Cumbernauld Airport
Airspace Change Proposal

Reintroduction of an RNP Instrument Approach Procedure to Runway 25

CAP1616 Part 1c

Stage 2 Outputs

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ssue 8	Updated version	10 June 2022

Approval Level	Authority	Name
Author	[redacted] Ltd	[redacted]
Reviewer		

Contents

Background

1. Cumbernauld Airport is a small General Aviation aerodrome, licensed by the CAA, located on the outskirts of the town of Cumbernauld approximately halfway between the cities of Glasgow and Edinburgh. It opened in 1966; a paved 820m runway was laid in 1988. It sits within a standard surface-to-2338' amsl Air Traffic Zone (ATZ) surrounded by Class G airspace. Immediately above is the Glasgow CTA with a base of 3000'. To the east, the CTA base rises to 3500' and 4 miles to the west lies the Glasgow CTR rising from the surface to 6000'. This, combined with the Edinburgh CTR 10 miles to the east, has traditionally funnelled VFR traffic routing north to south into the vicinity of the aerodrome.[1]

2. From the early 1990s, the airport enjoyed the use of a ground based NDB/DME non-precision instrument approach procedure to runway 26 (now runway 25 due to magnetic precession) until a storm destroyed the equipment in 2013. (See Fig 2 page 12) Longstanding Letters of Agreement with the ATS Units at Glasgow and Edinburgh proved effective in those days assisting inbound traffic. Since then, operators of Britten-Norman Islander aircraft which fly to remote Scottish Islands and are maintained at Cumbernauld have been hampered in meeting the standards of continuity, regularity and capacity due to inclement weather disrupting essential maintenance-flight arrivals at Cumbernauld.

3. Initial enquiries to the CAA about establishing a replacement satellite-based instrument approach were made in 2014 and the first ACP request lodged at the end of 2017 (refer to ACP-2017-050). However, in January 2018 the CAA instructed Sponsors who had previously commenced their ACP under CAP725 *CAA Guidance on the Application of the Airspace Change Process* to reapply under CAP1616 *Airspace change: Guidance on the regulatory process for changing the notified airspace design and planned and permanent redistribution of air traffic, and on providing airspace information*. In consequence ACP-2017-050 was withdrawn and a new application started under ACP-2019-042 .

[1] Both Glasgow & Edinburgh Airports have restarted ACPs which could eventually change the size and shape of controlled airspace above and around Cumbernauld.

4. The new ACP kicked off in January 2020 with an Assessment Meeting and moved on to Step 1B Design Principles in March of that year. Unfortunately, progress became very difficult due to COVID-19 restrictions which particularly affected stakeholders from whom obtaining engagement became in some cases impossible. Nevertheless, by the end of March a successful outcome was reached and a set of Design Principles agreed with the CAA was published on 2nd April 2020.

5. Changes affecting aerodromes such as Cumbernauld in how the CAA dealt with their ACP were imposed by the Secretary of State for Transport in 2020. This resulted in a streamlined route through early sections of CAP1616 (initially set out in a new CAP1961 *Airspace Change Process for GNSS Instrument Approach Procedures (IAPs) without an Approach Control Service.*) As a result, the existing ACP was again withdrawn and on December 15th 2020 the 3rd Assessment Meeting conducted under a new proposal. ACP-2020-095

6. In accordance with the new Part 1c of CAP1616, Stage 1 comprised *inter alia* submitting a Statement of Need (which hadn't changed from previously) attending an Assessment Meeting, submitting a completed ATM Questionnaire and agreeing a timeline for the project. By mid-2021 all of the above was either substantially complete or had reached sufficient maturity to allow progression on preparing Stage 2 outputs. The remainder of this document meets the requirements set out in Part 1c Stage 2.

Introduction

7. As can be seen from the above background the Sponsor has a long-held desire to introduce a Performance Based Navigation (PBN) instrument approach to runway 25 utilising an RNP IAP. Through European funding, a number of the subject aircraft were equipped with suitable receiver equipment and it is essential that Cumbernauld Airport satisfies the need to provide their client operators and others with an approach to be used when currently delay or diversion results from poor weather. No new controlled airspace is required to enable this.

8. The scale of the change is very small and mainly aims to land on-time booked-in maintenance flights for business continuity. Throughout this process evidence will be presented showing that of the approximately fifteen thousand baseline annual aircraft movements[2], a little less than 1.33% (*circa* 100 aircraft arrivals per annum/ 2 per week) may actually need to use the approach. As a movement is counted as a take-off or a landing (and generally are evenly balanced) a figure of 7500 approaches has been used. In other words, around 2 aircraft per week on average will utilise the system. Subject to prior permission other operators such as the Scottish Air Ambulance may be given access to the approaches.

Table 1: Annual movements

2018	14784
2019	13762
2020	6928
2021	9964
2022 part	4874

9. It must be borne in mind that the planned use of the approach does not represent a net increase in traffic. All these aircraft arrive eventually and are therefore already accounted for in the baseline figure. The imperative is to try to ensure each arrival is timed to when there is

[2] Down to 7000 during the COVID-19 pandemic in 2020

space in the maintenance hangar with assigned staff and servicing materials available for the job. It is hoped that generally total movements will increase to pre-pandemic levels.

Objectives

10. Cumbernauld Airport's objective in commencing an Airspace Change Proposal is detailed in the Statement of Need which can be found on the CAA website; - ACP-2020-095 Availability will be restricted to Category A aircraft due to the length of the runway.

11. The objective of this paper is to demonstrate to the CAA that the requirements necessary to progress to Stage 3 Engagement have been met. However, it should be noted that this follows a first application under CAP725 plus a further revised ACP following the original version of CAP1616. This progressed to obtaining agreed Design Principles with difficulties due to the lack of responses during the engagement phase and coincided with the introduction of Part 1c for Aerodromes Without Approach Control.

