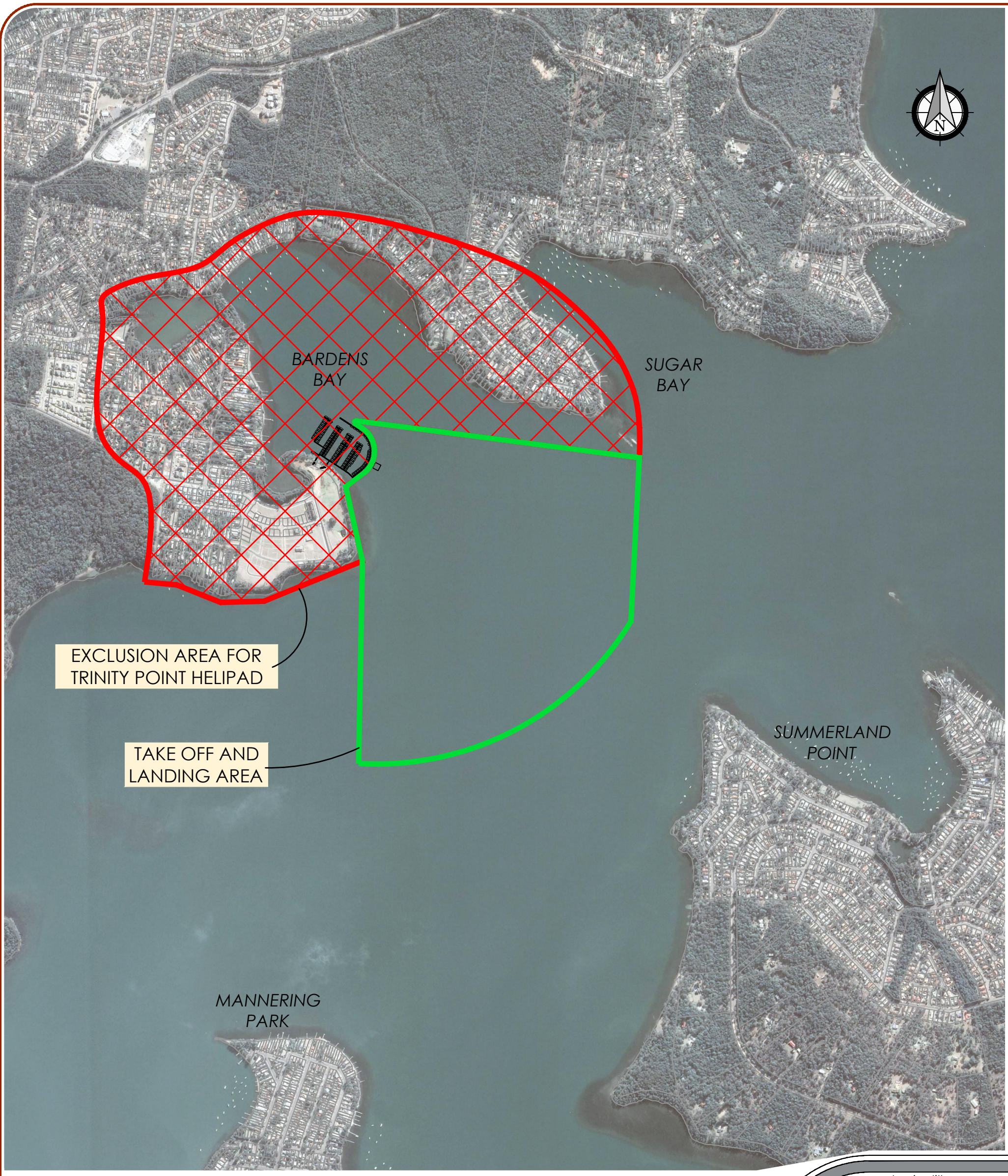
NSW OEH Threatened Species Profile Search - http://www.environment.nsw.gov.au/threatenedSpeciesApp/ (accessed May 2019)

Pizzey, G. and Knight, F. (2007) *The Field Guide to the Birds of Australia*. Harper Collins Publishers, Sydney.

Simpson. K, and Day. N. (2010) *Field Guide to the Birds of Australia*. Penguin Group, Australia.

Attachment 1 – Site Plan

37429(4)-HELI-08-E



DESIGNATED HELICOPTER TAKE OFF AND LANDING AREA

EXCLUSION AREA FOR TRINITY POINT HELIPAD

ver.	date	comment	drawn	pm	level information	scale (A3 original size)
E	16/4/19	AMEND GREEN AREA	MS	CM	DATUM: N/A CONTOUR INTERVAL: N/A	0 300 600 750m SCALE: 1:15,000 (FULL)

working beyond expectations

drawing title:

DESIGNATED HELICOPTER TAKE OFF & LANDING AREA

location: LAKE MACQUARIE NSW

council: LAKE MACQUARIE

dwg ref: 37429(4)-HELI-08-E

client: JOHNSON PROPERTY GROUP

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ATTACHMENT 2 - STAGE 2 HABITAT

Legend

- Helipad
- Designated Helicopter Take Off and Landing Area
- Exclusion Area for Trinity Point Helipad
- Study Area

Habitat Types

- Bushland
- Mudflat
- Rock Shelf
- Saltmarsh
- Sandy Beach
- Shoreline Veg

0 1

kilometers

Scale 1:22,000

N
W E
S

MJD Environmental PTY LIMITED

Aerial: NearMap (2018)
Data: MJD Environmental, ADW Johnson (2019)
Datum/Projection: GDA 1994 MGA Zone 56
Date: 28/02/2019 Version 2
Project Files\16002 - Trinity Point\5. GIS
This plan should not be relied upon for critical design dimensions.

ATTACHMENT 3 - STAGE 3 AVIFAUNA

Legend

- Helipad
- Designated Helicopter Take Off and Landing Area
- Exclusion Area for Trinity Point Helipad
- Study Area
- Census Location
- Additional Location

0 1

kilometers

Scale 1:22,000

N
W E
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MJD Environmental PTY LIMITED

Aerial: NearMap (2018)
Data: MJD Environmental, ADW Johnson (2019)
Datum/Projection: GDA 1994 MGA Zone 56
Date: 28/02/2019 Version 2
Project Files\16002 - Trinity Point\5. GIS
This plan should not be relied upon for critical design dimensions.

Attachment 4 – Prevailing Weather Conditions and Tides during field survey period

Date	Min Temp (°C)	Max Temp (°C)	Rain (mm)	Wind (km/h)	Sunrise-Sunset	Tide	Tide Time*	Survey Commencement
4 Feb 2019	20.6	27.8	0	N 15 to E 24 gusts to E 31	06:19 – 19:55	Low	16:14	15:30
5 Feb 2019	21.2	27.1	0	SE 6 to E 35 Gust to ENE 52	06:20 - 19:55	Low	16:45	16:00
7 Feb 2019	21.1	24.9	0	SE 7 to E 13 gusts to ENE 48	06:22 – 19:53	High	13:32	13:15

*Tide times include within lake variation; High +2.30hrs, Low+30min

Sources: http://www.bom.gov.au/climate/dwo/IDCJDW2097.latest.shtml
http://www.ga.gov.au/bin/geodesy/run/sunrisenset

Attachment 5 – Database Search Results and Likelihood of Occurrence Assessment

Threatened flora and fauna species (listed under the TSC Act as repealed) that have been gazetted and recorded within a 10 kilometres radius of the site have been considered within this assessment. Each species / community is considered for its likelihood to occur on the site and potential for impact arising from the proposal. Where a potential for impact is considered the entity has been nominated for further assessment under an assessment of significance (7-part test) in **Attachment 6**.

'**Species / Community**' – Lists each threatened species / EEC known from the locality (10 km radius). The status and number of records along with source and notes for each threatened entity under the TSC Act are also provided.

'**Likelihood of Occurrence on Site**' – Assesses the likelihood of each locally recorded species and EEC to occur within the site, using knowledge of each species' habitat and lifecycle requirements and with regard the habitat types present within the Site, results of the literature review and database searches and field investigations. The location and number of records of the species (OEH BioNet Atlas NSW) were also considered in determining probability of occurrence.

'**Potential for Impact**' – Assesses the likelihood of impacts to each species / community that would result from the proposed development, taking into account direct and indirect short and long-term impacts.

Database searches were conducted of the NSW Wildlife Atlas and Commonwealth Protected Matters Search Tool (20-5-2019).

Note: Note: marine species (reptile, fish, mammal) recorded on the Protected Matters have not been listed or assessed herewith due to these species being address in MPR (2016) report. Due to the additional helicopter operation areas which are the subject of this letter being entirely over open water, terrestrial flora have not been assessed below. Assessment of threatened flora species is found in Section 4.2 of the Ecological Assessment.

Table 1 Likelihood of Occurrence and Impact Assessment

Common Name	Scientific Name	TSC Act	EPBC Act	No. of records*	Likelihood of Occurrence / Likely Level of Impact
Birds					
Anthochaera phrygia	Regent Honeyeater	E	CE	14	The proposal does not seek to modify or alter habitats that this species could utilise for foraging or refuge habitat as a stepping stone across the local landscape during its seasonal migration. Noise produced from helicopters that will fly over forest or woodland that may provide habitat for this species would be minor due to the height

Common Name	Scientific Name	TSC Act	EPBC Act	No. of records*	Likelihood of Occurrence / Likely Level of Impact
					(approx. 1000 foot altitude) at which the helicopter would be above terrestrial vegetation. On this basis, it is **unlikely** the species will be impacted by the proposal
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V		1	The proposal does not seek to modify or alter terrestrial habitats that this species may utilise for foraging or for nesting. The proposed helicopter flight area from the helipad are over open water and once above land will be generally above 1000ft, greatly reducing the potential for interactions within the flight path. Noise produced by helicopters flying over woodland habitat would be minor due to the altitude at which the helicopter will fly above vegetation. On this basis, it is **unlikely** the species will be impacted by the proposal.
Botaurus poiciloptilus	Australasian Bittern	E	E	-	Targeted habitat surveys within the Study Area, did not detect suitable habitat (Permanent freshwater wetland with tall sedges and rushes), for this species to utilise. The proposed helicopter flight area will be over open water and once above land will be generally greater than 1,000ft. Due to the lack of suitable habitat this species is unlikely to occur in the Study Area. On this basis, it is **unlikely** the species will be impacted by the proposal.
Burhinus grallarius	Bush Stone-curlew	E		1	The proposal does not seek to modify or alter habitats this species could utilise for foraging or refuge. Noise produced from helicopters that will fly over terrestrial habitats for this species would be minor due to the height at which helicopters will fly above terrestrial vegetation. This species is largely nocturnal and unlikely to be flying within the area of flight area during hours of operation of the helipad. On this basis, it is **unlikely** the species will be impacted by the proposal.
Calidris carnutus	Red Knot		E, M, A	1	Targeted habitat surveys within the Study Area, did not detect this species or significant suitable habitat for this species to utilise. Intertidal zones of Barden's Bay and surrounds are generally no greater than 1-1.5m in width at low tides, often significantly less due to slope at the interface with water. The potential foraging habitat is marginal at best, therefore this species is unlikely to be present within the Study Area. In addition, the lack of protection and security in this narrow band of habitat, due to the close proximity of human occupation to much of the lakes edge and high pedestrian usage along the foreshore would severely limit the utilisation of this area by this species. The proposed helicopter flight area will be over open water outside intertidal zones and once above land will be generally greater than 1,000ft reducing the impacts of noise on fauna species. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area.

