YOUR LONDON AIRPORT Gatwick

Redesign of Gatwick Route 4 RNAV SIDs

Design Principles Report

CAA Ref: ACP-2018-86

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1 Introduction

1.1 Purpose

The purpose of this document is to explain how London Gatwick Airport have conducted engagement with stakeholders to develop a proposed suite of design principles to support our airspace change proposal (ACP-2018-86). Our design principle engagement was conducted in line with Stage 1B of the CAA's guidance on the regulatory process for changing the airspace design (known as CAP1616). ACP-2018-86 concerns modifications to Route 4, specifically the introduction of new RNAV1 performance-based navigation (PBN) Standard Instrument Departure (SID) Procedures. [1]

1.2 Current operations on Route 4

This section provides a short description of the current operations on Route 4, which is important context for the rest of this report.

In the UK the prevailing wind direction dictates that the majority of aircraft departures and arrivals are conducted in a westerly direction. Over the last 20 years, on 76% of occasions the westerly runway (Runway 26) at LGW was utilised for all departing and arriving aircraft. Easterly operations took place on 24% of occasions.

Route 4 is a departure route for aircraft taking off in a westerly direction from Runway 26. This route is one of nine departure routes from LGW. Route 4 is aligned to the published Noise Preferential Route (NPR) where, after take-off, aircraft turn right through 180 degrees, and onto a near reciprocal heading, tracking in an easterly direction to the South of Reigate and Redhill and north of Horley.

During the 12-months to February 2019, operations on the westerly runway have taken place on 64% of occasions; slightly lower than the 20-year average. During that time, 35,300 aircraft used Route 4, which represents 25% of all departures across LGW's nine departure routes.

Figure 1 shows the Route 4 NPR and its associated conformance swathe. The NPR swathe provides a degree of tolerance as aircraft using conventional navigation are likely to be more dispersed around the route centreline than aircraft using PBN technology. Once aircraft have climbed above 4,000 ft above mean sea level (AMSL), they are deemed to be clear of the NPR and can be vectored if required by Air Traffic Control (ATC).

[1] See the Statement of Need, published on the CAA Portal

Figure 1 - Route 4 NPR and Swathe

Figure 2 to Figure 4 show the traffic over 24 hours during a summer day. Each figure depicts the aircraft tracks at or below the altitude specified in the caption. The source data is provided by the LGW radar and Noise and Track Keeping (NTK) system. The radar data shows only those aircraft associated with a flight plan filed from LGW and flown along Route 4 up to the specified altitude.

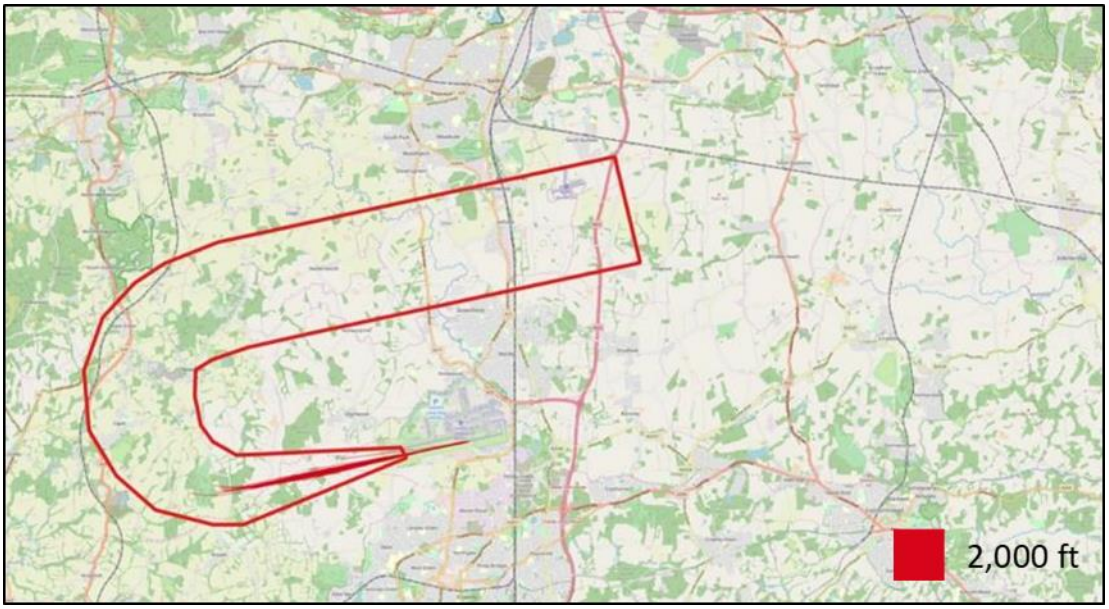

Figure 2 - Aircraft tracks at or below 2,000 ft AMSL (single summer day, 22nd July 2018).

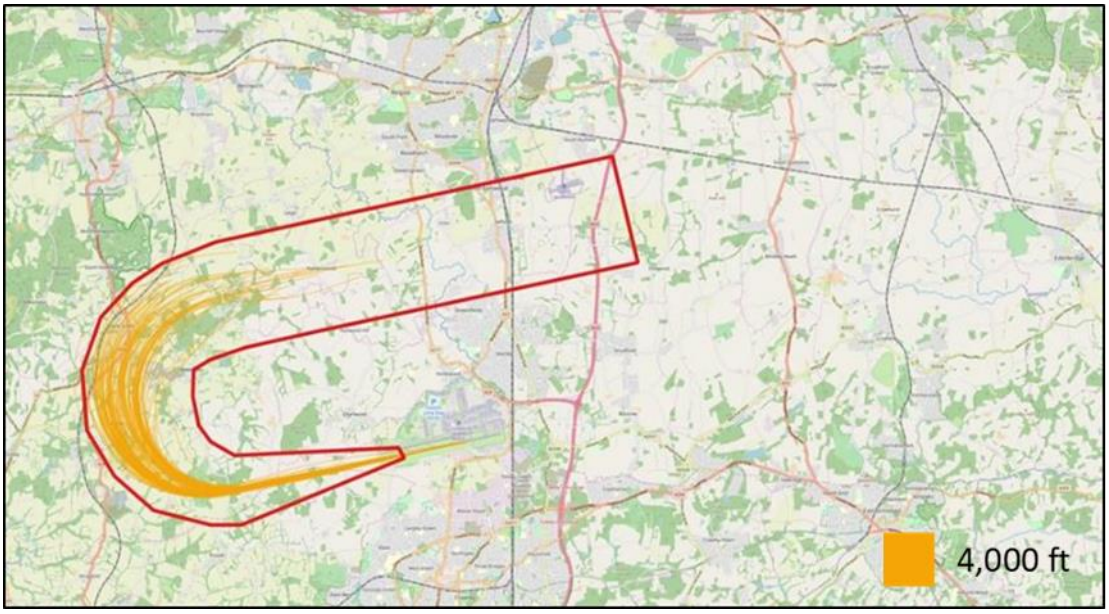

Figure 3 - Aircraft tracks at or below 4,000 ft AMSL (single summer day, 22nd July 2018).

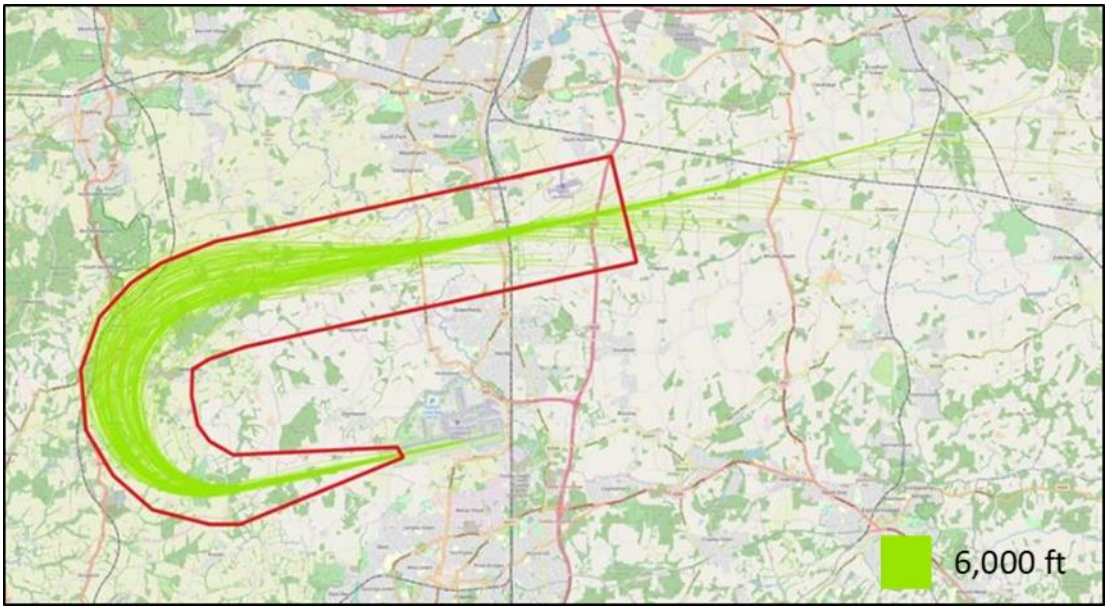

Figure 4 - Aircraft tracks at or below 6,000 ft AMSL (single summer day, 22nd July 2018).

Figure 5 shows all aircraft tracks using Route 4 during the month of July 2018. This figure shows more clearly how the distribution of tracks tend toward the outside of the turn, and some flights tracked outside the NPR swathe. The traffic outside of the NPR swathe is generally that in the altitude bands above 4,000 ft (green, blue and lilac).

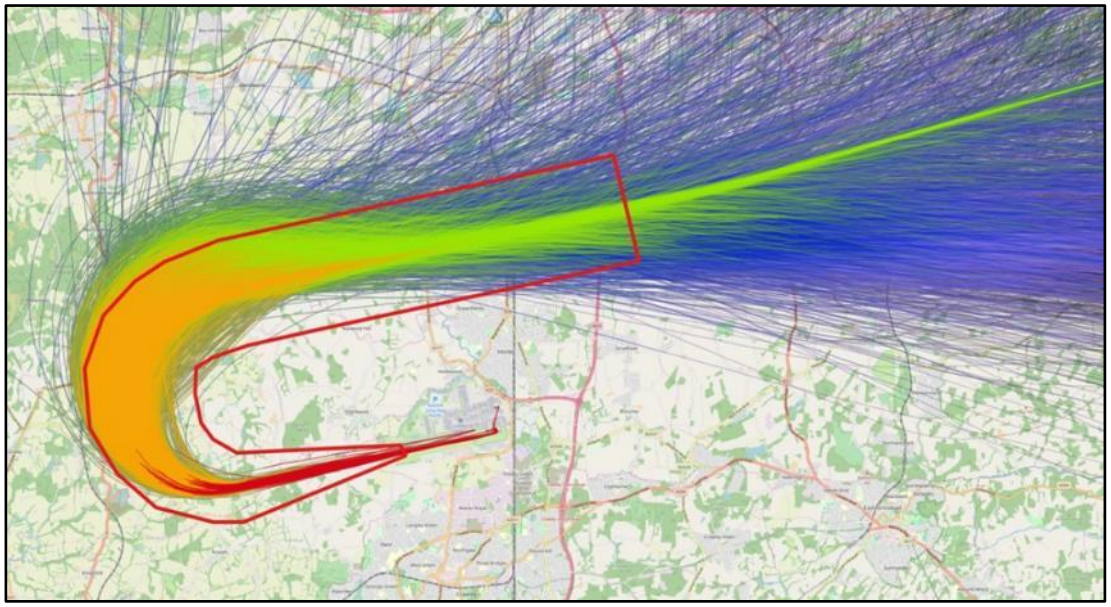

Figure 5 - Aircraft tracks over one summer month (July 2018).

