Safety and Airspace Regulation Group

UK Civil Aviation Authority

Safeguarding of Aerodromes

CAP 738

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Foreword

Civil Aviation Authority (CAA) Civil Aviation Publications (CAPs) are based upon UK legislation and non-legislative regulatory material, such as ICAO Standards and Recommended Practices. They are published in order to provide UK industry with:

a) guidance and clarification on the means of achieving compliance with global, UK and European regulatory requirements, and where applicable:

b) details of United Kingdom (UK) 'Alternative Means of Compliance', and

c) details of any additional national requirements, including CAA administrative procedures.

Details of appropriate supporting administrative procedures are also included where necessary.

In publishing CAPs, the CAA satisfies the obligations placed upon it by the Transport Act 2000[1], Chapter 1 Article 2 'CAA's general duty', which in paragraph 2(a) requires the CAA to exercise its functions under the Act in the manner it thinks best calculated, to further the interests of operators and owners of aircraft, owners and managers of aerodromes, persons travelling in aircraft and persons with rights in property carried in them. The only interests to be considered under subsection (2)(a) are interests regarding the range, availability, continuity, cost and quality of air traffic services.

Publication of CAPs additionally satisfies the requirements set out by the Civil Aviation Authority (Chicago Convention) Directions 2007[2] to ensure that it acts consistently with the obligations placed on the UK under the Chicago Convention. The CAA is obliged to consider whether it is necessary to amend United Kingdom aviation legislation to ensure appropriate implementation of an ICAO provision.

Where (a) the CAA considers it inappropriate to transpose an ICAO provision into domestic legislation and (b) the CAA has discretionary power to enforce the requirements of such a provision through a certificate, licence, or other means of approval, the Civil Aviation Authority (Chicago Convention) Directions 2007 obliges the CAA to develop and publish such requirements as are necessary to implement the ICAO provision and shall ensure that it is able to verify adherence to those requirements.

CAPs are subject to periodic revision to take account of changes to source regulatory material, feedback from industry, and recognised best practice. CAP 738 provides

[1] http://www.legislation.gov.uk/ukpga/2000/38/contents or http://www.legislation.gov.uk/ukpga/2000/38/data.pdf

[2] https://webarchive.nationalarchives.gov.uk/20100422174722/http://www.caa.co.uk/docs/286/CAA(ChicagoConvention)Directions2007(asamended).pdf

applicable guidance and clarification relating to Aerodrome Safeguarding and is to be read in conjunction with CAP 168, CAP 232, CAP 1732, CAP 1096 and CAP 1054 the regulatory material referenced below. ***Non-inclusion of source regulatory material within this CAP does not preclude the end user from either the need to be aware of, or the need to comply with, the requirements contained within the source regulatory materials unless otherwise exempted from those requirements.***

It is the policy of the UK government that, unless a Difference (from an ICAO requirement) or 'Alternative Means of Compliance' (AltMoC) (related to an EASA 'Acceptable Means of Compliance' (AMC)) has been established, compliance with relevant international (i.e. ICAO and applicable equivalents such as International Telecommunications Union) and European regulatory material is required to the extent mandated in law. Additionally, compliance with national requirements that are not addressed by international or EU regulations is also required.

The words 'must', 'shall' and 'will' indicate that compliance with applicable regulatory requirements is necessary. In the case of AMC, the word 'should' indicate that compliance is required, unless complying with an approved AltMoC.

Regulatory References:

CAP 738 is published to assist Aerodrome Operator's understanding of, and compliance with the requirements laid down in:

ICAO:

Annex 14 Volume I, Aerodrome Design and Operations, Annex 14 Volume II, Heliports

EU:

Regulation (EU) 2018/1139, Regulation (EC) No 1108/2009, COMMISSION REGULATION (EU) No 139/2014

UK:

CAP 168 Licensing of Aerodromes

Revision history

1st Edition **February 2003**

CAP 738 offers guidance to those responsible for the safe operation of an aerodromes or technical site, to help them assess what impact a proposed development or construction might have on that operation. The assessment is known as Safeguarding.

2nd Edition **December 2006**

This edition incorporates the inclusion of the London Tall Buildings Policy. In addition, the opportunity has been taken to incorporate a few minor changes to the text.

3rd Edition **October 2020**

This edition incorporates substantial changes to the content to include additional guidance material for Heliport safeguarding and to generally improve the clarity of the information with respect to official and non-official aerodrome safeguarding.

Executive summary

Introduction

1. This publication is intended to provide advice and guidance to all those involved in the process of 'aerodrome safeguarding'. Primarily these are certificated and licensed aerodromes, heliports and hospital helicopter landing sites (HHLS) but non-licensed aerodromes, heliports and HHLS[3] may find the information of assistance. Additionally, the publication provides guidance on the planning process for those aerodromes that are 'officially' safeguarded in accordance with DfT Circular 01/2003 and those 'non-officially' safeguarded aerodromes that may wish to establish a similar process with their Local Planning Authority. The content will clarify who the guidance is aimed at.

2. The safeguarding system described in this CAP satisfies International Civil Aviation Organisation (ICAO), European Union (EU) and National Regulations, which state:

    a) ICAO Annex 14, Volume I

        i. Requires that Contracting States define the airspace around aerodromes to be maintained free from obstacles so as to permit the intended aeroplane operations at the aerodromes to be conducted safely and to prevent the aerodromes from becoming unusable by the growth of obstacles around the aerodromes. This is achieved by establishing a series of obstacle limitation surfaces that define the limits to which objects may project into the airspace.

        ii. Objects which penetrate the obstacle limitation surfaces may in certain circumstances cause an increase in the obstacle clearance altitude/height for an instrument approach procedure or any associated visual circling procedure or have other operational impact on flight procedure design. Criteria for flight procedure design are contained in the Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS, Doc 8168).

[3] There is an action from the onshore helicopter review (CAP 1864) which states the CAA will establish a work group with key stakeholders and operators to review the provision of Hospital Helicopter Landing Site information with the aim of adopting a unified controlled source similar to that used for offshore helidecks.

iii. Action shall be taken to decrease the risk to aircraft operations by adopting measures to minimize the likelihood of collisions between wildlife and aircraft.

b) ICAO Annex 14, Volume II

i. Requires that the Contracting State define the airspace around heliports so as to permit intended helicopter operations to be conducted safely and to prevent, where appropriate, heliports from becoming unusable by the growth of obstacles around them.

c) Regulation (EU) 2018/1139 Article No. 38

i. Member States shall take the necessary measures to ensure that aerodromes located in their territory are safeguarded against activities and developments in their surroundings which may cause unacceptable risks to aircraft using the aerodrome.

ii. The aerodrome operator shall monitor activities and developments which may cause unacceptable safety risks to aviation in the surroundings of the aerodrome for the operation of which they are responsible. They shall take the necessary measures to mitigate those risks in as far as this lies within their control and, where that is not the case, bring those risks to the attention of the competent authorities of the Member State where the aerodrome is located.

iii. In order to ensure the uniform application of this Article, the Commission shall adopt implementing acts laying down detailed provisions.

d) Commission Regulation (EU) No.139/2014

i. The EU requires that Member States shall ensure that consultations are conducted with regard to safety impacts of constructions proposed to be built within the limits of the obstacle limitation and protection surfaces as well as other surfaces[4] associated with the aerodrome.

ii. The regulation requires that the aerodrome operator establishes means and procedures to minimise the risk of collision between wildlife and aircraft at the aerodrome. Additionally, they should notify the appropriate authority if a wildlife assessment indicates conditions in the surroundings of the aerodrome are conducive to a wildlife hazard

[4] Other surfaces may need to be established when operating in accordance with ICAO PANS-OPS Doc 8168 (Procedures for Air Navigation Services - Aircraft Operations), Volume II, as adopted into the national law. The term ‘surfaces’ in this meaning is not used uniformly in different sources of information where also terms ‘area’ or ‘zone’ may be used.

problem. In this case the 'appropriate authority', depending on the circumstances, could be the LPA or the CAA.

e) The Air Navigation Order 2016 Article No.187

iii. The regulation requires that an instrument flight procedure within the United Kingdom must not be notified unless that procedure has been designed or approved by the CAA.

3. With regard to Para 2, (a)(ii), the CAA promulgates guidance relating to Instrument Flight Procedures in CAP 785 'Approval Requirements for Instrument Flight Procedures for use in UK Airspace'. Of particular importance is Section 4, Chapter 2, Paragraph 2. (Safeguarding of IFPs)

4. UK licensed and certificated aerodromes follow the principles of ICAO Annex 14, and European Commission (EC) Regulation 139/2014.

Safeguarding Scope

Why:

5. 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.

Who:

6. Aerodromes holding a certificate based on European Union (EU) regulation or a licence based on UK regulation are required by the CAA to ensure they have a system in place to safeguard their aerodrome against the growth of obstacles; or activities that may present a hazard to aircraft operations (e.g encourage wildlife, glare, lighting, building induced turbulence, etc). Responsibility for all safeguarding activities at these aerodromes' rests with the aerodrome operator. Government advice is that non-licensed sites are also encouraged to have a system of safeguarding in place with their Local Planning Authority (LPA).

7. The CAA is not involved in the safeguarding process for individual cases. We consider the aerodrome operator of certificated and licensed sites to hold expert opinion on safeguarding their site; it therefore follows that they are best placed to know the impact of any development on its operation. We do not hold a view on safeguarding at non-licensed sites.

8. The CAA does not have a statutory role in safeguarding. However, the CAA is a statutory consultee on certain proposed wind turbine developments[5].

9. We may also be consulted as a non-statutory consultee on all other planning proposals, but our response will be limited to the safety impact of the proposal on the aerodrome. We will not form a view as to whether the development should be permitted or not.

10. There is no requirement for a planning applicant to engage with the aerodrome before submitting an application, although pre-application engagement is encouraged with both statutory consultees and others. If those discussions break down, or there is disagreement between the aerodrome operator and the applicant, the CAA can be asked to provide objective comment, typically to the LPA.

11. Our role is primarily concerned with ensuring regulatory oversight of certificated and licensed aerodromes.

12. Finally, our involvement in the safeguarding assessment changes to one of an 'interested party' whenever a potential 'call in' is notified that affects an officially safeguarded aerodrome. Please see Chapter 2 for further information.

What:

13. The criterion for safeguarding are based on the following publications:

a) ICAO, Annex 14 'Aerodromes',

b) European Union, Article 8 of (EU) 139/2014,

c) Civil Aviation Publication (CAP) 168 'Licensing of Aerodromes'.

d) CAP 785 'Approval Requirements for Instrument Flight Procedures for use in UK Airspace' contain information relevant to the task of safeguarding.

[5] For onshore developments in excess of 50MW and for offshore developments in excess of 100MW.

Chapter 1

Basics of Safeguarding

What is Aerodrome Safeguarding

1.1 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:

a) the airspace around an aerodrome to ensure no buildings or structures may cause danger to aircraft either in the air or on the ground. This is achieved through both the 'Obstacle Limitation Surfaces' (OLS) and the 'Instrument Flight Procedure' (IFP).

b) the integrity of radar and other electronic aids to navigation by preventing reflections and diffractions of the radio signals.

c) aeronautical lighting, such as approach and runway lighting, by ensuring that they are not obscured by any proposed development and that any proposed lighting, either temporary or permanent, could not be confused for aeronautical ground lighting.

d) the aerodrome from any increased wildlife strike risk. In particular bird strikes, which pose a serious threat to flight safety.

e) aerodrome operations from interference by any construction processes through the production of dust/smoke, temporary lighting or construction equipment impacting on radar and other navigational aids.

f) aircraft from the risk of collision with obstacles through appropriate lighting.

g) aircraft from the risk of building induced turbulence.

h) aircraft from the risk from glint and glare, e.g. solar panels.

All the above will be taken into account by the aerodrome operator when assessing development proposals.

How to set up consultation

1.2 There are a number of ways an aerodrome operator can become involved in the planning consultation process. An aerodrome operator could submit their views:

- informally to the applicant prior to a planning application being made;

- if it is a listed aerodrome under DfT Circular 01/2003;
- if local arrangements have been agreed with the LPA (see PPG – Consultation – para 22 Informally by applicant prior to a planning application being made;
- if a listed aerodrome under Circular 01/2003;
- if local arrangements agreed with LPA (see PPG – Consultation – para 22) guidance/consultation-and-pre-decision-matters
- if they are a direct neighbour of a development (share boundary); and
- on any application (as any member of the public can – there is no notification) all planning applications are published on LPA website

1.3 An effective means of prompting a safeguarding consultation between a non-officially safeguarded aerodrome and an LPA is to produce a safeguarding map depicting the areas upon which consultation should take place. Production of a safeguarding map is obligatory for an 'officially' safeguarded aerodrome. Production of such maps can be completed by the surveyor contracted by the aerodrome. However, before a non-officially safeguarded aerodrome operator commits resource to this they should consult with the LPA to ensure they agree, in principle, to the safeguarding process. Once produced, a copy of the map should be lodged with the LPA.

1.4 The production of a Safeguarding Map is described in Chapter 4 'Producing a Safeguarding Map'. A safeguarding map typically consists of a colour coded system covering the safeguarding area, defined by square coloured tiles, each one representing the height at which consultation should take place.

Details needed to assess an application

1.5 For the aerodrome operator to conduct an effective safeguarding assessment it is necessary to obtain as many details as possible regarding the proposal. This publication assumes that the application has come from a Local Planning Authority (LPA) although it is possible an aerodrome operator may receive a submission from a developer, prior to planning. The LPA/developer should provide the following documents as a minimum to an officially safeguarded aerodrome:

- A copy of the application for planning permission
- Submitted plans showing the location of the development
- A grid reference with at least 6 figures to each of 'eastings' and 'northings'
- An elevation of the site (to an accuracy of 0.25m above Ordnance Datum)

- Details of the dimensions, layout and height of the buildings or works to which the application relates

A non-officially safeguarded aerodrome is encouraged to agree a similar list with their LPA

1.6 The section below is focussed on the requirements for an officially safeguarded aerodrome, however, non-officially safeguarded aerodromes are encouraged to follow a similar process. As an aerodrome operator, this information should provide sufficient data to conduct an assessment on the possible impact of the application, however, as it may be necessary for the aerodrome operator to have further information in order to consider the effect of a proposed development on the aerodrome it is important that the Local Planning Authority (LPA) consult the representative of the aerodrome operator at the earliest possible stage. Once you have received this, you should write to the LPA confirming receipt6. LPAs are then required to provide 21 days for your assessment to be completed. If a reply is not forthcoming within that period, the LPA is entitled to assume that the consultee has no comment to make and may decide on the application without further delay.

1.7 The planning process is dynamic and complex. To avoid including details that may become obsolete in a short time. The aerodrome operator is directed to access the latest guidance on the Ministry of Housing, Communities & Local Government (MHCLG) website. The MHCLG update this online guidance resource regularly to reflect changes to the process and policy. https://www.gov.uk/guidance/making-an-application sets out guidance on types of planning application and application validation.

1.8 In addition to the above, LPA also manage the permitted development rights process. These are a national grant of planning permission which allow certain building works and changes of use to be carried out without having to make a planning application. Permitted development rights are subject to conditions and limitations to control impacts and to protect local amenity. Aerodrome operators are again directed to access up to date guidance on the MHCLG website. Using the link https://www.gov.uk/guidance/when-is-permission-required#What-are-permitted-development-rights

1.9 Circular 01/20037, Annex 2 refers to The Town and Country Planning (General Development Procedure) Order 1995 which provides for the LPA to determine

[6] A cautionary response to the LPA or developer, indicating the maximum height permissible at the specified location and potential impact upon navigational aids may assist LPAs/developers as they further develop their plans.

[7] The town and country planning (safeguarded aerodromes, technical sites and military explosives storage areas) direction 2002

that the application ought not to be considered separately from all or any of the reserved matters. This would allow officially safeguarded aerodromes to request more information to enable a thorough safeguarding assessment and minimise the need to advise against the proposal on a holding basis. Although the Circular (Annex 1) does state for safeguarded aerodromes that the LPA "shall furnish such further information as is necessary to enable them (aerodrome) to consider the application".

Instrument Flight Procedures *(Applicable 31 December 2023)*

1.10 Where the aerodrome has established Instrument Flight Procedures8 (IFPs) it will be necessary to ensure the proposal does not impact their design.

1.11 Whilst the OLS protects the aerodrome surroundings from developments that may prove a hazard to aircraft, it cannot be assumed that the OLS will provide sufficient protection for IFPs. The aerodrome regulations state the aerodrome operator should take, within its competence, appropriate action to mitigate the risks associated with the penetration of those obstacle limitation and protection surfaces as established in accordance with the certification basis, and other surfaces and areas associated with the aerodrome, in order to ensure they remain free from hazardous obstacles.

1.12 The protected areas for IFPs are complex. To ensure the obstructions are assessed for impact on flight procedure minima, advice on their exact shape and location should be sought from an Approved Procedure Design Organisation (APDO). CAP 785 'Approval Requirements for Instrument Flight Procedures for Use in UK Airspace' provides further information and guidance particularly for APDOs supporting the safeguarding requirements placed on aerodrome operators. The CAA promulgates the list of APDOs at the following site: https://www.caa.co.uk/Data-and-analysis/Approved-persons-and-organisations/Datasets/Lists-of-approved-persons-and-organisations/Approved-instrument-flight-procedures-design-organisations/

1.13 Whilst the APDO is the appropriate organisation to assist the aerodrome operator in assessing the impact of developments on IFP, there are a number of options to deliver the service that does not necessarily result in individual consultations for each development proposal. Examples of these are:

a) In collaboration with the APDO, safeguarding maps could be produced to include IFP obstacle protection areas. This would result in aerodromes being able to easily identify those areas where a development may not only have an impact on the OLS but may also have an impact on the published IFP's

[8] Approval Requirements for Instrument Flight Procedures for Use in UK Airspace are described in CAP 785

b) The APDO may be able to produce specific overlays that can be made available to the LPA to enable them to assess any proposed developments in the aerodrome's surroundings and contact the aerodrome should there be a potential impact on their published IFPs.

c) The aerodrome operator could include an 'IFP safeguarding assessment' clause in their contract with the APDO to ensure they respond to any development proposals.

