Swanwick Airspace Improvement Programme
Airspace Development 5
LAC West – ATS Route Connectivity Improvements

SAIP AD5
Gateway documentation:
Stage 3 Consult

Step 3A Draft Consultation Document

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Issue 1.0	Jan 2019	First draft submitted to CAA
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References

Ref No	Description	Hyperlinks
1	SAIP AD5 CAA web page – progress through CAP1616	(link)
2	Stage 1 Statement of Need	(link)
3	Stage 1 Assessment Meeting Presentation	(link)
4	Stage 1 Assessment Meeting Minutes	(link)
5	Stage 1 Design Principles	(link)
6	Stage 2 Design Options	(link)
7	Stage 2 Design Principle Evaluation	(link)
8	Stage 2 Initial Options Safety Appraisal	(link)
9	Stage 2 Level 1 Compliance Paper	(link)
10	Stage 3 Consultation Strategy	(link)
11	Stage 3 Full Options Appraisal	(link)

Airline Stakeholder Glossary

Airline Callsign Abbreviation	Name	Airline Callsign Abbreviation	Name
AAL	American Airlines	*RYR*	Ryanair
ACA	Air Canada	*STK*	Stobart Air
BAW	British Airways	*TCX*	Thomas Cook
BEE	Flybe	*TOM*	TUI Airways
DAL	Delta Airlines	*UAL*	United Airlines
EXS	Jet2	*VIR*	Virgin Atlantic

Contents

1. Introduction

1.1 The airspace change process

This document forms part of the document set required in accordance with the requirements of the CAP1616 airspace change process. This document aims to provide adequate evidence to satisfy Stage 3 Consult Gateway, Step 3A Draft Consultation Document.

For previous stages of the airspace change process, including the statement of need, design principles and design options, please see the CAA website detailing the progress of this proposal (also see the reference table on previous page).

Our stakeholders are considered to be an aviation expert audience; therefore we will use aviation technical language in this consultation document, in English only.

1.2 The purpose of consultation

This consultation allows NATS to gather and consider views, and information, about the potential impacts of this Airspace Change Proposal.

Each stakeholder is given the opportunity to provide relevant feedback, which may conflict with that of other stakeholders. NATS will design the airspace in line with current government guidance[1] unless there is a clear, justified remit across affected stakeholders to do differently, or if the needs of other air navigation service providers (ANSPs) take primacy, in order to progress the proposal. NATS will consider all consultation feedback when producing the final design proposal, after the consultation has ended.

Stakeholders therefore have a crucial role in providing relevant and timely feedback to the Change Sponsor (NATS) in the form of their views and opinions on the impact of a particular Airspace Change Proposal.

2. About this consultation

2.1 Overview

NATS' Swanwick Airspace Improvement Programme (SAIP) is proposing a number of modular airspace changes within the London Flight Information Region (FIR), managed by NATS Swanwick. It aims to modernise each region via airspace deployments (ADs) in different regions of the FIR.

This module, SAIP AD5, concerns the development of the following distinct areas of LAC west airspace:

- Establish appropriate CAS and ATS Routes for Birmingham arrivals and departures via the MOSUN area
- Provision of offload route and appropriate CAS for some traffic inbound to Heathrow
- Establish or revise a number of high-level ATS Routes in the West End Sector Group
- Amend the boundary of TRA 002, in conjunction with the MoD

The current airspace structure does not provide a predictable controlled environment for EGBB traffic, which routes via MOSUN. This traffic currently leaves CAS and is often given tactical shortcuts which are different to the longer flight planned route; thus carrying more fuel than required.

Currently, if the EGLL OCK (Ockham) stack is above capacity, arrivals are routed from OCK to BNN (Bovingdon). This can lead to an incredibly complex operational environment which has previously led to extreme traffic loading and an unsustainable workload.

As part of the SAIP project's requirement to, where possible, enable fuel and CO_2 savings for operators; a number of amendments to ATS routes within the western region are being proposed. They will provide more flight planning options and enable the reduction of fuel uplift/ burn and associated emissions.

Please consider the proposed routes in this document and send us your feedback on these changes.

[1] Department For Transport, Air Navigation Guidance 2017 (Oct 2017)

2.2 Stakeholders

Stakeholders are third-party groups or individuals interested in an airspace change proposal.

NATS does not plan to target organisations whose primary interest is environmental, such as noise or air quality, as there would be no discernible change in impact. As part of Stage 2 (Ref 8), we presented analysis which showed that there would not be a discernible noise or visual impact as a consequence of a potential descent to FL65, from a small number of GA aircraft. As outlined in Section 5 below, the environmental analysis requirements for this proposal have therefore been scaled equivalent to a Level 2 change i.e. CO_2 emissions only.

This is all in accordance with our engagement plan described in the consultation strategy (Ref 10). We have described stakeholders who were specifically engaged as part of Stages 1 and 2, and will also be targeted in the consultation as key stakeholders. Stakeholders who will be targeted as part of the consultation, but were not engaged with as part of Stages 1 or 2, have been referred to as other stakeholders.

The key stakeholders are the GA and MoD communities; EGBB and EGLL airports; and relevant ANSPs (IAA) and airline operators who would be affected by the changes presented herein.

NATS has engaged with the IAA (Irish Aviation Authority) throughout the SAIP AD5 design work. The importance of IAA involvement and acceptance was reflected in Design Principle 6, seeking ANSP achievement; as covered in the Design Principles document (Ref 5). The IAA will be invited to respond to the consultation as a key stakeholder. Alongside this, any changes which affect the interface with the IAA will have to be agreed via the international letter of agreement process which governs these arrangements.

The other stakeholders are the National Air Traffic Management Advisory Committee (NATMAC); relevant GA airfields and local airfields. A full list of all key and other stakeholders can be found in Annex A of the consultation strategy (Ref 10). We will target all of the stakeholders for an in-depth response as part of this consultation. They will each be informed via email when the consultation launches, providing them with the consultation material and inviting a response.

A link to the consultation will be available on the public NATS website and the NATS Customer Affairs website, used by our customer airlines. Everyone is welcome to respond, however our target for this consultation is to acquire responses from the targeted key and other stakeholders.

2.3 Engagement Activities

NATS has undertaken stakeholder engagement prior to and throughout SAIP AD5's development to date, as described in the stakeholder engagement evidence found in the consultation strategy document (Ref 10).

All of the key stakeholders were engaged with and invited to contribute to the design options developed as part of Stages 1 and 2. There were separate workshops held for the GA/ MoD and airline/ airport representatives, where participants were asked to provide feedback on the proposed design concepts. There was also frequent two-way correspondence via email, face to face meetings, attendance at real time simulations and telephone calls.

We have also presented the proposed changes at the Airspace and Flight Efficiency Partnership (AFEP) and the North American/ European Air Traffic Flow Management Task Force (NAMEUR) meetings. The meetings were attended by a wide variety of representatives from areas including UK and North Atlantic airline operators and Eurocontrol.

All of the above stakeholders and engagement activities have been described fully in our consultation strategy document (Ref 10).

3. Current Airspace

3.1 Birmingham Traffic Flows

The current EGBB traffic flows relevant to this proposal are the arrivals and departures which route via MOSUN, as shown in Figure 1 below. Aircraft currently join and leave CAS via MOSUN at FL170 or above. The proposed changes to this area of airspace can also be seen in Figure 2; this is covered fully in Section 4.3.1 below.

3.1.1 Arrivals

Traffic inbound to Birmingham may flight plan via the MOSUN area in accordance with the UK Standard Route Document (SRD) and using the Flight Plannable Directs (DCTs) published in RAD Appendix 4 during the same hours as departures detailed below. Traffic inbound to Birmingham from this direction utilises the GROVE Hold and in most cases is descended to FL80 towards GROVE.

3.1.2 Departures

As described in the AIP (AD 2.EGBB), the Birmingham-MOSUN departure procedure is only available between the following times:
Mon-Fri 1700-1000 (1600-0900); Fri 1700 (1600) - Mon 1000 (0900).
For turboprop aircraft joining or leaving at MOSUN FL160 or below, the Birmingham-MOSUN Procedure is available without restriction.

There are currently limited flightplanning options for flights between Birmingham to and from the south/ south-west. Whilst the procedures via MOSUN are flight plannable they are not compulsory when they are available, as they force aircraft outside Controlled Airspace. There are occasions when aircraft flight plan via the published ATS Route Network and either request, or are given a tactical 'short cut'. However aircraft have to fuel for the original and often longer flightplanned route, as the shortcut cannot be guaranteed; thus aircraft frequently carry more fuel than actually required.

The provision of an ATSOCAS service for Birmingham MOSUN traffic is provided by either NATS Western Radar or the MoD. This service requires coordination between the two functions and creates a high workload for whoever provides this service. This has intensified after recent traffic growth in this region. The uncertainty of the service is another reason why flights sometimes fuel for a longer flightplanned route than actually given.

The current airspace structure does not provide an efficient or predictable controlled environment for Birmingham arrival and departure traffic which routes via the MOSUN area. This traffic sometimes converges in the same area (MOSUN); resulting in a high level of complexity and workload due to the manual tactical vectoring to aircraft leaving CAS by ATC.

3.2 Heathrow Arrival Flows

The current Heathrow traffic flows relevant to this proposal are two high-level routes, used by traffic which has left Irish airspace. There is one main flow over South Wales into Ockham (OCK) and another over North Wales around to the west of Manchester into Bovingdon (BNN). The flow into OCK is by far the busiest hold, and there are occasions on most days when traffic routeing towards OCK needs to be switched to route via BNN.

These flights are currently vectored from the southern flow to the northern flow and can be seen in Figure 3 below. These are referred to as 'Stack Swaps'. This situation usually occurs when the OCK Hold is at full capacity but can also happen during periods of Cumulo-Nimbus activity. Stack swapping aircraft at a 'late' stage, i.e. closer to the Hold, increases the complexity. This has occasionally led to extreme traffic loading and complexity within this region resulting in a high increase in ATC and pilot workload. The proposed changes to this area of airspace can also be seen in Figure 4; this is covered fully in Section 4.3.2 below.

Following the implementation of Free Route Airspace in the Shannon FIR in December 2009, there has been a shift in the number of arrivals into OCK versus those into BNN. This has resulted in an increase in the number of Stack Swaps from OCK to BNN, and in 2017 these totalled approx. 2600. .

Sectors AC S23, TC SW Deps/ OCK (if split from TC SW Deps) and TC North currently initiate and manage these Stack Swaps.

3.3 Current usage

As previously described in the consultation strategy document [Ref 10], a representative group of airlines were engaged with as part of the Stage 2 design options work. These airlines, listed below, were chosen as a representative user group of the current airspace and routes which will be affected by the proposed changes.

American Airlines, Air Canada, British Airways, Delta Airlines, Flybe, Jet 2, Ryanair, Stobart Air, Thomas Cook, Thomson, TUI Group, United Airlines and Virgin Atlantic.

These airlines, alongside airline members of the NATMAC, will be targeted as part of the consultation.

The following sections 3.3.1 to 3.3.3 give an indication of the current use of the airspace and flows which will be affected as part of the proposed changes.

The following traffic flow counts were taken from the EUROCONTROL scenario-based modelling tool NEST for 2017. This is used by the NATS Analytics team for a number of purposes including airspace design and capacity/ traffic flow analyses, at local and network level. Appropriate filters were applied for when each of the below routes are available. The specific filters applied for each of the flows are described in the following sections.

3.3.1 Birmingham Traffic Flows

In 2017 there were 120,655 departures and arrivals to/from Birmingham International Airport. Table 1 below summarises the top 10 most frequent aircraft types found in this data, accounting for 83% of the traffic. The turboprop DH8D made up just over a fifth of all traffic.

