Wind Farm Aviation Safeguarding Ltd

Aviation Impact Assessment (Emissions) – prepared in response to Request for Further Information

For

EdgeConnex Ireland Ltd
Ballymakaily,
West of Newcastle Rd (R120),
Lucan,
Co.Dublin.

CONTENTS

Issue

In respect of the planning application for the proposed development of a data centre and administration building at Ballymakaily, West of Newcastle Rd (R120), Lucan, Dublin (Planning Register Reference SD22A/0333[1]) South Dublin County Council (SDCC) have requested further information.

By way of understanding the nature of the additional information to be requested it has been noted that, in the Chief Executive's Order PR/1281/22, issued in respect of the planning application for this development it states that:

> *16. The applicant is requested to submit:*
> *- A wildlife aviation impact assessment*
> *- Aviation impact assessment on all potential emissions*

It is assumed that this requirement for further information is as a result of the Department of Defence Representation[2] which states that:

- *Due to the proximity to Casement Aerodrome, the developer should produce a Wildlife Aviation Impact Assessment and implement adequate bird control measures during the construction phase to mitigate the effects of birds on Air Corps flight operations.*

- *Due to the proximity to Casement Aerodrome, mitigations may be required in relation to the management of wildlife attracted to attenuation ponds or other water features. Should negative effects of bird activity on Irish Air Corps operations arise, the owner must put measures in place to mitigate these effects to an acceptable level.*

- *Due to the proximity to Casement Aerodrome, Military Air Traffic Services requests an Aviation Impact Assessment on all potential emissions. The assessment should cover the possible effects of exhaust plumes or any other associated impact on flight operations at Casement Aerodrome.*

It should be noted that this request for further information does not constitute an objection to the development and in providing the requested information this report has been purely desk based and utilises information in the SDCC Planning portal, the SDCC Development Plan and elsewhere in the public domain; no correspondence or communication has been undertaken with SDCC or the Department of Defence (DoD) or the Irish Air Corps (IAC) to expand on operations and/or safeguarding protocols at Casement Aerodrome. This approach has been adopted for expediency, and, in providing the requested information, the authors would welcome the opportunity to discuss and provide any further information needed as a result of this report.

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[1] Application Date 16 Aug 2022, Order date 10/10/2022.

[2] Department of Defence – Property Management Branch, unreferenced letter dated 06 September 2022 (Re: Planning Registration No: SD22A/0333)

This assessment considers the potential for effects from plumes on aviation and the potential for effects from wildlife is addressed separately and contained in a further report.

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Executive Summary

This is a desk based report addressing the request for further information from South Dublin County Council in respect of the proposed development at Ballymakaily, West of Newcastle Rd (R120), Lucan, Dublin.

The specific perceived impacts to be addressed and, therefore, the focussed information needed in relation to aviation is considered to have three main distinct elements all in relation to operations at Casement Aerodrome namely, the Obstacle Limitation Surfaces surrounding the aerodrome, the Inner Zone and the effect of any plume.

Flight operations at an aerodrome and within the vicinity of an aerodrome, can be affected by obstacles inside and outside the aerodrome's boundary. Regulation on aviation is determined by various global, European and national bodies and the Irish Aviation Authority issues regulatory guidance on how aerodromes should manage operations in relation to obstacles and the licensing of an aerodrome depends on the extent to which these areas are free from current or new obstacles.

It should be noted that the Irish Air Corps are not subject to civil regulation but operate, independently, under regulation as determined by the Department of Defence/GoC IAC. However, in terms of safeguarding, the IAC implement civil regulation where it does not affect operations or operational capability.

Physical safeguarding is the protection of the aerodrome against vertical development which could have an effect on flying in the vicinity of the aerodrome or on the aerodrome procedures. Obstacle Limitation Surfaces (OLS) are the hypothetical boundaries which indicate the extent of a volume of airspace which must be kept free of obstacles, so far as is reasonably practicable, to facilitate the safe passage of aircraft. It is used collectively to refer to other terms which are fully defined in Chapter 4 of Annex 14 to the Chicago Convention, EASA regulation and incorporated into IAA aviation regulation and which are adopted at Casement Aerodrome by the DoD/IAC.

The OLS in question and pertaining to the development is the Inner Horizontal Surface (IHS), a horizontal plane located 45 m above the elevation of the specified datum at the aerodrome. Where the main runway is 1,800m or more in length, circles of radius 4,000m 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.

In attempting to determine the specified datum the available local information uses differing terminologies all of which can have subtly differing meanings. In determining the elevation of the IHS, and thereby the clearance between that and the proposed development, this report considered the clearances of the proposed development against the lowest runway threshold elevation of the aerodrome as stated in the SDCC Development Plan 2022 – 2028 and, for completeness, against the maximum elevation of the aerodrome.

