Snowdonia Aerospace Airspace Change Proposal
Initial Design Options Appraisal (Stage 2B), ACP-2020-02
Llanbedr Aerodrome Traffic Zone (ATZ)

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Document Details

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Executive Summary

This report documents the "Stage 2B Options Appraisal" element of the Snowdonia Aerospace LLP submission for an Airspace Change Proposal, Reference: ACP-2020-02, Llanbedr Aerodrome Traffic Zone (ATZ), under the Civil Aviation Authority (CAA) CAP1616 Airspace Change Process.

Snowdonia Aerospace LLP is continuing to progress and further develop a number of complementary business opportunities at Llanbedr Aerodrome relating to aerospace Research, Development, Test and Evaluation (RDT&E) and military aircraft training. To support these operations (and others) action is required to upgrade and formalise the current airspace around the Aerodrome as the present provision is insufficient to meet the identified future need and risks restricting opportunities that are in the strategic economic interest of the UK and Welsh governments and required to sustain long term employment in the region. Snowdonia Aerospace LLP (hereafter also referred to as the Change Sponsor) is therefore developing two Airspace Change Proposals (ACPs) to underpin these activities:

- ACP-2019-58, Llanbedr Danger Area (DA), which can be accessed online via: https://airspacechange.caa.co.uk/PublicProposalArea?pID=193
- ACP-2020-02, Llanbedr Aerodrome Traffic Zone (ATZ), which can be accessed online via: https://airspacechange.caa.co.uk/PublicProposalArea?pID=211

This document relates to the latter application, ACP-2020-02, that has been prompted by an opportunity for Llanbedr Aerodrome to be re-used by RAF Valley to support military aircraft training, particularly approach training for Hawk T2s of No.4 and 25 squadrons, thereby allowing fast and slow moving aircraft traffic to be separated in the vicinity of Valley itself and also providing a diversion in the event of poor weather. Whilst the initial opportunity relates to military air training, it should be noted that the ATZ is a standard safety measure that will protect all current and forecasted mixed-use aviation operations in the vicinity of Llanbedr Aerodrome.

The CAA Civil Aviation Publication CAP1616 defines a six-stage process through to implementation of a permanent airspace change, some of which have more than one step. This document addresses the requirements for Stage 2B: Options Appraisal.

Step 2B requires the Change Sponsor to carry out an initial appraisal of the impacts of each of the airspace design options identified in Step 2A and should, as a minimum, contain qualitative assessments of the different options. This highlights to change sponsors, stakeholders and the CAA the relative differences between the impacts, both positive and negative, of each option. The Change Sponsor assesses each option against a "do nothing" scenario (the "counterfactual"), even where there is only a single change option - as is the case with the Llanbedr ATZ - to understand these impacts. The following primary conclusions have been made for Stage 2B:

1. Snowdonia Aerospace has assessed the impacts of the ATZ design option proposed at Stage 2A against a "do nothing" option using the design criteria against which the options are being assessed;
2. The methodology applied a simple qualitative assessment of the different options, both positive and negative, against the CAP1616, Appendix E, Table E2: "Guide to expected approach to key analysis for a typical airspace change". This approach has been applied previously in other Airspace Change Proposals of similar scale/proportionality and it has been deemed compliant both with the spirit of CAP1616 and the Government Green Book;
3. The assessment highlighted that there is not a "do nothing" option that doesn't have an adverse impact somewhere else and that Llanbedr represents the most balanced solution to meet the need for continued military training in North Wales whilst also addressing the needs of the local communities and General Aviation and enhancing the safety standards to protect all mixed-use aviation operations in the vicinity of Llanbedr Aerodrome;

4. On the basis of the safety, operational, environmental and economic considerations, the Change Sponsor strongly recommends that the CAA consider the Llanbedr ATZ airspace change proposal favourably.

The initial design option appraisal stated here will be taken forward into Stage 3A of the CAP1616 process where the Change Sponsor plans its stakeholder consultation and engagement strategy, and prepares consultation documents, including the second-phase full options appraisal with more rigorous evidence for its chosen option.