Chapter 2

Official and non-official Safeguarding

Official and non-official Safeguarding explained

2.1 As far as licensed/certificated aerodromes are concerned, there are two forms of safeguarding:

1. official safeguarding, and
2. non-official safeguarding.

Officially Safeguarded Aerodromes

2.2 Specified certificated and licensed aerodromes are afforded safeguarding protection by UK Government (Department for Transport) to ensure their operation and development are not inhibited by proposed buildings, structures or constructions which might infringe the established obstacle limitation surfaces (OLS), or obscure runway approach lights or have the potential to impair the performance of aerodrome navigation aids, radio aids or telecommunication systems. These aerodromes are currently listed in Government Planning Circular 'Safeguarded Aerodromes, Technical Sites and Military Explosives Storage Areas: The Town and Country Planning (Safeguarded Aerodromes, Technical Sites and Military Explosive Storage Areas) Direction:

- England & Wales Circular (1/2003): https://www.gov.uk/government/publications/safeguarding-aerodromes-technical-sites-and-military-explosives-storage-areas
- Scotland Circular (2/2003): http://www.gov.scot/Publications/2003/01/16204/17030

a) The Government directs LPAs to consult with an officially safeguarded aerodrome whenever a development of a specified height is proposed within the colour-coded area and 13km (bird attractant) circle depicted on a safeguarding map. This formalises the consultation process and ensures an aerodrome receives an opportunity to comment on any development that may affect its existing or future safe operation. Further details are contained within the Planning Circulars identified above.

b) When an LPA is minded to grant permission contrary to an aerodromes' objection or grant permission subject to conditions contrary to the advice of the aerodrome operator and that aerodrome is officially safeguarded, the LPA is required to notify both the CAA and the aerodrome of its intentions,

before granting permission[9]. This process allows the CAA to identify any proposed solutions or, ultimately, provides the means for the Government to "call in" the application. It is very rare indeed for a "call in" to be invoked; however, it is always possible that this may occur where circumstances dictate.

Non-officially Safeguarded Aerodromes

2.3 Non-officially safeguarded aerodromes are not afforded a 'call in' opportunity. It follows that there is no requirement for the Local Planning Authority (LPA) to notify the CAA where it intends to grant permission contrary to their objection. However, Operators of licensed aerodromes which are not officially safeguarded, and operators of unlicensed aerodromes and sites for other aviation activities (for example gliding or parachuting) should take steps to protect their locations from the effects of possible adverse development by establishing an agreed consultation procedure between themselves and the local planning authority or authorities. One method, as described above in Para. 1.2 is to lodge a non-official safeguarding map with the local planning authority or authorities. Moreover, it is Government's advice to LPAs that they should respond "sympathetically" to requests for safeguarding from non-officially safeguarded aerodromes (and operators of unlicensed aerodromes and sites for other aviation activities).

Officially Safeguarded Aerodromes (as at Q1 2018)[10]

England & Wales			
Biggin Hill	Birmingham	Blackpool	Bournemouth
Bristol	Cardiff	Carlisle	Coventry
Doncaster	East Midlands	Exeter	Farnborough
London Gatwick	London Heathrow	London Heliport	Humberside
Leeds Bradford	Liverpool	London City	London Stansted
Luton	Manchester	Newcastle	Newquay

[9] The LPA is not allowed to grant planning permission for a further period of 28 days to enable the aerodrome or the CAA to comment further.

[10] List of aerodromes as appearing in the 'The Town and Country Planning (Safeguarded Aerodromes, Technical Sites and Military Explosives Storage Areas) Direction 2002 (Circular 1/2003 and 3/3004 (Scotland))

England & Wales			
Norwich	Oxford	Southampton	Southend
Teesside International			

Scotland			
Aberdeen	Benbecula	Edinburgh	Glasgow
Inverness	Islay	Kirkwall	Prestwick
Stornoway	Sumburgh	Tiree	Wick

Chapter 3

The Safeguarding Process

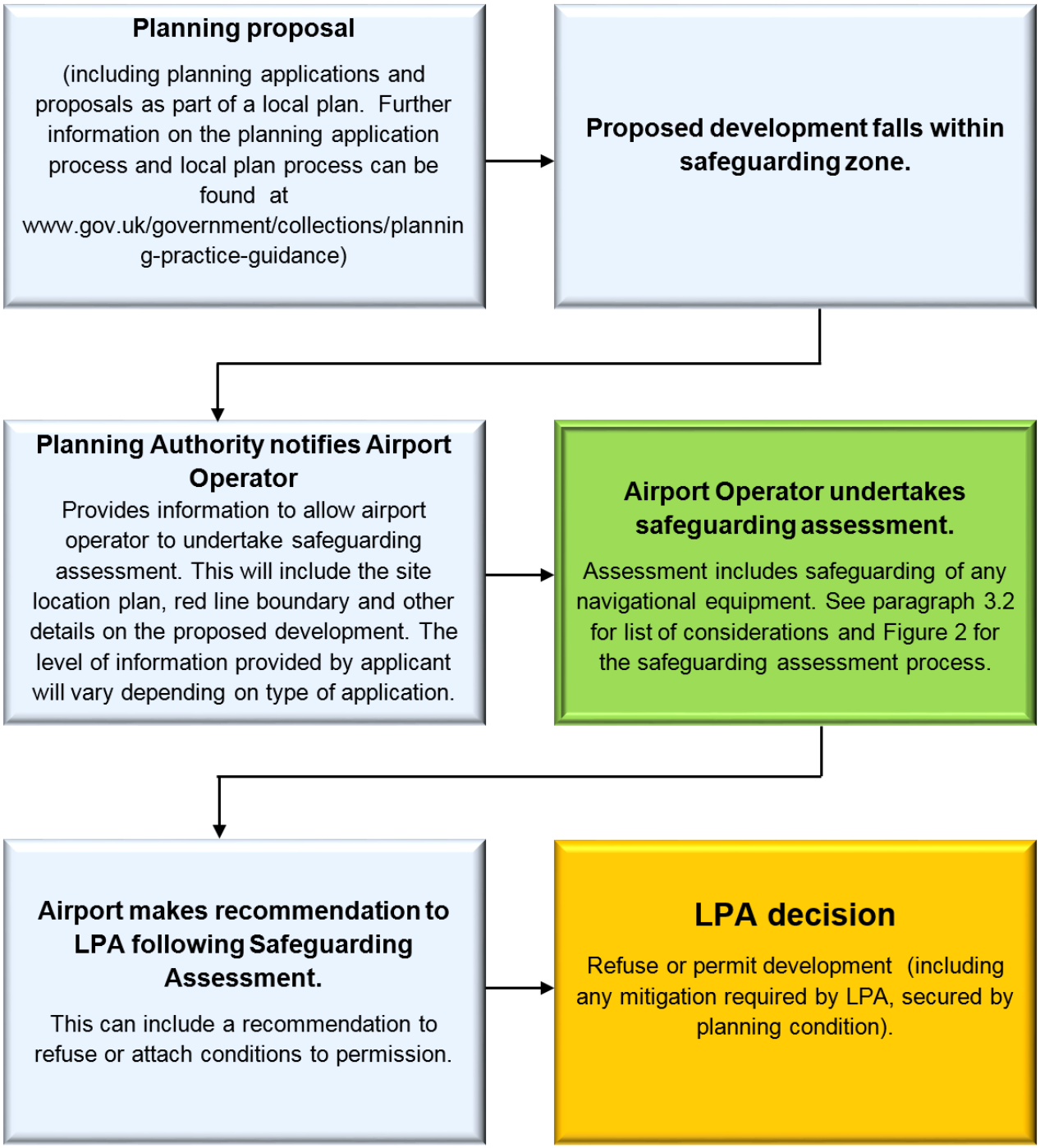


Figure 1

Safeguarding Assessment

3.1 Notification of an application for a proposed development can be received in the form of consultation from an LPA or the LPA might do so informally when there is pre-application engagement or encourage an applicant to do so. Pre-application engagement with the aerodrome is encouraged by the Government, direct from an architect/developer or their representative. The safeguarding process is outlined in Figure 1 and described in the following paragraphs.

3.2 The assessment should include, as a minimum, the impact of:

a) any development or change in land use in the aerodrome area;

b) any development which may affect the instrument flight procedures serving the aerodrome;

c) any development which may create obstacle-induced turbulence that could be hazardous to aircraft operations;

d) any development which may affect the performance of navigation aids.

e) the use of hazardous, confusing and misleading lights;

f) the use of highly reflective surfaces which may cause dazzling;

g) the creation of areas that might encourage wildlife activity harmful to aircraft operations.

3.3 It is essential that accurate records are kept of all consultations, even those on which no objections were raised. There may be occasions where the project has changed height or layout which could make a difference to the safeguarding or where a second or further planning application is submitted for a development on which comments have already been made. The information provided may differ between applications, e.g. a Recreation Centre at one application could be a Sports Facility at a second; a Leisure Park at a third; and the coordinates could be different. In addition, the construction materials or elevations may be altered. Differing responses to what the LPA may consider to be the same project will be questioned as inconsistency, and confidence in the response offered may be diminished. Further information on how to complete a safeguarding assessment is provided in Appendix D.

Insufficient Information

3.4 Outline planning applications do not normally provide sufficient information to assess the impact a development may have on an aerodrome. They have to include an address, location and site plan. This information will only confirm whether the proposed development is located within the safeguarded area. If, at outline planning stage, you decide certain conditions may be appropriate (e.g.

landscaping or lighting or height restriction) you should respond in a way that requests that these conditions are attached to any permission. It is important to remember that outline planning details can be changed without further consultation. In some cases, when it is clear that a proposed development would be unacceptable in principle at that location, you should respond accordingly. For example, if the proposed development falls within the area where the Take-off Climb, Approach or Transitional Surface prevails and the ground height almost meets it, then a structure in that position could present an unacceptable safety risk.

Requesting Planning Conditions

3.5 Planning conditions provide an opportunity to carefully monitor/manage certain aspects of the proposed development.

3.6 When the safeguarding assessment identifies the need for ‘planning conditions’, the aerodrome operator should explicitly request such conditions in their response to the LPA; this is particularly important where landscaping features have the potential to introduce an increased birdstrike risk, or where lighting could present a hazard to aviation safety. Where such conditions have been requested, aerodrome operators should work collaboratively with developers and the LPA to ensure those conditions are discharged by the LPA, where possible, to the satisfaction of the aerodrome.

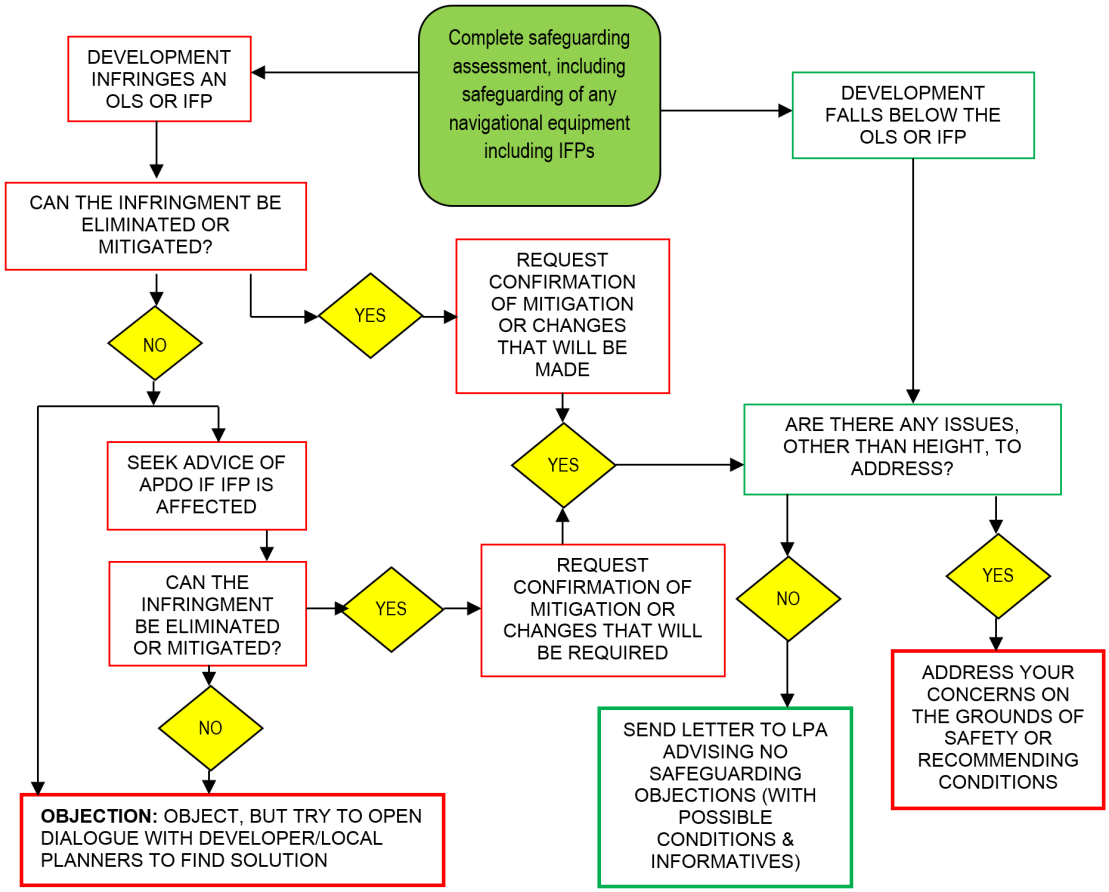


Figure 2

3.7 The flowchart above (Fig.2) indicates the safeguarding assessment process and compliments the safeguarding process shown above in Fig.1.

Additional items to consider in the assessment

Cranes and other vertical structures required to be notified to the CAA and/or the aerodrome operator

3.8 Some temporary and permanent vertical structures (including cranes) are notified to the CAA. The CAA's role is to identify and notify stakeholders (mainly aerodrome operators) which may be affected by such vertical structures and notify airspace users about any notified en-route obstacles (of a height of 100 m AGL and more).

3.9 CAP 109611 requires the crane user to inform the appropriate authority within a specified timescale of the intention to erect any crane exceeding a height of 10 m above ground level (AGL) or that of the surrounding structures or trees (if higher). The appropriate authority being either the CAA or in exceptional

[11] CAP 1096 'Guidance to Crane Users' describes the process crane users are required to undertake prior to the erection of a crane.

circumstances, the aerodrome operator themselves.

CAP 1096 Edition 2.1 states:

- **PLANNED LONG-TERM PROJECTS:** Notification to be sent to the CAA at least eight weeks (40 working days) before the erection of the crane. The CAA will then identify parties that may be affected by the crane and inform the crane user and affected parties about the next steps.
- **AD-HOC PROJECTS:** Notification to be sent to the CAA not later than 5 working days in advance. The CAA will then identify parties that may be affected by the crane and inform the crane user and the affected parties about the next steps.

  ***Note**: It is important that crane users who can notify their operations 40 working days or more before the erection of the crane (scenario I) are not using scenario II (delayed notification) as it has been created to allow the CAA to prioritise crane notifications which due to the character of their operations cannot be notified earlier.*
- **UNFORESEEN AND URGENT PROJECTS:** If there is an unforeseen and urgent requirement to erect a crane within 5 working days from the notification, the crane user is required to contact all aerodromes whose perimeters are within 10 Nautical Miles (NM) (18.5 km) of the crane and submit the notification form (CAP 1096 Annex A) to the CAA as soon as possible and advise which aerodrome operators have been contacted and the reason for less than 5 working days' notice. As the operation of the crane may have an implication to other airspace users, where no aerodromes are located within 10 NM (18.5 km) from the location of the crane, notification form (CAP 1096 Annex A) should still be submitted to the CAA, who will process such notifications at the earliest opportunity.

3.10 The 10nm notification area mentioned above was established to ensure the majority of IFPs are included in the assessment. The aerodrome operators, in collaboration with their APDO, are able to adjust their notification area (10nm), both horizontally and vertically, based on a combination of the OLS and their specific IFP Obstacle Protection areas. Any changes to the aerodrome notification area should be submitted to AROps@caa.co.uk with a confirmation from the APDO that this area should be used to support aerodrome safeguarding process.

Note: Where amendments to the notification areas are necessary, the resultant notification areas need to be as simple as possible. Complex shapes may create a risks of mis-interpretation of the notification areas.

3.11 When the CAA has received a crane notification, **the CAA will not assess the impact of the crane or any other vertical structure on the OLS or the**

aerodromes IFPs, its primary responsibility is to ensure the appropriate aerodrome has been identified and notified.

3.12 When the aerodrome operator has received notification from the CAA of a crane, the aerodrome operator should liaise directly with the crane user concerning the erection/operation strategy and any safeguarding requests they may require the crane user to implement. It is the aerodrome operator's responsibility to issue the approval once it is satisfied that the impact the crane will have on the operation of the aerodrome is manageable and understood by the crane user. If the crane is also an en-route obstacle, the aerodrome operator should notify the CAA about any NOTAM action taken by the aerodrome, as per CAP 1096.

