

London Biggin Hill Airport Noise Action Plan



L O N D O N
BIGGIN HILL
A I R P O R T

BUSINESS | TRAVEL | COMMUNITY

28 August 2015 - Final

Contents

1.0	Introduction	5
2.0	Current Noise Levels	8
3.0	Future Noise	12
4.0	Noise Action Measures	17

Tables

Table 2.1	Summary of current annual aircraft movements (2014)	8
Table 2.2	Noise Contour Areas (2014)	9
Table 3.1	Summary of 2020 forecast annual aircraft movements	13
Table 3.2	2020 Noise Contour Areas for operations of the airport	14
Table 3.3	Population Estimates for 2020 Noise Contours	15

Appendices

Appendix 1 Noise Action Plan Contours

- NAP1** Current Summer Daytime noise contours compared to Currently Adopted UDP noise contour (07:00 - 23:00)
- NAP2** Current Summer Early Morning noise contours (06:30 - 07:00)
- NAP3** 2020 Forecast Summer Daytime noise contours compared to Currently Adopted UDP contour and New Maximum Limit (07:00 - 23:00)
- NAP4** 2020 Forecast Summer Early Morning noise contours (06:30 - 07:00)
- NAP5** 2020 Forecast Summer Late Evening noise contours (22:00 - 23:00)
- NAP6** 90 dB(A) SEL footprints of Typical Arriving Business Jets from North
- NAP7A/7B** 90 dB(A) SEL footprints of Typical Departing Business Jet to North and South

Appendix 2 Summary of Noise Action Plan Measures

Appendix 3 Residential Sound Insulation Scheme

1.0

Introduction

1.1

London Biggin Hill Airport (LBHA) lies within the London Borough of Bromley (LBB) some five miles south of Bromley town centre and 12 miles from central London. The airport has direct access to the A233 which connects to the M25 motorway and the national road network. Frequent fast (16 minute) rail services operate from nearby Orpington and Bromley South stations into central London providing a total journey time of approximately 35 minutes.

1.2

Biggin Hill was opened in 1917 as an RAF station and went on to play a major role in the Battle of Britain as a front line Second World War fighter station. Civil flights started to replace noisy military jets in 1960 and they grew steadily to over 200,000 flights per annum in the 1980's, mostly light aircraft. This was however, insufficient to make the airfield economically sustainable and new management in 1988, new policies in 1991 and new investment from 1994 have since encouraged more commercial activity and a wider range of aircraft types.

1.3

The airfield is set on high ground and is predominantly surrounded by rural areas although there are generally small linear developments of residential properties nearby, Biggin Hill village is mainly to the side of the arrival and departure routes whilst the more developed areas of South East London lie several miles to the north east.

1.4

In 1994 LBHA acquired the business of the airport and entered into a 125 year lease from the freeholder, LBB.

1.5

LBHA are the relevant airport operator and the authority responsible for this Noise Action Plan (NAP).

1.6

The operational area of the airport covers a total of 195 hectares and includes a main Runway 1808 metres long and a shorter cross-wind Runway predominantly for light aircraft use. Biggin Hill provides a wide-range of international connections. It was calculated recently that Biggin Hill connected to over 760 different destinations over a 12 month period; three times more than can be reached by scheduled airlines from all of the other London airports.

1.7

LBHA is the only London airport within the M25 dedicated to meeting the needs of the General Aviation sector - that means that it does not have scheduled airline services or high numbers of passengers passing through. Aeroplanes operating in the Business and General Aviation sector are typically much smaller than scheduled airliners and are generally much quieter with new generation types being designed to meet the most stringent of environmental criteria. The General Aviation sector encompasses a wide range of aircraft types and uses, each being operated on an 'on demand' basis, and therefore the owners and commercial operators need the optimum flexibility to use their aircraft and assets when required.

1.8

The commercial role of the airport is to provide the flexibility, facilities and ease of operation needed by three types of customer by acting as:

- an important Gateway to and from London supporting its role as a World City, it provides ease of access for users of the business and general aviation sectors;
- the home base for a large number of corporate, commercial and privately owned aircraft;
- a provider of suitable hangars, offices and workshops for many of the world's aircraft manufacturers, their agencies and the independent operators who maintain, overhaul, redesign, supply and support the wide range of aircraft in the sector.

1.9 In order to invest and develop this role, LBHA needs to improve access and flexibility for customers by altering the existing hours set out in the Operating Criteria Schedule of its lease. The current airport operating hours were introduced by LBB, in its capacity as Landlord, 20 years ago and have been unchanged since; although prior to the lease, in 1991, the Council had approved weekend and Bank Holiday hours of 0800 - 2100hrs (i.e. two hours longer than currently permitted).

1.10 The current and rather simplistic controls on noise set out in the Third Schedule of the airport lease require that aircraft using the airport must comply with the Council's approved noise criteria which followed the then stringent ICAO Chapter 3 industry standards for modern turbo jets and turbo fans. The ICAO Chapter 3 criteria used industry noise measurement limits at locations known as Side line, Fly over and Approach. A list of older and specifically approved aircraft was also adopted and included at that time and the Operating Criteria included a limit on annual aircraft movements of 125,000 and an obligation on LBHA '*to maximise Gross Turnover consistent with the provisions of the lease unless the Tenant has good commercial reasons for acting otherwise*'.

1.11 As part of the strategic review of its business and in consideration for longer opening hours LBHA has prepared this Noise Action Plan (NAP).

1.12 This NAP provides information regarding how the airport proposes to continue its efforts to develop and maintain standards of best industry practice relating to noise controls as the business grows and as its economic performance improves. In preparing the NAP, LBHA has drawn on experience from other airports which have prepared Noise Action Plans (NAPs) and from the regulations and national guidance relating to their preparation contained in:

- a The Environmental Noise (England) Regulations 2006 (as amended) which transposed the EU Environmental Noise Directive 2002/49/EC known as END into UK Legislation;
- b The Aerodromes (Noise Restrictions) (Rules and Procedures) Regulations 2002;
- c Aviation Policy Framework March 2013; and
- d The National Planning Policy Framework, March 2012

1.13 There is no statutory requirement for LBHA to prepare a NAP as this only extends to major civil airports with over 50,000 annual aircraft movements, excluding movements purely for training purposes using light aircraft. This

does not currently apply to LBHA. Despite this, LBHA believes that an NAP provides the appropriate format in which to address noise mitigation and community interests. LBHA has therefore prepared, on a voluntary basis, this NAP with the purpose of ensuring the airport operates as quietly as possible and with minimal effect on its neighbours.

- 1.14 A requirement exists for major civil airport operators to draw up or update NAPs every five years or whenever a major development occurs that affects the existing noise situation. Following adoption of this NAP, LBHA will formally review its NAP every five years.
- 1.15 Providing long-term reliable forecasts of General and Business Aviation is problematic given the large range of market variables and uncertainties. The shorter the forecast horizon the greater the reliability of the forecast and of the predicted noise contour. This approach has therefore been adopted by LBHA in this NAP.
- 1.16 Noise Action Plans are complex technical documents and in order to ensure it is comprehensible to a wider audience, LBHA will produce and make widely available a simplified and easily understood leaflet explaining its approach to managing noise at the airport.
- 1.17 In preparing this document extensive public consultation has already taken place as part of wider changes to the operating conditions. The NAP has also been the subject of detailed consideration and input by LBB's appointed acousticians, Cole Jarman along with the relevant LBB officers.
- 1.18 This NAP is organised as follows:
- Section 2.0 addresses existing noise levels at the airport,
 - Section 3.0 discusses future noise including the first five year forecast and associated contour
 - Section 4.0 sets out a comprehensive set of noise control measures drawing on existing and new controls which aim to reduce the number of people affected by aircraft noise.

2.0

Current Noise Levels

2.1

The current noise levels can be quantified by both production of airport noise contours and consideration of community responses as demonstrated by the comments received by the Airport. The latter are regularly evaluated by a specialist sub-committee of the Airport Consultative Committee (ACC). After their evaluation and the actions taken by the Airport, a report is given by the Chairman of the Noise and Safety sub-committee to the ACC. The ACC meets four times each year and minutes of the meetings are subsequently published on the LBHA website.

2.2

Over recent years the total number of flights at the airport has declined, reflecting the economy and disposable income available for discretionary spend in the UK and worldwide, combined with growing competition from more airports focusing on this sector of aviation, both in the UK and Europe. In 2014, the total annual aircraft movements were about 46,600. An aircraft movement is defined as either a take-off or a landing.

2.3

To assist with noise and local planning, the Currently Adopted Unitary Development Plan (UDP) included a contour representing predicted noise from anticipated future airport activity and showed the possible area exposed to the highest noise levels, thereby avoiding future development conflicts due to noise from airport operations. The contour was produced on behalf of LBB by its noise consultant using an estimation of the likely growth of the business at the airport pursuant to the terms of the airport lease.

2.4

The basis for the current (2014) noise contours are actual aircraft movements at the airport during the calendar year which are summarised in Table 2.1. The airport movement data contains details of aircraft type, operation, Runway in use and the time of day and this information has been processed for input into suitable noise computation software; in this case the FAA's Integrated Noise Model (INM). For the summer contours, the actual level of summer traffic was used. This comprised 31% of the annual traffic, with no significant changes in aircraft mix. In common with noise contouring at other airports, military aircraft movements, which are very infrequent at Biggin Hill and mainly associated with the summer air show season, have been excluded.