Common Name	Scientific Name	TSC Act	EPBC Act	No. of records*	Likelihood of Occurrence / Likely Level of Impact
					On this basis, it is **unlikely** the species will be impacted by the proposal.
Calidris ferruginea	Curlew Sandpiper	E	CE, M, A	1	Targeted habitat surveys within the Study Area, did not detect significant suitable habitat for this species to utilise. Intertidal zones of Bardens Bay and surrounds are generally less than 1m in width, often significantly less due to slope at interface with water. Therefore, foraging habitat is unlikely to be present within the Study Area during all but the most significant low tide events. In addition, the lack of protection and security in this narrow bands of habitat, due to the close proximity of urbanisation to much of the lakes edge and high pedestrian usage along the foreshore would severely limit the utilisation of this area by this species. The proposed helicopter flight area will be over open water outside intertidal zones and once above land will be generally greater than 1,000ft reducing the impacts of noise on fauna species. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis, it is **unlikely** the species will be impacted by the proposal.
Calidris tenuirostris	Great Knot	V	CE, M, A	-	Targeted habitat surveys within the Study Area, did not detect significant suitable habitat for this species to utilise. Intertidal zones of Bardens Bay and surrounds are generally less than 1m in width, often significantly less due to slope at interface with water. Therefore, foraging habitat is unlikely to be present within the Study Area during all but the most significant low tide events. In addition, the lack of protection and security in this narrow bands of habitat, due to the close proximity of urbanisation to much of the lake's edge and high pedestrian usage along the foreshore would severely limit the utilisation of this area by this species. The proposed helicopter flight area will be over open water outside intertidal zones and once above land will be generally greater than 1,000ft reducing the impacts of noise on fauna species. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis, it is **unlikely** the species will be impacted by the proposal.
Callocephalon fimbriatum	Gang-gang Cockatoo	V		1	The proposal does not seek to modify or alter terrestrial habitats that this species may utilise for foraging or for nesting. The proposed helicopter flight area from the helipad are over open water and once above land will be generally above 1000ft, greatly reducing the potential for interactions within the flight path. Noise produced by helicopters flying over woodland habitat would be minor due to the altitude at which the helicopter will fly above terrestrial vegetation. On this basis, it is **unlikely** the species will be impacted by the proposal.

Common Name	Scientific Name	TSC Act	EPBC Act	No. of records*	Likelihood of Occurrence / Likely Level of Impact
Calyptorhynchus lathami	Glossy Black-Cockatoo	V		24	The proposal does not seek to modify or alter terrestrial habitats that this species may utilise for foraging or for nesting. The proposed helicopter flight area from the helipad are over open water and once above land will be generally above 1000ft, greatly reducing the potential for interactions within the flight path. Noise produced by helicopters flying over woodland habitat would be minor due to the altitude at which the helicopter will fly above terrestrial vegetation. On this basis, it is **unlikely** the species will be impacted by the proposal.
Charadrius mongolus	Lesser Sand Plover	V	E, M, A	-	Targeted habitat surveys within the Study Area, did not detect significant suitable habitat for this species to utilise. Intertidal zones of Bardens Bay and surrounds are generally less than 1m in width, often significantly less due to slope at interface with water. Therefore, foraging habitat is unlikely to be present within the Study Area during all but the most significant low tide events. In addition, the lack of protection and security in this narrow bands of habitat, due to the close proximity of urbanisation to much of the lakes edge and high pedestrian usage along the foreshore would severely limit the utilisation of this area by this species. The proposed helicopter flight area will be over open water outside intertidal zones and once above land will be generally greater than 1,000ft reducing the impacts of noise on fauna species. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis, it is **unlikely** the species will be impacted by the proposal.
Chthonicola sagittata	Speckled Warbler	V		1	The proposal does not seek to modify or alter terrestrial habitat that this species may utilise for foraging or for nesting. The proposed helicopter flight area from the helipad are over open water and once above land will be generally above 1000ft, greatly reducing the potential for interactions within the flight path. Noise produced by helicopters flying over woodland habitat would be minor due to the altitude at which the helicopter will fly above vegetation. On this basis, it is **unlikely** the species will be impacted by the proposal.
Climacteris picumnus victoriae	Brown Treecreeper	V		2	The proposal does not seek to modify or alter terrestrial habitats that this species may utilise for foraging or for nesting. The proposed helicopter flight area from the helipad are over open water and once above land will be generally above 1000ft, greatly reducing the potential for interactions within the flight path. Noise produced by helicopters flying over woodland habitat would be minor due to the altitude at which the helicopter will fly above vegetation. On this basis, it is **unlikely** the species will be impacted by the proposal.

Common Name	Scientific Name	TSC Act	EPBC Act	No. of records*	Likelihood of Occurrence / Likely Level of Impact
Daphoenositta chrysoptera	Varied Sittella	V		8	The proposal does not seek to modify or alter terrestrial habitats that this species may utilise for foraging or for nesting. The proposed helicopter flight area from the helipad are over open water and once above land will be generally above 1000ft, greatly reducing the potential for interactions within the flight path. Noise produced by helicopters flying over woodland habitat would be minor due to the altitude at which the helicopter will fly above vegetation. On this basis, it is **unlikely** the species will be impacted by the proposal.
Dasyomis brachypterus	Eastern Bristlebird	E	E	-	There is no suitable habitat (dense heathy understorey) for this species to utilise within the project Study Area. This species rarely flies at altitude and coupled with the lack of habitat, the helicopter flight paths would not impact this species. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis, it is **unlikely** the proposal will impact this species.
Diomedea antipodensis	Antipodean Albatross	V	V, A	-	There is no suitable habitat for this species to utilise within the Study Area. This species is known to spend significant portions of its life on the open ocean and only ventures to land (subantarctic Islands) to breed. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis, it is **unlikely** the proposal will impact this species.
Diomedea antipodensis gibsoni	Gibson's Albatross	V	V, A	-	There is no suitable habitat for this species to utilise within the Study Area. This species is known to spend significant portions of its life on the open ocean and only ventures to land (subantarctic Islands) to breed. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis, it is **unlikely** the proposal will impact this species.
Diomedea epomophora (senso stricto)	Southern Royal Albatross		V, M, A	-	There is no suitable habitat for this species to utilise within the Study Area. This species is known to spend significant portions of its life on the open ocean and only ventures to land (subantarctic Islands) to breed. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis, it is **unlikely** the proposal will impact this species.
Diomedea exulans (Sensu lato)	Wandering Albatross	E	V, M, A	-	There is no suitable habitat for this species to utilise within the Study Area. This species is known to spend significant portions of its life on the open ocean and only ventures to land (subantarctic Islands) to breed. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis, it is **unlikely** the proposal will impact this species.

Common Name	Scientific Name	TSC Act	EPBC Act	No. of records*	Likelihood of Occurrence / Likely Level of Impact
Diomedea sanfordi	Northern Royal Albatross		E, A	-	There is no suitable habitat for this species to utilise within the proposed project Study Area. This species is known to spend significant portions of its life on the open ocean and only ventures to land (Chatham Islands) to breed. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis, it is **unlikely** the proposal will impact this species.
Ephippiorhynchus asiaticus	Black-necked Stork	E		1	Targeted habitat surveys within the Study Area, did not detect significant suitable habitat for this species to utilise. The shorelines of Barden's Bay and Sugar Bay to a depth of about 0.5m potentially provide foraging habitat for this species. In addition, the lack of protection and security along the shoreline, due to the close proximity of urbanisation to much of the lakes edge and high pedestrian usage along the foreshore would severely limit the utilisation of this area by this species. The proposed helicopter flight area will be over open water well beyond the shoreline and once above land will be generally greater than 1,000ft reducing the impacts of noise on fauna species. On this basis, it is **unlikely** the species will be impacted by the proposal.
Epthianura albifrons	White-fronted Chat	V		1	Targeted habitat surveys within the Study Area, did not detect significant suitable habitat for this species to utilise. Grassy wetland margins around Bardens Bay potentially provide foraging habitat for this species. The proposed helicopter flight area will be over open water well beyond the shoreline and once above land will be generally greater than 1,000ft reducing the impacts of noise on fauna species. On this basis, it is **unlikely** the species will be impacted by the proposal.
Erythrotriorchis radiatus	Red Goshawk	CE	V	-	This species primarily occurs in riparian habitats, however the Study Area lacks this species preferred habitat. This species preys on passerines in dense forest and is unlikely to forage over open water and therefore unlikely to spend significant time foraging within the proposed flight area of helicopters. Noise produced by helicopters flying over woodland habitat would be minor due to the altitude (generally at or greater than 1000ft) at which the helicopter will fly above vegetation. On this basis, it is **unlikely** the species will be impacted by the proposal.
Falco subniger	Black Falcon	V		1	Black Falcons are uncommon in the Lake Macquarie area and the Study Area lacks the preferred habitats (open woodlands, tree lined watercourses) of this widespread species. Prey in the form of wetland birds is present within the Study Area, however this species is unlikely to forage over open water therefore unlikely to spend significant time foraging within the proposed flight area of helicopters. Noise produced by helicopters flying over woodland habitat would be minor due to the altitude (generally >1000ft) at which the helicopter will fly above vegetation.

Common Name	Scientific Name	TSC Act	EPBC Act	No. of records*	Likelihood of Occurrence / Likely Level of Impact
					On this basis, it is **unlikely** the species will be impacted by the proposal.
Glossopsitta pusilla	Little Lorikeet	V		13	The proposal does not seek to modify or alter terrestrial habitats that this species may utilise for foraging or for nesting. The proposed helicopter flight area from the helipad are over open water and once above land will be generally above 1000ft, greatly reducing the potential for interactions within the flight path. Noise produced by helicopters flying over woodland habitat would be minor due to the altitude at which the helicopter will fly above vegetation. On this basis, it is **unlikely** the species will be impacted by the proposal.
Grantiella picta	Painted Honeyeater	V	V	-	There is no suitable habitat for this species to utilise within the Study Area. This species habitat is predominantly Box-gum Woodlands of which no known occurrences of this community is present proposed project Study Area. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis it is **unlikely** the species will be impacted by the proposal.
Haematopus fuliginosus	Sooty Oystercatcher	V		1	There is limited suitable habitat for this species to utilise within the Study Area. Intertidal zones within the Study Area were observed to be quite restricted in size, and therefore the potential for this species to forage along the water's edge within the Study Area is limited. Nesting occurs almost exclusively on islands or isolated promontories which do not occur within the Study Area. This species was **recorded** flying across the southern portion of the Study Area during the initial Ecological Assessment but was not observed roosting and forging within the Study Area. As such this species has **potential** to occur in the project Study Area but low interaction shall occur due to the very limited available habitat within the project Study Area. On this basis it is **unlikely** the species will be impacted by the proposal.
Haematopus longirostris	Pied Oystercatcher	E		3	There is limited suitable habitat for this species to utilise within the proposed project Study Area. As per the Sooty Oyster Catcher, this species has **potential** to occur in the project Study Area, but low interaction shall occur due to the lack of available habitat within the project Study Area. On this basis it is **unlikely** the species will be impacted by the proposal.
Haliaeetus leucogaster	White Bellied Sea-eagle	V	A	22	This species was **recorded** during field surveys for the initial Ecological Assessment, but was not recorded during additional surveys which are the subject of this letter. This species foraging habitat will not be impacted by the proposed helipad, due to the limited surface area (25x25m approx.) the structure would cover in the aquatic

Common Name	Scientific Name	TSC Act	EPBC Act	No. of records*	Likelihood of Occurrence / Likely Level of Impact
					environment of Lake Macquarie. This structure will form part of the larger approved Marina that has been assessed to have no impacts on this species. The roosting or perching habitat of this species will not be directly impacted as there is no shoreline vegetation to be removed, trimmed or managed as part of the helipad proposal. The foraging behaviour (in aquatic environments) of this species has been observed to fly/glide at low elevations whilst scanning for food over water and then plunging to the water. The wide foraging range of this species across the Lake Macquarie water mass coupled with the rapid ascent / descent from cruising altitude (1000ft altitude), is considered to limit interactions between the species and proposed helicopter movements within the flight path. Nevertheless, given the recorded observations during the census period, known presence of this species across Lake Macquarie and foraging habitat within the entry and exit flight paths of helicopters in the Study Area, an assessment of impacts is considered in **Attachment 5**.
Hieraaetus morphnoides	Little Eagle	V		1	This species is widespread occurring across many habitat types, however the Study Area has limited preferred habitat (forests, woodlands, or open woodlands) present. Prey in the form of wetland birds is present within the Study Area, however this species is unlikely to forage over open water therefore unlikely to spend significant time foraging within the proposed flight path of helicopters. Noise produced by helicopters flying over woodland habitat would be minor due to the altitude (generally at or greater than 1000ft) at which the helicopter will fly above vegetation. On this basis, it is **unlikely** the species will be impacted by the proposal.
Ixobrychus flavicollis	Black Bittern	V		2	Targeted habitat surveys within the Study Area, did not detect suitable habitat for this species to utilise. The proposed helicopter flight area will be over open water and once above land will be generally greater than 1,000ft. Due to the lack of suitable habitat this species is unlikely to occur in the Study Area. On this basis, it is **unlikely** the species will be impacted by the proposal.
Lathamus discolor	Swift Parrot	E	CE, A	31	The proposal does not seek to modify or alter habitats that this species could utilise for foraging or refuge habitat as a stepping stone across the local landscape during its seasonal migration. Noise produced from helicopters that will fly over forest or woodland that may provide habitat for this species would be minor due to the height at which the helicopter would be above the vegetation. On this basis, it is **unlikely** the species will be impacted by the proposal.