3.13 Except cases when a specific aerodrome notification area was established (as per paragraph 3.10 above), the CAA will notify aerodromes based on the following criteria:

a) ALL vertical structures which are proposed to be located within 10nm of the aerodrome reference point (ARP) will be notified.

b) Vertical structures which are proposed to be located outside of 10nm from the aerodrome reference point (ARP) but within 30nm and with an elevation of **450m (1500ft) AMSL** or greater will also be notified.

3.14 All safeguarding arrangements should ensure that the aerodrome operator is notified about all obstacles that could penetrate the OLS or affect IFPs. It is the aerodrome operator's responsibility to ensure all obstacles (temporary and permanent) are assessed using their safeguarding procedures.

3.15 Aerodrome operators are responsible for safeguarding the Obstacle Limitation Surfaces (OLS) as well as other surfaces associated with the aerodrome including Instrument Flight Procedures (IFP). This should be reflected in the aerodrome safeguarding procedures. These safeguarding procedures will fall within the scope of the CAA regulatory audits.

Roads and railways

3.16 Road or rail vehicles may need to be considered as part of an aerodrome operator's safeguarding assessment – especially where positioned close to a runway(s). To ensure vehicles and rolling stock are accounted for in the safeguarding assessment process, the UK considers a road to contain a mobile obstruction of 4.8 metres above the crown of the road and in the case of a railway a mobile obstruction of 5.4 metres above the top of the rails. Any safeguarding assessment that includes a road or railway should use this criterion.

Lighting

3.17 Lighting elements of developments have the potential to distract or confuse pilots, particularly in the immediate vicinity of an aerodrome.

3.18 Aerodrome operators, LPAs and developers should pay attention to the intensity and alignment of road lighting, which is a matter of concern over much more than the areas close to the ends of a runway. The intensity of lighting can cause confusion to pilots by creating glare when viewed from the air; a road lighting scheme may give an illusion similar to an approach or runway lighting pattern which may confuse pilots who use such visual cues when landing at night or in low visibility conditions.

3.19 Where floodlighting is proposed, the aerodrome operator should request that the lighting scheme provides full cut-off with no light spill above the horizontal.

3.20 Article 224 of the Air Navigation Order 2016 (as amended) is explicit regarding lights liable to endanger aircraft, including the directions to be taken to extinguish any such light deemed as endangering aircraft.

Landscaping

3.21 Guidance on wildlife control within the vicinity of an aerodrome is provided in CAP 772 ‘Wildlife Hazard Management at Aerodromes’.

3.22 Safeguarding consultations that include landscaping design should be assessed to establish the likelihood of an increase in wildlife activity. The developer may wish to introduce landscaping that is attractive to humans, however an unintended consequence of such landscaping is that it is also attractive to wildlife (for example, berry bearing foliage, water features or wetlands). Equally, the developer may introduce unintended hazards in an attempt to meet environmental targets (for example, SUDS Schemes, building design including large area of flat or shallow pitched roof, putrescible waste management)

3.23 Finally, the introduction of trees within a landscaping scheme can introduce hazards to aircraft safety, for example the final height of the tree(s) may not have been considered in the initial scheme, but which may end up resulting in an infringement of the obstacle limitation surfaces and the species of tree could provide a roosting opportunity for a significant number of birds.

General Permitted Development Order (GPDO)

3.24 The Town and Country Planning (General Permitted Development (England) Order 2015 [No 596]), includes a notification process when telecommunication mast extensions are proposed.

3.25 The GPDO removes the opportunity for aerodromes to be consulted on extensions to existing mobile masts. Although Telecom Code Operators are

required to 'notify' the CAA and aerodrome operators, this does not constitute 'consultation' and there is no requirement on the Code Operator to act on any objection or request for a reduction in height.

3.26 To mitigate against any potential risk to aviation the CAA, MoD and NATS have contributed to the code operators 'Code of Best Practice on Mobile Network Development in England'12. This contains strongly worded guidance, that mirrors the original intent of consultation, where an extension to an existing mast is proposed and asks that planning authorities consult with aerodromes whenever they are notified of an extension being proposed. Whilst this is not as robust as the system previously in place, it does provide an opportunity for consultation.

3.27 Aerodrome operators are asked to be diligent in their safeguarding processes and mindful of the fact that a telecom mast extension may appear without prior warning. Where such a situation arises, the operator should conduct a safeguarding assessment and, if it is identified the mast presents an unacceptable risk to aviation, take action to ensure aviation safety is not compromised until such time as a further evaluation can take place or arrangements are in place to reduce/remove the mast. The CAA will be interested to learn of any situation, similar to that identified above, that has been experienced by an aerodrome operator.

Other considerations

3.28 In addition to the above, aerodrome operations should be aware of the risks caused by human activities and land use in the vicinity of the aerodrome which should be assessed and mitigated. These should include:

a) obstacles and the possibility of induced turbulence;

b) the dazzling caused by large and highly reflective surfaces;

c) sources of non-visible radiation, or the presence of moving, or fixed objects which may interfere with, or adversely affect, the performance of aeronautical communications, navigation and surveillance systems.

[12] https://www.mobileuk.org/codes-of-practice

Chapter 4

Producing a safeguarding map

Aerodrome Characteristics

4.1 To develop a safeguarding map, first determine the Aerodrome (Runway) Reference Code (ARC) – details available in EASA Decision 2017/021/R 'Certification Specifications' or CAP 168 'Licensing of Aerodromes'. The ARC comprises a number and a letter; the number element is determined by selecting the higher value of declared Take-Off Distance Available (TODA) or Accelerate-Stop Distance Available (ASDA). It determines the Obstacle Limitation Surfaces (OLS) and Obstacle Free Zone (OFZ).

4.2 Having established the ARC, you will need to identify the following:

- Runway designation and magnetic heading
- Whether the runway is instrument or non-instrument
- Whether the runway is provided with an Instrument Flight Procedure (IFP)
- Start and end of Landing Distance Available (LDA)
- Start and end of Take-Off Run Available (TORA)
- End of Accelerate Stop Distance Available (ASDA)
- End of Take-Off Distance Available (TODA)
- National grid reference of the mid-point of the longest runway (if less than 1800m long) for the determination of the Inner Horizontal and Conical Surfaces
- Aerodrome Reference Point (ARP) for the determination of the Outer Horizontal Surface (if applicable) and
- Coordination and elevation of any FATO for helicopter operations

Runway Strip and Obstacle Limitation Surfaces

4.3 Once you have identified the present and future landing and take-off distances you can plot the runway strip and obstacle limitation surfaces. The starting point is the Aerodrome Reference Code. When the strip is drawn on the map the approach surface slope and dimensions can be added, along with the take-off surfaces, the transitional surfaces, the inner horizontal surface, the conical surface, and the outer horizontal surface, all of which are explained in EASA Certification Specifications, CS ADR-DSN.A.005 Aerodrome Reference Code, ICAO Annex 14 or CAP 168, Chapter 4.

Technical Sites

4.4 Add parameters for safeguarding of technical sites, such as telecommunications facilities. To deduce the criteria which apply it will be necessary to consult the service provider (or, where applicable, the manufacturer) and/or study the advice in CAP 670. This is available on the CAA website; access the section in CAP 670 Part B dealing with generic requirements and guidance.

Coloured Tiles for Consultation

4.5 The maps currently used at certificated/licensed aerodromes reflect the need to protect the OLS and, when appropriate, the any IFPs[13] related to the aerodrome. They have a squared format superimposed on the national grid. In this system each square of the national grid is coloured to represent the most critical interaction between the obstacle limitation surface and ground height within that square. It is acceptable to reduce the notification height within a square, as desired. The following colour coding is normally used:

Grey: All developments should be notified

Red: All developments exceeding **10m** AGL should be notified

Green: All developments exceeding **15m** AGL should be notified

Yellow: All developments exceeding **45m** AGL should be notified

Blue: All developments exceeding **90m** AGL should be notified

Purple All developments exceeding **150m** AGL should be notified

Note: Not all safeguarding maps will comply with this convention and for unofficial safeguarding maps different colour/height bands may be used.

4.6 In addition to the coloured tiles, a safeguarding map also contains a dotted circle positioned at 13km from the ARP (see example below). This circle defines the area within which consultation is required for any proposal likely to attract birds or connected with an aviation use. For example:

a) Wildlife strike risk - Any proposed development that has the potential to increase the wildlife strike risk should be submitted to the aerodrome for a safeguarding consultation.

b) Other aeronautical use - Any proposed aeronautical establishment, for example a helicopter landing site or gliding activity being proposed in the vicinity, should be submitted to the aerodrome for a safeguarding consultation. This ensures the aerodrome can assess their operation in line with the new proposal.

[13] Refer to Chapter 1 CAP 738 regarding the inclusion of IFPs on the safeguarding map.

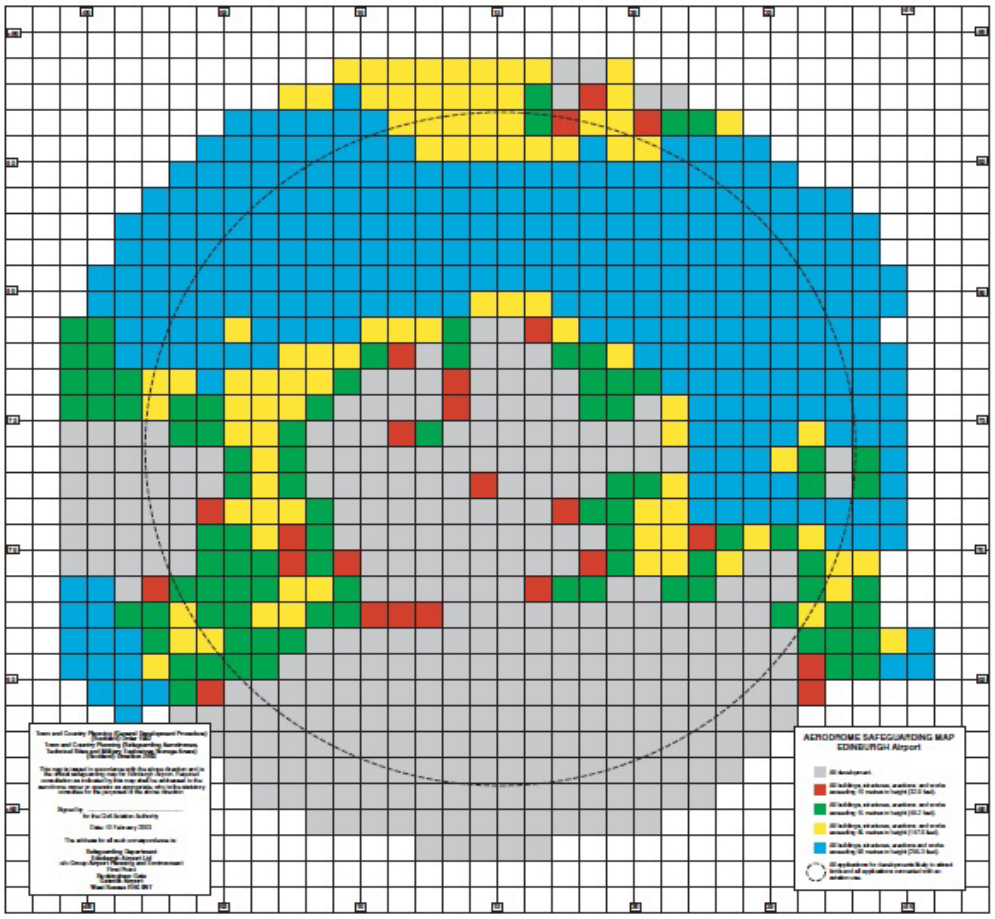
4.7 The safeguarding area extends to cover an area appropriate to safeguard the aerodrome's OLS and IFP surfaces and is centred on the Aerodrome Reference Point (ARP).

4.8 If as a result of the engagement between the aerodrome operator and APDO, additional areas beyond the extent of the current safeguarding map are identified, it should be reflected in the arrangement with the Local Planning Authority by either:

- the existing (coloured squares) safeguarding map could be reviewed and extended from 15km to 55.56km (30NM) to incorporate IFPs or
- a separate IFP safeguarding map would facilitate that process.

Once ready the new/revised safeguarding maps should be agreed with the relevant LPA(s) and submitted to Aerodromes.atm@caa.co.uk. The aerodrome operator should include confirmation from the APDO that they can be used to support IFP safeguarding

Note: An aircraft on a normal approach will descend into this zone when approximately 8 statute miles from the runway, which converts to 13 km.



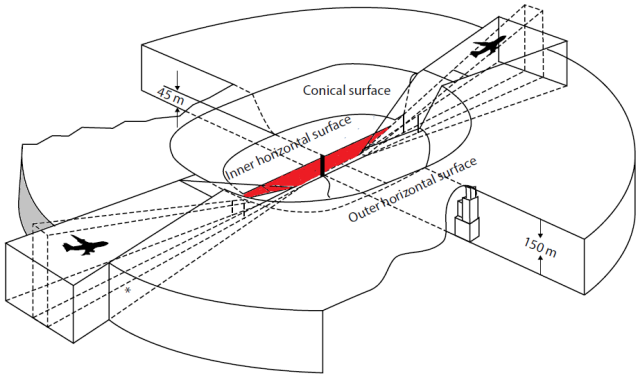
Example Safeguarding Map – extending out to 15km from the runway (aerodrome reference point), also depicting a 13km dotted circle and grid legend

Chapter 5

Obstacle Limitation Surfaces explained

Transitional Surface

Applicability: The purpose of the transitional surface is to define the limit of the area available for buildings, other structures or natural obstructions, such as trees.



5.1 The transitional surface is a complex surface along the side of the strip and part of the side of the approach surface that slopes upwards and outwards to the Inner Horizontal Surface (IHS).

5.2 Transitional surfaces are established for every runway intended to be used for landing.

5.3 The slope of the transitional surface is measured in the vertical plane above the horizontal, and normal to the centreline of each runway. The slope is 20% (1:5) for Code 1 and 2 non-instrument and non-precision instrument runways; for all other runways the slope is 14.3% (1:7).

5.4 The limits of a transitional surface should comprise:

a) A lower edge beginning at the intersection of the side of the approach surface with the IHS and extending down the side of the approach surface to the inner edge of the approach surface and from there along the length of the strip parallel to the runway centre line; and

b) An upper edge located in the plane of the IHS.

5.5 The elevation of a point on the lower edge should be:

a) Along the side of the approach surface — equal to the elevation of the approach surface at that point; and

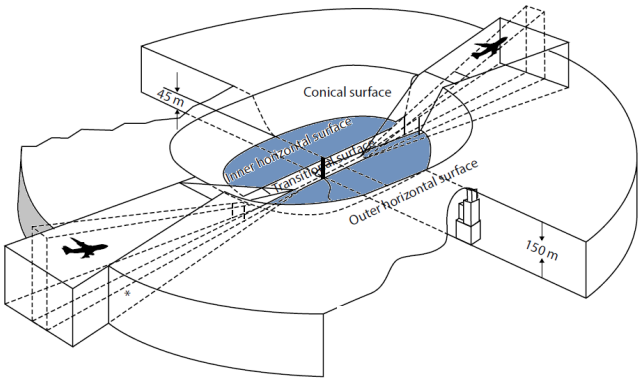
b) Along the strip — equal to the elevation of the nearest point on the centre line of the runway or its extension.

5.6 The outer limit of a transitional surface is determined by its intersection with the plane of the IHS.

5.7 The slope of the transitional surface should be measured in a vertical plane at right angles to the centre line of the runway.

Inner Horizontal Surface

Applicability: The purpose of the inner horizontal surface is to protect airspace for visual manoeuvring prior to landing.



5.8 The IHS is a surface located in a horizontal plane above an aerodrome and its environs and is established for every aerodrome.

5.9 The outer limits of the IHS are defined by circular arcs centred on the geometric centre of the runway, on the intersection of the extended runway centre line with the end of the runway strip joined tangentially by straight lines or points established for such purpose

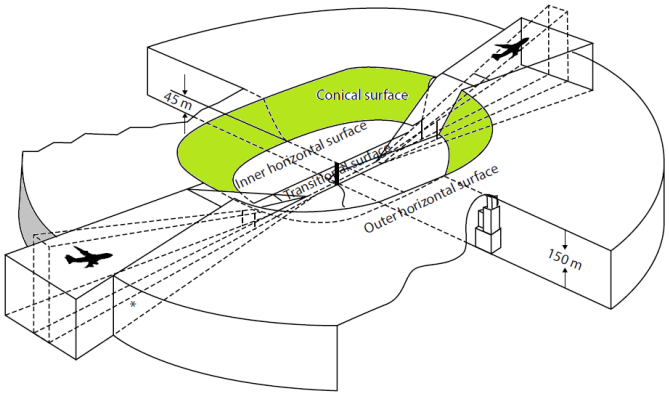
5.10 The height of the IHS should be measured above an established elevation datum. For consistency the UK CAA has historically used the elevation datum of highest point of the lowest threshold of the related runway, although it is acknowledged EASA offers alternative datums.

5.11 The limits of the IHS are established as follows:

- Where the main runway is 1800 m or more in length, circles of radius 4000m are described centred on the strip ends of the runway. These circles are joined by common tangents parallel to the runway centreline to form a racetrack pattern. The boundary of this pattern is the boundary of the IHS.
- Where a main runway is less than 1800 m in length, the IHS is circular and is centred on the mid-point of the runway. The radius is 4000 m except in the case of non-instrument runways where the code number is 1 or 2. For these runways the radii are 2000 m and 2500 m respectively.
- Where the IHS is at any point lower than an approach surface or take-off climb surface, the IHS is the obstacle limitation surface at that point.

