



CUMBERLAND
CITY COUNCIL



Ibis Management Plan

2021

IBIS MANAGEMENT PLAN

CONTENTS

1. INTRODUCTION	3
1.1 THE NATURE OF THE AUSTRALIAN WHITE IBIS	3
1.2 SCOPE AND OBJECTIVES	3
1.3 STRATEGIC CONTEXT	4
1.4 IBIS DISTRIBUTION	5
2. SIGNIFICANT SITES	6
2.1 CENTRAL GARDENS	6
2.2 HOLROYD GARDENS	7
2.3 PEMULWUY	8
2.4 TOWN CENTRES	9
2.5 CHILD CARE CENTRES	11
2.6 DUCK RIVER AUBURN (EDGAR STREET)	11
3. POTENTIAL ISSUES	12
3.1 GENERAL ISSUES	12
3.2 SITE SPECIFIC ISSUES	13
4. COLONY COMPOSITION	14
5. ACTIONS TO DATE	15
6. MANAGEMENT PLAN	16
6.1 OBJECTIVES	16
6.2 CRITERIA FOR ONGOING MANAGEMENT	16
6.3 ACTION 1: GROUNDWORKS	17
6.4 ACTION 2: EDUCATION	18
6.5 ACTION 3: MONITORING	18
7. IMPLEMENTATION STRATEGY	19
8. MANAGEMENT PLAN REVIEW	21

Acknowledgement of Traditional Custodians

Cumberland City Council acknowledges the traditional custodians of this land, the Darug people, and pays respect to their elders past, present and emerging.

1. INTRODUCTION

Over the past few years, the population of Australian White Ibis birds has gradually increased. This has resulted in increasing complaints and issues by our community about the Australian White Ibis. This Management Plan discusses the nature of Australian White Ibis, issues and problems associated with increase of populations of ibis birds whilst providing a management plan to balance the needs of our community.

Across Cumberland City, Council has identified ten problem areas that will require management actions to mitigate the impacts ibis are having on our community. These areas include Auburn, Lidcombe, Granville, Merrylands and Toongabbie Town Centres, Nelsons Ridge Pemulwuy, Central Gardens Merrylands, Holroyd Gardens Merryland, Pemulwuy Childcare Centre and Duck River (Edgar Street, Auburn). From the ten sites, Central Garden, Nelsons Ridge and Duck River (Edgar Street Auburn) recorded a population exceeding 100 ibis birds. Council will implement management actions when Ibis birds become problematic according to the 'Criteria for Ongoing Management'.

1.1 The Nature of the Australian White Ibis

The Australian White Ibis (AWI) is a wetland bird that is endemic to Australia. It has a white body with a black head and neck, with red patches on the back of its head and under its wings. The ibis has a curved, elongated beak which enables it to forage for aquatic invertebrates in its natural habitat. They primarily live in inland parts of the East Australian Coast, inhabiting freshwater wetlands and breeding during periods of inland flooding. They are migratory birds and will travel great distances to find suitable habitat to breed. In the last 60 years there has been a gradual increase in the number of ibis visiting the Sydney Basin. This shift in habitat range has been largely due to drought, bushfires and changes to land use.

The ibis has proven to be highly adaptable and resilient, feeding on human food sources from bins/ food scraps and nesting in trees and waterbodies across the city. As more ibis migrate to urban areas and their population numbers continue to grow, it is important that Cumberland City Council develop site specific management strategies to mitigate the impact of these birds on local communities.

1.2 Scope and Objectives

The Ibis Management Plan is applicable to public land within the Cumberland City. The management plan focuses on the main colonies located to the west of Pemulwuy Lake, Duck River Auburn near Edgar street, Holroyd Gardens and Central Gardens, as well as town centres of Auburn, Lidcombe, Merrylands, Toongabbie and Granville. Given the population growth of the Ibis bird in Cumberland, the scope may be extended beyond these specified areas to include additional parks, reserves and town centres as required.

The objective of Cumberland City's Ibis Management Plan is to address a range of issues associated with ibis throughout Cumberland. The Management Plan will aim to:

- Manage the Australian White Ibis population in Cumberland City
- Minimise local community issues associated with ibis birds
- Reduce the impact of ibis on the natural environment and infrastructure
- Provide information to the Department of Planning, Industry and Environment on licence requirements for Ibis bird management

These objectives will be achieved through managing Ibis birds through three action areas. Management actions will be site specific and tailored to issues that have been identified at each site.