Common Name	Scientific Name	TSC Act	EPBC Act	No. of records*	Likelihood of Occurrence / Likely Level of Impact
Limosa lapponica baueri	Bar Tailed Godwit	V	V	-	Targeted habitat surveys within the Study Area, did not detect significant suitable habitat for this species to utilise. Intertidal zones with sand and mudflats in Barden's Bay, Sugar Bay and surrounds are generally 1 -1.5m in width, often significantly less due to slope at interface with water. Therefore, foraging habitat is unlikely to be present within the Study Area during all but the most significant low tide events. In addition, the lack of protection and security in this narrow bands of habitat, due to the close proximity of urbanisation to much of the lakes edge and high pedestrian usage along the foreshore would severely limit the utilisation of this area by this species. The proposed helicopter flight area will be over open water outside intertidal zones and once above land will be generally greater than 1,000ft reducing the impacts of noise on fauna species. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis, it is **unlikely** the species will be impacted by the proposal.
Limosa lapponica menzbieri	Northern Siberian Bar-tailed Godwit		CE	-	Targeted habitat surveys within the Study Area, did not detect significant suitable habitat for this species to utilise. Intertidal zones with sand and mudflats in Barden's Bay and surrounds are generally 1 -1.5m in width, often significantly less due to slope at interface with water. Therefore, foraging habitat is unlikely to be present within the Study Area during all but the most significant low tide events. In addition, the lack of protection and security in this narrow bands of habitat, due to the close proximity of urbanisation to much of the lakes edge and high pedestrian usage along the foreshore would severely limit the utilisation of this area by this species. The proposed helicopter flight area will be over open water outside intertidal zones and once above land will be generally greater than 1,000ft reducing the impacts of noise on fauna species. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis, it is **unlikely** the species will be impacted by the proposal.
Lophoictinia isura	Square-tailed Kite	V		-	This species is widespread occurring across many habitat types, however the Study Area lacks the preferred habitats (timbered habitats, dry woodlands and open forest). This species preys on passerines in the forest canopy and is unlikely to forage over open water and therefore unlikely to spend significant time foraging within the proposed flight area of helicopters. Noise produced by helicopters flying over woodland habitat would be minor due to the altitude (generally at or greater than 1000ft) at which the helicopter will fly above vegetation. On this basis, it is **unlikely** the species will be impacted by the proposal.

Common Name	Scientific Name	TSC Act	EPBC Act	No. of records*	Likelihood of Occurrence / Likely Level of Impact
Macronectes giganteus	Southern Giant Petrel	E	E, M, A	-	There is no suitable habitat for this species to utilise within the proposed project Study Area. This species is known to spend significant portions of its life on the open ocean and only ventures to land, to breed on off shore Islands. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis it is **unlikely** the species will be impacted by the proposal.
Macronectes halli	Northern Giant Petrel	V	V, M, A	-	There is no suitable habitat for this species to utilise within the proposed project Study Area. This species is known to spend significant portions of its life on the open ocean and only ventures to land, to breed on off shore Islands. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis it is **unlikely** the species will be impacted by the proposal.
Neophema pulchella	Turquoise Parrot	V		1	The proposal does not seek to modify or alter terrestrial habitats that this species may utilise for foraging or for nesting. The proposed helicopter flight area from the helipad are over open water and once above land will be generally above 1000ft, greatly reducing the potential for interactions within the flight path. Noise produced by helicopters flying over woodland habitat would be minor due to the altitude at which the helicopter will fly above vegetation. On this basis, it is **unlikely** the species will be impacted by the proposal
Ninox connivens	Barking Owl	V		1	The proposal does not seek to modify or alter terrestrial habitats that this species may utilise for foraging or for nesting. This nocturnal woodland species is unlikely to occur within the Study Area during the hours of operation (daylight hours) of helicopters within the entry and exit flight paths. Noise produced by helicopters flying over woodland habitat would be minor due to the altitude at which the helicopter will fly above vegetation (generally at or greater than 1000ft) and would therefore be unlikely to cause disturbance to roosting owls. On this basis it is **unlikely** the species will be impacted by the proposal.
Ninox strenua	Powerful Owl	V		9	The proposal does not seek to modify or alter terrestrial habitats that this species may utilise for foraging or for nesting. This nocturnal woodland species is unlikely to occur within the Study Area during the hours of operation (daylight hours) of helicopters within the entry and exit flight paths. Noise produced by helicopters flying over woodland habitat would be minor due to the altitude at which the helicopter will fly above vegetation (generally at or greater than 1000ft) and would therefore be unlikely to cause disturbance to roosting owls. On this basis it is **unlikely** the species will be impacted by the proposal.

Common Name	Scientific Name	TSC Act	EPBC Act	No. of records*	Likelihood of Occurrence / Likely Level of Impact
Numenius madagascariensis	Eastern Curlew		CE, M, A	1	Targeted habitat surveys within the proposed project Study Area didn't identify habitat in the form of inter -tidal flats. Small patches of Saltmarsh (with encroaching Mangroves and She Oaks) were detected within the Study Area but do not provide adequate area for this species to inhabit. The lack of records in the area and during targeted surveys coupled within the limited habitat available in the proposed project Study Area, it is **unlikely** this species is to occur in the locality. On this basis it is **unlikely** the species will be impacted by the proposal.
Oxyura australis	Blue-billed Duck	V		1	This species prefers open water in areas with dense aquatic vegetation. It is unlikely to forage in the open saline water of the Study Area. When disturbed, it prefers to dive and is therefore unlikely to startle and fly within the flight path of helicopters in the Study Area. Due to the low number of records within 10km of the Study Area, lack of preferred habitat, and behaviour of this species, it is **unlikely** to be impacted by the proposal.
Pachyptila turtur subantarctica	Fairy Prion (Southern)		V	-	There is no suitable habitat for this species to utilise within the proposed project Study Area. This species is known to spend significant portions of its life on the open ocean and only ventures to land, to breed on off shore Islands. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis it is **unlikely** the species will be impacted by the proposal.
Pandion cristatus	Osprey	V		4	This species was not observed within the Study Area during field surveys as part of the original Ecological Assessment or during additional field surveys which are the subject of this letter, although it was detected roosting in the south west of the Study Area. This species foraging habitat will not be impacted by the proposed helipad, due to the limited surface area (25x25m approx.) the structure would cover in the aquatic environment of Lake Macquarie. This structure will form part of the larger approved Marina that has been assessed to have no impacts on this species. The roosting or perching habitat of this species will not be directly impacted as there is no shoreline vegetation to be removed, trimmed or managed as part of the helipad proposal. The foraging behaviour (in aquatic environments) of this species has been observed to fly at low elevations and plunging to water retrieve food from heights between 10-50m (Pizzey and Knight 2007). The wide foraging range of this species across the Lake Macquarie water mass coupled with the rapid ascent / descent from cruising altitude (1000ft altitude), is considered to limit interactions between the species and proposed helicopter movements within the flight path.

Common Name	Scientific Name	TSC Act	EPBC Act	No. of records*	Likelihood of Occurrence / Likely Level of Impact
					Nevertheless, given the potential presence of this species foraging within the helicopter flightpaths within the Study Area, an assessment of impacts is considered in **Attachment 5**.
Petroica boodang	Scarlet Robin	V		2	The proposal does not seek to modify or alter terrestrial habitats that this species may utilise for foraging or for nesting. The proposed helicopter flight area from the helipad are over open water and once above land will be generally above 1000ft, greatly reducing the potential for interactions within the flight path. Noise produced by helicopters flying over woodland habitat would be minor due to the altitude at which the helicopter will fly above vegetation. On this basis, it is **unlikely** the species will be impacted by the proposal
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V		1	The proposal does not seek to modify or alter terrestrial habitats that this species may utilise for foraging or for nesting. The proposed helicopter flight area from the helipad are over open water and once above land will be generally above 1000ft, greatly reducing the potential for interactions within the flight path. Noise produced by helicopters flying over woodland habitat would be minor due to the altitude at which the helicopter will fly above vegetation. On this basis, it is **unlikely** the species will be impacted by the proposal
Ptilinopus regina	Rose-crowned Fruite-Dove	V		2	The proposal does not seek to modify or alter terrestrial habitats that this species may utilise for foraging or for nesting. The proposed helicopter flight area from the helipad are over open water and once above land will be generally above 1000ft, greatly reducing the potential for interactions within the flight path. Noise produced by helicopters flying over woodland habitat would be minor due to the altitude at which the helicopter will fly above vegetation. On this basis, it is **unlikely** the species will be impacted by the proposal
Ptilinopus superbus	Superb Fruit-Dove	V		1	The proposal does not seek to modify or alter terrestrial habitats that this species may utilise for foraging or for nesting. The proposed helicopter flight area from the helipad are over open water and once above land will be generally above 1000ft, greatly reducing the potential for interactions within the flight path. Noise produced by helicopters flying over woodland habitat would be minor due to the altitude at which the helicopter will fly above vegetation. On this basis, it is **unlikely** the species will be impacted by the proposal
Puffinus assimilis	Little Shearwater	V		-	The proposal does not seek to modify or alter terrestrial habitats that this species may utilise for foraging or for nesting. The proposed helicopter flight area from the helipad are over open water and once above land will be generally above 1000ft, greatly reducing the potential for interactions within the flight path. Noise produced by

Common Name	Scientific Name	TSC Act	EPBC Act	No. of records*	Likelihood of Occurrence / Likely Level of Impact
					helicopters flying over woodland habitat would be minor due to the altitude at which the helicopter will fly above vegetation. On this basis, it is **unlikely** the species will be impacted by the proposal
Rostratula australis	Australian Painted Snipe	E	E, A	-	Targeted habitat surveys within the project Study Area, did not detect suitable habitat for this species to utilise. The proposed helicopter flight area will be over open water lacking swamps, grassy lagoons and mudflats required by this species. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis, it is **unlikely** the proposal will impact this species.
Stagonopleura guttata	Diamond Firetail	V		1	The proposal does not seek to modify or alter terrestrial habitats that this species may utilise for foraging or for nesting. The proposed helicopter flight area from the helipad are over open water and once above land will be generally above 1000ft, greatly reducing the potential for interactions within the flight path. Noise produced by helicopters flying over woodland habitat would be minor due to the altitude at which the helicopter will fly above vegetation. On this basis, it is **unlikely** the species will be impacted by the proposal
Sternula albifrons	Little Tern	E	M, A	1	Little Terns have potential to forage from the wing for fish in the open waters of Lake Macquarie, including within the Study Area. The proposal seeks to modify a small area of potential foraging habitat for this species for the construction of the helipad. Little Terns are an infrequent visitor to the inland Lake Macquarie area with only 1 record inside a 10km search. The primary threats to this species relate to its high rate of breeding failure and developments which either remove or degrade estuarine habitats in which it feeds. Given the low level of occurrence around the Study Area and the rarity of breeding events in the Lake Macquarie area, the potential for interactions within the flight area are quite low, and therefore the potential for mortality of individuals is quite low. Broad sandy beaches and dunes in which this species might nest do not occur in the Study Area. Given that disruptions affecting breeding success and quality of foraging habitat are the primary causes of this species decline, and the proposal will neither disrupt breeding sites nor degrade the aquatic environment in which this species forages, the proposal is unlikely to significantly impact local populations or transient individuals. On this basis, it is **unlikely** the species will be significantly impacted by the proposal.

