

# Farnborough Airport FASI-S ACP

Stage 2 Stakeholder Engagement  
Baseline scenarios & Comprehensive List of Options

December 2023

## DISCLAIMER:

The information contained within this document does not constitute a formal company position and does not necessarily reflect a final view.

It is provided to you to facilitate discussions with Farnborough Airport and feedback on our developing proposals. The incomplete and preliminary nature of the information should be recognised when reviewing this material.

Farnborough Airport Limited will not accept or assume any liability for the accuracy or correctness of the information or of any figures provided, or any assumptions that may be drawn from them.

All route options are shown for discussion only.

This information is intended for your sole purpose, is confidential and should not be shared outside your organisation or with any third party without the express consent of Farnborough Airport Limited.

Farnborough Airport will submit a formal submission that will be publicly available on the CAA Airspace Change Portal in 2024.

# Welcome & Introductions

Farnborough Airport would like to thank you for taking the time to attend this workshop.

This workshop is about the new Airspace Modernisation Airspace Change Proposal only, if you have any questions or points about current day operations or the Post-Implementation Review for the existing airspace change proposal, please contact Farnborough Airport separately.

# Agenda

- Airspace Modernisation
- The Airspace Change Process including Stage 1 Recap and Stage 2 process
- The Do-Nothing baselines
- BREAK
- Initial scenarios that were investigated for viability
- Farnborough Airport's initial comprehensive list of options
- Any Questions
- Next Steps

# Airspace Modernisation

## UK Airspace Modernisation Strategy

In December 2018, in response to tasking from the Department of Transport (DfT), the Civil Aviation Authority (CAA) published the Airspace Modernisation Strategy. This strategy sets out the ways, means and ends of modernising airspace, through initiatives that will modernise the design, technology and operations of airspace.

These include the removal of all fixed routes in upper airspace so aircraft can fly fully optimised routes, a fundamental redesign of the terminal route network using precise and flexible satellite navigation and the focus on electronic surveillance solutions to improve safety and enable better integration of all airspace users.

The overall objective for airspace modernisation is to deliver quicker, quieter and cleaner journeys and more capacity for the benefit of those who use and are affected by UK airspace.



## Airspace Modernisation & ACOG

The programme to modernise the airspace across the UK involves 20 airports and NATS. NATS is responsible for re-designing the airspace above 7000ft and airports are responsible for designing the arrival and departure routes that support their operations from the ground, to approximately 7000ft.

Many airports began their modernisation programme in 2018 and since 2020 have been working with the Airspace Change Organising Group (ACOG), who are responsible for developing the Masterplan. The Masterplan is a single coordinated implementation plan for airspace changes in the UK up to 2040.

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

# The Airspace Change Process

## CAP1616

In June 2022, Farnborough Airport submitted a Statement of Need to the CAA, which began the formal airspace change process.

To carry out an airspace change proposal, airports must follow the CAA's guidance on the regulatory process for changing notified airspace design and planned and permanent redistribution of traffic, this is known as CAP1616.

CAP1616 is a 7-stage process which provides a framework for changing airspace and places significant importance on engaging a wide-range of stakeholders.

The CAA released an updated (5<sup>th</sup>) edition of CAP1616 at the end of October 2023. CAA have confirmed Farnborough will be assessed against the current **edition 4** at the Stage 2 gateway.



# Stage 1 Recap

## Stage 1 Recap

In Stage 1, sponsors must complete a Statement of Need, which can be found on the CAA Portal [here](#) and have an Assessment Meeting with the CAA. Details can be found [here](#).

They must then create design principles through stakeholder engagement.

Design Principles are the objectives that the airport seeks to achieve through the airspace change and help the airspace designers to create and compare different flight path options.

Design principles include policy, safety, environmental (including noise) and operational factors. The design principles must also consider local context for the airspace change and take account of priorities within the area affected.

Farnborough Airport submitted the design principles and engagement evidence to the CAA and passed the Stage 1 gateway in June 2023. Our main submission document can be found on the CAA Portal, [here](#).



# Stage 1 Recap

Final Design Principles	
1	<p>Must be as safe or safer than today for all stakeholders that are affected by the airspace change*</p> <p>(*We will set out our methodology for assessing this in Stage 2 with a view to using data e.g. flight density plots outside CAS/Volume nm<sup>3</sup> of CAS, to support other qualitative assessments.)</p>
2	<p>Accord with:</p> <ul style="list-style-type: none"> <li>a) the CAA's published airspace modernisation strategy (CAP1711) and any current or future plans associated with it,</li> <li>b) Air Navigation Guidance 2017 &amp; other relevant policy and legislations</li> </ul>
3	<p>Shall not constrain the ability to meet forecast demand for Farnborough Airport</p>
4	<p>Improve vertical profiles compared to the baseline published SID/STAR levels, to enable:</p> <ul style="list-style-type: none"> <li>a) a reduction in population numbers affected by noise,</li> <li>b) a reduction in CO<sub>2</sub> emissions per flight from Farnborough aircraft,</li> <li>c) a reduction in the volume and where possible, complexity of Farnborough Airport's CAS,</li> <li>d) a reduction in the reliance on tactical intervention</li> </ul>
5	<p>Aim to remove dependencies with adjacent ATC units and minimise impacts on other airspace users</p>
6	<p>Where lateral changes to existing tracks are required to achieve improved environmental and operational performance, options should:</p> <ul style="list-style-type: none"> <li>a) deliver an overall reduction in flight plannable track miles,</li> <li>b) minimise population numbers newly overflown,</li> <li>c) avoid overflying the same communities with multiple routes to &amp; from Farnborough Airport,</li> <li>d) avoid overflying the same communities with Farnborough's routes and those routes to &amp; from other airports below 7000ft</li> </ul>
7	<p>Make best use of Farnborough's modern aircraft fleet capabilities</p>
8	<p>Ensure that Farnborough Clutch airways traffic can still be accommodated, as a result of the changes</p>

# CAP1616 Stage 2

- Stage 2 is known as “Develop & Assess” and is split into two steps, Step 2A “Options Development” and Step 2B, “ Options Appraisal”.
- Farnborough Airport are in Step 2A, “Options Development”, where we are required to develop a comprehensive list of options, to the extent a list is possible – that address the Statement of Need and that align with the Design Principles from Stage 1.
- Farnborough must then share those options with the same stakeholders who were engaged at Stage 1 and request their feedback.
- We will then produce a Design Principle Evaluation (DPE) that sets out how each of our design options responds to the design principles. This evaluation may enable us to create a shorter list of options.
- Following the DPE, Farnborough Airport then moves into Step 2B, Options Appraisal and carries out the first of 3 appraisals on the design options which were successful in the DPE. This is called the Initial Options Appraisal (IOA).
- At this stage our design options will be assessed more fully, against the criteria laid out in Edition 4 of CAP1616 Appendix E.



# Questions?

# Baseline (Do Nothing)

Including forecasts for Year of Implementation  
and + 10 Years

# Post Implementation Review

In our Stage 1 engagement and submission, we stated that our baseline will be set on the existing airspace arrangement, following the Post Implementation Review (PIR).

This was in case the PIR resulted in any requirement to amend the existing airspace arrangement and we were expecting the PIR outcome from CAA in August 2023.

The PIR has not yet been concluded but the CAA have confirmed that the do nothing can only be based on the current scenario and the ACP should be progressed on the current position known at the time.

Therefore, at stage 2, our baseline incorporates the existing published airspace arrangement and assumes no changes to that arrangement are required.

We can update our baseline position in Stage 3 if required.

# Airspace Constraints

## Commercial airport operations

Heathrow (c.475k ATMs)  
Gatwick (c.260k ATMs)  
Southampton (c.20k ATMs (45k 2019))

## General Aviation aerodromes

Fairoaks is home to two resident flight training schools. Commercial operations of mid-sized turboprops and small jets.  
Blackbushe is home to two resident flight training schools and several corporate jets, a helicopter training facility, as well as Aerobility, a flying charity.  
To the south, Goodwood and Lee-on-Solent.

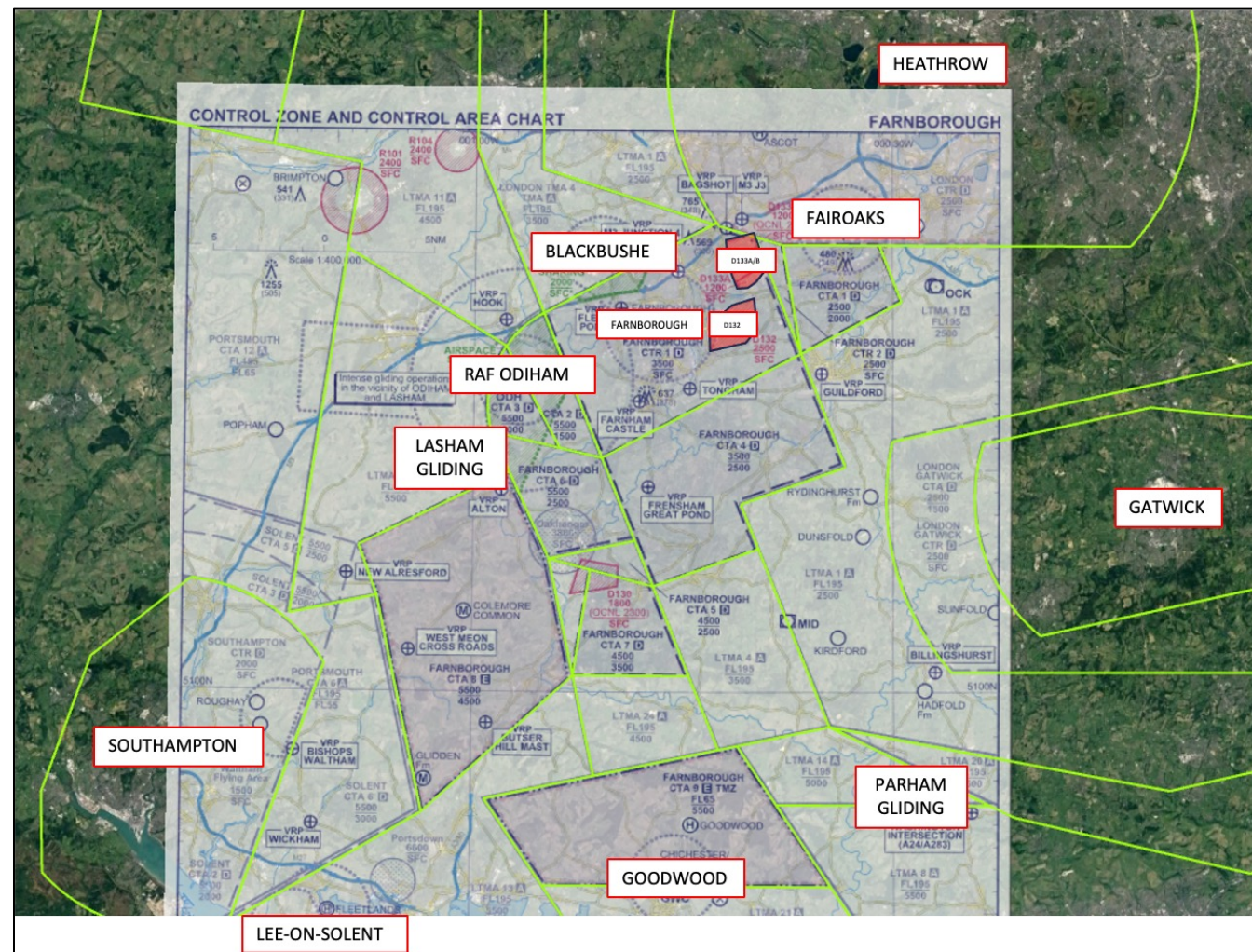
## Military airfields and Danger Areas

RAF Odiham home of the Royal Air Force's Chinook helicopters and home to the headquarters of the Joint Special Forces Aviation Wing (JSFAW).  
D132 and 133A/B Live Firing.

## Gliding sites and activity

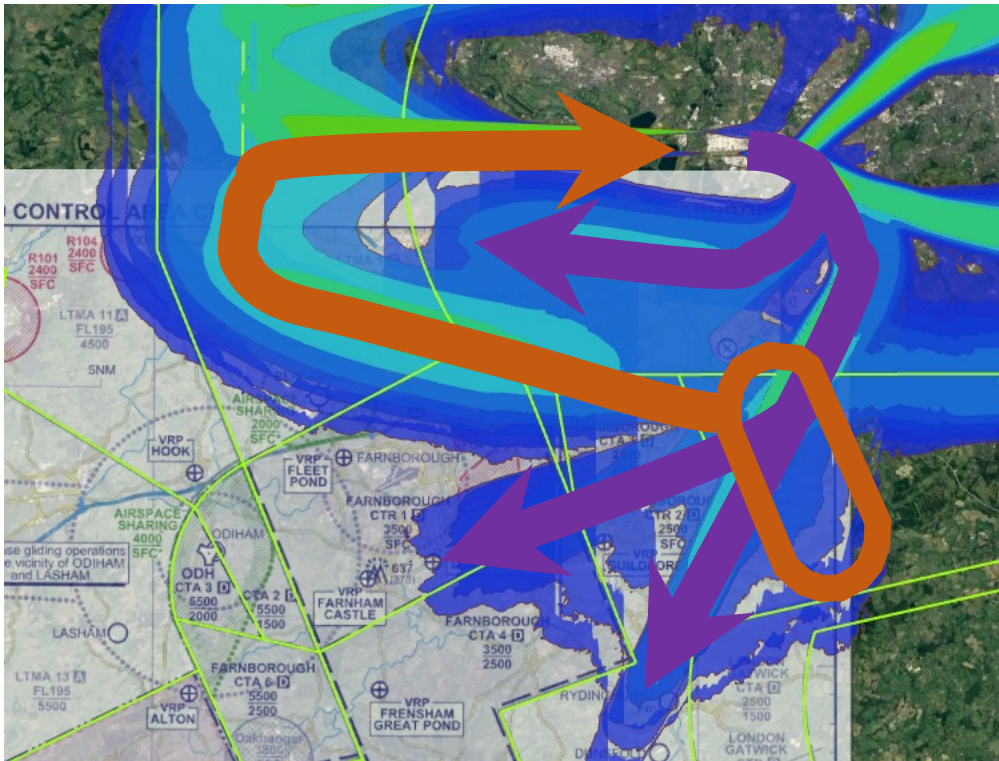
Lasham home of the largest British gliding club, also one of the world's largest. Up to 100 gliders can be in the vicinity at once, with winch cables up to 3,000 ft (910 m) above the ground. Also, home to a company that maintains jet aircraft for various airlines.

Parham (Southdown Gliding Club) home to over forty privately owned gliders.

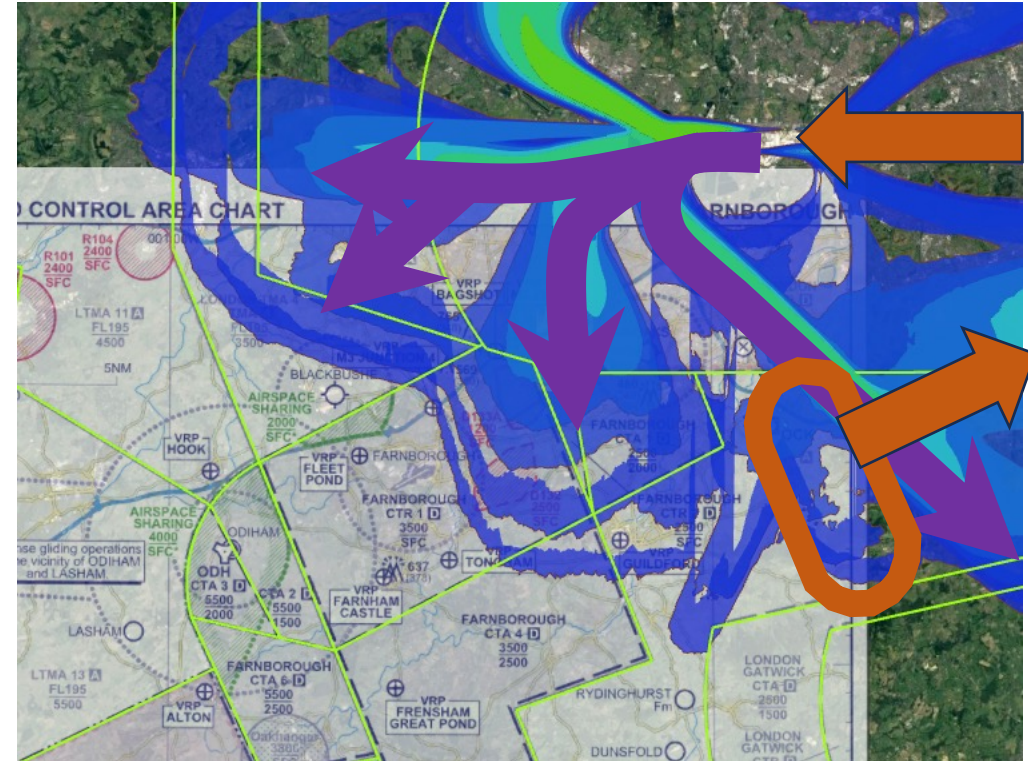


# Existing Heathrow constraints overview

Heathrow easterly operations



Heathrow westerly operations

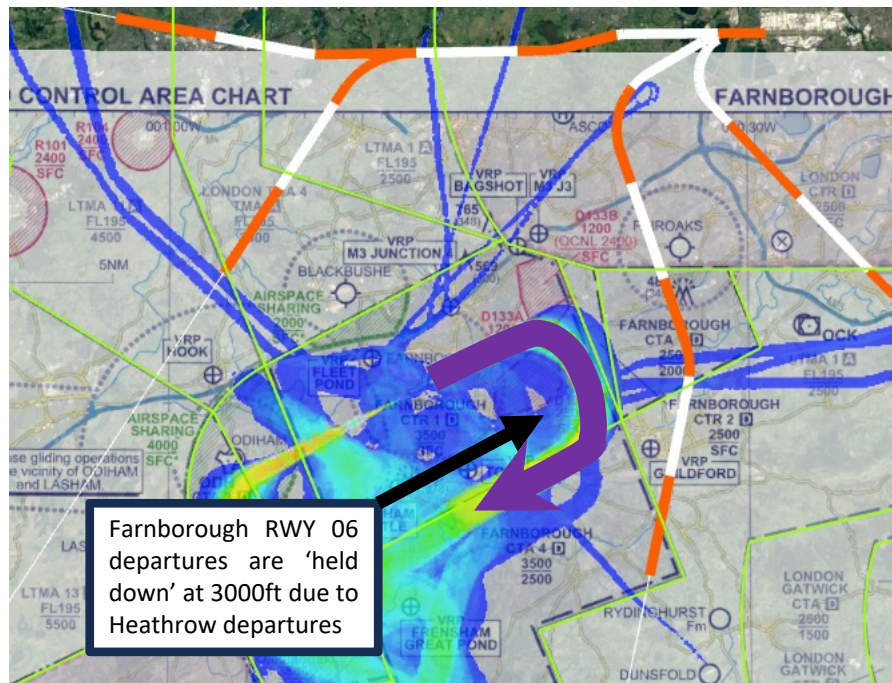


ARRIVALS →  
DEPARTURES →



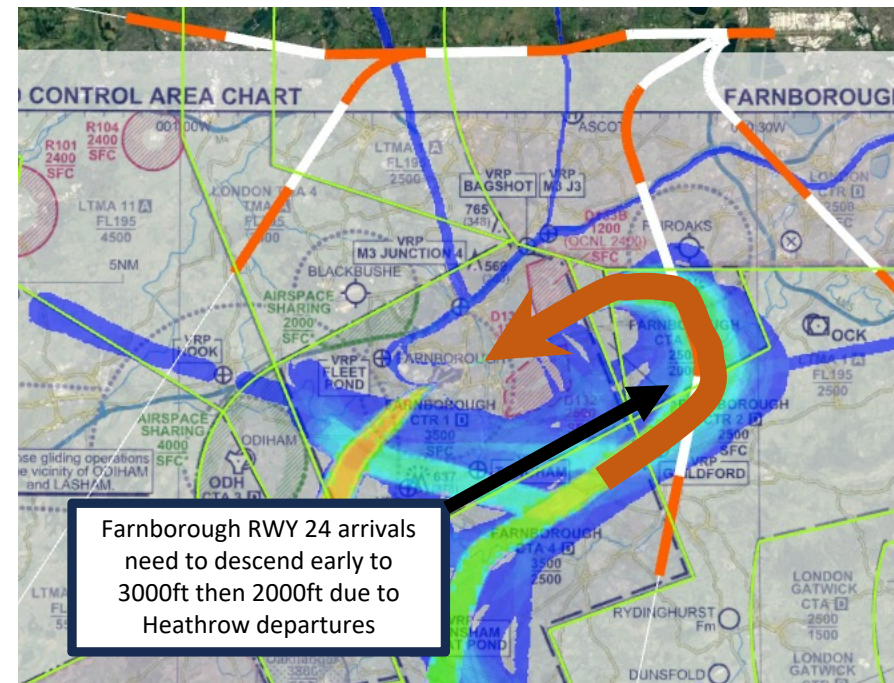
# Heathrow constraints in more detail

### Farnborough easterly operations



DEPARTURES →

### Farnborough westerly operations



ARRIVALS →

Heathrow are redesigning their airspace with one of their objectives being to enable continuous climb for their departures above 6000ft. However, no matter where Heathrow's southbound departures end up being positioned and, combined with the other constraints mentioned, Farnborough is going to continue to be very limited in design flexibility.

