Belfast International Airport

Environmental Noise Directive Round Two

Noise Action Plan 2013-2018

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1 Foreword by Airport MD

Successful international airports are key economic generators for the regions they serve, and we at Belfast International are justifiably proud of the substantial contribution we make to the financial health and well-being of this economy.

Whilst traffic numbers at UK airports generally peaked at historically high levels during the 2007-2008 period and Belfast International Airport hit a record 5¼ million during both those years, more recent years have been a little more subdued. However, the long-term trend is still one of growth. From 2½ million passengers passing through our doors in 1996, we have seen just over 4.3 million in 2012.

As a direct result of this growth, employment levels on the airport site have also increased, to the current level of just over 4,000 jobs, notwithstanding the positive spin-off that these create for the local economy.

Whilst the overall rise in the number of passengers using the airport has been significant, the increase in the numbers of civil aircraft using the airport has seen a much lower rate of growth, as average aircraft capacity has increased. Coupled with the decline in the number of military aircraft movements, and the substitution of newer, more efficient aircraft within the fleets of the airlines using the airport, the noise climate around the airfield has reduced over the same time period.

Furthermore, analysis carried out in preparation for development of this action plan has indicated that the number of properties exposed to intrusive aviation noise from aircraft taking off from or landing at Belfast International Airport is extremely low. Although regionally central, our relatively rural location enables us to grow sustainably, in a manner where the economic benefits we create for

the region are not outweighed by the environmental disbenefits that would normally be associated with a busy airport in a densely-populated area.

Having said that, we recognise that no matter how new or efficient aircraft are, they create noise and that we need to face up to our responsibilities in mitigating these noise emissions as much as possible in order to minimise the impact on our local communities. There is no room for complacency.

The attached action plan sets out in detail the steps we intend to take over the next five years in order to ensure that we are facing up to our environmental responsibilities when it comes to noise emissions from the airport. These measures will enable Belfast International to continue to grow the connections this region has to the rest of Great Britain, to Europe and to the rest of the world in support of the Northern Ireland Executive's objectives to position the local economy for recovery, but to do so in an environmentally sustainable manner.

We would like to hear what you think of these planned actions, before we finalise them. If you have any comments you would like to make at this stage:

Via email, please contact:
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Managing Director

2 Introduction and Context

The Environmental Noise Directive (2002/49/EC) more commonly referred to as the Environmental Noise Directive (END), requires all Member States within the European Union to produce strategic Noise Maps and Action Plans for the main sources of environmental noise, including airports.

The requirements of the Environmental Noise Directive (2002/49/EC) are transposed into the Environmental Noise Regulations (Northern Ireland) 2006 (The Regulations) and build upon the Government's aim, as set out in the Aviation Policy Framework, "to limit and where possible reduce the number of people in the UK significantly affected by aircraft noise".

The Regulations require the preparation of Strategic Noise Maps and the development of a Noise Action Plan on a 5-year rolling programme by each Competent Authority.

Round One mapping was completed in 2007 and its associated Noise Action Plan, having regard for the results of that mapping, was supplied to the Department of Environment for final publication in 2009. This was one of a set of five Action Plans, namely:

- Belfast International Airport Noise Action Plan
- Roads Noise Action Plan
- Railways Noise Action Plan
- Industrial Noise Action Plan; and
- George Best Belfast City Airport Noise Action Plan.

Belfast International Airport Limited, as operator of Belfast International Airport, is the Competent Authority for developing this Noise Action Plan. This Noise Action Plan is subject to a comprehensive consultation process prior to being formally approved by the Minister for the Environment.

This END Action Plan has been prepared using the Department for Environment "Noise Mapping and Action Planning Technical Guidance – Noise from Airports" document issued in February 2013.

Aircraft noise issues remain high on the agenda of many who live around airports and the aviation industry recognises that it needs to better understand specific issues that disturb the public. Belfast International Airport is committed to being a good neighbour and endeavours at all times to minimise the impact of its operations on local communities. Continued and enhanced consultation with the community is essential so that an appropriate balance can be struck between the socio-economic benefits of airport operations and its environmental impacts. This Noise Action Plan provides a meaningful framework for Belfast International Airport and its Consultative Committee to build upon our established voluntary approach to the proactive management of aircraft noise in and around the airport

3 Belfast International Airport

Under the Regulations, there is a requirement to assess the noise from major airports. There is only one airport in Northern Ireland that meets the Regulations definition of a "major airport" (in excess of 50,000 movements per year excluding those purely for training purposes on light aircraft).

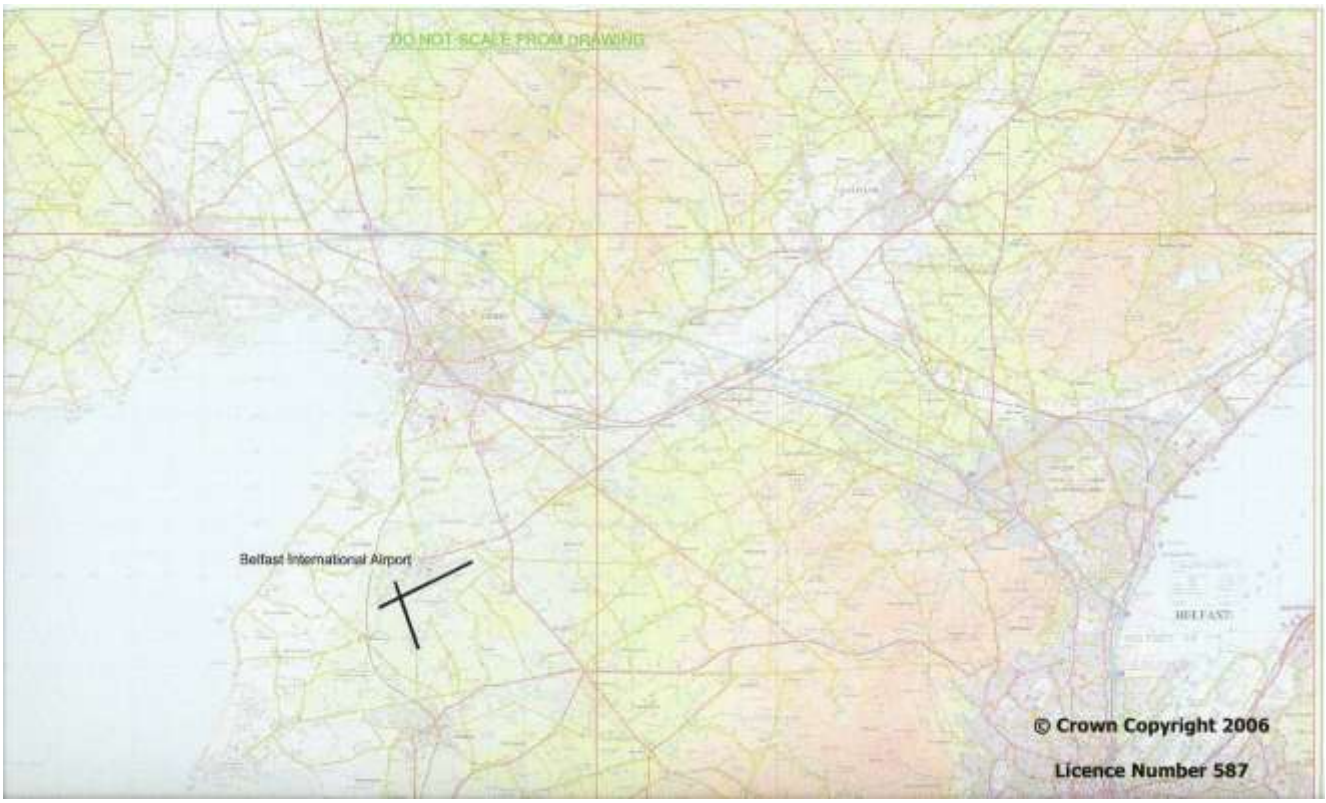
Belfast International Airport covers an area of over 4 km². Figure 1 shows its location within Northern Ireland and its two runways. The closest residential areas to the airport are Templepatrick to the north east; Crumlin to the south and Aldergrove Flying Station (formerly RAF Aldergrove) on the south edge of the airport site.

The majority of flights (87% in 2011) operate off the main runway because of prevailing westerly winds (07-25 which is 2,780m long). Predominantly, flights land from the east over the Templepatrick area and take off to the west over Lough Neagh. Flights landing on this route operate continuous descent approaches (CDA's) which reduce the level of noise produced.

The second runway (17-35 which is 1,891m long) is used when wind speed and direction would be above the acceptable cross wind limits for aircraft using 07-25 runway. 4.5% of movements in 2011 used this runway with the remaining 8.5% of movements related to helicopter operations.

In 2011 Belfast International Airport handled over 4.12 million passengers and in excess of 50,000 tonnes (air cargo), plus 100,000 tonnes of transhipped road freight through the airport facilities. 62% of passenger traffic was on domestic services with 38% being on international service.

Figure 1: Location map for Belfast International Airport.



4 Public Consultations

During the development of this Action Plan, Belfast International Airport, as the Competent Authority, undertook a formal consultation of the document with various stakeholders including but not limited to, the following:

- Belfast International Airport Consultative Committee (see appendix 1)
- Disability Action
- Belfast City Council
- Belfast Health and Social Care Trust
- Irish Branch of the Institute of Acoustics
- Northern Ireland Tourist Board
- Statutory Advisory Council Secretariat
- CAA Aerodrome Standards Department
- MPs; MLAs and MEPs offices

The formal consultation ran from the 3rd June 2013 to the 26th July 2013 with the draft Noise Action Plan available to the public on the airport website throughout.

The responses received have been included in a summary inserted as appendix 3 and, following review, the Action Plan was amended as required.

Belfast International Airport, through its Consultative Committee, remains committed to public engagement and communication with respect to noise management. This consultative approach will be sustained throughout the life of this Round Two Noise Action Plan which will remain available on the airport website.

5 Legislative and Policy Framework

Whilst not an exhaustive list, the following section sets out a summary of the relevant international, national and local legislation and policy for aircraft noise management.

International

ICAO Regulatory Framework.

The International Civil Aviation Organisation (ICAO) is the agency of the United Nations which oversees the civil aviation industry. ICAO adopts standards, protocols and recommended practices relating to all aspects of international aviation. Concerning noise, it seeks to adopt a 'balanced approach' which includes reducing noise at source; the use of operational noise abatement procedures, land use policies and management, and restricting and banning the operation of certain aircraft.

ICAO sets noise emissions standards for all aircraft types known as 'Chapters'. These standards are being progressively strengthened to prohibit aircraft that do not meet certain noise emission standards, with Chapter 2 aircraft the latest to be phased out for use in commercial aviation.

European

Directives relating to the management and control of environmental noise have been issued by the European Commission (EC). These are legislative acts which require Member States to achieve a specified result without necessarily determining a means of how it can be achieved.