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1. Introduction

1.1. Background

Llanbedr Aerodrome (EGFD), Gwynedd (Figures 1a-1d), is sited on a coastal promontory at the northerly end of Cardigan Bay[1] with bi-directional over-water approaches to the 2000m+ main runway (17/35), which is at an elevation of 8m above mean sea level. There are two additional cross runways 05/23 and 15/33. Under upcoming aerodrome licensing proposals it is currently intended the runways will be 2,188m, 1,199 and 799m respectively. The local geography is predominantly coastal lowland and farmland within Snowdonia National Park that is bounded to the east by the Rhinog mountains, which rise to 756m at a distance of 9500m (approx.) from the main runway. The village of Llanbedr (population 645, 2011 census) is 2000m (approx.) to the north-east of the northern threshold and there's also a transitory population during summer months at the Shell Island campsite (approx. 1000m to the north-west of the main runway northern threshold) and the Dyffryn caravan park (approx. 500m to the south of the main runway southern threshold). The overall population density is consistent with that for Gwynedd as a whole - *i.e.* <50 people per square km[2,3].

Fig. 1a *- aerial view looking west*

Fig. 1b *- aerial view looking east*

Fig. 1c *- aerial view looking north*

Fig. 1d *- aerial view looking south*

Llanbedr Airfield has a long history of research, development, test and evaluation (RDT&E) flying activities, particularly associated with the use of target drones, and also as a secondary/tertiary operating site for RAF Valley (EGOV, approx. 58km north/north-west). An Aerodrome Traffic Zone (ATZ)[4] and the original Danger Area D202 supported these activities prior to QinetiQ/MOD vacating the site in 2004, along with extant Danger Area D201, the closest edge of which is 25km (approx.) south-west of Llanbedr[5].

1 View on Google Maps
2 Ref: National Statistics Wales, June 2018
3 Ref: Annual Lower Super Output Area (LSOA) Population Estimates, 2018
4 Aerodrome Traffic Zone (ATZ) as detailed in Article 5 of the Air Navigation Order, 2016, Ref: Air Navigation Order, 2016
5 Ref: https://www.aurora.nats.co.uk/htmlAIP/Publications/2018-08-02/html/eAIC/EG-eAIC-2018-087-Y-en-GB.html

The airfield currently supports an increasing mix of small (<20kg) and light (<150kg) drone RDT&E and General Aviation (GA) operations together with visiting military aircraft (fixed wing and rotary) and others including the search and rescue (SAR) helicopter from Caernarfon (EGCK, approx. 35km north/north-west), Police helicopter and Air Ambulance. The airspace is currently Class G. A local Flight Information Service (FIS) has been provided to support day-to-day operations and a Temporary Danger Area (Ref: QINETIQ/MS/AD/LET1404197, 15th September 2014) has previously been consulted on and implemented to support local aerospace RDT&E activities and provide a safe corridor to D201. There are GA aircraft operations most flyable days with an average of 100 to 200 movements per month. The airfield has also been designated as one of the candidate sites for a UK Spaceport by the Department for Transport (DFT) and Snowdonia Aerospace LLP has recently received a grant award from the UK Space Agency to develop a Horizontal Spaceport Development Feasibility Plan.

1.2. Opportunity to be addressed and Statement of Need

Snowdonia Aerospace LLP is continuing to progress and further develop a number of complementary business opportunities at Llanbedr Aerodrome relating to aerospace RDT&E and military aircraft training. To support these operations (and others) action is required to upgrade and formalise the current airspace around the Aerodrome as the present provision is insufficient to meet the identified future need and risks restricting opportunities that are in the strategic economic interest of the UK and Welsh governments and required to sustain long term employment in the region. Snowdonia Aerospace LLP (hereafter also referred to as the Change Sponsor) is therefore developing two Airspace Change Proposals (ACPs) to underpin these activities:

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This document relates to the latter application, ACP-2020-02, that has been prompted by an opportunity for Llanbedr Aerodrome to be re-used by RAF Valley to support military aircraft training, particularly approach training for Hawk T2s of No.4 and 25 squadrons, thereby allowing fast and slow moving aircraft traffic to be separated in the vicinity of Valley itself and also providing a diversion in the event of poor weather. Whilst the initial opportunity relates to military air training, it should be noted that the ATZ is a standard safety measure that will protect all mixed-use aviation operations in the vicinity of Llanbedr Aerodrome. The Statement of Need for the application is declared as follows:

