Wind Farm Aviation Safeguarding Ltd

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

For

EQUINIX
Plot 100, Profile Business Park
Dublin 22

CONTENTS

Issue

In respect of the planning application for changes to the proposed development of a data centre and administration building at Plot 100, Profile Park, Nangor Road, Clondalkin, Dublin 22 (Planning Register Reference SD22A/0156) 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/1166/21, issued in respect of the previous planning application for this development Reg. Ref. SD21A/0186, dated 30/8/2021[1] it states that:

> ***Aviation Safety***
> *The site is located within the Department of Defence Inner Zone. The applicant states that the Department of Defence is satisfied with the proposal. The applicant has submitted this correspondence. The Department of Defence has submitted observations indicating the proposal is acceptable, subject to conditions.*

This is stated further in Chief Executive's Order PR/0062/22, dated 17th January 2022[2] and Chief Executive's Order PR/1166/21, dated 30/8/2021[3] *(et al).*

In the third iteration of the Order, and in addition to the glint and glare analysis which had previously been requested, the following Condition (Planning Register Reference SD21A/0186) was put in place in respect of aviation at Casement Aerodrome:

> *12. Casement Aerodrome. Given the proximity to Casement Aerodrome:*
> *(a) The operation of cranes shall be coordinated with Air Corps Air Traffic Services, no later than 28 days before use, contactable at airspaceandobstacles@defenceforces.ie or 01-4037681.*
> *(b) The developer shall implement adequate bird control measures during the construction phase to mitigate the effects of birds on Air Corps flight operations.*
> *(c) An Aviation Impact Assessment will be submitted to Military Air Traffic Services on all potential emissions. The assessment shall cover the possible effects of exhaust plumes or any other associated impact on flight operations at Casement Aerodrome.*
> *(d) 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 shall put measures in place to mitigate these effects to an acceptable level.*
> *(e) The applicant/developer shall submit written confirmation that the Glint and Glare Assessment prepared by Macro Works Ltd. has been submitted to Military Air Traffic*

[1] Comhairle Chontae Atha Cliath Theas, Record of Executive Business and Chief Executive's Order PR/1166/21, dated 30/8/2021, Page 16.
[2] Comhairle Chontae Atha Cliath Theas, Record of Executive Business and Chief Executive's Order PR/0062/22, dated 17th January 2022, Page 16.
[3] Comhairle Chontae Atha Cliath Theas, Record of Executive Business and Chief Executive's Order PR/0375/22, dated 24/03/2022, Page 16.

Services. Should negative effects become apparent on air or ATC operations as a result of the photovoltaic cells, then the owner shall take measures to mitigate these effects to an acceptable level. REASON: In the interests of aviation operation and safety.

Within Chief Executive's Order PR/0951/22 for the current planning application (Register Reference SD22A/0156), dated 25/7/2022[4] additional information was requested:

> ***Aviation Safety***
> *The site is located within the Department of Defence Inner Zone. It is noted that the proposed development on site does not increase the overall height to that which was previously permitted. There are, however, additional flues, and the applicant is requested to consult with the Department of Defence regarding any requirement for the proposed development. This should be done via* ***additional information.***

This included the following entry within the requested additional information,[5]

> *3. The applicant is requested to engage with the Property Management Branch of the Department of Defence in terms of the construction and operation phases of development, to assess* ***any*** *potential impact on flight procedures and communication, navigation and surveillance equipment present at Casement Aerodrome, a letter of consent shall be obtained from the Department of Defence* (emphasis added).

This direction is repeated in South Dublin Council letter to reflect the additional information to be supplied.[6]

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 within the client's available timeline, but the authors would welcome the opportunity to discuss and provide any further information needed as a result of this report.

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[4] Comhairle Chontae Athas Cliath Theas, Record of Executive Business and Chief Executive's Order PR/0951/22, dated 25/7/2022, Page 16.

[5] Comhairle Chontae Athas Cliath Theas, Record of Executive Business and Chief Executive's Order PR/0951/22, dated 25/7/22, Page 19.

[6] South Dublin Council Planning and Development Act, 2000 (as amended) and Planning Regulations Thereunder, Reference SD22A/0156 dated 28-Jul-2022.

Executive Summary

This is a desk based repost addressing the request for further information from South Dublin County Council in respect of the proposed development at Plot 100, Profile Park, Nangor Road, Clondalkin, Dublin 22, Planning Register Reference SD22A/0156.