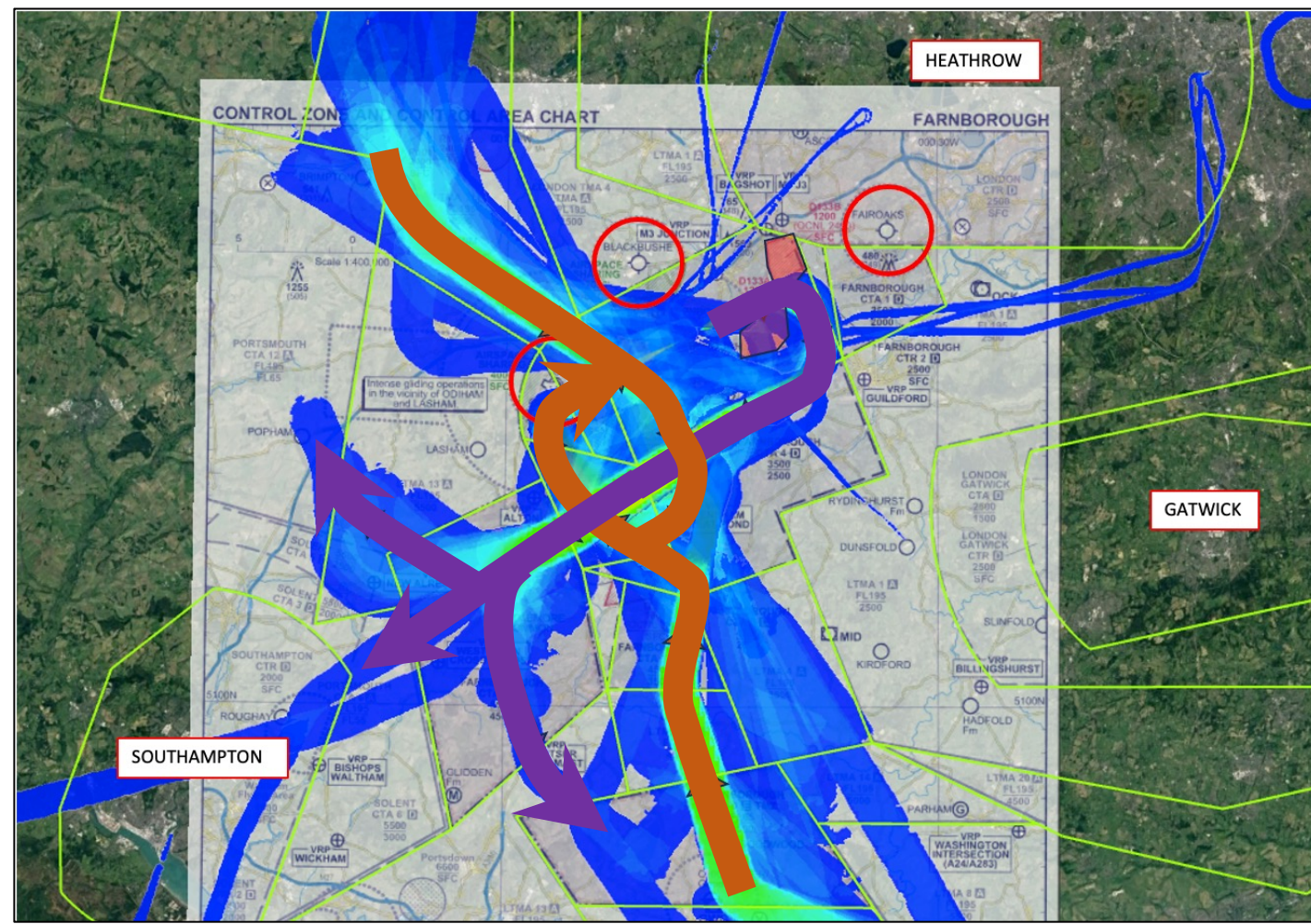




# Farnborough overflight patterns (easterlies)

This image represents typical overflight patterns on a busy day of easterly operations to/from Farnborough up to 7000ft above ground level (agl).

Period	Percentage of Movements
	<b>Runway 06</b>
Long Term Average (2018-2022)	26%

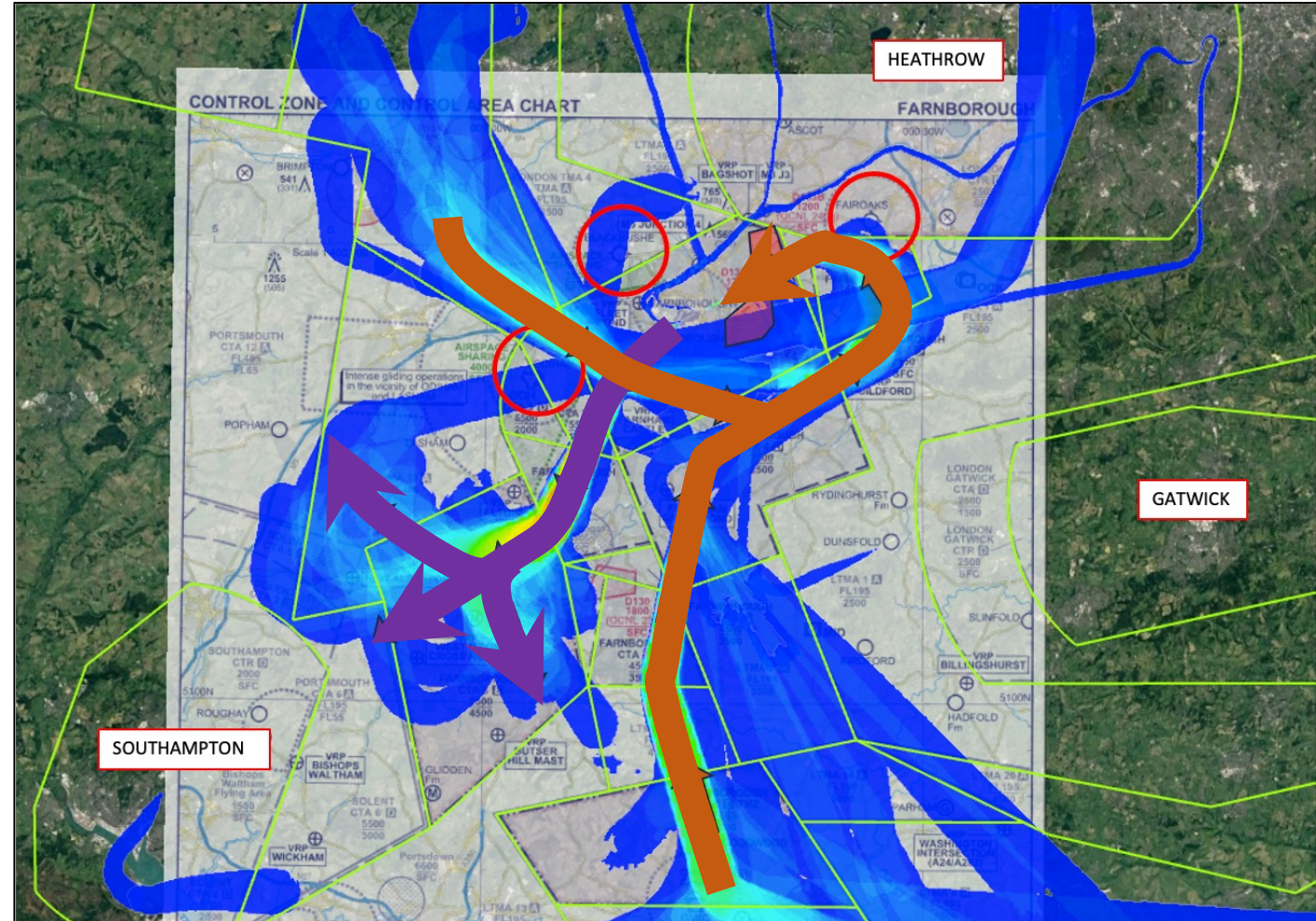


ARRIVALS →  
 DEPARTURES →

# Farnborough overflight patterns (westerlies)

This image represents typical overflight patterns on a busy day of westerly operations to/from Farnborough up to 7000ft agl.

Period	Percentage of Movements
Runway 24	
Long Term Average (2018-2022)	74%



ARRIVALS →  
DEPARTURES →

# Farnborough's Air Traffic Movements

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 CAP1616 process cannot be used to change this movement cap.**

The airport have 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.

Our baselines must take 'due consideration of known or anticipated factors that might affect them' and therefore the following slides include information for both the event of a successful and unsuccessful planning application.

Our baselines 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 which we currently consider a comparable timeframe for this ACP.

**There are no dependencies between the Planning Application and this ACP or vice-versa.**

# Farnborough's Air Traffic Movements

**Table 6-1 – Summer Day Aircraft Movements (16<sup>th</sup> June – 15<sup>th</sup> Sep inc.)**

Aircraft Type	Aircraft Movements						
	2022	2031 Without	2040 Without	2045 Without	2031 With	2040 With	2045 With
Helicopters	316	476	498	472	584	724	657
Turboprop	707	926	471	558	1,138	1,094	968
Business Jets	8,096	10,592	12,074	11,222	13,000	16,975	15,217
Large Business Jets	176	397	495	472	379	496	479
Zero Emission Aircraft	0	67	1,019	2,416	88	1,732	3,709
<b>Total</b>	<b>9,295</b>	<b>12,457</b>	<b>14,557</b>	<b>15,139</b>	<b>15,189</b>	<b>21,021</b>	<b>21,030</b>

**Table 6-2 – Summer Non-Weekday Aircraft Movements (16<sup>th</sup> June – 15<sup>th</sup> Sep inc.)**

Aircraft Type	Aircraft Movements						
	2022	2031 Without	2040 Without	2045 Without	2031 With	2040 With	2045 With
Helicopters	32	116	87	81	161	200	179
Turboprop	66	54	54	54	284	257	224
Business Jets	1,735	2,487	2,337	2,131	3,582	4,675	4,188
Large Business Jets	51	96	87	87	96	119	116
Zero Emission Aircraft	0	9	176	394	24	478	1,024
<b>Total</b>	<b>1,884</b>	<b>2,761</b>	<b>2,740</b>	<b>2,746</b>	<b>4,146</b>	<b>5,728</b>	<b>5,731</b>

**Table 6-3 – Annual Daytime Aircraft Movements (07:00 to 18:59)**

Aircraft Type	Aircraft Movements						
	2022	2031 Without	2040 Without	2045 Without	2031 With	2040 With	2045 With
Helicopters	806	1,458	1,528	1,446	1,804	2,230	2,021
Turboprop	1,790	1,772	360	630	2,565	2,293	1,904
Business Jets	26,803	32,603	37,205	34,561	40,109	52,409	46,952
Large Business Jets	315	834	1,139	1,067	834	1,142	1,088
Zero Emission Aircraft	0	208	3,163	7,500	272	5,375	11,512
<b>Total</b>	<b>29,714</b>	<b>36,875</b>	<b>43,395</b>	<b>45,203</b>	<b>45,584</b>	<b>63,449</b>	<b>63,477</b>

**Table 6-4 – Annual Evening Aircraft Movements (19:00 to 22:59\*)**

Aircraft Type	Aircraft Movements						
	2022	2031 Without	2040 Without	2045 Without	2031 With	2040 With	2045 With
Helicopters	69	152	162	154	186	230	209
Turboprop	59	198	40	70	265	237	196
Business Jets	2,700	3,407	3,935	3,659	4,141	5,411	4,848
Large Business Jets	56	86	121	113	86	118	112
Zero Emission Aircraft	0	22	337	800	28	555	1,188
<b>Total</b>	<b>2,884</b>	<b>3,865</b>	<b>4,595</b>	<b>4,797</b>	<b>4,706</b>	<b>6,551</b>	<b>6,553</b>

\*Farnborough Airport is open until 22:00, but for data purposes evening is until 22:59

# Farnborough's Air Traffic Movements

Table 3-7 – 2022 Average Daily Movements

Period	Average Daily Movements
Annual	93
Summer	101

Between April 2022 and March 2023:

Peak movements in a Day	189
Average movements per hour	6-7
Peak movements in an Hour	26

Should Farnborough planning application be successful, we **would not** expect to see the *peak* hourly or *peak* daily movements increase from those shown above. However, we **would** expect to see increases in the the *average* daily and hourly movements.

It is these peak hourly movements that the airspace design needs to be able to handle in the most operationally and environmentally efficient manner.

For more in-depth information on our forecast movements including noise contours information and fleet-mix changes for the with and without planning approval please see the following documents on the [Rushmoor Borough Council website](#):

**Movement Forecasts:** *Appendix 8.2 air noise part 1 of 4*

**Noise contours and counts:** *Appendix 8.2 air noise part 3 of 4*

**Fleet Mix Forecasts:** *Appendix 2.3 fleet mix*

**Indicative Aircraft Types:** *Appendix 2.2 indicative aircraft types*



# Farnborough's Air Noise Noise Footprint

**Table 7-1 – Summer Day Air Noise, Contour Areas**

Summer Contour L <sub>Aeq,16h</sub>	Contour Area, km <sup>2</sup>						
	2022	2031 Without	2040 Without	2045 Without	2031 With	2040 With	2045 With
51 dB (LOAEL)	7.0	7.9	7.5	7.1	9.4	10.0	9.2

**Table 7-6 – Summer Non-Weekday Air Noise, Contour Areas**

Summer Contour L <sub>Aeq,16h</sub>	Contour Area, km <sup>2</sup>						
	2022	2031 Without	2040 Without	2045 Without	2031 With	2040 With	2045 With
51 dB (LOAEL)	5.3	6.2	5.0	4.7	8.6	9.1	8.4

**Table 7-2 – Summer Day Air Noise, Population Excluding Committed**

Summer Contour L <sub>Aeq,16h</sub>	Population Excluding Committed Developments						
	2022	2031 Without	2040 Without	2045 Without	2031 With	2040 With	2045 With
51 dB (LOAEL)	4,350	5,900	5,500	5,300	7,300	7,600	7,100

**Table 7-7 – Summer Non-Weekday Air Noise, Population Excluding Committed**

Summer Contour L <sub>Aeq,16h</sub>	Population Excluding Committed Developments						
	2022	2031 Without	2040 Without	2045 Without	2031 With	2040 With	2045 With
51 dB (LOAEL)	2,550	3,750	2,950	2,550	6,900	7,000	6,700

**Table 7-4 – Summer Day Air Noise, Population Including Committed**

Summer Contour L <sub>Aeq,16h</sub>	Population Including Committed Developments						
	2022	2031 Without	2040 Without	2045 Without	2031 With	2040 With	2045 With
51 dB (LOAEL)	4,350	6,200	5,800	5,600	7,550	7,900	7,350

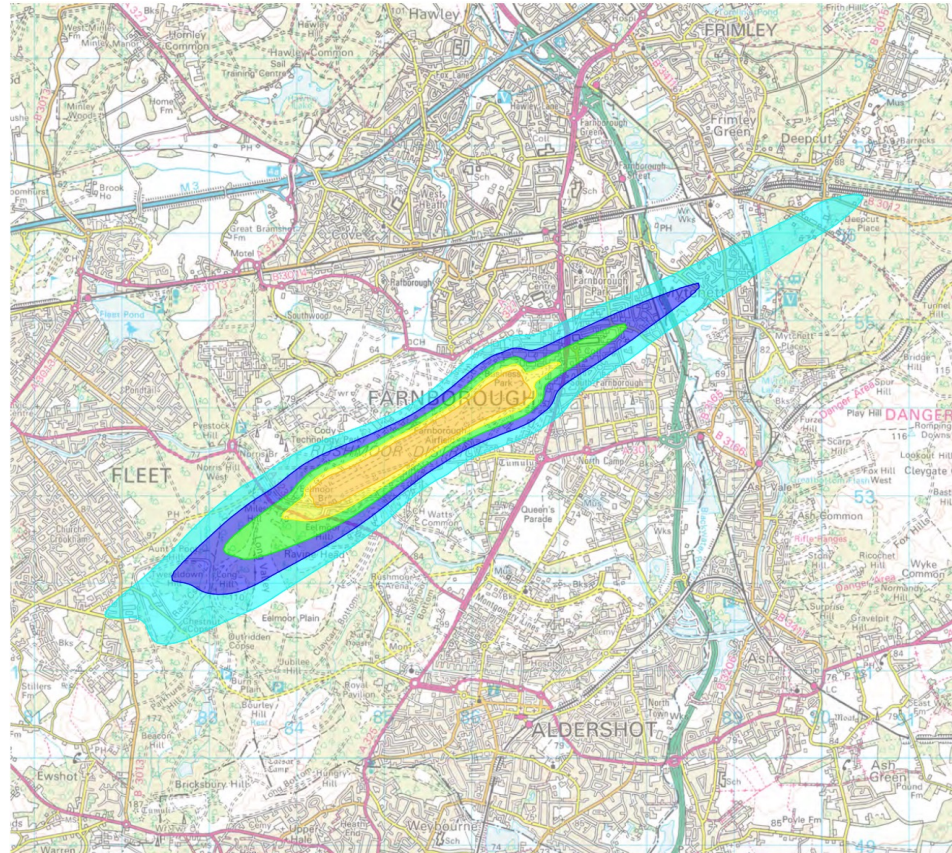
**Table 7-9 – Summer Non-Weekday Air Noise, Population Including Committed**

Summer Contour L <sub>Aeq,16h</sub>	Population Including Committed Developments						
	2022	2031 Without	2040 Without	2045 Without	2031 With	2040 With	2045 With
51 dB (LOAEL)	2,550	3,750	2,950	2,550	7,200	7,300	6,950

The following slides show the forecast 51dB LOAEL Daytime weekday (07:00 – 22:59) contours for 2031 and 2040 with and without planning approval scenarios. There are no night (23:00-06:59) movements at Farnborough.

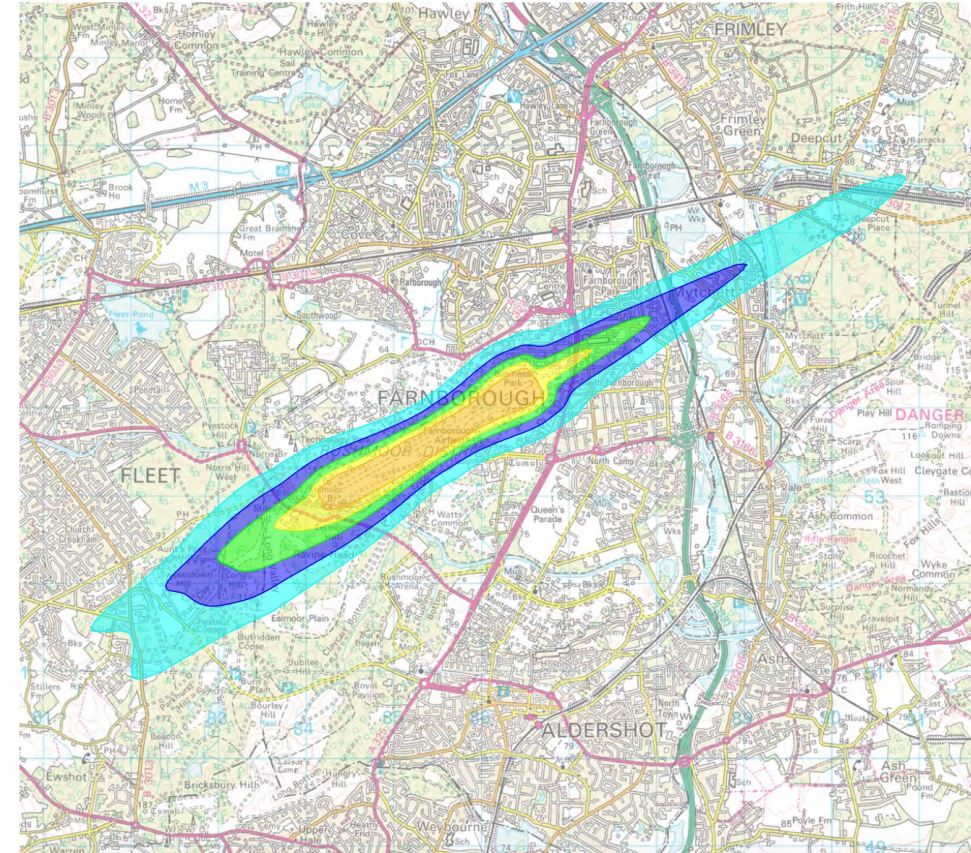
# Farnborough's Air Noise Noise Footprint

2031 DAY **without** Planning Approval to increase movement cap



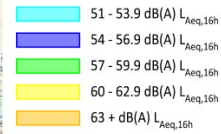
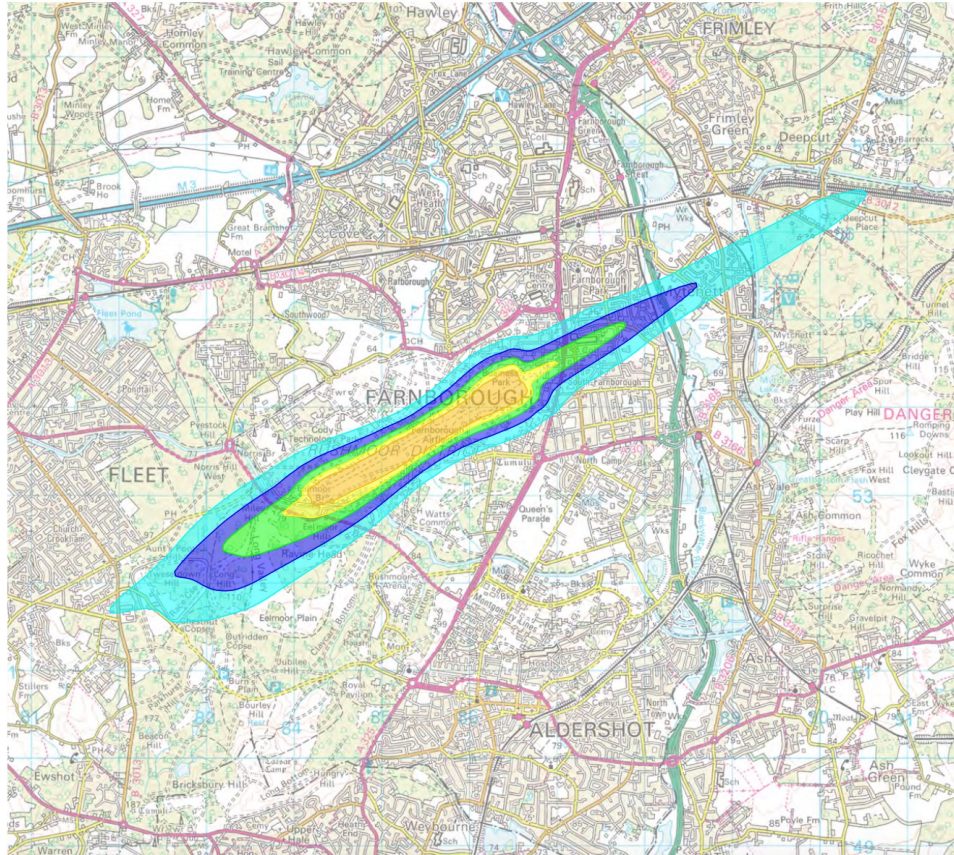
- 51 - 53.9 dB(A) L<sub>Aeq,16h</sub>
- 54 - 56.9 dB(A) L<sub>Aeq,16h</sub>
- 57 - 59.9 dB(A) L<sub>Aeq,16h</sub>
- 60 - 62.9 dB(A) L<sub>Aeq,16h</sub>
- 63 + dB(A) L<sub>Aeq,16h</sub>

