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Design Principles Report

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1 Design Principles Development

1.1 Background

Over the coming years, a national program of airspace modernisation will result in the redesign the airspace above London and the South East of England. In June 2018, the Aviation Minister, Baroness Sugg, wrote to London Biggin Hill Airport (LBHA), setting out the need for an Airspace Modernisation Programme to facilitate the future needs of UK airspace users and asking for our commitment to the development and delivery of this programme. As part of this modernisation process, LBHA is required to redesign the portion of the arrival and departure routes at the airport up to an height of 7,000 ft above mean sea level (amsl), where those routes must join and integrate with a new overarching route structure to be designed entirely by National Air Traffic Services (NATS), the UK's en-route air traffic service provider.

As part of this redesign, LBHALBHA must follow guidance provided by the CAA and successfully complete the first 6 stages of CAP 1616 – Airspace Design. In Stage 1 (Define), the CAA require LBHALBHA to satisfactorily assess the requirement for airspace change by producing a Statement of Need and produce a set of Design Principles that encompass the safety, environmental and operational criteria and policy objectives that LBHALBHA aims for in developing its airspace change.

LBHALBHA is required to develop Design Principles, which will inform the design of new departure and arrival routes that aircraft using LBHA will follow in order to integrate with the new London airspace architecture. CAP 1616 states that is important for Design Principles to be drawn up through discussion between the Change Sponsor and potentially affected stakeholders at the early stages of the airspace change process. The aim of this engagement is to ensure LBHALBHA has a good level of understanding of the proposed change, and to ascertain what design considerations are important to stakeholders.

1.2 General Approach to Development of Principles

In order to fulfil the required engagement aims, LBHA produced and distributed a brochure outlining the aims of the programme and what LBHA is aiming to achieve. The brochure contained an initial draft set of Design Principles that the airport had developed to meet its requirement. Stakeholders were asked to comment on the list and to add any further information that they believed the airport should consider as part of the redesign process. The brochure was also made available to download from the airport's website at https://yourairport.co.uk/londonairspace.

The draft list of Design Principles had been separated into:

- **Core Principles** – those principles that we believe are essential for reasons of safety, and/or the proper protection of the local amenity
- **Desirable Principles** – those features which, once Core Principles have been assured, might be desirable to achieve for various reasons, for instance, the expeditious flow of air traffic and/or the reduction of CO_2 and other emissions

- **Other Considerations** – any matters which should be incorporated into our Design Principles but which, whilst informing and enriching our Design Principles, may not form a Design Principle in their own right

LBHA requested stakeholder feedback to ensure that the Design Principles have encompassed the relevant points in the design of any proposed new routes. The initial draft Design Principles are described in the sections below.

1.3 Core Design Principles

1.3.1 A1 SAFETY – New routes must be safe for all aircraft types for which they are provided

Routes should be designed such that they are easily adhered to by flight crew and do not require aircraft to operate close to the limits of their performance.

1.3.2 A2 COMPLIANCE – Route designs to be PANS OPS compliant

New routes should be sufficiently standard that they do not require any additional flight crew training in order to operate to or from LBHA. To achieve this objective, routes should comply with ICAO PANS OPS internationally agreed criteria.

1.3.3 A3 WORKLOAD – Route must be designed to keep Air traffic Control workload as low as reasonably practicable

The correct design of traffic flows can greatly reduce Air traffic Control workload which in turn expedites flow and improves safety. LBHA will seek to design routes that 'procedurally deconflict' arrivals and departures from each other and from traffic operating in the London Terminal Control Area (LTMA) or the Flight Information Region (FIR) below the LTMA*.

'Procedurally deconflicted' routes mean unique routes that ensure that, provided they are followed, an aircraft will not come into conflict with any other aircraft along that route.

**(The LTMA is the area of controlled airspace (CAS) that lies above most of London and the South East. This airspace has varying lower 'floor levels' but it is airspace that is restricted and designated for use primarily by large commercial aircraft and business jet traffic. The FIR is the open and unrestricted airspace that lies below and around the LTMA and which can be used by all air traffic including light aircraft and helicopters. In practice commercial aircraft and business jets use the LTMA and almost all non-commercial traffic uses the open FIR).*

1.3.4 A4 NAVIGATION STANDARDS – New routes must be designed to the Required Navigational Performance

In order to comply with the proposed standards for the modernised UK airspace as a whole and in order to take full advantage of current and future aircraft navigation system capabilities, new routes must be based on GNSS navigation and designed to RNAV 1 (Area Navigation 1). Further information is available in the CAA performance -Based Navigation (PBN) Enhanced Route Spacing Guidance (CAP1385).

1.4 Desirable Design Principles

1.4.1 B1 ENVIRONMENTAL CONCERNS – Arrival routes should, where possible, aim to achieve the minimum noise and reduced fuel burn

1.4.2 B2 IMPROVED AIRCRAFT PERFORMANCE – Departure routes should aim to take advantage of the high-performance climb characteristics of typical Business Jet types by offering a continuous and uninterrupted climb direct to 7,000 ft

1.4.3 B3 EFFICIENT ROUTES - Arrival and Departure routes should, where possible, be designed to minimise track mileage flown

In order to minimise emissions and optimise operational efficiencies, LBHA should, where possible, design arrival and departure routes in order to minimise unnecessary airborne track mileage.

1.4.4 B4 REGULATED AIRSPACE – LBHA should consider the provision of Regulated Airspace to protect traffic using departure and arrival routes

Aircraft arriving and departing LBHA will likely be required to follow 'procedurally deconflicted' routes as they climb to 7,000 ft amsl in order to join or leave the airspace above. This means that, provided they do not deviate from a prescribed and unique route, they will not come into airborne conflict with any other traffic. This is the basis upon which modernised airspace below 7,000 ft will operate in future. In order to assure safe separation of aircraft it is therefore imperative that aircraft do not need to deviate from the prescribed route – for instance in order to avoid another aircraft in uncontrolled airspace. The provision of CAS would provide essential protection to climbing and descending aircraft through a known air traffic environment where all safety standards can be maintained.

1.5 Areas for Consideration

1.5.1 C1 HARMONISED ROUTES

LBHA should consider the effect of any changes in its flight routes on the behaviour of aircraft using the LTMA and open FIR airspace around Biggin Hill Airport.

1.5.2 C2 ENHANCED ARRIVAL AND DEPARTURE ROUTES

LBHA should consider how ground noise profiles might change as a result of enhanced/new departure and arrival routes, with particular reference to high power setting departures.

1.6 Design Principles Questionnaire

To assist with further development of the Design Principles, LBHA planned two drop-in focus group sessions and sent out Design Principles Questionnaires to aviation and non-aviation stakeholders. Non-aviation stakeholders included Local Government Authorities, Members of Parliament, members of the airport's consultative committee, national organisations and local resident associations and individuals. The aviation stakeholders included local Airlines, the local General Aviation (GA) community, airport operators and air navigation service providers (ANSP) and

members of the National Air Traffic Management Advisory Committee (NATMAC). A full list of those contacted is included in Annex A1.

