Dublin Agglomeration
Draft Action Plan Relating To The Assessment & Management of Environmental Noise

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South Dublin County Council

PUBLIC CONSULTATION DOCUMENT
For Comments\Observations
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Ta leagan Gaeilge den chaipéis seo ar fáil.

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Background Information

1.1 Introduction

1.1.1 As required by the EU Directive 2002/49/EC relating to The Assessment and Management of Environmental Noise, (known as the 'END' Directive) which was transposed into Irish law by the Environmental Noise Regulations, SI number 140 of 2006, this Draft Action Plan is aimed at managing 'Environmental Noise'. It is prepared jointly by all of the four local authorities in the Dublin Agglomeration- Dublin City Council, Fingal County Council, South Dublin County Council and Dún Laoghaire-Rathdown County Council, being the designated authorities under article 7 of the Environmental Noise Regulations 2006 to do so. It is proposed to exclude noise from domestic activities, noise created by neighbours, noise at work places or noise inside means of transport or due to military activities in military areas. Most of these issues can be dealt with under the Environmental Protection Agency Act 1992 and Health & Safety legislation.

1.1.2 Whilst the noise maps and the Environmental Noise Regulations are aimed at developing strategic policy, it is acknowledged that when most people complain about noise, it relates more to local issues such as neighbour, entertainment and construction noises. However, it is envisaged that the noise action plan should solely concentrate on strategic issues identified by the noise mapping as systems are already in place to deal with noise nuisances, including neighbour, entertainment and construction noises.

1.2 Noise Policy – Purpose and Scope of the 'END' Directive

1.2.1 Under the Environmental Noise Regulations and on foot of Directive 2002/49/EC, the four local authorities, within the agglomeration of Dublin (Dublin City Council, Fingal, Dún Laoghaire-Rathdown and South Dublin County Councils), are required to produce Noise Maps and Action Plans for noise emanating from Major Industry, Roads including Major Roads, Rail including Major Rail and Airports including Major Airports.

1.2.2 This Directive was implemented on foot of an EU Green Paper on '*Future Noise Policy'*, which highlighted the need for a high level of health and environmental protection against noise. In the Green Paper, the Commission addressed noise in the environment as one of the main environmental problems in Europe.

1.3 The aims of Directive 2002/49/EC are: -

- *To monitor environmental noise problems by requiring competent authorities in Member States to draw up "strategic noise maps" for major roads, railways, airports and agglomerations, using harmonised noise indicators Lden (day-evening-night average sound level) and Lnight (night time average sound level). These maps are to be used to assess the number of people annoyed and sleep-disturbed respectively throughout each member state in the European Union.*

- *To inform and consult the public about noise exposure, its effects, and the measures to be considered to address noise problems.*

- *To address local noise issues by requiring competent authorities to draw up action plans to reduce noise where necessary and maintain the environmental acoustic quality where it is good. The directive does not set any limit value, nor does it prescribe the measures to be used in the action plans, which remain at the discretion of the competent authorities*.

- *To develop a long-term EU strategy, which includes objectives to reduce the number of people affected by noise in the longer term, and provides a framework for developing existing Community policy on noise reduction from source.*

1.3.1 The Directive is also aimed at providing a basis for developing EU wide measures to reduce noise emitted by the major sources, in particular road and rail vehicles and infrastructure, aircraft, outdoor and industrial equipment. The Directive applies to environmental noise to which humans are exposed, in particular in built-up areas, in public parks or other quiet areas in an agglomeration, in quiet areas in open country, near schools, hospitals and other noise sensitive buildings and areas. It does not apply to noise that is caused by the exposed person himself\herself, noise from domestic activities, noise created by neighbours, noise at work places or noise inside means of transport or due to military activities in military areas. The maps are Strategic Noise Maps, and should not be used for the assessment of local noise nuisances.

1.4 **Roles and Responsibilities**

1.4.1 Under the Environmental Noise Regulations 2006 the 4 Local Authorities within the 'Agglomeration of Dublin' are designated as the noise-mapping and action planning bodies for the purpose of making and approving strategic noise maps and action plans. They have been designated as the noise mapping bodies and action planning authorities for the following categories within their areas: -

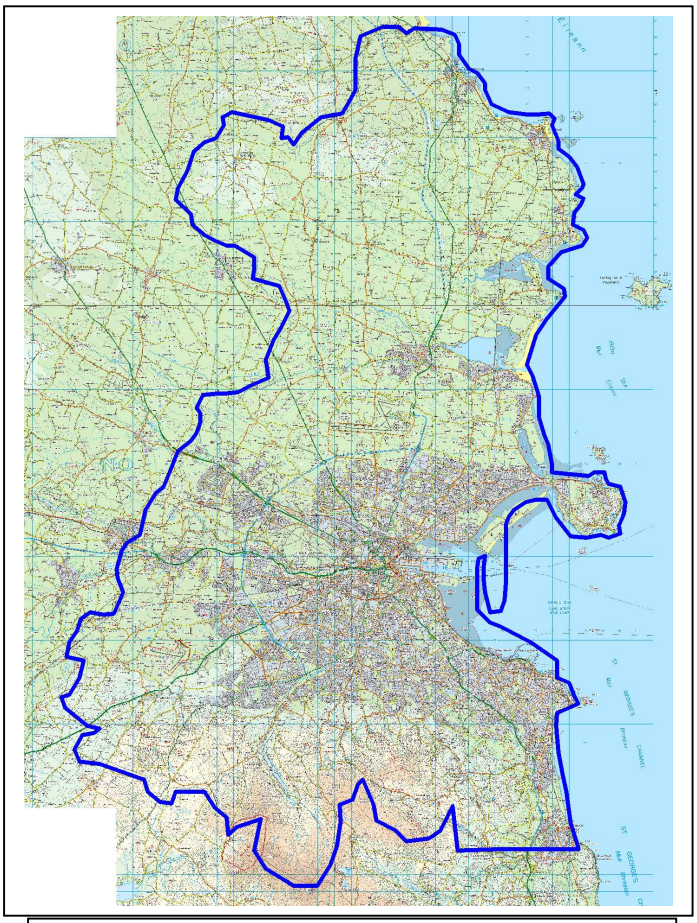
- All Roads and Major Roads,
- All Rail and Major Rail,
- Major Industrial Processes,
- All Airports and Major Airport.

1.4.2 No later than 18 July 2008, Draft Action Plans are required to be made, which are designed to manage, within the agglomeration, noise issues and effects, including noise reduction if necessary. The plans shall also aim to protect quiet areas against an increase in noise. Before producing and implementing Action Plans the Local Authorities must consult with the Environmental Protection Agency and the noise-mapping body for the noise-map involved, i.e. NRA, Iarnród Eireann, IPPC licensed Plants, Dublin Airport Authority. The Local Authorities are also responsible for consulting with members of the public and are required under the Directive to demonstrate how they have done so.

1.4.3 Under the Environmental Protection Agency Act, 1992, the local authorities are empowered to take action in relation to any premises process or works or any person, in order to prevent or abate a noise nuisance.

1.5 ‘ Noise Map’ Area

1.5.1 Noise Maps and Action Plans have to be developed for agglomerations with more than 250 000 inhabitants, but also for places near major roads, which have more than six million vehicle passages a year, major railways which have more than 60,000 train passages per year and major airports which have more than 50,000 movements per year. For the Dublin Agglomeration distinct noise maps have been produced for all roads, and all railway lines including the Luas for each individual local authority in the Agglomeration. These maps cover the long term average periods for daytime (Lday), night time (Lnight time) and 24 hours (Lden). Noise maps were also produced for Dublin Airport in the Fingal County Council area only. As a sound source, it has no strategic impact in the other local authority areas. Noise maps were not produced for Weston airport, which falls within the Dublin Agglomeration but is not defined as a major airport. Assessments carried out indicated that the population exposures were below the required reporting thresholds. No maps were produced for Industrial Plant activity either, as an assessment of individual plants located in the more heavily populated areas of the Agglomeration indicated that sound emissions at the boundary of the sites were below the reporting threshold required in the directive. This is not surprising as these plants are controlled by IPPC licences which already include controls in relation to sound emissions.



DUBLIN AGGLOMERATION

2 Preparation of Strategic Noise Maps

2.1 Introduction

2.1.1 Noise mapping entails the calculation or measurement of sound levels at a number of receiver\receptor points. These values are then used to draw colour contour 'noise maps', which visually represent the levels of 'noise' throughout the area being mapped. The 'END' indicates a preference for calculation rather than measurement for the production of 'noise maps'

2.1.2 Noise maps are developed by inputting data into 'noise mapping' software. This data includes long term average traffic volumes, the types of vehicles on the road, traffic speeds, road widths, type of road surface, road incline, road barriers, buildings, walls, ground contours and land use data. Similar data is inputted for the railway calculations, except vehicle and road information is substituted with rail track and train information. All this data is used in the calculations and is known as the 'noise model'. It forms a '3 D' representation of the Dublin Agglomeration. Across this noise model, sound levels are calculated using the inputted data, every 10 metres and every 2.5 metres around the façade of each individual building. There are no actual sound level measurements included in the model. Computation time for the model is extensive. For example, for the Dublin City Council area alone, it would have taken one computer approximately six months continuous calculation. However, when spread over a network the final calculations took six weeks. Once the calculations are complete, the values at every 10 metre spacing and around each building facade are designated individual colours, which are then displayed on a map. This enables large amounts of data to be presented visually in a relatively simple and understandable manner.

2.1.3 The 'Noise Maps' show colour coded areas in the Dublin Agglomeration based on sound levels, in 5 bands. These increment in 5 decibels. The Night time band starts at 50 decibels and the 24 Hour band starts at 55 decibels. The EU Directive and the Irish regulations do not give an indication as to what level of 'noise' is acceptable. This is left to each member state. At this point in time, Ireland does not have any statutory limit values, as is the case for air pollution. In the absence of guidance, one could assume that the closer the calculated noise level is to the highest band of noise set out in the Directive the more undesirable it is. Conversely, the closer the calculated noise is to the lowest band of sound set out in the Directive the more desirable it is.

2.1.4 The Noise maps for the whole Dublin Agglomeration can be found in Appendix 11-17 of this report. More detailed noise maps and reports for the 4 Local Authorities in the Agglomeration can be found at:

- Dublin City Council's maps are available to reference at any Dublin City Council library, at www.dublincity.ie or e-mail noisemaps@dublincity.ie
- Fingal County Council's maps are available at: www.fingalcoco.ie or e-mail noisemaps@fingalcoco.ie
- South County Dublin County Council's maps are available at www.southdublin.ie or e-mail noisemaps@sdublincoco.ie
- Dún Laoghaire – Rathdown County Council's maps area available at www.dlrcoco.ie or e-mail noisemaps@dlrcoco.ie

2.2 Objectives of Noise Mapping

2.2.1 The objectives of Noise Mapping are as follows: -

- To Comply with the requirements of EU Directive 2002/49/EC and S.I. No. 140 of 2006
- To identify and quantify the scale of the noise problem in the Dublin Agglomeration by providing information on noise levels.
- To provide information to the public on the level of noise throughout the Agglomeration and the location of 'Hot Spots'.
- To assist the four local authorities in the Dublin Agglomeration in the process of setting realistic targets for noise reduction if required.
- To provide a tool, permitting the more effective use of planning controls to reduce noise from new noise sources and to identify and protect and create areas of low sound levels.
- To be a tool, whereby action plans to reduce noise from existing sources can be developed, analysed and costed.
- To be a means of monitoring the effectiveness of planning controls and action plans for reducing noise.
- To be capable of monitoring trends in environmental noise.
- To provide a platform for further research into the effects of environmental noise in the Dublin Agglomeration.

3 Analysis of Strategic Noise Maps

3.1 Sound Assessment and Sound Indicators.

3.1.1 The results of a sound assessment can be expressed in different ways depending on the method of assessment. Each method is represented by its own 'sound indicator'. So for example an average measurement over a 24 hour period is called a 24 LEQ (pronounced L, E, Q), whilst measurements of sound from traffic over an 18hr period is designated by an L10 18 Hour value. Other common indicators are Lmax – maximum sound level over a specific period; SEL- sound exposure level, and L95 – the sound level exceeded for 95% of the measurement period. However, whatever the method of assessment, the unit of measurement for all sound measurement is the decibel (dB).

3.1.2 Under Directive 2002/49/EC relating to the assessment and management of environmental noise the EU has introduced two new indicators. The first is called the LDEN- standing for the long term average sound level over the day, evening and night periods. With this indicator a 5 decibel weighting is added to the evening period and a 10 decibel weighting added to the night time period. The second new indicator is called the Lnight, which equates to a one year average sound levels over an 8 hour night time period between 11pm and 7am.

3.1.3 There are no limits on permissible or impermissible sound exposure levels set down in Irish Statute law, in relation to environmental noise outside of the work place. However there are standards used by other countries, which are used here, such as the *Calculation of Road Traffic Noise* (Welsh Office). Sometimes references are made in relation to World Health Organisation Guidance for the protection of human health against environmental noise exposure. Industrial Pollution, Prevention and Control licenses (IPPC licenses) issued by the Environmental Protection Agency normally contain specific limits in relation to the sound levels produced by the industrial process at the boundary of the industrial site.

3.2 Public Perception

3.2.1 Most people are affected to some extent by noise as they go about their daily routine. The type, the level, and time of the sound occurrence, plays a major role in how people perceive the impact of sound. At its simplest, noise is unwanted sound. So for example, 30,000 people could attend a rock concert and enjoy the music, while residents in the vicinity may consider the music 'noise' as it may occur at, what they may consider, an unreasonable time, at an inappropriate venue or the music maybe of such a volume as to impinge on their enjoyment of their favourite TV programme or even sleep. So the old adage of 'One mans music is another mans noise' is still valid. People can become accustom to noise from certain sources and blot it out. However this is becoming increasingly more difficult as sound levels all around us are increasing all the time. Noise can disrupt people's conversations, interfere with rest and sleep thus increasing stress levels, disturb concentration and impinge on all kinds of daily activities.

3.2.2 While the Noise Maps may indicate desirable\ undesirable levels in particular areas, there is a possibility that people's perceptions may be different. Some people may like the 'buzz' of a noisy, energetic city. Others can become accustom to certain levels of noise, which may then become the accepted 'norm'. It is therefore important that all the public has the opportunity to express their views and that actions are not based solely on what a computer noise model has produced.

3.3 Strategic Noise Maps – Report and Statistics for the 4 Local Authorities

3.3.1 **The full details of Dublin City Council's noise maps are produced in the report – *'Noise Maps, Reports and Statistics, Dublin City Council Noise Mapping Project, Roads and Traffic Department, November 2007'*. It can be found at www.dublincity.ie or any Dublin City Council library.** The most current details of noise complaints and their source and investigation can be found in the *'Air Quality Monitoring & Noise Control Unit's Annual Report **2006'*.**

3.3.2 In summary, the statistics from noise modelling for the Dublin City Council area indicate that: -

- Railway noise does not have a major impact on overall noise levels.
- Traffic noise is the dominant noise source.
- Just over 66% of citizens are exposed to 24-hour (Lden) sound levels from traffic below 65 decibels
- The 'All Roads' category has a greater impact on people than the 'Major Road' category.
- 24 hour (Lden) sound levels from traffic do not drop below 55 decibels.
- 58% of Citizens are being expose to Night time levels from traffic above 55 decibels.
- Approximately 7,600 people are being exposed to average 24hour(Lden) sound levels equal to or greater than 75 decibels

3.3.3 The complete table of population exposure to sound from traffic and rail in the Dublin City Council area can be found in Appendix 6 - 7 of this report.

3.4 **The full details of Fingal County Council's noise maps are displayed at www.fingalcoco.ie**

3.4.1 In summary, the statistics from noise modelling for the Fingal County Council area indicate that: -

- Railway noise does not have a major impact on overall noise levels.
- Traffic noise is the dominant noise source.
- Almost 81% of citizens are exposed to 24-hour (Lden) sound levels from traffic below 65 decibels
- The 'All Roads' category has a greater impact on more people that the 'Major Road' category.
- 20% of people in Fingal County Council live in areas below 55 decibels 24 hour (Lden).
- 23% of citizens are being expose to Night time levels from traffic above 55 decibels.
- Approximately 2,291 people are being exposed to average 24hour sound levels equal to or greater than 75 decibels

3.4.2 The complete table of population exposure to sound from traffic, aircraft and rail in Fingal County Council area can be found in Appendix 8,11 & 12 of this report.