Table 2.1 Summary of current annual aircraft movements (2014)

Aircraft Category	2014 Annual Movements
Business Aviation	11,500
Light Aviation	35,100
Total	46,600

2.5

The noise metric and values used for the contouring provided in this NAP are based on current Government policy. The Future of Air Transport White Paper in December 2003 included policy advice on aircraft noise measurement and mapping. It advised that, based on research, the Government has used 57 dB

$L_{Aeq,16h}$ contour as marking the approximate onset of significant community annoyance. The current Aviation Policy Framework (APF) published in March 2013, confirmed policy support for retained use of the 57 dB $L_{Aeq,16h}$ criterion.

2.6 The APF also includes Government expectations in relation to noise mitigation and compensation. Specifically the Government expects airport operators to offer households exposed to levels of noise of 69 dB $L_{Aeq,16h}$ or more, assistance with the costs of moving house or with financial assistance towards the cost of acoustic insulation to residential properties exposed to levels of noise of 63 dB $L_{Aeq,16h}$ or more.

2.7 The following noise contours were therefore produced in respect of Biggin Hill Airport:

- Summer Daytime $L_{Aeq,16h}$ noise contours, based on movements in the standard daytime period 07:00 to 23:00, at 57, 63 and 69 dB, see **NAP1**
- Summer Early Morning $L_{Aeq,30m}$ noise contours, based on movements in the weekday early morning period 06:30 to 07:00, at 57, 63 and 69 dB, see **NAP2**

2.8 These contours have been produced using a version of the INM software (version 7.0d), with the effects of local terrain included in the model. The areas of the contours are given in Table 2.2.

Table 2.2 Noise Contour Areas (2014)

Contour Level	Area of Air Noise Contours (km^2)	
	Summer Daytime (07:00-23:00) $L_{Aeq,16h}$	Summer Early Morning (06:30-07:00) $L_{Aeq,30m}$
>57 dB $L_{Aeq,T}$	2.1	0.6
>63 dB $L_{Aeq,T}$	0.8	0.3
>69 dB $L_{Aeq,T}$	0.3	0.1

2.9 The current noise impact area is shown in **NAP1**, in terms of the standard 92 day summer daytime 57, 63 and 69 dB $L_{Aeq,16h}$ contours referred to in the APF.

2.10 Adopting the usual assessment criteria relating to aviation noise impact, the current noise impact at LBHA shows that the daytime contour representing high levels of annoyance, 69 dB $L_{Aeq,16h}$ is completely contained within the operational boundaries of the airport except at the southern end of the main Runway where it extends to the busy A233 highway but does not impinge on any residential properties. The daytime contour representing moderate levels of annoyance, 63 dB $L_{Aeq,16h}$, is also largely contained within the airport site although it does extend to the south across the A233. Some properties on the A233 abut this contour.

2.11 The daytime contour representing the onset of low community annoyance, 57 dB $L_{Aeq,16h}$, extends to east of Holwood Farm, (south of Shire Lane) to the north of the airport. To the south-west of the airport it extends to the fields north of Norheads Farm. In doing so, it includes a number of properties most of which are located in Biggin Hill village. Inspection of the contours indicates that there

are no non-residential noise sensitive premises such as hospitals and schools that lie within the noise impacted areas.

- 2.12 Although it is not standard U.K. assessment for airport noise, contours have also been produced for activity in the weekday summer early morning period, 06:30 – 07:00 hours. **NAP2** indicates the approximate extent of the noise impacted area using the 57 dB L_{Aeq,30m} contour as illustrative of possible risk of noise impact. It indicates no properties currently exposed to such risk.
- 2.13 Activity in the period prior to 07:00 hours is presently unrestricted for departures from the Airport for aircraft described as being 'normally based' at the Airport. It is restricted for arrivals and departures for aircraft not 'normally based' at the airport. However no restriction on the number of movements or their combined noise effect is currently in place.
- 2.14 The relatively small size of the 2014 contours and their location over largely uninhabited areas, as shown on **NAP1**, is compatible with the low level of public reaction to the airport's activities. In 2014 the airport received 44 comments relating to its activities. In that year there were about 46,600 movements. This rate of response is about 0.9 comments per thousand movements indicating a small response to Airport activity. To put this in context, at Farnborough Airport, Hampshire, which like Biggin Hill, specialises in business aviation and has Farnborough town close to its boundary, there were 265 complaints in 2014 against annual movements of 25,984. This equates to 10.1 complaints per thousand movements, approximately 10 times the level of complaints per aircraft movement received by LBHA.
- 2.15 LBHA acknowledges that at any airport some noise intrusion occurs, particularly close to the airfield but also under arrival and departure routes. Following consideration of the comments received from local residents it appears that the majority of the noise impact close to the airport relates to aero club and private light aircraft movements, especially at the weekends and additionally from occasional noise events involving either an unusual aircraft design or an older business jet type, as well as from the unguided Runway 03 arrival procedure that is currently in use when the wind blows from the north or east. On these days, aircraft approach the airport from the north east, using the Runway 21 instrument landing system (ILS), and then depart from the ILS trajectory, break to the west and carry out a visual circuit to the west of the airport, circling to the south west before turning north to land on Runway 03. Pilots following this procedure are not following any navigation guidance system, but are operating by visual reference relative to the airport and therefore height and track of the prevailing aircraft will vary to some extent and may be affected by the pilots' experience of Biggin Hill Airport, by the performance or characteristics of the aircraft type in question and by the prevailing weather conditions. This procedure is known to give rise to occasional noise intrusion in Keston, Tatsfield and Warlingham, in particular because aircraft are operating at relatively low level and medium or higher power settings as they manoeuvre to position for landing on Runway 03, the reciprocal of the more commonly used and south westerly oriented Runway 21.

- 2.16 A new dedicated Runway 03 approach guidance system is currently being developed, following a formal consultation procedure set down by the CAA, in the form of an Airspace Change Proposal (ACP). The proposed new Runway 03 approach is scheduled to be installed during the course of summer 2016 for implementation in the autumn of 2016. The proposed new approach procedure, when implemented, will significantly reduce traffic using the Runway 21 ILS approach. It is anticipated that all air traffic using the Runway 03 approach will no longer overfly residential areas situated the north and north east of the aerodrome (Petts Wood, Crofton and Farnborough) as part of its inbound routing potentially providing significant periods of respite in these areas when the prevailing wind is in the north or north east or east.
- 2.17 **NAP1** shows the currently adopted UDP noise contour and the corresponding current (2014) contour at 57 dB L_{Aeq,16h} the contour which is used to represent the onset of significant community annoyance. The much smaller size of the current contour indicates the airport operates well within the acceptable level of noise considered in the currently adopted UDP.
- 2.18 The existing framework for noise management at LBHA was set out over 20 years ago and did not include any provision for noise monitoring, or any regular noise impact assessment using noise contours. As part of the NAP, LBHA will introduce a range of best industry practices to better address noise control at and around the airport.

3.0

Future Noise

3.1

In line with Department for Transport (DfT) guidance on NAPs, airport operators are required to describe the likely future development of their airport and in doing so reference should be made to how any consequential noise impact will be managed.

3.2

Future development at LBHA will be influenced by both internal and external factors such as government aviation policy, by the London and European economy, by runway capacity available at other airports in the London area, and by the global growth of the business aviation sector and the prosperity of its users. Many of these factors are obviously outside the control of LBHA. Legal obligations set down in both the Airport Head Lease and the many subleases granted to companies resident on the airport must also be observed. Many subleases predate the 1994 airport lease between LBHA and LBB and were granted by LBB or its appointed airport operator and all subleases have been granted with LBB's consent. Care must be taken to ensure that new limitations are not applied unreasonably, retrospectively or unlawfully to businesses that have already invested in facilities at the airport and whose interests may be adversely affected by any unreasonable measures.

3.3

Despite the many macro-economic uncertainties that are likely to influence the outcome of any business plan, LBHA is confident that its proposed focus on the Business and General Aviation sector will result in a significant reduction to the contour area previously forecast to be affected by aircraft noise.

3.4

Providing reliable long-term forecasts for air traffic movement levels at a Business Aviation and General Aviation airport is notoriously difficult due to market uncertainties and other variables, many of which lie outside LBHA's control. Because the reliability of long-term forecasts is questionable, LBHA does not believe it is appropriate to commit to long-term forecasts. Rather, LBHA prefers a more reliable and more consistent approach to generating predicted noise contours and to managing future aircraft noise levels. LBHA will therefore adopt protocols as follows:

- a a five year forecast of future operations has been prepared which includes a projection of aircraft movements during the daytime (07h00 to 23h00) and additionally and separately during the early morning period (06h30 to 07h00) and the late evening period (22:00-23:00) on weekdays;
- b noise contours have been prepared based on these five year forecasts;
- c LBHA will use reasonable endeavours to manage the operation of the airport in such a way as to ensure that the five year forecast contours are not exceeded (and for these purposes it will not be reasonable for LBHA to do anything that would put it in breach of any sub-lease at the airport or other contractual commitment to which LBB has consented) without a further review of the NAP;
- d LBHA will install and operate a new Noise Monitoring and Track Keeping System (NMTKS) in order to ensure that the noise levels are accurately

recorded and contours are generated in order monitor the actual noise levels resulting from aircraft operations at LBHA so that they can be compared with the forecast values and contours. The results of this comparison will be reported to LBB on an annual basis. This annual advice to LBB will include annual contours.