European Directives 92/14/EEC and 2002/30

This legislation enabled Member States to phase out Chapter 2 aircraft and restrict marginally compliant Chapter 3 aircraft (discretionary).

Environmental Noise Directive (2002/49/EC)

Directive 2002/49/EC is the Environmental Noise Directive (END) whose aims are 'to define a common approach intended to avoid, prevent or reduce on a

prioritised basis the harmful effects, including annoyance, due to exposure to environmental noise.' To that end, the following actions are required:

- the determination of exposure to environmental noise, through noise mapping, by methods of assessment common to the Member States;
- ensuring that information on environmental noise and its effects is made available to the public; and
- adoption of action plans by the Member States, based upon noise-mapping results, with a view to preventing and reducing environmental noise where necessary and particularly where exposure levels can induce harmful effects on human health and to preserving environmental noise quality where it is good.

In accordance with the END, Belfast International Airport is identified as a major airport and consequently Round Two Strategic Noise Maps have been produced (Appendix 6) and this Round Two Noise Action Plan prepared. Annex V of END (Appendix 9) specifies those elements that a Noise Action Plan must include.

National

The UK Government has enacted several policies and regulations relating to the management and control of environmental noise and noise from aircraft and airports. These are summarised below:

The Environmental Noise Regulations (Northern Ireland) 2006

The Environmental Noise Regulations (Northern Ireland) 2006, 'the Regulations' came into force in October 2006 and transpose the requirements of the END into law in Northern Ireland. The Regulations also name the competent authorities responsible for their delivery. Under the Regulations, the competent authority for preparing Strategic Noise Maps and a Noise Action Plan for the single major airport in Northern Ireland is Belfast International Airport, the airport operator.

Strategic Noise Maps for Belfast International Airport have been produced and submitted to the Department of the Environment. These are shown in Appendix 6 and are available on the www.noiseni.co.uk website

The Regulations state that Noise Action Plans must:

- Meet the objectives of Article 1(c) of the END;
- Be designed to manage noise issues and effects, including noise reduction if necessary;
- Aim to preserve quiet areas in agglomerations;
- Address priorities which must be identified having regard to guidance;
- Apply to the most important areas as established by strategic noise maps;
- Meet the requirements in Schedule 4 of the END

The Department of the Environment published guidance in 2008 for Competent Authorities to produce their Round One Noise Action Plans. Guidance specifically for airports has now been written for Round Two Noise Action Plans and following consultation, was published for use on 18th February 2013. This Round Two Noise Action Plan has been prepared having regard for this guidance, as required by the Regulations.

Aviation Policy Framework

The Aviation Policy Framework (APF) was published in March 2013 and fully replaced the Future of Air Transport White Paper.

In relation to aircraft noise, the APF set out the Government's aim 'to limit and, where possible, reduce the number of people significantly affected by aircraft noise'. It recognises this is a challenging objective, and states "We want to strike a fair balance between the negative impacts of noise (on health, amenity (quality of life) and productivity) and the positive economic impacts of flights". The Government recognises that noise mitigation will be delivered through a combination of measures, including, increased research and development into new aircraft technology, implementing International and European legislation,

widening economic instruments and using local and national controls at airports, where required.

The APF signposts what actions the Government expects airports to undertake in relation to noise insulation and compensation. (See section 9)

Civil Aviation Act 1982 (as amended including the Civil Aviation Act 2006)

The Civil Aviation Act is the principal legislation within the UK for the control of aircraft operations. The Act provides a legislative means of avoiding and limiting the effect of noise from aircraft arriving and departing at UK airports. These include the enforcement of aircraft noise emission standards and operational procedures as well as the provision to enable airport operators to use charging mechanisms to encourage the use of aircraft that are quieter or with lower emission levels.

The Aerodromes (Noise Restrictions) (Rules and Procedures) Regulations 2003

These regulations were transposed from EC Directive 2002/30/EC which builds on ICAO's Balanced Approach. The Regulations apply to all city airports and other civil airports within the UK which have more than 50,000 civil aircraft movements a year and gives airport operators the scope to restrict marginally compliant aircraft.

Aeroplane Noise Regulations 1999

These regulations provide a set of statutory instruments that describe various methods that are implemented by the Civil Aviation Authority (CAA) that allow noise certified aircraft to use UK airports. The Regulations refer to ICAO noise certification standards and noise limits. The Regulations also provide a list of aircraft that are exempt from noise certification by ICAO.

Transport Act 2000

This Act sets out guidance and good practice for noise mitigation procedures and stakeholder consultation in relation to any changes to local airspace use. The Act looks at engaging with local authorities and states that the CAA must consider environmental noise impacts.

Local

A range of instruments are available at a local level to manage and minimise the effects of aircraft operations:

Belfast International Airport Consultative Committee

The Belfast International Airport Consultative Committee is the formal mechanism for the airport to interact and exchange information with communities in the vicinity. Its membership includes representatives from local authorities, community groups, airport users and other interested parties. The Committee meets three times per year and is well attended with current members listed in Appendix 1.

The Belfast International Airport Consultative Committee and its membership will play a full role in monitoring the implementation and effectiveness of the actions outlined in Appendix 2.

Northern Ireland END Steering Group (NIENDSG)

The NIENDSG was set up by the Department in 2005 to provide input to the development of the strategic noise maps for Northern Ireland and subsequent Action Plans. This group is made of representatives from each Competent Authority including:

- DRD Roads Service
- DRD Ports and Public Transport Division
- Translink
- Belfast International Airport
- George Best Belfast City Airport

- Northern Ireland Environment Agency and
- DoE Planning and Environmental Policy Group.

Voluntary Controls and Policies

In addition to mandated controls, Belfast International Airport's noise management strategy includes a variety of policies and voluntary controls developed and implemented with the support of the Belfast International Airport Consultative Committee, National Air Traffic Services and based airlines.

Belfast International Airport has introduced:

- Continuous decent approaches. This is a process where the aircraft descends continuously and avoids any segments where the aircraft is in level flight. CDA's require significantly less engine thrust than prolonged level flight so reduce both noise and fuel consumption.
- Restricted training times and durations. Training flights tend to result in repeat practice landings/take-offs which concentrates noise over a short period. With the assistance of National Air Traffic Services (NATS), circuits vary in length and location to spread any impacts over a wider area rather than subject the same people to repetitive noise.
- No training flights on Sundays at all.
- No training flights between 23.00 and 09.30 on any day.
- Restricted night training. Belfast International Airport endeavours to minimise such training, and encourages operators to use alternative aerodromes where possible. If this is not practicable, then night training will be restricted to hours where the nuisance to the public is minimised. Note that night time for flying training purposes starts 30 minutes after sunset but that the absolute restrictions noted above still apply
- Restricted ground operations including restricted engine runs and testing. Occasionally, aircraft engines must be run for maintenance and test reasons. This may involve long or short duration runs at settings

anywhere from ground idle to full power. Belfast International Airport endeavours to ensure that disturbance is minimised by limiting engine runs to daylight hours only (unless that aircraft is required for operation early the next morning). The locations used for engine running will be chosen to minimise disturbance, taking into account wind direction and urban conurbations.

These voluntary controls demonstrate our commitment to the positive management of aircraft noise.

6 Noise and Noise Mapping

What is noise?

Noise is generally defined as unwanted sound. It can be a very emotional subject for those people exposed to what they identify as an unreasonable level of noise. Although the level of noise that is perceived as annoying will differ from one person to the next, there are a number of internationally recognised terms to describe and measure aircraft noise, which are explained in the Glossary. These metrics form the basis of noise analyses conducted at major airports worldwide.

What are Noise Maps?

Typically, aircraft noise is presented on noise maps. A noise map is rather like a weather map for noise but it shows areas which are relatively louder or quieter. Just as a weather map might have isobars joining points of equal air pressure, a noise map can have contours joining points having the same noise level.

What are the Noise Maps for?

They can be used to provide information on noise levels that can be linked to population data to estimate how many people are affected. They inform decisions in relation to proactive management of noise. It is possible to use them to identify areas where potential future housing development could be adversely impacted by noise and thus avoided. Noise maps have also been used as the basis to inform the Noise Action Plan process.

How is noise measured?

Since 1989 the standard metric that has been used for measuring noise levels is the A-weighted equivalent noise level, L_{eq} contour. This takes into account all aircraft movements and is based on an average summer day. This measure is recognised by UK Government and has been used in all relevant planning, transport and environmental policies over recent years. This indicator takes account of all the noise energy that occurs over a particular time period and

thus takes account of all aircraft movements, both departures and arrivals, that occurred in that period.

In the UK, the noise impact of an airport is primarily described in terms of the LA_{eq} averaged over the 16 hour period from 0700 – 2300, for an average day between the 16th June and 15th September. (These dates cover the busiest traffic periods for UK airports.)

The Aviation Policy Framework treats the 57dB LA_{eq16hr} contour as the average level of daytime aircraft noise marking the approximate onset of significant community annoyance. It goes on to state "However, this does not mean that all people within this contour will experience significant adverse effects from aircraft noise. Nor does it mean that no-one outside of this contour will consider themselves annoyed by aircraft noise."

The Environmental Noise Regulations (Northern Ireland) 2006 also uses the LA_{eq16hr} metric but for END modelling it averages over the 16 hour period from 0700 – 2300 for an annual average day. The modelling results in this Action Plan relate to this metric, which is not directly comparable to the LA_{eq16hr} used in the Aviation Policy Framework but may be used as a guide.

The Regulations require major airports (as well as major agglomerations, roads, railways and non-major airports within agglomerations) to produce Strategic Noise Maps using L_{den} noise contours, a different noise measurement. The L_{den} noise metric is itself derived from three sets of contours:

- L_{day} : average 12 hour period from 0700 – 1900
- $L_{evening}$: average 4 hour period from 1900 – 2300
- L_{night} : average 8 hour period from 2300 – 0700

To date there are no limit values in place in the UK for environmental noise.

How is noise monitored?

Belfast International Airport has no planning restrictions relating to noise. Due to its rural location and relatively sparsely populated environment there are no Standard Instrument Departure (SID) or Standard Approach Procedure (STAR)

routes for Belfast International Airport. Consequently there are no noise preferential routes.

Noise modelling is completed for END and/or noise contour mapping purposes. There are no static noise monitors in place for continuous monitoring.

However, the upgrade to the main radar facility in 2011 allows improved investigation of noise complaints when these are received.

Noise Mapping Results

Noise maps have been produced in terms of the five noise metrics (L_{den}, L_{day}, $L_{evening}$, L_{night} and LA_{eq16hr}) required by the Regulations.

It should be noted that there are limitations to the maps and it is accepted that noise levels presented by the maps do not necessarily reflect the exact noise level which would be experienced at any given point. These Strategic Noise Maps can be found in Appendix 6.

The approach set out within the Directive is to first undertake strategic noise mapping within agglomerations, and for major sources outside agglomerations, and then assess the numbers of people exposed to noise within 5 dB bands.

