FARNBOROUGH AIRPORT FASI-S AIRSPACE CHANGE PROPOSAL

ACP-2022-038

Stage 2

Stage 2B Submission Document – Initial Options Appraisal

VERSION 2.0

Version	Date	
1.0	July 2024	Original
2.0	November 2024	Updated following Stage 2 Gateway CAA feedback

Change Record Following Stage 2 Gateway CAA Feedback

Reference	CAA Feedback	Sponsor Response	Update location
CAP1616 V4 Para E19	The change sponsor must clarify why they used N60 contours to discount Options 3A/B, 4A/B (component RWY 06 departure which turns over Aldershot) considering there are no night flights	Additional text added for clarification.	Paragraphs 5.1.14 - 5.1.16 and Paragraph 5.1.21
CAP2091 Para 4.10	The change sponsor as part of the planning application used a methodology that exceeds the Category D requirements. Therefore, the CAA expects the same methodology to apply in the noise modelling of this ACP (CAP2091 para 4.10). As a result, the change sponsor must amend the noise modelling category as per CAP 2091, from D to B; noise modelling must have the same level of detail the change sponsor used in their planning application.	Additional text for clarification	IOA Methodology, Page 26
CAP1616 V4 Para E12	The change sponsor must expand on the list included in para 5.2 - Information to collect as part of the Full Options Appraisal of their submission to include all Stage 3 requirements (CAP 1616v4 para E12). Besides the information mentioned in the submission the change sponsor must also consider providing information on the sources of data, methodology and metrics they will use for the Stage 3 environmental assessments (noise, local air quality, greenhouse gas emissions, tranquillity, biodiversity) and HRA screening with any further assessments if required.	Additional text added for clarification.	Paragraph 5.2

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1. INTRODUCTION

1.1 The UK's Airspace Modernisation Strategy

1.1.1 In 2017 the Secretary of State tasked the Civil Aviation Authority (CAA) with preparing and maintaining a coordinated strategy and plan for the use of UK airspace up to 2040.

1.1.2 The first Airspace Modernisation Strategy (AMS) was published in 2018 and set out the 'ends, ways, and means', of modernising airspace through a series of 'delivery elements' that will modernise the design, technology, and operations of the airspace.

1.1.3 The AMS was updated in 2023 and is split into 3 parts, published separately. Part 1 (Strategic objectives and enablers) explains the strategy's objectives, a high-level overview of what will enable those objectives to be fulfilled, and governance for overseeing delivery. Part 2 (Delivery elements) and Part 3 (Deployment) describe the short-term ambition and explain how the strategy is being delivered.

1.1.4 The AMS vision is to deliver quicker, quieter, and cleaner journeys and more capacity for the benefit of those who use and are affected by UK airspace. The AMS does not propose specific airspace changes, but a key deliverable is a masterplan of airspace changes that will be necessary for modernisation.

1.2 Airspace Change Organising Group & the Masterplan

1.2.1 Following the publication of the AMS, the aviation industry is working together to deliver airspace modernisation through a coordinated programme. More than 20 UK airports and NATS are involved in the delivery of this national programme of airspace change, which is being coordinated by the Airspace Change Organising Group (ACOG).

1.2.2 Airports are responsible for designing the arrival and departure roues that support their operations from the ground to approximately 7000ft. They also take responsibility for the way the airspace is used and developed in this lower portion of airspace.

1.2.3 NATS is responsible for re-designing the airspace above 7000ft. They take responsibility for the route network, and for the way the airspace is used and developed above 7000ft.

1.2.4 ACOG are responsible for developing the Masterplan, a single coordinated implementation plan for airspace changes in the UK up to 2040. The Masterplan is being produced by ACOG in stages, with more detail added with each iteration. Across all iterations, the masterplan will:

- Identify where and when airspace change proposals are needed, with proposed timelines for implementation,
- Describe how these proposals relate to each other, and highlight potential conflicts between their designs,
- Explain how trade-off decisions to resolve these conflicts have been made,
- Demonstrate the anticipated cumulative impact of all the airspace change proposals.

1.2.5 Iteration 1 was published in 2020 and Iteration 2[1] was published in January 2022, with an Addendum in October 2022, which advised that Farnborough Airport had joined the programme and would be integrated into all future iterations of the Masterplan.

1.2.6 From Iteration 3 onwards the Masterplan is being developed separately for each region. This will allow designs brough forward by each cluster, once approved, to be deployed and the benefits realised, without witing for all the ACPs to complete the airspace change process.

1.2.7 Farnborough Airport is now part of the LTMA (London Terminal Manoeuvring Area) cluster which includes, Heathrow, Gatwick, Southampton, London City, Biggin Hill, Bournemouth, Luton, Stansted, RAF Northolt, Southend, and Manston.

Farnborough Airport's Potential Interdependencies

1.2.8 Following the inclusion of Farnborough Airport into the Masterplan in October 2022, ACOG published an addendum, CAP2312A[2] identifying the potential interdependencies between Farnborough Airport and other airports in the LTMA cluster.

1.2.9 The analysis undertaken by ACOG in the LTMA airspace below 7000ft identifies potential interdependencies with 6 other airspace change proposals, Heathrow, Gatwick, London City, Southampton, RAF Northolt and Biggin Hill. In addition, Farnborough Airport will need to ensure ongoing co-ordination with the NATS NERL ACP regarding the airspace above 7000ft.

1.2.10 Since publication of Masterplan Iteration 2, Farnborough has had visibility of adjacent sponsors' options. Following our Design Principle Evaluation and this Initial Options Appraisal, we have identified that it is very unlikely that there will be any interdependencies between Farnborough and London City or RAF Northolt below 7000ft.

1.3 The Airspace Change Process

1.3.1 In December 2017, the CAA reformed the airspace change process and introduced CAP1616, guidance on the regulatory process for changing notified airspace design and planned and permanent redistribution of air traffic.

1.3.2 CAP1616 lays out the regulatory process for changing flight paths, including the community engagement requirements. Proposals for changes to flight paths are submitted to, assessed, and approved by the CAA following the guidance set out in CAP1616.

1.3.3 There are seven-stages which provide a framework for changing airspace and CAP1616 places significant importance on engaging a wide range of stakeholders, including potentially affected communities.

1.3.4 In early 2023 the CAA conducted a consultation on proposed changes to the CAP1616 process and in October 2023 published Edition 5 of the document. Following discussion with the CAA it was agreed that as Stage 2 work had already commenced, Farnborough Airport would continue Stage 2 in accordance with Edition 4 (March 2021) of CAP1616.

[1] ACOG Masterplan Iteration 2
[2] CAP2312A Addendum

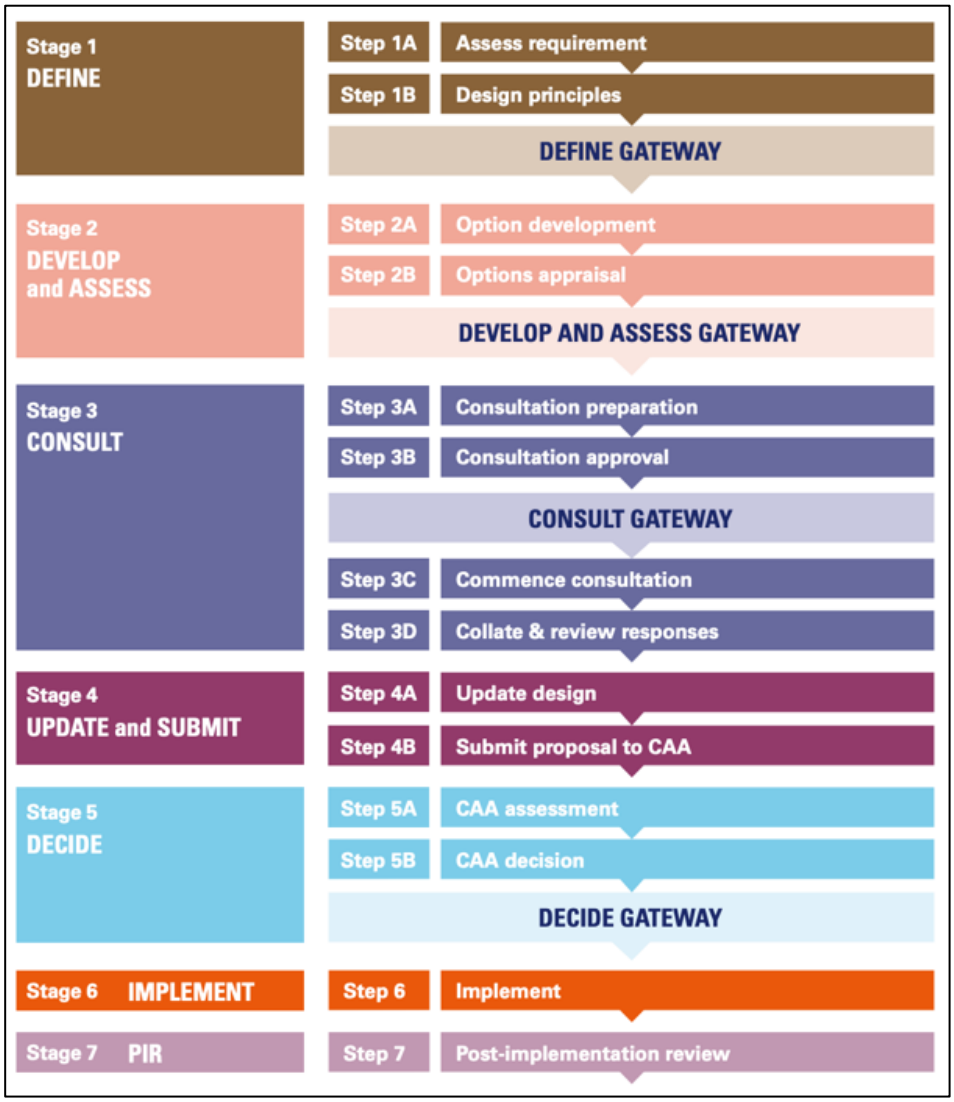


Figure 1: CAP1616 (Edition 4) 7-Stages

1.4 Airspace Modernisation at Farnborough Airport

1.4.1 Table 1 summarises the CAP1616 stages already undertaken for this ACP, providing links to submission documents for those previous stages. All information submitted to the CAA for this ACP is available on the CAA's Airspace Change Portal.

Airspace Change Stage	Summary	Link to Documents
Stage 1 **Step 1A**	In June 2022, Farnborough Airport submitted a Statement of Need (SoN) to the CAA.	Statement of Need
	In November 2022, Farnborough Airport had an assessment meeting with the CAA, as part of Step 1A of the CAP1616 process. The purpose of the assessment meeting is for the change sponsor to present and discuss its SoN and to enable to the CAA to consider whether the proposal falls within the scope of the formal airspace change process.	Assessment Meeting Presentation Assessment Meeting Minutes
Stage 1 **Step 1B**	At Step 1B, Farnborough Airport carried out engagement with stakeholder representatives to develop a set of Design Principles for this airspace change. The aim of the Design Principles is to provide the objectives that the change sponsor seeks to achieve through the airspace change and help the airspace change designers to create and compare different flight paths and design options. The CAA carried out the regulatory assessment to ensure that the Stage 1 requirements were followed, and Farnborough Airport passed the Stage 1 Gateway in June 2023.	Design Principle Submission Document
Stage 2 **Step 2A**	At Step 2A, Farnborough Airport developed options for the airspace change proposal, and evaluated how those options responded to the Design Principles created in Stage 1. These options were shared with the stakeholder representatives who were previously engaged with at Stage 1. Feedback from this engagement was then used to generate further information on existing options to aid engagement. The final part of Step 2A was to qualitatively, and where possible, quantitively assess the options against the Design Principles to produce a Design Principle Evaluation.	Step 2A Submission Document
Step 2B	We are now at Stage 2B ‘Options appraisal’. At Stage 2B an Airspace Change Sponsor is required to undertake an Initial Options Appraisal (IOA) which is the first of three phases of options appraisal as part of CAP1616. The following sections of the document initially describe the options under assessment and the baseline option, followed by explaining the	This document

	methodology used to assess each option, and then the IOA outcome. At the end of the document we explain, based on the IOA, the options or parts of options which we intend to take forward to Stage 3 'Consult' and our preferred option(s). Alongside this IOA document there is a Technical (Appendix A) which provides further details of the noise and CO2 appraisals, including noise contours, noise data, and track length assessments. This can be found on the CAA's Airspace Change Portal.	

Table 1: Summary of CAP1616 work to date

2. OVERVIEW OF OPTIONS UNDER ASSESSMENT

2.1.1 Our Stage 2A comprehensive list of options included 8 options and a 'do nothing' scenario. As part of Stage 2A, we undertook a Design Principle Evaluation where we evaluated each option against each Design Principle. The outcome of our Stage 2A Design Principle Evaluation was that all options were carried forward. Further details of this can be found in our Stage 2A submission document on the CAA's Airspace Change Portal.

2.1.2 The following section summarises the airspace change options we have taken through to this IOA. More information about how we have developed these options is available in our Stage 2A submission document on the CAA's Airspace Change Portal. The Initial Options Appraisal section of this document and the technical Appendix A (published on the CAA's Airspace Change Portal) also contains larger images and a more details of each option.

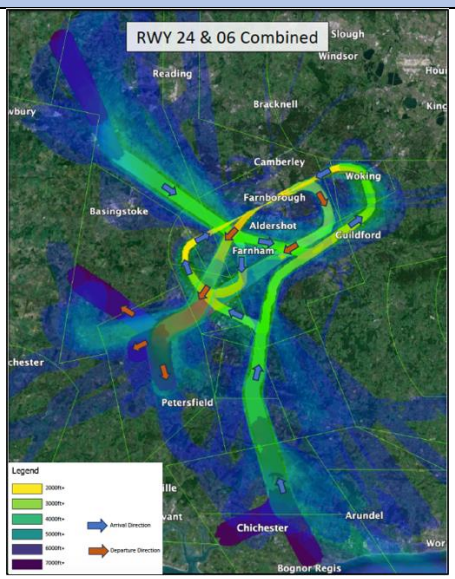
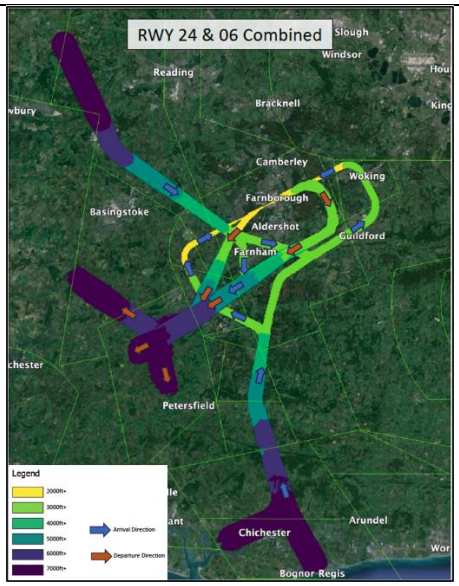
Options for the Initial Options Appraisal

2.1.3 The options (Options 2 – 5) each build in the amount of change, compared to Do nothing (Option 1). i.e. Option 2 is quite similar to Option 1 whereas Option 5 is the most different from Option 1. This was done purposefully because the amount of change that Farnborough can deliver is wholly dependent on the changes to the wider airspace system surrounding it. Therefore, in the event that Heathrow and Gatwick's routes did not change enough to the extent to derive significant improvements to Farnborough's published route structure, there are still some more subtle options that could deliver benefit requiring less, but still some, change in the vicinity.

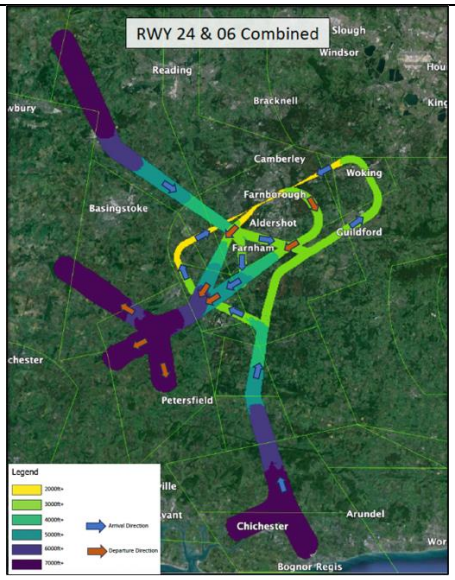
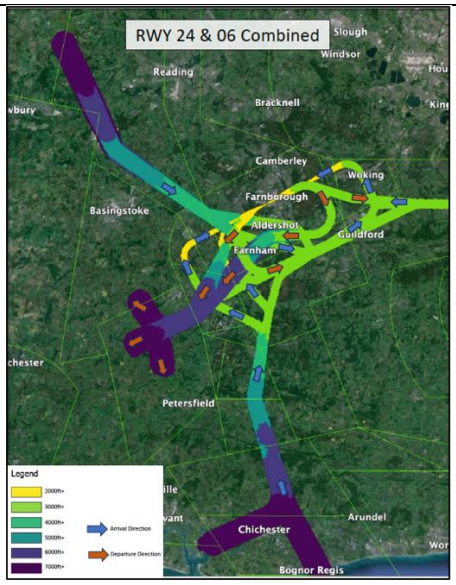
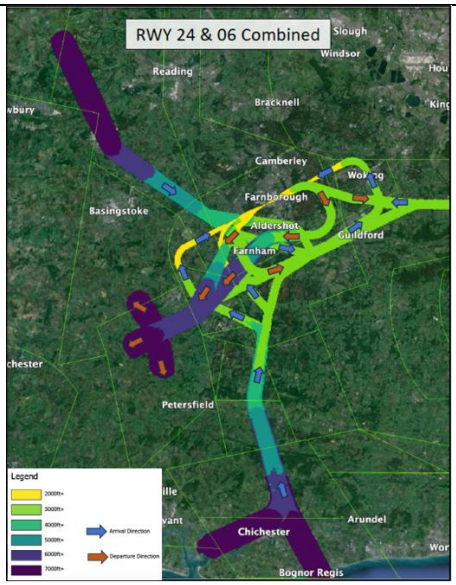
2.1.4 Importantly, Option 2 would still enable Farnborough to remove its reliance on RNAV Substitution[3] for the Initial Approach, even in the event that significant change in the surrounding LTMA was not realised.

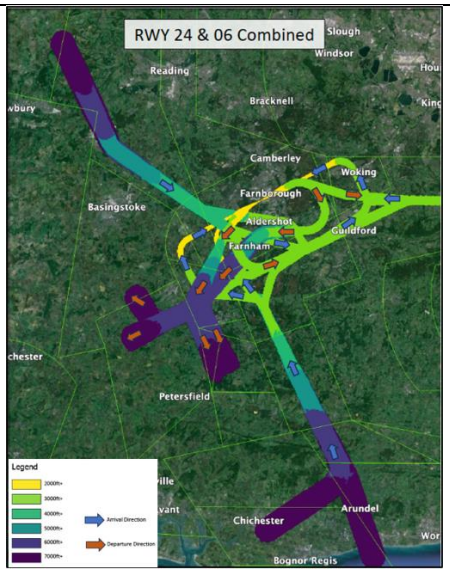
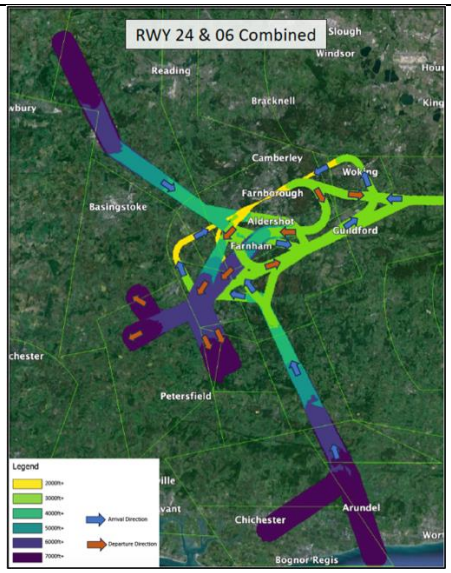
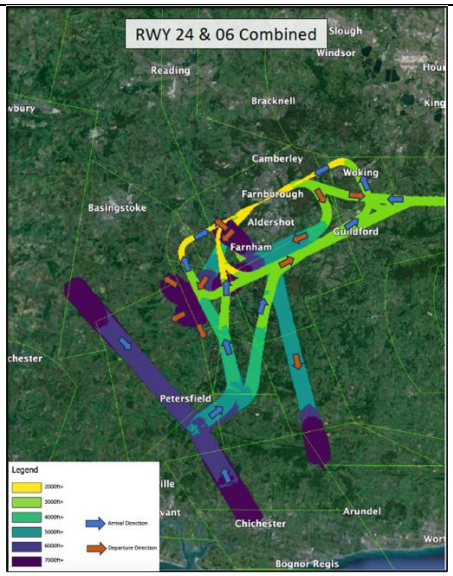
2.1.5 Each option was split into 2 sub-options (A and B), to better articulate the subtleties being explored. There were still 4 core Do Something options, but each option could have a slightly different final approach joining point and/or earlier turn for the Runway 06 departures.

[3] NATS En-Route Limited (NERL) are currently undertaking a rationalisation programme for ground-based DVOR infrastructure. As part of this, the Ockham (OCK) DVOR was withdrawn from service earlier this year. Farnborough's Initial Approach Procedures were dependent on this DVOR although those procedures are flown extremely rarely, only in cases of communication failure between pilots and ATC. These procedures are able to use RNAV Substitution[3] which is an interim measure due to planned decommissioning of a ground-based navigation aid which supports conventional procedures or segments, pending the introduction of new PBN procedures. This ACP is the mechanism for introducing PBN IAPs which connect the end of the STARs to the Instrument Approach Procedure (i.e. the ILS and/or RNP APCH).

Option	Image	Description
Option 1 Do Nothing		This maintains a high level of tactical intervention with all arrivals being vectored to final approach. ATC intervention is required to deconflict arrivals and departures. The existing contingency hold at VEXUB (Guildford) is very rarely used owing to its non-optimal location from an operational perspective. The existing and forecast baseline scenario is described in more detail in the Stage 2A submission document on the CAA's Airspace Change Portal
Option 2A		The lateral SID and STAR profiles remain similar to today but with enhancement to procedural and/or tactical vertical profiles, enabled by wider LTMA changes only[4]. A contingency hold to the South, West or Southwest added together with PBN transitions to final approach (ILS only). The latter will address the existing, interim scenario whereby Farnborough's IAPs are reliant on RNAV Substitution

[4] Changes to profiles not assumed or illustrated in this option.

Option 2B		The differences from Option 2A are that the PBN arrival routes connect to both ILS and RNP APCH requiring a slightly longer final approach, likely to require more CAS. The Runway 06 SID turns right earlier than today.
Option 3A		A build on Option 2A with the addition of a low level departure/arrival route to/from the east for flights between Farnborough and Biggin Hill. We may shorten the CPT SID to route more direct, aligned to where they are tactically positioned today, subject to improvements to Heathrow's departure profiles. A RNP-AR arrival to Runway 06 to avoid RAF Odiham and a re-alignment of the RWY 06 SIDs to better separate from arrivals are also considered.
Option 3B		The differences from Option 3A are that the PBN arrival routes connect to both ILS and RNP APCH requiring a slightly longer final approach, likely to require more CAS.

Option 4A		A build on Option 3A with a more direct arrival route from the south enabled by improved profiles for Gatwick departures. As a result, the departure route to the south can be more direct. This option has an example of how SIDs from different runways could converge later to reduce the frequency of overflight for the same communities.
Option 4B		The differences from Option 4A are that the PBN arrival routes connect to both ILS and RNP APCH requiring a slightly longer final approach, likely to require more CAS.
Option 5A		This option sees all arrivals entering Farnborough airspace from the southwest. We assume that, owing to improvements in profiles from Heathrow and Gatwick, Farnborough's departures and arrivals can be deconflicted by design. This requires Farnborough to be guaranteed airspace up to at least 6000ft to the west of Farnborough.

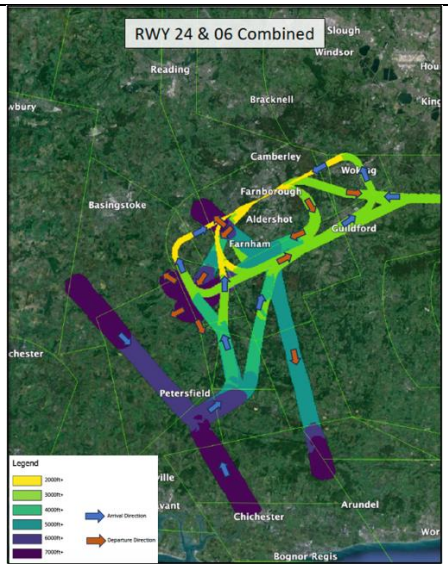
Option 5B		The differences from Option 5A are that the PBN arrival routes connect to both ILS and RNP APCH requiring a slightly longer final approach, likely to require more CAS. The Runway 06 SID turns right earlier than today.

Table 2: Options for Initial Options Appraisal

3. INITIAL OPTIONS APPRAISAL METHODOLOGY

3.1.1 The Initial Options Appraisal (IOA) is the first stage in a three-phase appraisal of airspace change options. It involves the mainly qualitative appraisal of the airspace change options that have proceeded from Stage 2A. As options progress through the airspace change process, the two following appraisals, the Full Options Appraisal and Final Options Appraisal undertaken at Stage 3 and 4, will quantitively evaluate options in further detail. The following sections outline the methodology we have followed whilst appraising our airspace change options as part of this IOA.

Defining the Baseline Scenario

3.1.2 As part of this IOA, CAP1616 requires airspace change sponsors to set a baseline which is used for environmental evaluation of the options. CAP1616 explains that this will be a 'do nothing' scenario and will largely reflect the current-day scenario, although taking due consideration of known or anticipated factors that might affect that baseline, for example a planned housing development close to an airport, forecast growth in air traffic, or expected changes in airlines' fleet mix.

Planned Housing Developments

3.1.3 As part of our preparation of the baseline, we have identified planned developments in the area surrounding Farnborough Airport so that these can be considered as part of appraisal of the benefits and impacts of each option. The population number increases that could come with these developments has not yet been factored into population counts. Where appropriate, new developments will be factored into assessments at Stage 3.