- e in subsequent five yearly reviews LBHA will review procedures in order to minimise noise for the upcoming 5 year period but in any event the total area of the 57 dB $L_{Aeq,16h}$ noise contour generated by the airport in any calendar year up until and including 2030 (excluding military aircraft movements but otherwise based on actual aircraft movements and noise levels recorded by the new NMTKS) will not exceed 50% of the total area of the currently adopted UDP noise contour. This represents a new and reduced maximum noise limit.
- f LBHA does not anticipate that it will exceed the 2010 level of aircraft movements (50,000 per annum) for some time. A movement is defined as being either a take-off or a landing. In the event that this level of 50,000 per annum appears likely to be breached the NAP will automatically be reviewed to see what further improvements can be made to the noise abatement measures.

- 3.5 Forecast of the activity at LBHA in 2020 have been prepared and are summarised in Table 3.1. The forecasts assume that RAF Northolt remains open, there is no new runway capacity and no airport closures in the south-east, the European economy remains depressed, LBHA introduces the proposed runway 03 approach facilities, and LBHA obtains the extended opening hours sought. On this basis growth of 7% per annum is forecast for business aviation, comprising 4% underlying global market growth and 3% resulting from an increased market share. A continued gradual reduction is forecast in respect of light aviation movements.

Table 3.1 Summary of 2020 forecast annual aircraft movements

Aircraft Category	2020 Forecast Annual Movements
Business Aviation	19,750
Light Aviation	29,750
Total	49,500

- 3.6 The forecast noise contours for 2020, with areas given in Table 3.2, are shown on the following figures:

- 2020 Forecast Summer Daytime $L_{Aeq,16h}$ noise contours, based on movements in the standard daytime period 07:00 to 23:00, at 57, 63 and 69 dB, see **NAP3**
- 2020 Forecast Summer Early Morning $L_{Aeq,30m}$ noise contours, based on the aircraft movements in the weekday early morning period 06:30 to 07:00, at 57, 63 and 69 dB, see **NAP4**

- 2020 Forecast Summer Late Evening $L_{Aeq,1h}$ noise contours, based on the aircraft movements in the weekday late evening period 22:00 to 23:00, at 57, 63 and 69 dB, see **NAP5**

Table 3.2 2020 Noise Contour Areas for operations of the airport

Contour Level	Area of 2020 Noise Contours (km^2)		
	Summer Daytime (07:00-23:00) $L_{Aeq,16h}$	Summer Early Morning (06:30-07:00) $L_{Aeq,30m}$	Summer Late Evening (22:00-23:00) $L_{Aeq,1h}$
57 dB $L_{Aeq,T}$	2.9	2.2	1.3
63 dB $L_{Aeq,T}$	1.0	0.8	0.6
69 dB $L_{Aeq,T}$	0.4	0.4	0.3

- 3.7 In **NAP3** the 2020 forecast summer daytime contour at 57 dB $L_{Aeq,16h}$ is compared with the corresponding contour from the currently adopted UDP, and the new maximum noise footprint. The 2020 contour, with an area of 2.9 km^2 , is significantly less in area than the new maximum noise footprint, and by definition also the currently adopted UDP contour which is some 8.7 km^2 in area.
- 3.8 The 2020 forecast summer daytime contour representing high levels of annoyance, 69 dB $L_{Aeq,16h}$, is contained within the operational boundaries of the airport except at the southern end of the main runway near the A233, no population exposure is estimated, see **NAP3**.
- 3.9 The 2020 forecast summer daytime contour representing moderate levels of annoyance, 63 dB $L_{Aeq,16h}$, is also largely contained within the airport site although it extends into a residential area south of the A233, population exposure estimated as 20.
- 3.10 The 2020 forecast summer daytime contour representing the onset of significant community impact, the low annoyance indicator, 57 dB $L_{Aeq,16h}$, extends to the country areas near the junction of Shire Lane and Farthing Street and south almost to Mollards Wood. It is estimated that the future population within the contour would be approximately 380.
- 3.11 Inspection of the contours indicates there are no non-residential noise sensitive premises such as hospitals and schools within the noise impacted area.
- 3.12 Table 3.3 contains estimates of the future population within the 2020 noise contours for the daytime, early morning, and late evening periods.

Table 3.3 Population Estimates for 2020 Noise Contours

Population Estimates (Current / 2020)				
Noise dB	Annoyance Rating	Summer Daytime (07:00-23:00) $L_{Aeq,16h}$	Summer Early Morning (06:30- 07:00) $L_{Aeq,30m}$	Summer Late Evening (22:00-23:00) $L_{Aeq,1h}$
57 dB	Low	186 / 380	0 / 320	0 / 25
63 dB	Medium	19 / 20	0 / 20	0 / 0
69 dB	High	0 / 0	0 / 0	0 / 0

- 3.13 **NAP4** indicates the area exposed to significant aircraft noise in the early morning half hour. The proposal is to restrict both the maximum number of movements in this period to eight on any day, and to restrict the average noise over the summer period such that the noise impacted area is no greater than shown in **NAP4**.
- 3.14 **NAP4** shows contours at the same values as for the daytime period. The early morning contours have a similar shape, with the exception that the cross runway is not expected to be used, and are smaller. Consequently the properties they contain are similar to those of the daytime contours, see Table 3.3.
- 3.15 **NAP5** indicates the area exposed to significant aircraft noise in the late evening hour between 22:00 and 23:00. The proposal is to restrict both the maximum number of movements in this period to eight on any day, and to restrict the average noise over the summer period such that the noise impacted area is no greater than shown in **NAP5**. In practice, it is not expected that there will be anywhere near eight movements daily, but that on rare occasions there may be up to eight movements in the period 22:00 - 23:00.
- 3.16 **NAP5** shows contours at the same values as for the daytime period. The late evening contours have a similar shape, with the exception that the cross runway is not expected to be used, and are noticeably smaller. Consequently they contain a reduced number of properties compared to the daytime contours.
- 3.17 The noise from single movements can be described by SEL noise footprints. These represent the total noise produced by a single movement and are often used when noise at night is being considered. **NAP6** shows the 90 dB(A) SEL noise footprints of current typical business jets arriving at LBHA from the north east, the common direction. No residential properties are contained within the footprints.
- 3.18 **NAP7A/7B** shows the 90 dB(A) SEL noise footprints for a current typical business jet departing LBHA from the main runway to the north east (Dep R03), and separately also to the south east (Dep R21). Compared to the arrival footprints, those for the departures are significantly larger. This is incompatible with the current restrictions which allow unlimited departure movements by based aircraft, but not any arrivals in the early morning period.

3.19

The combined extent of the departure footprints is not dissimilar to that of the currently adopted UDP contour, so they are limited to the area where aircraft noise is expected. For the departure to the north east (Dep R03) a small number of residential properties are contained within the footprint. For the departure to the south east (Dep R21) a number of residential properties are contained within the footprint generally located in north-west Biggin Hill. Such activity for based aircraft is currently allowed without any restriction on the number of occurrences.

4.0

Noise Action Measures

4.1

Noise abatement procedures presently contained in the airport lease Operating Criteria will remain in place and will be further supplemented by enhanced noise abatement measures and improved noise preferential routings (NPRs) in order to manage noise levels surrounding the airport. Output from the NMTKS will be used to assist in optimising NPRs and further to assist in ensuring that flight crew adhere to the published NPRs.

4.2

Many additional noise control measures can be introduced in the short-term following adoption of this NAP. Others will require further investigation and the support of external stakeholders such as National Air Traffic Services (NATS) or the UK Civil Aviation Authority (CAA). LBHA will continue to work closely with these parties with a view to implementing any reasonable measures or provisions to improve noise mitigation or controls. The principal measures anticipated by LBHA are described below. LBB will be consulted on details of the measures in order for implementation to be made on an agreed basis.

4.3

The table in **Appendix 2** provides a summary of the measures which will be adopted by LBHA and this list will be published in a community leaflet and on the airport website.

Noise Monitoring and Track Keeping

4.4

LBHA will acquire, install and maintain a continuous Noise Monitoring Track Keeping system (NMTK) that will provide the community with improved visibility of noise levels and track keeping performance of flights using the airport. This will utilise two fixed monitoring locations along with a mobile unit at the commencement of the scheme. Both the system and the location of the fixed noise monitors will be agreed with LBB and its specialist advisors. Once sufficient data has been acquired the performance of the NMTKS will be assessed and a review of its efficacy will be conducted and any improvements or enhancements will be identified.

4.5

The NMTKS will operate using radar information supplied by the London Heathrow radar head and supported by information from aircraft transponders in order to provide highly accurate height and track keeping data relating to aircraft using LBHA. The system will also record and display data belonging to aircraft overflying the Biggin Hill area whilst en-route to other London airports such as Heathrow, Gatwick or London City.

4.6

All the acquisition, installation and running costs of the NMTKS will be met by LBHA from levies raised from aircraft using the airport.

Noise Envelope and Maximum Permitted Noise Levels

4.7

LBHA has prepared a noise envelope based on a five year forecast of air traffic movements. This noise envelope covers the daytime period (07h00 to 23h00), the early morning period (06h30 to 07h00), and the late evening period (22h00 to 23h00) along with an associated noise contours. Future revisions to the air

traffic forecast and contours will take place at five yearly intervals. Notwithstanding this commitment, LBHA undertakes to remain within a noise envelope equivalent to fifty per cent of the currently adopted UDP contour area as shown on **NAP3**. Whilst no absolute noise limit currently exists (the currently adopted UDP contour was simply an expression of the expected noise footprint and not a representation of the maximum permissible footprint), this latter noise envelope will in effect be the longer-term new maximum limit for the airport offering local residents a tangible assurance of future control over noise generated by airport activity.