In all possible configurations of maximum building elevation against IHS the proposal does not infringe on the OLS for the aerodrome.

In respect of the Inner Zone applied by the IAC at the aerodrome the assessment has applied the information available from DoD and in the public domain but without any information on the rational for that additional zone.

The proposed development should not infringe this local additional OLS.

In respect of communication, navigation and surveillance equipment present at Casement Aerodrome, the development will be a static structure with no external moving parts. At this range, and in common with the other similar, some bigger, buildings surrounding the aerodrome the development should have no effect on any of the equipment listed and as confirmed by the DoD.

In respect of the plumes the AWN Consulting research has concluded that any effects will have completely dissipated within 5m above the stack top (the highest of which is 90.0m above mean sea level (amsl) and well below the IHS[3]). In an aviation sense, the implications are clear; any plume will not affect any OLS nor would any aircraft be flown within 5m of the top of the generators' stacks; to do so would create an inexplicable flight safety hazard to the aircrew and people on the ground.

There should be no impact on operations at Casement Aerodrome based on the 5m plume.

To put these considerations in perspective there are developments in the immediate vicinity of the proposed development which are comparable in terms of building height and with similar flue stacks and which are similarly below the IHS and which do not appear to have affected operations at Casement Aerodrome.

[3] DISCLAIMER - WFAS have not conducted any detailed topographical surveys on any of the heights or elevation quoted within this report and have relied on data from publicly available sources or those which have been supplied by stakeholders to enable this report to be completed.

Background Information

There are various agencies referred to within documentation pertinent to the information requested by SDCC. It might be useful in the context of this paper to provide an outline of the main agencies and government bodies which have roles and responsibilities for airspace and aviation regulation on a global, European and national level.

The International Civil Aviation Organisation (ICAO) is the aviation agency of the United Nations and is charged and funded by national governments to provide best advice, on a global basis, on civil aviation policy and civil aviation standardisation. ICAO was established (on a provisional basis due to the ongoing war) in Chicago in 1944 by the then participating 54 nations, hence the term "Chicago Convention". Annexes to the Chicago Convention now account for over 12,000 internationally agreed and recognised standards and recommended practise (SARPS). Ireland is a member state of ICAO.

The European Aviation Safety Agency (EASA) is the European Union aviation body charged with standardising the aviation regulations and practises within the EU member states to ensure the highest level of common safety standards. Ireland is a member state of EASA.

The Irish Aviation Authority (IAA) is the Regulator for all civil aviation matter within Ireland and Irish airspace for both General Aviation and Commercial Aviation. From December 2017 the IAA has implemented EASA regulation, reflecting ICAO regulation, but some documentation will still refer to either body or regulation number.

The Department of Defence regulates the Irish Air Corps (IAC) and civil regulations are not binding on either but, as is increasing the case by military forces on a global basis, the IAC will apply civil regulation and guidance, as best practise, where there is no impact on operations or operational effectiveness.

There are some subtle differences between EASA and ICAO regulations and where these are encountered within this report will apply the most restrictive in terms of the proposed development.

It is recognised that the Obstacle Limitation Surfaces defined within this paper are subject to ongoing review by ICAO but, as the extent regulations, are considered and applied here.

Introduction

Flight operations at an aerodrome and within the vicinity of an aerodrome, can be affected by obstacles inside and outside the aerodrome's boundary. The IAA issues regulatory guidance on how aerodromes should manage operations in relation to obstacles[4] and the

[4] IAA Aerodrome Licensing Manual dated January 2014.

licensing of an aerodrome depends on the extent to which these areas are free from current or new obstacles.[5]

The regulatory guidance states that certain areas of airspace surrounding an aerodrome should be assessed and that volumes of airspace must be defined to assess the significance of existing or proposed obstacles within specified distances and heights above the aerodrome; these are Obstacle Limitation Surfaces (OLS). The OLS are determined according to the classification of the aerodrome and its runway length. The safeguarded areas are represented by a number of complex planes around the aerodrome within which the absence of obstacles contributes to the safety of both visual and instrument-based flight operations in the vicinity of the aerodrome.