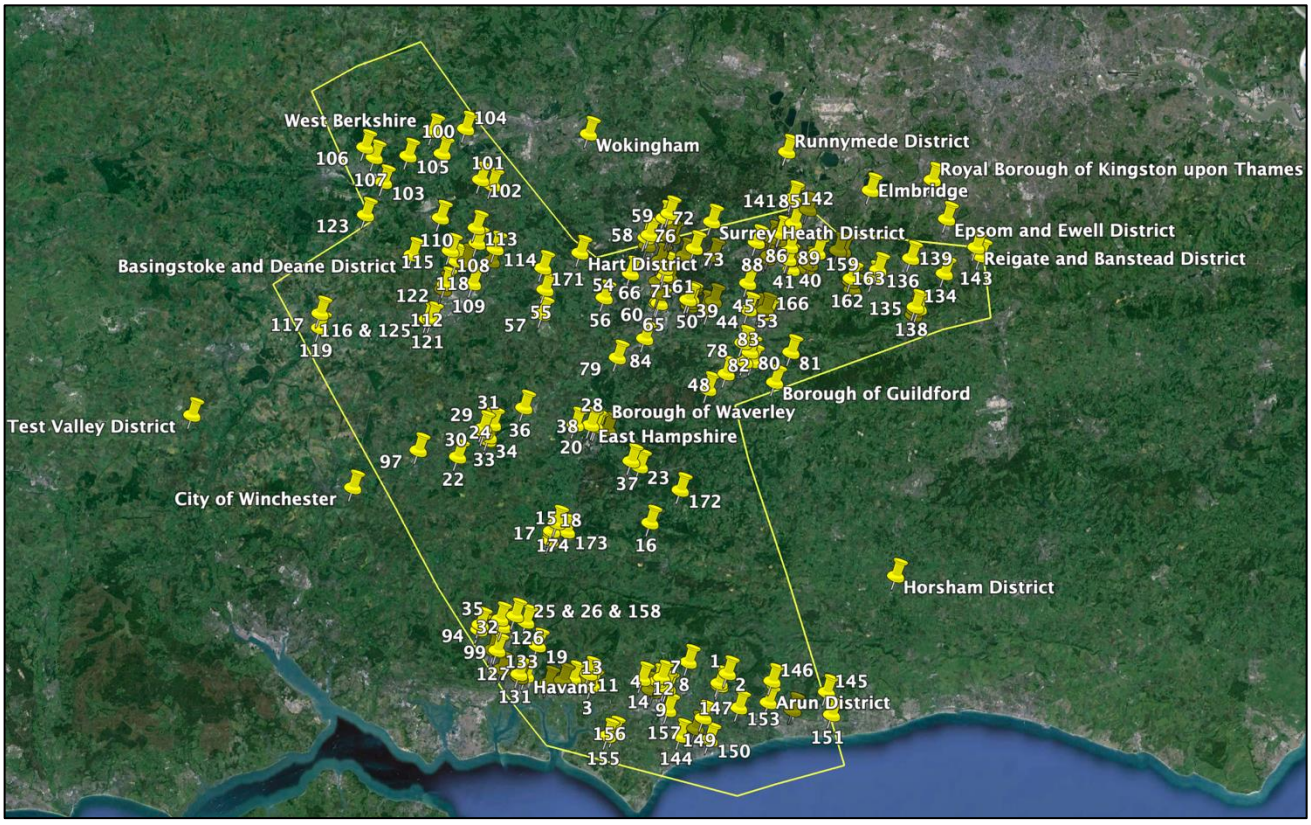


Figure 2: Map of local planned developments

Local Council/ Authority	Type of Development	Size of Development	Location	Status	Additional Comments	Map Ref
Arun - Aldingbourne	Residential - Houses	80 dwellings	PO20 3RU	Undecided	Planning Portal Page	1
Arun - Walberton	Residential - Bungalows	10 dwellings	BN18 0SD	Approved Conditionally	Planning Portal Page	2
Chichester - Bosham	Residential - Houses	300 dwellings	Land North Of Highgrove Farm Main Road Bosham West Sussex	Pending Consideration	Planning Portal Page	3
Chichester - Barnfield	Residential - Houses	200 dwellings	Land North Of Barnfield Drive East Of Graylingwell Hospital Barnfield Drive Chichester West Sussex	Pending Consideration	Planning Portal Page	4
Chichester - Bosham	Residential - Houses	26 dwellings	PO18 8PN	Pending Consideration	Planning Portal Page	5
Chichester - Hambrook	Residential - Houses	30 dwellings	PO18 8FT	Pending Decision	Planning Portal Page	6
Chichester - Westhampnett	Residential - Houses	165 dwellings	Land Within The Westhampnett / North East Chichester Strategic Development Location (north Of Madgwick Lane) Chichester	Pending Consideration	Planning Portal Page	7
Chichester - Halnaker	Residential - Houses	26 dwellings	Halnaker	Pending Consideration	Planning Portal Page	8
Chichester - Shopwhyke	Residential - Apartment Building	87 units	PO20 2EJ	Unknown	Planning Portal Page	9
Chichester - Hermitage	Residential - Houses	84 dwellings	PO10 8HE	Pending Decision	Planning Portal Page	10
Chichester - Hambrook	Residential - Houses	118 dwellings	PO18 8UA	Permit	Planning Portal Page	11
Chichester - Shopwhyke	Residential - Houses	13 dwellings	Land On The North Side Of Shopwhyke Road Shopwhyke West Sussex	Application Permitted with S106(PER106)	Planning Portal Page	12
Chichester - Emsworth	Residential - Houses	40 dwellings	PO10 8LQ	Pending Decision	Planning Portal Page	13
Chichester - West of Chichester	Residential (Homes) & School (Primary)	850 dwellings	Old Broyle Road / Land To The West Of Centurion Way. Chichester	Pending Decision	Planning Portal Page	14
South Downs - Petersfield	Residential - Houses	54 dwellings	Land to The West of The Causeway Petersfield Hampshire	Application in Progress	Planning Portal Page	15
South Downs - Tote Hill	Residential - Houses	10 dwellings	GU29 0QL	Application in Progress	Planning Portal Page	16

South Downs - Petersfield	Residential - Apartment Building	21 units	GU32 3NG	Application in Progress	Planning Portal Page	17
South Downs - Petersfield	Residential - Apartment Building	34 units	GU32 3EF	Approved	Planning Portal Page	18
East Hampshire - Rowlands Castle	Residential - Houses	35 dwellings	Land to the south east of, Woodlands Avenue, Rowlands Castle	Registered	Planning Portal Page	19
East Hampshire - Bordon	Residential - Houses	23 dwellings	Former site of Springfield Nursery, Oakhanger Road, Oakhanger, Bordon	Registered	Planning Portal Page	20
East Hampshire - Four Marks	Residential - Houses	79 dwellings	Land North East of Belford House, Lymington Bottom, Four Marks, Alton	Registered	Planning Portal Page	21
East Hampshire - Ropley	Residential - Houses	28 dwellings	Land North of Dean Cottage, Bighton Hill, Ropley, Alresford	Awaiting decision	Planning Portal Page	22
East Hampshire - Liphook	Residential - Houses	100 dwellings	GU30 7HY	Registered	Planning Portal Page	23
East Hampshire - Liphook	Residential - Houses	95 dwellings	Land to the west of, Longbourn Way, Medstead, Alton	Registered	Planning Portal Page	24
East Hampshire - Horndean	Residential - Houses	82 dwellings	Development Land East of Horndean, Rowlands Castle Road, Horndean, Waterlooville	Awaiting decision	Planning Portal Page	25
East Hampshire - Horndean	Residential - Houses	311 dwellings	Development Land East of Horndean, Rowlands Castle Road, Horndean, Waterlooville	Registered	Planning Portal Page	26
East Hampshire - Bordon	Residential - Houses	147 dwellings	GU35 0ER	Decided Permission	Planning Portal Page	27
East Hampshire - Bordon	Residential - Houses	315 dwellings	GU35 0JE	Decided Approval	Planning Portal Page	28
East Hampshire - South Medstead	Residential - Houses	70 dwellings	Land west of Beechlands Road, South Medstead, Alton	Registered	Planning Portal Page	29
East Hampshire - Medstead	Residential - Houses	53 dwellings	GU34 5EP	Registered	Planning Portal Page	30
East Hampshire - Medstead	Residential - Houses	45 dwellings	Land to the rear of Brackenbury Gardens and, Boyneswood Close, Medstead, Alton	Decided Approval	Planning Portal Page	31
East Hampshire - Horndean	Residential - Houses	117 dwellings	Land between Catherington Lane and, Five Heads Road, Horndean, Waterlooville	Registered	Planning Portal Page	32
East Hampshire - Four Marks	Residential - Houses	35 dwellings	Land at 103 and to the rear of 97 to 105, Blackberry Lane, Four Marks, Alton	Registered	Planning Portal Page	33
East Hampshire - Four Marks	Residential - Houses	60 dwellings	GU34 5AH	Appeal Allowed Permission granted	Planning Portal Page	34
East Hampshire - Horndean	Residential - Houses	30 dwellings	Land Rear of, 191-211 Lovedean Lane, Horndean, Waterlooville	Awaiting decision	Planning Portal Page	35

East Hampshire - Chawton	Residential - Houses	24 dwellings	GU34 1RZ	Awaiting decision	Planning Portal Page	36
East Hampshire - Liphook	School extension	Increased 30 pupils capacity	GU30 7QE	No objection	Planning Portal Page	37
East Hampshire - Bordon	School extension	Increased 300 pupils capacity	GU35 0JB	Registered	Planning Portal Page	38
Guildford - Ash	Residential - Apartment Building	13 units	GU12 6BQ	Registered	Planning Portal Page	39
Guildford - Send	Residential - Houses	10 dwellings	GU23 7HT	Registered	Planning Portal Page	40
Guildford - Send	Residential - Houses	40 dwellings	Land to the north of, Heath Drive, Send	Registered	Planning Portal Page	41
Guildford - Ash	Residential - Houses	24 dwellings	GU12 6DB	Awaiting decision	Planning Portal Page	42
Guildford - Normandy	Residential - Houses	16 dwellings	GU3 2JH	Approve	Planning Portal Page	43
Guildford - Normandy	Residential - Houses	12 dwellings	GU3 2JL	Registered	Planning Portal Page	44
Guildford - Worplesdon	Residential - Houses	12 dwellings	Land at School Lane, Worplesdon, GU3	Approve	Planning Portal Page	45
Guildford - Send	Residential - Houses	119 dwellings	Land at Garlicks Arch, Send Marsh/Burnt Common, Portsmouth Road, Send	Registered	Planning Portal Page	46
Guildford - Ash	Residential - Houses	93 dwellings	GU12 6JH	Registered	Planning Portal Page	47
Guildford - Milford	Residential - Houses	216 dwellings	GU8 5HU	Awaiting decision	Planning Portal Page	48
Guildford - Ripley	Residential - Houses	25 dwellings	GU23 6EY	Awaiting decision	Planning Portal Page	49
Guildford - Ash	Residential - Houses	51 dwellings	GU12 6DE	Allowed	Planning Portal Page	50
Guildford - Send	Residential - Houses	29 dwellings	GU23 7EP	Registered	Planning Portal Page	51
Guildford - Pirbright	Special Educational Needs School	NA	GU24 0DN	Registered	Planning Portal Page	52
Guildford - Royal Surrey County Hospital	Hospital Extension	NA	GU2 7XX	Registered	Planning Portal Page	53
Hart - Fleet	Residential - Houses	331 dwellings	Hartland Park Ively Road Fleet Hampshire	Registered	Planning Portal Page	54

Hart - North Warnborough	Residential - Houses	13 dwellings	Land East Of Hook Road North Warnborough Hook Hampshire	Registered	Planning Portal Page	55
Hart - Crookham	Residential - Houses	300 dwellings	Land At Watery Lane Church Crookham Fleet Hampshire	Registered	Planning Portal Page	56
Hart - Odiham	Residential - Houses	30 dwellings	Land On The West Sides Of Alton Road Odiham Hook Hampshire	Grant	Planning Portal Page	57
Hart - Camberley	Residential - Houses	158 dwellings	GU17 9EF	Grant	Planning Portal Page	58
Hart - Camberley	School extension	NA	GU17 9HU	Grant	Planning Portal Page	59
Rushmoor - Aldershot	Residential - Apartment Building	12 units	GU11 1JG	Registered	Planning Portal Page	60
Rushmoor - Farnborough	Residential - Apartment Building	10 units	GU14 6BS	Registered	Planning Portal Page	61
Rushmoor - Aldershot	Residential - Apartment Building	74 dwellings	Zone C - Cambridge Military Hospital Aldershot Urban Extension Alisons Road Aldershot Hampshire	Registered	Planning Portal Page	62
Rushmoor - Aldershot	Residential - Houses	3850 dwellings	Land At Zone H Stanhope Lines West And Zone I School End Aldershot Urban Extension Alisons Road Aldershot Hampshire	Registered	Planning Portal Page	63
Rushmoor - Farnborough	Residential - Apartment Building	18 units	GU14 7PQ	Permission Granted	Planning Portal Page	64
Rushmoor - Aldershot	Residential - Apartment Building	15 units	3 - 5 Pickford Street Aldershot Hampshire	Awaiting decision	Planning Portal Page	65
Rushmoor - Aldershot	Residential - Apartment Building	30 units	GU11 1LZ	Permission Granted	Planning Portal Page	66
Rushmoor - Farnborough	Residential - Houses	17 dwellings	GU14 6HF	Permission Granted	Planning Portal Page	67
Rushmoor - Farnborough	Residential - Houses	10 dwellings	GU14 9XW	Permission Granted	Planning Portal Page	68
Rushmoor - Farnborough	Residential - Apartment Building	12 units	GU14 7NR	Permission Granted	Planning Portal Page	69
Rushmoor - Aldershot	School - New	420 pupil capacity	Proposed Primary School On Land South Of Alisons Road Aldershot Hampshire	Registered	Planning Portal Page	70
Rushmoor - Farnborough	Pre-school - New	NA	GU14 6SF	Permission Granted	Planning Portal Page	71
Surrey Heath - Camberley	Residential - Apartment Building	10 units	GU15 3EY	Registered	Planning Portal Page	72
Surrey Heath - Deepcut	Residential - Houses (multiple phases)	1200 dwellings	GU16 6RN	Registered	Planning Portal Page	73

Surrey Heath - Frimley	Residential - Houses	170 dwellings	GU16 8QD	Registered	Planning Portal Page	74
Surrey Heath - Frimley Green	Residential - Houses	13 dwellings	GU16 6PB	Grant	Planning Portal Page	75
Surrey Heath - Camberley	Residential - Houses & Apartments	20 dwellings	GU15 4JY	Grant	Planning Portal Page	76
Surrey Heath - Frimley	Hospital Extension	NA	GU16 7UJ	Grant	Planning Portal Page	77
Waverley - Godalming	Residential - Apartment Building	12 apartments	GU7 1DT	Pending	Planning Portal Page	78
Waverley - Farnham	Residential - Houses	26 dwellings	70 WRECCLESHAM HILL	Pending	Planning Portal Page	79
Waverley - Godalming	Residential - Apartment Building	15 units	GU7 3BA	Pending	Planning Portal Page	80
Waverley - Wonersh	Residential - Houses & Apartments	50 dwellings	GU5 0QX	Pending	Planning Portal Page	81
Waverley - Godalming	Residential - Houses	27 dwellings	SOUTH EAST OF BINSCOMBE GODALMING	Pending	Planning Portal Page	82
Waverley - Godalming	Residential - Apartment Building	12 units	WOODSIDE PARK CATTESHALL LANE GODALMING	Granted	Planning Portal Page	83
Waverley - Farnham	Hospice extension	NA	GU9 8BL	Granted	Planning Portal Page	84
Woking - Sheerwater	Residential - Apartment Building	19 units	Albert Drive Sheerwater Woking	Pending Consideration	Planning Portal Page	85
Woking - Brookhouse Common	Residential - Apartment Building	72 units	GU21 5JE	Awaiting decision	Planning Portal Page	86
Woking - Brookhouse Common	Residential - Apartment Building	59 units	GU21 5HA	Pending Consideration	Planning Portal Page	87
Woking - St Johns	Residential - Houses	11 dwellings	GU21 7SA	Permitted	Planning Portal Page	88
Woking - Hoe Place	School extension	NA	GU22 8JE	Pending Consideration	Planning Portal Page	89
Woking - Mayford	Residential - Houses	86 dwellings	Egley Road Woking Surrey	Permitted	Planning Portal Page	90
Woking - Mayford	School extension	NA	GU22 0AN	Pending Consideration	Planning Portal Page	91
Woking - Mayford	School extension	NA	GU22 0NH	No objection	Planning Portal Page	92

Woking Community Hospital	Hospital Extension	NA	GU22 7HS	Pending Consideration	Planning Portal Page	93
Winchester - Denmead	Residential - Houses	11 dwellings	Tanners Lane Denmead Hampshire	Current	Planning Portal Page	94
Winchester - Waterlooville	Residential - Houses	90 dwellings	Laxton Leaze Waterlooville Hampshire	Current	Planning Portal Page	95
Winchester - Denmead	Residential - Houses	27 dwellings	Hambledon Road Denmead Hampshire	Current	Planning Portal Page	96
Winchester - Alresford	Residential - Apartment Building	14 units	1 - 3 The Dean Alresford Hampshire	Awaiting decision	Planning Portal Page	97
Winchester - Denmead	Residential - Houses	190 dwellings	Hambledon Road Denmead Hampshire	Permitted	Planning Portal Page	98
Winchester - Denmead	School extension	NA	PO7 6PH	Permitted	Planning Portal Page	99
West Birkshire - Padworth	Residential - Apartment Building	32 units	RG7 5HT	Awaiting decision	Planning Portal Page	100
West Birkshire - Mortimer Common	Residential - Houses	110 dwellings	The Street Mortimer Common Reading	Approved	Planning Portal Page	101
West Birkshire - Mortimer Common	Residential - Houses	24 dwellings	RG7 3RL	Awaiting decision	Planning Portal Page	102
West Birkshire - Thatcham	Residential - Apartment Building	18 units	RG19 8EA	Awaiting decision	Planning Portal Page	103
West Birkshire - Theale	Residential - Houses	104 dwellings	The Green Theale Reading	Approved	Planning Portal Page	104
West Birkshire - Midgham	Residential - Houses	16 dwellings	New Road Hill Midgham Reading	Awaiting decision	Planning Portal Page	105
West Birkshire - Thatcham	Residential - Houses	23 dwellings	Little Copse Southend Cold Ash Thatcham	Awaiting decision	Planning Portal Page	106
West Birkshire - Thatcham	School extension	NA	RG19 4GG	Approved	Planning Portal Page	107
Basingstoke & Deane - Bramley	Residential - Houses & School	350 dwellings	Cufaude Lane Bramley Hampshire	Granted	Planning Portal Page	108
Basingstoke & Deane - Basingstoke	Residential - Apartment Building	370 units	RG21 4RG	Registered	Planning Portal Page	109

Basingstoke & Deane - Pamber Green	Residential - Houses	245 homes	Skates Lane Pamber Green Hampshire	Registered	Planning Portal Page	110
Basingstoke & Deane - Marnel Park	Residential - Houses & School	450 dwellings	Marnel Park, Basingstoke	Registered	Planning Portal Page	111
Basingstoke & Deane - Kempshott Hill	Residential - Houses	494 dwellings	RG23 7LL	Registered	Planning Portal Page	112
Basingstoke & Deane - Bramley	Residential - Houses	140 dwellings	Stocks Farm The Street Bramley Hampshire	Registered	Planning Portal Page	113
Basingstoke & Deane - Church End	Residential - Houses	350 dwellings	Church End Sherfield-on-Loddon	Registered	Planning Portal Page	114
Basingstoke & Deane - Sherborne St John	Residential - Houses	220 dwellings	Aldermaston Road Sherborne St John Hampshire	Registered	Planning Portal Page	115
Basingstoke & Deane - Basingstoke	Residential - Houses	39 dwellings	Hounsome Fields Trenchard Lane Basingstoke Hampshire	Registered	Planning Portal Page	116
Basingstoke & Deane - Whitchurch	Residential - Houses	115 dwellings	Bere Hill Whitchurch Hampshire	Registered	Planning Portal Page	117
Basingstoke & Deane - Sherborne St John	Residential - Houses	350 dwellings	RG24 9LS	Registered	Planning Portal Page	118
Basingstoke & Deane - Whitchurch	Residential - Houses	183 dwellings	Shuttle Street Whitchurch Hampshire	Registered	Planning Portal Page	119
Basingstoke & Deane - Basingstoke	Residential - Houses	104 dwellings	Worting Park Worting Road Basingstoke Hampshire	Granted	Planning Portal Page	120
Basingstoke & Deane - Kempshott Hill	Residential - Houses	229 dwellings	Basingstoke Golf Club Winchester Road Kempshott Hill	Granted	Planning Portal Page	121
Basingstoke & Deane - Basingstoke	Residential - Houses	203 dwellings	Winklebury Way Basingstoke Hampshire	Awaiting decision	Planning Portal Page	122

Basingstoke & Deane - Kingsclere	Residential - Houses	165 dwellings	Porch Farm Newbury Road Kingsclere Hampshire	Registered	Planning Portal Page	123
Basingstoke & Deane - Chineham	Residential - Houses & School	900 dwellings	Whitmarsh Lane Chineham Hampshire	Enquiry Completed	Planning Portal Page	124
Basingstoke & Deane - Dummer	New School	420 pupil capacity	Hounsome Fields Trenchard Lane Dummer Hampshire	No Objection	Planning Portal Page	125
Havant - Waterlooville	Residential - Houses	190 dwellings	Woodcroft Lane, Waterlooville	Registered	Planning Portal Page	126
Havant - Waterlooville	Residential - Apartment Building	22 units	PO7 7ET	Registered	Planning Portal Page	127
Havant - Emsworth	Residential - Houses	15 dwellings	PO10 7HH	Unknown	Planning Portal Page	128
Havant - Purbrook	Residential - Houses	628 dwellings	College Road, Purbrook, Waterlooville	Registered	Planning Portal Page	129
Havant - Waterlooville	Residential - Houses	90 dwellings	Laxton Leaze, Waterlooville	Registered	Planning Portal Page	130
Havant - Bedhampton	Residential - Apartment Building	83 units	Palk Road, Bedhampton, Havant	Registered	Planning Portal Page	131
Havant - Bedhampton	Residential - Houses	120 dwellings	Marples Way, Havant	Registered	Planning Portal Page	132
Havant - Waterlooville	Residential - Apartment Building	13 units	PO7 7EL	Granted	Planning Portal Page	133
Mole Valley - Headley	Residential - Houses	10 dwellings	Church Lane, Headley, Surrey	Unknown	Planning Portal Page	134
Mole Valley - Dorking	Residential - Houses	69 dwellings	Pixham Lane, Dorking, RH4 8BE	Unknown	Planning Portal Page	135
Mole Valley - Little Bookham	Residential - Houses	200 dwellings	Little Bookham Street, Little Bookham, Leatherhead, Surrey	Unknown	Planning Portal Page	136
Mole Valley - Dorking	Residential - Apartment Building	126 units	Lincoln Road, Dorking, Surrey	Under consideration	Planning Portal Page	137
Mole Valley - Dorking	Residential - Apartment Building	36 units	RH4 1QA	Approved	Planning Portal Page	138
Mole Valley - Leatherhead	Residential - Apartment Building	19 units	KT22 8HE	Granted	Planning Portal Page	139
Runnymede - Addlestone	Residential - Apartment Building	14 units	KT15 3NZ	Unknown	Planning Portal Page	140
Runnymede - Ottershaw	Residential - Houses & Apartment Building	19 units	KT16 0LL	Granted	Planning Portal Page	141

Runnymede - Ottershaw	Residential - Houses	184 dwellings	KT16 0LQ	Approved	Planning Portal Page	142
Reigate & Banstead Kingswood	Residential - Apartment Building	14 units	KT20 6EP	Registered	Planning Portal Page	143
Arun - Pagham	Residential - Houses	44 dwellings	PO21 3EG	Undecided	OcellaWeb (arun.gov.uk)	144
Arun - Angmering	Residential - Houses	20 dwellings	BN16 4EN	Approved	OcellaWeb (arun.gov.uk)	145
Arun - Arundel	Residential - Houses	90 dwellings	Ford Road Arundel	Approved	OcellaWeb (arun.gov.uk)	146
Arun - Barnham	Residential - Houses	21 dwellings	PO20 3RP	Undecided	OcellaWeb (arun.gov.uk)	147
Arun - Bersted	Residential - Houses	225 dwellings	Chalcraft Lane Bersted	Approved	OcellaWeb (arun.gov.uk)	148
Arun - Bersted	Residential - Houses	1540 dwellings	Land West of Bersted	Outline - undecided	OcellaWeb (arun.gov.uk)	149
Arun - Bognor Regis	Residential - Apartment Building	43 units	PO21 1QT	Approved	OcellaWeb (arun.gov.uk)	150
Arun - Kingston	Residential - Houses	47 dwellings	Kingston Lane, Kingston, Arun	Undecided	OcellaWeb (arun.gov.uk)	151
Arun - Little Hampton	Residential - Houses	101 dwellings	Littlehampton Academy Littlehampton	Approved	OcellaWeb (arun.gov.uk)	152
Arun - Yapton	Residential - Houses	20 dwellings	Drove Lane, Yapton	Refused - Appealed	OcellaWeb (arun.gov.uk)	153
Chichester - Chichester	Residential - Apartment Building	23 units	PO19 7PP	Pending Consideration	Planning Portal Page	154
Chichester - Birdham	Residential - Houses	14 dwellings	PO20 7BY	Pending Decision	Planning Portal Page	155
Chichester - Birdham	Residential - Houses	150 dwellings	PO20 7HU	Pending Consideration	Planning Portal Page	156
Chichester - Runcton	Residential - Houses	94 dwellings	Marsh Lane Runcton West Sussex	Permitted	Planning Portal Page	157
East Hampshire - Horndean	Residential - Houses	66 dwellings	Development Land East of Horndean, Rowlands Castle Road, Horndean, Waterlooville	Registered	Planning Portal Page	158
Guildford - Ripley	Residential - Houses & Apartment Building	26 dwellings	GU23 6BB	Registered	Planning Portal Page	159
Guildford - East Horsley	Residential - Apartment Building	10 units	KT24 6TB	Awaiting decision	Planning Portal Page	160

Guildford - Ockham	Residential - Houses	200 dwellings	GU23 6NU	Registered	Planning Portal Page	161
Guildford - East Horsley	Residential - Houses	110 dwellings	Ockham Road North, East Horsley	Approved	Planning Portal Page	162
Guildford - Effingham	Residential - Houses	99 dwellings	KT24 5JR	Approved	Planning Portal Page	163
Guildford - Guildford	Residential - Houses	10 dwellings	GU2 7TH	Registered	Planning Portal Page	164
Guildford - Send	Residential - Houses	23 dwellings	GU23 7ER	Approved	Planning Portal Page	165
Guildford - Guildford	Residential - Apartment Building	10 units	GU1 4EQ	Registered	Planning Portal Page	166
Guildford - Ockham	Residential - Houses	70 dwellings	GU23 6NT	Registered	Planning Portal Page	167
Guildford - Normandy	Residential - Houses	28 dwellings	GU3 2DF	Registered	Planning Portal Page	168
Guildford - Guildford	Residential - Houses	44 dwellings	GU1 4QT	Registered	Planning Portal Page	169
Guildford - West Horsley	Residential - Houses	86 dwellings	Ockham Road, West Horsley, KT24	Registered	Planning Portal Page	170
Hart - Hook	Residential - Houses	44 dwellings	RG27 9EF	Registered	Planning Portal Page	171
South Downs - Fernhurst	Residential - Houses	210 dwellings	Fernhurst	Approved	Planning Portal Page	172
South Downs - Petersfield	Residential - Houses	85 dwellings	Heathfield Road Petersfield	Approved	Planning Portal Page	173
South Downs - Petersfield	Residential - Houses	10 dwellings	Reservoir Lane, Petersfield	Approved	Planning Portal Page	174

Table 3: Planned local developments

Air Traffic Movements, Caps and ongoing Planning Application

3.1.4 Existing planning permission for the Airport includes a condition imposing a movement cap of 50,000 movements per year, with 8900 of these being for non-weekdays (i.e. weekends & bank holidays). The airport has submitted a Planning Application to Rushmoor Borough Council to increase this movement cap to 70,000 movements per year, with 18,900 of these being for non-weekdays.

3.1.5 There are no dependencies between the Planning Application and this ACP or vice-versa. However, our baseline must take 'due consideration of known or anticipated factors that might affect them' and therefore our Stage 2A submission document on the CAA's Airspace Change Portal includes forecasts data and L_{Aeq} noise contours for both the event of a successful and unsuccessful planning application.

3.1.6 Our baseline for Full Options Appraisal (FOA, Stage 3) should be generated for Year of implementation and 10 years hence. The year of implementation for this ACP is currently unknown however, the information generated for the planning application included forecasts for 2031 and 2040. We currently consider 2031 is a comparable timeframe for implementation of this ACP on the basis that Farnborough's implementation will need to be with, or after a Heathrow and Gatwick implementation.

