Royal Randwick Racecourse

Biodiversity Impact Statement

Australian Turf Club

30 November 2021

Final

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Report No. 21217RP1

The preparation of this report has been in accordance with the brief provided by the Client and has relied upon the data and results collected at or under the times and conditions specified in the report. All findings, conclusions or commendations contained within the report are based only on the aforementioned circumstances. The report has been prepared for use by the Client and no responsibility for its use by other parties is accepted by Cumberland Ecology.

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Glossary

Term / Abbreviation	Definition
ATC	Australian Turf Club
BC Act	NSW Biodiversity Conservation Act 2016
DAWE	Commonwealth Department of Agriculture, Water and the Environment
EES	Environment, Energy and Science Group
EIS	Environmental Impact Statement
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
LGA	Local Government Area
MNES	Matters of National Environmental Significance
NSW	New South Wales
SSD	State Significant Development
the 'Guidelines'	Commonwealth 'The National Light Pollution Guidelines for Wildlife'
the 'project'	Proposed Night Racing project at Royal Randwick Racecourse
the 'subject site'	Royal Randwick Racecourse, Randwick

1. Introduction

Cumberland Ecology was commissioned by Mostyn Copper, on behalf of the Australian Turf Club (ATC), to undertake a Biodiversity Impact Statement for the proposed Night Racing project at Royal Randwick Racecourse (the 'project'). The project will be located at the existing Royal Randwick Racecourse, Randwick (the 'subject site'), and involves the proposal for up to 16 night racing events per year, facilitated by the installation of trackside lighting infrastructure and the upgrade of Spectator Precinct Lighting. This Biodiversity Impact Statement will form part of the Response to Submission documentation to support a State Significant Development application (SSD-8706) for the project.

1.1. Purpose

The purpose of this report is to document the findings of an environmental impact assessment for the project that assesses the potential impacts of artificial light on the Grey-headed Flying-fox colony based in Centennial Park. The Grey-headed Flying-fox (*Pteropus poliocephalus)* is listed as Vulnerable under both the NSW *Biodiversity Conservation Act 2016* (BC Act) and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This environmental impact assessment has been undertaken in accordance with the Commonwealth National Light Pollution Guidelines for Wildlife (DoEE 2020), which were published in January 2020, as requested by Randwick City Council in their submission on the SSD application. The main objective of this report is to determine whether the project is likely to affect the Grey-headed Flying-fox colony and to outline how the project plans to mitigate those potential impacts.

Specifically, the objectives of this Biodiversity Impact Statement are to:

- Describe the existing light environment and the proposed project specific lighting;
- Describe the biology and ecology of the Grey-headed Flying-fox colony that may be affected by the project's lighting;
- Undertake an impact assessment, to assess the risk to the Centennial Park colony of flying-foxes and whether the project's lighting is likely to cause an adverse response;
- Describe mitigation measures relevant to the project to reduce the impacts of the artificial lighting on the Grey-headed Flying-fox colony; and
- Recommend monitoring and auditing measures to be implemented for the project.

1.2. Background

1.2.1. Site Description

The subject site is located in the eastern suburbs of Sydney, NSW, approximately 5 km south-east of Sydney CBD, within the Randwick City Local Government Area (LGA). The subject site is legally described as Lot 2009 DP 1169042, is approximately 80.5 ha in size, and is zoned as RE1 Public Recreation under the *Randwick Local Environmental Plan 2012*. The subject property is generally bounded by Alison Road to the north, Doncaster Avenue to the west, High Street to the south, and Wansey Road to the east.

The site is the location for the existing Royal Randwick Racecourse, which occurs on Crown Land that is leased to the ATC who owns and operates the racecourse (Urbis 2021). The surrounding areas of the subject site

comprise the residential areas of the suburbs of Randwick and Kensington. Centennial Park occurs to the north of the subject site, on the northern side of Alison Road.

The subject site has historically been cleared since at least the early nineteenth century. The vegetation that occurs within the site today is mainly comprised of limited stands of scattered trees as part of the landscaping.

The subject site and surrounding areas are shown in **Figure 1**.

1.2.2. Description of the Project

The ATC are seeking to introduce night racing at Royal Randwick Racecourse, to reinforce the reputation of the racecourse, and provide an alternative night time cultural and sporting event with opportunity to provide increased tourism and boost Sydney's night-time economy (Urbis 2021).

In summary, the SSD application seeks approval for:

- Consent for 16 night racing events per year, concentrated between October and April;
- Installation of new trackside lighting to facilitate televised broadcasting;
- Upgrade of the existing Spectator Precinct lighting for patron safety;
- Permanent diesel generators for electricity generation for trackside lighting; and
- Staging of physical works.

A more detailed description of the proposed project is provided in the Environmental Impact Statement (Urbis 2021) prepared by Urbis.

