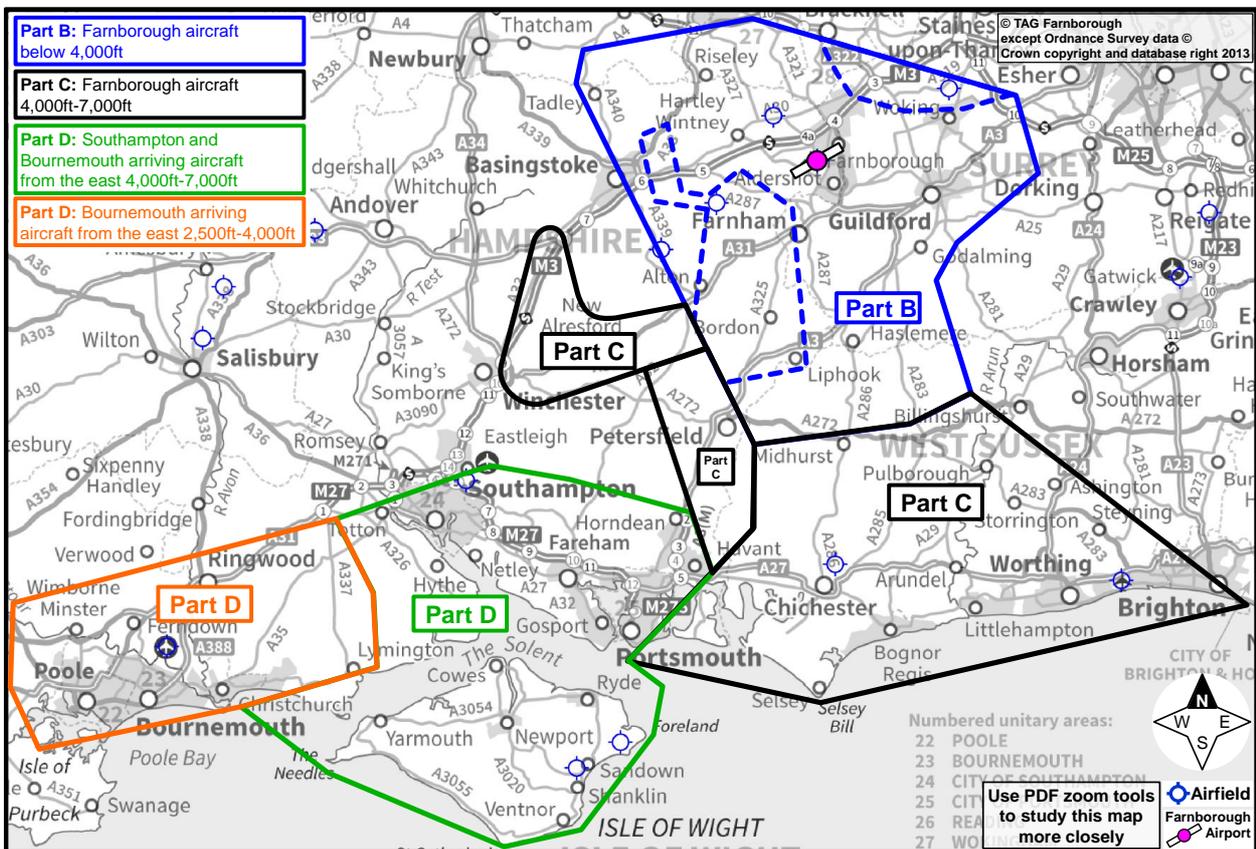




# Farnborough Airport

## Airspace Consultation

### Part C: Proposed changes between 4,000ft and 7,000ft further away from Farnborough Airport (Affecting Parts of Hampshire and West Sussex)



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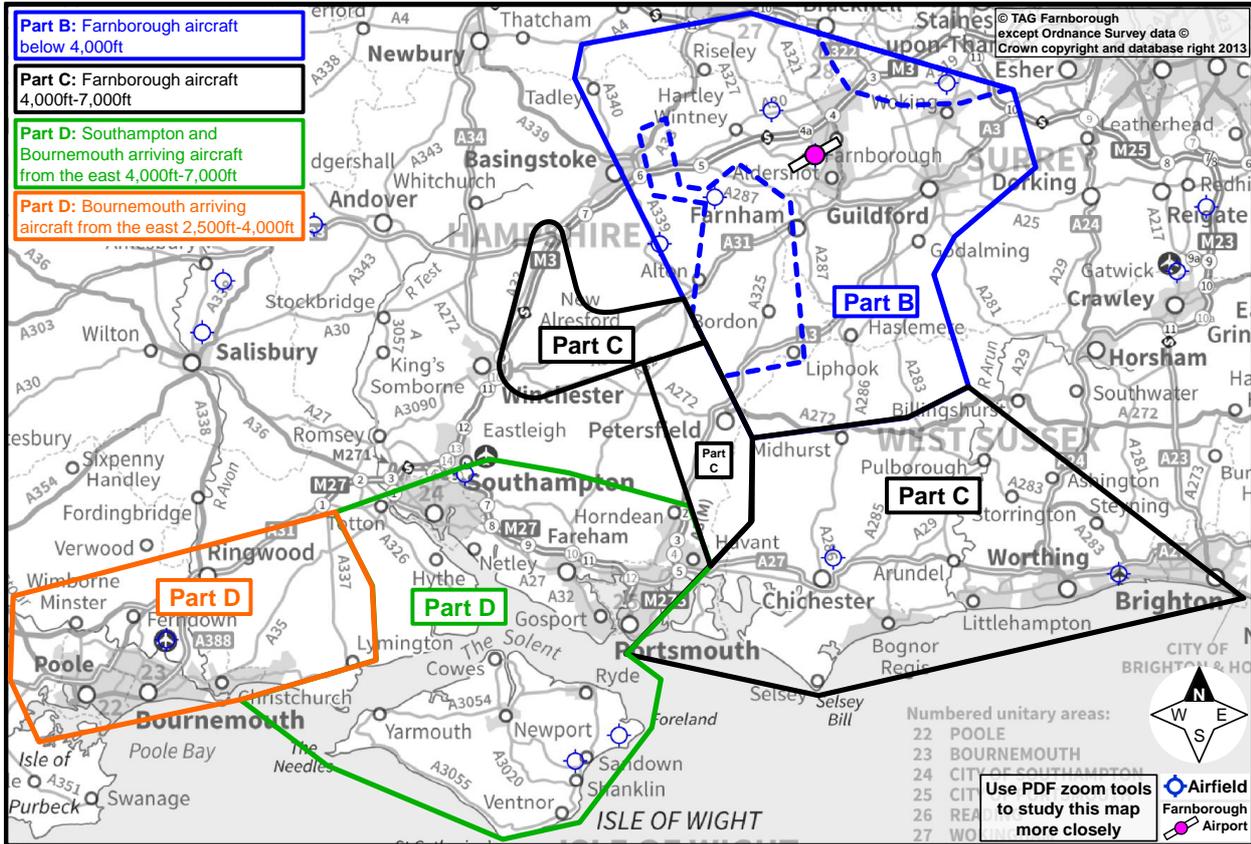
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# 1. Introduction to Part C

1.1. This part of the consultation material describes the airspace changes proposed from 4,000ft to 7,000ft above mean sea level<sup>1</sup>. The three regions which may be affected are shown enclosed by the solid black lines in Figure C1 below.



**Figure C1: Consultation areas overview**

- 1.2. Part C assumes that:
- a. You have read and understood the first half of Part A (this sets the context for the proposed changes)
  - b. You have identified that the geographic areas (shown outlined in black in Figure C1) above are of interest to you, and
  - c. You understand that this consultation only covers the areas identified in Figure C1 where changes to air traffic flows are likely to occur as a result of this proposal.
- 1.3. This part explains the proposed changes to routes and airspace further away from TAG Farnborough Airport.

<sup>1</sup> Altitudes of flights and airspace are given in feet above mean sea level (AMSL). Farnborough Airport is at 238ft AMSL. The terrain around Farnborough within the area shown in Figure C1 varies between about 100ft to about 900ft in elevation. To calculate the height above ground level (AGL) where you are, subtract your elevation from the altitudes in this document. For example, if you live on a 200ft hill (AMSL), and aircraft fly over you at an altitude of 5,400ft, that aircraft is 5,400 – 200 = 5,200ft AGL (above you).

- 1.4. In particular, we aim to provide an understanding of the impacts that the proposed changes would have on people living or working within the **solid black outlined areas** shown in Figure C1 (above) and Figure C2 (on Page C5, a zoomed in view).
- 1.5. The main focus of this document is on the impacts of establishing Farnborough departure and arrival routes which are covered in detail in Sections 1-4 of this document. You may consider this information to determine the local impact on your area of interest.
- 1.6. Other air traffic flows, such as Heathrow and Gatwick departures, also use the same airspace at higher altitudes throughout the region. Within the black outlined areas of this proposal, we are not considering changes to flows other than Farnborough arrivals and departures.
- 1.7. We need to gather feedback from you as a stakeholder, to enable us to understand how the change may impact you. Later in this part, we have included questions which are highlighted in a box like this. The easiest way to respond to the consultation is to answer these questions via the website:

**[www.Consultation.TAGFarnboroughAirport.com](http://www.Consultation.TAGFarnboroughAirport.com)**

- 1.8. Care has been taken to make this consultation accessible to anyone who may wish to respond. The design and operation of airspace is, by its nature, a complex and technical issue. We aim to avoid technical jargon, but in order to help readers fully understand the rationale behind the changes being proposed we have, where appropriate and necessary, gone into some technical details and used relevant terminology. Any technical terms used are explained briefly, and summarised as a glossary in Appendix B.
- 1.9. In this part, we describe:
  - a. Today's airspace usage - a description of today's flight-paths including maps of where aircraft are generally seen;
  - b. The objectives and justification for the proposed changes – describing the routes we are seeking to implement and their potential benefits and impacts; and
  - c. Local considerations for route positioning; describing potential local impacts. We ask for your feedback on any location that may require special consideration in the ongoing design process, and why you think we should consider it special. This will help us assess and balance the impacts of the design.

## **How do I work out the change in impact within the black outlined areas?**

- 1.10. Later in this document, there are worked examples of how to assess the change of impact on a place. Use it for where you live or work, in order to decide how the change might affect you. These worked examples start in Section 4 Page C17.
- 1.11. Sections 2 and 3 provide background information to give an understanding of our objectives for this proposal.