A Design Principles questionnaire was emailed to selected stakeholders on 30 May 2019 with a requested return date of 14 June 2019. The questionnaires were also made available to download from the airport's website at https://yourairport.co.uk/londonairspace.

The specific questions asked in each version of the questionnaire can be seen at Annexes A2, A3 and A4. Additionally, the LAMP brochure that provided the background information for each questionnaire is included as an attachment to this document.

1.7 Focus Groups

Following the guidance of CAP 1616, London Biggin Airport elected to host a series of focus groups to elicit and discuss Design Principles with stakeholders. The focus groups were advertised as walk-in sessions, open to all stakeholders, which allowed each stakeholder individual time with representatives from LBHA. The sessions were attended by a mixture of stakeholders, including local residents, local government representatives and aviation stakeholders.

The purpose of each walk-in session was to provide attendees with information regarding the need for airspace modernisation programme and the CAP 1616 process to be followed, particularly stressing the airport's desire and obligation to engage with stakeholders. The first level of this engagement would seek to jointly develop Design Principles that would serve as a framework against which alternative Design Options would be devised in the next stage of the CAP 1616 process.

The walk-in sessions planned and undertaken are detailed in Table 1 below:

Focus Gp (a)	Attendees (b)	Date (c)
FG 1	Local Residents, Local government representatives, Aviation Stakeholders	13 June 2019
FG 2	Local Residents, Local government representatives, Aviation Stakeholders	20 June 2019

Table 1 - Focus Group Details

Following the walk-in sessions and after the questionnaires were returned, the list of Design Principles was adjusted in line with the responses and discussions as shown at Annex A5, Table 6 to produce the shortlist of Design Principles shown at Section 2, Table 2.

The shortlist was reviewed by stakeholders during a second round of engagement as described at Section 3. The stakeholder responses were analysed, and the prioritised shortlist of Design Principles was developed and is shown at Section 4, Table 3.

2 Shortlist of Design Principles

2.1 Shortlist of Design Principles

A shortlist of Design Principles was drawn from the initial draft list produced by LBHA and amended in line with conversations during the walk-in sessions and from responses received in the questionnaires. Table 6 shows a breakdown of the themes and responses as well as the source of those points. The initial shortlists of Design Principles identified are shown in Table 2 below.

No (a)	Design Principle (b)	Rationale (c)
1.	SAFETY – New routes must be safe for all aircraft types	Routes should be designed such that they are easily adhered to by flight crew and do not operate close to the limits of their performance.
2.	COMPLIANCE – Route should, where possible, be designed to be PANS OPS compliant	New routes should be sufficiently standard that they do not require any additional flight crew training in order to operate to or from LBHA. To achieve this objective, routes should, where possible, comply with ICAO PANS OPS internationally agreed criteria.

No (a)	Design Principle (b)	Rationale (c)
3.	WORKLOAD - Routes must be designed to keep Air traffic Control workload as low as reasonably practical	The correct design of traffic flows can greatly reduce Air traffic Control workload which in turn expedites flow and improves safety. LBHA will seek to design routes that 'procedurally deconflict' arrivals and departures from each other and from traffic operating in the London Terminal Manoeuvring Area (LTMA) or the Flight Information Region (FIR) below the LTMA*. 'Procedurally deconflicted' routes mean unique routes that ensure that, provided they are followed, an aircraft will not come into conflict with any other aircraft along that route. *(The LTMA is the area of controlled airspace that lies above most of London and the South East. This airspace has varying lower 'floor levels' but it is airspace that is restricted and designated for use primarily by large commercial aircraft and business jet traffic. The FIR is the open and unrestricted airspace that lies below and around the LTMA and which can be used by all air traffic including light aircraft and helicopters. In practice commercial aircraft and business jets use the LTMA and almost all non-commercial traffic uses the open FIR).
4.	NAVIGATION STANDARDS - New routes must be designed to the Required Navigation Performance	In order to comply with the proposed standards for the modernised UK airspace as a whole and in order to take full advantage of current and future aircraft navigation system capabilities, new routes must be based on GNSS navigation and designed to RNAV 1 (Area Navigation 1). Further information is available in the CAA Performance-Based Navigation (PBN) Enhanced Route Spacing Guidance (CAP1385).

No (a)	Design Principle (b)	Rationale (c)
5.	REGULATED AIRSPACE - LBHA should consider the provision of Regulated Airspace to protect traffic using departure and arrival routes	Aircraft arriving and departing LBHA will be required to follow 'procedurally deconflicted' routes as they climb to 7,000ft AMSL in order to join or leave the airspace above 7000ft. This means that, provided aircraft do not deviate from a prescribed and unique route, they will not come into airborne conflict with any other traffic. This is the basis upon which modernised airspace below 7,000ft will operate in future. In order to assure safe separation of aircraft it is therefore imperative that aircraft do not need to deviate from the prescribed route – for instance in order to avoid another aircraft in uncontrolled airspace. The provision of CAS would provide protection to climbing and descending aircraft through a known air traffic environment.
6.	ENVIRONMENTAL CONCERNS - Arrival and Departure routes should, where possible, be designed to minimise the impact of noise below 7000ft	One of the Governments key environmental objectives is to limit and, where possible, reduce the number of people in the UK significantly affected by adverse impacts from aircraft noise. Therefore, consideration should be made regarding the ability to reduce noise over residential areas in close proximity to the airport and avoid designated noise sensitive areas.
7.	EFFICIENT ROUTES - Arrival and Departure routes should, where possible, be designed to minimise track mileage flown	In order to minimise emissions and optimise operational efficiencies, LBHA should, where possible, design arrival and departure routes in order to minimise unnecessary airborne track mileage.
8.	IMPROVED AIRCRAFT PERFORMANCE – Departure routes should, where possible, aim to take advantage of the high-performance climb characteristics of typical Business Jet types by offering a continuous and uninterrupted climb direct to 7,000ft AMSL	High performance Business type aircraft are able to achieve climb rates which exceed those which can be achieved by most passenger airliners. This should be considered along with continuous climb profiles which may provide environmental benefits.

No (a)	Design Principle (b)	Rationale (c)
9.	HARMONISED ROUTES - LBHA should consider the effect of any changes in its flight routes on the behaviour of other airspace users making use of the airspace around Biggin Hill Airport	Full consideration of other airspace users (as stakeholders) in the vicinity of Biggin Hill Airport in the design and development of flight routes to and from the airfield.
10.	Procedures should be designed to avoid overflight of sensitive areas e.g. hospitals, schools, country parks or Areas of Outstanding Natural Beauty (AONB)	Where noise modelling indicates it may be necessary, the routes should be designed to minimise, as much as practicable, affects on establishments that are sensitive to noise e.g. Hospitals, Schools. Consideration should also be given to avoid overflight of areas that are used by the public for recreational purposes during the day e.g. public parks, Areas of Outstanding Natural Beauty.