3.1.7 As explained in the methodology section below, the forecast data provided in the baseline description in Stage 2 does not directly influence any quantitative analysis performed for this IOA. Noise modelling was performed at this stage only on a single sound event basis, as were overflight counts. Track mile impacts were calculated based on 2023 movements. We have however performed a qualitative assessment of whether each option could have an impact on the 2031 LOAELs for both with and without an increase to the movement cap.

Initial Options Appraisal Assessment Criteria and Methodology

3.1.8 At Stage 2B CAP1616 requires sponsors to carry out an initial appraisal of the benefits and impacts of each option, tested against the 'do nothing' baseline scenario. The purpose of this initial appraisal is to highlight the change to sponsors, stakeholders and the CAA and the relative differences between the impacts, both positive and negative, of each option. The initial appraisal is based around a qualitative assessment although CAP1616 encourages sponsors to use as much analysis as reasonably possible at this stage.

3.1.9 Our assessment criteria shown in Table 4 below have been categorised based on the example in CAP1616 Appendix E, however we have added an additional category called 'Interdependencies, conflicts and trade-offs' to satisfy the requirements to outline potential interdependencies with other FASI-S ACPs, and 'Airspace Modernisation Strategy' to satisfy the 7 confirmed indicators that the CAA will use to assess whether this Stage 2 submission accords with the AMS including iteration 2 of the Masterplan. We will follow the structure of Table 4 across the appraisal of all our options.

Group	Impact	Level of Analysis
Communities	Noise impact on health and quality of life	Quantitative
A partly quantitative, partly qualitative assessment of changes to noise impacts compared with the do-nothing baseline. The following data has been generated to support this assessment: - The population counts within a 60dB and 65dB LAMAX contour of a single event of a typical aircraft (the Global Express Business Jet (GLEX) was chosen for this analysis, on account of it being the most frequent aircraft type using the airport) operating on the illustrative centrelines generated to articulate each option - Population counts within overflight cones 0-7000ft (CAA definition 48.5˚) for the average, typical profiles generated for Stage 2 engagement purposes. Data was generated for each route within the option and then the data was grouped and averaged into RWY 06 Arrivals, RWY 06 Departures, Runway 24 Arrivals and Runway 24 departures for each option. This allows us to present each option as a % increase or decrease compared to the baseline to use as likely indicators of the scale of noise impacts from each option. Whilst for the overflight counts we used average, typical profiles generated for Stage 2 engagement purposes, the 60dB and 65dB LAMAX data was generated using a standard AEDT (Aviation Environmental Design Tool) profile of an GLEX aircraft, assuming the same climb profile across all options. The overflight data considers the route centreline only and has not yet attempted to predict the scale and patterns of any ATC vectoring which will continue to exist in the future. The overflight and 60dB and 65dB LAMAX counts consider a single overflight along the procedure centreline, and therefore at this stage the data does not take into account frequency of overflight. This will be quantified at Stage 3 Full Options Appraisal, together with vectoring swathe assumptions. The counts are generated using Census 2021 data. Although not used to support decision making purposes at this stage, data on the number of healthcare facilities, education facilities and places of worship have also been provided. When considering the centreline data for the arrivals baseline, it's important to note that a centreline for the existing arrivals all the way to final approach does not actually exist in reality as there are no defined tracks that connect the end of the Standard Arrival Routes (STARs) to the Instrument Approach procedures. Therefore average tracks were created based on historical radar data from a busy westerly day and a busy easterly day. For each of the options, we present the data both including and excluding the presence of a potential route between Farnborough and Biggin Hill. This is because the dominant noise impacts will be on other routes and not on the Farnborough and Biggin Hill routes, owing to the low numbers of movements expected on such a route (c.1-2 day). Each option has also been qualitatively assessed against the existing and forecast (2031, both with and without development) LOAEL contours to describe whether the options have potential to affect the shape of the LOAEL and could therefore have an impact on the number of people adversely affected by noise. No modelling been performed in Stage 2 to determine whether such a change would be positive or negative. The LAMAX metrics have been developed using the Aviation Environmental Design Tool (AEDT) in accordance with CAP2091 requirements. CAP2091 sets out the minimum requirements for noise modelling with respect to the level of detail that shall be afforded to aircraft noise data and track information. Within CAP2091, the CAA defines 'categories' of noise modelling based on likely population experiencing an average noise exposure above the daytime and night-time LOAEL i.e. 51dB LAeq,16hr for daytime and 45dB LAeq,8hr for night. Based on baseline conditions, Farnborough falls into CAP2091 Category D for daytime and Category E for night time. However the noise modelling applied as part of the Flightpath 2040 planning application exceeded this category in most cases (Appendix 8.1 Para 3.1.2 of the planning application). The CAA therefore expects the same level of noise modelling, or higher, to apply in the noise modelling of this ACP (CAP2091 para 4.10).		
Communities	Air Quality	Qualitative
A qualitative assessment of changes to local air quality compared with the do-nothing baseline. Due to the effects of mixing and dispersion, emissions of NOx, PM10 and PM2.5 from aircraft travelling above 1000ft are unlikely to have a significant impact on local air quality. The DfT's Air Navigation Guidance (2017) states that: "Studies have shown that NOx emissions from aviation related operations reduce rapidly beyond the immediate area around the runway. Due to the effects of mixing and dispersion, emissions from aircraft above 1000ft are unlikely to have a significant impact on local air quality. Therefore, the impact of airspace design on local air quality is generally negligible compared to changes in the volume of air traffic and that of the local transport infrastructures feeding the airport." ICAO's Airport Air Quality Manual (International Civil Aviation Organization. Doc 9889 Airport Air Quality Manual. Second Edition, 2020. ICAO, Canada.) similarly states that 1000ft is the typical limiting altitude for ground-level NOx impacts from aircraft emissions. If a local authority finds any places where the national air quality objectives are not likely to be achieved, it must declare an Air Quality Management Area (AQMA) there. Then the local authority will put together a plan to improve the air quality. This qualitative assessment will highlight if there could be lateral flight path changes below 1000ft (compared to the baseline) which could therefore have an impact on Local Air Quality. It will also advise whether those changes could fall within an AQMA.		
Wider Society	Greenhouse Gas Impact	Quantitative
Emissions of greenhouse gases arise from the combustion of aviation fuel and fuel burn and are therefore linked to track mileage. For this IOA Farnborough Airport Limited have estimated the differences in track miles between the baseline and each route which forms part of the options. Following engagement with NERL , it is anticipated that Farnborough arrivals will continue to arrive and depart broadly from/to the West/Northwest (Compton (CPT) region) and Southwest (SAM)/South (Goodwood (GWC)) region. It is currently expected that en-route holding will continue to be available in the PEPIS and RUDMO regions. For this reason and in the absence of more definite locations at this stage, track miles are calculated between each runway end and CPT, GWC or SAM, noting that the exact locations will be determined in Stage 3. The one exception to this is comparison of the option with a low-level route between Farnborough and Biggin Hill. In this circumstance miles are compared for the full anticipated/existing routes between the airports. For options with an RNP AR arrival to runway 06, we have assumed that 10% of arrivals would be capable of flying the procedure. Total track miles have been annualised based on the 20 year modal split average of 74.5W / 25.5E and on the number of movements on the applicable route in 2023. CO2 emissions as a result of the track mile changes have not been quantified, as the track miles are still crude estimates owing to network uncertainty. As part of the Full Options Appraisal (Stage 3A), track mileage, fuel burn and the associated greenhouse gas impact will be appraised in further detail, including as part of the Cumulative Assessment Framework being developed by ACOG.		
Wider Society	Capacity/Resilience	Qualitative
A qualitative assessment of changes to airspace capacity and resilience compared with the do-nothing baseline. Capacity and resilience covers a wide range of considerations. This evaluation estimates the impact of each option on ATC workload for Farnborough compared to the baseline as ATC workload can be a measure of delay as an indicator of capacity and resilience. This qualitative assessment considers whether the option is expected to reduce, maintain or increase workload for Farnborough ATC.		

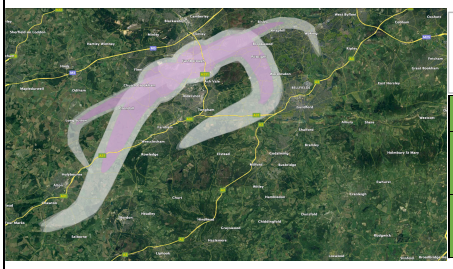
Wider Society	Biodiversity and Tranquillity	Qualitative
The effects of airspace change on ecology or biodiversity are expected to be minimal. CAA guidance states that "In general, airspace change proposals are unlikely to have an impact upon biodiversity because they do not involve ground-based infrastructure. As such they are unlikely to have a direct impact that would engage the Birds or Habitats legislation.". Though there is limited research available on the effects of aircraft noise on wildlife, there is some evidence that disturbance effects associated with aircraft can occur during take-off and landing where aircraft are below around 500m (~1640ft). [Drewitt, A. (1999) Disturbance effects of aircraft on birds. English Nature Birds Network Information Note]. The biodiversity assessment will highlight where changes to flight paths below 2000ft could change traffic patterns over Special Protection Areas (SPAs), Special Areas of Conservation (SACs), National Parks, RAMSAR and/or Sites of Special Scientific Interest (SSSI). CAP1616 outlines the consideration of impacts upon tranquillity is with specific reference to National Parks and Areas of Outstanding Natural Beauty (AONB), plus any locally identified 'tranquil' areas that are identified through community engagement and are subsequently reflected within an airspace change proposal's design principles. This IOA will quantiatively describe whether the option is likely to increase or decrease overflight of the North Wessex Downs and Surrey Hills Areas of Outstanding Natural Beauty (AONB) as well as the South Downs National Park. These assessments are based on the existing boundaries. Subsequent assessments in the Full and Final appraisals, will be based on revised boundaries if they have been granted by the SoS at that time. For each of the options, we present the data both including and excluding the presence of a potential route between Farnborough and Biggin Hill.		
General Aviation	Access	Qualitative
A qualitative assessment of where changes to controlled airspace boundaries could be required, both increases and decreases, together with a commentary on envisaged associated impact on GA as a result of those changes.		
General Aviation/ Commercial Airlines	Economic impact from increased effective capacity	Qualitative
A qualitative assessment of changes to GA (EGLF business aviation traffic is classed as GA) or any commercial airline economic impacts from increased effective capacity compared with the do-nothing baseline.		
General Aviation/ Commercial Airlines	Fuel Burn	Part quantitative, part qualitative
EGLF business aviation traffic is classed as GA. As the combustion of aviation fuel is linked to track mileage, for this IOA Farnborough Airport Limited have estimated the differences in track miles between the baseline and each route which forms part of the options. Following engagement with NERL , it is anticipated that Farnborough arrivals will continue to arrive and depart from/to the West/Northwest (Compton (CPT) region) and Southwest (SAM)/South (Goodwood (GWC)) region. It is currently expected that en-route holding will continue to be available in the PEPIS and RUDMO regions. For this reason and in the absence of more definite locations at this stage, track miles are calculated between each runway end and CPT, GWC or SAM, noting that the exact locations will be determined in Stage 3. The one exception to this is comparison of the option with a low-level route between Farnborough and Biggin Hill. In this circumstance miles are compared for the full anticipated/existing routes between the airports. Whilst approximated changes to the average typical vertical profiles were created to aid stakeholder engagement in Stage 2A, there is still too much uncertainty to include an estimate, either positive or negative, of any fuel burn at this stage. This is due to the dependencies on adjacent airports and the wider airspace design to realise any improved CCO/CDO for Farnborough's movements below 7000ft. Fuel burn changes in Kg as a result of the track mile changes have not been quantified, as the track miles are still crude estimates owing to network uncertainty. As part of the Full Options Appraisal (Stage 3A), track mileage and fuel burn will be appraised in further detail.		
Commercial airlines	Training costs	Qualitative
Farnborough's movements are business jet traffic and therefore classed as General Aviation however this assessment contains a qualitative assessment of changes to their associated training costs compared with the do-nothing baseline.		
Commercial airlines	Other costs	Qualitative
Farnborough's movements are business jet traffic and therefore classed as General Aviation however this assessment contains a qualitative assessment of changes to their other relevant costs compared with the do-nothing baseline.		
Airport/ANSP	Infrastructure costs	Qualitative
A qualitative assessment of changes to Air Navigation Service Provider (ANSP) infrastructure costs compared with the do-nothing baseline.		
Airport/ANSP	Operational costs	Qualitative
A qualitative assessment of changes to ANSP operational costs compared with the do-nothing baseline.		
Airport/ANSP	Deployment costs	Qualitative
A qualitative assessment of ANSP deployment costs compared with the do-nothing baseline.		
All	Safety	Qualitative
A qualitative safety assessment of each option which compares against the baseline, including where additional safety assurances, over and above the norm, could be required		
All	Interdependencies, conflicts, and trade-offs	Qualitative
An airspace change proposal at a Stage 2 gateway in the CAP 1616 process should specify any interdependencies with other airspace changes identified in Iteration 2 of ACOG's Airspace Change Masterplan. This IOA will take the information available from adjacent sponsors (Heathrow, Gatwick, Southampton, Bournemouth and Biggin Hill) Stage 2 submissions or work in progress. This will give an indication of whether there is the potential for trade-offs with other airspace change sponsors required during Stage 3 including an indication of whether the option is likely to increase/decrease chances of CCO/CDO.		
All	Performance against the vision and parameters/strategic objectives of the AMS	Qualitative
A qualitative assessment of how the design option strikes a balance, considering the AMS objectives of improved capacity, noise, and fuel/CO2 and reduced CAS and increased airspace integration compared with the do-nothing baseline.		

4. INITIAL OPTIONS APPRAISAL

4.1.1 The following tables outline our Initial Options Appraisal (IOA) for each option and provide an assessment of the baseline scenario. We have also produced a technical appendix (Appendix A), which is published on the CAA's Airspace Change Portal and provides further supporting information which has informed this IOA.

OPTION 1 DO NOTHING

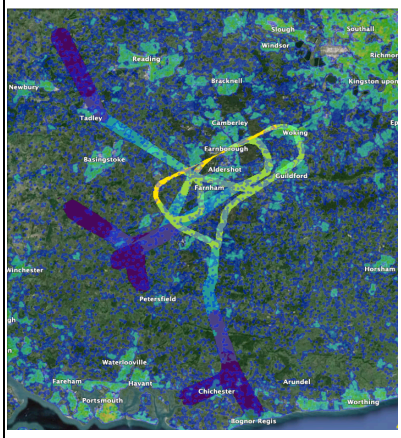
Group	Impact	Level of Analysis
Communities	Noise impact on health and quality of life	Quantitative



The image to the left shows the 65dB (magenta) and 60dB (white) LAMAX contours for GLEX single event for each existing arrival and departure route. The numbers of people within each contour are shown in the tables below. Note that no published centreline exists between the end of the STARs and final approach.

Option	Route Name	1 Do nothing Baseline
ARRIVALS GLEX 65 dB LAMAX Population Count	6	8177
	24	11808
DEPARTURES GLEX 65 dB LAMAX Population Count	6	36723
	24	16707

Option	Route Name	1 Do nothing Baseline
ARRIVALS GLEX 60 dB LAMAX Population Count	6	12364
	24	41751
DEPARTURES GLEX 60 dB LAMAX Population Count	6	62613
	24	39958



The image to the left shows the average typical overflight cones to/from 7000ft for each existing arrival and departure route, assuming all traffic is on the route centreline. It is mapped against areas of population density with figures for total population

Option	RUNWAY	1 Do nothing Baseline
ARRIVALS Overflight (0-7000ft) Population Count	6	31018
	24	85365

Option	RUNWAY	1 Do nothing Baseline
DEPARTURES Overflight (0-7000ft) Population Count	6	21336
	24	7918

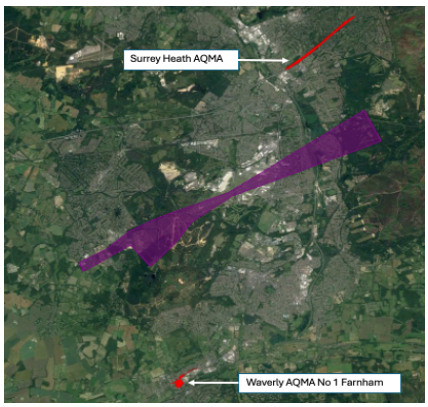
The tables below show the number of education and healthcare facilities and places of worship overflown by average typical overflight cones to/from 7000ft for the do nothing scenario,

ARRIVALS Overflight (0-7000ft)	RUNWAY	1 Do nothing Baseline
Heathcare Count	6	38
	24	110
Education Count	6	39
	24	120
Places of Worship Count	6	32
	24	56

DEPARTURES Overflight (0-7000ft)	RUNWAY	1 Do nothing Baseline
Heathcare Count	6	16
	24	9
Education Count	6	25
	24	7
Places of Worship Count	6	25
	24	14

Communities	Air Quality	Qualitative

The purple shaded area in the figure below represents the area overflown up to 1000ft by traffic arriving and departing Farnborough. The nearest AQMAs are well to the north and south of these areas.



Wider Society	Greenhouse Gas Impact	Quantitative

If the baseline design was retained, the same lateral, vertical and longitudinal profiles would be flown and greenhouse gas impacts would not change. The tables below show the track miles for each route against which each option will be compared, together with a % split of traffic to/from each direction, based on flight plan information from 2023 used to arrive at an annual nm increase/decrease for each option compared to this Do Nothing baseline.

RWY06	CPT	CPT RNPAR	GWC	GWC RNPAR	EGKB	KB-RNPAR	RWY06	CPT	SAM	GWC	EGKB
1A Do Nothing	48.5		43.2		167.2		1A Do Nothing	77.4	44.7	43.9	214.9

	ARRIVALS							DEPARTURES			
RWY24	CPT		GWC		EGKB		RWY24	CPT	SAM	GWC	EGKB
1A Do Nothing	45.8		40.8		164.8		1A Do Nothing	67.2	34.4	33.6	204.6

LF Deps via CPT	25%
LF Deps via SAM	16%
LF Deps via GWC	58%
LF deps to EGKB	1%
	100%

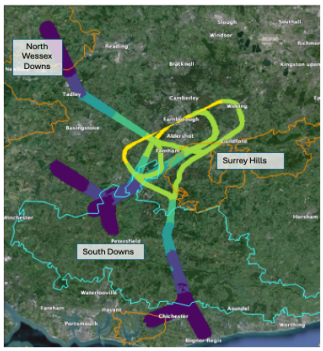
LF Arrs via CPT	46%
LF Arrs via GWC	53%
EGKB to EGLF	1%
	100%

Continuous Climb/Descent from/to Farnborough is currently heavily limited owing to interactions with routes to/from adjacent airports. Standard Instrument Departures have step climbs, some requiring level offs at 2000 and 3000ft. Arrivals are often required to descend much earlier than ideal in under to descend below Gatwick and Heathrow traffic.

Wider Society	Capacity/Resilience	Qualitative

Currently there is a general flow rate applied to Farnborough by London Terminal Control (TC) of 20 movements per hour (10 arrivals and 10 departures). This is to do with sector capacity in TC and the complexity involved in integrating Farnborough's movements into the network. This flow rate can vary depending on wider traffic levels in TC South but it includes Wessex Group traffic. Farnborough's ability to handle more movements in any one hour is dependent on TC South and how the traffic is integrated. If the baseline design was retained there could not expect to be any improvement in the typical peak flow rates imposed by Terminal Control of Farnborough's traffic, nor any reduction in associated delay .

Wider Society	Biodiversity and Tranquillity	Qualitative



Tranquillity

The image to the left shows the average typical overflight cones to/from 7000ft for each existing arrival and departure route, mapped against the North Wessex Downs and Surrey Hills AONB and the South Downs National Park.

It can be seen how there is significant overflight of both AONBs and the National Park by arrivals and departures. It would not be possible to avoid overflight of the Surrey Hills and South Downs without switching the arrival and departure patterns from

Option	RUNWAY	1 Do nothing Baseline
ARRIVALS Overflight (0-7000ft) AONB Area (km2)	6	16
	24	39

Option	RUNWAY	1 Do nothing Baseline
ARRIVALS Overflight (0-7000ft) Nat Park Area	6	52
	24	32

Option	RUNWAY	1 Do nothing Baseline
DEPARTURES Overflight (0-7000ft) AONB Area (km2)	6	16
	24	0

Option	RUNWAY	1 Do nothing Baseline
DEPARTURES Overflight (0-7000ft) Nat Park Area	6	40
	24	37

Biodiversity

The image to the right shows the average typical overflight cones to/from 2000ft for the Do Nothing option mapped against SACs, SSSIs, SPA and RAMSAR sites surrounding the airport. The following sites are currently overflown below 2000ft:

1. Thames Basin Heaths SPA, Bourley and Long Valley SSSI
2. Thames Basin Heaths SPA, Eelmoor Marsh SSSI, Basingstoke Canal SSSI
3. Thames Basin Heaths SPA, Ash to Brookwood Heaths SSSI, Basingstoke Canal SSSI, Thursley, Ash, Pirbright & Chobham SAC
4. Thames Basin Heaths SPA, Colony Bog and Bagshot Heath SSSI, Thursley, Ash, Pirbright & Chobham SAC

General Aviation	Access	Qualitative

The ability to reduce the volume of Farnborough's Controlled Airspace is dependent on being able to improve profiles for Farnborough's arrivals and departures which in turn is dependent on changes being made to Heathrow and Gatwick's profiles. In a Do Nothing scenario, airspace boundaries will not change, and the services provided by Farnborough ATC to their own traffic and other General Aviation inside and outside CAS would likely remain similar. It would not be expected to degrade the joining/transiting services offered to GA by Farnborough ATC because peak hourly movement rates for Farnborough's own traffic above what is seen today will continue to be constrained by TC complexity. Note that Farnborough's Business Jet customer base is classed an General Aviation.

General Aviation/ commercial airlines	Economic impact from increased effective capacity	Qualitative

There would be no opportunity to improve airspace capacity for either Farnborough's business jet traffic or capacity to integrate other GA traffic. This would continue to rely on tactical intervention by London Terminal Control and Farnborough Radar and therefore not reduce their workload to enable airspace capacity improvements. There would be no change in economic impact for either GA or commercial operators. If the levels of complexity associated with integrating Farnborough traffic within the TC SW sector remain, this could have a knock-on impact to the ability for TCSW to handle increased movements from other airports within the LTMA SW quadrant. Note that Farnborough's Business Jet customer base is classed an General Aviation.

General Aviation/ commercial airlines	Fuel Burn	Quantitative

The same route lengths would be flown and the same typical profiles would remain for Farnborough's traffic and therefore fuel burn per flight will remain unchanged in a do nothing scenario. There would be no change in economic impact for either Farnborough's arrivals and departures or wider GA. The tables below show the track miles for each route against which each option will be compared, together with a % split of traffic to/from each direction, based on flight plan information from 2023 used to arrive at an annual nm increase/decrease for each option compared to this Do Nothing baseline.

RWY06	CPT	CPT RNPAR	GWC	GWC RNPAR	EGKB	KB-RNPAR	RWY06	CPT	SAM	GWC	EGKB
1A Do Nothing	48.5		43.2		167.2		1A Do Nothing	77.4	44.7	43.9	214.9

	ARRIVALS							DEPARTURES			
RWY24	CPT		GWC		EGKB		RWY24	CPT	SAM	GWC	EGKB
1A Do Nothing	45.8		40.8		164.8		1A Do Nothing	67.2	34.4	33.6	204.6

LF Deps via CPT	25%	LF Arrs via CPT	46%
LF Deps via SAM	16%	LF Arrs via GWC	53%
LF Deps via GWC	58%	EGKB to EGLF	1%
LF deps to EGKB	1%		100%
	100%		

Continuous Climb/Descent from/to Farnborough is currently heavily limited owing to interactions with routes to/from adjacent airports. Standard Instrument Departures have step climbs, some requiring level offs at 2000 and 3000ft. Arrivals are often required to descend much earlier than ideal in under to descend below Gatwick and Heathrow traffic.

Commercial airlines	Training costs	Qualitative

Flight procedures change worldwide with each AIRAC cycle and operators update their procedures accordingly, training if required. If this baseline system was retained, the same flight procedures would be used and training cost impacts would not change.

Commercial airlines	Other costs	Qualitative

As this option is already in operation, there are no other costs beyond business as usual maintenance anticipated as there will be no change.

Airport/ANSP	Infrastructure costs	Qualitative

As this option is already in operation, there are no infrastructure costs anticipated with no additional costs beyond business as usual maintenance as there will be no change.

Airport/ANSP	Operational costs	Qualitative

As this option is already in operation, there are no operational costs anticipated with no additional costs beyond business as usual as there will be no change.

Airport/ANSP	Deployment costs	Qualitative

As this option is already in operation, there are no deployment costs anticipated as there will be no change.

All	Safety	Qualitative

A PBN arrival route onto final approach (as proposed in each of our Options 2-5) would mitigate the possibility of CAS excursions of aircraft being positioned towards RWY 06 final approach, which can occur when the R/T loading is high and time-critical ATC instruction to turn onto base-leg and/or final approached is slightly delayed. As covered above, Farnborough's movements are generally capped at 20/hr. The ability to increase this flow rate is dependent on wider changes to the LTMA and Farnborough. Farnborough's complexity has a direct impact on TC workload and therefore future traffic growth in the LTMA SW quadrant may lead to traffic levels within the London TMA being capped, or increased aircraft holding on the ground, in order to maintain safety.

All	Interdependencies, conflicts, and trade offs with other ACPs	Qualitative

Doing nothing at Farnborough could still generate Interdependencies, conflicts, and trade offs with other ACPs should the changes proposed by either Heathrow, Gatwick, Southampton, Biggin or NERL require changes to Farnborough's traffic flows below 7000ft.

All	Performance against the vision and parameters/strategic objectives of the AMS	Qualitative

The Airspace Modernisation Strategy vision is to deliver quicker, quieter and cleaner journeys and more capacity for the benefit of those who use and are affected by UK airspace.

Our DPE concluded that doing nothing partly meets the strategic aims of the AMS. Farnborough have recently modernised their airspace by implementing PBN arrivals and departures together with Controlled Airspace. Since then, in order to enable DVOR rationalisation (mentioned in Para 2.83 of CAP1711), Farnborough implemented the use of RNAV substitution for their Initial Approach Procedures (See ACP-2023-023). As set out in the Statement of Need for that ACP and as within CAP1781, RNAV substitution is an interim measure prior to a permanent PBN solution. Option 2A/2B within this ACP represents the minimum changes necessary to adhere to the temporary nature of RNAV substitution.

It's not entirely plausible at this stage to say that Do Nothing will not meet the objectives of the AMS, that depends very much on what changes NERL, Heathrow, Gatwick and Southampton want to propose and whether Doing Nothing at Farnborough would hinder those changes. However, in the event that changes to surrounding airspace would enable improved operational and/or environmental performance and/or CAS reductions, Farnborough would wish to implement those changes, hence being part of the programme.

On the basis that the CAA requires RNAV substitution to be of a temporary nature only and combined with the strong likelihood that there will be changes to Farnborough's traffic flows as a result of the wider FASI programme, Farnborough determine that Do Nothing is not a viable option that can be carried forward. Option 2A/B illustrate the minimum changes necessary to remove reliance on RNAV substitution at Farnborough.

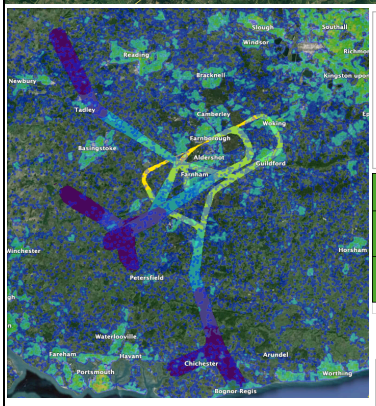
OPTION 2A

Group	Impact	Level of Analysis
Communities	Noise impact on health and quality of life	Part quantitative, part qualitative

The image to the left shows the 65dB (magenta) and 60dB (white) LAMAX contours for GLEX single event for each existing arrival and departure route. The % change for the number of people within each contour compared to the baseline is shown in the tables below.