- 4.8 Using industry standard methodologies, LBHA will produce noise contours based on actual aircraft movement activity and upon actual noise data recordings and will provide LBB with an annual Performance Monitoring Report (PMR) which will contain a description of the contouring methodology used, the inputs to the computations, the contours and the resulting areas.

Controls of Operating Hours

- 4.9 LBHA will clearly publish its opening hours (subject to Landlords consent) in aeronautical publications such that they are clearly understood by aircraft operators worldwide. Detailed restrictions, such as flying training times and no fly zones, will be set out in industry information circulars and other publications provided by the CAA, such as the Air Information Pilot (AIP).

- 4.10 LBHA opening hours will be:

- **Weekdays**

06:30 - 23:00 with a cap on movements each weekday (see below) in the first half hour and last hour of the day

- **Weekends and Public Holidays**

08:00 - 22:00

- 4.11 The following additional restrictions will apply to flights:

- **Monday to Friday**

- i A cap of 8 aircraft movements between 06:30 and 07:00 on any one day
- ii A cap of 8 aircraft movements between 22:00 and 23:00 on any one day

- **Saturday, Sunday and Public Holidays**

- i Circuit training will not be permitted before 09:00 or after 17:00 during British Summer Time

- 4.12 The Airport will continue to observe the Chapter 3 noise level requirement for aircraft as set out in the Operating Criteria.

Controls on Activity in the early morning

- 4.13 For new based and non-based aircraft operations in the period before 07:00 only those aircraft types that meet the ICAO Chapter 4 standard will be permitted.
- 4.14 LBHA will also use reasonable endeavours to ensure that these Chapter 4 aircraft operate within a maximum noise level set by the noise characteristics of the Learjet 35 or a comparable aircraft.

Residential Sound Insulation Scheme (RSIS)

- 4.15 LBHA will put in place a sound insulation scheme for certain residential properties in order to mitigate the effects of aircraft noise during the period 06:30 to 07:00 (the Early Morning Period). A financial contribution towards double-glazing of bedrooms within properties within an area affected by noise will be available where it can be demonstrated that there is an annual exceedance of a defined noise level. LBHA will maintain an annual budget of £15,000 for the RSIS. That will allow grants of up to £1,500 to be made to owners of residential properties for noise insulation works to mitigate effects of flying operations in the period 06:30 to 07:00. The details of the grants scheme will be in line with U.K. practice and agreed with LBB prior to implementation. Further information is provided in Appendix 3.
- 4.16 Following the first full year of NMTKS operation, LBHA will process all recorded noise data relating to the Early Morning Period and will accurately determine the geographical area that is regularly exposed to 90 dB(A) SEL contour during the early morning period. LBHA will determine the resulting area and adopt to determine properties meeting the eligibility threshold; after discussion with LBB on prioritisation RSIS implementation will proceed.

Control on Types of Aircraft Permitted to Use the Airport

- 4.17 Following adoption of the NAP, LBHA will limit use of the airport to those aircraft types that meet the ICAO Chapter 3 standard.
- 4.18 LBHA will continue to observe its Good Neighbour obligations as defined in the airport lease and will refuse access to aircraft demonstrated to be excessively noisy or to be in persistent breach of the procedures and protocols set out below.

Controls on Flying Training

- 4.19 The airport will work with operators of light training aircraft to incentivize the installation of exhaust noise suppression equipment, such as silencers and/or improved propellers in order to ensure that light aircraft using Biggin Hill Airport are operating as quietly as may be possible. Where possible and economically viable, operators will be encouraged to replace their aircraft with new technology aircraft types.
- 4.20 LBHA will not permit flying training circuits (the process of repeatedly taking-off and then landing for training purposes known as Circuit Training) before 09:00

hours and after 17:00 hours on Saturdays, Sundays and Bank Holidays during British Summer Time (BST).

Working with Existing Operators to Reduce Noise Levels

- 4.21 LBHA will formalise its established light aircraft "no fly zones". In future, these areas will be "policed" by the new NMTKS which will automatically record and sanction those pilots failing to observe the established protocols in order to better protect local settlements from aircraft noise. It must be acknowledged that many settlements and residences have been constructed under established airport flight paths and at peak times or when wider safety concerns require it, it may still be necessary for air traffic control to instruct light aircraft to adopt a route which takes them over some residential areas. However this will be minimised and will be within established aviation practices as today.
- 4.22 LBHA will continue its regular liaison with aircraft operators in order to promote adherence to existing and future operational procedures and to enforce compliance with those procedures via the NMTKS.
- 4.23 LBHA will continue to review the Standard Operating Procedures (SOPs) for all aircraft operations and where it believes that new SOPs would produce a significant benefit to residents without compromising safety in any way, the existing SOPs will be modified accordingly.

Introducing Global Positioning System (GPS) Based Runway Guidance System

- 4.24 The airport will work with NATS and the CAA to introduce improved GPS based aircraft guidance procedures for all arriving and departing aircraft, on both Runway 03 and 21.

Raising the Height of Arriving and Departing Aircraft

- 4.25 Wherever practicable and safe and subject to approval by NATS, LBHA will adopt appropriate operational procedures to raise the operating levels of jet or turbo-prop aircraft arriving at and departing from LBHA in order to secure any available reduction in noise on the ground surrounding the airport and under its flight paths. In order to ensure that the local community benefits from this initiative, LBHA will work with NATS and the Airport Consultative Committee (ACC), within the framework of the London Airspace Management Plan (LAMP) in order to deliver improved airspace arrangements for LBHA air traffic always with particular regard to raising the heights of arriving and departing aircraft whenever it is safe and practicable to do so.

Changing the "03-Instrument Approach"

- 4.26 LBHA will continue its ongoing investment in the installation of a new GPS based Instrument Approach Procedure (IAP) for Runway 03, together with the necessary changes to runway environment and approach lighting systems.

- 4.27 LBHA will work with NATS with a view to implementing the new IAP as soon as practicably possible. Implementation is currently forecast for late summer 2016. The new Runway 03 IAP will replace the existing visual 'circle to land' procedure that gives rise to varied aircraft ground tracks and extended low level circling operations by arriving aircraft when the northerly oriented runway (Runway 03) is in use.
- 4.28 The installation of a new Runway 03 IAP is expected to reduce the noise generated by aircraft arriving from the north east. The new Runway 03 arrival procedure will be the subject of a full Stakeholder Consultation expected to take place during the autumn of 2015. Full details of the proposed Runway 03 IAP and its associated flight paths, which have already been considered by focus groups formed of various stakeholders, will be provided at that time.

Supporting the Removal of the Biggin Hill VOR Beacon

- 4.29 LBHA lies beneath one of four holding patterns or 'stacks' used by aircraft seeking to land at London Heathrow Airport. National Air Traffic Services (NATS) operates a radio navigation beacon, known as a VOR (an air navigation radio aid) located centrally on the LBHA site. It is this beacon which provides the focal point of the 'hold' or stack. Aircraft enter this area as high as 17,000 feet but then descend, often to as low as 7,000 feet and sometimes lower before leaving the stack to begin an approach to land at London Heathrow Airport. Aircraft are held vertically above each other and as the lowest aircraft leaves the stack to land, so the other aircraft are each instructed to reduce their height sequentially. At any one time many large commercial passenger aircraft might be circling over the Borough of Bromley in the stack and thereby collectively contribute to the ambient noise in the area surrounding LBHA. It is important to note, however, that this noise is not in any way created by the LBHA or its operations, but rather by London Heathrow bound commercial air traffic. Noise associated with the Heathrow holding procedure is often wrongly attributed to aircraft using LBHA. The effect of the stack is particularly noticeable in the early morning period (typically between 05:00 and 07:00 daily). Once aircraft leave the stack they descend further and often overfly the Borough of Bromley a further time, routing east, before turning back to the west for a 'final approach' to London Heathrow Airport.
- 4.30 During the LAMP phase 1 consultation process NATS revealed plans to relocate the Biggin Hill holding stack to the coast. They propose to introduce continuous descent angle (CDA) approach procedures for all aircraft. The proposed changes are currently tabled for 2019, after which the Biggin Hill stack will cease operation. However, Heathrow air traffic may still cross the Biggin Hill area, both on arrival and departure, but it is anticipated that the peak and cumulative noise in the area, particularly early morning noise, will be reduced to some extent since CDA procedures require less engine thrust than level flight and are designed to provide benefit to those on the ground by keeping aircraft higher for longer thereby offering noise reduction benefits. LBHA will continue to work with NATS and other parties in order to secure the earliest possible removal of the holding stack at Biggin Hill.

Reporting

4.31 The airport will report ongoing progress of NAP actions to the Airport Consultative Committee (ACC), which meets quarterly, in the normal manner via the Noise and Safety Sub-Committee.

4.32 Following formal adoption of the NAP, LBHA, in association with LBB, will review the NAP every five years or whenever it is considered that a major event or material change has the potential to create wider noise implications for local residents. Such an event might, for example, be unforeseen changes to the air traffic forecast or a change in wider government airport related policy. In contrast to the manner in which the airport lease currently operates whereby no material changes in airport operating criteria have taken place for 20 years, regular reviews will allow the benefits of emerging technology to be evaluated and incorporated in the NAP if thought to be beneficial.