1.3 Background to this ACP

This section summarises the origins of ACP-2018-86 to introduce RNAV[2] SIDs for Route 4.

The introduction of RNAV SIDs for Route 4 has been subject to regulatory and legal challenge since its original approval in 2013, when the CAA approved the introduction of RNAV procedures for all nine LGW departure routes. In 2015 the CAA conducted a Post Implementation Review and approved most of the routes for continued use but found that Route 4 had not delivered the aim of the airspace change and required the route to be modified. This work was completed, and we submitted an amended Route 4 proposal which was ratified by the CAA.

However, the community group 'Plane Justice' then sought a judicial review to challenge the CAA's Post Implementation Review decision. Following a further detailed investigation, the CAA asked the court to quash their previous decision. . The Route 4 conventional SIDs were to be reverted to the track as published on 6 April 2017 whilst the RNAVSIDs assumed a temporary status. Following further correspondence between the CAA, Plane Justice and ourselves, it is expected that the CAA will in due course be able to draw to a close the ACP originally approved in 2013 and address the current temporary status of the existing Route 4 RNAV SIDs. This ACP is not connected in process to the previous airspace change.

The objectives of this ACP are to design and implement new RNAV SIDs for Route 4 that:

- Improve further, where practicable, aircraft and passenger safety;
- Limit and seek to reduce, where possible, the environmental impact on local communities in the vicinity of the Route 4 SIDs;

[2] RNAV, or Area Navigation is a navigational accuracy specification, based on GNSS technology, that permits an aircraft to follow any desired route without reliance on ground-based navigation beacons.

- Enable further improvements in safety and noise reduction through the application of more efficient FASI-South[3] operating procedures and opportunities;
- Provide long term predictability of flight paths.

1.4 CAP1616 Airspace Change Process

This section sets out the requirements of Stage 1B of the CAP1616 process. In Stage 1 (Define), the CAA requires sponsors to satisfactorily assess the requirement for an airspace change by producing a Statement of Need and then to develop a set of design principles that encompass the safety, environmental and operational criteria and policy objectives that the sponsor aims for in developing its airspace change. The design principles are developed through engagement with stakeholders and form a qualitative framework against which design options can be evaluated.

The Define Gateway assessment criteria, as set out in Appendix D to CAP1616, require that sponsors present a range of information to the CAA. Table 1 summaries the criteria and indicates where the relevant information can be found in this document and its appendices.

CAA Stage 1B Criteria	Location of Evidence
List of stakeholders engaged	Section 2 para 2.2, Development of List of Stakeholders Section 2 Table 2 - Timeline of significant events, Focus Group Details - Appendix 1 -
Explanation of the engagement methods involved	Section 2 paras 2.2 - 2.5 Section 4 paras 4.2 - 4.3
Approach to and chronology of the engagement activity	Section 2 paras 2.2 - 2.5 Section 4 para 4.2
Issues raised during the engagement	Section 3 para 3.2 Section 4 paras 4.5 - 4.5.20, Design Principle Review Responses
Evidence of two-way discussion	Material distributed to stakeholders: • Stakeholder Questionnaires, Appendices Appendix 2 - Appendix 5 - • Design Principles Stakeholder Review
Rationale to adopt or discount design principles	Section 3 paras 3.3 - 3.4 Section 5 para 5.2 - 5.18

[3] FASI-South is the umbrella name for the programme to modernise the airspace structure and route network in Southern England. The programme is a collaborative initiative between 17 airports, and NATS as the UK's en route air navigation services provider (ANSP).

Technical and strategic considerations	Section 1 para 1.3 Section 5 Design Principles Section 6 Alignment to Route 4 Change Objectives, Table 6 - Alignment of Design Principles with the Airspace Change Objectives
Design Principles	Section 6 Final Shortlist of Design Principles

Table 1 - Stage 1B Output Evidence

2 Approach to Stakeholder Engagement

2.1 Introduction

This section summarises our approach to engaging with stakeholders, and specifically:

- Details of the stakeholders that were engaged;
- Explains the engagement methods we used;
- Describes the approach and chronology of our engagement.

It is important for design principles to be drawn up through discussion between the sponsor and stakeholders at the early stages of the airspace change process. The aim of our engagement is to ensure that LGW has a good understanding of the proposed change and to ascertain what design considerations are important to stakeholders.

2.2 List of stakeholders engaged

We invited a wide range of organisations and groups to help develop the design principles for our ACP, drawn from the following categories:

- Airlines and the wider aviation industry;
- Councils and public officials;
- Environmental and campaign groups.

In developing the stakeholder list, we looked at those communities that are under the current flight paths, as well as those who had previously expressed an interest in our airspace projects through their representative community groups. We identified that communities within seven district and borough councils could potentially be affected by this ACP. These boroughs fall within Kent, Surrey and West Sussex. In addition, we identified three town and 14 parish councils that could potentially be affected. The potentially affected area also includes the Surrey Hills Area of Outstanding Natural Beauty (AONB).

A full list of the organisations and groups that we invited to participate in the development of design principles for this ACP, and the extent to which we received feedback, is set out in Appendix 1 - .

2.3 General Approach to Development of Principles

Our general approach to the development of design principles for this ACP was to ensure a high degree of transparency and two-way engagement with all relevant stakeholders, including local communities, so that the options for new Route 4 RNAV SIDs are designed in accordance with the priorities of those stakeholders that are most likely to be affected.

Two main activities have helped us to determine the long list of potential design principles set out in section 3:

- A design principles development questionnaire; and
- Stakeholder focus groups

Table 2 sets out the timeline of significant events that we undertook throughout the engagement:

Date	Activity
17 April 2019	GAL letters sent out to stakeholders
17 April 2019	Design principle questionnaires distributed
8 May 2019	Reminders sent to complete the questionnaires and attend focus groups
10 May 2019	Deadline for responses to the questionnaire
15 May 2019	Focus Group 1
16 May 2019	Focus Group 2
20 May 2019	Focus Group 3
10 June 2019	Design principle review document distributed
28 June 2019	Deadline for responses to design principle review doc
27 September 2019	CAA Stage 1 DEFINE Gateway

Table 2 - Timeline of significant events

In early March, a questionnaire was distributed to all stakeholders identified in para 2.2 and shown in Appendix 1 - , seeking views on several topics related to this ACP. Three focus groups were held in May that offered aviation and non-aviation stakeholders the opportunity to share their views on the design principles that should be adopted for the ACP.

The questionnaire responses received and the discussions during the focus groups have helped us to derive a comprehensive long list of potential design principles. During the course of this engagement, some stakeholders expressed opposing views in a number of areas. These views are reflected in the long list of potential design principles. The long list of potential design principles is set out in section 3, Table 4. The long list of potential design principles was evolved from listening to the priorities stakeholders had expressed along with any concerns and also from the responses to the discussions during the focus groups; this was refined into the shortlist of design principles set out in section 3, Table 5.

The shortlist was reviewed by stakeholders during the second round of engagement as described in section 4. The stakeholder responses were analysed, and the prioritised shortlist of design principles that we propose to adopt for this ACP was developed, as set out in section 5.

2.4 Design Principles Development Questionnaire

The design principles development questionnaire included a summary of the current operations at LGW and provided details of some important points that stakeholders might wish to consider. The questionnaire was tailored to each specific stakeholder group (Airports and ANSPs, Airline Operators and GA, Local Government and Planners, and Public Representatives) to align to their experience and knowledge and was distributed on 17 April 2019 with a requested return date of 10 May 2019. Follow up emails were sent to remind consultees of the questionnaire timescales and offer an opportunity to attend one of the planned focus groups. The specific questions asked in each version of the questionnaire can be seen at Appendix 2 - , Appendix 3 - , Appendix 4 - and Appendix 5 - . Additionally, the background information common to each questionnaire, along

with the responses received for each questionnaire can be found on the CAA portal alongside this document.

2.5 Focus Groups

Following the guidance of CAP 1616, we elected to undertake a series of focus group meetings to discuss the development of design principles for this ACP with relevant stakeholders. Three focus groups were organised that included a variety of representatives from different stakeholder groups including Airlines, Airports and ANSPs, the Gatwick Airport Consultative Committee, Local Authorities and local community noise action groups. Details of the dates and attendees of each focus group are set out in Table 3.

The purpose of the focus groups was to provide attendees with information regarding this ACP and the CAP 1616 process and gather feedback on the issues that stakeholders consider are important when jointly developing design principles.

In addition to discussing the development of design principles, the focus group attendees were asked to assess the appropriateness of the CAA's decision to provisionally consider this ACP to be a level 1 project. There was a unanimous agreement between those attending that level 1 was appropriate for this ACP. Minutes of the focus groups can be found on the CAA portal alongside this document.

Focus Group (a)	Attendees (b)	No. of Attendees (c)	Date (d)
FG 1	Plane Justice, CAGNE, Cathay Pacific Airways & London Heathrow Airport	5	15 May 2019
FG 2	Horsham District Council, Nutfield Parish Council, Outwood Parish Council & Salfords and Sidlow Parish Council	5	16 May 2019
FG 3	Burston Parish Council, Horley Town Council, Reigate and Banstead Borough Council, Capel Parish Council, GATCOM, GACC & CAGNE	7	20 May 2019

Table 3 - Focus Group Details

In our view, the focus groups facilitated active discussions and well-articulated arguments between participating stakeholders and reached a mutual level of understanding of the issues raised.

2.6 Design Principle Review

During the second round of engagement, a Design Principle Review document was sent to stakeholders for comment; this document can be found on the CAA portal alongside this document. The shortlist of potential design principles that had been developed from the questionnaires and focus group feedback was shared with stakeholders for feedback on the principle statements and how they might be prioritised. Details of the review document, the responses received and how they

affected the development of the final suite of design principles that we propose to adopt is set out in section 4.

3 Design Principle Development

3.1 Introduction

After analysing all responses to the questionnaires and feedback gathered from the focus groups, we developed a comprehensive long list of potential design principles. The long list of principles aims to include all the views expressed and acknowledge the comments directly related to this ACP. We have also aimed to reflect the spread of opinions articulated by those who provided a response, either written or verbally.

3.2 Long List of Potential Design Principles

Table 4 sets out the long list of potential design principles developed from the questionnaire responses and focus group feedback, together with the source and a broad categorisation of the points.