- *To provide protection for all traffic on the manoeuvring area at Llanbedr (EGFD) and all aircraft flying in the vicinity of the aerodrome via implementation of a standard Aerodrome Traffic Zone (ATZ) extending from the ground up to 2000 feet with a radius of 2.5nm around the midpoint of Runway 17/35.*

1.3. The cause of the opportunity and associated factors or requirements

Consolidation of UK military air training at RAF Valley has increased the need for supporting secondary/tertiary airfields to mitigate the potential aviation and programme schedule risks associated with the throughput of student pilots that might arise as a consequence of local air traffic congestion and/or poor weather. The combination of safety, operational, technical and environmental factors associated with mixing military air training with low volume aerospace RDT&E activities at Llanbedr is consistent with previous operations and was further validated during a successful detachment of Hawk T2s from Valley to Llanbedr during the Eisteddfod in August 2017.

The proposal does not form part of the Civil Aviation Authority (CAA) Airspace Modernisation Strategy (AMS)[6], but it does not conflict with the plan in any way.

[6] Ref: https://www.caa.co.uk/News/New-Airspace-Modernisation-Strategy-launched-to-overhaul-UK-airspace/

2. Design Options and Design Principle Evaluation

2.1. CAP1616 requirements and document scope

The CAA Civil Aviation Publication CAP1616[7] provides guidance on the regulatory process for changing the notified airspace design and planned and permanent redistribution of air traffic, and on providing airspace information.

CAP1616 defines a six-stage process through to implementation of a permanent airspace change, some of which have more than one step. However, it is recognised that requested airspace changes can vary hugely in size, scale and complexity and this variation has led the CAA to scale the process accordingly (CAP1616, Para. 50). Furthermore, the CAA will consider requests from the Change Sponsor for additional scaling of the process when there is a good reason and it is proportionate to do so.

On the 23rd January 2020 the CAA Airspace Regulation team met with Snowdonia Aerospace LLP to discuss an appropriately scaled submission for ACP-2020-02, Llanbedr Aerodrome Traffic Zone. Subsequent to this meeting, the CAA determined that the simplified Aerodrome Traffic Zone (ATZ) Policy Statement, December 2019[8], could not be applied due to the potential for increased traffic movements, but did agreed to a scaled CAP1616 submission with a combined Define, Develop and Assess Gateway in June 2020. To meet this combined Gateway, Snowdonia Aerospace as the Change Sponsor is required to submit the following documents:

- Stage 1A: Assess Requirements - Statement of Need (previously submitted)
- Stage 1B: Design Principles;
- Stage 2A Options Development;
- Stage 2B Options Appraisal.

This document addresses the requirements for Stage 2B: Options Appraisal.

Stage 2B requires the Change Sponsor to carry out an initial appraisal of the impacts of each of the airspace design options identified in Step 2A and should, as a minimum, contain qualitative assessments of the different options. This highlights to change sponsors, stakeholders and the CAA the relative differences between the impacts, both positive and negative, of each option. The Change Sponsor assesses each option against a “do nothing” scenario (the “counterfactual”), even where there is only a single change option - as is the case with the Llanbedr ATZ - to understand these impacts.

The remainder of this section summarises the design principles from Stage 1B, the design option from Stage 2A and further history on the airspace use around Llanbedr as context for the full options appraisal in Section 3.

2.2. Summary of design principles

Based upon responses received from stakeholder engagement and associated discussions and analysis, the final technical, safety, environmental and operational design principles for ACP-2020-02, Llanbedr ATZ are as defined in Table 1 below:

[7] Ref: https://publicapps.caa.co.uk/docs/33/CAP1616_Airspace%20Change_Ed_3_Jan2020_interactive.pdf
[8] Ref: http://publicapps.caa.co.uk/docs/33/PolicyStatementEstablishmentAndDimensionsOfATZs.pdf

