Wildlife Hazard Management Plan for Atlas Park Development

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Final (revised)

	NAME	DATE
WRITTEN BY:	John Allan	22/09/2025
CHECKED BY:	Lee Johnson	31/03/2026
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1 The Objective of this Document

The aim of this document is to provide an effective Wildlife Hazard Management Plan (WHMP) for Aviva Investors Global Services Limited in relation to the proposed development of Atlas Park Development, Wythenshawe, Manchester. The plan will, when implemented, ensure that the development does not adversely affect the wildlife strike risk at Manchester Airport (MAN). This is also to satisfy Manchester City Council, as the Local Planning Authority, that a WHMP that is acceptable to MAN and Manchester Airport Group's (MAG)[1] Safeguarding Department is in place.

The commitments in the document relate both to the construction and operational phases of the development, and will be transferred to any subsequent owners, tenants or site managers in perpetuity.

2 Birdstrike Management Ltd.

Birdstrike Management Ltd (BML) is a specialist independent company that delivers research, consultancy and advisory services to airports, airlines, regulators and developers in relation to the prevention of bird and other wildlife strikes to aircraft. BML has advised and authored many of the guidance documents and aviation standards used for wildlife hazard management both on and off aerodromes and has decades of experience reviewing and advising on the safe implementation of developments adjacent to airports. BML has extensive experience working for both airports and developers and is therefore competent to advise on the safe and responsible delivery of wildlife hazard management standards applicable to aerodromes and their surroundings.

3 Hazards to Aircraft caused by Birds

Bird/Wildlife strikes are collisions between aircraft and wild animals (usually birds). Many of these have the potential to cause damage to aircraft or, in extreme but rare cases, catastrophic accidents. In the UK, over 1500 confirmed wildlife strike incidents are recorded each year. In the history of world civil aviation, at least 271 civilian aircraft have been destroyed following bird strikes, with several of those incidents involving loss of life. Countless other wildlife strikes have caused less significant damage, with the total cost of wildlife strikes estimated to exceed £1.5 billion per year in 2002. The aviation industry therefore invests millions of pounds every year in reducing the risk of bird strike, especially from large and/or flocking bird species. Gulls, Corvids, Starlings, Waterfowl, Pigeons and Raptors continue to represent the species groups most likely to result in higher risks to aviation safety. Reducing their presence on aerodromes is, therefore, essential, as is managing any increased wildlife strike risk from new developments in the vicinity of aerodromes.

4 Aerodrome Safeguarding Requirements

The UK, as a signatory to the Convention on International Civil Aviation, Chicago 1944, complies with the provisions published by the International Civil Aviation Organisation (ICAO). Annex 14 of The Convention includes a series of Standards And Recommended Practices (SARPs) that address the potential for increases in the bird or wildlife strike risk that may be caused by new developments on, or in the vicinity of, an aerodrome (the term "in the vicinity" is stated to be land or water within 13 kms of the aerodrome reference point).

Annex 14, Edition 7, for example, states that: *when a bird/wildlife strike hazard is identified at an aerodrome, the appropriate authority shall take action to decrease the number of birds/wildlife*

[1] MAG is a UK airport group that owns and operates three UK airports – Manchester, London Stansted and East Midlands.

constituting a potential hazard to aircraft operations by adopting measures for discouraging their presence on, or in the vicinity of, an aerodrome.

Volume I then states that: *iii. Action shall be taken to decrease the risk to aircraft operations by adopting measures to minimize the likelihood of collisions between birds/wildlife and aircraft.*

The UK Department of Transport follows these SARPS by setting out guidance on safeguarding of aerodromes in the Town and Country Planning Direction 2002 (safeguarding aerodromes, technical sites and military explosives storage areas), as updated, 22 December 2016. Annex 2; Arrangements for safeguarding aerodromes, technical sites and military explosives storage areas, states that:

1. *Birdstrikes are one of the major controllable hazards to aviation. Common birds have caused catastrophic accidents to all types of aircraft. Most birdstrikes occur on or near aerodromes but, because birds are very mobile, features far beyond an aerodrome boundary may increase the hazard. If a man-made development provides feeding, roosting or breeding opportunities, or shelter and security, it may, depending on the siting of the development and the species which it attracts, increase the number of birds visiting or overflying an aerodrome or the number of birds in the airspace used by aircraft. Gulls and starlings congregate in very large overnight roosts and travel long distances daily, while waterfowl are large and often fly in close formation. There is only limited scope for taking action on aerodromes to counter these hazards, and safeguarding may be the only effective means of reducing the risk to aircraft in flight.*

2. *The primary aim is to guard against new or increased hazards caused by development.*

3. *Planting trees and bushes normally creates a bird hazard only when it takes place relatively near to an aerodrome, but a potential starling roost site further away from an aerodrome can create a hazard.*

The UK Civil Aviation Authority (CAA) applies these requirements by ensuring all airports take appropriate action to deter hazardous birds on and around aerodromes. CAA guidance is therefore set out in a series of more detailed documents referred to as Civil Aviation Publications (CAPs) with CAP 772 relating to Wildlife Hazard Management at Aerodromes and CAP 738 to Safeguarding at Aerodromes.