The source of comments are as follows:

- AO&GA – Airline Operators and General Aviation Questionnaire
- AP&ANSP – Airports and Air Navigation Service Providers Questionnaire
- Loc Govn – Local Government and Planners Questionnaire
- Pub Reps – Public Representatives Questionnaire
- FG1 – Focus Group 1
- FG2 – Focus Group 2
- FG3 – Focus Group 3

No (a)	Potential Design Principle (b)	Source (c)	Category (d)
1.	Route 4 options will be designed safely with full regulatory compliance	*FG1*	*Safety*
2.	New Route 4 designs should give due regard to the historic routings in use before 2012	*Pub Reps* *FG1* *FG2*	*Environmental*
3.	Route 4 designs should, where possible, involve Continuous Climb Operations (CCOs)	*AO&GA* *Loc Govn* *Pub Reps* *FG3*	*Technical*
4.	Design of CCOs should consider optimal use of generic aircraft performance to minimise noise impact	*Loc Govn* *Pub Reps*	*Technical*
5.	Routes should include an extended westerly climb profile before a later easterly turn	*Pub Reps* *FG1*	*Environmental*
6.	Minimise the practice of radar vectoring below 7,000ft	*Pub Reps* *FG3*	*Operational*
7.	Procedures should include Radius-to-Fix (RF) legs	*AO&GA*	*Technical*

No (a)	Potential Design Principle (b)	Source (c)	Category (d)
8.	Designs should incorporate 'all engine' and 'engine out' considerations	*AO&GA*	*Technical*
9.	ARINC 424[4] coding must ensure aircraft follow the desired lateral and vertical paths	*AO&GA*	*Technical*
10.	Route 4 designs should consider neighbouring airports procedures to ensure adequate deconfliction	*AO&GA* *AP&ANSP* *FG1*	*Operational*
11.	Route 4 designs must consider FASI-S objectives and ensure alignment	*AP&ANSP*	*Operational*
12.	Key aviation stakeholders should be engaged during the early design stages	*Loc Govn*	*Technical*
13.	Overflight protections already contained in the UK AIP must be maintained	*Loc Govn* *FG2*	*Environmental*
14.	Designs should be built to manage dispersion below 7,000ft	*Loc Govn* *Pub Reps* *FG1* *FG2* *FG3*	*Environmental*
15.	Routes should be designed to concentrate dispersion below 7,000ft	*Loc Govn*	*Environmental*
16.	Designs should not include respite options that place routes over newly overflown populations	*FG1* *FG2*	*Environmental*
17.	Designs should seek to minimise overflight of previously unaffected locations	*Loc Govn* *Pub Reps* *FG1* *FG3*	*Environmental*
18.	Use of the WIZAD SID for respite reasons should be considered	*Loc Govn* *FG3*	*Environmental*
19.	Routes should be designed to limit the wrap around turn to no more than 180°	*FG2*	*Environmental*
20.	Route 4 designs should seek to minimise the impact of adverse noise on the Surrey Hills AONB	*Loc Govn* *Pub Reps* *FG3*	*Environmental*
21.	Route 4 designs should remain within the existing NPR	*Loc Govn* *Pub Reps* *FG1* *FG3*	*Environmental*

[4] ARINC 424 coding is an international standard file format for aircraft navigation data uploaded into aircraft Flight Management Systems, which guide the aircraft along a desired flight path.

No (a)	Potential Design Principle (b)	Source (c)	Category (d)
22.	Route 4 designs should not be constrained by the lateral dimensions of the existing NPR to 4,000ft	*FG1*	*Environmental*
23.	Route 4 procedures should seek to minimise noise exposure during the night-time period	*Loc Govn* *Pub Reps*	*Environmental*
24.	Minimising noise must be a higher priority than fuel efficiency	*Loc Govn*	*Environmental*
25.	Route 4 procedures should follow M25 and A24 corridors where background noise is already high	*Pub Reps* *FG3*	*Environmental*
26.	Designs should use the shortest routing to minimise pollution	*Loc Govn* *Pub Reps*	*Environmental*
27.	Designs should seek to avoid the same residents suffering aircraft noise from Route 4 and Route 3 departures	*Pub Reps*	*Environmental*
28.	Designs will seek to avoid overflight of notified noise sensitive areas	*Loc Govn* *FG2*	*Environmental*

Table 4 - Long list of potential design principles

3.3 Design Principles Not Taken Forward

This section considers each of the potential design principles identified from the engagement activities and, in line with CAP 1616 guidance, identifies those items we chose not to include as a shortlisted design principle and take forward to the second round of engagement. The constraints and dependencies that provide the evidence to support our decisions are listed against the relevant design principle in the sub-sections below. This section also includes the final prioritised shortlist of design principles that we took forward to the second round of engagement in Table 5.

3.3.1 DP3 - Route 4 designs should, where possible, involve CCOs

Existing airspace constraints and altitude restrictions mean that implementing CCOs would be impracticable for Route 4 SIDs. A CCO to achieve the necessary altitude for the en-route airways structure would result in a small rate of climb which would keep the aircraft at lower altitudes for longer.

3.3.2 DP4 - Design of CCOs should consider optimal use of generic aircraft performance to minimise noise impact

The use of CCOs would result in a greater noise impact due to the reduced rate of climb as described above.

3.3.3 DP6 - Minimise the practice of radar vectoring below 7,000ft

The use of radar vectoring is a tactical procedure used by ATC above 4,000 ft to manage air traffic routing and does not form part of the designed procedure and is therefore outside of the scope of this ACP.

3.3.4 DP8 - Designs should incorporate ‘all engine’ and ‘engine out’ considerations

Procedures are designed in accordance with *PANS-OPS 8168 Aircraft Operations – Volume 2 Construction of Visual and Instrument Flight Procedures* and do not incorporate procedures for aircraft that have experienced engine failure(s).

3.3.5 DP12 - Key aviation stakeholders should be engaged during the early design stages

This is not a design principle that will inform the development of the design options. Key aviation stakeholders will continue to be engaged in accordance to the process laid down in CAP 1616.

3.3.6 DP18 - Use of the WIZAD SID for respite reasons should be considered

The WIZAD SID is an existing procedure at Gatwick and so this design principle does not inform the design of the new Route 4 SID options. The WIZAD SID cannot be flight planned and cannot therefore be used as a respite option under current arrangements.

3.3.7 DP21 - Route 4 designs should remain within the existing NPR

In order to explore all options for the Route 4 SIDs, designs that are not constrained by the NPR will be considered and hence this design principle has not been taken forward.

3.3.8 DP23 - Route 4 procedure should seek to minimise noise exposure during the night-time period

Separate procedures are not produced for day/night operations. The Route 4 procedures will seek to minimise noise exposure in accordance with Government guidelines and those design principles taken forward to the shortlist.

3.3.9 DP24 - Minimising noise must be a higher priority than fuel efficiency

The ACP is required to comply with Government guidelines for prioritising noise exposure against aircraft emissions. This is published in the Department for Transport Air Navigation Guidance 2017 under Altitude Based Priorities (para 3.2 to 3.3).

3.3.10 DP26 - Designs should use the shortest routing to minimise pollution

In order to design procedures that limit noise and other impacts, it may not be possible to fly direct routings; for example, where this approach might conflict with safety imperatives, including aircraft deconfliction, hence this design principle has not been taken forward. During the options development and assessment stage direct routing may be considered if it is assessed to generate an acceptable balance between competing environmental and operational impacts.

3.3.11 DP27 - Designs should seek to avoid the same residents suffering aircraft noise from Route 4 and Route 3 departures

Route 4 and Route 3 departures both route to the north of the Airport, from different ends of the runway and route in opposite directions. Feedback to date, suggests current NPRs should be retained and moving these would be beyond the scope of this project.

3.4 Shortlist of Potential Design Principles

Prioritisation of the design principles was initially conducted based on the volume of comments received through feedback in the design principles questionnaires and focus group feedback. Table 5 sets out the first version of the shortlist of potential design principles before the second round of engagement.

Prioritised (a)	Original Ref (b)	Potential Design Principle (c)
1	1	Route 4 options will be designed safely with full regulatory compliance
2	14	Designs should be built to manage dispersion below 7,000 ft
3	2	New Route 4 designs should give due regard to the historic routings in use before 2012
4	17	Designs should seek to minimize overflight of previously unaffected locations
5	28	Designs will seek to avoid overflight of notified noise sensitive areas
6	20	Route 4 designs should seek to minimise the impact of adverse noise on the Surrey Hills AONB
7	10	Route 4 designs should consider neighbouring airports procedures to ensure adequate deconfliction
8	5	Routes should include an extended westerly climb profile before a later easterly turn
9	16	Designs should not include respite options that place routes over newly overflown populations
10	13	Overflight protections already contained in the UK AIP must be maintained
11	25	Route 4 procedures should follow M25 and A24 corridors where background noise already high
12	15	Routes should be designed to concentrate dispersion below 7,000ft
13	7	Procedures should include RF legs
14	9	ARINC 424 coding must ensure aircraft follow the desired lateral and vertical paths
15	19	Routes should be designed to limit the wrap around turn to no more than 180°
16	11	Route 4 designs must consider FASI-S objectives and ensure alignment
17	22	Route 4 designs should not be constrained by the lateral dimensions of the existing NPR to 4,000ft

Table 5 - Version 1 of a Shortlist of Potential Design Principles

4 Design Principle Review

4.1 Introduction

We recognise the importance of engagement and transparency throughout the ACP process. At key stages during the engagement we shared our progress with stakeholders and sought additional feedback. The shortlist of potential design principles that had been developed as described in the previous section was shared with stakeholders and we invited them to share their views through a second round of engagement.

4.2 Review Process for the Second Round of Engagement

On 10 June 2019, the Design Principles Review document was sent to all stakeholders that responded to the questionnaires or attended a focus group meeting. Stakeholders were invited to offer their views on seven questions in order to:

- Confirm that the shortlist of design principles captured the sentiment of the stakeholders' original comments.
- Confirm broad support for the removal of certain design principles from the original long list.
- Seek comment on the prioritisation of the shortlist of design principles.
- Capture any additional feedback.

A description of the feedback received is provided in para 4.5 below.

4.3 Responses Received

From the emails sent out to stakeholders that responded to the questionnaire or attended a focus group we received a total of 20 responses to the Design Principle Review document from the following organisations:

- Airlines and Aviation Industry
  - easyJet
  - TUI
  - The Honourable Company of Air Pilots
  - London Heathrow Airport
- Councils and Public Officials
  - Kent County Council
  - Surrey County Council
  - Mole Valley District Council
  - Tandridge District Council
  - Reigate & Banstead Borough Council
  - Waverley Borough Council
  - Horley Town Council
  - Betchworth Parish Council
  - Charlwood Parish Council
  - Outwood Parish Council

  - Rusper Parish Council
  - Salfords & Sidlow Parish Council
  - CAGNE

- Environmental and Campaign Groups
  - Plane Justice
  - Plane Wrong

4.4 Prioritisation Methodology

In order to produce the initial stakeholder preference of design principles detailed in this section and section 5, the priority ranking provided by each stakeholder was analysed.

If a stakeholder objected to a particular design principle, that was placed lower down the list.

Returns that did not include an order of prioritisation were not used to determine the overall priority.

This list was then assessed, and the highest priorities were taken forward to the Deign Principles Review document shortlist.

4.5 Stakeholder Review Requested Feedback

A summary of the responses we received on the Design Principles Review Document is shown against each of the questions asked and referenced in paras 4.5.1 to 4.5.20 below.

4.5.1 Question 1 - Do you agree that London Gatwick Airport has developed its Route 4 design principles in full accordance with the process detailed in CAP 1616, Step 1B?

4.5.2 Summary of Responses

Nine of the respondees stated that they agreed that we had followed the process detailed in CAP1616.

CAGNE did not believe that the correct process had been followed because we had not engaged with residents outside of the route or impacted by other routes to the west. In CAGNE's view there had been no consideration of the impact that some of the design principles would have on other communities already impacted by other routes. This design principle stage had not considered the totality of aircraft noise all communities suffer and had only considered that of Routes 4 and 3.

Mole Valley District Council considered that we had unreasonably ruled out DP21 in the long list of potential design principles that: *Route 4 designs should remain within the existing NPR*, which had considerable support from some stakeholders.