ID	Category	Design Principle
1	Technical	The design will conform to the standard definition of an ATZ to enhance the safety of operation at the aerodrome and will also include Runway Protection Zones to counter drone operators flying without permission
2	Safety	The design will not adversely affect the safety of operations at other nearby aerodromes
3	Safety / Operational	Operating hours of the Flight Information Service (FIS) and ATZ will be linked to ensure consistent traffic procedures and radio calls, and demand for changes in operating hours of the FIS will require a corresponding change in the operating hours of the ATZ and vice-versa
4	Environmental / Operational	Any impact on the environment should, where possible, be minimised via operating procedures and should, where possible, take account of any local development projects or noise sensitive areas that are highlighted as a result of stakeholder engagement
5	Environmental	The design should, where possible, allow approach and departure profiles to minimise environmental impact - *e.g.* lower-power continuous descents
6	Environmental	The design should, where possible, take account of local planning policy including that of the Snowdonia National Park Authority and the aerodrome registered Safeguarding Map
7	Operational	Impact on General Aviation (GA), gliding, microlight flying, hang gliding, paragliding or model flying should, where possible, be minimised via operating procedures

Table 1 *- Final design principles for ACP-2020-02, Llanbedr ATZ*

2.3. Summary of design option(s)

The Change Sponsor is proposing a single design option (Figure 2) that conforms with the standard definition of an ATZ as detailed in Article 5 of the Air Navigation Order, 2016.

Fig. 2a *- The proposed ATZ at Llanbedr superimposed on a 1:250,000 scale local map*

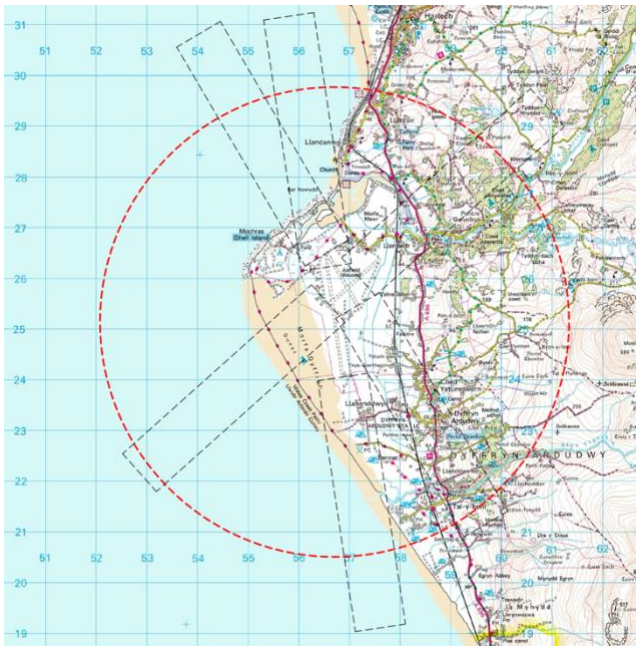

Fig. 2b *- The proposed ATZ + RPZ at Llanbedr superimposed on a 1:50,000 scale local map*

2.4. Summary of historical airspace use

Llanbedr Aerodrome opened in 1941 as part of RAF Fighter Command's 12 Group and pre-dates the creation of Snowdonia National Park by 10 years. From 1942 it was an operational base for towed targets and later became part of the Royal Aircraft Establishment, Defence Evaluation & Research Agency and QinetiQ, providing target drone services to the UK Armed Forces through to initial closure in October 2004.

In terms of airspace, these activities (and those highlighted below) were previously supported by an Aerodrome Traffic Zone and Danger Area (D202) as illustrated in Figure 3 (from 2002). These airspace constructs lapsed when QinetiQ/MOD vacated the site in 2004.

Figure 3 *- UK aviation chart from 2002 showing the ATZ and Danger Area (D202) at and around Llanbedr Aerodrome until its initial closure in 2004*

As well as target drone operations, Llanbedr also supported training activities from RAF Valley, a range of other military operations, General Aviation and a variety of other novel aviation during this period and "Target Rolling: A History of Llanbedr Airfield"[9] provides a detailed record of activity. A further article in Target Magazine[10] by the Senior Air Traffic Control Officer at Llanbedr notes that over 67,000 aircraft movements were recorded in the period from 1998 through to QinetiQ/MOD vacating the site in 2004, an average of approximately 9500 movements per annum.