2031 DAY **with** Planning Approval to increase movement cap

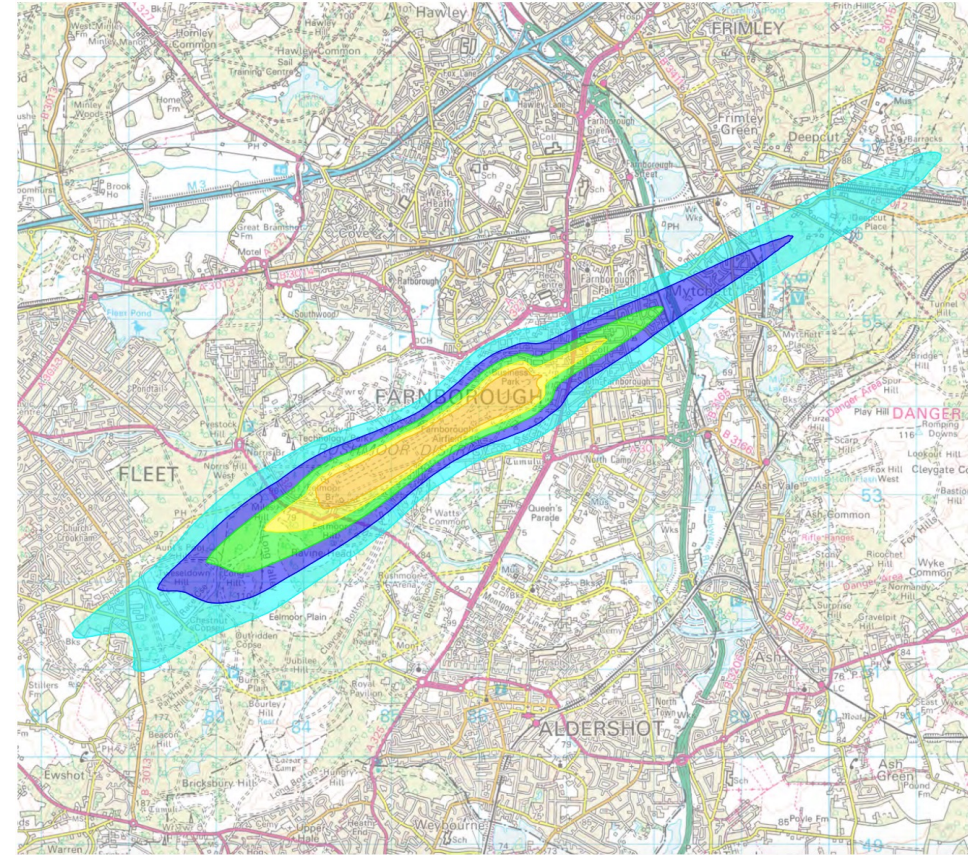


# Farnborough's Air Noise Noise Footprint

2040 DAY **without** Planning Approval to increase movement cap



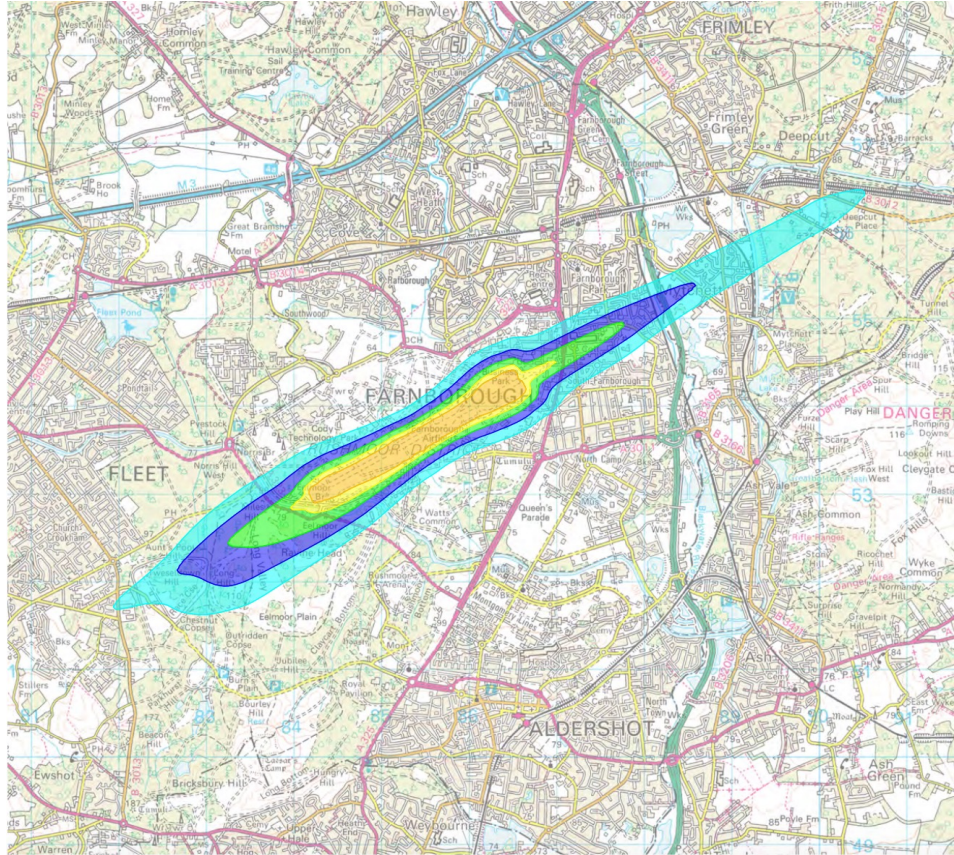
2040 DAY **with** Planning Approval to increase movement cap





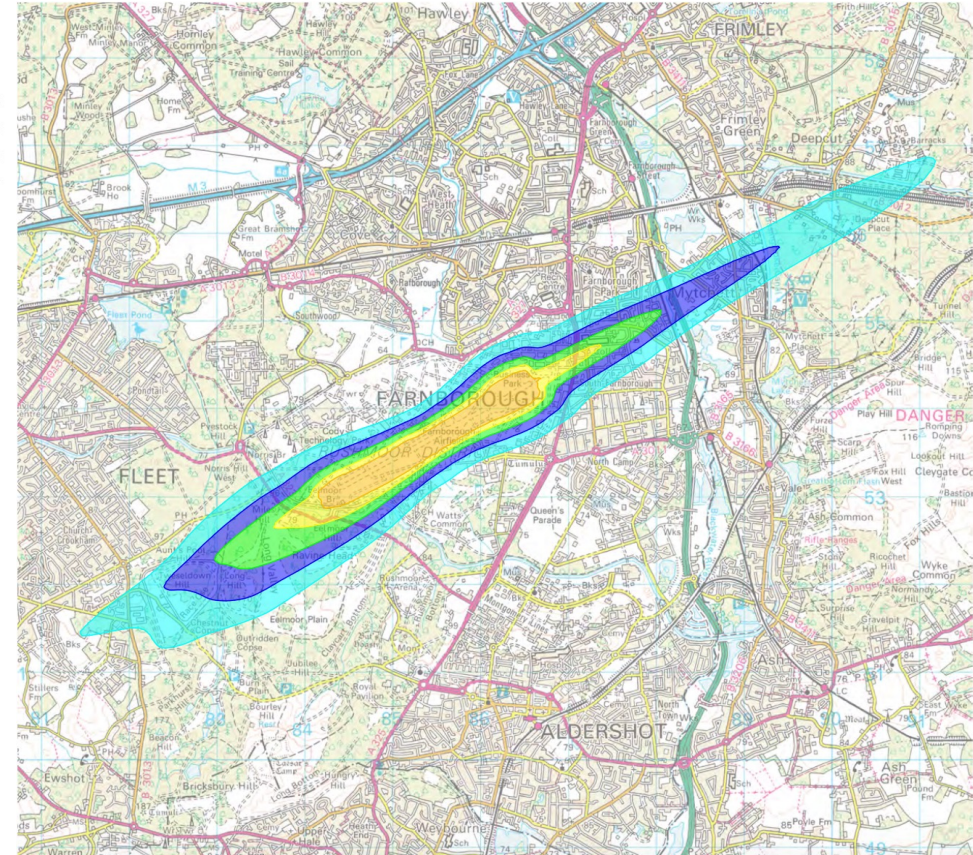
# Farnborough's Air Noise Noise Footprint

2045 DAY **without** Planning Approval to increase movement cap



- 51 - 53.9 dB(A)  $L_{Aeq,16h}$
- 54 - 56.9 dB(A)  $L_{Aeq,16h}$
- 57 - 59.9 dB(A)  $L_{Aeq,16h}$
- 60 - 62.9 dB(A)  $L_{Aeq,16h}$
- 63 + dB(A)  $L_{Aeq,16h}$

2045 DAY **with** Planning Approval to increase movement cap



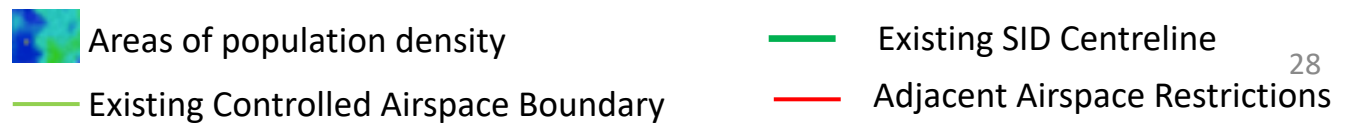
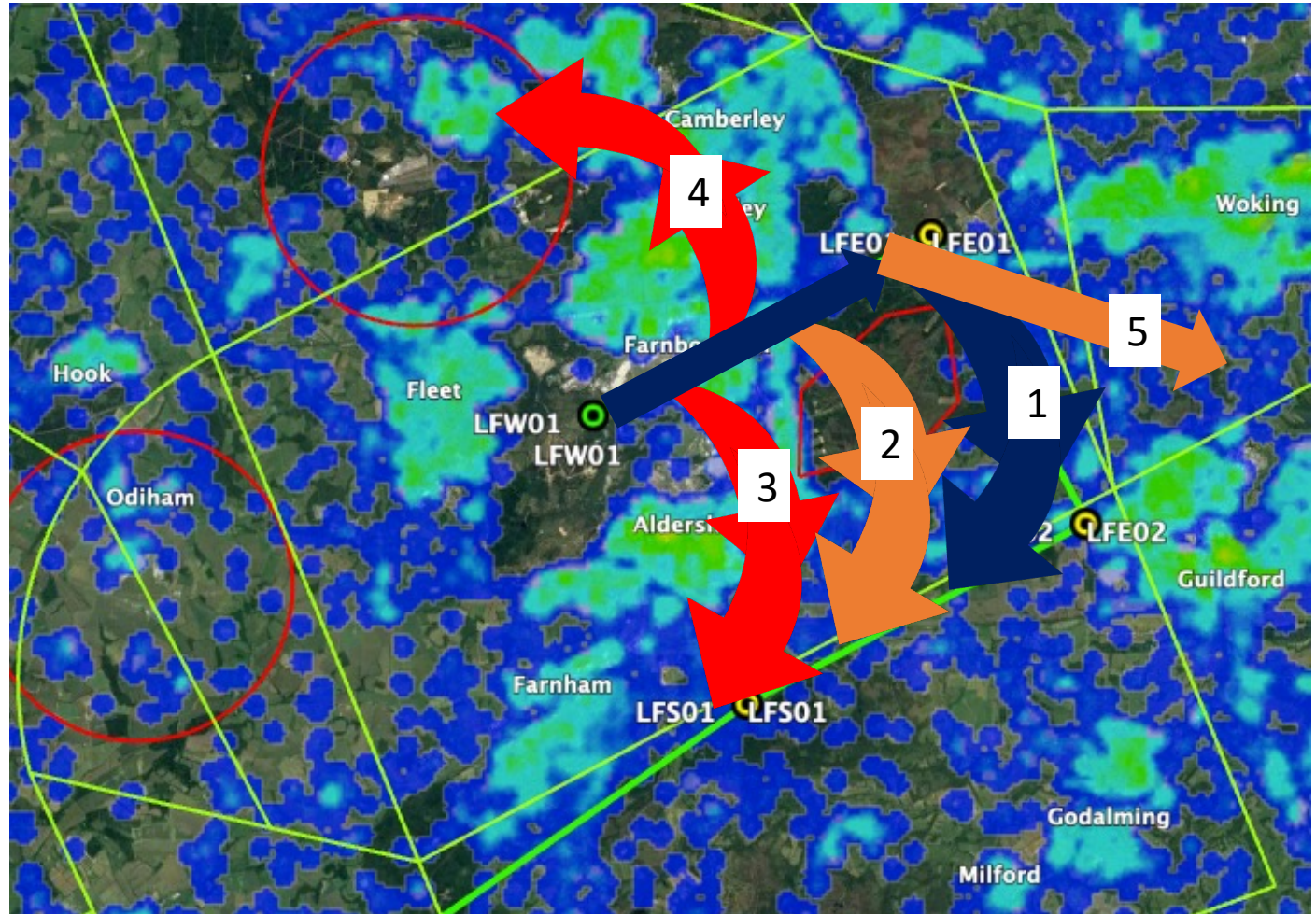
# Questions?

# Examples of scenarios investigated for viability

# RWY 06 First turn departure options

- 1. Turn as today (Do Nothing)
- 2. Right turn over D132
- 3. Immediate right turn  
Not possible within PANS OPS
- 4. Immediate left turn wraparound to follow A331/M3 where possible.  
Not possible within PANS OPS. PANS Ops compliant version requires 15% CG to stay inside CAS and could not climb to above 2000ft due Heathrow
- 5. East between Woking and Guildford.  
Possible to stay inside CAS but will depend on Gatwick and Heathrow's options. Level flight at 3000ft for significant distance expected.

Images are to illustrate the concept only therefore may not be accurate



# RWY 24 First turn departure options

1. Turn as today (Do Nothing)



2. Straight ahead

22% CG required to avoid Odiham



3. Right turn towards Hook.

20% CG required to stay inside CAS

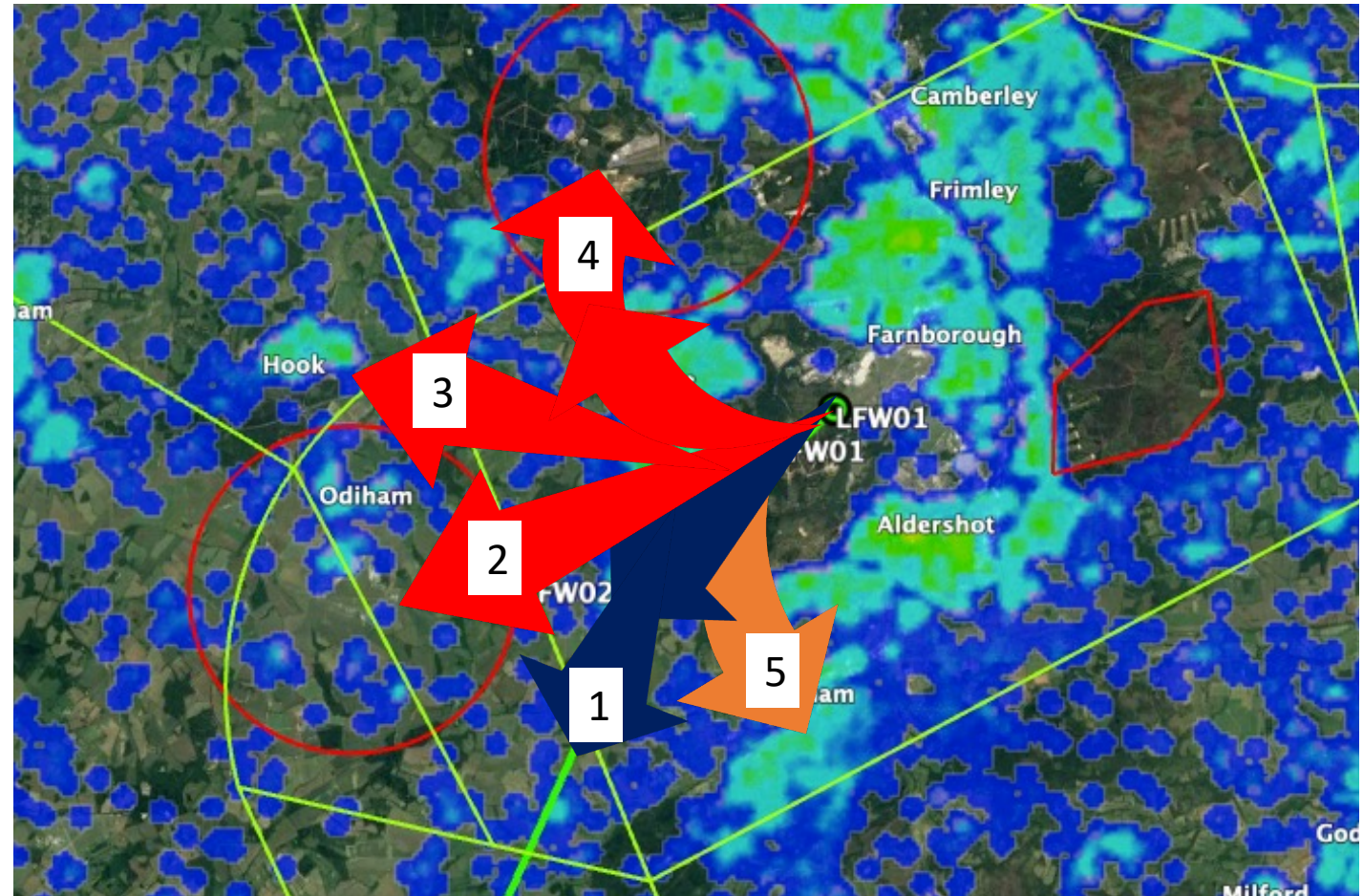


4. Right turn wrap around.

15% CG required to stay inside CAS and could not climb above 2000ft due Heathrow



5. Immediate left turn



Images are to illustrate the concept only therefore may not be accurate



Areas of population density



Existing Controlled Airspace Boundary



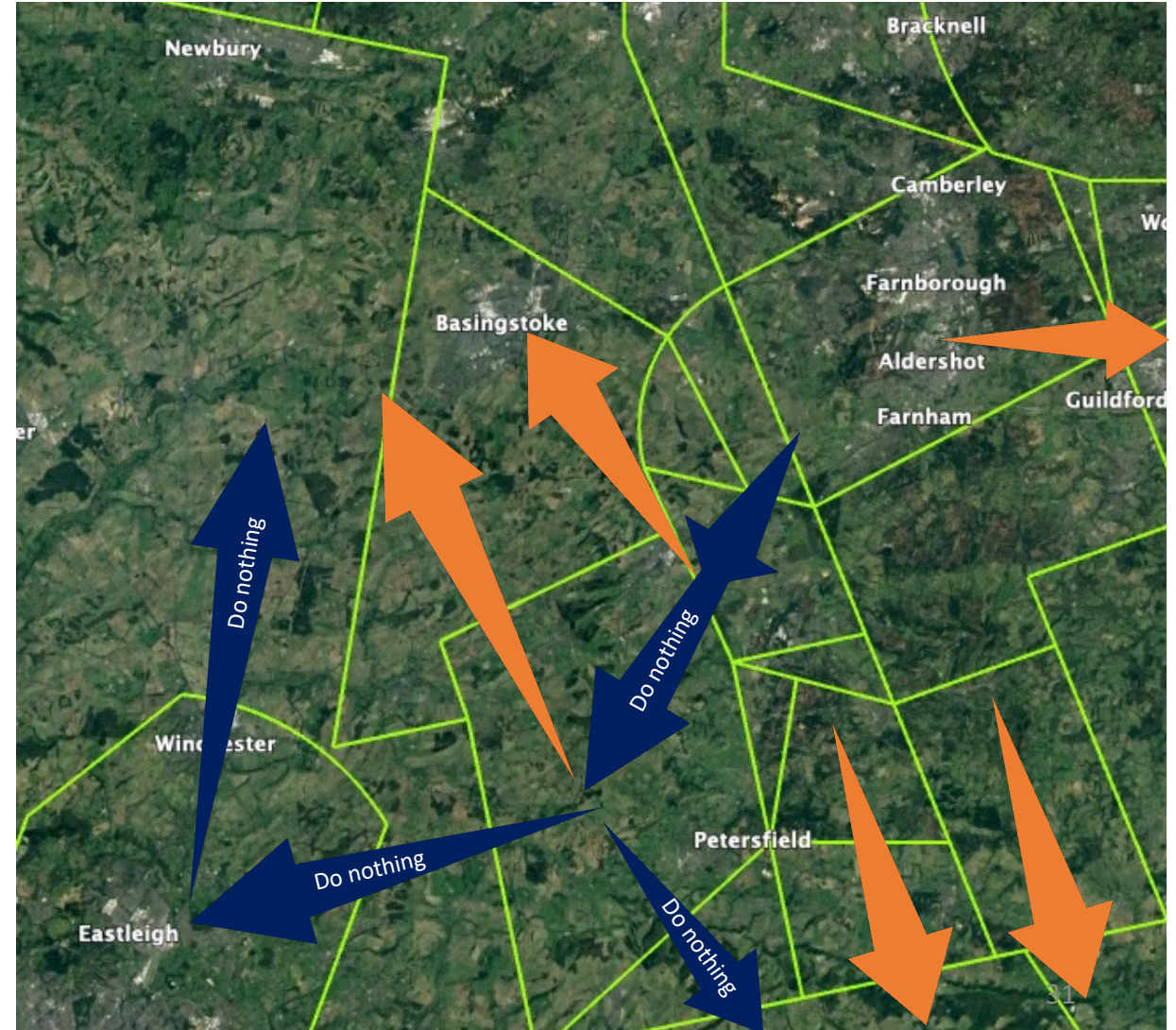
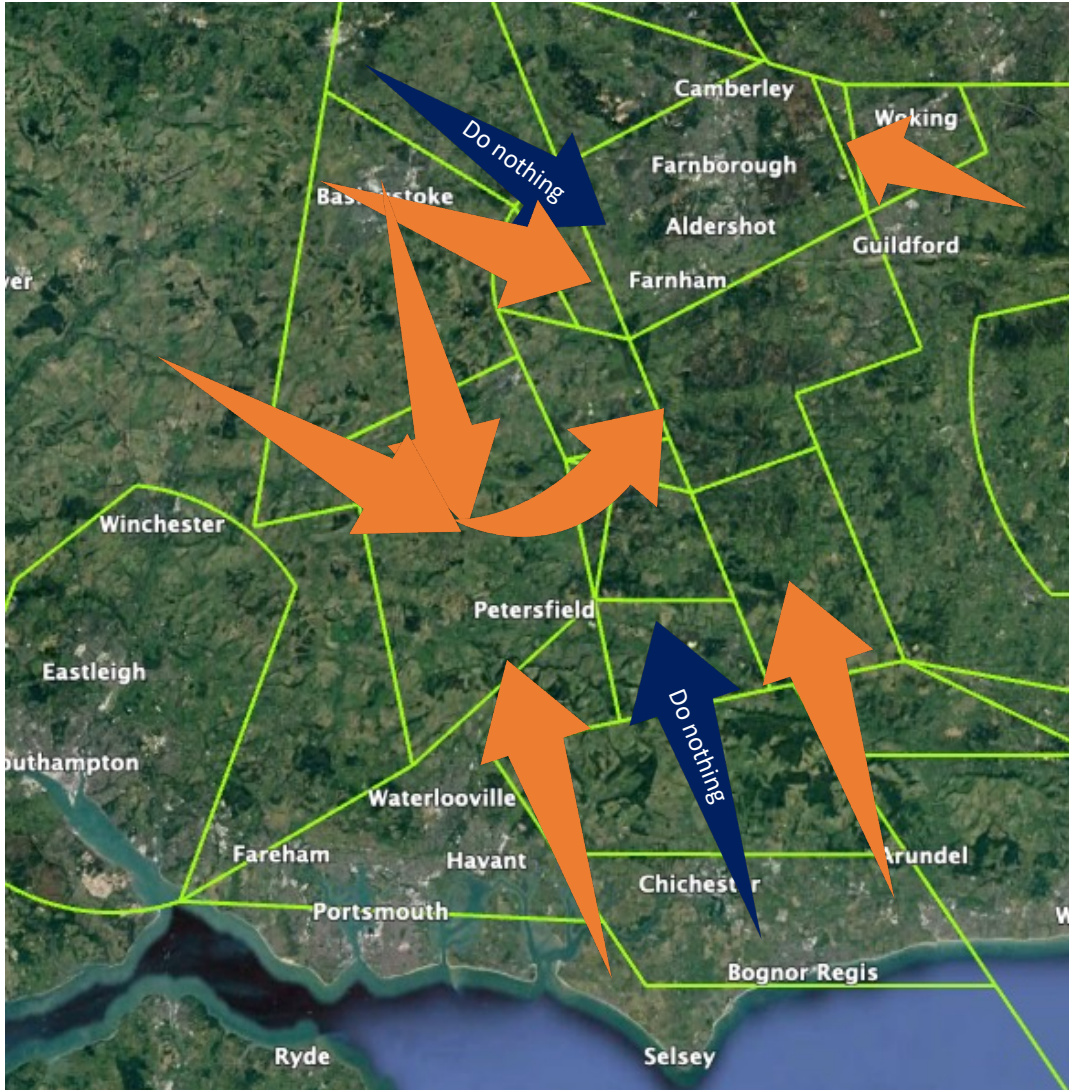
Existing SID Centreline