Conical Surface

Applicability: The purpose of the conical surface is to facilitate safe visual manoeuvring in the vicinity of the aerodrome.



5.12 A surface sloping upwards and outwards from the periphery of the IHS. It represents the level above which consideration needs to be given to the control of new obstacles to ensure safe visual manoeuvring in the vicinity of an aerodrome.

5.13 A conical surface is established for every aerodrome.

5.14 The limits of the conical surface should comprise:

a) A lower edge coincident with the periphery of the IHS; and

b) an upper edge contained in a horizontal plane located 100m above the IHS except:

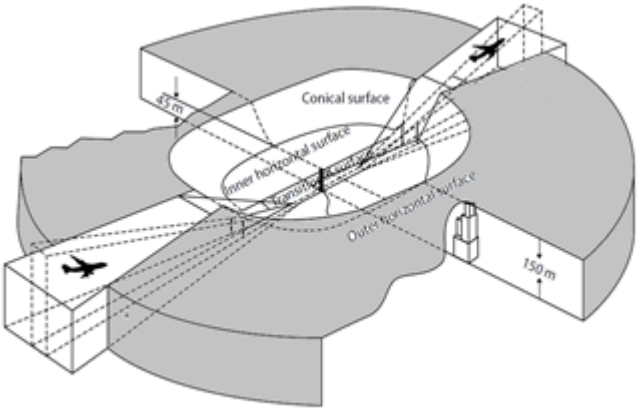
i. where the code number of a non-precision instrument runway is 3,2 or 1; in these cases, the plane is located 75m above the IHS where the code number is 3 and 60m where the code number is 2 or 1.

ii. where the code number of a non-instrument runway is 3, 2 or 1; in these cases, the plane is located 75m above the IHS where the code number is 3, 55m where the code number is 2 and 35m where the code number is 1.

5.15 The slope of the conical surface should be measured in a vertical plane perpendicular to the periphery of the IHS, at 5% (1:20).

Outer Horizontal Surface

Applicability: ICAO and EASA provides guidance on the application of an OHS. The UK CAA has historically applied an OHS at those aerodromes where the overall runway length exceeds 1100m. Aerodromes, especially those issued with a certificate based on the EU Regulation, are free to determine the suitability of an OHS, taking into account the surrounding topography and proliferations of existing tall structures.



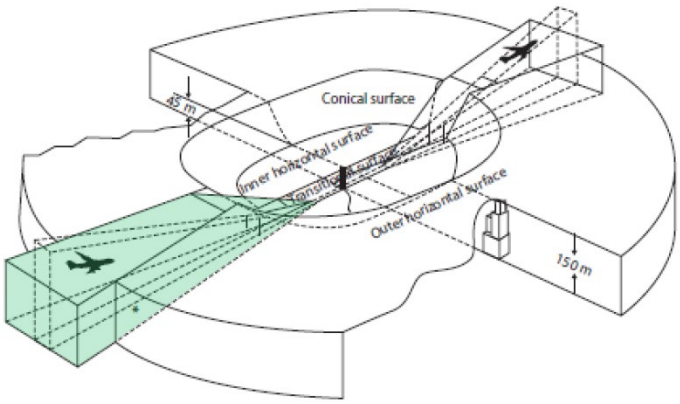
5.16 An OHS is a specified portion of a horizontal plane around an aerodrome beyond the limits of the conical surface. It represents the level above which consideration needs to be given to the control of new obstacles in order to facilitate practicable and efficient instrument approach procedures, and together with the conical and IHS to ensure safe visual manoeuvring in the vicinity of an aerodrome. The inner edge of the OHS is located directly above the outer edge of the conical surface.

5.17 An OHS may be established for any aerodrome where the main runway is 1100m or more in length.

5.18 The OHS extends from the periphery of the conical surface to a minimum radius of 15,000m from the aerodrome reference point where the runway code number is 3 or 4 and to a minimum radius of 10,000m where the main runway is 1100m or more but less than 1200m in length.

Approach Surface

Applicability: An approach surface is an inclined plane or combination of planes preceding the threshold and is established for each runway direction intended to be used for the landing of air*craft*



5.19 The limits of the approach surface comprise: a horizontal inner edge of specified length perpendicular to the centreline of the runway located at a distance of 60 m before the landing threshold, except in the case of non-instrument runways where the code number is 1 and where the distance is 30 m;

a) two sides originating at the ends of the inner edge and diverging uniformly at a specified rate from a line drawn parallel to the extended centreline of the runway;

b) an outer edge parallel to the inner edge.

5.20 The elevation of the inner edge is equal to the elevation of the mid-point of the landing threshold.

5.21 The slope of the approach surface is measured in the vertical plane containing the centreline of the runway. An approach surface for an instrument runway is horizontal beyond the point at which it intersects a horizontal plane 150 m above the threshold elevation.

5.22 The following table describes the characteristics of approach runways for all aerodrome (runway) references codes:

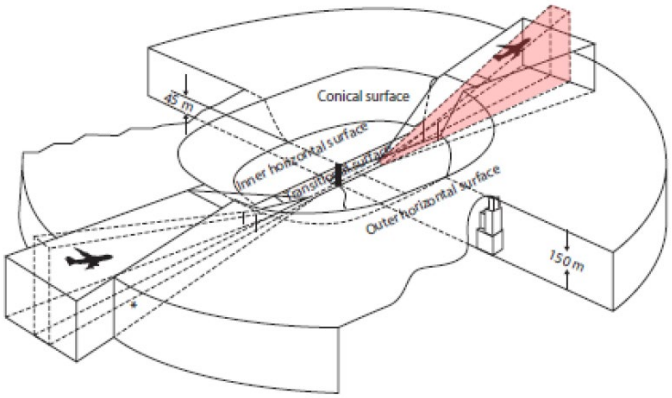
Approach surface slopes and dimensions

	Precision instrument approach runways		Non-precision instrument approach runways		Non-instrument runways			
	Code number		Code number		Code number			
	3 or 4	1 or 2	3 or 4	1 or 2	4	3	2	1
Length of inner edge	280 m*	150 m	280 m*	150 m	150 m	150 m	80 m	60 m
Distance before threshold	60 m	60 m	60 m	60 m	60 m	60 m	60 m	30 m
Divergence each side	15%	15%	15%	15%	10%	10%	10%	10%
Length of first section	3000 m	3000 m	3000 m	2500 m	3000 m	3000 m	2500 m	1600 m
Slope of first section	2% (1:50)	2.5% (1:40)	2% (1:50)	3.33% (1:30)	2.5% (1:40)	3.33% (1:30)	4% (1:25)	5% (1:20)
Length of second section	3600 m	2500 m	3600 m					
Slope of second section	2.5% (1:40)	3% (1:33.3)	2.5% (1:40)					
Length of horizontal section	8400 m	9500 m	8400 m					

* The length of the inner edge may be reduced to 210 m for a runway where the LDA falls into the lower third of code number 3, and where, in the opinion of the CAA, such a reduction is compatible with the use made of the runway.

Take Off Climb Surface

Applicability: A take-off climb surface is an inclined plane located beyond the end of the take-off run available or the end of the clearway where one is provided and is established for each runway direction intended to be used for take-off.



5.23 The limits of a take-off climb surface comprise:

a) an inner edge of specified length, perpendicular to the extended centreline of the runway, at the end of the clearway, when such is provided, but in no case less than:

i. a distance of 60 m measured horizontally in the direction of take-off beyond the end of the declared take-off run available, where the code number is 2, 3 or 4; or

ii. a distance of 30 m measured horizontally in the direction of take-off beyond the end of the declared take-off run available where the code number is 1.

b) two sides originating at the ends of the inner edge, diverging uniformly at a specified rate from the vertical projection of the take-off flight path to a specified final width and continuing thereafter at that width for the remainder (if any) of the length of the take-off climb area;

c) an outer edge parallel to the inner edge.

5.24 The elevation of the inner edge is equal to that of the end of the clearway, or clearway plane, on the extended centreline of the runway. Where a clearway is not provided, the elevation is that of the point of intersection of the centreline of the runway and the inner edge.

5.25 In the case of a straight take-off flight path, the slope of the take-off climb surface is measured in the vertical plane containing the extended centreline of the runway. Where no object reaches the 2% (1:50) surface slope specified for runways where the code number is 3 or 4, the slope should be reduced until it touches the first immovable object or reaches 1.6% (1:62.5), whichever is the steeper. If the slope is reduced, the length of the surface should be increased to afford protection on the climb to a height of 1000 ft.

5.26 In the case of a take-off flight path involving a turn, the take-off climb surface is a complex surface such that the normal at any point on the flight path centreline is a horizontal line at the same height above surface origin as would have resulted from the application of a straight flight path. The edge of a TOCS may be slewed in the direction of a turn away from the extended runway centreline up to a maximum of 15° splay. The portion of TOCS encompassing the new departure track should be the same shape and dimensions as the original TOCS measured relative to the new departure track. The opposite edge of the TOCS should remain unchanged unless there is another turning departure towards that side also, in which case, the edge may be slewed in that direction too.

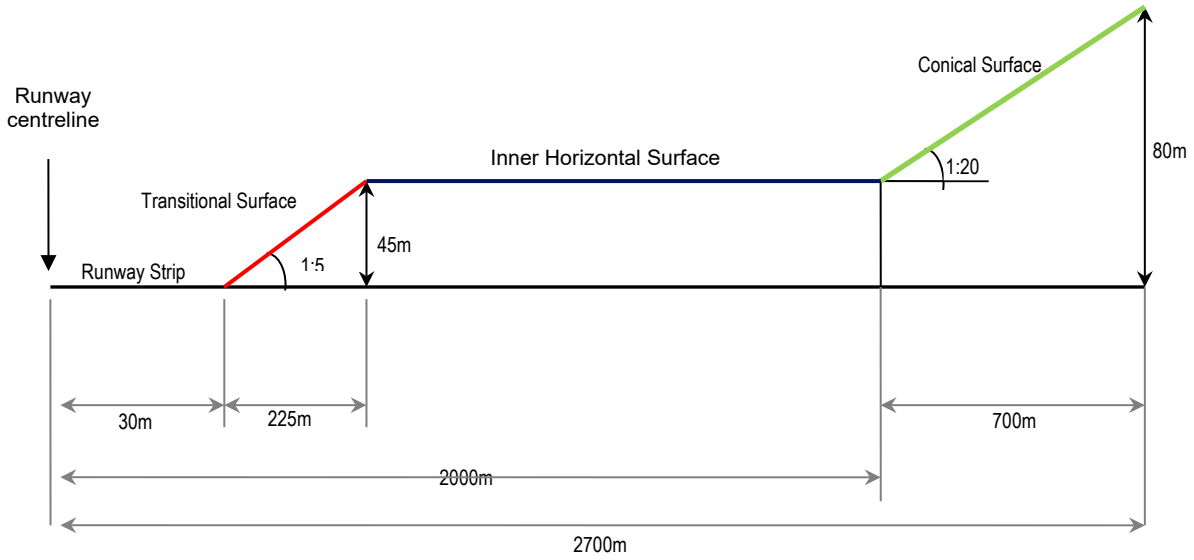
5.27 The following table describes the characteristics of the take-off climb surface for all aerodrome (runway) references codes:

Code number	**3 or 4**	**2**	**1**
Length of inner edge	180 m	80 m **(1)**	60 m **(2)**
Distance of inner edge from end of take-off run (TORA) **(3)**	60 m	60 m	30 m
Divergence (each side)	12.5%	10%	10%
Final width	1200 m **(4)**	580 m	380 m
Length	15000 m	2500 m	1600 m
Slope	2% (1:50)	4% (1:25)	5% (1:20)

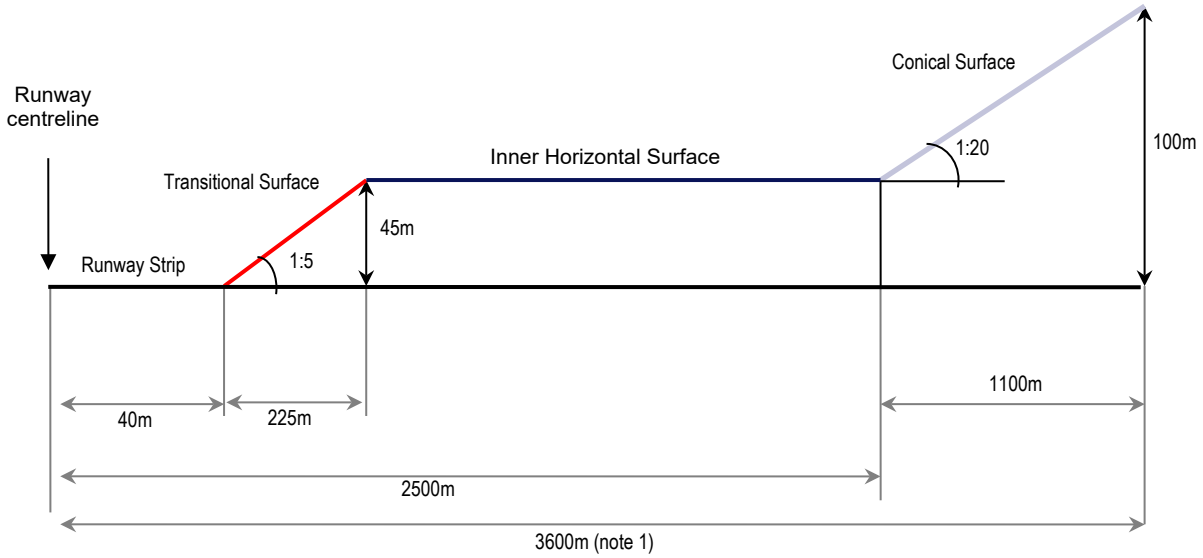
1 & 2. Where clearway is provided, the length of the inner edge should be 150 m.

3. The take-off climb surface starts at the end of the clearway if the clearway length exceeds the specified distance.
4. When the intended track includes changes of heading greater than 15°, the final width of the take-off climb surface for runways where the code number is 3 or 4 is increased to 1800 m.

Code 1 Non-Instrument:

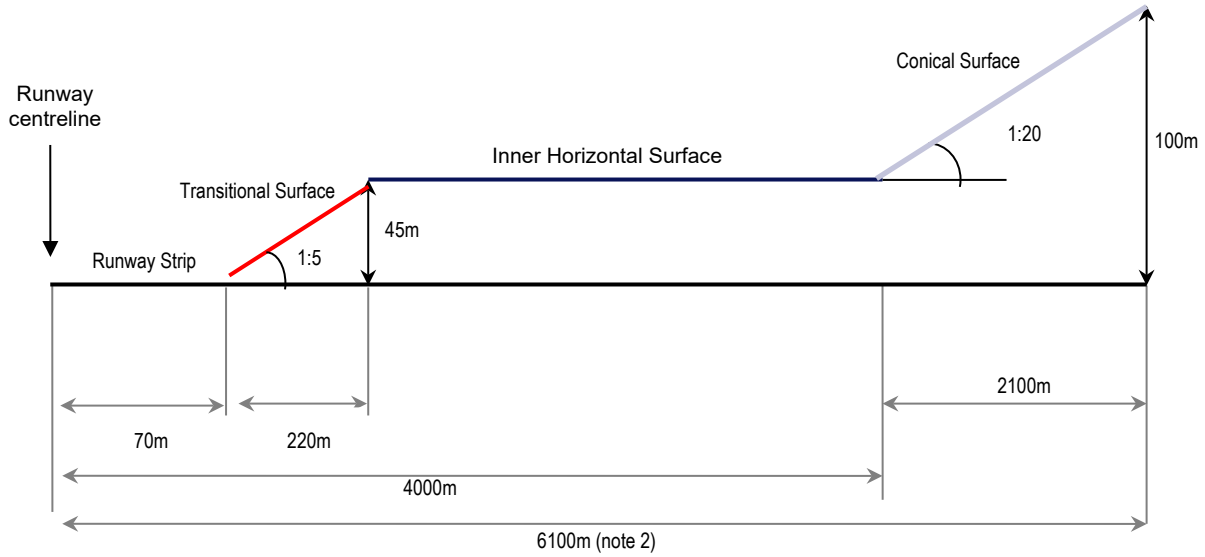


Code 2 Non-Instrument <1100m:



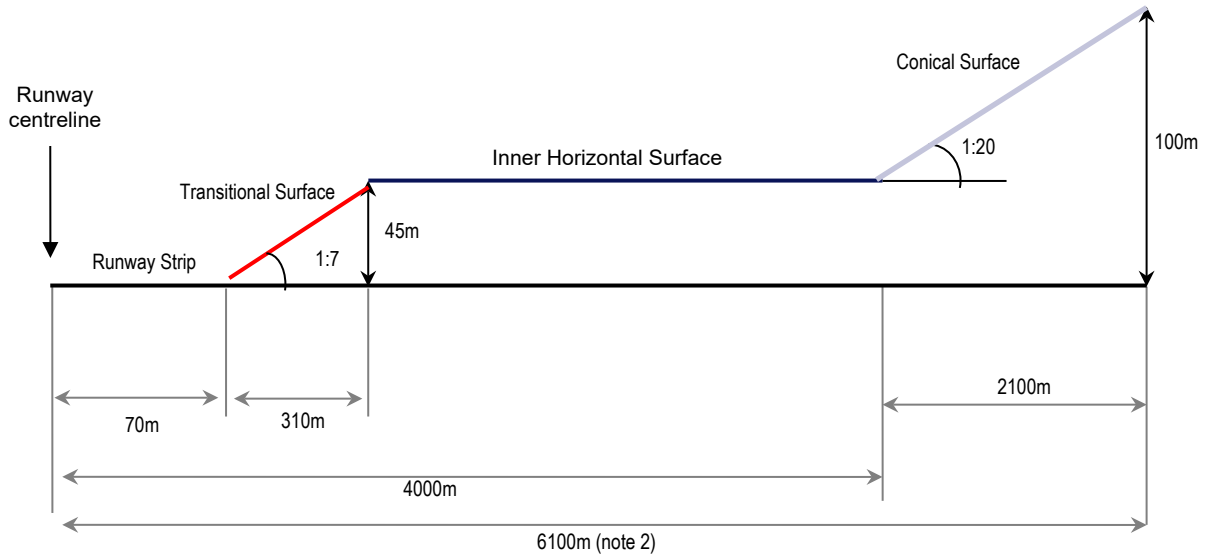
Note 1: Where the main runway length is greater than 1100, an OHS may be provided that extends to 10,000m from the aerodrome reference point (ARP).