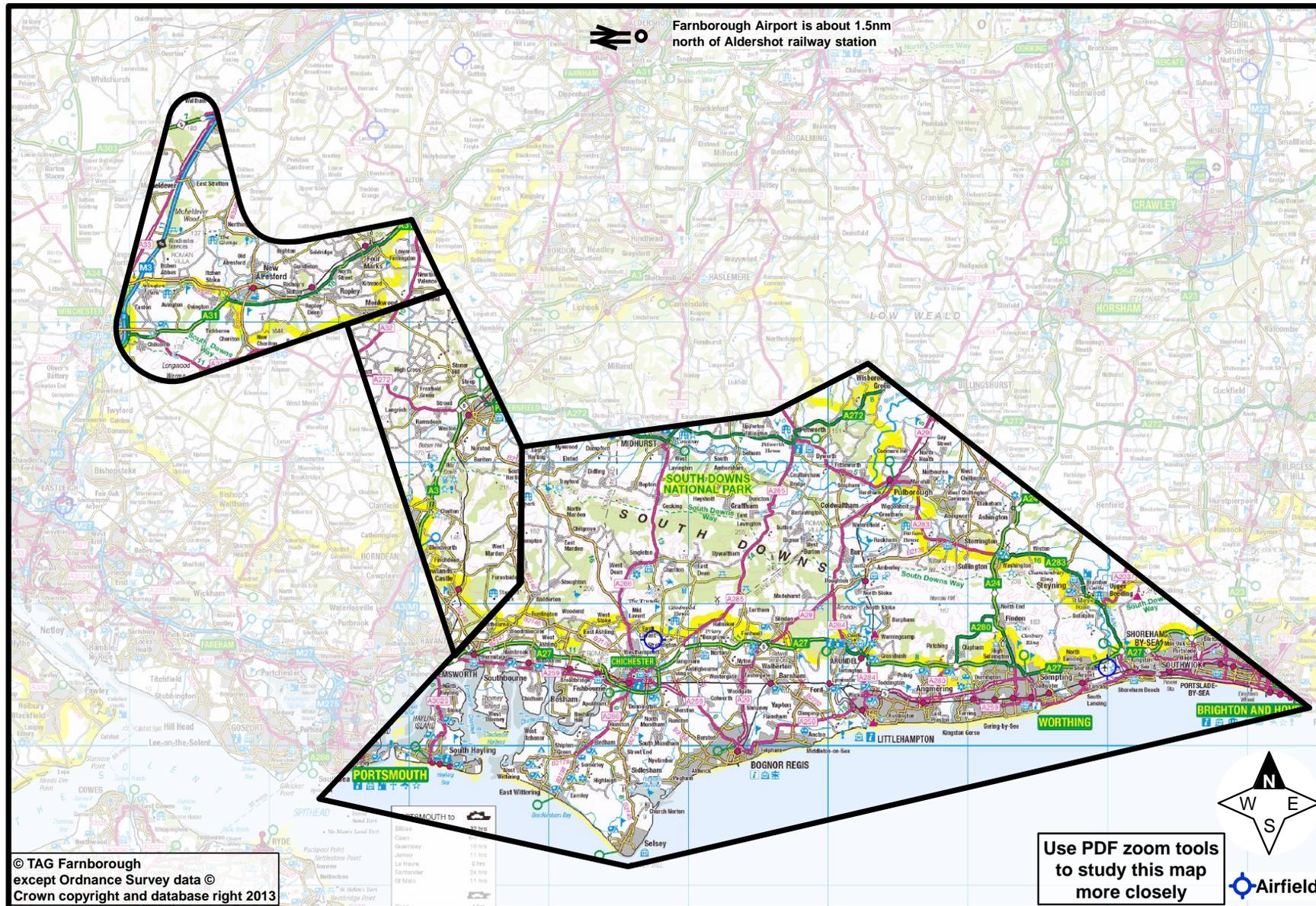


Figure C2: Consultation areas for Farnborough air traffic between 4,000ft-7,000ft

## 2. Today's airspace usage

- 2.1. The airspace south of London, which includes that used by Farnborough, is one of the busiest and most complex volumes of airspace in the world. The Farnborough area is over-flown by aircraft originating from many different airports, as shown in Figure C3 on Page C30, which is a 'density plot' (see explanation below). This map shows all commercial air traffic in the region, up to 20,000ft. Most notably there are several arrival and departure routes to and from Heathrow, Gatwick and Southampton airports crossing the region. In Figure C4 we have highlighted National Parks and Areas of Outstanding Natural Beauty so you can compare Figures C3 and C4 to see how often these places are over-flown by commercial aircraft today.

### Aircraft flight-path density plots

- 2.2. In order to illustrate where commercial aircraft currently fly, we have provided maps overlaid with aircraft flight-paths (Figures C3 and C5-C7). These are known as density plots, which are produced using radar data, and show how many aircraft over-flew a particular place. These maps start from Page C30.
- 2.3. The density plots show all flights for one month<sup>2</sup>, and hence give a good representation of where flights are most concentrated. A colour key explains the average number of flights per day over a particular place. **Note** that, because Farnborough has far fewer flights than Heathrow or Gatwick, the colour keys are different between density plots that show **all** airports and those that **only** show flights relating to Farnborough.
- 2.4. We have filtered the radar data so we can show you different views:
  - a. Figure C3 shows all flights to/from all airports up to 20,000ft
  - b. Figure C5 shows only flights to/from Farnborough up to 20,000ft
  - c. Figures C6 and C7 show only flights to/from Farnborough, up to 7,000ft.
- 2.5. The density plots are provided to illustrate the spread of tracks today. The diagrams also have arrows which show the general direction of the traffic flows to aid your interpretation of these plots. The arrows are *illustrative* of the general flow directions.

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<sup>2</sup> Period chosen: September 2012. This month was chosen because it was a representative sample of aircraft types and destinations, and was outside the 2012 Olympics period. During the Olympics, special airspace was applied to the London region for parts of July and August - those special flight-paths did not represent the typical paths normally flown.

## Today's Farnborough departures - See Figure C6 on Page C33

- 2.6. ATC currently manages departing aircraft by manually directing each flight as there are no formal departure routes from Farnborough. When ATC manually directs a flight it is known as 'vectoring'. The controller that is responsible for the aircraft immediately after take-off plans a safe flight-path avoiding arrivals and any GA<sup>3</sup> in the area. This regularly includes 'unknown' aircraft (not in contact with a Farnborough controller) – these are represented only by blips on the radar screen with no confirmed information about their height or their intentions (Part A has more background information on 'known' and 'unknown' aircraft). For safe passage through the airspace, some departures are given longer flight-paths, and some shorter, depending on the specific situation at the time. Equally, some aircraft are climbed early, or late, for the same reason.
- 2.7. This variance/manual intervention due to other flights in the region means that departure flight-paths at altitudes below 7,000ft do not currently follow specific paths and tend to be spread over a wide area, as shown by Figure C6.
- 2.8. Departures from Farnborough usually join the air route network on passing about 7,000ft (sometimes earlier). However, the actions taken by our radar controllers at lower altitudes defines their flight-path even above 7,000ft until fully integrated into, and navigating along, the air route network.
- 2.9. Arrow 1 illustrates departures to the north, which can be seen along the northern edge of Figure C6. This traffic flow is not within the black outlined area. It is shown here because we propose to move this flow to within the black outlined area. This is explained in more detail in Section 4. About 45% of all our departures route this way.
- 2.10. Arrows numbered 2 illustrate departures to the south. About 45% of all our departures route this way.
- 2.11. Arrows numbered 3 illustrate departures to the southwest. About 10% of all our departures route this way.
- 2.12. Remember that these percentages **only** apply to departures. If you live or work in an area over-flown by departures, you may also be over-flown by arrivals. Please consider all the maps in this document to assess how your area of interest might be affected.

## Points to note about Farnborough departures

- 2.13. Where the tracks end in Figure C6, the aircraft have climbed above 7,000ft. For example, for our departures to the south, most are above 7,000ft by the time they get south of Chichester.

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<sup>3</sup> General Aviation (GA) aircraft are usually private light aircraft, gliders, recreational aircraft etc. See Part A for more details.

- 2.14. Even though Part C is concerned with our air traffic from 4,000ft to 7,000ft, we are showing you the flight-paths below 4,000ft so you can see how the flows work. Aircraft flight-paths north of the black outlines, nearest to the airport, are most likely to be below 4,000ft. See Part B for details of this region.
- 2.15. Unknown aircraft on the radar (see paragraph 2.6) often cause controllers to turn our departures a long way left and/or right, and they may have to change the climb instructions as per paragraphs 2.6-2.7. Occasionally, they need to be delayed on the runway at the last moment, ready for take-off, waiting for a gap between other air traffic (known or unknown). This means the specific take-off time, flight-path and altitude are not often predictable, making the controller's (and the departing pilot's) work more difficult until they can climb into the air route network. Joining the network may take a long time depending on other air traffic, causing an unpredictable delay and an unpredictable extra distance to be flown.

### Today's Farnborough arrivals - See Figure C7 on Page C34

- 2.16. ATC currently directs arriving aircraft towards the runway by vectoring (see paragraph 2.6). As the aircraft descend from about 7,000ft towards the runway, our radar controller takes command of the arrival and is planning a safe flight-path avoiding our departures, unknown radar blips or other aircraft known to be in the area. Some arrivals are given longer flight-paths, and some shorter, depending on the specific situation at the time. Equally, some aircraft are descended early, or late, for the same reason.
- 2.17. This variance/manual intervention means that arriving flight-paths below about 7,000ft do not currently follow specific paths and tend to be spread over a wide area, as shown by Figure C7.
- 2.18. Arrivals to Farnborough usually leave the air route network on passing about 7,000ft, sometimes lower, sometimes higher depending on the traffic situation.
- 2.19. Arrow 1 illustrates arrivals from the north, which can be seen along the northern edge of Figure C7. This traffic flow is not within the black outlined area, and would not change under this proposal. This is explained in more detail in Section 4. About 55% of all our arrivals route this way.
- 2.20. Arrows numbered 2 illustrates arrivals from the south. About 35% of all our arrivals route this way.
- 2.21. Arrows numbered 3 illustrates arrivals from the southwest. About 10% of all our arrivals route this way.
- 2.22. Remember that these percentages **only** apply to arrivals. If you live or work in an area over-flown by arrivals, you may also be over-flown by departures. Please consider the maps in this document to assess how your area of interest might be affected.

## Points to note about Farnborough arrivals

- 2.23. The tracks in Figure C7 start when the aircraft have descended below 7,000ft. For example, for our arrivals from the southwest, most are below 7,000ft by the time they near Petersfield.
- 2.24. Even though Part C is concerned with our air traffic from 4,000ft to 7,000ft, we are showing you the flight-paths below 4,000ft so you can see how the flows work. Aircraft flight-paths north of the black outlines, nearest to the airport, are most likely to be below 4,000ft. See Part B for details of this region.
- 2.25. Unknown aircraft on the radar (see paragraph 2.6) often cause controllers to turn our arrivals a long way left and/or right, and they may have to change the descent instructions as per paragraphs 2.16-2.17. Occasionally, they have to be placed in a holding pattern in a safe area. This means the specific arrival time, flight-path and altitude are not often predictable, making the controller's (and the arriving pilot's) work more difficult until they land. This causes an unpredictable delay and an unpredictable extra distance to be flown.

## Traffic to/from other airports, and General Aviation (GA) activity

- 2.26. Figure C3 shows that everywhere in the region is over-flown to some extent – there are no white areas on the map. Figures C5 to C7 only depict Farnborough traffic flows, and show that Farnborough air traffic is a relatively small part of that overall picture shown in Figure C3 – remember that the colour key for Figure C3 is bigger than that used in the other density plots because Farnborough is much less busy than Heathrow or Gatwick. Regardless of our proposal, the traffic to/from other airports will continue to be seen and heard over-flying these areas (in particular Heathrow, Gatwick and Southampton arrivals and departures) at similar altitudes to today. These aircraft are currently, and would continue to be, at higher altitudes than our aircraft within the black outlined areas.
- 2.27. This proposal is likely to have an effect on where some GA aircraft fly.
- 2.28. The change of impacts to people on the ground due to this is impossible to predict accurately. They are not required to speak with any ATS provider outside controlled airspace (CAS), and may not show up on radar.
- 2.29. What we do know is that there are popular areas of GA activity that we have tried to avoid as far as practicable, given our own requirements for consistent and predictable routes.
- 2.30. We know that changing flight-paths or airspace boundaries can be challenging to GA, and our intention is for as little disruption as possible by striking a fair balance.
- 2.31. See paragraphs 3.14-3.21 for additional information on the impact on gliders, and how we can mitigate it.

### 3. Objectives and justification for proposed changes from 4,000ft-7,000ft

- 3.1. This section describes our objectives for changing the routes to/from Farnborough airport; it describes what we are trying to achieve and the generic benefits/impacts that would result. We welcome your feedback on these objectives. The effects on specific aviation users are discussed in Part E. Specific local considerations are discussed below in section 4.
- 3.2. This consultation is to develop airspace solutions, assuming unchanged airport infrastructure. It is not associated with the work being undertaken by the Airports Commission. Any further proposals arising from any recommendations made by the Airports Commission would be subject to separate consultation at a later date.
- 3.3. The introduction of PBN, as recommended by the aviation industry's CAA-supported FAS, means the route system **must** undergo change (these terms are explained in Part A). This provides the opportunity to consider changes that will enable us to make best use of the runways and to improve the management of noise impact.
- 3.4. **Specific justifications:** We are seeking to optimise the route structure to bring benefits to the ATC operation. We intend to do this by balancing the operational benefits of introducing new routes with environmental impacts, considering GA activity areas as far as practicable, making airspace more efficient for as many users as possible. In particular we are proposing to introduce formal departure routes and to improve the management of arrivals by using the RNAV navigation standards. These would make the flight-paths more consistent and predictable whilst retaining sufficient flexibility for dealing with any air traffic scenario. The more consistent and predictable the routes, the more efficient they can be, and the already-high safety standards can be further enhanced. The airspace management would be more efficient for all users as well as the airport itself.
- 3.5. Maintaining Farnborough's competitive position in the UK and international market is important both for the airport and for the communities that benefit from having a commercially successful airport in the region.