1.2.3. Centennial Park Grey-headed Flying-fox Colony

The flying-fox colony in Centennial Park is based in a camp within Lachlan's Swamp, in the southern portion of Centennial Park as shown in **Figure 2**. The camp covers an area of approximately 6.5 ha and was established in 2010. The average population count since January 2012 is approximately 21,000 individuals, with the largest number of flying-foxes recorded to date being 95,442 in February 2020. The camp is an important annual maternity roost within central Sydney (Eco Logical Australia. 2021).

As shown in **Figure 2**, the Centennial Park flying-fox camp is located approximately 800 m north of the subject.

1.3. Regulatory Framework

1.3.1. Commonwealth Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act provides for the protection of Matters of National Environmental Significance (MNES), which includes nationally listed Threatened Ecological Communities and species, and listed migratory species. Under the EPBC Act, any action (which includes a development, project or activity) that is considered likely to have a significant impact on MNES entities must be referred to the Commonwealth Minister for the Environment. The purpose of the referral is to allow a decision to be made about whether an action requires approval on a

Commonwealth level. If an action is considered likely to have a significant impact on MNES, it is declared a "controlled action" and Commonwealth approval is required.

The Grey-headed Flying-fox is listed as Vulnerable under the EPBC Act. When considering the Commonwealth's Significant Impact Guidelines for MNES entities for Vulnerable species, the project is unlikely to result in a significant impact on an important population. Therefore, the project does not require to be referred to the Commonwealth Minister for the Environment.

Nevertheless, the Commonwealth's document 'The National Light Pollution Guidelines for Wildlife' (DoEE 2020) have been used for this assessment as requested by Randwick City Council.

1.3.2. National Recovery Plan for the Grey-headed Flying-fox

The Recovery Plan for the Grey-headed Flying-fox (DAWE 2021d) sets out the management and research actions necessary to stop the decline of the species, and support the recovery of the flying fox over the next ten years. The plan outlines several threats to the survival of the species, including the main threat of loss and degradation of foraging and roosting habitat.

The overall objectives of the recovery plan are:

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

1.3.3. National Light Pollution Guidelines for Wildlife

The National Light Pollution Guidelines for Wildlife (DoEE 2020) (the 'Guidelines') outline the process to be followed where there is the potential for artificial light to affect wildlife, including an approach to assessing and mitigating the effect of artificial light on wildlife.

In accordance with the Guidelines, where there is important habitat for a listed species that may be affected by artificial light within 20 km of a proposed project, potential impacts on the species should be considered through an Environmental Impact Assessment process.

The Grey-headed Flying-fox camp in Centennial Park is located approximately 800 m north of the subject site. The camp meets the criteria for being 'nationally important' under the EPBC Act as it has contained more than 10,000 flying-foxes in more than one year in the last ten years (Eco Logical Australia. 2021).

2. Methods

2.1. Desktop Assessment

A desktop assessment was undertaken as part of this environmental impact assessment, to gain an understanding of the general habitat and behaviour of the Grey-headed Flying-fox, and the status and potential threats to the Centennial Park colony. The desktop assessment also focused on understanding the species susceptibility to the effects of artificial light in an urban environment.

Key documents reviewed for the Biodiversity Impact Statement included:

- National Light Pollution Guidelines for Wildlife – Including marine turtles, seabirds and migratory shorebirds (DoEE 2020);
- National Recovery Plan for the Grey-headed Flying-fox (DAWE 2021d);
- Centennial Parklands Flying-fox Management Plan (Eco Logical Australia. 2021);
- CSIRO: A monitoring method for the Grey-headed Flying-fox, *Pteropus poliocephalus* (CSIRO 2011);
- Australian Turf Club, Royal Randwick Racecourse: Night Racing Lighting Assessment (IGS 2021); and
- Royal Randwick Racecourse Night Racing: Environmental Impact Statement (Urbis 2021).

Several databases were also utilised during the preparation of this report, including the following key databases:

- Species records/occurrences:
    - Environment, Energy and Science (EES) BioNet Atlas (EES 2021)
    - Commonwealth Department of Agriculture, Water and the Environment (DAWE) Protected Matters Search Tool (DAWE 2021a);
- Species profiles;
    - NSW Department of Planning, Industry and Environment (DPIE) Threatened Species Profile Database; and
    - DAWE Species Profile and Threat Database.

The subject site and surrounding areas were also inspected through the review of recent aerial imagery, to gain a better understanding of the existing light conditions surrounding the subject site and the Grey-headed Flying-fox camp.

The information collected and reviewed during the desktop assessment was used in assessing the potential impacts of the project on the Grey-headed Flying-fox.

2.2. Site Inspection

A site inspection was undertaken within the subject site on 22 September 2021 by two Ecologists from Cumberland Ecology. The purpose of the site inspection was not that of detailed targeted surveys, but more to undertake a reconnaissance survey to gain an understanding of potential movement patterns of the flying foxes on a specific date when they leave the Centennial Park camp at dusk.

The site inspection commenced before dusk, with the Ecologists mainly positioned just below the intersection of Darley Road and Alison Road, within the subject site. Observations were made regarding the direction of the flying-foxes when leaving the camp, until the time that no further individuals were seen leaving the camp.