CAP 772; Wildlife Hazard Management at Aerodromes, states that:

Virtually all land types and land uses (including natural habitats) attract wildlife in some way. Safeguarding should therefore address developments that could become wildlife attractants with the potential to increase the wildlife strike risk at a nearby aerodrome.

Safeguarding systems need to be put in place to guard against new or increased wildlife hazards caused by developments both on and in the vicinity of an aerodrome. They should include details of activities employed by the aerodrome operator to control or influence areas beyond the boundary of the airfield, in the vicinity of the aerodrome (up to 13 km and in some instances beyond, or less than 13km, as determined by risk and effectiveness of interventions), and where practicable, could include:

- *establishment of a process with the local planning authorities for consultation on proposed developments that have the potential to be wildlife attractant within 13 km of the aerodrome;*
- *means to influence land use and development surrounding the aerodrome such that the strike risk does not increase and, where practicable, is reduced;*
- *means to help encourage landowners to adopt wildlife control measures and support landowners' efforts to reduce wildlife strike risks, via land use agreements and;*

- *procedures to conduct and record the results of off-aerodrome site monitoring visits.*

CAP 738, Safeguarding at Aerodromes, states that:

The common aim of all safeguarding is to assess the implications of any development being proposed within the vicinity of an established aerodrome to ensure, as far as practicable, that the aerodrome and its surrounding airspace is not adversely impacted by the proposal, thus ensuring the continued safety of aircraft operating at the location.
…
Responsibility for all safeguarding activities at these aerodromes' rests with the aerodrome operator.
…
Safeguarding is the process by which the Aerodrome Operator can, in consultation with the Local Planning Authority (LPA) and within their capability, protect the environment surrounding the Aerodrome from developments and activities that have the potential to impact on the aerodrome's safe operation. Aerodrome safeguarding covers several aspects. Its purpose is to protect:
…
d) the aerodrome from any increased wildlife strike risk. In particular bird strikes, which pose a serious threat to flight safety.

The Airport Operators Association (AOA) published an Advice Note addressing Wildlife Hazards around Aerodromes. Page 3, paragraph 2 states that:

A *proposed development would need to either: increase the population of hazardous*[2] *birds; or to generate flight lines that enter critical airspace*[3]*, to increase the risk in order for it to be determined as unacceptable.*

MAN is an officially safeguarded aerodrome and is, therefore, a statutory consultee under the provisions of the Office of the Deputy Prime Minister (ODPM) Circular 1/2003 – The Town and Country Planning (Safeguarded Aerodromes, Technical Sites and Military Explosives Storage Areas) Direction 2002 [46].

5 Requirements Summary

The regulatory and guidance material listed above requires proposed developments not to increase the presence of hazardous wildlife, or modify the movements of existing hazardous wildlife, in a way that is detrimental to flight safety at a nearby safeguarded airport. This will normally be achieved by removing features that may attract hazardous wildlife from the development design and/or agreeing to a Wildlife Hazard Management Plan. If hazardous wildlife is attracted, the WHMP must stipulate suitable provisions for dispersal, or to remove or modify the feature(s) that are attracting the wildlife concerned. Such a plan needs to meet the requirements of the airport operator as well as the Local Planning Authority and be applied in perpetuity at the development site.

The proposed development is located 1.4 km NE of the 23R runway threshold at MAN and part of the site lies beneath the extended centerline of the runway. The development is acknowledged to lie in a highly sensitive location and, if not properly designed and managed, could increase the wildlife strike risk at MAN. To this end, Aviva Life and Pensions UK Ltd. (Aviva) has commissioned this plan to ensure that the proposed Atlas Park Development (the proposal) will not adversely impact flight safety at MAN.

[2] Large and / or flocking bird species capable of causing damage to aircraft if struck.

[3] Undefined, but widely understood to mean any area into which aircraft manoeuvre both on the runway and through the approach and departure corridors at altitudes that could be affected by hazardous bird species.

In order to assess the likely impacts, this document provides an outline of:

A. What wildlife attracting habitats may be created
B. What hazardous species may be attracted to the area
C. What changes in the movements of hazardous wildlife that could influence air safety may occur
D. If any of the above result, or might result, in increases in the wildlife strike risk to aircraft, what measures would be implemented to manage those risks.

This review does not address any other aspects of the developments that may impact on the airport, such as the possible use of cranes, construction equipment, temporary lighting structures, etc. It only reviews the potential impact on, and management of, wildlife strike risks at MAN arising from this development.