3.5 **The full details of South Dublin County Council's noise maps are displayed at www.southdublin.ie**

3.5.1 In summary, the statistics from noise modelling for South Dublin County Council indicate that: -

- Railway noise does not have a major impact on overall noise levels.
- Traffic noise is the dominant noise source.
- Almost 70% of citizens are exposed to 24-hour (Lden) sound levels from traffic below 65 decibels
- The 'All Roads' category has a greater impact on more people that the 'Major Road' category.
- 7.2% of people in South Dublin County Council live in areas below 55 decibels 24 hour (Lden).
- 43% of citizens are being expose to Night time levels from traffic above 55 decibels.
- Approximately 8,000 people are being exposed to average 24hour sound levels equal to or greater than 75 decibels

3.5.2 The complete table of population exposure to sound from traffic and rail in South Dublin County Council area can be found in Appendix 6 & 10 of this report.

3.6 **The full details of Dún Laoghaire-Rathdown County Council's noise maps are displayed at www.dlrcoco.ie**

3.6.1 In summary, the statistics from noise modelling for the Dún Laoghaire-Rathdown County Council area indicate that: -

- Railway noise does not have a major impact on overall noise levels.
- Traffic noise is the dominant noise source.
- Almost 73% of citizens are exposed to 24-hour (Lden) sound levels from traffic below 65 decibels
- The 'All Roads' category has a greater impact on more people that the 'Major Road' category.
- 4% of people in Dún Laoghaire-Rathdown County Council live in areas below 55 decibels 24 hour (Lden).
- 31% of citizens are being expose to Night time levels from traffic above 55 decibels.
- Approximately 6,100 people are being exposed to average 24hour sound levels equal to or greater than 75 decibels

3.6.2 The complete table of population exposure to sound from traffic and rail in the Dún Laoghaire-Rathdown County Council area can be found in Appendix 6 & 9 of this report.

3.7 **The population exposure details for the Dublin Agglomeration can be found in Appendix 4 –10 of this report. The 24Hr Lden and the 8Hr Lnight Noise Maps can be found in Appendix 11 - 17.**

3.7.1 In summary, the statistics from noise modelling for the Dublin Agglomeration indicate that: -

- Railway noise does not have a major impact on overall noise levels.
- Traffic noise is the dominant noise source.
- Just over 71% of citizens are exposed to 24-hour (Lden) sound levels from traffic below 65 decibels
- The 'All Roads' category has a greater impact on people than the 'Major Road' category.
- 6% of the population are exposed to 24 hour (Lden) sound levels from traffic below 55 decibels.
- 44% of Citizens are being expose to Night time levels from traffic above 55 decibels.
- Approximately 24,000 (2%) people are being exposed to average 24hour (Lden) sound levels equal to or greater than 75 decibels

3.7.2 The complete table of population exposure to sound from traffic, aircraft and rail in the Dublin Agglomeration can be found in Appendix 4 -12 of this report.

3.8 Limitations of the maps/results

3.8.1 As stated, noise maps are derived from computer modelling. The computation method of the traffic model used for the Dublin City Council area was based on the British method for the calculation of road traffic noise. This method calculates the sound for traffic emissions over an 18-hour period from 06.00Hrs to 24.00Hrs. The method has been widely used and accepted in most of the Environmental Impact Assessments for major infrastructural developments within this state.

3.8.2 However with the introduction of two new EU sound indicators - LDEN and Lnight, which cover a full 24 hour and 8 hour night time periods respectively, a conversion had to be applied to convert the original 18 hour sound values to the new 24 hour and night time periods.

3.8.3 In order to assess whether this conversion is robust, a limited long term measurement programme at one location has been under taken. Measurements from this site over a 7 month monitoring period indicate the following differences between the measured and the modelled values.

	Day dB(A)	**Night dB(A)**	**Lden dB(A)**
Measurement	56.3	49.6	58.6
Modelled	54.5	51	58.6
Difference	1.8	-1.4	0

3.8.4 The model under estimates the daytime value by 1.8dB, and over estimates the night time value by 1.4dB. The Lden was identical for both measurement and modelled results.

3.8.5 Whilst the computer modelling may identify quiet areas or areas with undesirable high sound levels, this in itself may not indicate that priority action is required. As information is not readily available in relation to noise mitigation measures at a local level, it maybe necessary to carry out surveys in order to confirm what action is necessary.

4 Preparation of an Action Plan on the Management of Environmental Noise

4.1 Introduction

4.1.1 In general low environmental sound levels contribute significantly to the good health and quality of life for the population in the Dublin Agglomeration. Co-ordinated and sustained effort is required to protect those areas that have low environmental sound levels and to improve areas that are deemed to have undesirable high levels. It is more cost effective to adopt an approach of prevention through good management and planning rather than having to retrofit existing situations to try and improve the quality of life for citizens. The use and enjoyment of many natural resources, such as our green spaces and sea frontage can be further enhanced through the preservation of low sound levels or the reduction in undesirably high levels, thus providing respite from the noisy 'hustle and bustle' often experienced in the busy urban environment.

4.2 Description of Action Planning Area

4.2.1 The Dublin Agglomeration is made up of the county borough of Dublin, the administrative county of Dún Laoghaire - Rathdown other than those areas excluded in the First Schedule to the Air Pollution Act 1987 (Marketing, Sale and Distribution of Fuels) Regulations 1998 (S.I. No. 118 of 1998), and the administrative counties of Fingal and South Dublin; In total it covers an area of approximately 924Km^2, with a population of 1,186,704. There is one major airport with over 215,000 movements per year and caters for 23 million passengers per year. 130 Kilometres of Rail track including the Luas with 80Km being designated Major Rail track. Approximately 4000Km of road was inputted into the models with 9.9% being designated as Major Roads i.e. carrying more than 16,438 vehicles per 24hours.

4.2.2 The following is the break down of the individual statistics within the four local authorities in the Agglomeration: -

- The Dublin City Council area covers an area of approximately 127Km^2 and is populated by 506,211 people. Within its boundaries there are just over 31Km of Irish Rail track and just under 13Km of Luas track. The entire rail track within the Dublin City Council area is designated as major rail. Approximately 1280Km of road was inputted into the noise model, 16% of which was designated as Major Road i.e. carrying more than 16,438 vehicles per 24 hours.
- The Fingal County Council area covers an area of approximately 450Km^2 and results from the 2006 Census confirm that the official population of Fingal County Council has grown dramatically to just under 240,000. Almost 44,000 more people live in Fingal County Council now than in 2002, a growth rate of 22.2% in just 4 years.

Fingal is officially Ireland's fastest growing county and the area of Dublin undergoing the greatest expansion comprising 5.6% of the national population. Within its boundaries there are just over 36Km of Irish Rail track with 6Km being designated as major rail. Approximately 1198 Km of roadway was inputted into the noise model comprising of 76 Km of Motorway, 219 Km of Regional Road and 903 Km of Local Road. Approximately 6% of road was inputted as major road into the computer model. There is also one Airport with 215,000 aircraft movements per year and which caters for 23 million passengers per year.

- The South Dublin County Council area covers an area 220Km^2. The 2006 Census shows a population of just under 247,000 – a rise of 3.4% in four years. Within its boundaries there are just over 19Km of Rail track with 8Km being designated as major rail. Approximately 846Km of roadway was inputted into the computer model. This included approximately 55Km of National roads, 103Km of Regional roads and 689Km of Local Roads. Approximately 9% of road was inputted as major road into the computer model.
- The Dún Laoghaire-Rathdown County Council area covers an area of 127Km^2 and results from the 2006 Census show a population just over 194,000, a rise of just 1.2% since the last census in 2002. Within its boundaries there are just over 27Km of Irish Rail track with 19Km being designated as major rail. There is approximately 26Km of National roads, 110Km of Regional roads and 535Km of Local Roads. Approximately 7% of road was inputted as major road into the computer model.

4.3 **Responsible Authorities for Implementing 'Noise' Legislation & Action Planning**

4.3.1 There are a number of bodies that implement 'noise legislation'. The Health and Safety Authority under the various pieces of health and safety legislation enforces noise in the work place legislation, which can impact on employees' health.

4.3.2 Noise in the environment that has the potential to cause nuisance\annoyance comes within the remit of Environmental Protection legislation. The Environmental Protection Agency Act 1992 states in section 108 'that where a noise gives reasonable cause for annoyance to a person in any premises in the neighbourhood or to any person lawfully using any public place, the Local Authorities or the Environmental Protection Agency or any such person can complain to the District Court, which may order measures to be taken to reduce, prevent or limit the noise. Section 107 of the same Act allows the Local Authorities to prevent or limit noise from any premises process or works by service of a notice on the offending party requiring appropriate mitigation measures to be taken. So in general, neighbour noise such as noisy neighbours, noise from road works, construction sites etc, places of entertainment such as pubs and bars can all be dealt with by the local authorities under section 108. Section 107 can be used by the local authorities to prevent or limit noise in anticipation of a noise nuisance arising.

4.3.3 'Environmental Noise' which is all around us can arise from many sources, such as traffic, industrial activities, rail, and aircraft. The Environmental Noise Directive, requires that action is taken by each member state, 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 acoustic quality where it is good. The relevant local authorities have been designate by the Environmental Noise Regulations, SI Regulations No. 140 of 2006, as the bodies charged with development and making of 'Noise Action Plans'.

4.3.4 Under the Environmental Noise Regulations, an Action Plan for the management of environmental noise in the Dublin agglomeration is required to be made by July 18th 2008. Dublin City Council, Fingal County Council, South Dublin County Council and Dún Laoghaire-Rathdown have been designated by Article 7 of the Environmental Noise Regulations 2008 as the action planning authorities for the purpose of making and approving action plans, in consultation with the Environmental Protection Agency and the relevant noise mapping bodies.

4.3.5 The Action Plan is to be prepared for a five year period and must be reviewed at a minimum, no later than five years after the date on which it was made. At this point in time, the Environmental Protection Agency has not established any noise limit values or noise criteria.

4.3.6 The local authorities in the Agglomeration have published individual reports on the impact of noise from traffic, rail, industry and aircraft, which includes colour coded noise maps. These maps show the various sound levels from rail and road for night time and 24 hours. (See Ch 3)

4.3.7 Some of the strategic issues that lead to increases or decreases in specific levels of environmental noise may lie beyond the direct control of the local authorities. This however should not be a deterrent to taking action, or being an advocate for change. Local authorities have a unique role in influencing other organisations and being a facilitator of change. Local authorities also have the potential to be models of best practice that in turn can influence other bodies.

4.4 **Public Consultation**

4.4.1 Apart from the requirement in the END and the Environmental Noise Regulations to consult with all stakeholders in relation to the development of the Action Plan, it is important to receive views from all quarters in relation to how noise is perceived, (See 3.2) Therefore all stakeholders, including the public, the RPA, Luas operators, NRA,

Dublin Airport Authority and Iarnród Eireann are encouraged to respond to this initial draft Action Plan.

4.4.2 Included in Appendix 2 is a list of organisations\bodies to which copies of this Draft Action Plan and the report on Noise Maps has been sent to for observation and comments.

4.5 **Region and Activities covered by Action Plan**

4.5.1 It is proposed that this draft action plan will encompass the Dublin Agglomeration

4.5.2 It is proposed to include actions to manage environmental noise, primarily from road traffic as this is the dominant sound source, but also from rail, industrial and airport sources, where required.

4.6 Identification of Areas to be subject to noise management activities

4.6.1 A decision/selection matrix is a chart that enables identification, analysis and rating of the strength of relationships between various sets of information. It enables a number of different factors to be examined and facilitates assessing the relative importance of each.

4.6.2 For this Action Plan it is proposed that the higher the number achieved in the decision matrix process, the higher the priority for action. A value of 17 or more is suggested as the point where priority action should be considered **either to reduce excessive sound levels or to preserve low sound levels where they exist**.

Decision Selection Criteria		Score Range Day	Score Range Night	SubTotal
Noise Band (dB(A))	<55	3	4	
	55 - 59	2	2	
	60-64	1	3	
	65-69	2	4	
	70-74	3	5	
	>=75	4	6	
Type of Location	City Centre	1	1	
	Commercial	1	2	
	Residential	2	3	
	Noise Sensitive Location	3	3	
	Quiet Area	3	3	
	Recreational open space	2	2	
Type of Noise	Road	2	3	
	Rail	1	2	
	Airport	3	4	

4.6.3 ***For example*** an address, which falls within the Sound level 65-69dB in the day (2) and 60-64dB at night (3), in a quiet area for day and night (3+3) and exposed to sound from traffic day and night, (2+3) will give an overall total of 16.

4.7 **Areas with undesirable high sound levels**

4.7.1 It is proposed that these areas are defined as areas with a nigh time level greater than 55 decibels and a daytime level greater than 70 decibels. Areas with undesirable high sound levels have been identified by the noise maps and can be seen in the various noise mapping reports for each of the local authorities, in the appendices.

4.8 **Areas with desirable low sound levels**

4.8.1 It is proposed that these areas are defined as areas with a night time level less than 50 decibels and\or a daytime level less than 55 decibels. Areas with desirable low sound levels have been identified by the noise maps and can be seen in the various noise mapping report s for each of the local authorities, in the appendices.

4.9 **Quiet Areas**

4.9.1 The Environmental Noise Regulations defines a 'Quiet Area' as *"quiet area in an agglomeration" means an area, delimited by an action planning authority following consultation with the Agency and approval by the Minister, where particular requirements on exposure to environmental noise shall apply;*

4.9.2 The 'Environmental Noise Directive' defines a Quiet Area as '*quiet area in an agglomeration' shall mean 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*;

4.9.3 A Quiet Area could be an area with low sound levels or an area, which should not be exposed to high sound levels due to the type of area or the nature of the activities that take place within it. An area may also be perceived to be quiet although the sound levels may be relatively high. For instance sound levels on St Stephens Green East exceed daytime levels of 70 decibels, while sound levels in the centre of the Park, range from 57–60 decibels. Whilst still relatively high, people use this park at lunch and other times to recreate and escape from the hustle and bustle of city life.

4.9.4 In this Action Plan it is proposed to use an absolute value of below 55 decibels daytime and below 45 decibels at night time as one criterion for defining a Quiet Area. A second criterion to cover what are perceived as Relatively Quiet Areas, is proposed. These types of locations will be defined by their proximity to areas of high sound levels,

and which provide a perceived area of tranquillity. Both quantitative and qualitative assessments will be used to identify these types of locations.

4.10 Noise Sensitive Locations

4.10.1 The Dublin Agglomeration is geographically located near the Wicklow Mountains and plains of Kildare and Meath. It borders the Irish Sea and a number of large rivers and canals such as the River Liffey, River Dodder, Royal and Grand canals flow through it.

4.10.2 The character of use of land\property within the four local authorities varies substantially throughout the Agglomeration - from a busy urban capital city to rural landscapes, to busy local towns, to fast developing suburban residential developments. Set out below is a break down of what are considered noise sensitive locations for each of the 4 local authorities in the agglomeration.

- For Dublin City Council area the recreational open spaces available to the City's population can be broken down into approximately 120 large open space\ recreational areas, approximately 260 playing fields, 230 play grounds, 180 public parks and gardens, 4 beaches, two nature reserves, one main river with associated boat clubs and river walks and two canals with associated green spaces and walks. There are 128 places of worship, 54 hospitals including nursing and convalescence homes, 346 educational institutions, and 396 childcare\crèche facilities.

  Using the decision\ selection matrix it has been found that 96 of the 1,279 areas identified as Noise sensitive, Quiet or Recreational Open Spaces have a score of at least 17. These include 32 Child Care facilities, 32 Educational establishments, 2 Nature Reserves, 7 Hospitals, 4 Nursing Homes, 12 Parks & Gardens and 7 places of Worship.

- For the Fingal Council area the recreational open spaces available to its citizens population can be broken down into approximately 4,500 acres of large open space\ recreational areas, 11 play grounds, 11 public parks and gardens, 30 miles of coastline with 20 popular bathing spots, 10 major heritage sites, two nature reserves, one major river and one canals with associated green spaces and walks. There are 74 places of worship, 23 hospitals including nursing and convalescence homes, 108 educational institutions, and 170 childcare\crèche facilities.