The information was then used to inform the impact assessment, in combination with the information collated during the desktop assessment.

3. Description of Lighting

3.1. Existing Light Environment

The subject site occurs within a highly urbanised environment, which is associated with a variety of existing light sources from residential houses, traffic, street lights, hospitals and university campuses. The site is bordered by residential areas, as well as two major roads; Alison Road and Anzac Parade. Furthermore, the Sydney Children's Hospital and Price of Wales Hospital are located approximately 350 m south-east of the subject site, whilst the campus of University of NSW is located directly south of the site, on the southern side of High Street. In addition to the urbanised setting of the subject site, the Sydney Light Rail runs along High Street.

Based on the urbanised setting of the subject site, it is expected that the subject site and surrounding areas are already subject to relatively high levels of existing ambient lighting.

3.2. Project Requirement for Additional Lighting

To facilitate the night racing events at the Royal Randwick Racecourse, new trackside lighting is required to be installed at the subject site. The track lighting for the project has been designed to meet specific broadcasting standards, as outlined in detail in the EIS (Urbis 2021). The lighting must provide specific lux levels at certain points across the track to ensure clear visibility of horses and jockeys for televised broadcasting standards and spectators on the Grandstand, whilst also not emitting glare to cameras or grandstands.

For additional details of the project's requirements for additional lighting, please refer to the EIS (Urbis 2021) and the Lighting Impact Assessment (IGS 2021).

3.3. Description of Proposed Lighting

The proposed lighting comprises 79 light columns around the track, that will collectively house 1,912 lighting fixtures to provide the required illumination. The heights of the light columns will range between approximately 18-40 m (Urbis 2021).

Based on the season for the racing events (between October and April) and the timing of sunset, the effects of the lighting will not be as noticeable until between the hours of 7:20-8:30 pm up to 10 pm, which accounts for approximately 34 hours per racing season. When dimming of the lights between races is also taken into account, the amount of time the lights will be on at full intensity during night reduces to approximately 8.5 hours per racing season (IGS 2021).

The proposed lighting design complies with the relevant Australian Standards. Further details on the proposed lighting are provided in the Lighting Impact Assessment (IGS 2021).

4. Biology and Ecology of the Grey-headed Flying-fox

4.1. Biology and Ecology of the Grey-headed Flying-fox

4.1.1. Distribution

The Grey-headed Flying-fox is endemic to Australia and is known to occur on coastal lowlands and slopes of eastern Australia. They are regularly found in NSW and Queensland, but have also become established in South Australia, the ACT and Victoria. There are also records of the species on mainland Tasmania (DAWE 2021d).

The patterns of occupancy and abundance of the species within its distribution are known to vary widely seasonally and temporally within its range of distribution. Annual cycles of migration at regional scales in response to the distribution of seasonal foraging resources are known to occur regularly, resulting in only a small proportion of the species distribution range being used at any one time (DAWE 2021d, b).

The species is widespread throughout their range in summer, however is mainly found to occupy coastal lowlands in autumn. In winter, the species is more common in coastal lowlands north of the Hunter Valley, whilst in spring the species is uncommon south of Nowra (DAWE 2021b).

4.1.2. Foraging Behaviour and Habitat

The Grey-headed Flying-fox is a canopy-feeding frugivore and nectarivore, known to forage in a range of vegetation communities including rainforests, open forests, woodlands, *Melaleuca* swamps, *Banksia* woodland, but also within commercial fruit crops and introduced trees species in urban areas. None of the vegetation communities used by the flying-foxes produce continuous foraging resources throughout the year, hence the species has adopted its migration traits in response to the seasonality of its food resources (DAWE 2021b).

The species has the ability to forage over extensive areas and is known to fly as far as 40-50 km in one night to feed (DAWE 2021d, b).

4.1.3. Roosting Behaviour and Habitat

The Grey-headed Flying-fox roosts in specific sites known as camps. The camps are often located near water, where the species roosts in variable sized formations on exposed branches. The camps provide resting habitat, as well as refuge during various phases of the species life cycle such as birth and conception (DAWE 2021d).

The occupation of camps often varies, ranging from sites that are inhabited continuously to sites that are only inhabited rarely. Seasonable patterns of occupation as well as annual variations are common (DAWE 2021d). This also applies for the Centennial Park camp, with quarterly population counts indicating that the number of flying-foxes using the camp fluctuates. Nonetheless, since 2012, only eight of the quarterly population counts have yielded less than 10,000 individuals, which indicates that the camp is inhabited continuously (Eco Logical Australia. 2021).

4.1.4. Key Threats

The National Recovery Plan for the species has identified habitat loss as the key threat to the survival of the Grey-headed Flying-fox population.

Other threats identified include:

- Camp disturbance;
- Mortality in commercial fruit crops;
- Heat stress;
- Entanglement in netting and barbed wire fencing;
- Climate change;
- Bushfires;
- Electrocution on power lines; and
- Public misunderstanding of disease risk.