This data sample was taken from filtering flights for arrivals to, and departures from Birmingham Airport, in 2017.

Aircraft Type	Generic AC Type	2017 Count	Proportion
DH8D	2-engine turboprop	24,911	20.6%
B738	2-engine turbo-jet	23,525	19.5%
A320	2-engine turbo-jet	13,164	10.9%
A321	2-engine turbo-jet	10,067	8.3%
E170	2-engine turbo-jet	8,370	6.9%
A319	2-engine turbo-jet	6,524	5.4%
B752	2-engine turbo-jet	4,914	4.1%
AT76	2-engine turboprop	3,379	2.8%
E190	2-engine turbo-jet	3,015	2.5%
B788	2-engine turbo-jet	2,207	1.8%

Table 1: EGBB Aircraft Types, 2017

Eurocontrol CFMU (Central Flow Management Unit) data was also used to give an indication of EGBB arrivals and departures via NUMPO – GROVE, AND MOSUN. These two flows are applicable to the proposed changes covered in Section 4.3.1 below.

Two sets of CFMU data were used to obtain this information: one which contains the planned waypoints for an aircraft and the other which has the actual waypoints flown over by an aircraft, using a level of tolerance. It is worth noting that this data will not contain all relevant flights, such as night flights which took a direct routing.

The data was filtered using waypoints NUMPO – GROVE for arrivals, and GROVE – NUMPO for departures. The below figures show the planned flights (pre-flight) and actual flights (post-flight) which flew via these areas.

Planned Flights (2017)

EGBB arrivals via NUMPO GROVE – 2,548
EGBB arrivals via MOSUN – 585

EGBB departures via GROVE NUMPO – 0
EGBB departures via MOSUN – 1215

Actual Flights (2017)
EGBB arrivals via NUMPO GROVE – 782
EGBB arrivals via MOSUN – 649
EGBB departures via GROVE NUMPO – 7
EGBB departures via MOSUN – 1,059

3.3.2 Heathrow Arrival Flows

In 2017 there were 1,971 arrivals into Heathrow that could have used the proposed offload route and CAS. Table 2 below summarises the top 10 most frequent aircraft types found in this data, accounting for over 99% of the traffic. The B744 and B772 aircraft types made up just under half of all traffic.

This data sample was taken from filtering flights that flew over a specific waypoint pair (e.g. BEXET/ ELSOX/ MOGLO/ SOVED) and BAKUR/ SLANY. It also only focussed on flights which departed Newark or JFK International Airport and arrived at Heathrow. Flights also had to be at BAKUR/ SLANY before 0745 local time.

Aircraft Type	Generic AC Type	2017 Count	Proportion
B744	4-engine turbo-jet	495	25.1%
B772	2-engine turbo-jet	485	24.6%
B763	2-engine turbo-jet	436	22.1%
B77W	2-engine turbo-jet	148	7.5%
A346	4-engine turbo-jet	135	6.8%
A333	2-engine turbo-jet	107	5.4%
B789	2-engine turbo-jet	98	5.0%
B764	2-engine turbo-jet	26	1.3%
B752	2-engine turbo-jet	25	1.3%
B788	2-engine turbo-jet	14	0.7%

Table 2: EGLL Aircraft Types, 2017

3.3.3 High-Level ATS Routes

ATS Route Realignment and extension of Q60; KOPUL – UGNUS

In 2017 there were 11,381 aircraft that would benefit from the proposed ATS Route Q60; KOPUL – UGNUS. Table 3 below summarises the top 10 most frequent aircraft types found in this data, accounting for 72% of the traffic.

This data sample was taken from filtering flights that flew over KOPUL at FL315 or above, and then UGNUS or DIKAS.

Aircraft Type	Generic AC Type	2017 Count	Proportion
A333	2-engine turbo-jet	1,467	12.9%
A332	2-engine turbo-jet	1,321	11.6%
B763	2-engine turbo-jet	1,071	9.4%
A320	2-engine turbo-jet	1,018	8.9%
B77W	2-engine turbo-jet	950	8.3%
B744	4-engine turbo-jet	704	6.2%
B772	2-engine turbo-jet	498	4.4%
A346	4-engine turbo-jet	402	3.5%
A321	2-engine turbo-jet	340	3.0%
B77L	2-engine turbo-jet	329	2.9%

Table 3: Q60 KOPUL - UGNUS Aircraft Types, 2017

ATS Route Realignment of Q60; MORAG – LANON - UGNUS

In 2017 there were 13,774 aircraft that would benefit from the proposed realignment of ATS Route Q60; MORAG – LANON - UGNUS. Table 4 below summarises the top 10 most frequent aircraft types found in this data, accounting for 82% of the traffic. The turbo-jet A320 made up a significant 44% proportion of this traffic.

This data sample was taken from filtering flights that flew over LANON and UGNUS. No time filters were applied as it was assumed traffic used it as the danger area wasn't active.

Aircraft Type	Generic AC Type	2017 Count	Proportion
A320	2-engine turbo-jet	6,007	43.6%
B738	2-engine turbo-jet	1,114	8.1%
A319	2-engine turbo-jet	792	5.7%
B77W	2-engine turbo-jet	683	5.0%
B763	2-engine turbo-jet	521	3.8%
B789	2-engine turbo-jet	519	3.8%
A321	2-engine turbo-jet	485	3.5%
A333	2-engine turbo-jet	427	3.1%
B772	2-engine turbo-jet	380	2.8%
B788	2-engine turbo-jet	356	2.6%

Table 4: Q60 –MORAG – LANON - UGNUS Aircraft Types, 2017

ATS Route N24; PEMOB – NIGIT

In 2017 there were 14,600 aircraft that would benefit from the proposed ATS Route N24; PEMOB – NIGIT. Table 5 below summarises the top 10 most frequent aircraft types found in this data, accounting for 81% of the traffic.

This data sample was taken from filtering flights that flew over either BAKUR or SLANY and then NIGIT, with an RFL of FL335 and above. Data was also filtered to remove any flights arriving at a UK (EG**) airport.

Aircraft Type	Generic AC Type	2017 Count	Proportion
A320	2-engine turbo-jet	3,903	26.7%
B738	2-engine turbo-jet	2,025	13.9%
A333	2-engine turbo-jet	1,416	9.7%
B763	2-engine turbo-jet	1,100	7.5%
B77W	2-engine turbo-jet	791	5.4%
B772	2-engine turbo-jet	690	4.7%
B764	2-engine turbo-jet	538	3.7%
A332	2-engine turbo-jet	522	3.6%
B752	2-engine turbo-jet	455	3.1%
B789	2-engine turbo-jet	417	2.9%

Table 5: N24 PEMOB - NIGIT Aircraft Types, 2017

ATS Route P155; MORAG – XXXXX (awaiting a new 5LNC) – HON

In 2017 there were 2,374 aircraft that would benefit from the proposed ATS Route MORAG – XXXXX (awaiting a new 5LNC) - HON. Table 6 below summarises the top 10 most frequent aircraft types found in this data, accounting for 89% of the traffic.

This data sample was taken from filtering flights that flew over a specific waypoint (e.g. BEXET, MOGLO, RILED) and entered the UK FIR via another specific waypoint (e.g. BAKUR, DEXEN, SLANY); before exiting the UK via either REDFA or SOMVA at FL345 and above.

Aircraft Type	Generic AC Type	2017 Count	Proportion
B763	2-engine turbo-jet	448	18.9%
B744	4-engine turbo-jet	348	14.7%
B772	2-engine turbo-jet	278	11.7%
A333	2-engine turbo-jet	246	10.4%
A332	2-engine turbo-jet	218	9.2%
B77W	2-engine turbo-jet	142	6.0%
B752	2-engine turbo-jet	125	5.3%
B788	2-engine turbo-jet	104	4.4%
B748	4-engine turbo-jet	102	4.3%
B764	2-engine turbo-jet	92	3.9%