6 Background

6.1 Site Location.

The proposed development lies approximately 1.4 km north-east of the 23R runway at MAN (see Fig. 1). As such, it is very close to the runway threshold and aircraft will pass the site at an altitude where they may come into conflict with birds either using the site itself or moving to and from it. The proximity of the airfield also means that birds that might use the site to roost or nest could move onto the airfield grassland to feed, thus coming even closer to the aircraft operating areas.

The proximity to the airfield also raises the issue of coordinating any bird dispersal actions that may be required with the airport's own bird controllers. If birds are dispersed from the development site, they could move onto the airport itself, or fly up into the path of aircraft on approach or departure, thus increasing risk. Similarly, if the airport bird controllers are in the process of dispersing birds from close to the 23R threshold and site staff are also dispersing birds from the development site, conflicts could result in birds moving in unsafe directions. The need for full coordination of bird control on Atlas Park with the airport's Operations Unit is, therefore, recognised throughout this document.

Aviva therefore recognises that it is essential to remove wildlife attracting features from the development as far as possible and to have a robust, and fully coordinated, plan in place to deal with any unforeseen wildlife attractions that do occur.



Fig. 1: The location of the proposed Atlas Business Park in relation to the 23 R runway threshold at Manchester Airport.
Note that this image is provided as an indicative location only. It should not be relied upon for measurements or any other purpose.

7 Design Review

The development of the site will involve the construction of a number of industrial units, car parking areas and associated amenity planting. There are a variety of features associated with a development of this sort that can attract hazardous birds and, because of the proximity to the runway threshold at MAN, it is recognized that these will need to be rigorously managed. The various potential attractions are described below along with design commitments to eliminate those attractions as far as possible. Where potential attractions must remain, appropriate actions are identified, and techniques described, that should prevent any additional hazardous wildlife being present on the site.

7.1 Building and Roofscape Design

The buildings proposed for the development will have roofs that consist of a series of sloping elements which abut a vertical rise and then another sloping section to create a ‘saw tooth’ pattern. The ‘gutter’, where the sloping section abuts the vertical part of the next roof section, provides an ideal sheltered location for birds (gulls in particular) to place nests. Gulls may nest or roost on large roofs in significant numbers, and there are several airports around the UK that suffer elevated levels of birdstrike risk because of rooftop nesting or roosting gulls within the 13 km safeguarding circle. The risks on existing roofs may be difficult to manage, either because landowners will not permit access, or because the roofs are not safe to access to carry out bird control. Aviva recognises that is essential that this problem is avoided in such a sensitive location.

All roofs in this proposal will have safe and easy access designed-in, so that staff can access roofs quickly and safely either to check for the presence of hazardous birds or to carry out bird dispersal or nest and egg removal should it prove necessary (see section 10.6.7). Access will be via roof hatches and there will be a perimeter gutter/walkway that will allow staff to access the end of each 'saw tooth' roof section and look along the 'gutter' to check for bird presence. An industry standard 'Mansafe' cable system will be fitted to ensure that staff can access the roof safely and quickly should nests or eggs need to be removed.

7.2 Green and Brown Roofs

Green or brown roofs are defined as roofs with a covering of vegetation (green roof) or inert material such as gravel (brown roof). A recent review by BML (unpublished) suggests that there is no evidence that gulls are more likely to nest or roost on a green or brown roof compared to a conventional roof covering, such as metal cladding. Whilst it might be expected that gulls, or other birds, would prefer a more 'natural' roof covering, especially to nest on, it would seem that other factors, such as roof size and local food availability are more important in this regard.

There are no green or brown roofs in the current proposal but, if they were to be added, the same management will be used as described for general metal-clad roofs (see section 10.5.1).

7.3 Sustainable Drainage Systems (SUDS)

The development proposals involve areas of impermeable surfaces for car parking etc. as well as the large roofscapes described above. This creates issues for management of rainwater run-off during heavy rainfall events. Modern SUDS often use swales or retention ponds to hold rainwater after storm events allowing controlled discharge into sewers or watercourses thus preventing downstream flooding. Holding water in ponds and swales also provides a level of bioremediation thus improving discharge water quality. SUDS are often also designed to provide increased biodiversity on a site by offering habitat for aquatic or wetland plant species, insects, invertebrates and, sometimes, birds and mammals. SUDS that involve the retention of water in surface swales or attenuation ponds may attract hazardous birds such as gulls and waterfowl.

All rainwater management in the proposal will be achieved by siphonic drainage and underground attenuation. This will not attract wildlife, therefore no further action is needed.

7.4 Retained Water Bodies

There are no water bodies present, or proposed, for the development

7.5 PV Panels

Solar PV arrays are not normally a major attraction for hazardous birds and, indeed, have been installed on a number of commercial airports in the UK in recent years without increasing risks. Roof mounted panels may provide shelter for nesting or roosting Feral Pigeons depending on how they are installed, but this can be managed by the use of skirts, exclusion netting or nest and egg removal.