The results of the strategic noise mapping process help to gain an understanding of:

- Where environmental noise is located
- The approximate magnitude of noise levels within the assessment area and
- Approximately how many people are exposed to differing levels of environmental noise

Table 1 – Area exposed to noise categories for BIA

Noise Scenario	Noise Category	Area (km²)		
		All Flights Round 2	Excluding Military Flights R2	All Flights Round 1
L_{den}	50 - 54	23.1	22.5	29
	55 – 59	9.2	9.1	11
	60 – 64	4.0	3.9	5
	65 – 69	1.5	1.4	2
	70 – 74	0.6	0.5	1
	≥75	0.3	0.3	1
	Total	**38.7**	**37.7**	**49**
L_{night}	45 - 50	12.3	12.3	14
	50 - 54	5.4	5.4	6
	55 – 59	1.9	1.9	2
	60 – 64	0.7	0.7	1
	65 – 69	0.2	0.2	0
	≥70	0.2	0.2	0
	Total	**20.7**	**20.7**	**23**
LA_{eq16hr}	50 - 54	12.7	11.9	16
	55 – 59	5.2	5.0	7
	60 – 64	2.2	1.9	3
	65 – 69	0.9	0.7	1
	70 – 74	0.4	0.3	0
	≥75	0.2	0.2	0
	Total	**21.6**	**20.0**	**27**

Table 1 shows that area exposed to environmental noise generated by Belfast International Airport activities across all noise scenarios, has decreased significantly between the Round One and Round Two mapping exercises. The

decrease ranges from 10% to 21% of area exposed depending upon the noise scenario selected. The highest LA_{eq16hr} noise exposure contours (>65dB) are all contained within the footprint of the airport. (LA_{eq16hr} is the noise rating criteria used within the Aviation Policy Framework for noise insulation and compensation schemes.)

An evaluation of the estimated number of people exposed to noise

The results of the dwellings and population analysis for Belfast International Airport are shown on the location map in Appendix 4 with numerical analysis of the data set out in Tables 2 and 3 below.

Table 2 indicates the number of dwellings exposed to noise categories and table 3 indicates the population living within these dwellings.

Table 2 – Number of dwellings exposed to noise categories for Belfast International Airport

Noise Scenario	Noise Category	Dwellings		
		All Flights Round 2	Excluding Military Flights R2	All Flights Round 1
L_{den}	50 - 54	937	953	679
	55 – 59	215	184	157
	60 – 64	34	34	33
	65 – 69	6	4	6
	70 – 74	0	0	0
	≥75	0	0	0
	Total	**1192**	**1175**	**875**
L_{night}	45 - 50	304	304	261
	50 - 54	62	62	53
	55 – 59	8	8	9
	60 – 64	1	1	0
	65 – 69	0	0	0
	≥70	0	0	0
	Total	**375**	**375**	**323**
LA_{eq16hr}	50 - 54	514	423	198
	55 – 59	85	77	86
	60 – 64	16	11	14
	65 – 69	0	0	0
	70 – 74	0	0	0
	≥75	0	0	0
	Total	**615**	**511**	**298**

Table 3 – Population exposed to noise categories for Belfast International Airport

Noise Scenario	Noise Category	Population		
		All Flights Round 2	Excluding Military Flights R2	All Flights Round 1
L_{den}	50 - 54	2143	2176	1,907
	55 – 59	501	435	462
	60 – 64	50	47	85
	65 – 69	11	9	15
	70 – 74	0	0	0
	≥75	0	0	0
	Total	**2705**	**2667**	**2,469**
L_{night}	45 - 50	735	735	743
	50 - 54	104	104	143
	55 – 59	16	16	22
	60 – 64	2	2	0
	65 – 69	0	0	0
	≥70	0	0	0
	Total	**857**	**857**	**908**
LA_{eq16hr}	50 - 54	1233	1029	628
	55 – 59	162	136	232
	60 – 64	24	19	37
	65 – 69	0	0	0
	70 – 74	0	0	0
	≥75	0	0	0
	Total	**1419**	**1184**	**897**

Round One and Round Two comparisons

Tables 1 to 3 include figures from the Round One and Round Two mapping process. Although the area affected by the noise bands has decreased significantly, both the number of dwellings and population exposed has risen. AMEC, the company charged with conducting the NI mapping process for Round Two, investigated the apparent anomalies to determine the reasons.

There were a number of changes in data processing between the two mapping cycles. The key factors were:

- Change in method from INM version 6.2a (ECAC Doc29v2) to INM version 7.0c (ECAC Doc29v3)
- Change in buildings dataset used
- Rotation of alignment of noise contours to runway position

At the start of the Round Two exercise, the AMEC team was provided with a DVD containing the FDMI datasets used in the Round One (2007) analysis. This DVD only includes partial building information around the airport and did not include property information for some key concentrations of dwellings covering parts of Crumlin and at the Aldergrove Flying Station (formerly RAF Aldergrove). AMEC was unable to establish whether this was due to limitations of the OSNI large scale datasets used for the Round One exercise or the absence of some building information from the final deliverables. Manual review of the available mapping information, aerial photography and 2003-2010 Google Earth imagery covering the airport area indicates that there have been no major changes in the number and distribution of dwellings within the vicinity of the airport over the past 5 years.

Residential buildings in Aldergrove Flying Station, which were not included in Round One mapping, account for about 53% of the total dwellings in the Round Two >50dB L_{den} noise envelope.

The INM modelling process can introduce a rotation in the contours relative to the alignment of the runways. Round Two mapping made changes to take this into account which resulted in a small shift in the orientation of the contours

relative to Round One. This brought some additional properties into the >50 dB noise exposure envelope, primarily in an area south of Templepatrick.

These changes are reflected in tables 1 to 3, however to allow a level of comparison, the Round One data was reprocessed using the same methodologies as Round Two. Table 4 details the results.

Table 4 L_{den} Noise Exposure for different Round One and Round Two Scenarios (Dwellings exposed)

	(A) Round 1 Published Results	**(B) Round 1 Using Round 2 Property Database**	**(C) Round 2 Using Round 2 Property Database**	**Change (B - A)**	**Change (C – A)**	**Change (C – B)**
50-54	679	1385	937	706	258	-448
55-59	157	269	215	112	58	-54
60-64	33	46	34	13	1	-12
65-69	6	6	6	0	0	0
70-74						
Total	**875**	**1706**	**1192**	**831**	**317**	**-514**

Column (B) expresses the Round One data once it has been processed through the same methodology as the Round Two data. Using this system, the 875 dwellings noted in the original Round One reporting would have been 1706.

Round Two mapping has identified 1192 dwellings exposed to >50dB L_{den} thus an overall reduction of over 500 exposed dwellings has occurred over the 5 year period.

The difference is most noticeable in the 50-54dB band which suggests the absence of a number of key concentrations of dwellings near to the airport in the Round One analysis. This links in with the limited building information covering the areas of Crumlin and Aldergrove Flying Station that were not on the Round One DVD.

Population exposed is a function of the number of dwellings. In general terms, the methodology used to calculate population exposure uses OSNI large scale data to determine dwelling numbers and census output areas (as recorded by Northern Ireland Statistics and Research Agency (NISRA)) to generate population estimates. For Aldergrove Flying Station this results in an average population density of nearly 16 which is 5-6 times higher than the national average. As a military base, the population will continuously be in a state of flux. The NISRA data used for this density figure predates the 2009 transfer of a large number of RAF personnel to other bases in Great Britain.

7 Identification of Aircraft Noise Problems

Noisier Aircraft

At Belfast International Airport, we recognise that we need to do all that is reasonably practicable to minimise the impact of our business on our neighbours. We are fortunate that we are located in a relatively rural area where we can demonstrate a good balance of economic benefit and environmental sustainability. The population within a 5 mile radius of this airport is low. However we endeavour to minimise the effect on this relatively small population by regularly monitoring and reviewing to determine how best to reduce noise both on the ground and in the air.

8 Managing Aircraft Noise

Belfast International Airport has adopted a proactive voluntary approach to noise management, which seeks to minimise the effects of aircraft noise. The Round One Noise Action Plan included a number of practical measures designed to support this process.

This Round Two Noise Action Plan builds upon and expands this work.

Noise Action Plan

The Round One Noise Action Plan identified a series of measures designed to manage and mitigate the effects of aircraft noise and ensure noise is effectively monitored. Issues identified from the Strategic Noise Maps and the public consultation processes were taken into consideration when formulating the measures.

These have advanced through the life of the Round One Noise Action Plan with a combination of completed actions; actions that are on-going activities and some that roll over into this Round Two Noise Action Plan.

Examples of actions that have been implemented are below. Full details can be found in the appendix 2 table.

Round One Action	Progress
Consider the developments of SID's, STARS and CDA's.	Continuous descent approaches have been introduced for aircraft arriving on runway 25 which accounts for 87% or arriving traffic.
Establish an Airport Consultative Committee.	The committee has held regular meetings from March 2011 with minutes available on the airport website.
Regularly report noise complaints to the Board.	Figures are supplied to the Board on a regular basis and included in the annual corporate social responsibility returns.

Belfast International Airport will work with the Consultative Committee to ensure it delivers against these commitments and that the Noise Action Plan remains effective.

This Round 2 Noise Action Plan will remain valid throughout the 5-year period up to Round 3.

Through the Aviation Policy Framework, the Government recognises the ICAO Assembly 'balanced approach' principle to aircraft noise management which consists of identifying the noise problem at an airport and then assessing the cost-effectiveness of the various measures available to reduce noise through the exploration of four principal elements. These elements are:

Reduction at source (quieter aircraft).

- BIA encourages its airlines to operate modern quiet fleets. BIA supports Sustainable Aviation, an aviation industry wide body. A core element of their programme is the development and introduction of quieter aircraft. (BIA's previous shareholder, abertis Airports, is a signatory of Sustainable Aviation.)

Land-use planning and management.

- BIA continues to lobby local Government for planning policy that encourages control of development close to airports to avoid population encroachment.

Noise abatement operational procedures (optimising how aircraft are flown and the routes they follow to limit the noise impacts).

- BIA has introduced continuous descent approaches for runway 25 arrivals.

Operating restrictions (preventing certain (noisier) types of aircraft from flying either at all or at certain times).

- BIA has restricted the use of aircraft below ICAO Chapter 3 and has strict control on training flights.

Appendix 2 tabulates the status of current noise reduction measures in force and Round One Noise Action Plan actions.

Each measure includes a timescale for implementation and identifies the impact(s) it has been designed to address along with key performance indicators where appropriate.

9 Long Term Strategy and Other Considerations/Action Planning Priorities

In 2003, the Government published its White Paper, the Future of Air Transport, setting out a balanced strategic framework for the development of national airport capacity to 2030. The White Paper included support for the growth of Belfast International Airport:

> "It is situated in a sparsely populated area, and is able to operate 24 hours a day. As a result, it is the major freight and flown mail airport in Northern Ireland, and we envisage that these activities will also continue to expand.
>
> It has adequate space within the airport boundary to serve the whole of the forecast demand and well beyond. We therefore support the development of the airport within the existing airport boundaries to serve the forecast passenger and freight demand in full, subject to consideration of any local environmental impacts."