Table 2 - Shortlist of Design Principles

A review of the Design Principles indicates that the 10 Design Principles identified are mutually exclusive therefore there is no requirement to reject one principle over another and all 10 Design Principles can therefore be used as a framework against which the Design Options can be developed at CAP 1616 Step 2A.

Not only is it important to have a list of Design Principles, but these should also be ranked in priority order. This could be important as Design Options are developed and where a choice presents itself concerning which Design Principle has primacy should inconsistencies occur.

The next section shows how continued engagement with stakeholders was conducted in order to understand the importance stakeholders attached to the developed Design Principles.

3 Design Principle Review

3.1 Review Process

On 24 June 2019, the Design Principles were sent to all organisations and individuals who had received the Design Principle questionnaires or attended a focus group meeting. Stakeholders were asked to review the Design Principles and offered the opportunity to comment further, requesting their thoughts on how these Design Principles should be prioritised.

Specifically, consultees were asked to provide the following information regarding each Design Principle:

1. Do you agree with this Design Principle?
2. Rank the 10 Design Principles in order of priority from 1 (Highest) to 10 (Lowest).
3. If you feel any of the Design Principles are not applicable to you, please mark it as '0'.
4. Please provide comments as to why you agree or disagree with the Design Principle.
5. Suggest any additional Design Principles you feel ought to be considered by LBHA.

A review of the feedback received is provided in paras 3.5 to 3.14 below.

3.2 Responses Received

From the emails sent out to organisations and individuals that had received the questionnaire or attended a walk-in session there were a total of 11 responses from the following organisations or individuals:

- RAF Kenley
- [redacted]
- Defence Airspace and Air Traffic Management (DAATM)
- Tatsfield Parish Council
- Bromley Council
- Mr David Clapham
- Tandridge District Council
- London Heathrow Airport
- London Gatwick Airport
- Avalon Aero
- Surrey County Council
- Green Street Green Association

In addition to the specific importance, ranking and comments provided for each Design Principle, the consultees were given the opportunity to provide more general comments and to inform LBHA of any additional Design Principles that they would like the airport to consider.

Tatsfield Parish Council suggested that the Design Principles should include managing the effect on road traffic in the area. If the proposed changes to flight paths lead to an increase in air traffic movements at the airport, then plans should be put in place to mitigate any 'rat run' impact of road traffic in the local area.

LBHA Response – This ACP is concerned with the modernisation of the airspace above London and the south east of England and hence this is not considered as a Design Principle for this airspace change. However, LBHA anticipates a significant increase in business air traffic movements over the next 15 years due to the other London airports becoming increasingly congested with scheduled airline flights, so will need to liaise with local Government organisations and planners to mitigate the effect of any increase in road traffic due to an increase in activity at the airport.

Bromley Council suggested that practices such as 'flying higher for longer' and 'continuous descent' could bring noise benefits to residents and asked that these practices are incorporated into any plans.

LBHA Response – LBHA agrees that these practices, known as Continuous Climb and Descent Operations, would contribute to reducing the impact of noise to local residents and will be considered as part of Design Principles 6 and 8.

Surrey County Council were concerned that there was no Design Principle that seeks to achieve respite from noise.

LBHA Response – LBHA accepts Surrey County Council's comments on achieving respite for local residents but does not feel that it will be practicable to achieve genuine respite given the congested airspace and existing restrictions around LBHA, particularly in regard to London Gatwick Airport operations. It may be possible to propose alternate routes that still meet the requirements of the London airspace modernisation programme and these will be considered as design options at the next step.

There were no additional Design Principles provided for consideration.

3.3 Prioritisation Methodology

In order to produce the prioritised shortlist of Design Principles detailed in Section 4 below, the priority ranking provided by each stakeholder was analysed. Returns that did not include an order of prioritisation were not used to determine the overall priority. A score of zero was discounted when calculating the average score as this would skew the average score in favour of higher priority. The average of the scores attributed to each Design Principle was used to determine the final ranking of the Design Principles. The Design Principle with the lowest average was ranked the highest for importance, the Design Principle with the highest average was ranked the least important.

3.4 Prioritisation Returns and Assumptions

Bromley Council did not provide an overall prioritisation of the Design Principles but made general comments that related to the Design Principles and as such, assumptions have been made on the prioritisation as follows:

- Bromley Council comments state that safety will be of paramount concern. As such Design Principle 1 was given a score of 1.

- The Council also stated in their comments that '*of great concern for residents is that any noise generated is kept to an absolute minimum*' and suggested that this Design Principle should be considered a Core Design Principle. Given the importance given to this Design Principle by Bromley Council, Design Principle 6 was attributed a score of 2 for prioritisation purpose.

Bromley Council provided no other scores for the Design Principles and no further assumptions have been made.

Tandridge Borough Council made comments on several Design Principles and rated them as 'level 1' or 'level 2'. This has assumed to mean a score of 1 and 2 respectively in terms of the prioritisation scoring. The Council also commented on Design Principle 10, stating that, like the previous Design Principles it was '*incredibly relevant to the quality of life experienced by residents, businesses and environments affected by the flight paths*'. As such, Design Principle 10 was attributed a score of 3 for prioritisation from Tandridge Borough Council. Tandridge Borough Council provided no other scores for the Design Principles and no further assumptions have been made.

London Gatwick Airport did not score each of the Design Principles but stated how they rated the priority of the Design Principle, in terms of Top, High or Medium. To assist with the prioritisation of the Design Principles, the Top priority Design Principle was attributed a score of 1, High Priority Design Principles a score of 2 and Medium Priority Design Principles a score of 3. Any Design Principles that were not given a priority by Gatwick Airport were not scored for prioritisation purposes.

Surrey County Council provided comments for each of the Design Principles but did not give any scores for prioritisation. No assumptions have been made for the return from Surrey County Council.

3.5 DP1 SAFETY – New routes must be safe for all aircraft types

Routes should be designed such that they are easily adhered to by flight crew and do not operate close to the limits of their performance.

3.5.1 Summary of Feedback

All respondees agreed that safety was of paramount importance in any redesign of airspace and all but one prioritised this Design Principle as top priority. London Gatwick Airport suggested amendments to the wording of the Design Principle and its description.

3.5.2 How has the feedback influenced the Design Principle?

The wording of the Design Principle and its description have been amended to reflect the feedback received. This Design Principle will be carried forward to the Design Options stage.

3.5.3 Proposed text of Design Principle and Priority

Priority 1 Design Principle – SAFETY – New routes must be safe - Routes should be designed such that they are easily adhered to by flight crew and do not operate close to the limits of **crew or aircraft licenced capabilities**.

3.6 DP2 COMPLIANCE – Route should, where possible, be designed to be PANS OPS compliant

New routes should be sufficiently standard that they do not require any additional flight crew training in order to operate to or from LBHA. To achieve this objective, routes should, where possible, comply with ICAO PANS OPS internationally agreed criteria.