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Thalassarche bulleri	Buller's Albatross		V, M, A	-	There is no suitable habitat for this species to utilise within the proposed within the project Study Area. This species is known to spend significant portions of its life on the open ocean and only ventures to land (Islands off New Zealand) to breed. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis it is **unlikely** the species will be impacted by the proposal.
Thalassarche bulleri platei	Northern Buller's Albatross, Pacific Albatross		V, A	-	There is no suitable habitat for this species to utilise within the proposed project Study Area. This species is known to spend significant portions of its life on the open ocean and only ventures to land (Islands off New Zealand) to breed. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis it is **unlikely** the species will be impacted by the proposal.
Thalassarche cauta cauta	Shy Albatross, Tasmanian Shy Albatross		V, M, A	-	There is no suitable habitat for this species to utilise within the proposed project Study Area. This species is known to spend significant portions of its life on the open ocean and only ventures to land (Offshore Islands of Tasmania) to breed. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis it is **unlikely** the species will be impacted by the proposal.
Thalassarche cauta steadi	White-capped Albatross		V, A	-	There is no suitable habitat for this species to utilise within the proposed project Study Area. This species is known to spend significant portions of its life on the open ocean and only ventures to land (Offshore Islands of New Zealand) to breed. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis it is **unlikely** the species will be impacted by the proposal.
Thalassarche eremita	Chatham Albatross		E, A	-	There is no suitable habitat for this species to utilise within the proposed project Study Area. This species is known to spend significant portions of its life on the open ocean and only venture to land to breed on the Chatham Islands(NZ). Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis it is **unlikely** the species will be impacted by the proposal.
Thalassarche impavida	Campbell Albatross, Campbell Black-browed Albatross		V, A	-	There is no suitable habitat for this species to utilise within the proposed project Study Area. This species is known to spend significant portions of its life on the open ocean and only breed on Campbell Islands (NZ). Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis it is **unlikely** the species will be impacted by the proposal.

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Thalassarche melanophris	Black-browed Albatross	V	V, A	1	There is no suitable habitat for this species to utilise within the proposed project Study Area. This species is known to spend significant portions of its life on the open ocean and only ventures to land (subantarctic Islands) to breed. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis it is **unlikely** the species will be impacted by the proposal.
Thalassarche salvini	Salvin's Albatross		V, K	-	There is no suitable habitat for this species to utilise within the proposed project Study Area. This species is known to spend significant portions of its life on the open ocean and only ventures to land (subantarctic Islands) to breed. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis it is **unlikely** the species will be impacted by the proposal.
Turnix maculosus	Red-backed Button-quail	V		1	The proposal does not seek to modify or alter terrestrial habitats that this species may utilise for foraging or for nesting. The proposed helicopter flight area from the helipad are over open water and once above land will be generally above 1000ft, greatly reducing the potential for interactions within the flight path. Noise produced by helicopters flying over woodland habitat would be minor due to the altitude at which the helicopter will fly above vegetation. On this basis, it is **unlikely** the species will be impacted by the proposal
Tyto novaehollandiae	Masked Owl	V		3	The proposal does not seek to modify or alter terrestrial habitats that this species may utilise for foraging or for nesting. This nocturnal woodland species is unlikely to occur within the Study Area during the hours of operation (daylight hours) of helicopters within the entry and exit flight paths. Noise produced by helicopters flying over woodland habitat would be minor due to the altitude at which the helicopter will fly above vegetation (generally >1000ft) and would therefore be unlikely to cause disturbance to roosting owls. On this basis it is **unlikely** the species will be impacted by the proposal.
Tyto tenebricosa	Sooty Owl	V		1	The proposal does not seek to modify or alter terrestrial habitats that this species may utilise for foraging or for nesting. This nocturnal woodland species is unlikely to occur within the Study Area during the hours of operation (daylight hours) of helicopters within the entry and exit flight paths. Noise produced by helicopters flying over woodland habitat would be minor due to the altitude at which the helicopter will fly above vegetation (generally >1000ft) and would therefore be unlikely to cause disturbance to roosting owls. On this basis it is **unlikely** the species will be impacted by the proposal.

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Frogs					
Crinia tinnula	Wallum Froglet	V		34	There is no suitable habitat for this species to utilise within the proposed project Study Area. There is no potential habitat in the saline environment of the Lake Macquarie water body beneath the proposed flight path. When the helicopter reaches land on the proposed flight paths it will be at an elevation of generally greater than 1,000ft. As such no interaction shall occur with this species terrestrial habitat where present. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis it is **unlikely** the species will be impacted by the proposal.
Heleioporus australiacus	Giant Burrowing Frog		V	-	There is no suitable habitat for this species to utilise within the proposed project Study Area. There is no potential habitat in the saline environment of the Lake Macquarie water body beneath the proposed flight path. When the helicopter reaches land on the proposed flight paths it will be at an elevation of generally greater than 1,000ft. As such no interaction shall occur with this species terrestrial habitat where present. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis it is **unlikely** the species will be impacted by the proposal.
Litoria aurea	Green and Golden Bell Frog	E	V	-	There is no suitable habitat for this species to utilise within the proposed project Study Area. There is no potential habitat in the saline environment of the Lake Macquarie water body beneath the proposed flight path. When the helicopter reaches land on the proposed flight paths it will be at an elevation of generally greater than 1,000ft. As such no interaction shall occur with this species terrestrial habitat where present. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis it is **unlikely** the species will be impacted by the proposal.
Litoria littlejohni	Littlejohn's Tree Frog, Heath Frog	V	V	-	There is no suitable habitat for this species to utilise within the proposed project Study Area. There is no potential habitat in the saline environment of the Lake Macquarie water body beneath the proposed flight path. When the helicopter reaches land on the proposed flight paths it will be at an elevation of generally greater than 1,000ft. As such no interaction shall occur with this species terrestrial habitat where present. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis it is **unlikely** the species will be impacted by the proposal.

Common Name	Scientific Name	TSC Act	EPBC Act	No. of records*	Likelihood of Occurrence / Likely Level of Impact
Mixophyes balbus	Stuttering Frog	E	V	-	There is no suitable habitat for this species to utilise within the proposed project Study Area. There is no potential habitat in the saline environment of the Lake Macquarie water body beneath the proposed flight path. When the helicopter reaches land on the proposed flight paths it will be at an elevation of generally greater than 1,000ft. As such no interaction shall occur with this species terrestrial habitat where present. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis it is **unlikely** the species will be impacted by the proposal.
Mixophyes iteratus	Giant Barred Frog, Southern Barred Frog	E	E	-	There is no suitable habitat for this species to utilise within the proposed project Study Area. There is no potential habitat in the saline environment of the Lake Macquarie water body beneath the proposed flight path. When the helicopter reaches land on the proposed flight paths it will be at an elevation of generally greater than 1,000ft. As such no interaction shall occur with this species terrestrial habitat where present. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis it is **unlikely** the species will be impacted by the proposal.
Mammals					
Chalinolobus dwyeri	Large-eared Pied Bat, Large Pied Bat	V	V	-	There is potential suitable habitat for this species to utilise within the proposed project Study Area. This species frequents low to mid elevation dry open forest and woodland close to roosting habitat (Caves, crevices in cliffs in well-timbered areas.). This species has the **potential** to occur in small forest remnants at the northern and southern portions of the proposed project Study Area. This is a nocturnal species and all flights are diurnal after dawn and before dusk when this species is active, therefore rotor strike is highly **unlikely** to occur at any time during the helicopter flight to and from including decent/ ascent the helipad. On this basis it is **unlikely** the species will be impacted by the proposal.
Cercartetus nanus	Eastern Pygmy-possum	V		1	There is no suitable habitat for this species to utilise within the Study Area. When in flight there is no potential habitat in the saline environment of the Lake Macquarie water body. When the helicopter reaches land on the proposed flight paths it will be at an elevation of generally greater than 1,000ft. As such no interaction shall occur with this species terrestrial habitat where present. On this basis it is **unlikely** the species will be impacted by the proposal.
Dasyurus maculatus maculatus (SE mainland population)	Spot-tailed Quoll, Spotted-tail Quoll	V	E	2	There is no suitable habitat for this species to utilise within the Study Area. When in flight there is no potential habitat in the saline environment of the Lake Macquarie water body. When the helicopter reaches land on the proposed flight paths it will be at an elevation of generally greater than 1,000ft. As such no interaction shall occur with this species terrestrial habitat where present.

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					On this basis it is **unlikely** the species will be impacted by the proposal.
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V		3	This species has potential to occur in small forest remnants at the northern and southern portions of the Study Area. Within entry and exit flight paths, helicopters will generally be above 1,000ft when they reach land. As such no interaction with this species terrestrial habitat will occur, and noise impacts over land will be minimal. This is a nocturnal species and no helicopter flights will occur when this species is active, therefore strikes are highly unlikely to occur. On this basis, it is **unlikely** this species will be impacted by the proposal.
Miniopterus australis	Little Bentwing-bat	V		30	This species has potential to occur in small forest remnants at the northern and southern portions of the Study Area. Within entry and exit flight paths, helicopters will generally be above 1,000ft when they reach land. As such no interaction with this species terrestrial habitat will occur, and noise impacts over land will be minimal. This is a nocturnal species and no helicopter flights will occur when this species is active, therefore strikes are highly unlikely to occur. On this basis, it is **unlikely** this species will be impacted by the proposal.
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	V		21	This species has potential to occur in small forest remnants at the northern and southern portions of the Study Area. Within entry and exit flight paths, helicopters will generally be above 1,000ft when they reach land. As such no interaction with this species terrestrial habitat will occur, and noise impacts over land will be minimal. This is a nocturnal species and no helicopter flights will occur when this species is active, therefore strikes are highly unlikely to occur. On this basis, it is **unlikely** this species will be impacted by the proposal.
Mormopterus norfolkensis	Eastern Freetail-bat	V		24	This species has potential to occur in small forest remnants at the northern and southern portions of the proposed project Study Area. Within entry and exit flight paths, helicopters will generally be above 1,000ft when they reach land. As such no interaction with this species terrestrial habitat will occur, and noise impacts over land will be minimal. This is a nocturnal species and no helicopter flights will occur when this species is active, therefore strikes are highly unlikely to occur. On this basis, it is **unlikely** this species will be impacted by the proposal.
Myotis macropus	Southern Myotis	V		14	This species has potential to occur in small forest remnants at the northern and southern portions of the proposed project Study Area. Within entry and exit flight paths, helicopters will generally be above 1,000ft when they reach land. As such no interaction with this species terrestrial habitat will occur, and noise impacts over land will be minimal. This is a nocturnal species and no helicopter flights will occur when this species is active, therefore strikes are highly unlikely to occur.