Table 6: P155 MORAG – XXXXX (awaiting a new 5LNC) - HON Aircraft Types, 2017

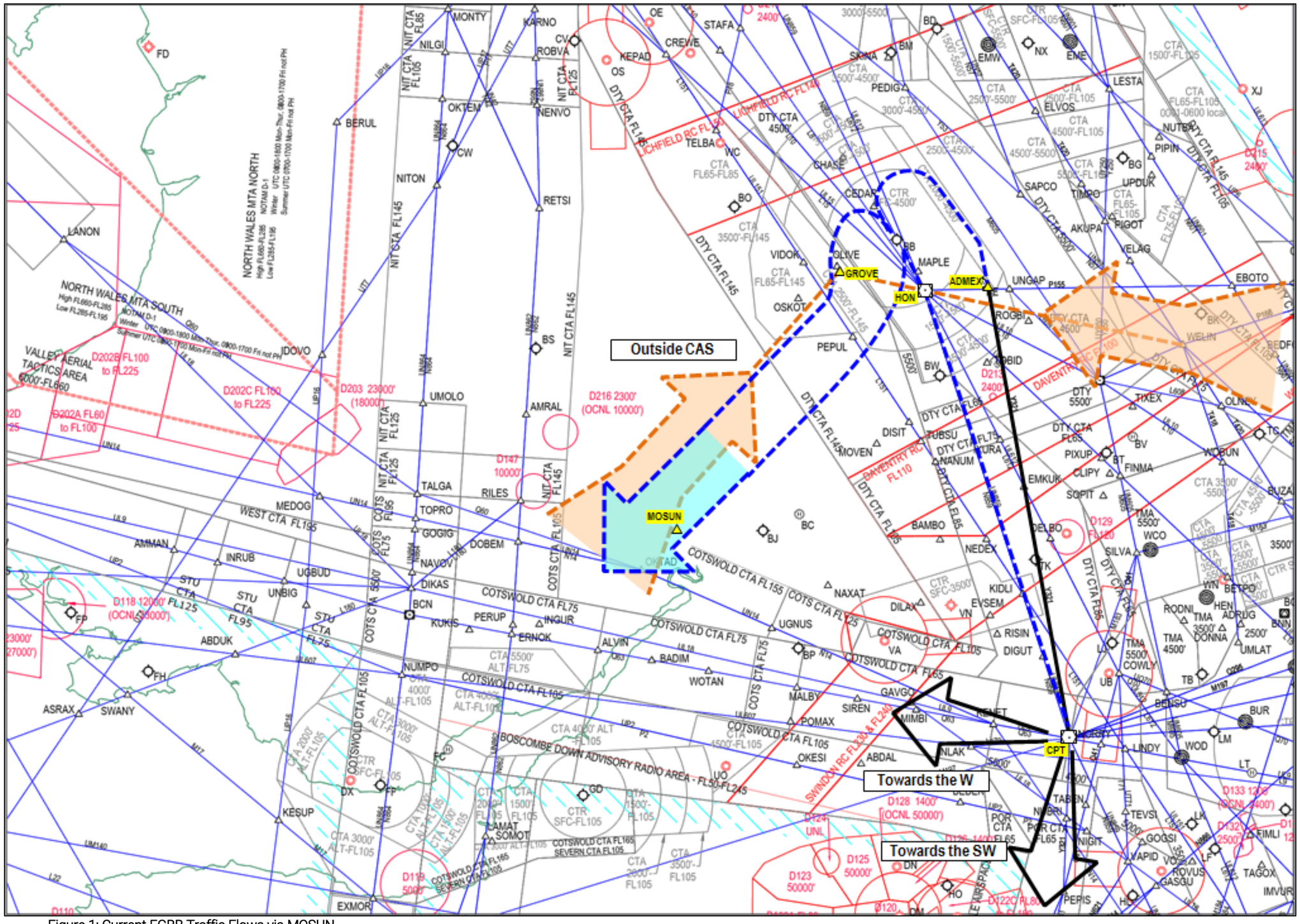

Figure 1: Current EGBB Traffic Flows via MOSUN

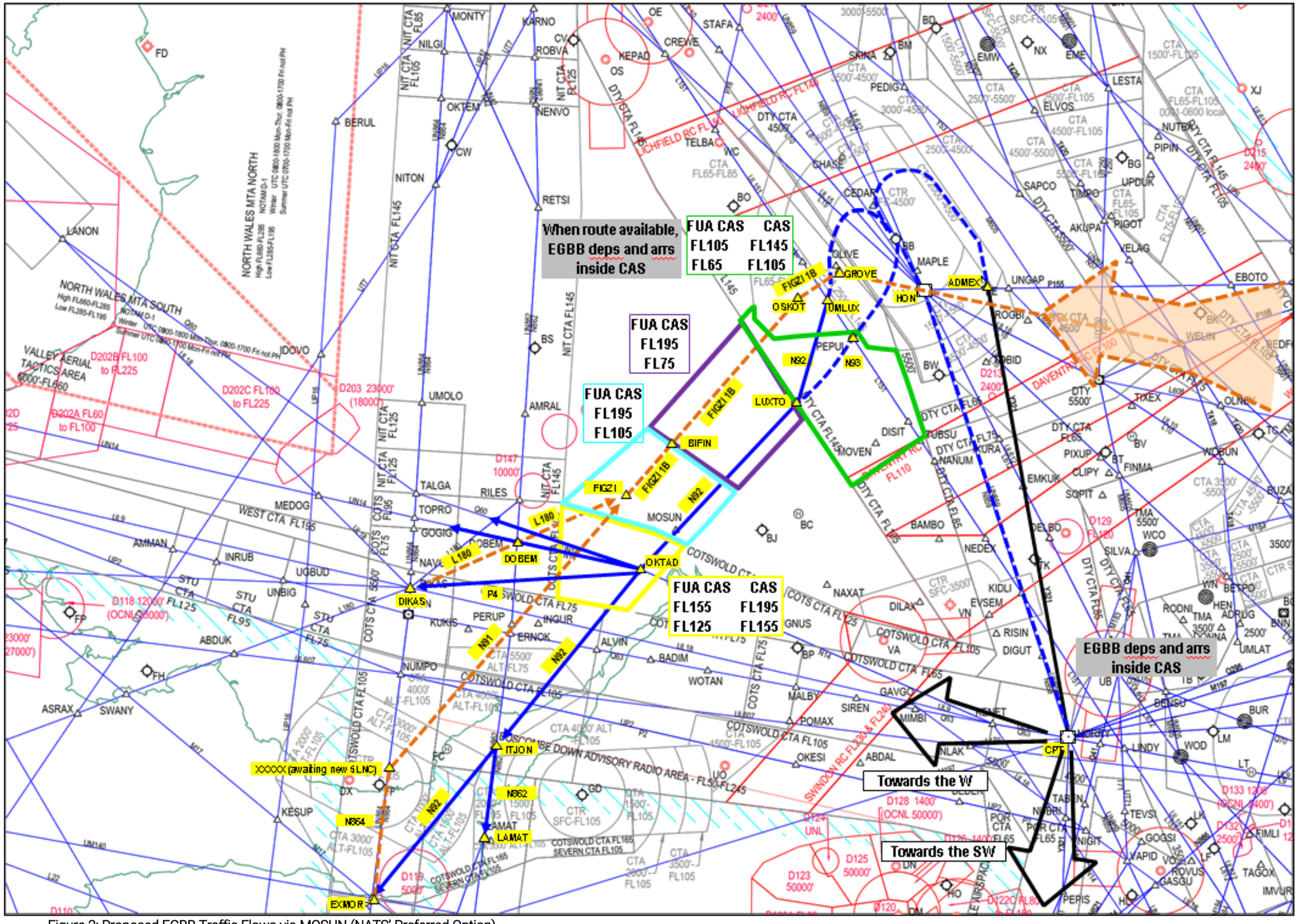

Figure 2: Proposed EGBB Traffic Flows via MOSUN (NATS' Preferred Option)

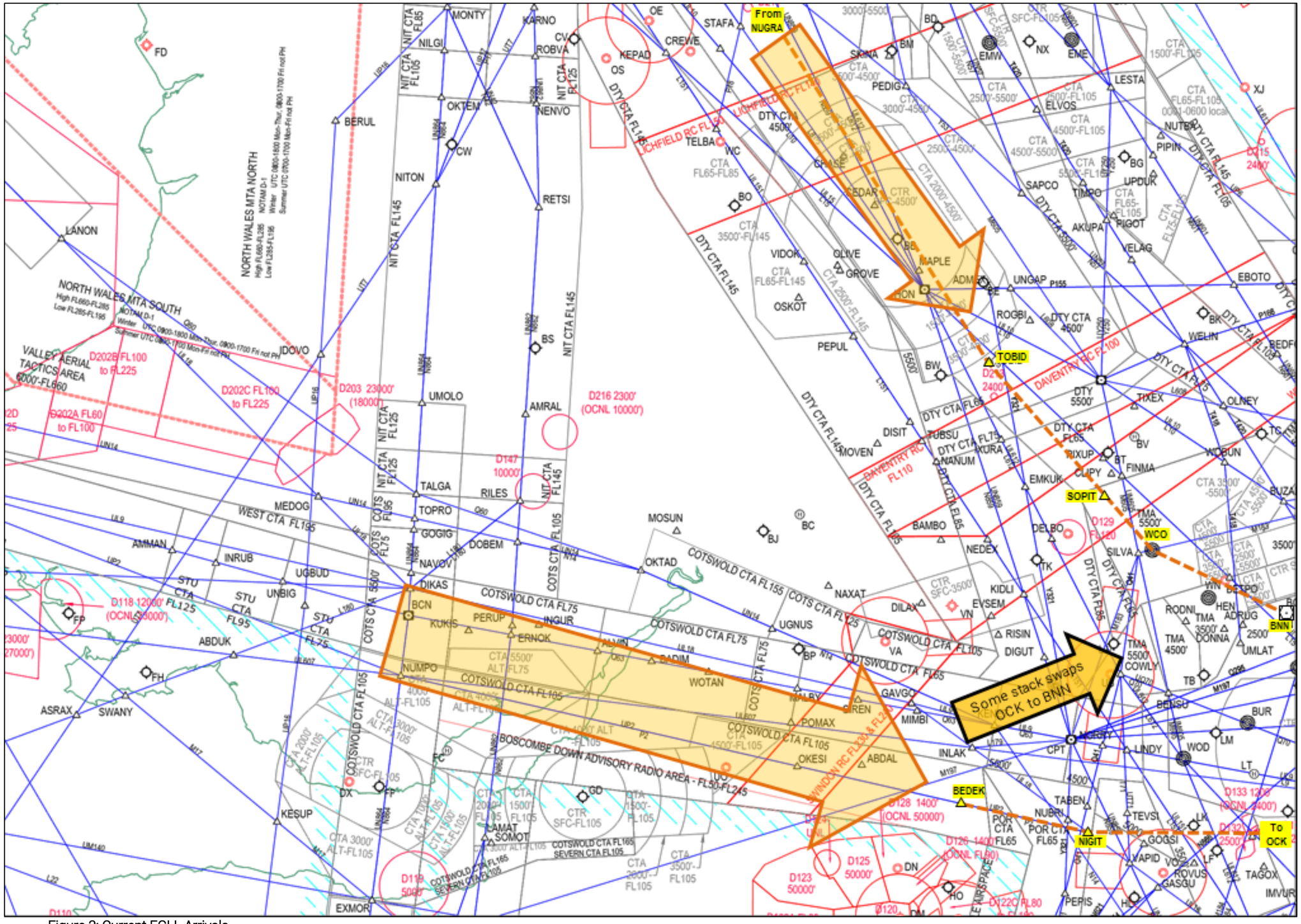

Figure 3: Current EGLL Arrivals

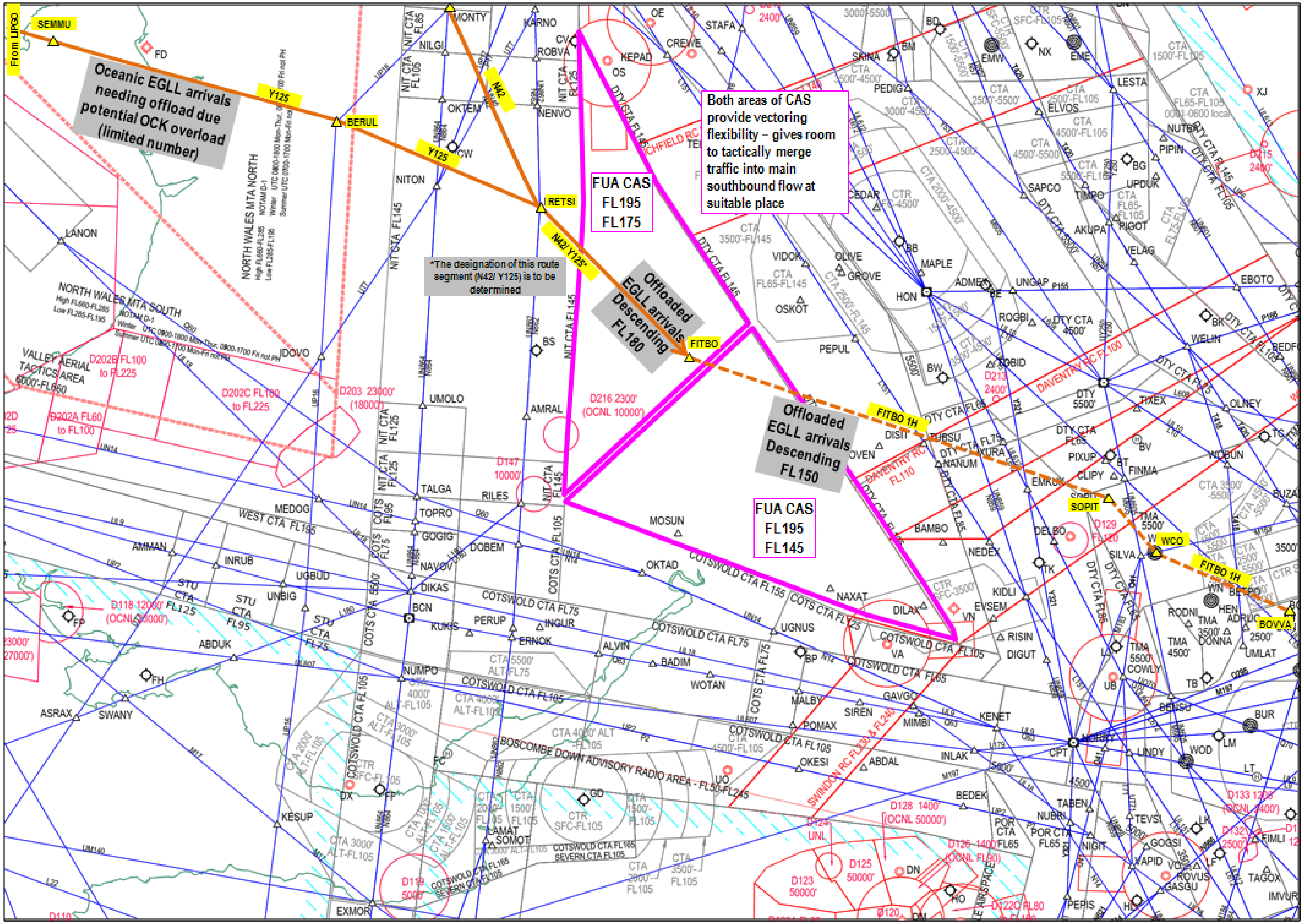

Figure 4: Proposed EGLL Arrivals

4. Proposed Changes

4.1 Rationale and Justification behind the proposed changes, and additional objective

The proposed changes have been designed to reduce complexity in the West End sectors by providing streamlined procedures for optimal routing and flightplanning options. This will provide environmental and economic benefits for airline operators alongside increased operational flexibility to airspace capacity management. There is not expected to be an increase in traffic as a result of the proposed CAS and routes.