The proposed development includes the installation of PV panels on 10% of the roof area. The panels will be mounted in a way that may allow birds access beneath them so appropriate skirting will be fitted.

Mesh skirts will be fitted to all solar PV panels to prevent birds accessing the space beneath them to roost or nest.

7.6 Amenity Planting

Amenity planting around developments has the potential to provide feeding, nesting and roosting habitat for a variety of hazardous bird species. The use of colourful berry-bearing species such as Rowan, Cotoneaster or Pyracantha is common around car parks, and Hawthorn, Blackthorn and similar fruit or berry-bearing native species are commonly used in hedgerow planting. All of these species will attract flocking species such as Starlings and wintering thrushes to feed on the berries and fruit. Taller trees, especially species with robust crowns, such as Oak or Scots Pine, if planted in groups, provide suitable habitat for Rooks to form nesting colonies.

Groups of tall tree species will not be included in the planting scheme, and, because of the proximity to the airport, fruit and berry-bearing species will be limited to no more than 10% of the planting palette.

7.7 Biodiversity Net Gain

There is a requirement under planning guidance for developments to deliver Biodiversity Net Gain (BNG). Ecologists will often use amenity planting and SUDS designs as means of ensuring that BNG targets are met, and this may include providing additional habitat for birds (see section 8.9 below). The requirement to deliver BNG is often a cause of friction between developers and aerodrome safeguarders. Aerodromes often object to BNG proposals because they may attract hazardous birds, whether or not that is the intention.

Because there is to be no surface water retention in the proposals, options for BNG, which are already limited by the restrictions to the amenity planting, are further constrained.

Ecologists will therefore focus on nectar bearing plants that attract pollinating insects or tree species such as Birch, that do not offer nesting sites for Rooks as alternatives, as well as nesting boxes for non-hazardous bird and bat species (see 7.8 below).

7.8 Bat and Bird Boxes

Nest boxes for smaller bird species are unlikely to cause a problem at a nearby airport. Arboreal bird species, such as tits, are too small to constitute a significant risk to aircraft and are also unlikely to venture out onto an open airfield to feed. Bird nest boxes with a hole aperture of up to 25mm (i.e. too small for Starlings) can therefore be used freely in development, as can bat boxes. Nest boxes (or nest bricks) specifically designed for Swifts *Apus apus,* should not be used, however. Swifts range widely when feeding, and will often feed low over large, grassed areas, such as airfields, especially in wet or misty weather when their insect prey is flying at low levels.

Swift nest boxes and boxes for larger species that may feed over airfield grassland, such as Kestrels, will not be used in the development.

7.9 Food Retail and Staff Leisure Areas

Food sale outlets, especially if combined with the provision of areas for people to sit and consume food outdoors, can attract hazardous birds such as gulls, pigeons and corvids.

There are no food sales areas planned in the proposal and no further action is required in this regard.

8 Construction Phase Issues

In addition to the design features that may attract birds, there are a number of aspects to the construction works themselves that have the potential to attract hazardous birds to the site. Appropriate staff will need to be identified to carry out monitoring on the site during construction, and they will need to be trained and equipped to disperse hazardous birds effectively should numbers build to over agreed threshold levels (see section 10.2). The likely attractions are listed below, and the appropriate management techniques are described in section 10.4.

The Applicants undertake to apply the appropriate management and dispersal techniques, in consultation with MAN Airport Operations, to ensure that numbers of hazardous birds do not exceed agreed target levels throughout the construction phase of the development.

8.1 Large Open and Undisturbed Areas

In general, construction sites are highly disturbed, with staff and vehicles present throughout the day. There may be times, however, when a part of the site is cleared but, for whatever reason, is not scheduled for the next phase of development for some time. If the area is large and has an open aspect, it may provide a suitable loafing or roosting site for a number of bird species that rely on the early detection of predators for protection. Gulls, in particular, may be attracted to this type of habitat, especially if food resources are also available nearby (see sections 8.2 and 8.3 below). These issues can be easily dealt with by regular site monitoring and bird dispersal or the deployment of visual barriers or other bird deterrents (see section 10.6).

8.2 Disturbed or Stockpiled Soils

The construction phase of any development that requires large areas of earthworks can result in areas of bare or recently disturbed soil, which can provide attractive feeding opportunities for hazardous bird species, such as corvids, gulls, Starlings and waders in the form of readily available soil invertebrates. Earthworks should, therefore, be carried out on a ‘just in time’ basis wherever possible, so that bare earth is not exposed for longer periods than necessary. Temporarily compacting soils, or covering them with inert materials, can be used to prevent birds gaining access to food items. If this is not possible, deploying bird deterrence measures should be enough to manage the risk (see section 10.6).