4.33 During each five year review the airport will assess performance with respect to the previously forecast noise envelope, based on the latest five year forecasts of air traffic movements along with an assessment of the effectiveness of the various measures within the NAP and by reference to the number of people and dwellings affected.

4.34 Each review will compare noise over the preceding 5 years against the forecast of that period and will use that experience to revise the air traffic forecast for the five year period immediately following that review. This process will identify the need for any changes in procedures which may help to further reduce noise disturbance. It will also monitor noise management practices at other comparable airports and investigate whether any innovations being employed elsewhere could usefully be applied at LBHA, thereby ensuring industry best practice is being employed at LBHA.

4.35 **On a quarterly basis LBHA will provide the Airport Consultative Committee (ACC) with:**

- A report on compliance with procedures given in the UK Aeronautical Information Publication (AIP) to minimize noise, i.e. EGKB AD 2.21 Noise Abatement Procedures (as revised from time to time).
- Report the number of departures and arrivals on each Runway
- Report the movements in the early morning and late evening periods
- Investigate, log, record and report on the output of the NMTKS and provide the ACC with copies of its responses to all noise complaints received from members of the public.

On an annual basis LBHA will:

- Issue a Performance Monitoring Report (PMR) on the actual summer contours which will contain a description of the contouring methodology used, the inputs to the computations, the contours and the resulting areas expressed in square kilometres. This report will go to the LBB and the Noise and Safety sub-committee of the Airport Consultative Committee. On a five yearly basis the report will also include forecast summer contours for five years ahead.

4.36 Where complaints are received from members of the public, community visits to investigate complaints may be conducted and the mobile NMTKS monitor may be used to record, authenticate and evaluate any such complaint.

Sanctions for Non-Compliance with Noise Abatement Measures

4.37 LBHA will introduce a system of fines and controls for aircraft that fail to comply with the published Noise Abatement Procedures (NAPRs) or which fail to adhere to the published Noise Preferential Routings (NPRs). The scheme of sanctions will be determined by LBHA and agreed by LBB following the installation of the NMTKS and will operate as follows:

- a preferential routes will be defined and Track Violation Limits (TVLs) set in the programming of the NMTKS;
- b maximum Permissible Noise Levels (MPNLs) will also be set;
- c the NMTKS will automatically identify and record details of any and all aircraft in breach of either a TVL and/or an MPNL;
- d LBHA will issue an initial Notice of Violation (NOV) to any aircraft operator identified as having violated a TVL or MPNL, seeking an explanation for the violation within a set time period of 14 days;
- e violation reports along with the relevant operator explanation and/or mitigation will be presented monthly to the airport Safety And Noise Abatement Review Board (SANARB) for consideration.
- f As a result and if there exists no reasonable excuse for the reported violation(s), the SANARB may, at its sole discretion, elect to levy a fine on the flight crew or aircraft operator concerned. Should the flight crew or aircraft operator choose not to pay the requested fine, that flight crew or aircraft operator may be excluded from using Biggin Hill Airport until the fine is paid;
- g where continuous breaches occur (i.e. more than three breaches), the SANARB may elect to permanently exclude that flight crew or aircraft operator from using LBHA in perpetuity;
- h revenues received from fines will be used to fund the installation, implementation, upkeep and operation of the NMTKS and to operate the RSIS;
- i sanctions will not apply where deviations or exceptions are caused by, or result from, issues of safety such as ATC traffic separation instructions, TCAS alerts, weather avoidance measures or other airborne emergencies.

Ground Noise

4.38 Ground noise at LBHA emanates from engine testing, mandatory pre-departure checks by aircraft, the use of Auxiliary Power Units (APUs) and aircraft taxiing on the aerodrome surface. LBHA has sought to minimise ground noise impact through the construction of noise bunds where seen to be appropriate and beneficial, the judicious siting of new hangars (ie Rizon and Terminal hangars) and other noise management and abatement measures.

- 4.39 Whilst ground noise is not normally considered as part of an airport NAP, LBHA will nevertheless draw up a Ground Noise Management Plan with the aim of minimising noise impact resulting from aircraft operations which may significantly affect noise sensitive residential locations. Such measures might, for instance, include the appropriate siting and construction of a facility for engine ground run testing, potentially incorporating a noise attenuating pen or earth bund.
- 4.40 LBHA has recently introduced a policy discouraging the use of aircraft reverse thrust on landing except where its use is required for safety reasons and this policy will be reinforced with aircraft operators.
- 4.41 LBHA will use reasonable endeavours to publish and adopt this Ground Noise Management Plan within 12 months of adoption of this NAP.

Restricting Noise Sensitive Development Close to the Airport

- 4.42 There is evidence that residential and other noise sensitive developments are being developed close to airports throughout Great Britain. This unnecessarily and avoidably exposes such development and its residential population to airport related noise and can give rise to future objections to airport operations. LBHA believes the best way to minimise noise exposure is to ensure that development does not take place at locations identified as being subject to current and predicted airport noise. LBHA will maintain its PSZ and its statutory role in airport safeguarding and will work with LBB to discourage residential and other noise sensitive development close to the airport boundaries or in areas likely to be affected by aircraft noise now or in the future. LBHA will work with LBB to ensure awareness of present and future aircraft operations in making land use allocations in the preparation and review of its local plan.

Appendix 1 Noise Action Plan Contours

- **NAP1** Current Summer Daytime noise contours compared to Currently Adopted UDP contour (07:00 - 23:00)
- **NAP2** Current Summer Early Morning noise contours (06:30 - 07:00)
- **NAP3** 2020 Forecast Summer Daytime noise contours compared to Currently Adopted UDP contour and New Maximum Limit (07:00 - 23:00)
- **NAP4** 2020 Forecast Summer Early Morning noise contours (06:30 - 07:00)
- **NAP5** 2020 Forecast Summer Late Evening noise contours (22:00 - 23:00)
- **NAP6** 90 dB(A) SEL footprints of Typical Arriving Business Jets from North
- **NAP7A/7B** 90 dB(A) SEL footprints of Typical Departing Business Jet to North and South

Appendix 2 Summary of Noise Action Plan Measures

Table B1: Action - Monitor and Manage

NO.	ACTION	TIMING
1	Operate and maintain a noise and track-keeping system to (NMTK) monitor aircraft operations.	2015 - Ongoing
2	Produce noise contours, based on five year forecast of air traffic.	Ongoing
3	Undertake regular reviews of procedures to minimize noise disturbance with BHACC.	Ongoing
4	Undertake community noise surveys using NMTK.	2015 - On-going
5	Investigate, log and respond to all complaints relating to London Biggin Hill Airport, reporting details to BHACC on a quarterly basis.	Ongoing
6	Calibrate NMTK on an annual basis.	2015 - Ongoing
7	Monitor the track-keeping and maximum noise level compliance and takes actions as necessary.	2015 - Ongoing
8a	Implement a scheme to incentivize operators of light and training aircraft to install noise suppression equipment or to replace noisy aircraft.	2015 - Ongoing
8b	Implement a scheme to restrict circuit training to certain operating hours.	2015
9	Monitor the aircraft movements comprising details of movement numbers in each hour each day, and Runway use.	Ongoing
10a	Implement introduction of a Global Positioning System (GPS) based Runway guidance system.	2016 - Ongoing
10b	Implement altered 03 - Instrument approach procedures.	2017
10c	Work with NATS and others to secure the early removal of the VOR beacon at Biggin Hill.	2015 - Ongoing
11	Operate controls on requested aircraft operations to contain movements to those aircraft meeting the Biggin Hill noise limits.	Ongoing

NO.	ACTION	TIMING
	MONITOR AND MANAGE	
12	Limit airport operating hours to 06.30-23.00 on weekdays, and on Saturdays, Sundays and Public Holidays limit operating hours to 08.00-22.00.	Ongoing
13a	Operate the Airport to ensure that the resultant noise, expressed in the form of Summer Daytime noise contour area does not exceed that specified, namely 4.3 km ² at 57 dB L _{Aeq,16h} .	2015 - Ongoing
13b	Operate the Airport using reasonable endeavours to achieve actual noise contours for daytime, early morning, and late evening less than the 2020 forecast noise contours.	2015 - 2020
14a	From 1 January 2016 operate a ban on fixed wing aircraft which are not fully compliant with ICAO Chapter 3 or above noise certification numerical standards.	2016 - Ongoing
14b	Operate a ban on fixed wing aircraft that do not meet the ICAO Chapter 4 noise certification numerical standards between 06:30 and 07:00 (except for existing based aircraft)	2016 - Ongoing
14c	Operate the airport using reasonable endeavours to ensure that these Chapter 4 aircraft operate within a maximum noise level set by the noise characteristics of the Learjet 35 or a comparable aircraft	2016 - Ongoing
15	Manage compliance with the preferred noise routes and tolerance limits using the NMTK system.	2016 - Ongoing
16	Operate the Airport in accordance with the noise abatement procedures delineated in the UK AIP.	2015 - Ongoing
17	Discourage the use of aircraft reverse thrust except where its use is required for safety reasons	2015 - Ongoing
18	The airport will put in place a sound insulation scheme for residential properties (RSIS) relating to exposure to noise in the early morning	2016 - Ongoing
19	Provide information and services to the London Biggin Hill Airport Consultative Committee (BHACC).	2003 - Ongoing
20	Monitor and report progress against Noise Action Plan actions to BHACC, provide statistics in the Performance Monitoring Report.	2016 - Ongoing
21	Engage with local planning authorities to ensure awareness of aircraft operations is considered in land use development, for instance with LBB over future work on the local plan.	2015 - Ongoing