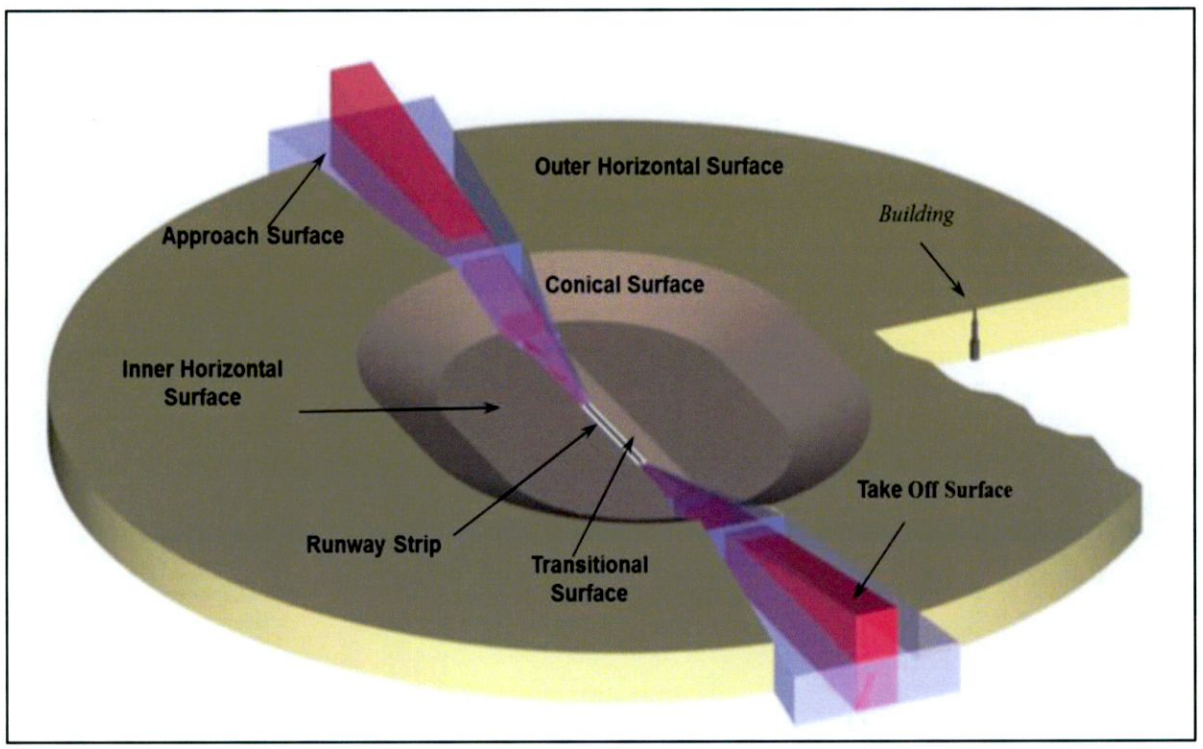

Figure 1 – obstacle limitation distances surrounding airports where the runway is greater than 1800m in length.

Physical Safeguarding – Obstacle Limitation Surfaces

Physical safeguarding which is the protection of the aerodrome against vertical development which could have an effect of flying in the vicinity of the aerodrome or on the aerodrome procedures. OLS are the hypothetical boundaries which indicate the extent of a volume of airspace which must be kept free of obstacles, so far as is reasonably practicable, to facilitate the safe passage of aircraft. It is used collectively to refer to other terms which are fully

[5] It should be noted that there is no requirement for a civil licence for Casement Aerodrome.

defined in Chapter 4 of Annex 14 to the Chicago Convention, EASA regulation and incorporated into IAA aviation regulation and which are adopted at Casement Aerodrome by DoD/IAC.

The OLS comprise of approach surface, balked landing surface, conical surface, inner approach surface, outer horizontal surface, inner horizontal surface, inner transitional surface, take-off climb surface and transitional surface. These distances are measured from the airfield reference point, the designated datum or, if one is not defined, from the mid-point of the longest runway.

It is not proposed to go into any detail regarding the definitions and complexity of each of the surfaces that surround airfields, but an Inner Horizontal Surface (IHS) is a horizontal plane located above an aerodrome and its vicinity. It represents the level above which consideration needs to be given to the control of new obstacles and the removal or marking of existing obstacles to ensure safe visual manoeuvring of aeroplanes prior to landing.

The IHS is contained in a horizontal plane located 45m above the elevation of the specified datum. Where the main runway is 1800m 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. Where there is more than one runway there will be more than one racetrack pattern and it is the boundary of this pattern, or overlapping patterns, which is the boundary of the IHS.

Sources of Reference in relation to Casement Aerodrome - South Dublin County Council (SDCC) Development Plan 2022 – 2028 *et al*

For reasons which are not in the public domain the DoD would appear to have removed all information relating to the aerodrome from publicly available documents, including the aerodrome website and the IAA IP. In meeting the request for further information, the baseline environment and criteria contained within the extant SDC Development Plan, the Chief Executive's Order, DoD previously published information and aviation documents and registries of aerodrome information, have, as far as possible, been the prime sources of data, in correlation with aviation documentation in the public domain. In determining the safeguarding criteria and parameters to be adopted in relation to the aerodrome at Casement these have then correlated with extant regulation as determined by the IAA, EASA and ICAO.

The safeguarding requirements to be applied to developments in respect of Casement are outlined within the Chief Executive's Order (PR1281/22 dated 10/10/2022). Information contained with aviation publications and previously published DoD information show a slight disparity with the figures outlined within that Order regarding the elevation of the IHS based on the lowest runway threshold (runway 10)[6]; this disparity is very slight (less than 2 feet and is not considered relevant within the context of the figures presented within this report).