4.2. Local Population of the Grey-headed Flying-fox

The nationally important Grey-headed Flying-fox camp in Centennial Park, is a camp within a highly urbanised setting, which is mainly occupied by the Grey-headed Flying-fox, but also by Black Flying-foxes *(Pteropus alecto*). Although the extent of the core roosting habitat varies seasonally, the average population of the camp since January 2012 is approximately 21,000 individuals. The largest number of individuals recorded to date is 95,442 in February 2020 (Eco Logical Australia. 2021).

Although the direction of nightly migration is likely to change between nights and seasonally, the observations from the site inspection indicated one fly-out direction utilised being south-west from the camp, or west of the subject site (**Figure 3**).

The camp occurs within Lachlan Swamp, which provides vital habitat for the species. Although heat-related deaths have been reports at the Centennial Parklands camp in recent years, monitoring and other observations suggest that the Centennial Park camp has not been as severely affected by heat waves compared to other Sydney camps, which may have been the result of the presence of Lachlan Swamp or the camps proximity to the coast. The vegetation in the camp also presents a uniform canopy that provides a dense shade for the flying-foxes (Eco Logical Australia. 2021).

5. Impact Mitigation, Monitoring and Adaptive Management

5.1. Mitigation Measures

A number of mitigation measures to deal with light spill will be implemented for the project, as outlined in detail within the Light Impact Assessment by IGS (IGS 2021) and the EIS (Urbis 2021). The following key mitigation measures are considered relevant in mitigating any potential impacts on the Grey-headed Flying-fox colony's movement patters:

- Dimming of racecourse lighting between races, to minimise the impacts of light spill through a reduction of the duration of full brightness of the lighting to approximately 8.5 hours per racing season;
- Implementation of design features such as baffles and shields to reduce the lighting levels and minimise the light spill; and
- Incorporation of best practice and latest technology into the proposed design of the lighting to minimise the light spill on surrounding areas within acceptable levels below 100 lux.

In addition to the mitigation measures described above, it is recommended that an ecological monitoring program is implemented for the project, including the preparation of a Grey-headed Flying-fox Monitoring Plan, as well as an Adaptive Management Strategy. These measures are further described in subsequent sections of this Chapter.

5.2. Ecological Monitoring Program

In addition to the monitoring and auditing proposed in the Lighting Impact Assessment by IGS (IGS 2021), in which the actual lighting is continuously measured and audited, it is recommended as part of this environmental impact assessment that an ecological monitoring program is implemented to monitor any potential adverse impacts on the Grey-headed Flying-fox colony and to inform the Adaptive Management Strategy.

It is recommended that a Grey-headed Flying-fox Monitoring Plan ('Monitoring Plan) is prepared and implemented by a qualified Ecologist as part of the Development Consent Conditions for the project. The Monitoring Plan should include a detailed design of the ecological monitoring program and associated reporting requirements.

The monitoring program should include baseline monitoring of the flying-fox camp fly-out at dusk prior to the first night racing event, over a minimum of three-five days. The monitoring should then be repeated during the first night racing event. It is recommended that this monitoring sequence is repeated for the first five nights of racing events, with due consideration to seasonal changes in foraging behaviour and movement patterns of the flying-foxes. If no significant changes in the flying-fox colony's fly-out movement patterns or behaviours are recorded following the monitoring of the first five nights of racing events, then it is recommended that no further monitoring is required. However, if a significant difference in the flying-foxes behaviour or movement patterns is recorded in associated with the usage of lights at the night racing events, the Adaptive Management Strategy will be triggered (see ***Section 6.3***).

5.3. Adaptive Management Strategy

In the unlikely event that the monitoring results indicate a shift in the movement patterns or behaviour of the Grey-headed Flying-fox colony at fly-out from the camp, due to the lights used during the night racing events, it is recommended that the following measures are implemented as part of an Adaptive Management Strategy:

- Continuation of the Grey-headed Flying-fox monitoring program for the remainder of the night racing season, as per the Monitoring Plan;
- Preparation and implementation of an Artificial Light Management Plan, in accordance with the Guidelines; and
- Further review of the lighting used for the night racing events, and the potential for additional mitigation measures to be implemented.

Additionally, the Monitoring Plan should be revised as required in response to the findings of the ongoing monitoring.

6. Risk Assessment

6.1. Risk Assessment

Based on the known behaviour of the flying-fox and the proximity of the subject site to the Centennial Park camp, the main impact that may arise from the increased lighting associated with the project is considered to be changes to the species movement patterns or behaviour at fly-out from the camp at dusk. The increased lighting could have the potential to disrupt and alter the direction of the nightly migration that is part of the foraging behaviour of the species.

The proposed lighting comprises 79 light columns around the track, that will collectively house 1,912 lighting fixtures to provide the required illumination. Based on the season for the racing events (between October and April) and the timing of sunset, the effects of the lighting will not be as noticeable until between the hours of 7:20-8:30 pm up to 10 pm, which accounts for approximately 34 hours per racing season. When dimming of the lights between races is also taken into account, the amount of time the lights will be on at full intensity during night reduces to approximately 8.5 hours per racing season. Hence, the impacts of the proposed lighting and associated light spill will be limited to a relatively short period over the racing season (IGS 2021).