1.3 Strategic Context

National Parks and Wildlife Act 1974

The objectives of the National Parks and Wildlife Act 1974 are to conserve habitat, ecosystem and biodiversity of lands reserved under the Act. All native animals and plants are protected under the Act, including the Australian White Ibis. Under this legislation, offences relating to the harming of fauna and flora is prosecuted under section 70 and 71 of the Act.

Biodiversity Conservation Act 2016

The purpose of the Biodiversity Conservation Act 2016 is to maintain healthy, productive and resilient environments for the well-being of the community. Under section 2 of the Act, licences can be issued for actions in relation to harming or obtaining protected fauna to control native animals.

Department of Planning, Industry and Environment: Landholders Licence to Harm Protected Animals-Australian White Ibis – Nest and Eggs

If protected native animals are shown to be a threat to human safety, damaging property and/or causing economic hardship, the National Parks and Wildlife Service (NPWS) may grant a licence to the owner or occupier of a property, to harm (for example, cull or catch and release) the animals. All management actions must be carried out in accordance with the licence conditions. Licensee's must keep a register of animals harmed under the licence using record sheets provided by the Department and returned to NPWS office within 7 days of the licence expiration.

Cumberland City Biodiversity Strategy

Cumberland City is committed to a clean, green and environmentally sustainable environment by protecting and enhancing Cumberland's natural areas. The Strategy commits Cumberland City to protecting biodiversity and supporting ecosystem services to ensure biodiversity is protected for current and future generations. Key Focus Area 3.1 aims to embed biodiversity consideration and protections into strategic plans and controls.



1.4 Ibis Distribution

Cumberland City's Australian White Ibis bird population is concentrated in its large green open spaces, often near water bodies. The largest permanent colony comprises of over 190 ibis birds at Central Gardens located to the central west of the local government area. This was closely followed by a colony present at Lake Pemulwuy with over 140 ibis birds and a colony located on a small island at Duck River Auburn (near Edgar Street) which recorded a population of over 130 ibis birds. During the ibis survey undertaken by Council in late 2020 and early 2021, an emerging population was observed at Holroyd Gardens, specifically to the east portion of the garden where a large lake is conducive for ibis habitat. Furthermore, the large open green spaces and high amount of palm trees and casuarinas promote establishment of colonies given the limited number of water bodies in Cumberland.

The survey also noted scattered smaller populations of ibis throughout the town centres of Merrylands, Granville, Auburn, Toongabbie and Lidcombe.

The ibis bird population has gradually increased over recent years. As their population continues to grow, it is expected that further conflicts between Ibis and the community and environment will increase.