Casement Aerodrome

Casement Aerodrome is a military airfield located approximately 13km southwest of the city of Dublin. The Aerodrome serves as the Headquarters and the main operating base of the Irish Air Corps.

Casement Aerodrome has two runways of orientation 04/22 and 10/28 and respective lengths of 1,828m and 1,462m; a runway length of over 1,800m (for runway 10/28) results in an assumed Aerodrome Reference Code of 4 if the civilian guidance stipulated in the IAA regulation were applied.[7] From available aviation documentation the Aerodrome Reference Point (ARP) elevation is 319ft (97.23m) amsl (or OD) and the lowest available threshold elevation is 283ft (86.26m) amsl[8].

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[6] The Depart of Defence Submission, July 2021, to SDCC Development Plan offers two figures for the threshold elevation of runway 10 which is used as the datum for the IHS. WFAS have used the stated IHS figure of 131.6m although this is higher than the alternative.

[7] Runway 04/22 is a Code 3 runway but for simplicity this assessment will treat the aerodrome as Code 4 *in toto*. The ICAO Aerodrome Reference Code is 4D.

[8] The Depart of Defence Submission, July 2021, to SDCC Development Plan offers two figures for the threshold elevation of runway 10 which is used as the datum for the IHS. WFAS have used the stated IHS figure of 131.6m although this is higher than the alternative.

The Development Site

The closest point of the development site to the ARP, north of the mid-point of runway 10/28, is approximately 2.6km and the furthest point approximately 3.0km which places the proposed development under the IHS. No other OLS needs to be considered.