12. A Stage 1 Assessment Meeting was held on 15th December 2020 and the minutes for this can be found on the CAA ACP Portal. During that meeting the CAA gave a determination that this proposal could be considered under CAP1616 Part 1c Airspace Change Process for establishing RNP IAPs without an Approach Control Service (WAC). A provisional timeline was agreed and permission to progress to Stage 2 given. Due to delays associated with Government restrictions during the COVID-19 Pandemic the target AIRAC cycle has yet again been revised to 12/22 effective Thursday 1st December 2022.

13. This paper sets out the actions taken by the Sponsor under the requirements of Stage 2, details the work done and records outputs from the process. A request to proceed to Stage 3 forms the conclusion.

Limited Options Assessment

14. There was never going to be a plethora of options bearing in mind the surrounding constraining airspace. In the original ACP all ground-based options along with 'Do Nothing' were sifted out. The only other idea was to replicate the procedural turn "tear drop" shape of the old NDB let down commencing over the field. (See Fig 2.) To contain the track, the notion of employing a Radius to Fix (RF) turn was contemplated. Although the result was an elegant design which satisfied the sponsor, it quickly became clear that adoption of RF in the UK was not yet widespread. Representations from PPL/IR Europe pointed to the fact that equipage of receivers capable of using RF was not yet universal. Hence, the option was dropped.

15. There is now only one option being pursued. The preferred design being the simplest of a straight-in RNP approach with minimum leg lengths from IAF to FAF and MAPt remaining outside of CAS as shown in Fig 3

Stage 2 Responses mapped to CAP1616 Part 1c paragraphs

16. Since the Assessment Meeting the Sponsor has progressed a number of tasks aimed at satifying the requirements in CAP 1616 paragraphs 350 to 361. Evidenced below are the results of that work using the relevant paragraphs from Part 1c to introduce each output.

350. Stage 2 of CAP 1616 ensures the change sponsor assesses all appropriate options that address the Statement of Need. It is recognised that the options associated with the implementation of an RNP IAP (WAC) are very limited. For this reason, there is no

requirement for change sponsors' own Design Principles to be developed at Stage 1. However, change sponsors must produce an assessment of any options considered against the following Design Principles:

• The proposal must maintain a high level of safety
• The proposal should avoid overflight of densely populated areas where possible.

17. Currently all approaches to Cumbernauld are conducted under VFR in VMC conditions. Safe operations are derived from the Rules of the Air contained in the ANO which limit pilots' ability to land once visibility and or cloudbase fall below certain minima. History shows that when conditions start to deteriorate, on rare occasions, pilots might be tempted to press on into deteriorating weather with the potential for a CFIT accident. By providing an approved IAP designed to international standards and flown by additionally qualified aircrew the safety of those flights is improved thus meeting Design Principle 1.

18. As can be seen from the Google Earth satellite view the airport sits in a relatively rural area with only the town of Falkirk more than 5 nm to the east. There are no densely populated areas so Design Principle 2 is also met.

19. Part 1c goes on to encourage the Sponsor to consider their own additional DPs in relation to other airspace users. Fortunately, in the previous iteration of the ACP the CAA approved a number of DPs some of which speak to this suggestion. These were -

a) The design shall benefit from collaboration with other Scottish airports and NATS to ensure it is compatible with the wider programme of lower altitude and network airspace changes being coordinated by the FASI North programme with adjacent aerodromes.

b) The design should minimise the impact on General Aviation including sporting and recreational aviation activity and not deny continued rights of access to existing airspace nor place restrictions on non-participating traffic.

c) The design shall not adversely affect designs being developed by Glasgow and Edinburgh Airports in the course of their ACPs.

d) The design must be ICAO Doc 8168 PANS OPS compliant, validated and flyable by aircraft types in speed category A.

20. Cumbernauld self identified itself as a key aviation stakeholder to GLA, EDI and NATS at an early stage and are now deep in conversations with all three as they develop their own ACPs under FASI. The preferred option was deliberately designed laterally and vertically not to require entry into any controlled airspace thus meeting DP a)

21. Cumbernauld sits in Classs G airspace in the gap between GLA & EDI airspace. It provides traffic information to aircraft transiting the vicinity should it be requested. Creating a defined route in Class G but without additional controlled airspace means that other GA activities will have to be cognisant of the existance of an IAP, but the inclusion of Feathered Arrows on charts together with a Pilot Brief document, low numbers of approaches and targetted publicity to the GA community in Scotland witll saisfy DP b)

22. As above, the design does not impinge on existing GLA/EDI controlled airspace. Their designers are aware of Cumbernauld's proposal and the good communications in place will help ensure DP c) will be met.

352. The change sponsor should engage with an Approved Procedure Design Organisation (APDO) to understand the potential design options in the context of the circumstances at the aerodrome (for example, obstacles, nearby airspace structures as well as environmental considerations).

23. PildoLabs has been involved with the Sponsor for many years and successfully tendered for this design work. The APDO had already contributed design ideas under the original ACP and produced material of sufficient detail to form part of the Engagement Material. The preferred design is the simplest being a straight-in RNP approach with minimum leg lengths from IAF to FAF and MAPt remaining outside of CAS as shown in Fig 3

24. They are a CAA Approved Procedure Design Organisation which uses ICAO Doc8168 PANSOPS and satifies DP d)

354. The change sponsor should consider the environmental impact of any potential design option (for example, the design of the track over the ground or restrictions on the number of aircraft that can use the procedure on a given day).

25. Pre-pandemic demand for the approaches was a small percentage of the total movements for the Airport. Out of approximately 15,000 mpa (7,500 landings) around 100 were anticipated being customers for the IAP. The main user being BN2 Islander aircraft arriving for maintenance. Post Covid-19 lockdown the annual movements have fallen dramatically in line with the rest of industry and in particular due to restriction from Scottish Government lock downs. At the time of writing (April 2022) traffic has not yet returned to the baseline figure and forecasts remain pessimistic.