GLEX 60dB LAMAX	RUNWAY	1 Do nothing Baseline	2A
ARRIVALS GLEX 60 dB LAMAX Population Count	6	100%	96%
	24	100%	97%
DEPARTURES GLEX 60 dB LAMAX Population Count	6	100%	100%
	24	100%	100%
AVERAGE CHANGE			-2%

GLEX 65dB LAMAX	RUNWAY	1 Do nothing Baseline	2A
ARRIVALS GLEX 65 dB LAMAX Population Count	6	100%	93%
	24	100%	100%
DEPARTURES GLEX 65 dB LAMAX Population Count	6	100%	100%
	24	100%	100%
AVERAGE CHANGE			-2%



The image to the left shows the average typical overflight cones to/from 7000ft for each existing arrival and departure route, assuming all traffic is on the route centreline. It is mapped against areas of population density with the % change for the number of people within each contour compared to the baseline shown

Overflight Population	RUNWAY	1 Do nothing Baseline	2A
ARRIVALS Overflight (0-7000ft) Population Count	6	100%	99%
	24	100%	101%
DEPARTURES Overflight (0-7000ft) Population Count	6	100%	100%
	24	100%	100%
AVERAGE CHANGE			0%

The tables below show the % change in the number of education and healthcare facilities and places of worship overflown by average typical overflight cones to/from 7000ft compared to the do nothing scenario, assuming all traffic is on the route centreline.

Overflight NSRs Arrivals	RUNWAY	1 Do nothing Baseline	2A
Heathcare Count (0-7000ft)	6	100%	97%
	24	100%	105%
Education Count (0-7000ft)	6	100%	94%
	24	100%	94%
Places of Worship Count (0-7000ft)	6	100%	102%
	24	100%	108%
AVERAGE CHANGE			0%

Overflight NSRs Departures	RUNWAY	1 Do nothing Baseline	2A
Heathcare Count (0-7000ft)	6	100%	100%
	24	100%	100%
Education Count (0-7000ft)	6	100%	100%
	24	100%	100%
Places of Worship Count (0-7000ft)	6	100%	100%
	24	100%	100%
AVERAGE CHANGE			0%

Based on the extent of the existing and forecast (2031) LOAEL, both with and without planning consent, this airspace design option is expected to have no impact on the size or shape of the LOAEL.

Communities	Air Quality	Qualitative

This option would not alter the lateral or vertical tracks of flight paths below 1000ft for Farnborough's arrivals or departures and this option is therefore not expected to have an effect on Local Air Quality.

Wider Society	Greenhouse Gas Impact	Quantitative

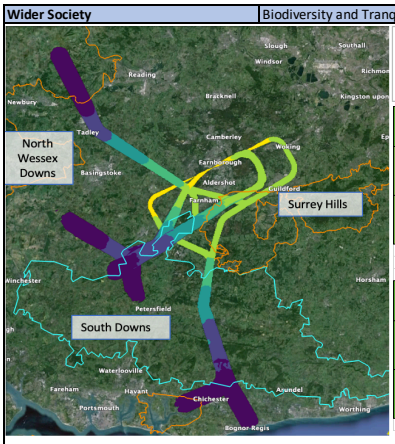
Option 2A is estimated to result in an annual increase of 2,174nm flown by Farnborough movements compared to the Do Nothing scenario, based on 2023 movements, the 20 year average modal split and the same directional split of traffic.

	NM Difference
1A Do Nothing	0.0
2A	2174

Wider Society	Capacity/Resilience	Qualitative

This option would be expected to reduce the workload of Farnborough ATC quite considerably by removing the need to descend and turn aircraft in a very timely manner in the constrained airspace onto final approach. This would enable them to perhaps provide an improved service to aircraft in their airspace, for example by climbing departures sooner owing to a lower R/T workload though it would not be expected to facilitate any reduction in the standard flow rates applied by TC as the handling to movements between the 2 units would remain the same as today.

Wider Society	Biodiversity and Tranquillity	Qualitative

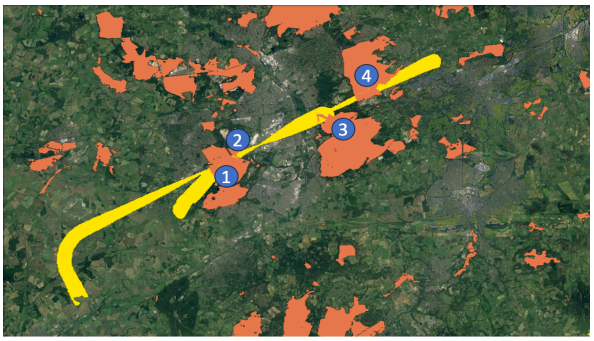


Tranquillity
The image to the left shows the average typical overflight cones to/from 7000ft for each existing arrival and departure route, mapped against the North Wessex Downs and Surrey Hills AONB and the South Downs National Park.
The tables below illustrate the typical changes in overflight of these areas compared to the baseline.

Overflight AONB	RUNWAY	1 Do nothing Baseline	2A
ARRIVALS Overflight (0-7000ft) AONB Area (km2)	6	100%	98%
	24	100%	94%
DEPARTURES Overflight (0-7000ft) AONB Area (km2)	6	100%	100%
	24	100%	100%
	AVERAGE CHANGE		-2%

Overflight Nat Park	RUNWAY	1 Do nothing Baseline	2A
ARRIVALS Overflight (0-7000ft) NP Area (km2)	6	100%	96%
	24	100%	149%
DEPARTURES Overflight (0-7000ft) NP Area (km2)	6	100%	111%
	24	100%	122%
	AVERAGE CHANGE		19%

Biodiversity
The image to the right shows the average typical overflight cones to/from 2000ft for the Do Nothing option mapped against SACs, SSSIs, SPA and RAMSAR sites surrounding the airport. The following sites are currently overflown below 2000ft:
1. Thames Basin Heaths SPA, Bourley and Long Valley SSSI
2. Thames Basin Heaths SPA, Eelmoor Marsh SSSI, Basingstoke Canal SSSI
3. Thames Basin Heaths SPA, Ash to Brookwood Heaths SSSI, Basingstoke Canal SSSI, Thursley, Ash, Pirbright & Chobham SAC
4. Thames Basin Heaths SPA, Colony Bog and Bagshot Heath SSSI, Thursley, Ash, Pirbright & Chobham SAC



General Aviation	Access	Qualitative

This option assumes only the introduction of PBN procedures to the ILS with all other profiles remaining as they are today. By moving the RWY 06 Final Approach Fix (FAF) closer to the Threshold (THR), the PBN approach transition can fit in the centre of the existing arrival swathe. The CAA Policy for the Design of Controlled Airspace Structures says that there should be between 2 and 3nm from an RNAV1 arrival route and the edge of CAS. There would be between 1 and 2nm between this centreline and the edge of CAS which would require a bespoke safety case to support. This is felt to be achievable at this time. The RWY 24 arrival is wholly contained laterally although, in the vertical plane, could require some amendments to CTR2/CTA1 potentially affecting Fairoaks aswell as the LON CTR potentially requiring an adjustment to its dimension or managed through LoA. This option would be expected to reduce the workload of Farnborough ATC quite considerably by removing the need to descend and turn aircraft in a very timely manner in the constrained airspace onto final approach. This would provide reduced R/T workload, perhaps enabling the ability to provide an improved service to other GA aircraft wishing to transit the airspace. This option is not expected to facilitate the release of any of Farnborough's CAS to Class G.

General Aviation/ Commercial Airlines	Economic impact from increased effective capacity	Qualitative

We expect the increased capacity/resilience detailed in the section above will result in a positive economic impact on Farnborough's customers compared with the Do Nothing scenario. The requirement to contain a PBN arrival to RWY06 final approach inside CAS could negatively affect Fairoaks.

General Aviation/ Commercial Airlines	Fuel Burn	Quantitative

See wider society Green House Gas Impact as the methodologies employed at Stage 2 are the same.

Commercial airlines	Training costs	Qualitative

Flight procedures are updated or introduced worldwide as part of an AIRAC cycle. As part of this cycle, Business Jet operators update their procedures accordingly and undertake training if required on a business as usual basis. This option is not anticipated to require any additional training costs for Farnborough's customers

Commercial airlines	Other costs	Qualitative

No other costs for Farnborough's customers are foreseen with this option.

Airport/ANSP	Infrastructure costs	Qualitative

This design option is not expected to change Farnborough's infrastructure costs.

Airport/ANSP	Operational costs	Qualitative

This design option is not expected to change Farnborough's operational costs.

Airport/ANSP	Deployment costs	Qualitative

This option is expected to require air traffic controller training for the controllers and assistants located at Farnborough Airport, and London Terminal Control. The scale and nature of this training requires further exploration as part of the Stage 3 Full Options Appraisal, when appraising the shortlist of options and once further information is known about the network above 7000ft and interdependencies with adjacent airports and NERL.

All	Safety	Qualitative

The reduction in Farnborough ATC workload is expected to enhance safety. The ability to fit a PBN IAP to ILS within the existing CTA is subject to an acceptable case safety case allowing reduced distance between the PBN centreline and the edge of CAS. IFP design has shown that an RNP APCH to RWY 24 has an impact on D132. Any BaroVNAV RNP APCH would not be designed to 3.5° to match the ILS but would need to have a lower profile to enhance availability in all temperatures, this could further impact CTR2/1 and would also need consideration of the PAPI angle. IFP flyability has not yet been performed which could change the impacts described so far. Any impact on Fairoaks as a result on any changes to CTR2/1 have not yet been assessed.

All	Interdependencies, conflicts, and trade offs with other ACPs	Qualitative

The implementation of PBN to final approach is unlikely to require trade-offs with Heathrow, Gatwick, Biggin Hill or Southampton because the changes are very small and low level. The addition of a new contingency hold is dependent on Heathrow and/or Gatwick being able to be guaranteed to climb higher, sooner. This could result in trade-off analysis if a steeper than optimal gradient were to be required from those airports in order to facilitate the hold.

All	Performance against the vision and parameters/strategic objectives of the AMS	Qualitative
The Airspace Modernisation Strategy vision is to deliver quicker, quieter and cleaner journeys and more capacity for the benefit of those who use and are affected by UK airspace. This option would not directly deliver environmental benefit although the reduction in R/T for Farnborough ATC could be expected to result in an improved service to GA aircraft wishing to transit the airspace and provide more time to climb/descend Farnborough's movements in a more optimal manner. Only having PBN Initial Approach Procedures (IAP) to ILS (and not also RNP APCH) would reduce the requirement for extending the CTR to the west. A reduction in Farnborough ATC workload would enhance safety and potentially reduce ground/airborne delay through improved ATC capacity. This could be expected to offset the small increase in CO2 necessary to implement PBN IAPs.		

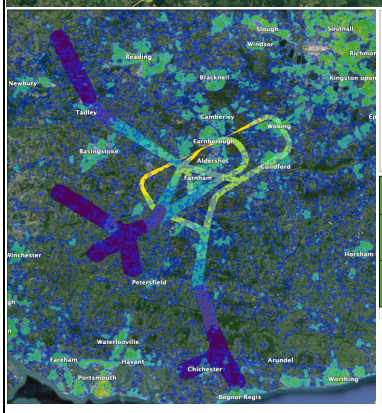
OPTION 2B

Group	Impact	Level of Analysis
Communities	Noise impact on health and quality of life	Part quantitative, part qualitative

The image to the left shows the 65dB (magenta) and 60dB (white) LAMAX contours for GLEX single event for each existing arrival and departure route. The % change for the number of people within each contour compared to the baseline is shown in the tables below.

GLEX 60dB LAMAX	RUNWAY	1 Do nothing Baseline	2B
ARRIVALS GLEX 60 dB LAMAX Population Count	6	100%	96%
	24	100%	81%
DEPARTURES GLEX 60 dB LAMAX Population Count	6	100%	87%
	24	100%	100%
	AVERAGE CHANGE		-9%

GLEX 65dB LAMAX	RUNWAY	1 Do nothing Baseline	2B
ARRIVALS GLEX 65 dB LAMAX Population Count	6	100%	93%
	24	100%	100%
DEPARTURES GLEX 65 dB LAMAX Population Count	6	100%	90%
	24	100%	100%
	AVERAGE CHANGE		-4%



The image to the left shows the average typical overflight cones to/from 7000ft for each existing arrival and departure route, assuming all traffic is on the route centreline. It is mapped against areas of population density with the % change for the number of people within each contour compared to the baseline shown in the tables below.

Overflight Population	RUNWAY	1 Do nothing Baseline	2B
ARRIVALS Overflight (0-7000ft) Population Count	6	100%	102%
	24	100%	96%
DEPARTURES Overflight (0-7000ft) Population Count	6	100%	92%
	24	100%	100%
	AVERAGE CHANGE		-3%

The tables below show the % change in the number of education and healthcare facilities and places of worship overflown by average typical overflight cones to/from 7000ft compared to the do nothing scenario, assuming all traffic is on the route centreline.

Overflight NSRs Arrivals	RUNWAY	1 Do nothing Baseline	2B
Heathcare Count (0-7000ft)	6	100%	98%
	24	100%	108%
Education Count (0-7000ft)	6	100%	93%
	24	100%	100%
Places of Worship Count (0-7000ft)	6	100%	100%
	24	100%	115%
	AVERAGE CHANGE		2%

Overflight NSRs Departures	RUNWAY	1 Do nothing Baseline	2B
Heathcare Count (0-7000ft)	6	100%	119%
	24	100%	100%
Education Count (0-7000ft)	6	100%	84%
	24	100%	100%
Places of Worship Count (0-7000ft)	6	100%	95%
	24	100%	100%
	AVERAGE CHANGE		0%

Owing to the earlier turn on RWY 06 departures, this option could have an impact on the size or shape of the existing and forecast (2031 both with and without planning consent) LOAEL. No modelling of the LOAEL has been performed at this stage to determine whether such a change would be positive or negative.

Communities	Air Quality	Qualitative

This option would not alter the lateral or vertical tracks of flight paths below 1000ft for Farnborough's arrivals or departures and this option is therefore not expected to have an effect on Local Air Quality.

Wider Society	Greenhouse Gas Impact	Quantitative

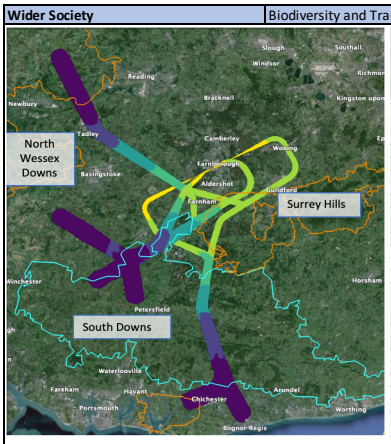
Option 2B is estimated to result in an annual increase of 7,530nm flown by Farnborough movements compared to the Do Nothing scenario, based on 2023 movements, the 20 year average modal split and the same directional split of traffic.

	NM Difference
1A Do Nothing	0.0
2B	7530

Wider Society	Capacity/Resilience	Qualitative

This option would be expected to reduce the workload of Farnborough ATC quite considerably by removing the need to descend and turn aircraft in a very timely manner in the constrained airspace onto final approach. This would enable them to perhaps provide an improved service to aircraft in their airspace, for example by climbing departures sooner owing to a lower R/T workload though it would not be expected to facilitate any reduction in the standard flow rates applied by TC as the handling to movements between the 2 units would remain the same as today.

Wider Society	Biodiversity and Tranquillity	Qualitative



Tranquillity

The image to the left shows the average typical overflight cones to/from 7000ft for each existing arrival and departure route, mapped against the North Wessex Downs and Surrey Hills AONB and the South Downs National Park.

Overflight AONB	RUNWAY	1 Do nothing Baseline	2B
ARRIVALS Overflight (0-7000ft) AONB Area (km2)	6	100%	91%
	24	100%	88%
DEPARTURES Overflight (0-7000ft) AONB Area (km2)	6	100%	81%
	24	100%	100%
	AVERAGE CHANGE		-10%

Overflight Nat Park	RUNWAY	1 Do nothing Baseline	2B
ARRIVALS Overflight (0-7000ft) NP Area (km2)	6	100%	98%
	24	100%	155%
DEPARTURES Overflight (0-7000ft) NP Area (km2)	6	100%	132%
	24	100%	121%
	AVERAGE CHANGE		27%

Biodiversity

The image to the right shows the average typical overflight cones to/from 2000ft for the Do Nothing option mapped against SACs, SSSIs, SPA and RAMSAR sites surrounding the airport. The following sites are currently overflown below 2000ft:

1. Thames Basin Heaths SPA, Bourley and Long Valley SSSI
2. Thames Basin Heaths SPA, Eelmoor Marsh SSSI, Basingstoke Canal SSSI
3. Thames Basin Heaths SPA, Ash to Brookwood Heaths SSSI, Basingstoke Canal SSSI, Thursley, Ash, Pirbright & Chobham SAC
4. Thames Basin Heaths SPA, Colony Bog and Bagshot Heath SSSI, Thursley, Ash, Pirbright & Chobham SAC

General Aviation	Access	Qualitative

This option assumes only the introduction of PBN procedures to the ILS and RNP APCH and a slightly earlier first turn on RWY06 departures with all other profiles remaining as they are today. By moving the RWY 06 Final Approach Fix (FAF) closer to the Threshold (THR), the PBN approach transition can only be as far east the left hand side of the existing arrival swathe. The CAA Policy for the Design of Controlled Airspace Structures says that there should be between 2 and 3nm from an RNAV1 arrival route and the edge of CAS. There would be only be c.0.5nm between this centreline and the edge of CAS which would require a bespoke safety case to support. This is not felt to be achievable without extending the Farnborough CTR to the west. The impact on RAF Odiham and Lasham is considered to be significant with GA outside CAS already currently operating close to the boundary. The RWY 24 arrival is wholly contained laterally although, in the vertical plane, could require some amendments to CTR2/CTA1 potentially affecting Fairoaks aswell as the LON CTR potentially requiring an adjustment to its dimension or managed through LoA. This option would be expected to reduce the workload of Farnborough ATC quite considerably by removing the need to descend and turn aircraft in a very timely manner in the constrained airspace onto final approach. This would provide reduced R/T workload, perhaps enabling the ability to provide an improved service to other GA aircraft wishing to transit the airspace. This option is not expected to facilitate the release of any of Farnborough's CAS to Class G.

General Aviation/ commercial airlines	Economic impact from increased effective capacity	Qualitative

We expect the increased capacity/resilience detailed in the section above will result in a positive economic impact on Farnborough's customers compared with the Do Nothing scenario. Owing to the extension of the CTR to the west required by this option there could be a negative effect on Lasham/Odiham operations. The requirement to contain a PBN arrival to RWY06 final approach inside CAS could negatively affect Fairoaks.

General Aviation/ commercial airlines	Fuel Burn	Quantitative

See wider society Green House Gas Impact as the methodologies employed at Stage 2 are the same.

Commercial airlines	Training costs	Qualitative

Flight procedures are updated or introduced worldwide as part of an AIRAC cycle. As part of this cycle, Business Jet operators update their procedures accordingly and undertake training if required on a business as usual basis. This option is not anticipated to require any additional training costs for Farnborough's customers

Commercial airlines	Other costs	Qualitative

No other costs for Farnborough's customers are foreseen with this option.

Airport/ANSP	Infrastructure costs	Qualitative

This design option is not expected to change Farnborough's infrastructure costs.

Airport/ANSP	Operational costs	Qualitative

This design option is not expected to change Farnborough's operational costs.

Airport/ANSP	Deployment costs	Qualitative

This option is expected to require air traffic controller training for the controllers and assistants located at Farnborough Airport, and London Terminal Control. The scale and nature of this training requires further exploration as part of the Stage 3 Full Options Appraisal, when appraising the shortlist of options and once further information is known about the network above 7000ft and interdependencies with adjacent airports and NERL.

All	Safety	Qualitative

The reduction in Farnborough ATC workload is expected to enhance safety inside CAS. Any impact on Fairoaks as a result on any changes to CTR2/1 have not yet been assessed. Impacts on RAF Odiham and Lasham as a result of an extension of the CTR to the west have not yet been assessed.

IFP design has shown that an RNP APCH to RWY 24 has an impact on D132 and an earlier turn for RWY06 departures would continue to requirement ATC intervention during D132 activation. Any BaroVNAV RNP APCH would not be designed to 3.5˚ to match the ILS but would need to have a lower profile to enhance availability in all temperatures, this could further impact CTR2/1 and would also need consideration of the PAPI angle. IFP flyability has not yet been performed which could change the impacts described so far.

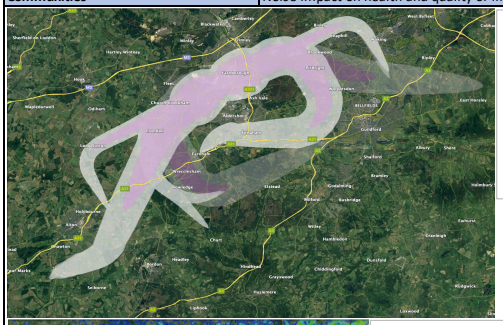
All	Interdependencies, conflicts, and trade offs with other ACPs	Qualitative

The implementation of PBN to final approach is unlikely to require trade-offs with Heathrow, Gatwick, Biggin Hill or Southampton because the changes are very small and low level. The addition of a new contingency hold is dependent on Heathrow and/or Gatwick being able to be guaranteed to climb higher, sooner. This could result in trade-off analysis if a steeper than optimal gradient were to be required from those airports in order to facilitate the hold.

All	Performance against the vision and parameters/strategic objectives of the AMS	Qualitative
The Airspace Modernisation Strategy vision is to deliver quicker, quieter and cleaner journeys and more capacity for the benefit of those who use and are affected by UK airspace. This option would not directly deliver environmental benefit although the reduction in R/T for Farnborough ATC could be expected to result in an improved service to GA aircraft wishing to transit the airspace and provide more time to climb/descend Farnborough's movements in a more optimal manner. Having PBN Initial Approach Procedures (IAP) to both ILS and RNP APCH would create a requirement to extend the CTR to the west, potentially increasing Class G compression, GA pilot workload and Odiham ATC workload. The slightly shorter RWY 06 departure does not offset the slightly longer final approach to each end. A reduction in Farnborough ATC workload would enhance safety and potentially reduce ground/airborne delay through improved ATC capacity.		

OPTION 3A

Group	Impact	Level of Analysis
Communities	Noise impact on health and quality of life	Part quantitative, part qualitative



The image to the left shows the 65dB (magenta) and 60dB (white) LAMAX contours for GLEX single event for each existing arrival and departure route. The % change for the number of people within each contour compared to the baseline is shown both with and without the low level routes between Farnborough and Biggin

With Biggin Hill routes

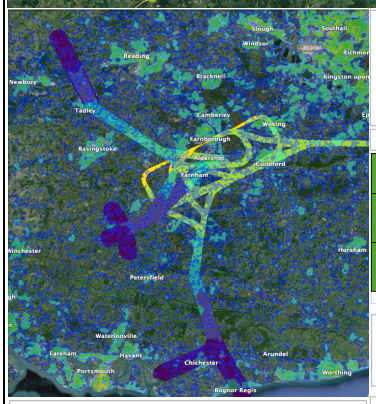
GLEX 60dB LAMAX	RUNWAY	1 Do nothing Baseline	3A
ARRIVALS GLEX 60 dB LAMAX Population Count	6	100%	99%
	24	100%	97%
DEPARTURES GLEX 60 dB LAMAX Population Count	6	100%	126%
	24	100%	108%
		AVERAGE CHANGE	8%

Without Biggin Hill routes

GLEX 60dB LAMAX	RUNWAY	1 Do nothing Baseline	3A
ARRIVALS GLEX 60 dB LAMAX Population Count	6	100%	98%
	24	100%	97%
DEPARTURES GLEX 60 dB LAMAX Population Count	6	100%	133%
	24	100%	94%
		AVERAGE CHANGE	6%

GLEX 65dB LAMAX	RUNWAY	1 Do nothing Baseline	3A
ARRIVALS GLEX 65 dB LAMAX Population Count	6	100%	94%
	24	100%	100%
DEPARTURES GLEX 65 dB LAMAX Population Count	6	100%	96%
	24	100%	103%
		AVERAGE CHANGE	-2%

GLEX 65dB LAMAX	RUNWAY	1 Do nothing Baseline	3A
ARRIVALS GLEX 65 dB LAMAX Population Count	6	100%	93%
	24	100%	100%
DEPARTURES GLEX 65 dB LAMAX Population Count	6	100%	96%
	24	100%	81%
		AVERAGE CHANGE	-8%



The image to the left shows the average typical overflight cones to/from 7000ft for each existing arrival and departure route, assuming all traffic is on the route centreline. It is mapped against areas of population density. The % change for the number of people within each contour compared to the baseline is shown below both with and without the low level routes between Farnborough and Biggin Hill.

With Biggin Hill routes

Overflight Population	RUNWAY	1 Do nothing Baseline	3A
ARRIVALS Overflight (0-7000ft) Population Count	6	100%	138%
	24	100%	89%
DEPARTURES Overflight (0-7000ft) Population Count	6	100%	211%
	24	100%	193%
		AVERAGE CHANGE	58%

Without Biggin Hill routes

Overflight Population	RUNWAY	1 Do nothing Baseline	3A
ARRIVALS Overflight (0-7000ft) Population Count	6	100%	134%
	24	100%	101%
DEPARTURES Overflight (0-7000ft) Population Count	6	100%	262%
	24	100%	74%
		AVERAGE CHANGE	43%

Based on the extent of the existing and forecast (2031) LOAEL, both with and without planning consent, this airspace design option is expected to have no impact on the size or shape of the LOAEL.

The tables to the right show the % change in the number of education and healthcare facilities and places of worship overflown by average typical overflight cones to/from 7000ft compared to the do nothing scenario, assuming all traffic is on the route centreline. Data with and without the low level routes between Farnborough and Biggin Hill are shown.

With Biggin Hill routes

Overflight NSRs Arrivals	RUNWAY	1 Do nothing Baseline	3A
Heathcare Count (0-7000ft)	6	100%	146%
	24	100%	91%
Education Count (0-7000ft)	6	100%	143%
	24	100%	80%
Places of Worship Count (0-7000ft)	6	100%	132%
	24	100%	94%
		AVERAGE CHANGE	14%

Without Biggin Hill routes

Overflight NSRs Arrivals	RUNWAY	1 Do nothing Baseline	3A
Heathcare Count (0-7000ft)	6	100%	136%
	24	100%	105%
Education Count (0-7000ft)	6	100%	118%
	24	100%	94%
Places of Worship Count (0-7000ft)	6	100%	118%
	24	100%	108%
		AVERAGE CHANGE	13%

Overflight NSRs Departures	RUNWAY	1 Do nothing Baseline	3A
Heathcare Count (0-7000ft)	6	100%	233%
	24	100%	206%
Education Count (0-7000ft)	6	100%	189%
	24	100%	402%
Places of Worship Count (0-7000ft)	6	100%	152%
	24	100%	129%
		AVERAGE CHANGE	119%

Overflight NSRs Departures	RUNWAY	1 Do nothing Baseline	3A
Heathcare Count (0-7000ft)	6	100%	290%
	24	100%	93%
Education Count (0-7000ft)	6	100%	233%
	24	100%	95%
Places of Worship Count (0-7000ft)	6	100%	191%
	24	100%	84%
		AVERAGE CHANGE	64%

Communities	Air Quality	Qualitative

This option would not alter the lateral or vertical tracks of flight paths below 1000ft for Farnborough's arrivals or departures and this option is therefore not expected to have an effect on Local Air Quality.