Reigate & Banstead Borough Council felt that they had not been provided with sufficient information to assess whether we had developed the Route 4 design principles in full accordance with the CAP 1616 process. In their view, no information had been provided with regards to who the airport had engaged with, why other organisations had not been engaged, a summary of stakeholders' comments or how the airport had taken into consideration comments raised by stakeholders.

EasyJet recommended a review of the radius of turn defined by the NPR to facilitate aircraft to be able to accelerate to a clean wing and to design a lead-in radial type construction.

Betchworth Parish Council and Plane Wrong both commented on the lack of a clear explanation in the Design Principle Review document of some of the proposed design principles and requested a further round of engagement, which would be required following the provision of proper explanations of what these mean and their likely impact and also a review of the unrestricted climb (CCO) suggestions.

Plane Justice considered that we had undertaken this stage in utmost good faith and with a high degree of professionalism, but they were not in a position to state that this is in full accord with the process determined by the CAA.

Rusper Parish Council stated that consideration had not been given to the total amount of aircraft noise from all routes, not just Routes 3 and 4, which did not give a fair representation of the noise suffered.

4.5.3 Gatwick's Summary

At this stage of the CAP 1616 process, the design principles will be drawn up through discussion between ourselves and affected local stakeholders including, amongst others, elected community representatives and local community groups. We have engaged with County, Borough, District, Town and Parish councils that represent the affected communities. Information on those engaged with is not included in the individual documents sent to stakeholders for comment but is included in this document for assessment.

The rationale for not including suggested design principles is included in para 4.5.17 below.

4.5.4 Question 2 - Do you agree that the comprehensive long list of potential design principles captured the specific areas of concern you have articulated in either a questionnaire or during participation in one of the focus groups?

4.5.5 Summary of Responses

Ten of the respondees stated that the long list of potential design principles captured their specific areas of concern.

GMX commented that the priority list did not appear to include a continuous climb element within the 3 km swathe and then to keep within the virtual swathe up to 7,000 ft before vectoring so as to avoid overflying areas not previously overflown.

CAGNE could not support flights in line with the M25 and A24 due to the possibility of overflight of new populations and that the route should be contained inside the existing NPR flying over areas historically flown over. In their view night flights should be distributed in a fair and balanced fashion taking into account the totality of aircraft noise over other westerly routes caused by Gatwick Airport's 24/7 operations as other areas to the west have no respite from aircraft noise. CAGNE highlighted that all areas are noise sensitive and that there should be a fair and equitable distribution of aircraft noise. CAGNE reiterated that Government policy is noise up to 7,000 ft and that noise should be the number one consideration over distance and fuel burn in line with this policy.

Reigate & Banstead Borough Council stated that they consider that the core principle regarding airspace design should be that it should not increase, and

where possible should reduce, noise disturbance to communities, to minimise the number of newly overflown people and to minimise the total population overflown. The other principles that are important to the Council are that the future Route 4 departure route should reflect the pre-2012 'legacy' position towards the northern edge of the current NPR but stressed that it should remain within the current NPR to minimise the number of newly overflown residents and that the no overflight of Horley provision should be retained. In addition, the Council provided comments relating to a number of the proposed design principles, reiterating that any new route should remain within the existing NPR and minimise the number of newly overflown residents. The Council did not believe that people who are already affected by road traffic noise should also be 'fair game' to be affected by aircraft noise.

Surrey County Council expressed concern as to how the design principles, once implemented, would fit in with the wider Future Airspace Strategy Implementation without being compromised in order to meet deconfliction objectives. They stated the need for collaboration, coordination and transparency to ensure that those residents that are affected by a number of airports understand the impact of the ACPs.

Betchworth Parish Council and Plane Wrong both stated that the requirement should be to contain all aircraft within the existing NPR and that the majority of aircraft should follow the centreline of the NPR. They also both commented that, due to enhanced air traffic control technology, the procedure could facilitate a continuous and unrestricted climb for departures, at normal climb rates, to 7,000 ft or above, rather than the ICAO recognised definition of a Continuous Climb Operation[5].

4.5.6 Gatwick's Summary

The proposal for the principle to keep the route inside the existing NPR was not included in the shortlist because it would constrain our ability to create a comprehensive list of airspace design options with the potential to achieve the objectives of the project. There appears to be some confusion in the use of the terminology associated with the NPR. The NPR is the published centreline rather than conformance swathe of 1.5 km either side of the centreline. Any change to the SIDs which moves away from the published NPR will require a change to the NPR as published in the AIP. Should a change to an NPR become necessary, Gatwick would have to make an application to the Secretary of State for Transport to make such a change.

Existing airspace constraints and altitude restrictions mean that implementing CCOs within the existing airspace structure, would currently be impracticable for Route 4 SIDs. However, with the modernisation of the FASI-S airspace, it is hoped that the future air traffic situation will allow departing traffic to be given clearance to climb above stated altitude limits.

In view of stakeholder responses, Design Principle 4 will be amended to read 'Designs should seek to minimise overflight of previously unaffected populations and seek to reduce the total number of people overflown'.

[5] An operation, enabled by airspace design, procedure design and ATC, in which a departing aircraft climbs continuously, to the greatest possible extent, by employing optimum climb engine thrust and climb speeds until reaching the cruise flight level.

4.5.7 Question 3 - Do you broadly support our reasons for not including certain design principles in the shortlist? If not, please provide further comment.

4.5.8 Summary of Responses

Ten of the respondees supported our reasons for not including certain design principles in the shortlist.

CAGNE commented that the ACP will affect areas already impacted by arrivals and departures from another route and that no consideration is given to the totality of noise that people suffer.

EasyJet commented that the optimal use of airspace should be the governing criteria for airspace design and that identifying routes that facilitate the optimal efficiency of modern aircraft designs should be governing principles.

Mole Valley District Council stated that it believed that we had ignored the potential design principle '*Route 4 designs should remain within the existing NPR*' in favour of an opposing design principle, and that design principles that contradict one another can both be included. The Council considered that we had not specifically taken account of the existing NPR through the design principles.

Reigate and Banstead Borough Council felt that there was a lack of clarity regarding the rationale for the selection of the shortlist of proposed design principles and expressed concern that new routes could be designed outside of the existing NPR. They reiterated that in their view the new Route 4 SIDs should remain within the existing NPR.

Salfords and Sidlow Parish Council and Horley Town Council also suggested that the design principle '*Route 4 designs should remain within the existing NPR*' should not be excluded.

Betchworth Parish Council and Plane Wrong both commented on a number of design principles that they felt should be included in the shortlist, including the use of continuous climbs to 7,000 ft or above, the tactical use of other routes to relieve the noise burden on Route 4. They also considered that the design principle '*Route 4 designs should remain within the existing NPR*' should not be excluded.

Plane Justice supported our reasons for not including certain design principles in the shortlist and stated that they believe that NPRs are an anachronism which provide a false sense of entitlement to move flight paths. The focus should be on where the planes are, or were, actually flying.

Whilst broadly supporting the reasons for not including certain design principles, Kent County Council stated that Route 4 procedures should seek to minimise noise exposure during the night-time period and that we should reconsider the inclusion of this design principle within the shortlist.

4.5.9 Gatwick's Summary

Existing airspace constraints and altitude restrictions mean that implementing CCOs within the existing airspace structure, would currently be impracticable for Route 4 SIDs. However, with the modernisation of the FASI-S airspace, it is hoped that the future air traffic situation will allow departing traffic to be given clearance to climb above stated altitude limits. Until that time, where the air traffic situation allows, departing traffic will be given clearance to climb above 7,000 ft as soon as is practicable. Once these vertical constraints are removed, under the airspace modernisation, it should be possible to allow continuous climb to at least 7,000 ft.

The Design Principle '*Route 4 designs should not be constrained by the lateral dimensions of the existing NPR to 4,000ft*' is not in opposition to design options that position the new RNAV SIDs within the existing NPR swathe, but does allow us to create a comprehensive list of airspace design options with the potential to achieve the objectives of the project. Should a change to an NPR become necessary, we would have to make an application to the Secretary of State for Transport to make such a change.

4.5.10 Question 4 - Do you believe any of the items selected for the shortlist of design principles are inappropriate selections? If so, please explain why.

4.5.11 Summary of Responses

Eight of the respondees did not believe any of the design principles selected for the shortlist were inappropriate.

GMX commented that any departure that continues further west before turning will increase fuel burn and will not reduce emissions. They also stated that in order to achieve noticeable respite it may be necessary to affect some residents that had not been previously affected by aircraft noise.

CAGNE opposed a number of the shortlisted design principles as they would allow for design options that are outside of the current NPR swathe and would impact communities not previously overflown by Route 4.

EasyJet commented that routes that give due regard to historic routings may not allow the optimal efficiency in the operation of the aircraft, therefore in itself creating more noise and emissions. They also recommended that designs should be built to facilitate dispersion below 7,000 ft.

Mole Valley District Council reiterated their concern over the inclusion of the design principle '*Route 4 designs should not be constrained by the lateral dimensions of the existing NPR to 4,000 ft*'. They also had concerns on a number of design principles that would have an adverse noise effect by either increasing noise in some areas already affected or by overflying communities not previously overflown.

Salfords and Sidlow Parish Council stated that the principles related to safety are essential for safe aviation route planning and therefore should not be included as design principles.

Betchworth Parish Council and Plane Wrong both stated that including some design principles would give too great a beneficial bias towards currently unaffected areas leaving currently affected areas to suffer the full consequences of expansion. They also reiterated that the route should remain within the existing NPR with the aim to follow the centreline of the NPR.

Whilst London Heathrow Airport believed that Gatwick's proposed design principles capture the key elements to be taken into account when developing new route options, they commented on how the design principles could enable the specific management of the impact of noise on those local communities in the vicinity of an airport.

4.5.12 Gatwick's Summary

Gatwick is required to create a comprehensive list of airspace design options with the potential to achieve the objectives of the project. Options should not be constrained by the existing NPRs, which are essentially published centrelines, but the process should take into account design principles that focus on not impacting

those previously unaffected, which is the basis for the inputs relating to NPRs. The NPR is the published centreline rather than conformance swathe of 1.5 km either side of the centreline. Any change to the SIDs which moves away from the published NPR will require a change to the NPR as published in the AIP. Should a change to an NPR become necessary, we would have to make an application to the Secretary of State for Transport to make such a change.

4.5.13 Question 5 - Do you agree with the prioritisation that we have applied to the shortlist of design principles? If not, please add any comments and use Table 1 (page 6 of the attached Response document) to provide us with your preferred prioritisation.

4.5.14 Summary of Responses

Six of the respondees agreed with the prioritisation that we had applied to the design principles.

Although CAGNE provided a prioritisation of those design principles that they did not oppose, they also believed that the engagement had been flawed as it only considered those residents impacted by Routes 3 and 4 and did not consider the totality of noise suffered by some communities that others seek to move noise over.

Mole Valley District Council, whilst providing an alternate prioritisation order, stated that the inclusion of the design principle '*Route 4 designs should remain within the existing NPR*' would be highly prioritised.

Reigate and Banstead Borough Council felt they could not comment on the prioritisation of the design principles as there had been no information as to the rationale behind the prioritisation method provided in the document. Their view was that there should be core design principles and subsidiary design principles that would allow the creation of key strategic policy objectives that would need to be delivered and subsidiary design principles which would influence airspace design but would be assessed against the core principles. The Council considered that the core principle should be to not increase – and where possible reduce – noise disturbance to communities and residents; to minimise the number of newly overflown people; to minimise the total population overflown; and to reflect the pre-2012 'legacy' position towards the northern edge of the current noise preferential route. Other proposed design principles should be subsidiary to these.