Code 1 & 2 Non-Precision Instrument Runway

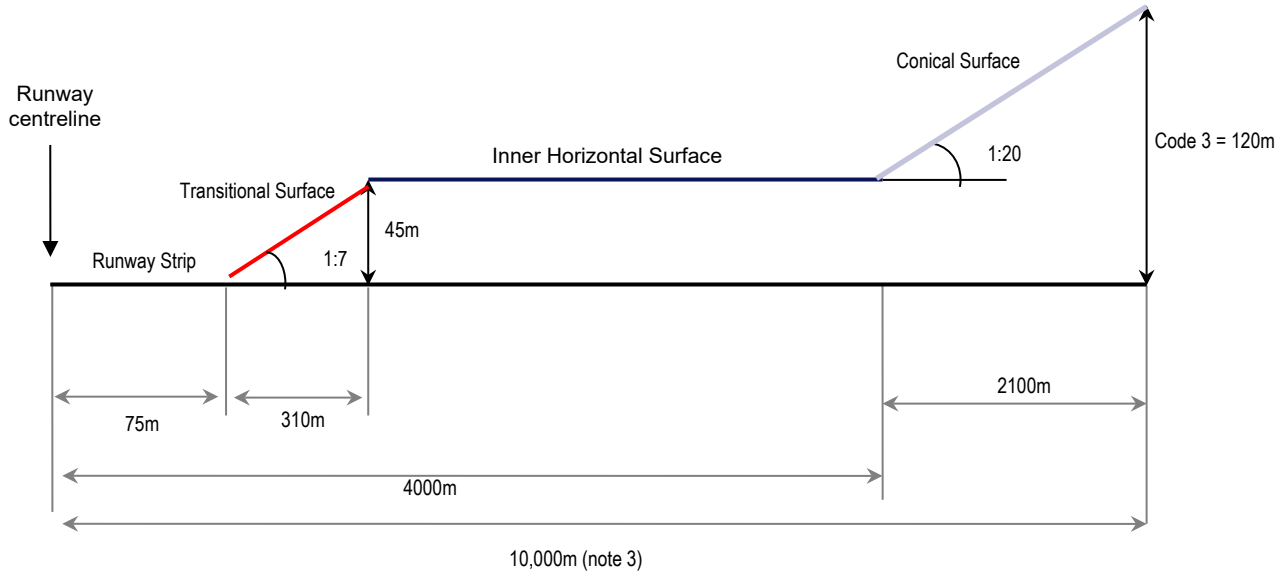


Note 2: Where the main runway is Code 2 and the length is greater than 1100m, an OHS may be provided that extends to 10,000m

Code 1 & 2 Precision Instrument Runway

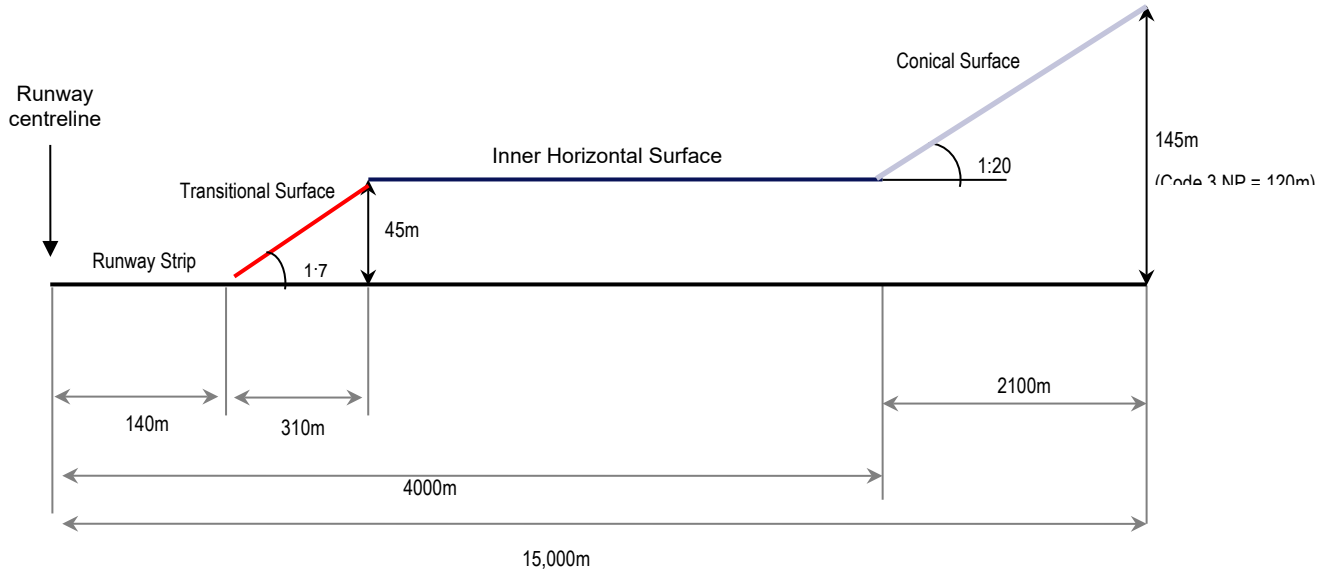


Code 3 and 4 Non-Instrument Runway



Note 3: Where the code number is 4 and the main runway length is greater than 1200m, the OHS can extend to 15,000m from the ARP.

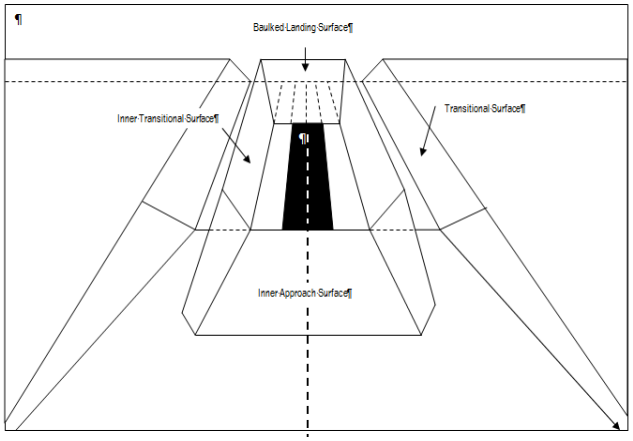
Code 3 and 4 (Non-Precision) and Precision Instrument Runway



Obstacle Free Zone (OFZ) Explained

Obstacle Free zone

An OFZ is intended to protect aeroplanes from fixed and mobile obstacles during Category II and III operations when approaches are continued below decision height, and during any subsequent missed approach or balked landing with all engines operating normally. It is not intended to supplant the requirement of other surfaces or areas where these are more demanding.



5.28 An OFZ is established for each precision instrument approach category II or III runway and is be maintained during operations conforming to those categories.

Note: An OFZ should be established for precision instrument approach Category I runways and should be maintained during operations conforming to this category.

5.29 The limits of the OFZ where the code number is 3 or 4 are described in EASA Decision 2017/021/R Certification Specifications, Chapters H & J or CAP 168 Chapter 4.

5.30 It is designed to protect an aeroplane with a wingspan of up to 60m which has descended below a height of 100 ft and has been correctly aligned with the runway at that height by visual reference to the runway or approach lighting. The length of runway enclosed is based on an assumption that a go-around is initiated not later than the end of the touchdown zone and that a further 900m distance is sufficient for the pilot to make any necessary changes of the aircraft configuration and to achieve a positive rate of climb of at least 3.33% with a deviation from track contained within a 10% splay either side of centreline. When an aeroplane's wingspan is greater than 60 m or its performance is worse than the basis used in defining the surfaces, the OFZ will need to be redesigned or operations for the particular aeroplane restricted. Conversely a narrower OFZ may be acceptable if the wingspan of the aeroplanes at a particular aerodrome is limited to less than 60m.

5.31 The limits of the OFZ where the code number is 1 or 2 are as described in Paragraph 1.2 above.

5.32 The rationale is similar to that detailed in Paragraph 1.3 except that the maximum wingspan is reduced to 30m, the rate of climb on missed approach increased to 4%, and the origin of the balked landing surface is at the upwind end of the runway strip.

5.33 The OFZ is made up of the following obstacle limitation surfaces:

1. inner approach surface;
2. inner transitional surfaces; and
3. balked landing surface.

5.34 *The inner approach surface* - is a rectangular portion of the approach surface immediately preceding the threshold. The limits of the inner approach surface should comprise an inner edge coincident with the location of the inner edge of the approach surface but of its own specified length. Two sides originating at the ends of the inner edge and extending parallel to the vertical plane containing the centre line of the runway and an outer edge parallel to the inner edge.

5.35 *The inner transitional surface* – is a surface similar to the transitional surface but closer to the runway. The limits of an inner transitional surface should comprise of a lower edge beginning at the end of the inner approach surface and extending down the side of the inner approach surface to the inner edge of that surface, from there along the strip parallel to the runway centre line to the inner edge of the balked landing surface, and from there up the side of the balked landing surface to the point where the side intersects the inner horizontal surface and an upper edge located in the plane of the inner horizontal surface. The elevation of a point on the lower edge should be along the side of the inner approach surface and balked landing surface, equal to the elevation of the particular surface at that point and along the strip, equal to the elevation of the nearest point on the centre line of the runway or its extension. The slope of the inner transitional surface should be measured in a vertical plane at right angles to the centre line of the runway.

5.36 *The baulked landing surface* – is an inclined plane located at a specified distance after the threshold, extending between the inner transitional surfaces. The limits of the balked landing surface should comprise of an inner edge horizontal and perpendicular to the centre line of the runway and located at a specified distance after the threshold. Two sides originating at the ends of the inner edge and diverging uniformly at a specified rate from the vertical plane containing the centre line of the runway and an outer edge parallel to the inner edge and located in the plane of the inner horizontal surface. The elevation of the inner edge should be equal to the elevation of the runway centre line at the location of the inner edge. The slope of the balked landing surface should be measured in the vertical plane containing the centre line of the runway.

Aerodrome survey and obstacle collection areas (eTOD) Explained

5.37 By Dec 2023 all aerodromes in the scope of CAP 1732[14] should have Area 2 and in some cases Area 3 obstacles published in their AD 2.10 section of the AIP. The aerodrome operator is required to provide and maintain those datasets. When they do, they can also asses and protect their OLS (as OLS is never more demanding than eTOD+).

5.38 It is important that all those responsible for the provision of terrain and obstacle data are aware of the applications in which this data may be utilised, as these determine the data quality requirements.

5.39 The purpose of the aerodrome survey is to provide eTOD necessary to:

1. control and monitor the aerodrome obstacle environment;
2. be promulgated in the AIP, on aeronautical charts and other AIS products;
3. be used in air navigation applications such as:
    i. ground proximity warning systems with forward looking terrain avoidance functions and minimum safe altitude warning systems;
    ii. determination of contingency procedures for use in the event of an emergency during a missed approach or take-off;
    iii. aircraft operating limitations analysis;
    iv. instrument flight procedure design (including circling procedure);
    v. determination of en-route “drift-down” procedures and en-route emergency landing locations;
    vi. advanced surface movement guidance and control systems;
    vii. aeronautical chart production and on-board databases;
    viii. geofencing;

    and other purposes.

For more information, see CAP 1732 Aerodrome Survey Guidance.

[14] The guidance contained in CAP 1732 applies to aerodromes that are certificated/licensed by the CAA and have instrument approach procedures (IFP).

Chapter 6

Safeguarding Assessment

Calculating the Obstacle Limitation Surface (OLS) - v - Obstacle

6.1 This section explains the technical calculations to be conducted when safeguarding assessments take place. It is not possible to provide examples of all scenarios – or indeed infringements of all the different obstacle limitation surfaces – but it does provide an indication of how the calculation is made.

6.2 Throughout this Chapter the scenarios are based on a large Code 4 Precision Instrument runway, as this involves the most restrictive OLS. It may well be your aerodrome is less than this (reference to the Aerodrome (Runway) Reference Code within this publication will help you identify your coding).

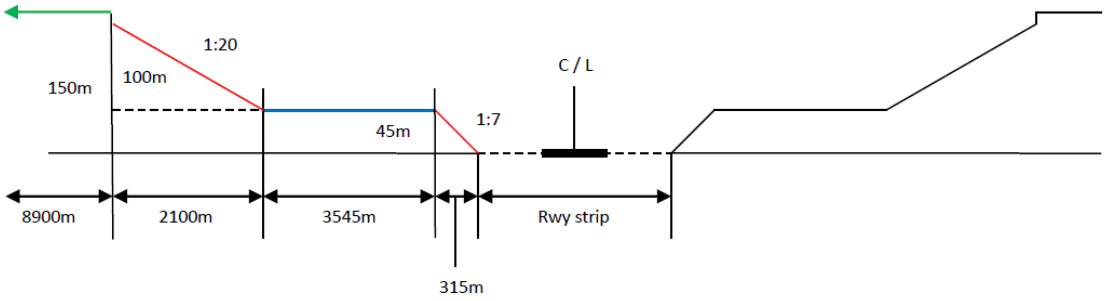
6.3 It is important to remember that, along with the OLS, there will be other safeguarding implications to consider, for example: Instrument Flight Procedure (IFP) designs. IFPs are established at many certificated and licensed aerodromes. The design and approval of an IFP is based on a known obstacle environment; achieved through the completion of an aerodrome survey. Any change to the obstacle environment within the vicinity of the aerodrome must also consider the potential impact of the development on the IFP. To ensure the continuing safety of aircraft operations to a runway with an IFP, aerodrome operators must also safeguard these important surfaces. An approved procedure designer will be able to confirm the likely impact of a proposed structure; it is CAA's expectation that aerodrome operators will have formal arrangements with their APDO for safeguarding assessments as part of their ongoing safety assurance and maintenance of the IFP.

6.4 On completion of the assessment, the decision should be recorded and, if necessary, appropriate action taken to publish the obstacle (either permanent or temporary) in the AIP[15].

The Transitional Surface

6.5 The first drawing (below) shows a profile picture of the OLS, "looking down the centreline of the runway". This denotes the OLS for a Code 4 Precision Instrument runway.

[15] CAP 1732 'Aerodrome Survey Guidance' provides information on promulgation of obstacles in the AIP



6.6 A few important things to remember:

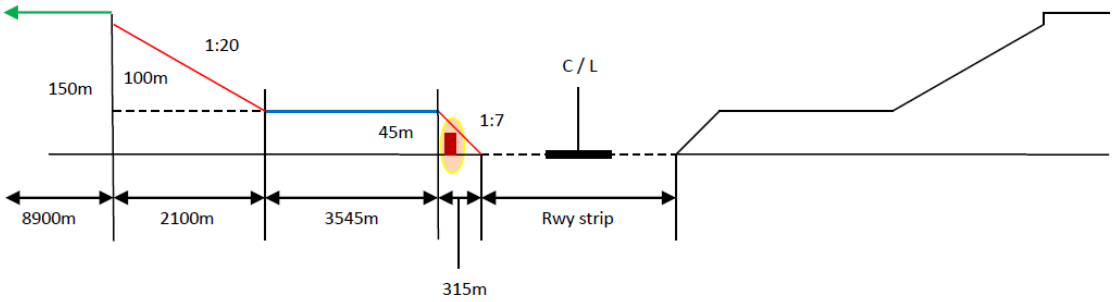
a) Runway to the extremity of the OLS can be up to 15 000m (or 15km)

b) The height of the Inner Horizontal Surface (IHS) is based on the lowest threshold. For example, if the threshold for runway 09 is 10m elevation above mean sea level, the IHS would be at a height of 55m (45m above the lowest threshold). If the ground and runway have an upward longitudinal slope towards the runway 27 threshold, there would be less space between the ground and the IHS towards runway 27. This, in turn, would mean less room for objects to be placed before they 'penetrate' the IHS.

c) The first 'sloping' surface (identified by the 1:7 red line above) is the transitional surface which, as already identified, is 'attached' to the runway side strip.

d) The elevation at the point it attaches itself to the strip is equal to the elevation of the runway centreline at any given point. Therefore, if you have an undulating runway, then the transitional surface 'origin' height will also be undulating.