Wider Society	Greenhouse Gas Impact	Quantitative

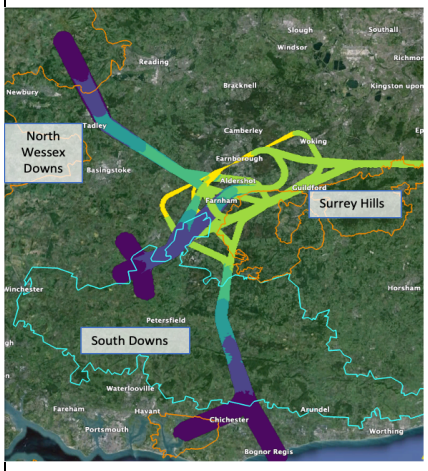
Option 3A is estimated to result in an annual reduction of 161,143nm flown by Farnborough movements compared to the Do Nothing scenario, based on 2023 movements, the 20 year average modal split and the same directional split of traffic.

	NM Difference
1A Do Nothing	0.0
3A	-161143

Wider Society	Capacity/Resilience	Qualitative

This option would be expected to reduce the workload of Farnborough ATC quite considerably by removing the need to descend and turn aircraft in a very timely manner in the constrained airspace onto final approach. In addition the RWY 06 departure routing to the north of the existing track, where traffic is typically vectored when conflicting with an arrival from the south, could further help reduce R/T. This would enable them to perhaps provide an improved service to aircraft in their airspace, for example by climbing departures sooner owing to a lower R/T workload though it would not be expected to facilitate any reduction in the standard flow rates applied by TC as the handling to movements between the 2 units would remain the same as today. However, the removal of Biggin Hill arrivals and departures from TC could be expected to help reduce complexity in TC sectors and eliminate and ground delay imposed by TC for those movements. The availability of an RNP-AR arrival to runway 06 which avoids Odiham's MATZ will reduce ATC workload and co-ordination with RAF Odiham.

Wider Society	Biodiversity and Tranquillity	Qualitative



Tranquillity

The image to the left shows the average typical overflight cones to/from 7000ft for each existing arrival and departure route, mapped against the North Wessex Downs and Surrey Hills AONB and the South Downs National Park.

The tables below illustrate the typical changes in overflight of these areas compared to the baseline.

With Biggin Hill routes

Overflight AONB	RUNWAY	1 Do nothing Baseline	3A
ARRIVALS Overflight (0-7000ft) AONB Area (km2)	6	100%	152%
	24	100%	78%
DEPARTURES Overflight (0-7000ft) AONB Area (km2)	6	100%	6%
	24	100%	104%
	AVERAGE CHANGE		-15%

Without Biggin Hill routes

Overflight AONB	RUNWAY	1 Do nothing Baseline	3A
ARRIVALS Overflight (0-7000ft) AONB Area (km2)	6	100%	149%
	24	100%	94%
DEPARTURES Overflight (0-7000ft) AONB Area (km2)	6	100%	8%
	24	100%	104%
	AVERAGE CHANGE		-11%

Overflight Nat Park	RUNWAY	1 Do nothing Baseline	3A
ARRIVALS Overflight (0-7000ft) NP Area (km2)	6	100%	71%
	24	100%	119%
DEPARTURES Overflight (0-7000ft) NP Area (km2)	6	100%	91%
	24	100%	78%
	AVERAGE CHANGE		-10%

Overflight Nat Park	RUNWAY	1 Do nothing Baseline	3A
ARRIVALS Overflight (0-7000ft) NP Area (km2)	6	100%	89%
	24	100%	149%
DEPARTURES Overflight (0-7000ft) NP Area (km2)	6	100%	122%
	24	100%	104%
	AVERAGE CHANGE		16%

Biodiversity

The image to the right shows the average typical overflight cones to/from 2000ft for the Do Nothing option mapped against SACs, SSSIs, SPA and RAMSAR sites surrounding the airport. The following sites are currently overflown below 2000ft:

1. Thames Basin Heaths SPA, Bourley and Long Valley SSSI
2. Thames Basin Heaths SPA, Eelmoor Marsh SSSI, Basingstoke Canal SSSI
3. Thames Basin Heaths SPA, Ash to Brookwood Heaths SSSI, Basingstoke Canal SSSI, Thursley, Ash, Pirbright & Chobham SAC
4. Thames Basin Heaths SPA, Colony Bog and Bagshot Heath SSSI, Thursley, Ash, Pirbright & Chobham SAC

General Aviation	Access	Qualitative

This assumes the introduction of PBN procedures to the ILS, a change to the lateral track of the RWY 06 SIDs after the 2nd turn, a route between Farnborough and Biggin Hill and an RNP-AR arrival to RWY 06 and an improvement in profiles for departures to the NW/W. By moving the RWY 06 Final Approach Fix (FAF) closer to the Threshold (THR), the PBN approach transition can fit right in the centre of the existing arrival swathe. The CAA Policy for the Design of Controlled Airspace Structures says that there should be between 2 and 3nm from an RNAV1 arrival route and the edge of CAS. There would be between 1 and 2nm between this centreline and the edge of CAS which would require a bespoke safety case to support. This is felt to be achievable at this time. The RWY 24 arrival is wholly contained laterally although, in the vertical plane, could require some amendments to CTR2/CTA1 potentially affecting Fairoaks aswell as the LON CTR potentially requiring an adjustment to its dimension or managed through LoA. The change to the lateral profile of the RWY 06 SIDs is not expected to affect CAS.

The RNP-AR arrival to RWY06 that avoids the RAF Odiham MATZ could require a very small adjustment to the NW corner of CTA4 and the SW corner of the CTR. The route between Farnborough and Biggin Hill is not expected to affect Farnborough's CAS dimensions.

This option would be expected to reduce the workload of Farnborough ATC quite considerably by removing the need to descend and turn aircraft in a very timely manner in the constrained airspace onto final approach. This would provide reduced R/T workload, perhaps enabling the ability to provide an improved service to other GA aircraft wishing to transit the airspace. This option is not expected to facilitate the release of any of Farnborough's CAS to Class G.

General Aviation/ commercial airlines	Economic impact from increased effective capacity	Qualitative

We expect the increased capacity/resilience detailed in the section above will result in a positive economic impact on Farnborough's customers compared with the Do Nothing scenario. The requirement to contain a PBN arrival to RWY06 final approach inside CAS could negatively affect Fairoaks.

General Aviation/ commercial airlines	Fuel Burn	Quantitative

See wider society Green House Gas Impact as the methodologies employed at Stage 2 are the same.

Commercial airlines	Training costs	Qualitative

Flight procedures are updated or introduced worldwide as part of an AIRAC cycle. As part of this cycle, Business Jet operators update their procedures accordingly and undertake training if required on a business as usual basis. Whilst this option contains an RNP-AR arrival, it would not be the only approach available and therefore Farnborough's customers would not be required to be RNP-AR approved. This option is not anticipated to require any additional training costs for Farnborough's customers.

Commercial airlines	Other costs	Qualitative

No other costs for Farnborough's customers are foreseen with this option.

Airport/ANSP	Infrastructure costs	Qualitative

This design option is not expected to change Farnborough's infrastructure costs.

Airport/ANSP	Operational costs	Qualitative

This design option is not expected to change Farnborough's operational costs.

Airport/ANSP	Deployment costs	Qualitative

This option is expected to require air traffic controller training for the controllers and assistants located at Farnborough Airport, and London Terminal Control. The scale and nature of this training requires further exploration as part of the Stage 3 Full Options Appraisal, when appraising the shortlist of options and once further information is known about the network above 7000ft and interdependencies with adjacent airports and NERL.

All	Safety	Qualitative

The reduction in Farnborough ATC workload is expected to enhance safety. The ability to fit a PBN IAP to ILS within the existing CTA is subject to an acceptable case safety case allowing reduced distance between the PBN centreline and the edge of CAS. IFP design has shown that an RNP APCH to RWY 24 has an impact on D132. Any BaroVNAV RNP APCH would not be designed to 3.5° to match the ILS but would need to have a lower profile to enhance availability in all temperatures, this could further impact CTR2/1 and would also need consideration of the PAPI angle. IFP flyability has not yet been performed which could change the impacts described so far. Any impact on Fairoaks as a result on any changes to CTR2/1 have not yet been assessed. Removal of flights between Biggin Hill and Farnborough from TC would reduce complexity in their sectors. There are not yet any RNP-AR arrival procedures promulgated in the UK which may require additional assurances.

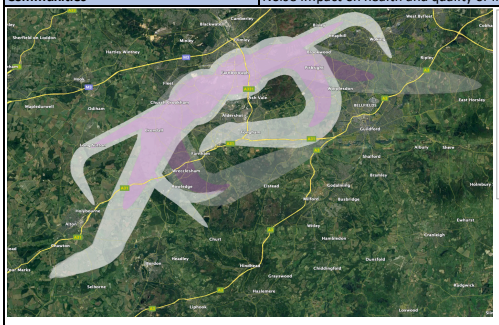
All	Interdependencies, conflicts, and trade offs with other ACPs	Qualitative

The implementation of PBN to final approach is unlikely to require trade-offs with Heathrow, Gatwick and Southampton because the changes are very small and low level. The addition of a new contingency hold is dependent on Heathrow and/or Gatwick being able to be guaranteed to climb higher, sooner. This could result in trade-off analysis if a steeper than optimal gradient were to be required from those airports in order to facilitate the hold. The addition of a low level route between Farnborough and Biggin Hill does have interdependencies with Heathrow, Gatwick and Biggin Hill's ACPs. There are no RNP-AR arrivals promulgated in the UK at this time.

All	Performance against the vision and parameters/strategic objectives of the AMS	Qualitative
The Airspace Modernisation Strategy vision is to deliver quicker, quieter and cleaner journeys and more capacity for the benefit of those who use and are affected by UK airspace. This option would deliver environmental benefit, through the availability of an RNP-AR approach to a shorter final and the ability for a more direct flight planned route to CPT. The reduction in R/T for Farnborough ATC from PBN IAPs to final approach, an RNP-AR arrival and a RWY06 SID that better deconflicts from arrivals could be expected to result in an improved service to GA aircraft wishing to transit the airspace and provide more time to climb/descend Farnborough's movements in a more optimal manner. Only having PBN Initial Approach Procedures (IAP) to ILS (and not also RNP APCH) would reduce the requirement for extending the CTR to the west. A reduction in Farnborough ATC workload would enhance safety and potentially reduce ground/airborne delay through improved ATC capacity.		

OPTION 3B

Group	Impact	Level of Analysis
Communities	Noise impact on health and quality of life	Part quantitative, part qualitative



The image to the left shows the 65dB (magenta) and 60dB (white) LAMAX contours for GLEX single event for each existing arrival and departure route. The % change for the number of people within each contour compared to the baseline is shown both with and without the low level routes between Farnborough and Biggin

With Biggin Hill routes

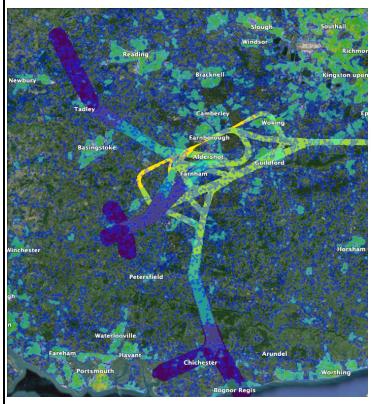
GLEX 60dB LAMAX	RUNWAY	1 Do nothing Baseline	3B
ARRIVALS GLEX 60 dB LAMAX Population Count	6	100%	99%
	24	100%	81%
DEPARTURES GLEX 60 dB LAMAX Population Count	6	100%	126%
	24	100%	108%
	AVERAGE CHANGE		4%

Without Biggin Hill routes

GLEX 60dB LAMAX	RUNWAY	1 Do nothing Baseline	3B
ARRIVALS GLEX 60 dB LAMAX Population Count	6	100%	98%
	24	100%	81%
DEPARTURES GLEX 60 dB LAMAX Population Count	6	100%	133%
	24	100%	94%
	AVERAGE CHANGE		2%

GLEX 65dB LAMAX	RUNWAY	1 Do nothing Baseline	3B
ARRIVALS GLEX 65 dB LAMAX Population Count	6	100%	94%
	24	100%	100%
DEPARTURES GLEX 65 dB LAMAX Population Count	6	100%	96%
	24	100%	103%
	AVERAGE CHANGE		-2%

GLEX 65dB LAMAX	RUNWAY	1 Do nothing Baseline	3B
ARRIVALS GLEX 65 dB LAMAX Population Count	6	100%	93%
	24	100%	100%
DEPARTURES GLEX 65 dB LAMAX Population Count	6	100%	96%
	24	100%	81%
	AVERAGE CHANGE		-8%



The image to the left shows the average typical overflight cones to/from 7000ft for each existing arrival and departure route, assuming all traffic is on the route centreline. It is mapped against areas of population density. The % change for the number of people within each contour compared to the baseline is shown below both with and without the low level routes between Farnborough and Biggin Hill.

With Biggin Hill routes

Overflight Population	RUNWAY	1 Do nothing Baseline	3B
ARRIVALS Overflight (0-7000ft) Population Count	6	100%	139%
	24	100%	84%
DEPARTURES Overflight (0-7000ft) Population Count	6	100%	211%
	24	100%	193%
	AVERAGE CHANGE		57%

Without Biggin Hill routes

Overflight Population	RUNWAY	1 Do nothing Baseline	3B
ARRIVALS Overflight (0-7000ft) Population Count	6	100%	135%
	24	100%	95%
DEPARTURES Overflight (0-7000ft) Population Count	6	100%	262%
	24	100%	74%
	AVERAGE CHANGE		41%

Based on the extent of the existing and forecast (2031) LOAEL, both with and without planning consent, this airspace design option is expected to have no impact on the size or shape of the LOAEL.

The tables to the right show the % change in the number of education and healthcare facilities and places of worship overflown by average typical overflight cones to/from 7000ft compared to the do nothing scenario, assuming all traffic is on the route centreline. Data with and without the low level routes between Farnborough and Biggin Hill are shown.

With Biggin Hill routes

Overflight NSRs Arrivals	RUNWAY	1 Do nothing Baseline	3B
Heathcare Count (0-7000ft)	6	100%	146%
	24	100%	91%
Education Count (0-7000ft)	6	100%	143%
	24	100%	82%
Places of Worship Count (0-7000ft)	6	100%	131%
	24	100%	96%
	AVERAGE CHANGE		15%

Without Biggin Hill routes

Overflight NSRs Arrivals	RUNWAY	1 Do nothing Baseline	3B
Heathcare Count (0-7000ft)	6	100%	136%
	24	100%	105%
Education Count (0-7000ft)	6	100%	117%
	24	100%	97%
Places of Worship Count (0-7000ft)	6	100%	117%
	24	100%	111%
	AVERAGE CHANGE		14%

With Biggin Hill routes

Overflight NSRs Departures	RUNWAY	1 Do nothing Baseline	3B
Heathcare Count (0-7000ft)	6	100%	233%
	24	100%	206%
Education Count (0-7000ft)	6	100%	189%
	24	100%	402%
Places of Worship Count (0-7000ft)	6	100%	152%
	24	100%	129%
	AVERAGE CHANGE		119%

Without Biggin Hill routes

Overflight NSRs Departures	RUNWAY	1 Do nothing Baseline	3B
Heathcare Count (0-7000ft)	6	100%	290%
	24	100%	93%
Education Count (0-7000ft)	6	100%	233%
	24	100%	95%
Places of Worship Count (0-7000ft)	6	100%	191%
	24	100%	84%
	AVERAGE CHANGE		64%

Communities	Air Quality	Qualitative

This option would not alter the lateral or vertical tracks of flight paths below 1000ft for Farnborough's arrivals or departures and this option is therefore not expected to have an effect on Local Air Quality.

Wider Society	Greenhouse Gas Impact	Quantitative

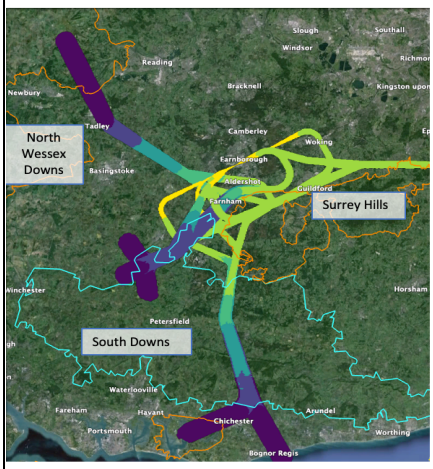
Option 3B is estimated to result in an annual reduction of 146,684nm flown by Farnborough movements compared to the Do Nothing scenario, based on 2023 movements, the 20 year average modal split and the same directional split of traffic.

	NM Difference
1A Do Nothing	0.0
3B	-146684

Wider Society	Capacity/Resilience	Qualitative

This option would be expected to reduce the workload of Farnborough ATC quite considerably by removing the need to descend and turn aircraft in a very timely manner in the constrained airspace onto final approach. In addition the RWY 06 departure routing to the north of the existing track, where traffic is typically vectored when conflicting with an arrival from the south, could further help reduce R/T. This would enable them to perhaps provide an improved service to aircraft in their airspace, for example by climbing departures sooner owing to a lower R/T workload though it would not be expected to facilitate any reduction in the standard flow rates applied by TC as the handling to movements between the 2 units would remain the same as today. However, the removal of Biggin Hill arrivals and departures from TC could be expected to help reduce complexity in TC sectors and eliminate and ground delay imposed by TC for those movements. The availability of an RNP-AR arrival to runway 06 which avoids Odiham's MATZ will reduce ATC workload and co-ordination with RAF Odiham.

Wider Society	Biodiversity and Tranquillity	Qualitative



Tranquillity
The image to the left shows the average typical overflight cones to/from 7000ft for each existing arrival and departure route, mapped against the North Wessex Downs and Surrey Hills AONB and the South Downs National Park.

With Biggin Hill routes

Overflight AONB	RUNWAY	1 Do nothing Baseline	3B
ARRIVALS Overflight (0-7000ft) AONB Area (km2)	6	100%	149%
	24	100%	72%
DEPARTURES Overflight (0-7000ft) AONB Area (km2)	6	100%	6%
	24	100%	104%
	AVERAGE CHANGE		-17%

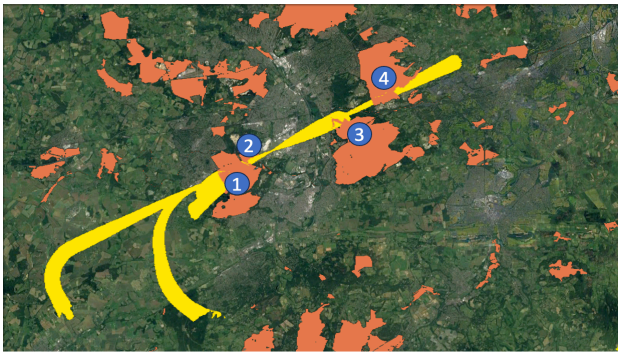
Overflight Nat Park	RUNWAY	1 Do nothing Baseline	3B
ARRIVALS Overflight (0-7000ft) NP Area (km2)	6	100%	72%
	24	100%	124%
DEPARTURES Overflight (0-7000ft) NP Area (km2)	6	100%	91%
	24	100%	78%
	AVERAGE CHANGE		-9%

Without Biggin Hill routes

Overflight AONB	RUNWAY	1 Do nothing Baseline	3B
ARRIVALS Overflight (0-7000ft) AONB Area (km2)	6	100%	146%
	24	100%	88%
DEPARTURES Overflight (0-7000ft) AONB Area (km2)	6	100%	8%
	24	100%	104%
	AVERAGE CHANGE		-14%

Overflight Nat Park	RUNWAY	1 Do nothing Baseline	3B
ARRIVALS Overflight (0-7000ft) NP Area (km2)	6	100%	90%
	24	100%	149%
DEPARTURES Overflight (0-7000ft) NP Area (km2)	6	100%	122%
	24	100%	104%
	AVERAGE CHANGE		16%

Biodiversity
The image to the right shows the average typical overflight cones to/from 2000ft for the Do Nothing option mapped against SACs, SSSIs, SPA and RAMSAR sites surrounding the airport. The following sites are currently overflown below 2000ft:
1. Thames Basin Heaths SPA, Bourley and Long Valley SSSI
2. Thames Basin Heaths SPA, Eelmoor Marsh SSSI, Basingstoke Canal SSSI
3. Thames Basin Heaths SPA, Ash to Brookwood Heaths SSSI, Basingstoke Canal SSSI, Thursley, Ash, Pirbright & Chobham SAC
4. Thames Basin Heaths SPA, Colony Bog and Bagshot Heath SSSI, Thursley, Ash, Pirbright & Chobham SAC



General Aviation	Access	Qualitative

This option assumes the introduction of PBN procedures to the ILS and RNP APCH, a change to the lateral track of the RWY 06 SIDs after the 2nd turn, a route between Farnborough and Biggin Hill and an RNP-AR arrival to RWY 06 and an improvement in profiles for departures to the NW/W. By moving the RWY 06 Final Approach Fix (FAF) closer to the Threshold (THR), the PBN approach transition can only be as far east the left hand side of the existing arrival swathe. The CAA Policy for the Design of Controlled Airspace Structures says that there should be between 2 and 3nm from an RNAV1 arrival route and the edge of CAS. There would be only be c.0.5nm between this centreline and the edge of CAS which would require a bespoke safety case to support. This is not felt to be achievable without extending the Farnborough CTR to the west. The impact on RAF Odiham and Lasham is considered to be significant with GA outside CAS already currently operating close to the boundary. The RWY 24 arrival is wholly contained laterally although, in the vertical plane, could require some amendments to CTR2/CTA1 potentially affecting Fairoaks aswell as the LON CTR potentially requiring an adjustment to its dimension or managed through LoA. The change to the lateral profile of the RWY 06 SIDs is not expected to affect CAS.
The RNP-AR arrival to RWY06 that avoids the RAF Odiham MATZ could require a very small adjustment to the NW corner of CTA4 and the SW corner of the CTR. The route between Farnborough and Biggin Hill is not expected to affect Farnborough's CAS dimensions.
This option would be expected to reduce the workload of Farnborough ATC quite considerably by removing the need to descend and turn aircraft in a very timely manner in the constrained airspace onto final approach. This would provide reduced R/T workload, perhaps enabling the ability to provide an improved service to other GA aircraft wishing to transit the airspace. This option is not expected to facilitate the release of any of Farnborough's CAS to Class G.

General Aviation/ commercial airlines	Economic impact from increased effective capacity	Qualitative

We expect the increased capacity/resilience detailed in the section above will result in a positive economic impact on Farnborough's customers compared with the Do Nothing scenario. Owing to the extension of the CTR to the west required by this option there could be a negative effect on Lasham/Odiham operations. The requirement to contain a PBN arrival to RWY06 final approach inside CAS could negatively affect Fairoaks.

General Aviation/ commercial airlines	Fuel Burn	Quantitative

See wider society Green House Gas Impact as the methodologies employed at Stage 2 are the same.

Commercial airlines	Training costs	Qualitative

Flight procedures are updated or introduced worldwide as part of an AIRAC cycle. As part of this cycle, Business Jet operators update their procedures accordingly and undertake training if required on a business as usual basis. Whilst this option contains an RNP-AR arrival, it would not be the only approach available and therefore Farnborough's customers would not be required to be RNP-AR approved. This option is not anticipated to require any additional training costs for Farnborough's customers.

Commercial airlines	Other costs	Qualitative

No other costs for Farnborough's customers are foreseen with this option.

Airport/ANSP	Infrastructure costs	Qualitative

This design option is not expected to change Farnborough's infrastructure costs.

Airport/ANSP	Operational costs	Qualitative

This design option is not expected to change Farnborough's operational costs.

Airport/ANSP	Deployment costs	Qualitative

This option is expected to require air traffic controller training for the controllers and assistants located at Farnborough Airport, and London Terminal Control. The scale and nature of this training requires further exploration as part of the Stage 3 Full Options Appraisal, when appraising the shortlist of options and once further information is known about the network above 7000ft and interdependencies with adjacent airports and NERL.

All	Safety	Qualitative

The reduction in Farnborough ATC workload is expected to enhance safety inside CAS. Any impact on Fairoaks as a result on any changes to CTR2/1 have not yet been assessed. Impacts on RAF Odiham and Lasham as a result of an extension of the CTR to the west have not yet been assessed.
IFP design has shown that an RNP APCH to RWY 24 has an impact on D132. Any BaroVNAV RNP APCH would not be designed to 3.5˚ to match the ILS but would need to have a lower profile to enhance availability in all temperatures, this could further impact CTR2/1 and would also need consideration of the PAPI angle. IFP flyability has not yet been performed which could change the impacts described so far. Removal of flights between Biggin Hill and Farnborough from TC would reduce complexity in their sectors. There are not yet any RNP-AR arrival procedures promulgated in the UK which may require additional assurances.

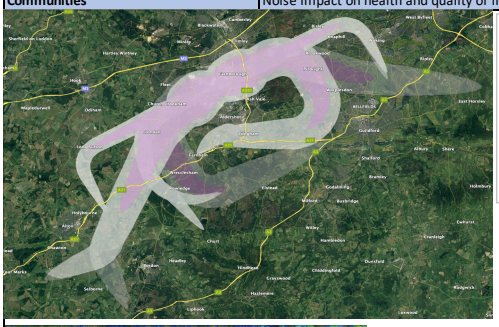
All	Interdependencies, conflicts, and trade offs with other ACPs	Qualitative

The implementation of PBN to final approach is unlikely to require trade-offs with Heathrow, Gatwick and Southampton because the changes are very small and low level. The addition of a new contingency hold is dependent on Heathrow and/or Gatwick being able to be guaranteed to climb higher, sooner. This could result in trade-off analysis if a steeper than optimal gradient were to be required from those airports in order to facilitate the hold. The addition of a low level route between Farnborough and Biggin Hill does have interdependencies with Heathrow, Gatwick and Biggin Hill's ACPs.

All	Performance against the vision and parameters/strategic objectives of the AMS	Qualitative
The Airspace Modernisation Strategy vision is to deliver quicker, quieter and cleaner journeys and more capacity for the benefit of those who use and are affected by UK airspace. This option would deliver environmental benefit, through the availability of an RNP-AR approach to a shorter final and the ability for a more direct flight planned route to CPT. The reduction in R/T for Farnborough ATC from PBN IAPs to final approach, an RNP-AR arrival and a RWY06 SID that better deconflicts from arrivals could be expected to result in an improved service to GA aircraft wishing to transit the airspace and provide more time to climb/descend Farnborough's movements in a more optimal manner. However having PBN Initial Approach Procedures (IAP) to ILS and RNP APCH would create a requirement to extend the CTR to the west, potentially increasing Class G compression, GA pilot workload and Odiham ATC workload. A reduction in Farnborough ATC workload would enhance safety and potentially reduce ground/airborne delay through improved ATC capacity.		