  Using the decision\ selection matrix it has been found that 98 of the 427 areas identified as Noise sensitive, Quiet or Recreational Open Spaces have a score of at least 17. These include 51 Child Care facilities, 40 Educational establishments, 1Nature Reserve, 4 Nursing Homes, 2 Parks & Gardens and 3 Places of Worship.

- For the South Dublin County Council area the recreational open spaces available to its citizens can be broken down into approximately 4,000 acres of Public Open Space, including five regional parks, 50 neighbourhood parks, 10 play grounds with public access and 120 playing fields. There are five rivers with associated parklands and walks, one of which is a proposed Natural Heritage Area, and one canal with associated green spaces and walks which is also a proposed Natural Heritage Area. There is one tourist caravan park. There are 69 places of worship, 123 educational institutions and 251 childcare/crèche facilities.

  Using the decision\ selection matrix it has been found that 329 of the 748 areas identified as Noise sensitive, Quiet or Recreational Open Spaces have a score of at least 17. These include 127 Parks and Gardens, 56 Child Care facilities, 106 Educational establishments, 6Hospitals, and 34 places of Worship.

- For the Dún Laoghaire-Rathdown County Council area the recreational open spaces available to it's citizens can be broken down into approximately 1,717 large open space\ recreational areas\public parks, approximately 86 playing fields, 13 play grounds, 7 beaches, 5 rivers with associated river walks, 4 harbours, 1 marina with associated boat/yacht clubs. There are 87 places of worship, 5 public and 3 private hospitals, 11 health centres, 104 educational institutions, 186 nursing homes and 74 childcare\crèche facilities.

  Using the decision\ selection matrix it has been found that 861 of the 2,303 areas identified as Noise sensitive, Quiet or Recreational Open Spaces have a score of at least 17. These include 25 Child Care facilities, 16 Educational establishments, 1Hospitals, 5 Nursing Homes, 797 Parks & Green Areas, 14 places of Worship, and 3 Health Centres

4.11 **Residential Areas**

For each of the noise mapping bodies it is possible to identify the number of residential properties exposed to the various bans of sound levels outlined in the Environmental noise Regulations 2006. Whilst not defined as noise sensitive locations, residential properties are ranked just 1 point below noise sensitive locations in the decision matrix. Therefore it is essential to now the sound exposure level at each property. Set out below are the individual tables showing this data for each of the local authorities in the agglomeration.

4.11.1 For the Dublin City Council area there are approximately 228,100 residential addresses. The following is the percentage breakdown of their exposure to the various bands of 'noise' from traffic, as this is the dominant sound source.

Decibels dB(A)	**Residential Dwellings Day (7am-7pm) %**	**Residential Dwellings Night (11pm-7am) %**
<55	5.5	41.5
55 - 59	48	32.2
60 - 64	27	20.5
65 - 69	15.8	5.7
70 - 74	3.7	0.1
>=75	0	0

4.11.2 For the Fingal Council County Council area there are approximately 73,050 residential addresses. The following is the percentage breakdown of their exposure to the various bands of 'noise' from traffic, as this is the dominant sound source.

Decibels dB(A)	Residential Dwellings Day (7am-7pm) %	Residential Dwellings Night (11pm-7am) %
<55	29	78.4
55 - 59	42.6	12.8
60 - 64	15.4	6.7
65 - 69	9.3	1.9
70 - 74	3.5	0.1
>=75	0.2	0

4.11.3 For the South Dublin County Council area there are approximately 84,190 residential addresses. The following is the percentage breakdown of their exposure to the various bands of 'noise' from traffic, as this is the dominant sound source.

Decibels dB(A)	Residential Dwellings Day (7am-7pm) %	Residential Dwellings Night (11pm-7am) %
<55	28.3	55.6
55 - 59	42.3	24.2
60 - 64	16.3	12.4
65 - 69	8.5	6.9
70 - 74	4.4	0.9
>=75	0.2	0

4.11.4 For the Dún Laoghaire-Rathdown County Council area there are approximately 79,861 residential addresses. The following is the percentage breakdown of their exposure to the various bands of 'noise' from traffic, as this is the dominant sound source.

Decibels dB(A)	**Residential Dwellings Day (7am-7pm) %**	**Residential Dwellings Night (11pm-7am) %**
<55	6	68
55 - 59	32.4	16
60 - 64	37.1	12.3
65 - 69	12.5	3.6
70 - 74	9.5	0.1
>=75	2.4	00

4.11.5 Using this decision matrix the following has been found for each of the four local authorities:

- In the Dublin City Council area 6.1 %(13,914) of residential properties have been identified as having a score of 17 or greater thus suggesting priority action should be considered. This 6.1% is broken down into:

a) 4.98% (11,359) being properties in quiet areas with exposure to low sound levels,

b) 1.14% (2,600) being properties being exposed to high sound levels. This equates to potential annoyance from high sound levels for approximately 5,720 people.

- In the Fingal County Council area 29.5 % (21,549) of residential properties have been identified as having a score of 17 or greater thus suggesting priority action should be considered. This 29.5% is broken down into:

a) 29.3%(21404) being properties in quiet areas, with exposure to low sound levels

b) 0.15% (110) being properties being exposed to high sound levels. This equates to potential annoyance from high sound levels for approximately 360 people.

- In the South Dublin County Council area 14.1 %(11,870) of residential properties have been identified as having a score of 17 or greater thus suggesting priority action should be considered. This 14.1% is broken down into:

a) 12.43% (10,464) being properties in quiet areas, with exposure to low sound levels
b) 1.67% (1,405) being properties being exposed to high sound levels. This equates to potential annoyance from high sound levels for approximately 4,117 people.

- In the Dún Laoghaire-Rathdown County Council area 6.5 %(5,191) of residential properties have been identified as having a score of 17 or greater thus suggesting priority action should be considered. This 6.5% is broken down into:

a) 4.4% (3,516) being properties in quiet areas, with exposure to low sound levels
b) 2.1% (1,678) being properties being exposed to high sound levels. This equates to potential annoyance from high sound levels for approximately 4,077 people.

4.12 **The proposed aims of the Dublin Agglomeration's Action Plan for the Management of Environmental Noise are as follows**: -

a) It is proposed that the plan should address priorities, which have been identified by the exceedances of any relevant noise limit value or other relevant criteria established by the Environmental Protection Agency and shall in the first instance, address the most important areas established by the strategic mapping process.

b) As the noise maps were developed for strategic use only, it is proposed that the basis of the Action Plan should be strategic in nature also, and will not include proposals in relation to noise from domestic activity, noise created by neighbours, noise caused by the exposed person themselves or noise at work.

c) To ensure that information on environmental noise and its effects is made available to the public.

d) To prevent and reduce 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.

e) To manage, within the Dublin Agglomeration, environmental noise issues and effects, including noise reduction if necessary.

f) To provide a comprehensive policy document for the Council with regard to noise

g) To provide a platform for noise guidance

h) To identify priorities for further research into the field of Environmental Noise.

i) To aim to protect relatively quiet areas against an increase in noise.

5 Discussion on Potential Noise Abatement Measures

5.1 Benefit of mitigation and protection measures

5.1.1 The general principles of sound mitigation apply in relation to noise action planning. These are, 1) mitigate the source, 2) mitigate the receiver or 3) mitigate the sound pathway. So, for instance, treating the sound path between receiver and source by inserting a barrier could mitigate sound from traffic on a roadway. By reducing the traffic numbers on the road, the source sound levels could be reduced. A house receiving\exposed to the sound levels could be treated with dual glazing or a new house could be located further away from the source.

5.1.2 In December 2003 a European Commission working group - *'Working Group on Health and Socio-Economic Valuation of Noise'* produced a position paper. In this position paper the following was recommended: -

The European Commission Working Group of Health and Socio-Economic Aspects recommend the following: -

- *For road transport, the (interim) use of the median value change in noise perceived by households of 25 € per dB (Lden), per household per year. The validity range of this interim value is between 50/55 Lden and 70/75 Lden and it should be adjusted as new research on the value of noise becomes available.*
- *The estimate of the change should apply at all initial noise levels, and regardless of the size of any change brought about;*
- *In the absence at present of conclusive evidence on how the value might vary on different modes, it is advised to leave open the possibility of an adaptation of this roads-based value for use on other noise sources like rail and air using adjustment factors. Specific research should be carried out to resolve this issue.*
- *This value should be corrected using PPP (Purchasing Power Parity) indices for use in accession candidate countries if necessary; and*
- *For other impacts, it is recommended that, in the interim, qualitative and qualitative assessments are used to complement the value of the perceived changes and that research is initiated on this issue.*

5.1.3 According to the European Commission funded SMILE project '*In other German regions, where the housing market is more stable, it was found (Borjans et al) that noise could reduce the value of a plot of land by at least 1.5 % for every decibel exceeding 50 dB (A) during the day. Even at times when the demand for individual dwellings was extraordinarily high, a plot of land with an average sound level of 70 dB (A) was found to cost 30 % less than a plot with an average sound level of 50 dB (A).*

5.1.4 For the Dublin City Council area, the number of priority residential properties has been calculated at 2,600. Movement from the priority action status to a lower status equates to a positive benefit, estimated between €65,000 to €325, 000 for a year – using the value of €25 per dB (Lden), per household per year. Assuming the positive influence in of the Action Plan will impact in the 3rd year of the plan this will result in an estimated positive benefit of between € 130,000 - € 650,000 over the period of the plan.

5.1.5 For the Fingal County Council area, the number of priority residential properties has been calculated at 110. Movement from the priority action status to a lower status equates to a positive benefit, estimated between €2,750 to € 13,750 – using the value of €25 per dB (Lden), per household per year. Assuming the positive influence in of the Action Plan will impact in the 3rd year of the plan this will result in an estimated positive benefit of between € 5,500 - € 27,500 over the period of the plan

5.1.6 For the South Dublin County Council area, the number of priority residential properties has been calculated at 1,405. Movement from the priority action status to a lower status equates to a positive benefit, estimated between € 35,100 to € 175,500 – using the value of €25 per dB (Lden), per household per year. Assuming the positive influence in of the Action Plan will impact in the 3rd year of the plan this will result in an estimated positive benefit of between € 70,200- € 351,000 over the period of the plan

5.1.7 For the Dún Laoghaire-Rathdown County Council area, the number of priority residential properties has been calculated at 1,678. Movement from the priority action status to a lower status equates to a positive benefit, estimated between € 41,950 to € 209,750 – using the value of €25 per dB (Lden), per household per year. Assuming the positive influence in of the Action Plan will impact in the 3rd year of the plan this will result in an estimated positive benefit of between € 83,900- € 419,500 over the period of the plan

5.1.8 For the Dublin Agglomeration as a whole, this would mean a total positive benefit, estimated between € 144,800 to € 724,000. Assuming the positive influence in of the Action Plan will impact in the 3rd year of the plan this will result in an estimated positive benefit of between € 289,600- € 1,448,000 over the period of the plan

5.1.9 In the main, the best way to minimise the costs of noise prevention and noise reduction is: -

- In the case of existing noise sources or sensitive buildings affected by noise, noise mitigation can be coordinated with scheduled maintenance, renewal and modernisation activities insofar as the funding and lands available will allow.
- Where new noise sources are being created in the vicinity of existing sensitive buildings, or vice versa the most cost effective mitigation is to take it into account from the very beginning of the planning process.

- Where a new noise source is being created, consideration should be given as to whether it is absolutely necessary, and whether the benefits really outweigh the disadvantages. If this is the case then consideration should be given to the location of the noise source so that it causes the minimum possible disturbance.

5.1.10 For an environmental noise management plan to be comprehensive and effective it needs to be dovetailed and integrated in a sustainable way with all the other policies and plans produced and\or being implemented by the four local authorities:

- For the Dublin City Council area this includes the City Development Plan, Dublin- A City of Possibilities 2002 – 2012, Transport 21, A Platform for Change 2000- 2016, Dublin City Council HGV Management Strategy, Local Area Regeneration Plans, Planning Control, Noise Abatement policy, Traffic Management strategies, the Draft Climate Change Strategy for Dublin City, the Air Quality Management Plan, the Energy Action Plan, the Biodiversity Action Plan, the Refurbishment policy of Dublin City Council housing stock and Fleet Management policies.
- For the Fingal County Council, and the Dún Laoghaire-Rathdown County Council area this includes: - the County Development Plans, Transport 21, A Platform for Change 2000- 2016, 2020 Vision - Sustainable Travel & Transport (Dún Laoghaire – Rathdown), Cycling Strategies, Road Refurbishment Policies, Local Area Regeneration Plans, Planning Controls, Noise Abatement policies, Traffic Management strategies, the Air Quality Management Plan and Biodiversity Action Plans.
- For the South Dublin County Council area this includes: - South Dublin County Council Development Plan, Transport 21, A Platform for Change 2000-2016, Air Quality Management Plan, Planning Control, Draft Climate Change Strategy for South Dublin County Council and Fleet Management Policies

The early integration of the noise action planning into the afore mentioned processes enables a more efficient and comprehensive planning and evaluation to be carried out.

5.1.11 As prescribed by the Environmental Noise Regulations 2006, Schedule 4, paragraph 3, '*each action plan should contain estimates in terms of the reduction of the number of people affected (annoyed, sleep disturbed, or other)'*, in relation to abatement measures. This is difficult to estimate. For example, sound measurements were taken before and during the implementation of the heavy good vehicles strategy along Custom House Quay and North Wall in the Dublin City Council area. It was anticipated that sound levels would decrease. However due to the removal of the HGVs, other traffic can now move faster along North Wall\Custom House Quay and the anticipated decline in sound levels has not transpired.

5.12 A tentative estimate for the reduction of the number of people affected (annoyed, sleep disturbed, or other) due to the implementation of the Action plan in the Dublin City Council area is put at approximately 5,720 people. For Fingal the estimate is 360. For South Dublin County Council and Dún Laoghaire-Rathdown the estimated is 4117 and 4,077 respectively.

5.2 **Combating Road Traffic noise**

5.2.1 Abatement Measures

To create an effective overall plan for the reduction of road traffic noise, individual measures should be consolidated into a single set of measures. Examples of this consolidated approach include the following:

- Traffic avoidance plans that combine walking, cycling and public transport
- Speed reduction plans involving partial access zones, smoothing traffic flows and reducing driving speeds.
- Traffic flow relocation i.e. diverting traffic along non-residential, less sensitive routes.
- Mitigation of noise black spots by optimising traffic signals and traffic management.
- Traffic congestion management through management and optimisation of the availability of parking spaces.
- Plans for road surface improvements and road maintenance.
- Transport mobility plans
- Enforcement of speed limits
- HGV Management (including deliveries)
- Promotion of the sustainable electric vehicles

However, the measures that may be considered by each local authority will be primarily driven by the policies and business plans of that local authority and relevant agencies.

5.2.2 Screening noise

- Noise barriers are less effective at reducing disturbance than reducing the volume of traffic. Nonetheless, noise barriers do reduce the disturbance if the average sound level is reduced by at least 4 dB (A)[1]. Furthermore, the design of the noise barriers proves very important to their acceptance by residents.
- Roadside noise barriers maybe only acceptable for roadways, where pedestrians do not need to cross. It would be unpractical to place noise barriers along streets, which are crossed by pedestrians along their entire lengths.

[1] SMILE Project – Guidelines for Road Traffic Noise Abatement

- When new dwellings are being constructed or where areas are being rejuvenated, it is important that dwellings, both houses and apartments, are designed, orientated and located in such a way that each apartment has at least one or two quiet rooms on the least exposed façade to sound from traffic.

5.2.3 Soundproof Glazing

- Soundproofing with dual or triple glazing or equivalent products are a possibility for further protection against noise, if no other measures can be applied or if the effect of other measures is insufficient. However, windows must be kept closed to be effective. Assisted ventilation is therefore required to avoid poor ventilation and the associated problems of condensation and dampness. This may not suit the Irish situation and people may have trouble adjusting to this restriction on their normal behaviour. Also, this form of ventilation is not commonly found in the current or new housing stock.

5.2.4 Changing road surfaces

- Renewing road surfaces or replacing rough paving with more smooth or low noise surfaces is another action that can be considered, in order to reduce sound levels and noise impact. This option may not be suitable in all cases. Therefore each situation will have to be assessed as to whether the option is suited to the circumstances under consideration.