Betchworth Parish Council and Plane Wrong both stated that so much change was required to the shortlist that to rank the design principles would be hardly meaningful in their current state and that they believed a further consultation was required with a more coherent list.

Plane Justice did not agree with our prioritisation and provided their own prioritised list. They included qualifications for a number of their prioritised design principles, based on the principle that 'not previously overflown' refers to those communities not overflown under the procedures in force pre-2012, and not those communities that have experienced a 'no overflight position' as a result of the changes that should not have taken place.

Rusper Parish Council endorsed the prioritisation that had been provided by CAGNE.

4.5.15 Gatwick's Summary

The value of preserving the pattern of traffic that was in place prior to 2012 is an important consideration as part of this ACP and to recognise the weight that will

be placed on this, a design principle specifically related to the pre-2012 historic tracks will be included as a high priority on the final shortlist.

Environmental impact assessments will be conducted throughout the options development to understand the totality of the noise impacts, both positive and negative, for each of the design options.

Design options that revert to the historic routings may result in an increase in the total population exposed to noise. This will be assessed through the options development and assessment stage, which will also seek to draw out the environmental impacts.

4.5.16 Question 6 - Are there other design principles not included in the long list that you feel should be considered as candidates for the final shortlist? If so, please provide your comments.

4.5.17 Stakeholder Suggestions and Gatwick's Reponses

Aircraft continuously climb to 7,000 ft within the NPR swathe, where possible, before vectoring (GMX)

This will prevent the overflight of residents not previously overflown and will also give some noise respite to those already under the NPR.

- **Our response** – Unlikely to be possible, before airspace modernisation, due to existing airspace constraints and altitude restrictions. The NPR only extends to an altitude of 4,000 ft. Above this, ATC vectoring is required due to airspace restrictions and coordination requirements.

Dispersal needs to be kept inside the NPR (CAGNE and Rusper Parish Council)

- **Our response** – Design options will not be constrained by the NPR at this stage in order to allow all possible options to be considered.

CCO must not be used to fly over new areas (CAGNE)

- **Our response** – The principle not to fly over new areas has been included in the final shortlist of design principles. A design principle including CCOs was rejected from the long list of design principles as described earlier in para 3.3.1. However, the consideration that the designs should enable transition to a vertical profile that allows an efficient, and potentially faster, climb to higher altitudes, in support of the airspace modernisation objectives for continuous climbs and better management of noise impacts has been included in the final shortlist to allow for future improvements to the airspace and the possibility of achieving a continuous climb profile. CCOs will not necessarily mean increase in climb gradients, and therefore the potential to increase noise but could remove intermediate climb restrictions that will have an impact on noise.

Sensitive areas and AONBs must share the burden of noise if they have historically been flown over before (CAGNE)

- **Our response** – Consideration of the impact on noise on sensitive areas has been included in the final shortlist of design principles and consideration of historic overflight of areas has also been included in the final shortlist of design principles.

Night flights should be banned at Gatwick Airport (CAGNE and Rusper Parish Council)

- **Our response** – This is not considered a design principle. The night flight regime is established and overseen by the Department for Transport and will not change as a result of this ACP. Specifically, in relation to Route 4, the banning of night flights on specific routes would increase the burden on other communities situated in the vicinity of other routes and would be beyond the scope of this ACP.

Noise must be the number one consideration over fuel burn (CAGNE)

- **Our response** – The Government has laid out altitude-based priorities which Gatwick will take into account when considering the potential environmental impacts of the design options. Below 4,000 ft, the priority will be to limit and, where possible, reduce the impact of noise on the population. Above 4,000 ft but below 7,000 ft, the environmental priority will continue to be minimising the impact of noise, unless to do so would increase CO_2 emissions. Gatwick have included design principles in the final shortlist that consider the impact of noise.

Designs should reflect modern and planned aircraft design which optimises noise and emissions (easyJet)

- **Our response** – The designs will take into account the performance characteristics of modern aircraft in order to consider the impact of noise and emissions in line with the finalised shortlist of design principles detailed in section 6.

Aircraft are not given the same vectored heading above 4,000 ft (Outwood Parish Council).

- **Our response** – The vectoring of aircraft above 4,000 ft is a tactical operation that is used to provide safe separation between aircraft or to enable continuous climbs of aircraft, which could improve the environmental impact. The vectors an aircraft is given will rely solely on the air picture at the time and cannot be built into the design of a procedure.

Not increase, and where possible reduce noise disturbance to communities and residents (Reigate and Banstead Borough Council)

- **Our response** – A design principle to minimise the impact of noise on previously unaffected populations and seek to reduce the total number of people overflown has been included in the final shortlist.

Minimise the number of newly overflown people, and minimise the total population overflown (Reigate and Banstead Borough Council)

- **Our response** – A design principle to minimise the impact of noise on previously unaffected populations and seek to reduce the total number of people overflown has been included in the final shortlist.

All departures should make an unrestricted climb to 7,000 ft or above (Betchworth Parish Council and Plane Wrong)

- **Our response** – Unlikely to be possible, before airspace modernisation, due to existing airspace complexity, constraints and the consequent altitude restrictions. However, the consideration that the designs should enable transition to a vertical profile that allows an efficient, and potentially faster, climb to higher altitudes, in support of the airspace modernisation objectives for continuous climbs and better management of noise impacts has been included in the final shortlist to allow for future improvements to the airspace and the possibility of achieving a continuous climb profile.

No single location should suffer noise from Route 4 in addition to any other Gatwick route or Heathrow route (Betchworth Parish Council and Plane Wrong)

Supporting commentary: This could be considered as an amendment to the design principle '*Route 4 designs should consider neighbouring airports procedures to ensure adequate deconfliction*' as a consideration of the overall noise an area is expected to suffer.

- **Our response** – This is not possible due to the airspace complexity in the vicinity of Route 4. Environmental impact assessments will be conducted throughout the options development to understand the totality of the noise impacts for each of the design options.

The starting point for any route design must be the 2012 lateral location of Route 4 (Plane Justice)

- **Our response** – A design principle that considers the historic routings in use prior to the introduction of RNAV routes in 2012 has been included in the final shortlist of design principles.

Route 4 designs should seek to minimise the impact of adverse noise on protected locations (Kent County Council)

Supporting commentary: Reference has been made to the Surrey Hills AONB within a new design principle 6, but consideration should also be given to minimising the impact of adverse noise on other protected landscapes, such as the Kent Downs AONB.

- **Our response** – A design principle that seeks to minimise the impact of noise on particularly sensitive areas, which will include AONBs, has been included in the final shortlist of design principles.

4.5.18 Question 7 - Do you have any other comments on how the CAP 1616, Step 1B process has been conducted to date?

4.5.19 Summary of Responses

CAGNE considered that the process undertaken was flawed as we had only engaged with those that already impacted by this departure route or Route 3. This allowed for design principles to go unchallenged in proposals to move noise from one community over another with no consideration to the totality of noise already suffered by other communities. These design principles are not set out to be fair or equitable to all communities as it takes a departure route in isolation.

Reigate and Banstead Borough Council stated that as no information was currently available about the potential level of local impact, the airport will need to provide sufficient information for local stakeholders and residents in order to

understand the amount and level of disturbance that may be experienced, including compared to the 'baseline' situation. This position was endorsed by a number of other respondees.

Charlwood Parish Council stated that the original SID in 2013 caused a great deal of anxiety to local residents and should have been reversed immediately. They hoped the new departure route would follow the original flight paths and reduce resident's concerns.

4.5.20 Gatwick's Summary

In the development of the design principles, we chose to engage with those local stakeholders that we felt had the potential to be affected by the proposed changes, including, amongst others, elected community representatives and local community groups. LGW engaged with County, Borough, District, Town and Parish councils that represent the affected communities. The wider community will have the opportunity to express their views on the proposed design options during the statutory consultation in Stage 3 of the CAP1616 process.

Environmental impact assessments will be conducted throughout the options development and assessment stage (Stage 2B and 3A of the CAP1616 process) to understand the totality of the noise impacts, both positive and negative, for each of the design options.

5 Design Principles Feedback Summary

5.1 Introduction

Section 3 described the responses received from the original questionnaires and focus group feedback. Section 4 then provided further details on the comments received following the second round of engagement based on stakeholder feedback to the Design Principles Review document. This section now consolidates all the key points of feedback, using the information we have received and our appraisal of key strategic and technical considerations.

In this section each of the 17 shortlist design principles are prioritised as described in the paras below. The final prioritised shortlist of design principles that we intend to take forward to the DEFINE Gateway are shown later in Section 6.

A schematic of how the suggested design principles have been amalgamated and combined to form the prioritised final shortlist is shown at Table 9, Appendix 6.

5.2 Design Principle 1

Route 4 options will be designed safely with full regulatory compliance.

5.2.1 Summary of Feedback

Although some respondees did not regard safety as a design principle, it was agreed that safety is paramount and this design principle is prioritised accordingly.

This design principle received a very high level of support and will be taken forward to the shortlist without amendment.

5.2.2 Proposed text of Design Principle

- **Route 4 options will be designed safely with full regulatory compliance.**

5.3 Design Principle 2

Designs should be built to manage dispersion below 7,000 ft.

5.3.1 Summary of Feedback

There was general support for managed dispersion below 7,000 ft but only within the existing NPR. Any design should at least maintain the current dispersal around the initial turn.

This design principle received a very high level of support and will be taken forward to the shortlist with an amendment to the wording. This has allowed other design principles from the suggested shortlist described in section 3 to be incorporated into this design principle.

5.3.2 Proposed text of Design Principle

- **Designs should be built to facilitate dispersion below 7,000 ft.**

5.4 Design Principle 3

New Route 4 designs should give due regard to the historic routings in use before 2012.

5.4.1 Summary of Feedback

There was general agreement that the new Route 4 design options should reflect the pre-2012 'legacy' position and that the route should remain within the NPR, to minimise the number of newly overflown residents. There were, however, conflicting views as to whether the new route should follow the centreline or track towards the northern edge of the NPR.

This design principle received a very high level of support and will be taken forward to the shortlist with an amendment to the text to better define the 'legacy' position of the routes.

5.4.2 Proposed text of Design Principle

- **New Route 4 designs should give due regard to the historic routings in use prior to the introduction of RNAV routes in 2012.**

5.5 Design Principle 4

Designs should seek to minimise overflight of previously unaffected locations.

5.5.1 Summary of Feedback

It was considered that the core principle regarding airspace design should be to not increase, and where possible reduce, noise disturbance to residents and, in particular, to minimise the number of newly overflown people. 'Newly overflown' should include those residents that have been overflown as a result of the introduction of the previous RNAV SID but were not overflown previous to its introduction. Some respondees considered that this design principle should only apply to locations outside of the NPR. It was suggested that the design principle be extended to include previously unaffected populations.

This design principle received a very high level of support. The wording has been amended in light of stakeholder feedback and to allow other design principles from the suggested shortlist described in section 3 to be incorporated into this design principle.

5.5.2 Proposed text of design principle

- **Designs should seek to minimise the impact of noise on previously unaffected populations and seek to reduce the total number of people overflown.**

5.6 Design Principle 5

Designs will seek to avoid overflight of notified noise sensitive areas.

5.6.1 Summary of Feedback

It was considered that all areas are noise sensitive and that the distribution of noise should fair and equitable for all. In line with previous comments regarding the definition of 'newly overflown', it was felt that some locations only overflown since the introduction of the new RNAV SID, could be motivated to consolidate a

'no overflight position' which that area only enjoyed as a result of a change that should not have been implemented.