26. The very low utilisation of the IAP means that measuring the environmental effects of an occasional light aircraft movement quantitively is not possible due to unsustainable costs. Furthermore, the short final approach segment is similar to tracks flown now especially within 1 nautical mile of the runway end.

355. When considering the impact, the change sponsor should set out the change that is anticipated from the introduction of the proposed IAPs along with any supporting evidence. This should include the anticipated change in the number of aircraft using the aerodrome, the change in the type of aircraft using the aerodrome, changes to the altitude of aircraft using the procedure and the change to areas overflown by the introduction of the IAPs.

27. The business imperative driving the introduction of the IAP is to help ensure BN2 Islander aircraft arrive on time for planned or ad hoc maintenance. The fleet of aircraft are employed *inter alia* in passenger air services and delays in turning airframes around during maintenance has a detrimental effect on the network. Although other aircraft may make use of the approach the numbers anticipated are small. The chosen option has a short straight in approach which is generally the route aircraft landing on runway 25 take now. If anything, they will be slightly higher to start with as the Initial Approach Fix is 2500'.

356. No further environmental assessment will be necessary if:

• the change sponsor can reasonably demonstrate that the introduction of the RNP IAP is not expected to increase the total number of aircraft movements at the aerodrome in the first two years after introduction, by 10% or more (by at least a minimum of 3,650 movements per year), and;

29. The estimated number of approaches is likely to be 100 per year mostly comprising the Islander aircraft arriving for planned maintenance. These aircraft arrive already but are often delayed by weather. The approach will help these arrive on time but not increase total movements in the first two years after introduction.

• the proposal does not change the final approach path of aircraft to the runway within 1nm from the runway end, and;

30. The proposed design comprises a straight in approach. The Final Approach Fix is 4.4nm from the runway and the track over the ground is the same in the latter stages as for an aircraft on a visual approach in the circuit within 1 mile of the runway end. See Fig 3.

• the proposal will not change the environmental impact of aircraft utilising other aerodromes

31. The nearest other airports are Glasgow (GLA) 17 miles to the west and Edinburgh (EDI) 20 miles to the east. The approach and missed approach paths do not enter their Controlled Airspace and existing Letters of Agreement covering traffic services will be rewritten. As the IAP remains outside both of their controlled airspace, Cumbernauld traffic can arrive without requiring to be separated from GLA/EDI traffic. As there will be no consequential increase in track miles, CO2 or noise for their traffic, introduction will not change the environmental impact on aircraft using GLA/EDI.

357. Even for the larger GA aerodromes, the population exposed to noise above 51dB Laeq16h seldom exceeds 750 people. Therefore a 10% increase in traffic which may lead to around a 10% increase in the number of people exposed, or a maximum increase of 10 movements per day, is an appropriate threshold below which the overall noise impact is likely to be low. This means that undertaking a full environmental assessment as detailed in CAP 1616 for Level 1 changes, is unnecessary.

32. Cumbernauld is in a rural setting with only the town of Falkirk more than 5 nm to the east. See Google map image Fig 4 Apart from the low utilisation, the subject aircraft are mostly piston engine with a low noise footprint especially on approach. These aircraft already operate into Cumbernauld and follow the same final approach path. On circa 7500 arrivals p.a. the anticipated use of the IAP will represent ~1.3% well below the 10% threshold mentioned above. There have been approximately 5000 movements so far this year. (See Table 1). Fig 1 shows areas to avoid for noise sensitivity when flying in the circuit. There are no areas to avoid on final approach. There has generally not been a noise issue with people in the vicinity.

359. In addition to the design of any procedure's track in space, the way in which the change sponsor will operate the procedures will also determine the impact on other airspace users, so the change sponsor will need to develop their operational concept and complete the CAA's ATM Safety Questionnaire. The review and associated feedback of this Questionnaire allows the change sponsor to continue to develop their final Safety Case for the operation of the procedures, which will need to be agreed to enable the CAA to provide an exemption from Article 183(b) of the Air Navigation Order 2016.

33. The ATM Questionnaire has been reviewed by the CAA. The Safety Case and associated Concept of Operations including a Pilot Brief are in course of preparation.

360. Once the change sponsor has assessed the potential procedure design options and the CAA has reviewed the ATM Safety Questionnaire, the change sponsor then engages with affected stakeholders to gather information and to understand views about the potential impact of their proposals.

34. A comprehensive list of Aviation Stakeholders was drawn up for the last ACP (see Appendix 3). This will form the basis of the target audience for new Engagement Material and discussions. Some new potential stakeholders have come to light following conversations with GLA and EDI airspace change teams and these will be added to the engagement list.

361. The Stage 2 Gateway Assessment of the full CAP1616 process is not required. Output from Stage 2

• An assessment of each proposed option (a single option is acceptable with supporting justification) with information as to why it is being considered as a potential option. This information should include how the options meet the design principles as well as qualitative statements on the:

• Impact on safety (guidance in para E50 of CAP 1616)

35. There is but one option considered viable for this RNP approach. It will be designed to ICAO Doc 8168 standards and as it supplements visual approaches is intrinsically safer than existing VFR approaches.

• Environmental impact

36. The very small number of flights anticipated using the approaches which are for the most part existing customer arrivals is not likely to have any additional detrimental effect on the environment either in terms of noise or exhaust emissions.

• Economic impact (Relevant parts of Table E2 of CAP 1616)

37. Currently delayed or diverted aircraft incur costs to the operators. The maintenance business losses money due to their non-arrival. There is often little chance of filling hangar space with other work at short notice.

38. Successful approaches will mean the operators not incurring diversion costs and the maintenance company preserving planned income against targets.