5.3 **Combating Railway, Airport and Industrial noise**

5.3.1 Abatement Measures

- The requirement for noise reduction measures in the rail, air traffic and industrial sectors has also been considered. However, no actions are being proposed for industrial point sources as an assessment of individual plants located in the more heavily populated areas of the City indicated that sound emissions at the boundary of the sites were below the reporting threshold required in the directive. It is anticipated that the current IPPC licensing system is adequate to prevent any significant increase in sound levels from these plants.

- The noise mapping project has also found that aircraft noise, at this point in time, has no impact in most of the Dublin Agglomeration with the exception of Fingal County Council. With the proposed new second runway coming into operation it is unlikely to be a strategic noise issue for the other 3 local authorities in the Agglomeration.

- Sound from the railway sector is insignificant in comparison to traffic noise. The noise mapping has found that less than 0.3% of the population in the Dublin Agglomeration

region are exposed to sound levels greater than Lden of 65 decibels. The local authorities have very limited scope for action in this area.

5.4 Protecting 'Quiet Areas'

5.4.1 *'Quiet areas offer many opportunities for public recreation. They are thus not only of value to their residents, but can also improve the quality of life of people living in adjacent but noisy roads, by affording opportunities for peaceful recreation from time to time. Hence, it is very important that existing quiet areas be preserved, and that new ones be created where possible.* While one aim of the action plan is to reduce human exposure to high sound levels, another important goal is to preserve areas, which are still 'tranquil' or quiet.

5.5 Noise Complaint Investigation and Control procedures.

5.5.1 Whilst the noise maps and the Environmental Noise Regulations are aimed at developing strategic policy, it is acknowledged that when most people complain about noise, it relates more to local issues such as neighbour, entertainment and construction noises. However, it is envisaged that the noise action plan should solely concentrate on strategic issues identified by the noise mapping as systems are already in place to deal with noise nuisances, including neighbour, entertainment and construction noises.

5.5.2 For Completeness the current approach adopted by the various local authorities in the Dublin Agglomeration in relation to noise complaint investigation and control is set out in Appendix 3. This approach is primarily governed by the current legislative requirements of the Environmental Protection Agency Act 1992 (EPA Act 1992), sections 107 and 108.

6 Proposals for Action

6.1 Principles for deciding on Actions

6.1.1 It is proposed that the following principles will be adhered to when deciding on the appropriate actions to reduce sound levels and to maintain levels where they are considered good\satisfactory. -

a) A strategic approach will be adopted.

b) It is proposed that this draft Action Plan will encompass the Dublin Agglomeration.

c) It is proposed to include actions to manage environmental noise only, primarily from road traffic as this is the dominant sound source, but also from rail, aircraft and industrial sources, where required.

d) It is proposed to define areas with desirable low sound levels as areas with a night time level less than 50 decibels and\or a daytime level less than 55 decibels.

e) It is proposed to define areas with undesirable high sound levels as areas with a night time level greater than 55 decibels and a daytime level greater than 70 decibels.

f) In this Action Plan it is proposed to use an absolute value of below 55 decibels daytime and below 45 decibels at night time as one criterion for defining a Quiet Area.

g) A second criterion is also proposed for perceived or 'Relatively Quiet' areas. These areas will be defined by their proximity to areas of high sound levels, but which provide a perceived area of tranquillity. Both quantitative and qualitative assessments will be used to identify these areas.

h) A step-by-step approach will be taken and will be in accordance with the current policies and practices of the relevant Local Authorities and relevant agencies.

i) Noise levels to be taken account of in the prioritisation/assessment of future Traffic Calming Scheme

j) Speed limit reviews

k) Management of HGV traffic

l) There will be earlier integration of noise abatement planning into the planning process.

m) Emphasis will be placed on developing local noise abatement plans.

n) The local authorities within the Dublin Agglomeration will seek to be facilitators of change.

o) The local authorities within the Dublin Agglomeration will strive to be a model of best practice that in turn can influence other bodies.

p) Mitigation measures will be prioritised using the decision matrix already discussed, (see 4.7). For this Action Plan it is proposed that the higher number achieved the higher the priority for action. A value of 17 or more has been proposed as the point where priority action should be considered.

6.2 **Measures to prevent noise and reduce, avoid or relocate the various types of noise source**

The following list contains a breakdown of proposed measures to prevent noise and reduce, avoid or relocate the various types of noise source. These measures focus mainly on road traffic sound emissions, as the 'noise maps have shown it to be the major sound source. However, particular actions in relation to Dublin Airport and Fingal County Council are also included. These measures will be the primary measures considered when deciding on action to prevent, reduce avoid or relocate sources of high sound levels.

6.2.1 **The local authorities within the Dublin Agglomeration will strive to be a model of best practice that in turn can influence other bodies by: -**

a) Including low-noise and low-emission vehicles as a criterion in invitations to tender for local authority fleet or waste collection services.

6.2.2 **The local authorities within the Dublin Agglomeration will strive to reduce traffic density through: -**

a) Promoting public transport, including QBC's in conjunction with transport providers

b) Traffic management including smoothing traffic flows

c) Promoting and encouraging environmentally friendly means of transport, e.g. walking and cycling

d) Parking management

e) Fiscal measures where\when appropriate.

f) Supporting 'Transport 21'

g) Adopt sustainable urban mobility strategies

h) Adopting best practice / guideline documents and policy in Transportation Planning

6.2.3 **The local authorities within the Dublin Agglomeration will strive to reduce the percentage of heavy goods vehicles on the relevant streets by considering: -**

a) Designating restricted heavy goods vehicle (HGV) access to areas

b) HGV access bans and restrictions at certain times (night time delivery restrictions or limits)

6.2.4 **The local authorities within the Dublin Agglomeration will consider introducing where appropriate, speed reduction / traffic calming measures by: -**

a) Reducing excessive driving speeds through the provision of appropriate traffic calming measures (Noise levels to be taken account of in the prioritisation / assessment of future Traffic Calming Schemes).

b) Design in accordance with best consultation practice design guidelines (i.e. Draft Guidelines for Planning Authorities, "Sustainable Residential Development in Urban Areas, February 2008) and other DoEHLG guidance documents.

6.2.5 **The local authorities within the Dublin Agglomeration will consider where appropriate, improvement or changes in road surfaces during the routine maintenance cycle, where necessary by: -**

a) Improving road surfaces.

b) Using low-noise road surfaces. For new roads schemes, low noise surfaces will be considered as part of the overall design and in keeping with current design guidelines

6.2.6 **The local authorities within the Dublin Agglomeration will consider noise screening where necessary by: -**

a) Use of building structures for screening

b) Roadside Noise Barriers will only be considered in the context of new construction projects and schemes and as far as Roads Design and Construction Schemes are concerned will be considered only in the context of the NRA Guidelines for the Treatment of Noise and Vibration in National Road Schemes.

6.2.7 **The local authorities within the Dublin Agglomeration will consider requiring sound proofing of: -**

a) All windows on the most exposed façade, in all new residential developments, where noise maps have indicated undesirable high sound levels. This may also lead to a requirement to install ducted ventilation.

6.2.8 **The local authorities within the Dublin Agglomeration will consider using the Planning Process, where necessary:**

a) To integrate Noise Action Plans into the City and County Development Plans
b) To require developers to produce a sound impact assessment, and mitigation plan where necessary, for any new development that the local authorities considers will

impact negatively on pre-existing environmental sound levels within their Council area.

c) To ensure that future developments are designed and constructed in such a way as to minimise noise disturbances. e.g. the position, direction and height of new buildings, along with their function, their distance from roads, and the position of noise barriers and buffer zones with low sensitivity to noise

d) To ensure that new housing areas and in particular brown field developments will be planned from the outset in a way that ensures that at least the central area is quiet. This could mean designating the centre of new areas as pedestrian and cycling zones with future developments to provide road design layouts to achieve low speed areas where appropriate**.**

e) To incorporate 'Home zones' or 'Streets for People' in new developments, which recognise that residential streets have multi function uses (e.g. movement, recreation) for pedestrians, cyclists and vehicles, in that priority order. The noise maps will be used to identify and classify the priority areas and streets.

f) To reduce / avoid traffic by decentralising amenities into local areas.

g) To interposing less sensitive uses between noise source and sensitive uses.

6.2.9 Measures to prevent noise and reduce, avoid or relocate noise from aircraft sources

The current noise mitigation measures with regard to aircraft noise have been in place for a number of years for Dublin Airport. These include the "Residential Sound Insulation Programme:" This is a programme run by the DAA (previously Aer Rianta) since the opening of the new runway at Dublin Airport in 1989. The programme originally identified those dwellings that lie within a certain contour boundary and carried out insulation measures on these dwellings, which include 2) Double or secondary glazing for all windows and external doors. 2) Attic insulation comprising layers of quilting and gypsum slab. 3) Acoustic treatment for vents and active chimneys and capping of redundant chimneys. As a result of further proposed development at the Airport, most notably the development of the Northern Parallel Runway, the DAA propose to extend this scheme as is necessary. The boundary of the scheme (i.e. the 66 Leq -16 Hour noise contour) is to be reviewed every two years from 2010.

a) It is considered, in relation to engine testing, that improvements may be achieved by relocating the site for engine ground running events away from the northern boundary of the airport, i.e. away from populated neighbouring areas and as such, this will be pursued by Fingal County Council during the period of the Noise Action Plan.

b) Fingal County Council will promote appropriate land use patterns in the vicinity of the flight paths and strive to restrict housing development in order to minimise the exposure of residents of such developments to undesirable noise levels. This will further reduce the potential for future conflict between airport operations and residents.

c) The continued restriction of inappropriate development in the Outer Noise Zone and the restriction of noise sensitive uses in the Inner Noise Zone will continue to be pursued,

d) It is proposed that information be made readily available to local communities and to the public in general, from the Noise and Flight Track Monitoring system. The Noise and Flight Track Monitoring System measures noise levels generated by aircraft and identifies the flight path taken to and from the airport, for each individual aircraft movement. This system is an important tool in determining the impact of aircraft noise on local communities. It is desirable that real time information from this system be made available to the public in a non technical manner.

e) It is suggested that 'best practice' guidelines/ procedures in relation to noise minimisation should be formulated jointly by the DAA and the IAA, in relation to take off and landing policies, which should have positive impacts on noise control measures. These procedures should be documented and formally conveyed to pilots and air traffic control personnel on a regular basis.

f) During the lifetime of the present Noise Action Plan, the introduction of a new, beamed Aircraft Navigation system, to assist aircraft approaching Dublin Airport will be pursued. Such a system will ensure that approaching aircraft will not drift from the approach corridor, which often leads to an increase in noise complaints from the public.

6.2.10 Fingal County Council in conjunction with the Dublin Airport Authority and local stakeholder groups will continue to engage with each other through the **Environmental Monitoring Working Group set up under the Dublin Airport Stakeholders Forum,** in order to resolve any issues that may emerge. To this end potential action could include: -

Noise Monitoring

(a) Airborne Aircraft Noise

- Noise from aircraft taking off and landing.
- Runway utilisation
- Landing and take-off procedures.
- Flight Track Monitoring.
- Frequency of aircraft operations.

- Night flights.
- Preferential Environmental Noise Corridors

(b) Aircraft on the Ground

- Engine testing during maintenance.
- Aircraft taxiing.

(c) Monitoring

- Consideration of Noise Zones
- Consideration of measures of dealing with Aircraft Noise and deviation from designated flight paths.
- Consultation on the introduction of Noise Mitigation Scheme/s.
- Monitoring of flights over communities.
- Monitoring of flights in environmental corridors.

6.2.11 **The local authorities within the Dublin Agglomeration proposes to require other stakeholders i.e. Iarnród Éireann and the Railway Procurement Agency: -**

a) To produce a sound impact assessment and mitigation measures when\where appropriate, for any new rail infrastructure or any major intensification on any existing rail track or ancillary developments within the Dublin Agglomeration. This assessment should not alone include railway sound emissions but also a sound impact assessment, for example, of traffic, where the new infrastructure or intensification is likely to increase, disrupt or displace traffic flows within the Dublin Agglomeration.

6.2.12 **The local authorities within the Dublin Agglomeration will carry out a review of the Action Plan. To support this review it will: -**

a) Develop a permanent, long-term sound monitoring network to support the decision making process.
b) Put systems in place that will capture, maintain and update the data required to carry out a review of the noise maps and action plans every 5 years, as required by legislation.

7 Implementation Plan

Each local authority within the Dublin Agglomeration will follow the time frame set out below in relation to the implementation of the Action Plan.

1. First year of Plan:

a) Identify from noise maps where priority action is required at a local level

b) Set up sound monitoring network.

2. Second Year of Plan

c) Carry out local assessment

d) Identify Quiet Areas and prepare submissions for approval by the Minister

3. Third to Fifth Year of Plan

e) Commence implementation of the relevant actions as outlined in Chapter 6, 6 and where the current business plan and expenditure as agreed by the relevant local authority allows

4. Year Four of Plan.

f) Produce new noise maps.

5. Year Five of Action Plan

g) Review impact of Action Plan and amend where appropriate.

APPENDIX 1

Definitions & Explanations.

Agglomeration: 'Agglomeration' shall mean 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**.**

Agglomeration of Dublin: 'Agglomeration of Dublin' means the county borough of Dublin, the administrative county of Dun Laoghaire/Rathdown other than those areas excluded in the First Schedule to the Air Pollution Act 1987 (Marketing, Sale and Distribution of Fuels) Regulations 1998 (S.I. No. 118 of 1998), and the administrative counties of Fingal and South Dublin;

Decibel: A unit of measurement of sound.

Daytime: Between the hours of 7am and 7pm

Evening time: Between the hours of 7pm and 11pm

Environmental Noise: Shall mean unwanted or harmful outdoor sound created by human activities, including noise emitted by means of transport, road traffic, rail traffic, air traffic, and from sites of industrial activity such as integrated pollution prevention and control licensed industries.

HGV: Heavy Goods Vehicle

IPPC: License Integrated Prevention and Pollution Control license

Lden: (day-evening-night noise indicator) shall mean the noise indicator for overall annoyance. This comprises of adding the average value for the 12 hour day time period with the average value of the 4 hour evening period plus a 5 decibel weighting or penalty, and the average value for the 8 hour night time period with a 10 decibel weighting or penalty.

Lday: (day-noise indicator) shall mean the noise indicator for annoyance during the day period. This is the average value in decibels for the daytime period

Levening: (evening-noise indicator) shall mean the noise indicator for annoyance during the evening period. This is the average value in decibels for the evening time period.

Lnight: (night-time noise indicator) shall mean the noise indicator for sleep disturbance. This is the average value in decibels for the night-time period

Local Area Committee: Dublin City Council is broken into 5 local sub administrative areas. These areas are: - The North Central Area, The North West Area, The Central Area, The South East Area, and The South Central Area.

Night time: Between the hours of 11pm and 7am

Noise: Sometimes defined as unwanted sound.

Noise Indicator: Method used to measure or quantify sound, in decibels, in order to equate it with what might be perceived as noise.

QBC: Quality Bus Corridor

Transport 21: Transport 21 is the capital investment framework through which the transport system in Ireland will be developed, over the period 2006 to 2015. This framework will address the twin challenges of past investment backlogs and continuing growth in transport demand. The projects and programmes that make up Transport 21 will aim to, increase accessibility, ensure sustainability, expand capacity, increase use, and enhance quality.

APPENDIX 2

Public Consultation

The following Bodies\Agencies were circulated for comment on this draft document:

An Bord Pleanala

An Taisce

Bord Failte (Planning Section)

Chambers of Commerce

CODEMA

Comhar

County Development Boards

ESB

Department of Education

Department of Environment Heritage and local Government

Department of Transport

Dublin Airport Authority

Dublin Bus

Dublin City Business Association

Dublin Transportation Office

Environmental Protection Agency

Eastern Regional Boards

Health Service Executive

Iarnród Éireann

Iriah Aviation Authority

NAOSH

National Roads Authority

Office of Public works

Rail Procurement Agency

Appendix 3

Noise Complaint, Investigation and Control.

Part 1

DUBLIN CITY COUNCIL AREA

Atmospheric Pollution and Noise Control Unit,
Environmental Health Officers Service,
Dublin City Council,
Civic Offices, Wood Quay, Dublin 8.

The Atmospheric Pollution and Noise Control Unit investigate complaints that fall within the remit of the EPA Act 1992. Set out below are the type of complaints investigated and the procedures that apply.