#### **Balancing consistent and predictable routes against the environmental impact and impact on GA activity**

- 3.6. The proposed routes for Farnborough traffic would enable the position of the aircraft to be more precisely controlled. With careful design, this would allow the impact of the new routes to be balanced against changes to environmental impacts for flight-paths and also balanced with impacts on GA activity areas.

- 3.7. At low altitudes it is important to minimise the spread of flight-paths to reduce the noise impact as much as possible, and to ensure a consistent and predictable flow of departures and arrivals. At high altitudes in the air route network, it is important to fly the shortest possible route to reduce fuel consumption and CO<sub>2</sub> emissions. When connecting low altitude routes with the higher altitude air route network, flexibility in the intermediate altitudes between 4,000 and 7,000ft (the focus of this part of the consultation document) is key to operational efficiency. Whilst the system needs flexibility, the proposed change would still improve the consistency and predictability of flight-paths, because air traffic controllers would still need to regularly vector aircraft – it would happen less often than today.
- 3.8. We estimate that, due to the design proposed in this part of the consultation, **130,000 fewer people<sup>4</sup>** would be over-flown by flight-paths at intermediate altitudes (4,000ft-7,000ft).
- 3.9. In addition to positioning the routes to reduce noise impact, we are also proposing changes that will keep arrivals higher for longer and climb departures higher earlier. The higher an aircraft is, the quieter and smaller it appears and so these changes would further reduce overall noise impact, however we are not able to quantify this benefit.
- 3.10. The proposal seeks to enable the airspace sharing arrangement with gliders, discussed later (starting at paragraph 3.17). When the airspace is shared with the gliders, we would move our southbound departures to avoid them. In this case, our departures would be less likely to be climbed higher earlier and so would stay at similar altitudes to today. This sharing would be infrequent as it would only happen when gliders sought to use the airspace.

## Potential negative impacts

- 3.11. Avoiding over-flight of one area inevitably means flights over neighbouring ones instead. For example, avoiding over-flight of a town almost always means flying over the surrounding countryside, which may be valued for its relative tranquillity<sup>5</sup>. This applies equally to departure and arrival routes. Therefore whilst our proposal reduces the net number of people over-flown by these flight-paths (see paragraph 3.8) we recognise that changing the flight-paths will mean increased impact over some neighbouring areas (notwithstanding that aircraft would generally be higher –see paragraph 3.9)
- 3.12. Avoiding populated areas and GA activity areas also means some aircraft would have to fly longer paths than today. Part A Section 10 describes how longer routes cause aircraft to use more fuel and produce more CO<sub>2</sub>.

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<sup>4</sup> Population data based on information supplied by CACI for 2012. This is a net figure based on a simple comparison of the populations within the areas covered by the current flight-paths vs the (smaller) areas covered by the proposed flight-paths. It is not intended to imply that all areas benefit from this proposal – some areas would, but others would not. It is intended to show that, as a net calculation, fewer people would be over-flown by the flight-paths described in this proposal than are currently over-flown.

<sup>5</sup> Route positioning is limited by aircraft manoeuvrability. Aircraft fly at high speeds; this limits how tightly, and how often, aircraft can turn in order for the route to be considered flyable and safe (this is governed by international design standards); hence avoiding one sensitive area can often mean over-flying another.

## Concentration versus dispersal

- 3.13. Aircraft following RNAV routes have more reliable and accurate track-keeping, and hence most aircraft follow the same paths within closer tolerances. Flights are concentrated along the routes, rather than being dispersed more widely across an area. Our proposed RNAV routes would therefore mean that net fewer people are over-flown, but those that are, would be over-flown more often.

## Airspace sharing with gliders – infrequent use of an alternate southbound departure route

- 3.14. We also provide a service, on request, to all airspace users in the region outside controlled airspace (CAS)<sup>6</sup>. Changes to airspace inevitably affect those other users, and we want to minimise the disruption to them as much as we can whilst fulfilling our objectives to provide a predictable airspace environment which can be managed safely and efficiently.
- 3.15. The higher the altitude, in general the fewer GA flights. Many GA activities take place at these intermediate altitudes (4,000ft-7,000ft) such as parachuting and flying training<sup>7</sup>, but these are fewer than occur at low altitudes (below 4,000ft).
- 3.16. Gliding is a GA activity that is an exception. Gliders need to climb to these intermediate altitudes, using geographical features like ranges of hills and valleys, to be able to glide to their ultimate destination. We know that the airspace we propose could disrupt some gliding activities because it could reduce access to these useful geographical features at the altitude to which gliders need to climb. That is one of the reasons that the proposed consultation areas are the shapes shown in this document – we have refined the airspace blocks to be as small as possible and in places away from gliding areas wherever we can.
- 3.17. We also have an innovative solution to reduce the potential disruption to the places gliders fly. It is called a **Flexible Use of Airspace (FUA)**.
- 3.18. Activating the FUA means that we would 'give' the gliding organisation some pieces of the newly proposed airspace when they need it; this means moving our southbound departures out of their way onto an alternate (longer) proposed route. When they have finished they would return it to us, and we would go back to using the normal (more direct) proposed routes.
- 3.19. The gliding organisations cannot predict exactly how often they would need to request activation of the FUA. Gliding is heavily dependent on the weather, and tends to happen more on summer weekends during daylight. Based local operational expertise, the sharing is expected to happen between **30 and 80 days per year**, but this is a broad estimate.

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<sup>6</sup> See Part A for more details on CAS and on ATC services

<sup>7</sup> There are many GA activities that regularly occur at intermediate altitudes, these are just examples. GA activities such as hang gliding and helicopter flying occur more often below 4,000ft than above.

- 3.20. The consequence of this airspace sharing is that most days (85-90% of the year), our departures to the south would route the standard way as per Figure C8 on Page C35, and some days (10-15% of the year) they would route the alternate (longer) way as per Figure C9 on Page C36. This is likely to be infrequent, as per paragraph 3.19.
- 3.21. Setting this up would involve detailed negotiation between us and the gliding community to ensure it could be done safely and reliably. This negotiation has been started, and will progress throughout the consultation and beyond.
- 3.22. Paragraph 3.12 and Part A Section 10 describes how the longer routes avoiding populated areas and GA activity areas that we are proposing would cause aircraft to use more fuel and produce more CO<sub>2</sub>.
- 3.23. In the same way, avoiding gliders during FUA activation would cause our departures to use even more fuel than stated in Part A on those activation days as it would increase the length of our southbound departure flight-paths by about 4.5 nautical miles and would restrict the opportunity for quicker climb (albeit infrequently). We estimate that this would cost our aircraft from 8.5kg-25kg fuel, emitting 27kg-80kg more CO<sub>2</sub> per flight<sup>8</sup> when the FUA is active. This would be *additional* to the proposal's change in fuel/CO<sub>2</sub> described in Part A.
- 3.24. Only departures to the south and southeast would be affected by FUA activation, which would be about 35% of all our departures during the activation period. Arrivals would not be affected, and nor would our departures to other destinations.
- 3.25. Due to the unknown frequency of potential FUA activation, population analysis has not been performed for this airspace/route scenario.

## Overall benefit

- 3.26. Our assessment of impacts is based on our interpretation of the Government's priorities described in Part A, which focusses on minimising the impact of aviation noise on densely populated areas, balanced with the need for a predictable and efficient flow of air traffic (operationally and with respect to fuel/CO<sub>2</sub>). Whilst the proposed design would have both positive and negative impacts, we believe that by reducing the net number of people over-flown at intermediate altitudes and by avoiding disruption of GA areas as far as practicable (including a large design change to accommodate potential FUA to benefit the gliding community), our design achieves the best balance. We therefore believe that the change is justified. In the questions below we ask about the principles behind our design decisions, and in Section 4 we are seeking local views in order to help determine whether our design can be improved further.

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<sup>8</sup> The lesser amount for small executive jets, the greater amount for larger corporate jets. Based on a typical fuel cost of £650/tonne or 65p/kg.

## Questions C1-C3

The following three questions are intended to gather your views regarding our **justification** for the proposed changes, and the **balances** we strike between route efficiency and environmental impacts.

Please remember that these three questions are **not** asking about specific locations, only the **principles** behind why and how we designed the proposed routes.

Answering these questions does not prevent you from providing information on local sensitivities in answer to the questions in Section 4; for example you may support our objective to balance the placement of predictable over-flights at these intermediate altitudes against the needs of GA and the people beneath, but have strong views on areas that should be avoided. Equally you may have information that we have not considered that leads you to oppose the objective of consistent and predictable flight-paths, regardless of local issues. Please use the questions below to express your views on the general principles.

Question C4 (later) will ask about the impact on specific locations.

### Question C1 – Routes and airspace structures

This question is about **justification for change**.

In Section 3 above, we say that the more **predictable** aircraft flight-paths are, the more **efficient** their safe management can be.

This proposal is seeking to introduce new departure and arrival routes, and airspace structures to surround them, which would change some flight-paths from 4,000ft-7,000ft.

This would improve the consistency of aircraft flight-paths on those routes, using modern navigational capabilities. Consistent flight-paths would be predictable and more efficient to manage safely. It would retain the required operational flexibility at the same time.

The use of CAS structures would help separate Farnborough aircraft from recreational and military flights that also operate in the area. This means that everything inside the structures would be known and predictable, which would also be more efficient to manage safely. GA users outside CAS would fly more predictable paths due to the presence of the CAS structures themselves, and could make requests to cross them, again using predictable paths.

**To what extent do you agree with our justification:**

***Introducing new routes and airspace would make aircraft flight-paths more predictable. Making them more predictable makes them more efficient to manage safely.***

- 1 Strongly agree
- 2 Somewhat agree
- 3 No preference
- 4 Somewhat disagree
- 5 Strongly disagree

You are welcome to provide a statement to support your answer.

**Question C2 – Balance between route efficiency and environmental impacts**

This question is about *balance*. In Section 3 above we say that we have designed routes at low altitudes to avoid populated areas, and that linking low altitude routes with the high altitude air route network needs flexibility, consistency and predictability.

The consequence is that some routes are longer than today's typical flight-paths. This means that some aircraft need to use more fuel, leading to more CO<sub>2</sub> emissions. It's not possible to reduce the local noise impact at low altitudes **and** make all our aircraft fly shorter routes at the same time, so we prioritised reducing low-altitude local noise impact at the expense of more fuel.

We then balanced the (diminished) environmental impacts at intermediate altitudes with the need to fly as efficient a route as possible.

**To what extent do you agree with our balance:**

***At low altitudes, avoiding over-flying populated areas where possible is the highest priority. At these intermediate altitudes (4,000ft-7,000ft), some environmental impact is justified because the effect is much less than at low altitudes.***

- 1 Strongly agree
- 2 Somewhat agree
- 3 No preference
- 4 Somewhat disagree
- 5 Strongly disagree

You are welcome to provide a statement to support your answer.

**Question C3 – Balance between route efficiency and affecting GA activities**

This question is also about **balance**. In Section 3 above we say that we have designed routes whilst considering areas of popular GA activity as much as possible.

The consequence is that some routes are longer than today's typical flight-paths. This means that some aircraft need to use more fuel, leading to more CO<sub>2</sub> emissions. It's not possible to avoid popular GA areas *and* make all our aircraft fly shorter routes at the same time, so we prioritised avoiding GA areas at the expense of more fuel.

We also propose sharing airspace with the gliding community using FUA, which would further increase the length of some of our departure routes (but only infrequently).

We then balanced all these impacts on GA at intermediate altitudes with the need to fly as efficient a route as possible, as often as possible.

**To what extent do you agree with our balance:**

***At low altitudes, reducing the impact on GA activities is important wherever possible. At these intermediate altitudes (4,000ft-7,000ft), some impact on GA activities is justified. FUA airspace sharing with gliders would reduce that impact.***

- 1 Strongly agree
- 2 Somewhat agree
- 3 No preference
- 4 Somewhat disagree
- 5 Strongly disagree

You are welcome to provide a statement to support your answer.