From the transfer of the aerodrome into private ownership in 2012, Snowdonia Aerospace LLP has and continues to develop the aerodrome to create a multi-use aerospace centre. This was much welcomed by the GA community, as noted in Pilot Magazine[11]. As detailed in Section 1, Snowdonia Aerospace LLP is further progressing and further developing a number of complementary business opportunities at Llanbedr Aerodrome relating to aerospace RDT&E and military aircraft training, while also continuing to support a mix of other aerospace uses including general aviation. To safely sustain these activities, action is required to upgrade and formalise the current airspace around the Aerodrome as per Airspace Change Proposal, Reference: ACP-2020-02, Llanbedr Aerodrome Traffic Zone (ATZ).

[9] Wendy Mills, "Target Rolling: A History of Llanbedr Airfield", Midland Publishing. pp. 128. ISBN 1-85780-136-9
[10] Target, Souvenir Edition No. 10, Autumn 2004
[11] https://www.pilotweb.aero/airfieldsfurther /welcome-to-llanbedr-1-3656415

3. Design Options Appraisal

3.1. Methodology

Stage 2B requires an initial appraisal of the impacts of the ATZ design option presented in Section 2.3 against a "do nothing" option using the design criteria against which the options are being assessed (from Section 2.2).

An ATZ is a standard safety measure that will protect all aviation operations in the vicinity of Llanbedr Aerodrome and provide a fundamental building block for its growth as a mixed-use aerospace centre, but it's acknowledged that this airspace change application has been prompted by a need to support forecasted increased military air training at the aerodrome. The options appraisal has therefore been conducted in the context of this opportunity and references to "commercial airline" within CAP1616 have been interpreted as "RAF/MOD".

The RAF/MOD do not provide quantitative environmental data for their aircraft and hence the Department for Transport's WebTAG[12] analysis guidance has not been employed. Instead, the chosen methodology is to conduct a simple qualitative assessment of the different options, both positive and negative, against the headings identified in CAP1616, Appendix E, Table E2: "Guide to expected approach to key analysis for a typical airspace change". This approach has been applied previously in other Airspace Change Proposals of similar scale/proportionality that have successfully passed the Stage 2 Gateway and it has been deemed compliant both with the spirit of CAP1616 and the Government Green Book[13].

3.2. The "do nothing" option

As noted in Section 1.3, consolidation of UK military air training at RAF Valley has increased the need for supporting secondary/tertiary relief landing grounds (RLGs) in addition to nearby RAF Mona in order to mitigate the potential aviation and programme schedule risks associated with the throughput of student pilots that might arise as a consequence of local air traffic congestion and/or poor weather. Llanbedr, just 30 nautical miles from RAF Valley, has been identified as an ideal candidate site to support this role.

The "do nothing" option in the context of the current Airspace Change Proposal would be to not implement an Aerodrome Traffic Zone at Llanbedr, but this would have a number of detrimental implications for the RAF/MOD fast jet approach training programme:

1) Training could still be conducted at Llanbedr without an ATZ (as it was during the successful Eisteddfod deployment in August 2017), but throughput would be limited to maintain safety;
2) Training could continue at RAF Valley/Mona alone, but airspace usage at Valley and Mona is already exceptionally taut and there is little or no room for accommodating an increasing training load;
3) Training could potentially alternatively be conducted at Hawarden (Broughton) in Flintshire (56 nautical miles from RAF Valley), Warton in Lancashire (66 nautical miles from RAF Valley) or Ronaldsway on the Isle of Man (51 nautical miles from RAF Valley).

The "do nothing option" therefore takes all of these factors into account.

3.3. Options appraisal

Table 2 detail the appraisal of the Llanbedr ATZ option and the "do nothing" options against the high-level objectives and assessment criteria laid out in CAP1616, Appendix E, Table E2. The immediate pre-2004 position at Llanbedr (Section 2.4) is also valuable as a further baseline.