3.6.1 Summary of Feedback

All of the response received for this Design Principle agreed that it was a valid Design Principle, although Tandridge District Council stated that it was unclear whether the Design Principles relating to safety were an option for LBHA since aviation safety is a mandatory compliance.

London Gatwick Airport suggested that it may be better to reframe the principle so that designs help flight crews to adhere to procedures. We suggest that the rationale could be framed around the avoidance of airport specific procedure training rather than additional training. If the emphasis was placed on the avoidance of 'additional training', this may rule out some design features which could be used to better manage noise impacts.

3.6.2 How has the feedback influenced the Design Principle?

As a result of the importance many consultees gave this Design Principle, it will be taken forward to the Design Options stage, with a minor amendment to the wording of the description based on the feedback received.

3.6.3 Proposed text of Design Principle and Priority

Priority 2 Design Principle – COMPLIANCE – Route should, where possible, be designed to be PANS OPS compliant - New routes should be sufficiently standard that they **should** not require any additional flight crew training in order to operate to or from LBHA. To achieve this objective, routes should, where possible, comply with ICAO PANS OPS internationally agreed criteria.

3.7 DP3 WORKLOAD - Routes must be designed to keep Air traffic Control workload as low as reasonably practical

The correct design of traffic flows can greatly reduce Air traffic Control workload which in turn expedites flow and improves safety. LBHA will seek to design routes that 'procedurally deconflict' arrivals and departures from each other and from traffic operating in the London Terminal Manoeuvring Area (LTMA) or the Flight Information Region (FIR) below the LTMA. 'Procedurally deconflicted' routes mean unique routes that ensure that, provided they are followed, an aircraft will not come into conflict with any other aircraft along that route.

3.7.1 Summary of Feedback

Tatsfield Parish Council stated that Safety must be number one priority so designing routes that 'procedurally deconflict' is an absolute essential particularly in the light of local residential populations in the Biggin Hill area. Although keeping ATC workload as low as possible is desirable it must be of secondary importance to safety.

One respondee stated that this Design Principle was a safety rather than a workload issue and that this Design Principle should be incorporated into DP1. The principle of correctly designing traffic flows is correct but ATC workload is the wrong articulation.

Whilst agreeing with the Design Principle, London Gatwick Airport expressed concern over the wording of the Design Principle and suggested that '**as low as reasonably practical**' was not a helpful standard to include as other benefits could be excluded if workload levels were a higher determining factor. They suggested that as a criterion, then having sufficient ATC capacity to deal with non-routine /unforeseeable events would be more suitable.

3.7.2 How has the feedback influenced the Design Principle?

By designing routes that are 'procedurally deconflicted', ATC workload would be focused more on other traffic in the local area that can cause a conflict and provide the necessary deconfliction to increase safety for all airspace users. This Design Principle has been amended to incorporate the feedback received and will be taken forward to the Design Options stage.

3.7.3 Proposed text of Design Principle and Priority

Priority 4 Design Principle – WORKLOAD - Routes must be designed to **introduce capacity to** Air traffic Control workload **to facilitate adequate deconfliction in the vicinity** - The correct design of traffic flows can greatly reduce Air traffic Control workload which in turn expedites flow and improves safety. LBHA will seek to design routes that 'procedurally deconflict' arrivals and departures from each other and from traffic operating in the London Terminal Manoeuvring Area (LTMA) or the Flight Information Region (FIR) below the LTMA. 'Procedurally deconflicted' routes mean unique routes that ensure that, provided they are followed, an aircraft **should reduce its level of possible** conflict with any other aircraft **in the vicinity**.

3.8 DP4 NAVIGATION STANDARDS - New routes must be designed to the Required Navigation Performance

In order to comply with the proposed standards for the modernised UK airspace as a whole and in order to take full advantage of current and future aircraft navigation system capabilities, new routes must be based on GNSS navigation and designed to RNAV 1 (Area Navigation 1). Further information is available in the CAA Performance-Based Navigation (PBN) Enhanced Route Spacing Guidance (CAP1385).

3.8.1 Summary of Feedback

All consultees were in agreement that this was a valid Design Principle, but the levels of prioritisation were varied, resulting in an overall low prioritisation. Bromley Council commented that although RNAV procedures would enable better track keeping on any proposed route, they would be interested in any proposals on how disturbance might be minimised directly under the flight path.

Both London Heathrow and London Gatwick Airports commented on the possible ambiguity of the wording in the Design Principle and suggested that LBHA clarify the navigational standards that it is looking to use in the design of its new routes.

3.8.2 How has the feedback influenced the Design Principle?

This Design Principle will be carried forward to the Design Options stage with an amendment to the wording based on the feedback received.

3.8.3 Proposed text of Design Principle and Priority

Priority 8= Design Principle – NAVIGATION STANDARDS - New routes must be designed to **use Performance Based Navigation** - In order to comply with the proposed standards for the modernised UK airspace as a whole and in order to take full advantage of current and future aircraft navigation system capabilities, new routes must be based on GNSS navigation and designed to RNAV 1 (Area Navigation 1). Further information is available in the CAA Performance-Based Navigation (PBN) Enhanced Route Spacing Guidance (CAP1385).

3.9 DP5 REGULATED AIRSPACE - LBHA should consider the provision of Regulated Airspace to protect traffic using departure and arrival routes

Aircraft arriving and departing LBHA will be required to follow 'procedurally deconflicted' routes as they climb to 7,000ft AMSL in order to join or leave the airspace above 7000ft. This means that, provided aircraft do not deviate from a prescribed and unique route, they will not come into airborne conflict with any other traffic. This is the basis upon which modernised airspace below 7,000ft will operate in future. In order to assure safe separation of aircraft it is therefore imperative that aircraft do not need to deviate from the prescribed route – for instance in order to avoid another aircraft in uncontrolled airspace. The provision of CAS would provide protection to climbing and descending aircraft through a known air traffic environment.

3.9.1 Summary of Feedback

This Design Principle received overall support, with one respondee stating that regulated airspace would be of major benefit to all users of the airport, providing protection for aircraft arriving at or departing from the airport. However, a number of aviation respondees stated that any new CAS should be the minimum required and it could severely restrict the movement of other airspace users, leading to an increase in airspace infringements or funnelling of GA traffic. The creation of additional CAS has to be balanced against the extent that risk exposure is reduced and impact on other airspace users through reduced access to the airspace. LBHA should also consider the height of the land surrounding the airport, which would be impacted by the altitude of flight paths where other lower land areas would not.

3.9.2 How has the feedback influenced the Design Principle?

LBHA acknowledges the comments attributed to this Design Principle and will consider the needs of other airspace users in any designs for new regulated airspace. This will include consideration of any increase in the risk of CAS infringements or funnelling of GA traffic as well as the consideration of the increase in noise caused by the displacement of any other traffic. This Design Principle will be taken forward to the Design Options stage.