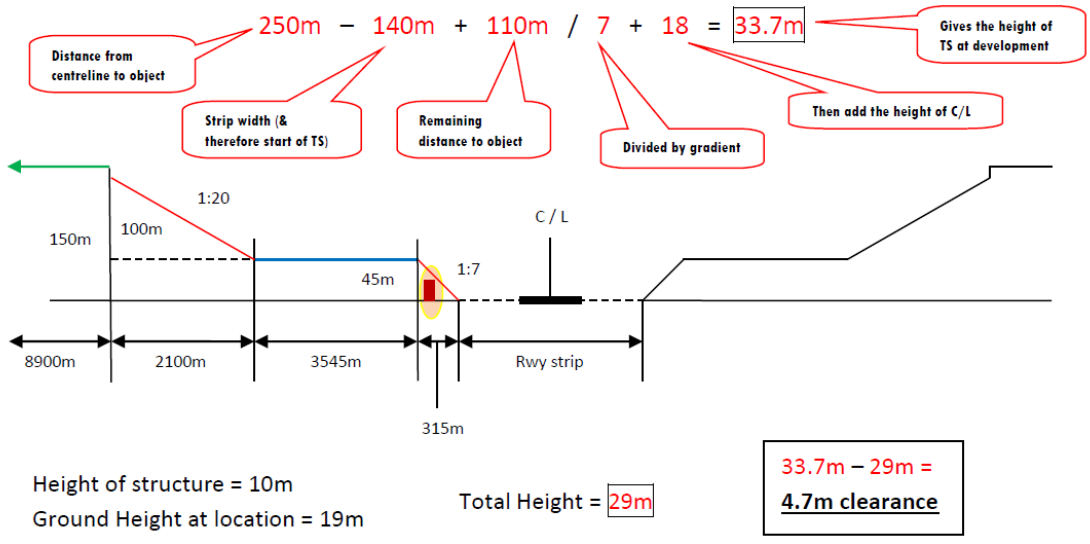
6.7 Consider a proposed development close to the runway (250m from the centreline), laterally offset, where the transitional surface is the dominant OLS; this is identified by the red block in the picture below.



6.8 A calculation of the height of the obstacle (including the ground elevation) is required and a need to identify the height of the transitional surface at the development site. In this example we are going to assume the elevation of the runway centreline perpendicular to the development site is **18**m – on this basis the start of the transitional Surface will also be 18m elevation.

Let's do the calculation:

1. **identifying the height of the Transitional Surface**: The grid coordinates and the site location plan (not shown here) confirms the structure will be positioned 250m from the centreline of the runway – off to the side – therefore quite close! As this runway is a 'Code 4 Precision' it will have a 140m runway strip, which is where the transitional surface commences. This leaves 110m between the start of the transitional surface and the development site. Divide 110m ÷ 7 then add the elevation of the centreline/start of the transitional surface, which gives a transitional surface height of 33.7m.
2. **Identifying the elevation of the structure**: The scaled drawings provided (not shown here) confirm the overall height of the structure is 10m, with a ground elevation of 19m, giving an overall AMSL height of 29m.
3. Calculated height of the transitional surface at that point is 33.7m, therefore giving a clearance of 4.7m between the height of the structure and the height of the transitional surface. There are no safeguarding objections, but consider a crane condition, lighting condition (including glint and glare) and landscaping condition in the response to the Planning Authority, as well as the likelihood of building induced turbulence due to the shape and location of the structure.
4. The centreline, perpendicular to the development site has an 18m elevation. Calculation as follows:

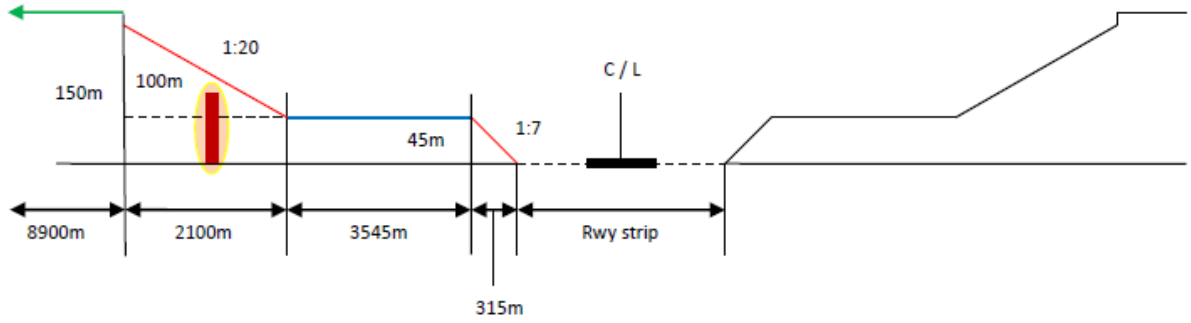


6.9 Caution - the drawings used show the ground profile to be level with the elevation of the runway. This is not always the case as the ground profile could be above or below that of the centreline (if the ground is 'above' the centreline elevation then there is less space for an object, if it is below then there is more).

The Conical Surface

6.10 Analysis of an obstacle being proposed in the location of the conical surface.

6.11 Consider a proposed development further away from the runway, at 5500m from the centreline; again, laterally offset. Referencing the same picture used in the transitional surface scenario previously, the proposed development is in the area where the conical surface is the dominant OLS:



6.12 Caution points to remember:

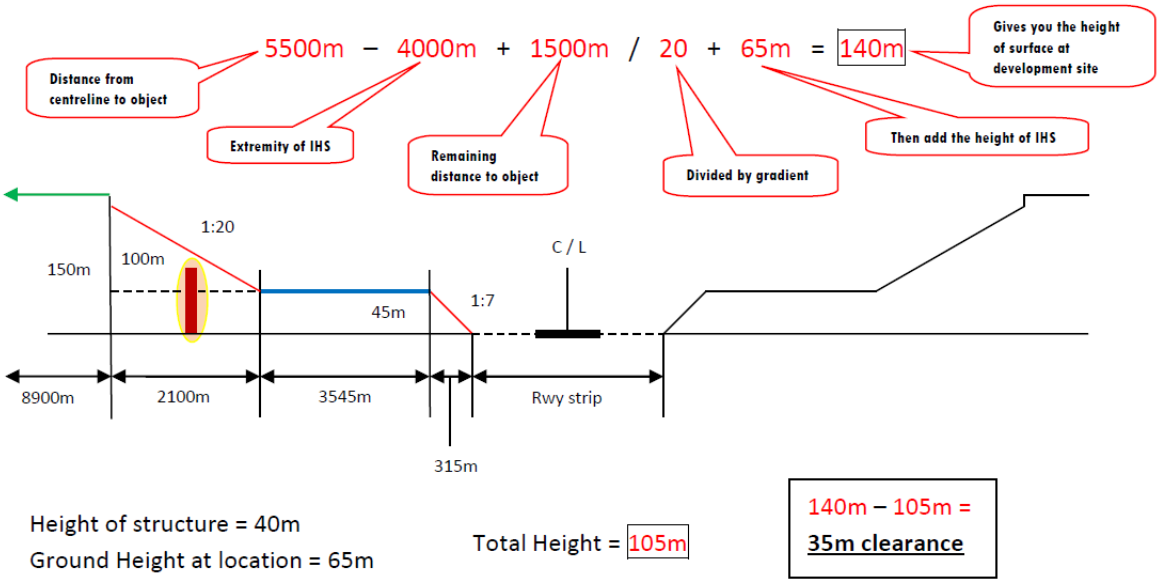
a) The IHS is always located 45m above the lowest threshold. Therefore, an assumed lowest threshold of 20m elevation gives an IHS at 65m.

b) The outer extremity of the IHS for a Code 4 Precision runway is 3990m. Therefore, the height of the IHS at 3990m from the runway centreline is 65m leaving a calculation of the remaining distance from the outer edge of the IHS to the site of the development.

1. Identifying the height of the Conical Surface: The grid coordinates and site location plan (not shown here) confirm the structure will be positioned 5500m from the runway, laterally offset. Although this is quite a distance from the runway, it still needs careful consideration, especially if it's on higher ground than that of the runway. As previously identified, a Code 4 Precision runway with an IHS at 65m, extending to 4000m from the runway centreline. The remaining distance to calculate is 1500m. Dividing 1500m ÷ 20 and add this to the height of the IHS, which gives me an overall height of the conical surface of 140m.

2. Now we need to identify the elevation of the structure: The scaled drawings provided (not shown here) confirm the overall height of the structure is 40m, with a ground elevation of 65m giving an overall AMSL height of 105m.

3. The height of the conical surface at that point is 140m, therefore giving a clearance of 35m between the height of the structure and the height of the conical surface. T*here are no safeguarding objections and, because there is a significant gap between the building and the conical surface, there may not be a need to include a crane condition, however requesting a landscaping condition to the Planning Authority may be appropriate.*



Chapter 7

London Tall Buildings Policy

CIVIL AVIATION AUTHORITY LONDON AIRSPACE – SAFEGUARDING POLICY

Introduction

7.1 Owing to the proximity of the approach and departure flight paths of London Heathrow Airport (LHR) and London City Airport (LCY), there is a specific need to maintain the safe and efficient use of airspace over London and to ensure that this is considered during the planning of all future aerodrome and tall building developments in London.

7.2 The purpose of this Chapter is to specify the CAA's policy with regard to future building or other construction developments that may affect either airport's safety surfaces or airspace.

Policy

7.3 Both LHR and LCY are designated as "officially safeguarded aerodromes" in accordance with ODPM Circular 1/2003: Safeguarding Aerodromes, Technical Sites and Military Explosives Storage Areas: The Town and Country Planning

7.4 (Safeguarding Aerodromes, Technical Sites and Military Explosives Storage Areas) Direction 2002[16]. The Aerodrome Certificate Holder is responsible for the administration of the safeguarding process. To ensure that both the aerodrome and its airspace remain safe for use by aircraft, the Certificate holder assesses all proposed buildings and other development plans that may have an impact on the safety of flight operations, or a detrimental effect on their future plans, and they will seek to resolve any conflicts at an early stage.

7.5 LHR is safeguarded according to international standards and recommended practices, which are specified in ICAO Annex 14 and Chapter 4 of CAP 168 Licensing of Aerodromes[17]. LCY was designed as a Short Take-off and Landing Airport (Stolport) and licensed according to unique criteria, including hybrid obstacle limitation surfaces (OLS) that cater exclusively for those predicted operations, and which take into account its proximity to the City of London, Canary Wharf and other developments in the London Boroughs, notably Newham and Greenwich. However, LCY has since developed its operations

16 www.dft.gov.uk/stellent/groups/dft_aviation/documents/page/dft_aviation_040247.hcsp

17 www.caa.co.uk/CAP168

beyond those covered by the Stolport criteria and, owing to the specific type of operations that are now conducted at LCY, the safety surfaces are as specified in the document: Safeguarding and Obstacle Limitation Surfaces – London City Airport (August 2004)[18].

7.5 In addition, aircraft on approach to or departure from both LHR and LCY enter a complex interaction of arrival and departure flight paths over the Central London area. In this area there is a high incidence of simultaneous operations to each airport that, under certain circumstances, results in opposite direction flows over the central London area. Precise and integrated airspace management procedures are necessary to maintain safety and efficiency, which require the operations of LCY traffic to be at altitudes below LHR traffic. In this phase of flight, international aviation criteria require 1000 ft obstacle clearance. Accordingly, a building development over 1016 ft in elevation in Central London would infringe the volume of airspace required to provide obstacle clearance for LCY traffic at its current operating altitude. Alternatively, a higher flight altitude would be required to maintain the prescribed obstacle separation and this in turn would require other aircraft inbound to LHR to be at an altitude 1000 ft higher than currently used. This would have a significant adverse impact on landing rates at LHR and other parts of the London Terminal Manoeuvring Area.

7.6 If a Local Planning Authority proposes to grant planning permission contrary to an objection by LHR or LCY, it is required to notify the CAA and both aerodromes in accordance with paragraph 25 of Annex 2 to ODPM Planning Circular 1/2003.

7.7 Additionally, within the area bounded in the east by Tower Bridge, in the west by Chelsea Bridge and extending 5 NM north of LCY runway 10 extended centreline (OS National Grid 528200/189800, 534350/189800) and 5 NM south of LHR runway 27(Left) extended centreline (OS National Grid 528200/166200, 534350/166200), the CAA will support an objection by LHR or LCY to a proposed development of a height in excess of 1016 feet (309.67m) above mean sea level (amsl) – see Figure C1.

7.8 If a Local Planning Authority propose to grant planning permission contrary to advice given on behalf of the consultee for LHR or LCY, or not to attach conditions which that consultee has requested, or to attach conditions which the consultee has advised against, it will be necessary for the safety regulator to assess the planning application and the consultee's advice and to identify any possible solutions. In such circumstances the Local Planning Authority are therefore required to notify the Civil Aviation Authority as well as the consultee. The Civil Aviation Authority has authority to request the Secretary of State to call in the planning application and determine it.

[18] Available on request from London City Airport

NOTE: A safeguarding assessment will consider the height of cranes or other equipment used during the construction of the development.

Correspondence

7.9 Correspondence on this policy should be addressed to:

Airspace, ATM & Aerodromes

Civil Aviation Authority

1NE Aviation House

Gatwick Airport South

West Sussex RH6 0YR

7.10 Correspondence on planning matters should be addressed to:

The Safeguarding Consultee

Technical Operations

London City Airport

City Aviation House

Royal Docks

London, E16 2PB

Email: safeguarding@londoncityairport.com

The Safeguarding Consultee

Heathrow Airport Ltd

Airside Operations Facility

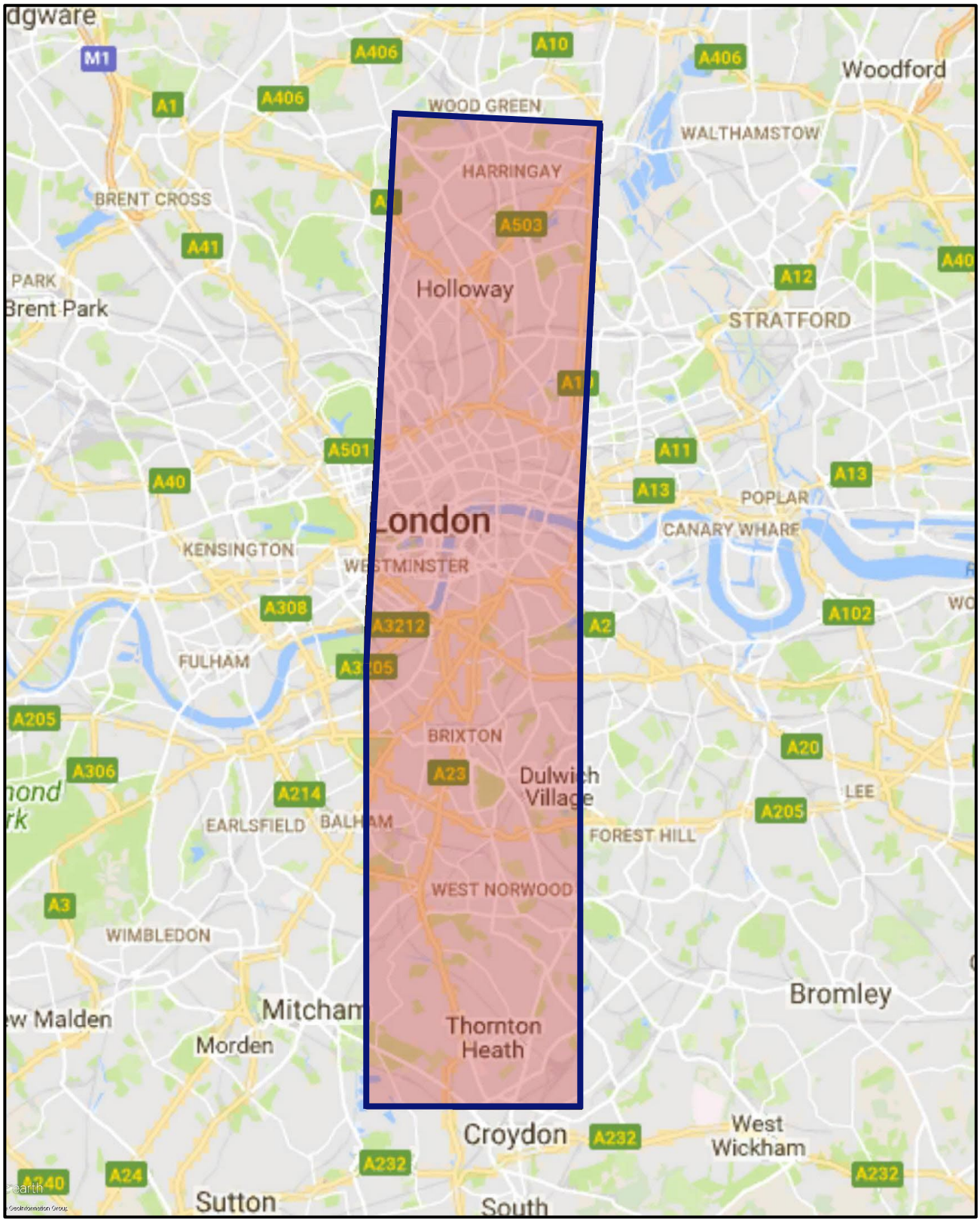
Building 16887 (snow base)

TW6 2GW

Email: Safeguarding@heathrow.com

Map

Map to depict the area within which the CAA would support an objection to a planning application over 1016 feet asml.