The specific perceived impacts to be addressed and, therefore, the focussed information needed are not entirely clear from the available documentation. Consequently, and in order to consider all possible aspects of the development in relation to aviation, there are three main distinct elements within this report (but acknowledging that some may be unnecessary) 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 of 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 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.

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 and against the maximum elevation of the aerodrome. By this means it is considered that, by calculation of the clearances for the possible maximum

and minimum values for the aerodrome datum, the results will satisfy the requirement of further information against the OLS.

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 been slightly complicated by the lack of available information regarding the datums, lateral and vertical, to be used in the application of that zone. It was not possible to find any comparable defined zone within any extant aviation regulation in the public domain against which the proposed development could be assessed. In applying requirement in the most restrictive means (to the development) which could be envisaged, the report shows the maximum and minimum clearances for the proposed development against this additional IAC safeguarding 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.

Further discussions on the bird control conflicting conditions are required with the DoD as WFAS cannot comment further on the need for such measures nor understand how you can meet the requirements of both (or either). Any mitigation measures which might be considered necessary will be dependent on many factors (bird types, seasons etc) together with the geographical extent to which they might need to be applied; all of the relevant information in determining this action should be contained within an aerodrome/BCU management plan which will inform any decision on bird control mitigation.

In respect of the plumes the AWN Consulting research has concluded that any effects will have completely dissipated within 9m above the stack top (the highest of which is 95.2m above mean sea level (amsl) and well below the IHS)[7]). In an aviation sense, the implications are clear; any plume will not affect any OLS nor would any aircraft be flown within 9m 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 9m 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.

[7] 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.

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[8] and the licensing of an aerodrome depends on the extent to which these areas are free from current or new obstacles.[9]

[8] IAA Aerodrome Licensing Manual dated January 2014.

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

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.