3.9.3 Proposed text of Design Principle and Priority

Priority 6 Design Principle – REGULATED AIRSPACE - LBHA should consider the provision of Regulated Airspace to protect traffic using departure and arrival routes - Aircraft arriving and departing LBHA will be required to follow 'procedurally deconflicted' routes as they climb to 7,000ft amsl in order to join or leave the airspace above 7000ft. This means that, provided aircraft do not deviate from a prescribed and unique route, they will not come into airborne conflict with any other traffic. This is the basis upon which modernised airspace below 7,000 ft will operate in future. In order to assure safe separation of aircraft it is therefore imperative that aircraft do not need to deviate from the prescribed route – for instance in order to avoid another aircraft in uncontrolled airspace. The provision of CAS would provide protection to climbing and descending aircraft through a known air traffic environment.

3.10 DP6 ENVIRONMENTAL CONCERNS - Arrival and Departure routes should, where possible, be designed to minimise the impact of noise below 7000 ft

One of the Governments key environmental objectives is to limit and, where possible, reduce the number of people in the UK significantly affected by adverse impacts from aircraft noise. Therefore, consideration should be made regarding the ability to reduce noise over residential areas in close proximity to the airport and avoid designated noise sensitive areas.

3.10.1 Summary of Feedback

There was widespread agreement that noise was a primary concern and as such, it was generally prioritised high. A number of respondees suggested that this Design Principle should be included as a Core Design Principle, helping to demonstrate LBHA's commitment to minimising noise disturbance wherever possible.

Tatsfield Parish Council stated that current arrangements for departures from runway 21 are satisfactory and should not be compromised and that no measures to protect neighbouring areas should be at the expense of Tatsfield.

LBHA were again reminded that the land levels in the local area are generally very high and will be impacted by the altitude of flight paths more than lower areas.

Bromley Council were hopeful that reduced fuel burn would follow as a result but that the over-riding priority should be minimising noise disturbance. One respondee stated that the Design Principle must be uprated to include the impact of emissions.

Surrey County Council felt that the reduction of noise over residential areas and the avoidance of designated noise sensitive areas should be considered as separate Design Principles. The Council also made it clear that they are opposed to operations that generate frequent aircraft overflights and high noise levels in areas previously not overflown. They were concerned that there was no Design Principle that seeks to achieve respite from noise.

3.10.2 How has the feedback influenced the Design Principle?

It is clear that the adverse impact of aircraft noise is a high priority for aviation and non-aviation stakeholders alike. In light of the feedback received, the wording of this Design Principle has been amended and the Design Principle has been re-categorised as a Core Design Principle and prioritised accordingly. The comment concerning the

reduction of emissions was included in Design Principle 7. This amended Design Principle will be taken forward to the Design Options stage.

3.10.3 Proposed text of Design Principle and Priority

Priority 3 Design Principle – ENVIRONMENTAL CONCERNS - Arrival and Departure routes should, where possible, be designed to minimise the impact of noise below 7000 ft **and should avoid the overflight of populations not previously overflown** - One of the Governments key environmental objectives is to limit and, where possible, reduce the number of people in the UK significantly affected by adverse impacts from aircraft noise. Therefore, consideration should be made regarding the ability to reduce noise over residential areas in close proximity to the airport and avoid designated noise sensitive areas.

3.11 DP7 EFFICIENT ROUTES - Arrival and Departure routes should, where possible, be designed to minimise track mileage flown

In order to minimise emissions and optimise operational efficiencies, LBHA should, where possible, design arrival and departure routes in order to minimise unnecessary airborne track mileage.

3.11.1 Summary of Feedback

Although this Design Principle received general support from most respondees, there was concern that this principle would be to the detriment of avoiding noise sensitive areas and providing respite for overflown communities. One respondee did not agree with this Design Principle as they felt that additional mileage would be better if it meant avoiding noise and disturbance to the local population.

The MOD stated that the shortest flight paths are not necessarily the most environmentally efficient and it may be more appropriate to reword the Design Principle to take this into account.

LBHA were again reminded that the land levels in the local area are generally very high and will be impacted by the altitude of flight paths more than lower areas.

3.11.2 How has the feedback influenced the Design Principle?

Whilst it is important to reduce emissions where possible, Government guidance states that limiting the adverse effect of noise is the priority below 7,000 ft. This Design Principle has a much lower priority than the Design Principle designed to minimise the impact of noise. This Design Principle has been amended to reflect comments made in the feedback and will be carried forward to the Design Options stage.

3.11.3 Proposed text of Design Principle and Priority

Priority 7 Design Principle – EFFICIENT ROUTES - Arrival and Departure routes should, where possible, be designed to minimise **emissions and optimise operational efficiencies** - In order to minimise emissions and optimise operational efficiencies, LBHA should, where possible, design arrival and departure routes in order to minimise unnecessary airborne track mileage.

3.12 DP8 IMPROVED AIRCRAFT PERFORMANCE – Departure routes should, where possible, aim to take advantage of the high-performance climb characteristics of typical Business Jet types by offering a continuous and uninterrupted climb direct to 7,000 ft AMSL

High performance Business type aircraft are able to achieve climb rates which exceed those which can be achieved by most passenger airliners. This should be considered along with continuous climb profiles which may provide environmental benefits.

3.12.1 Summary of Feedback

One respondee did not agree with this Design Principle as currently drafted. They felt that in addition to the implication of the high-performance take-off and climb rates on emissions and noise, there should be a paragraph which considered helicopters. Helicopters are noisy and disruptive and whilst they are classified as small aircraft, their routes must be properly incorporated within this process to minimise impacts on those living nearby.

3.12.2 How has the feedback influenced the Design Principle?

This Airspace Change Proposal is responsible for the design of routes up to an altitude of 7,000 ft where those routes join the en-route structure controlled by NATS. Although helicopters do not fly routes that connect to the en-route airways, they are required to avoid noise sensitive areas surrounding the aerodrome, and must conform to normal fixed-wing joining, departure and circuit procedures unless otherwise instructed by ATC. This Design Principle will be brought forwards to the Design Options stage.

3.12.3 Proposed text of Design Principle and Priority

Priority 10 Design Principle – IMPROVED AIRCRAFT PERFORMANCE – Departure routes should, where possible, aim to take advantage of the high-performance climb characteristics of typical Business Jet types by offering a continuous and uninterrupted climb direct to 7,000 ft amsl - High performance Business type aircraft are able to achieve climb rates which exceed those which can be achieved by most passenger airliners. This should be considered along with continuous climb profiles which may provide environmental benefits.

3.13 DP9 HARMONISED ROUTES - LBHA should consider the effect of any changes in its flight routes on the behaviour of other airspace users making use of the airspace around Biggin Hill Airport

Full consideration of other airspace users in the vicinity of Biggin Hill Airport in the design and development of flight routes to and from the airfield.