In March 2013 the White Paper was replaced by the Aviation Policy Framework. This document reiterated the Governments support for growth in Northern Ireland airports.

In October 2005, we published our Master Plan setting out our response to the White Paper including noise. This is available on the Belfast International Airport website:

http://www.belfastairport.com/en/content/8/104/airport-master-plan.html

Quiet Areas

Belfast International Airport does not operate within the vicinity of any Round Two agglomerations as defined by the Regulations, so no consideration is required with respect to the conflict with quiet area objectives in urban areas.

Noise Management Areas

The Aviation Policy Framework expects Airport Operators to:

- assist with relocation expenses for those exposed to LA_{eq16hr} 69 dB and above (no dwellings fall within this noise category) and,
- offer acoustic insulation to dwellings exposed to noise in the LA_{eq16hr} 63 – 69 dB range

The 5dB mapping bands required by END do not readily identify the dwellings that may be covered by the acoustic insulation requirements. As such, additional analysis of the mapping data was undertaken giving dwellings and population exposures in 1dB bands.

Table 5 Dwellings and Population exposed LA_{eq16hr} 1dB Results

Min dB	Max dB	Dwellings	Population
60	61	7	10
61	62	2	4
62	63	3	3
63	64	2	5
64	65	2	2
65	66	0	0
Total in 63 – 69 dB band		4	7

Table 5 gives a 1dB range breakdown of dwellings and population exposed showing four dwellings (containing a population of 7) fall within the scope of the Aviation Policy Framework that should be offered assistance with acoustic insulation.

The NIENDSG agreed that LA_{eq16hr} should be the indicator used for prioritisation and that Airport Competent Authorities should identify the total population affected by noise levels of more than 50dB LA_{eq16hr} from the airport. From this group, the 1% of population that are affected by the highest noise levels will be targeted for investigation with a view to becoming Candidate Noise Management Areas.

Table 6 Noise Exposure >50db LA_{eq16hr}

Noise Scenario	Noise Category	Dwellings All Flights Round 2
LA_{eq16hr}	50 - 54	514
	55 – 59	85
	60 – 64	16
	65 – 69	0
	70 – 74	0
	≥75	0
	Total	**615**
1% Level		**6**

To meet the Aviation Policy Framework requirements and the NIENDSG agreed indicator, Belfast International Airport will generate a programme to identify the current acoustic insulation properties of the dwellings identified as the 1% affected by the highest noise level and offer assistance with acoustic insulation if not already present. Table 6 shows this to be six dwellings. The four properties identified through the application of the Aviation Policy Framework (>63dB LA_{eq16hr}) are contained within this group of six dwellings. However, to ensure the top 1% are covered, those dwellings in the 62 – 63dB range will be included in the programme. This takes the number of dwellings that will be investigated further up to 7 (population 10).

Figures 2 and 3 show the specific locations identified during the noise modelling process. (Note, the number adjacent to the dot relates to the upper limit of the 1dB range. I.e. exposure range 64 to 65 is marked as 65.)

Figure 2: LA_{eq16hr} Dwellings Exposed from Runway 07

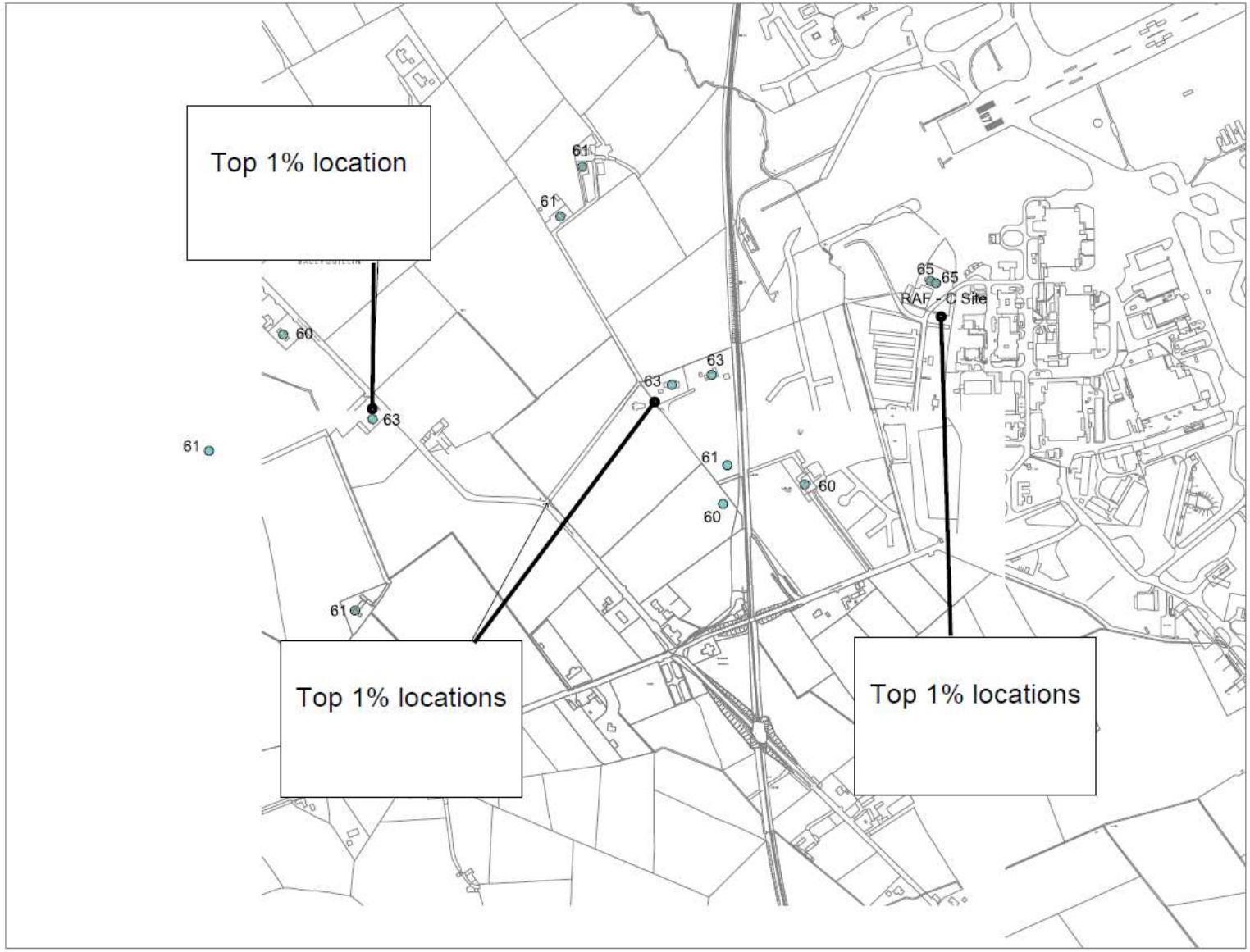
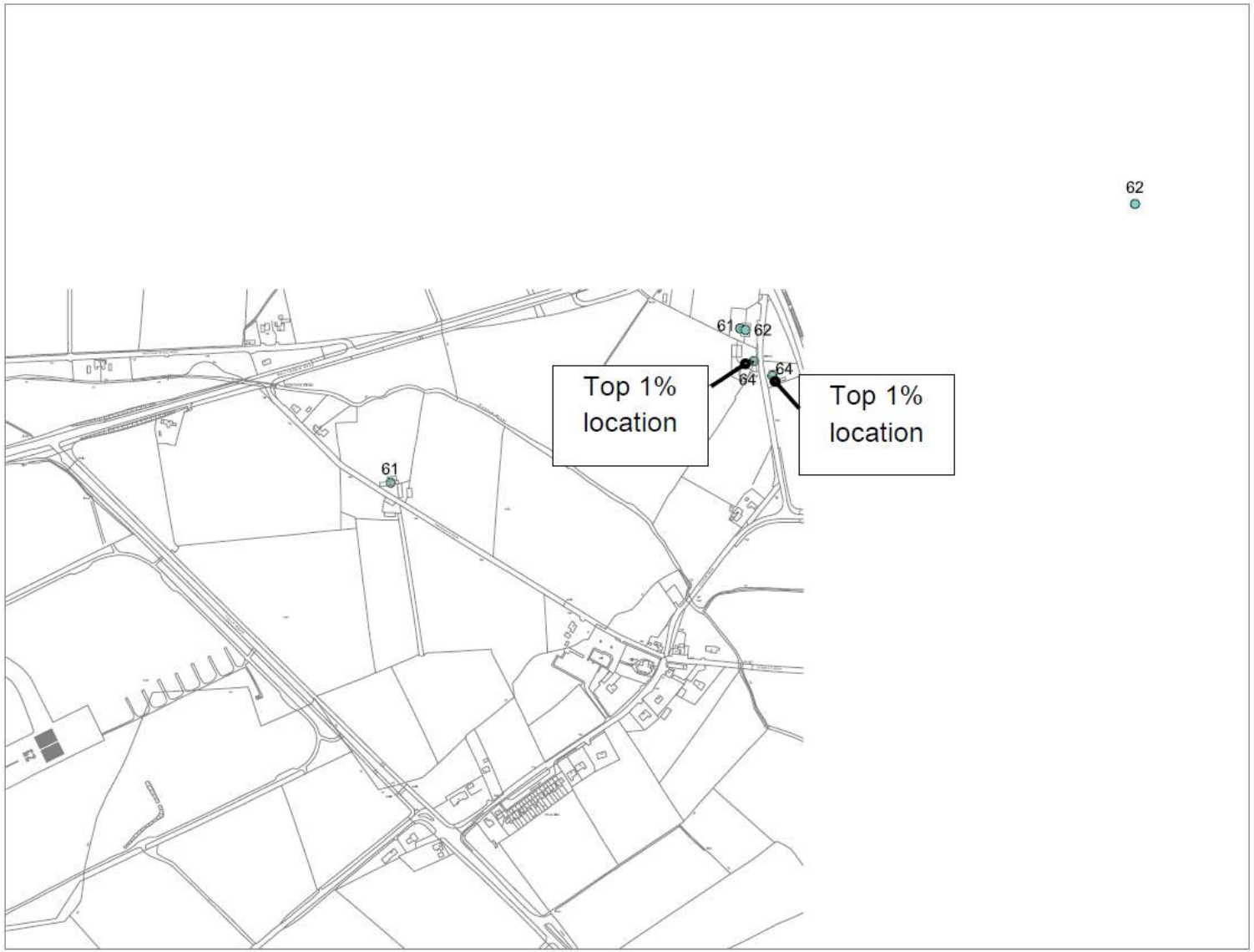


Figure 3: LA_{eq16hr} Dwellings Exposed from Runway 25



Financial Information

Detailed costs for the next five years covered by this Noise Action Plan are not available at this stage but Belfast International Airport estimates costs to be in the region of £115,000.