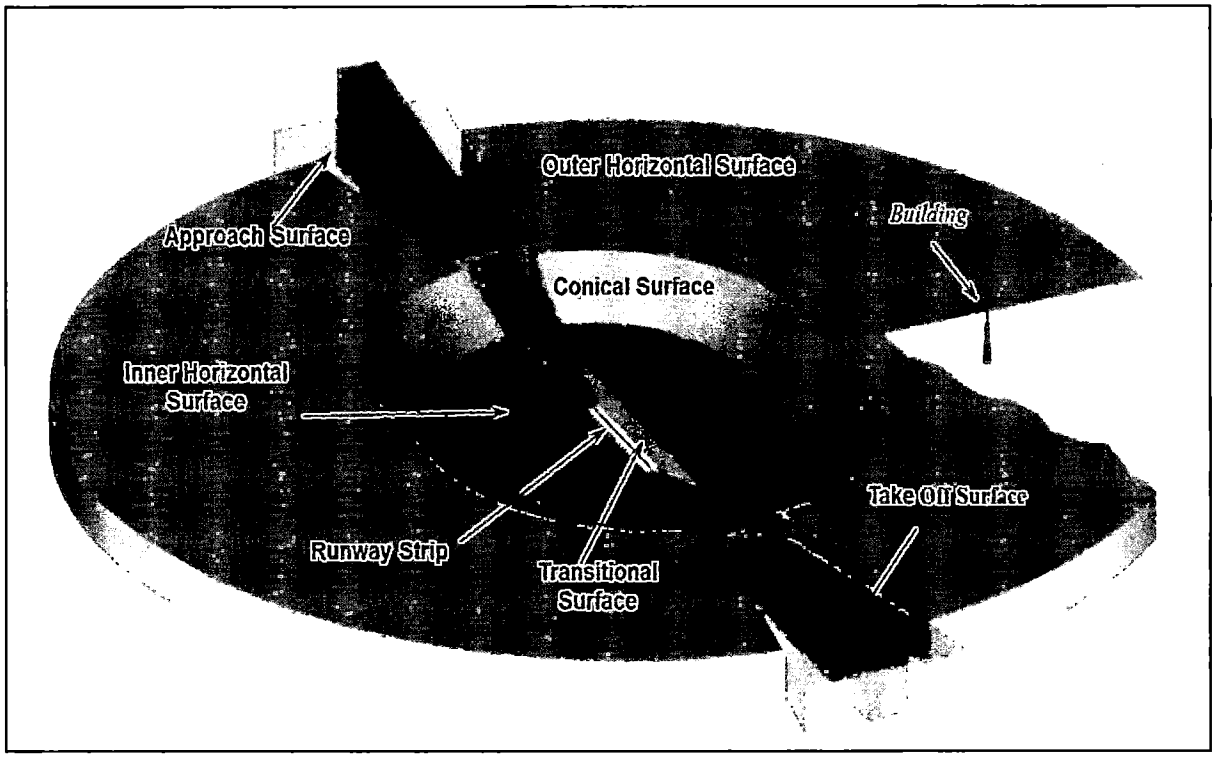

Figure 1 – obstacle limitation distances surrounding airports where the runway is greater than 1800m in length.

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 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.

South Dublin County Council (SDCC) Development Plan 2016 – 2022 and 2022 - 2028

It is noted that the client was informed that, whilst the application was initially considered under the requirements of South Dublin County Council (SDCC) Development Plan 2016 – 2022, that plan was superseded by the South Dublin County (SDC) Development Plan 2022 – 2028 as of 3rd August 2022 and that it is this document that the application should conform with[10].

However, that adopted, extant SDC Development Plan is not yet available electronically within the public domain; the only indication as to what that might contain in relation to safeguarding at Casement Aerodrome in respect of proposed development in the area is contained within the undated DRAFT document of the same name[11].

The SDCC Development Plan 2016 – 2022 contains much information in relation to Casement Aerodrome which was in need of updating. However, in adopting the available information from the Draft SDC Development Plan 2022 – 2028 it is accepted that this report is drawing on what is a Draft document. Notwithstanding this caveat, the figures within that document align with those from our assessment and, therefore, in providing the requested further information, the baseline environment and criteria contained within the that extant SDC Development Plan has, as far as possible, been a prime source of data, in correlation with aviation documentation in the public domain, to be adopted in relation to the aerodrome at Casement Aerodrome; this has 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 Draft SDC Development Plan 2022 – 2028 in Sections 11.7 (pages 409, 410 and 413) and 13.9.5 (page 593).

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.[12] From available aviation documentation the aerodrome elevation is 319ft amsl (or OD).

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[10] Comhairle Chontae Athas Cliath Theas, Record of Executive Business and Chief Executive's Order PR/0951/22, dated 25/7/22, Page 20.

[11] https://consult.sdublincoco.ie/en/consultation/draft-south-dublin-county-development-plan-2022-2028

[12] 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.

The Development Site

The closest point of the development site to the Airfield Reference Point (ARP), north of the mid-point of runway 10/28, is approximately 1.76km and the furthest point approximately 2.1km which places the proposed development under the IHS. No other OLS needs to be considered.