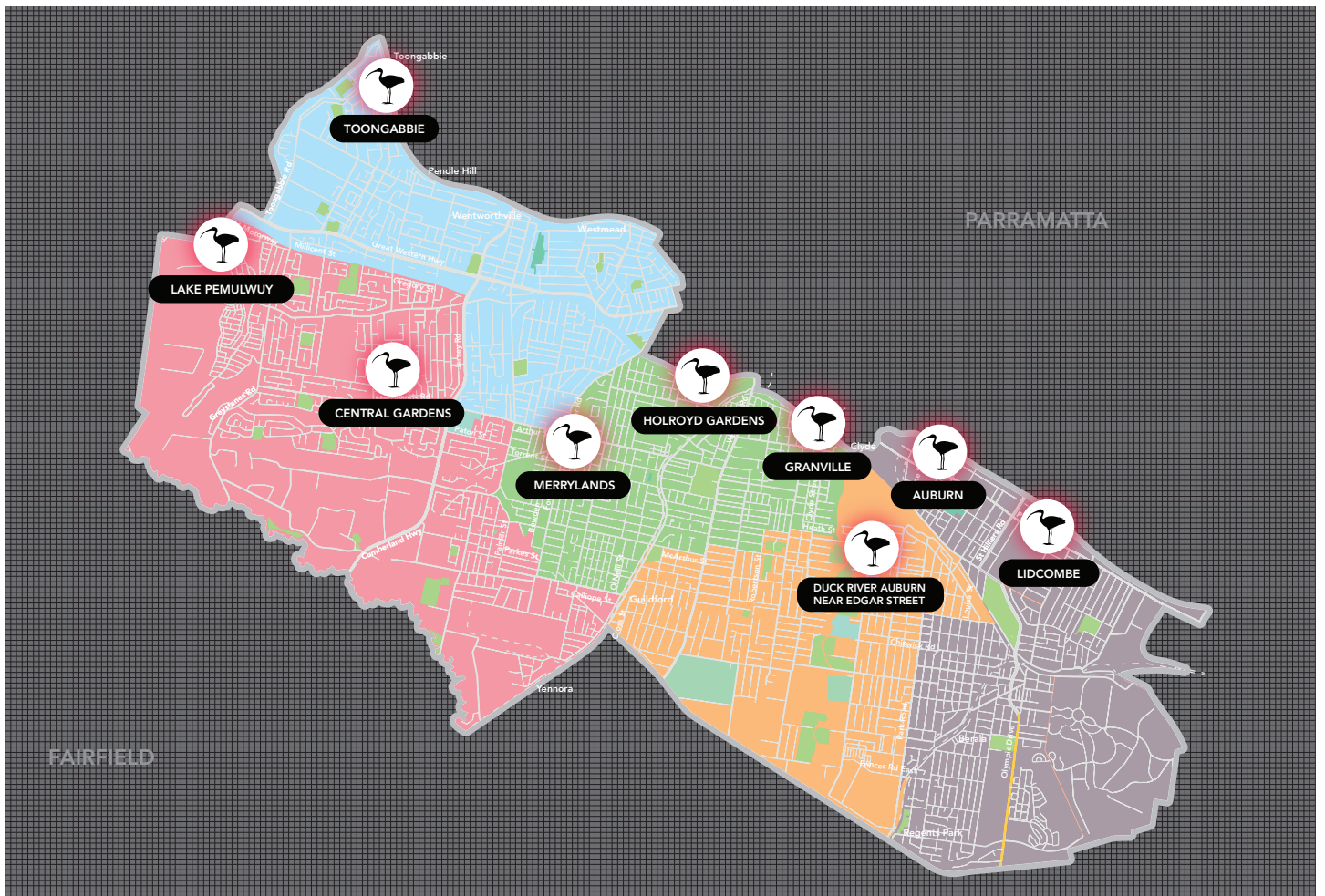


Figure 1 - Distribution of ibis birds and colonies across Cumberland City

2. SIGNIFICANT SITES

2.1 Central Gardens

Central Gardens is located on the corner of Merrylands Road and the Cumberland Highway in Merrylands West and forms an important component of Cumberland City Council's open spaces. The site's open grassed areas allow for recreational activities, such as BBQ's, picnics and tennis.

Central Gardens is unique as it contains patches of remnant vegetation of the native Cumberland Plain woodlands, including Eucalypts such as Grey Box (*E. moluccana*), Red forest Gum (*E. tereticornis*) and Narrow-leaved Ironbark (*E. crebra*).

The park also contains a nature reserve which has an animal enclosure containing native species including wallabies, emus, wombats and native cockatoos and cockatiels.

The lake at the park provides habitat for various species of waterfowl including dusky moorhens, pacific black ducks and wood ducks.

The manmade lake provides a natural habitat for Ibis and is Cumberland's largest permanent colony. In recent years, the Ibis have moved beyond the lake and colonised nearby casuarina's within the animal enclosures resulting in widespread fouling which has increased the risk of disease for the native animals.

Impact of Ibis Birds

The ibis at Central Gardens were found to be roosting and nesting in the trees and on the ground, predominately in the area surrounding the lake. Much of the trees, particularly the casuarinas, were showing signs of damage to the foliage. Multiple trees were found to contain up to 4 – 5 ibis nests. When observing the flora and fauna at the site it was apparent that the ibis bird was the dominant species present, which suggests that they are outcompeting other species of birds for food and space. The water in the lake was murky in appearance with an offensive odour associated with excretion. It is expected that the water quality will continue to decline unless action is taken. If left unmanaged it is expected that the ibis population at this site will continue to cause further disruption to public activities in the park as the birds will encroach more on public space when foraging for food, particularly when there are large gatherings of people having a BBQ or picnic.



Figure 2 - Central Gardens ibis colony

2.2 Holroyd Gardens

Holroyd Gardens is located on the corner of Walpole and Pitt Street in Merrylands. The site at Holroyd Gardens was originally a clay excavation pit and, as a result, there is limited remnant indigenous vegetation. Holroyd Gardens is an important open space and recreation area for our community. It contains sheltered BBQ areas, playgrounds, duck ponds and walking trails. Holroyd Gardens acts as a greenspace corridor for wildlife as it connects to the tree line that runs along A'Becketts Creek.

Impact of Ibis Birds

There was a relatively small ibis population located at this site, the majority of which were found to be roosting on the ground around a stagnant pond near the lake. No nests or chicks were found on inspection. The site overlaps with a high-density residential area (apartments). Should the population grow, this could cause disharmony among residents in the future. A copious amount of bird excretion along the footpath of the lake was noted, although it was unclear if this was produced by the ibis and there was no offensive smell associated with the excretion. The surrounding lake and brickwork site are both aesthetic features which makes the area appealing for residents and often serve as a backdrop for wedding photograph shoots. A growing ibis population could lead to the birds occupying much of this space which could lead to a decline in both the water quality and attractiveness of the site. As the brickworks site is heritage listed, Council would need to invest time and resources into cleaning and removing bird excrement from the structure in order to maintain it.