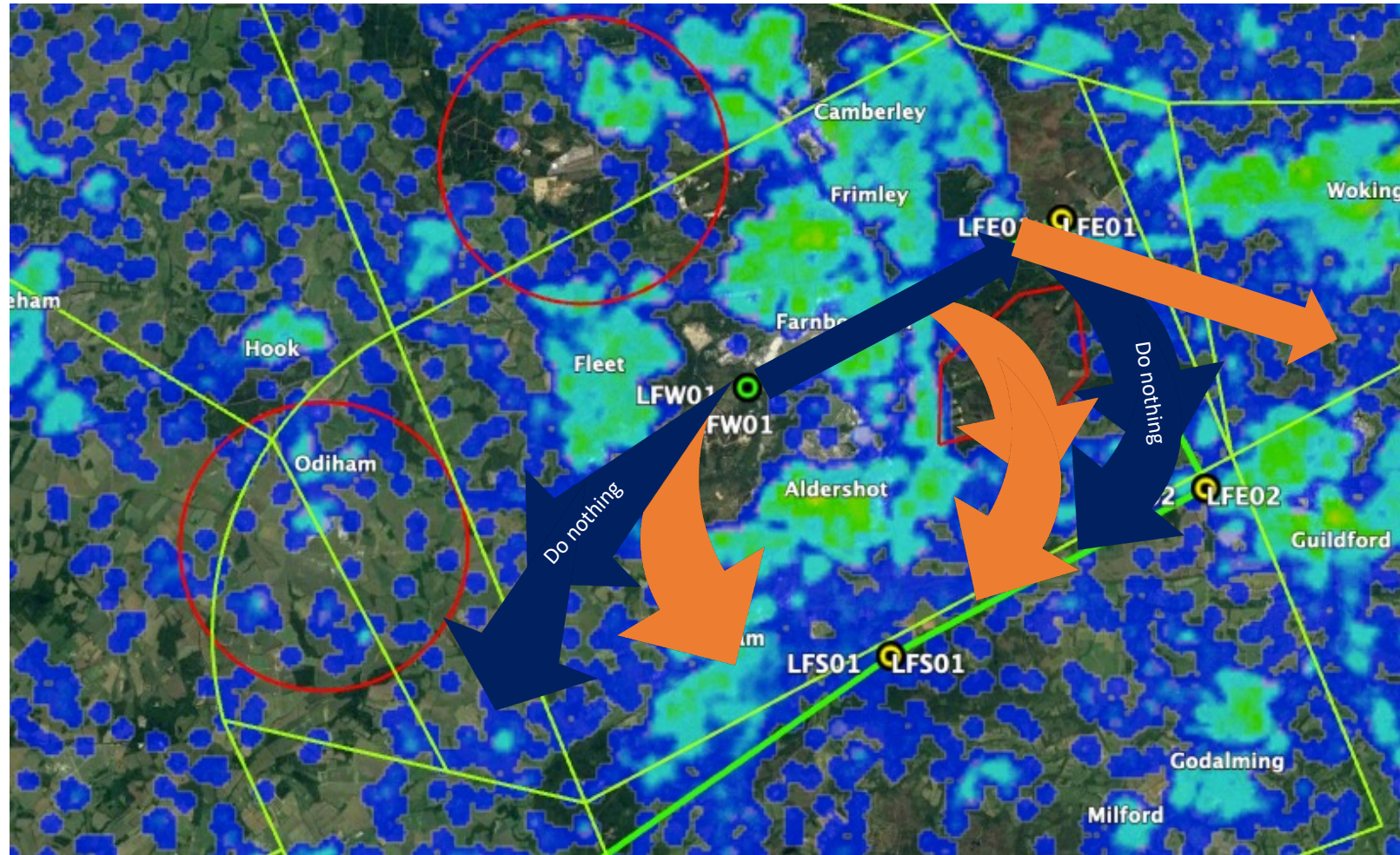
Adjacent Airspace Restrictions/Considerations

# Overview of technically viable scenarios



# Network arrival and departure route options



# First turn departure options



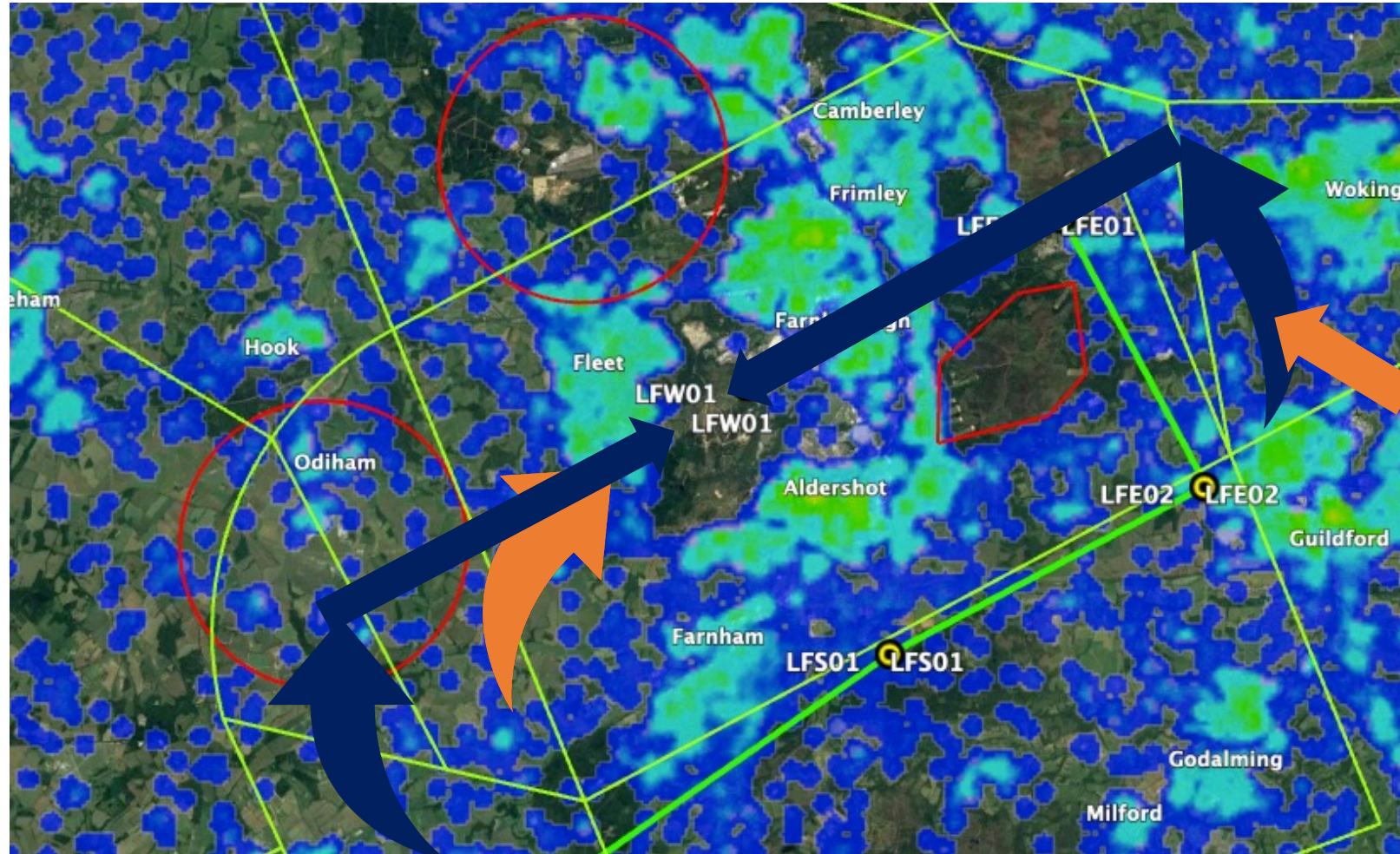
Images are to illustrate the concept only therefore may not be accurate

-  Areas of population density
-  Existing Controlled Airspace Boundary







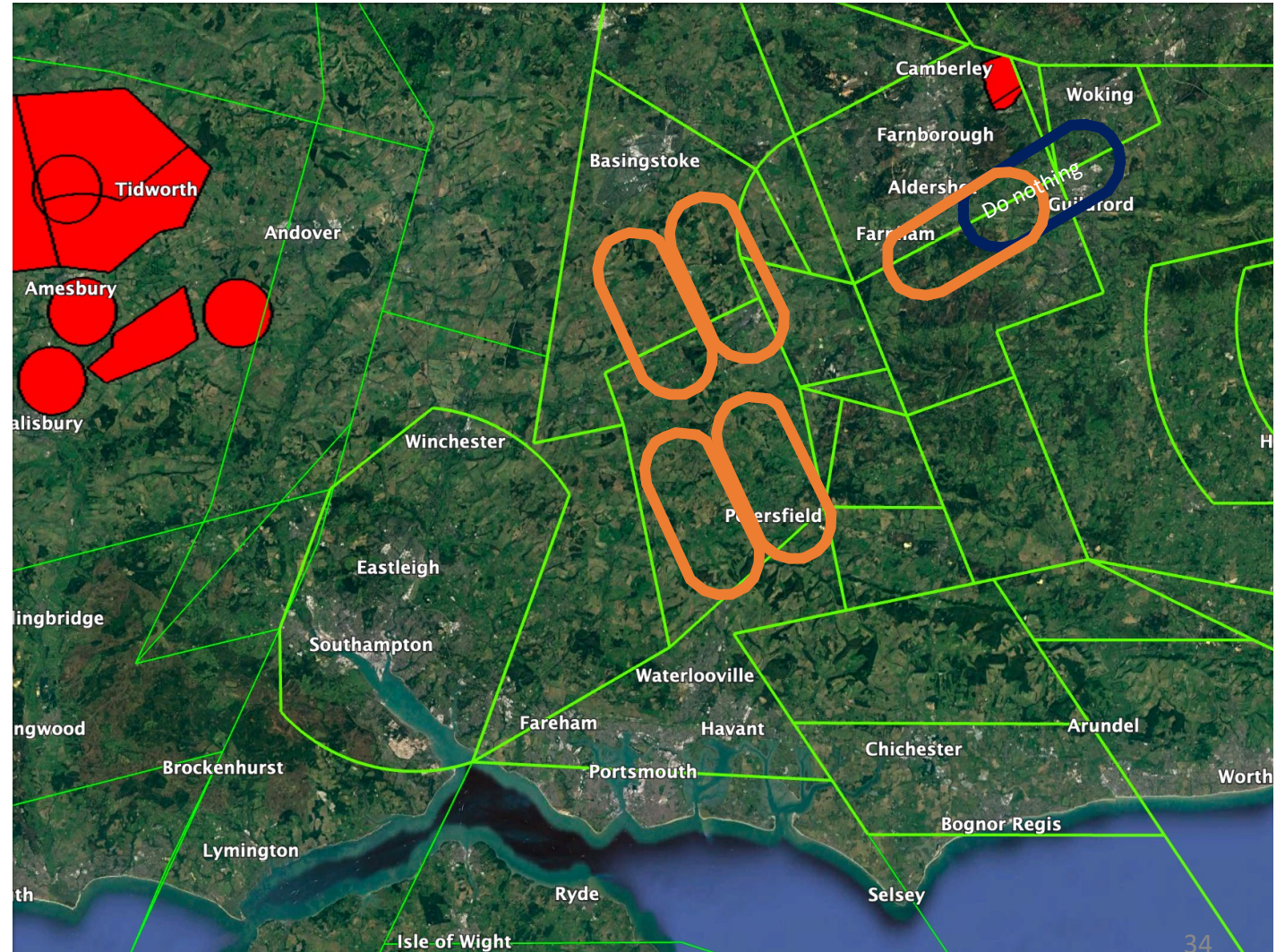
# Transition to Final Approach Options



Images are to illustrate the concept only therefore may not be accurate

-  Areas of population density
-  Existing Controlled Airspace Boundary

# Contingency hold options



Images are to illustrate the concept only  
therefore may not be accurate

# Questions?

# Illustrative System Options

# Illustrative System Options

We then generated **illustrative** system options (our initial Comprehensive List) that aim to align with our design principles.

A system option is a group of easterly and westerly arrival and departure routes that can work in combination.

Each system option builds in the scale of change from existing traffic flows.

Final Design Principles	
1	Must be as safe or safer than today for all stakeholders that are affected by the airspace change*  <i>(*We will set out our methodology for assessing this in Stage 2 with a view to using data e.g., flight density plots outside CAS/volume nm<sup>3</sup> of CAS, to support other qualitative assessments.)</i>
2	Accord with: <ul style="list-style-type: none"> <li>a) the CAA's published airspace modernisation strategy (CAP1711) and any current or future plans associated with it,</li> <li>b) Air Navigation Guidance 2017 &amp; other relevant policy and legislations</li> </ul>
3	Shall not constrain the ability to meet forecast demand for Farnborough Airport
4	Improve vertical profiles compared to the baseline published SID/STAR levels, to enable: <ul style="list-style-type: none"> <li>a) a reduction in population numbers affected by noise,</li> <li>b) a reduction in CO<sub>2</sub> emissions per flight from Farnborough aircraft,</li> <li>c) a reduction in the volume and where possible, complexity of Farnborough Airport's CAS,</li> <li>d) a reduction in the reliance on tactical intervention</li> </ul>
5	Aim to remove dependencies with adjacent ATC units and minimise impacts on other airspace users
6	Where lateral changes to existing tracks are required to achieve improved environmental and operational performance, options should: <ul style="list-style-type: none"> <li>a) deliver an overall reduction in flight plannable track miles,</li> <li>b) minimise population numbers newly overflowed,</li> <li>c) avoid overflying the same communities with multiple routes to &amp; from Farnborough Airport,</li> <li>d) avoid overflying the same communities with Farnborough's routes and those routes to &amp; from other airports below 7000ft</li> </ul>
7	Make best use of Farnborough's modern aircraft fleet capabilities
8	Ensure that Farnborough Clutch airways traffic can still be accommodated, as a result of the changes

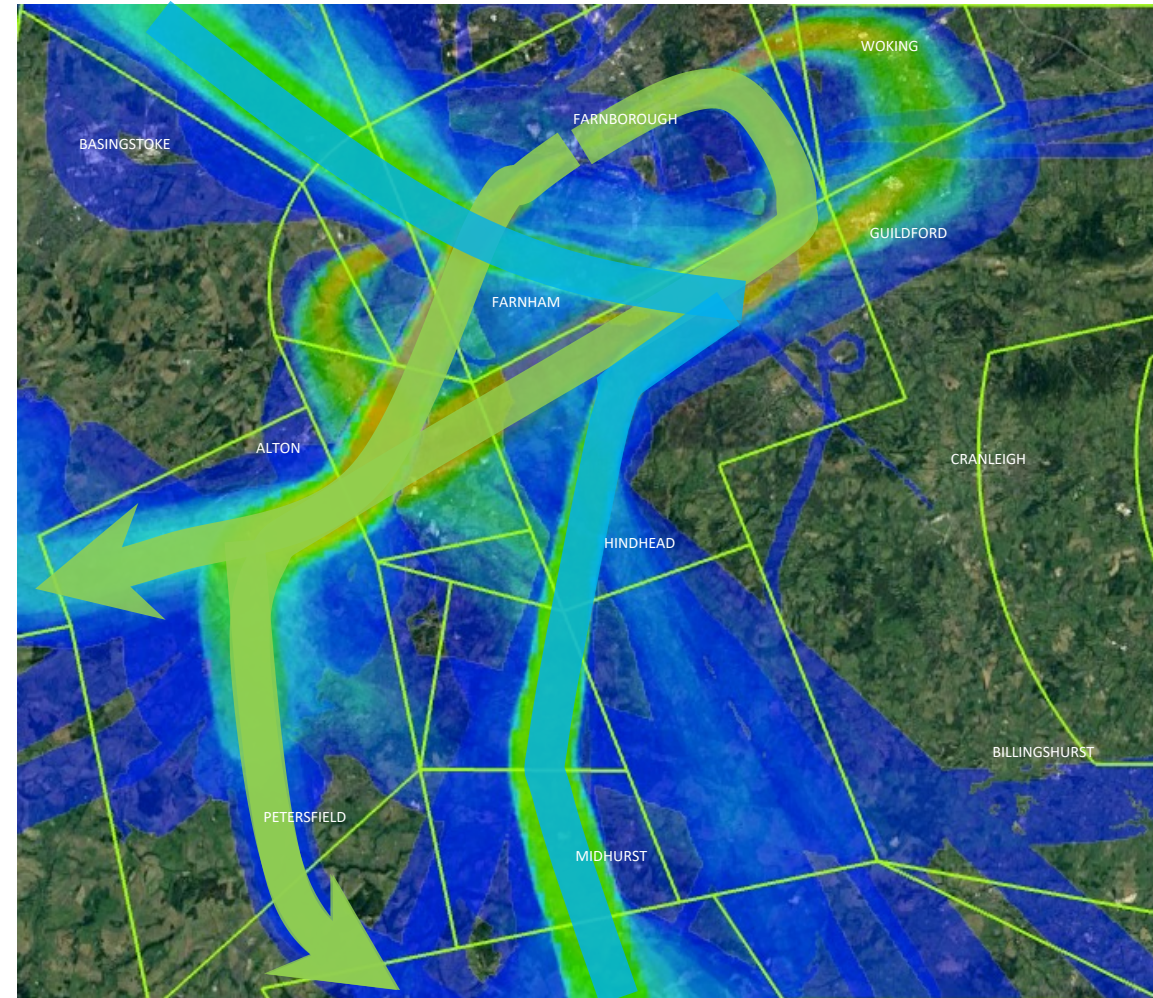
# Option 1 (Do Nothing)

# Do Nothing

Maintains a high level of tactical intervention with all arrivals being vectored to final approach.

ATC intervention required to deconflict arrivals and departures.

Lack of airspace for contingency holding closer to airfield.



# Option 2

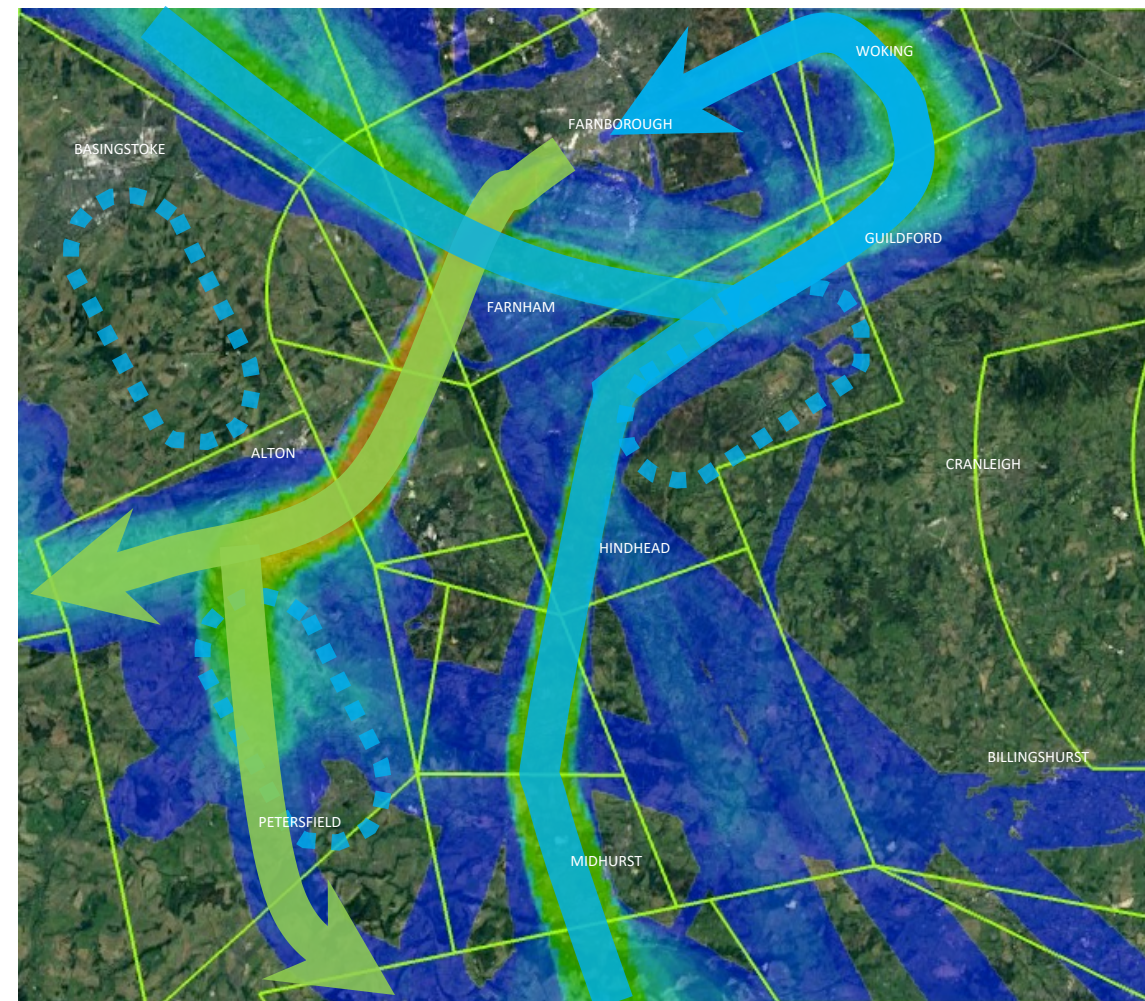




# Illustrative System Option 2 RWY24

The lateral SID and STAR profiles remain as today (unless required to change as a result of wider network changes) but with enhancement to procedural and/or tactical profiles, enabled by wider LTMA changes only. Possible upgrade to higher PBN specification if there is benefit of doing so.