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					On this basis, it is **unlikely** this species will be impacted by the proposal.
Petaurus australis	Yellow-bellied Glider	V		-	There is no suitable habitat for this species to utilise within the Study Area. When the helicopter reaches land on the proposed flight paths it will be at an elevation of generally greater than 1,000ft limiting noise. As such no interaction shall occur with this species terrestrial habitat where present. Additionally, this species is a nocturnal mammal, whereas all flights shall be diurnal therefore limiting any potential for impact to this species. On this basis it is **unlikely** the species will be impacted by the proposal.
Petauroides volans	Greater Glider		V	-	There is no suitable habitat for this species to utilise within the Study Area. When the helicopter reaches land on the proposed flight paths it will be at an elevation of generally greater than 1,000ft limiting noise. As such no interaction shall occur with this species terrestrial habitat where present. Additionally, this species is a nocturnal mammal, whereas all flights shall be diurnal therefore limiting any potential for impact to this species. On this basis it is **unlikely** the species will be impacted by the proposal.
Petaurus norfolcensis	Squirrel Glider	V		49	There is no suitable habitat for this species to utilise within the Study Area. When in flight there is no potential habitat in the saline environment of the Lake Macquarie water body. When the helicopter reaches land on the proposed flight paths it will be at an elevation of generally greater than 1,000ft. As such no interaction shall occur with this species terrestrial habitat where present. Additionally, this species is nocturnal, whereas all flights shall be diurnal therefore limiting any potential for impact to this species. On this basis it is **unlikely** the species will be impacted by the proposal.
Petrogale penicillata	Brush-tailed Rock-wallaby	E	V	-	There is no suitable habitat for this species to utilise within the Study Area. On this basis it is **unlikely** the species will be impacted by the proposal.
Phascolarctos cinereus	Koala	V	V	10	There is no suitable habitat for this species to utilise within the Study Area. When in flight there is no potential habitat in the saline environment of the Lake Macquarie water body. When the helicopter reaches land on the proposed flight paths it will be at an elevation of generally greater than 1,000ft. As such no interaction shall occur with this species terrestrial habitat where present. On this basis it is **unlikely** the species will be impacted by the proposal.

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Potorous tridactylus tridactylus	Long-nosed Potoroo (SE mainland)	V	V	-	There is no suitable habitat for this species to utilise within the Study Area. When in flight there is no potential habitat in the saline environment of the Lake Macquarie water body. When the helicopter reaches land on the proposed flight paths it will be at an elevation of generally greater than 1,000ft. As such no interaction shall occur with this species terrestrial habitat where present. Additionally, this species is mainly nocturnal with limited diurnal foraging known to occur during the cooler winter months, whereas all helicopter movements shall occur during the daylight hours therefore limiting any potential for impact to this species. On this basis it is **unlikely** the species will be impacted by the proposal.
Pseudomys gracilicaudatus	Eastern Chestnut Mouse	V		-	There is no suitable habitat for this species to utilise within the Study Area. When in flight there is no potential habitat in the saline environment of the Lake Macquarie water body. When the helicopter reaches land on the proposed flight paths it will be at an elevation of generally greater than 1,000ft. As such no interaction shall occur with this species terrestrial habitat where present. Additionally, this species is nocturnal, whereas all flights shall be diurnal therefore limiting any potential for impact to this species. On this basis it is **unlikely** the species will be impacted by the proposal.
Pseudomys novaehollandiae	New Holland Mouse, Pookila		V	-	There is no suitable habitat for this species to utilise within the proposed project Study Area. When in flight there is no potential habitat in the saline environment of the Lake Macquarie water body. When the helicopter reaches land on the proposed flight paths it will be at an elevation of generally greater than 1,000ft. As such no interaction shall occur with this species terrestrial habitat where present. Additionally, this species is nocturnal, whereas all flights shall be diurnal therefore limiting any potential for impact to this species. On this basis it is **unlikely** the species will be impacted by the proposal.
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	12	Targeted habitat surveys detected potential suitable foraging or roosting habitat for this species to utilise within the proposed project Study Area. The proposal will not affect the flight paths of this species due to this species flight activities occurring in the evening. This is a nocturnal species and all helicopter flights will occur in daylight hours, therefore rotor strike is highly unlikely to occur at any time during the helicopter flight to and from including decent/ ascent to the helipad. On this basis it is **unlikely** the species will be impacted by the proposal.

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Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-	1	This species has potential to occur in small forest remnants at the northern and southern portions of the proposed project Study Area. Within entry and exit flight paths, helicopters will generally be above 1,000ft when they reach land. As such no interaction with this species terrestrial habitat will occur, and noise impacts over land will be minimal. This is a nocturnal species and no helicopter flights will occur when this species is active, therefore strikes are highly unlikely to occur. On this basis, it is **unlikely** this species will be impacted by the proposal.
Scoteanax rueppellii	Greater Broad-nosed Bat	V		12	This species has potential to occur in small forest remnants at the northern and southern portions of the proposed project Study Area. Within entry and exit flight paths, helicopters will generally be above 1,000ft when they reach land. As such no interaction with this species terrestrial habitat will occur, and noise impacts over land will be minimal. This is a nocturnal species and no helicopter flights will occur when this species is active, therefore strikes are highly unlikely to occur. On this basis, it is **unlikely** this species will be impacted by the proposal.
Vespadelus troughtoni	Eastern Cave Bat	V		1	This species has potential to occur in small forest remnants at the northern and southern portions of the proposed project Study Area. Within entry and exit flight paths, helicopters will generally be above 1,000ft when they reach land. As such no interaction with this species terrestrial habitat will occur, and noise impacts over land will be minimal. This is a nocturnal species and no helicopter flights will occur when this species is active, therefore strikes are highly unlikely to occur. On this basis, it is **unlikely** this species will be impacted by the proposal.
Reptiles					
Caretta caretta	Loggerhead Turtle	E	E	2	This species forging/feeding habitat will not be impacted by the proposed helipad, due to the limited surface area (25x25m approx.) the structure would cover in the aquatic environment of Lake Macquarie. This structure will form part of the larger approved Marina that has been assessed to have no impacts on this species. There is no favoured habitat for breeding of this species within the Study Area as they require sandy beaches. On this basis it is **unlikely** the species will be impacted by the proposal.
Chelonia mydas	Green Turtle	V	V	31	This species is known to forage on the inshore seagrass beds of Lake Macquarie. The proposed helipad will form part of the larger approved Marina. As part of the Marina approval (DA1503/2014) - MPR (2014) undertook detailed sea grass bed mapping. Mapped seagrass beds proximate to the Marina will be largely retained as part of the approved marina footprint. The proposed helipad has a surface area of 25x25m (approx.) to be established over an area with a sandy bottom and no mapped marine

Common Name	Scientific Name	TSC Act	EPBC Act	No. of records*	Likelihood of Occurrence / Likely Level of Impact
					vegetation (sea grass). No shadowing of the known sea grass beds shall occur. The proposal occurs over an aquatic environment and does not occur adjacent to any known breeding / nesting habitat Given the retention of foraging habitat for this species and avoidance of breeding / nesting habitat it is considered **unlikely** the species will be impacted by the proposal.
Dermochelys coriacea	Leatherback Turtle	E	E	-	This is a pelagic species with a significant (global) home range. The Leatherback Turtle requires coastal sandy beaches as part of its breeding cycle to lay clutches of eggs. The species forages on soft bodied marine species such as jellyfish and squid. While foraging within Lake Macquarie during any part of this species life cycle cannot be discounted, the proposed helipad has a surface area of 25x25m (approx.) to be established over an area with a sandy bottom and no mapped marine vegetation (sea grass) or with deep benthic inclines where preferred food species may congregate or breed before heading to the ocean as part of their life cycle. There are no known breeding / nesting locations proximate to the Study Area and noting the coastal preferences coupled with the required sand temperatures for incubation known from the limited species ecology (SPRAT) it is unlikely the Lake Foreshore would provide any suitable locations. On this basis it is **unlikely** the species will be impacted by the proposal.
Eretmochelys imbricata	Hawksbill Turtle		V	-	This is a pelagic species with known populations off northern and western Australia. The species is omnivorous around the waters of Australia with a wide diet based reflective of their large home range and food availability. Feed species includes sponges, gastropods, jellyfish and seagrass. Suitable habitat does not occur in the Study Area. On this basis it is **unlikely** the species will be impacted by the proposal. While foraging within Lake Macquarie during any part of this species life cycle cannot be discounted, the proposed helipad has a surface area of 25x25m (approx.) to be established over an area with a sandy bottom and no mapped marine vegetation (sea grass) the may provide foraging habitat. Mapped seagrass beds proximate to the Study Area will be retained as part of the approved marina. The area of bed disturbance from the installation of up to 5 piles is considered to be minor in the context of this species home range and board foraging preferences. On this basis it is **unlikely** the species will be impacted by the proposal.
Natator depressus	Flatback Turtle		V	-	This species is found only in tropical waters of northern Australia and has not been recorded in Lake Macquarie.

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					The proposal does not occur in the known geographic region for this species, therefore it is considered highly that any impacts would occur to the Flatback Turtle.
Threatened Ecological Communities					
Posidonia australis seagrass meadows of the Manning-Hawkesbury ecoregion			E	-	This ecological community does occur within the proposal area. Aquatic ecology assessments of the larger approved Marina development, have indicated that the structures to be built as part of the helipad sit within bare silty sand habitat at a depth of around 5.6m Chart datum (MPR 2014 and MPR 2016). On this basis it is **unlikely** the species will be impacted by the proposal.
Subtropical and Temperate Coastal Saltmarsh			V	-	This ecological community does not occur within the proposal area.
Listed Migratory Species					
Migratory Marine Birds					
Anous stolidus	Common Noddy		M	-	There is no suitable habitat for this species to utilise within the proposed Study Area (helipad and flight paths). This species is known to spend significant portions of its life on the open ocean and there is no suitable nesting habitat in the Study Area. On this basis it is **unlikely** the species will be impacted by the proposal.
Apus pacificus	Fork-tailed Swift		M	-	Suitable habitat is present within the Study Area, however this species is thought to be almost entirely aerial throughout its range in Australia, and is likely to forage across all terrestrial habitat types, with suitability of a particular area influenced more by weather events (low pressure systems) and seasonal abundances of prey (insects) than by terrestrial habitat conditions. Thus, while study area provides habitat, it is not likely to be a focus of foraging activity compared to the rest of this species range. As this species forages at high altitudes (up to and exceeding 300m), foraging activity would likely outside the entry and exit flight path elevations, altitudes above which aircraft flight patterns are less restricted. On this basis it is **unlikely** the species will be impacted by the proposal.