12 https://www.gov.uk/guidance/transport-analysis-guidance-webtag
13 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/685903/The_Green_Book.pdf

Group	Impact	Option 1 - implement ATZ at Llanbedr	Option 2 - "do nothing" and divert military training to Hawarden, Warton or Ronaldsway
Communities	Noise impact on health and quality of life	• General noise impact is estimated to be substantially lower (42% to 63%) than the 2004 baseline based on the predicted number of annual movements (4000 to 6000 vs. 9500)[14] • Qualitative extrapolation of data from Valley and Mona[15] suggests the 63dB L_{Aeq} level threshold will not be breached in Llanbedr village • The maximum number of movements per day is estimated at 40 to 50 • Mitigations could be implemented in terms of time of operation, duration of operation and location of operation (with regard to over water versus over land) and managed via Letters of Agreement with the local communities	• There is not expected to be any increase (or decrease) in the overall number of sorties from Valley as a result of "do nothing" but some respite will be gained by moving elements of the training elsewhere • "Do nothing" may reduce the noise impact at Llanbedr, but will also move the issue elsewhere • Noise impact at Hawarden, Warton and Ronaldsway is unknown, but nearby population densities are higher and only Ronaldsway has potential for mitigation via over water approach/departure profiles
Communities	Air quality	• Air quality will be strongly influenced by the number of movements (*see noise impact*) and the distance travelled (*see fuel burn*). • Mitigation could be provided by adopting lower-power continuous descents profiles over water	• Air quality will be strongly influenced by the number of movements (*see noise impact*) and the distance travelled (*see fuel burn*). • Only Ronaldsway has potential for over water approach/departure profiles
Wider society	Greenhouse gas impact	• Greenhouse gas impact will be strongly influenced by the number of movements (*see noise impact*) and the distance travelled (*see fuel burn*).	• Greenhouse gas impact will be strongly influenced by the number of movements (*see noise impact*) and the distance travelled (*see fuel burn*).
Wider society	Capacity / resilience	• There would be no impact on the wider UK airspace infrastructure	• Transit to alternative airfields would require student pilots to cross the air traffic approaches to Liverpool John Lennon and Manchester airports with a potential minor impact on ATC workload
General Aviation	Access	• The current level of GA traffic (789 movements in 2019)[16] is unlikely to be impacted by an ATZ and related operational issues could be managed via Letters of Agreement with the local community.	• There would be no impact on General Aviation at Llanbedr. The impact on General Aviation at Valley, Mona, Hawarden, Warton or Ronaldsway is unknown
General Aviation / RAF	Economic impact from increased	• Airspace usage at Valley and Mona is exceptionally taut and there is little or no room for accommodating	• Airspace usage at Valley and Mona is exceptionally taut and there is little or no room for accommodating

[14] Private communication from RAF Valley to Snowdonia Aerospace, 22nd September 2019
[15] https://www.gov.uk/government/publications/noise-amelioration-scheme-military-raf-valley-and-raf-mona
[16] Snowdonia Aerospace, Llanbedr Aerodrome Movement Record 2019

	effective capacity	an increasing training load. Use of an alternative aerodrome as a relief landing ground (RLG) will offset the cost and risk of further expansion. • There will be a significant fuel burn cost saving from using Llanbedr as opposed to any other alternative (*see fuel burn*). • There is not expected to be any economic impact on General Aviation • *See also safety assessment*	an increasing training load. Use of an alternative aerodrome as a relief landing ground (RLG) will offset the cost and risk of further expansion.
General Aviation / RAF	Fuel burn	• The distance from Valley to Llanbedr is approximately half the distance to alternative airfields and estimates suggest this will save 100kg of fuel per flying event and a total of 650,000 litres per annum[17] • General aviation fuel burn is not expected to change	• The distance from Valley to alternative airfields is approximately double the distance to Llanbedr and estimates suggest this will cost an additional 100kg of fuel per flying event and a total of 650,000 litres per annum[15] • General aviation fuel burn is not expected to change
RAF	Training cost	• *See economic impact*	• *See economic impact*
RAF	Other costs	• *See economic impact*	• *See economic impact*
Airport / ANSP	Infrastructure costs	• There will be a need for further investment into the Aerodrome facilities to enable it to become licensed to support military training. Works will include new runway markings and a new weather station. These costs are being borne by Snowdonia Aerospace LLP as part of its ongoing investment programme at the Aerodrome	• Any additional infrastructure costs at Valley, Mona, Hawarden, Warton or Ronaldsway are unknown
Airport / ANSP	Operational costs	• There will be a need for increased Flight Information Service (FIS) and Rescue & Fire-Fighting Services (RFFS), but this cost will be borne by Snowdonia Aerospace LLP • *See also economic impact*	• Any additional infrastructure costs at Valley, Mona, Hawarden, Warton or Ronaldsway are unknown
Airport / ANSP	Deployment costs	• There will be a need for additional FIS and RFFS training, but this cost will be borne by Snowdonia Aerospace LLP • *See also economic impact*	• Any additional deployment costs at Valley, Mona, Hawarden, Warton or Ronaldsway are unknown
Airport / ANSP	Economic impact from increased	• A recent economic impact assessment[18] suggested a multi-use aerospace site at Llanbedr (with aerodrome licencing and ATZ	• Any economic impact at Hawarden, Warton or Ronaldsway is unknown