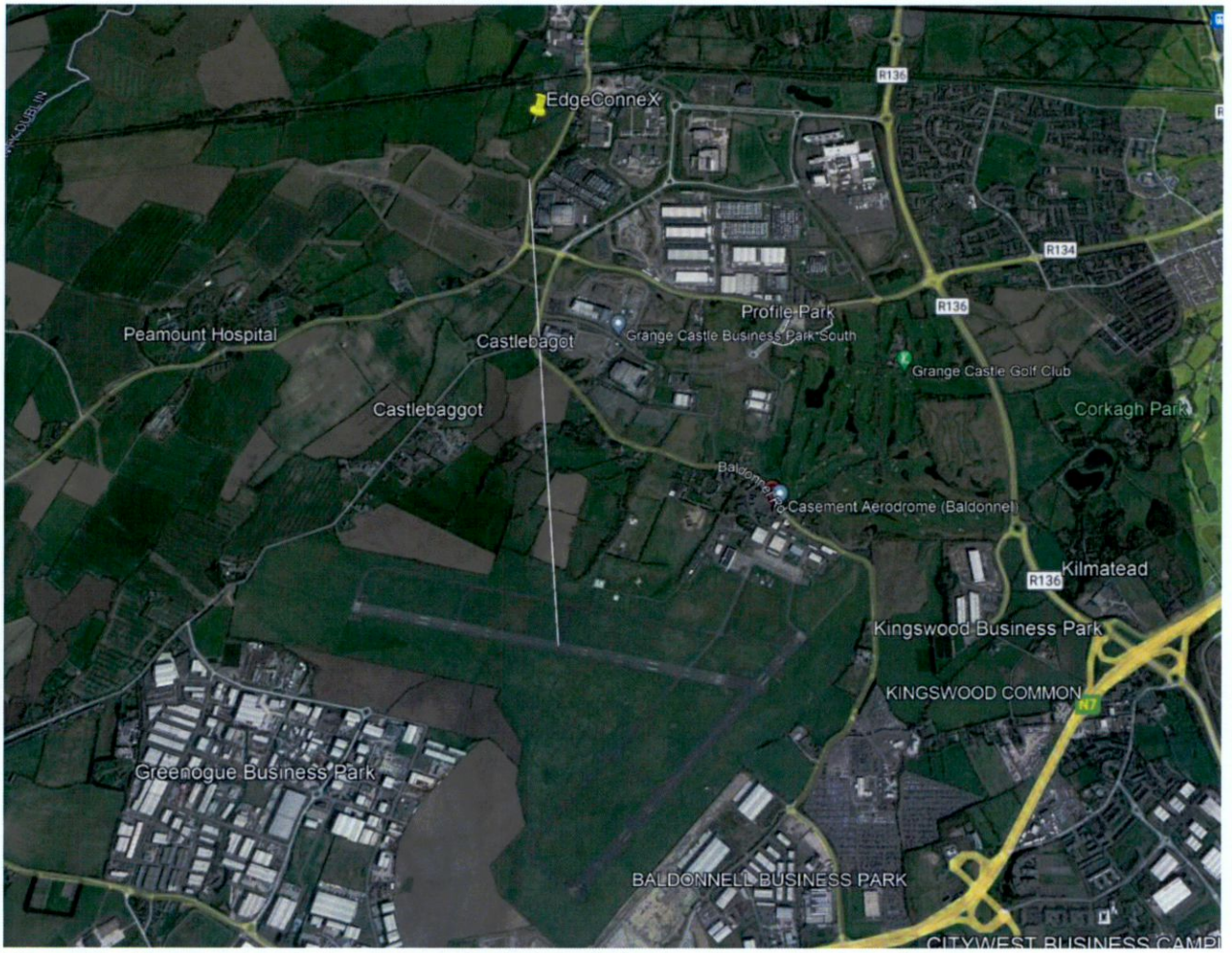

Figure 2 – The proposed development site in relation to Casement Aerodrome
Source: Google Earth

The datum elevation of construction at the site is 65m amsl.

Inner Horizontal Surface

Under IAA regulation the height of the IHS shall be 45m above the elevation datum established for that purpose. Under extant ICAO and EASA regulation it is acknowledged that alternative datums can be used but that, where no such datum is specified, the IHS is to be above the elevation of the lowest runway threshold, existing or proposed, for the

aerodrome.[9] Within the available guidance and regulation differing countries/regulators adopt differing practices around the globe within the available options of:

a. the elevation of the highest point of the lowest threshold of the related runway,
b. the elevation of the highest point of the highest threshold of the related runway,
c. the elevation of the highest point of the runway, or,
d. the aerodrome elevation.

It is apparent from the Casement Aerodrome section within the SDC Development Plan 2022 – 2028[10] that the elevation of the lowest runway threshold has been applied to determine the IHS. However, for completeness, the figures will also be calculated for the maximum airfield elevation.

The submitted drawings demonstrate that the maximum elevation of the proposed development is 90.00m which represents the terrain elevation (65m amsl) plus the height of the highest point of the proposed building (to the top of the stainless-steel generator flues, 25m).

Lowest threshold datum

The lowest published threshold elevation is that of runway 10 at 283ft amsl or 86.25m amsl. If 45m is added to this elevation, the IHS is 131.25m amsl which results in 41.25m clearance between the maximum building elevation and the relevant obstacle limitation surface. (131.25m – 90.00 = 41.25m). If the figure of 131.6 is used for the IHS the clearance, as the value stated within the SDC Development plan 2022 – 2028, the values are slightly different but afford slightly more clearance (131.6m – 90.00m = 41.6m).

Aerodrome elevation datum

The aerodrome elevation is stated in the airfield documentation to be 319ft amsl (or 97.23m amsl.) If 45m is added to this elevation, the IHS is 142.23m amsl which results in 52.23m clearance between the maximum construction elevation and the relevant obstacle limitation surface. (142.23m –90.00m = 52.23m).

Irrespective of whether the highest or lowest possible datum value is used (or which value is applied to the IHS), the proposed development is well below the relevant obstacle limitation surface.[11] Based on extant regulation designed to ensure safe operations at aerodromes there will be no effect on operations at Casement Aerodrome.

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[9] Guidance on determining the elevation datum is contained in the ICAO Airport Services Manual, Part 6 (Doc 9137).

[10] Para 13.9.5.

[11] These are the extreme values that could be used for the purposes of a specified datum. If any of the other datums permitted under ICAO and EASA regulation are used the resulting clearances between the IHS and the constructed infrastructure at either site will be between the illustrated results for each site.

The Inner Zone

Additionally, it is understood that the Department of Defence applies further restricted areas of its own, a circular 'Inner Zone' of 2km radius from the ARP, and a 'Security Zone' more closely aligned with the flight strips, which are the areas around the runways.

These are local safeguarding criteria; the Inner Zone is not referred to in the aviation sections of the SDC Development plan 2022 – 2028.

There is no such zone defined within international aviation documentation which WFAS could find within the time available. However, within the DoD provided information to the SDCC Development Plan 2022 – 2028, it states that this two kilometer zone :

> "a. *Comprises an area contained within a radius of 2km from Baldonnel Aerodrome Reference Point (ARP) established for security reasons as well as the safety of specific flight profiles in the vicinity of the aerodrome.*
>
> *b. The maximum height allowed for development within the Inner Zone is 20m above the highest point on the site or a horizontal surface of 106.6m AMSL whichever is higher.."*

The matter of the need for this zone on the basis of security is addressed below.

In terms of physical safeguarding against the IAC Inner Zone the proposed development is outside the 2km distance specified.

In respect of communication, navigation and surveillance equipment present at Casement Aerodrome, the development will be a static structure with no external moving parts. Given the safeguarding distance to be applied to such infrastructure, at this range and in common with the other similar, some bigger, buildings surrounding the aerodrome it should have no affect on any of the equipment listed as confirmed by the DoD.