The proposed changes focus on the following three areas of work:

- New CAS and procedures for Birmingham arrivals and departures to/ from the South-West where currently there is no flight plannable route within CAS which airlines can use between Birmingham and the Brecon area. These flights have to currently leave CAS and are provided with a Flight Information Service (FIS).
- An alternative offload route and CAS for EGLL arrivals from the Irish boundary, across Sectors 5, 23 and 35 into TC Midlands. This will allow for more pre-planned tactical offloading and rerouting of flights. Currently, if the OCK hold is at or near capacity, Heathrow arrivals can be rerouted to the BNN hold, however this often happens at late notice which can lead to a highly complex tactical operation with very high cockpit and controller workload.
- Introduce new high-level and direct flight plannable ATS routes to replicate common tactical behaviour. These proposed changes will also contribute towards NATS overall 10% fuel burn reduction targets from within this project.

NATS' proposed changes have been designed in order to provide improved routing and flight planning options for the benefit of airline and airport operators, and to provide operational flexibility to airspace capacity management. This is our justification.

4.2 Design Principles, evolution to date, and options appraisal

We have engaged with relevant external stakeholders throughout the entire process to date. We initially used operational expertise to agree a set of Design Principles to work from, and assist in developing an appropriate and optimal airspace solution.

Seven Design Principles were constructed around the safety, environmental and operational objectives of the proposal, which should be met by the final design. This work, fully described in Stage 1 of the airspace change process, explained the Design Principles we used to influence the design decisions (Ref 5).

We developed individual design components for the Birmingham and Heathrow CAS/ route designs, rather than focussing on the overall combined design. The design components were based on different geographical designs which had different CAS classification, FUA timings and CDR route status applied to them. There were a total of 21 Birmingham design components and 17 Heathrow design components.

The design components for the small re-design of the RILES Gliding Area and the high-level ATS routes have been considered as either "do nothing" or "implement some or all of the proposed routes". All of these designs are documented in our Stage 2 Design Options document (Ref 6), and covered in subsequent sections.

We evaluated and appraised each of the design components separately against the Design Principles; in order to evaluate each scenario in isolation. Based on this evaluation, the most suitable design components were combined to make full-system design option concepts. This process resulted in four final full-system design options which best met the Design Principles; we are therefore consulting on these four. Further details on how the options were appraised can be found in the Design Principles Evaluation document (Ref 7).

These final design option concepts consider a combination of Class C and D airspace classifications for the Birmingham/ Heathrow CAS and routes. They also specify appropriate FUA timings and CDR1/3 or CDR3 route status, following on from the appraisal. The proposed four design option concepts have all been designed to provide predictable fuel savings and/ or improve ATC flexibility and/or reduce workload for ATC and pilots.

These final four full-system design options are fully described in Sections 4.3 and 4.4 below. NATS have specified a preferred design, which is termed design option 1B; this seeks to maximise flexibility for controllers facilitating Birmingham traffic through a larger volume of CAS and appropriate FUA timings.

Typically we would expect to consider 'doing nothing' as a viable option i.e. leaving the airspace arrangements and procedures unchanged from today. However in this case, doing nothing is not a viable option because of the unsustainable workload and associated potential safety risk which has arisen on several occasions from the manual Heathrow Stack Swaps; as well as the amount of civil traffic flying outside of CAS around Birmingham.

This is considered to be a Level 1 airspace change under CAP1616 due to the proposed CAS volume close to Birmingham, with a base of FL65. This would not change commercial aircraft traffic patterns below 7,000ft but could, potentially theoretically, change some GA traffic patterns outside CAS and below 7,000ft.

In the unlikely event that there are unexpected issues caused by this proposal then short notice changes could be made via NOTAM or by adding a RAD restriction. For a permanent reversion, the changes would have to be reversed by incorporating this into an appropriate future AIRAC date; of which there are only four a year.

4.3 Preferred Combined Design Option – Design Option 1B

This section describes NATS' preferred system-wide design option, out of the four we are consulting on. It has been broken down into the different geographical elements of this proposal: Birmingham arrivals and departures; the Heathrow offload route and CAS; high-level ATS Routes and changes to the TRA002.

A final summary paragraph (4.3.5) describes the full preferred combined design option.

4.3.1 Proposed Birmingham Changes

The current and proposed Birmingham traffic flows can be seen in Figure 1 and Figure 2 above. The current flows which will still be used in the future have also been shown on Figure 2 alongside the proposed flows.

NATS proposes to introduce RNAV1 ATS Routes for Birmingham arrivals and departures. Birmingham Airport Limited has a proposal under consideration that will provide connectivity to these from Runway 33. Their published Non Standard Departure via MOSUN from Runway 15 will be amended to route via PEPUL in order to connect with the proposed ATS Route N93. There is an assumed minimum route spacing of 7NM between opposite direction RNAV1 ATS Routes in a 5NM radar separation environment.

The Birmingham arrival routes would use the following routings; both connecting with the new proposed FIGZI 1B STAR (these include working names):
EXMOR (FL240) – N864 – XXXXX (awaiting a 5LNC) – N91 – FIGZI – FIGZI 1B
DIKAS (FL240) – L180 – DOBEM – L180 – FIGZI – FIGZI 1B

The Birmingham EGBB departure routes would use the following routings:
EGBB (Non-standard departure as per current operation) - PEPUL N93 – LUXTO – N92 – OKTAD – L180/N14/P4
EGBB UMLUX (or UMLUX SID if approved) – N92 – LUXTO – N92 – OKTAD – L180/N14/P4

See Section 7: Annex A for the draft coordinates of the major new waypoints described in this proposal.

These routes will be available during the following times of operation:
Monday to Friday from 1700L to 1000L; and Friday 1700L until Monday 1000L.

These routes will be contained within four new blocks of Class C/ D CAS with appropriate base levels to reflect climb and descent profiles. An appropriate controlled airspace containment would be applied which would be cognisant of sector boundaries and CAS containment policy. The northern block of CAS near to EGBB, shown in green, also Class C/ D and larger in size compared to other design options (2A and 2B), covered in Section 4.4 below. This allows maximum flexibility for controllers accommodating EGBB traffic.

The four new proposed blocks of CAS would also be available during the above times; except for the upper sections of two of the proposed blocks of CAS, which we are proposing to split in two and H24 availability:

- FL105 – FL145 of the northern block (Daventry CTA 23), shown in green in Figure 2, would be H24 CAS. Having H24 access to this CAS would provide ATC with significantly greater vectoring options for alleviating congestion and reducing the risk of CAS excursions.
    - Specifically this would benefit the handling of low level southbound flights (FL110 – 130) which conflict with Birmingham arrivals from the south. The proposed block of H24 airspace would allow these to be tactically vectored in order to resolve potential conflictions.
    - Secondly, this proposed airspace could also be used to alleviate the risk of CAS excursions for Oxford departures which initially route north. Weather conditions can increase the risk of this traffic inadvertently leaving CAS.

- FL155 – FL195 of the southern block (Cotswold CTA 5), shown in yellow in Figure 2, would also be H24 CAS.
  This would also help to minimise the risk of CAS excursions around the Cotswold CTA and provide controllers with more flexibility whilst handling Birmingham joiners and leavers.

The splitting of these blocks of proposed CAS has arisen from analysis of the SAIP AD5 development simulations and feedback from operational experts. Both of the proposed H24 sections of airspace are "cul de sacs" of airspace that our analysis has shown is not used; without airspace users running the high risk of incursion. The proposed additional CAS would give controllers more tactical freedom, whilst reducing the risk of excursion when aircraft are on headings due to simpler designs of CAS. The aforementioned benefits of making these blocks CAS would be realised during and beyond the FUA timings, hence proposing the H24 availability.

We do not anticipate the split blocks of CAS to negatively impact any stakeholders which our initial engagement has also shown. However we still wish to seek feedback on this as part of the overall proposed design.

The division of responsibility will reflect today's division between NATS London Terminal Control Midlands (TC Midlands) at higher levels; and Birmingham Radar at lower levels near to the airport. The other blocks of CAS will have a classification of either C/ D, dependent on the appropriate division of responsibility and levels of CAS.

The proposed changes will provide aircraft operators and ATC with more predictability for flight and fuel planning. They will also provide a shorter route option to and from Birmingham to the south-west/ west destinations, than is often currently used. The proposed routes have been designed to introduce as low workload as possible for controllers handling Birmingham arrivals and departures on these routes. The overall workload should decrease as controllers have to currently manually vector these traffic flows outside of CAS; which requires a large amount of coordination, monitoring and controller interactions with pilots and between controllers.

4.3.2 Proposed Heathrow Changes

The current and proposed Heathrow traffic flows can be seen in Figure 3 and Figure 4 above.

NATS proposes to introduce an offload route and CAS for transatlantic traffic inbound to Heathrow with a conditional route status, for when the OCK (Ockham) hold is at full capacity. A CDR3 route status would be used in order to provide predictable flexibility for ATC to be able to offload traffic when required. A CDR1/3 route status would provide an additional flightplannable option and benefit for aircraft operators, however we do not intend to make this route flight plannable nor increase the number of aircraft using the BNN flow. The proposed route will be restricted, such that it is not used significantly more often than how frequently aircraft are currently re-routed from the OCK to BNN hold. This will ensure that no additional complexity is introduced to AC Sectors 5 and 23.

The new unidirectional EGLL RNAV1 arrival ATS route would be contained within two new blocks of Class C CAS with bases of FL175 and FL145 to adequately contain descending EGLL arrivals. The route would use the following routing; connecting with the new proposed FITBO 1H STAR:
LIPGO – Y125 – SEMMU (FL340) – Y125 – BERUL – Y125 – RETSI – N42/ Y125[2] FITBO (FL180) – FITBO 1H

See Section 7: Annex A for the draft coordinates of the major new waypoints described in this proposal.

The proposed Heathrow offload route and CAS would be available on a tactical basis for the offloading and rerouting of identified flights in the early morning. When ACM recognises that S23 and/ or TC Ockham will be at or close to capacity, appropriate arrival flights will be tactically identified and re-routed in Irish airspace to use the new proposed offload ATS Route Y125.

The proposed route is not compatible with the NWMTA (North Wales Military Training Area) Upper and Lower activity and so would be unavailable when either area is active. This is reflected in the proposed timings for the entire design, covered in Section 4.3.5 below.

4.3.3 High-Level ATS Routes

SAIP has a Specific Project Requirement (SPR) to enable fuel savings for airline operators as part of NATS 10% target for RP2. This proposal aims to contribute by rationalising and establishing a number of ATS routes within the West End Sector Group.

[2] The designation of this route segment is to be determined (either N42/ Y125)

NATS proposes to introduce four new high-level ATS Routes which have been designed to reduce fuel uplift/ burn and associated emissions to airlines, by replicating common tactical behaviour or future trajectories expected to be seen in FRA. These ATS Routes are solely for traffic operating above FL195; and there is little or no expected impact on other airspace users.

The four proposed high-level ATS routes have been summarised below. They can also be seen visually in the figures within Section 8 which show the proposed routes in purple; alongside any appropriate existing DCT which is used, in orange.

ATS Route Q60; Realignment and extension KOPUL – UGNUS
This proposed westbound route would provide a more direct route for LTMA overflights which route from Europe and further east, to Ireland and the North Atlantic. It improves on the currently available route which takes aircraft via KOPUL – CPT – KENET – UGNUS. This new high-level ATS route was requested via the FEP (Flight Efficiency Partnership) meetings.