Table 7

Type	Description	Approximate Costs
Equipment	Acoustic insulation	£50,000
Consultant fees	Noise modelling; data interpretation etc.	£25,000
Staff costs	Environment team	£40,000

10 Conclusion

This Noise Action Plan has been produced with regard to the European Noise Directive and the DoE guidance and builds on Belfast International Airport's established voluntary approach to noise management. It has carefully considered the responses received during the public consultation process, which will enhance Belfast International Airport's understanding of the problems associated with its operations and provide a context to strengthen our approach to noise management.

It includes actions that will further improve noise management at Belfast International Airport, representing a robust and acceptable approach to addressing noise matters. A large proportion of these measures are voluntary in nature, demonstrating our commitment to take a proactive approach to noise management and seek to minimise the adverse effects of our operations.

The strategy includes a range of instruments highlighting the need to monitor our operations carefully and to report this information transparently and in a way it can be easily understood. It also stresses our commitment to engage in an open and honest way.

In line with the 2006 regulations, we will formally review our Noise Action Plan every five years. However, we are committed to review and deliver improvements where possible and necessary.

The successful delivery of this Noise Action Plan requires the cooperation and support of our air traffic control provider, NATS; airlines and other operators. However, it also requires support from the local community and other key stakeholders, to ensure that noise management is considered in the context of the ICAO Balanced Approach.

We will continue to listen and engage. With the support of the Belfast International Airport Consultative Committee we will seek to deliver improvements in the noise performance at Belfast International Airport whilst maximising the wider benefits that a major international airport can bring to the local community.

11 Appendices

Appendix 1 - Belfast International Airport Consultative Committee

Membership consists of:

Tom McGrath – Airport Forum chairman

BIA Managing Director / Forum secretary

ABTA representative / Knock Travel Agency

Templepatrick Action Group

The Consumer Council

Airport Operators Committee

Tourism Ireland

NI Tourist Board

Antrim Borough Council

Department for Regional Development

National Air Traffic Services

Airport Business Development Director

Airport Operations Director

Airport Public Relations Manager

Cargo representative

Commercial representative / Aelia Duty Free

Killead Presbyterian Church / Killead residents

DETI

Belfast City Council

NI Chamber of Commerce

Institute of Directors

Appendix 2 – END Actions

	Action	Comment	Impact	Time-scale	Performance Indicator	Number of People Affected by Action (approx.)
Round 1 END Noise Action Plan Actions:						
1	Restrict excessively noisy aircraft from operating at Belfast International Airport	All aircraft operating at BIA meet ICAO Chapter 3 as a minimum	Arrivals Departures Community	Complete	N/A	
2	Restrict noise impact from training flights	With the assistance of National Air Traffic Services (NATS), training times and durations are restricted to ensure that circuits vary in length and location to spread any impacts over a wider area rather than subject the same people to repetitive noise	Community	Complete	N/A	
3	Restrict noise impact from training flights	BIA does not allow training flights on Sundays at all	Community	Complete	N/A	
4	Restrict noise impact from training flights	BIA does not allow training flights after 23.00 on any day and do not commence again until 09.30	Community	Complete	N/A	

	Action	Comment	Impact	Time-scale	Performance Indicator	Number of People Affected by Action (approx.)
5	Restrict noise impact from training flights	Instrument training flights are restricted to a maximum of one Chapter 3 aircraft at any one time	Community	Complete	N/A	
6	Restrict noise impact from training flights	BIA endeavours to minimise night training, and encourages operators to use alternative aerodromes where possible. If this is not practicable, then night training will be restricted to hours where the nuisance to the public is minimised. Note that night time for flying training purposes starts 30 minutes after sunset but that the absolute restrictions noted in 3 and 4 above still apply.	Community	Complete	N/A	
7	Develop methodology on determining Candidate Quiet Areas.	Quiet Areas only apply to agglomerations and with BIA external to the Belfast agglomeration this action is no longer valid.	Community	Closed	N/A	

	Action	Comment	Impact	Time-scale	Performance Indicator	Number of People Affected by Action (approx.)
8	Consider the development of SIDs; STARS and CDA's.	CDA's have been introduced for flights arriving on runway 25 (87%). SID's and STARS were reviewed. However, to introduce them would require a formal change to Northern Ireland airspace involving a lengthy change process with limited if any improvement. As such SID's and STARS will not be progressed at this time.	Arrivals Departures Community	Complete		
9	Establish an Airport Consultative Committee.	The Consultative Committee is in place with regular meetings. Meeting minutes are added to the airport website.	Community	Complete	Minutes of meetings.	
10	Develop a more robust noise complaints process.	The existing process has been revised. Operation of the process is on-going.	Community	Complete	Reporting number of callers and events.	
11	Regularly report noise complaints to Board.	Noise complaints are reported through Board reports on a regular basis.	Community	Complete	Reports issued.	
12	Report noise complaint statistics to Airport Consultative Committee.	Annual statistics on noise complaints are supplied to the Consultative Committee.	Community	Complete	Annual report to Consultative Committee	

	Action	Comment	Impact	Time-scale	Performance Indicator	Number of People Affected by Action (approx.)
13	Ensure other appropriate complaints (low flying etc.) outside BIA ATZ are progressed to PSNI.	This is an on-going aspect of the BIA complaints procedure.	Community	Complete		
14	Develop CSR section on company website and include noise complaint statistics.	Annual statistics on noise complaints are added to the airport website.	Community	Complete	Annually updated web report.	
15	Establish a Noise Abatement Working Group (NAWG).	Due to the low level of noise complaints (<5 annually 2008-2012) it was not appropriate to have a specific working group. Noise is covered within the regular Airport Consultative Committee meetings	Arrivals Departures Community Ground Noise	Complete		
16	Generate an operational instruction to control the use of engine run tests.	The instruction has been written, disseminated and is being followed.	Ground Noise	Complete		
17	Introduce 4-yearly modelling of noise contours in line with Air Transport White Paper noise values: LA_{eq16hr}	The 5-yearly END modelling, coupled with a very low level of noise concerns indicates the actual benefits of this interim modelling to the local community and the airport as being negligible. As such this will not be progressed.	Community	Closed		

	Action	Comment	Impact	Time-scale	Performance Indicator	Number of People Affected by Action (approx.)
18	Introduce 4-yearly noise measurement mapping in line with Air Transport White Paper noise values: LA_{eq16hr}	The 5-yearly END modelling, coupled with a very low level of noise concerns indicates the actual benefits of this interim modelling to the local community and the airport as being negligible. As such this will not be progressed.	Community	Closed		
19	Investigate feasible alternatives to the use of APU's.	Ground power units (GPU's) can operate instead of aircraft auxiliary power units (APU's). Discussions with airlines and ground handling companies required to finalise process.	Ground Noise	December 2014	Procedure	
20	Investigate feasibility of installing FEGP on future stand development.	To be considered in future stand developments.	Ground Noise	On-going	N/A	N/A
21	Promulgate minimum standards for ground vehicles in relation to noise and emissions.	All new BIA vehicles meet euro 4 diesel engines. Discussions continue with existing and new apron to promote the introduction of this level of engine standard.	Ground Noise	On-going	N/A	N/A

	Action	Comment	Impact	Time-scale	Performance Indicator	Number of People Affected by Action (approx.)
22	Ensure airport design developments take into account noise generation and equipment and materials used minimise noise creation.	Guideline to be provided for airport developments	Ground Noise	On-going		
Round 2 END Noise Action Plan Actions:						
23	Identify Candidate Noise Management Areas	Application of the 1% rule from the Action Planning Technical Guidance will be used by BIA to identify Candidate Noise Management Areas. (see table 6) As per the Guidance document, consultation with the Department will then be entered into prior to validation	Community	On-going		10
24	Develop methodology for determining priority noise issues including noise sensitive buildings.	The ITool and 1% rule from the Technical Guidance will be used to identify the priority areas	Community	May 2014 (in conjunction with item 25)	Identification of all noise sensitive buildings within the appropriate noise contours.	To be determined

	Action	Comment	Impact	Time-scale	Performance Indicator	Number of People Affected by Action (approx.)
25	Determine which properties will be assessed for noise insulation. An acoustic engineer will be engaged to review the dwellings identified within the 1% rule from the Action Planning Technical Guidance	Review of modelling results	Community	May 2014	Engineering report	Up to 10
		Determination of exposed facades that may benefit from noise insulation	Community	July 2014	Engineering report	Up to 10
26	Consider any requirement for financial assistance towards acoustic insulation for households exposed to levels of noise of 63 dB LAeq16h or more. BIA will conduct a peer review of existing noise insulation grant schemes to assist in the development of its own scheme. DRD to be included in overall discussions	Peer review of existing schemes	Community	March 2014		Up to 10
		Draft BIA scheme available for discussions with DoE/DRD	Community	May 2014		Up to 10
		Implementation and application of agreed scheme	Community	August 2014		Up to 10
27	Disseminate progress of actions within the Noise Action Plan	Summary of progress to be included on the airport website	Community	Annually	Annual summary on website	