## 4. Local considerations for route positioning

- 4.1. Figures C5-C7 show current air traffic flows, and Figures C8-C10 show the proposed air traffic flows. You can also view the maps interactively at:

**[www.Consultation.TAGFarnboroughAirport.com](http://www.Consultation.TAGFarnboroughAirport.com)**

and use the postcode search function. The website will also allow you to zoom in on maps, and to easily switch between the current day traffic picture and the consultation swathes for the new routes.

### How to use the maps and data to assess potential effects

- 4.2. We have provided information to help answer the questions 'Would the change mean more or fewer over-flights? And if so, how many aircraft and what is the potential change in impact?' This information is in the form of maps and data that indicates potential noise and visual impacts across the consultation swathe. These swathes cover all options for the positioning of the new routes described in this document (they do not cover existing flight-paths that would not change). The consultation swathes themselves are shown in Figures C8-C10, including data indicating the predicted numbers of flights affected. These Figures may be directly compared to the maps in Figures C3 and C5-C7 which show today's air traffic flows.
- 4.3. The information we have provided describes:
- a. The potential number of aircraft that would fly on the route. A summary is provided on the data pages preceding those maps
  - b. The lowest, and the most likely, altitudes these aircraft would be at. This is shown by the shading on the maps themselves and is discussed in more detail in the paragraphs below; and
  - c. A measurement of the maximum noise impact aircraft over-flying at that height would generate at ground level (referred to as  $L_{max}$ ). This is also dependent on the aircraft types expected. A summary is provided on the data page preceding these maps.

### Swathes

- 4.4. The swathe maps have shaded areas to show where flight-paths would normally be as a consequence of this proposal. The areas enclosed by the dashed black lines denote the widest extent of the likely traffic spread, and the solid red lines show where traffic would normally be concentrated. We have not yet finalised the exact position of the routes we are proposing, but they would need to be within the area enclosed by the solid red lines.

## Arrows

- 4.5. The swathe maps have arrows which indicate the general direction of the traffic flows, provided to help you interpret the maps. These arrows are illustrative and do not represent the precise position of any formal airspace route.

## Altitude data

- 4.6. The altitude information presented on the maps shows a worst case (lowest) altitude and an indication of typical (most likely) altitude for aircraft during normal operations. The worst case represents the lowest altitude we would normally expect an aircraft to be on the flight-path in question. For example, the start of the 'minimum 6,000ft' altitude band on a map for a departure route is the area by which we would normally expect all aircraft to have reached 6,000ft. This would include the worst case of a slow climbing aircraft. Slow climbers are generally the larger/older aircraft types – most aircraft significantly outperform these slow climbers and would therefore usually be higher<sup>9</sup>. Most Farnborough aircraft tend to be amongst the highest performing types.
- 4.7. The typical altitude is shown to indicate that most aircraft would usually be above the worst case; however, predicting typical altitudes for aircraft for a future airspace design is not an exact science. We have therefore erred on the side of caution with these typical values, and even they do not represent the true range of altitudes that most aircraft achieve. It is worth noting that, in general, we expect the proposed changes to mean that, for a given location, aircraft will be at least the same, but most probably at higher, altitudes than today.
- 4.8. Whilst this variation in altitudes would happen in reality, it is difficult to represent in a consultation document. We therefore suggest that, as a default, stakeholders should consider the potential impact of aircraft at the minimum altitudes shown on Figures C8, C9 and C10.

## Tranquillity

- 4.9. Another factor that may determine the significance of a potential impact is tranquillity. CAA guidance for airspace change does not provide a method for assessing tranquillity. Any assessment will therefore be subjective and dependent on the specific location in question. The Government guidance (see Appendix A) specifically mentions AONBs and National Parks and so we have highlighted them in Figure C4 and in the worked examples later in this section. You may wish to consider the potential effect on tranquillity when providing feedback.

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<sup>9</sup> When FUA is activated and our alternate departure route to the south is in use, they would climb about the same as today, rather than higher.

## Assumptions

- 4.10. In order to ensure you do not underestimate the number of over-flights over a particular location, and to ensure we get feedback across the range of options within the swathes presented in this consultation, we ask you to make the following assumptions if your area of interest falls within the shaded areas bounded by the red lines on the maps:
- a. Assume the flight-path may be positioned directly above you at the altitudes shown (so the maximum number of over-flights would apply to this area, as described in the data tables); and
  - b. Assume that all aircraft would consistently fly along the flight-path in question rather than being vectored elsewhere in the vicinity by ATC.
- 4.11. These assumptions, combined with the worst-case assumptions regarding minimum altitude described above, mean that the potential impact may be overestimated in this document. This is because the consultation swathes presented are wider than the routes which would be positioned within them, so not all the areas would be directly over-flown by the route, and because vectoring off route would happen some of the time (albeit less than today).
- 4.12. We believe that this is a prudent and favourable approach over one which risks you underestimating the potential effects as it is better for us to analyse and filter the salient points from a wide consultation response, than to risk stakeholders not responding because they assume the impact is lower than it might in fact be. For this reason, please think about what feedback you would supply us *if* you were directly over-flown by one, some or all of the routes and provide your feedback by answering the questions we ask.

## General characteristics of proposed changes

- 4.13. The following paragraphs present the consultation swathes and describe the key factors that determine where they sit.
- 4.14. The traffic data shown on the pages preceding Figures C3 show a forecast of the average daily number of flights.

## Farnborough's proposed departure routes to the north and southwest See Figure C8 on Page C35

- 4.15. Figure C8 shows the consultation swathe for departure routes to the north. Figure C6 shows today's equivalent pattern. You may prefer to view the website where you can switch between these maps on screen.
- 4.16. Figure C8 illustrates that when compared to today's wide spread of flight paths, the area over-flown by our proposal would be relatively small (enclosed by the dashed lines), and the flights would most likely be concentrated somewhere within an even smaller region (between the solid red lines). Also, it illustrates where the departures would most likely climb past 7,000ft (grey shaded region).

- 4.17. Arrow 1 on Figure C6 shows where departures to the north currently route (about 45% of all departures), and Arrow 3 shows where they route to the southwest (about 10% of all departures).
- 4.18. Comparing Figure C6 with Figure C8 shows how our proposal would change this. All departures to the north and to the southwest would route to the west first, before turning north or south respectively once east of Winchester. The 'new' boomerang-shaped region to the west of Figure C8 would be over-flown more often at intermediate altitudes, but the 'old' region (Arrow 1 to the north of Figure C6) would be over-flown less often or not at all by our departures (see below for information about arrivals).
- 4.19. Remember that only the pink and blue shaded areas could be up to 7,000ft – the large grey area would be 7,000ft and above, and is currently part of a major air route network running north-south between France and the west side of London.
- 4.20. In Part A (Section 8) we describe that 10% of our departures currently leave the country eastbound via a southeasterly initial departure. To improve overall system efficiency <sup>10</sup> our proposal includes switching the traffic from this initial routing onto the northerly departure route. They would only be directed eastward once above 7,000ft. This means that this eastbound 10% would be added to the northbound flow below 7,000ft.

### **Farnborough's proposed departure routes to the south and southeast**

**See Figures C8 on Page C35 and Figure C9 on Page C36**

- 4.21. Figure C8 shows the consultation swathe for the proposed departure routes to the south and southeast in normal operations, and Figure C9 when FUA is activated (See paragraph 3.17 to 3.21 regarding the potential for infrequent FUA airspace sharing arrangements with gliders). Figure C6 shows today's traffic. You may prefer to view the website where you can switch between these maps on screen.
- 4.22. Arrows marked 2 on Figure C6 shows that departures to the south currently route this way (about 45% of all departures), and Arrow 3 shows where they currently route to the southwest (about 10% of all departures).
- 4.23. Remember that only the yellow, pink and blue shaded areas could be up to 7,000ft – the large grey area would be 7,000ft and above, and is part of a major air route network over the south coast between eastern France and the west.
- 4.24. In general, the departure routes to the south would follow a similar flight-path to those followed today, but would be more concentrated over a smaller area. Some southerly departures would head slightly further to the southwest before turning south. They would also most likely be higher than today's flights at an equivalent place along the flight-path.

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<sup>10</sup> This particular change is to enable system efficiency in the airspace above that being consulted upon here. It is a request from 'NATS En-Route' ATC (the next 'link' in the ATC chain after Farnborough)

- 4.25. Comparing Figure C6 with Figure C9, when FUA is activated (infrequently) shows our proposed route would follow the longer pink flight-path which does not allow for a quicker climb due to adjacent air routes.
- 4.26. Paragraph 4.20 describes that 10% of our departures currently leave the country eastbound via a southerly initial departure but that we propose these flights would instead initially head north. This means that 10% fewer departures would route via our proposed routes to the south and southeast compared to today.

### **Farnborough's proposed arrival routes – See Figure C10 on Page C37**

- 4.27. Figure C10 shows the consultation swathe for the arrival routes to both runways. Figure C7 shows today's equivalent pattern. You may prefer to view the website where you can switch between these maps on screen.
- 4.28. Arrow 1 on Figure C7 shows that all arrivals from the north currently route this way (about 55% of all arrivals). Arrows marked 2 show the wide arrival flow from the south and southeast (about 35% of all arrivals), and Arrow 3 shows where they arrive from the southwest (about 10% of all arrivals).
- 4.29. Comparing Figure C7 with Figure C10, we propose that there would be no change to arrivals from the north. Arrivals from the southwest would join the arrivals from the south and southeast.
- 4.30. Remember that only the yellow, pink and blue shaded areas could be up to 7,000ft – the large grey area would be 7,000ft and above, and is currently part of a major air route network running north-south between France and the west side of London.
- 4.31. Figure C10 illustrates that the areas we expect to be over-flown by this proposal are broadly similar to today's spread of flight paths (the dashed lines enclose a similar area), however the proposal would mean the flights would most likely be concentrated somewhere within a smaller region (between the solid red lines). Also, it illustrates where the arrivals would most likely stay at or above 7,000ft (grey shaded region).
- 4.32. This means that the region near Portsmouth in Figure C10 would be over-flown more often, albeit most likely at or above 7,000ft, but the region near Petersfield (Arrow 3 in Figure C7) would be over-flown less often or not at all by our arrivals.
- 4.33. Figure C3 shows where all commercial aircraft currently fly (please note the strong colouring in the vicinity of Portsmouth), and Figure C5 shows where Farnborough aircraft currently fly.

### **Current and forecast air traffic information for Figures C8-C10**

- 4.34. Below, Tables C1-C6 show the potential number of flights that could pass directly overhead if that is where a route gets positioned.

- 4.35. Areas beneath the final routes would expect more over-flights than today due to the more consistent and accurate flight-paths. Areas away from the routes would expect fewer over-flights.
- 4.36. The hourly numbers given in Tables C1-C6 (Pages C27-C28) are *averages*<sup>11</sup>. Like any airport, there are busy periods where flights per hour are greater than the average, likewise there are quiet periods where there are few flights, or none at all. At Farnborough, these peaks and troughs are unpredictable, though weekends and public holidays tend to be less busy than weekdays. This would not change due to the proposal.

## Noise impact for Figures C8-C10

- 4.37. Below, Tables C7-C8 show the potential noise impact of a single flight directly overhead at a given height. This measurement is known as  $L_{max}$ .

## What is the impact now, and what would it be in the future? Worked examples

- 4.38. The following paragraphs explain how to work out the changes in impact for real places, as an example. Follow these examples, use the maps to find where you live or work, and run through the same method for your area of interest.
- 4.39. We have worked three examples below, using the towns of Petersfield, Midhurst and Ropley. To follow the examples we suggest you have the maps nearby, or have the consultation website open with the map pages on display.
- 4.40. We describe what impacts Petersfield, Midhurst and Ropley are exposed to now, what they would be exposed to in the future if this proposal was not implemented, and what they would be exposed to in the future if this proposal was implemented.
- 4.41. To describe the impact today, we used radar data and aircraft numbers from 2012. In 2019, if the proposal was not implemented, aircraft would continue to follow the same flight-paths as today. We have provided forecast numbers of flights for both the most likely and the highest cases. Part A describes the proportions of all Farnborough aircraft that depart to, or arrive from, a given direction.
- 4.42. In these examples, we compare today's movement numbers with the most likely forecast movement numbers for 2019.
- 4.43. Please remember the assumptions in paragraphs 4.10-4.12.
- 4.44. The relevant Figures (C3-C10) are on Pages C30-C37. The relevant Tables (C1-C9) are on pages C27-C29.