A number of design principles in the suggested shortlist described in section 3 aimed at reducing the impact of noise on sensitive areas. This design principle received a high level of support and has been amalgamated with others into a single design principle that will be taken forward to the final shortlist.

5.6.2 Proposed text of Design Principle

- **Designs should seek to minimise the impact of noise on particularly sensitive areas.**

5.7 Design Principle 6

Route 4 designs should seek to minimise the impact of adverse noise on the Surrey Hills AONB.

5.7.1 Summary of Feedback

It was considered that some areas of the Surrey Hill AONB had always sustained a degree of overflight and noise from Route 4 operations and that these areas should share the burden of noise if they have been historically overflown. Any designs should, however, not cause a greater noise in this area than existed prior to 2012. It was also considered that consideration should also be given to minimising the impact of adverse noise on other protected landscapes, such as the Kent Downs AONB.

A number of design principles in the suggested shortlist described in section 3 aimed at reducing the impact of noise on sensitive areas. This design principle received a high level of support and has been amalgamated with others into a single design principle that will be taken forward to the final shortlist.

5.7.2 Proposed text of Design Principle

- **Designs should seek to minimise the impact of noise on particularly sensitive areas.**

5.8 Design Principle 7

Route 4 designs should consider neighbouring airports procedures to ensure adequate deconfliction.

5.8.1 Summary of Feedback

As a principle related to safety, some respondees considered that this design principle should not be considered as an option. It was stated that this design principle should only be supported where there is a bona fide safety issue which required deconfliction and that the requirements of Route 4 should prevail as this ACP has arisen from the previous unlawful design process.

This design principle received a high level of support but as an issue related to safety, it has been incorporated into Design Principle 1.

5.8.2 Proposed text of Design Principle

- **Route 4 options will be designed safely with full regulatory compliance.**

5.9 Design Principle 8

Routes should include an extended westerly climb profile before a later easterly turn.

5.9.1 Summary of Feedback

Whilst this design principle was not deemed an inappropriate selection for some respondees, it was opposed by some. There was significant concern that the aircraft would fly outside of the NPR and overfly areas and populations that have not been previously affected. There was also the consideration that this would increase fuel burn, therefore increasing emissions. By limiting the priority of this principle, there would still be scope to include an extended westerly climb however other principles would be given a higher priority and therefore the potential adverse impacts outlined above from a later easterly turn would be reduced.

This design principle received a moderate level of support. It could be considered as a design option and as we will be creating a comprehensive list of airspace design options at the next stage which could incorporate this profile, this design principle has been incorporated into the design principle that considers the NPR.

5.9.2 Proposed text of Design Principle

- **Route 4 designs should not be constrained by the existing NPR to 4,000ft.**

5.10 Design Principle 9

Designs should not include respite options that place routes over newly overflown populations.

5.10.1 Summary of Feedback

There was a mixed response to the issue of respite with some respondees being in favour of genuine respite and others who were not in favour. Those that supported respite considered that it would have an adverse impact on the number of newly people overflown. Those that were opposed to respite believed that it would give too great a beneficial bias towards currently unaffected areas leaving currently affected areas to suffer the full consequences of expansion. It is a recipe for long-term discord between communities and for undue influence being wielded by those who ‘umpire’ the allocation of the respite.

This design principle received a high level of support and will be taken forward to the final shortlist with an amendment to the wording to avoid ambiguity in the meaning.

5.10.2 Proposed text of Design Principle

- **Designs that seek to provide respite should not overfly previously unaffected populations.**

5.11 Design Principle 10

Overflight protections already contained in the UK AIP must be maintained.

5.11.1 Summary of Feedback

The provision for overflight protections already notified (in particular Horley) was widely supported. However, it was commented that only overflight restrictions that were in force in 2012 and earlier should be considered as any move of the route back to legacy positions could breach overflight protections in the current AIP.

A number of design principles in the suggested shortlist described in section 3 aimed at reducing the impact of noise on sensitive areas. This Design Principle received a moderate to high level of support and has been amalgamated with others into a single design principle that will be taken forward to the final shortlist.

5.11.2 Proposed text of Design Principle

- **Designs should seek to minimise the impact of noise on particularly sensitive areas.**

5.12 Design Principle 11

Route 4 procedures should follow M25 and A24 corridors where background noise is already high.

5.12.1 Summary of Feedback

It was felt by a number of respondees that this design principle was not appropriate and that it could be considered a design option, rather than a design principle. Notwithstanding this, it was felt that it would be likely that not only new populations would be overflown as a result, but that those already affected by road noise would also be 'fair game' to be affected by aircraft noise. To suggest that Route 4 should follow the A24 corridor would unfairly increase the adverse aircraft noise effects upon these communities in densely populated areas. Some of the respondees opposed this design principle and felt that it should not be considered further.

This design principle received a moderate to low level of support. It could be considered as a design option and as we will be creating a comprehensive list of airspace design options at the next stage which could incorporate this profile, this design principle has been incorporated into the design principle that considers the impact of noise.

5.12.2 Proposed text of Design Principle

- **Designs should seek to minimise the impact of noise on previously unaffected populations and seek to reduce the total number of people overflown**.

5.13 Design Principle 12

Designs should be built to concentrate dispersion below 7,000 ft.

5.13.1 Summary of Feedback

It was unclear to some respondees as to what this Design Principle meant. If the Design Principle meant the elimination of dispersion below 7,000 ft by concentrating the routes, it would not be acceptable and was opposed. Designs should reduce concentration as far as possible as it would unfairly concentrate

adverse noise effects upon a smaller number of people rather than fairly and equitably distributing them across a wider number of already-affected people.

This design principle received a moderate level of support but caused some confusion amongst stakeholders as to the definition. As a result, the design principle has been amalgamated with others into a single design principle that will be taken forward to the final shortlist.

5.13.2 Proposed text of Design Principle

- **Designs should be built to facilitate dispersion below 7,000 ft.**

5.14 Design Principle 13

Procedures should include RF legs.

5.14.1 Summary of Feedback

One respondee expressed concern as to why a Radius-to-Fix was proposed as the only technical parameter when there are a number of other leg types or waypoint types that could be considered and stated that we should be open-minded on the technical methods to be employed to deliver a route which accords with the process. Another respondee understood that defining the turn using an RF leg should provide more accurate tracking but suggested data would need to be provided to demonstrate the effects this will have applied to Route 4 and in particular the effect of dispersion around the turn. One respondee supported this design principle only if alternative procedures would be available for non-capable operators.

5.14.2 Proposed text of Design Principle

There was very little support for a design principle that would result in the concentration of routes. The majority of the stakeholders were in favour of some form of dispersion. RF Legs would specifically introduce concentration and as such, this design principle will not be taken forward to the shortlist.

5.15 Design Principle 14

ARINC 424 coding must ensure aircraft follow the desired lateral and vertical paths.

5.15.1 Summary of Feedback

One respondee stated that this design principle was again moving into the technology by which any chosen design option may be delivered and should not be considered as a design principle since there are other options that could be considered. Another respondee stated that ARINC 424 coding must ensure aircraft follow the desired lateral and vertical paths, routing aircraft along the centreline of the NPR.

There was a moderate to low level of support for this design principle as it was considered to be a technical solution to achieve a desired outcome. As such, this design principle has been incorporated into the final shortlist design principle that considers dispersion.

5.15.2 Proposed text of Design Principle

- **Designs should be built to facilitate dispersion below 7,000 ft.**

5.16 Design Principle 15

Routes should be designed to limit the wrap around turn to no more than 180°.

5.16.1 Summary of Feedback

There were conflicting views relating to this design principle. One view stated that by restricting the turn to no more than 180°, aircraft would be required to fly along the northern edge of the NPR or even outside it. The consequence of this would be to take aircraft closer to more populated areas such as Reigate and Redhill. Another view agreed that limiting the wrap around turn to no more than 180° would make sure the aircraft remain on the legacy route to the northern part of the NPR. From an operator's point of view, if optimal airspace design required a turn greater than 180°, it would be better to facilitate this than prevent it being used.

There was a mixed level of support for this design principle depending on the stakeholder's viewpoint as to where the nominal tracks should lie. In order to explore all the possible design options at the next stage, this design principle has been incorporated into the final shortlist design principle that considers dispersion.

5.16.2 Proposed text of Design Principle

- **Designs should be built to facilitate dispersion below 7,000 ft**.

5.17 Design Principle 16

Route 4 designs must consider FASI-S objectives and ensure alignment.

5.17.1 Summary of Feedback

This design principle was opposed by two respondees as it proposes to fly over areas that already impacted by Route 1. These communities do not have respite from LGW operations as they receive arrivals and departures. This does not give any consideration to the totality of noise that others suffer whereby this route already offers respite. One respondee expressed concern as to how these design principles once implemented would fit in with the wider FASI-S without being compromised in order to meet deconfliction objectives. Here are areas that are overflown from a number of airports and there is a need for collaboration and coordination and transparency to ensure that residents can understand the impact of other airports' airspace change proposals.

There was a low level of support for this design principle. However, there was clear support to include CCOs in order to achieve a higher altitude as quickly as possible. Therefore, this design principle has been amended to allow options to be developed that would allow aircraft to get higher quicker, should future airspace designs allow.

5.17.2 Proposed text of Design Principle

- **Route 4 designs should enable transition to a vertical profile that allows an efficient, and potentially faster, climb to higher altitudes.**

5.18 Design Principle 17

Route 4 designs should not be constrained by the lateral dimensions of the existing NPR to 4,000ft.

5.18.1 Summary of Feedback

It was felt by some that this design principle did not take into consideration the view that the new route should reflect the pre-2012 legacy position with the existing NPR and that it should minimise the number of newly overflown people. The concept of the NPR in allowing people to determine, in advance of principle deciding to live in a particular location, the extent to which they are likely to be affected by departing aircraft, has been undermined by this design. There was also support for this design principle, claiming that NPRs provide a false sense of entitlement to move flight paths, but not at the expense of overflying people who were not overflown previously. From an operator's point of view, the design principle was supported as it allowed routes to be identified which facilitate the optimal efficiency of modern aircraft design.

There was a low level of support for this design principle from stakeholders. However, this design principle will be taken forward to the final shortlist to allow us to create a comprehensive list of design options. The wording has been amended to reflect that the definition of the NPR is the published centreline rather than the conformance swathe that surrounds it.

5.18.2 Proposed text of Design Principle

- **Route 4 designs should not be constrained by the existing NPR to 4,000 ft.**

6 Final Shortlist of Design Principles

6.1 Introduction

Following a comprehensive review of all stakeholder feedback the proposed set of final design principles is outlined below in para 6.2. These proposed design principles will act as the qualitative framework against which the Route 4 RNAV SIDs design options - devised in the next stage of the CAP 1616 process - can be drafted and evaluated.

Design principles help us to identify the suite of initial design options that most closely match the preferences of the majority of aviation and non-aviation stakeholders. The design principles also provide some guidance during the development of design options that may help maximise the potential benefits associated with the new designs.

In order to develop the design principles LGW engaged with a group of aviation and non-aviation stakeholders in order to ascertain their views using questionnaires and focus groups. Responses to the questionnaires were analysed and considered alongside all comments received during the focus groups. A document entitled Design Principles - Stakeholder Review was then sent to a large selection of stakeholders, including those who returned questionnaires and attended the focus groups.