The Security Zone surrounding Casement Aerodrome

Security of the aerodrome is not an aviation safeguarding matter and the methods and measures enforced to meet that security requirement is a matter solely for DoD and GoC IAC.

The Effects Of Emissions/Exhaust Plumes

The IAC have not objected to the proposed development on the basis of the effects from the proposed plumes/flues but are seeking further information on the potential effects that might arise.

AWN Consulting have prepared a technical assessment of the plumes that can be associated with the proposed development. This section should be read in conjunction with that work. In recent years there has been significant research on the potential aviation consideration in relation to flues/plumes/stacks following initial Federal Aviation Authority (FAA) involvement and trials. Within aviation the accepted modelling on the potential effects are:

> (a) MITRE - Expanded Model For Determining The Effects of Vertical Plumes On Aviation Safety and,
> (b) the Australian Civil Aviation Safety Authority Guidelines For Conducting Plume Rise Assessments (2012 *et al*) and studies and modelling techniques by Cambridge environmental Research Consultants.

The AWN Consulting research concludes that the maximum combined risk zone for all parameters of oxygen, temperature and vertical velocity is 5m above the generators' stack top (90.0m OD). In applying those findings to aviation operations at Casement Aerodrome it should be explained that there are two forms of conduct of flights and the conditions and circumstances under which they may/must be adopted.

In simple terms:

- Visual Flight Rules (VFR) flight is when the pilot operates the aircraft in weather conditions which are clear enough to allow him to see where the aircraft is going and to see other aircraft, terrain and obstacles such that he can "see and avoid" anything representing a risk of collision or hazard to the aircraft. These weather conditions are known as Visual Meteorological Conditions (VMC).

- When flight under VFR is not possible due to weather, or when the airspace classification demands it, flights can be conducted under Instrument Flight Rules (IFR). The main purpose of flight in Instrument Meteorological Conditions (IMC) is to ensure safe separation of aircraft when the pilot cannot see or when traffic conditions are complex enough to demand ATC control.

It is fair to say that, in general, aviators would prefer to have a landscape free from any man-made obstructions such as power lines, radio masts, power station cooling towers, wind turbines etc.; however, this is not a realistic ambition. Tall obstructions are part of the modern day life and, so that pilots can avoid collision with such obstructions, there are Rules of the Air which must be obeyed; these rules are a matter of law and it is a criminal offence

to contravene them. It is often the case that pilots have concerns in respect of developments close to airfields based on their understanding of what constitutes an obstruction or their perception of potential interference with flight. It is down to the developer to ensure that there can be no effect from proposed development and to illustrate that, conclusively, to aircrew but, setting aside the emotion which can often pervade such concerns, it is necessary to examine and understand what the regulations actually state.

Irish Aviation Authority Rules of the Air state that the minimum heights that can be flown are no closer than 150metres (500ft) to any person, vehicle, vessel or structure, or at a height less than 150 metres (500ft) above the ground or water.

These IAA Rules of the Air are the minimum that should be flown and that minimum height and distance for the avoidance of obstacles should be used to assess potential effects. Consequently, unless in very remote areas, pilots will fly at a minimum of 150m (500ft) above ground level (agl) since it is impossible to guarantee the Requirement that an aircraft shall not be flown less than 150m (500) feet above the highest obstacle (which could be a fence, mast, structure) by simple visual observation alone unless in remote areas that have been previously cleared.[12]

It is important to note the distance of 150m (500ft) is measured in any direction, not just the vertical and pilots are required by law to plan their flights in such a way that they do not fly closer than 500 feet to any obstacle **except** when landing or taking-off in accordance with normal aviation practice; this exemption applies to aircraft in the visual circuit (although good airmanship would dictate that any vertical obstacle is not directly overflown). In any instance where it is felt that an aircraft has breached the Rules of the Air the Irish Aviation Authority/DoD may be able to investigate the matter and, where it is appropriate, take legal/disciplinary action.

The proposed development is well clear of any of the instrument approach paths as defined with the OLS; only VFR flight should be assessed. Within the vicinity of the aerodrome the IHS is established to ensure safe visual manoeuvring of aeroplanes prior to landing.

Procedures at Casement Aerodrome, as detailed in available aviation documentation[13], state that fixed wing circuits are normally to be carried out at 1300ft QNH with helicopters operating in the vicinity of the aerodrome to do so not above 800ft QNH[14]. Helicopters joining the circuit will route to the airfield at 800ft QNH and do so at one of the visual holding points

[12] It should be noted that, within Ireland, military air bases, personnel and flight operations are regulated in accordance with regulations established by the Director of Military Aviation (GOC Air Corps), which are not required to comply with civil regulations and that IAC operations are in accordance with Air Regulations Manuals.