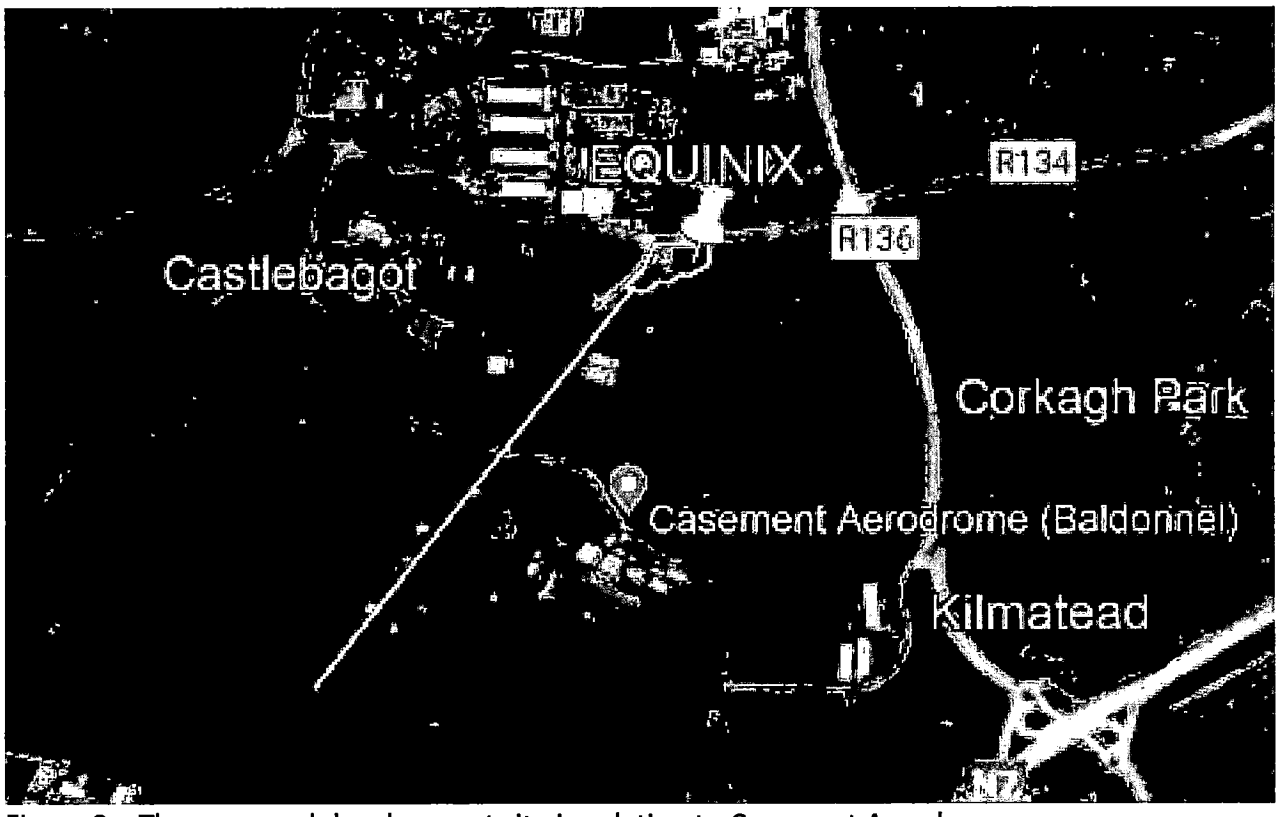

Figure 2 – The proposed development site in relation to Casement Aerodrome
Source: Google Earth

The highest elevation at the site is 77m amsl (the extreme north-eastern corner).

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

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

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 at 13.9.5 within the Draft SDC Development Plan 2022 – 2028 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.

From the submitted drawings RKD have determined that the maximum elevation of the proposed development is 97.579 which represents the terrain elevation plus the height of the building (to the top of the rooftop access ladder); this is RKD's preferred value to be used for calculation[14].

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 33.671m clearance between the maximum building elevation and the relevant obstacle limitation surface. (131.23m – 97.579 = 33.671m). Under the definition and values stated within the Draft SDC Development plan 2022 – 2028 the values are slightly different but afford slightly more clearance[15]. Within that document the IHS is considered to be at 131.6m which results in 34.02m clearance (131.6m – 97.579m = 34.021m).

Aerodrome elevation datum

The aerodrome elevation is stated in the airfield documentation to be 319ft ams) or 97.23m amsl. If 45m is added to this elevation, the IHS is 142.23m amsl which results in 44.651m clearance between the maximum construction elevation and the relevant obstacle limitation surface. (142.23m –97.579m = 44.651m).

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.[16] 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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[14] Email Babiarz (RKD)/Savage (WFAS) 19TH October 2022 @ 16:19. All references to building and/or flue stack heights/elevations within this report are those figures supplied by RKD.

[15] The figures used by South Dublin Council equate to those contained within the Department of Defence Submission to the ongoing review by Kildare County Council (KDC) of the FDC Development Plan 2023 – 2029 but, as the available copy of that submission is undated and unsigned, we have elected to use the slightly more stringent values.
https://consult.kildarecoco.ie/ga/system/files/materials/4060/6024/Appendix%201%20-%20DoD%20Submission%20to%20KCC%20Development%20Plan%202023-2029_0.pdf

[16] 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 two further restricted areas of its own, a circular 'Inner Zone' of 2km radius, 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 Draft SDC Development plan 2022 – 2028 although it is referred to within the planning documentation and regulation outlined within SDC responses on the application as being relevant under the superseded SDDCC Development Plan 2016 – 2022.