8.3 Ponding and Drainage Issues

There is the potential for transient areas of shallow water and temporary puddling to form across construction sites. These can provide exploitable resources for hazardous species including gulls and corvids as well as ducks and waders which may come to bathe, feed or drink. These sites will be drained if possible. If draining is not achievable, then bird dispersal will be carried out (see sections 10.6.1, 10.6.4 and 10.6.5).

8.4 Staff Food and Waste Management

For a large development site, there will need to be canteen facilities or other food provision for the staff working there. The waste from the food preparation areas may attract hazardous birds if not properly managed and staff eating outdoors may leave food waste or actively feed birds. Provision of lidded bins for food waste, regularly emptying of bins to prevent overflowing, and education of staff including appropriate signage is normally sufficient to deal with these issues.

9 Operational Phase Issues

Most of the operational phase issues will revolve around monitoring whether the site is attracting more than the specified number of hazardous birds. If this occurs, appropriate management measures to remove bird attractants, or to provide dispersal measures if the attractive feature(s) cannot be removed, must be initiated. As with the construction phase, the staff tasked with monitoring and managing the bird numbers on the site will be properly trained and equipped to carry out the task quickly and effectively using the techniques described in section 10.6.

Monitoring schedules for hazardous birds will need to be developed and agreed with MAG for the construction and operational phases. Details of the monitoring frequency to be used are provided in section 10.3 below.

10 The Bird Hazard Management Commitment

Aviva commit to comply with the principles and standards in this WHMP. The WHMP will be submitted to the MAG Safeguarding Team (as statutory consultee) for their approval prior to initiation.

10.1 Species of Concern

The following lists the birds that are known to be hazardous to aircraft and which may be attracted to the site.

Species of concern:

- Black-headed Gull *Chroicocephalus ridibundus*
- Common Gull *Larus canus*
- Herring Gull *Larus argentatus*
- Lesser black-backed Gull *Larus fuscus*
- Rook *Corvus frugilegus*
- Carrion Crow *Corvus corone*
- Jackdaw *Coloeus monedula*
- Starling *Sturnus vulgaris*
- *Feral Pigeon* *Columba livia*
- *Woodpigeon* *Columba Palumbus*
- *Redwing* *Turdus Iliacus*
- *Fieldfare* *Turdus pilaris*

It is acknowledged that bird populations are not static, and this list may be amended with the agreement of MAN and MAG in due course.

10.2 Threshold Numbers to Trigger Action

The following number of each bird species or species group, if exceeded, will trigger management action using the techniques described below.

Prior to any bird dispersal action being taken, contact will be made with MAN Airfield Operations Department to ensure that any bird dispersal carried out does not impact flight safety or conflict with bird control in progress on the airport.

Bird Group	Number
Construction phase	
All gulls and corvids and pigeons, combined, on the construction site(s)	20
Starlings on the construction site	20
Waterfowl or wading birds on the construction site	10
Operational Phase	
Starling and thrushes (all species) in the amenity planting	30
Starlings roosting overnight anywhere on the site	any
Rooks nesting anywhere on site	any
Corvids roosting anywhere on site	10
Gulls roosting on roofs at night (site-wide total)	any
Gulls nesting or prospecting for nest sites on roofs (site-wide total)	any
Birds of any species nesting under solar PV panels	any

In the event that threshold bird numbers are exceeded, the airport will be informed and, with their agreement, management actions as set out below will be implemented. Dispersal will only take place if authorised by the MAN Airfield Operations Department. A person suitably trained and equipped to carry out bird control using the techniques described in section 10.6 will be available to carry out these duties as required.

10.3 Monitoring Hazardous Bird Numbers

In order to determine whether thresholds for hazardous bird numbers are being exceeded, it will be necessary to set up an appropriate monitoring programme.

Weekly monitoring across the entire site will be carried out during the construction phase. In the event that target numbers are exceeded, and action is taken to disperse hazardous birds, monitoring will be increased to daily until numbers return to below threshold levels for 3 consecutive days. Following dispersal actions, hourly checks will be made for the remainder of

the day to determine if birds are returning to the site, and additional dispersal carried out if required.

Operational Phase monitoring will consist of weekly checks of rooftops during the nesting season for gulls (April to June inclusive). Annual checks of tall trees should be carried out in early May to check for breeding Rooks. Monthly checks of rooftops after dark for roosting gulls will be carried out from December to February inclusive. If management action is carried out, monitoring frequency will increase to daily until threshold numbers are not exceeded for 3 consecutive days, after which monitoring will be weekly for the following 4 weeks.

10.4 Construction Phase Management

10.4.1 Open Areas

The security offered by any open areas left during construction work can normally be easily overcome by regular human disturbance. The attraction of an open area is not large, and numerous alternative loafing areas are likely to be nearby. Simple human disturbance, i.e. approaching the birds on foot or in a vehicle and waving arms or sounding the horn will normally be sufficient to disperse loafing birds. This will be repeated whenever birds appear in numbers over the target threshold (see section 11.2).