[13] It should be noted that the aerodrome information for Casement Aerodrome is no longer contained within the IAA AIP and are only available in the public domain within unofficial documentation or previous versions of the IAA AIP. However, it is considered unlikely that any of the relevant parameters of the aerodrome data in respect of this report will have changed since those previous iterations.

[14] 1,300ft QNH equates, approximately, to 1,000ft above aerodrome ground level, 800ft QNH equates, approximately, to 500ft above aerodrome ground level.

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delineated on the aerodrome chart. (It is presumed that this is to ensure separation on any fixed-wing operations above the helicopter whilst ensuring separation from terrain, obstacles, for noise abatement reasons and to ensure that there is sufficient space to ensure that there is no hazard presented to people or property caused by rotor downwash effects.) These are VFR procedures in airspace protected from obstacles by the established IHS.

If the figures calculated previously in determining the clearance between the physical building and the IHS are used then by adding the determined maximum combined risk zone of 5m to the maximum construction elevation the maximum elevation of any plume effect and the clearance between that and the IHS can be determined.

The clearance between the maximum extent of any plume and the IHS will be:

- 36.6m if the IHS datum of 131.6m is used,
- 47.23m if the IHS datum is the aerodrome elevation

Given that the emissions from the flues will dissipate so quickly and so far below the IHS they can have no effect on the visual manoeuvring of aircraft preparing to land, and flying safely and professionally, above that IHS as they are required so to do. The findings of AWN in their site-specific modelling have determined that the effects of any plume would have completely dissipated within 5m; the effects of any plume should not add to or complicate the extant aviation considerations. Regardless of the Regulations to which the IAC or any aircraft inbound to Casement Aerodrome fly, the existing regulations should preclude the flight being affected by the stack or the plume; in avoiding the existing hazards the aircraft should always be well clear of the plumes.

Irrespective of the separation between the IHS and the flue, for the lowest case, namely that of helicopters at 800ft QNH, the procedures at Casement Aerodrome should ensure an approximate vertical separation between the helicopter and the maximum extent of the plume of 500ft as it does for other development in the area such as the nearby Pfizer plant which is believed to be taller. (The accurate extent of vertical separation will depend on barometric pressure.) There can be no effect on aircraft operations at Casement Aerodrome for aircraft operating within the published procedures at Casement Aerodrome and/or applying the recognised avoidance criteria for building and such flues. Adherence to published obstacle clearances must be practiced by all aviators, whether in the vicinity of an aerodrome or not, as not to do so would be detrimental to flight safety and any aircraft flying at or closer than 5m separation from the proposed buildings is inconceivable.

Conclusions

In addressing the request for further information there are three distinct elements, in terms of safeguarding and the safe operation of aircraft at Casement Aerodrome, given the proposed development, namely the OLS, the Inner Zone and the effect of any plume.

In respect of OLS it is the Inner Horizontal Surface which is the relevant plane to be considered. Using the figures for the IHS presented within the SDC Development Plan 2022 - 2028, two values representing the IHS contained within that document and that of the ARP were used.

In all possible configurations of maximum building elevation against IHS the proposal does not infringe on the OLS for the aerodrome.

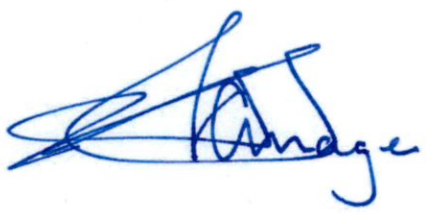
In respect of the Inner Zone applied by the IAC the proposed development should not infringe this local additional OLS.

In respect of communication, navigation and surveillance equipment present at Casement Aerodrome, the development will be a static structure with no external moving parts. At this range, and in common with the other similar, some bigger, buildings surrounding the aerodrome it should have no effect on any of the equipment listed as confirmed by the DoD.

In respect of the plumes the AWN Consulting research has concluded that any effects will have completely dissipated within 5m from the flue stack top. In an aviation sense, the implications are clear; any plume will not affect any OLS nor would any aircraft be flown within 5m of the building/stack top. To do so would create an inexplicable flight safety hazard to the aircrew and people on the ground. There should be no impact on operations at Casement Aerodrome based on the 5m plume.

To put these considerations in perspective there are developments in the immediate vicinity of the proposed development which are comparable in terms of building height and with similar flue stacks and which are similarly below the IHS and which do not appear to have affected operations at Casement Aerodrome.

Security of the aerodrome, and the methods and measures enforced to meet that security requirement, is a matter solely for DoD and GoC IAC.



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Wind Farm Aviation Safeguarding Ltd

Wind Farm Aviation Safeguarding consultants share a single mission – to provide accurate, sensible and pragmatic aviation consultancy services to the developers considering projects in the vicinity of civil aerodromes and military airfields and to the wind farm and solar industries. Output ranges from initial aviation site reports and ad hoc consultancy through to provision of expert witness evidence at planning inquiries, based on at least 35 years operational or technical experience for each of our senior staff which comprises airspace managers, pilots, experts in radio propagation, project management and GIS mapping. We have been successful in negotiating with the Regulators, Defence Departments, Air Navigation Service Providers and with civil airports, to enable objections to developments to be removed and are established experts in the safeguarding of aviation.