OPTION 4A

Group	Impact	Level of Analysis
Communities	Noise impact on health and quality of life	Part quantitative, part qualitative



The image to the left shows the 65dB (magenta) and 60dB (white) LAMAX contours for GLEX single event for each existing arrival and departure route. The % change for the number of people within each contour compared to the baseline is shown both with and without the low level routes between Farnborough and Biggin

With Biggin Hill routes

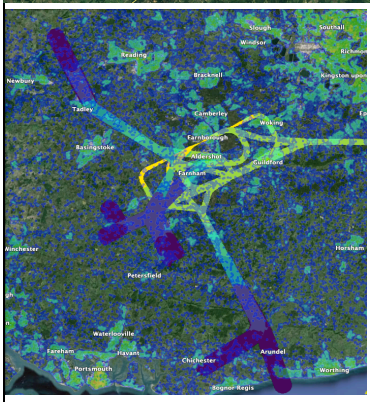
GLEX 60dB LAMAX	RUNWAY	1 Do nothing Baseline	4A
ARRIVALS GLEX 60 dB LAMAX Population Count	6	100%	100%
	24	100%	97%
DEPARTURES GLEX 60 dB LAMAX Population Count	6	100%	126%
	24	100%	108%
AVERAGE CHANGE			8%

Without Biggin Hill routes

GLEX 60dB LAMAX	RUNWAY	1 Do nothing Baseline	4A
ARRIVALS GLEX 60 dB LAMAX Population Count	6	100%	99%
	24	100%	97%
DEPARTURES GLEX 60 dB LAMAX Population Count	6	100%	133%
	24	100%	93%
AVERAGE CHANGE			6%

GLEX 65dB LAMAX	RUNWAY	1 Do nothing Baseline	4A
ARRIVALS GLEX 65 dB LAMAX Population Count	6	100%	95%
	24	100%	100%
DEPARTURES GLEX 65 dB LAMAX Population Count	6	100%	96%
	24	100%	103%
AVERAGE CHANGE			-2%

GLEX 65dB LAMAX	RUNWAY	1 Do nothing Baseline	4A
ARRIVALS GLEX 65 dB LAMAX Population Count	6	100%	94%
	24	100%	100%
DEPARTURES GLEX 65 dB LAMAX Population Count	6	100%	96%
	24	100%	81%
AVERAGE CHANGE			-7%



The image to the left shows the average typical overflight cones to/from 7000ft for each existing arrival and departure route, assuming all traffic is on the route centreline. It is mapped against areas of population density. The % change for the number of people within each contour compared to the baseline is shown below both with and without the low level routes between Farnborough and Biggin Hill.

With Biggin Hill routes

Overflight Population	RUNWAY	1 Do nothing Baseline	4A
ARRIVALS Overflight (0-7000ft) Population Count	6	100%	130%
	24	100%	84%
DEPARTURES Overflight (0-7000ft) Population Count	6	100%	217%
	24	100%	217%
AVERAGE CHANGE			62%

Without Biggin Hill routes

Overflight Population	RUNWAY	1 Do nothing Baseline	4A
ARRIVALS Overflight (0-7000ft) Population Count	6	100%	123%
	24	100%	94%
DEPARTURES Overflight (0-7000ft) Population Count	6	100%	270%
	24	100%	106%
AVERAGE CHANGE			48%

Based on the extent of the existing and forecast (2031) LOAEL, both with and without planning consent, this airspace design option is expected to have no impact on the size or shape of the LOAEL.

The tables to the right show the % change in the number of education and healthcare facilities and places of worship overflown by average typical overflight cones to/from 7000ft compared to the do nothing scenario, assuming all traffic is on the route centreline. Data with and without the low level routes between Farnborough and Biggin Hill are shown.

With Biggin Hill routes

Overflight NSRs Arrivals	RUNWAY	1 Do nothing Baseline	4A
Heathcare Count (0-7000ft)	6	100%	140%
	24	100%	83%
Education Count (0-7000ft)	6	100%	139%
	24	100%	76%
Places of Worship Count (0-7000ft)	6	100%	137%
	24	100%	93%
AVERAGE CHANGE			11%

Without Biggin Hill routes

Overflight NSRs Arrivals	RUNWAY	1 Do nothing Baseline	4A
Heathcare Count (0-7000ft)	6	100%	129%
	24	100%	95%
Education Count (0-7000ft)	6	100%	113%
	24	100%	89%
Places of Worship Count (0-7000ft)	6	100%	125%
	24	100%	106%
AVERAGE CHANGE			10%

With Biggin Hill routes

Overflight NSRs Departures	RUNWAY	1 Do nothing Baseline	4A
Heathcare Count (0-7000ft)	6	100%	244%
	24	100%	253%
Education Count (0-7000ft)	6	100%	193%
	24	100%	433%
Places of Worship Count (0-7000ft)	6	100%	150%
	24	100%	141%
AVERAGE CHANGE			136%

Without Biggin Hill routes

Overflight NSRs Departures	RUNWAY	1 Do nothing Baseline	4A
Heathcare Count (0-7000ft)	6	100%	304%
	24	100%	156%
Education Count (0-7000ft)	6	100%	238%
	24	100%	136%
Places of Worship Count (0-7000ft)	6	100%	188%
	24	100%	100%
AVERAGE CHANGE			87%

Communities	Air Quality	Qualitative

This option would not alter the lateral or vertical tracks of flight paths below 1000ft for Farnborough's arrivals or departures and this option is therefore not expected to have an effect on Local Air Quality.

Wider Society	Greenhouse Gas Impact	Quantitative

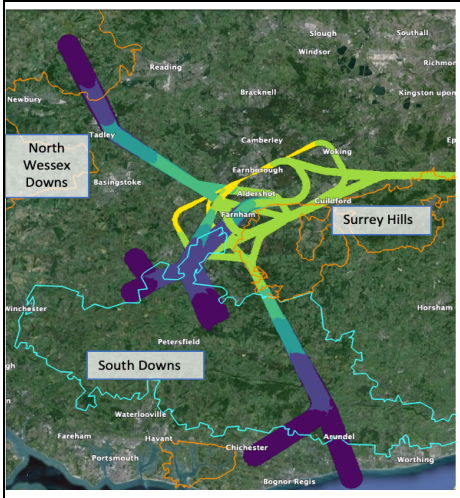
Option 4A is estimated to result in an annual reduction of 214,094nm flown by Farnborough movements compared to the Do Nothing scenario, based on 2023 movements, the 20 year average modal split and the same directional split of traffic.

	NM Difference
1A Do Nothing	0.0
4A	-214094

Wider Society	Capacity/Resilience	Qualitative

This option would be expected to reduce the workload of Farnborough ATC quite considerably by removing the need to descend and turn aircraft in a very timely manner in the constrained airspace onto final approach. In addition the RWY 06 departure routing to the north of the existing track, where traffic is typically vectored when conflicting with an arrival from the south, could further help reduce R/T. This would enable them to perhaps provide an improved service to aircraft in their airspace, for example by climbing departures sooner owing to a lower R/T workload though it would not be expected to facilitate any reduction in the standard flow rates applied by TC as the handling to movements between the 2 units would remain the same as today. However, the removal of Biggin Hill arrivals and departures from TC could be expected to help reduce complexity in TC sectors and eliminate and ground delay imposed by TC for those movements. The movement of the arrival stream of the south to the east is unlikely to generate capacity; that change is to facilitate track mile reductions. The availability of an RNP-AR arrival to runway 06 which avoids Odiham's MATZ will reduce ATC workload and co-ordination with RAF Odiham.

Wider Society	Biodiversity and Tranquillity	Qualitative



Tranquillity

The image to the left shows the average typical overflight cones to/from 7000ft for each existing arrival and departure route, mapped against the North Wessex Downs and Surrey Hills AONB and the South Downs National Park.

With Biggin Hill routes

Overflight AONB	RUNWAY	1 Do nothing Baseline	4A
ARRIVALS Overflight (0-7000ft) AONB Area (km2)	6	100%	135%
	24	100%	70%
DEPARTURES Overflight (0-7000ft) AONB Area (km2)	6	100%	6%
	24	100%	105%
	AVERAGE CHANGE		-21%

Without Biggin Hill routes

Overflight AONB	RUNWAY	1 Do nothing Baseline	4A
ARRIVALS Overflight (0-7000ft) AONB Area (km2)	6	100%	128%
	24	100%	85%
DEPARTURES Overflight (0-7000ft) AONB Area (km2)	6	100%	8%
	24	100%	105%
	AVERAGE CHANGE		-19%

Overflight Nat Park	RUNWAY	1 Do nothing Baseline	4A
ARRIVALS Overflight (0-7000ft) NP Area (km2)	6	100%	88%
	24	100%	145%
DEPARTURES Overflight (0-7000ft) NP Area (km2)	6	100%	84%
	24	100%	70%
	AVERAGE CHANGE		-3%

Overflight Nat Park	RUNWAY	1 Do nothing Baseline	4A
ARRIVALS Overflight (0-7000ft) NP Area (km2)	6	100%	110%
	24	100%	181%
DEPARTURES Overflight (0-7000ft) NP Area (km2)	6	100%	112%
	24	100%	93%
	AVERAGE CHANGE		24%

Biodiversity

The image to the right shows the average typical overflight cones to/from 2000ft for the Do Nothing option mapped against SACs, SSSIs, SPA and RAMSAR sites surrounding the airport. The following sites are currently overflown below 2000ft:

1. Thames Basin Heaths SPA, Bourley and Long Valley SSSI
2. Thames Basin Heaths SPA, Eelmoor Marsh SSSI, Basingstoke Canal SSSI
3. Thames Basin Heaths SPA, Ash to Brookwood Heaths SSSI, Basingstoke Canal SSSI, Thursley, Ash, Pirbright & Chobham SAC
4. Thames Basin Heaths SPA, Colony Bog and Bagshot Heath SSSI, Thursley, Ash, Pirbright & Chobham SAC

General Aviation	Access	Qualitative

This option assumes the introduction of PBN procedures to the ILS, a change to the lateral track of the RWY 06 SIDs after the 2nd turn, a route between Farnborough and Biggin Hill, an RNP-AR arrival to RWY 06 and also a shift of the arrivals from the south to the east, the latter achieved by improved vertical profiles for Gatwick departures. By moving the RWY 06 Final Approach Fix (FAF) closer to the Threshold (THR), the PBN approach transition can fit right in the centre of the existing arrival swathe. The CAA Policy for the Design of Controlled Airspace Structures says that there should be between 2 and 3nm from an RNAV1 arrival route and the edge of CAS. There would be between 1 and 2nm between this centreline and the edge of CAS which would require a bespoke safety case to support. This is felt to be achievable at this time. The RWY 24 arrival is wholly contained laterally although, in the vertical plane, could require some amendments to CTR2/CTA1 potentially affecting Fairoaks aswell as the LON CTR potentially requiring an adjustment to its dimension or managed through LoA. The change to the lateral profile of the RWY 06 SIDs is not expected to affect CAS.

The RNP-AR arrival to RWY06 that avoids the RAF Odiham MATZ could require a very small adjustment to the NW corner of CTA4 and the SW corner of the CTR. The route between Farnborough and Biggin Hill is not expected to affect Farnborough's CAS dimensions.

The shift of the arrival route from the south to the east could facilitate release of some of CTA9. There could be scope to release some parts of CTA7 as arrivals would be further east but it depends on whether climb to 5000ft for departures could be guaranteed. This option would be expected to reduce the workload of Farnborough ATC quite considerably by removing the need to descend and turn aircraft in a very timely manner in the constrained airspace onto final approach. This would provide reduced R/T workload, perhaps enabling the ability to provide an improved service to other GA aircraft wishing to transit the airspace.

General Aviation/ commercial airlines	Economic impact from increased effective capacity	Qualitative

We expect the increased capacity/resilience detailed in the section above will result in a positive economic impact on Farnborough's customers compared with the Do Nothing scenario. The requirement to contain a PBN arrival to RWY06 final approach inside CAS could negatively affect Fairoaks.

General Aviation/ commercial airlines	Fuel Burn	Quantitative

See wider society Green House Gas Impact as the methodologies employed at Stage 2 are the same.

Commercial airlines	Training costs	Qualitative

Flight procedures are updated or introduced worldwide as part of an AIRAC cycle. As part of this cycle, Business Jet operators update their procedures accordingly and undertake training if required on a business as usual basis. Whilst this option contains an RNP-AR arrival, it would not be the only approach available and therefore Farnborough's customers would not be required to be RNP-AR approved. This option is not anticipated to require any additional training costs for Farnborough's customers.

Commercial airlines	Other costs	Qualitative

No other costs for Farnborough's customers are foreseen with this option.

Airport/ANSP	Infrastructure costs	Qualitative

This design option is not expected to change Farnborough's infrastructure costs.

Airport/ANSP	Operational costs	Qualitative

This design option is not expected to change Farnborough's operational costs.

Airport/ANSP	Deployment costs	Qualitative

This option is expected to require air traffic controller training for the controllers and assistants located at Farnborough Airport, and London Terminal Control. The scale and nature of this training requires further exploration as part of the Stage 3 Full Options Appraisal, when appraising the shortlist of options and once further information is known about the network above 7000ft and interdependencies with adjacent airports and NERL.

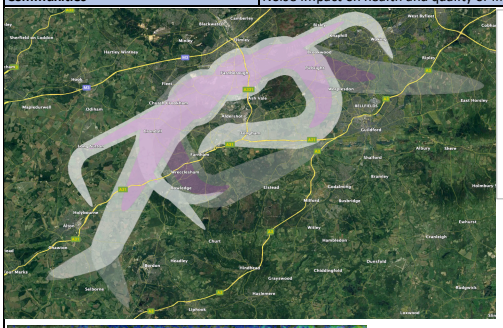
All	Safety	Qualitative

The reduction in Farnborough ATC workload is expected to enhance safety. The ability to fit a PBN IAP to ILS within the existing CTA is subject to an acceptable case safety case allowing reduced distance between the PBN centreline and the edge of CAS. IFP design has shown that an RNP APCH to RWY 24 has an impact on D132. Any BaroVNAV RNP APCH would not be designed to 3.5° to match the ILS but would need to have a lower profile to enhance availability in all temperatures, this could further impact CTR2/1 and would also need consideration of the PAPI angle. IFP flyability has not yet been performed which could change the impacts described so far. Any impact on Fairoaks as a result on any changes to CTR2/1 have not yet been assessed. Removal of flights between Biggin Hill and Farnborough from TC would reduce complexity in their sectors. There are not yet any RNP-AR arrival procedures promulgated in the UK which may require additional assurances. The close proximity of the arrival route from the south to Gatwick's easterly RMA may require closer attention.

All	Interdependencies, conflicts, and trade offs with other ACPs	Qualitative
The implementation of PBN to final approach is unlikely to require trade-offs with Heathrow, Gatwick and Southampton because the changes are very small and low level. The addition of a new contingency hold is dependent on Heathrow and/or Gatwick being able to be guaranteed to climb higher, sooner. The same applied to the move of Farnborough's arrival route to the east, closer to Gatwick. These both could result in trade-off analysis if a steeper than optimal gradient were to be required from those airports in order to facilitate the hold. The addition of a low level route between Farnborough and Biggin Hill does have interdependencies with Heathrow, Gatwick and Biggin Hill's ACPs.		
All	Performance against the vision and parameters/strategic objectives of the AMS	Qualitative
The Airspace Modernisation Strategy vision is to deliver quicker, quieter and cleaner journeys and more capacity for the benefit of those who use and are affected by UK airspace. This option is likely to deliver the biggest reduction in CO2 emission per flight owing to the availability of an RNP-AR approach to a shorter final, the ability for a more direct flight planned route to CPT, more direct arrivals from the south and the shortest final approach possible, to ILS only. The reduction in R/T for Farnborough ATC from PBN IAPs to final approach, an RNP-AR arrival could be expected to result in an improved service to GA aircraft wishing to transit the airspace and provide more time to climb/descend Farnborough's movements in a more optimal manner. Only having PBN Initial Approach Procedures (IAP) to ILS (and not also RNP APCH) would reduce the requirement for extending the CTR to the west. A reduction in Farnborough ATC workload would enhance safety and potentially reduce ground/airborne delay through improved ATC capacity.		

OPTION 4B

Group	Impact	Level of Analysis
Communities	Noise impact on health and quality of life	Part quantitative, part qualitative



The image to the left shows the 65dB (magenta) and 60dB (white) LAMAX contours for GLEX single event for each existing arrival and departure route. The % change for the number of people within each contour compared to the baseline is shown both with and without the low level routes between Farnborough and Biggin

With Biggin Hill routes

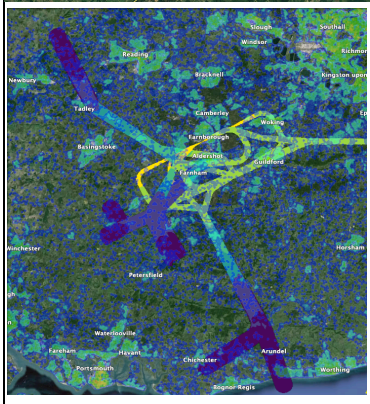
GLEX 60dB LAMAX	RUNWAY	1 Do nothing Baseline	4B
ARRIVALS GLEX 60 dB LAMAX Population Count	6	100%	100%
	24	100%	82%
DEPARTURES GLEX 60 dB LAMAX Population Count	6	100%	126%
	24	100%	108%
	AVERAGE CHANGE		4%

GLEX 65dB LAMAX	RUNWAY	1 Do nothing Baseline	4B
ARRIVALS GLEX 65 dB LAMAX Population Count	6	100%	95%
	24	100%	100%
DEPARTURES GLEX 65 dB LAMAX Population Count	6	100%	96%
	24	100%	103%
	AVERAGE CHANGE		-2%

Without Biggin Hill routes

GLEX 60dB LAMAX	RUNWAY	1 Do nothing Baseline	4B
ARRIVALS GLEX 60 dB LAMAX Population Count	6	100%	99%
	24	100%	81%
DEPARTURES GLEX 60 dB LAMAX Population Count	6	100%	133%
	24	100%	94%
	AVERAGE CHANGE		2%

GLEX 65dB LAMAX	RUNWAY	1 Do nothing Baseline	4B
ARRIVALS GLEX 65 dB LAMAX Population Count	6	100%	94%
	24	100%	100%
DEPARTURES GLEX 65 dB LAMAX Population Count	6	100%	96%
	24	100%	81%
	AVERAGE CHANGE		-7%



The image to the left shows the average typical overflight cones to/from 7000ft for each existing arrival and departure route, assuming all traffic is on the route centreline. It is mapped against areas of population density. The % change for the number of people within each contour compared to the baseline is shown below both with and without the low level routes between Farnborough and Biggin Hill.

With Biggin Hill routes

Overflight Population	RUNWAY	1 Do nothing Baseline	4B
ARRIVALS Overflight (0-7000ft) Population Count	6	100%	131%
	24	100%	81%
DEPARTURES Overflight (0-7000ft) Population Count	6	100%	217%
	24	100%	217%
	AVERAGE CHANGE		61%

Without Biggin Hill routes

Overflight AONB	RUNWAY	1 Do nothing Baseline	4B
ARRIVALS Overflight (0-7000ft) AONB Area (km2)	6	100%	127%
	24	100%	87%
DEPARTURES Overflight (0-7000ft) AONB Area (km2)	6	100%	8%
	24	100%	105%
	AVERAGE CHANGE		-18%

Based on the extent of the existing and forecast (2031) LOAEL, both with and without planning consent, this airspace design option is expected to have no impact on the size or shape of the LOAEL.

The tables to the right show the % change in the number of education and healthcare facilities and places of worship overflown by average typical overflight cones to/from 7000ft compared to the do nothing scenario, assuming all traffic is on the route centreline. Data with and without the low level routes between Farnborough and Biggin Hill are shown.

With Biggin Hill routes

Overflight NSRs Arrivals	RUNWAY	1 Do nothing Baseline	4B
Heathcare Count (0-7000ft)	6	100%	140%
	24	100%	92%
Education Count (0-7000ft)	6	100%	139%
	24	100%	84%
Places of Worship Count (0-7000ft)	6	100%	137%
	24	100%	104%
	AVERAGE CHANGE		16%

Overflight NSRs Departures	RUNWAY	1 Do nothing Baseline	4B
Heathcare Count (0-7000ft)	6	100%	244%
	24	100%	253%
Education Count (0-7000ft)	6	100%	193%
	24	100%	433%
Places of Worship Count (0-7000ft)	6	100%	150%
	24	100%	141%
	AVERAGE CHANGE		136%

Without Biggin Hill routes

Overflight NSRs Arrivals	RUNWAY	1 Do nothing Baseline	4B
Heathcare Count (0-7000ft)	6	100%	129%
	24	100%	103%
Education Count (0-7000ft)	6	100%	113%
	24	100%	97%
Places of Worship Count (0-7000ft)	6	100%	125%
	24	100%	117%
	AVERAGE CHANGE		14%

Overflight NSRs Departures	RUNWAY	1 Do nothing Baseline	4B
Heathcare Count (0-7000ft)	6	100%	304%
	24	100%	156%
Education Count (0-7000ft)	6	100%	238%
	24	100%	136%
Places of Worship Count (0-7000ft)	6	100%	188%
	24	100%	100%
	AVERAGE CHANGE		87%

Communities	Air Quality	Qualitative

This option would not alter the lateral or vertical tracks of flight paths below 1000ft for Farnborough's arrivals or departures and this option is therefore not expected to have an effect on Local Air Quality.

Wider Society	Greenhouse Gas Impact	Quantitative

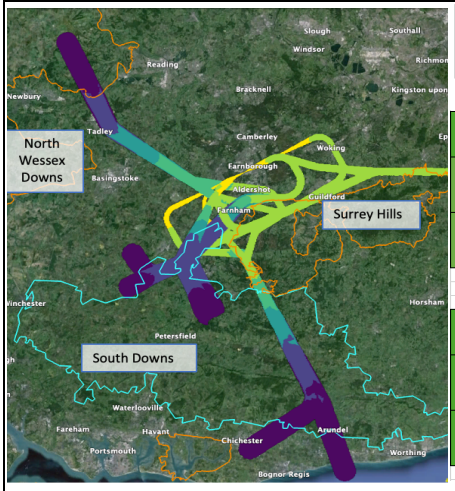
Option 4B is estimated to result in an annual reduction of 206,910nm flown by Farnborough movements compared to the Do Nothing scenario, based on 2023 movements, the 20 year average modal split and the same directional split of traffic.

	NM Difference
1A Do Nothing	0.0
4B	-206910

Wider Society	Capacity/Resilience	Qualitative

This option would be expected to reduce the workload of Farnborough ATC quite considerably by removing the need to descend and turn aircraft in a very timely manner in the constrained airspace onto final approach. In addition the RWY 06 departure routing to the north of the existing track, where traffic is typically vectored when conflicting with an arrival from the south, could further help reduce R/T. This would enable them to perhaps provide an improved service to aircraft in their airspace, for example by climbing departures sooner owing to a lower R/T workload though it would not be expected to facilitate any reduction in the standard flow rates applied by TC as the handling to movements between the 2 units would remain the same as today. However, the removal of Biggin Hill arrivals and departures from TC could be expected to help reduce complexity in TC sectors and eliminate and ground delay imposed by TC for those movements. The movement of the arrival stream of the south to the east is unlikely to generate capacity; that change is to facilitate track mile reductions. The availability of an RNP-AR arrival to runway 06 which avoids Odiham's MATZ will reduce ATC workload and co-ordination with RAF Odiham.

Wider Society	Biodiversity and Tranquillity	Qualitative



Tranquillity

The image to the left shows the average typical overflight cones to/from 7000ft for each existing arrival and departure route, mapped against the North Wessex Downs and Surrey Hills AONB and the South Downs National Park.

With Biggin Hill routes

Overflight AONB	RUNWAY	1 Do nothing Baseline	4B
ARRIVALS Overflight (0-7000ft) AONB Area (km2)	6	100%	135%
	24	100%	72%
DEPARTURES Overflight (0-7000ft) AONB Area (km2)	6	100%	6%
	24	100%	105%
	AVERAGE CHANGE		-21%

Overflight Nat Park	RUNWAY	1 Do nothing Baseline	4B
ARRIVALS Overflight (0-7000ft) NP Area (km2)	6	100%	88%
	24	100%	151%
DEPARTURES Overflight (0-7000ft) NP Area (km2)	6	100%	84%
	24	100%	70%
	AVERAGE CHANGE		-2%

Without Biggin Hill routes

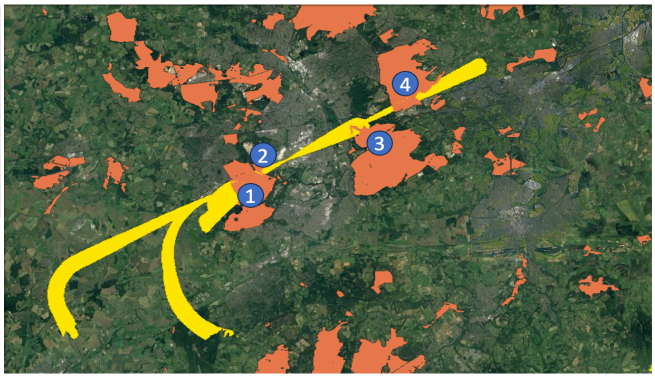
Overflight AONB	RUNWAY	1 Do nothing Baseline	4B
ARRIVALS Overflight (0-7000ft) AONB Area (km2)	6	100%	127%
	24	100%	87%
DEPARTURES Overflight (0-7000ft) AONB Area (km2)	6	100%	8%
	24	100%	105%
	AVERAGE CHANGE		-18%

Overflight Nat Park	RUNWAY	1 Do nothing Baseline	4B
ARRIVALS Overflight (0-7000ft) NP Area (km2)	6	100%	111%
	24	100%	189%
DEPARTURES Overflight (0-7000ft) NP Area (km2)	6	100%	112%
	24	100%	93%
	AVERAGE CHANGE		26%

Biodiversity

The image to the right shows the average typical overflight cones to/from 2000ft for the Do Nothing option mapped against SACs, SSSIs, SPA and RAMSAR sites surrounding the airport. The following sites are currently overflown below 2000ft:

1. Thames Basin Heaths SPA, Bourley and Long Valley SSSI
2. Thames Basin Heaths SPA, Eelmoor Marsh SSSI, Basingstoke Canal SSSI
3. Thames Basin Heaths SPA, Ash to Brookwood Heaths SSSI, Basingstoke Canal SSSI, Thursley, Ash, Pirbright & Chobham SAC
4. Thames Basin Heaths SPA, Colony Bog and Bagshot Heath SSSI, Thursley, Ash, Pirbright & Chobham SAC



General Aviation	Access	Qualitative

This option assumes the introduction of PBN procedures to the ILS and RNP APCH, a change to the lateral track of the RWY 06 SIDs after the 2nd turn, a route between Farnborough and Biggin Hill, an RNP-AR arrival to RWY 06 and also a shift of the arrivals from the south to the east, the latter achieved by improved vertical profiles for Gatwick departures. By moving the RWY 06 Final Approach Fix (FAF) closer to the Threshold (THR), the PBN approach transition can only be as far east the left hand side of the existing arrival swathe. The CAA Policy for the Design of Controlled Airspace Structures says that there should be between 2 and 3nm from an RNAV1 arrival route and the edge of CAS. There would be only be c.0.5nm between this centreline and the edge of CAS which would require a bespoke safety case to support. This is not felt to be achievable without extending the Farnborough CTR to the west. The impact on RAF Odiham and Lasham is considered to be significant with GA outside CAS already currently operating close to the boundary. The RWY 24 arrival is wholly contained laterally although, in the vertical plane, could require some amendments to CTR2/CTA1 potentially affecting Fairoaks aswell as the LON CTR potentially requiring an adjustment to its dimension or managed through LoA. The change to the lateral profile of the RWY 06 SIDs is not expected to affect CAS.

The RNP-AR arrival to RWY06 that avoids the RAF Odiham MATZ could require a very small adjustment to the NW corner of CTA4 and the SW corner of the CTR. The route between Farnborough and Biggin Hill is not expected to affect Farnborough's CAS dimensions.