Monitoring and dispersal frequency will be increased in response to the speed with which the birds return to the site, and, if repeatedly dispersed, they should soon find an alternative site to rest on. Unfortunately, one nearby large open site is the airfield at MAN. Coordination of any dispersal actions with the MAN wildlife controllers is, therefore, essential to avoid hazardous birds being displaced onto the airfield itself.

If the loafing site chosen by the birds is not accessible for any reason, either a bird deterrent laser, broadcast bird distress calls or pyrotechnic bird scaring cartridges will be used as an additional dispersal technique (see section 10.6). These techniques need to be deployed correctly to be effective, and pyrotechnics (and to a lesser extent lasers) have obvious safety issues associated with their use close to an airport.

Staff tasked with on-site wildlife management will be trained in advance in their safe and proper use and only deploy them with the agreement of the Airfield Operations Department.

10.4.2 Exposed Soils

Where possible, exposed soils that are attracting birds to feed will be covered or compacted to reduce the availability of food items or removed from the site altogether. If this is not possible, the dispersal techniques proposed for open areas (see section 10.4.1 above) will be deployed until bird numbers fall to below threshold levels.

10.4.3 Ponding

Areas of ponding will be removed by draining in the first instance. If this is not possible, bird dispersal will be deployed as described in section 10.4.1 above.

10.4.4 Staff Food and Waste Management

Although there will be no food retail on the site, construction staff may consume their own food outdoors during lunch breaks. **If birds are attracted to waste food, or by staff actively feeding them, observations will be made to determine where the food is being obtained by the birds and**

necessary action taken. This may include improving bin emptying frequency, better site clean-up and litter picking, or reminding staff to keep the site clean and not feed the birds. Observation frequency will be increased to daily at appropriate times (e.g. lunch breaks) to ensure that this is carried out.

10.5 Operational Phase Management

10.5.1 Management of Birds on Rooftops

10.5.1.1 Roosting Birds

Gulls are the only species group that routinely roost on flat rooftops in large numbers. Starlings do roost on buildings, but more usually in areas with complex and sheltered structures such as city centres. Roofs will be designed so that staff can gain access easily and safely to check for the presence of roosting gulls and disperse them if needed. If gulls are seen on the rooftops after dark, they can be dispersed with human presence, distress calls or a bird deterrent laser (see section 10.6). If bird numbers in excess of the threshold values are detected, monitoring and dispersal actions should be carried out every evening at dusk until the roost is dispersed.

10.5.1.2 Nesting Birds

Gulls are the only species group likely to nest on large flat roofs in significant numbers. If checks at the start of the breeding season detect birds showing signs of establishing territories, intensive disturbance using human presence, distress calls, pyrotechnics (if possible) or lasers (see section 10.6.5) will be used to dissuade them from nesting in that location. If birds are found to have already started building a nest, or have eggs or young present, then a license to remove the nest(s) will be obtained from Natural England. Consideration will be given to having a licence in place in advance on a precautionary basis. This is a part of the WHMP that may be contracted-out to a specialist pest control company who are experienced in dealing with licence applications for this sort of work.

10.5.2 Management of Green and Brown Roofs

There is currently no evidence to suggest that green and brown roofs are any more attractive to nesting or roosting gulls than conventional roofs. At present there are no plans to use green or brown roofs in the development. If any green or brown roofs are used on site, they will be designed with easy and safe access and will be checked and managed in the same way as conventional roofs under the same WHMP.

10.5.3 SUDS and Retained Water Features

There are no surface level water features planned for the site.

10.5.4 Landscaping and Amenity Planting

It is not generally practical to disperse birds from amenity planting on a large site as they will simply move from one part of the site to another. The exception to this is if a Starling roost were to develop on site, in which case dispersal by distress calls and pyrotechnics, in collaboration with the Airfield Operations Department, over several consecutive nights will be used to disperse the roost.

The key issue for amenity planting is the initial choice of plant and tree species that are used. For example, if trees such as Oak and Scots Pine and evergreens such as Laurels are used extensively, they can result in more attractive habitat for nesting or roosting, and berry and fruit bearing plants such

as cherries, Hawthorn, Strawberry Tree and Dogwood will result in an exploitable food resource for flocking birds such as Starlings, Wood Pigeons and winter thrushes.

No more than 10% of the planting on the site will use fruit or berry-bearing species, and tree species with robust crowns that may support a rookery will be avoided.

Tree species such as Birches, Acers and Eucalyptus, shrubs such as Hydrangea, grasses and perennials such as Valerian will not result in exploitable resources for hazardous birds and will be used more frequently in the planting palette.