• Impacts (positive and negative) on airspace users

39. There are no known negative impacts of the chosen option on airspace users. The positive for General Aviation in Scotland will be the introduction of an additional bad weather approach.

40. The objective of the simple design includes not having to enter GLA/EDI controlled airspace. Achieving this means that controllers there will not have to accommodate traffic which may require separating from their own traffic.

41. For Class G airspace users, the presence of a defined approach signified by Feathered Arrows on charts will bring certainty as to where traffic might be expected during periods of poor weather. Cumbernauld already provides traffic information to transiting aircraft on frequency in the vicinity.

• Confirmation that the ATM Safety Questionnaire has been reviewed.

42. The ATM Questionnaire has been reviewed with CAA on 6th April 2021 and feedback used to inform the developing Safety Case.

• Feedback from APDO on design options that are to be included in engagement materials (the design options do not need to have been formally approved at this stage but should be able to provide stakeholders with enough information on the likely track and altitude to enable meaningful feedback). • A description of any options that have been considered but are not being proposed and the reasons why they are not being proposed.

• Additional environmental assessment, if required

43. Not required

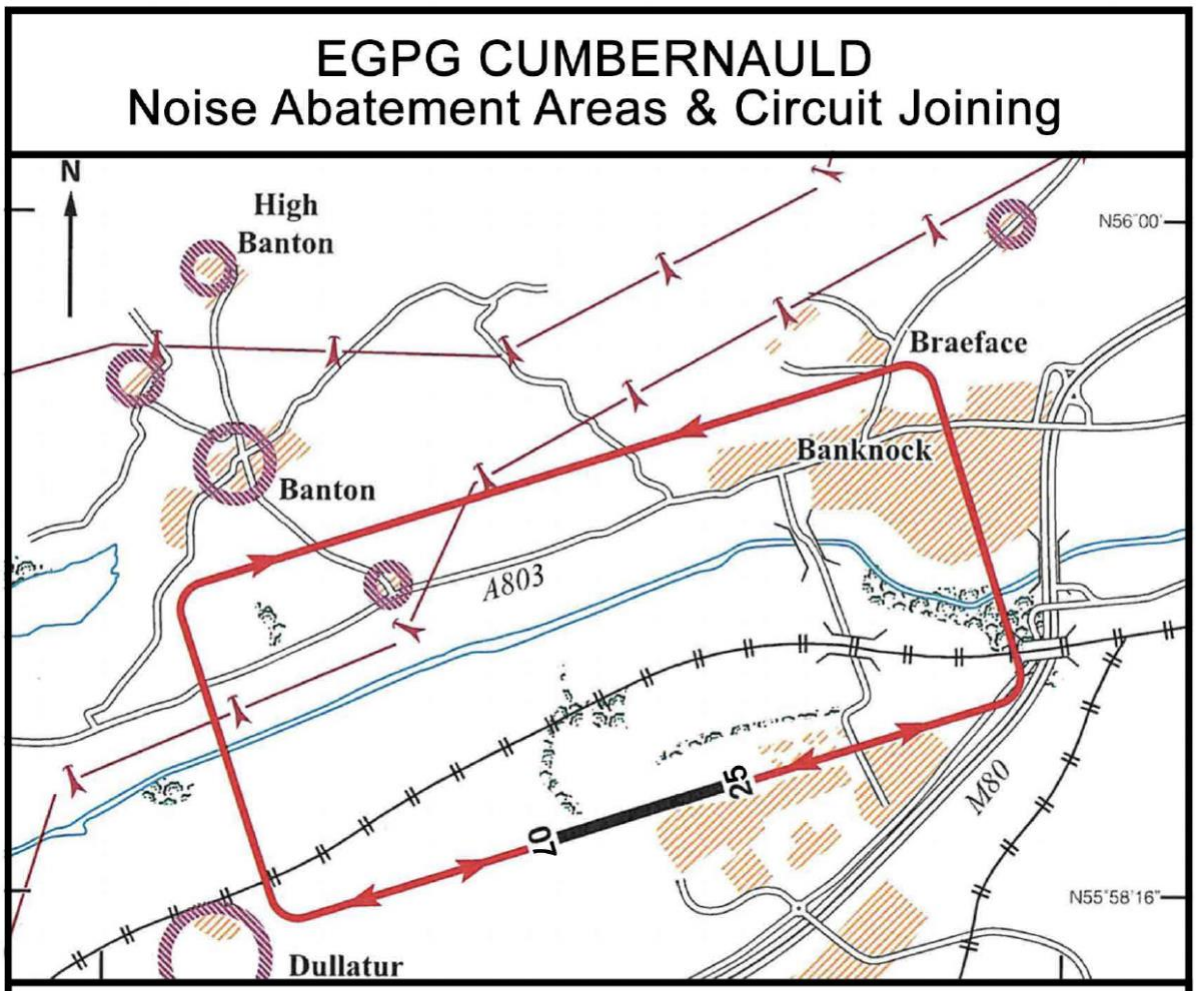
• Determination from the CAA that the proposal can move to Stage 3

Conclusion

44. The Sponsor requests clearance to proceed to Stage 3.

Appendix 1 – Figures

Fig 1. Cumbernauld Noise sensitive areas



Circuits: 800ft QFE, LH on Rwy 07, RH on Rwy 25.
When circuit is active standard overhead join at 2000ft QFE, descending dead-side to join the circuit at 800ft QFE.

Visiting helicopters to follow circuit; position to 25 threshold then proceed to landing pad.

Remarks:
PPR via radio 120.605, tel 01236 722822 or by email: ops@cumbernauldairport.org.

No aircraft is to enter the yellow hatched area at the fuel pump other than by hand manoeuvring.

All fixed wing operators must ensure that aircraft are not left parked on the main apron after fuelling under any circumstances.

No aircraft may start or carry out engine runs with tails directed towards hangars or other aircraft.