Figure 8 in Section 8 shows the proposed route (purple) alongside the current DCT which is used (dashed orange).

ATS Route eastbound only extension of N24; PEMOB – NIGIT (FL285+)
This proposed eastbound only route extension of the existing N24 would provide a more direct flightplannable route for London FIR overflights and would be available H24 for traffic FL285+. This would replace a commonly used tactical eastbound direct route for UK overflights and likely replicate a track planned in Free Route Airspace.

Figure 9 in Section 8 shows the proposed route (purple) alongside the current DCT which is used (dashed orange).

ATS Route eastbound only extension of P155; MORAG – XXXXX (awaiting a 5LNC) – HON
This proposed eastbound only route would allow UK overflight traffic to exit the UK FIR via SOMVA and REDFA, which would take traffic out of the Central and/ or Lakes sector groups. This would only be available when NWMTA Upper is not active and traffic may have to be destination limited via the RAD in order to manage demand.

Figure 10 in Section 8 shows the proposed route (purple). There is not currently an existing DCT which this proposed ATS Route would replace.

ATS Route Q60; MORAG – LANON (FL335+) and LANON – UGNUS (FL195+)
The proposed bi-directional route between UGNUS – LANON would provide a more direct route for LTMA overflights at FL340+, when the NWMTA Upper is not active. It would also provide a more direct route for Dublin arrivals to access L18 at LANON, when the NWMTA Upper and Lower are not active. The proposed bi-directional route between LANON – MORAG would be used by LTMA overflights at FL340+.

These proposed routes would replicate common tactical bidirectional direct routes which are currently issued in quiet hours. They would allow aircraft operators to flightplan these routes and enable fuel savings.

Figure 11 in Section 8 shows the proposed route (purple) alongside the current DCT which is used (dashed orange).

ATS Route UL18; GAVGO - DIKAS
The proposed administrative change to UL18 would re-align UL18 between GAVGO – DIKAS. The route would be re-aligned from GAVGO – DIKAS; to GAVGO – UGNUS - DIKAS. This would allow route UL18 to be uncoupled from UL9, which is in accordance with the requirement placed on all States to remove Dual Designation by Eurocontrol.

This would be used by UK overflight traffic travelling eastbound. It would also enable traffic routing via LANON to UGNUS, to make use of the realigned Q60; as described in the above section.

Please note that this is an additional proposed administrative change beyond the ATS route information which was originally included in the Stage 2 documentation.

Figure 12 in Section 8 shows the proposed realigned route (purple) alongside the current route which is used (dashed orange).

4.3.4 Proposed TRA002 changes

Slow climbing Birmingham departures on the proposed ATS Route N92 would need to be tactically vectored around the Temporary Restricted Area (TRA) 002. As such, we have engaged with the MoD and negotiated for the north-west corner of TRA002, above and coincident with the boundary of Cotswold CTA 2, from FL195 – FL245 to be reclassified as permanent Class C airspace. NATS will formally action and submit this change.

The proposed change to the TRA002 can be seen in Figure 5 below. The existing TRA002 boundary can be seen in orange.

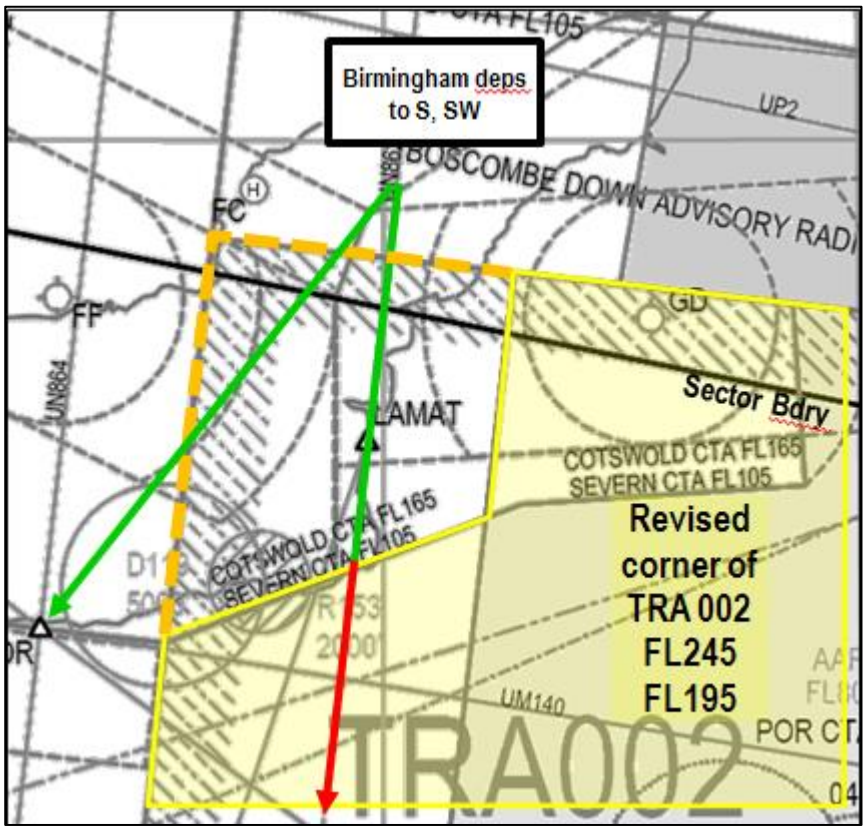

Figure 5: Proposed Change to TRA002

4.3.5 Preferred Combined Design Option 1B

NATS preferred design option is a combination of the proposed changes covered above in Sections 4.3.1 – 4.3.4. The proposed airspace and routes would be available weekday evenings, overnights and mornings; and H24 at the weekend, with appropriate arrangements or consideration of planned special events such as air shows.

This has been referred to as Combined Design Option 1B. Figure 6 on Page 24 shows this Design Option 1B, which includes all of the proposed Birmingham and Heathrow CAS/ route changes. The proposed ATS routes

and TRA002 changes are covered Figure 5, Figure 8, Figure 11, Figure 9 and Figure 10; as they would not easily fit onto the same map.

4.4 Other Combined Design Options

NATS are also consulting on the following three combined system-wide design options, referred to as design options 1A, 2A and 2B. These differ slightly from the preferred design option 1B; notably in the CAS volume near EGBB and the overall airspace FUA arrangements.
Design options 1A and 2A have more restrictive FUA timings than 1B.
Design options 2A and 2B each have a proposed smaller block of CAS near EGBB than 1B.

All of the design options would contain appropriate arrangements or consideration of planned special events such as air shows.

The below Sections 4.4.1 – 4.4.3 describe how these design options differ from the preferred design option 2A, as covered above.

4.4.1 Combined Design Option 1A

Alongside NATS' preferred design option 1B, this design option (1A) would also contain a larger Class C/ D CAS close to Birmingham. However this option has a different proposed FUA arrangement whereby the airspace would be established evenings, overnights and mornings on weekdays and weekends. These are the same FUA timings as for design option 2A.

This design option is less favourable than NATS' preferred design option 1B because the FUA timings would be a lot more restrictive than the preferred option at weekends. It would also create a reduced net saving of fuel burn and CO_2 emissions, as outlined in the Final Options Appraisal (Ref 11).

Geographically, this design option is identical to 1B (NATS' preferred design); they only differ in FUA timings. Figure 6 on Page 24 shows a visual diagram of the system-wide design for options 1B and 1A, which includes all of the proposed Birmingham and Heathrow CAS/ route changes. The proposed ATS routes and TRA002 changes are covered Figure 5, Figure 8, Figure 11, Figure 9 and Figure 10; as they would not easily fit onto the same map.

4.4.2 Combined Design Option 2A

This design option (2A) contains a smaller Class C/ D CAS volume near Birmingham than the preferred design option 1A; thus providing a smaller and less flexible vectoring area. The FUA timings would also be different whereby the airspace would be established evenings, overnights and mornings on weekdays and weekends.

This design option is less favourable than NATS' preferred design option 1A because it would provide less flexibility for controllers facilitating Birmingham arrivals and departures alongside the airspace being available for a smaller amount of time. It would also create a reduced net saving of fuel burn and CO_2 emissions, as outlined in the Final Options Appraisal (Ref 11).

Figure 7 on Page 25 shows a visual diagram of the system-wide design for option 2A (this is geographically the same as option 2B, covered below), which includes all of the proposed Birmingham and Heathrow CAS/ route changes. The proposed ATS routes and TRA002 changes are covered Figure 5, Figure 8, Figure 11, Figure 9 and Figure 10; as they would not easily fit onto the same map.

4.4.3 Combined Design Option 2B

This design option (2B) is geographically identical to option 2A except for a different proposed FUA arrangement whereby the airspace would be established evenings, overnights and mornings on weekdays; and H24 at weekends. These are the same FUA timings as for NATS preferred design option 1B.

This design option is less favourable than NATS' preferred design option 1B because the smaller block of CAS close to EGBB would provide less flexibility for controllers vectoring EGBB traffic.

Geographically, design options 2B and 2A are identical; they only differ in FUA timings. Figure 7 on Page 25 shows a visual diagram of the system-wide design for 2A and 2B, which includes all of the proposed Birmingham and Heathrow CAS/ route changes. The proposed ATS routes and TRA002 changes are covered Figure 5, Figure 8, Figure 11, Figure 9 and Figure 10; as they would not easily fit onto the same map.

4.5 Other changes separate from this proposal

NATS has embarked on a programme of DVOR rationalisation, removing en route dependencies from DVORs. This will have no impact on flight behaviours, but may result in the re-designation of some STARs and waypoint names compared with their designations in this proposal. That on-going work is separate from this proposal, but there is some regional overlap, therefore the STARs and waypoint names ultimately used will need to accommodate those changes.

4.6 Dependencies

We recognise that MoD operations could be impacted by the proposed changes; particularly those around Birmingham and west of the Daventry CTA. As such, we are consulting on time-bounded route availability which would facilitate a flexible use of airspace. This proposal has no impact on the published timings of the NWMTA Upper/ Lower and Danger Area D201 which retain their current published availability which, when activated, would close a number of the proposed routes.

The timeline for this proposed airspace change implementation is fixed by an agreed target implementation date of 7th November 2019; which fits in which the overall NATS change programme.

Typically, an airspace change consultation would have a 12-week duration. That period would push the timeline for implementation beyond the target implementation date and potentially impact upon other projects. As we have already completed significant stakeholder engagement, we feel that a duration of 11 weeks is appropriate and means we would be able to achieve the target implementation date. This is also accounting for the fixed periods of CAA decision-making and AIS data lead time for a single AIRAC cycle.