When assessing the importance of the habitat to the species, it is recognised that the Centennial Park flying-fox camp is a nationally important camp under the EPBC Act and considered as an important annual maternity roost within central Sydney (Eco Logical Australia. 2021). However, the project is not expected to result in any direct impacts on the actual camp. Furthermore, based on the National Flying-fox Monitoring Viewer (DAWE 2021c), there are a number of other known camps within Sydney that meet the criteria for being nationally important in the Greater Sydney area (including Wolli Creek, Gordon and Parramatta Park). Therefore, although the Centennial Park camp is an important camp for the species, it is not the only camp site found in the Sydney area.

Although the project will not directly impact the camp, increased lighting could have the potential to adversely affect the movement patters of the flying-foxes when they fly-out from their camp at dusk. During the site inspection completed by Cumberland Ecology, movement patterns at dusk during fly-out were observed from the first flying-foxes leaving the camp until no further individuals could be seen. Although some smaller groups of bats (4-5 individuals) were occasionally flying over the subject site, the majority of the flying-foxes were observed to fly out from the camp in a south-westerly direction, west of the subject site (see **Figure 3**) (**Photographs 1-2**). Nevertheless, the Grey-headed Flying-fox is known to change their foraging behaviour based on the distribution of seasonal foraging resources, hence it is likely that their direction at fly-out from the camp changes between nights and between seasons, and they may fly across the subject site in larger numbers from time to time. However, based on the availability of resources within their foraging range, which can be up 40-50 km per night, they may also fly-out in an opposite direction from the subject site (i.e. northerly direction).

However, when determining the risk of an impact to the species movement patterns, it is important to consider the extent of the additional light impacts. As mentioned, the night race events will take place over 16 nights spread out over the season between October and April. Based on the light impact assessment (IGS 2021), this will result in approximately 8.5 hours of lights at full intensity per racing season. With the implementation of design features such as baffles and shields, the light spill during these 8.5 hours will be minimised.

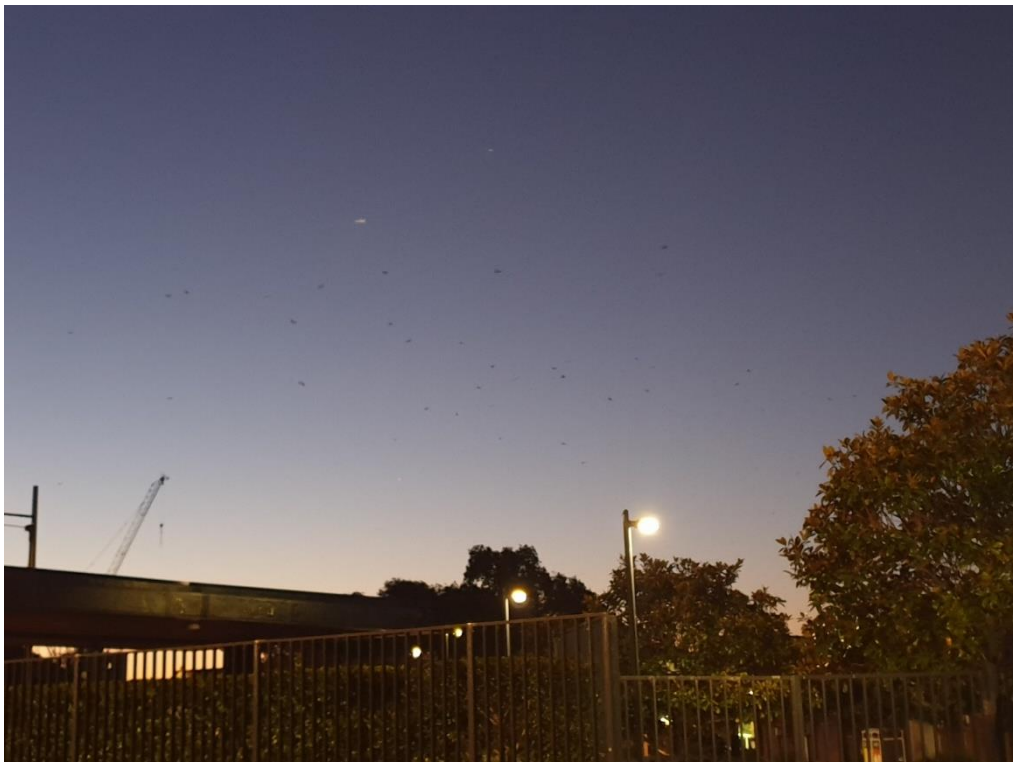
Although the lighting will be increased for a relatively short period of time during each of the night racing events, it will occur within an environment that has a high existing ambient light level within a highly urbanised area and is likely to mainly contribute to existing sky glow as opposed to creation of a new directly visible light source. As a result, the flying-foxes are likely to already be relatively accustomed to the light environment at night. Furthermore, based on studies to date involving bright lights as deterrents over orchards, flying-foxes can become accustomed to increased lighting and has been known to feed in fully illuminated orchards (Queensland Government DPIF. 2021).