Common Name	Scientific Name	TSC Act	EPBC Act	No. of records*	Likelihood of Occurrence / Likely Level of Impact
Ardenna carneipes	Flesh-footed Shearwater			-	There is no suitable habitat for this species to utilise within the proposed Study Area (helipad and flight paths). This species is known to spend significant portions of its life on the open ocean and nests on Lord Howe Island. On this basis it is **unlikely** the species will be impacted by the proposal.
Calonectris leucomelas	Streaked Shearwater		M	-	There is no suitable habitat for this species to utilise within the proposed Study Area (helipad and flight paths). This species is known to spend significant portions of its life on the open ocean and there is no suitable nesting habitat in the Study Area. On this basis it is **unlikely** the species will be impacted by the proposal.
Fregata ariel	Lesser Frigatebird		M	-	This species very rarely occurs in the locality and is unlikely to utilise habitat within the Study Area for foraging. This species is known to spend a significant portion of its life on the open ocean and it is unlikely to forage in inshore habitat. On this basis it is **unlikely** the species will be impacted by the proposal.
Fregata minor	Great Frigatebird		M	-	This species very rarely occurs in the locality and is unlikely to utilise habitat within the Study Area for foraging. This species is known to spend a significant portion of its life on the open ocean and it is unlikely to forage in inshore habitat. On this basis it is **unlikely** the species will be impacted by the proposal.
Migratory Terrestrial Species					
Cuculus optatus	Oriental Cuckoo		M	-	There is no suitable habitat for this species to utilise within the proposed Study Area. When in flight there is no potential habitat in the saline environment of the Lake Macquarie water body. When the helicopter reaches land on the proposed flight paths it will be at an elevation of generally greater than 1,000ft. As such low interaction shall occur with this species terrestrial habitat where present. On this basis it is **unlikely** the species will be impacted by the proposal.
Hirundapus caudacutus	White-throated Needletail		M	-	Suitable habitat is present within the study area, however this species is thought to be almost entirely aerial throughout its range in Australia, and is likely to forage across all terrestrial habitat types, with suitability of a particular area influenced more by weather events (low pressure systems) and seasonal abundances of prey (insects) than by terrestrial habitat conditions. Thus, while study area provides habitat, it is not likely to be a focus of foraging activity compared to the rest of this species range. As this

Common Name	Scientific Name	TSC Act	EPBC Act	No. of records*	Likelihood of Occurrence / Likely Level of Impact
					species forages at high altitudes (up to and exceeding 300m), foraging activity would likely to be outside the entry and exit flight path elevations, altitudes above which aircraft flight patterns are less restricted. On this basis it is **unlikely** the species will be impacted by the proposal.
Monarcha melanopsis	Black-faced Monarch		M, A	-	There is no suitable habitat for this species to utilise within the proposed Study Area. When in flight there is no potential habitat in the saline environment of the Lake Macquarie water body. When the helicopter reaches land on the proposed flight paths it will be at an elevation of generally greater than 1,000ft. As such low interaction shall occur with this species terrestrial habitat where present. On this basis it is **unlikely** the species will be impacted by the proposal.
Monarcha trivirgatus	Spectacled Monarch		M, A	-	There is no suitable habitat for this species to utilise within the proposed Study Area. When in flight there is no potential habitat in the saline environment of the Lake Macquarie water body. When the helicopter reaches land on the proposed flight paths it will be at an elevation of generally greater than 1,000ft. As such low interaction shall occur with this species terrestrial habitat where present. On this basis it is **unlikely** the species will be impacted by the proposal.
Motacilla flava	Yellow Wagtail		M, A	-	There is no suitable habitat for this species to utilise within the proposed Study Area. When in flight there is no potential habitat in the saline environment of the Lake Macquarie water body. When the helicopter reaches land on the proposed flight paths it will be at an elevation of generally greater than 1,000ft. As such low interaction shall occur with this species terrestrial habitat where present. On this basis it is **unlikely** the species will be impacted by the proposal.
Myiagra cyanoleuca	Satin Flycatcher		M, A	-	There is no suitable habitat for this species to utilise within the proposed Study Area. When in flight there is no potential habitat in the saline environment of the Lake Macquarie water body. When the helicopter reaches land on the proposed flight paths it will be at an elevation of generally greater than 1,000ft. As such low interaction shall occur with this species terrestrial habitat where present. On this basis it is **unlikely** the species will be impacted by the proposal.
Rhipidura rufifrons	Rufous Fantail		M, A	-	There is no suitable habitat for this species to utilise within the proposed Study Area. When in flight there is no potential habitat in the saline environment of the Lake Macquarie water body. When the helicopter reaches land on the proposed flight paths it will be at an elevation of generally greater than 1,000ft. As such low interaction shall occur with this species terrestrial habitat where present. On this basis it is **unlikely** the species will be impacted by the proposal.

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Migratory Wetland Species					
Actitis hypoleucos	Common Sandpiper		M, A	-	Targeted habitat surveys within the Study Area, did not detect significant suitable habitat for this species to utilise. Intertidal zones with sand and mudflats in Barden's Bay and surrounds are generally 1 -1.5m in width, often significantly less due to slope at interface with water. Therefore, foraging habitat is unlikely to be present within the Study Area during all but the most significant low tide events. In addition, the lack of protection and security in this narrow bands of habitat, due to the close proximity of urbanisation to much of the lakes edge and high pedestrian usage along the foreshore would severely limit the utilisation of this area by this species. The proposed helicopter flight area will be over open water outside intertidal zones and once above land will be generally greater than 1,000ft reducing the impacts of noise on fauna species. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis, it is **unlikely** the species will be impacted by the proposal.
Arenaria interpres	Ruddy Turnstone		M, A	-	Targeted habitat surveys within the Study Area, did not detect significant suitable habitat for this species to utilise. Intertidal zones with sand and mudflats in Barden's Bay and surrounds are generally 1 -1.5m in width, often significantly less due to slope at interface with water. Therefore, foraging habitat is unlikely to be present within the Study Area during all but the most significant low tide events. In addition, the lack of protection and security in this narrow bands of habitat, due to the close proximity of urbanisation to much of the lakes edge and high pedestrian usage along the foreshore would severely limit the utilisation of this area by this species. The proposed helicopter flight area will be over open water outside intertidal zones and once above land will be generally greater than 1,000ft reducing the impacts of noise on fauna species. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis, it is **unlikely** the species will be impacted by the proposal.

Common Name	Scientific Name	TSC Act	EPBC Act	No. of records*	Likelihood of Occurrence / Likely Level of Impact
Calidris acuminata	Sharp-tailed Sandpiper		M, A	-	Targeted habitat surveys within the Study Area, did not detect significant suitable habitat for this species to utilise. Intertidal zones with sand and mudflats in Barden's Bay and surrounds are generally 1 -1.5m in width, often significantly less due to slope at interface with water. Therefore, foraging habitat is unlikely to be present within the Study Area during all but the most significant low tide events. In addition, the lack of protection and security in this narrow bands of habitat, due to the close proximity of urbanisation to much of the lakes edge and high pedestrian usage along the foreshore would severely limit the utilisation of this area by this species. The proposed helicopter flight area will be over open water outside intertidal zones and once above land will be generally greater than 1,000ft reducing the impacts of noise on fauna species. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis, it is **unlikely** the species will be impacted by the proposal.
Calidris alba	Sanderling		M, A	-	Targeted habitat surveys within the Study Area, did not detect significant suitable habitat for this species to utilise. Intertidal zones with sand and mudflats in Barden's Bay and surrounds are generally 1 -1.5m in width, often significantly less due to slope at interface with water. Therefore, foraging habitat is unlikely to be present within the Study Area during all but the most significant low tide events. In addition, the lack of protection and security in this narrow bands of habitat, due to the close proximity of urbanisation to much of the lakes edge and high pedestrian usage along the foreshore would severely limit the utilisation of this area by this species. The proposed helicopter flight area will be over open water outside intertidal zones and once above land will be generally greater than 1,000ft reducing the impacts of noise on fauna species. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis, it is **unlikely** the species will be impacted by the proposal.
Calidris melanotos	Pectoral Sandpiper		M, A	-	Targeted habitat surveys within the Study Area, did not detect significant suitable habitat for this species to utilise. Intertidal zones with sand and mudflats in Barden's Bay and surrounds are generally 1 -1.5m in width, often significantly less due to slope at interface with water. Therefore, foraging habitat is unlikely to be present within the Study Area during all but the most significant low tide events. In addition, the lack of protection and security in this narrow bands of habitat, due to the close proximity of urbanisation to much of the lakes edge and high pedestrian usage along the foreshore would severely limit the utilisation of this area by this species.

Common Name	Scientific Name	TSC Act	EPBC Act	No. of records*	Likelihood of Occurrence / Likely Level of Impact
					The proposed helicopter flight area will be over open water outside intertidal zones and once above land will be generally greater than 1,000ft reducing the impacts of noise on fauna species. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis, it is **unlikely** the species will be impacted by the proposal.
Calidris ruficollis	Red-necked Stint		M, A	-	Targeted habitat surveys within the Study Area, did not detect significant suitable habitat for this species to utilise. Intertidal zones with sand and mudflats in Barden's Bay and surrounds are generally 1 -1.5m in width, often significantly less due to slope at interface with water. Therefore, foraging habitat is unlikely to be present within the Study Area during all but the most significant low tide events. In addition, the lack of protection and security in this narrow bands of habitat, due to the close proximity of urbanisation to much of the lakes edge and high pedestrian usage along the foreshore would limit the utilisation of this area by this species. The proposed helicopter flight area will be over open water outside intertidal zones and once above land will be generally greater than 1,000ft reducing the impacts of noise on fauna species. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis, it is **unlikely** the species will be impacted by the proposal.
Charadrius bicinctus	Double-banded Plover		M, A	-	Targeted habitat surveys within the Study Area, did not detect significant suitable habitat for this species to utilise. Intertidal zones with sand and mudflats in Barden's Bay and surrounds are generally 1 -1.5m in width, often significantly less due to slope at interface with water. Therefore, foraging habitat is unlikely to be present within the Study Area during all but the most significant low tide events. In addition, the lack of protection and security in this narrow bands of habitat, due to the close proximity of urbanisation to much of the lakes edge and high pedestrian usage along the foreshore would limit the utilisation of this area by this species. The proposed helicopter flight area will be over open water outside intertidal zones and once above land will be generally greater than 1,000ft reducing the impacts of noise on fauna species. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis, it is **unlikely** the species will be impacted by the proposal.
Gallinago hardwickii	Latham's Snipe		M, A	-	There is no suitable habitat for this species to utilise within the proposed Study Area. When in flight there is no potential habitat in the saline environment of the Lake Macquarie water body. When the helicopter reaches land on the proposed flight paths

Common Name	Scientific Name	TSC Act	EPBC Act	No. of records*	Likelihood of Occurrence / Likely Level of Impact
					it will be at an elevation of generally greater than 1,000ft. As such low interaction shall occur with this species terrestrial habitat where present. On this basis it is **unlikely** the species will be impacted by the proposal.
Gallinago megala	Swinhoe's Snipe		M, A	-	There is no suitable habitat for this species to utilise within the Study Area. When in flight there is no potential habitat in the saline environment of the Lake Macquarie water body. When the helicopter reaches land on the proposed flight paths it will be at an elevation of generally greater than 1,000ft. As such low interaction shall occur with this species terrestrial habitat where present. On this basis it is **unlikely** the species will be impacted by the proposal.
Gallinago stenura	Pin-tailed Snipe		M, A	-	There is no suitable habitat for this species to utilise within the Study Area. When in flight there is no potential habitat in the saline environment of the Lake Macquarie water body. When the helicopter reaches land on the proposed flight paths it will be at an elevation of generally greater than 1,000ft. As such low interaction shall occur with this species terrestrial habitat where present. On this basis it is **unlikely** the species will be impacted by the proposal.
Limosa lapponica	Bar-tailed Godwit		M, A	-	Targeted habitat surveys within the Study Area, did not detect significant suitable habitat for this species to utilise. Intertidal zones with sand and mudflats in Barden's Bay and surrounds are generally 1 -1.5m in width, often significantly less due to slope at interface with water. Therefore, foraging habitat is unlikely to be present within the Study Area during all but the most significant low tide events. In addition, the lack of protection and security in this narrow bands of habitat, due to the close proximity of urbanisation to much of the lakes edge and high pedestrian usage along the foreshore would limit the utilisation of this area by this species. The proposed helicopter flight area will be over open water outside intertidal zones and once above land will be generally greater than 1,000ft reducing the impacts of noise on fauna species. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis, it is **unlikely** the species will be impacted by the proposal.
Limosa limosa	Black-tailed Godwit		M, A	-	Targeted habitat surveys within the Study Area, did not detect significant suitable habitat for this species to utilise. Intertidal zones with sand and mudflats in Barden's Bay and surrounds are generally 1 -1.5m in width, often significantly less due to slope at interface with water. Therefore, foraging habitat is unlikely to be present within the Study Area during all but the most significant low tide events. In addition, the lack of protection and security in this narrow bands of habitat, due to the close proximity of