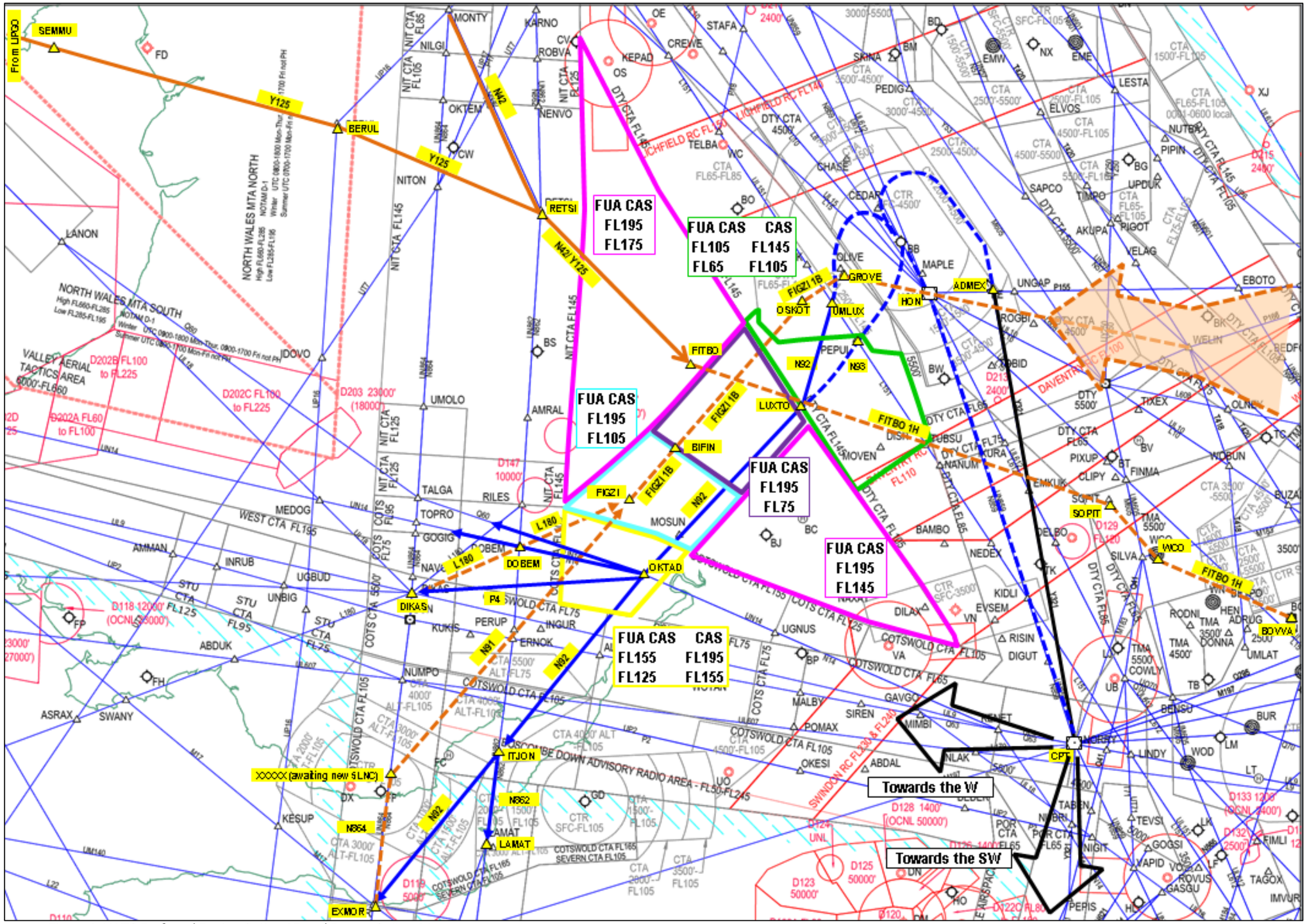

Figure 6: NATS Preferred Design Option 1B and Design Option 1A

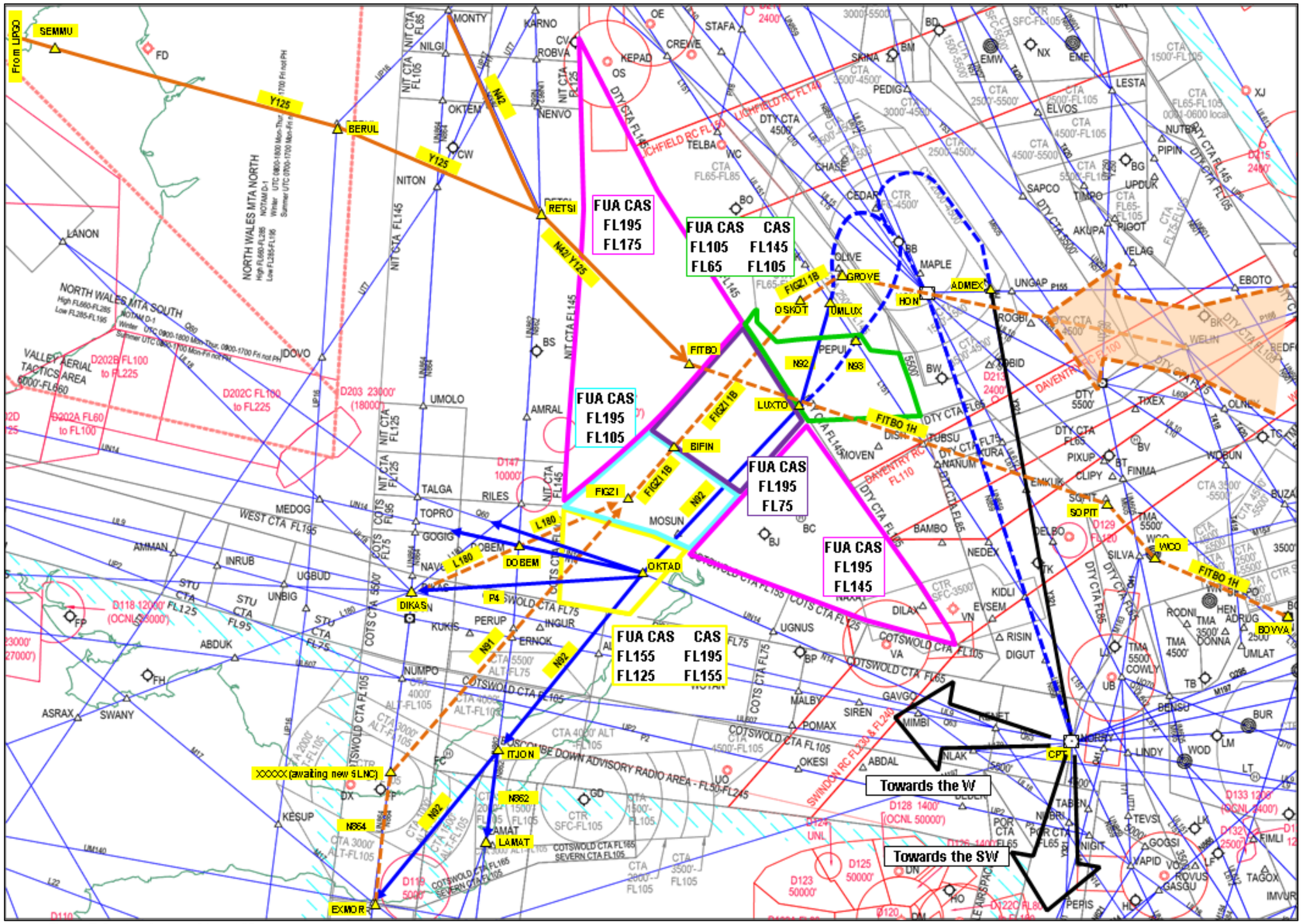

Figure 7: Design Options 2A and 2B

5. Benefits and impacts of this proposal

5.1 Capacity benefit

The aim of the resulting systemisation from this proposal is not to improve upon the capacity or delay of the associated airspace or routes. NATS is therefore not citing any benefit (or disbenefit) in terms of conflict or delay.

5.2 Noise and visual intrusion

This proposal has technically been categorised as a Level 1 airspace change proposal due to the proposed FL65 CAS base close to Birmingham. However as part of Stage 2 (Ref 8), we have assessed that there would not be a discernible noise or visual impact as a consequence of the FL65 base; and its impact on a small number of GA aircraft potentially descending below this base. The environmental analysis requirements for this proposal have therefore been scaled equivalent to a Level 2 change, CO_2 emissions only, and there has been no further environmental analysis completed. This assessment is summarised in a compliance paper which was submitted as part of the Stage 2 assessment (Ref 9).

5.3 Fuel and CO_2

CAP1616 states that for a Level 2A change, there is a requirement for the change sponsor to produce environmental (CO_2) emissions analysis for inclusion in the consultation material. This is due to the reduction of fuel burn and CO_2 emissions being the priority for airspace changes where aircraft operate above 7,000ft. The following data summarises the environmental assessments completed.

The NATS Analytics team have completed a full environmental analysis on the proposed changes presented here. Table 7 below shows the forecast fuel burn and CO_2 emission differences for the proposed changes in the first full year of implementation (2020) and ten years after (2030). It describes the same flows previously described in the document. This is based on the proposed Birmingham FUA timings for NATS preferred design option (1B): active evenings/ overnights/ mornings due weekdays and H24 at weekends.

Traffic Flow (SAIP AD5)	Annual Fuel Burn Change 2020 (T)	Annual CO_2 Change 2020 (T)	Annual Fuel Burn Change 2030 (T)	Annual CO_2 Change 2030 (T)
Birmingham Arrivals and Departures	-489	-1,555	-549	-1,746
Heathrow Offload Route	+71	+226	+80	+254
Q60 KOPUL - UGNUS	-312	-992	-443	-1409
Q60 MORAG – LANON - UGNUS	-118	-375	-158	-502
N24 PEMOB - NIGIT	-659	-2096	-743	-2363
P155 MORAG – XXXXX (awaiting a 5LNC) - HON	-299	-951	-425	-1352
All flows	-1,806	-5,743	-2,238	-7,117

Table 7: Fuel burn and CO_2 forecast changes

This analysis concluded that there would be an annual saving of 1,806 tonnes fuel and 5,743 tonnes CO_2 in 2020 after implementation, due to the proposed design and forecast route usage. The impact assessment indicates that up to a total of 183,547 flights would be impacted by the change by 2020. The analysis has also forecast a further saving of 2,238 tonnes fuel and 7,117 CO_2 by 2030, 10 years after implementation. This analysis was based on the Eurocontrol Strategic Forecasting (STRATFOR) data for 2017 grown to future traffic levels; which

provides quantitative forecasts by origin and destination. The forecast flows between specific origin and destinations may change to a greater or less extent.

The fuel and CO_2 reduction from the proposed route changes is due to the EGBB arrival/ departure and high-level ATS routes offering more direct routings and therefore less track mileage. The proposed changes have been designed to prioritise minimising the environmental extent throughout the whole design. This was one of the key drivers behind the design principle evaluation options appraisal (Ref 7) which included the environmental Design Principle "*avoid low-level changes and reduce CO_2 emissions where possible*".

As shown in Table 7 above, the proposed Heathrow offload route will result in a small increase in fuel usage and CO_2 emissions. This is due to the proposed offload route being slightly longer than the current high-level routes and manual vectoring used, when aircraft are manually instructed to swap stacks. It is worth noting that the exact fuel usage would also depends on how much contingency fuel aircraft carry on the actual NAT Track they use, which changes daily. The analysis was based on New York departures arriving at Heathrow. Therefore this figure could increase or decrease slightly.
Although systemising this area of airspace creates a slightly disbenefit the design work ensured that minimising the track mileage and environmental impact has been prioritised. There is also still a large overall fuel and CO_2 saving from the other changes under this proposal.

Systemising the airspace offers additional benefits such as a reduction in complexity from the systemised flows. It is also difficult to currently account for the fuel used in tactical heading and speed management, tools which controllers employ every day in these sectors of airspace – systemisation would reduce the need for tactical management.

A UK government transport analysis, known as 'WebTAG', has been completed in order to quantify the monetary value of the impact on the environment due to greenhouse gas emissions (specifically using CO_2 as the measure). Details of the WebTAG results are given in the Stage 3 Full Options Appraisal (Ref 11).

5.4 Proposed route usage by traffic flow

There is no forecast increase in air transport movements, passenger numbers or cargo carried as an outcome of this proposal.

6. Consultation Participation

6.1 How to respond

This consultation commences on Thursday 31st January 2019 and ends on Thursday 18th April 2019; a period of 11 weeks.

This consultation is being conducted by NATS. The UK's Civil Aviation Authority (CAA) Safety and Airspace Regulation Group (SARG) will oversee the consultation and ensure that it adheres to the CAP1616 process and government guidelines. See Reference 1 for the CAA's web page dedicated to this proposal.