There is no such zone defined within international aviation documentation which WFAS could find within the time available. However, within the previous version of the SDCC Development Plan 2016 - 2022 at Section 7.8.1, page 137, IE8 Objective 5 states that due to the volume of helicopter operations and aircraft movements:

> *" Within the Department of Defence Inner Zone (delineated on Development Plan Index Map), in addition to the Obstacle Limitation Surfaces for the Aerodrome, no buildings or structures exceeding 20m in height above ground level should be permitted except where specifically agreed following consultation with the Department of Defence that the proposed development will not affect the safety, efficiency or regularity of operations at the aerodrome."*

with further explanation at page 230, but which appears to apply this Inner Zone only to structures such as high mast lighting and antennae. Variation No2 to the that Development Plan then, again, refers to buildings. The requirement for this additional safeguarding surface would appear to be based on aircraft operations rather than as part of any security measure. It is noted that this Inner Zone is in addition to the globally adopted and regulated obstacle limitation surfaces and designated Public Safety Zones. We are not aware of equivalent any zone, established in additional to the established protective surfaces, in place in Europe or North America. There are similar zones within Indian, Liberian and Ghanian regulation and guidance but there is little, if any, direct read across to what the IAC have implemented at Casement Aerodrome. We have examined the Building Restricted Area policies in place within Federal Aviation (FAA) Regulation in America, within EASA Regulation for Europe, UK Civil Aviation Authority, Australian Civil Aviation Authority, amongst others, and can find no commensurate Inner Zone applied by either civil or military regulators. Consequently, the criteria and methodology for the application of this are unclear. From the SDCC Plans it is not readily apparent if the Inner Zone is still applicable or how the Inner Zone is to be applied laterally, and from what point the vertical datum is to be applied, in determining the 20m building limitation. Furthermore, the restrictions specified within the Inner Zone as detailed within the Plan, are not consistent with additional comments with Variation No2, Section 2, which states that,

".....development of 20m in height would normally be permissible in most areas (from an aviation safeguarding point of view). Additional heights may also be possible below the 110m contour (depending on actual ground elevation) ***up to the elevations of the lowest***

Obstacle Limitation Surface (i.e. the Inner Horizontal Surface or the Conical Surface for either Weston or Casement Aerodromes as indicated on Index Map)." (emphasis added)

In general, in terms of aviation regulation and guidance, it would appear that the consensus policy is that any such zoning restrictions, additional to OLS, can only be applied where airport operators or sponsors have direct jurisdictional control over uses of property and land in the vicinity of airports/aerodromes. Such operators can request to be consulted over development within areas near their facility but they are not vested with a right of veto for development outside the obstacle limitation zones or, if one is in place, their agreed safeguarding map. This is not, by any means, to seek to reduce the compatibility of the operation of the aerodrome with development in the area but the accepted standard, globally, are the mandated obstacle limitation surfaces and the compliance requirements within those. Many countries have established enhanced Public Safety Zones, determined by risk assessment methods, around aerodromes and airports but most extend the current regulations further into the approach path. In Europe, the regulators in Ireland, the UK and The Netherlands, and in the USA, have a history of enhancement to existing measures based on such factors as permanent population density, temporary/transitory population (work sites), number of aircraft movements etc. but which are in relation to the runway strip, more akin to the dimensions of the Casement Security Zone.

Without a specified reference datum the methodology of the 20m height restriction is not fully understood and it is, therefore, slightly problematic to prove any lack of infringement of that without knowing what aerodrome datum that 20m height above ground level at the development is to be measured against. It cannot, logically, solely be above ground level at the location of any development in question otherwise e.g. a building 19.9m above ground level 2.0km to the south-east at Cooldown Commons on ground elevation 105m amsl would not be subject to the required assessment by IAC whereas a building, for example, in Profile Park on the proposed development site and at a maximum terrain elevation of approximately 77 metres, would require consent even the though the maximum elevation extent of the former is approximately 23.5m higher than the latter and is much closer to the IHS.

Similarly, the 2km distance is not defined from a specific point, e.g. the proposed building at Profile Park would fall into the category needing IAC approval if the measurement is from the Airfield Reference Point (ARP) but would remain outside the 2km consultation if the threshold of runway 10 is used as the elevation datum.