Noise Control Unit Complaint Investigation
Establishing Nuisance under the EPA ACT 1992

Investigation and inspection
Noise Nuisance is established by means of inspection and monitoring. If a nuisance is established the case officer will take action initially through verbal warnings and recommendations on mitigation measures. If the nuisance continues unabated, the officer may proceed by serving notice under Section 107 of the EPA Act 1992, legally requiring the offending party to abate the nuisance.

Re-inspection
When a Section.107 notice expires, the case officer will re-inspect the premises to determine compliance with the terms of the notice. If the terms of the notice have been addressed and the nuisance has abated, the case officer informs the complainant and closes the case.
If the terms of the notice have not been addressed and the nuisance continues the case officer, may recommend prosecution proceedings to be undertaken.

Legal and Policy Parameters.

- Complaints arising from noise emanating from a public place and which may cause annoyance in a public place and/or subsequently in private premises are investigated by the Noise Control Unit.
- Complaints arising from noise emanating from a private premises, other than the type of premises listed below in next paragraph and which may cause annoyance in a

public place and/or subsequently in a private premise are pursued by the Noise Control Unit.

- Complaints arising from noise emanating from a domestic premises (other than from where a business is been carried on), including a flat or apartment, are not investigated by the Noise control Unit. However there maybe special circumstances such as intimidation or anti-social behaviour by the alleged offending party, or other circumstances, where it may be more appropriate for the Noise Control Unit i.e. the Local Authority to take action.

- It shall be a good defence, in a prosecution for a contravention of section 107 of the EPA Act 1992, in the case of noise caused in the course of a trade or business, for the accused to prove that he took all reasonable care to prevent or limit the noise to which the charge relates by: -

  (a) providing, maintaining, using, operating and supervising facilities, or by employing practices or methods of operation, that, having regard to all the circumstances were suitable for the purposes of such prevention or limitation, or

  (b) the noise is in accordance with -

  (i) the terms of a licence under this act, or

  (ii) regulations under section 106

- It shall be a good defence, in the case of proceedings under subsection (1) of Section 108 of the EPA Act 1992 or in a prosecution for contravention of this section, in the case of noise caused in the course of a trade or business, for the accused to prove that-

  (a) he took ***all reasonable care*** to prevent or limit the noise to which the complaint relates by providing, maintaining, using, operating and supervising facilities, or by employing practices or methods of operation, that having regard to all the circumstances, were suitable for the purposes of such prevention or limitation, or

  (b) the noise is in accordance with-

  (i) the terms of a licence under this Act, or

  (ii) regulations under section 106.

- Section 107 and 108 shall not apply to noise caused by-

  (a) aircraft, or

  (b) such statutory undertaker or local authority, as may be prescribed, in the exercise of powers conferred on it by or under any enactment in such circumstances as may be prescribed.

Guidance used in establishing noise nuisances

E.P.A. Act - Guidance notes for noise in relation to scheduled activities. B.A.T.N.E.E.C.
Noise sensitive areas include domestic dwellings, hospitals, schools, places of worship, areas of leisure or high amenity.

- LAr T <55 dB(A) daytime outside noise sensitive areas.
- LAeqT <45 dB(A) night-time and preferably within the range 35 dB(A) to 40 dB(A).
- Clearly audible and impulsive tones outside dwellings at night should be avoided irrespective of the noise level.
- Appropriate levels of sound insulation should be provided.
- Levels may be set for noise levels at boundary of the plant.
- Restriction on times of operation may be imposed for some part of the plant. This must be balanced with regard to economic or practical impact on the plant.
- The noise parameter to be measured is the equivalent continuous sound pressure level LAeqT or the rated sound level LArT - LAeq corrected for the tonal or impulsive character , where present.
- Measurement time interval 1 hour - day
    - 15 minutes - night.
- Monitoring in compliance with I.S.O.1996 - 2 Acoustics- Description and measurement of environmental noise. No measurement when wind speed >5metres/second.
- 5dB(A) is added to measured levels for tonal content or impulsiveness as assessed by 1/3 Octave band analysis, using Joint Nordic Method.
- For Compliance, the long term mean value of the criterion noise level should not be exceeded. Occasional durations of +3dB(A) are acceptable, but no relaxation of requirement that no pure tones be audible at night.

Scheduled Activities include : Minerals Energy, Metals, Mineral Fibres and Glass, Chemicals, Intensive Agriculture, Food and Drink, Wood, Paper, Leather, Fossil Fuels, Cement, Waste, Surface Coatings, and other activities - all large scale activities.

Reference legislation:
E.C. (Protection of Workers) (Exposure to noise) Regulations 1990.
E.C. Construction (Plant and Equipment)(permissible Noise Levels) Regulations 1988.

Guidance used in establishing noise nuisances contd.

British Standard : Noise Control on Construction and Open Sites.
B.S. 5228: Part 1 Code of Practise for basic information and procedures for noise control.

Noise Sensitive Premises: any premises outside the site used as a dwelling, hospital, school, place of worship or for any other purpose likely to be affected by site noise.

Legislative Background

- This Standard represents a standard of good practise. Compliance with it does not confer immunity from relevant legal requirements including those imposed by regulations, bye-laws and conditions attached to planning permissions.
- LAeq - recommended description for sound level measurements noise. It can be useful to use a short period (e.g. 5 minutes) Laeq when describing noise from isolated incidents that may not always be apparent from a longer period LAeq. Alternatively the maximum. sound level LpAmax or the one percentile level LA01 can be used.
- When noise levels are set the evening limit may have to be as much as 10dB(A) below the Daytime limit. Very strict noise control targets should be applied to any site which is to operate at night. The periods when people are getting to sleep and just before they wake appear to be particularly sensitive.
- Site noise expressed at LAeq over 1 hour at the facade of a noise sensitive premises may need to be as low as 40dB(A) to 45dB(A) to avoid sleep disturbance.

British Standard Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas. B.S. 4142 : 1990.

The standard is intended to meet the need for rating various noises of an industrial nature affecting persons living in the vicinity. It provides a method for determining a noise level, together with procedures for assessing whether the noise is likely to give rise to complaints. It does not provide standards, which can be applied as planning requirements, but references from the document are of use in determining such requirements.

- Reference time interval - a specified interval over which an equivalent continuous A weighted sound pressure level is determined. Use a reference time interval of 1 hour during the day and a reference time interval of 5 minutes during the night.

Guidance used in establishing noise nuisances contd.

- Note: the choice of day and night periods will depend on normal local circumstances. It is intended that the night period should cover the times when the general adult population are preparing for sleep or are actually asleep.
- When predicting the noise level from a planned new source due consideration to be given to the possible effects of weather conditions and ground conditions on the sound propagation in the planned location.

Procedure for processing complaints that fall outside the Noise Control Units Legal & Policy Parameters

Intruder Alarm Systems

Noise Nuisance Prevention Guidelines.

Intruder alarm systems are an effective and often essential means of protecting property and deterring crime. However recurring or continuous false alarms not only reduce the effectiveness of the intruder alarm system, they can also cause noise nuisance and disturbance.

Prevention

The best way to avoid needless disturbance to the public from audible intruder alarms is by preventing false alarms.

- The system should be properly designed and installed, maintained in good order,
- Equipment which has proved unreliable or ineffective should be replaced.
- The intruder alarm system should be designed, installed and maintained in compliance with **Irish Standard 199: 1987 Standard Specification (Intruder Alarm Systems).**
- The Irish Standard EN 50131 – 1 2006 Intrusion and Hold Up Systems Part 1 System Requirements Section 8.6 states: “Audible warning devices shall operate for a minimum of 90 seconds unless a shorter period is demanded by local or national regulations. The maximum operating period shall be 15 minutes unless a shorter period is demanded by local or national regulations.”
- This requirement shall generally not apply to internal audible alarms unless the noise generated by such alarms can cause distress to the occupants of the building or adjacent buildings.
- A cut out device can be supplemented with a flashing light, which should have a minimum duration of 60 minutes. In rural areas or in situations where security requirements demand, the above time limits may be subject to review.

- At least 2 keyholders should be nominated and should be well versed in operating and silencing the alarm. The householder / property owner, or a security firm, can be nominated as keyholders.
- The response time of the keyholder should not exceed 60 minutes.
- The nominated keyholders should be telephone subscribers and, where necessary, have their own means of transport.
- Where the alarm system is not connected to a monitoring centre e.g. Eircom or a security firm, it is recommended that the name and contact telephone number of the keyholders should be made known to a trusted neighbour(s) who may be affected by continuous sounding of the alarm if activated.
- Failure of a keyholder to respond to an activated audible intruder alarm within 60 minutes will be relevant to any consideration of whether a noise nuisance has occurred in any particular case of prolonged or recurring sounding of an alarm system.

Note : In line with the Irish Standard for Intruder Alarm Systems it is recommended that before installing or altering an alarm system the prospective subscriber should consult their insurer and the Garda Crime Prevention Officer because their experience may be useful in resolving any problems that may arise.

Domestic Noise Complaints

- Complainant informed of Unit's policy with regard to domestic noise complaints.
- Log sheets and instructions as to how to fill them out correctly are forwarded to complainant(s).
- The Department of Environment Guide to the Noise Regulations, forwarded to complainant(s).

The Dublin City Development Plan

The Dublin City Development Plan adopted on 14 March 2005, contains policy on the operating hours for construction sites. Theses times as per Sec. 15.37.0 of the Plan are:

0700 –1800 Monday to Friday

0800 – 1400 Saturday

No work on Sundays or public holidays

Noise Complaint, Investigation and Control.

Part 2

FINGAL COUNTY COUNCILS

GUIDELINE ON NOISE LEVELS

To be applied only in industrial, commercial or public leisure activities. Not to domestic, transport or construction noises.

The noise level outside any residence, at the boundary of any residential zoned area, any site for which residential development has a least outline approval, any hospital or any school shall:

1. **Not contain and pure tones.**

2. **Not exceed the background level by 10dB(A) or more *or* exceed 65 dB(A) by day or 45 dB(A) by night, whichever is the lesser.**

In the case of noise which will only last a short time (i.e. a few weeks) the above standards may be temporarily relaxed.

In cases where it is impossible to measure the noise due, for example, to the interference of traffic noise, prediction methods should be used.

The duration and frequency of noise events should be considered when assessing annoyance.

A correction for impulsive character of 5dB(A) shall be added to the measured or predicted level where appropriate.

If background levels cannot be measured on site due to the continuous presence of the noise under investigation then measurements at another site that approximates the conditions at the site of interest may be used.

When an background is established in relation to a particular reception point all future noise sources affecting this point shall be assessed with respect to the originally established background.

It shall not be necessary to attain a standard below 45 dB(A) by day or 35 dB(A) by night where very low backgrounds exist.

In the case of premises where frequent musical events occur e.g. discos, pub music, etc. no music shall be audible in any nearby noise sensitive premises.

Where specific guidelines have been drafted for assessing specific types of events e.g. concerts, they should be used instead of these proposals.

DEFINITIONS

Noise Level: The Leq for worst hour by day or worst 15 minutes by night with impulsive correction.

Background Level: The L95 at the appropriate time and under similar conditions.

Day: 08.00 - 22.00 Monday to Friday.
09.00 - 1700 Saturday.

Pure Tone: An octave band that exceeds both adjacent octave bands by 3dB or more.

Measurement Location: One meter from the facade.

Equipment Standards: I.E.C. Type I as minimum.

Calibration: Calibration shall be carried out before measurement in all cases and before and after measurement when the measurement period exceeds 24 hours.

Weather: Measurements shall not be carried out where the windspeed is so high that it affects the accuracy of the readings and preferably when the windspeed does not exceed 5m/sec.The windspeed and direction should both be recorded.

Frequency Range: 31.5 Hz - 16 KHz

Noise Rating Curve: As defined by the International Standards Organisation.

GUIDELINES IN RELATION TO CONSTRUCTION AND DEMOLITION SITES.

The guidelines are made based on the requirements of the Air Pollution Act 1987 and the Environmental Protection Agency Act 1992 (Noise) Regulations 1994.

MEASURES TO BE TAKEN TO PREVENT NUISANCE FROM NOISE AT CONSTRUCTION SITES.

1. The hours of operation on all construction sites shall be restricted to 8.00a.m. to 7.00p.m., Monday to Friday, and 8.00 a.m. to 1.00p.m. on Saturdays.
2. No activities shall take place in site on Sundays or Bank Holidays.
3. No activity, which would reasonably be expected to cause annoyance to residents in the vicinity, shall take place on site between the hours of 7.00p.m. and 8.00a.m.
4. No deliveries of materials, plant or machinery shall take place before 8.00a.m. in the morning or after 7.00p.m. in the evening.
5. If there is any occasion when work must be carried on outside daytime hours, this department, local residents and businesses in areas which are likely to be affected by noise from the proposed works should be notified in advance e.g. in letter or leaflet or advertisement form, of:
    - Name, address and telephone number of company carrying out works
    - Nature of and reason for works
    - Likely duration and times of work

In the interests of both public health and the environment the above guidelines should be included in the work policy of those undertaking all large and small building projects. These details must be made known to all developers contractors and sub-contractors.

Noise Complaint, Investigation and Control.

Part 3

DUN LAOGHAIRE-RATHDOWN COUNTY COUNCILS

GUIDELINE ON NOISE LEVELS

To be applied only in industrial, commercial or public leisure activities. Not to domestic, transport or construction noises.

The noise level outside any residence, at the boundary of any residential zoned area, any site for which residential development has a least outline approval, any hospital or any school shall:

1. **Not contain and pure tones.**

2. **Not exceed the background level by 10dB(A) or more *or* exceed 65 dB(A) by day or 45 dB(A) by night, whichever is the lesser.**

In the case of noise which will only last a short time (i.e. a few weeks) the above standards may be temporarily relaxed.

In cases where it is impossible to measure the noise due, for example, to the interference of traffic noise, prediction methods should be used.

The duration and frequency of noise events should be considered when assessing annoyance.

A correction for impulsive character of 5dB(A) shall be added to the measured or predicted level where appropriate.

If background levels cannot be measured on site due to the continuous presence of the noise under investigation then measurements at another site that approximates the conditions at the site of interest may be used.

When an background is established in relation to a particular reception point all future noise sources affecting this point shall be assessed with respect to the originally established background.

It shall not be necessary to attain a standard below 45 dB(A) by day or 35 dB(A) by night where very low backgrounds exist.

In the case of premises where frequent musical events occur e.g. discos, pub music, etc. no music shall be audible in any nearby noise sensitive premises.

Where specific guidelines have been drafted for assessing specific types of events e.g. concerts, they should be used instead of these proposals.

DEFINITIONS

Noise Level: The Leq for worst hour by day or worst 15 minutes by night with impulsive correction.

Background Level: The L95 at the appropriate time and under similar conditions.

Day: 08.00 - 22.00 Monday to Friday.
09.00 - 1700 Saturday.

Pure Tone: An octave band that exceeds both adjacent octave bands by 3dB or more.

Measurement Location: One meter from the facade.

Equipment Standards: I.E.C. Type I as minimum.

Calibration: Calibration shall be carried out before measurement in all cases and before and after measurement when the measurement period exceeds 24 hours.

Weather: Measurements shall not be carried out where the windspeed is so high that it affects the accuracy of the readings and preferably when the windspeed does not exceed 5m/sec.The windspeed and direction should both be recorded.

Frequency Range: 31.5 Hz - 16 KHz

Noise Rating Curve: As defined by the International Standards Organisation.

GUIDELINES IN RELATION TO CONSTRUCTION AND DEMOLITION SITES.

The guidelines are made based on the requirements of the Air Pollution Act 1987 and the Environmental Protection Agency Act 1992 (Noise) Regulations 1994.

MEASURES TO BE TAKEN TO PREVENT NUISANCE FROM NOISE AT CONSTRUCTION SITES.

6. The hours of operation on all construction sites shall be restricted to 8.00a.m. to 7.00p.m., Monday to Friday, and 8.00 a.m. to 1.00p.m. on Saturdays.
7. No activities shall take place in site on Sundays or Bank Holidays.
8. No activity, which would reasonably be expected to cause annoyance to residents in the vicinity, shall take place on site between the hours of 7.00p.m. and 8.00a.m.
9. No deliveries of materials, plant or machinery shall take place before 8.00a.m. in the morning or after 7.00p.m. in the evening.
10. If there is any occasion when work must be carried on outside daytime hours, this department, local residents and businesses in areas which are likely to be affected by noise from the proposed works should be notified in advance e.g. in letter or leaflet or advertisement form, of:
    - Name, address and telephone number of company carrying out works
    - Nature of and reason for works
    - Likely duration and times of work

In the interests of both public health and the environment the above guidelines should be included in the work policy of those undertaking all large and small building projects. These details must be made known to all developers, contractors and sub-contractors.