NATS is conducting this consultation via the CAA's online consultation portal.

https://consultations.airspacechange.co.uk/nats/nats-saip-ad5

This consultation document and all supporting documents can be found on this portal. It is also where responses to this consultation can be submitted through a feedback questionnaire. On submission, this is submitted direct to the CAA.

Respondents can also submit a postal response to the consultation. We will not commit to respond to postal responses directly; however respondents are welcome to include a stamped envelope if they do require a reply. Responses can be sent to the following address:

NATS Airspace Consultation, Mailbox 11, 4000 Parkway, Whiteley, Fareham, Hampshire, PO15 7FL

Please note that when submitting feedback you will be asked to provide the following information:

- Your name, and your role if you are responding on behalf of an organisation
- Your contact details
- A feedback category: SUPPORT NO COMMENT AMBIVALENT OBJECT
- Your level of support for the following aspects of this proposal:
  Proposed Birmingham CAS and route changes
  Proposed Heathrow CAS and route changes
  Proposed high-level ATS routes
  Proposed changes to the TRA002
  Airspace classifications
  FUA timings restrictions
  CDR route status
- Your general feedback comments with an opportunity to provide more detailed comments. There will also be an opportunity to upload a document containing greater details of your feedback such as charts or tables.

All responses will be analysed, with any common themes extracted and summarised. NATS will actively monitor the consultation portal and will formally respond back to any queries.. All responses will be passed on to the CAA.

We are asking to consider what impact this proposal would have on your operation, suggestions you may have regarding those impacts, and how acceptable they are.

6.2 What happens with the responses

All responses will be published. Responses will be managed and uploaded to the consultation portal as appropriate. However, should any responses contain commercially sensitive data then we would expect the CAA to redact that information as part of the CAA's moderating practice.

On completion of the consultation, we will analyse the feedback and produce a feedback report, summarising themes arising from the feedback, alongside NATS' response to any issues raised. The feedback report will be

uploaded onto the portal. Any new requirements identified will be considered in the on-going design process, leading to the production of a formal airspace change proposal (ACP). The ACP will detail the final design being submitted and make reference to changes that have been made to take account of consultation feedback.

Subject to approval, we plan the implement the final version of this proposal on 7th November 2019.

7. Annex A: Table of new waypoints – coordinates

These waypoint names are used within the charts and route tables in Section 4.

Other waypoints in those charts and tables are already in use in the UK.

The following waypoints are not in the current AIP database. Some of these waypoints are in the same location as, but have different designations from, those used in pre-consultation engagement. The names below are those formally requested from ICAO's bank of 5-letter name codes. These names are still draft and are subject to change.

Draft Waypoint Name	Lat	Long	Direction of use
XXXXX (awaiting a new 5LNC)	51°23'38.66"N	3°19'12.46"W	East
FIGZI	51°57'42.13"N	2°35'28.49"W	East
ITJON	51°27'28.48"N	2°59'21.53"W	West
SEMMU	52°50'37.89"N	4°22'31.96"W	East
LUXTO	52 08 33.02N	002 03 33.11W	West
FITBO	52°13'8.55"N	2°24'12.55"W	East
BIFIN	52°03' 41.74"N	002 °27'08.45" W	East
XXXXX (awaiting a 5LNC,)	52°21'39.83"N	2°17'53.70"W	East
UMLUX	52°20'16.74"N	1°57'59.24"W	West

This list shows the waypoints most relevant to this proposal. In conjunction with the existing waypoints, it will allow fuel calculations to be carried out by stakeholder airlines.

This list does not show every individual new waypoint planned for this proposal because many are intermediate waypoints along ATS routes, and would be used for data transfer, flight-strip production, sector boundaries, or other similar purpose. This includes waypoints which will be introduced as Free Route Airspace enabler points on routes.