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<sup>11</sup> These averages were calculated based on Farnborough being open 253 weekdays for 15 hours, and 110 weekend/ Bank Holiday days for 12 hours, with two days closed (Dec 25th and 26th). The weekend limit set by the Planning Deed will be observed (maximum 17.8% of all annual flights are allowed at weekends).

4.45. We use:	In order to:
Figures C3-C7	See where the place is, in relation to current   flight-paths
Figures C8-C10	See where the place is, in relation to proposed   flight-paths
Tables C1-C6	Find out how many flights affect the place
Tables C7-C9	Understand the noise impacts involved for that place.

## Petersfield

- 4.46. From Figure C3, Petersfield is currently over-flown by commercial air traffic to and from many airports, including established routes to/from Heathrow and Gatwick. This density plot shows Petersfield covered by red, yellow and green colours. There is one red coloured route which passes over the north side of Petersfield. This means that more than 24 flights per day over-fly on that route (at altitudes up to 20,000ft). The green area (on the south side of Petersfield) represents up to 18 flights per day. From Figure C4, Petersfield is within the South Downs National Park.
- 4.47. Figure C5 (Farnborough air traffic only, up to 20,000ft) shows that Petersfield is currently overflowed by Farnborough air traffic. This density plot shows Petersfield covered mainly by the grey colour (note the density plots show one month of data). This means that, on average, Petersfield is directly over-flown less than once per day by Farnborough flights. The light blue swathes either side indicate that 1-3 other Farnborough flights per day pass nearby, but not directly overhead.
- 4.48. Figure C6 and C7 show the Farnborough departures and arrivals respectively below 7,000ft. These show that over Petersfield there are fewer than 1 aircraft per day on average below 7,000ft,, and these are close to 7,000ft since they are close to where the tracks disappear to the south of Petersfield (which is due to the data cutting off at 7,000ft). Hence it can be concluded that the trajectories shown in Figure C3 are generally at or above 7,000ft.

## Petersfield today, and if the proposal was not implemented

- 4.49. Figure C5 and C6 shows Petersfield is partly over-flown by Farnborough departures and arrivals to/from the southwest. Table C3 and C6 show that, in 2012, about 1,150 aircraft arrived from, and departed to, the southwest (arrows marked 3 on figure C6 & C7). In 2019 the most likely number to fly that route would be 1,600 (i.e. ~4 per day).
- 4.50. This many aircraft currently fly through the vicinity of Petersfield:
- 1,150 departures per annum
  - 1,150 arrivals per annum

- 4.51. If the proposal was not implemented (*no change* to tracks), in 2019 this many aircraft would fly through that same vicinity:

1,600 departures per annum

1,600 arrivals per annum

## Petersfield under this proposal

- 4.52. Figure C8 shows Petersfield would not usually be over-flown by any Farnborough departures or arrivals at all, because it would not lie within or near a dashed corridor. However from Figure C9 it can be seen that when gliding activity causes the FUA airspace sharing area to be active (forecast less than 80 days per year), all departures to the south would route to the west of Petersfield.

From Table C2 & C3, in 2019 the greatest likely number to fly that route would be if the FUA airspace sharing occurred 80 days per year, the maximum forecast.

$(5,600 + 1,600) \times (\text{max } 80 \text{ days out of } 365) \text{ departures} = 1,578.$

For noise impacts, see Table C7

No arrivals would be likely to fly in that area, regardless of FUA airspace sharing.

## Midhurst

- 4.53. From Figure C3, Midhurst is currently over-flown by commercial air traffic to and from many airports, including established routes to/from Heathrow and Gatwick. This density plot shows a red band (departures) passing just to the west of Midhurst. This means that, on average Midhurst is overflown by more than 24 flights per day (at altitudes below 20,000ft). From Figure C4, Midhurst is within the South Downs National Park.
- 4.54. Figure C5 (Farnborough air traffic only, up to 20,000ft) shows that Midhurst is currently overflown by Farnborough air traffic. This density plot shows Midhurst covered mainly by the blue colour<sup>12</sup>, with a swathe of green passing to the west. This means that, on average over a month, Midhurst is directly over-flown by up to 3 Farnborough flights, up to 20,000ft. The adjacent colours mean that other Farnborough flights (up to 5) pass nearby, but not directly overhead.
- 4.55. Figure C6 and C7 show the Farnborough departures and arrivals respectively up to 7,000ft. These show that Midhurst is covered partly by grey, partly by blue, so there are up to 3 Farnborough aircraft per day up to 7,000ft.

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<sup>12</sup> Remember that the colour key for Figure C3 is different from other Figures because Figure C3 includes traffic for *all* airports

## Midhurst today, and if the proposal was not implemented

- 4.56. Figure C5 & C6 shows Midhurst is partly over-flown by Farnborough departures to, and arrivals from, the south. Table C3 & C6 show that, in 2012, about 5,175 aircraft arrived/departed to the south (arrows numbered 2 on Figures C6 and C7). In 2019 the most likely number to fly that route would be 5,600 (i.e. ~15 per day).
- 4.57. This many aircraft currently fly in the vicinity of Midhurst:
- 5,175 departures per annum
  - 5,175 arrivals per annum
- 4.58. If the proposal was not implemented (*no change* to tracks), in 2019 this many aircraft would fly within that same vicinity:
- 5,600 departures per annum
  - 5,600 arrivals per annum

## Midhurst under this proposal

- 4.59. Figure C8 shows a dashed corridor to the west of Midhurst, through which Farnborough departures would fly climbing through about 5,000ft passing by the town. Figure C10 shows a wide dashed box through which Farnborough arrivals would descend, which includes Midhurst, at about 5,000ft. From Figure C9 it can be seen that, when gliding activity causes the FUA airspace sharing area to be active (forecast 30 - 80 days per year), departures to the south would not fly over Midhurst. From Table C2 & C3, in 2019 the greatest likely number to fly in the vicinity would be if the FUA airspace sharing occurred 30 days per year, the minimum forecast.
- $5,600 \times (365 - 30 \text{ days FUA}) / 365 = 5,140$  departures per annum - For noise impacts, see Table C7
- 5,600 arrivals per annum - For noise impacts, see Table C8

## Ropley

- 4.60. From Figure C3, Ropley is currently over-flown by commercial air traffic to and from many airports, including to/from Heathrow and Gatwick. This density plot shows Ropley covered by a mix of light blue and grey. This means that, on average Ropley is over-flown by up to 12 flights per day (by aircraft at altitudes below 20,000ft). From Figure C4, Ropley is not actually within a National Park or AONB, but it is near the boundary of the South Downs.
- 4.61. Figure C5 (Farnborough air traffic only, up to 20,000ft) shows that Ropley is occasionally grazed by Farnborough air traffic.

- 4.62. Figure C6 and C7 show the Farnborough departures and arrivals respectively below 7,000ft. These show that no Farnborough aircraft over-fly Ropley below 7,000ft.

### Ropley today, and if the proposal was not implemented

- 4.63. Figure C6 & C7 show Ropley is not over-flown by Farnborough departures or arrivals below 7,000ft.
- 4.64. If the proposal was not implemented, in 2019 Ropley would still not be over-flown by Farnborough aircraft. Aircraft to/from other airports would continue to over-fly Ropley.

### Ropley under this proposal

- 4.65. Figure C8 shows that if the proposal is implemented, the vicinity of Ropley would regularly be over-flown by Farnborough departures at a typical altitude of about 7,000ft. From Figure C9 it can be seen that, when gliding activity causes the FUA airspace sharing area to be active (forecast 30 - 80 days per year), departures to the north & southwest would still route in the vicinity of Ropley. From Figure C10, Farnborough arrivals would be unlikely to over-fly Ropley. From Table C2 & C3, in 2019 the most likely number to fly in the vicinity of Ropley would be:

$5,600 + 1,600 = 7,200$  Farnborough departures per annum (~20 per day).

For noise impacts, see Table C7

No arrivals would fly in that area, regardless of FUA airspace sharing.

### Noise impacts

- 4.66. Comparing the noise impacts for departures (Table C7) and arrivals (Table C8) against Table C9 (which gives examples of everyday noises) allows you to understand the approximate scale of the noise impact. Farnborough aircraft are generally moving quickly, so each noise impact would build then disappear as each aircraft got closer then moved away.

### End of worked examples

- 4.67. Completing this exercise for yourself will allow you to form your own opinion on the change in impact this proposal could have on where you live or work.
- 4.68. Remember that, if this proposal is **not** implemented, the forecast 2019 traffic numbers would **still** apply to today's flight-paths.

## Departing Aircraft Numbers<sup>13</sup>: Figures C6, C8 and C9

Flights	2012 Typical	2015 Most Likely	2015 High Forecast	2019 Most Likely	2019 High Forecast
Annual	5,175	7,425	12,375	8,800	13,750
Average Per Hr Weekday	1.12	1.61	2.68	1.91	2.98
Average Per Hr Weekend	0.70	1.00	1.67	1.19	1.85

**Table C1: Departures to the north (ref Figure C6 arrow No.1)**

Under this proposal, future departures to the north would route west first, moving the route from the immediate northwest of Farnborough further towards the west before heading north. Departures to the east would initially route north instead of south. Departures to the southwest would route this way initially (adding from Table C3).

Flights	2012 Typical	2015 Most Likely	2015 High Forecast	2019 Most Likely	2019 High Forecast
Annual	5,175	4,725	7,875	5,600	8,750
Average Per Hr Weekday	1.12	1.02	1.71	1.21	1.90
Average Per Hr Weekend	0.70	0.64	1.06	0.76	1.18

**Table C2: Departures to the south (ref Figure C6 arrow No.2)**

Under this proposal, future departures to the south would route in a similar manner to today (Figure C8). Departures to the east would initially route north instead of south.

If the (infrequent) FUA sharing arrangement was activated, these numbers would instead use the alternate route illustrated in Figure C9.

Flights	2012 Typical	2015 Most Likely	2015 High Forecast	2019 Most Likely	2019 High Forecast
Annual	1,150	1,350	2,250	1,600	2,500
Average Per Hr Weekday	0.25	0.29	0.49	0.35	0.54
Average Per Hr Weekend	0.16	0.18	0.30	0.22	0.34

**Table C3: Departures to the southwest (ref Figure C6 arrow No.3)**

Under this proposal, future departures to the southwest would route west first (adding to Table C1).

<sup>13</sup> As per Part A, the proportion of departures to the north would change due to requests from NATS En-Route, the next 'link' in the ATC chain. This has been included in these calculations.

**Arriving Aircraft Numbers<sup>14</sup>: Figures C7 and C10**

Flights	2012 Typical	2015 Most Likely	2015 High Forecast	2019 Most Likely	2019 High Forecast
Annual	5,175	7,425	12,375	8,800	13,750
Average Per Hr Weekday	1.12	1.61	2.68	1.91	2.98
Average Per Hr Weekend	0.70	1.00	1.67	1.19	1.85

**Table C4: Arrivals from the north (ref Figure C7 arrow No.1)**

Under this proposal, future arrivals from the north would route in a similar manner to today.

Flights	2012 Typical	2015 Most Likely	2015 High Forecast	2019 Most Likely	2019 High Forecast
Annual	5,175	4,725	7,875	5,600	8,750
Average Per Hr Weekday	1.12	1.02	1.71	1.21	1.90
Average Per Hr Weekend	0.70	0.64	1.06	0.76	1.18

**Table C5: Arrivals from the south (ref Figure C7 arrow No.2)**

Under this proposal, future arrivals from the south would route in a similar manner to today, and would be joined by the arrivals from the southwest (adding from Table C6).

If the FUA sharing arrangement was activated, it would make no difference to the numbers or to where they flew – Figure C10 would continue to apply.