3.13.1 Summary of Feedback

This Design Principle received general support from the respondees, with one stating that whilst the needs of other airspace users were important, the needs of Biggin Hill Airport must remain paramount. Respondees were keen to ensure that any new airspace should be minimised and there should be provision for other airspace users

to transit portions of CAS. There was concern that it could restrict routing options in the local area and create funnelling of GA traffic.

One respondee stated that it was important for all airspace users to eliminate noise and low flights in the vicinity of LBHA.

3.13.2 How has the feedback influenced the Design Principle?

The restriction of other aircraft from flying low level in Class G uncontrolled airspace around LBHA is not under the control of LBHA. However, the design and development of new routes or airspace will consider any effect on other traffic that is likely to lead to an increase in funnelling or noise over a particular area. This Design Principle will be taken forward to the Design Options stage.

3.13.3 Proposed text of Design Principle and Priority

Priority 5 Design Principle – HARMONISED ROUTES - LBHA should consider the effect of any changes in its flight routes on the behaviour of other airspace users making use of the airspace around Biggin Hill Airport - Full consideration of other airspace users in the vicinity of Biggin Hill Airport in the design and development of flight routes to and from the airfield.

3.14 DP10 Procedures should be designed to avoid overflight of sensitive areas e.g. hospitals, schools, country parks or Areas of Outstanding Natural Beauty (AONB)

Where noise modelling indicates it may be necessary, the routes should be designed to protect, as much as practicable, establishments that are sensitive to noise e.g. Hospitals, Schools. Consideration should also be given to avoid overflight of areas that are used by the public for recreational purposes e.g. public parks, Areas of Outstanding Natural Beauty.

3.14.1 Summary of Feedback

Whilst there was general support for this Design Principle, it was also recognised that it may not always be possible to avoid the overflight of some noise sensitive areas and that LBHA would have to assess what would have the least impact. Surrey County Council also commented that at certain times, some noise sensitive areas would not be so sensitive.

One respondee stated that overflight of AONB, parks, schools, hospitals and recreational areas should not be allowed.

3.14.2 How has the feedback influenced the Design Principle?

There are designated Noise Sensitive Areas for LBHA, and new routes will be designed to avoid these areas. Other areas sensitive to noise will be considered as part of the design process. This Design Principle has been amended slightly and will be carried forward to the Design Options stage.

3.14.3 Proposed text of Design Principle and Priority

Priority 8= Design Principle – Procedures should be designed to avoid, **where possible**, overflight of sensitive areas e.g. hospitals, schools, country parks or Areas Of Outstanding Natural Beauty (AONB) - Where noise modelling indicates it may be

necessary, the routes should be designed to protect, as much as practicable, establishments that are sensitive to noise e.g. Hospitals, Schools. Consideration should also be given to avoid overflight of areas that are used by the public for recreational purposes e.g. public parks, Areas of Outstanding Natural Beauty.

4 Prioritised Shortlist of Design Principles

4.1 Design Principle Review

In light of the feedback received from stakeholders during the review described above in Section 3, the final prioritised shortlist of Design Principles is shown in Table 3 below.

Prioritised DP (a)	DP No (b)	Design Principle (c)	Category (d)
1	1	SAFETY – New routes must be safe	Safety
2	2	COMPLIANCE – Route should, where possible, be designed to be PANS OPS compliant	Technical
3	6	ENVIRONMENTAL CONCERNS - Arrival and Departure routes should, where possible, be designed to minimise the impact of noise below 7,000 ft and should avoid the overflight of populations not previously overflown	Environmental
4	3	WORKLOAD - Routes must be designed to introduce capacity to Air traffic Control workload to facilitate adequate deconfliction in the vicinity	Operational
5	9	HARMONISED ROUTES - LBHA should consider the effect of any changes in its flight routes on the behaviour of other airspace users making use of the airspace around Biggin Hill Airport	Technical
6	5	REGULATED AIRSPACE - LBHA should consider the provision of Regulated Airspace to protect traffic using departure and arrival routes	Technical

Prioritised DP (a)	DP No (b)	Design Principle (c)	Category (d)
7	7	EFFICIENT ROUTES - Arrival and Departure routes should, where possible, be designed to minimise **emissions and optimise operational efficiencies**	Environmental
8=	10	Procedures should be designed to avoid, where possible, overflight of sensitive areas e.g. hospitals, schools, country parks or Areas of Outstanding Natural Beauty (AONB).	Environmental
8=	4	NAVIGATION STANDARDS - New routes must be designed to use Performance Based Navigation	Operational
10	8	IMPROVED AIRCRAFT PERFORMANCE – Departure routes should, where possible, aim to take advantage of the high-performance climb characteristics of typical Business Jet types by offering a continuous and uninterrupted climb direct to 7,000 ft amsl	Environmental

Table 3 - Prioritised Design Principles

5 CAP 1616 - Next Steps

5.1 Next Steps

This document will be submitted to the CAA as evidence to support Step 1B of the CAP 1616 airspace change process ahead of the Stage 1 Define Gateway.

Following the CAA's acceptance of the documentation 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 developed to address the Statement of Need.

Currently, LBHA's estimated timeline for subsequent stages of this process is shown in Table 4 below:

CAP 1616 Stage (a)	Estimated Completion Date (b)
Stage 1 Define	26 July 2019
Stage 2 Develop and Assess	31 January 2020
Stage 3 Consult	28 January 2022
Stage 4 Update and Submit ACP	January 2023

Table 4 - LBHA ACP Timeline

A1 Stakeholders Contacted - Step 1B

Type	Contact
Airport Users	1 Aviation
	Acropolis Aviation
	Alouette Flying Club
	Alpha Golf
	Arena Aviation
	Avalon Aerojet
	Bombardier
	Castle Air
	Catreus Ltd
	Centreline Air Charter
	Cirrus Aircraft
	EFG Flying School
	Falcon Flying Services
	Heritage Hangar
	Interflight Air Charter
	JT Air Ltd
	Linkinjet
	London Executive Aviation
	Net Jets
	Oriens Aviation
	RAS Completions
	Signature Flight Support
	Shipping & Airlines
	Sovereign Business Jets
	Surrey & Kent Flying Club
	Textron
	Voluxis
	Wessex Aviation
	Zenith Aviation
Aircraft Operators	Formula 1
	Globe Air
	Starspeed

Type	Contact
	Fresh Air UK Ltd
	Air Hamburg
	Fai Rent-a-jet
	Elite Aero Services
	Luxwing
	Centreline Air Charter
	xclusive jet
	Executive Jet
	Jetfly Aviation
	Vista Jet
Local GA Community	East Haxted microlight site
	Green Dragons Warlingham
	Hurley Lodge helicopter site
	Surrey Hills Glider Club - Kenley Aerodrome
	2FTS - Kenley Aerodrome
	Redhill Aerodrome
	Rochester Airport
	GA Alliance
	Staffhurst Woods
ANSP	London Heathrow (NATS)
	London City (NATS)
	NATS (Farnborough – LARS)
	NATS (LTC)
Airport	London Gatwick (LGW) Airport
	London Heathrow (LHR) Airport
	London City (LCY) Airport