8. Annex B: Proposed ATS Route Diagrams

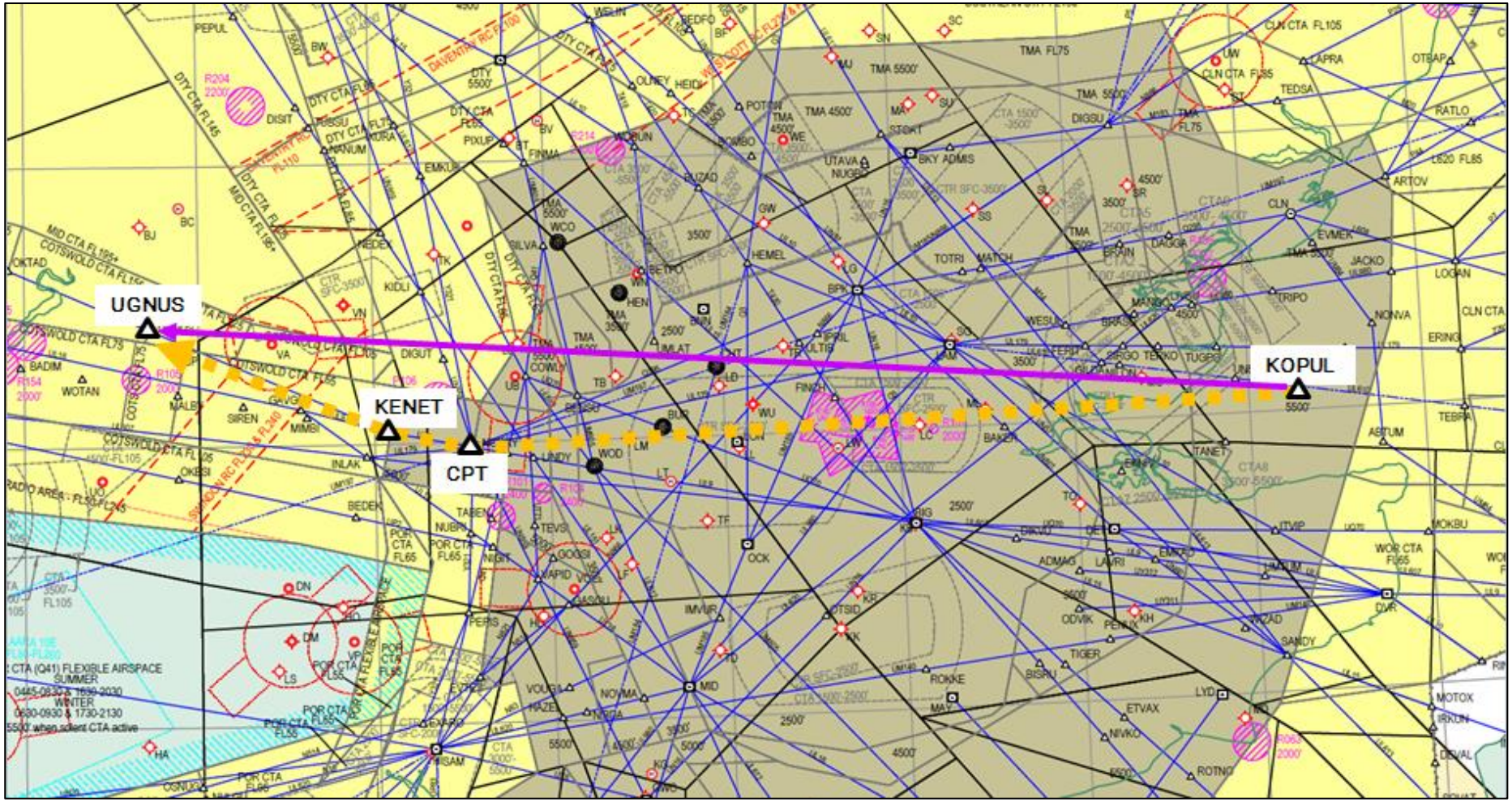

Figure 8: Proposed Westbound ATS Route Q60, KOPUL - UGNUS

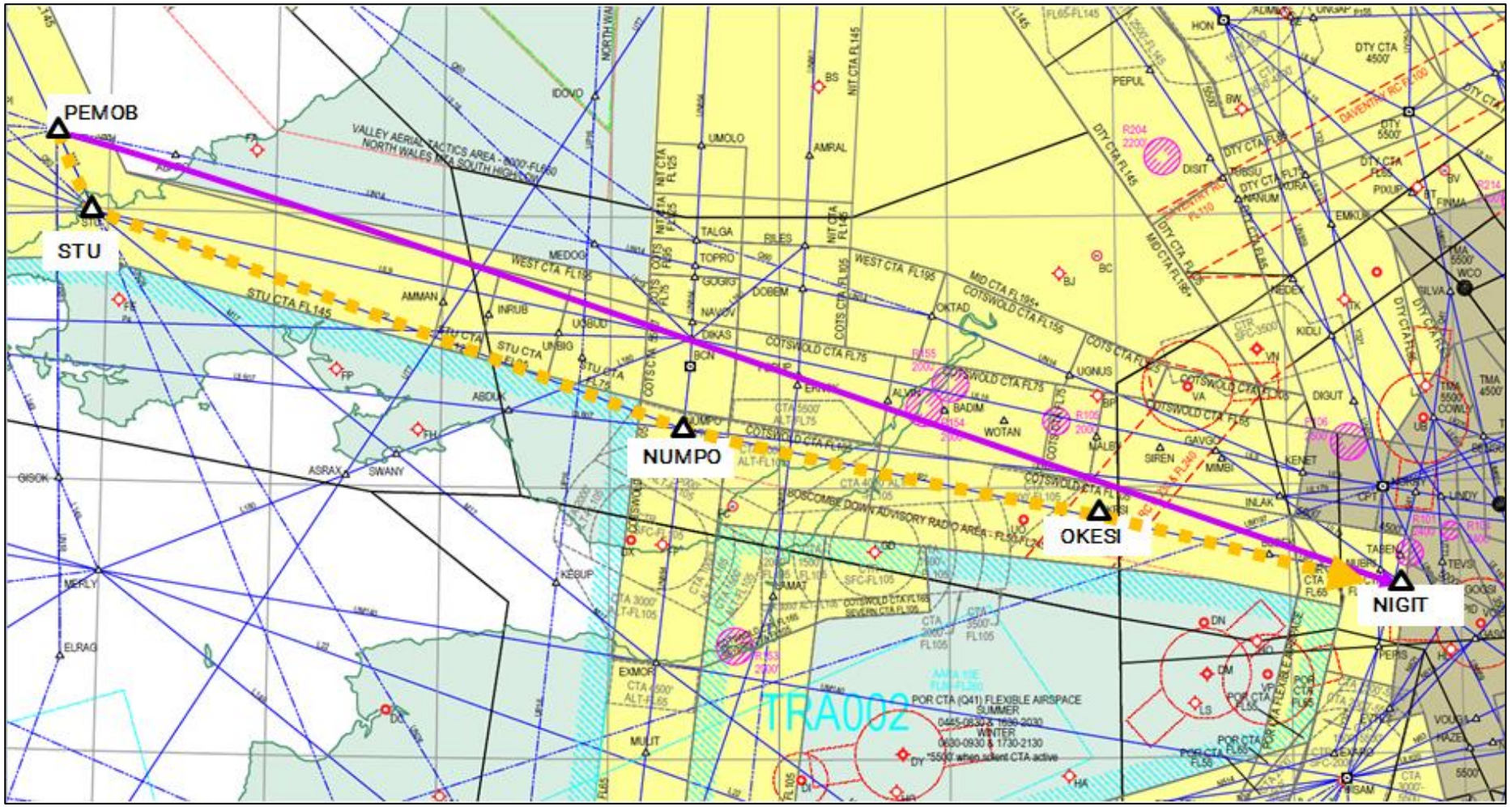

Figure 9: Proposed Eastbound ATS Route N24, PEMOB - NIGIT

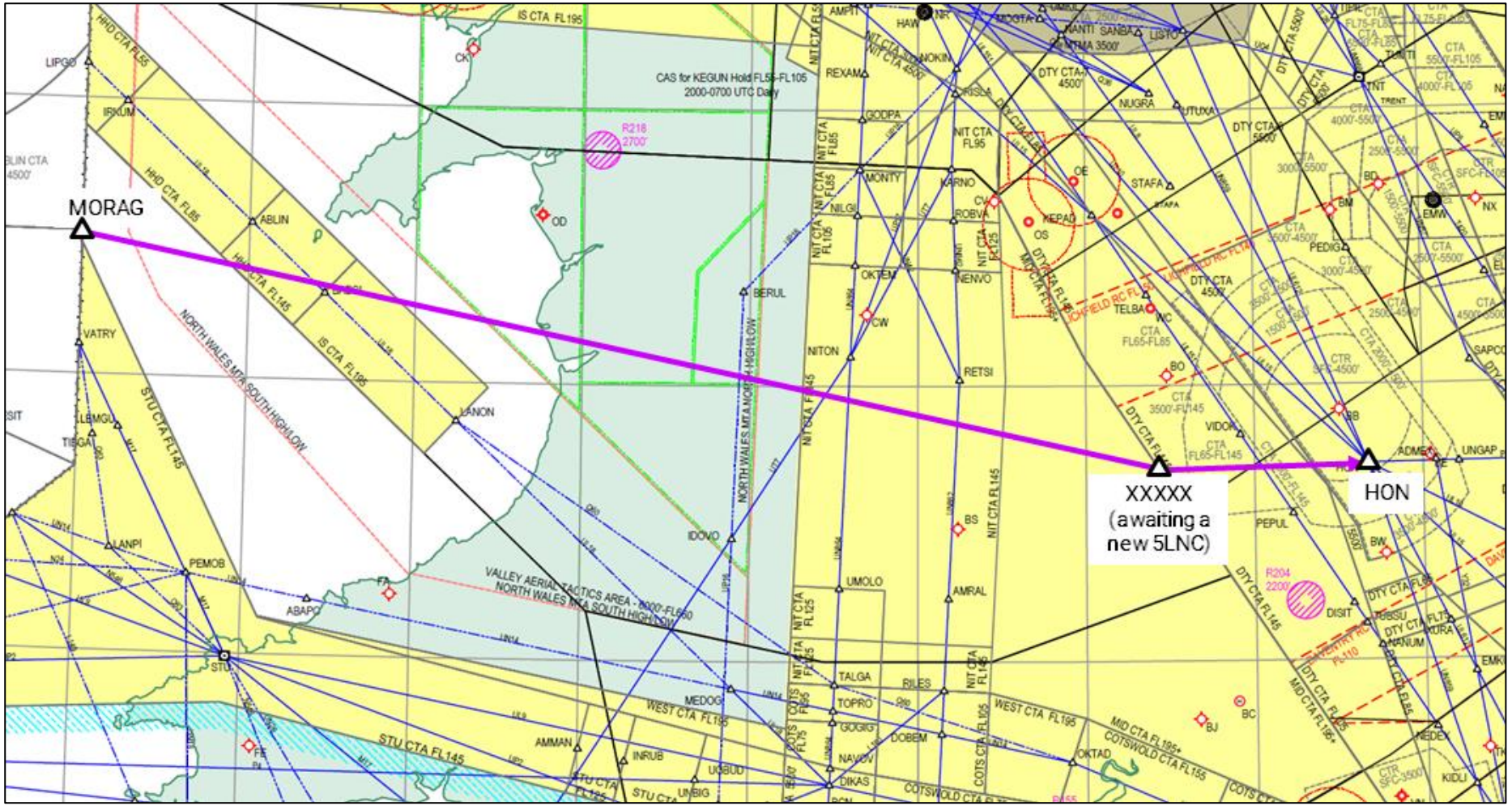

Figure 10: Proposed Eastbound ATS Route P155, MORAG - XXXXX (awaiting a new 5LNC) – HON

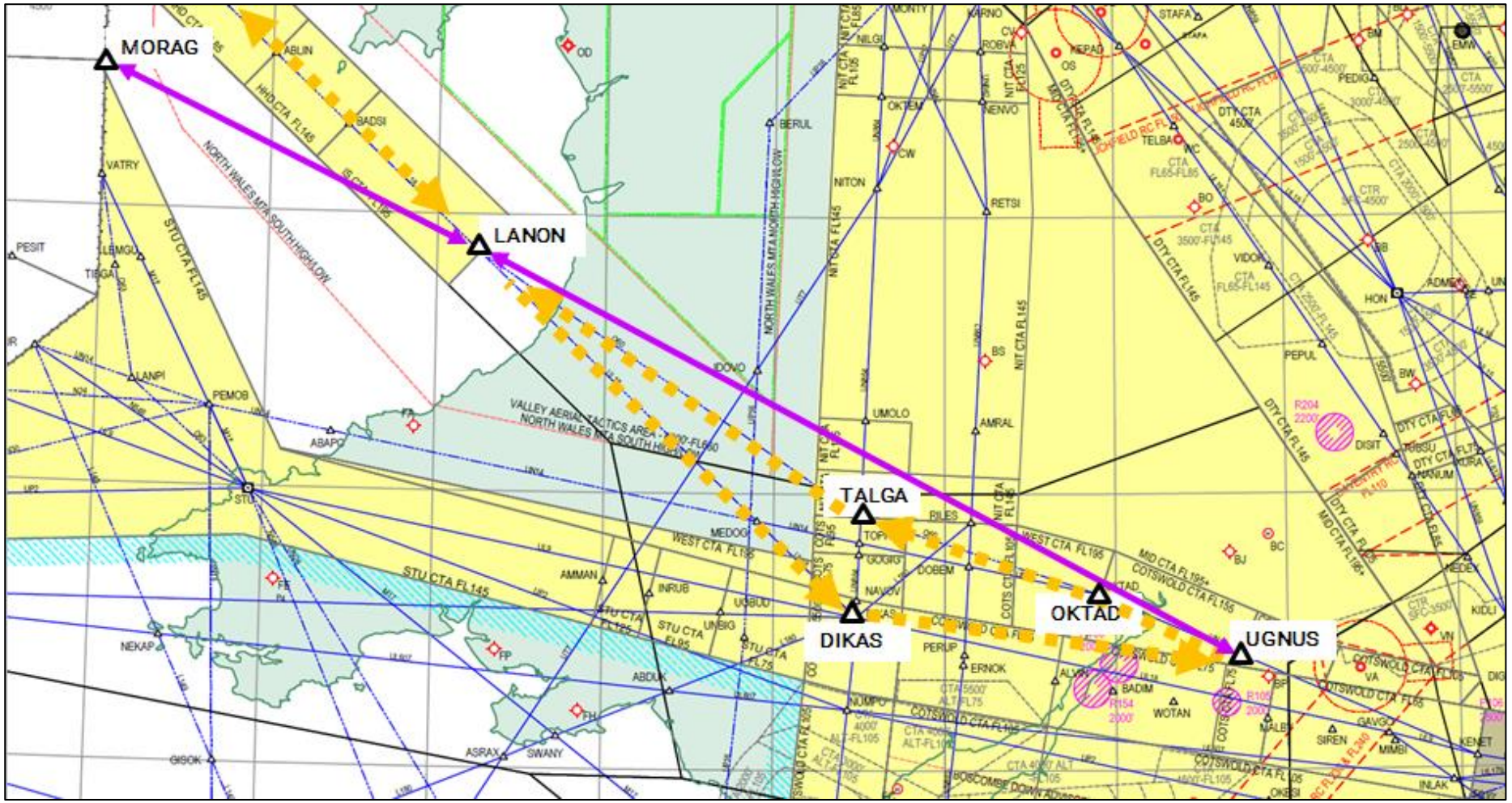

Figure 11: Proposed Bi-Directional ATS Route: Q60, –MORAG – LANON - UGNUS

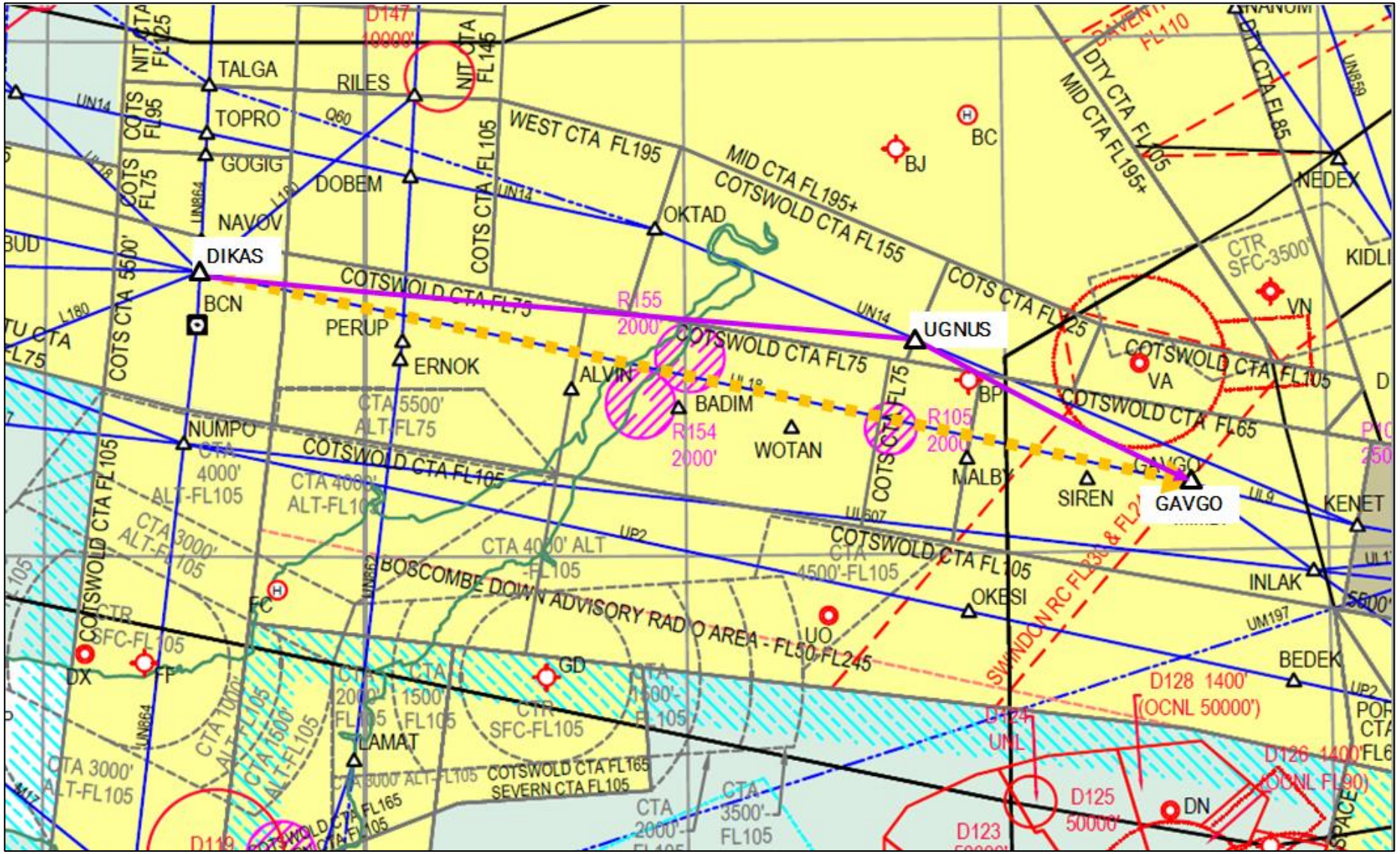

Figure 12: Proposed Re-alignment of UL18

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