NO.	ACTION	TIMING
	MONITOR AND MANAGE	
22	Provide an information pack to local Estate Agents, and to those seeking information on local conditions prior to relocating to near the Airport or its departure and arrival tracks.	2016

Table B2: Action - Research and Reporting

NO.	RESEARCH AND REPORTING	TIMING
i	Carry out a review of arrival and departure routes, based on the results trial any new procedure with the aim of reducing further the over flight of residential areas.	2015 - Ongoing
ii	Use reasonable endeavours to promote and support airspace changes in order to benefit local residents through the creation of greater amount of controlled airspace.	2016
iii	Prepare and issue a quarterly complaints report.	Ongoing
iv	Prepare and issue Integrated Noise Monitoring (INM) report when contours are prepared.	Ongoing
v	Prepare and issue five yearly Performance Monitoring Report.	Ongoing
vi	Investigate the potential and benefit that might arise from introducing a departure noise preferential route track performance target, with penalties for recurrent failures to meet target.	2016
vii	Investigate the potential and benefit that might arise from introducing a Biggin Hill specific Code of Practice for Arriving Aircraft.	2017
viii	Investigate the potential and benefit that might arise from introducing a Biggin Hill specific Code of Practice for Departing Aircraft.	2017
ix	Dependant on the related work with NATS investigate the potential and benefit that might arise from introducing continuous descent arrival (CDA) and continuous climb departure (CCD) performance at London Biggin Hill.	2017
x	Work with operators, NATS, and other stakeholders to introduce new technologies which can reduce noise impact.	Ongoing
xi	Review communication material, and the Airports' website with respect to noise/noise management.	2017

Appendix 3 Residential Sound Insulation Scheme

The Scheme provides a grant for noise insulation works to residential buildings that meet the residential eligibility criteria. The residential eligibility criteria are as detailed below.

Airborne Aircraft Noise

Any habitable rooms which are used as bedrooms at dwellings where the airborne aircraft noise level in excess of 90 dB SEL occurs at an annual average frequency of once or greater during the night-time (23.00 to 07.00). This will be determined on an annual basis.

The Scheme will provide a grant of up to the value of £1,500.00 Index Linked per property, in order that noise insulation can be provided to bedrooms.

The Scheme Grant can only be used for works that will improve the internal noise climate within the residential property. The primary method of improving sound insulation is the installation of secondary glazing. Secondary glazing units provide an additional layer of glass inside the existing external windows. The style of secondary glazing units fitted will be dependent on the existing external window. The design will be such that both sides of the secondary glazing and the inside of the existing window can be cleaned from inside the habitable room.

The Grant may also be used to assist in installation of High-Specification Double Glazed replacement windows, with a glazing specification of 10/12/6.4 acoustic laminate or similar.

Where glazing works are undertaken it will be necessary to install sound attenuated ventilation units. These will provide background ventilation and would normally be fitted to external walls.

The works can also include installation of loft insulation.

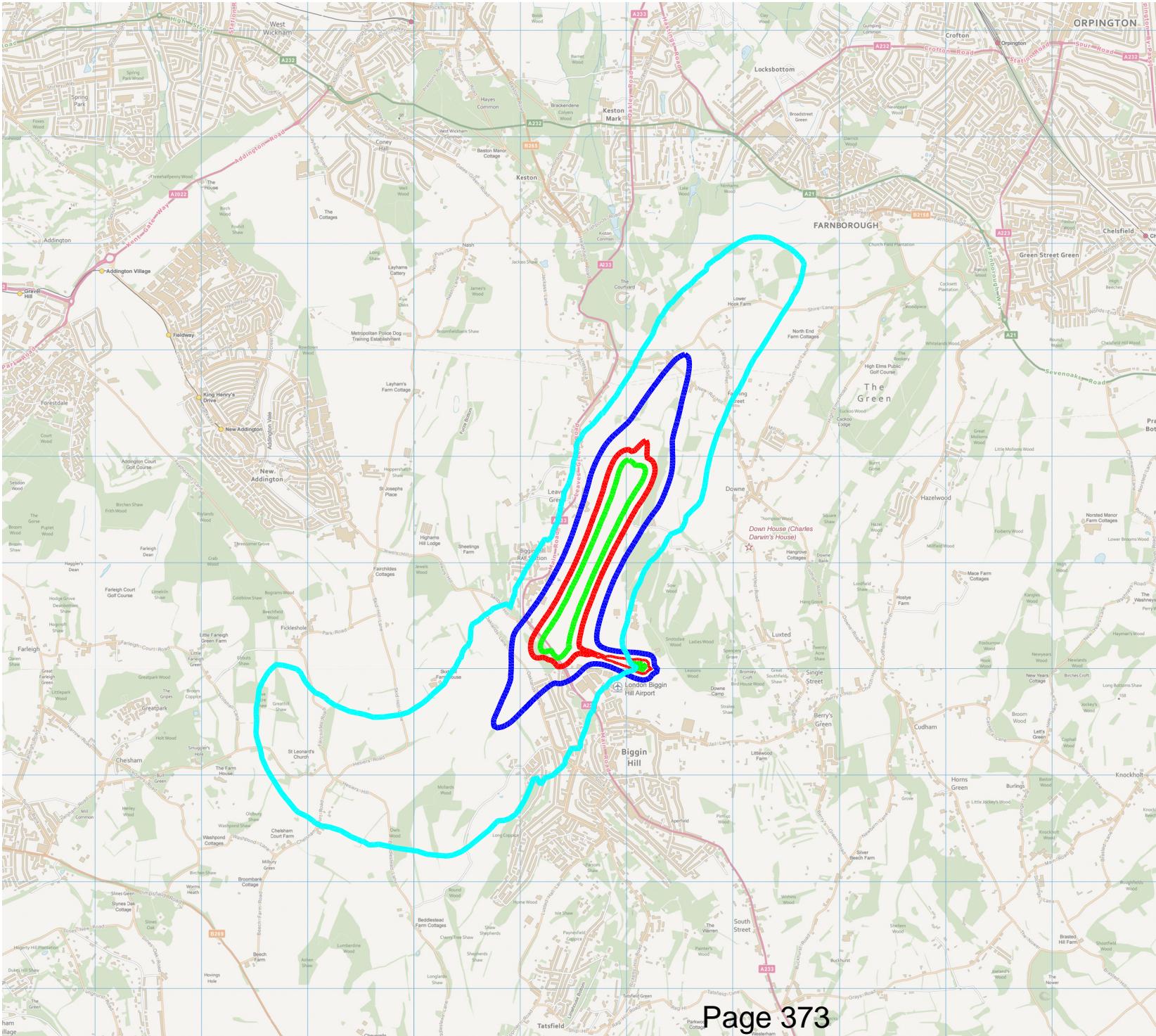
Where treated habitable rooms have an external door, the works can provide improved sound insulating external doors.

Excluded from this Scheme are residential properties built after the date of the grant of the lease variation.

Once properties have received a grant they will no longer be eligible.

The Scheme will be advertised on the Airport's website. The advertisement will describe the Scheme, and clarify that eligible property owners will be approached, and so application to the Airport will not be required.

This page is left intentionally blank



This drawing contains Ordnance Survey data © Crown Copyright and database right 2015.

L_{Aeq,16h} Noise Contours

- 57 dB Current
- 63 dB Current
- 69 dB Current
- 57 dB Currently Adopted UDP

REVISIONS

**Bickerdike
Allen
Partners**
Architecture
Acoustics
Technology

121 Salusbury Road, London, NW6 6RG
Email: mail@bickerdikeallen.com
www.bickerdikeallen.com

T: 0207 625 4411
F: 0207 625 0250

Biggin Hill Airport Noise Action Plan

Airborne Aircraft Noise Contours
Current Summer Daytime & Currently
Adopted UDP (07:00-23:00)