Fig 2. Original IAP

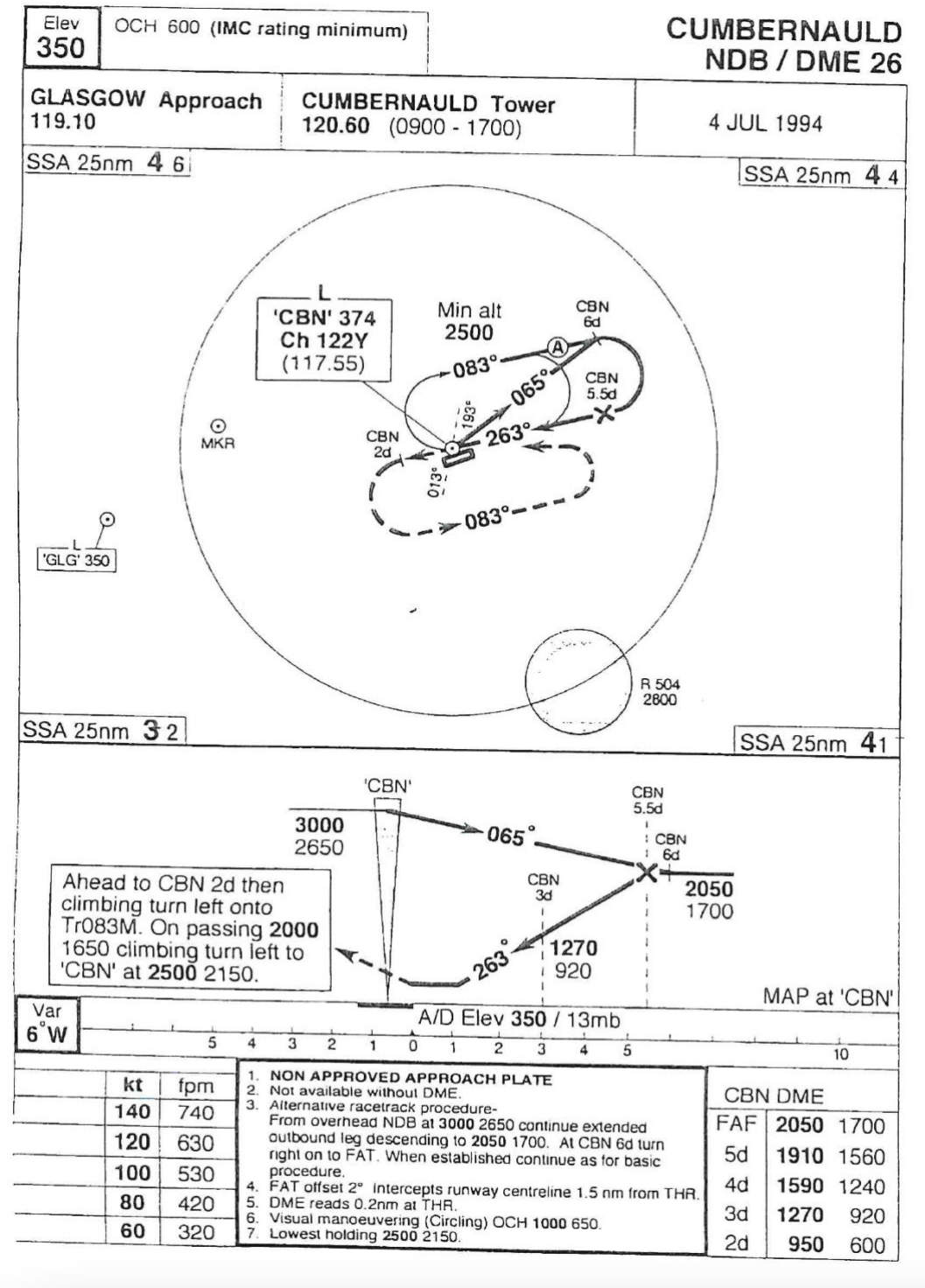


Fig 3a. Preferred option – airspace boundaries