In the event that hazardous birds are still attracted in numbers over the threshold levels, they will initially be dispersed using the techniques described in section 10.6. Observations will also be made as to which plants are attracting the birds, and those plants will be replaced with less attractive species.

10.5.5 Biodiversity Net Gain and Ecological Enhancement

Planning guidance requires developers to show that there is a Biodiversity Net Gain (BNG) from their development proposals. The need to ensure that hazardous birds are not attracted to the site does limit the options for designers and ecologists in this regard, but there are a variety of options available to achieve BNG whilst not compromising flight safety at MAN.

Suitable enhancements that will be considered include bat boxes, bird boxes aimed at smaller bird species (suitable for sparrows, tits or Robins for example), sensitive lighting design, hedgehog highways and houses, toad abodes, hibernacula for bats, and habitat piles. Planting of trees, shrubs, herbs and grassland types that provide nectar or larval food plants for insects, or foraging habitat for bats without also resulting in suitable habitats for hazardous birds may also be employed.

10.5.6 Food Retail and Outdoor Eating Areas

There will be no food retail or outdoor food consumption areas on the site.

10.5.7 PV Panels

Recent surveys (BML, unpublished) have shown that solar PV arrays are not particularly attractive to hazardous bird species, and they have been installed airside on a number of UK airports.

The design proposes that 10% of the roof area will be covered with solar PV panels fitted flush to the roof. It is unlikely that these panels will be used as nesting sites by hazardous birds, but if they are, then the monitoring and dispersal protocols followed by nest removal if required (see 10.5.1.2), will be sufficient to manage the problem. If the panels are to be more than 10cm clear of the roof surface, bird exclusion skirts will be fitted around the panels to exclude hazardous birds.

10.6 Dispersal Techniques To Be Used

10.6.1 Human Presence

In many situations, regular human presence is enough to disperse hazardous birds. This is especially true for birds roosting on large open areas where the lack of potential threats, combined with clear lines of sight, allow the birds to feel safe. In these cases, simply walking briskly towards the birds repeatedly raising and lowering arms, is often sufficient to make the birds disperse. This effect can be enhanced by holding a flag in each hand if required. Over larger areas, driving a vehicle towards the birds and

sounding the horn will also be effective. Repeating this process every time the birds return is normally sufficient to make them move elsewhere.

10.6.2 Visual Barriers

For large open areas with difficult access, or where an open area is to be left undeveloped for a long period of time, visual barriers can be erected to interrupt the bird's line of sight and remove the feeling of security. Plastic sheet fencing, about 1m high and supported by wooden or metal posts, will achieve the desired effect if placed across the site in a zigzag pattern to obstruct the view in any direction. This should also reduce the need for repeated checks of the site by staff tasked with bird management.

10.6.3 Static Bird Scarers

There are a wide variety of bird deterrent devices on the market, including traditional scarecrows, plastic predatory-bird effigies, flutter tapes, helium filled kites, rotating pyramid-shaped mirrors, gas cannons, sound generating units, robotic flying falcon-shaped drones and many others. These products are mostly designed for use in agriculture, where bird dispersal is often only required for a few weeks during seed-sowing or harvest. Most are only effective for a short period of time before birds habituate to them (i.e. they learn that they represent no real threat and begin to ignore them) and they are usually effective over relatively small areas. They are not, therefore, normally recommended for use on sites where continuous control over large areas is required. They may be employed if short term dispersal of hazardous birds is needed, and in particular if small areas are proving attractive to hazardous birds.

Aviva are aware that there are some bird deterrent devices on the market that are not effective. Plastic owls, for example, do not deter species like gulls effectively, and ultrasonic bird scarers do not work because birds cannot hear ultrasound. Site managers will seek expert advice, possibly from the MAN bird control team, if they are uncertain about which techniques to use in a particular situation.

10.6.4 Distress Calls

Staff tasked with bird control may be equipped with a hand-held bioacoustic bird deterrent unit. The unit plays a variety of bird distress calls which can be used in daily bird deterrence. Distress calls (the cries made by a bird that has been caught by a predator) are the main tool used in bioacoustic bird control. It is understood that distress calls need to be used in a particular way to retain their effectiveness, and staff will be trained to use them properly before they are deployed. Distress calls will cause birds to fly up and circle looking for the predator that they think is present. It may, therefore, not be appropriate to use this technique if aircraft are passing low over the site. **Contact will be made with the MAN Airport Operations Unit to obtain their approval before this technique is used.**

10.6.5 Bird Deterrent Lasers

The use of specialist hand-held lasers to deter birds is now common on airfields. The units are specifically designed to avoid damaging the eyes of birds or humans and are extremely effective in low light or at night. They are silent and will not disturb staff working in nearby buildings. Because they have a range of over 1km, they are particularly suitable for use over large areas of ground or over rooftops. The laser is seen by the birds as a long green 'stick' of light and, if moved slowly about 1 meter above their heads, will cause them to take flight and disperse. Care must obviously be taken to avoid dazzling pilots, members of the public, drivers of vehicles or anyone operating machinery. Bird dispersal lasers may be an especially suitable tool for bird management across rooftops on the site. It is noted, however, that lasers are not effective in bright sunlight when they become effectively invisible and other dispersal methods will be used at those times.