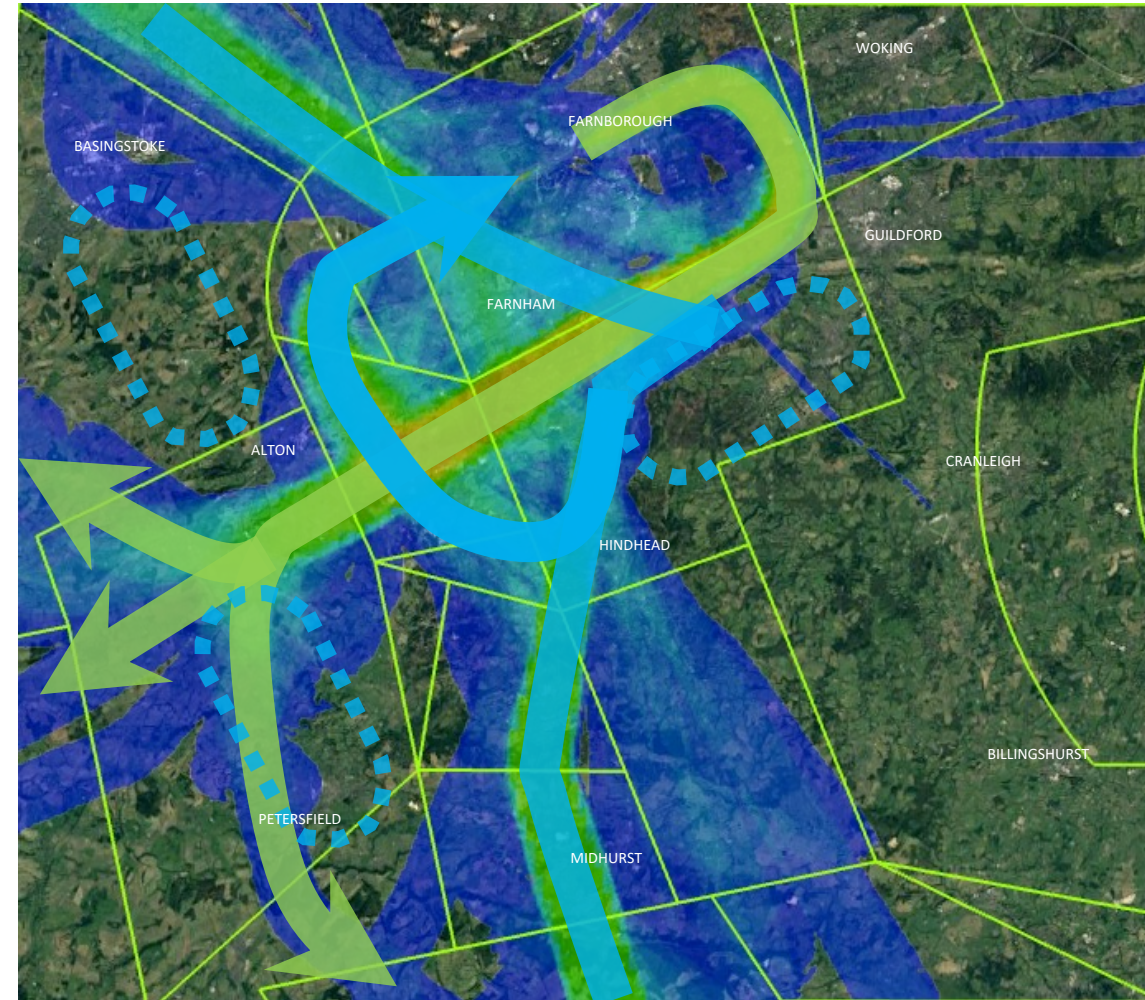
A contingency hold to the South, West or Southwest added together with PBN transitions to final approach (ILS and RNP APCH, if possible).



# Illustrative System Option 2 RWY06

The SIDs and STARs remain as today (unless required to change as a result of wider network changes) but with enhancement to procedural and/or tactical profiles, enabled by wider LTMA changes only.

A contingency hold to the South, West or Southwest added together with PBN transitions to final approach (ILS and RNP APCH, if possible).



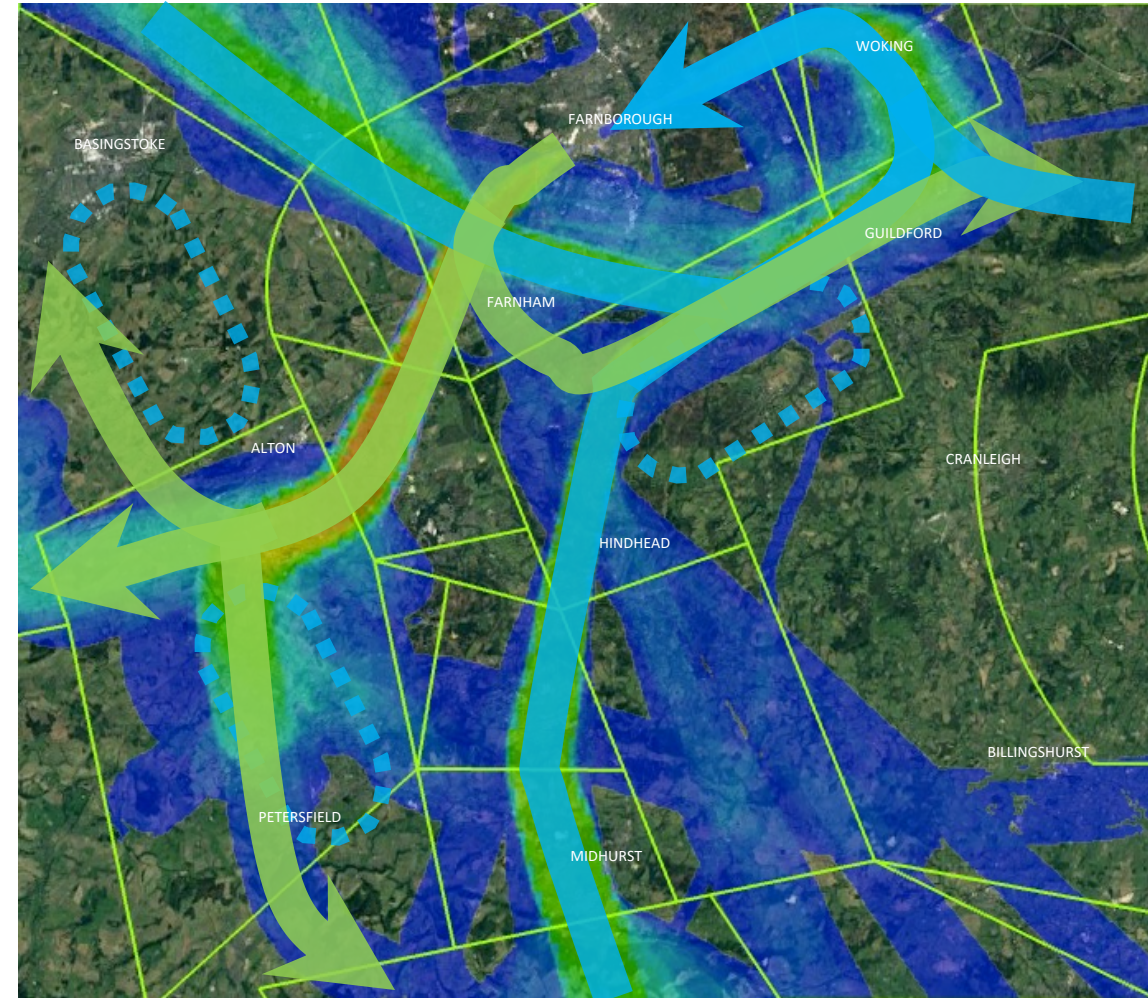
# Option 3

# Illustrative System Option 3 RWY24

A build on Option 2 but with:

The addition of a low level departure and arrival routes to/from the east for flights between Farnborough and Biggin Hill airports.

An earlier turn to the north on departures towards CPT, enabled by earlier climb as a result of wider modernisation (TBC).



# Illustrative System Option 3 RWY06

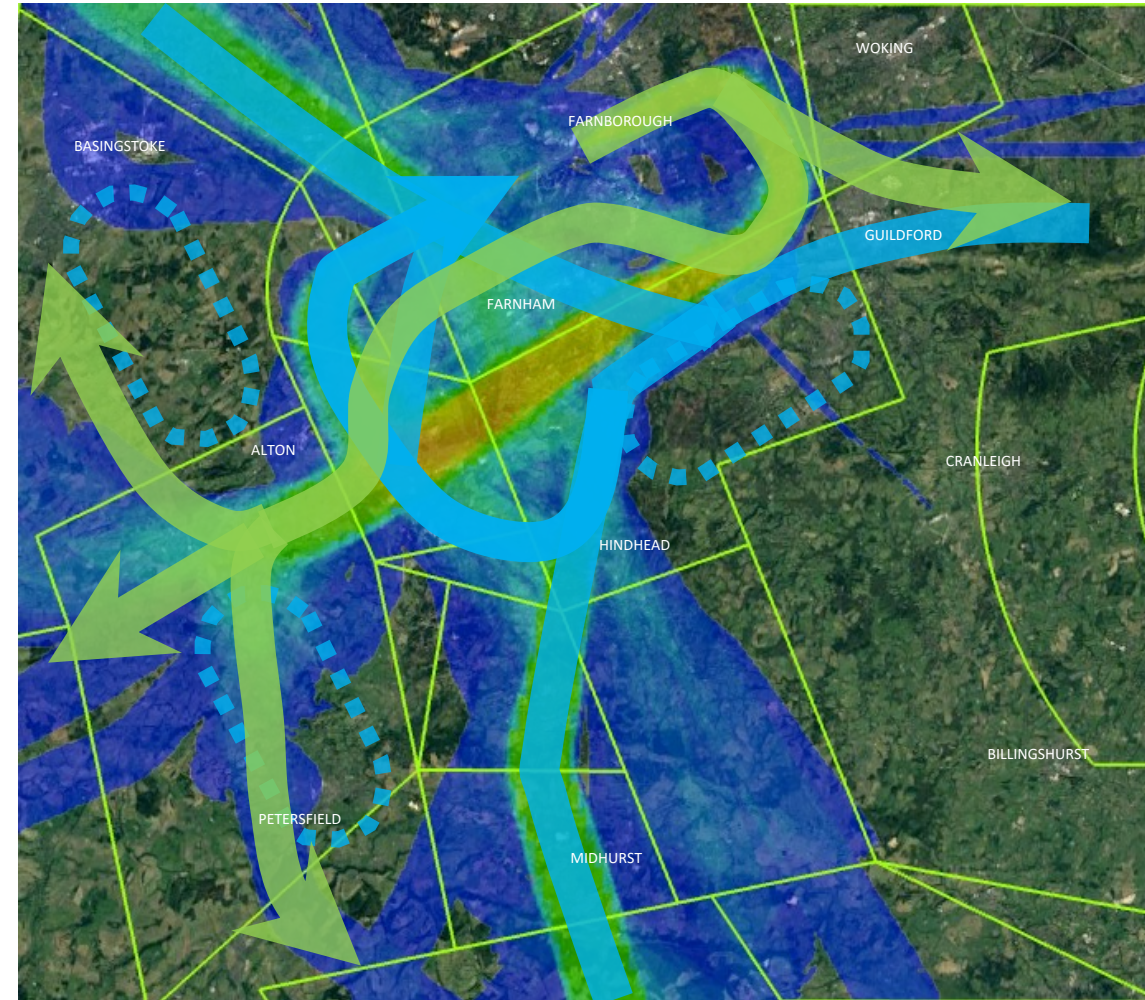
A build on Option 2 but with:

The addition of a low level departure and arrival routes to/from the east for flights to between Farnborough and Biggin Hill.

An earlier turn to the north on departures towards CPT, enabled by earlier climb as a result of wider modernisation (TBC).

The addition of an RNP-AR arrival which avoids Odiham.

A change to the RWY 06 SID south of the aerodrome to reflect where ATC vector departures today to help deconflict from arrivals.



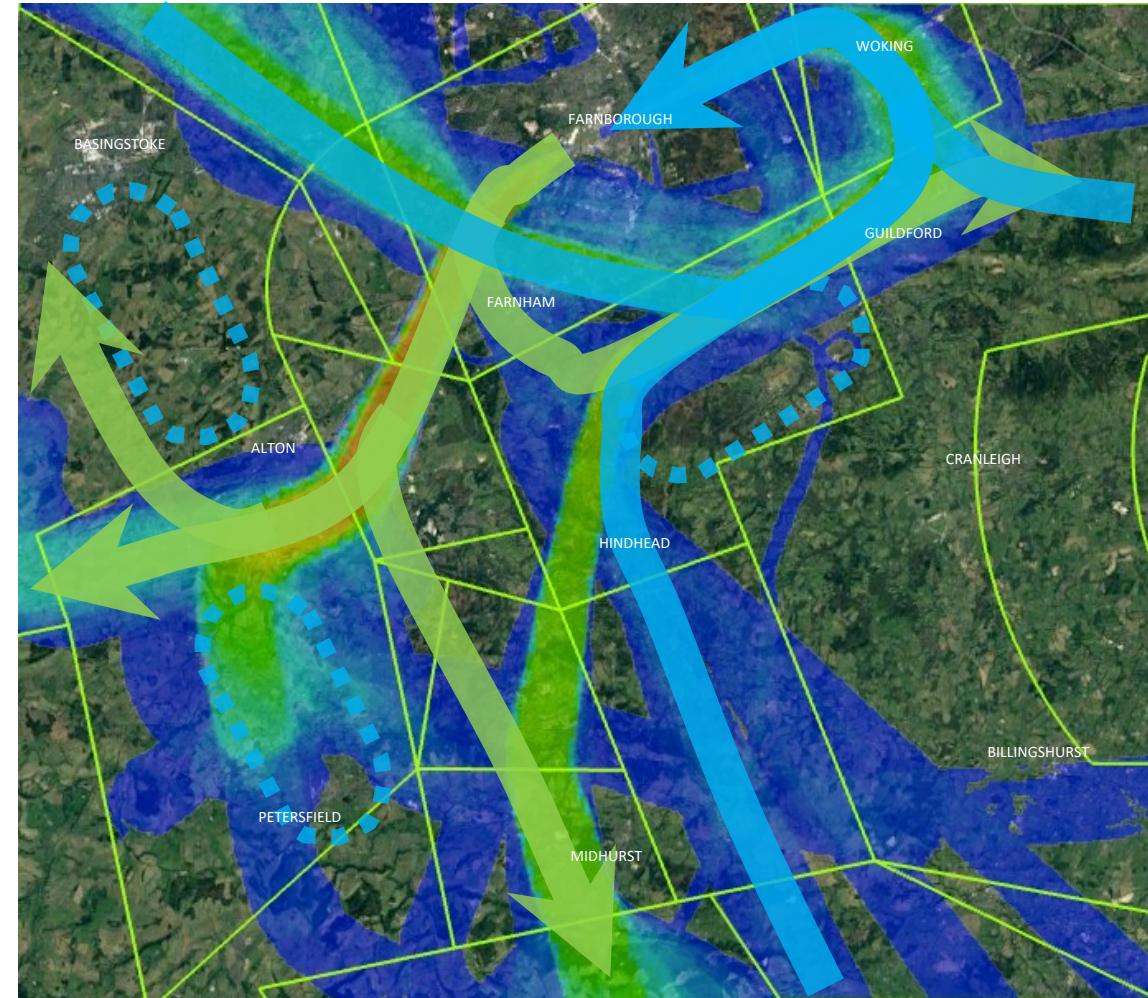
# Option 4

# Illustrative System Option 4 RWY24

A build on Option 3 but with:

More direct arrival route from the south enabled by higher PBN specification than today.

Southerly SID more direct enabled by higher PBN specification than today.



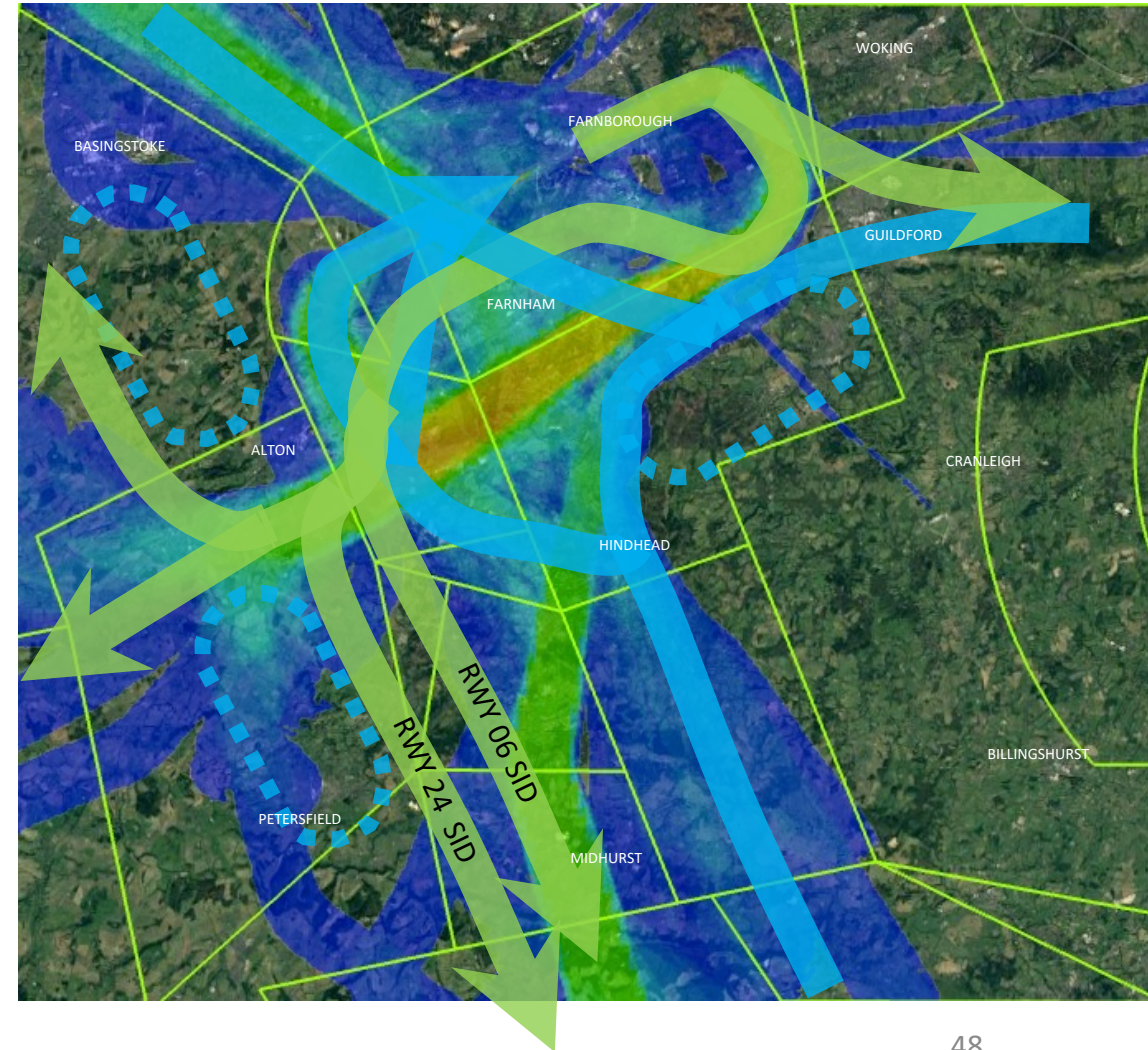
# Illustrative System Option 4 RWY06

A build on Option 3 but with:

More direct arrival route from the south enabled by higher PBN specification than today.

Southerly SID more direct enabled by higher PBN specification than today.

Southerly SID with possible different track to RWY24 SID.