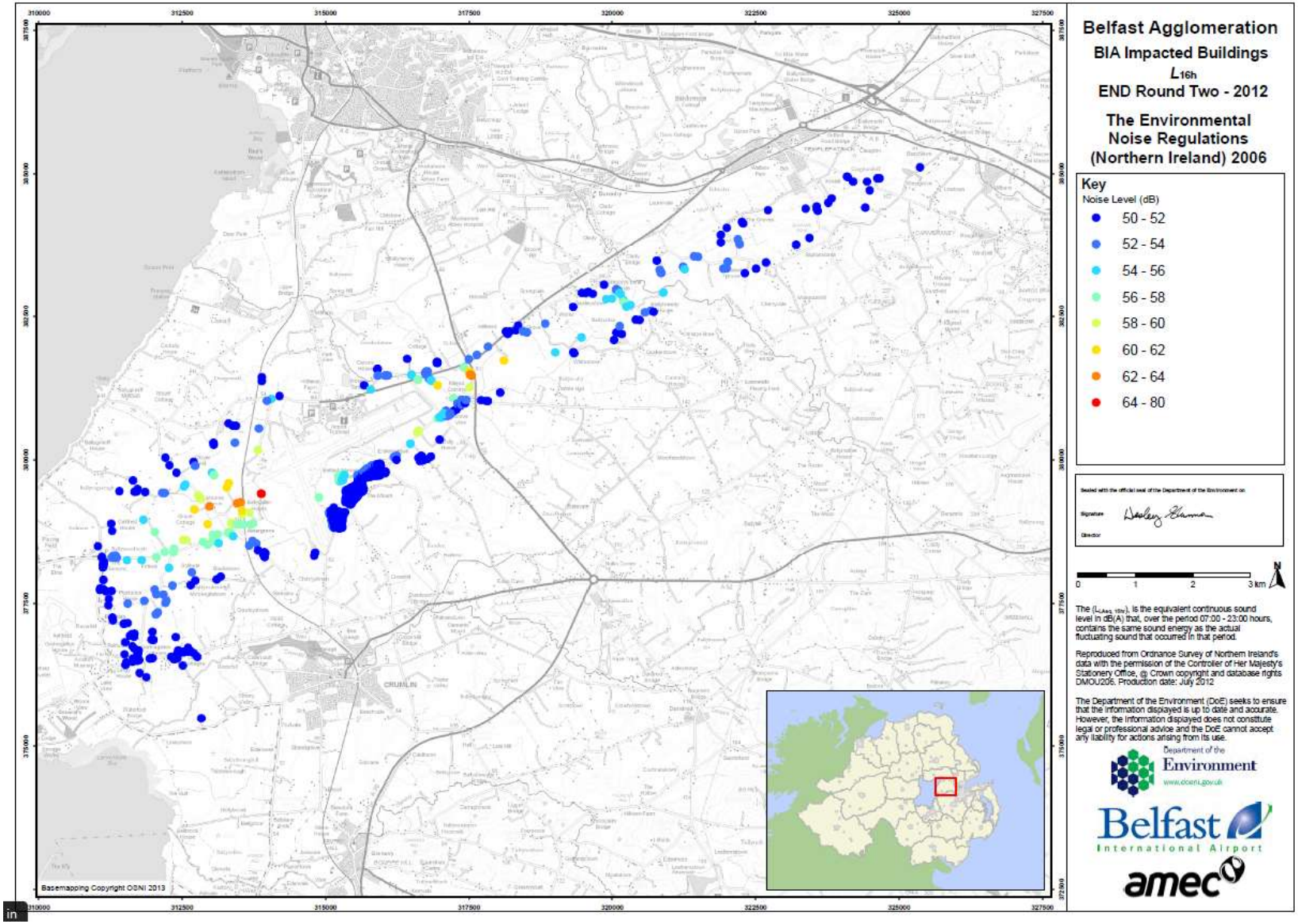
	Action		Impact	Time-scale	Performance Indicator	Number of People Affected by Action (approx.)
28	Assess on-going airport operations in order to minimise the number of dwellings affected by noise levels above 63 dB LA_{eq16hr}	In addition to the 5-yearly mapping required by END, BIA will, following major developments, review and revise the Noise Action Plan as appropriate	Community	As required	Future mapping and reviews	
29	Lobby local government for planning policy that encourages control of development close to airports to avoid population encroachment.	England and Wales have consolidated their planning guidance into a single document. Planning Policy Guidance 24 Planning and Noise (PPG24) guided local authorities in England on the use of their planning powers to minimise the adverse impact of noise. It outlined the considerations to be taken into account in determining planning applications both for noise-sensitive developments and for those activities which generate noise. It was replaced in March 2012 with National Planning Policy Framework. Following this approach, Northern Ireland is considering consolidating its planning guidance however, currently there is no equivalent	Land Use Planning Community	On-going		Unknown

Appendix 3 – Summary of Consultation Responses Received

Description of Comment Received	Belfast International Airport Response	Change to the Noise Action Plan?
BIA should detail how it will assess whether a property requires further acoustic insulation and indicate the timeframe	The technical guidance indicates measuring noise levels may not be a cost effective method of validation. An acoustic engineer will be engaged to review the existing insulation of those dwellings identified in table 6 and BIA will consider their recommendations including measurement if deemed appropriate. It is anticipated that this be conducted during 2014 however, if measurements are required, this time period may need to be extended to make the measurements meaningful.	Yes AP No 25
BIA should detail how it will assess its operations in order to limit the number of properties affected by noise levels above 63dB$_{LAeq16hr}$	To comply with the Environmental Noise Directive, assessment of the noise levels will be undertaken every 5 years as a minimum. In the intervening period, if BIA experiences a major development, it will review noise generation impacts and revise the Action Plan as appropriate.	Yes AP No 28
BIA should disseminate the monitoring of the Action Plan wider than the Consultative Committee	An annual summary of progress of the Action Plan will be included on the airport website.	Yes AP No 27
BIA should provide further detail on the noise insulation scheme	A peer review of existing noise insulation schemes alongside findings from the acoustic engineer report will be undertaken. Proposed criteria will be discussed with DRD prior to application.	Yes Following discussions AP No 26

Description of Comment Received	Belfast International Airport Response	Change to the Noise Action Plan?
Confirmation request that a specific dwelling falls within the 1% affected by the highest noise level and details of assistance available if this is the case.	The address provided will be compared to the data supplied by AMEC and response supplied.	No

Appendix 4 Dwellings Exposed to Noise Categories for Belfast International Airport (LA_{eq16hr})



Appendix 5 - Schedule of Airports

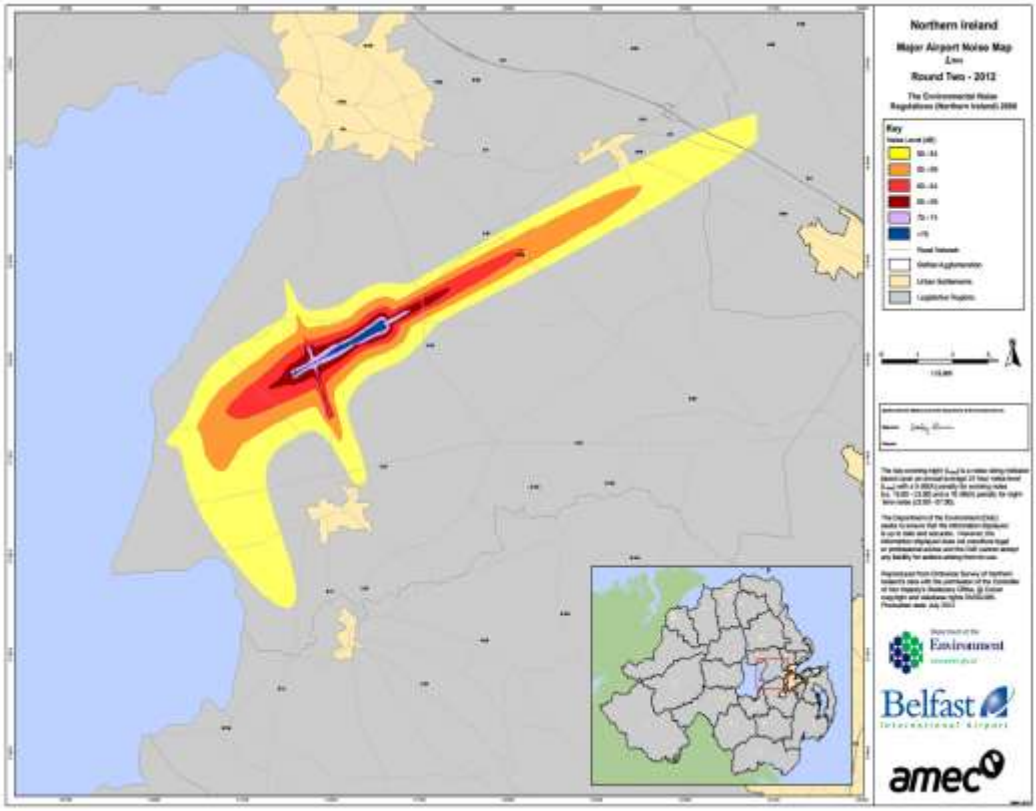
Schedule of Airports which produced noise maps in the second round of noise mapping

Airport	ICAO Location Code
Belfast International*	EGAA
George Best Belfast City	EGAC