10.6.6 Pyrotechnics

Airports make extensive use of hand-launched pyrotechnics in their bird control programmes. These take the form of a cartridge, similar to that fired from a shotgun, which is launched from a specially adapted pistol. When fired, a projectile is launched around 50m into the air which then explodes with a loud bang and flash. These tools are very effective in dispersing birds, but they are unlikely to be suitable for general use around the operational site because of the disturbance to staff and possible conflict with the bird control activities on the airport. Depending on the type of cartridge used, it may also be necessary to hold a firearms permit to use these devices and appropriate training to maintain staff safety is essential.

10.6.7 Nest and Egg Removal

For some species, such as gulls on rooftops, pigeons in buildings or Rooks in trees, the main method to prevent breeding will be the removal of nests and eggs. This is not difficult to achieve, and due care will be taken when working at height to ensure staff safety. It should also be expected that, once a nest is removed, the birds will re-build it almost immediately. Ideally, once a nest is removed, access to the area should be prevented e.g. by netting the areas to exclude pigeons or gulls, or lopping trees to deter Rooks. If this is not possible, repeat visits will be made at weekly intervals and any new nests removed until the birds give up and move elsewhere. Nest and egg control for some species is permitted under a general licence. For other species, including gulls, a Natural England CL-12 licence will be registered for this purpose. Natural England will then supply the Registered Person with the numbers of each species (including fledged birds and their nests and eggs) that can be taken. The site managers will need to register for the licence before the commencement of lethal measures and send in returns for any nests destroyed or birds culled at the end of the year. Care will be taken to check the licence annually as the species listed may change.

Consideration will be given to whether hiring a specialist pest control company to carry out work of this nature is the best option.

11 Record Keeping

Records must be kept which may be inspected by the airport or their nominated representatives. This will be in a dedicated logbook, or secure electronic equivalent, and will include: -

1. The dates, times and areas checked, and details of birds found (including species and numbers).
2. Hazardous bird activity, i.e. feeding, loafing, roosting, nesting.
3. Confirmation that the airport was contacted prior to any dispersal action being carried out.
4. Details of any action taken and the result of any such action.
5. Details of any nests removed or destroyed if relevant.
6. If further action is required by the airport, then full details of relevant additional checks, species and numbers seen, and control action carried out should be detailed.

12 Review and Failure of the Management Plan

Failure of the management plan will be defined as –

- Hazardous birds at the site are detected in excess of threshold numbers but cannot be dispersed within 30 minutes. This does not apply to nesting birds which will take longer to deal with.
- Birds are regularly attracted to or utilising the site requiring multiple dispersal actions within a 24-hour period.
- Large gulls nest successfully on the roof spaces.
- A Starling roost develops on the site.
- Failure to comply with any additional reasonable bird control requests that MAN may make as a result of recording a birdstrike hazard or risk linked to the site.

If the management plan is found to be ineffective and the development site is attracting hazardous birds resulting in a risk to aircraft, additional measures such as proofing (excluding hazardous birds by fitting specialist netting, wires or spikes) of the roof structure, improved drainage during construction or more regular checks and further active bird deterrence will be necessary in order to mitigate the risk. **Should it be deemed necessary, a meeting between the airport and site managers will be convened at the earliest opportunity to discuss and agree how the situation can be resolved.**

13 Inspection and Site Access

MAN or their nominated representatives will be allowed access to the Site to evaluate the success of the WHMP and to review any remaining birdstrike hazard. They may call at short notice, subject to relevant Health And Safety and site induction requirements. Periodic inspections will be facilitated as necessary by the site managers.

14 Long-Term Management

The WHMP at the site will remain enforceable by MAN, the local planning authority, or any successor to these bodies throughout the existence of the development. These obligations will be passed to any subsequent owner or tenants on the site.

This management plan will be subject to review to reflect changes in habitat or populations of local bird species. Should the airport deem it necessary, a meeting between MAN and the site managers will be convened to discuss and agree any changes which may be required.

15 Conclusion

This WHMP provides both a plan for the Construction Phase of the Atlas Park Development and a site-wide plan that can be used post-construction.

The review of likely attractants, along with commitments to design modifications and implementation of bird management actions, shows that it is possible to manage any additional bird attraction generated by the development. Implementation of this plan will ensure that no additional flight safety risk at MAN arises from this development.

Dr John Allan
Birdstrike Management Ltd
Tel: +44 07407 340444
Web: www.birdstrike.co.uk



16 Disclaimer

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