However, if it is accepted that the 20m building height is to be applied then it is possible to consider that as a hypothetical additional safeguarding consideration. This is done without prejudice. If the lowest threshold is assumed to be the reference datum for the 20m building restriction (as it seems to be for the other OLS) then, with a threshold elevation of 86.25m, the restriction would place the maximum elevation of any building within 2km of 106.25m amsl (20m above threshold elevation runway 10). The maximum constructed elevation of the proposed development at Profile Park 97.579m amsl; the proposed development will be well below any IAC requirement for a 20m building height restriction within 2km, even for the lowest possible reference datum (and with a slight increase in that clearance if the SDC figures and actual elevation of the development terrain are used).

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.[17]

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.

[17] DoD letter Re:Proposed development in Profile Business Park – Onsite power generation compound (SD22A/0156) dated 04th October 2022.

Bird Control

WFAS consider that the implementation of effective bird control measures would require expert advice on both ornithological aspects and on bird control/scaring measures, depending on the species of birds considered likely to result as a consequence of this development, and further advice on those will need to be taken. However, the staff within the WFAS team have extended experience of bird control around airfields and of managing bird control units at military airfields over many years and are of the following opinion.

We have not discussed the stated concerns, or the justification for them, with DoD personnel. The small water areas/spills within the various iterations of the proposal are not considered significant in terms of birds and, therefore, it is not apparent why the concerns over possible effects from birds is an issue with this development as opposed to other proposals in the area. Without the background thinking/rationale on why birds, with their possible effects on air operations, will be attracted to this small construction site it is not understood why,

- there is a perception that the number of bird movements in and around Profile Business Park might increase from current levels, as a result of the construction activity or,

- why birds might prefer to be around the noisy environs of a new construction site rather than much quieter surroundings of the long-established golf course lakes which, presumably, represent a much more plentiful source of food.

The potential issue is one on which we have not been asked, formally, to comment. However, WFAS would offer the following comments for consideration.

From the available information on the Casement Aerodrome Bird Control Unit (BCU) the techniques employed at the aerodrome would be very much in keeping with those in place at other aerodromes and airfields across Europe and beyond. It is acknowledged that we do not have sight of the local migratory patterns for birds, or types of birds, in the vicinity of Casement Aerodrome but the IAA Bird and Wildlife Strike Management at Aerodromes has provided valuable information on the types of birds that might be encountered within the area and possible techniques to counter those.

Given that WFAS does not have all of the information that was considered in determining the stated conditions we would consider that, as written, the conditions are confused, and that the validity of the conditions should be subject to further scrutiny. Of particular note:

First,

> *(b) The developer shall implement adequate bird control measures during the construction phase to mitigate the effects of birds on Air Corps flight operations.*

Putting measures in place during construction would seem to imply that those measures would need to be in place from the outset of construction. However, this would require mitigation of any effect before that effect was experienced. Putting in place mitigation before

any effect was experienced would not allow an assessment to be made as to whether the mitigation was being effective or whether the bird issue was never actually realised.

Second,

furthermore, the condition is considered to be extremely opened-ended in that in demanding that the developer *".....to mitigate the effects of birds on Air Corps flight operations"*, would seem to bestow an over-arching responsibility on the developer. In our opinion, the scope of those possible effects needs to geographically bounded. As it currently reads the developer shall be responsible for all bird effects on all Air Corps operations irrespective of location.

Third,

> *(d) 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 shall put measures in place to mitigate these effects to an acceptable level.*

This condition is considered to be at variance with condition b above. That previous condition calls for mitigation to be implemented, this condition states that mitigation may be required *"....should negative effects of bird activity on Irish Air Corps operations arise"*. If condition *(b)* is met successfully then condition *(d)* cannot be considered be valid.

Additionally, and again in our opinion, this is considered to be open-ended to the point of being undeliverable. Given the lack of any geographical boundary within which the undefined *"owner"* is responsible for such measures, it reads as if the measures should address <u>all</u> wildlife whilst then, apparently, focussing on birds, but without any geographical limit.

Fourth,

the condition, as it reads, would make the *"owner"* responsible for wildlife attenuation resulting from the nearby, much bigger, much more attractive small lakes and ponds on the adjoining golf course and beyond.

In attempting to satisfy this condition (if it cannot be resolved by negotiation), there will have to be more clarity on the definition of *"negative effects"* and how they can be attributed directly to the construction on the site as opposed to usual bird/wildlife activity in the general area. Any measures would have to be in concert and co-ordinated with the actions of the BCU on the aerodrome together with any actions being taken by other landowners at the behest of the DoD; forcing birds to move from one site but only on to, or in the direction of, the aerodrome would be counter-productive and could constitute a much greater flight safety hazard. Additionally, and for the same reason, any measures would have to be in concert and co-ordinated with any actions or bird/wildlife mitigation measures the DoD has required of the golf club in controlling bird and wildlife activity around the golf course lakes.