Flights	2012 Typical	2015 Most Likely	2015 High Forecast	2019 Most Likely	2019 High Forecast
Annual	1,150	1,350	2,250	1,600	2,500
Average Per Hr Weekday	0.25	0.29	0.49	0.35	0.54
Average Per Hr Weekend	0.16	0.18	0.30	0.22	0.34

**Table C6: Arrivals from the southwest (ref Figure C7 arrow No.3)**

Under this proposal, future arrivals from the southwest would route at a higher altitude heading eastwards, turning left to join the arrivals from the south (adding to Table C5).

14 As per Part A, the proportion of departures to the north would change due to requests from NATS En-Route, the next 'link' in the ATC chain. This has been included in these calculations.

## Departure Noise Information

Height above ground	Peak noise impact of most common aircraft types Executive Jets (75%)	Peak noise impact of noisiest aircraft types A320/ Boeing 737 (10%)
4,000ft-5,000ft	61-64 dBA	63-66 dBA
5,000ft-6,000ft	57-61 dBA	60-63 dBA
6,000ft-7,000ft	56-57 dBA	59-60 dBA
Above 7,000ft	Up to 56 dBA	Up to 59 dBA

**Table C7: Departures - Typical noise level (L<sub>max</sub> dBA) at various heights for the most common aircraft types, and the noisiest aircraft types, using Farnborough.**

The highest L<sub>max</sub> dBA would be for the aircraft at the lowest altitude in each band.

## Arrival Noise Information

Height above ground (ft)	Peak noise impact of most common aircraft types Executive Jets (75%)	Peak noise impact of noisiest aircraft types A320/ Boeing 737 (10%)
4,000ft-5,000ft	Up to 57 dBA	59-61 dBA
5,000ft-6,000ft	55 dBA or below	57-59 dBA
6,000ft-7,000ft	55 dBA or below	55-57 dBA
Above 7,000ft	55 dBA or below	55 dBA or below

**Table C8: Arrivals - Typical noise level (L<sub>max</sub> dBA) at various heights for the most common aircraft types, and the noisiest aircraft types, using Farnborough.**

The highest L<sub>max</sub> dBA would be for the aircraft at the lowest altitude in each band.

## Table of Equivalent Sounds

Example Sound	Noise level (dBA)
Chainsaw, 1m distance	110
Disco, 1m from speaker	100
Diesel truck pass-by, 10m away	90
Kerbside of busy road, 5m away	80
Vacuum cleaner, 1m distance	70
Conversational speech, 1m away	60
Quiet office	50
Room in quiet suburban area	40

**Table C9: Table of noise levels (L<sub>max</sub> dBA) for equivalent sounds<sup>15</sup>**

<sup>15</sup> Based substantially on [www.sengpielaudio.com/TableOfSoundPressureLevels.htm](http://www.sengpielaudio.com/TableOfSoundPressureLevels.htm)