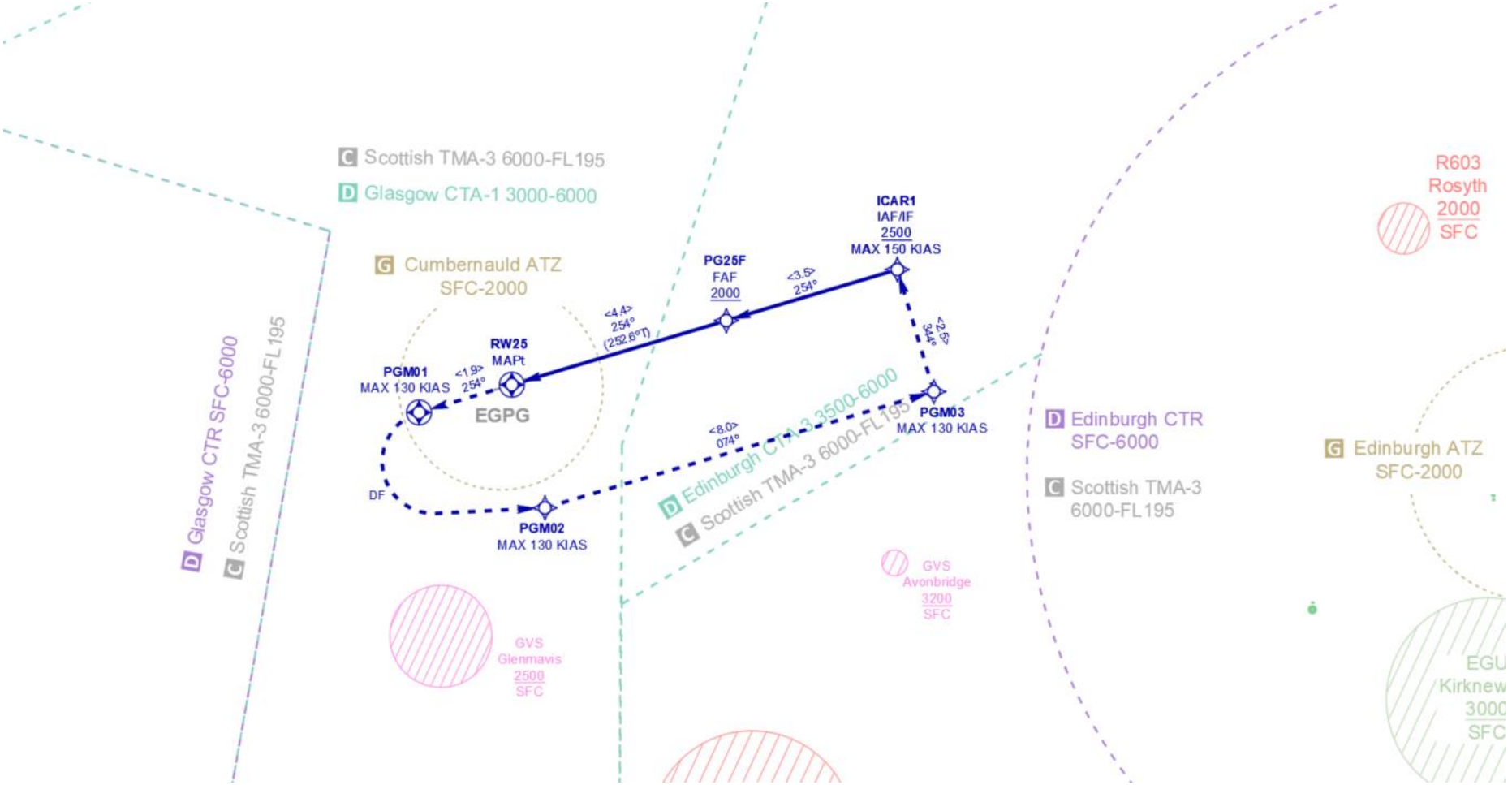


Fig 3b. Preferred option – local road map

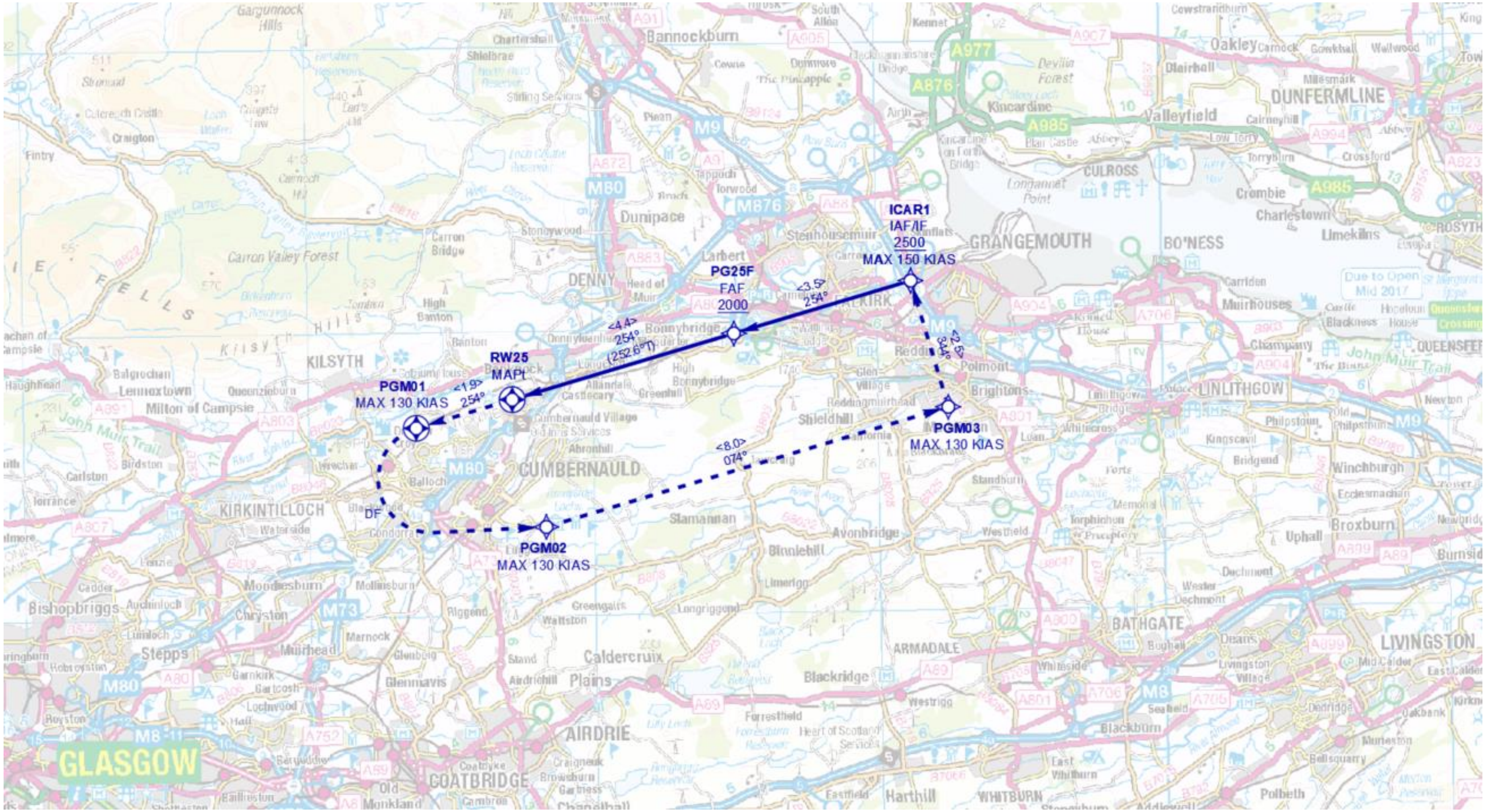