Figure 3 - Holroyd Gardens is a site with a growing ibis population in close proximity to residential properties

2.3 Pemulwuy

The ibis colony at Pemulwuy is spread across three areas at Nelsons Square, Driftway Reserve and Dirrabari Reserve. Pemulwuy Lake is approximately 3,650sqm, provides recreation for the local community and playing an important role in the environment.

Nelsons Ridge acts as a greenspace corridor which provides habitat connectivity for biodiversity. Previous fauna surveys recorded four threatened species located in the area surrounding the Nelsons Ridge, including the Greater broad-nosed bat, Eastern freetail bat, Eastern falsistrelle and the Powerful owl. Dirrabari Reserve contains some remnant vegetation of the endangered Shale Plains Woodland vegetation.

Driftway Reserve is aligned with the original creek which slopes northward. The creek line has been extensively modified during the development of Nelsons Ridge to ensure the surrounding development does not succumb to flooding. Run off that enters the creek line flows down into the water feature in Nelsons Square.



Figure 4 - Pemulwuy Lake has a large population of ibis in close proximity to homes

Impact of Ibis Birds

There is a growing ibis population that has established themselves around the lake at Nelsons Ridge. A site inspection recorded a total of 147 individuals present (141 adults, 6 chicks), making it the second largest population of the sites identified by Council. The birds were observed to be nesting in the vegetation on the lake and were seen flying in and out of the site. No ibis were observed nesting in the trees. Residents that live along the waterfront of the lake have lodged several complaints to Council relating to disruptive behaviour associated with this ibis population. There are also many complaints how the ibis birds reduce the attractiveness of the lake.

Long term effects of an unmanaged ibis population could see a decline in the aesthetic appeal and recreational value of the area. As this population is heavily concentrated around the water, there is likely to be a decline in water quality at the lake (despite having a water feature which assists in aeration). Poor water quality can lead to issues such as algal blooms and disruption to the local ecosystem services and biodiversity within the lake. Damage to aquatic vegetation was observed to be occurring at the site due to ibis birds nesting and roosting. Aquatic vegetation play an important role in ecosystem services, as they provide habitat and food resources for other aquatic animals, such as fish, amphibians and insects, and they remove toxins from the lake through photosynthesis.

2.4 Town Centres

This Management Plan also covers the town centres in Cumberland City Council. Presently, the problematic locations with ibis include Auburn, Lidcombe, Merrylands, Granville and Toongabbie town centres. Town centres offer a range of services and facilities to support our community. These include retail, restaurants and leisure opportunities. Town centres are the focal point of our community play host to festivals, markets and events. As ibis birds are increasingly being pushed out of their natural habitat, they find opportunities within town centres to forage through public and commercial bins, litter scraps and nest in trees close to these food sources. This poses an increasing public nuisance problem where large colonies produce strong smells and v in public spaces.



Impact of Ibis Birds Auburn Town Centre

An inspection of Auburn Town Centre found that ibis birds were nesting primarily in one location along Northumberland Road, in two palm trees at a site currently under construction close to the trainline. The trees that the birds were nesting in were not pruned and ibis were observed to be flying between Northumberland Road and Auburn Long Day Care, which is indicative that the two populations are linked.



Impact of Ibis Birds Lidcombe Town Centre

The Lidcombe Town Centre consists of Joseph Street, Bridge Street, Railway Parade and Remembrance Park in Lidcombe. Ibis were found to be nesting outside the library near Olympic Drive (main road) and near the railway line. The ibis nesting near the railway line were found in one single bottle brush tree, which contained several nests with chicks. There was a considerable amount of faeces under the tree and debris from the ibis was noticed to be scattered as the birds would take flight. A further inspection of Remembrance Park found a pair of ibis sitting in one of the palm trees in the park (despite the palm being recently pruned). While the population in this area is small, it is located near multiple restaurants, some of which include outdoor dining areas. Therefore, there is a potential health hazard associated with this population if left unmanaged.



Impact of Ibis Birds Merrylands Town Centre

Merrylands Town Centre is a high use pedestrian area consisting of McFarlane Street, Merrylands Road and Finns Lane and Main Lane. A small population of 7 ibis birds were surveyed in the rear of the McFarlane Street carpark, backing onto the stormwater channel. Sources of food included water, rubbish and scraps of food. Native casuarinas provided cover and nesting opportunities. A few ibis birds were also spotted in the lane ways picking through commercial waste bins for food scraps.