Chapter 8

Heliports

Introduction

8.1 In addition to providing a landing pad of appropriate size and load bearing capacity, a heliport design requires that a defined area free of obstructions such as buildings and trees be provided. Wherever possible, the helicopter will approach and depart into the prevailing wind. To facilitate this, there must be at least two approach and take-off/ climb 'corridors' rising from the edge of the heliport that will allow helicopters to safely approach to land. Many helicopters will utilize specific operating techniques that follow manufacturer approved flight paths. These may include backing-up prior to an into wind departure, from the heliport. Any new obstructions that are built, or trees that are allowed to grow unchecked within defined areas, may result in helicopter operations being severely restricted or curtailed altogether.

Safeguarding the Heliport

8.2 It is therefore important that the location of the heliport be considered in the light of the potential future developments around the heliport, whether within an existing aerodrome providing fixed wing services or a standalone site. Once the helipad is built and approved for use, it is vitally important that the obstacle environment surrounding any heliport is carefully controlled.

8.3 All helicopters in flight create a downward flow of air from the rotor system known as rotor downwash. The severity of downwash experienced is related to the mass of the helicopter, the diameter, and design of the rotor disc and the proximity of the helicopter to the surface. The characteristics of downwash from some helicopters are known to exhibit a hard jet, as opposed to a soft cushion, which although more localised in its impact, a hard jet tends to be more intense and disruptive on the surface. The intensity of the downwash may be affected by the dissipating action of any wind present or by the screening effect of local features such as buildings, trees, hedges etc. The downwash in an area beneath large and very large helicopters, and beneath even a small helicopter operating at high power settings (such as are used during the upwards and rearwards portion of take-off manoeuvre by some air ambulance types) can be intense, displacing loose hoardings and blowing grit and debris at persons, property or vehicles in the vicinity of the heliport. Loose objects can pose a risk to the helicopter itself if sucked up by re-circulating air flows into the rotor blades or engines. For small light air helicopters, performing clear area take-off manoeuvres, the effects are greatly reduced but still need to be considered

particularly as, depending on the meteorological conditions on any given day, these same helicopters may be required to use a helipad profile. Therefore, it is prudent for designers always to plan for the worst-case downwash profile for the design helicopter.

8.4 It should be appreciated that ground level sites capable of accommodating helicopters using a clear area operating technique will require more space than for helicopter that operate other approved profiles; whether helicopters operate a helipad profile/ vertical 'procedure' or a 'short field procedure'. Whatever procedure is utilised, heliports are required to accommodate at least two take-off climb and approach surfaces creating 'airways' (generally aligned to take advantage of the prevailing wind conditions) that are free of obstructions which could compromise obstacle limitation surfaces. This is particularly challenging for a ground level facility, likely situated in a densely built up area and so requiring the removal of screening such as trees and shrubs.

8.5 At the earliest design/concept stage designers should consider what type (or types) may be required to operate at a particular heliport throughout the proposed operating life of the facility. Exceptionally, consideration for the size of the heliport may be based on operations by a single type, but much more likely will need to satisfy a range of twin-engine helicopters operating a number of different roles including, but not limited to: Police, HEMS, Air Ambulance, other emergency services and Search and Rescue (SAR). In this event the task of the heliport designer becomes one of identifying the most critical type in respect to the dimensional design aspects of the heliport and to then assume this as the 'design helicopter', in the knowledge that other types should also be able to operate safely and legally to the heliport; provided the other critical design consideration for accommodating the maximum take-off mass (MToM) of the heaviest helicopter intending to operate to the heliport is also satisfied.

8.6 Whilst further information on the design[19], maintenance and operation of Heliports can be found in ICAO Annex 14 Volume II, the same rules for those located at hospitals can be found in CAP 1264[20]. The specification and principles contained in this document may be used for the design of heliports located elsewhere in the UK, except for markings, which are uniquely applied to hospital heliports.

[19] Certification Specifications and Guidance Material for the design of surface level VFR heliports located at certificated aerodromes can be found in EASA CS-HPT-DSN

[20] The purpose of the CAP is to promulgate design standards and options for new heliports and refurbishments located at hospitals in the United Kingdom. Design standards are based on the international standards and recommended practices in ICAO Annex 14 Volume II. A good heliport design will ensure it is safe for helicopter operations, while accounting also for the clinical needs of a patient.

Chapter 9

Hospital Helicopter Landing Sites (HHLS)

Introduction

9.1 Air Ambulance Helicopters form an essential part of the UK's Pre-hospital response to patients suffering life threatening injuries or illnesses. It is estimated that everyday about 70 patients are treated using helicopters operating in the air ambulance role to helicopter landing sites (HLSs) located at hospitals in the United Kingdom. HLSs are routinely provided at hospitals for the transfer of critically ill patients by air ambulance helicopters and by helicopters operating in the Helicopter Emergency Medical Services (HEMS) role, with facilities varying in complexity from a purpose-built structure on a rooftop above the emergency department (ED), with integral aeronautical lighting and firefighting systems, to dedicated landing pads in close proximity to the ED.

9.2 CAP 1264 'Standards for Helicopter Landing Areas at Hospitals' provides guidance and advice on the design and operation of such sites; the purpose of this chapter is not to replace CAP 1264, but to provide guidance to Site Keepers (in normal circumstances the hospital) on safeguarding the asset to ensure it does not become unusable by the emergency services.

Safeguarding the site

9.3 It is quite usual for hospitals to be focussed on the welfare of the patient, especially when they arrive needing critical intervention. It therefore follows that the priority at that point in time is getting the patient from the HLS to the ED. To ensure the HLS remains safe for use at all times, the Site Keeper should develop and maintain routine 'processes' to provide protection on an on-going basis, rather than just when it is known a helicopter is due to arrive.

9.4 **The safeguarding advice contained within this CAP is as relevant to HLSs as it is to other aerodrome operators.** The following pages are intended to assist Hospital Site Keepers in the task of safeguarding their facility.

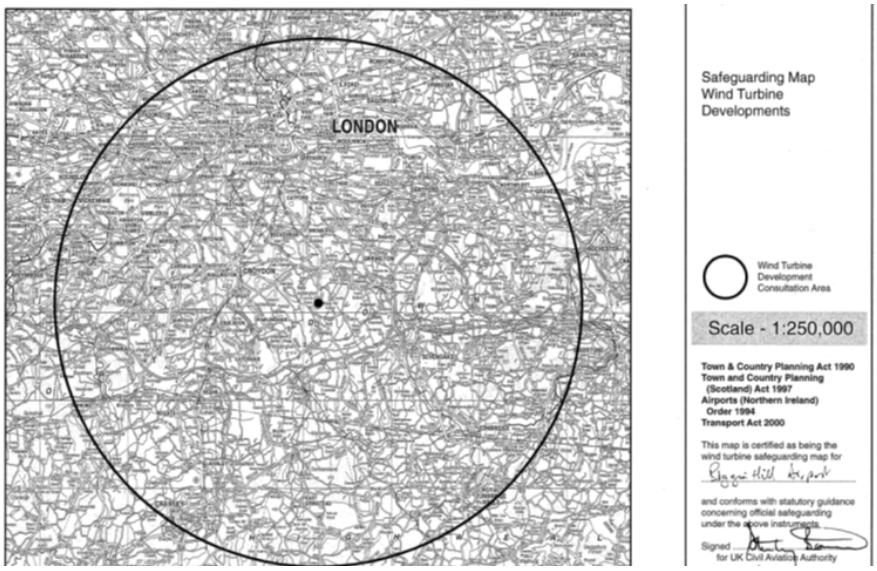
9.5 One of the most effective processes is to adopt an 'Aviation Safeguarding Procedure' intended to guide individuals and organisations in the task of safeguarding; Appendix G (HHLS Aviation Safeguarding Procedure) provides sufficient guidance to safeguard the site on an ongoing basis, both from obstacles and rotor downwash; another important consideration. It is not intended that the Site Keeper uses the example in the Appendix *verbatim*, because each site is unique and therefore not all the document will be relevant, but it does provide an indication of the aspects that need to be considered.

9.6 Appendix H (HHLS Aviation Safeguarding Checklist) is a sample checklist which can be used when consulting with Local Planning Authorities (LPA) on proposed development(s) close to the HLS.

9.7 Both these Appendices are intended to assist Site Keepers in the task of aviation safeguarding and ensuring the site remains safe for use at all times.

APPENDIX A

Wind Turbine Safeguarding Maps



1. In addition to the normal safeguarding map, officially safeguarded aerodromes also promulgate wind turbine safeguarding maps, which are based on the aerodrome reference point (ARP) and cover a 30km radius. The purpose of the wind turbine map is to provide aerodromes with an opportunity to comment on any proposed wind turbine developments within the specified radius[21].

2. Aerodrome Operators should conduct a safeguarding assessment as normal, to identify any physical infringement or impact on existing or proposed radar. Turbines are usually placed on high, open ground, which – although away from the aerodrome – often penetrate the conical surface or outer horizontal surface, where one is in place

3. It is CAA's view that the aerodrome operator is best placed to judge the safety (and commercial) impact of any proposed turbine on its operation; this may well extend to perceived impact if it is concerned that its existing aircraft operators may decide not to use the aerodrome due to the obstacle environment. The CAA itself will not routinely take licensing action where a physical infringement is identified, however if it is considered there may be a risk to aircraft, then the CAA is likely to require mitigations to be put in place

[21] NATS produce an online Wind Turbine Assessment Tool so developers can understand where interference with NATS infrastructure is likely https://www.nats.aero/services-products/services/wind-farms/n/wind-farms-self-assessment-maps/

4. It is recognised that over recent years the issue of turbines positioned close to aerodromes has sometimes involved protracted discussions between developers and aerodrome operators; on occasion the CAA has been asked to provide an independent assessment of the viability of turbines when positioned close to aerodromes. Where the CAA deems it appropriate to comment it will, however it must be recognised that any comment will be based only on the safety of aircraft operations and will not take into account any commercial impact being highlighted by either the turbine developer or aerodrome operator.

5. In general, the most effective and expeditious outcomes on such consultations are normally achieved when regular and open consultation takes place between affected parties. It is natural for both turbine developers and aerodrome operators to want to achieve the best outcome for their stakeholders, taking into account the potential environmental opportunities, aircraft safety, and commercial viability. As a result, conversations can sometimes become protracted and even reach an impasse. Aerodrome operators, developers and LPAs are encouraged to find opportunities to progress these discussions to the benefit of all affected parties.

6. Further guidance and CAA policy on the issue of wind turbines is contained in CAP 764 'Policy and Guidelines on Wind Turbines'.

APPENDIX B

Cranes and Associated Lighting

Introduction

1. As with any tall structure, dependent upon the height and location, the presence of a single crane or number of cranes has the potential to affect aviation activities. In the main, crane-related issues are considered and managed in much the same way as for any tall structure. However, the fact that cranes can be erected at quickly, a potential air navigation obstacle can therefore appear at very short notice. Accordingly, in some respect cranes are assessed separately.

2. The principle areas of concern are related to crane activity in the vicinity of an aerodrome and the potential requirement for crane activity to be notified to the aviation community. Clearly, the scale of potential impact will principally depend upon location, particularly in relationship to any nearby aerodrome and the crane heights involved. Note that if a crane is located on top of another structure, it is the overall height (structure + crane) above ground level that is relevant.

Crane Activity in the Vicinity of an Aerodrome

3. The operation of cranes in the vicinity of any aerodrome could present a serious hazard to air navigation, particularly as, during the approach and departure phases of flight, aircraft are at low altitudes. In addition to the manifestation of an air navigation obstacle, cranes could also interfere with navigation and/or communication equipment. Any flight safety implications might be mitigated by co-ordinating crane and aircraft operations through the advance notification of the crane to the CAA in the first instance.

4. To that end, CAP 1096[22] requires the crane user to notify the CAA of all planned operations of all cranes exceeding a height[23] of 10 m above ground level (AGL) or that of the surrounding structures or trees (if higher). The CAA will assess which aerodrome, if any, the crane activity will impact on and notify the appropriate aerodrome operator of the proposal. The aerodrome operator will then liaise directly with the relevant crane user once notification has been received.

[22] CAP 1096 'Guidance to Crane Users' describes the process crane users are required to undertake prior to the erection of a crane.

[23] Crane falls into this scope if at any point during the planned lifting operation the highest point of the crane structure or load will exceed 10m AGL or that of the surrounding structures or trees (if higher).

5. Aerodrome operators are responsible for safeguarding the Obstacle Limitation Surfaces (OLS) as well as other surfaces associated with the aerodrome including Instrument Flight Procedures (IFP). Lateral boundaries of these extend far beyond the OLS.

6. To ensure the safety of operations, actions imposed by the aerodrome operator may include, but are not limited to:

- survey of the crane position and height;
- fitting of obstacle lights (see Para.9);
- restrictions on crane operating times;
- restrictions depending on the runway in use;
- restrictions on crane operating height;
- restrictions during low visibility conditions;
- publication of Notice to Airmen (NOTAM).

Aviation Warning Lighting[24]

7. In the UK, the need for aviation obstruction lighting on 'tall' structures depends in the first instance upon any particular structure's location in relationship to an aerodrome. For any obstacles, including cranes, which are affecting aerodrome operations the lighting and marking requirement will be dictated by the relevant aerodrome operator in accordance with ICAO Annex 14.

8. Away from aerodromes Article 222 of the UK Air Navigation Order applies. This Article requires that for en-route obstructions lighting only becomes legally mandated for structures of a height (measured above ground level) of 150 meters (492 feet) or more. However, structures of lesser height might need aviation obstruction lighting if, by their location and nature, they are considered a significant navigational hazard. Article 222 requirements are aligned with international aviation recommendations associated with lighting en-route obstacles.

Cranes, whether in situ temporarily or long term are captured by the points highlighted above.

Note: *More information and guidance on crane lighting and marking can be found in CAP 1096.*

[24] A headline CAA Policy Statement concerning the lighting of en-route obstacles is available at: http://www.caa.co.uk/docs/33/DAP_LightingEnRouteObstaclesAndWindTurbines.pdf

Notification

9. Crane notification process including crane user responsibilities is described in CAP 1096.

APPENDIX C

Solar Photovoltaic Cells

Policy

1. In 2010 the CAA published interim guidance on Solar Photovoltaic Cells (SPCs). At that time, it was agreed that we would review our policy based on research carried out by the Federal Aviation Authorities (FAA) in the United States, in addition to reviewing guidance issued by other National Aviation Authorities. New information and field experience, particularly with respect to compatibility and glare, has resulted in the FAA reviewing its original document 'Technical Guidance for Evaluating Selected Solar Technologies on Airports', which is likely to be subject to change, see link;

   https://www.federalregister.gov/documents/2013/10/23/2013-24729/interim-policy-faa-review-of-solar-energy-system-projects-on-federally-obligated-airports

2. In the United Kingdom there has been a further increase in SPV cells, including some located close to aerodrome boundaries; to date the CAA has not received any detrimental comments or issues of glare at these established sites. Whilst this early indication is encouraging, those responsible for safeguarding should remain vigilant to the possibility.

Other Considerations

3. It is also wise to consider other implications of accepting SPVs within very close proximity to an aerodrome, especially in the (albeit unlikely) event of an aircraft accident at the site of the panels. If an aerodrome operator is proposing to accept a solar panel in close proximity, a risk assessment should be conducted to help understand what actions should be taken given this scenario, and by whom.

APPENDIX D

Completing a Safeguarding Assessment (Structures)

1. Identify the location of the proposed development on a suitable map.
2. Measure the distance of the site from the runway. If the site layout does not clearly indicate the exact location of the structure, use the part of the site nearest to the aerodrome to:
   - determine the most critical, normally the highest, point of the proposed structure (but remember if it sits below a sloping surface, the part closest to the runway may be the most critical regardless of height)
   - establish the ground height and add the height of the structure to achieve an above mean sea level (AMSL)
   - calculate the height of the applicable OLS/IFP and compare with AMSL measurement.
3. Generate a 'safeguarding assessment form', recording all relevant information including technical safeguarding comments.
4. Consider the potential impact of the proposal on all aspects of safeguarding as described in previous chapters, its acceptability and, if resulting in an infringement to the OLS/IFP or other safeguarding considerations[25], possible objection or, if appropriate, mitigations.
5. Respond to the LPA or developer, as appropriate, clearly stating your response with supporting reasons for any objection. If you have lodged an objection it is prudent to follow up with the LPA to ensure your objection was considered during the planning assessment.
6. Keep a record of all calculations and correspondence, and of the reasoning behind the decision made.
7. Retention of Records. Under the aerodrome's Safety Management System (SMS), accurate records should be kept of all consultations, even those upon which no objections were raised. There may be occasions when you will need to demonstrate your safeguarding assessment for a proposal and the response offered. There is no defined timeline for retention of records, although for those assessments where you have objected/requested conditions on the application, it is recommended that you retain these for a period of circa 3 years.

[25] Other consideration are described in Chapter 3 Para. 3.2

APPENDIX E

Safeguarding Assessment Slip

SAFEGUARDING CASE SLIP

FILE NO.	CASE NO.