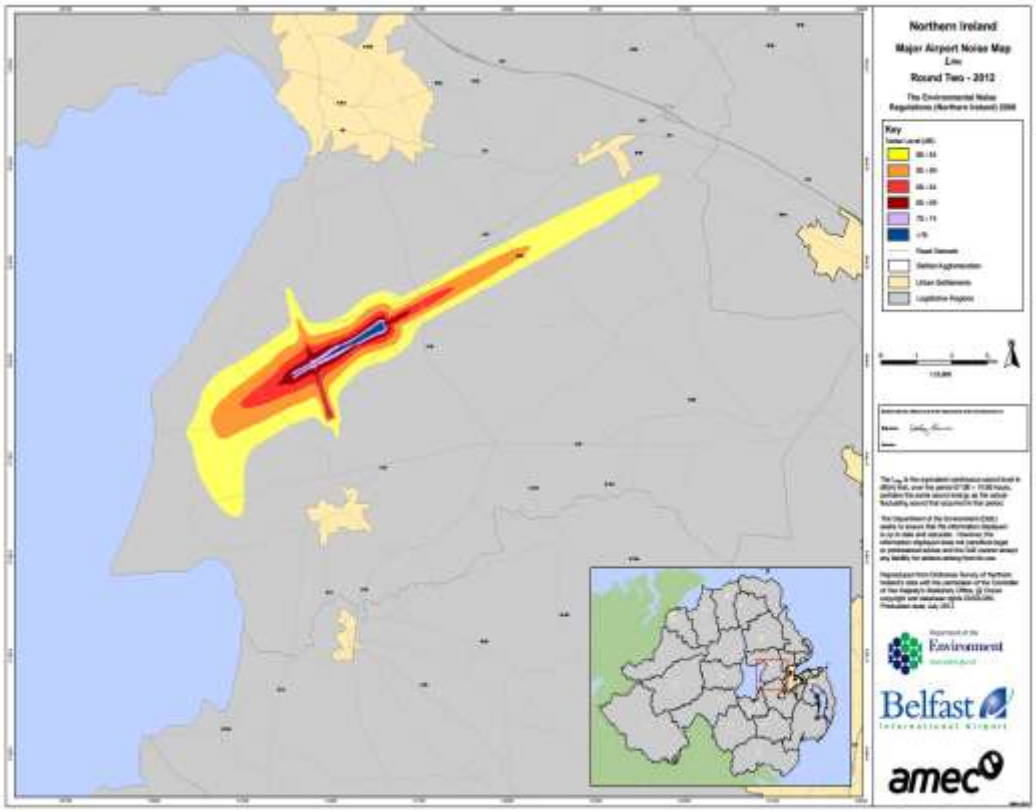
* - Major Airport

Appendix 6 – Strategic Noise Maps

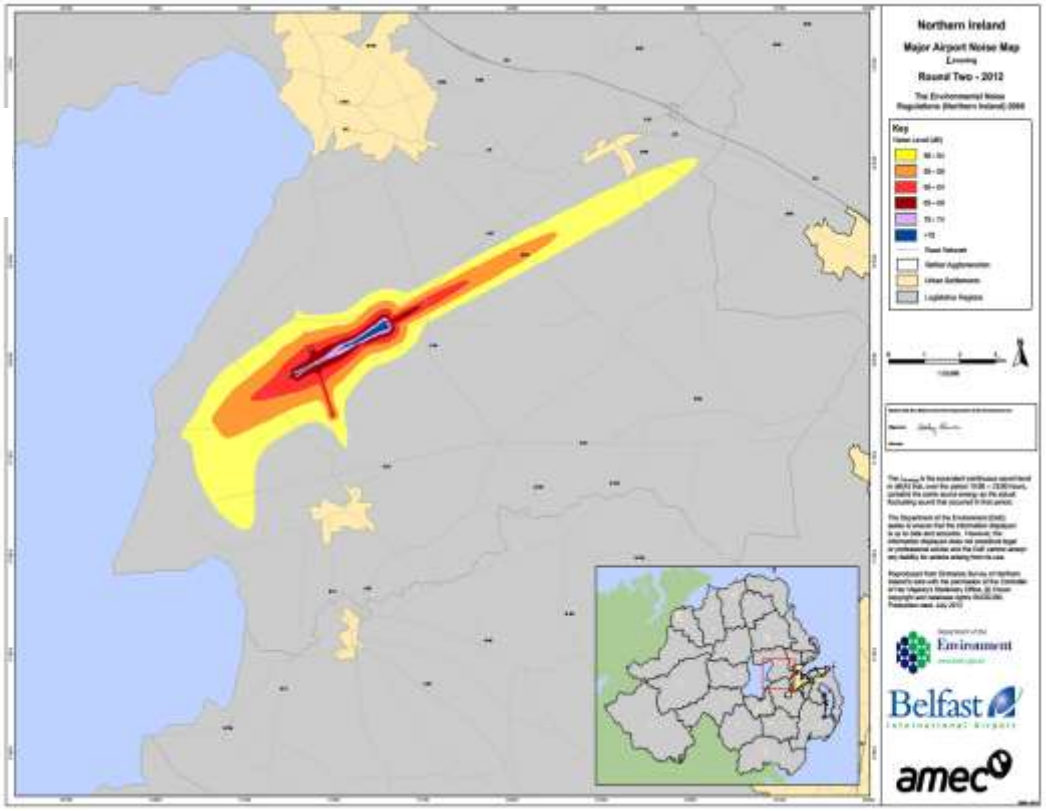
L_{den}



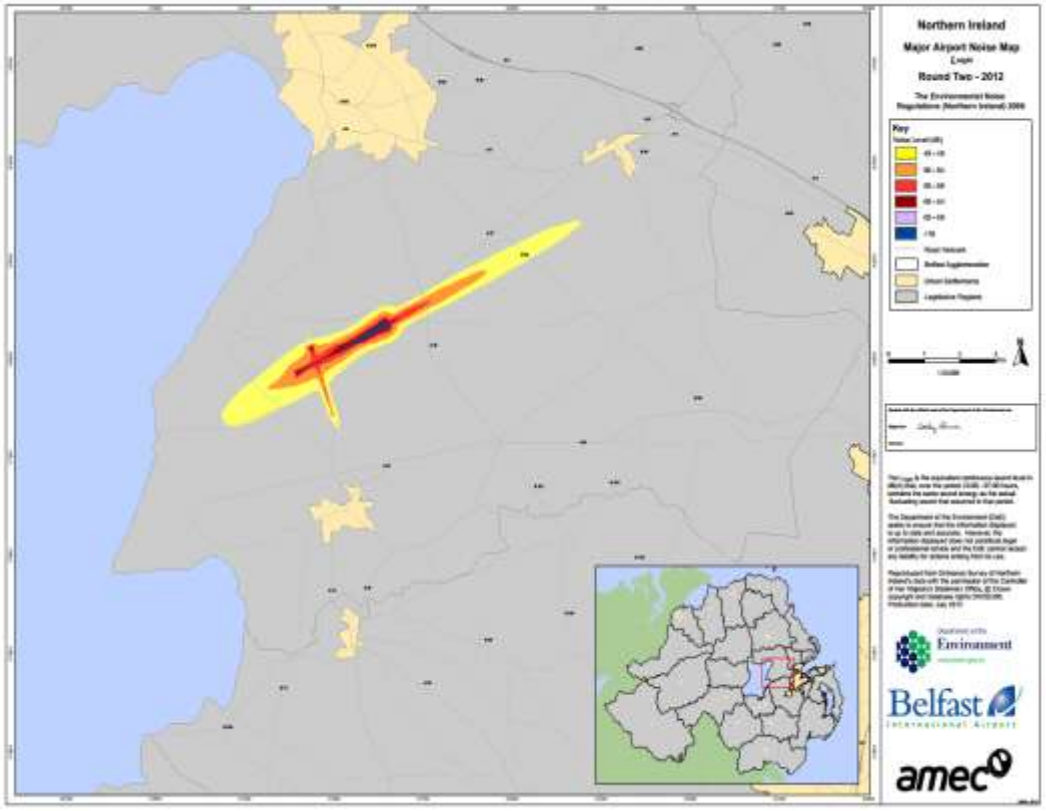
L_{day}



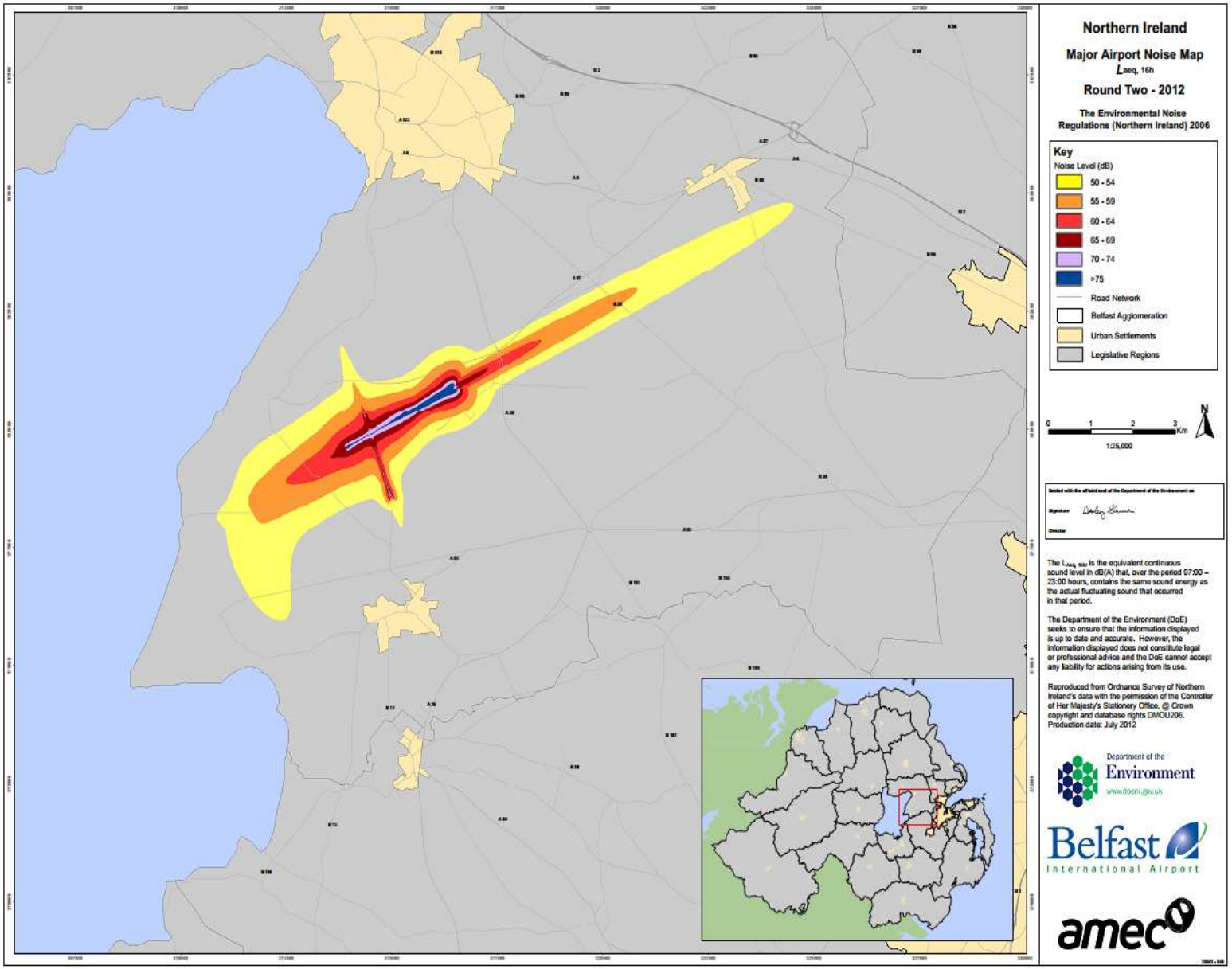
Levening



Lnight



LA_{eq16hr}


Northern Ireland
Major Airport Noise Map
Laeq, 16h
Round Two - 2012
The Environmental Noise Regulations (Northern Ireland) 2006
Key
Noise Level (dB)
50 - 54
55 - 59
60 - 64
65 - 69
70 - 74
>75
Road Network
Belfast Agglomeration
Urban Settlements
Legislative Regions
0 1 2 3 Km
1:25,000
N
The LAeq, 16h is the equivalent continuous sound level in dB(A) that, over the period 07:00 – 23:00 hours, contains the same sound energy as the actual fluctuating sound that occurred in that period.
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Belfast International Airport
amec

Appendix 7 - Glossary of Terms

Term	Definition
Action Plan	Plans designed to manage noise issues and effects, including noise reduction if necessary. An Action Plan must include: ▪ A description of the agglomeration, major roads, major railways and major airports and other noise sources taken into account; ▪ The authority responsible; ▪ The legal context; ▪ Any limit values in place in accordance with Article 5 of the END; ▪ A summary of the results of the noise mapping; ▪ An evaluation of the estimated number of people exposed to noise, identification of problems and situations to be improved; ▪ A record of the public consultations organised in accordance with Article 8(7) of the END; ▪ Any noise-reduction measures already in force and any projects in preparation; ▪ Actions which the Competent Authorities intend to take in the next five years, including any measures to preserve Quiet Areas; ▪ Long-term strategy; ▪ Financial information (if available): budgets, cost-effectiveness assessment, cost-benefit assessment; and ▪ Provisions envisaged for evaluating the implementation and the results of the Action Plan. The actions which the Competent Authorities intend to take in the fields within their competence may include: ▪ Transport planning; ▪ Land-use planning; ▪ Technical measures at noise sources; ▪ Selection of quieter aircraft; ▪ Reduction of sound transmission; and ▪ Regulatory or economic measures or incentives. Each Action Plan should contain estimates in terms of the reduction of the number of people affected (annoyed, sleep disturbed, or other)
Agglomeration (first round)	A part of a territory, delimited by the Member State, having a population in excess of 250,000 persons and a population density such that the Member State considers it to be an urbanised area. The population density must exceed 500 persons per square kilometre.
Agglomeration (subsequent rounds)	A part of a territory, delimited by the Member State, having a population in excess of 100,000 persons and a population density such that the Member State considers it to be an urbanised area. The population density must exceed 500 persons per square kilometre.