Impact of Ibis Birds Granville Town Centre

Granville Town Centre is a busy area with restaurants, shopping and community facilities. During the survey, 3 Ibis birds were spotted in the town centre foraging through residential and public bins. A large nest was surveyed in a palm tree at the intersection of Russell and Carlton Streets. The nest emitted a strong foul odour and signs of fouling around the palm tree.



Impact of Ibis Birds Toongabbie Town Centre

Toongabbie Town Centre is located in the north west of Cumberland City, comprising of restaurants, residential apartments, a small park, playground and community centre. The survey found two ibis birds flying over the town centre. No ibis birds were found to be nesting in any of the trees around the town centre. The park on the corner of Targo and Toongabbie Roads showed signs of ibis birds and nests being present. This was evident by the significant amount of excrement on the road, footpath and bin near the playground. There was also an odour and ibis feathers scattered along the ground indicating that the birds frequent the park throughout the day.

2.5 Child Care Centres

Child care centres cater to the very young. They are an environment for growth, learning and development and socialisation. As outdoor playtime is an important element to childhood development, it is important that the child care centres are clean and hygienic.

During the survey, it was noted that Pemulwuy Childcare Centre had a nest located in the gumtree in the play area. Staff at the day care have reported that birds started nesting in the tree in March 2020 and they became increasingly concerned as bird dropping began to accumulate in the playground area posing a health hazard to young children. In response to this, Council organised for the tree to be cut back and installed roof spikes and spotlights to further discourage roosting and nesting. These methods were successful for a short period of time; however, the Ibis breeding season has seen the birds return, particularly at dusk. The ibis have a potential food source in the form of the bins behind the Woolworths which is adjacent to the childcare centre.

Auburn Long Day Care Centre is located next to Council's Northumberland Office in Auburn. Upon site inspection, ibis birds were found to be nesting in weedy vines that have grown onto the fence of the day care. Staff at the day care centre had raised concerns about the ibis as their behaviour was not only disrupting the children but they had also begun to destroy the centre's vegetable garden. Droppings from the birds are beginning to accumulate in the playground and this pose a health hazard to the children.

2.6 Duck River Auburn (Edgar Street)

The Duck River is approximately 12km long and lies on the traditional lands of the Dharug peoples, running through the suburbs of Auburn, Granville and Clyde and flows into the Parramatta River. This greenspace corridor holds both recreational and ecological value as members of the public frequent the walking trail and native wildlife use the area for habitat and nesting space.

Scattered throughout Duck River are several small islands which provide habitat and nesting space for birds, including ibis birds. An inspection of the Duck River corridor indicated that there was one island, located near Edgar Street Auburn, which had an abundance of ibis birds. Over 130 ibis birds were recorded during a survey in May 2021.



Impact of Ibis Birds Duck River Auburn (Edgar Street)

While the ibis birds at this site were mainly contained to the island, it was noted that ibis were foraging for food on the sporting fields at Oriole Park. As the Duck River is flanked by residential property, should ibis numbers increase, it is likely that the birds will encroach more into the residential area.

3. POTENTIAL ISSUES

3.1 General Issues

There are a range of general issues associated with ibis birds in the area. These are outlined below:



Public nuisance

Residents and the public generally are not receptive to ibis birds. Council often receives many complaints against them including the associated noise, smell, accumulation of excrement, aggressive behaviour and scattering of rubbish through public spaces.



Fauna displacement

Ibis are known to compete with native species over nesting locations, for example, the Grey-headed Flying-fox colony at Clyde along Duck River, are in direct competition with ibis for roosting spots. An overabundance of ibis can reduce ecosystem services and biodiversity.



Smell

Offensive odours have been experienced at several sites. The odours are emitted from ibis bird defecation and decaying organic matter including rotting eggs, carcasses and feathers.



Public health risk

Ibis are known carriers of pathogens that could be transmitted to humans. Salmonellosis is a common bacteria that is excreted in bird faeces, areas that contain an accumulation of bird droppings pose a risk to human health (particularly in small children). Increase in nutrients may result in algae blooms.



Damage to vegetation

Ibis smother native vegetation when nesting in the canopy and their excreta can inhibit seed growth of the under-storey vegetation. This can potentially reduce fauna and flora diversity.



Degraded water quality

An increase in faecal matter from ibis birds in water bodies increases the nutrient levels in the water and can lead to eutrophication and algal blooms.