Noise Complaint, Investigation and Control.

Part 4

South Dublin County Council

The Environmental Health Department of South Dublin County Council investigates and advises on noise complaints, and by and large follows the procedures set out on pages 48-53.

Under the Environmental Protection Agency Act 1992 Section 106, a noise nuisance is defined as:

"Any noise which is so loud, so continuous, so repeated, of such duration and pitch or occurring at such times as to give reasonable cause for annoyance to a person in any premises in the neighbourhood or to a person lawfully using any public place."

Complaint Investigation:

When a complaint is received it is assessed to determine the source of noise. Permitted operating hours for construction works in the South Dublin County Council area are:

07. 00 – 19. 00 hrs Monday to Friday
09. 00 – 13. 00 hrs Saturday

No work on Sundays or Public Holidays.

Complaint investigations are carried out by:

- Site visits
- Noise monitoring
- Completion of log sheets

1 If a noise nuisance is established, verbal and/or written advice or warning is issued to abate the noise nuisance.
2 Failure to abate the nuisance may result in service of a Notice under Section 107 of the EPA Act 1992.
3 Failure to comply with terms of the Notice may result in the recommendation of legal proceedings.

Domestic Noise:

- On receipt of a complaint regarding domestic noise, the complainant is informed that the Environmental Health Department acts in an advisory role only.
- A noise record sheet and an information leaflet on the Noise Regulations produced by the Department of the Environment and Local Government are sent to the complainant.
- A copy of the Department of Environment – ENFO's "A Guide to Noise Regulations" will be sent to the complainant if desired.
- A letter is sent to the alleged offender to advise them of the complaint. The majority of complaints are resolved at this stage.

Under the EPA Act 1992 (Noise) Regulations 1994 any person may seek an order in the District Court to have noise giving reasonable cause for annoyance abated. The procedures involved have been simplified to allow action to be taken without legal representation. The task of the District Court is to hear both sides of the case and to make an order directing specified actions to be taken. Full details of this procedure are included in the Guide to the Noise Regulations booklet.

Intruder Alarms:

The procedure for investigation is in line as that set out earlier on page 52.

The Irish Standard EN 50131 – 1 2006 Intrusion and Hold Up Systems Part 1 System Requirements Section 8.6 states:

"Audible warning devices shall operate for a minimum of 90 seconds unless a shorter period is demanded by local or national regulations. The maximum operating period shall be 15 minutes unless a shorter period is demanded by local or national regulations."

POPULATION EXPOSURE TABLES FOR THE DUBLIN AGGLOMERATION AND THE 4 LOCAL AUTHORITIES

APPENDIX 4

Population Exposure, For Road Traffic, Dublin Agglomeration

All Roads Dublin Agglom.	LDEN Total 24Hr All Road Values	LNIGHT Total Night All Road Values	LDENQF No Of People with Quiet FaçadeTotal All Road	LNIGHTQF No Of People with Quiet FaçadeTotal AllRoad	LDEN Area Area Exposed(Km2) Total AllRoad	No. Of Dwellings Exposed (LDEN)Total AllRoad
0-44	21200	57500	0	100	0	6974
45-49	16400	160400	0	300	0	5418
50-54	35600	450300	0	1200	0	12007
55-59	252100	292100	700	3700	0	90821
60-64	518800	169400	1000	6100	0	209932
65-69	197600	54400	4300	5100	0	78657
70-74	121300	2900	6300	500	0	51416
>55	1114700	518300	13300	12000	660.42	441189
>65	342800	57200	11500	3150	172.62	140044
>=70	146300	3100	10900	500	0	61293
>=75	24000	0	4600	0	18.65	9989
Total	1187000	1187000	16900	17000		465214

Major Road Dun Laoire Rathdown	LDEN Total 24Hr Major Road Values	LNIGHT Total Night Major Road Values	LDENQF No Of People with Quiet FaçadeTotal Major Road	LNIGHTQF No Of People with Quiet FaçadeTotal Major Road	LDEN Area Area Exposed(Km2) Total Major Road	No. Of Dwellings Exposed (LDEN)Total Major Road
0-44	361400	591500	3382	3826	0	120141
45-49	137800	214100	309	476	0	60055
50-54	222800	159200	373	378	0	94834
55-59	154700	89200	324	1880	0	62471
60-64	133400	90900	673	14561	0	52058
65-69	85100	38300	6247	12555	0	34767
70-74	74500	3500	18116	106	0	33328
>55	502900	196900	29613	29004	499.26	190355
>65	176800	45100	28516	12758	201.067	75743
>=70	91800	4000	22273	106	0	40988
>=75	17300	400	4157	0	41.21	7660
Total	1187000	1187100	33581	33782		465314

APPENDIX 5

Population Exposure, For Rail, Dublin Agglomeration

All Rail Agglomeration	LDEN Total 24Hr AllRail Values Agglom	LDAY Total Day AllRail Values Agglom	LEVE Total Eve AllRail Values Agglom	LNIGHT Total Night AllRail Values Agglom	No. Of QF Total AllRail QF Agglom	LDENQF No Of People with Quiet Façade Total All Rail Agglom	LNIGHT QF No Of People with Quiet Façade Total All Rail Agglom	LDEN Area Area Exposed(Km2) Total All Rail Agglom	No.Of Dwellings Exposed (LDEN)Total All Rail Agglom
0-44	1111400	1134900	1141100	1161800	1074	4000	6900	0	453900
45-49	37700	23900	21200	12300	290	1200	2300	0	16800
50-54	16900	13100	12000	7700	527	1800	3200	0	7500
55-59	10600	8400	7400	3500	565	2700	2000	0	4700
60-64	6800	5300	4200	1400	949	3600	800	0	3300
65-69	2800	1300	700	100	574	1400	0	0	1400
70-74	500	0	0	0	156	300	0	0	200
>55	18800	14000	11700	4800	2235	8000	2800	7.2	9000
>65	3200	900	700	200	687	1700	100	0.93	1500
>=70	600	100	0	0	145	300	0	0	200
>=75	0	0	0	0	16	0	0	0.02	0
Total	1186700	1186900	1186600	1186800	4151	15000	15200		487800

Major Rail Agglomeration	LDEN Total 24Hr MajorRail Values Agglom	LDAY Total Day MajorRail Values Agglom	LEVE Total Eve MajorRail Values Agglom	LNIGHT Total Night MajorRail Values Agglom	No. Of QF Total MajorRail QF Agglom	LDENQF No Of People with Quiet Façade Total MajorRail Agglom	LNIGHTQF No Of People with Quiet Façade Total MajorRail Agglom	LDEN Area Area Exposed(Km2) Total MajorRail Agglom	No. Of Dwellings Exposed (LDEN)Total MajorRail Agglom
0-44	1118600	1140400	1146400	1163000	1422	5200	7100	0	456800
45-49	33500	20800	18100	11400	207	1000	2200	0	15100
50-54	15300	11700	10800	7400	364	1400	3200	0	6800
55-59	9500	7600	6900	3500	517	2500	2000	0	4400
60-64	6500	5000	4000	1400	916	3600	800	0	3200
65-69	2800	1300	700	100	559	1400	0	0	1400
70-74	500	0	0	0	150	300	0	0	200
>55	18400	13000	11000	4800	2137	7800	2800	4.22	8500
>65	3200	900	700	200	672	1700	100	0.86	1500
>=70	600	100	0	0	145	300	0	0	200
>=75	0	0	0	0	16	0	0	0.02	0
Total	1186700	1186800	1186900	1186800	4151	15400	15300		487900

APPENDIX 6

Population Exposure, For Luas, Dublin Agglomeration

All Luas Dublin City Council	LDEN Total 24HrAll Luas Values DCC	LDAY Total DayAll Luas Values DCC	LEVE Total EveAll Luas Values DCC	LNIGHT Total NightAll Luas Values DCC	No. Of QF Total All LuasQF DCC	LDENQF No Of People with Quiet FaçadeTotal All Luas DCC	LNIGHTQF No Of People with Quiet FaçadeTotal All Luas DCC	LDEN Area Area Exposed Total All Luas DCC	No. Of Dwellings Exposed (LDEN)Total All Luas DCC
0-44	480400	489700	491500	495800	2	0	0	0	216200
45-49	12700	6400	5400	3200	1	0	100	0	6500
50-54	4600	3000	2800	2100	5	0	100	0	2300
55-59	2700	2300	2200	2000	23	200	700	0	1400
60-64	2000	2200	1900	1100	53	300	400	0	1100
65-69	1800	800	400	100	251	700	0	0	1000
70-74	400	0	0	0	34	100	0	0	200
>55	6900	5000	4500	3100	367	1400	1000	0	3500
>65	2100	600	500	200	278	800	0	0	1200
>=70	400	100	0	0	33	100	0	0	200
>=75	0	0	0	0	7	0	0	0	0
Total	504600	504400	504200	504300	376	1300	1300		228700

All Luas County	LDEN Total 24HrAll Luas Values County	LDAY Total DayAll Luas Values County	LEVE Total EveAll Luas Values County	LNIGHT Total NightAll Luas Values County	No. Of QF Total All LuasQF County	LDENQF No Of People with Quiet FaçadeTotal All Luas County	LNIGHTQF No Of People with Quiet FaçadeTotal All Luas County	LDEN Area Area Exposed Total All Luas County	No. Of Dwellings Exposed (LDEN)Total All Luas County
0-44	667200	672600	674800	677300	219	600	800	0	253900
45-49	8000	5400	4000	2500	104	200	100	0	2800
50-54	3800	2200	1900	1600	60	100	400	0	1300
55-59	1900	1200	1100	700	113	200	200	0	700
60-64	900	600	600	300	188	300	100	0	200
65-69	500	300	200	0	104	100	0	0	100
70-74	100	0	0	0	59	100	0	0	0
>55	3400	2000	1500	900	464	700	400	0	1100
>65	600	200	100	0	155	200	0	0	100
>=70	100	0	0	0	54	100	0	0	0
>=75	0	0	0	0	1	0	0	0	0
Total	682400	682300	682600	682400	848	1600	1600		259000

APPENDIX 7

Population Exposure, For Road Traffic, Dublin City Council Region

All Road DCC	LDEN Total 24Hr All Road Values DCC	LDAY Total Day All Road Values DCC	LEVE Total Eve All Road Values DCC	LNIGHT Total Night All Road Values DCC	No. Of QF Total All Road QF DCC	LDENQF No Of People with Quiet FaçadeTotal All Road DCC	LNIGHTQF No Of People with Quiet FaçadeTotal All Road DCC	LDEN Area Area Exposed(Km2) Total All Road DCC	No. Of Dwellings Exposed (LDEN)Total All Road DCC
0-44	0	0	0	0	0	0	0	0	0
45-49	0	100	100	3300	0	0	0	0	0
50-54	100	20800	22500	207400	0	0	0	0	0
55-59	36400	263200	269100	170700	0	0	0	0	17000
60-64	298200	130400	134300	98000	0	0	0	0	130300
65-69	101200	73700	68000	26200	0	0	0	0	45900
70-74	62700	17800	12100	600	2	0	0	0	31000
>55	506200	486100	484500	295200	9	0	0	136	228500
>65	171400	91500	79900	26700	9	0	0	24.93	80800
>=70	70200	18000	12000	600	9	0	0		34800
>=75	7600	200	100	0	7	0	0	1.11	3900
Total	506200	506200	506200	506200	9	0	0		228100

Major Road DCC	LDEN Total 24 Hr Major Road Values DCC	LDAY Total Day Major Road Values DCC	LEVE Total Eve Major Road Values DCC	LNIGHT Total Night Major Road Values DCC	No. Of QF Total Major Road QF DCC	LDENQF No Of People with Quiet FaçadeTotal Major Road DCC	LNIGHTQF No Of People with Quiet FaçadeTotal Major Road DCC	LDEN Area Area Exposed(Km2) Total Major Road DCC	No. Of Dwellings Exposed (LDEN)Total Major Road DCC
0-44	36900	191600	217300	197400	37	100	300	0	14500
45-49	109800	134000	121600	155300	60	200	200	0	50100
50-54	170300	63300	56700	58400	36	100	100	0	76300
55-59	75200	31400	27900	25600	15	100	1500	0	33600
60-64	30400	23600	27400	49600	19	400	13800	0	13300
65-69	36800	47700	45200	19700	1129	6000	11700	0	16900
70-74	41000	14500	10000	200	2254	17300	100	0	20400
>55	189300	117600	110700	95200	3750	27300	27000	48.53	87400
>65	83700	62300	55300	19900	3715	26700	11800	13.23	40400
>=70	46800	14600	10100	200	2583	20700	100		23500
>=75	5800	100	100	0	326	3400	0	0.79	3100
Total	506200	506200	506200	506200	3876	27600	27700		228200

APPENDIX 8

Population Exposure, For Road Traffic, Fingal County Council

All Road Fingal	LDEN Total 24Hr All Road Values	LNIGHT Total Night All Road Values	LDENQF No Of People with Quiet FaçadeTotal All Road	LNIGHTQF No Of People with Quiet FaçadeTotal AllRoad	LDEN Area Area Exposed(Km2) Total All Road	No. Of Dwellings Exposed (LDEN)Total AllRoad
0-44	9800	38400	0	100		3107
45-49	14100	88900	0	300		4479
50-54	23600	56100	0	500		7481
55-59	97000	32600	400	3000		30485
60-64	49200	18300	500	2500		14859
65-69	28100	5500	3200	400		7867
70-74	15800	200	2100	0		4163
>55	192400	56500	6600	5900	288.7	57957
>65	46200	5600	5700	400	70.72	12621
>=70	18100	200	2500	0		4760
>=75	2300	0	400	0	5.87	609
Total	239900	240000	6600	6800		73050

Major Road Fingal	LDEN Total 24Hr Major Road Values	LNIGHT Total Night Major Road Values	LDENQF No Of People with Quiet FaçadeTotal Major Road	LNIGHTQF No Of People with Quiet FaçadeTotal Major Road	LDEN Area Area Exposed(Km2) Total Major Road	No. Of Dwellings Exposed (LDEN)Total Major Road
0-44	192900	221100	0	0		54133
45-49	2000	700	0	100		732
50-54	4300	1700	0	100		1725
55-59	14500	6000	100	100		6015
60-64	13400	5400	0	100		5423
65-69	7700	2900	100	0		2942
70-74	4400	1700	100	0		1736
>55	40700	16500	300	200	104.59	16460
>65	12900	5000	200	0	32.39	5022
>=70	5200	2100	100	0		2080
>=75	700	300	0	0	3.54	344
Total	239900	239800	300	400		73050

APPENDIX 9

Population Exposure, For Road Traffic, Dún Laoghaire-Rathdown County Council

All Road Dún Laoghaire\ Rathdown	LDEN Total 24Hr All Road Values	LNIGHT Total Night All Road Values	LDENQF No Of People with Quiet FaçadeTotal All Road	LNIGHTQF No Of People with Quiet FaçadeTotal AllRoad	LDEN Area Area Exposed(Km2) Total AllRoad	No. Of Dwellings Exposed (LDEN)Total AllRoad
0-44	100	5000	0	0		65
45-49	1200	21800	0	0		524
50-54	6500	106500	0	300		2656
55-59	34600	30700	0	500		14146
60-64	99000	23100	400	2500		40394
65-69	25400	6700	500	2600		10581
70-74	21000	100	2600	0		8875
>55	186200	60700	6000	5600	95.62	76616
>65	52600	6900	5500	2600	22.23	22076
>=70	27100	100	5100	0		11495
>=75	6100	0	2500	0	2.74	2620
Total	193900	193900	6000	5900		79861

Major Road Dún Laoghaire\ Rathdown	LDEN Total 24Hr Major Road Values	LNIGHT Total Night Major Road Values	LDENQF No Of People with Quiet FaçadeTotal Major Road	LNIGHTQF No Of People with Quiet FaçadeTotal Major Road	LDEN Area Area Exposed(Km2) Total Major Road	No. Of Dwellings Exposed (LDEN)Total Major Road
0-44	91700	92800	0	0		37600
45-49	100	7500	0	0		57
50-54	1800	46600	0	0		724
55-59	11700	21800	0	100		4764
60-64	47300	19000	0	500		19349
65-69	18300	6400	100	700		7599
70-74	17300	100	500	0		7293
>55	138400	47100	1300	1300	185.82	41480
>65	41200	6400	1300	800	94.81	17367
>=70	23100	100	1200	0		9768
>=75	5800	0	700	0	25.32	2475
Total	194000	194200	1300	1300		79861