17 Private communication from RAF Valley to Snowdonia Aerospace, 29th January 2019

18 Wavehill Ltd, "Economic Impact Assessment for the Masterplan Development Proposals for the Snowdonia Aerospace Centre incorporating Spaceport Snowdonia at Llanbedr Airfield", 12th March 2020

	effective capacity	implementation as fundamental building blocks) could contribute 515 jobs and £19.5m/annum of GVA at the local level and 765 jobs and £34m/annum of additional GVA in Wales over the next 10 years	

***Table 2** - options appraisal for Llanbedr ATZ and "do nothing" options*

3.4. Safety assessment

By definition and design an ATZ is intended to enhance the safety of aviation operations by creating a small volume of controlled airspace that gives protection to aircraft at the critical stages of flight when departing, arriving and flying in the vicinity of an aerodrome, such that:

1. An aircraft must not fly, take off or land within the ATZ of an aerodrome unless the commander of the aircraft has complied with paragraphs 2, 3 or 4 as appropriate;
2. If the aerodrome has an air traffic control unit, the commander must obtain the permission of that unit to enable the flight to be conducted safely within the ATZ;
3. If the aerodrome provides a flight information service, the commander must obtain information from the flight information centre to enable the flight to be conducted safely within the ATZ;
4. If there is no flight information centre at the aerodrome the commander must obtain information from the air/ground communication service to enable the flight to be conducted safely within the ATZ.

In addition, the commander of an aircraft flying within the ATZ of an aerodrome must:

1. cause a continuous watch to be maintained on the appropriate radio frequency notified for communications at the aerodrome; or
2. if this is not possible, cause a watch to be kept for such instructions as may be issued by visual means; and
3. if the aircraft is fitted with means of communication by radio with the ground, communicate the aircraft's position and height to the air traffic control unit, the flight information centre or the air/ground communications service unit at the aerodrome (as the case may be) on entering the aerodrome traffic zone and immediately prior to leaving it.

Flying operations can be conducted safely without an ATZ - and mixing visiting military aircraft with low volume aerospace RDT&E activities at Llanbedr has been performed many times during post-2004 operations and was further validated during a successful detachment of Hawk T2s from RAF Valley to Llanbedr during the Eisteddfod in August 2017 - but an ATZ is considered to be an appropriate additional safety mechanism to support an increased level of air traffic associated with regular training operations from Valley and to protect all aircraft, military and non-military alike.

Equally, in the event of "do nothing", safety assessments at RAF Valley[13,16] have also been carried out to ensure that all platforms can operate in a safe and tolerable manner and the studies have produced positive results. However, as noted previously, the same studies also highlighted that current airspace usage is exceptionally taut with little or no room for accommodating an increasing training load and that use of an alternative aerodrome as a relief landing ground (RLG) would mitigate the potential programme schedule risks associated with the throughput of student pilots that might arise as a consequence of local air traffic congestion.

These studies also highlighted the safety benefit of using Llanbedr as a diversionary airfield in the event of bad weather or aircraft emergencies. Indeed, there are several historical instances of pilots being able to recover safely to Llanbedr when it was debatable whether the aircraft would have made it back to Valley[9].

Other relief landing grounds/diversionary airfields are available, but these are typically twice the distance of Llanbedr from Valley and would require student pilots to cross the air traffic approaches to Liverpool John Lennon and Manchester airports and/or cover significant over water distances.

An ATZ at Llanbedr is therefore considered to be most appropriate mechanism to balance safety and operational requirements across multiple sites.