# Option 5

Greater dependency on the wider FASI design

# Illustrative System Option 5 RWY24

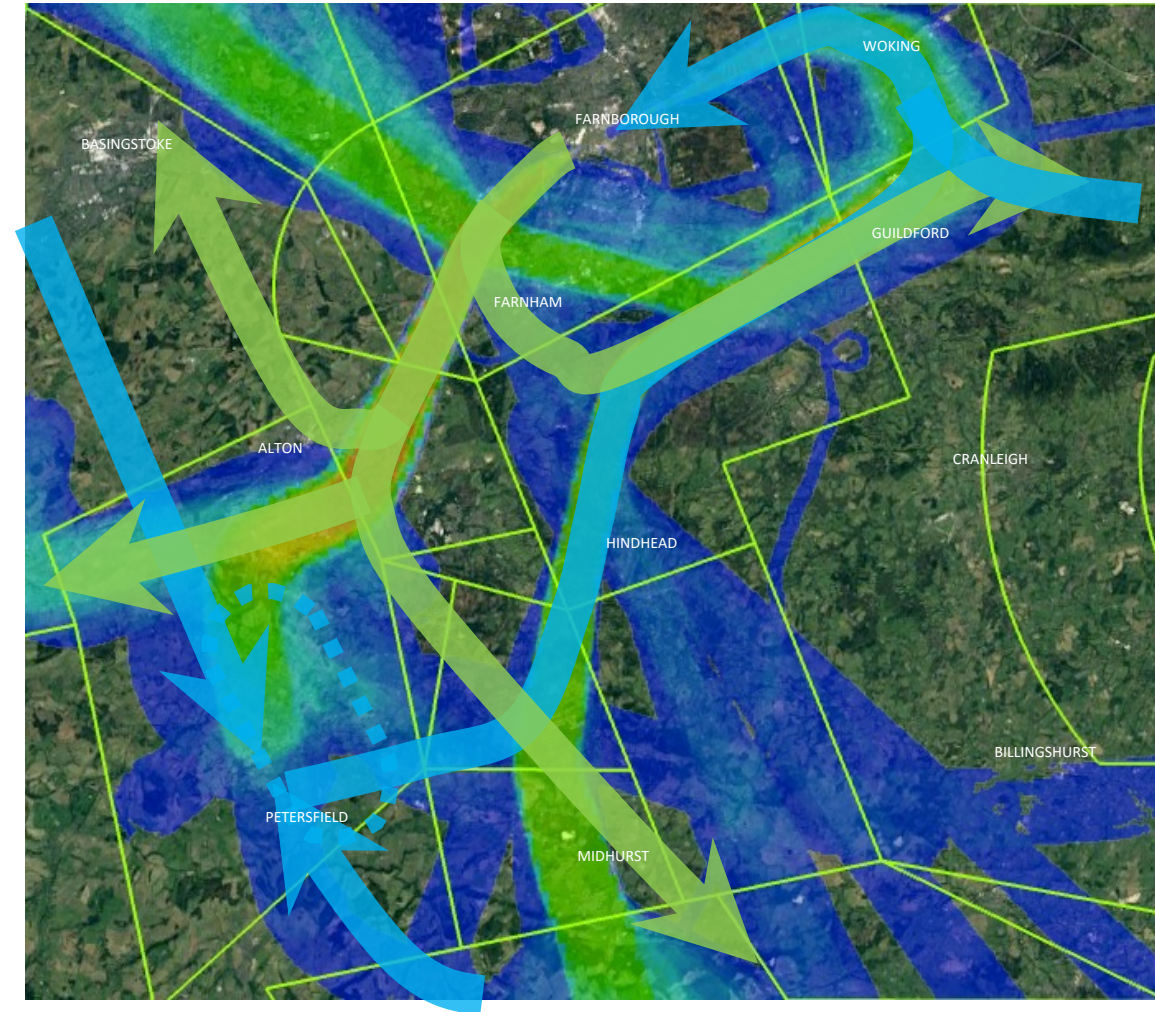
Arrival routes from north and south entering Farnborough airspace from the SW.

PBN transition to final Final approach (ILS and RNP APCH if possible).

SIDs deconflicted from departures and more direct, enabled by earlier climb as a result of wider modernisation (TBC).

Contingency hold enabled by improved profiles from Heathrow and Gatwick (TBC).

Low level arrival and departures route from/to the east for aircraft repositioning between Biggin Hill and Farnborough.



# Illustrative System Option 5 RWY06

Arrival routes from north and south entering Farnborough airspace from the SW.

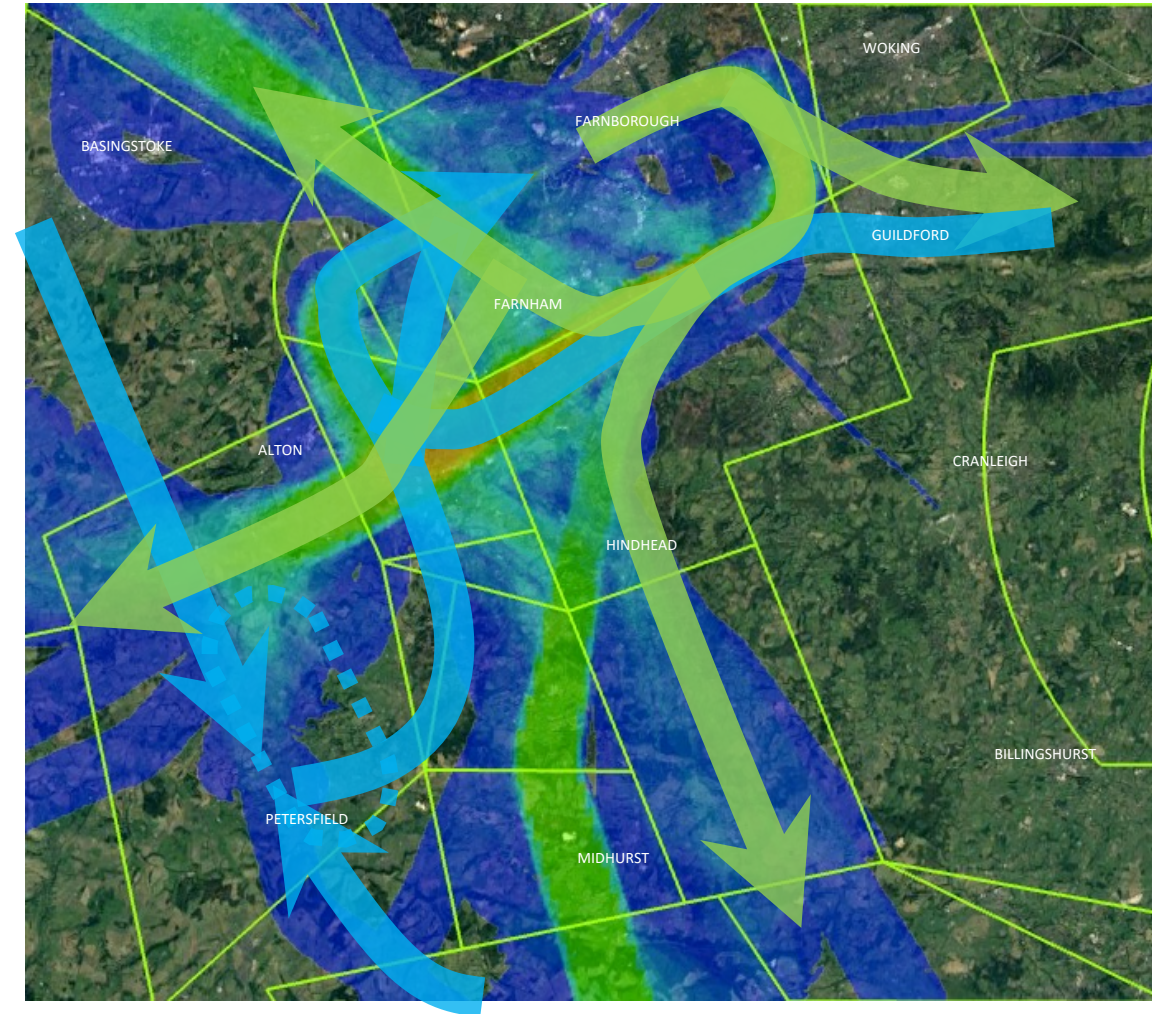
PBN transition to final Final approach (ILS and RNP APCH if possible).

The addition of an RNP-AR arrival which avoids Odiham.

SIDs deconflicted from departures and more direct, enabled by earlier climb as a result of wider modernisation (TBC).

Contingency hold enabled by improved profiles from Heathrow and Gatwick (TBC).

Low level arrival and departures route from/to the east for aircraft repositioning between Biggin Hill and Farnborough.



# Questions?

# Your Feedback

# Provide your feedback

We appreciate the first question is not the easiest to answer before we have done the Design Principle Evaluation, but this is what the process requires us to ask. Please answer the following questions via email:

**Do you think our current design options are aligned with our Statement of Need and Design Principles?**

**Are there any changes or additional options you would like us to consider?**

Please ask any questions you may have now, or alternatively you can email the team at

[fasi-s@farnboroughairport.com](mailto:fasi-s@farnboroughairport.com)

**Farnborough Airport would like to thank you for your time today and welcome your feedback on the comprehensive list of options.**

Please send your feedback on our comprehensive list of options to: [fasi-s@farnboroughairport.com](mailto:fasi-s@farnboroughairport.com)

The deadline for feedback is **Friday 26 January 2024**

# Next Steps

- We will generate illustrative PBN centrelines for our system options, which will be used to generate data to give an indication of the scale of environmental impacts and change, including changes to Controlled Airspace boundaries and therefore, potential impacts on safety for all airspace users (DP1).
- Alongside qualitative and quantitative assessments, data will be used to inform a Design Principle Evaluation and the Initial Options Appraisal.
- Owing to lack of certainty in the YOI and to keep analysis proportionate and in line with other FASI sponsors, the Initial Options Appraisal (Stage 2) will compare our options against just a 2023 baseline.
- For Full Options Appraisal (Stage 3) we will compare our options against a YOI + 10 years baseline.

Please send your feedback on our comprehensive list of options to: [fasi-s@farnboroughairport.com](mailto:fasi-s@farnboroughairport.com)

The deadline for feedback is **Friday 26 January 2024**

# Ahead of the Curve

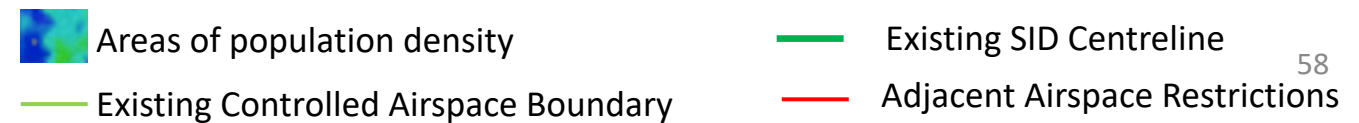
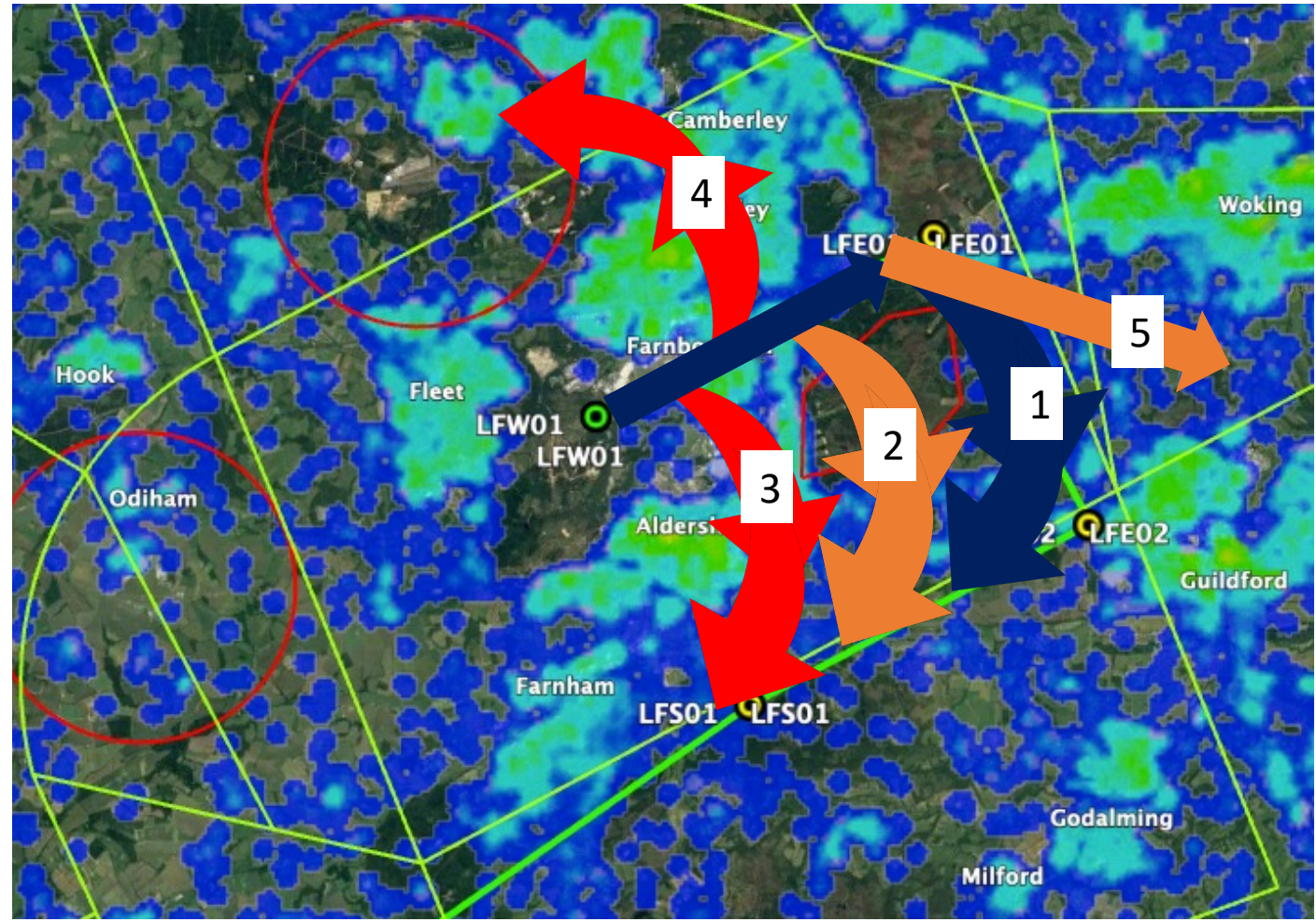


All scenarios investigated  
for viability

# RWY 06 First turn departure options

- 1. Turn as today (Do Nothing)
- 2. Right turn over D132
- 3. Immediate right turn  
Not possible within PANS OPS
- 4. Immediate left turn wraparound to follow A331/M3 where possible.  
Not possible within PANS OPS. PANS Ops compliant version requires 15% CG to stay inside CAS and could not climb to above 2000ft due Heathrow
- 5. East between Woking and Guildford.  
Possible to stay inside CAS but will depend on Gatwick and Heathrow's options. Level flight at 3000ft for significant distance expected.

Images are to illustrate the concept only therefore may not be accurate



# RWY 24 First turn departure options

1. Turn as today (Do Nothing)



2. Straight ahead

22% CG required to avoid Odiham



3. Right turn towards Hook.

20% CG required to stay inside CAS

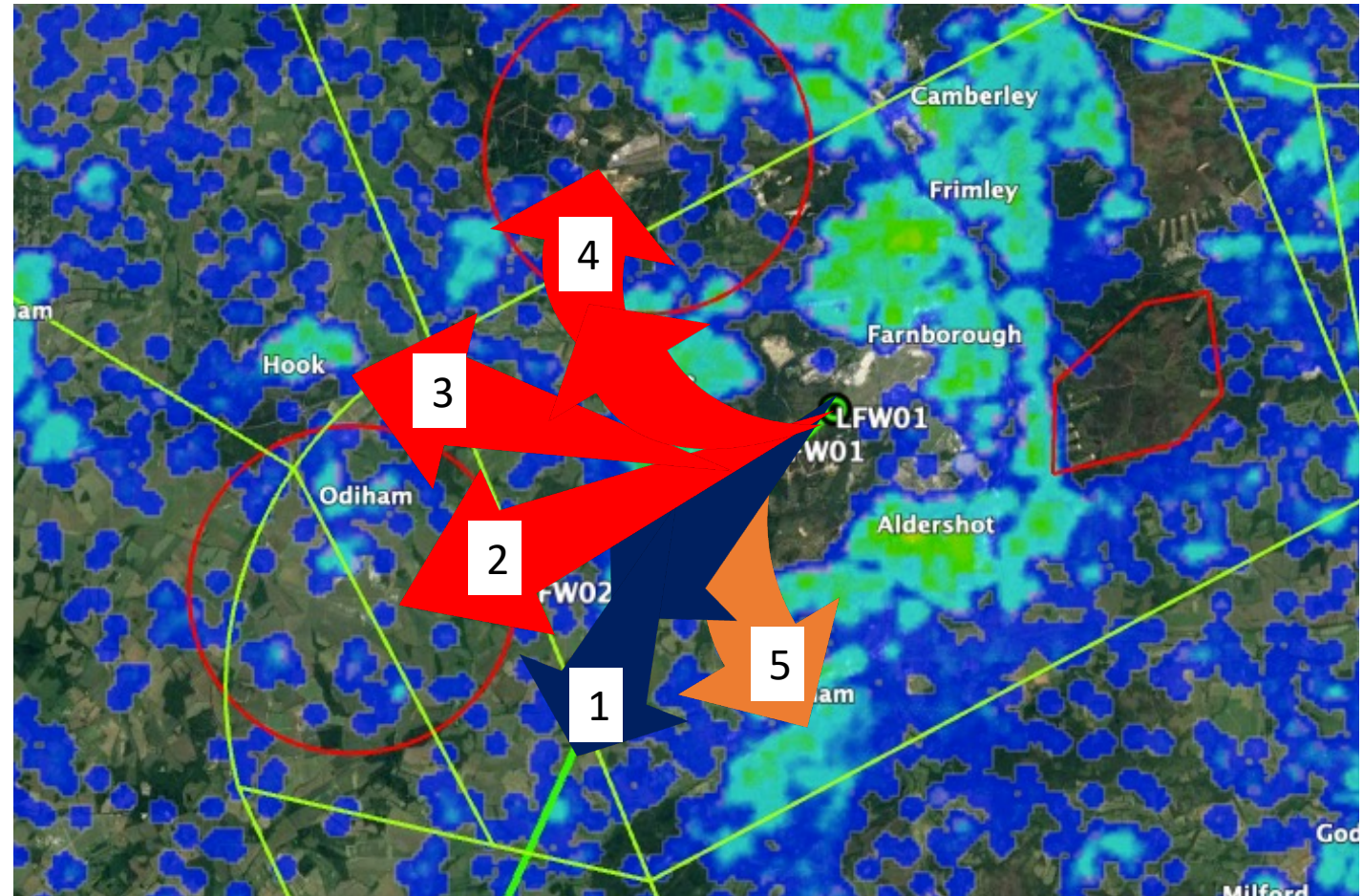


4. Right turn wrap around.

15% CG required to stay inside CAS and could not climb above 2000ft due Heathrow



5. Immediate left turn



Images are to illustrate the concept only therefore may not be accurate



Areas of population density



Existing Controlled Airspace Boundary



Existing SID Centreline



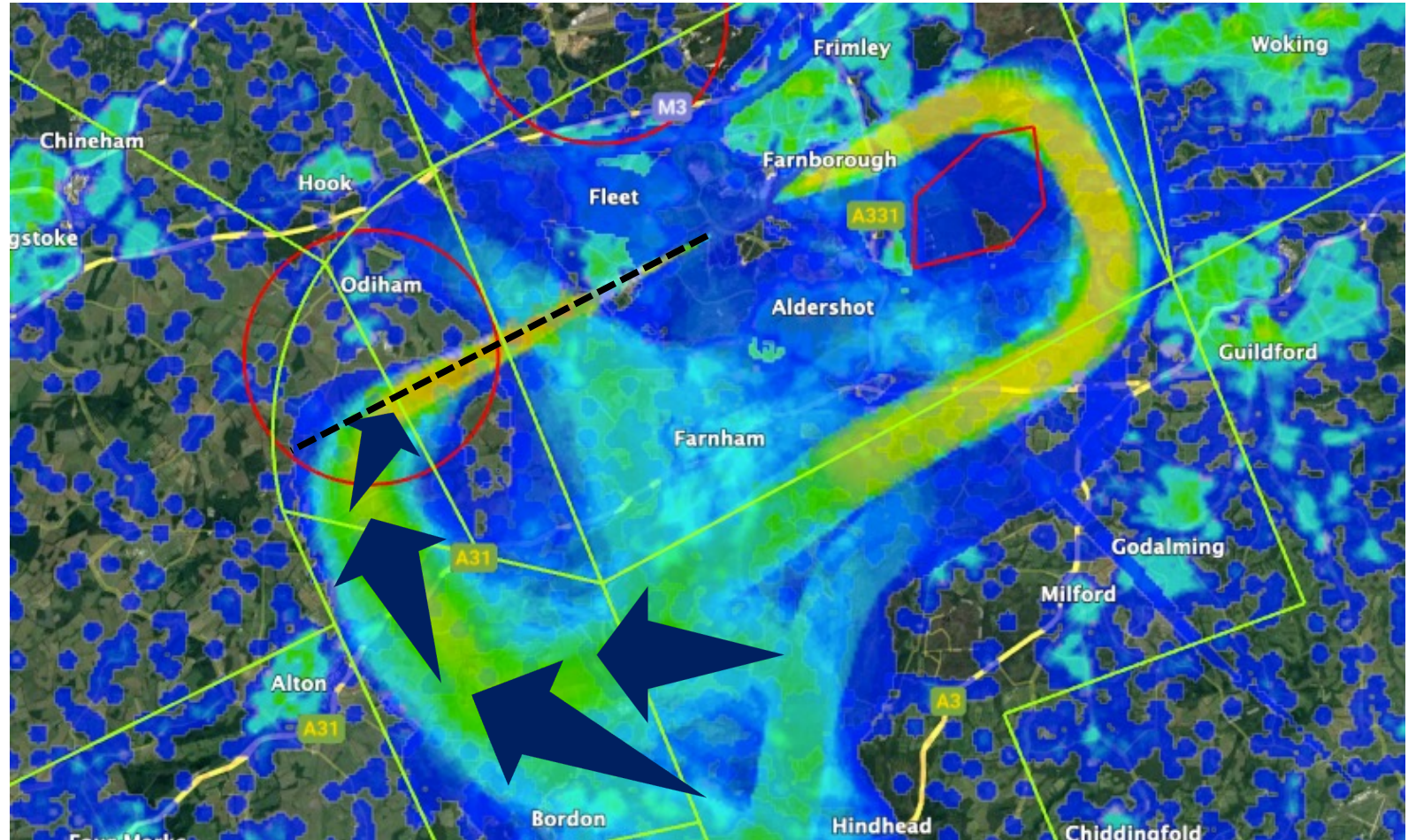
Adjacent Airspace Restrictions/Considerations