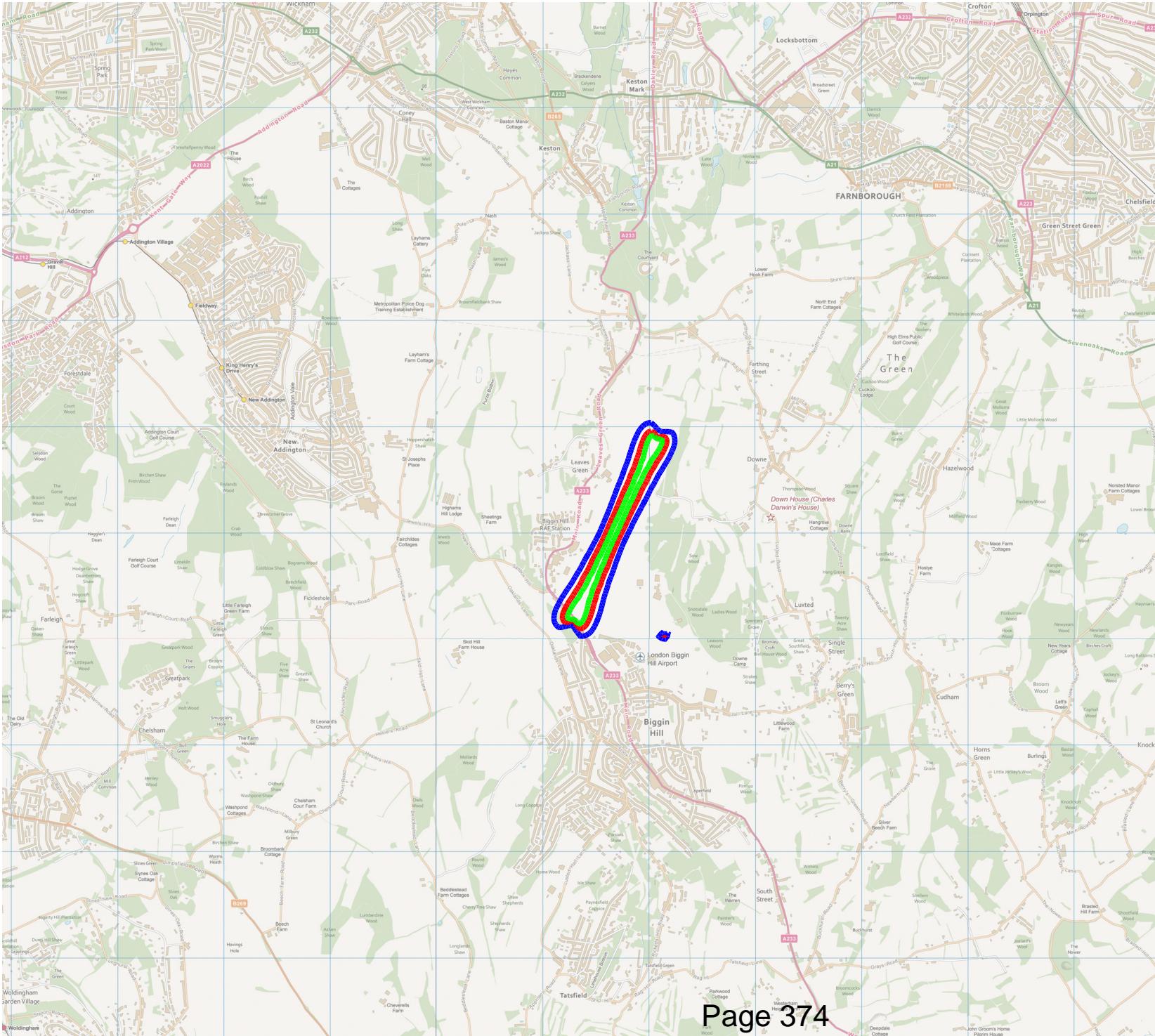
DRAWN: DR

CHECKED: DC

DATE: August 2015

SCALE: 1:50000@A4

FIGURE No:



This drawing contains Ordnance Survey data © Crown Copyright and database right 2015.

L_{Aeq,30m} Noise Contours

- 57 dB Current
- 63 dB Current
- 69 dB Current



REVISIONS

**Bickerdike
Allen
Partners**
Architecture
Acoustics
Technology

121 Salusbury Road, London, NW6 6RG
Email: mail@bickerdikeallen.com
www.bickerdikeallen.com

T: 0207 625 4411
F: 0207 625 0250

**Biggin Hill Airport
Noise Action Plan**

**Airborne Aircraft Noise Contours
Current Summer Early Morning
(06:30-07:00)**

DRAWN: DR

CHECKED: DC

DATE: August 2015

SCALE: 1:50000@A4

FIGURE No:

L_{AeG,16h} Noise Contours

- 57 dB Currently Adopted UDP
- 57 dB New Maximum Limit
- 57 dB 2020 Forecast
- 63 dB 2020 Forecast
- 69 dB 2020 Forecast

REVISIONS

**Bickerdike
Allen
Partners**
Architecture
Acoustics
Technology

121 Salusbury Road, London, NW6 6RG
Email: mail@bickerdikeallen.com
www.bickerdikeallen.com

T: 0207 625 4411
F: 0207 625 0250

**Biggin Hill Airport
Planning For Change**

Airborne Aircraft Noise Contours
Comparison of 2020 Forecast Summer Day
Currently Adopted UDP and New Maximum

DRAWN: DR

CHECKED: DC

DATE: August 2015

SCALE: 1:50000@A4

FIGURE No:

NAP3

L_{Aeq,30m} Noise Contours

- 57 dB 2020 Forecast
- 63 dB 2020 Forecast
- 69 dB 2020 Forecast

REVISIONS

**Bickerdike
Allen
Partners**
Architecture
Acoustics
Technology

121 Salusbury Road, London, NW6 6RG
Email: mail@bickerdikeallen.com
www.bickerdikeallen.com

T: 0207 625 4411
F: 0207 625 0250

**Biggin Hill Airport
Planning For Change**

Airborne Aircraft Noise Contours
2020 Forecast Summer
Early Morning (06:30-07:00)

DRAWN: DR

CHECKED: DC

DATE: August 2015

SCALE: 1:25000 @ A4

FIGURE No:

NAP4

L_{Aeq,1h} Noise Contours

- 57 dB 2020 Forecast
- 63 dB 2020 Forecast
- 69 dB 2020 Forecast

REVISIONS

**Bickerdike
Allen
Partners**
Architecture
Acoustics
Technology

121 Salusbury Road, London, NW6 6RG
Email: mail@bickerdikeallen.com
www.bickerdikeallen.com

T: 0207 625 4411
F: 0207 625 0250

**Biggin Hill Airport
Planning For Change**

**Airborne Aircraft Noise Contours
2020 Forecast Summer
Late Evening (22:00-23:00)**

DRAWN: DR

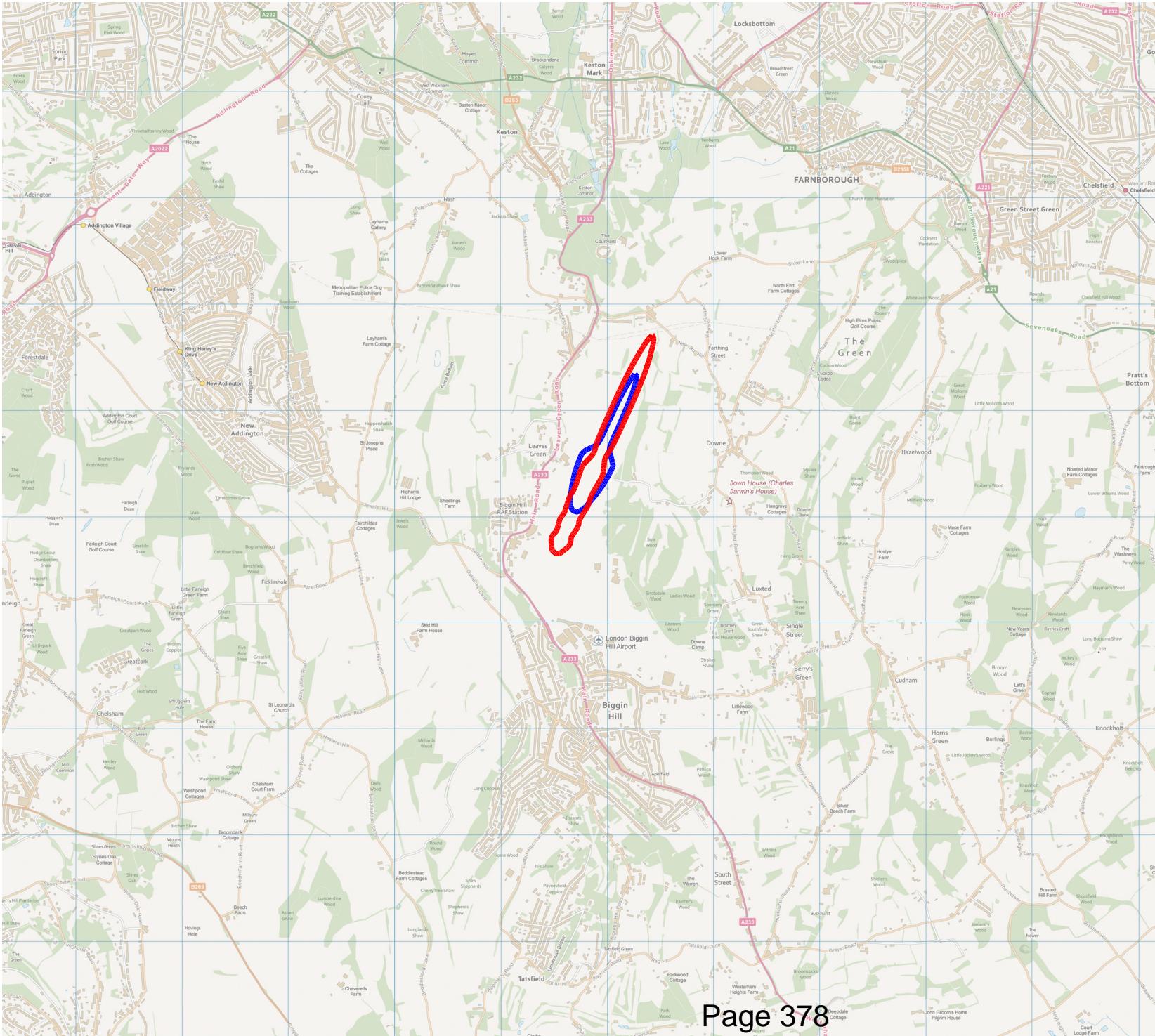
CHECKED: DC

DATE: August 2015

SCALE: 1:25000@A4

FIGURE No:

NAP5



This drawing contains Ordnance Survey data © Crown Copyright and database right 2015.