3.5. Discussion of options appraisal

Taking the analysis in Sections 3.3 and 3.4 together, there is an exceptionally strong argument that implementation of an ATZ at Llanbedr provides a solution that not only satisfies safety and operational requirements, but also minimises the broader environmental impact, whilst meeting a need that is in the strategic economic interest of both the UK and Welsh governments in terms of ensuring continuity of fast jet training and creating jobs in south Gwynedd, respectively.

The challenge is that there is not a “do nothing” option that doesn’t have an adverse impact somewhere and that Llanbedr represents the most balanced option.

The biggest likely concern for communities local to Llanbedr is noise, but the qualitative analysis indicates that the overall impact is likely to be at a level that is approximately half of that experienced in pre-2004 operations. The maximum number of movements per day is estimated at 40 to 50, but the weekly average is likely to be in the order of 80 to 120, giving an approximate annual average of 4000 to 6000 compared to 9500 historically. Indeed, a qualitative measure of potential acceptability was provided by one local landowner who commented during the Stage 1B stakeholder engagement exercise that “our clients are unlikely to be objectionable to the levels of noise experienced when the site operated prior to its closure in 2004 if in fact noise is the total extent of likely prejudice created by the outcome of this proposal - especially if the proposal genuinely creates local employ”;

Furthermore, there is potential for further mitigation in terms of time of operation, duration of operation and location of operation (with regard to over water versus over land). With regard Figure 2, the vast majority of flying activities will be conducted to the west of the railway line and hence very few permanent properties will be overflown. Qualitative extrapolation of data from Valley and Mona suggests the 63dB L_{Aeq} level threshold will not be breached in Llanbedr village. Further analysis will be conducted in Stage 3A to confirm this.

The effect on local air quality may also be a concern, although the same mitigations that can be applied to noise will also minimise the impact on air quality. With regard to any impact of greenhouse gases on the wider environment there is a clear and obvious benefit of using Llanbedr in preference to any other relief landing grounds in that it would reduce fuel burn by a hugely significant 650,000 litres per annum.

From the Stage 1B stakeholder engagement again, there appeared to be a significant majority acknowledgement (combined positive and neutral replies totalling 84% of respondents) that an acceptable solution can be found for increased flight operations at Llanbedr where appropriate mitigations could be implemented to minimise any possible environmental impact and managed via Letters of Agreement with the local communities.

On the basis of the safety, operational, environmental and economic considerations, the Change Sponsor strongly recommends that the CAA consider the Llanbedr ATZ airspace change proposal favourably.

4. Conclusions and Next Steps

4.1. Conclusions

The following conclusions have been drawn from the “Stage 2B Options Appraisal” element of the Snowdonia Aerospace LLP submission for an Airspace Change Proposal, Reference: ACP-2020-02, Llanbedr Aerodrome Traffic Zone (ATZ), under the Civil Aviation Authority (CAA) CAP1616 Airspace Change Process:

1. Snowdonia Aerospace has assessed the impacts of the ATZ design option proposed at Stage 2A against a “do nothing” option using the design criteria against which the options are being assessed;
2. The methodology applied a simple qualitative assessment of the different options, both positive and negative, against the CAP1616, Appendix E, Table E2: “Guide to expected approach to key analysis for a typical airspace change”. This approach has been applied previously in other Airspace Change Proposals of similar scale/proportionality and it has been deemed compliant both with the spirit of CAP1616 and the Government Green Book;
3. The assessment highlighted that there is not a “do nothing” option that doesn’t have an adverse impact somewhere else and that Llanbedr represents the most balanced solution to meet the need for continued military training in North Wales whilst also addressing the needs of the local communities and General Aviation and also increases the safety for the increasing number and mix of other aerospace activities / users operating and forecasted to operate from Llanbedr;
4. On the basis of the safety, operational, environmental and economic considerations, the Change Sponsor strongly recommends that the CAA consider the Llanbedr ATZ airspace change proposal favourably.

4.2. Next steps

The initial design option appraisal stated here will be taken forward into Stage 3A of the CAP1616 process where the Change Sponsor plans its stakeholder consultation and engagement, and prepares consultation documents, including the second-phase full options appraisal with more rigorous evidence for its chosen option.

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