# RWY 06 Transition to final approach options

1. Vectors to ILS (Do Nothing)
2. Vectors to RNP APCH

Explore moving the FAF closer to help keep swathe in the same place

Images are to illustrate the concept only therefore may not be accurate



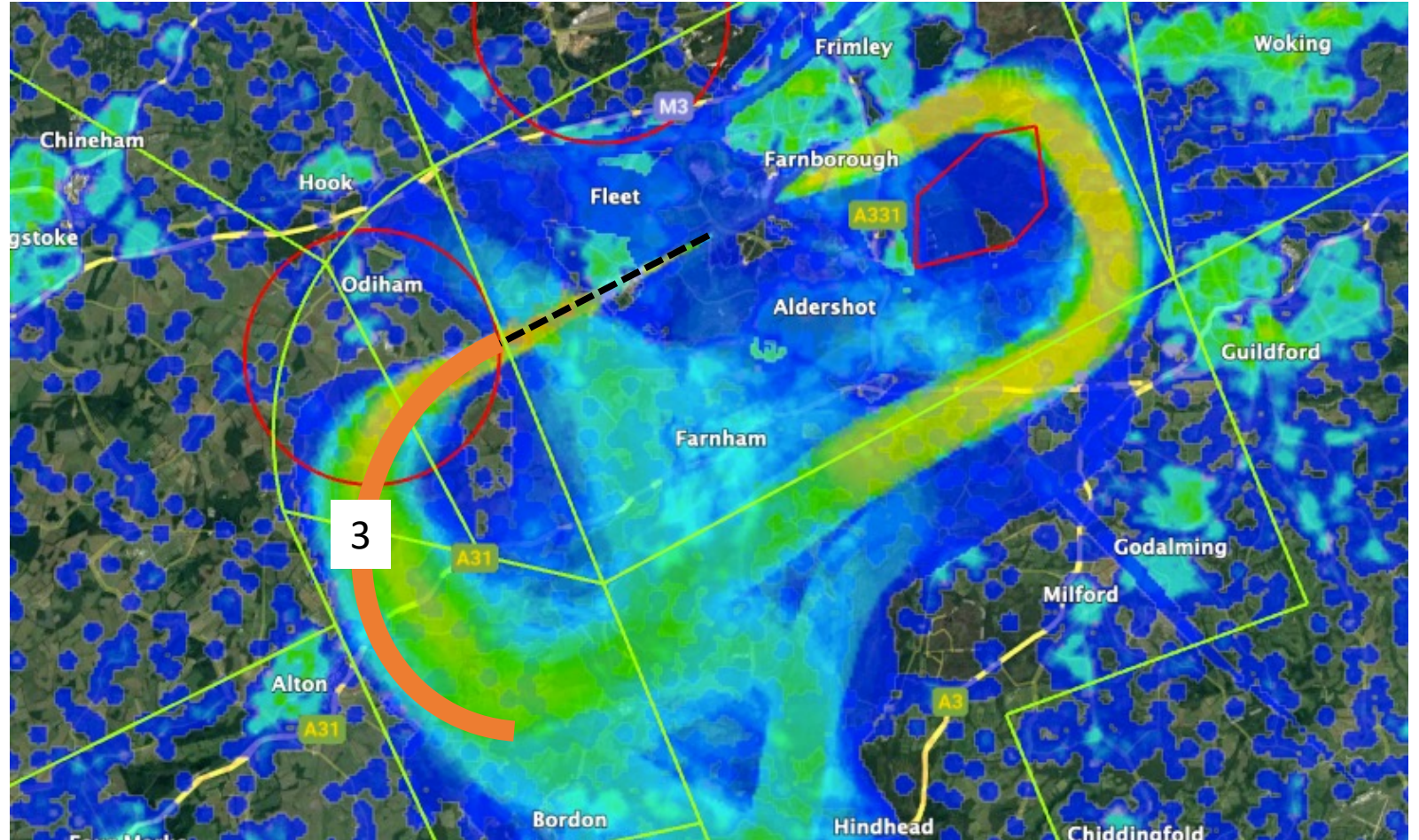
 Areas of population density  
 Adjacent Airspace Restrictions/Considerations  
 Existing Controlled Airspace Boundary

# RWY 06 Transition to final approach options

3. PBN to Final Approach to replicate today's swathe where possible (ILS and RNP APCH if possible)

Explore moving the FAF closer to help keep PBN path as far east as possible

Images are to illustrate the concept only therefore may not be accurate

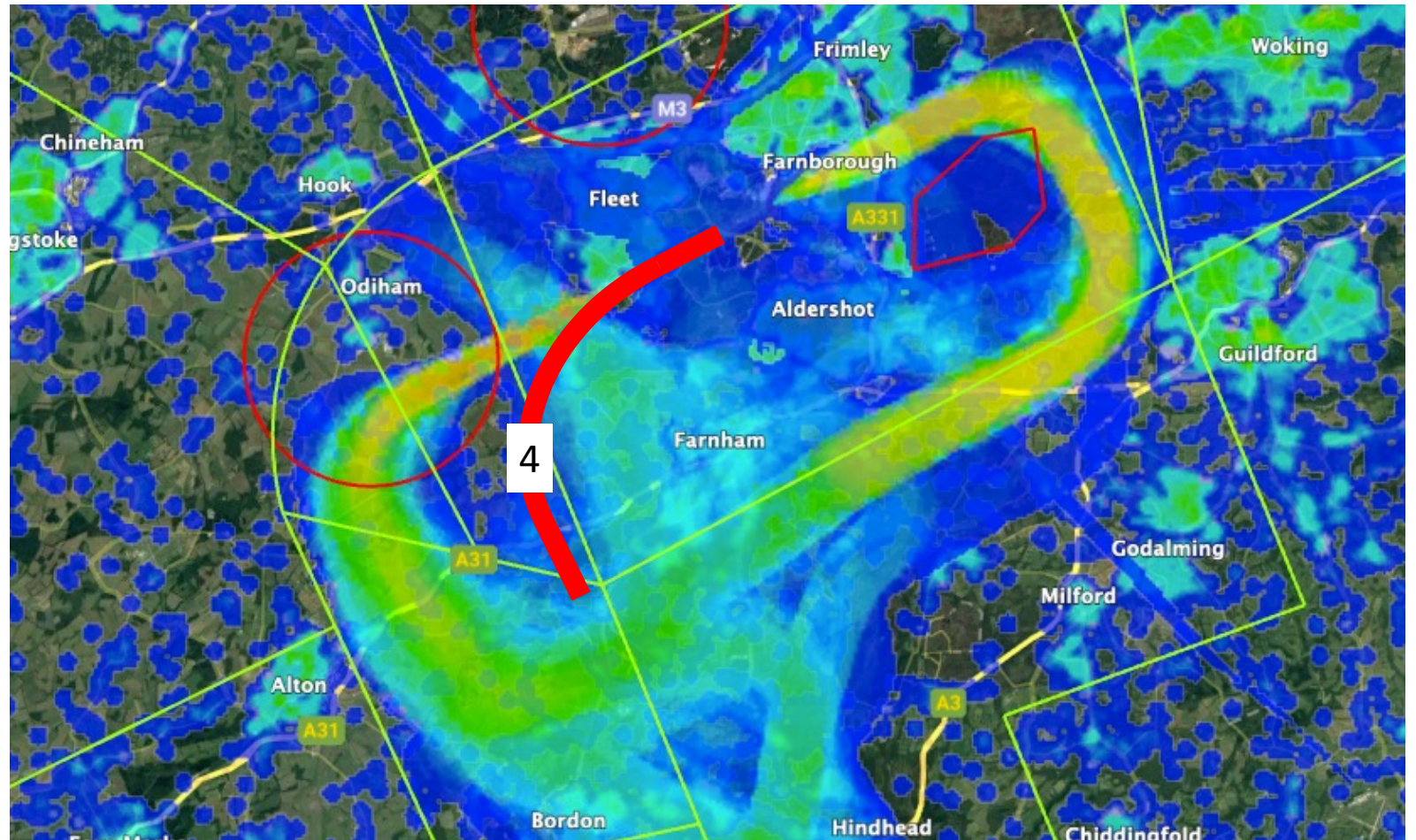


# RWY 06 Transition to final approach options

## 4. RNP-AR

RNP-AR could be achieved which avoids Odiham

Images are to illustrate the concept only therefore may not be accurate



 Areas of population density

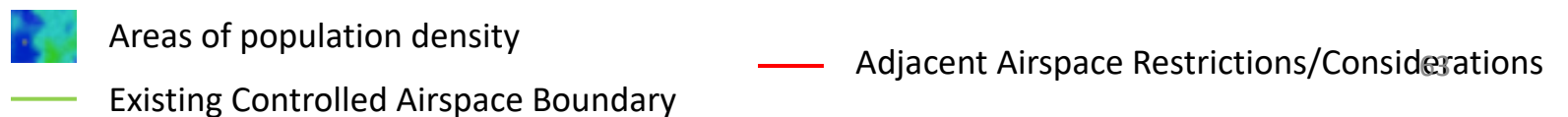
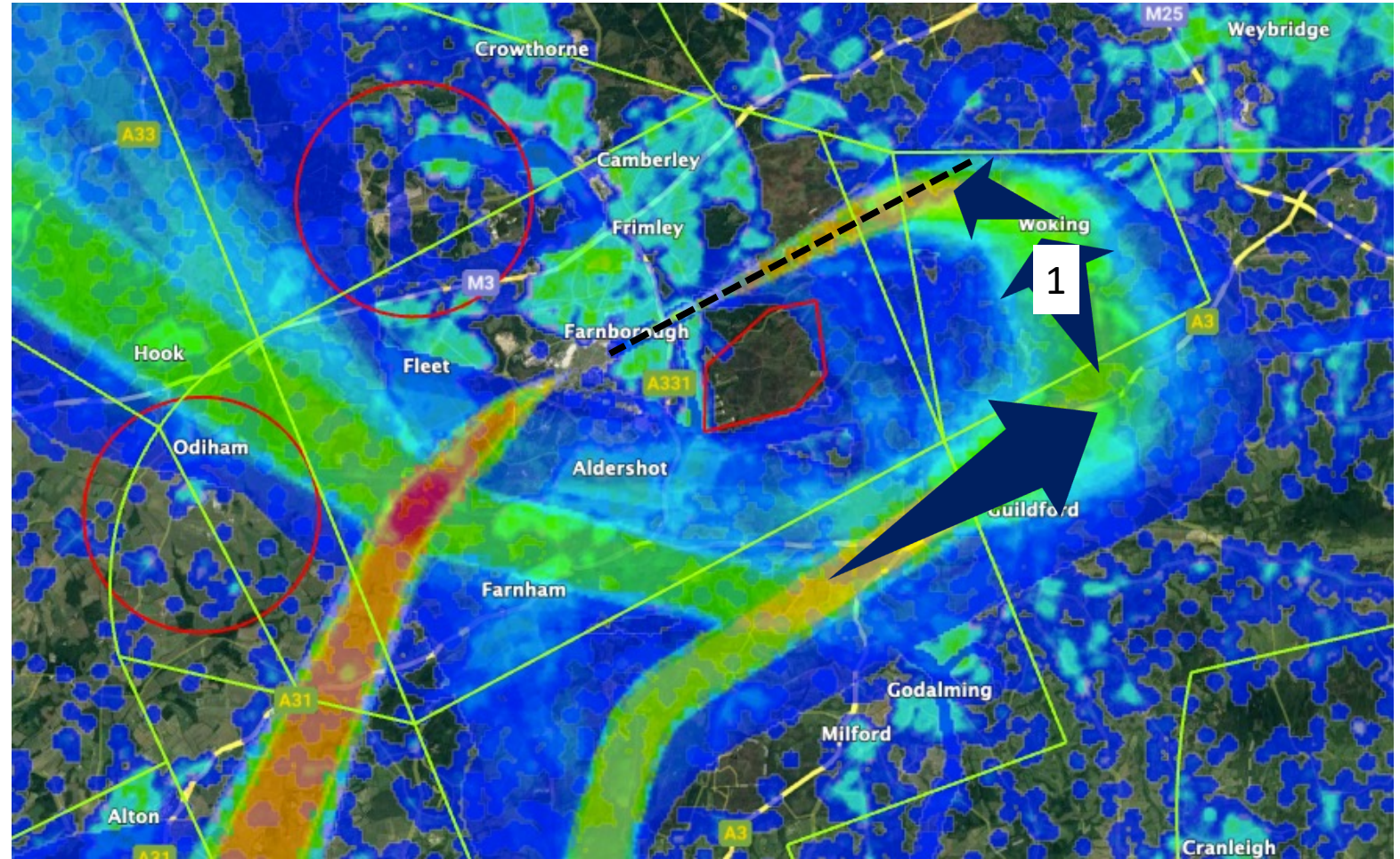
 Adjacent Airspace Restrictions/Considerations

 Existing Controlled Airspace Boundary

# RWY 24 Transition to final approach options

1. Vectors to ILS (Do Nothing)
2. Vectors to RNP APCH if possible

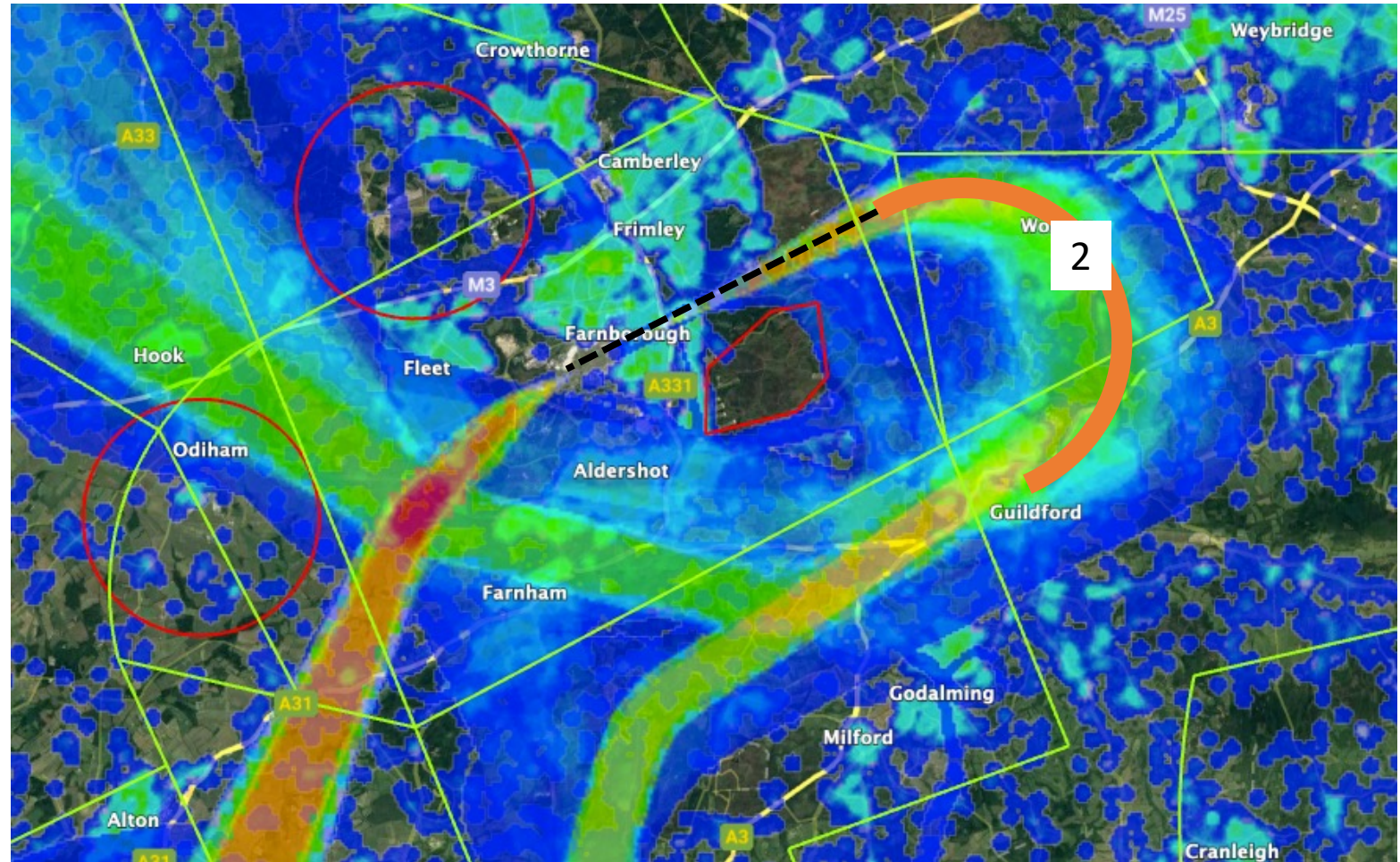
Images are to illustrate the concept only therefore may not be accurate



# RWY 24 Transition to final approach options

3. PBN to Final Approach to replicate today's swathe where possible (ILS and RNP APCH if possible)

Images are to illustrate the concept only therefore may not be accurate



Areas of population density  
Existing Controlled Airspace Boundary  
Adjacent Airspace Restrictions/Considerations

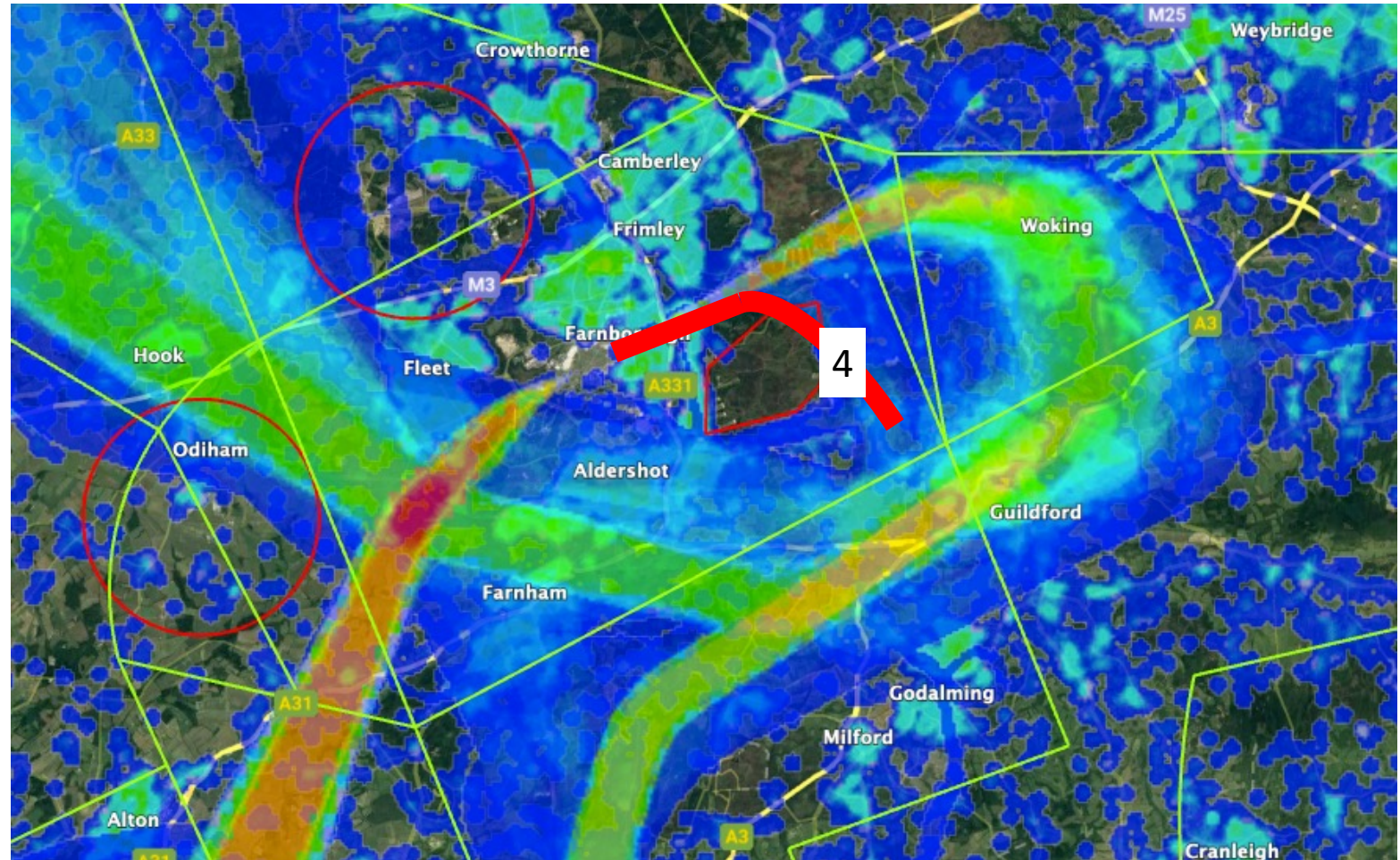


# RWY 24 Transition to final approach options

## 4. RNP-AR

It's not possible to have a shorter final approach without an increase in size of the Farnborough CTR to the South ❌

Images are to illustrate the concept only therefore may not be accurate

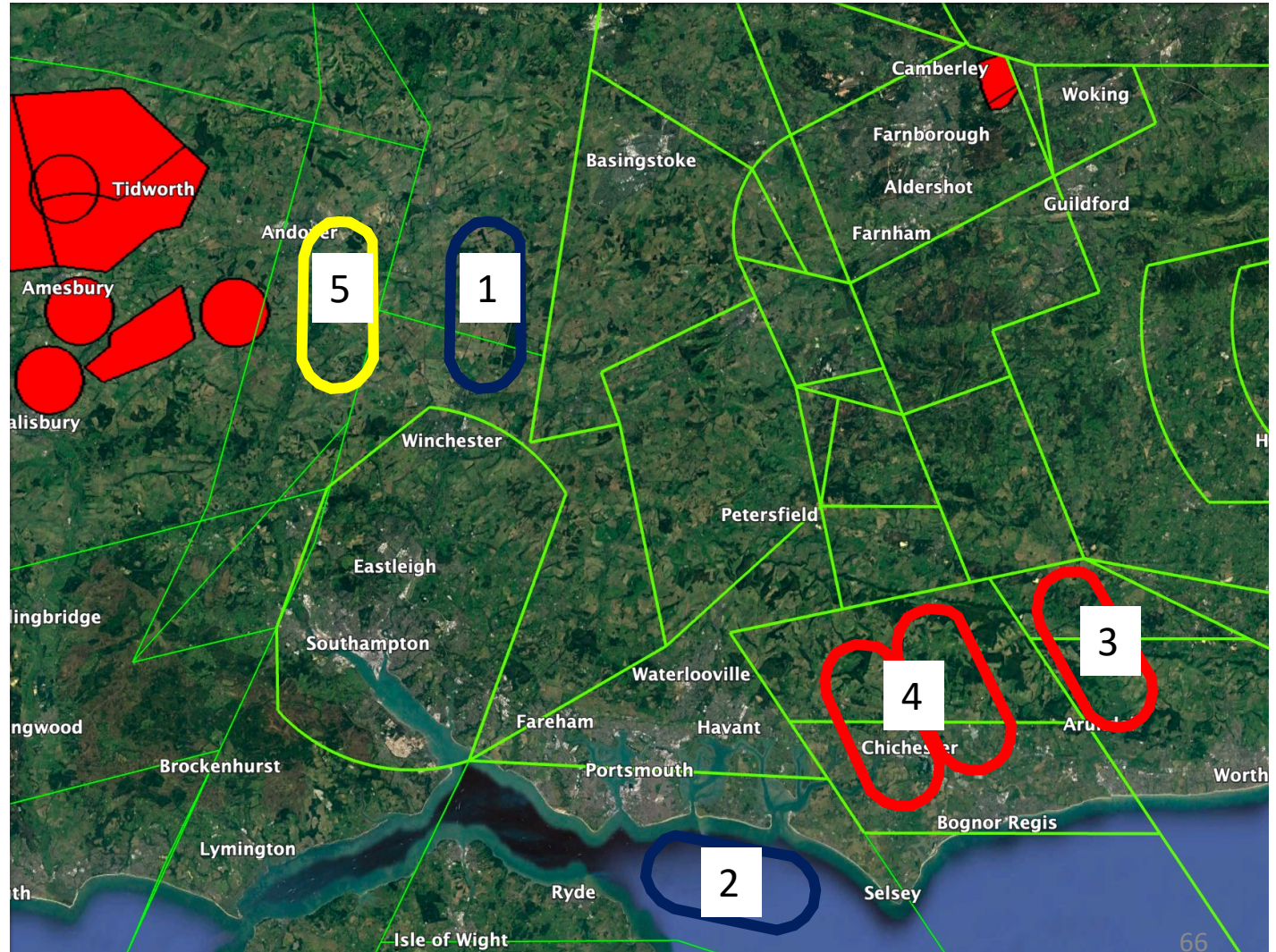


- Areas of population density
- Existing Controlled Airspace Boundary
- Adjacent Airspace Restrictions/Considerations