Our consultants have provided, and continue to provide, project management and aviation safeguarding advice (on both technical and physical safeguarding) around the globe on physical safeguarding at airports and on wind and solar projects for clients including;

Energiekontor, West Coast Energy, BAYWA, e.ON, Gaelectric (Ireland), REG Windpower, SSE, RWE, RES, Vattenfall, Fisher German, Indaver (Ireland), Infinis, ARCUS, Microsoft, Coriolis, Freewind (Bahamas), MOJO Maritime, Glosten Assoc (USA), Guinness, British Solar Renewables, Infra-Red Capital Partners, Element Power (Ireland), Infinergy, Cenin, Engena and various local authorities across the UK and Ireland. This list is not exhaustive.

Since inception, and long before the recent extenuating circumstances, Wind Farm Aviation Safeguarding Ltd and its immediate predecessors, DBS Consulting /Wind Farm Aviation Consultants, have continually striven to reduce our carbon footprint and have implemented a comprehensive environmental management programme. We have, and will continue to be, committed to our community by being environmentally conscious and will do whatever we can to ensure the continued availability of natural resources for current and future generations. We recognize our responsibility to protect human health, the environment and natural resources and to continually strive to improve the environmental quality of our work. Our operation, with bespoke software designed to enable us to achieve our aims, ensures that we can do everything within assessments on a desk-based methodology. Our internal working practices have been routinely amended and honed to reflect our commitment to our principles of leaving a better world for the future generations. With our experience and contacts within the civil and military aviation spheres in the UK, Ireland and Europe we are able to minimise our travel, our expenditure and our impact on the planet. Over the last 12 years we have continually questioned how we do things and have become very adept at producing innovative solutions with minimum environmental impact and costs to the developer. That approach has enabled us to minimise our overheads, our energy consumption and our environmental impact and has enabled us to ensure delivery of supply to the highest possible standards, with dedicated, like -minded experts in their respective fields. Our ability to conduct full, detailed appraisals and assessments is something that our

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wide client base tell us that they appreciate and, from their comments and our own internal assessment, we understand that the lack of any imperative to travel to development sites and meetings represent a direct saving to those clients of an average of £10k per development. We can, and do, deliver the same meticulous results without impacting our environment and those savings are passed directly to developers in our tenders and fees.

The Author

Shane is a former helicopter pilot who spent over 27 years in the Royal Navy specialising in Airspace Management, Air Traffic Control (ATC) and Air Defence. His extensive experience includes an appointment within MOD Main Building responsible for Defence Windfarm Policy, RN Airspace Policy, regulatory issues and Defence ATC equipment programmes. He had several operational tours and with other appointments as the Senior Air Traffic Controller (SATCO) at both Plymouth Military Radar and at the military airfield at RNAS Culdrose, at that time one of the busiest military airfields in Europe. His naval career culminated in leading both the ATC and Fighter Control specialisations as Head of Operations Support to the Fleet Air Arm when he was responsible for aviation infrastructure including airfields, radars and radio sites as well as being the naval Safeguarding Authority for naval aviation, airfields and radars in the UK, and abroad (including ships deployed globally) and the Sponsor for UK offshore Danger Areas.

In 2011 he formed Wind Farm Aviation Consultants Ltd and, latterly, has been working as lead consultant of a group of associates on projects throughout Europe and globally. He has assessed over 2000 development proposals in the UK, Ireland and globally, in terms of aerodrome and technical safeguarding. He is currently the Senior Consultant and a Director of Wind Farm Aviation Safeguarding Ltd.

He has been a member of the following working groups and policy bodies:

- UK CAA National Air Traffic Management Advisory Committee
- UK CAA/MOD National Flight Safety Committee
- CAA Flexible Use of Airspace Policy Group
- UK National Air Traffic Management Advisory Committee
- UK Airprox Board
- UK NATS Joint Future Airspace Design Team
- UK Airspace Strategy Steering Committee
- UK National UK IFF and SSR Committee
- UK MOD Wind Farm Policy Group
- UK Military Users Airspace Co-ordination Team
- UK MOD Airspace Requirements Review Team
- UK MOD Air Command and Control Programme Delivery Board

- UK MOD ATC Aviation Safety Board
- UK CAA Danger Areas User Group
- UK MOD UAV Airspace Design Working Group
- USA Joint Forces Command Executive Steering Committee on Air Battlespace Management, Close Air Support and Digital Data links
- UK MOD Mode S Working Group
- UK Low Flying Policy Group

Additionally, he has represented UK interests on several international policy groups at Eurocontrol and NATO.