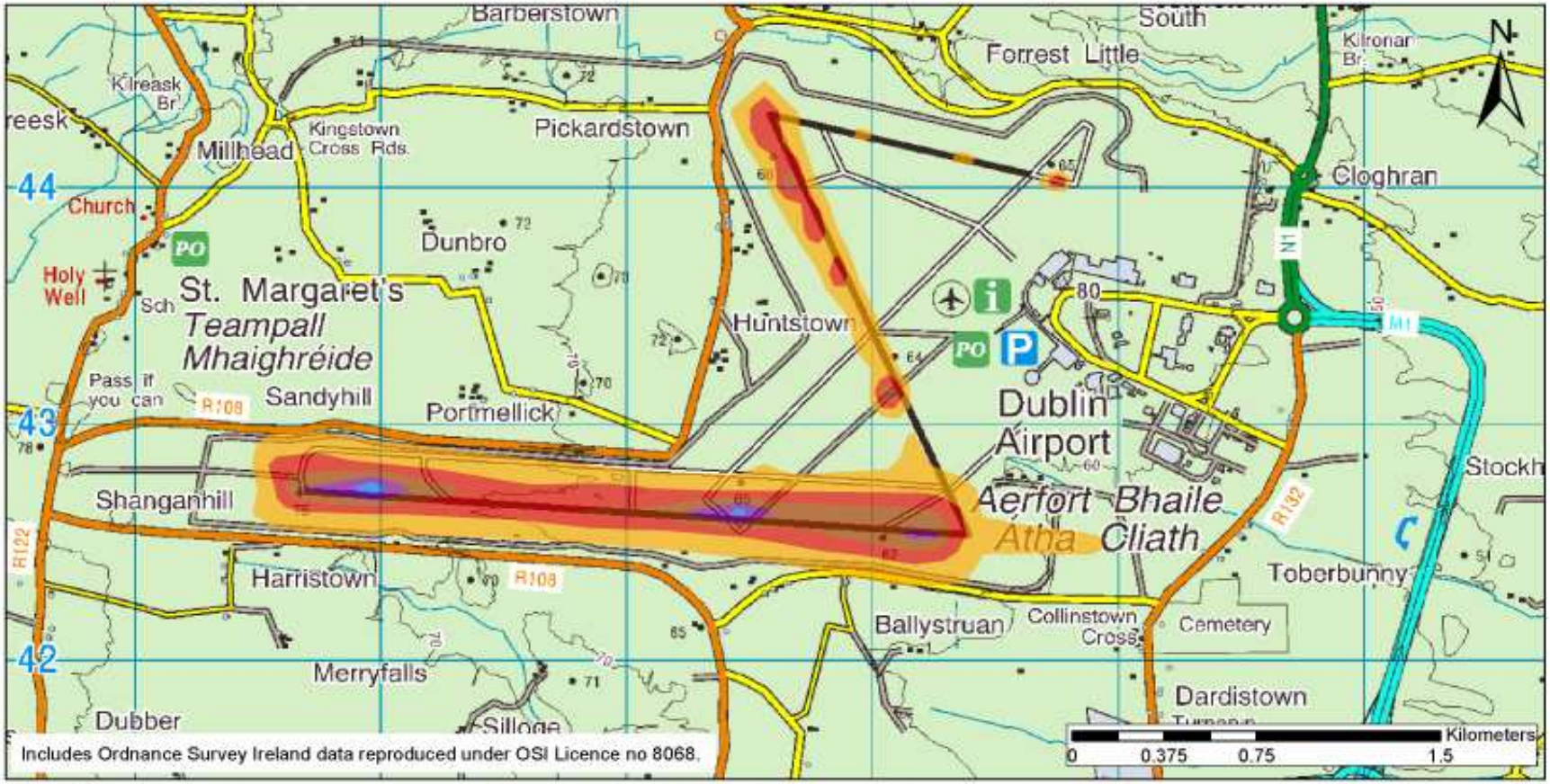
APPENDIX 10

Population Exposure, For Road Traffic, South Dublin County Council

All Road Sth. Dublin	LDEN Total 24Hr All Road Values	LNIGHT Total Night All Road Values	LDENQF No Of People with Quiet FaçadeTotal All Road	LNIGHTQF No Of People with Quiet FaçadeTotal AllRoad	LDEN Area Area Exposed(Km2) Total AllRoad	No. Of Dwellings Exposed (LDEN)Total AllRoad
0-44	11300	14100	0	0		3802
45-49	1100	46400	0	0		415
50-54	5400	80300	0	400		1870
55-59	84100	58100	300	200		29190
60-64	72400	30000	100	1100		24379
65-69	42900	16000	600	2100		14309
70-74	21800	2000	1600	500		7378
>55	229200	105900	700	500	140.1	78116
>65	72600	18000	300	150	54.74	24547
>=70	30900	2200	3300	500		10238
>=75	8000	0	1700	0	8.93	2860
Total	247000	246900	4300	4300		84203

Major Road Sth. Dublin	LDEN Total 24Hr Major Road Values	LNIGHT Total Night Major Road Values	LDENQF No Of People with Quiet FaçadeTotal Major Road	LNIGHTQF No Of People with Quiet FaçadeTotal Major Road	LDEN Area Area Exposed(Km2) Total Major Road	No. Of Dwellings Exposed (LDEN)Total Major Road
0-44	39,900	80200	3282	3526		13908
45-49	25900	50600	109	176		9166
50-54	46400	52500	273	178		16085
55-59	53300	35800	124	180		18092
60-64	42300	16900	273	161		13986
65-69	22300	9300	47	155		7326
70-74	11800	1500	216	6		3899
>55	134500	38100	713	504	160.32	45015
>65	39000	13800	316	158	60.637	12954
>=70	16700	1600	273	6		5640
>=75	5000	100	57	0	11.56	1741
Total	246900	246900	4381	4382		84203

APPENDIX 11



Dublin Airport Environmental Noise Regulations 2006

L-Night Contours

FLawler, EPA, 18/12/2007

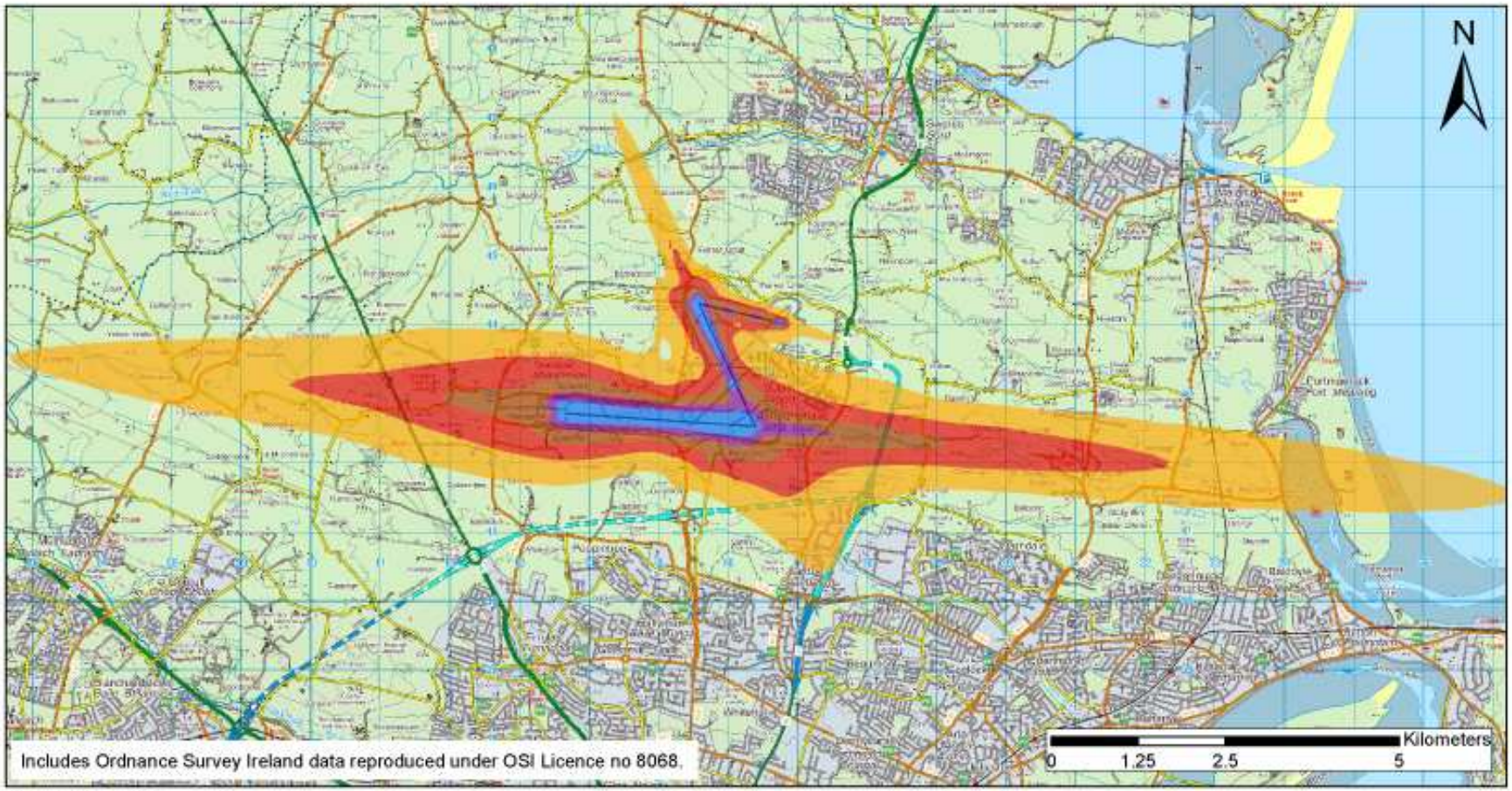
Legend

- 55 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- > 75

Statistics (expressed as hundreds)

Numbers of people Exposed to Lnight 50-54	agglomeration	0
Numbers of people Exposed to Lnight 55-59	agglomeration	0
Numbers of people Exposed to Lnight 60-64	agglomeration	0
Numbers of people Exposed to Lnight 65-69	agglomeration	0
Numbers of people Exposed to Lnight >70	agglomeration	0

APPENDIX 12



Dublin Airport
Environmental Noise
Regulations 2006

L-DEN Contours

FLawlor, EPA, 18/12/2007

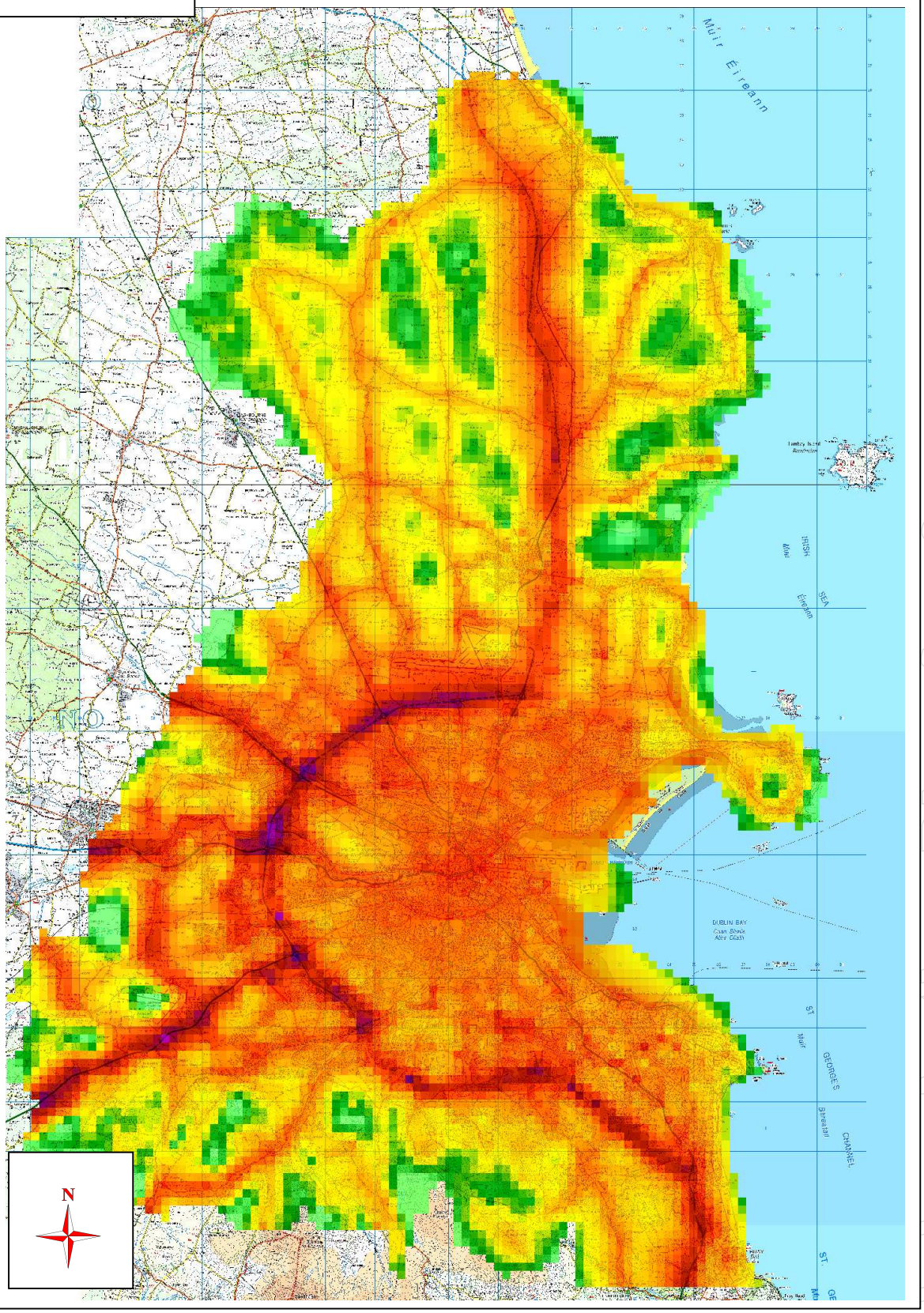
Legend

- 55 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- > 75

Statistics (expressed as hundreds)

Numbers of people Exposed to Lden 55-59	agglomeration	28
Numbers of people Exposed to Lden 60-64	agglomeration	2
Numbers of people Exposed to Lden 65-69	agglomeration	1
Numbers of people Exposed to Lden 70-74	agglomeration	0.1
Numbers of people Exposed to Lden >75	agglomeration	0