Fig 3c. Preferred option – SkyDemon chart

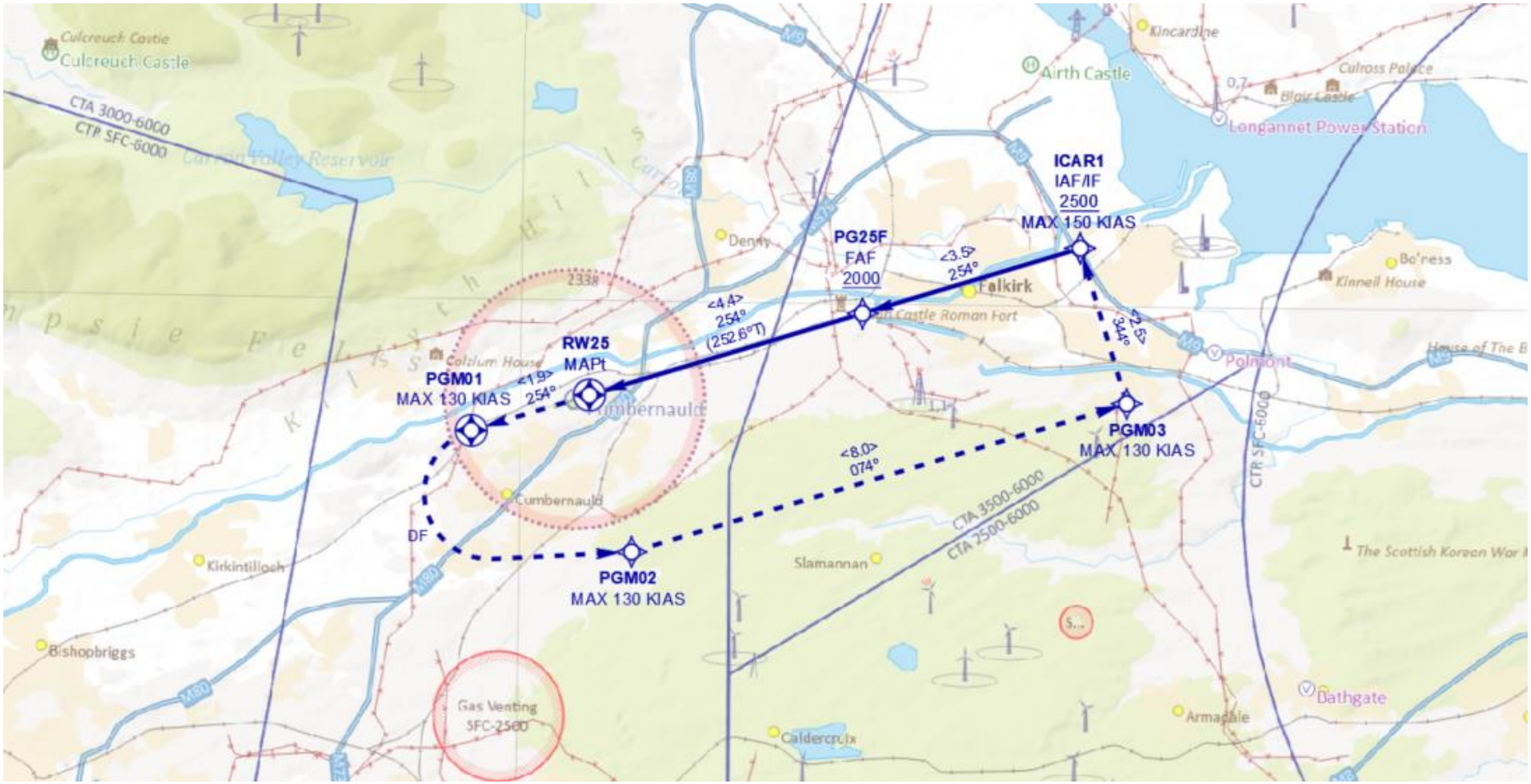
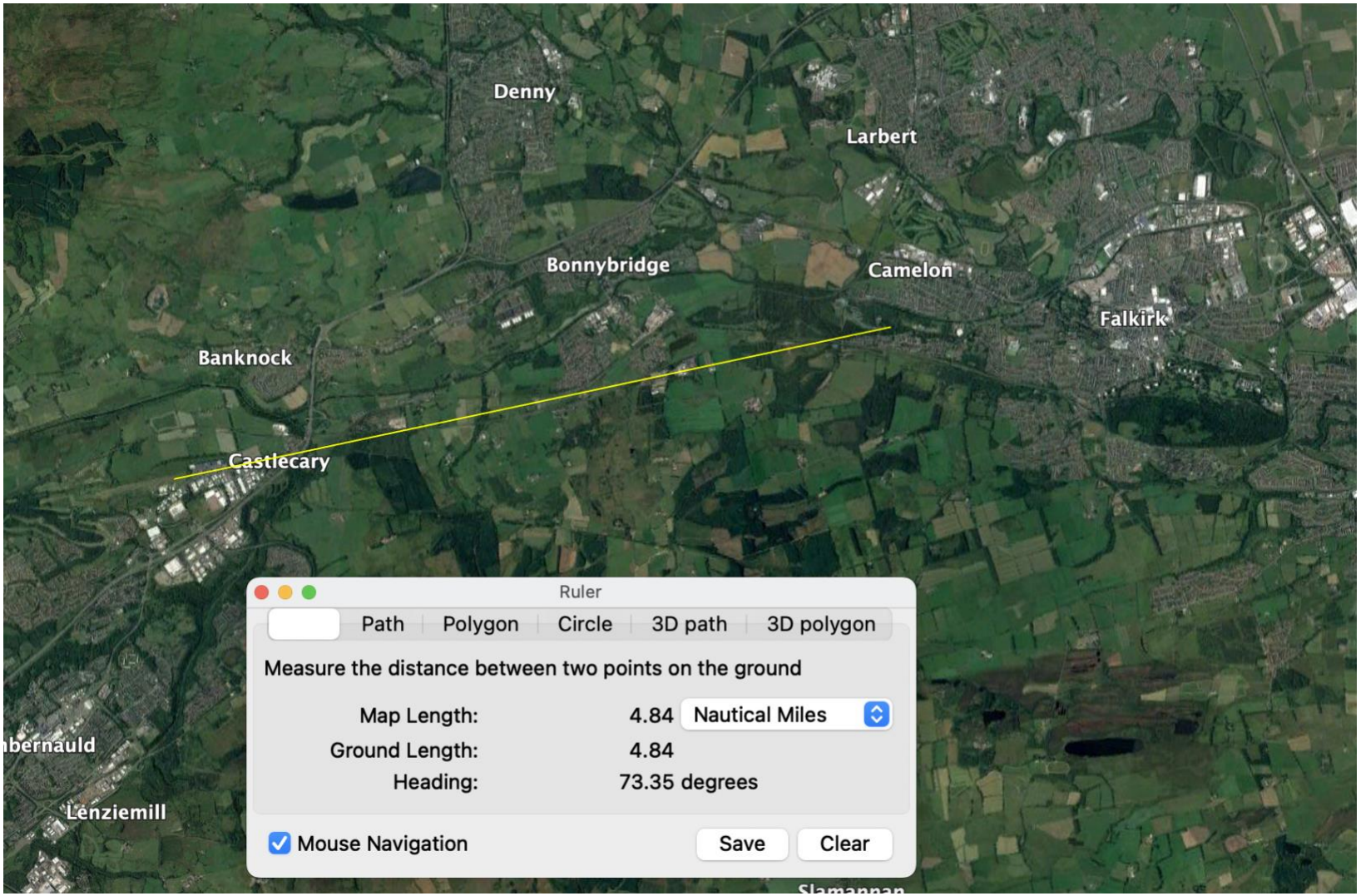