The purpose of this stakeholder review document was to share the comprehensive list of design principles and propose a shortlist of design principles. The document also explained how the shortlist was initially prioritised, in accordance with the volume of comments received. Section 5 of the document requested stakeholder responses to 7 questions, including a question that asked if stakeholders agreed with the prioritisation; if not, stakeholders were asked to apply their own preference to the prioritisation of the design principle shortlist. The responses received were fewer and narrower than expected and, although a smaller percentage of respondees did agree with the prioritisation, the majority of respondees all proposed a different order of prioritisation.

Whilst there are a number of different methodologies that could be used to prioritise design principles (ranking, grouping, MoScoW Technique, Bubble Sort, etc) the small sample size and polarised views of the stakeholders indicated that any such scientific analysis would only return a compromise view that again may not match the stated priorities of the majority of those engaged. As such, the further prioritisation of design principles was considered to be an extremely time-consuming exercise with extremely limited validity, even if a representative sample of all stakeholders were simultaneously available to participate in some of the more detailed methodologies listed above.

Any prioritisation of the final shortlist of design principles has therefore now been removed.

6.2 Final Shortlist of Design Principles

The final shortlisted design principles are shown below. Design Principle 1 is the main priority of the CAA in accordance with its statutory duties set out in Section 70(1) of the Transport Act 2000 and is therefore the main priority of Gatwick Airport. As part of the safety requirement, Gatwick Airport will consider neighbouring airspace procedures to ensure adequate deconfliction as part of the

design process. The numbering of the other design principles should not be taken to imply any relative priority.

- Design Principle 1 - **Route 4 options will be designed safely with full regulatory compliance.**
- Design Principle 2 - **Designs should be built to facilitate dispersion below 7,000 ft.**
- Design Principle 3 - **New Route 4 design options should give due regard to the historic routings in use prior to the introduction of RNAV routes in 2012.**
- Design Principle 4 - **Route 4 designs should seek to minimise the adverse impact of noise on previously unaffected populations and seek to reduce the total number of people overflown.**
- Design Principle 5 - **Designs should seek to minimise the impact of noise on particularly sensitive areas.**
- Design Principle 6 - **Route 4 designs should enable transition to a vertical profile that allows an efficient, and potentially faster, climb to higher altitudes.**
- Design Principle 7 - **Designs that seek to provide respite should not overfly previously unaffected populations.**
- Design Principle 8 - **Route 4 designs should not be constrained by the existing NPR to 4,000ft.**

6.3 Alignment to Route 4 Change Objectives

Table 6 below shows how each design principle aligns with the objectives to be secured by the Route 4 RNAV SID ACP, as described in para 1.3 above.

	1	2	3	4	5	6	7	8
Change Objectives	Designed Safely	Facilitate Dispersion	Due Regard for Historic Routes	Minimise Impact of Noise	Noise Sensitive Locations	Transition to Vertical Profile	Respite Routes	Not Constrained by the NPR
Improve further, where practicable, aircraft and passenger safety								
Limit, and seek to reduce where possible, the environmental impact on, local communities in the vicinity of the Route 4 SIDs								
Enable further improvements in safety and noise reduction, through the application of more efficient FASI-South operating procedures and opportunities								
Provide long term predictability of flight paths								

Table 6 - Alignment of Design Principles with the Airspace Change Objectives

7 Next Steps

7.1 CAA Submission

Following successful completion of the Stage 1 DEFINE gateway and subsequent publication, further stakeholder engagement meetings will be organised to discuss the design options once they are developed. The design principles will be used as the framework against which design options are assessed to address the Statement of Need and airspace change objectives.

Currently, Gatwick Airport's estimated timeline for subsequent stages of this process is shown in Table 7 below:

CAP 1616 Stage (a)	Estimated Completion Date (b)
Stage 1 Define	27th September 2019
Stage 2 Develop and Assess	31st January 2020
Stage 3 Consult	27th March 2020
Stage 4 Update and Submit ACP[6]	14th December 2020
Stage 5 Decide	27th August 2021
Stage 6 Implement	30th December 2021

Table 7 - CAP 1616 Timeline

[6] Subject to public consultation commencing in January 2020.

Appendix 1 - Stakeholder List

Table 8 below sets out all stakeholders that were engaged to participate in the development of the design principles and highlights those that responded. The response rate was c.36%. Of these, 52% of respondees were classified as aviation stakeholders and 48% were classified as non-aviation stakeholders.

No	Type	Organisation/Group Name	Questionnaire Received	Focus Group Attended	DP Review Received
1.	Aerodrome	Redhill Aerodrome			
2.	Aerodrome	Kenley Aerodrome			
3.	Airline	British Airways			
4.	Airline	easyJet			17 June
5.	Airline	Norwegian			
6.	Airline	Tui			11 June
7.	Airline	Emirates	6 May		
8.	Airline	Thomas Cook			
9.	Airline	Virgin			
10.	Airline	Aer Lingus			
11.	Airline	Aurigny			
12.	Airline	TAP Air Portugal			
13.	Airline	Turkish Airlines			
14.	Airline	Vueling			
15.	Airline	Ryanair			
16.	Airport	Biggin Hill Airport	15 May		
17.	Airport	Heathrow Airport	9 May	15 May	28 June

No	Type	Organisation/Group Name	Questionnaire Received	Focus Group Attended	DP Review Received
18.	ANSP	NATS En-Route Ltd			
19.	ANSP	Air Navigation Solutions			
20.	Emergency Services	Sussex Police Helicopter			
21.	Emergency Services	Kent Surrey & Sussex Air Ambulance			
22.	GA	General Aviation Alliance			
23.	GA	British Helicopter Association			
24.	GAL Airlines Group	Gatwick Airline Operators Committee			
25.	Representative Body	Airlines UK			
26.	Military	MOD - DAATM			
27.	Public Body	Surrey County Council			28 June
28.	Public Body	Kent County Council			28 June
29.	Public Body	Reigate & Banstead Borough Council		15 & 20 May	7 June
30.	Public Body	Crawley Borough Council			
31.	Public Body	Horsham District Council		16 May	
32.	Public Body	Mole Valley District Council	9 May		26 June
33.	Public Body	Tandridge District Council			28 June
34.	Public Body	Sevenoaks District Council			
35.	Public Body	Horley Town Council	8 May	20 May	28 June
36.	Public Body	Crawley Town Council			
37.	Public Body	Charlwood Parish Council			28 June
38.	Public Body	Newdigate Parish Council			
39.	Public Body	Capel Parish Council	22 May	20 May	
40.	Public Body	Ockley Parish Council			

No	Type	Organisation/Group Name	Questionnaire Received	Focus Group Attended	DP Review Received
41.	Public Body	Holmwood Parish Council			
42.	Public Body	Betchworth Parish Council	14 May		28 June
43.	Public Body	Bletchingley Parish Council			
44.	Public Body	Brockham Parish Council			
45.	Public Body	Nutfield Parish Council	9 May	16 May	
46.	Public Body	Salfords & Sidlow Parish Council	8 May	16 May	27 June
47.	Public Body	Leigh (Surrey) Parish Council			
48.	Public Body	Outwood Parish Council		16 May	13 June
49.	Public Body	Dorking Town Council			
50.	Consultative	GATCOM		20 May	
51.	MP	MP Tonbridge & Malling			
52.	MP	MP Crawley Borough			
53.	MP	MP East Surrey			
54.	MP	MP Horsham			
55.	MP	MP Guildford			
56.	MP	MP Mole Valley			
57.	MP	MP Reigate			
58.	MP	MP Sevenoaks			
59.	Public Body	West Sussex County Council			
60.	Airport Oversight Group	NMB			
61.	Public Body	Crawley Borough Council			
62.	Campaign Group	Plane Wrong	10 May		28 June
63.	Campaign Group	Plane Justice	10 May	15 May	28 June

No	Type	Organisation/Group Name	Questionnaire Received	Focus Group Attended	DP Review Received
64.	Campaign Group	Route 4 No More			
65.	Charity	Surrey Hills AONB	18 April		
66.	Environmental Group	GACC		20 May	
67.	Govt	DfT (policy)			
68.	Campaign Group	Campaign to Protect Rural England			
69.	Campaign Group	Communities Against Gatwick Noise Emission		15 & 20 May	17 June
70.	Oversight Group	NATMAG			
71.	NATMAC	Airlines UK			
72.	NATMAC	Airspace4All			
73.	NATMAC	Airport Operators Association (AOA) 1			
74.	NATMAC	Airport Operators Association (AOA) 2			
75.	NATMAC	Airfield Operators Group (AOG)			
76.	NATMAC	Aircraft Owners and Pilots Association (AOPA)			
77.	NATMAC	Aircraft Owners and Pilots Association (AOPA)			
78.	NATMAC	Association of Remotely Piloted Aircraft Systems UK (ARPAS-UK)			
79.	NATMAC	Aviation Environment Federation (AEF)			
80.	NATMAC	British Airways (BA)			
81.	NATMAC	BAe Systems			
82.	NATMAC	British Airline Pilots Association (BALPA) 1			
83.	NATMAC	British Airline Pilots Association (BALPA) 2			
84.	NATMAC	British Airline Pilots Association (BALPA) 3			
85.	NATMAC	British Balloon and Airship Club			
86.	NATMAC	British Business and General Aviation Association (BBGA)			

No	Type	Organisation/Group Name	Questionnaire Received	Focus Group Attended	DP Review Received
87.	NATMAC	British Gliding Association (BGA)			
88.	NATMAC	British Helicopter Association (BHA)			
89.	NATMAC	British Hang Gliding and Paragliding Association (BHPA)			
90.	NATMAC	British Microlight Aircraft Association (BMAA) / General Aviation Safety Council (GASCo)			
91.	NATMAC	British Model Flying Association (BMFA)			
92.	NATMAC	British Parachute Association (BPA)			
93.	NATMAC	General Aviation Alliance (GAA)			
94.	NATMAC	Guild of Air Traffic Control Officers (GATCO)			
95.	NATMAC	Honourable Company of Air Pilots (HCAP)			21 June
96.	NATMAC	Helicopter Club of Great Britain (HCGB)			
97.	NATMAC	Heavy Airlines			
98.	NATMAC	Isle of Man CAA			
99.	NATMAC	Light Aircraft Association (LAA)			
100	NATMAC	Low Fare Airlines			
101	NATMAC	Military Aviation Authority (MAA)			
102	NATMAC	Ministry of Defence - Defence Airspace and Air Traffic Management (MoD DAATM)			
103	NATMAC	NATS 1			
104	NATMAC	NATS 2			
105	NATMAC	Navy Command HQ			
106	NATMAC	PPL/IR (Europe)			
107	NATMAC	PPL/IR (Europe)			
108	NATMAC	UK Airprox Board (UKAB)			

No	Type	Organisation/Group Name	Questionnaire Received	Focus Group Attended	DP Review Received
109	NATMAC	UK Flight Safety Committee (UKFSC)			
110	NATMAC	United States Air Force Europe (3rd Air Force-Directorate of Flying (USAFE (3rd AF-DOF))			
111	AJ	GMX	10 May		22 June
112	Chairman	Nutfield Conservation Society	7 May		
113	Principal Transport Planner	East Sussex County Council			
114	Operations Manager	Cathay Pacific Airways	30 April	15 May	
115	Chief Executive	Sussex Chamber of Commerce			
116	RG	Gatwick Airport			
117	MH	NATS 3			
118	Public Body	Beare Green Community Association	23 May		
119	Public Body	Burston Parish Council		20 May	
120	Public Body	Rusper Parish Council			28 June
121	Public Body	Waverley Borough Council			28 June

Table 8 - Stakeholder List

Appendix 2 - Questionnaire Airports & ANSPs

Q1 - Please list any altitude constraints, together with your reasons, that you feel Gatwick Airport could consider when designing its new Route 4 PBN procedure?