County, City and District Councils	Dartford BC
	East Sussex County Council
	Kent County Council
	London Assembly
	London Borough Councils
	London Borough of Bromley
	London Borough of Bromley - Leader
	London Borough of Bexley
	London Borough of Croydon

Type	Contact
	Reigate & Banstead BC
	Sevenoaks DC
	Surrey County Council
	Tatsfield Parish Council
	Tandridge DC
	West Sussex County Council
MP	Beckenham
	Bexleyheath & Crayford
	Bromley & Chislehurst
	Croydon Central
	Croydon North
	Croydon South
	Dartford
	East Surrey
	Old Bexley & Sidcup
	Orpington
	Reigate
	Sevenoaks
	Sutton & Cheam
Airport Consultative Committee	Cllr R Parry
	Cllr C McIntosh
	Cllr M Allen
	George Crowe
	John High
	Jonathan Gibb
	Katey Martin
	Nick Kemp
	Peter Osborne
	Rev J Musson
	Robert Hadley
	Steve O'Connell
	Peter Martin
	Deva Ponnoosami
	Cllr R Scoates
	Cllr M Stevens

Type	Contact
	Mr J Willis
	Anoop Bamrah
Other Organisations/ Consultees	Woldingham
	Green Street Green Association
	CPRE - Kent
	Flightpath Watch
	Natural England
	Surrey Hills AONB
	London Borough of Bromley Residents Federation
	Andrew Rogers
	NATS Mgr LAMP
	CAA SARG
	Jon Allbutt
	Breed Aviation (CI)
	James Chan
	Michael Nicolai
	Godstone Preservation Society
	Jack Pease
	Paul Sweeting
	Laura Magee
	Richard Woods
	Nutfield Conservation Society
	David Clapham
	Mr F Hunter
	Ramesh Selvamani
NATMAC Civil Consultees	Airlines UK
	Airspace4All
	AOA
	AOA
	Airfield Operators Group (AOG)
	AOPA UK
	AOPA UK
	ARPAS UK
	AEF
	BAe Systems

Type	Contact
	British Airways
	BALPA
	BALPA
	BALPA
	BBAC
	BBGA
	BGA
	BPA
	BHPA
	BHA
	BMFA
	BMAA & GASCo
	GAA
	GATCO
	Heavy Airlines
	HCGB
	HCAP
	Isle of Man CAA
	LAA
	Low Cost Airlines
	NATS
	NATS
	PPL/IR Europe
	PPL/IR Europe
	UKAB
	UKFSC
NATMAC Military Consultees	DAATM
	HQ 3rd Air Force USAFE
	Military Aviation Authority
	NC HQ Aviation Division

Table 5 - Stakeholders Contacted

A2 Aviation Stakeholder Questionnaire

Q1 - Please list any altitude constraints, together with your reasons, that you feel London Biggin Hill Airport (LBHA) could consider when designing its new airspace structure?

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 LBHA and adjacent ATC units that should be considered during the development of the new LBHA airspace structure?

Q4 - Are there any aspects of the Future Airspace Strategy (FAS) (e.g. airway entry/exit points, existing planned or new handover points) that LBHA should take into account in the design of the new airspace? Please provide details.

Q5 - Are you aware of anything in the CAA Airspace Modernisation Strategy that presents a risk or opportunity to LBHA airspace development? Please provide details.

Q6 - Do you have an existing Letter of Agreement or Memorandum of Understanding or other agreement with LBHA? 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).

Q7 - Please let us know if there are any time-based constraints that you consider LBHA could take into account when updating its airspace structure? Please provide details and reasons.

Q8 - Please tell us if there are there any other operational constraints that LBHA will need to consider when planning its new airspace?

Q9 - Please inform us of who you consider to be the other key local aviation stakeholders that you believe LBHA should engage with during the process of designing its new airspace? Please provide details and reasons.

Q10 - Please provide details of any constraints imposed by restricted operations in the area encompassed by LBHA flight operations (e.g. military operations, danger areas, restricted areas, route crossings, transit corridors, training areas etc.)?

Q11 - Please indicate if you feel there is a requirement for improved coordination between LBHA and adjacent Air Navigation Service Providers (ATC) units that should be considered during the development of the Design Principles, Design Options and when implementing the new LBHA airspace structure?

Q12 - Please provide details of any issues or constraints due to local helicopter operations that you believe may have an impact on LBHA's new airspace design project?

Q13 - Please provide details of any issues or constraints due to local General Aviation operations, that you believe may have an impact on LBHA's new airspace structure.

Q14 - Please provide details of any constraints that may be created by local gliding activities on the LBHA's new airspace structure?

Q15 - Please provide details of any impacts on General Aviation/VFR flying and VFR/IFR Training activities that you feel may be created by LBHA's new airspace structure.

Q16 - Please advise us of any other issues or constraints you feel LBHA should consider when designing new airspace.

A3 Public Stakeholder Questionnaire

Q1 - Please provide the location of any future planned facilities you are aware of in your local area that should be protected from the impact of aircraft noise; please state why you feel this is necessary?

Q2 - Please highlight your awareness of any particularly sensitive issues with aircraft noise over the night-time period.

Q3 - Please identify any other areas, that are not necessarily local to you, but in your opinion require protection from either direct overflight or from aircraft noise?

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

Q5 - Please tell us the locations of any particularly sensitive wildlife habitats, not already notified, that you feel aircraft should avoid?

Q6 - Please state what principles you believe London Biggin Hill Airport (LBHA) should opt to mitigate (in full or in part) any concerns you may have regarding the impact of aircraft exhaust fumes or pollution?

Q7 - Please bring to our attention any recent or ongoing local environmental studies, you feel should be considered by LBHA when designing its new procedures?

Q8 - We would be grateful for any views you may wish to express regarding how LBHA should balance the needs of its customers against the needs of the local community?

Q9 - Are there any other local issues or constraints you feel should be considered by LBHA, and that would inform the development of design principles, that will then be used to guide the development of options for the geographical location of LBHA arrival and departure procedures?

A4 Local Government Questionnaire

Q1 - When London Biggin Hill Airport (LBHA) design new procedures for the airport, please list the facilities in your local area that you believe need to be protected from the impact of aircraft noise (eg hospitals, schools, parks, hospices etc)?

Q2 - Please highlight your awareness of any particularly sensitive issues with aircraft noise over the night-time period.

Q3 - Please identify any other areas, in adjacent council/borough areas, but in your opinion require protection from either direct overflight or from aircraft noise?

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

Q5 - Please tell us the locations of any particularly sensitive wildlife habitats, not already notified (linked to 1AONB, 2SSSI etc), that you feel aircraft should avoid?

Q6- Please state what principles you believe LBHA should adopt to mitigate (in full or in part) any concerns you may have regarding the impact of aircraft exhaust fumes or pollution?