Management Costs

Costs associated with vegetation management (pruning of palms) and street cleansing services (hosing down footpaths and surfaces covered with ibis droppings).



Noise

Ibis bird calls are often heard around nesting sites around sunrise and sunset. This has the potential to disturb neighbouring residents.

3.2 Site Issues

The general issues identified in section 3.1 have been applied on the sites surveyed by Council. This is outlined in Table 1.









								
Site	Public nuisance	Smell	Noise	Degrade water quality	Damage to vegetation	Public health risk	Management costs	Fauna displacement
Central Gardens	●			●			●	●
Holroyd Gardens	●			●				
Pemulwuy Lake	●			●			●	●
Pemulwuy Childcare Centre	●					●	●	
Auburn Town Centre	●					●	●	
Lidcombe Town Centre	●	●				●	●	
Merrylands Town Centre	●	●						
Granville Town Centre	●	●						
Toongabbie Town Centre	●	●				●	●	
Duck River Auburn (Edgar St)	●	●	●	●	●			●

Table 1: Site specific issues associated with ibis

4. COLONY COMPOSITION

4.1 Details of ibis Populations

Council has undertaken surveys of ibis populations across a range of locations in Cumberland City. The results of the surveys are provided in Table 2.

Site	Population size	Date/Time start/finish	Total chicks on-site (a)	Total adults on-site (b)	Flying in	Flying out	Total nests	Colony population a+b
Central Gardens	Large	23/10/20 1:30pm– 2:30pm	31	165	5	0	51	196
Holroyd Gardens	Small	28/10/20 3:30pm – 4:00pm	0	24	5	0	0	24
Pemulwuy Lake	Large	23/10/20 2:30pm – 3:00pm	6	141	5	1	39	147
Pemulwuy Childcare Centre	Small/ Transient	28/10/20 3:00pm – 3:30pm	0	0	0	0	2	0
Auburn Town Centre	Small/ Transient	28/10/20 2:00pm – 2:30pm	4	16	4	3	8	20
Lidcombe Town Centre	Small/ Transient	30/11/20 10:30am - 11:00am	7	15	1	2	8	22
Granville Town Centre	Small/ Transient	04/12/2020 11.30am - 12pm	0	3	0	1	1	3
Toongabbie Town Centre	Small/ Transient	04/02/2021 9:30am - 10am	0	0	0	2	0	0
Macfarlane Street, Merrylands	Small/ Transient	04/12/2020 1.30pm - 2.30pm	1	6	0	0	1	7
Memorial Avenue, Merrylands								
Duck River Auburn (Edgar Street)	Large	13/05/21 2:00pm – 2:20pm	8	129	1	0	9	138

Table 2: Results from ibis surveys

5. ACTIONS TO DATE

Ibis management actions has increased in Cumberland over recent years, which corresponds with a growing ibis population across Cumberland. To date, past management actions have been reactive and only at specific locations on both public and private land. Past management actions include pruning trees to deter ibis roosting and nesting in trees, and putting up signage in parks instructing the public not to feed the birds (noting this is not specific to the ibis).

Although Council has limited authority in implementing management actions on private property, Council advises residents to seek tree pruning approval on private land to deter roosting and nesting on private property. Council also has a town centre cleansing program to remove excrement and smells and litter pick up to ensure town centres are clean and free of food source.

In addition to this, Pemulwuy childcare centre implemented roost dispersal strategies in early March 2020, including the installation of spikes and predatory statues with noise and spotlight activation. These methods were successful in deterring the ibis from nesting at the site for a 6-month period; however, ibis have been spotted returning to the site at the beginning of the 2020 breeding season.

In late 2020, Council was granted a temporary 'Landholders Licence to Harm Protected Animals'. Council undertook actions at Pemulwuy to remove and oil 50 ibis eggs and destroyed 30 nests under its temporary licence.

To date, past management actions have been reactive and only at specific locations on both public and private land.



6. MANAGEMENT PLAN

6.1 Objectives

The objectives of the ibis Management Plan aims to:

- Manage the Australian White Ibis population in Cumberland City
- Minimise community issues associated with ibis birds
- Reduce the impact of ibis on the natural environment and infrastructure
- Provide information to the Department of Planning, Industry and Environment license requirements for ibis bird management

These objectives will be achieved through managing Ibis in three action areas:

Action 1: Groundworks

Action 2: Education

Action 3: Monitoring

Management actions will be site specific and tailored to issues that have been identified at each site.