The shift of the arrival route from the south to the east could facilitate release of some of CTA9. There could be scope to release some parts of CTA7 as arrivals would be further east but it depends on whether climb to 5000ft for departures could be guaranteed. This option would be expected to reduce the workload of Farnborough ATC quite considerably by removing the need to descend and turn aircraft in a very timely manner in the constrained airspace onto final approach. This would provide reduced R/T workload, perhaps enabling the ability to provide an improved service to other GA aircraft wishing to transit the airspace.

General Aviation/ commercial airlines	Economic impact from increased effective capacity	Qualitative

We expect the increased capacity/resilience detailed in the section above will result in a positive economic impact on Farnborough's customers compared with the Do Nothing scenario. Owing to the extension of the CTR to the west required by this option there could be a negative effect on Lasham/Odiham operations. The requirement to contain a PBN arrival to RWY06 final approach inside CAS could negatively affect Fairoaks.

General Aviation/ commercial airlines	Fuel Burn	Quantitative

See wider society Green House Gas Impact as the methodologies employed at Stage 2 are the same.

Commercial airlines	Training costs	Qualitative

Flight procedures are updated or introduced worldwide as part of an AIRAC cycle. As part of this cycle, Business Jet operators update their procedures accordingly and undertake training if required on a business as usual basis. Whilst this option contains an RNP-AR arrival, it would not be the only approach available and therefore Farnborough's customers would not be required to be RNP-AR approved. This option is not anticipated to require any additional training costs for Farnborough's customers.

Commercial airlines	Other costs	Qualitative

No other costs for Farnborough's customers are foreseen with this option.

Airport/ANSP	Infrastructure costs	Qualitative

This design option is not expected to change Farnborough's infrastructure costs.

Airport/ANSP	Operational costs	Qualitative

This design option is not expected to change Farnborough's operational costs.

Airport/ANSP	Deployment costs	Qualitative

This option is expected to require air traffic controller training for the controllers and assistants located at Farnborough Airport, and London Terminal Control. The scale and nature of this training requires further exploration as part of the Stage 3 Full Options Appraisal, when appraising the shortlist of options and once further information is known about the network above 7000ft and interdependencies with adjacent airports and NERL.

All	Safety	Qualitative

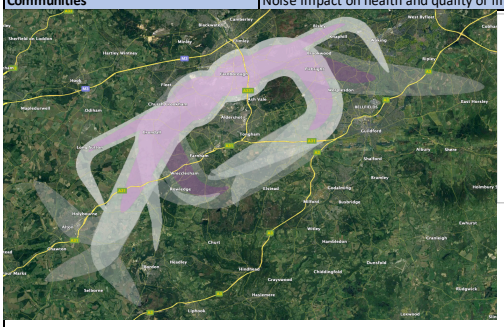
The reduction in Farnborough ATC workload is expected to enhance safety inside CAS. Any impact on Fairoaks as a result on any changes to CTR2/1 have not yet been assessed. Impacts on RAF Odiham and Lasham as a result of an extension of the CTR to the west have not yet been assessed.

IFP design has shown that an RNP APCH to RWY 24 has an impact on D132. Any BaroVNAV RNP APCH would not be designed to 3.5˚ to match the ILS but would need to have a lower profile to enhance availability in all temperatures, this could further impact CTR2/1 and would also need consideration of the PAPI angle. IFP flyability has not yet been performed which could change the impacts described so far. Removal of flights between Biggin Hill and Farnborough from TC would reduce complexity in their sectors. There are not yet any RNP-AR arrival procedures promulgated in the UK which may require additional assurances. The close proximity of the arrival route from the south to Gatwick's easterly RMA may require closer attention.

All	Interdependencies, conflicts, and trade offs with other ACPs	Qualitative
The implementation of PBN to final approach is unlikely to require trade-offs with Heathrow, Gatwick and Southampton because the changes are very small and low level. The addition of a new contingency hold is dependent on Heathrow and/or Gatwick being able to be guaranteed to climb higher, sooner. The same applied to the move of Farnborough's arrival route to the east, closer to Gatwick. These both could result in trade-off analysis if a steeper than optimal gradient were to be required from those airports in order to facilitate the hold. The addition of a low level route between Farnborough and Biggin Hill does have interdependencies with Heathrow, Gatwick and Biggin Hill's ACPs.		
All	Performance against the vision and parameters/strategic objectives of the AMS	Qualitative
The Airspace Modernisation Strategy vision is to deliver quicker, quieter and cleaner journeys and more capacity for the benefit of those who use and are affected by UK airspace. This option is likely to deliver the a significant reduction in CO2 emission per flight owing to the availability of an RNP-AR approach to a shorter final, the ability for a more direct flight planned route to CPT and more direct arrivals from the south. The reduction in R/T for Farnborough ATC from PBN IAPs to final approach, an RNP-AR arrival could be expected to result in an improved service to GA aircraft wishing to transit the airspace and provide more time to climb/descend Farnborough's movements in a more optimal manner. However this option would create a requirement to extend the CTR to the west, potentially increasing Class G compression, GA pilot workload and Odiham ATC workload. A reduction in Farnborough ATC workload would enhance safety and potentially reduce ground/airborne delay through improved ATC capacity.		

OPTION 5A

Group	Impact	Level of Analysis
Communities	Noise impact on health and quality of life	Part quantitative, part qualitative



The image to the left shows the 65dB (magenta) and 60dB (white) LAMAX contours for GLEX single event for each existing arrival and departure route. The % change for the number of people within each contour compared to the baseline is shown both with and without the low level routes between Farnborough and Biggin

With Biggin Hill routes

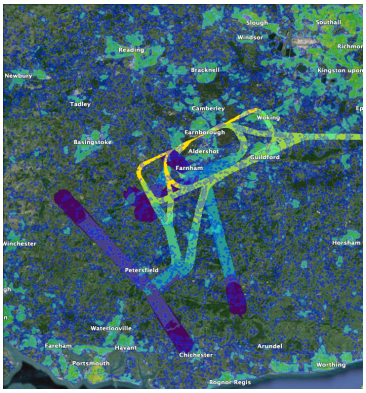
GLEX 60dB LAMAX	RUNWAY	1 Do nothing Baseline	5A
ARRIVALS GLEX 60 dB LAMAX Population Count	6	100%	100%
	24	100%	97%
DEPARTURES GLEX 60 dB LAMAX Population Count	6	100%	99%
	24	100%	116%
	AVERAGE CHANGE		3%

Without Biggin Hill routes

GLEX 60dB LAMAX	RUNWAY	1 Do nothing Baseline	5A
ARRIVALS GLEX 60 dB LAMAX Population Count	6	100%	99%
	24	100%	97%
DEPARTURES GLEX 60 dB LAMAX Population Count	6	100%	97%
	24	100%	105%
	AVERAGE CHANGE		0%

GLEX 65dB LAMAX	RUNWAY	1 Do nothing Baseline	5A
ARRIVALS GLEX 65 dB LAMAX Population Count	6	100%	94%
	24	100%	100%
DEPARTURES GLEX 65 dB LAMAX Population Count	6	100%	98%
	24	100%	103%
	AVERAGE CHANGE		-1%

GLEX 65dB LAMAX	RUNWAY	1 Do nothing Baseline	5A
ARRIVALS GLEX 65 dB LAMAX Population Count	6	100%	94%
	24	100%	100%
DEPARTURES GLEX 65 dB LAMAX Population Count	6	100%	98%
	24	100%	81%
	AVERAGE CHANGE		-7%



The image to the left shows the average typical overflight cones to/from 7000ft for each existing arrival and departure route, assuming all traffic is on the route centreline. It is mapped against areas of population density. The % change for the number of people within each contour compared to the baseline is shown below both with and without the low level routes between Farnborough and Biggin Hill.

With Biggin Hill routes

Overflight Population	RUNWAY	1 Do nothing Baseline	5A
ARRIVALS Overflight (0-7000ft) Population Count	6	100%	97%
	24	100%	58%
DEPARTURES Overflight (0-7000ft) Population Count	6	100%	104%
	24	100%	231%
	AVERAGE CHANGE		23%

Without Biggin Hill routes

Overflight Population	RUNWAY	1 Do nothing Baseline	5A
ARRIVALS Overflight (0-7000ft) Population Count	6	100%	69%
	24	100%	65%
DEPARTURES Overflight (0-7000ft) Population Count	6	100%	120%
	24	100%	125%
	AVERAGE CHANGE		-5%

Based on the extent of the existing and forecast (2031) LOAEL, both with and without planning consent, this airspace design option is expected to have no impact on the size or shape of the LOAEL.

The tables to the right show the % change in the number of education and healthcare facilities and places of worship overflown by average typical overflight cones to/from 7000ft compared to the do nothing scenario, assuming all traffic is on the route centreline. Data with and without the low level routes between Farnborough and Biggin Hill are shown.

With Biggin Hill routes

Overflight NSRs Arrivals	RUNWAY	1 Do nothing Baseline	5A
Heathcare Count (0-7000ft)	6	100%	103%
	24	100%	48%
Education Count (0-7000ft)	6	100%	126%
	24	100%	54%
Places of Worship Count (0-7000ft)	6	100%	102%
	24	100%	63%
	AVERAGE CHANGE		-17%

Without Biggin Hill routes

Overflight NSRs Arrivals	RUNWAY	1 Do nothing Baseline	5A
Heathcare Count (0-7000ft)	6	100%	65%
	24	100%	55%
Education Count (0-7000ft)	6	100%	74%
	24	100%	70%
Places of Worship Count (0-7000ft)	6	100%	63%
	24	100%	74%
	AVERAGE CHANGE		-33%

With Biggin Hill routes

Overflight NSRs Departures	RUNWAY	1 Do nothing Baseline	5A
Heathcare Count (0-7000ft)	6	100%	153%
	24	100%	275%
Education Count (0-7000ft)	6	100%	120%
	24	100%	430%
Places of Worship Count (0-7000ft)	6	100%	92%
	24	100%	143%
	AVERAGE CHANGE		102%

Without Biggin Hill routes

Overflight NSRs Departures	RUNWAY	1 Do nothing Baseline	5A
Heathcare Count (0-7000ft)	6	100%	183%
	24	100%	185%
Education Count (0-7000ft)	6	100%	141%
	24	100%	132%
Places of Worship Count (0-7000ft)	6	100%	111%
	24	100%	102%
	AVERAGE CHANGE		42%

Communities	Air Quality	Qualitative

This option would not alter the lateral or vertical tracks of flight paths below 1000ft for Farnborough's arrivals or departures and this option is therefore not expected to have an effect on Local Air Quality.

Wider Society	Greenhouse Gas Impact	Quantitative

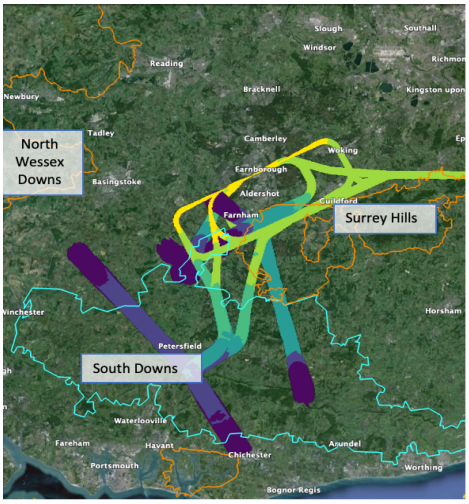
Option 5A is estimated to result in an annual reduction of 73,949nm flown by Farnborough movements compared to the Do Nothing scenario, based on 2023 movements, the 20 year average modal split and the same directional split of traffic.

	NM Difference
1A Do Nothing	0.0
5A	-73949

Wider Society	Capacity/Resilience	Qualitative

The assumptions necessary for this option require Heathrow and Gatwick departures to climb higher, sooner than today. This releases more airspace above Farnborough for Farnborough's departures to also climb higher, sooner. In turn this could vertically resolve the conflict with Farnborough's own arrivals, dramatically reducing the amount of tactical intervention relied on by Farnborough ATC. The ability for Farnborough to receive all their airways arrivals from the south, metered through one region reduced confliction points within the sector. The option also contains elements of other options such as PBN arrivals to final approach, an RNP-AR arrival to RWY06 that avoids Odiham MATZ and a route between Farnborough and Biggin Hill which would further contribute to a reduced ATC workload and increased systemisation. The option has scope for a more standardised transfer of control between Farnborough and TC which could enable complexity reductions in TC.

Wider Society	Biodiversity and Tranquillity	Qualitative



Tranquillity

The image to the left shows the average typical overflight cones to/from 7000ft for each existing arrival and departure route, mapped against the North Wessex Downs and Surrey Hills AONB and the South Downs National Park.

With Biggin Hill routes

Overflight AONB	RUNWAY	1 Do nothing Baseline	5A
ARRIVALS Overflight (0-7000ft) AONB Area (km2)	6	100%	53%
	24	100%	46%
DEPARTURES Overflight (0-7000ft) AONB Area (km2)	6	100%	126%
	24	100%	105%
	AVERAGE CHANGE		-17%

Without Biggin Hill routes

Overflight AONB	RUNWAY	1 Do nothing Baseline	5A
ARRIVALS Overflight (0-7000ft) AONB Area (km2)	6	100%	0%
	24	100%	63%
DEPARTURES Overflight (0-7000ft) AONB Area (km2)	6	100%	169%
	24	100%	105%
	AVERAGE CHANGE		-16%

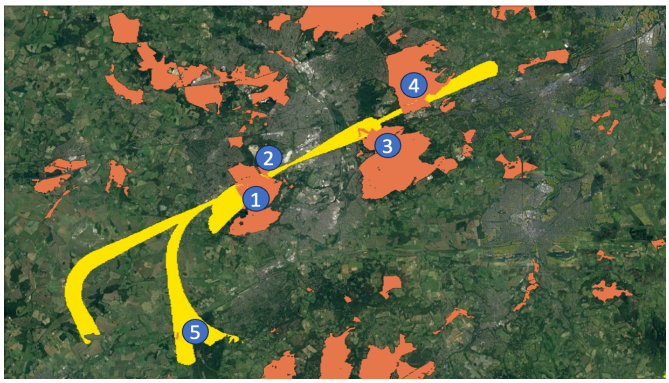
Overflight Nat Park	RUNWAY	1 Do nothing Baseline	5A
ARRIVALS Overflight (0-7000ft) NP Area (km2)	6	100%	116%
	24	100%	174%
DEPARTURES Overflight (0-7000ft) NP Area (km2)	6	100%	40%
	24	100%	30%
	AVERAGE CHANGE		-10%

Overflight Nat Park	RUNWAY	1 Do nothing Baseline	5A
ARRIVALS Overflight (0-7000ft) NP Area (km2)	6	100%	169%
	24	100%	261%
DEPARTURES Overflight (0-7000ft) NP Area (km2)	6	100%	53%
	24	100%	40%
	AVERAGE CHANGE		31%

Biodiversity

The image to the right shows the average typical overflight cones to/from 2000ft for the Do Nothing option mapped against SACs, SSSIs, SPA and RAMSAR sites surrounding the airport. The following sites are currently overflown below 2000ft:

1. Thames Basin Heaths SPA, Bourley and Long Valley SSSI
2. Thames Basin Heaths SPA, Eelmoor Marsh SSSI, Basingstoke Canal SSSI
3. Thames Basin Heaths SPA, Ash to Brookwood Heaths SSSI, Basingstoke Canal SSSI, Thursley, Ash, Pirbright & Chobham SAC
4. Thames Basin Heaths SPA, Colony Bog and Bagshot Heath SSSI, Thursley, Ash, Pirbright & Chobham SAC
5. Bentley Station Meadow SSSI



General Aviation	Access	Qualitative

This option assumes the introduction of PBN procedures to the ILS, a route between Farnborough and Biggin Hill, an RNP-AR arrival to RWY 06, an assumed improvement to vertical profiles from Heathrow and Gatwick meaning Farnborough departures to the NW and W can climb to 6000ft, and also a shift of all arrivals from the north and south through the same point and southerly departures routing further east than today. By moving the RWY 06 Final Approach Fix (FAF) closer to the Threshold (THR), the PBN approach transition can only be as far east the left hand side of the existing arrival swathe. The CAA Policy for the Design of Controlled Airspace Structures says that there should be between 2 and 3nm from an RNAV1 arrival route and the edge of CAS. There would be only be c.0.5nm between this centreline and the edge of CAS which would require a bespoke safety case to support. This is not felt to be achievable without extending the Farnborough CTR to the west. The impact on RAF Odiham and Lasham is considered to be significant with GA outside CAS already currently operating close to the boundary. The RWY 24 arrival is wholly contained laterally although, in the vertical plane, could require some amendments to CTR2/CTA1 potentially affecting Fairoaks aswell as the LON CTR potentially requiring an adjustment to its dimension or managed through LoA. The change to the lateral profile of the RWY 06 SIDs is not expected to affect CAS.

The RNP-AR arrival to RWY06 that avoids the RAF Odiham MATZ could require a very small adjustment to the NW corner of CTA4 and the SW corner of the CTR. The route between Farnborough and Biggin Hill is not expected to affect Farnborough's CAS dimensions.

The availability of 6000ft for Farnborough and the shift of arrivals from the north could potentially enable the release of CAS around LTMA11 although that is not Farnborough's airspace to amend and would also be reliant on Heathrow operations. The option could enable reduction in the size of CTA9. A contingency hold would ideally have a lowest holding level of 6000ft but if this is not possible, a 5000ft minimum holding level could result in a requirement to lower a part of LTMA13 south of Buster Hill mast. This option would be expected to reduce the workload of Farnborough ATC quite considerably by removing the need to descend and turn aircraft in a very timely manner in the constrained airspace onto final approach and owing to the deconfliction of Farnborough's own arrivals and departures from each other. This should provide greatly reduced R/T workload, enabling the ability to provide an improved service to other GA aircraft wishing to transit the airspace.

General Aviation/ commercial airlines	Economic impact from increased effective capacity	Qualitative

We expect the increased capacity/resilience detailed in the section above will result in a positive economic impact on Farnborough's customers compared with the Do Nothing scenario. The requirement to contain a PBN arrival to RWY06 final approach inside CAS could negatively affect Fairoaks.

General Aviation/ commercial airlines	Fuel Burn	Quantitative

See wider society Green House Gas Impact as the methodologies employed at Stage 2 are the same.

Commercial airlines	Training costs	Qualitative

Flight procedures are updated or introduced worldwide as part of an AIRAC cycle. As part of this cycle, Business Jet operators update their procedures accordingly and undertake training if required on a business as usual basis. Whilst this option contains an RNP-AR arrival, it would not be the only approach available and therefore Farnborough's customers would not be required to be RNP-AR approved. This option is not anticipated to require any additional training costs for Farnborough's customers.

Commercial airlines	Other costs	Qualitative

No other costs for Farnborough's customers are foreseen with this option.

Airport/ANSP	Infrastructure costs	Qualitative

This design option is not expected to change Farnborough's infrastructure costs.

Airport/ANSP	Operational costs	Qualitative

This design option is not expected to change Farnborough's operational costs.

Airport/ANSP	Deployment costs	Qualitative

This option is expected to require air traffic controller training for the controllers and assistants located at Farnborough Airport, and London Terminal Control. The scale and nature of this training requires further exploration as part of the Stage 3 Full Options Appraisal, when appraising the shortlist of options and once further information is known about the network above 7000ft and interdependencies with adjacent airports and NERL.

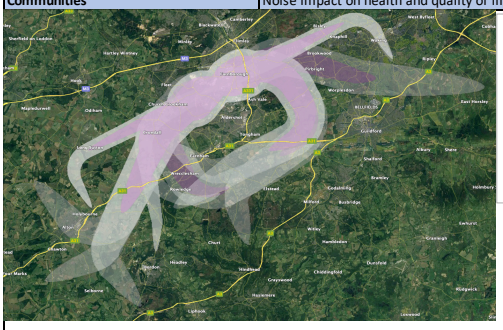
All	Safety	Qualitative

The reduction in Farnborough ATC workload is expected to enhance safety. The ability to fit a PBN IAP to ILS within the existing CTA is subject to an acceptable case safety case allowing reduced distance between the PBN centreline and the edge of CAS. IFP design has shown that an RNP APCH to RWY 24 has an impact on D132. Any BaroVNAV RNP APCH would not be designed to 3.5° to match the ILS but would need to have a lower profile to enhance availability in all temperatures, this could further impact CTR2/1 and would also need consideration of the PAPI angle. IFP flyability has not yet been performed which could change the impacts described so far. Any impact on Fairoaks as a result on any changes to CTR2/1 have not yet been assessed. Removal of flights between Biggin Hill and Farnborough from TC would reduce complexity in their sectors. There are not yet any RNP-AR arrival procedures promulgated in the UK which may require additional assurances.

All	Interdependencies, conflicts, and trade offs with other ACPs	Qualitative
The implementation of PBN to final approach is unlikely to require tradeoffs with Heathrow, Gatwick and Southampton because the changes are very small and low level. The addition of a new contingency hold is dependent on Heathrow and/or Gatwick being able to be guaranteed to climb higher, sooner. The same applies to the ability for Farnborough's NW/W departures to climb to 6000ft. These both could result in trade-off analysis if a steeper than optimal gradient were to be required from those airports in order to facilitate the hold or potentially even a change to the lateral profile from another airport. The addition of a low level route between Farnborough and Biggin Hill does have interdependencies with Heathrow, Gatwick and Biggin Hill's ACPs. This option will have dependencies on Southampton's ACP.		
All	Performance against the vision and parameters/strategic objectives of the AMS	Qualitative
The Airspace Modernisation Strategy vision is to deliver quicker, quieter and cleaner journeys and more capacity for the benefit of those who use and are affected by UK airspace. This option delivers CO2 reductions through overall reduced track mileage but the funnelling of arrivals from the north and south to the SW of Farnborough degrades some CO2 benefit in favour of enhanced systemisation and lower ATC workload which will enhance safety. The significant reduction in ATC workload could be expected to improve service delivery to both Farnborough's customers and GA wishing to transit the airspace.		

OPTION 5B

Group	Impact	Level of Analysis
Communities	Noise impact on health and quality of life	Part quantitative, part qualitative



The image to the left shows the 65dB (magenta) and 60dB (white) LAMAX contours for GLEX single event for each existing arrival and departure route. The % change for the number of people within each contour compared to the baseline is shown both with and without the low level routes between Farnborough and Biggin

With Biggin Hill routes

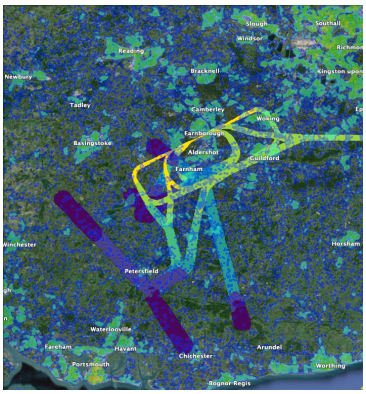
GLEX 60dB LAMAX	RUNWAY	1 Do nothing Baseline	5B
ARRIVALS GLEX 60 dB LAMAX Population Count	6	100%	100%
	24	100%	82%
DEPARTURES GLEX 60 dB LAMAX Population Count	6	100%	94%
	24	100%	116%
	AVERAGE CHANGE		-2%

GLEX 65dB LAMAX	RUNWAY	1 Do nothing Baseline	5B
ARRIVALS GLEX 65 dB LAMAX Population Count	6	100%	95%
	24	100%	100%
DEPARTURES GLEX 65 dB LAMAX Population Count	6	100%	89%
	24	100%	103%
	AVERAGE CHANGE		-3%

Without Biggin Hill routes

GLEX 60dB LAMAX	RUNWAY	1 Do nothing Baseline	5B
ARRIVALS GLEX 60 dB LAMAX Population Count	6	100%	99%
	24	100%	81%
DEPARTURES GLEX 60 dB LAMAX Population Count	6	100%	91%
	24	100%	105%
	AVERAGE CHANGE		-6%

GLEX 65dB LAMAX	RUNWAY	1 Do nothing Baseline	5B
ARRIVALS GLEX 65 dB LAMAX Population Count	6	100%	94%
	24	100%	100%
DEPARTURES GLEX 65 dB LAMAX Population Count	6	100%	86%
	24	100%	81%
	AVERAGE CHANGE		-10%



The image to the left shows the average typical overflight cones to/from 7000ft for each existing arrival and departure route, assuming all traffic is on the route centreline. It is mapped against areas of population density. The % change for the number of people within each contour compared to the baseline is shown below both with and without the low level routes between Farnborough and Biggin Hill.

With Biggin Hill routes

Overflight Population	RUNWAY	1 Do nothing Baseline	5B
ARRIVALS Overflight (0-7000ft) Population Count	6	100%	97%
	24	100%	60%
DEPARTURES Overflight (0-7000ft) Population Count	6	100%	91%
	24	100%	231%
	AVERAGE CHANGE		20%

Without Biggin Hill routes

Overflight Population	RUNWAY	1 Do nothing Baseline	5B
ARRIVALS Overflight (0-7000ft) Population Count	6	100%	68%
	24	100%	68%
DEPARTURES Overflight (0-7000ft) Population Count	6	100%	103%
	24	100%	125%
	AVERAGE CHANGE		-9%

Owing to the earlier turn on RWY 06 departures, this option could have an impact on the size or shape of the existing and forecast (2031 both with and without planning consent) LOAEL. No modelling of the LOAEL has been performed at this stage to determine whether such a change would be positive or negative.

The tables to the right show the % change in the number of education and healthcare facilities and places of worship overflown by average typical overflight cones to/from 7000ft compared to the do nothing scenario, assuming all traffic is on the route centreline. Data with and without the low level routes between Farnborough and Biggin Hill are shown.

With Biggin Hill routes

Overflight NSRs Arrivals	RUNWAY	1 Do nothing Baseline	5B
Heathcare Count (0-7000ft)	6	100%	100%
	24	100%	64%
Education Count (0-7000ft)	6	100%	121%
	24	100%	63%
Places of Worship Count (0-7000ft)	6	100%	100%
	24	100%	80%
	AVERAGE CHANGE		-12%

Overflight NSRs Departures	RUNWAY	1 Do nothing Baseline	5B
Heathcare Count (0-7000ft)	6	100%	161%
	24	100%	275%
Education Count (0-7000ft)	6	100%	107%
	24	100%	430%
Places of Worship Count (0-7000ft)	6	100%	87%
	24	100%	143%
	AVERAGE CHANGE		100%

Without Biggin Hill routes

Overflight NSRs Arrivals	RUNWAY	1 Do nothing Baseline	5B
Heathcare Count (0-7000ft)	6	100%	60%
	24	100%	70%
Education Count (0-7000ft)	6	100%	66%
	24	100%	79%
Places of Worship Count (0-7000ft)	6	100%	61%
	24	100%	94%
	AVERAGE CHANGE		-28%

Overflight NSRs Departures	RUNWAY	1 Do nothing Baseline	5B
Heathcare Count (0-7000ft)	6	100%	194%
	24	100%	185%
Education Count (0-7000ft)	6	100%	122%
	24	100%	132%
Places of Worship Count (0-7000ft)	6	100%	104%
	24	100%	102%
	AVERAGE CHANGE		40%

Communities	Air Quality	Qualitative

This option would not alter the lateral or vertical tracks of flight paths below 1000ft for Farnborough's arrivals or departures and this option is therefore not expected to have an effect on Local Air Quality.