Any lack of a co-ordinated effort between any and all agencies required would be counter-productive; not to have such co-operation would result in agencies working at odds with one another and creating the hazard they were trying to mitigate whilst ensuring that the efficacy of the measures at each site could not be assessed/validated.

Fifth,

".....measures in place to mitigate these effects to an acceptable level" would need further expansion if any mitigation is not to be required unnecessarily. The IAC/BCU should be maintaining both a Wildlife Management Plan and records of bird types/movements/migrations which represent the currently acceptable level. The period of time over which any perceived increase in the numbers of birds should be correlated against those records and in accordance with the Wildlife Management Plan/records and be shown to be directly attributable to the construction activities before mitigation measures are enforced. The BCU should be operating beyond the scope of the aerodrome boundary (not to do so would imply that any bird issue is confined to that boundary which is unrealistic given the flight patterns of birds) and it might prove that their area of operation, either with vehicles on the ground or by their airborne birds of prey, would account for any perceived effect from the construction activities given the proximity of the development location to the boundary of Casement Aerodrome.

Further discussions on these conflicting conditions is required with the DoD as WFAS cannot comment further:

- on the need for such measures,
- see how you can meet the requirements of both (or either),
- the geographical extent to which they would need to be applied,
- of any form of mitigation which might be considered necessary, or
- that nature of the mitigation required and/or permitted is permissible under Irish/EU legislation.

All of the relevant information in determining the need for these conditions should be contained within an aerodrome/BCU management plan which will inform any decision on bird control mitigation. Further discussions on clarifying the requirement for bird control measures and the conditions which would warrant those, should be requested with the DoD.

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 9m above the generators' stack top (104.2m 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 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.[18]

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[19], 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[20]. Helicopters joining the circuit will route to the airfield at 800ft QNH and do so at one of the visual holding points 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.

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[18] 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. Furthermore,

[19] 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.

[20] 1300ft QNH equates, approximately, to 1000ft above aerodrome ground level, 800ft QNH equates, approximately, to 500ft above aerodrome ground level.

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 9m 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:

- 27.05m if the IHS datum the lowest published threshold elevation
- 38.03m if the IHS datum is 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 9m; 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 do so would be detrimental to flight safety and any aircraft flying at or closer than 9m 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. We have further commented informally on bird control.

In respective of OLS it is the Inner Horizontal Surface which is the relevant plane to be considered. There is some conflating of aviation terms within the SDCC Development Plan 2016 -2022 but, using the figures for the IHS presented within the DRAFT SDC Development Plan 2022 - 2028, two values representing the extremes of maximum and minimum possible datums were used. (In the absence of any DoD verification of the values articulated within that DRAFT SDC paper WFAS have used their own values. The two are very closely aligned and with only a very small difference but with those of WFAS being the more stringent.)

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 been complicated by the lack of available information regarding the datums, lateral and vertical, to be used in the application of that zone. There is no comparable defined zone within any extant aviation regulation in the public domain against which the proposed development could be assessed. In applying requirement in the most restrictive means (to the development) which could be envisaged the report determined the maximum and minimum clearances for the proposed development against this additional IAC safeguarding zone. The proposed development should not infringe this local additional OLS.

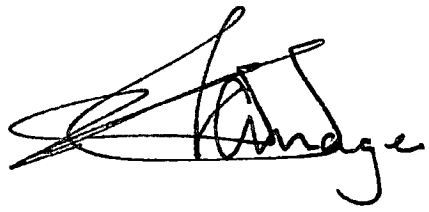
In respect of communication, navigation and surveillance equipment present at Casement Aerodrome, the development will be a static structure with no external moving parts. At this range, and in common with the other similar, some bigger, buildings surrounding the aerodrome it should have no effect on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

Further discussions on clarifying the requirement for bird control measures and the conditions which would warrant those, should be requested with the DoD.

In respect of the plumes the AWN Consulting research has concluded that any effects will have completely dissipated within 9m 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 9m 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 9m 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.

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