6.2 Criteria for Ongoing Management

Management and monitoring actions will be undertaken based on the below criteria:

Criteria	Description
Population numbers	Maintain manageable Ibis population to balance the needs of the community and environment.
Number of complaints	The number of complaints received in relation to noise, smell, aggressive behaviour and fouling.
Proximity to food premises	Food premises with outdoor dining within 20m of an Ibis site could attract Ibis birds creating conflict between ibis birds, business and community.
Proximity to childcare centres	Ibis sites located within 20m of childcare centres creates problematic issues like fouling on play equipment, offensive smells and potentially aggressive behaviour towards children.
Degradation in ecosystem	Large numbers of ibis can reduce the ecosystem health leading to poor water quality and vegetation degradation.
Proximity to Bankstown Airport	According to the Australian National Airports Safeguarding Framework (NASF), Cumberland is impacted by its proximity to Bankstown and Sydney Airports. Regulations within the 'Managing Risk of Wildlife Strikes' specify that monitoring of ibis is recommended between eight to thirteen kilometres from an airport.

6.3 Action 1: Groundworks

Restricting food

There was a strong correlation between Ibis populations and access to human food sources, particularly in the form of rubbish from bins and food scraps that had been dumped. Ibis are resilient animals that have adapted to the urban landscape and it is not uncommon to see these birds pulling food out of bins that have either been left open or uncovered. Ways in which we can limit access to food is by:

- Provide bins in problem areas to reduce dumping of food scraps
- Ensure all bins have lids
- Ensure bins are emptied regularly and in a timely manner
- Picking up litter and food scraps

Roost dispersal

Roost dispersal methods can include:

- Installing bird deterrent spikes
- Using ultrasonic speakers (noise deterrents)
- Spotlights to deter birds from landing in specific areas.

Bird deterrent spikes are cost effective, non-harmful and easy to install, making them the most feasible option. The use of ultrasonic speakers aims to interrupt acoustic communication between the birds. This method is limited as there has been limited trials of this technique with ibis and can require a permit. Spotlights are also an effective roosting deterrent. The lighting around a nesting area reduces the attractiveness of the site and does not require a permit to install. When considering the use of spotlights, the birds could potentially find an alternative roost in a tree near the initial site.

Roost dispersal management strategies should only be used on small colonies to supplement egg and nest removal methods and can only be done when chicks are not present.

Restricting breeding success

The ibis breeding season generally begins in June and runs until February. Each year ibis have a clutch size ranging from 1 – 4 eggs, and have between 1 – 3 clutches per season and it takes 3 years for them to reach sexual maturity. Breeding success in ibis is dependent on access to resources and can be extended in the urban environment due to increased food and water supplied from external sources. These animals have a high reproductive turn over and it is important that any management activity designed to reduce breeding success are coordinated properly. Sporadic/uncoordinated breeding management can lead to the population splintering and recolonising in another area.

Breeding restrictions can include egg and nest removal, oiling eggs and pruning vegetation where ibis are known to nest. Egg and nest removal and oiling eggs are activities that require Council to obtain a 'licence to harm' from the NSW Government and these activities must be carried out by licensed personnel.

Egg and nest removal must commence at the start of the first signs of ibis breeding activity. Eggs must be removed on a fortnightly basis and nests must be closely examined before removal to ensure that only nests without chicks are removed.

Egg oiling is an effective, non-lethal and human method of bird control. It involves the coating of the birds egg in a specialised liquid which contains paraffin oil. This chemical stops the embryo from developing. Ibis have a keen sense of smell and are able to sense when their eggs have been disturbed and will either eject or abandoned eggs that have been oiled.

Trees that have been identified as nesting sites should be pruned regularly. Ibis also tend to nest in exotic vines that run along fence lines. These vines can be removed completely provided there are no chicks in the nests.

Street cleaning

Regular cleaning of areas that are susceptible to fouling by ibis birds can significantly reduce perceived health risk associated with the birds. Cleaning efforts should be focused primarily in locations with high public traffic, such as the town centres and childcare centres. Cleansing works may include use of a street sweeper or high-pressure hose to remove bird excrement from the pavement.

In addition to street/pavement cleaning, any dead ibis should be removed from the area immediately in order to improve odours and reduce health risk.

6.4 Action 2: Education

Signage

Signs are an effective way to engage and educate members of the community about ibis's and what they can do to help minimise the impacts of ibis birds on their local area.

For example, signs may discourage the community from feeding birds. For a sign to be effective, it should contain the following:

- Written in plain text/avoid complicated jargon
- Written in English but contain translations to other languages common to Cumberland
- Be eye catching and contain a graphic relevant to the issue being addressed.