Term	Definition
Attributable Data	A trait, quality, or property describing a geographical feature, e.g. vehicle flow or building height
Attributing (Data)	The linking of attribute data to spatial geometric data
BIA	Belfast International Airport
Competent Authority	The Competent Authorities will be responsible for aspects such as making and, where relevant, approving noise maps and Action Plans for agglomerations, major roads, major railways and major airports. They will also be responsible for delimiting Quiet Areas within agglomerations and open countryside and collecting noise maps and Action Plans. The Competent Authorities are as follows: ▪ Agglomerations – Department of the Environment ▪ Major roads – Department for Regional Development ▪ Major railways – Northern Ireland Transport Holding Company ▪ Major airports – Airport Operator
Data	Data comprises information required to generate the outputs specified, and the results specified
Decibel (dB)	The human ear can detect sound waves exerting pressures ranging from 20 micropascals up to 100,000,000 micropascals. Because these numbers are so unwieldy a logarithmic scale (the decibel scale) is used. The typical threshold of human hearing, 20 micropascals, is set as 0 decibels. It follows from this that the loudest sounds we can hear before suffering immediate hearing damage (around 100,000,000 micropascals) correspond to around 130-140 decibels. Typically, an increase/decrease of ten decibels is perceived by listeners as a doubling/halving in loudness (Doubling/halving the sound power of the source, however, only results in an increase/decrease of three decibels. The response of the human ear is nonlinear in energy terms.)
dB(A)	The human ear is most sensitive to sound waves with frequencies of a few thousand Hz. A sound wave with the same sound pressure amplitude outside this range will sound noticeably quieter than one in this range with the same sound pressure amplitude. Describing the loudness of a sound purely in terms of decibels based on sound pressure can therefore be misleading. When measuring sound, it is therefore standard practice to break it down into frequency bands and apply a correction to each band depending on the sensitivity of the typical human ear to the frequencies in that band, before combining them into an overall ”A-weighted” sound pressure level. A-weighted decibels are a good indication of perceived loudness for broadband noise (noise covering a broad range of frequencies), but they sometimes underestimate the effect of low frequency noise.
END	Directive 2002/49/EC of the European Parliament and Council relating to the assessment and management of environmental noise, otherwise known as the Environmental Noise Directive.
FDMI	Final Modified Data Inputs

Term	Definition
INM	Integrated Noise Model
ITool	Interactive programme that allows the user to input differing noise levels to identify the spatial extent, exact location, number of individuals and percentage of population exposed to that particular level
$LA_{eq,T}$	The A-weighted equivalent continuous sound pressure level which is a notional continuous level that, at a given position and over the defined time period, T, contains the same sound energy as the actual fluctuating sound that occurred at the given position over the same time period, T.
L_{day}	The LAeq over the period 0700 – 1900, local time (for strategic noise mapping this is an annual average).
$L_{evening}$	The LAeq over the period 1900 – 2300, local time (for strategic noise mapping this is an annual average).
L_{night}	The LAeq over the period 2300 – 0700, local time (for strategic noise mapping this is an annual average).
LA_{eq16h}	The LAeq over the period 0700 – 2300, local time (for strategic noise mapping this is an annual average).
L_{den}	The LAeq over the period 0000 – 2400, but with the evening values (1900 – 2300) weighted by the addition of 5 dB(A), and the night values (2300 – 0700) weighted by the addition of 10 dB(A).
Limit Values	Member States are required to inform the Commission of existing limit values or limit values in preparation (Article 5, paragraph 4 of the END).
Major Airport	The END defines a major airport as: a civil airport, designated by the Member State, which has more than 50,000 movements per year (a movement being a take-off or landing), excluding those purely for training purposes on light aircraft (Article 3(p)). In the UK a light aircraft is generally considered to be one with a maximum take-off weight authorised (MTWA) of less than 5,700 kilogrammes. In the UK a civil airport is one operated by civil authorities and so excludes those operated by the military. In any event, military activity in a military area is excluded from the END (Article 2, paragraph 2).
Major Railway	The END defines a major railway as: a railway designated by the Member State which has more than 30,000 train passages per year (approximately 80 train passages per day) (Article 3(o)). However, for the first round of mapping in 2007 the qualifying figure was 60,000 train passages per annum (Article 7, paragraph 1).
Major Road	The END defines a major road as: a regional, national or international road, designated by the Member State, which has more than 3 million vehicle passages per annum (approximately 8,200 vehicles per day) (Article 3(n)). However, for the first round of mapping in 2007 the qualifying figure was 6 million vehicle passages per annum
NIENDSG	Northern Ireland Environmental Noise Directive Steering Group

Term	Definition
Noise Bands	Areas lying between contours of the following levels (dB): L_{den} <55, 55 – 59, 60 – 64, 65 – 69, 70 – 74, >74 L_d <55, 55 – 59, 60 – 64, 65 – 69, 70 – 74, >74 L_e <55, 55 – 59, 60 – 64, 65 – 69, 70 – 74, >74 L_n <50, 50 – 54, 55 – 59, 60 – 64, 65 – 69, >69 Notes: 1) It is recommended that class boundaries be at .00, e.g. 55 to 59 is actually 55.00 to 59.99. 2) The assessment and reporting of the 45 – 49 dB band for Lnight is optional under the Regulations.
Noise Mapping	The presentation of data on an existing or predicted noise situation in terms of a noise indicator.
Noise Mapping (Input) Data	Two broad categories: (1) Spatial (e.g. road centre lines, building outlines). (2) Attribute (e.g. vehicle flow, building height – assigned to specific spatial data)
Noise Mapping Software	Computer program that calculates required noise levels based on relevant input data
Noise Model	All the input data collated and held within a computer program to enable noise levels to be calculated.
Noise Model File	The (proprietary software specific) project file(s) comprising the noise model
Output Data	The noise outputs generated by the noise model
Processing Data	Any form of manipulation, correction, adjustment factoring, correcting, or other adjustment of data to make it fit for purpose. (Includes operations sometimes referred to as 'cleaning' of data)
Quiet Area	Article 3(l) and 3(m) of the END define a 'quiet area in an agglomeration' as an area, delimited by the Competent Authority, for instance which is not exposed to a value of Lden or of another appropriate noise indicator greater than a certain value set by the Member State, from any noise source.
Round One	The noise mapping and action planning process is to be taken forward on a five-year rolling programme. The first round of mapping and action planning applies to the largest of the agglomerations (including the industries and ports within them), the busiest major roads and railways and all major airports. The thresholds determining which agglomerations, major roads, major railways and major airports should be mapped during the first round are set out in Article 7 paragraph 1, and are as follows: ▪ Agglomerations - only those which have a population in excess of 250,000 persons; ▪ Major roads - only those which more than 6 million vehicle passages a year; ▪ Major railways - only those that have more than 60,000 train passages per year; ▪ All airports within round one agglomerations and major airports.

Term	Definition
Round Two	▪ Agglomerations - only those which have a population in excess of 100,000 persons; ▪ Major roads - only those which more than 3 million vehicle passages a year; ▪ Major railways - only those that have more than 30,000 train passages per year; ▪ All Airports within round one, and any which have since expanded and meet the criteria of the END.
Spatial (Input) Data	Information about the location, shape, and relationships among geographic features, for example road centre lines and buildings.

Appendix 8 - Legislation

List of Current Policy together with a list of the framework for Environmental Noise[1]

- Air Navigation Order 2005
- Air Navigation (Environmental Standards) Order 2002
- The Airports (NI) Order 1994
- Land Acquisition and Compensation (Northern Ireland) Order 1973
- Pollution Control and Local Government (NI) Order 1978
- Noise Insulation Regulations (NI) 1995
- Aeroplane Noise Regulations 1999
- Aeroplane Noise (Amendment) Regulations 1999
- Air Navigation (General) Regulations 1999
- The Aerodromes (Noise Restrictions) (Rules and Procedures) Regulations 2003
- The Environmental Assessment of Plans and Programmes Regulations (NI) 2004
- The Civil aviation Act 2006
- Environmental Noise Regulations (Northern Ireland) 2006.
- The Clean Neighbourhoods and Environment Act 2012

Relevant Policy and Guidance Publications.

- Control of Noise (Code of Practice for Construction and Open Sites) Order (NI) 2002
- Land Compensation - Your Rights Explained DOE (NI)
- BS 5228 Noise & Vibration Control on Construction and Open Sites
- Part 1 1997 - Code of Practice for basic info and procedures for noise & vibration control
- Part 2 1997 - Guide to noise & vibration control legislation for construction and demolition including road construction and maintenance
- BS 5228 Part 4 1992 - Code of Practice for noise and vibration from piling operations

- BS 6472 1992 - Guide to Evaluation of human exposure to vibration in buildings (1Hz to 80 Hz)
- BS 7385 Part 1 1990 – Evaluation and Measurement for Vibration in Buildings – Guide for measurement and evaluation of their effects on buildings
- BS 7385 Part 2 1993 - Evaluation and Measurement for Vibration in buildings - Guide to damage levels from ground borne vibration
- BS 7445 Part 1: 1999 - Description and measurement of environmental noise
- BS 7445 Part 2: 1999 - Guide to the acquisition of data pertinent to land use
- BS 7445 Part 3: 1999 - Guide to the application of noise limits.
- BS 8233 1999 - Sound Insulation and noise reduction for buildings – Code of Practice
- DEFRA - Low Frequency Noise 2002
- The Noise Insulation (Railways and other Guided Transport Systems) Regulations 1996 DEFRA – A Review of Published Research on High Freq. Noise and Its Effects – May 200
- Development Control Advice Note 10 (Revised) Environmental Impact Assessment (August 1999)
- Transport Assessment; Guidelines for Development Proposals in N. Ireland Nov 06 DRD/DOE

[1] Taken from Appendix D Noise Mapping and Action Planning Technical Guidance, Noise from Airports, published by the Department of the Environment

Appendix 9 – Annex V of END as it Applies to Airports

Annex V from the END, as it applies to airports, states that an Action Plan must at least include the following elements:

- A description of the airport and any other noise sources taken into account
- The authority responsible
- The legal context
- Limit values in place
- A summary of the results of the noise mapping
- An estimate of the number of people exposed to noise and identify problems and situations that need to be improved
- A record of the public consultations organised in accordance with Article 8(7) of the END
- Any noise reduction measures already in force and projects in preparation
- Actions which the Competent Authorities intend to take in the next five years, including any measures to preserve quiet areas
- Long-term strategy
- Financial information (if available): budgets, cost-effectiveness assessment, cost-benefit assessment
- Provisions envisaged for evaluating the implementation and the results of the action plan

The Action Plan should also contain estimates of the number of people affected (in terms of annoyance, disturbed sleep, etc.).