In addition to the limited time of increased artificial lighting across the racing season, and the minimised light spill associated with the lighting, a number of mitigation measures as well as the recommended adaptive management strategy should also be considered when assessing the risk of the artificial light on the Grey-headed Flying-fox. With the implementation of a robust monitoring program, which will be outlined within a Grey-headed Flying-fox Monitoring Plan, and the implementation of an adaptive management strategy, the risk to the Grey-headed Flying-fox and associated Centennial Park colony is considered to be minimal.

Based on the information above, it is considered unlikely that the artificial lighting associated with the project will significantly impact on the movement patterns of the Grey-headed Flying-fox.

Photograph 1 View of Flying-foxes during fly-out, west of the subject site. Photo captured below the intersection of Darley Road and Alison Road.

Photograph 2 View of Flying-foxes during fly-out, west of the subject site. Photo captured below the intersection of Darley Road and Alison Road.



7. Conclusion

The purpose of this Biodiversity Impact Statement is to document the findings of an environmental impact assessment for the project that assesses the potential impacts of artificial light on the Grey-headed Flying-fox colony based in Centennial Park, in accordance with the Commonwealth National Light Pollution Guidelines for Wildlife (DoEE 2020).

Based on the known behaviour of the flying-fox and the proximity of the subject site to the Centennial Park camp, the main impact that may arise from the increased lighting associated with the project is considered to be changes to the species movement patterns at fly-out from the camp at dusk.

The night race events will take place over 16 nights spread out over the season between October and April. Based on the light impact assessment (IGS 2021), this will result in approximately 8.5 hours of lights at full intensity per racing season. With the implementation of design features such as baffles and shields, the light spill during these 8.5 hours will be minimised.

Although the lighting will be increased for a relatively short period of time during each of the night racing events, it will occur within an environment that has a high existing ambient light level within a highly urbanised area and therefore will mainly contribute to existing sky glow as opposed to creation of a new visible light source. As a result, the flying-foxes are likely to already be relatively accustomed to the light environment at night.

When considering the suite of mitigation measures proposed for the project, including a recommended ecological monitoring program and adaptive management strategy, in combination with the limited number of events proposed, it is considered unlikely that the artificial lighting associated with the project will significantly impact on the movement patterns of the Grey-headed Flying-fox.