Type of App: Full ☐ Outline ☐ Pre-planning ☐ Other ☐	Date Received…… Date Replied…… Plotting Map entry (Optional)……

APPLICANT NAME / LPA:

BRIEF DESCRIPTION AND LOCATION OF DEVELOPMENT:

……

……

Ordnance Survey Co-ordinates: (Eastings/Northings) ……

Safeguarding Map Colour Zone: ……

Height of Structure: (above ground level) ……

Height of ground level at development location: ……

Overall maximum height of proposed structure: ……

Technical Site Safeguarding Acceptable: ……

SAFEGUARDING SPECIALIST COMMENT:

……

OBJECTION		NO OBJECTION BUT WITH CONDITIONS		NO OBJECTION	
S/G ☐	PSZ ☐	S/G ☐	PSZ ☐	S/G ☐	PSZ ☐

AID-MEMOIRE FOR SURFACES THAT HAVE GRADIENTS

A/D Code No.	Strip				TS			Conical (1:20)	
	Width		Length					Max Height above IHS	
	Non Inst	Inst	Non Inst	Inst	Non Inst	Non PI	Inst	Non Inst	Inst
1 = Less than 800m -	30m	70m	30m	60m	1:5	1:5	1:7	35m	105m
2 = 800 – 1199m	40m	70m	60m	60m	1:5	1:5	1:7	55m	105m
3 = 1200m – 1799m	75m	140m	60m	60m	1:7	1:7	1:7	105m	105m
4 = more than 1800m	75m	140m	60m	60m	1:7	1:7	1:7	105m	105m

APPENDIX F

Shielding

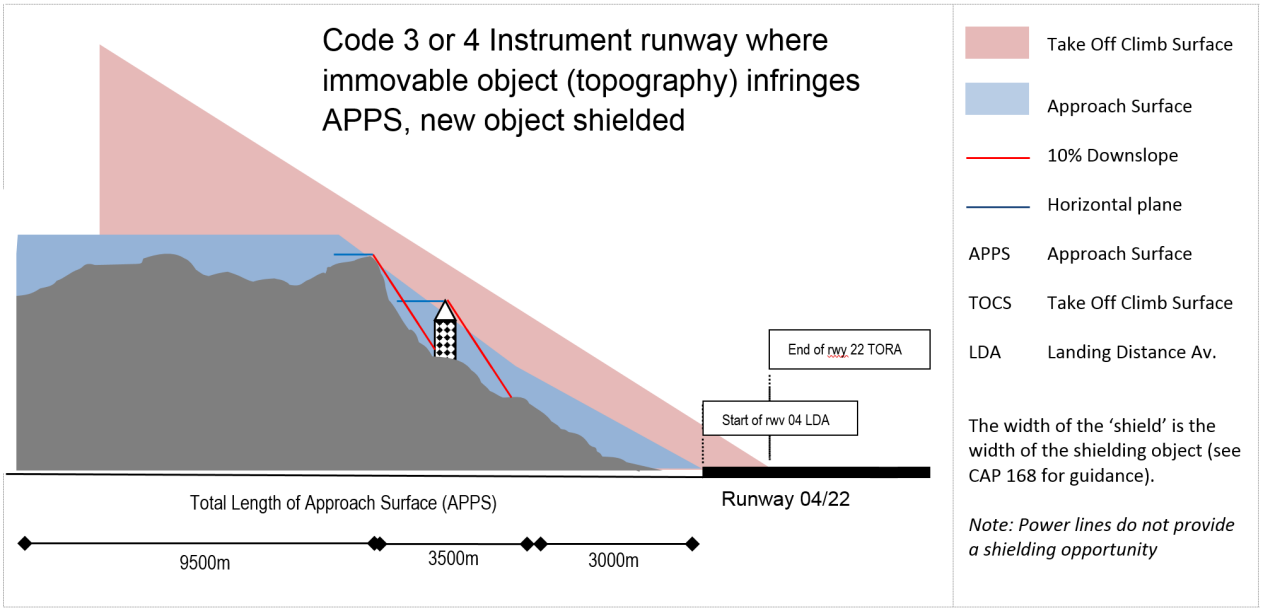
1. The principles of shielding are described in CAP 168 'Licensing of Aerodromes', ICAO Annex 14 and Aerodrome Design Manual 9137, Part 6, 'Control of Obstacles'. Please note EASA is silent on the principles of shielding.

2. The technical specifications contained in Annex 14 state:

   "New objects or extensions of existing objects shall not be permitted above an approach or transitional surface except when, in the opinion of the appropriate authority, the new object or extension would be shielded by an existing immovable object".

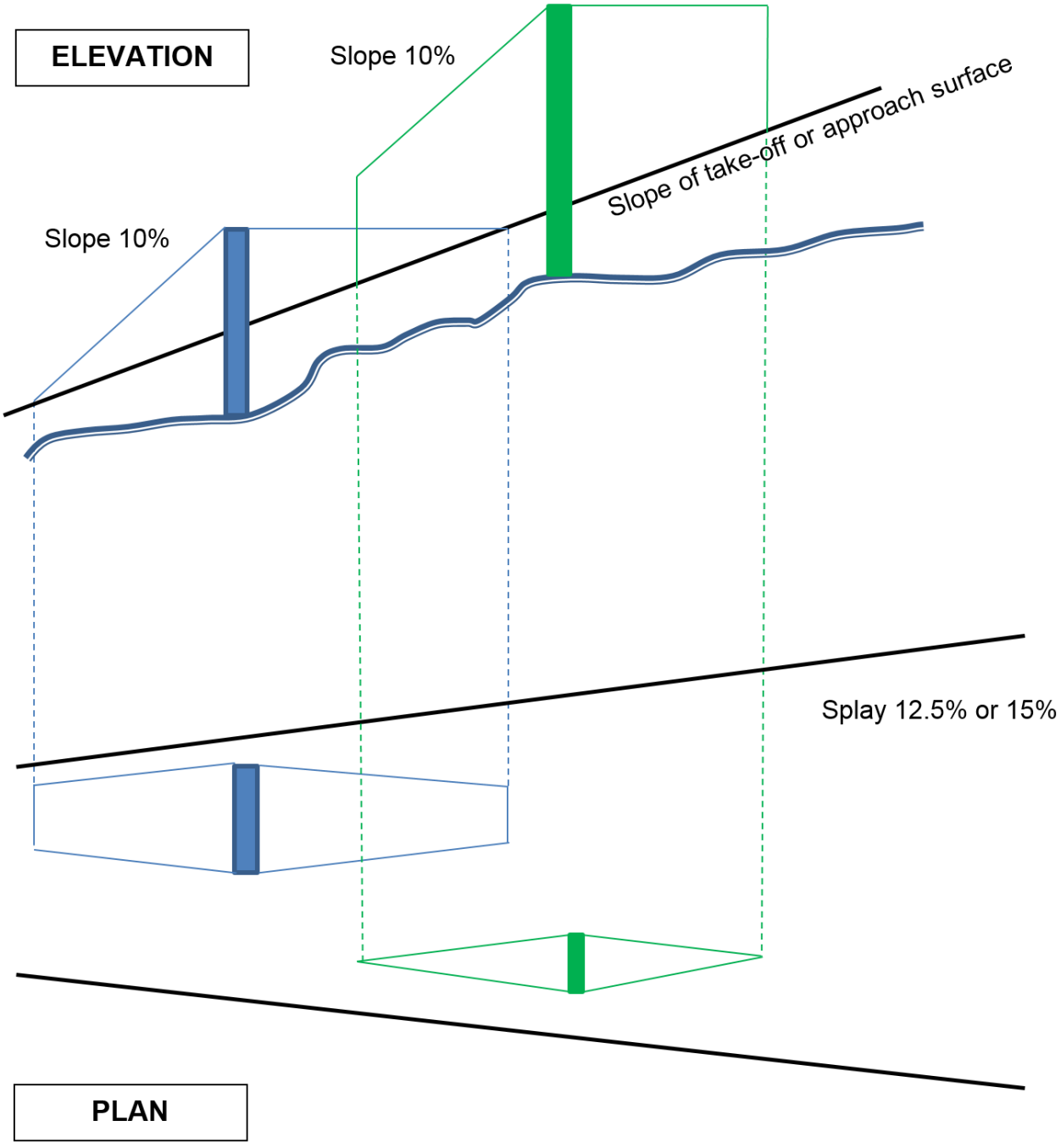
3. The CAA provides its opinion of shielding in CAP 168, Chapter 4, and expands on this guidance below.

4. The most important aspect when considering whether to accept an obstacle using the shielding criteria, is to identify whether there is a safety implication associated with the proposed shielded structure. Shielding is normally applied when a substantial obstacle, that cannot be removed (normally natural terrain) provides an opportunity for additional objects to be permitted to penetrate an approach or transitional surface, so long as it sits within the 'shadow' of the dominant obstacle. Shielding is quite a complex subject and each proposed shielded object should be considered on an individual basis.



Instrument Runway, Code 3 or 4 where high ground (immovable object) penetrates APPS
(*but not TOCS - note that TOCS for Rwy 22 does not coincide with APPS for Rwy 04*)

5. The above diagram shows the protective planes that confirm whether an object is shielding or not. The first of these planes is one that has a negative slope (towards the runway) of 10%, and the second one shows the horizontal plane (in the direction away from the runway). The width of these planes will be the width of the obstacle (measured in the plane normal to the extended centreline of the runway at the obstacle), decreasing with sides parallel to the sides of the relevant protecting surface (see figure below), until the point where these projected lines converge, or intersect the take-off climb surface or the approach surface.



6. Although both ICAO and EASA stipulate that new objects shall not penetrate an approach surface unless they are shielded, the CAA would not normally consider regulatory action for such infringements so long as an aeronautical study has been conducted that confirms the new object does not affect the regularity or safety of aircraft operations. This is not to say that the CAA endorses such infringements, but it recognises that some aerodromes are willing to accept infringements by new objects in certain circumstances. Such circumstances might, for example, be an agreement to re-design the existing instrument flight procedures or knowledge that no aircraft route over the area of the obstacle.

7. The shielding principles equally apply for objects that penetrate the transitional surface. In the case of the transitional surface, there is only one assessment surface

8. Nevertheless, the aerodrome operator is responsible for aviation safeguarding, and is completely within its rights to object to any obstacle that might threaten their existing land right uses; it is also possible that safeguarding objections might extend to commercial considerations as well as future aerodrome development (i.e. protection of new runway).

APPENDIX G

Sample 'Aviation Safeguarding' Procedure

AVIATION SAFEGUARDING
HOSPITAL HELICOPTER LANDING SITES

GUIDANCE

1. Introduction

1.1 Air Ambulance Helicopters including Search and Rescue form an essential part of the United Kingdom's pre-hospital response to patients suffering life threatening injuries or illnesses. Helicopter Landing Sites (HLS) are provided at hospitals for the transfer of critically ill patients by air ambulance. It therefore follows that once a Hospital Helicopter Landing Site (HHLS) has been established, it remains essential that the facility is 'safeguarded' against the growth of obstacles that could compromise and restrict the facility, or, in the worst case, that prohibits its use, due to the number of obstructions around the facility.

1.2 CAP 1264 encourages a hospital Trust / Board to include the heliport operation as part of the Development Control Plan (DCP) which functions to restrict the growth of obstacles around the heliport. However, a DCP is often only partially effective tool as, without formal safeguarding arrangements in place, it is unable to control the growth of obstacles beyond the boundary of the hospital. Therefore, it is preferable to put in place a formal safeguarding arrangement as described in this document.

2. Purpose

2.1 The purpose of this procedure is to describe the process that Xxxxxxx Hospital will follow to protect the HHLS against the growth of such obstacles.

3. Scope

3.1 This procedure is in place to protect the HHLS for the following operators:

3.1.1 [Name and address of primary Air Ambulance (AA) Operator No 1]

3.1.2 [Name and address of Search and Rescue (SAR) Operator No 2]

3.1.3 [Name and address of Operator No 3] if appropriate

4. Responsibilities

4.1 The Site Keeper (the owner of the HHLS) is responsible for ensuring that the landing site remains fit for purpose and safe for use by operators of air ambulance/search and rescue.

4.2 The Site Keeper is responsible for conducting a safeguarding assessment whenever it is notified of a proposed development that may have an impact on the HHLS.

4.3 The Site Keeper is responsible for notifying the operators whenever an unannounced object is constructed within 1 kilometre of the HHLS.

4.4 All crane users are required to follow the procedure in CAP 1096. However, the Site Keeper is responsible for notifying the CAA if it becomes aware that a crane, with a potential to be an obstacle to helicopter operations, has been erected without their prior knowledge, using the email address AROps@caa.co.uk , providing an opportunity for a 'Notice to Airmen' (NOTAM) to be raised by the CAA

4.5 The Helicopters Operators, notified at 3.1, are responsible for responding to a safeguarding consultation received from the Site Keeper and, where appropriate, provide technical input into the Site Keepers safety assessment.

4.6 Where formal safeguarding arrangements are in place, the Local Planning Authority (LPA) is responsible for consulting Xxxxxxxx Hospital whenever a development is being proposed within 1 kilometre of the hospital.

5. Initial Actions for setting up a Safeguarding Arrangement

a) Write/Visit the local planning authority (LPA) to discuss and agree a safeguarding arrangement with them.

b) If appropriate, lodge a 'safeguarding map' with the LPA to denote the areas of consultation. The 'safeguarding map' should contain at least the boundary of the agreed safeguarding area with an indication of development heights acceptable within the area.

c) Once agreed, request confirmation from the LPA that formal arrangements that have been put in place.

d) Include details of the safeguarding arrangement in the hospital 'Development Control Plan'.

6. Conducting a Safeguarding Assessment

a) Record all details received from LPA/developer on Form 1 (attached)

b) Where possible, conduct a safeguarding assessment (in relation to the protected surfaces[26])

c) Forward 'Form 1' to primary operators (including SAR) using the HHLS, requesting urgent comment/objections

d) Respond to the application within a 21-day period (14 days for Scotland)

e) Where an objection has been identified, notify the LPA/Developer as early as possible

f) Where appropriate, request the LPA to confirm whether your objection has been upheld[27]

7. Other Safeguarding Considerations

7.1 Whilst the focus of this procedure relates primarily to the protection of the heliport obstacle limitation/ identification surfaces due to growth of obstacles around the HHLS, integral to safeguarding is the potential for damage caused by the downward flow of air from the rotor system in flight, known as 'rotor downwash' which, for large and very large helicopters, and even for small helicopters at high power settings, can be intense, displacing loose hoardings and blowing grit and debris at persons, property and vehicles in the vicinity. As part of safe management practices, Xxxxxxxx Hospital commits to ensure that, as far as reasonably practicable, a minimum downwash safety zone, agreed between the helicopter operator and the Site Keeper, around the HHLS will be established and to the extent necessary kept free of persons, property or parked vehicles beneath the approach path, back-up area, take-off/climb surfaces. The following safety checks will be completed daily:

a) Identify a person responsible for monitoring helipad 'downwash safety zone'.

b) The responsible person to ensure to the extent necessary that this zone is kept free from persons, property, parked vehicles.

c) Ensure that any the area is capable of withstanding 'rotor downwash', especially relevant for very large helicopters, without generating Foreign Object Debris (FOD). The generation of FOD could be a hazard to either the helicopter, or persons in the vicinity of the landing site.

d) If operating at night, ensuring the HHLS aeronautical lights are functioning correctly.

---

[26] Details relating to safeguarding the protective surfaces can be found in CAA Civil Aviation Publications (CAP) 738 and 1264.

[27] *The HHLS Site Keeper does not have an automatic right to have an objection upheld, but the Local Planning Authority (LPA) should consider the merits of the objection and take this into account when processing the planning application. It follows that an objection should only be lodged when the proposed development is confirmed to have a detrimental impact on the helicopter operations taking place at the HHLS. In such circumstances, the Site Keeper should work with the LPA or Developer to try and find an amicable solution.*

e) Any identified outages notified to the Site Keeper without delay.

8. References

8.1 Civil Aviation Publication (CAP) 738 'Safeguarding of Aerodromes' http://publicapps.caa.co.uk/modalapplication.aspx?catid=1&pagetype=65&appid=11&mode=list&type=search&search=738

8.2 Civil Aviation Publication (CAP) 1264 'Standards for Helicopter Landing Areas at Hospitals' http://publicapps.caa.co.uk/modalapplication.aspx?catid=1&pagetype=65&appid=11&mode=list&type=search&search=1264

9. Review Period

9.1 This procedure will be reviewed regularly, and any changes introduced will result in a complete re-issue of the Appendix. Version control will be maintained as footnotes on each page (i.e. Version 1, dated xx.xx.xxxx).

APPENDIX H

Safeguarding Checklist

Hospital Name: Heliport Type: *Surface level / Mounded / Raised / Elevated* *(Strike-through as appropriate)* **FORM 1:** SAFEGUARDING ASSESSMENT	

TYPE OF APPLICATION:

FULL	☐	DATE RECEIVED.....
OUTLINE	☐	DATE REPLIED.....
TEMPORARY CRANES*	☐	*(Reply within 21 days for England and Wales,*
PRE-PLANNING	☐	*14 days for Scotland)*
OTHER	☐	

***Notice to Airmen may be necessary (NOTAM) – email** AROps@caa.co.uk

BRIEF DESCRIPTION AND LOCATION OF DEVELOPMENT

_____

_____

Ordnance Survey Coordinates (Eastings/Northings)_____

Height of Structure Above Ground Level_____

Height of Ground Level at proposed location _____

Overall maximum height of proposed structure_____

SUMMARY OF SAFEGUARDING ASSESSMENT:

_____

_____

FORWARDED TO HELICOPTER OPERATORS FOR COMMENT: YES☐ NO ☐

Note: Consultation should include the search and Rescue Operator (Bristow)

	OBJECTION?	
NAME OF OPERATOR No 1: _____	YES☐	NO ☐
NAME OF OPERATOR No 2: _____	YES☐	NO ☐
NAME OF OPERATOR No 3: _____	YES☐	NO ☐

RESPONSE TO LOCAL PLANNING AUTHORITY/DEVELOPER

Objection	**No Objection**	**No Objection but with comment**	**Additional Comment:**
☐	☐	☐	