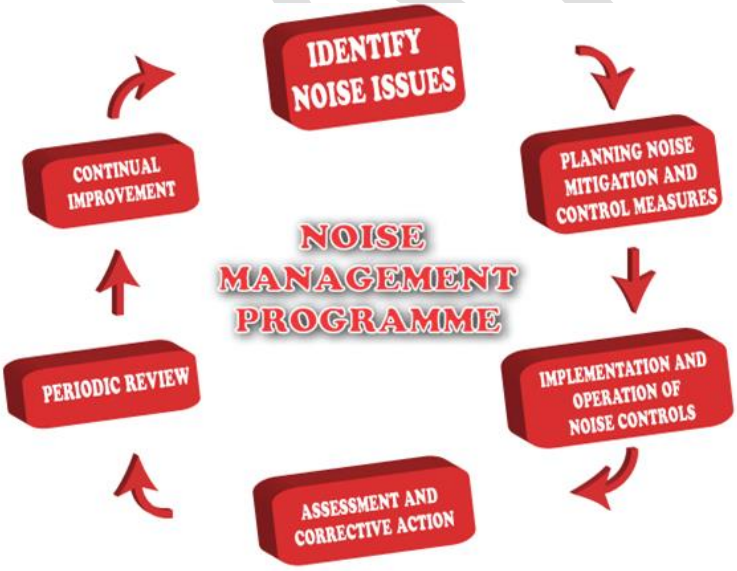
Draft Noise Action Plan 2018-2023

Submission to the EPA under the Environmental Noise Regulations, 2006

Traffic & Road Safety Section,
Municipal Services Department
Dún Laoghaire Rathdown County Council



March 2018

Executive Summary

Introduction

The key objective of the Dún Laoghaire-Rathdown County Council (DLRCC) Noise Action Plan 2018-2023 is to avoid, prevent and reduce, where necessary, on a prioritised basis the harmful effects, including annoyance, arising from long term exposure to environmental noise from road traffic and rail. This will be achieved by taking a strategic approach to managing environmental noise and undertaking a balanced approach in the context of sustainable development.

Legal Context

This Noise Action Plan has been prepared in accordance with the requirements of the Environmental Noise Regulations 2006, Statutory Instrument 140 of 2006. These Regulations give effect to the EU Directive 2002/49/EC relating to the assessment and management of environmental noise. This Directive sets out a process for managing environmental noise in a consistent manner across the EU and the Noise Regulations set out the approach to meeting the requirements of the Directive in Ireland.

Description of the Area

DLRCC varies substantially throughout the County from busy town centres to rural landscapes and developing suburban residential developments. It is bounded by the Irish Sea at the east of the County and by the Wicklow mountains in the South West of the County. The area of the County is approximately 127km^2.

Noise Mapping

The Regulations set out a requirement for the assessment of environmental noise through the development of strategic noise maps. The strategic noise maps were developed using Predictor noise mapping software. Within the DLRCC administrative area, strategic noise maps were developed for noise emanating from road traffic, rail (DART and heavy rail) and light rail (LUAS) sources. The noise mapping for rail and light rail sources were undertaken by Irish Rail and Transport Infrastructure Ireland (TII) respectively, whilst the noise mapping for road traffic noise was undertaken directly by DLRCC.

With regard to road traffic noise mapping, approximately 460 km of road was input into the models with 49% being designated as Major Roads i.e. carrying more than 8,220 vehicles per 24 hours. The area modelled was slightly larger than the area mapped as a two kilometre buffer outside the County boundary was included in the

noise model in order to take into consideration the influence of traffic outside of the area to be mapped.

Desirable and Undesirable Sound Levels

In line with the previous noise action plan, the following are the target values for desirable low and undesirable high sound levels in the Noise Action Plan 2018-2023:

Desirable Low Sound levels
< 50 dB(A) Lnight
< 55 dB(A) Lday

Undesirable High Sound levels
> 55 dB(A) Lnight
< 70 dB(A) Lday

Also, it is proposed to use the following absolute values as a criterion for defining a Quiet Area:

< 45 dB(A) Lnight
< 55 dB(A) Lday
< 55 dB(A) Lden

During the implementation of the noise action plan, it is proposed to identify locations that have noise levels below these criteria and review their use. If appropriate or necessary, locations will be identified as quiet areas where the existing noise levels are to be preserved or reduced if possible.