8. References

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FIGURES

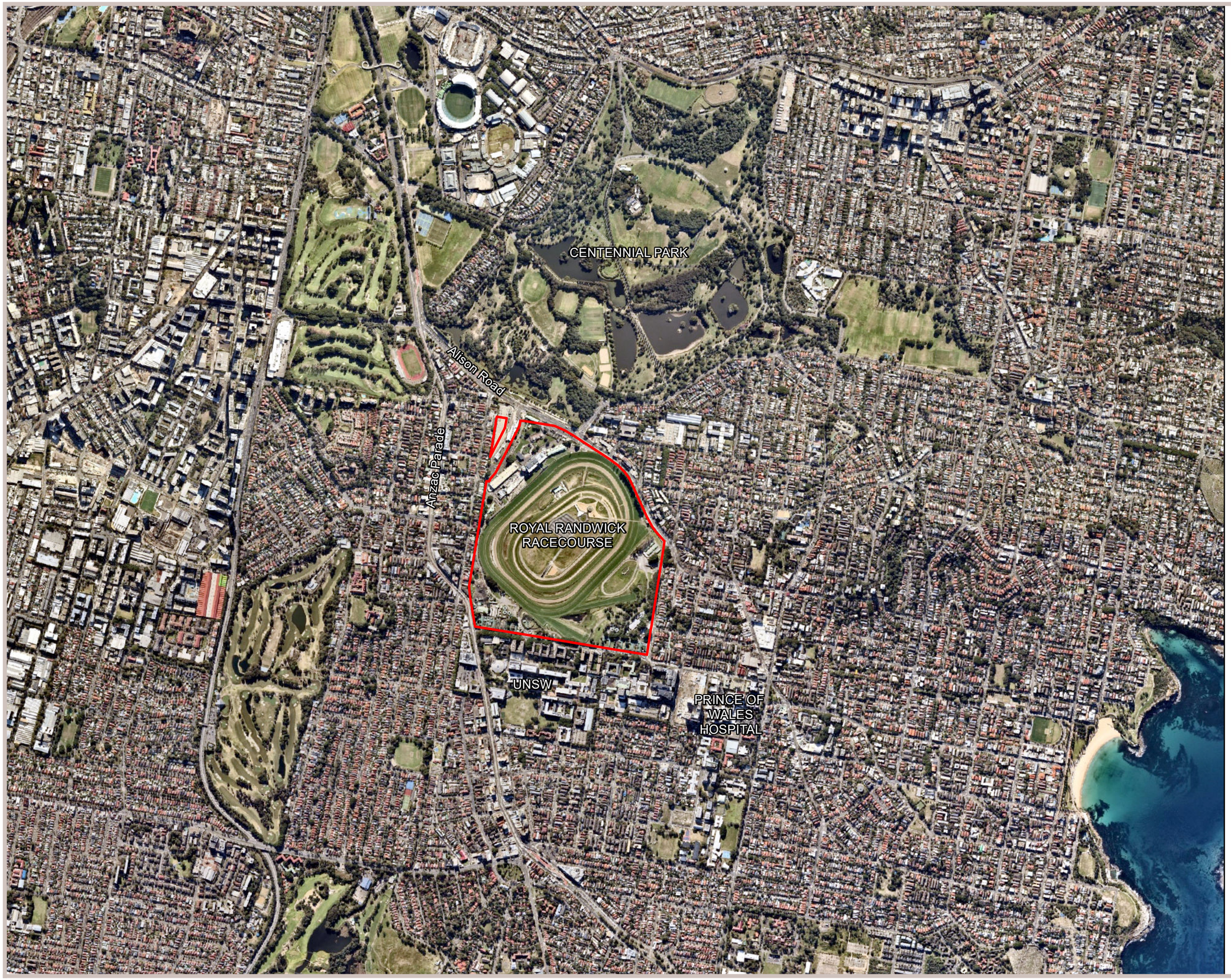
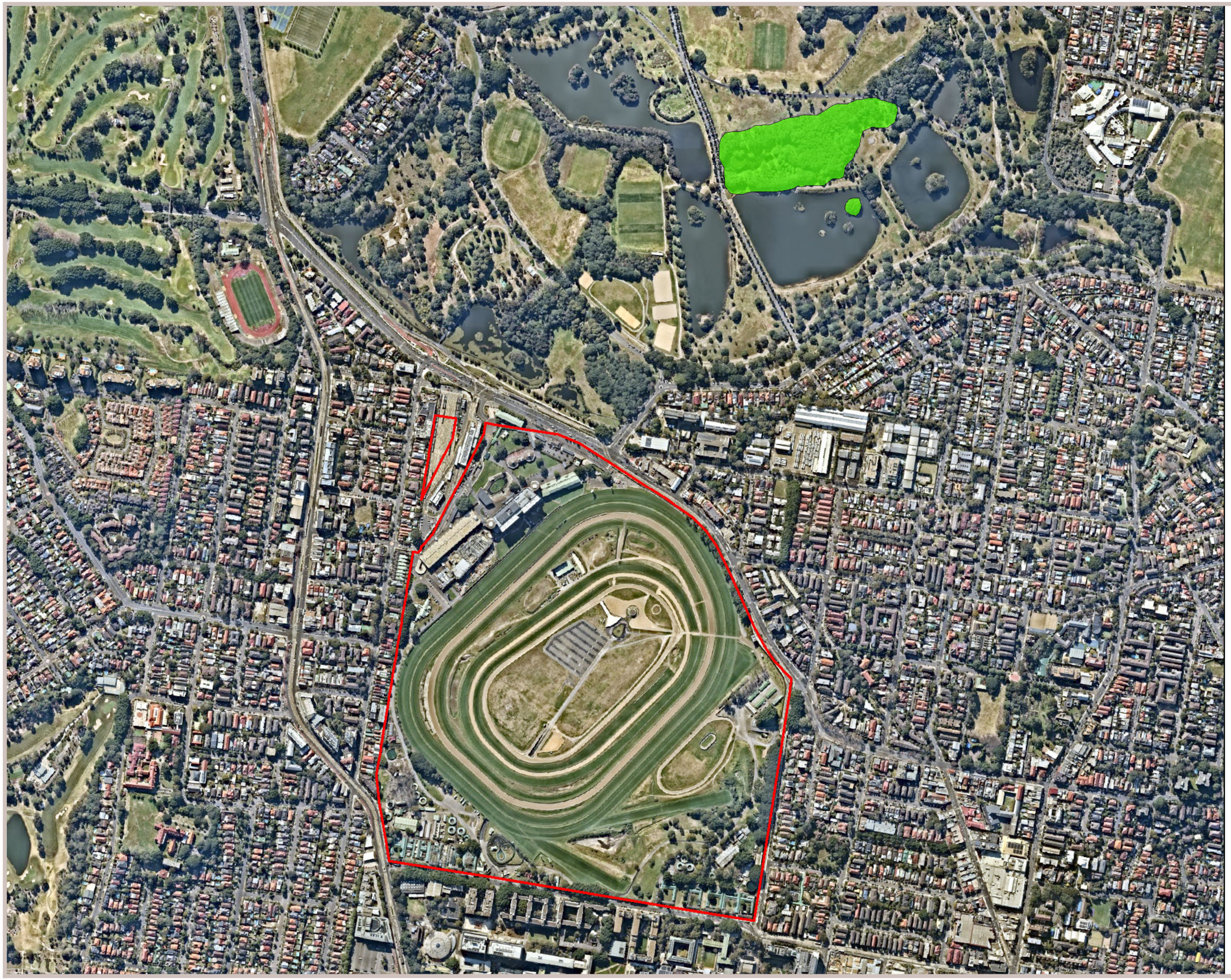


Figure 1. Location of the subject site and surrounds



Legend

Subject Site

Location of Grey-headed Flying-fox Camp

Image Source:
NearMap
(dated 17-06-2021)

Data Source:
Eco Logical Australia (2021).
Centennial Parklands
Flying-fox Camp Management
Plan.