Common Name	Scientific Name	TSC Act	EPBC Act	No. of records*	Likelihood of Occurrence / Likely Level of Impact
					urbanisation to much of the lakes edge and high pedestrian usage along the foreshore would limit the utilisation of this area by this species. The proposed helicopter flight area will be over open water outside intertidal zones and once above land will be generally greater than 1,000ft reducing the impacts of noise on fauna species. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis, it is **unlikely** the species will be impacted by the proposal.
Numenius minutus	Little Curlew		M, A	-	Targeted habitat surveys within the Study Area, did not detect significant suitable habitat for this species to utilise. Intertidal zones with sand and mudflats in Barden's Bay and surrounds are generally 1 -1.5m in width, often significantly less due to slope at interface with water. Therefore, foraging habitat is unlikely to be present within the Study Area during all but the most significant low tide events. In addition, the lack of protection and security in this narrow bands of habitat, due to the close proximity of urbanisation to much of the lakes edge and high pedestrian usage along the foreshore would limit the utilisation of this area by this species. The proposed helicopter flight area will be over open water outside intertidal zones and once above land will be generally greater than 1,000ft reducing the impacts of noise on fauna species. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis, it is **unlikely** the species will be impacted by the proposal.
Numenius phaeopus	Whimbrel		M, A	-	There is no suitable habitat for this species to utilise within the Study Area. When in flight there is no potential habitat in the saline environment of the Lake Macquarie water body. When the helicopter reaches land on the proposed flight paths it will be at an elevation of generally greater than 1,000ft. As such low interaction shall occur with this species terrestrial habitat where present. On this basis it is **unlikely** the species will be impacted by the proposal.
Pluvialis fulva	Pacific Golden Plover		M, A	-	Targeted habitat surveys within the Study Area, did not detect significant suitable habitat for this species to utilise. Intertidal zones with sand and mudflats in Barden's Bay and surrounds are generally 1 -1.5m in width, often significantly less due to slope at interface with water. Therefore, foraging habitat is unlikely to be present within the Study Area during all but the most significant low tide events. In addition, the lack of protection and security in this narrow bands of habitat, due to the close proximity of urbanisation to much of the lakes edge and high pedestrian usage along the foreshore would limit the utilisation of this area by this species.

Common Name	Scientific Name	TSC Act	EPBC Act	No. of records*	Likelihood of Occurrence / Likely Level of Impact
					The proposed helicopter flight area will be over open water outside intertidal zones and once above land will be generally greater than 1,000ft reducing the impacts of noise on fauna species. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis, it is **unlikely** the species will be impacted by the proposal.
Pluvialis squatarola	Grey Plover		M, A	-	Targeted habitat surveys within the Study Area, did not detect significant suitable habitat for this species to utilise. Intertidal zones with sand and mudflats in Barden's Bay and surrounds are generally 1 -1.5m in width, often significantly less due to slope at interface with water. Therefore, foraging habitat is unlikely to be present within the Study Area during all but the most significant low tide events. In addition, the lack of protection and security in this narrow bands of habitat, due to the close proximity of urbanisation to much of the lakes edge and high pedestrian usage along the foreshore would limit the utilisation of this area by this species. The proposed helicopter flight area will be over open water outside intertidal zones and once above land will be generally greater than 1,000ft reducing the impacts of noise on fauna species. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis, it is **unlikely** the species will be impacted by the proposal.
Tringa brevipes	Grey-tailed Tattler		M, A	-	Targeted habitat surveys within the Study Area, detected minor suitable habitat for this species to utilise. Intertidal zones with sand and mudflats in Barden's Bay and surrounds are generally 1 -1.5m in width, often significantly less due to slope at interface with water. The unnamed bay may provide minor forging opportunity Therefore, foraging habitat is marginal at best within the Study Area. In addition, the lack of protection and security in this narrow bands of habitat, due to the close proximity of urbanisation to much of the lakes edge and high pedestrian usage along the foreshore would limit the utilisation of this area by this species. The proposed helicopter flight area will be over open water outside intertidal zones and once above land will be generally greater than 1,000ft reducing the impacts of noise on fauna species. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis it is **unlikely** the species will be impacted by the proposal.
Tringa nebularia	Common Greenshank		M, A	-	Targeted habitat surveys within the Study Area, detected minor suitable habitat for this species to utilise. Intertidal zones with sand and mudflats in Barden's Bay and surrounds are generally 1 -1.5m in width, often significantly less due to slope at interface with water. The unnamed bay may provide minor forging opportunity

Common Name	Scientific Name	TSC Act	EPBC Act	No. of records*	Likelihood of Occurrence / Likely Level of Impact
					Therefore, foraging habitat is marginal at best within the Study Area. In addition, the lack of protection and security in this narrow bands of habitat, due to the close proximity of urbanisation to much of the lakes edge and high pedestrian usage along the foreshore would limit the utilisation of this area by this species. The proposed helicopter flight area will be over open water outside intertidal zones and once above land will be generally greater than 1,000ft reducing the impacts of noise on fauna species. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis it is **unlikely** the species will be impacted by the proposal.
Tringa stagnatilis	Marsh Sandpiper		M, A	-	Targeted habitat surveys within the Study Area, did not detect significant suitable habitat for this species to utilise. Intertidal zones with sand and mudflats in Barden's Bay and surrounds are generally 1 -1.5m in width, often significantly less due to slope at interface with water. Therefore, foraging habitat is unlikely to be present within the Study Area during all but the most significant low tide events. In addition, the lack of protection and security in this narrow bands of habitat, due to the close proximity of urbanisation to much of the lakes edge and high pedestrian usage along the foreshore would limit the utilisation of this area by this species. The proposed helicopter flight area will be over open water outside intertidal zones and once above land will be generally greater than 1,000ft reducing the impacts of noise on fauna species. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis, it is **unlikely** the species will be impacted by the proposal.
Xenus cinereus	Terek Sandpiper		M, A	-	Targeted habitat surveys within the Study Area, did not detect significant suitable habitat for this species to utilise. Intertidal zones with sand and mudflats in Barden's Bay and surrounds are generally 1 -1.5m in width, often significantly less due to slope at interface with water. Therefore, foraging habitat is unlikely to be present within the Study Area during all but the most significant low tide events. In addition, the lack of protection and security in this narrow bands of habitat, due to the close proximity of urbanisation to much of the lakes edge and high pedestrian usage along the foreshore would limit the utilisation of this area by this species. The proposed helicopter flight area will be over open water outside intertidal zones and once above land will be generally greater than 1,000ft reducing the impacts of noise on fauna species. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis, it is **unlikely** the species will be impacted by the proposal.

Common Name	Scientific Name	TSC Act	EPBC Act	No. of records*	Likelihood of Occurrence / Likely Level of Impact
Listed Marine Species					
Birds					
Ardea alba	Great Egret, White Egret		A	-	Targeted habitat surveys within the Study Area, detected limited habitat for this species to utilise. Intertidal zones with sand and mudflats in Barden's Bay and surrounds are generally 1 -1.5m in width, often significantly less due to slope at interface with water. Therefore, foraging habitat is marginal within the Study Area during. In addition, the lack of protection and security in this narrow bands of habitat, due to the close proximity of urbanisation to much of the lakes edge and high pedestrian usage along the foreshore would limit the utilisation of this area by this species. The proposed helicopter flight area will be over open water outside intertidal zones and once above land will be generally greater than 1,000ft reducing the impacts of noise on fauna species. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis, it is **unlikely** the species will be impacted by the proposal.
Ardea ibis	Cattle Egret		A	-	There is no suitable habitat for this species to utilise within the proposed Study Area. When in flight there is no potential habitat in the saline environment of the Lake Macquarie water body. When the helicopter reaches land on the proposed flight paths it will be at an elevation of generally greater than 1,000ft. As such low interaction shall occur with this species habitat along the lake shores where present. On this basis, it is **unlikely** the species will be impacted by the proposal.
Charadrius ruficapillus	Red-capped Plover		A	-	Targeted habitat surveys within the Study Area, did not detect significant suitable habitat for this species to utilise. Intertidal zones with sand and mudflats in Barden's Bay and surrounds are generally 1 -1.5m in width, often significantly less due to slope at interface with water. Therefore, foraging habitat is unlikely to be present within the Study Area during all but the most significant low tide events. In addition, the lack of protection and security in this narrow bands of habitat, due to the close proximity of urbanisation to much of the lakes edge and high pedestrian usage along the foreshore would limit the utilisation of this area by this species. The proposed helicopter flight area will be over open water outside intertidal zones and once above land will be generally greater than 1,000ft reducing the impacts of noise on fauna species. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis it is **unlikely** the species will be impacted by the proposal.

Common Name	Scientific Name	TSC Act	EPBC Act	No. of records*	Likelihood of Occurrence / Likely Level of Impact
Himantopus himantopus	Black-winged stilt		A	-	Targeted habitat surveys within the Study Area, did not detect significant suitable habitat for this species to utilise. Intertidal zones with sand and mudflats in Barden's Bay and surrounds are generally 1 -1.5m in width, often significantly less due to slope at interface with water. Therefore, foraging habitat is unlikely to be present within the Study Area during all but the most significant low tide events. In addition, the lack of protection and security in this narrow bands of habitat, due to the close proximity of urbanisation to much of the lakes edge and high pedestrian usage along the foreshore would limit the utilisation of this area by this species. The proposed helicopter flight area will be over open water outside intertidal zones and once above land will be generally greater than 1,000ft reducing the impacts of noise on fauna species. Due to the lack of suitable habitat this species is **unlikely** to occur in the Study Area. On this basis it is **unlikely** the species will be impacted by the proposal.
Rostratla benghalaensis (sensu lato)	Painted Snipe		A	-	There is no suitable habitat for this species to utilise within the Study Area. When in flight there is no potential habitat in the saline environment of the Lake Macquarie water body. When the helicopter reaches land on the proposed flight paths it will be at an elevation of generally greater than 1,000ft. As such low interaction shall occur with this species terrestrial habitat where present. On this basis it is **unlikely** the species will be impacted by the proposal.
Thalassarche sp.*nov.*	Pacific Albatross		A	-	There is no suitable habitat for this species to utilise within the Study Area and flight paths. This species is known to spend significant portions of its life on the open ocean and only ventures to land (Offshore Islands of New Zealand) to breed. On this basis it is **unlikely** the species will be impacted by the proposal

Key:

V = Vulnerable
E = Endangered
CE = Critically Endangered
M = Migratory
A = Marine

Attachment 6 – Assessment of Significance (7-Part Test)

Section 5A of the EP&A Act lists seven factors that must be taken into account in the determination of the significance of potential impacts of proposed activities on 'threatened species, populations or ecological communities or their habitats' (threatened biota) listed under the TSC Act. The '7-part test' is used to determine whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats and thus whether a Species Impact Statement (SIS) is required to be produced.

The significance of the impacts on those threatened species and EECs which have been recorded in the Site or are likely to occur and are likely to utilise habitat to be potentially impacted by the proposal (see **Attachment 5**) have been assessed. The following threatened species and ecological community have been considered:

- *Haliaeetus leucogaster* (White-bellied Sea-Eagle)
- *Pandion haliatus* (Eastern Osprey)

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.