Summary of Actions

The key actions that will be implemented under the new Noise Action Plan 2018-2023 area listed under the following headings:

- Identify priority action areas;
- Develop Traffic Noise reduction and prevention measures;
- Develop Rail reduction and prevention measures;
- Include Noise in the Planning Process;
- Protecting 'Quiet Areas';
- Expand the existing Sound Monitoring Network; and
- Noise Complaint Investigation.

The Noise Action Plan 2018-1023 will be implemented through a staged process over 5 years, subject to resources being made available.

In 2021, DLRCC will carry out a review of the actions implemented and polices developed under this action plan. Progress and results will be evaluated using information gathered through local assessment of environmental noise exposure. A review of new noise maps will also be carried out, giving an indication of the change in environmental noise levels and the numbers of people exposed.

Contents

Appendices

1. Introduction

1.1 Background

This Environmental Noise Action Plan has been developed Dún Laoghaire - Rathdown County Council (DLRCC) in its role as designated Action Planning Authority under Article 7 of the Environmental Noise Regulations 2006, Statutory Instrument Number 140 of 2006 (the Regulations).

The Noise Action Plan is aimed at managing environmental noise and excludes noise from domestic activities, noise created by neighbours, noise at workplaces or construction noise as these can be dealt with under existing legislation such as the Environmental Protection Agency Act 1992 and Health & Safety legislation.

The aim of this document is to provide an overview of the regulations, to review the results of the latest strategic noise maps for DLRCC and to set out an approach to the strategic management and control of environmental noise over the next five years. It also provides the basis for feedback and input from the statutory authorities and the public to help inform the Noise Action Plan for DLRCC.

1.2 Sound and Effects of Noise

Noise can be characterised as "unwanted sound" or "sound that is loud, unpleasant or unexpected", (European Commission Green Paper). Prolonged exposure to noise can lead to serious health effects mediated by the human endocrine system and by the brain, such as sleep disturbance, cardiovascular diseases, annoyance (a feeling of discomfort affecting general well-being), cognitive impairment and mental health problems. It can also cause direct effects such as tinnitus. The effects of exposure to noise impact EU economies. They can lead to a loss of productivity of workers whose health and well-being are affected by noise, put a burden on health care systems and cause a substantial depreciation in real-estate value.

Sound levels are expressed in decibels (dB) on a logarithmic scale, where 0 dB is nominally the "threshold of hearing" and 120 dB is nominally the "threshold of pain". One effect of using the decibel scale is that a doubling of the sound energy results in a 3 dB increase in the sound level.

Figure 1.1 below provides an overview of common sound levels on the dB(A) scale as outlined in the NRA (now TII) Guidelines for the Treatment of Noise and Vibration in National Road Schemes, 2004. From this, we can see that the sound in a quiet bedroom is about 35 dB(A) and the sound in a busy office is about 60 dB(A).