Coordinate System: MGA Zone 56 (GDA 94)

cumberland ecology

0 100 200 300 400 m

I:\...\21217\Figures\RP1\20211008\Figure 2. Location_GHFF Camp

Figure 2. Location of the Centennial Park Grey-headed Flying-fox camp

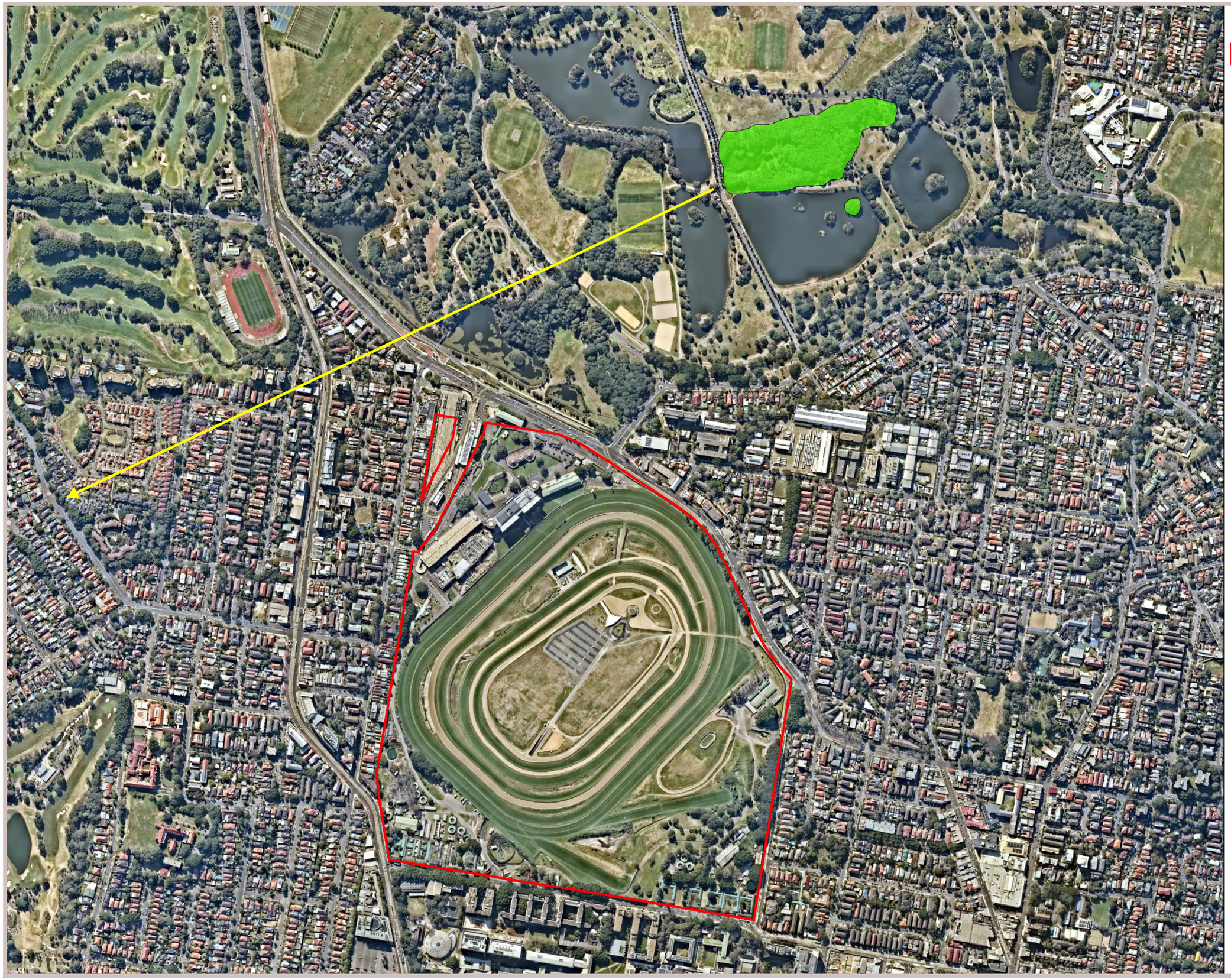


Figure 3. Grey-headed Flying-fox fly-out direction observed during site inspection