Q7 - Please bring to our attention any recent or ongoing local environmental studies, you feel should be considered by LBHA when designing its new procedures?

Q8 - Do existing Noise Preferential Routes (NPRs), agreed with LBHA meet current and future planned local government requirements?

Q9 - Are there any other local development projects, perhaps currently at the planning stage, that LBHA should be aware of and consider when planning its new procedure changes?

Q10 - Please list any other relevant local or national organisations that you believe LBHA should ensure are involved in its formal consultation in early 2019?

Q11 - We would be grateful for any views you may wish to express regarding how LBHA should balance the needs of our customers against the needs of the local community?

Q12 - Are there any other local issues or constraints you feel should be considered by LBHA, and that would inform the development of design principles, that will then be used to guide the development of options for the geographical location of LBHA arrival and departure procedures?

A5 Summary of Responses from Initial Engagement

Table 6 below shows the summary of responses (column b) derived from the Focus Group and Questionnaire responses and how they relate to the initial list of Design Principles.

No (a)	Focus Group/Questionnaire Responses (b)	Source (c)	Broad Design Principle Themes (d)	DP No (e)	Specific Design Principle (f)
1.	London Biggin Hill Airport (LBHA) is now a business airport and priority should be maintained for Business Aviation activities	ASQ	Safe Routes	A1	SAFETY
2.	The use of PBN should be considered to provide maximum benefits in route separation and airspace capacity	ASQ	Routes designed to required navigation performance	A4	NAVIGATION STANDARDS
3.	Deconfliction of arrival and departure routes from neighbouring airports, to reduce noise over local communities.	LGQ	Route to minimise the impact of noise	B1	ENVIRONMENTAL CONCERNS
4.	Noise and fuel burn appear to be on equal footings. Noise should be the priority below 7000ft.	ASQ	Route to minimise the impact of noise	B1	ENVIRONMENTAL CONCERNS
5.	Achieving higher operational altitudes will result in lessening noise exposure to communities being overflown.	PSQ	Route to minimise the impact of noise	B1	ENVIRONMENTAL CONCERNS
6.	Changes to routes should not overfly communities which have not previously been overflown.	PSQ	Route to minimise the impact of noise	B1	ENVIRONMENTAL CONCERNS
7.	Noise Impact on residents should be reduced to the minimum levels possible	LGQ	Route to minimise the impact of noise	B1	ENVIRONMENTAL CONCERNS

No (a)	Focus Group/Questionnaire Responses (b)	Source (c)	Broad Design Principle Themes (d)	DP No (e)	Specific Design Principle (f)
8.	We favour routes over commercial or industrial areas rather than residential areas, schools and hospitals.	LGQ	Route to minimise the impact of noise	B1	ENVIRONMENTAL CONCERNS
9.	We support measures taken to reduce noise impact and provide respite to local communities as a Core Design Principle.	LGQ	Route to minimise the impact of noise	B1	ENVIRONMENTAL CONCERNS
10.	We consider that Biggin Hill should set a core Noise principle, with other principles except safety being subsidiary to this.	LGQ	Route to minimise the impact of noise	B1	ENVIRONMENTAL CONCERNS
11.	We suggest that environmental concerns are considered as Core Design Principles.	LGQ	Route to minimise the impact of noise	B1	ENVIRONMENTAL CONCERNS
12.	Consider elevation of surrounding communities when evaluating noise impact. Higher locations closer to aircraft noise.	LGQ	Route to minimise the impact of noise	B1	ENVIRONMENTAL CONCERNS
13.	We support the principle of commercial incentives to deliver reductions in noise disturbance and other environmental benefits	LGQ	Route to minimise the impact of noise	B1	ENVIRONMENTAL CONCERNS
14.	Residential areas in close proximity to Biggin Hill are predominantly at higher land levels which need to be considered.	LGQ	Route to minimise the impact of noise	B1	ENVIRONMENTAL CONCERNS
15.	Environmental Concerns should be a Core Design Principle and include enhanced Arrival and Departure routes.	Email	Environmental Concerns	B1 & C2	ENVIRONMENTAL CONCERNS

No (a)	Focus Group/Questionnaire Responses (b)	Source (c)	Broad Design Principle Themes (d)	DP No (e)	Specific Design Principle (f)
16.	A higher climb clearance is better for both aircraft handling and noise.	ASQ	Improved Aircraft performance	B2	AIRCRAFT PERFORMANCE
17.	Keeping Jets at low altitude after departure is an issue for fuel planning. Most jets can reach FL100, 3 minutes after departure.	ASQ	Improved Aircraft performance	B2	AIRCRAFT PERFORMANCE
18.	The consequences of the noise impact of a high-performance climb should be considered.	Email	Improved Aircraft performance	B2	AIRCRAFT PERFORMANCE
19.	It would be good to have an established Class D Airspace around LBHA	ASQ	Regulated Airspace	B4	REGULATED AIRSPACE
20.	Any significant increase in CAS would be a concern if it restricted routing options in already restricted airspace.	ASQ	Regulated Airspace	B4	REGULATED AIRSPACE
21.	Regulated Airspace should be a core design Principle.	Email	Regulated Airspace	B4	REGULATED AIRSPACE
22.	Avoiding the need to leave CAS whilst on final approach would be desirable.	ASQ	Regulated Airspace	B4	REGULATED AIRSPACE
23.	VFR Routes should be considered as part of the Design	ASQ	Access for all	B4 & C1	REGULATED AIRSPACE
24.	Changes to airspace should not impact GA traffic, causing funnelling or increased CAS infringements.	ASQ	Access for all	B4 & C1	REGULATED AIRSPACE
25.	A co-ordinated approach with all ACPs concerned with this Airspace Change should be reflected in the Design Principles	ASQ	Routes designed on a collaborative basis	C1	HARMONISED ROUTES

No (a)	Focus Group/Questionnaire Responses (b)	Source (c)	Broad Design Principle Themes (d)	DP No (e)	Specific Design Principle (f)
26.	Must maintain a Southern Transit corridor for GA, SFC to 2500ft, between Godstone & Sevenoaks.	ASQ	Harmonised routes	C1	HARMONISED ROUTES
27.	LBHA should be mindful and respectful of GA in the area.	ASQ	Harmonised routes	C1	HARMONISED ROUTES
28.	It is recognised that LBHA will need to joint working parties with adjacent airspace users.	LGQ	Harmonised routes	C1	HARMONISED ROUTES
29.	Suggest a Core Principle of Consideration of noise profile over the ground caused by new routes.	ASQ	Route to minimise the impact of noise	C2	ENHANCED ARR/DEP ROUTES
30.	Design Principle Headlines - Safety, Technical, Regulatory, Environmental, Operational, Economic, Policy & Implementation.	ASQ	Design Principle headlines	All	
31.	Suggested Design Principle -Vertical changes in relation to the Transition Altitude should be considered in the design work.	ASQ	Consider impact of Transition Altitude.		

Table 6 - Summary of Response