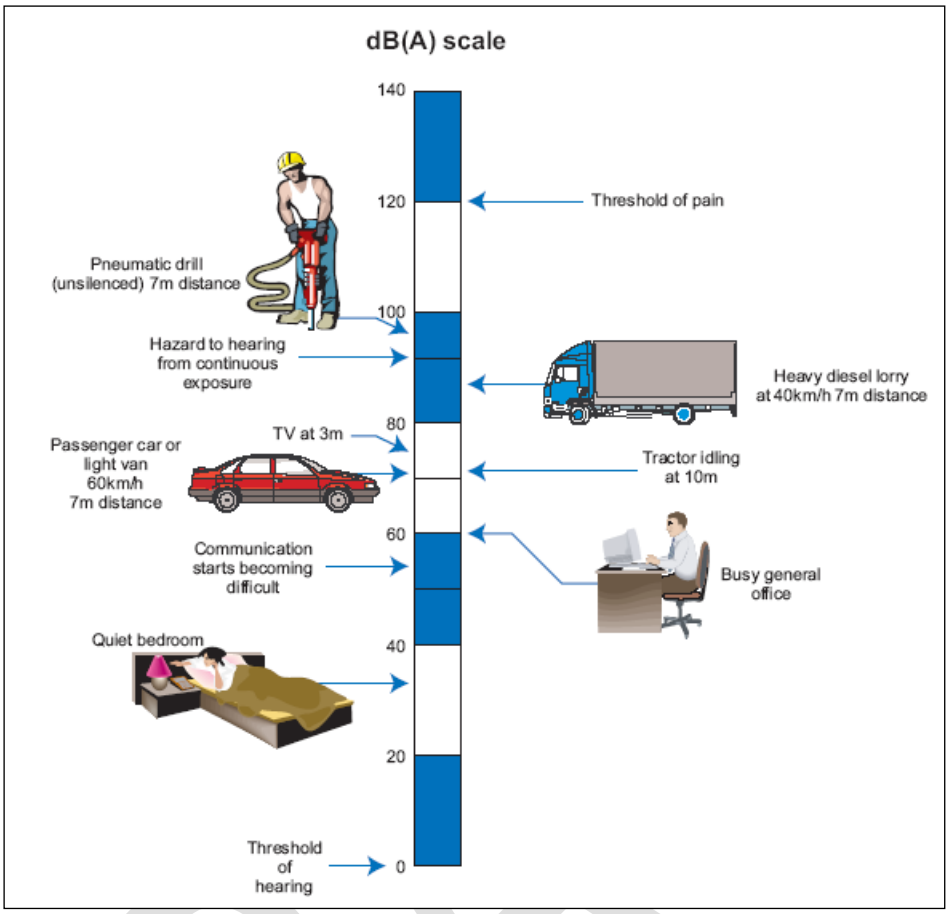


Figure 1.1 Levels of Typical Common Sounds on the dB(A) Scale (NRA, 2004)

Environmental noise, commonly called noise pollution, is among the most frequent sources of complaint regarding environmental issues in Europe, especially in densely populated urban areas and residential areas near highways, railways and airports, (WHO, European office). People are exposed to different sources of noise, including:

- Transport (road traffic, rail traffic, air traffic);
- Construction and industry;
- Community sources (neighbours, radio, TV, bars, restaurants);
- Social and leisure sources (portable music players, fireworks, etc.);
- Indoor noise sources (ventilation systems, office machines, home appliances and neighbours).

Noise disturbance can contribute greatly to diminishing people's quality of life. Unwanted sound (noise) of sufficient intensity and duration can cause temporary and/or permanent hearing loss. It can also interfere with speech communication, the transmission of other auditory signals, can disturb sleep and can act as a general

source of annoyance or disturbance and interfere with the performance of complicated tasks and the opportunity for privacy. In particular, exposure of people to daytime noise levels above 65 dB(A) can cause severe health problems. In general, sound levels in cities can range between 60-70 dB(A), with suburban levels between 50-60 dB(A).

In 2009, the WHO European Regional Office published the '*Night Noise Guidelines for Europe'.* It presented new evidence on the health damage of night time sound exposure and recommended threshold values that, if exceeded at night, would threaten health. An annual average night exposure not exceeding 40 dB(A) outdoors is recommended in the WHO guidelines. It is recommended that this level should be the target for night noise guidelines to protect the public, including the most vulnerable groups such as children, the chronically ill and the elderly. A night time level of 55 dB(A) is recommended as an interim target for countries that cannot meet these night noise guidelines in the short term and where policy-makers choose to adopt a stepwise approach.

In 2011 the European Regional Office of the WHO published a document entitled '*Burden of Disease from Environmental Noise'*. It suggests that there is overwhelming evidence that exposure to environmental noise has adverse effects on human health. The publication provides an evidence base for the future development of suitable guidelines on noise. It supports the recommendations as set out in the '*Night Noise Guidelines for Europe*' publication and supports this view based on a review of evidence based assessments of the impact of noise on health.

Noise pollution remains a major environmental health problem in Europe, with the transport sector being a major cause. According to the European Environment Agency (EEA) report titled 'Managing exposure to noise in Europe', Road traffic noise is the dominant source affecting human exposure above the EU's threshold of 55 decibels (dB) for daily exposure and 50 dB for night exposure. Also in the report, it is stated that around 100 million people are exposed to road traffic noise above 55 dB in the 33 member countries of the EEA. Of these, 32 million are exposed to very high noise levels (above 65 dB). Railways are the second largest source, with 19 million people exposed above 55 dB. Aircraft noise, close to major airports, is the third main source, with more than 4.1 million people exposed, followed by industrial noise within urban areas, with 1.0 million people exposed.