Brochures

Brochures can be prepared and handed out to community members who are observed to be feeding ibis birds. Brochures can explain the impact of this behaviour to improve community behaviour.

Website

Information can be provided on Council's website about the Australian White ibis, their importance to the natural environment and correct community behaviour to minimise ibis bird issues.

6.5 Action 3: Monitoring

Ibis counts

Regular survey counts are important to tracking the population numbers of ibis birds at key sites, such as Holroyd Gardens, Pemulwuy Lake and Central Gardens. This will enable Council to determine the effectiveness of mitigation actions. Council will be responsible for conducting regular ibis counts to monitor population size at problem sites.

There are two types of counts that can be conducted, an ibis population count and an ibis roost count. A population count must occur at a site before any management strategies have been implemented to establish the colony definition (small, medium, large, transient refuge colony).

Population counts should be conducted on a bi-annual basis to monitor the ibis population size during daylight hours. A roost count serves the same purpose as a population count, with the only difference being that roost counts are conducted exclusively in the evening. Roost counts will also be done on a bi-annual basis approximately one and a half hours before sunset.

Water quality and vegetation health

Excess numbers of ibis birds can degrade the local environment. Increase in faecal matter in water bodies has the potential for algal blooms and poor water quality. Large numbers of ibis birds can defoliate branches as they form roosts and nests, large amounts of faecal matter also can inhibit growth of new seedlings which will have long term implications to the ecological health of the site.

7.1 Action 1: Groundworks

The implementation strategy for the ibis Management Plan is outlined below.

7. IMPLEMENTATION STRATEGY

Objectives	Management Actions	Locations	Timing	Responsibility	Monitoring	Performance indicator
1.1 Maintain a sustainable ibis population	Implement relevant groundwork actions: -Restrict food -breeding success -roosting opportunities	As required Pemulwuy Lake Central Gardens Duck River Auburn (Edgar Street)	As required	Works and Infrastructure	Bi-annual	Ibis population survey count
1.2 Reduce ibis population	Apply for 'License to Harm' to implement groundwork actions: -roost dispersal -egg removal -egg oiling	As required	As required	Works and Infrastructure	Bi-annual	Ibis population survey count
1.3 Reduce odour and public health risk	Street cleansing Remove dead Ibis Clean footpath and furniture	As required	As required	Works and Infrastructure	As required	Number of complaints
1.4 Reduce opportunities to forage on litter and food scraps	Maintain clean town centres and parks by picking up litter and emptying bins	As required	As required	Works and Infrastructure	As required	Number of complaints
	Audit bins to ensure sufficient and appropriate covered bins to reduce foraging opportunities Advise residents and business not to overfill bins	As required	As required	Environment and Planning	As required	Number of complaints
Reduce impact on water quality	Investigate water quality improvement plan	Holroyd Gardens Pemulwuy Lake Central Gardens Duck River (Edgar Street, Auburn)	As required	Works and Infrastructure	Annual	No excess weed or algal growth
	Trim tree branches to reduce opportunities to nest Implement roost dispersal actions (spikes, noise and spotlights)	As required	As required	Works and Infrastructure	As required	Number of complaints

7.2 Action 2: Education

Objectives	Management Actions	Locations	Timing	Responsibility	Monitoring	Performance indicator
1.1 Discourage feeding Ibis birds	Develop site signages	As required Penulwuy Lake Central Gardens	As required	Works and Infrastructure	Bi-annual	Ibis population survey count
1.2 Improve community understanding of Ibis birds	<ul style="list-style-type: none"> Hand out flyers in problematic areas to educate community Develop webpage to include information about Ibis birds and appropriate behaviour 	As required	As required	Works and Infrastructure	Bi-annual	Ibis population survey count
1.3 Develop and implement an education campaign	Work with Communications to develop an education campaign including social media	As required	As required	Works and Infrastructure	As required	Number of complaints

7.3 Action 3: Monitoring

Objectives	Management Actions	Locations	Timing	Responsibility	Monitoring	Performance indicator
1.1 Monitor Ibis population	Complete bi-annual Ibis count at listed significant sites	Significant sites	Spring and Autumn	Environment and Planning	Bi-annual	Ibis bird count

8. MANAGEMENT PLAN REVIEW

The review approach for the ibis Management Plan is outlined below.

	Review Item	Task	Timing	Responsibility
1.1	Review existing sites and add new sites as required to management actions	Monitor existing sites through completing ibis survey and add new sites as required	Bi-annual	Works and Infrastructure
1.2	Review ibis Management Plan	Complete a full review of the Management Plan	5 years	Environment and Planning





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