Fig 4. Google Earth image



Appendix 2 Targeted Stakeholders

Airspace4All
Airport Operators Association (AOA)
Airfield Operators Group (AOG)
Aircraft Owners and Pilots Association (AOPA)
Airspace Change Organising Group (ACOG)
Association of Remotely Piloted Aircraft Systems UK (ARPAS-UK)
Aviation Environment Federation (AEF)
Babcock
British Airline Pilots Association (BALPA)
British Balloon and Airship Club
British Business and General Aviation Association (BBGA)
British Gliding Association (BGA)
British Helicopter Association (BHA)
British Hang Gliding and Paragliding Association (BHPA)
British Microlight Aircraft Association (BMAA)
British Model Flying Association (BMFA)
British Skydiving
Drone Major
Edinburgh Airport
General Aviation Safety Council (GASCo)
General Aviation Alliance (GAA)
Glasgow Airport
Guild of Air Traffic Control Officers (GATCO)
HM Coastguard
Honourable Company of Air Pilots (HCAP)
HeliAir
Helicopter Club of Great Britain (HCGB)
Iprosurv
Light Aircraft Association (LAA)
Ministry of Defence - Defence Airspace
and Air Traffic Management (MoD DAATM)
NATS
PDG Helicopters
Phoenix Flight Training
PPL/IR (Europe)
RABA
Scottish Air Ambulance
UK Airprox Board (UKAB)
UK Flight Safety Committee (UKFSC)

Appendix 3 Acronyms & Abbreviations

AAL Above aerodrome level
AGCS Aerodrome Ground Communications Service
AMSL Above mean sea level
ANO Air Navigation Order
AOC Air Operator Certificate
ATC Air Traffic Control
ATS Air Traffic Services
ATSU Air Traffic Service Unit
ATZ Aerodrome Traffic Zone
CAA Civil Aviation Authority
CAP Civil Aviation Publication
CAT Commercial Air Transport
CFIT Controlled Flight into Terrain
CNS Communication, Navigation and Surveillance
CTA Control Area
CTR Control Zone
DME Distance Measuring Equipment
DOC Designated Operational Coverage
FAF Final Approach Fix
FL Flight Level
GA General Aviation
GNSS Global Navigation Satellite System
GPS Global Positioning System
IAF Initial Approach Fix
IAP Instrument Approach Procedure
ICAO International Civil Aviation Organisation
IF Intermediate Fix
IFR Instrument Flight Rules
IMC Instrument Meteorological Conditions
LNAV Lateral Navigation
LOC Loss of control
LPV Localiser Performance with Vertical guidance
MAC Mid-air collision
MAP Missed Approach Procedure
MAPt Missed Approach Point
MET Meteorological
MHz Mega Hertz
MSA Minimum Sector Altitude
NDB Non-directional Beacon
NM Nautical Mile
OCA(H) Obstacle Clearance Altitude (Height)
PANS - OPS Procedures for Air Navigation Services – aircraft operations
RNP Required Navigation Performance
PPR Prior Permission Required
QFE Q-code for atmospheric pressure at Field Elevation
QNH Q-code for atmospheric pressure at Sea Level
RCF Radio Communications Failure
RCOLL Runway COLLision
RESA Runway End Safety Area
REXC Runway EXCursion accident
RWY Runway
SMS Safety Management System
SSR Secondary-Surveillance Radar
UKAIP United Kingdom Aeronautical Information Publication
VFR Visual Flight Rules
VMC Visual Meteorological Conditions
VM(c) Visual Manoeuvring (Circling)
VR Visual Room

Unintentionally Blank