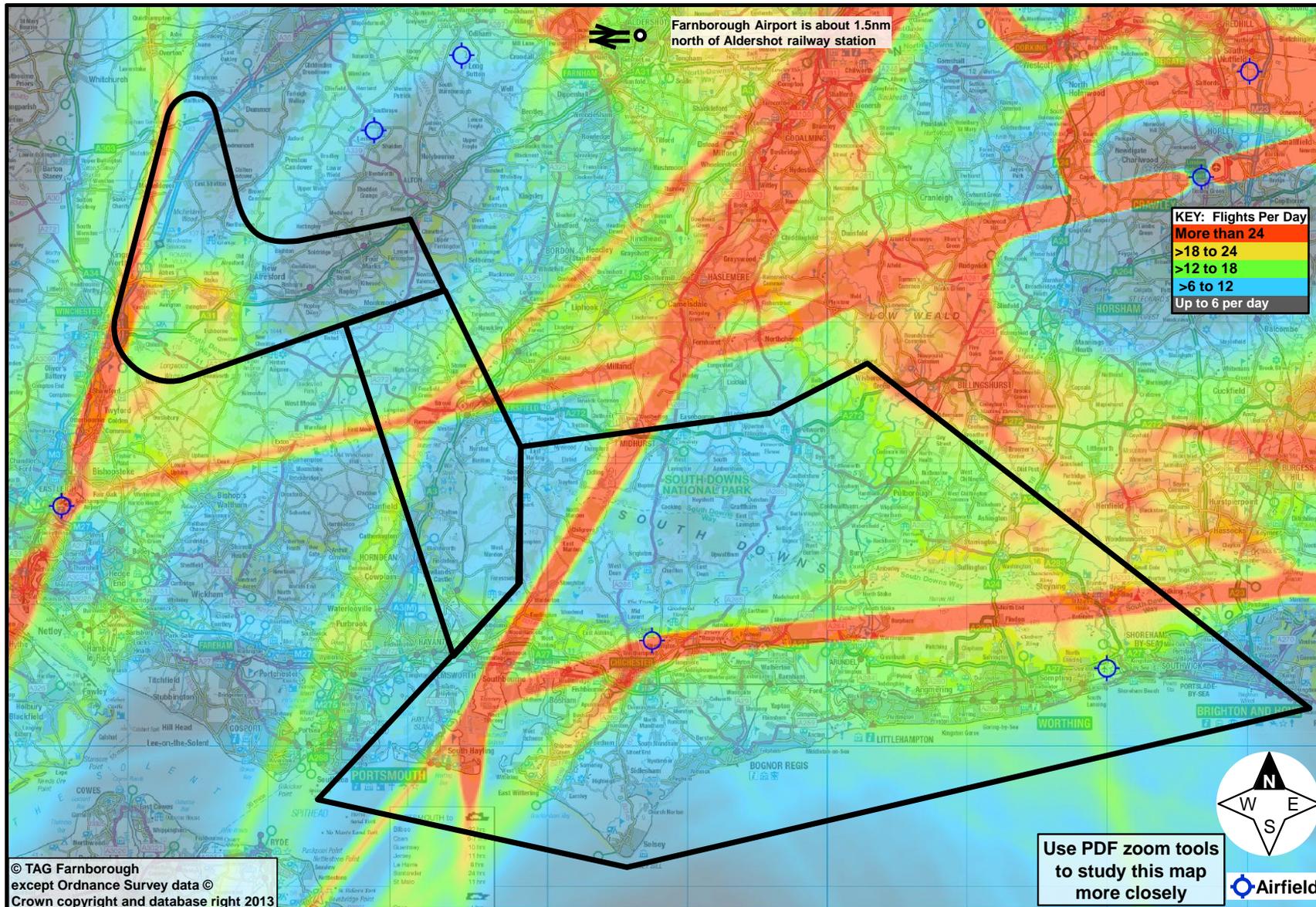


Figure C3: All commercial flights (up to 20,000ft) density plot

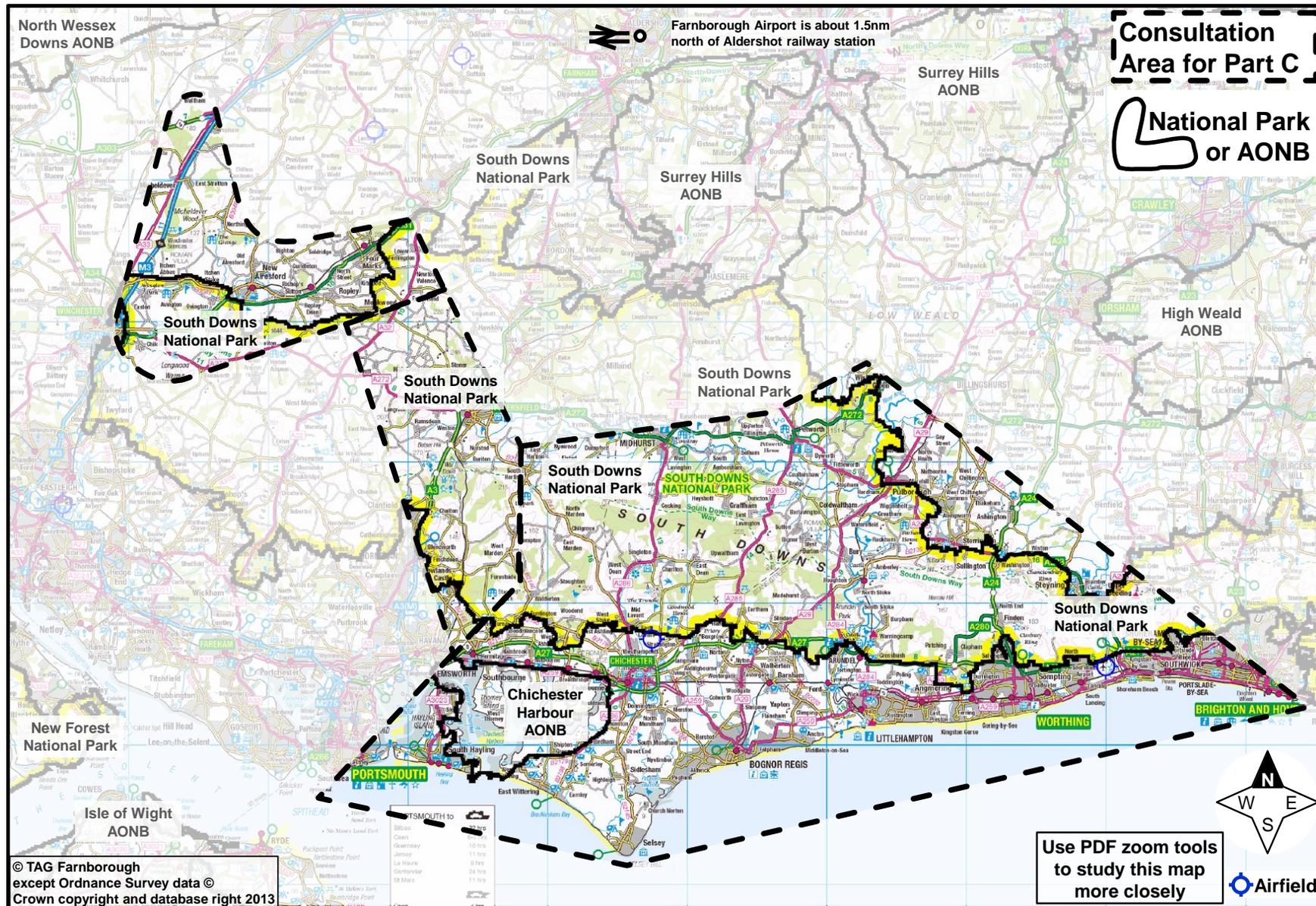


Figure C4: National Parks and AONBs

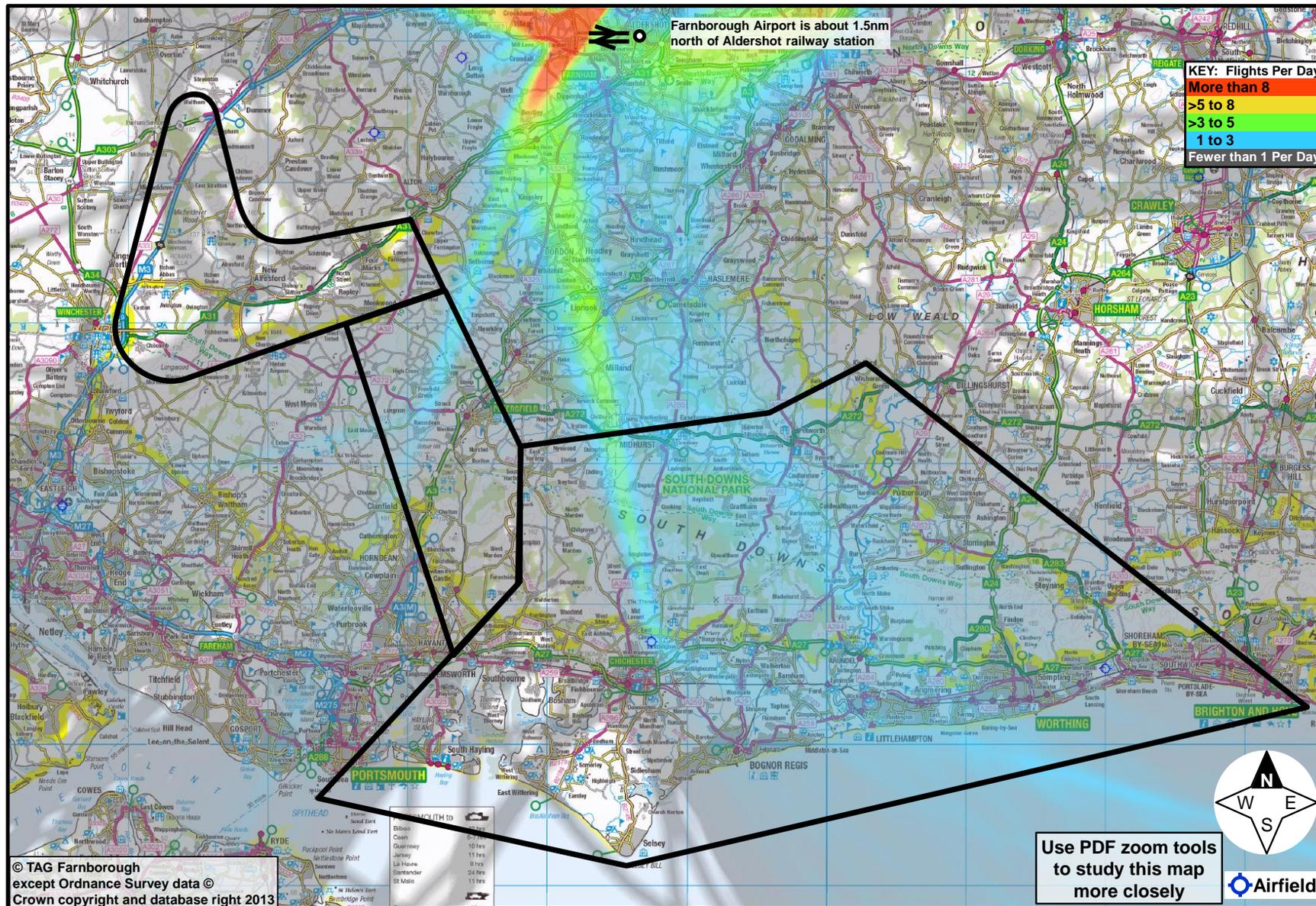


Figure C5: Farnborough departures and arrivals (up to 20,000ft) density plot

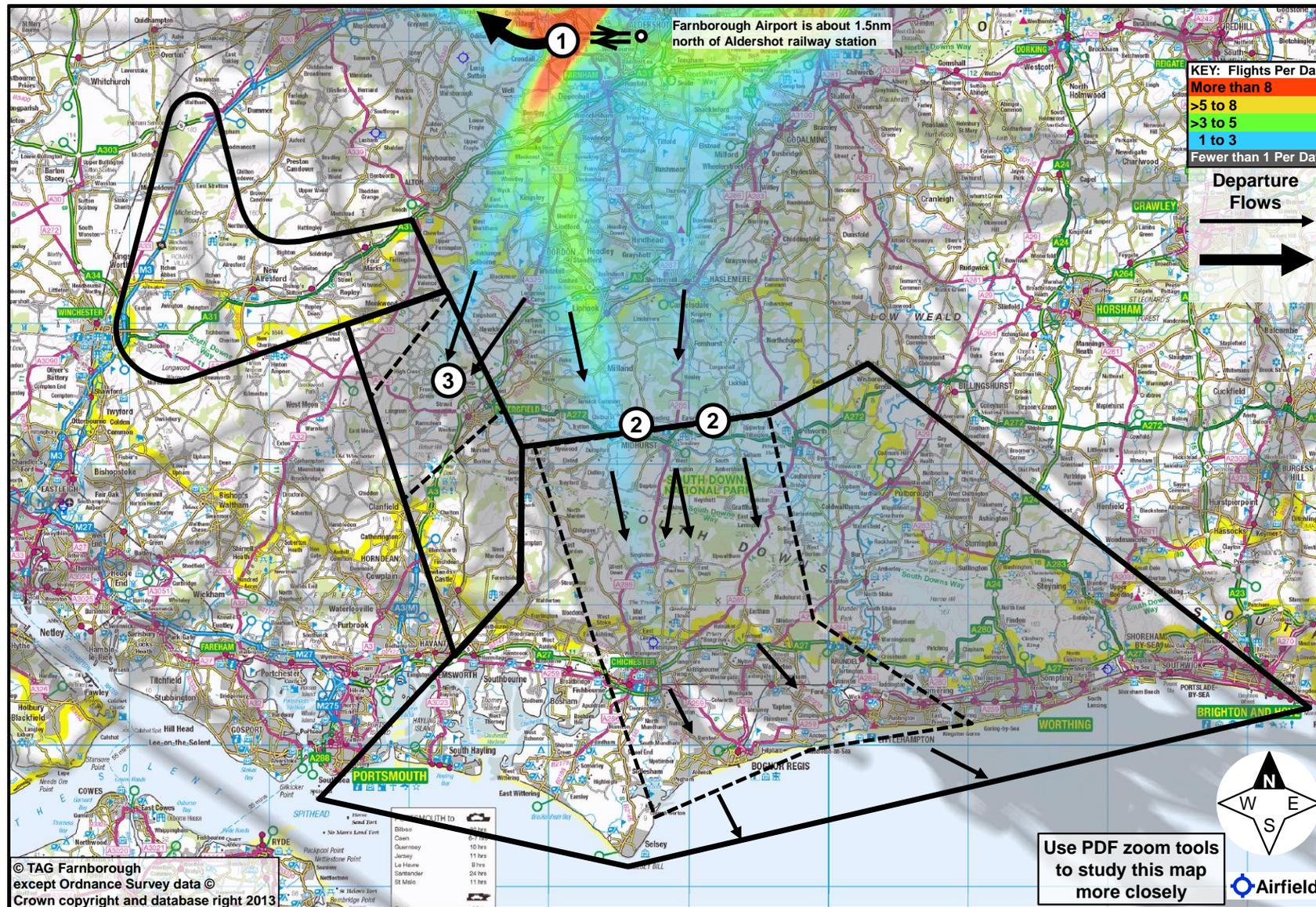


Figure C6: Arrows/dotted lines show Farnborough departure flows to the south (Radar data shows all Farnborough air traffic up to 7,000ft)

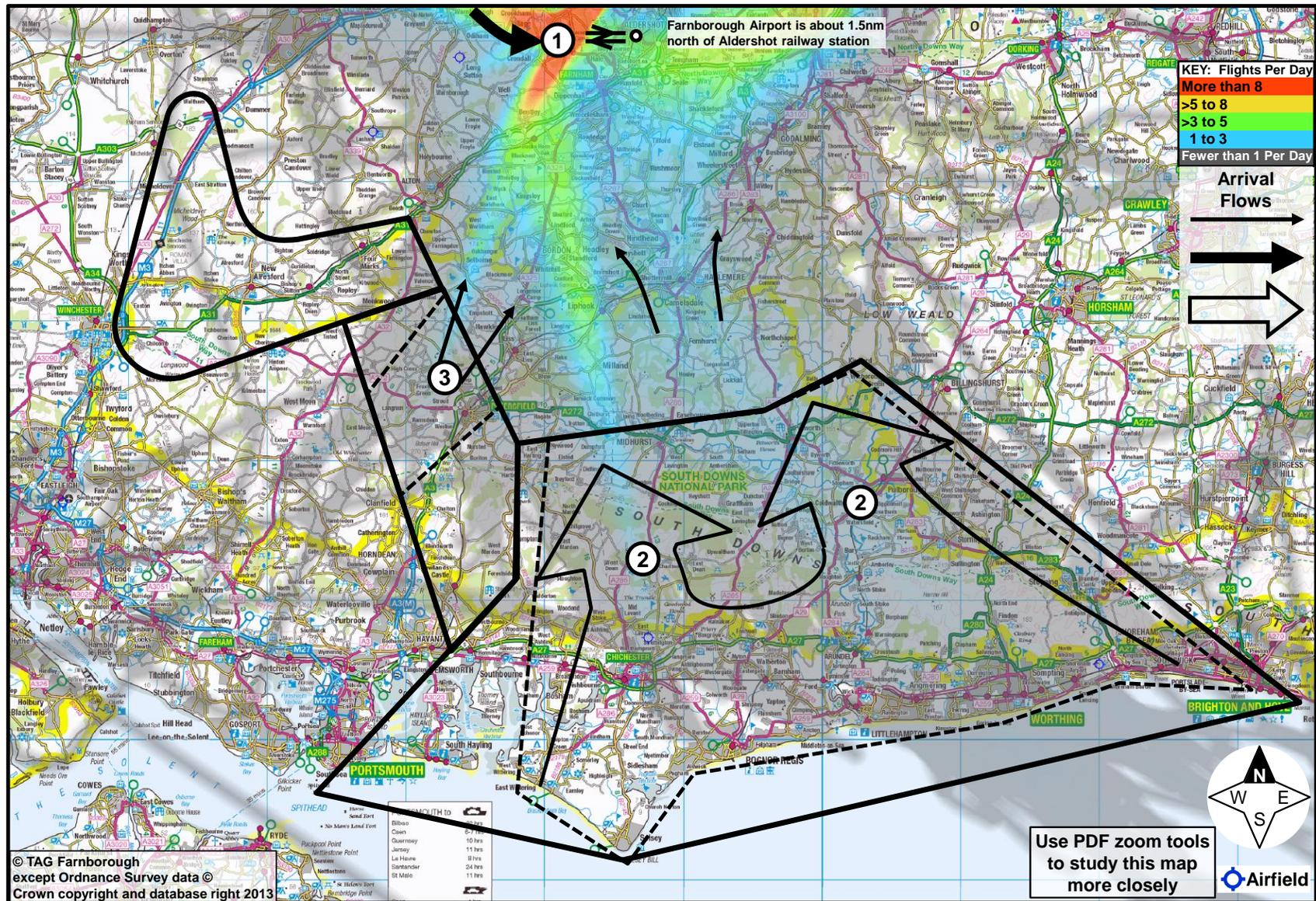


Figure C7: Arrows/dotted lines show Farnborough arrival flows from the south (Radar data shows all Farnborough air traffic up to 7,000ft)

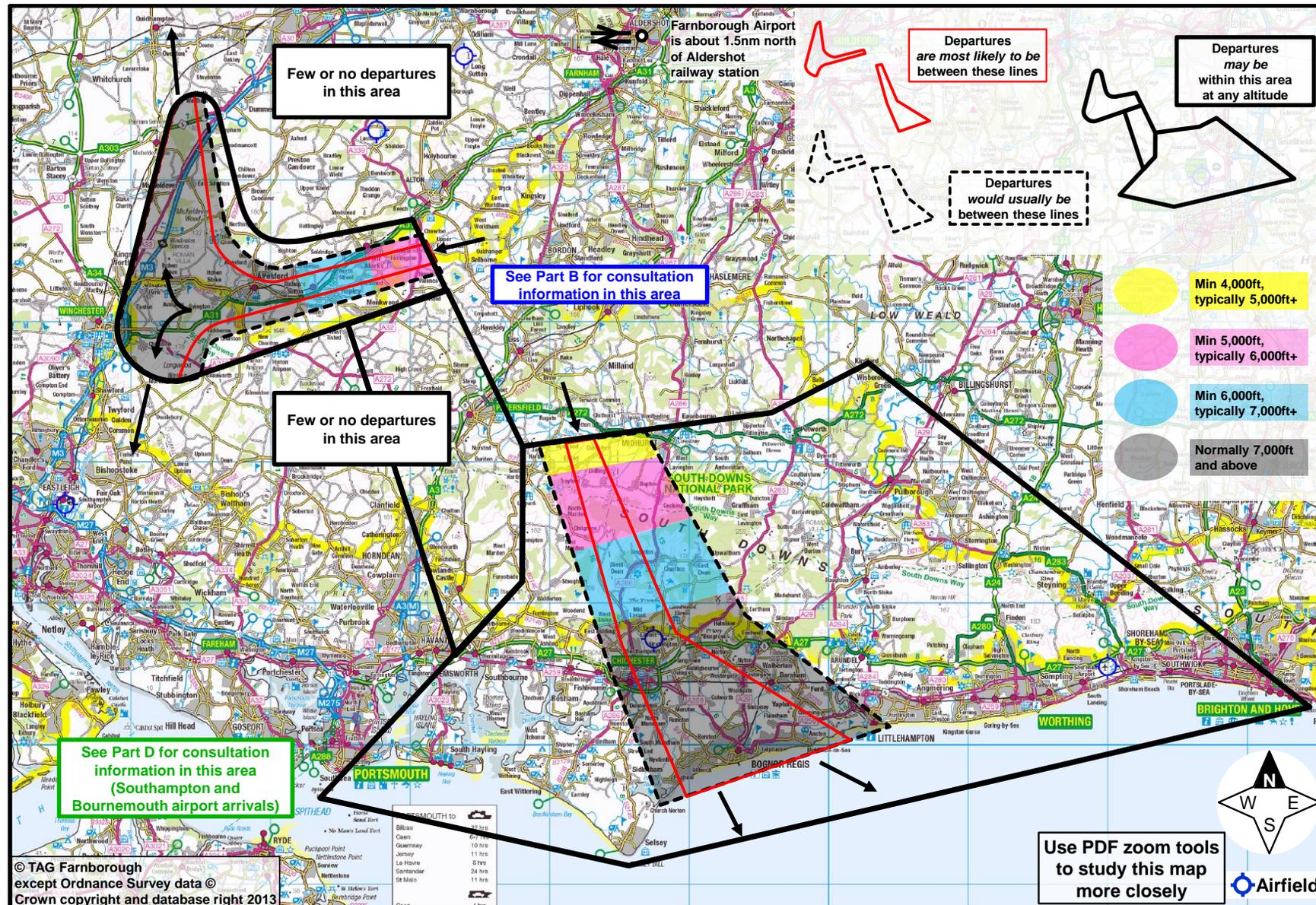


Figure C8: Proposed Farnborough departures (4,000ft-7,000ft) when FUA airspace sharing is not active (most of the time)