Wider Society	Greenhouse Gas Impact	Quantitative

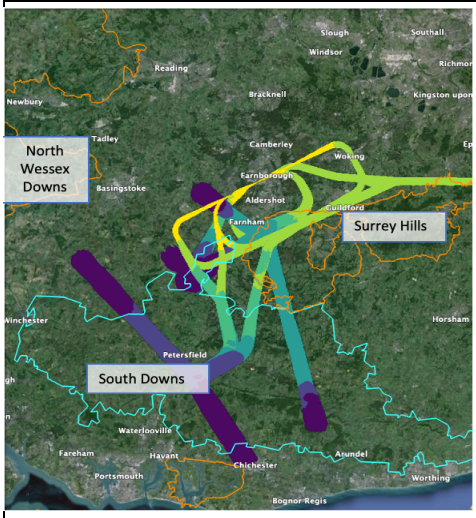
Option 5B is estimated to result in an annual reduction of 69,945nm flown by Farnborough movements compared to the Do Nothing scenario, based on 2023 movements, the 20 year average modal split and the same directional split of traffic.

	NM Difference
1A Do Nothing	0.0
5B	-69945

Wider Society	Capacity/Resilience	Qualitative

The assumptions necessary for this option require Heathrow and Gatwick departures to climb higher, sooner than today. This releases more airspace above Farnborough for Farnborough's departures to also climb higher, sooner. In turn this could vertically resolve the conflict with Farnborough's own arrivals, dramatically reducing the amount of tactical intervention relied on by Farnborough ATC. The ability for Farnborough to receive all their airways arrivals from the south, metered through one region reduced confliction points within the sector. The option also contains elements of other options such as PBN arrivals to final approach, an RNP-AR arrival to RWY06 that avoids Odiham MATZ and a route between Farnborough and Biggin Hill which would further contribute to a reduced ATC workload and increased systemisation. The option has scope for a more standardised transfer of control between Farnborough and TC which could enable complexity reductions in TC.

Wider Society	Biodiversity and Tranquillity	Qualitative



Tranquillity

The image to the left shows the average typical overflight cones to/from 7000ft for each existing arrival and departure route, mapped against the North Wessex Downs and Surrey Hills AONB and the South Downs National Park.
The tables below illustrate the typical changes in overflight of these areas compared to the baseline.

With Biggin Hill routes

Overflight AONB	RUNWAY	1 Do nothing Baseline	5B
ARRIVALS Overflight (0-7000ft) AONB Area (km2)	6	100%	53%
	24	100%	47%
DEPARTURES Overflight (0-7000ft) AONB Area (km2)	6	100%	113%
	24	100%	105%
	AVERAGE CHANGE		-20%

Without Biggin Hill routes

Overflight AONB	RUNWAY	1 Do nothing Baseline	5B
ARRIVALS Overflight (0-7000ft) AONB Area (km2)	6	100%	0%
	24	100%	65%
DEPARTURES Overflight (0-7000ft) AONB Area (km2)	6	100%	151%
	24	100%	105%
	AVERAGE CHANGE		-20%

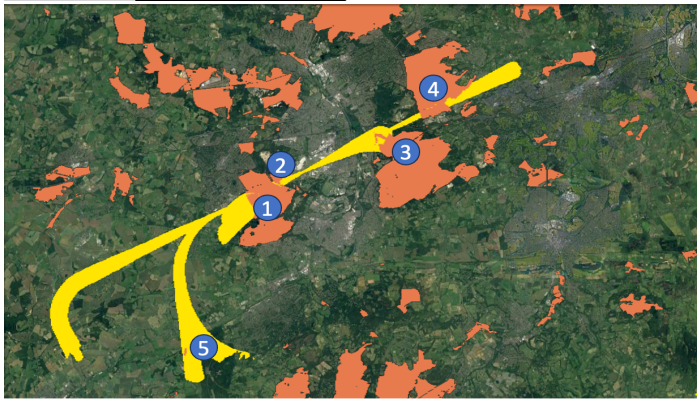
Overflight Nat Park	RUNWAY	1 Do nothing Baseline	5B
ARRIVALS Overflight (0-7000ft) NP Area (km2)	6	100%	117%
	24	100%	178%
DEPARTURES Overflight (0-7000ft) NP Area (km2)	6	100%	51%
	24	100%	30%
	AVERAGE CHANGE		-6%

Overflight Nat Park	RUNWAY	1 Do nothing Baseline	5B
ARRIVALS Overflight (0-7000ft) NP Area (km2)	6	100%	170%
	24	100%	266%
DEPARTURES Overflight (0-7000ft) NP Area (km2)	6	100%	68%
	24	100%	40%
	AVERAGE CHANGE		36%

Biodiversity

The image to the right shows the average typical overflight cones to/from 2000ft for the Do Nothing option mapped against SACs, SSSIs, SPA and RAMSAR sites surrounding the airport. The following sites are currently overflown below 2000ft:

1. Thames Basin Heaths SPA, Bourley and Long Valley SSSI
2. Thames Basin Heaths SPA, Eelmoor Marsh SSSI, Basingstoke Canal SSSI
3. Thames Basin Heaths SPA, Ash to Brookwood Heaths SSSI, Basingstoke Canal SSSI, Thursley, Ash, Pirbright & Chobham SAC
4. Thames Basin Heaths SPA, Colony Bog and Bagshot Heath SSSI, Thursley, Ash, Pirbright & Chobham SAC
5. Bentley Station Meadow SSSI



General Aviation	Access	Qualitative

This option assumes the introduction of PBN procedures to the ILS and RNP APCH, a route between Farnborough and Biggin Hill, an RNP-AR arrival to RWY 06, an assumed improvement to vertical profiles from Heathrow and Gatwick meaning Farnborough departures to the NW and W can climb to 6000ft, an earlier first turn from RWY 06 and also a shift of all arrivals from the north and south through the same point and southerly departures routing further east than today. By moving the RWY 06 Final Approach Fix (FAF) closer to the Threshold (THR), the PBN approach transition can fit right in the centre of the existing arrival swathe. The CAA Policy for the Design of Controlled Airspace Structures says that there should be between 2 and 3nm from an RNAV1 arrival route and the edge of CAS. There would be between 1 and 2nm between this centreline and the edge of CAS which would require a bespoke safety case to support. This is felt to be achievable at this time. The RWY 24 arrival is wholly contained laterally although, in the vertical plane, could require some amendments to CTR2/CTA1 potentially affecting Fairoaks aswell as the LON CTR potentially requiring an adjustment to its dimension or managed through LoA. The change to the lateral profile of the RWY 06 SIDs is not expected to affect CAS.

The RNP-AR arrival to RWY06 that avoids the RAF Odiham MATZ could require a very small adjustment to the NW corner of CTA4 and the SW corner of the CTR. The route between Farnborough and Biggin Hill is not expected to affect Farnborough's CAS dimensions.

The availability of 6000ft for Farnborough and the shift of arrivals from the north could potentially enable the release of CAS around LTMA11 although that is not Farnborough's airspace to amend and would also be reliant on Heathrow operations. The option could enable reduction in the size of CTA9. A contingency hold would ideally have a lowest holding level of 6000ft but if this is not possible, a 5000ft minimum holding level could result in a requirement to lower a part of LTMA13 south of Buster Hill mast. This option would be expected to reduce the workload of Farnborough ATC quite considerably by removing the need to descend and turn aircraft in a very timely manner in the constrained airspace onto final approach and owing to the deconfliction of Farnborough's own arrivals and departures from each other. This should provide greatly reduced R/T workload, enabling the ability to provide an improved service to other GA aircraft wishing to transit the airspace.

General Aviation/ commercial airlines	Economic impact from increased effective capacity	Qualitative

We expect the increased capacity/resilience detailed in the section above will result in a positive economic impact on Farnborough's customers compared with the Do Nothing scenario. Owing to the extension of the CTR to the west required by this option there could be a negative effect on Lasham/Odiham operations. The requirement to contain a PBN arrival to RWY06 final approach inside CAS could negatively affect Fairoaks.

General Aviation/ commercial airlines	Fuel Burn	Quantitative

See wider society Green House Gas Impact as the methodologies employed at Stage 2 are the same.

Commercial airlines	Training costs	Qualitative

Flight procedures are updated or introduced worldwide as part of an AIRAC cycle. As part of this cycle, Business Jet operators update their procedures accordingly and undertake training if required on a business as usual basis. Whilst this option contains an RNP-AR arrival, it would not be the only approach available and therefore Farnborough's customers would not be required to be RNP-AR approved. This option is not anticipated to require any additional training costs for Farnborough's customers.

Commercial airlines	Other costs	Qualitative

No other costs for Farnborough's customers are foreseen with this option.

Airport/ANSP	Infrastructure costs	Qualitative

This design option is not expected to change Farnborough's infrastructure costs.

Airport/ANSP	Operational costs	Qualitative

This design option is not expected to change Farnborough's operational costs.

Airport/ANSP	Deployment costs	Qualitative

This option is expected to require air traffic controller training for the controllers and assistants located at Farnborough Airport, and London Terminal Control. The scale and nature of this training requires further exploration as part of the Stage 3 Full Options Appraisal, when appraising the shortlist of options and once further information is known about the network above 7000ft and interdependencies with adjacent airports and NERL.

All	Safety	Qualitative
The reduction in Farnborough ATC workload is expected to enhance safety inside CAS. Any impact on Fairoaks as a result on any changes to CTR2/1 have not yet been assessed. Impacts on RAF Odiham and Lasham as a result of an extension of the CTR to the west have not yet been assessed. IFP design has shown that an RNP APCH to RWY 24 has an impact on D132 and an earlier turn for RWY06 departures would continue to requirement ATC intervention during D132 activation. Any BaroVNAV RNP APCH would not be designed to 3.5˚ to match the ILS but would need to have a lower profile to enhance availability in all temperatures, this could further impact CTR2/1 and would also need consideration of the PAPI angle. IFP flyability has not yet been performed which could change the impacts described so far. Removal of flights between Biggin Hill and Farnborough from TC would reduce complexity in their sectors. There are not yet any RNP-AR arrival procedures promulgated in the UK which may require additional assurances.		
All	Interdependencies, conflicts, and trade offs with other ACPs	Qualitative
The implementation of PBN to final approach is unlikely to require trade-offs with Heathrow, Gatwick and Southampton because the changes are very small and low level. The addition of a new contingency hold is dependent on Heathrow and/or Gatwick being able to be guaranteed to climb higher, sooner. The same applies to the ability for Farnborough's NW/W departures to climb to 6000ft. These both could result in trade-off analysis if a steeper than optimal gradient were to be required from those airports in order to facilitate the hold or potentially even a change to the lateral profile from another airport. The addition of a low level route between Farnborough and Biggin Hill does have interdependencies with Heathrow, Gatwick and Biggin Hill's ACPs. This option will have dependencies on Southampton's ACP.		
All	Performance against the vision and parameters/strategic objectives of the AMS	Qualitative
The Airspace Modernisation Strategy vision is to deliver quicker, quieter and cleaner journeys and more capacity for the benefit of those who use and are affected by UK airspace. This option delivers CO2 reductions through overall reduced track mileage but the funnelling of arrivals from the north and south to the SW of Farnborough degrades some CO2 benefit in favour of enhanced systemisation and lower ATC workload which will enhance safety. The significant reduction in ATC workload could be expected to improve service delivery to both Farnborough's customers and GA wishing to transit the airspace. However the required extension of the CTR to the west could potentially increasing Class G compression, GA pilot workload and Odiham ATC workload. The slightly longer final approach to accommodate PBN to RNP APCH reduces some of the CO2 benefit.		

5. IOA CONCLUSIONS

5.1 IOA outcomes

5.1.1 The options have been created and assessed as separate, complete system options. Each option, 2A through to 5B, increase the scale of change compared to Option 1 (Do Nothing). The "B" version of each option generally contains only a small variation from the "A" version; a slightly longer PBN IAP to final approach to cater for PBN to both ILS and RNP APCH and/or an earlier first turn on Runway 06 departures.

5.1.2 Our options were designed to explore multiple competing demands/principles i.e. improved operational performance, a reduction in population numbers affected by noise, a reduction in CO_2 emissions per flight, a reduction in the volume of CAS, minimise overflight of AONBs and National Parks and so on. In airspace design, it is highly unlikely that a single option can address all these demands to the maximum extent. Therefore, the airspace design process seeks to enable sponsors to investigate a series of different options that meet each principle/criteria to a greater or lesser extent. It is inevitable that where one option may deliver benefit in one IOA category, it may negatively impact another. A different option could do the opposite. Our goal is to arrive at a final proposal that best balances the series of competing demands and in order to do that, options need to be created at the outset that may be undesirable against a single objective. As we progressed through the Design Principle Evaluation and Initial Options Appraisal the pros and cons of different elements of each option have emerged. The outputs of the IOA have enabled Farnborough to arrive at the following conclusions:

Option 1 Do Nothing

5.1.3 The Airspace Modernisation Strategy vision is to deliver quicker, quieter and cleaner journeys and more capacity for the benefit of those who use and are affected by UK airspace.

5.1.4 Our DPE concluded that doing nothing partly meets the strategic aims of the AMS. Farnborough have recently modernised their airspace by implementing PBN arrivals and departures together with Controlled Airspace. Since then, in order to enable DVOR rationalisation (mentioned in Para 2.83 of CAP1711), Farnborough implemented the use of RNAV substitution for their Initial Approach Procedures (See ACP-2023-023). As set out in the Statement of Need for that ACP and as within CAP1781, RNAV substitution is an interim measure prior to a permanent PBN solution. Option 2A/2B within this ACP represents the minimum changes necessary to adhere to the temporary nature of RNAV substitution.

5.1.5 It's not entirely plausible at this stage to say that Do Nothing will not meet the objectives of the AMS, that depends very much on what changes NERL, Heathrow, Gatwick and Southampton want to propose and whether Doing Nothing at Farnborough would hinder those changes. However, in the event that changes to surrounding airspace would enable improved operational and/or environmental performance and/or CAS reductions, Farnborough would wish to implement those changes, hence being part of the programme.

5.1.6 However, on the basis that the CAA requires RNAV substitution to be of a temporary nature only and combined with the strong likelihood that there will be changes to Farnborough's traffic flows as a result of the wider FASI programme, Farnborough determine that Do

Nothing is not a viable option that can be carried forward. Option 2A/B illustrate the minimum changes necessary to remove reliance on RNAV substitution at Farnborough,

'A' Options (PBN to ILS) versus 'B' Options' (PBN to ILS and RNP APCH)

5.1.7 The continued absence of the ability to implement LPV approaches in the UK maintains a reliance on BaroVNAV. Regardless of PBN Initial Approach Procedures to final approach, the implementation of BaroVNAV RNP APCH at Farnborough will be challenging owing to the extant 3.5˚ ILS angle and there are also issues with a RWY 06 RNP APCH and D132. However, to enhance Farnborough's resilience and to address one of the wider aims of the AMS, Farnborough wish to pursue their adoption. It is possible that LPV will become available in the timeframe between the end of Stage 2 and a firm LTMA deployment which includes Farnborough. This would address some of the issues.

5.1.8 Considering the ability for a PBN IAP to both ILS and RNP APCH. IFP design criteria results in a slightly longer final approach to an RNP APCH at Farnborough than just to an ILS. As a result an extension to the CTA to the west would be required, negatively impacting Lasham and RAF Odiham. There is no noise benefit to a PBN to this longer final on RWY 06 whereas there is on RWY 24. On RWY 24, the impact to GA does not appear to be any different between the slightly different approaches. However, when vectoring to an RNP APCH, the distance between the Initial Fix (IF) and the Final Approach Fix (FAF) can be reduced meaning that, on RWY 06, ATC could vector to an RNP APCH whilst still having a PBN arrival to ILS. Considering that RNP APCHs would be for resilience only and ILS would always be the approach of choice, an argument for additional CAS to contain an arrival that could be relatively infrequently flown is challenging. In addition, the slightly longer final approach would add c.0.5nm to every arrival, ILS and RNP APCH. Keeping the PBN arrival in an optimal location for the ILS minimises overall CO_2 emissions.

5.1.9 Therefore, PBN Initial Approach Procedures to RNP APCH to Runway 06 is being discontinued to minimise impact to Lasham and RAF Odiham whilst maximising CO_2 and noise benefit. Vectors to RNP APCH would solve this issue. PBN IAPs to RNP APCH on RWY 24 is still being progressed. For avoidance of doubt PBN IAPs to ILS is being progressed on both runway ends as a necessity to remove Farnborough's dependency on RNAV substitution as well as providing significant workload reductions for ATC. Preferred Option(s).

Early turns on RWY 06 departures

5.1.10 There is both noise and CO_2 benefits with a SID that turns right slightly earlier than today and this component is being progressed. An earlier turn could also be beneficial in avoiding overflight of communities by multiple routes including those to/from other airports although it depends on the ultimate positioning of Heathrow's southerly departures. We will also keep the option of the same first turn on the table.

5.1.11 Following the outcomes above, we then considered aspects of Options 2-5.

Option 2A and Option 2B

5.1.12 Both these options are progressed with the exception of PBN IAPs to RNP APCH RWY 06.

Option 3A and Option 3B

5.1.13 The low level route between Farnborough and Biggin (which is the same in Options 3A/B, 4A/B and 5A/B) is being progressed owing to the large reduction in track miles and reduced

complexity in TC. London Biggin Hill Airport are supportive of this option though it does have a dependency on the LBHA ACP.

5.1.14 The RWY 06 departure which turns over Aldershot (which is the same in Options 3A/B, 4A and 4B) does reduce overflight of Surrey Hills but, as a result, generates significant increases (30%+) in number of people within the 60dB L_{AMAX} contour. It generates a small increase in track miles and would also not be possible in conjunction with an earlier first turn. DP4a is to *'enable a reduction in population numbers affected by noise,* DP4b is to *'enable a reduction in CO2 emissions per flight from Farnborough aircraft'* and DP6b is to *'minimise population numbers newly overflown'.* ANG2017 3.3c says *"in the airspace at or above 4,000 feet to below 7,000 feet, the environmental priority should continue to be minimising the impact of aviation noise in a manner consistent with the government's overall policy on aviation noise unless the CAA is satisfied that the evidence presented by the sponsor demonstrates this would disproportionately increase CO2 emissions;"* and the Government's overarching aviation noise policy says *"The impact of aviation noise must be mitigated as much as is practicable and realistic to do so.."*

5.1.15 Whilst N60 is indeed a metric to measure nighttime noise, it is still an indicator of noise impacts, where our DP4a does not distinguish between adverse noise effects or any noise effects. The RWY06 departure which turns over Aldershot would not result minimise the number of people newly overflown newly when compared to do nothing (see Page 16 of technical appendix,) which typically avoids Aldershot, compared to the majority of RWY 06 departures today. Also, as also included in our rationale for discontinuation explanation of this component, the turn over Aldershot would also add a small increase in track miles.

5.1.16 We are therefore discontinuing this component as it would increase the number of people affected by noise (to some extent), would not minimise people newly overflown and would not enable a reduction in CO_2 emissions per flight. Whilst N60 is a nighttime noise metric, there were no other overarching operational or environmental benefits in progressing this component.

5.1.17 The RNP AR arrival to RWY 06 avoiding RAF Odiham (which is the same in Options 3A/B, 4A/B and 5A/B) is being progressed.

5.1.18 PBN IAPs to RNP APCH RWY 06 are not being progressed.

5.1.19 The only components in this option being progressed are also present in Options 4A/B and 5A/B. Therefore, Options 3A and 3B are discontinued.

Option 4A and Option 4B

5.1.20 The low-level route between Farnborough and Biggin (which is the same in Options 3A/B, 4A/B and 5A/B) is being progressed owing to the large reduction in track miles and reduced complexity in TC.

5.1.21 The RWY 06 departure which turns over Aldershot (which is the same in Options 3A/B, 4A and 4B) does reduce overflight of Surrey Hills but, as a result, generates significant increases (30%+) in number of people within the 60dB LAMAX contour. It generates a small increase in track miles and would also not be possible in conjunction with an earlier first turn. This component is being discontinued for the reasons covered in 5.1.14 – 5.1.16.

5.1.22 The RNP AR arrival to RWY 06 avoiding RAF Odiham (which is the same in Options 3A/B, 4A/B and 5A/B) is being progressed.

5.1.23 The move of the arrival route from the south to the east is being progressed owing to the significant CO_2 benefits. The ability to keep arrivals from the NW close to where they route today is also being progressed to keep track miles to a minimum and to also help reduce overflight of the South Down National Park (compared to Option 5).

Option 5A and Option 5B

5.1.24 Both these options are progressed with the exception of PBN IAPs to RNP APCH RWY 06.

Preferred Option

5.1.25 Option 5 is our current preferred option at this stage owing to greatly increased systemisation, positive noise and CO_2 benefits and this option contains most potential to release elements of CAS to Class G. The option does increase overflight of South Downs National Park but reduces overflight of North Wessex Downs AONB.

5.1.26 Whilst this option is our preferred option at this time, it is likely that the final option(s) in Stage 3 will be made up of a combination of components from the "Components Progressed" list below. Further work is required on all components progressed. The final proposal may not contain all components taken forward.

Components Progressed
Earlier first turn on RWY 06 SIDs
Keeping the same first turn on RWY 06 SIDs
RNP AR to RWY 06
PBN to ILS RWY 06
PBN to ILS RWY 24
PBN to RNP APCH RWY 24
Low level route between Farnborough and Biggin Hill
Contingency hold, ideally min level 6000ft
Arrival from the south moved to the east (taken from Options 4A/4B)
Option 2A
Option 2B excluding PBN to RNP APCH RWY 06
Option 5A
Option 5B excluding PBN to RNP APCH RWY 06
Keeping arrivals from the NW as today
Keeping arrivals from the south as today
No change to RWY 24 first turns

Table 4: Components progressed

Components Discontinued
Option 1 Do Nothing
PBN to RNP APCH RWY 06
RWY 06 SID turning over Aldershot
Option 3A and 3B
Option 4A and 4B excluding arrival from the south moved to the east

Table 5: Components discontinued

5.2 Information to collect as part of the Full Options Appraisal

5.2.1 The IOA involves a mixture of qualitative and quantitative analysis of each option against the baseline. To fill any evidence gaps from the IOA, during the FOA, Farnborough Airport will further develop and assess the following by using primarily quantitative analysis where possible.

- Generate a future forecast for year of implementation and year of implementation + 10 years including movement numbers and aircraft fleet.
- Quantitatively appraise full airport system LAeq contours, including population data, noise sensitive buildings and contour area. This will include consented local developments where applicable.
- Quantitatively appraise full airport system fuel burn and equivalent CO_2 emissions data taking into account the expected vertical profile of the routes.
- Undertake noise and carbon webTAG assessments.
- Undertake tranquillity impact assessments where applicable.
- Undertake biodiversity impact assessments where applicable.
- Undertake air quality impact assessments where applicable.
- Quantitatively appraise overflight contours based on full airport system options, which include frequency of cumulative overflight and contours showing 100% runway usage.
- Provide further information about interdependencies, conflicts and trade-offs with neighbouring airports and the airspace above 7000ft.
- Include qualitative information and quantitative data about cumulative impacts with neighbouring airports.
- Provide quantified costs for ATC deployment and training where applicable
- Provide quantified costs for ANSP/Airport infrastructure and operational costs where applicable
- Provide further assessments around capacity / operational resilience
- Quantify the volume and designation of Controlled Airspace (CAS) required and articulate the benefits and impacts of this for General Aviation.
- Undertake further safety assessments.
- Where applicable, undertake a Habitats Regulations Assessment (HRA)

5.2.2 As Stage 3 of this ACP will be undertaken in accordance with CAP1616 Edition 5, Farnborough Airport will use the metrics outlined in CAP1616F and CAP1616i to carry out these assessments.

5.3 Impacted Audiences

5.3.1 At the 'Develop and assess' gateway, the IOA must set out impacted audiences, as this information will be a key feature in developing the consultation strategy required during Step 3A and at the 'Consult' gateway.

5.3.2 The following figure shows our remaining components on one map image. We will use this mapping as a starting point to identify our impacted audiences and ensure that this is considered when developing our consultation strategy at Stage 3. We're aware that other factors also need to be taken into account when identifying the audience such as other noise metrics, changes to controlled airspace etc and we will ensure these are also factored in.

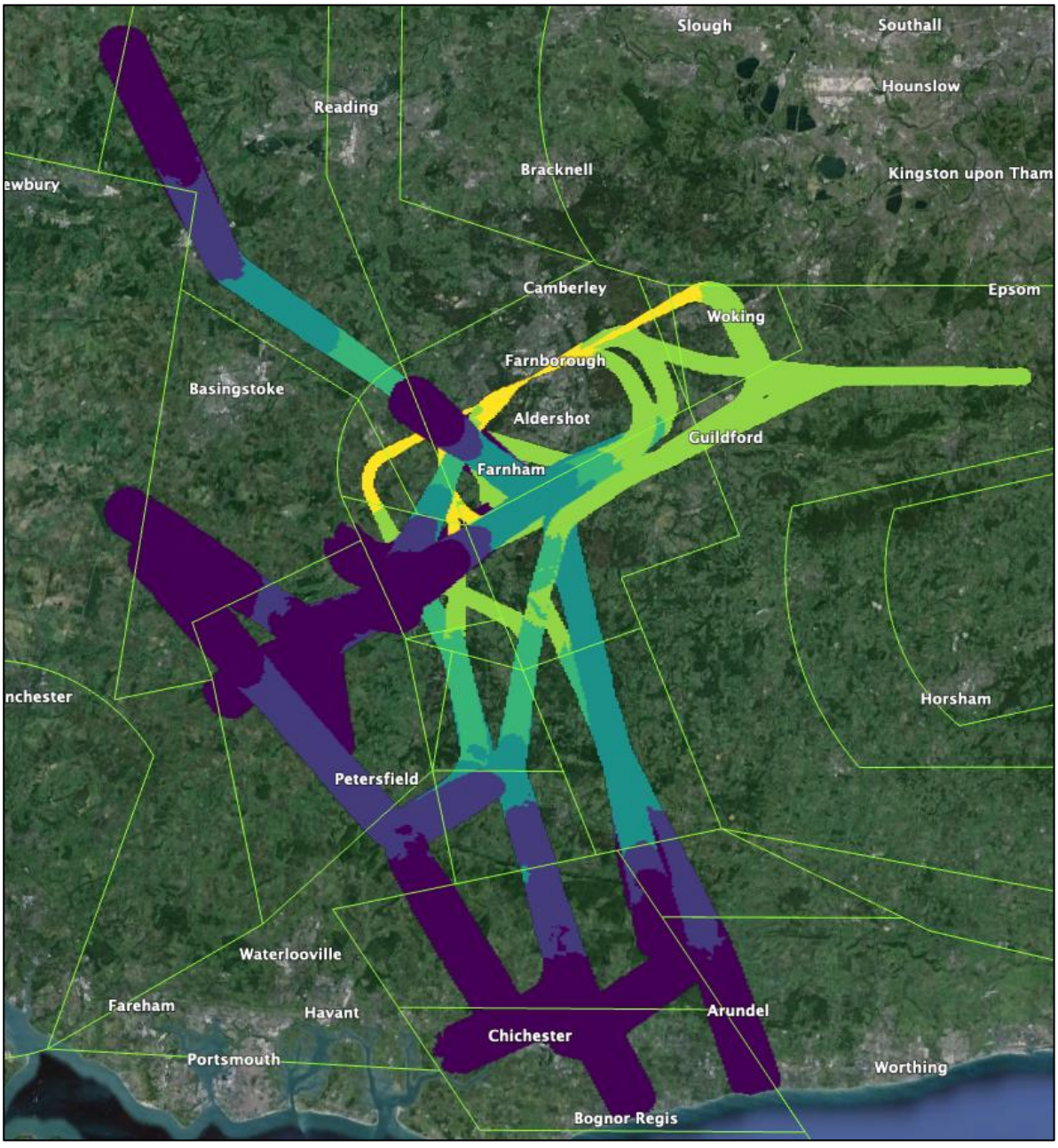


Figure 3: Impacted audiences

5.4 Next steps

5.4.1 A date for the Stage 3 Gateway Assessment has not yet been set as this will be as a result of an agreed deployment plan within an accepted version of the Masterplan.