1.3 Purpose and Scope of the Environmental Noise Directive

In 2004 the European Commission adopted Directive 2002/49/EC, which relates to the assessment and management of environmental noise. This directive is commonly referred to as the Environmental Noise Directive.

The aim of the Environmental Noise Directive is to identify a European Union common approach aimed at avoiding, preventing or reducing the negative and harmful effects due to exposure to environmental noise. In the Directive's provisions, environmental noise is defined as 'unwanted or harmful outdoor sound created by human activity, such as noise emitted by means of transport, road traffic, rail traffic, air traffic and industrial activity'. The Directive indicates a number of actions that need to be progressively implemented by Member States in order to achieve the objectives of the Directive. These actions relate to four main principles:

- **Monitoring of environmental noise** – Member States must develop strategic noise maps, using a common methodology, in order to determine the exposure to environmental noise in priority areas in their territories;
- **Managing environmental noise issues** – On the basis of the developed strategic noise maps, Member States have to adopt noise action plans containing measures designed to address noise issues, including noise prevention / reduction and preserving environmental noise quality where it is good;
- **Public information and consultation** – Strategic noise maps, noise action plans and relevant information about noise exposure, its effects and measures to be considered to address environmental noise issues should be made available to the public or developed in consultation with the public;
- **Development of European Union long-term strategy** – With a view to reducing noise emitted by the major sources (in particular road and rail vehicles and infrastructure, aircraft, outdoor and industrial equipment), the EU Member States should cooperate in order to provide a framework for EU policies addressing environmental noise issues.

The Directive applies to environmental noise to which humans are exposed, particularly in industrial or build-up areas, public parks and in other quiet areas in agglomerations and in open country, near schools, hospitals, etc. However, the Directive does not apply to noise caused by the exposed person, noise created by domestic activities or neighbours or noise at workplaces. Member States are obliged to

designate competent national authorities responsible for the implementation of the Directive.

The Environmental Noise Directive requires all European Union (EU) Member States to produce strategic noise maps for the main sources of environmental noise, i.e. major roads, major railways, major airports and all sources within agglomerations with a population of more than 250,000 persons in 2007, and those with a population of more than 100,000 persons in 2012 and subsequent rounds.

One of the objectives of the Directive is to establish a common approach to assess the exposure to environmental noise throughout the European Union. Article 6.2 empowers the European Commission to establish common assessment methods for the determination of the noise indicators Lden (day-evening-night equivalent level) and Lnight (night equivalent level). Article 6.2 of the Directive foresaw the development of a harmonised methodological framework for noise assessment and, in 2009, the Commission decided to develop CNOSSOS_EU (Common Noise aSSessment MethOdS) for noise mapping of road traffic, railway traffic, aircraft and industrial noise.

On the 19th May 2015 European Commission Directive (EU) 2015/996 was published. This Directive sets out common data requirements and a common assessment method for determining the values of Lden and Lnight by computation. Member States are required to use these methods from 31 December 2018 onwards. This methodology will be adopted for the 4th Round of Noise Mapping.

1.4 Purpose and Scope of the Noise Regulations

The purpose and scope of the regulations are set out in the statutory instrument S.I No. 140 of 2006, which transposes EU Directive 2002/49/EC relating to the assessment and management of environmental noise. It states that for the purposes of these Regulations, environmental noise means 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.

The Regulations set out to deliver the implementation in Ireland of a common approach to avoid, prevent or reduce on a prioritised basis the harmful effects, including annoyance, due to exposure to environmental noise. This is to be done through a two-stage process. Firstly, noise must be assessed through the preparation of strategic noise maps for areas and infrastructure falling within defined criteria, e.g. large agglomerations, major roads, railways and airports. Secondly, based on the

results of the mapping process, the Regulations require the preparation of noise action plans for each area concerned. The fundamental objective of noise action plans is the prevention and reduction of environmental noise.

The Regulations provide for strategic noise maps and noise action plans to be made available to the general public. They also provide for public consultation to take place on the proposed action plans and for the results of public consultation to be taken into account in finalising action plans or in the review of action plans.