APPENDIX 13

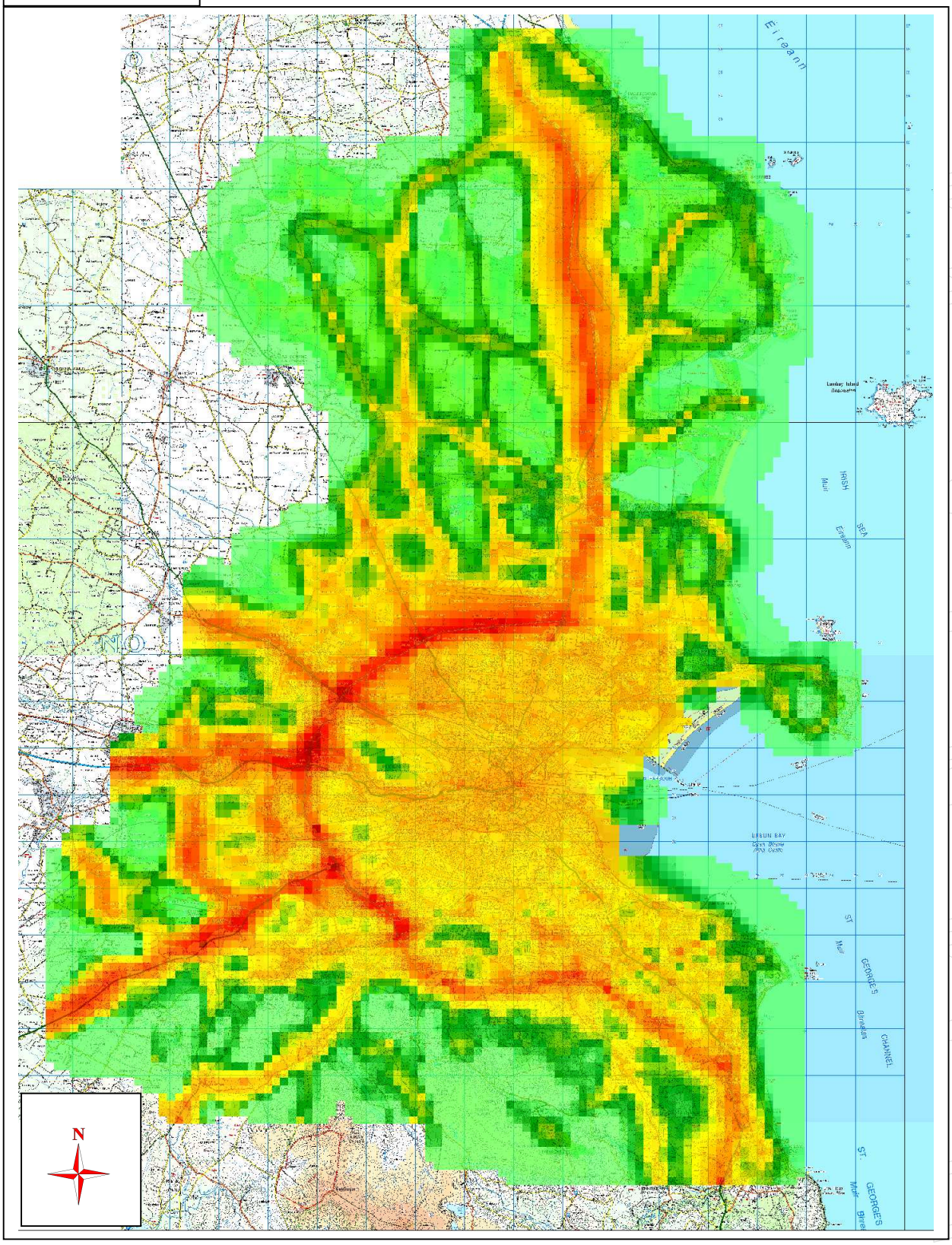


Values in d(B)A

- 85
- 80
- 75
- 70
- 65
- 60
- 55
- 50
- 45
- 40

24 Hour (LDEN) Traffic Sound Levels Dublin Agglomeration

APPENDIX 14



Values in d(B)A
- 85
- 80
- 75
- 70
- 65
- 60
- 55
- 50
- 45
- 40

Night Time (Lnight) Traffic Sound Levels
Dublin Agglomeration

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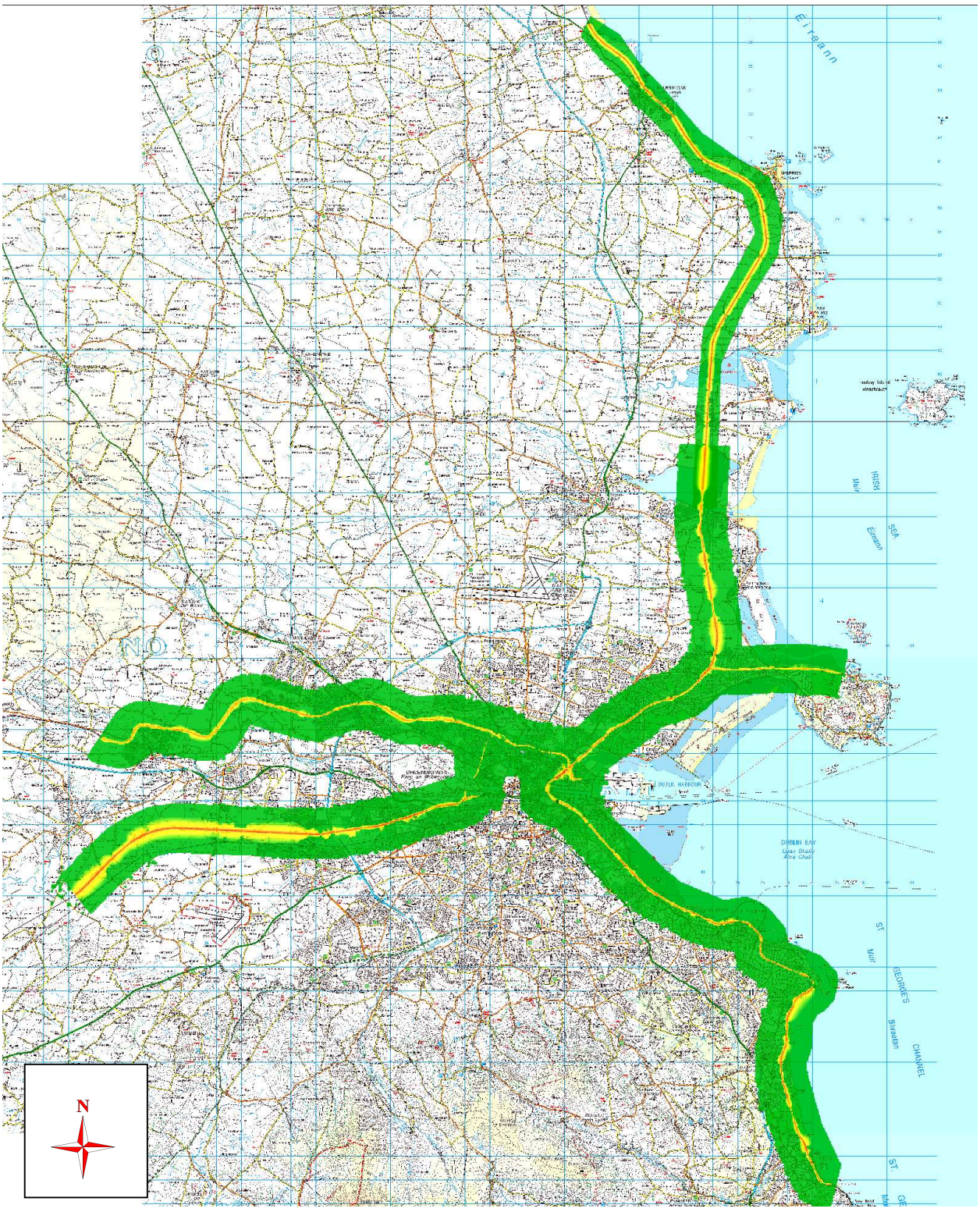
APPENDIX 15

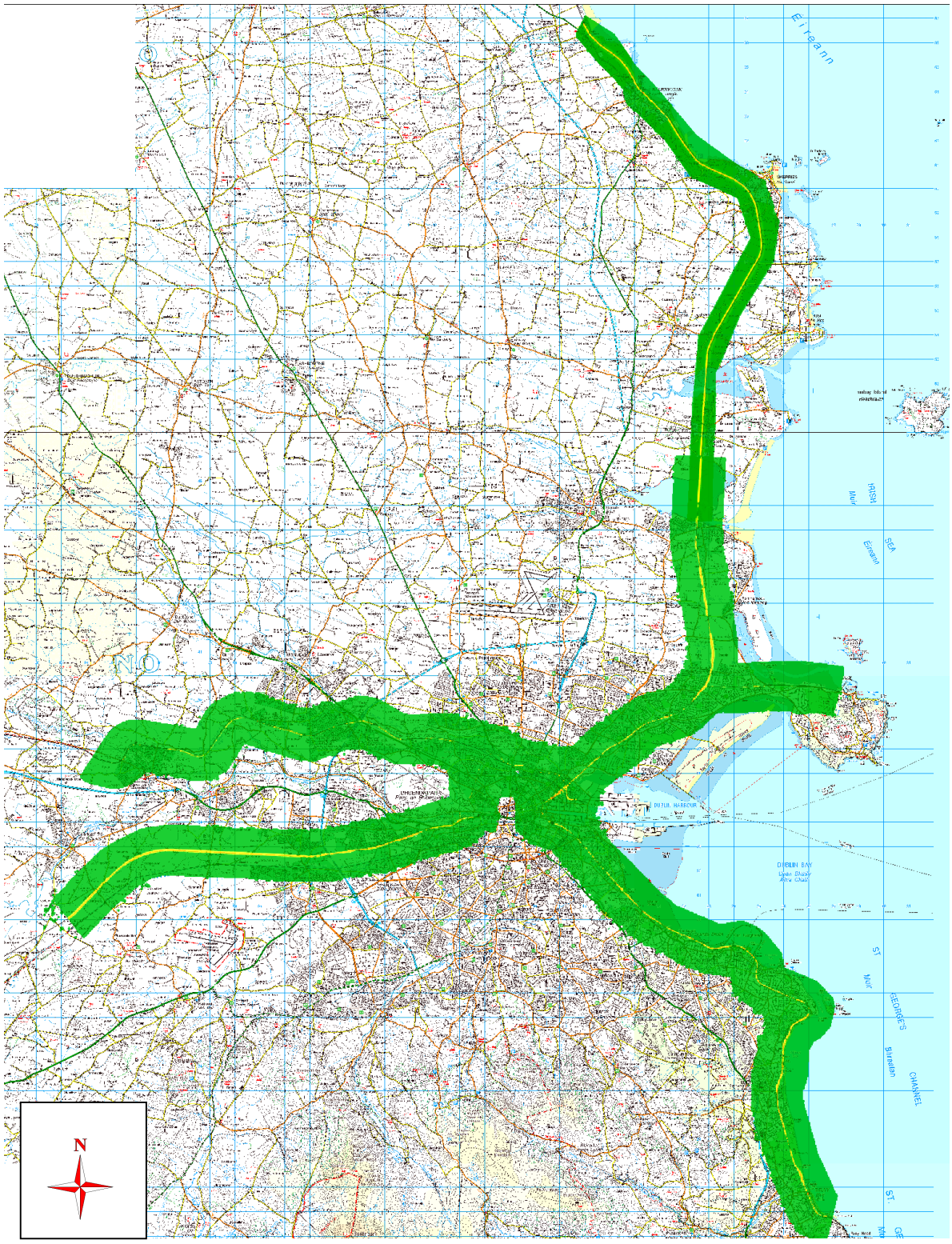


Values in d(B)A

- 85
- 80
- 75
- 70
- 65
- 60
- 55
- 50
- 45
- 40

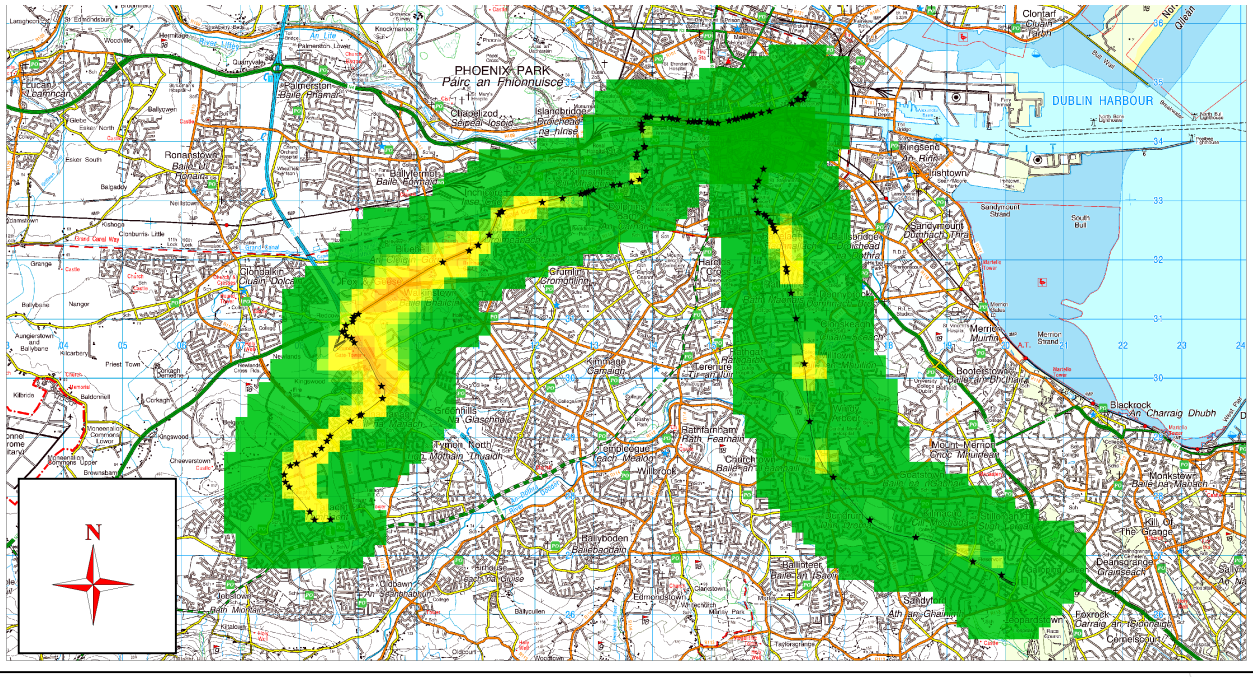
24 Hour LDEN Rail Sound Levels
Dublin Agglomeration

APPENDIX 16

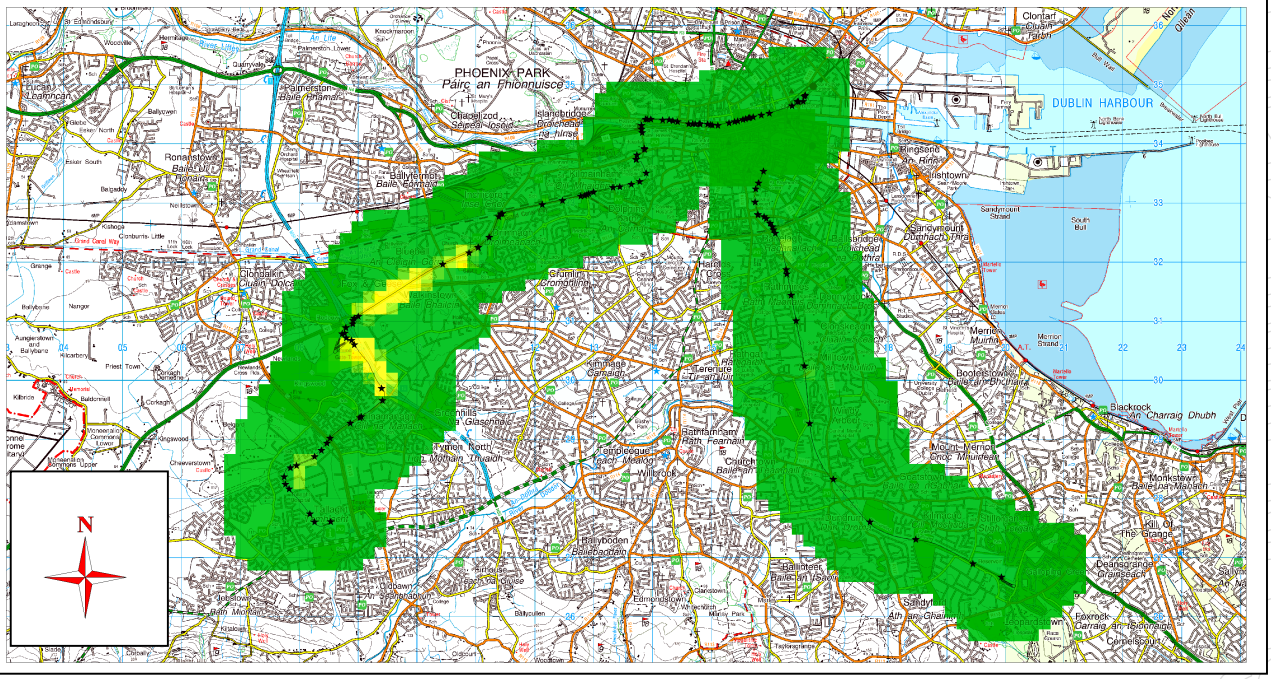


Night Time (Lnight) Rail Sound Levels
Dublin Agglomeration

APPENDIX 17



24 Hour LDEN LUAS Sound Levels
Dublin Agglomeration



Night Time (Lnight) LUAS Sound Levels
Dublin Agglomeration

Values in d(B)A

- 85
- 80
- 75
- 70
- 65
- 60
- 55
- 50
- 45
- 40