90 dB(A) SEL Footprints

LEAR35 Arr R21

CNA560XL Arr R21

REVISIONS

**Bickerdike
Allen
Partners**
Architecture
Acoustics
Technology

121 Salusbury Road, London, NW6 6RG
Email: mail@bickerdikeallen.com
www.bickerdikeallen.com

T: 0207 625 4411
F: 0207 625 0250

Biggin Hill Airport Noise Action Plan

**90 dB(A) SEL Footprints
Typical Arriving Business Jets
from North**

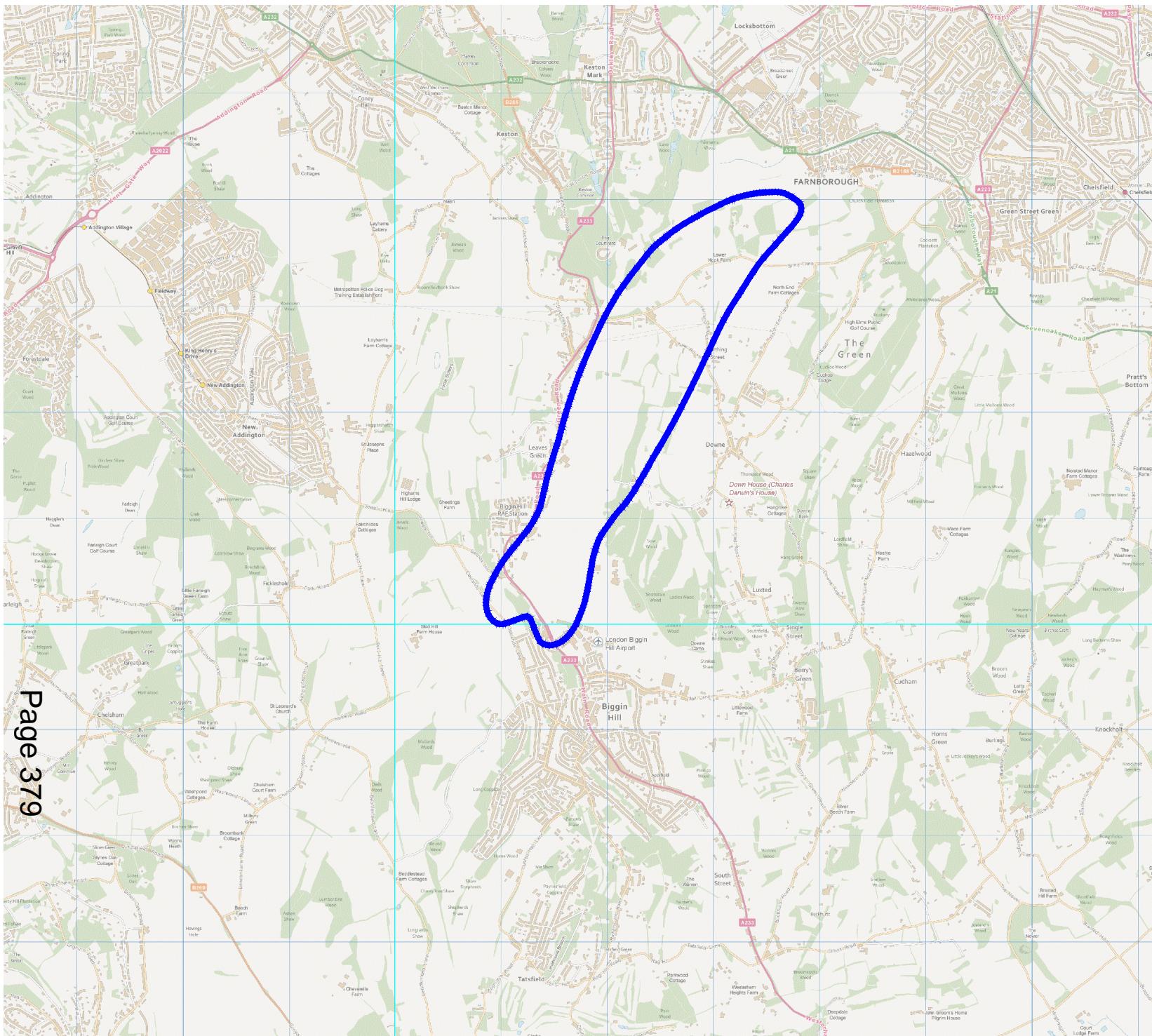
DRAWN: DR

CHECKED: DC

DATE: August 2015

SCALE: 1:50000@A4

FIGURE No:



Page 379

This drawing contains Ordnance Survey data © Crown Copyright and database right 2015.

90 dB(A) SEL Footprints

— LEAR35 Dep R03

REVISIONS

**Bickerdike
Allen
Partners**
Architecture
Acoustics
Technology

121 Salusbury Road, London, NW6 6RG

Email: mail@bickerdikeallen.com

www.bickerdikeallen.com

T: 0207 625 4411

F: 0207 625 0250

Biggin Hill Airport Noise Action Plan

**90 dB(A) SEL Footprints
Typical Departing Business Jet
to North**

DRAWN: DR

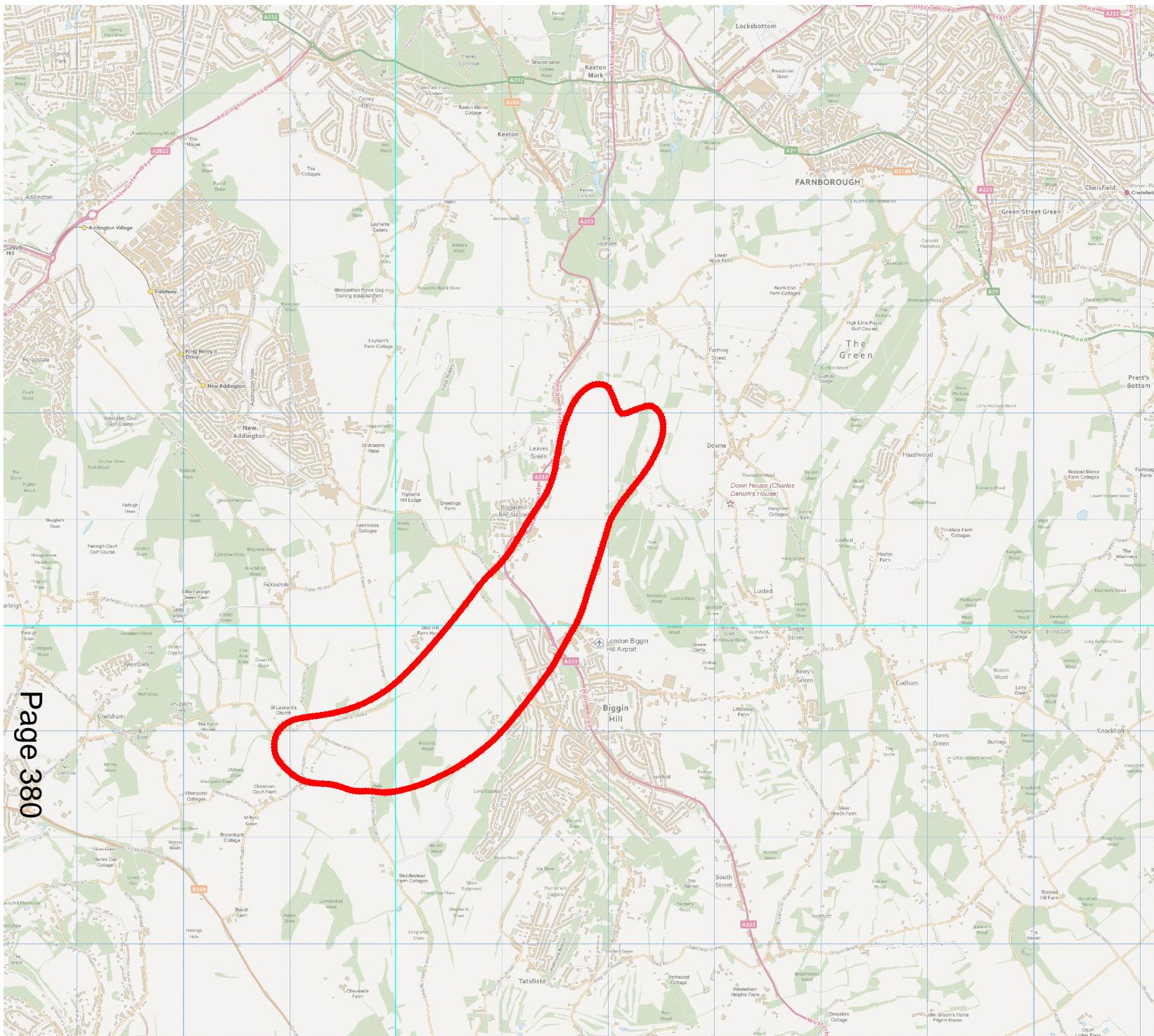
CHECKED: DC

DATE: August 2015

SCALE: 1:50000@A4

FIGURE No:

NAP7a



Page 380

This drawing contains Ordnance Survey data © Crown Copyright and database right 2015.

90 dB(A) SEL Footprints

— LEAR35 Dep R21

REVISIONS

**Bickerdike
Allen
Partners**
Architecture
Acoustics
Technology

121 Salusbury Road, London, NW6 6RG

Email: mail@bickerdikeallen.com

www.bickerdikeallen.com

T: 0207 625 4411

F: 0207 625 0250

Biggin Hill Airport Noise Action Plan

90 dB(A) SEL Footprints

Typical Departing Business Jet
to South

DRAWN: DR

CHECKED: DC

DATE: August 2015

SCALE: 1:50000@A4

FIGURE No:

NAP7b