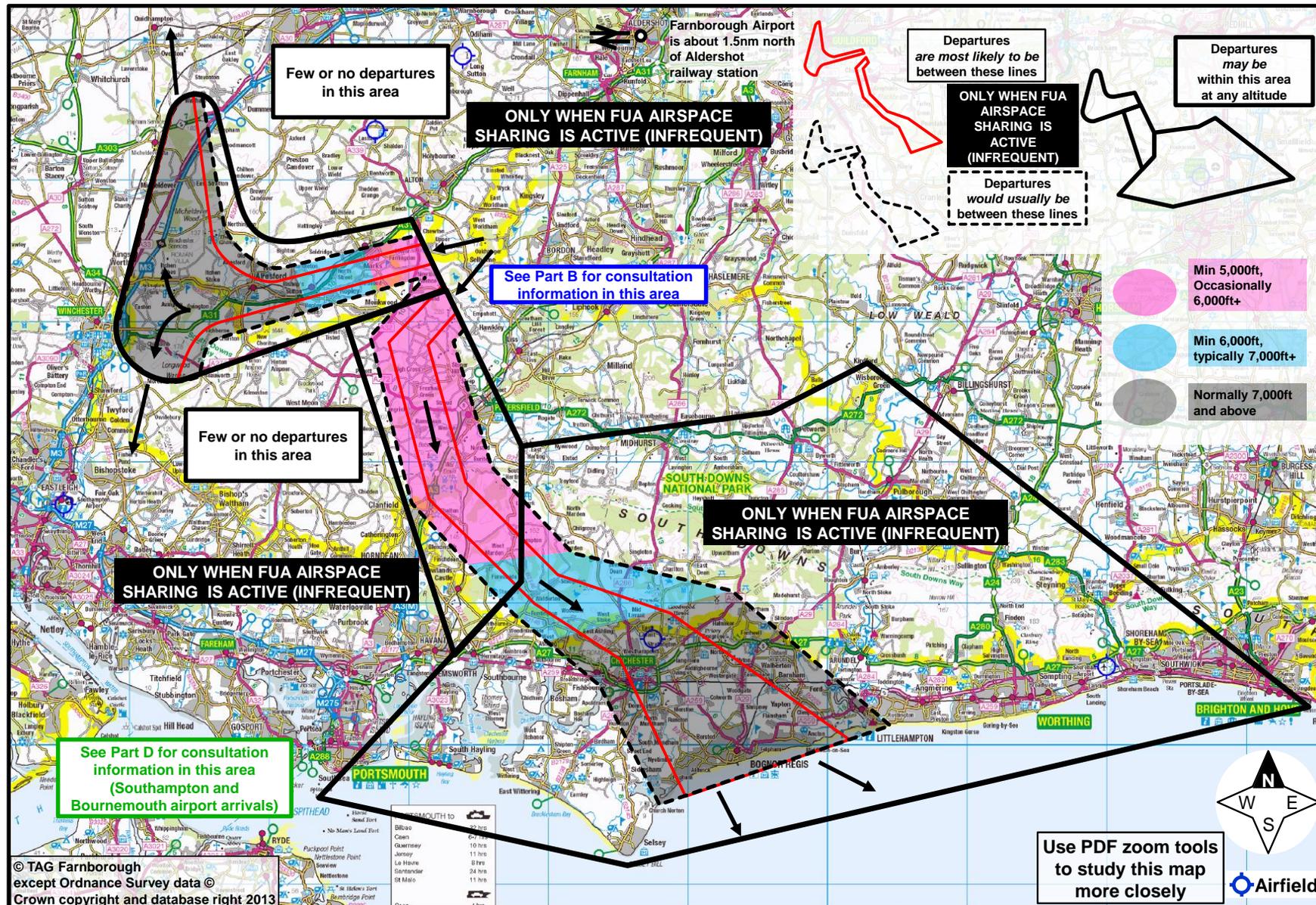


Figure C9: Proposed Farnborough departures (4,000ft-7,000ft) when FUA airspace sharing is active (infrequent)

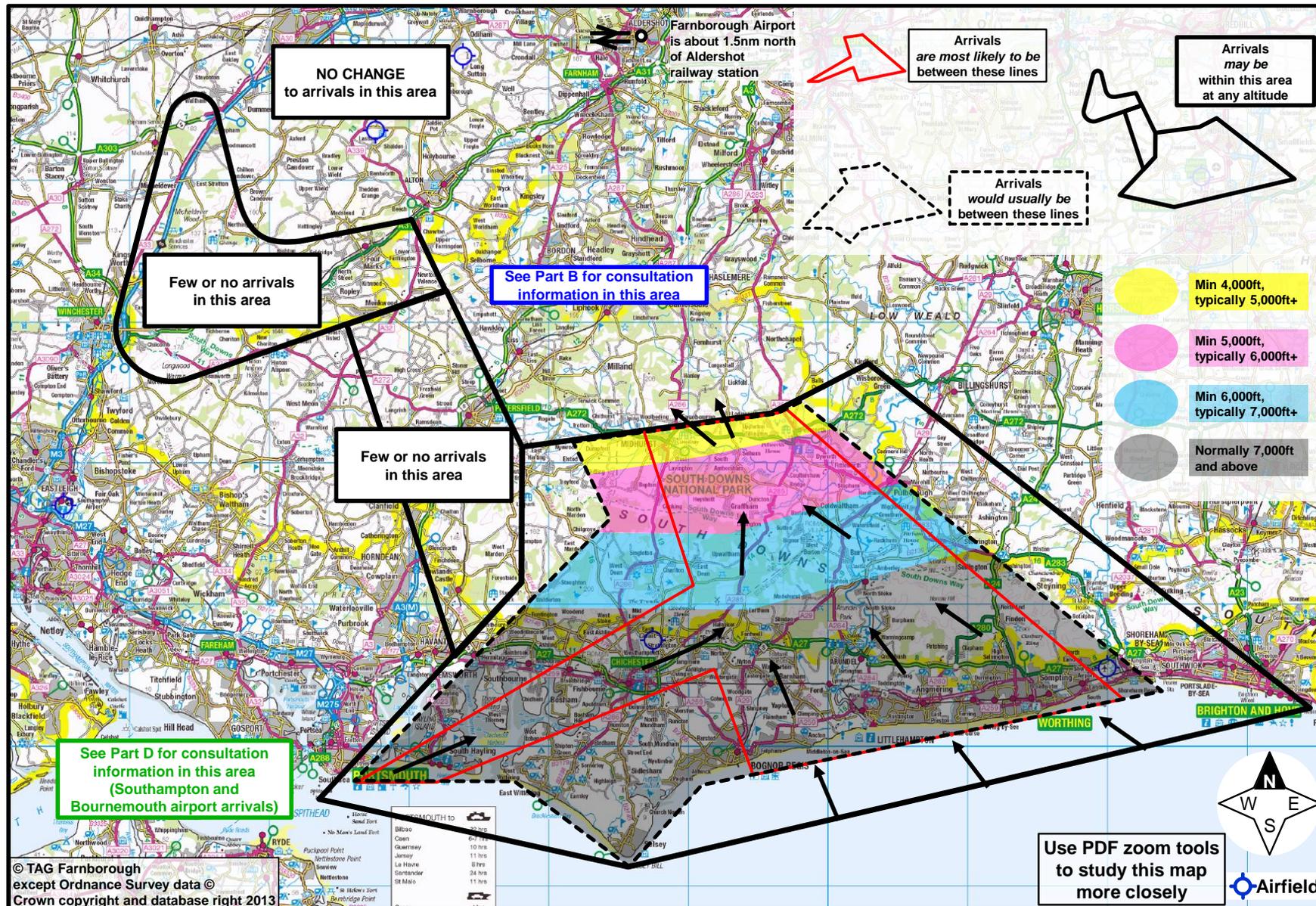


Figure C10: Proposed Farnborough arrivals from the South (4,000ft-7,000ft) regardless of airspace sharing

### Question C4 – Specific Locations

This question is about *places* within the consultation swathes.

In Section 4 we asked you to consider your area(s) of interest using the maps, and compare the impact now with the impact under this proposal.

We want you to tell us about places within the black consultation region that you think require special consideration in the ongoing design process.

Bear in mind that aircraft at intermediate altitudes (4,000ft-7,000ft) appear smaller and quieter than those at low altitudes (below 4,000ft). Also bear in mind the effect of the airspace sharing arrangement with gliders, FUA, that would infrequently move our southbound departure flight-path.

Ideally, you would supply us with a postcode of the location. Otherwise, please use town or village names, the names of National Parks/AONBs, or other easily identifiable location. This means we can find the right place more easily.

Tell us broadly what type of place this is by choosing the closest type from the online menu. Do you think these places would benefit from the proposed change, or not, and to what extent? Describe the characteristics of these places, stating whether they should be considered special due to concerns about noise impact, visual impact or other reason.

You can do this for as many locations as you wish. We have provided a template for you below. Choose the closest or most important option from those suggested, or add your own if none are suitable.

Structuring your response like this will make it easier for us to analyse your feedback, which in turn makes it more effective on your behalf.

#### Location

Postcode, or name of easily identifiable place.

#### **What type of place is this?** *I consider this a...*

Populated residential area / Busy commercial area (town centre, retail park) / Industrial area (including military use) / Recreational area / Tranquil area / Sensitive area (e.g. hospital) / Village / Nature area / Tourist attraction / Transport link (railway, motorway, airport) / Other (brief description)

#### **What would the change in impact be, on this place?** *If the change occurred, this place would...*

Benefit significantly from the change / Benefit slightly / Probably not notice the change / Be slightly negatively impacted / Be very negatively impacted by the change

#### **Why would the impact change, on this place?** *If I was at this place...*

I would hear less aircraft noise / I would see fewer aircraft / It wouldn't make much difference to me / I would hear more aircraft noise / I would see more aircraft / Other (brief description)

Choose the **most relevant**, or **most important**, item from the suggestions, or add your own if none are suitable.

Please repeat this process until you have finished telling us about specific locations that are important to you.

## 5. Changes below 4,000ft, and changes above 7,000ft

- 5.1. For information relating to changes below 4,000ft in the vicinity of Farnborough, see Part B of this consultation document.
- 5.2. Changes above 7,000ft are designed for flight efficiency because they are far less likely to be noticeable from the ground. Changes due to this proposal above 7,000ft are mostly over the sea wherever possible, or are within modified areas of the current air route network where aircraft are already common.

### **General Question**

If there is something that you think we should know that hasn't already been covered by the questions in this document (or by other questions in other parts of this consultation), please provide a statement.

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