Q2 - Please inform us of the latest proposed timescales for any neighbouring airspace/procedure re-design projects?

Q3 - Please advise us of any future requirements for improved coordination (particularly adjacent/contiguous routes) between Gatwick Airport and adjacent ATC units that should be considered during the development of new Gatwick Airport Route 4 PBN procedures?

Q4 - Are there any current ATM coordination arrangements with Gatwick Airport that you would like to see remain or change as a result of Gatwick Airport's new procedure design? Please provide a brief description.

Q5 - Are there any aspects of FAS (e.g. airway entry/exit points, existing planned or new handover points) that Gatwick Airport should take into account in the design of procedures? Please provide details.

Q6 - Are you aware of anything in the CAA Airspace Modernisation Strategy that presents a risk or opportunity to Gatwick Airport Route 4 PBN procedure development? Please provide details.

Q7 - Do you have an existing Letter of Agreement or Memorandum of Understanding or other agreement with Gatwick Airport? If so, do you see this as:

(a) An agreement you would like to see remain, preferably in its current form.

(b) An opportunity to alter or extend this agreement – and how?

(c) An agreement that is unfit for purpose (or may come to be as a result of the change).

Q8 - Please let us know if there are any daytime or night time constraints that you consider Gatwick Airport could take into account when updating its Route 4 PBN procedure? Please provide details and reasons.

Q9 - Please tell us if there are any other operational constraints that Gatwick Airport will need to consider when planning its new Route 4 departure procedure?

Q10 - Please inform us of who you consider to be the other key local aviation stakeholders that you believe Gatwick Airport should engage with during the process of designing its new Route 4 departure procedure? Please provide details and reasons.

Q11 - Please provide details of any constraints imposed by restricted operations in the area encompassed by Gatwick Airport flight operations (e.g. military operations, danger areas, restricted areas, route crossings, transit corridors, training areas etc.)?

Q12 - Please indicate if you feel there is a requirement for improved coordination between Gatwick Airport and adjacent ANSP (ATC) units that should be considered during the development of the Design Principles, Design Options and when implementing the new Gatwick Airport Route 4 PBN departure procedure?

Q13 - Please provide details of any issues or constraints due to local helicopter operations that you believe may have an impact Gatwick Airport's Route 4 PBN departure procedure design project?

Q14 - Please advise us of any other issues or constraints you feel Gatwick Airport could consider when designing its new Route 4 PBN departure procedure? Please provide details.

Q15 - Please provide details of any issues or constraints due to local GA/VFR operations that you believe may have an impact on Gatwick Airport's Route 4 PBN departure procedure?

Appendix 3 - Questionnaire Airline Operators & GA

Q1 - Please list any altitude constraints, together with your reasons, that you feel Gatwick Airport could consider when designing its new Route 4 PBN procedure?

Q2 - Please advise us of any future requirements for improved coordination (particularly adjacent/contiguous routes) between Gatwick Airport and adjacent ATC units that should be considered during the development of new Gatwick Airport Route 4 PBN procedures?

Q3 - Do you have an existing Letter of Agreement or Memorandum of Understanding or other agreement with Gatwick Airport? If so, do you see this as:

(a) An agreement you would like to see remain, preferably in its current form.

(b) An opportunity to alter or extend this agreement – and how?

(c) An agreement that is unfit for purpose (or may come to be as a result of the change).

Q4 - Please let us know if there are any daytime or night time constraints that you consider Gatwick Airport could take into account when updating its Route 4 PBN procedure? Please provide details and reasons.

Q5 - Please tell us if there are any other operational constraints that Gatwick Airport will need to consider when planning its new Route 4 departure procedure?

Q6 - Please inform us of who you consider to be the other key local aviation stakeholders that you believe Gatwick Airport should engage with during the process of designing its new Route 4 departure procedure? Please provide details and reasons.

Q7 - Please provide details of any constraints imposed by restricted operations in the area encompassed by Gatwick Airport flight operations (e.g. military operations, danger areas, restricted areas, route crossings, transit corridors, training areas etc.)?

Q8 - Please provide details of any issues or constraints due to local helicopter operations that you believe may have an impact Gatwick Airport's Route 4 PBN departure procedure design project?

Q9 - Please advise us of any other issues or constraints you feel Gatwick Airport could consider when designing its new Route 4 PBN departure procedure? Please provide details.

Q10 - Please provide details of any issues or constraints due to local GA/VFR operations that you believe may have an impact on Gatwick Airport's Route 4 PBN departure procedure?

Q11 - Please provide details of any constraints that may be occasioned by local gliding activities on, or adjacent to, the Gatwick Airport Route 4 PBN departure procedure?

Appendix 4 - Questionnaire Local Government and Planners

Q1 - Please advise us of any issues or constraints you feel Gatwick Airport could consider when designing its new Route 4 PBN departure procedure? Please provide details.

Q2 - When Gatwick Airport design new procedures for the Route 4 departure, please list the facilities in your local area that you believe could be prioritised when considering aircraft noise (e.g. hospitals, schools, parks, hospices etc)?

Q3 - Please tell us if dispersal of noise impacts across a greater number of households is preferable than the concentration of noise impacts on a smaller number of households?

Q4 - Please highlight your awareness of any particularly sensitive issues with aircraft noise over the night-time period?

Q5 - Please identify any other areas, in adjacent council/borough areas, that in your opinion may be sensitive to either direct overflight or exposure to aircraft noise?

Q6 - Do you believe aircraft conducting continuous climbs to higher altitude after taking off (where this is safe to do so) may improve (lessen) exposure to noise in your local area?

Q7 - Please tell us the locations of any particularly sensitive wildlife habitats, not already notified (linked to AONB, SSSI etc), that you feel aircraft could avoid?

Q8 - Please state what principles you believe Gatwick Airport may adopt to mitigate (in full or in part) any concerns you may have regarding the impact of airliner emissions or pollution?

Q9 - Please bring to our attention any recent or ongoing local environmental studies, you feel should be considered by Gatwick Airport when designing the new Route 4 PBN departure procedure?

Q10 - Do existing long standing Noise Preferential Routes (NPRs), agreed with Gatwick Airport, meet current and future planned local government requirements?

Q11 - Do existing noise abatement procedures meet current and future local government and community requirements?

Q12 - Are there any other local development projects, perhaps currently at the planning stage, that Gatwick Airport should be aware of and consider when planning its new Route 4 PBN departure procedure?

Q13 - Please list any other relevant local or national organisations that you believe Gatwick Airport should ensure are involved in its formal consultation.

Appendix 5 - Questionnaire Public Representatives

Q1 - Please advise us of any issues or constraints you feel Gatwick Airport could consider when designing its new Route 4 PBN departure procedure? Please provide details.

Q2 - Please tell us if dispersal of noise impacts across a greater number of households is preferable than the concentration of noise impacts on a smaller number of households?

Q3 - Please highlight your awareness of any particularly sensitive issues with aircraft noise during the night-time period?

Q4 - Do you believe aircraft conducting continuous climbs to higher altitude after taking off (where this is safe to do so) may improve (lessen) exposure to noise in your local area?

Q5 - Please tell us the locations of any particularly sensitive wildlife habitats, not already notified (linked to AONB, SSSI etc), that you feel aircraft could avoid?

Q6 - Please state what principles you believe Gatwick Airport may adopt to mitigate (in full or in part) any concerns you may have regarding the impact of airliner emissions or pollution?

Q7 - Please bring to our attention any recent or ongoing local environmental studies, you feel should be considered by Gatwick Airport when designing the new Route 4 PBN departure procedure?

Q8 - Do existing noise abatement procedures meet current and future local government and community requirements?

Q9 - Please provide the location of any future planned facilities you are aware of in your local area that could be considered sensitive to the impact of aircraft noise; please state why you feel this is necessary?

Q10 - Please identify any other areas, that are not necessarily local to you, but in your opinion could be sensitive to direct overflight or exposure to localised aircraft noise?

Appendix 6 - Formulation of the Final Shortlist of Design Principles

Table 9 below illustrates how the suggested list of design principles that stakeholders were asked to review have been amended and combined to form the final shortlist of proposed design principles.

DP No[7].	Suggested Shortlist Design Principle	Stakeholder Suggested Design Principle	DP No.	Proposed Design Principle
1	Route 4 options will be designed safely with full regulatory compliance		1	Route 4 options will be designed safely with full regulatory compliance
7	Route 4 designs should consider neighbouring airports procedures to ensure adequate deconfliction			
2	Designs should be built to manage dispersion below 7,000 ft	Dispersal needs to be kept inside the NPR	2	Designs should be built to facilitate dispersion below 7,000 ft
12	Designs should be built to concentrate dispersion below 7,000 ft			
14	ARINC 424 coding must ensure aircraft follow the desired lateral and vertical paths			
15	Routes should be designed to limit the wrap around turn to no more than 180°			

[7] Section 3 Table 4 – Version 1 of a Shortlist of Potential Design Principles

DP No[7].	Suggested Shortlist Design Principle	Stakeholder Suggested Design Principle	DP No.	Proposed Design Principle
3	New Route 4 designs should give due regard to the historic routings in use before 2012	The starting point for any route design must be the 2012 lateral location of Route 4	3	New Route 4 designs options should give due regard to the historic routings in use prior to the introduction of RNAV routes in 2012
4	Designs should seek to minimize overflight of previously unaffected locations	Noise must be the number one consideration over fuel burn	4	Route 4 designs should seek to minimise the adverse impact of noise on previously unaffected populations and seek to reduce the total number of people overflown
		Designs should reflect modern and planned aircraft design which optimises noise and emissions		
		Not increase, and where possible reduce noise disturbance to communities and residents		
		Minimise the number of newly overflown people, and minimise the total population overflown		
11	Route 4 procedures should follow M25 and A24 corridors where background noise is already high			
5	Designs will seek to avoid overflight of notified noise sensitive areas		5	Designs should seek to minimise the impact of noise on particularly sensitive areas
6	Route 4 designs should seek to minimise the impact of adverse noise on the Surrey Hills AONB	Sensitive areas and AONBs must share the burden of noise if they have historically been flown over before		
		Route 4 designs should seek to minimise the impact of adverse noise on protected locations		

DP No[7].	Suggested Shortlist Design Principle	Stakeholder Suggested Design Principle	DP No.	Proposed Design Principle
10	Overflight protections already contained in the UK AIP must be maintained			
16	Route 4 designs must consider FASI-S objectives and ensure alignment	CCO must not be implemented if this results in overflight of previously not overflown areas.	6	Route 4 designs should enable transition to a vertical profile that allows an efficient, and potentially faster, climb to higher altitudes.
		All departures should make an unrestricted climb to 7000 feet or above		
9	Designs should not include respite options that place routes over newly overflown populations		7	Designs that seek to provide respite should not overfly previously unaffected populations
17	Route 4 designs should not be constrained by the lateral dimensions of the existing NPR to 4,000 ft		8	Route 4 designs should not be constrained by the existing NPR to 4,000 ft
8	Routes should include an extended westerly climb profile before a later easterly turn			
13	Procedures should include RF legs		–	Not taken forward to the final shortlist of Design Principles

Table 9 - Design Principle Evolution