Fishing Eagles

- *Haliaeetus leucogaster* (White-bellied Sea-Eagle)
- *Pandion Haliaeetus* (Eastern Osprey)

During the initial Ecological Assessment surveys from 10th February to 17th August 2017, the White Bellied Sea-Eagle was detected on five occasions within the Study Area with two sightings at Morisset Park, one observation at Belmont Airport, a single observation at the Hospital site and a single at Summerland Point. These species were not recorded during the additional surveys which are the subject of this letter. The Eastern Osprey was only detected at one location being the Hospital site within the Study Area. Both species are noted to have large numbers of records existing in the surrounding region of Lake Macquarie. Habitat for these species is found within the Study Area in the form of foraging over the Lake Macquarie water body and perching, roosting habitat. These species are likely to soar over the waters of Barden's Bay and Lake Macquarie while foraging for fish, and the high number of large canopy trees along the lakes edge provide opportunity for perching or nesting for these large raptor species.

Threats to these species primarily relate to disturbance of breeding sites and degradation of the aquatic environment and subsequent reduction in fish stocks available for foraging. The proposal does not seek to alter the attributes of the habitat within the Study Area beyond the construction of a 25m x 25m (approx.) helipad (625m^2 approx.) that will form part of the existing Trinity Point Marina. Within the Study Area beyond the helipad, the nature of the potential impact is not to alter the attributes of the habitat itself, but to affect the likelihood of this species to utilise that habitat, due to disturbance caused by noise and activity of aircraft.

The Study Area is currently subject to disturbance due to residential development and recreation activity on the lake. Existing disturbance in this area due to recreational boating creates noise and disruption to the waters (outboard motors, jet skis, etc) these actions alone will affect the foraging potential of within this habitat. The addition of noise from helicopter movements within their entry and exit flight area to the helipad is not expected to be excessively disruptive to foraging over and above the noise and disturbance caused by existing recreational activity. The Acoustics report notes there will be an increase in noise in the locality but current estimates are compliant with AirServices

Australia Environmental Principles, (Acoustic Group 2016). The source of the noise being from an aircraft is unlikely to be disruptive to birds, as recent studies undertake for the Western Sydney Airport noted that avifauna thrives in habitats (if habitat available) in the vicinity of the airport despite noise levels significantly higher than those likely from the proposal (Commonwealth of Australia (2016).

With regard to potential interactions between this species and helicopters while foraging, the likelihood of bird strike is assessed as extremely low. Australian Transportation Safety Bureau statistics compiled between 2006 and 2015 support this assessment (ATSB 2017). Bird strike occurrence data is a reportable matter under provisions of the Transportation Safety Regulations 2003 and therefore data is expected to be comprehensive and reliable. Out of the 16,069 bird strikes occurring in Australia over the past 10 years, helicopters account for 275 bird strikes. The vast majority of bird strikes involve large commercial aircraft, but within the General Aviation category of which helicopters operating within the Study Area would belong, the strike rate is 0.419 strikes per 10,000 aircraft movements (General Aviation statistics include fixed-wing aircraft which account for a significantly higher proportion of bird strikes, therefore the strike rate possible from helicopters within the Study Area would likely fall well below this number). The proposal will result in a maximum of 38 aircraft movements occurring within the Study Area per week. Assuming every week involves the maximum number of movements and factoring in the General Aviation strike rate of 0.419 strikes per 10,000 aircraft movements, then the likelihood of a bird strike occurring within the Study Area is approximately 0.0827 strikes per year, or about 1 bird strike occurring every 13 years. Moreover, bird strike statistics indicate that, by contrast with fixed wing aircraft where most bird strikes occur during takeoff and landing, helicopter bird strikes occur significantly less often during the movement types that will occur within the Study Area, with approximately 10% of strikes occurring during takeoff, 5% during landing, and 18% occurring on approach. Eagles account for a very low number of bird strikes, with 87 eagles struck by all types of aircraft across Australia over a 10-year period. Sea eagles account for 12 of these strikes.

The greatest population impact on the White-Bellied Sea-Eagle or the Eastern Osprey would be potential disturbance of nest sites. Nests are built in large emergent trees or stags near water, with high nest site fidelity over several years for resident breeding pairs. Nests have been recorded in the wider locality outside the Study Area, however no existing nests were found within the Study Area during the survey. The helicopter flight area proposed would result in helicopters nearing 1,000 feet at the point that flight paths approach the shoreline. Once at cruising altitude, the noise impacts and visual disturbance of a helicopter is not expected to be greater than the levels of disturbance currently operating in the area from residential housing, vehicle traffic, and recreational boating.

On this basis, it is considered that the establishment and operation of the Trinity Point helipad, is not likely to lead to an adverse effect on the life cycle of these species such that a viable local population is likely to be placed at risk of extinction.

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 were considered as having potential to occur on site. Therefore, the action proposed is not 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.

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 EEC or CEECs were considered as having potential to occur within the Study Area in the impact zone of works for construction of the helipad. Therefore, the action proposed is not likely to have an adverse effect on the life cycle of the community or substantially modify an ecological community composition such that a viable local population of the species is likely to be placed at risk of extinction.

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,

The helipad will occupy 625m^2 (approx.) over open water in Barden's Bay. Proposed helicopter flight area for approach and departure to a height of 1000ft cruising altitude will extend to the east and southeast of the helipad, occurring entirely over open water. At the extreme northwest of the Study Area, helicopters may briefly be below 1,000ft during their ascent / descent from cruising altitude. Once outside of the take off and landing Operations Area, helicopters movements will be as per Civil Aviation Safety Authority (CASA) regulations for helicopter flight. On this basis the area of permanent foraging habitat removal for fishing eagle species is 625m^2. A linear alignment of the air column above Lake Macquarie will be modified on each occasion a helicopter approaches or departs the helipad below an altitude of 1000ft. It is acknowledged that aircraft including helicopters generate noise, thus on each occasion noise is considered to represent a modification to foraging habitat above Lake Macquarie for the period of helicopter travel on approach to or departure from the helipad where the helicopter is below a cruising altitude of 1000ft (or the period of noise generation). A conservative approach to impact assessment has been made in this report, where impacts or modification to habitat have been considered to an area of a 1km buffer from the flight area where it occurs below 1000ft.

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

The proposal will not lead to fragmentation or isolation of habitat. The helipad (625m^2 approx.) is situated in an area of open water adjacent to the approved marina. The movement of a helicopter on approach or departure from the helipad below an altitude of 1000ft. will not lead to a permanent isolation or fragmentation of habitat on either side of the flight path.

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

Fishing Eagles

- *Haliaeetus leucogaster* (White-bellied Sea-Eagle)
- *Pandion haliatus* (Eastern Osprey)

The Study Area consists of a patch of open water that may be utilised periodically by these species for hunting prey. This habitat will not be degraded with respect to its potential to provide prey for White-bellied Sea-Eagles or Eastern Ospreys. The hunting potential of the open waters immediately within the flight path will be disrupted over brief periods of time (only during take-off and landing) and

only with respect to noise and interaction with aircraft. Noise will increase in the area during these time, it is assumed noise is not likely to disrupt the hunting of visual predators foraging on aquatic prey as observations made at the nearby Lake Macquarie Airport indicated during take-off of aircraft raptor species such as the White-bellied Sea-eagle where observed to continue to hunt in close proximity to the aircraft. Interactions with aircraft are expected to occur only if raptors are compelled to move in avoidance of aircraft, limiting the foraging potential of the area over a brief time period. Mortality via bird strikes is unlikely (ATSB 2017).

On this basis the minor removal of foraging habitat on site is not considered to be significant for the long-term survival of the threatened species assessed herewith.

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

No critical habitat for any threatened species or ecological communities occurs on site, therefore the proposal is unlikely to impact upon such habitat.

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

Threat abatement plan or recovery plans have not been prepared for White-bellied Sea-eagles or Ospreys at the time of letter preparation.

More broadly the NSW OEH are in the early phases of implementing the 'Saving our Species' program, that aims to secure species in their natural settings for the next 100 years. The intent is to manage threatened species one of six streams being:

1) Site managed species
2) Iconic species
3) Data-deficient species
4) Landscape-managed species
5) Partnership species
6) Keep watch species

Based on management allocation each species will be prioritised by OEH. At the time of reporting, the fishing eagle species assessed were nominated as 'Landscape-managed 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.

Key Threatening Processes (KTPs) are listed under Schedule 3 of the TSC Act 1995. KTPs considered relevant to the proposal is described in Section 4.3.1 of the Ecological Assessment. This assessment concluded that the proposal was unlikely to trigger KTPs currently not operating on site and/or not contribute to or increase the activity of a KTP potentially operating on the site.

Attachment 7 – Habitat Assessment Site Photographs

Photo 1: Sugar Bay – West

Photo 2: Sugar Bay – West

Photo 3: Sugar Bay – East

Photo 4: Sugar Bay – East

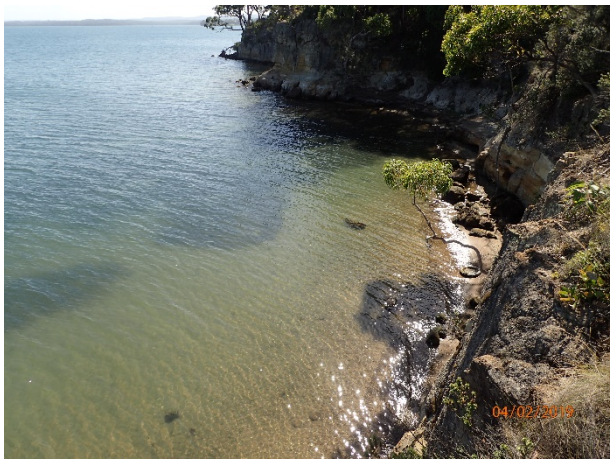

Photo 5: Fishery Point

Photo 6: Fishery Point

Photo 7: Frying Pan Bay – Western Shore

Photo 8: Frying Pan Bay – Western Shore

Photo 9: Frying Pan Bay – Boat Ramp and Jetty

Photo 10: Frying Pan Bay – Boat Ramp and Jetty

Attachment 8 – Avifauna Species List

Bird List		Sugar Bay - East	Fishery Point	Frying Pan Bay – Boat Ramp and Jetty	Study Area (opportunistic)
White-breasted Woodswallow	*Artamus leucorynchus*	X		X	X
Pacific Black Duck	*Anas superciliosa*	X		X	X
Sulphur Crested Cockatoo	*Cacatua galerita*	X		X	X
Little corella	*Cacatua sanguinea*	X			X
Wood Duck	*Chenonetta jubata*	X		X	X
Silver Gull	*Chroicocephalus novaehollandiae*	X		X	X
Australian Raven	*Corvus coronoides*			X	X
Australian Magpie	*Cracticus tibicen*	X	X		X
Pied Butcherbird	*Cracticus nigrogularis*	X			
Laughing Kookaburra	*Dacelo novaeguineae*				X
Galah	*Eolophus roseicapilla*			X	
Magpie Lark	*Grallina cyanoleuca*	X		X	X
Welcome Swallow	*Hirundo neoxena*	X		X	
Noisy Miner	*Manorina melanocephala*	X	X	X	X
Little Pied Cormorant	*Microcarbo melanoleucos*			X	X
Crested Pigeon	*Ocyphaps lophotes*	X		X	
Australian Pelican	*Pelecanus conspicillatus*		X	X	X
Little Black Cormorant	*Phalacrocorax sulcirostris*		X		
Pied Cormorant	*Phalacrocorax varius*			X	X
Willy Wagtail	*Rhipidura leucophrys*				X
Crested Tern	*Thalasseus bergii*		X		X
Rainbow Lorikeet	*Trichoglossus moluccanus*	X	X	X	X
Masked Lapwing	*Vanellus miles*	X		X	X