# Outer contingency hold options (7000ft+)

## Outer NERL Hold Options (7000ft+)

- 1. PEPIS (Do Nothing) ✔
- 2. RUDMO (Do Nothing) ✔
- 3. Not viable due proximity to Gatwick ✘
- 4. Not viable due proximity to Farnborough departures ✘
- 5. Under consideration ✔



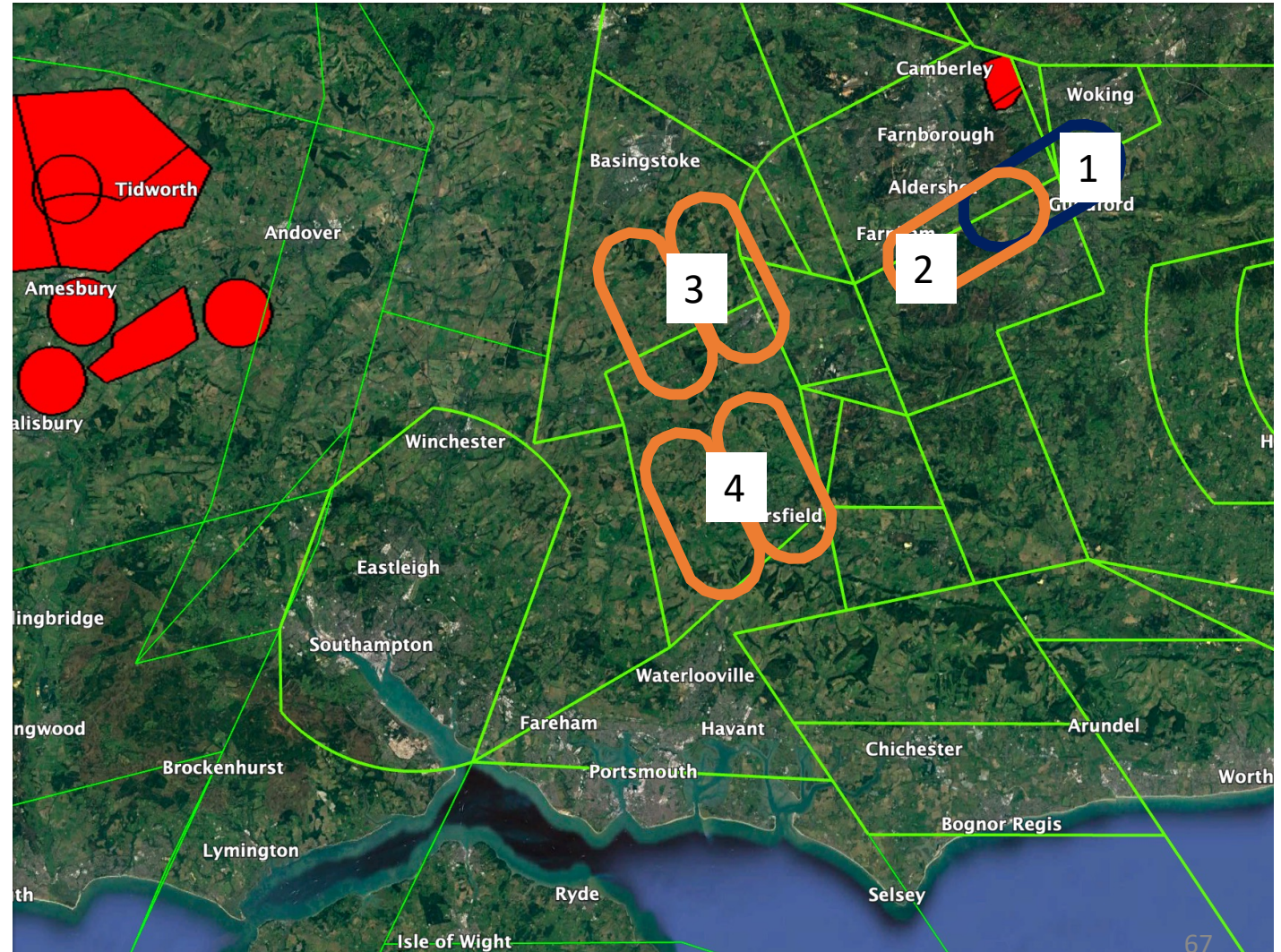
Images are to illustrate the concept only therefore may not be accurate

# Inner contingency hold options (<7000ft)

## Inner Farnborough Hold Options

- 1. VEXUB (Do Nothing)   
Under consideration
- 2. Under Consideration
- 3. Under Consideration
- 4. Under Consideration

Images are to illustrate the concept only therefore may not be accurate



# Network arrival route options from the north

- 1. As today (Do Nothing)
- 2. Over Odiham (6000ft)
- 3. Via Petersfield
- 4. PEPIS-Petersfield
- 5. Via RUDMO   
Significant increase in miles and increased network complexity
- 6. From the east between Heathrow and Gatwick at low altitude



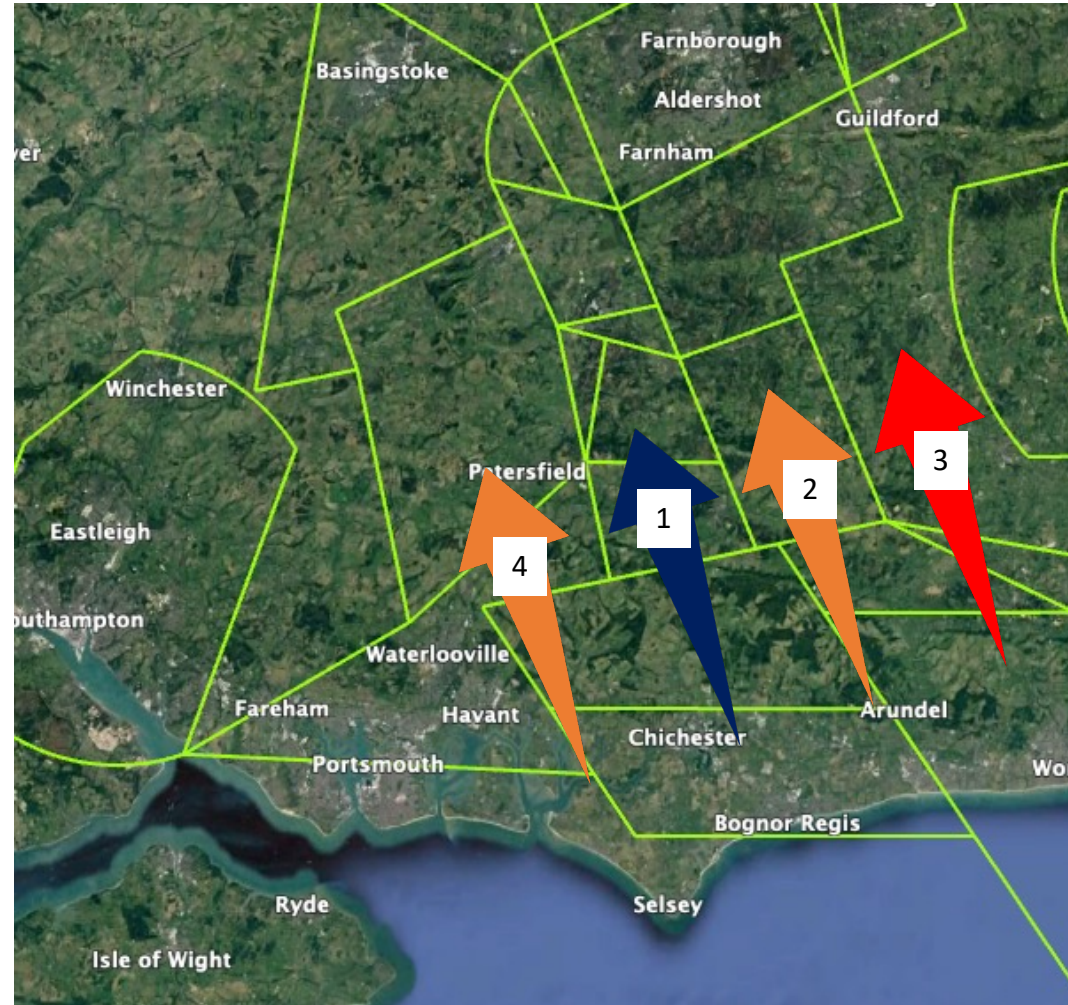
Images are to illustrate the concept only therefore may not be accurate

# Network arrival route options from the south

- 1. As today (Do Nothing)
- 2. East of today
- 3. Direct. Not viable due proximity to Gatwick
- 4. West of today



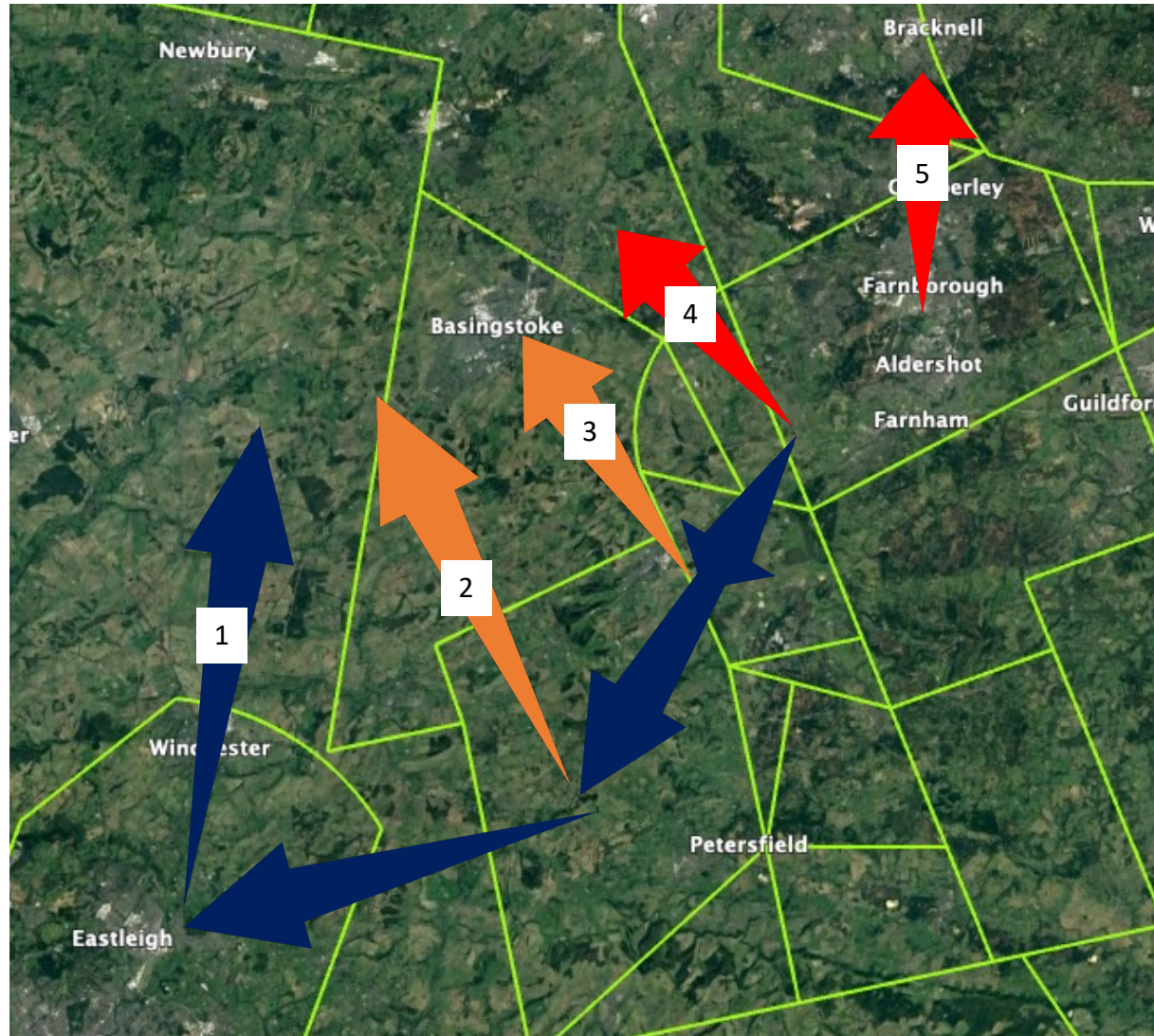
Images are to illustrate the concept only therefore may not be accurate



# Network departure route options to the north

- 1. As per today's flight planned route (Do Nothing)
- 2. As per today's typical profile
- 3. Alton-Basingstoke
- 4. Direct to CPT. Not viable as would require 20% CG
- 5. Direct north. Not viable due Heathrow

Images are to illustrate the concept only therefore may not be accurate



# Network departure route options to the south

1. As today (Do Nothing)



2. Liphook-Midhurst



3. Hindhead-Petworth



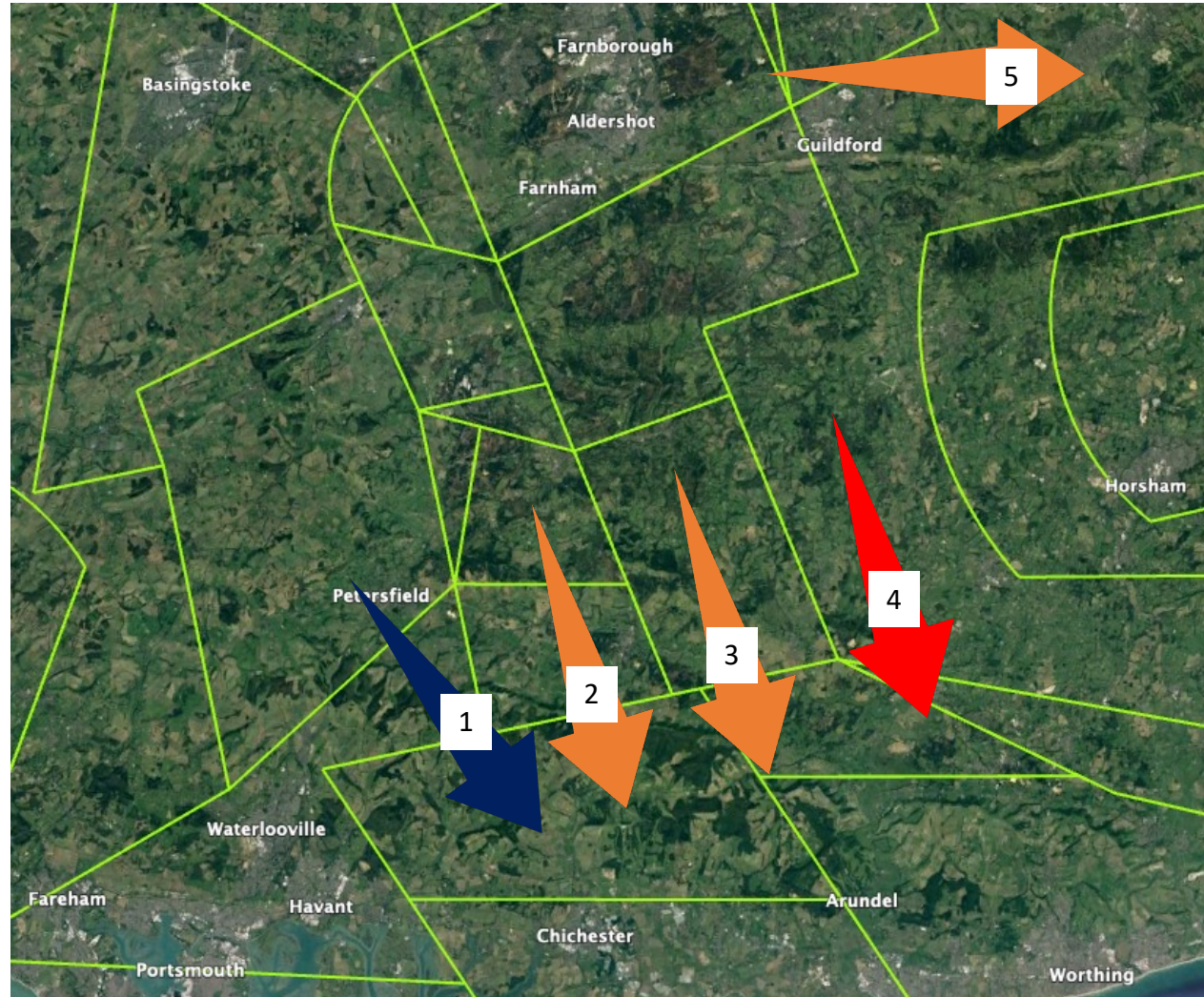
4. Godalming-Billingshurst.  
Not viable due to proximity to Gatwick



5. East between Heathrow and Gatwick at low altitude



Images are to illustrate the concept only therefore may not be accurate

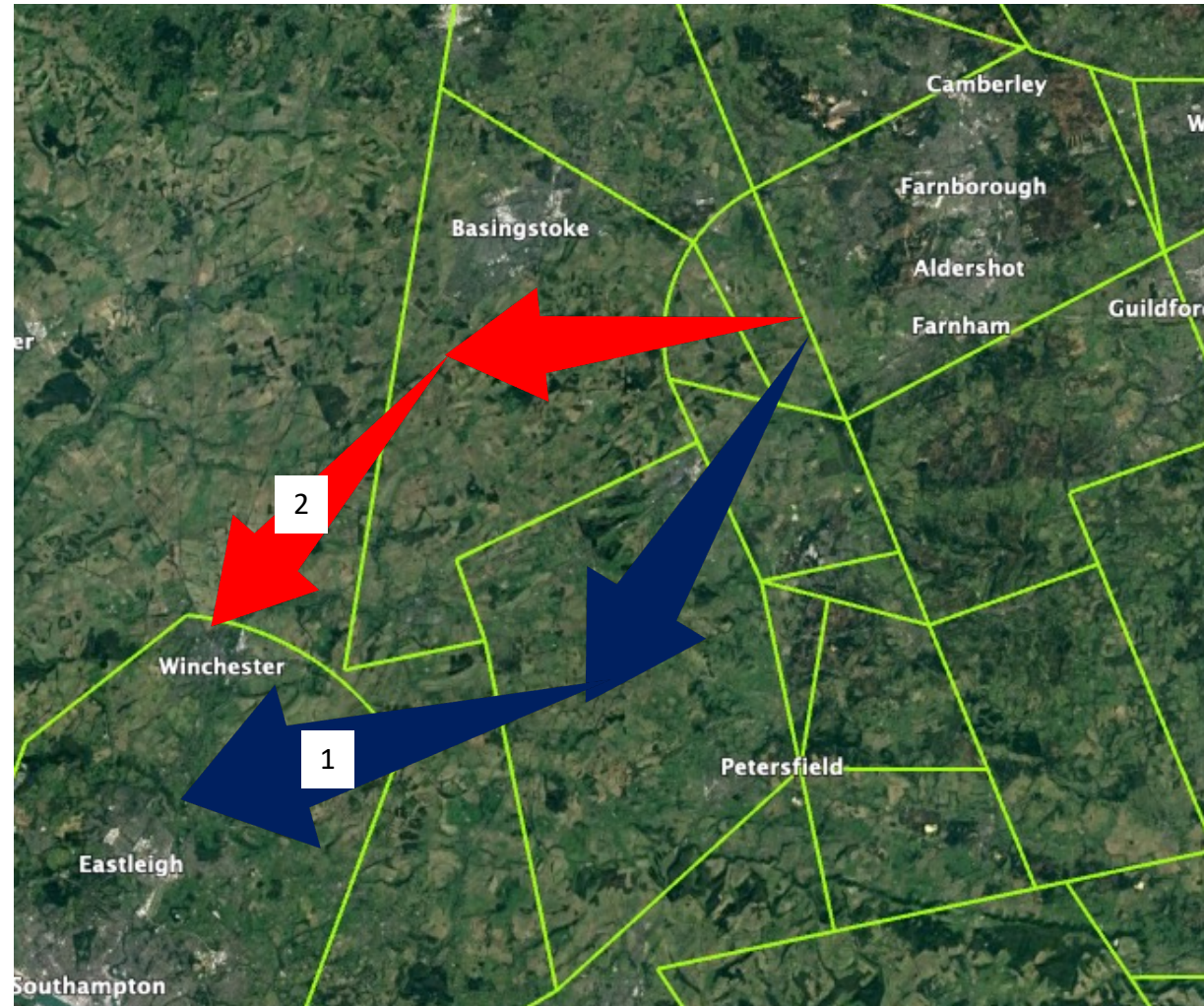


# Network departure route options to the west

1. As today (Do Nothing)



2. Lasham-Winchester. Not viable due to 22% CG to avoid Odiham



Images are to illustrate the concept only therefore may not be accurate



# Glossary

# Glossary of Terms

Abbreviation	Description of Term
ATM	Air Traffic Movement. An ATM is a single aircraft movement, an arrival or a departure.
CG	Climb Gradient. The gradient at which an aircraft is expected to climb away from the airport.
PANS Ops	Procedures for Air Navigation Services – Aircraft Operations. These are the rules for designing arrival and departure procedures which airspace designers must adhere to.
PBN	Performance Based Navigation. Satellite based navigation for aircraft.
RNP-AR	Required Navigation Performance. A specific type of PBN procedure.
SIDs	Standard Instrument Departures. The departure profile an aircraft will fly on leaving the airport.
STARs	Standard Instrument Arrivals. The arrival profile an aircraft will fly to land at the airport.