1.5 Role and Responsibilities of Designated Bodies

The Regulations designate the EPA as the national authority for the purposes of the Regulations. The role of the Agency includes supervisory, advisory and coordination functions in relation to both noise mapping and action planning, as well as reporting requirements for the purpose of the Directive.

The Regulations designate noise-mapping bodies and action planning authorities for the making of strategic noise maps and action plans. Primary responsibility for both noise mapping and action planning is assigned to local authorities. While a number of other bodies also have noise mapping functions, these bodies will carry out their functions on behalf of the local authorities concerned.

1.5.1 Noise Mapping Bodies

A strategic noise map is defined within the Environmental Noise Directive as a map designed for the global assessment of noise exposure in a given area due to different noise sources for overall predictions for such an area' (EU, 2002).

The roles of the Irish noise mapping bodies are set out in the Environmental Noise Regulations 2006. Table 1.1 outlines the organisations that have been designated as noise-mapping bodies under the regulations:

Table 1.1 Designated Noise Mapping Bodies	
For the agglomeration of Dublin	Dublin City Council and the County Councils of Dún Laoghaire/Rathdown, Fingal and South Dublin
For the agglomeration of Cork	Cork City Council and Cork County Council
For major roads	The Transport Infrastructure Ireland (TII) , for national roads classified in accordance with Section 10 of the Roads Act 1993 (No.14 of 1993), and the relevant road authority, or authorities, for major roads not classified as national roads
For major railways -	Iarnród Éireann (Irish Rail) or the Railway Procurement Agency (now known as TII), as appropriate;
For major airports	The relevant airport authority.

Following the second round of noise mapping in 2012, each designated noise mapping body was required to make a strategic noise map during 2017, for each of the following areas in respect of data from 2016:

- An agglomeration with more than 100,000 inhabitants;
- Any major road with more than 3 million vehicle passages per year (approximately 8,220 per day);
- Any major railway with more than 30,000 train passages per year (approximately 82 per day); and
- Any major airport with more than 50,000 aircraft take-off or landing movements per year (approximately 137 per day).

DLRCC submitted the required Noise Mapping Report to the EPA in January 2018. A key element in the production of maps is that they are sufficiently accurate and detailed to satisfy any public appraisals as public engagement is a central objective of the Environmental Noise Directive.

1.5.2 Noise Action Planning Bodies

Action planning authorities are responsible for the making and approving of Noise Action Plans, in consultation with the EPA and the noise mapping body for the relevant noise map. Under the Regulations, the organisations listed in Table 1.2 have been designated as action planning bodies:

Table 1.2 Designated Noise Action Planning Bodies	
For the agglomeration of Dublin	Dublin City Council and the County Councils of Dún Laoghaire Rathdown, Fingal and South Dublin.
For the agglomeration of Cork	Cork City Council and Cork County Council.
For major railways	The local authority or local authorities within whose functional area or areas the railway is located.
For major roads	The relevant local authority or local authorities within whose functional area or areas the road is located.
For major airports	The local authority or local authorities within whose functional area the airport is located.

Accordingly DLRCC is designated as the Noise Action Planning Authority for all roads (including major roads**), major railways, major airports and major industry within its administrative area. DLRCC are also required to contribute to an overall Dublin Agglomeration Noise Action Plan.

** *Major Roads are defined as roads which experience a volume of traffic greater than 3 million vehicle passages per year.*

DLRCC are required to ensure the following:

- The public are consulted on proposals for noise action plans;
- The public are given early and effective opportunities to participate in the preparation and review of action plans;
- The results of public participation are taken into account in finalising action plans or reviews of action plans;

- The public are informed of the decisions taken in relation to action plans;
- Reasonable time-frames are adopted to allow sufficient time for each stage of public participation.

1.6 Key Phases

The Environmental Noise Directive sets out a process for managing environmental noise in a consistent manner across the EU and the Regulations set out the approach to meeting the requirements of the Directive in Ireland. Responsibility for undertaking the phases of work required under the Regulations is shared between the noise mapping bodies and the action planning authorities.

Noise Action Plans are required to be reviewed and revised every five years. The 3rd Round of mapping for DLRCC was completed in December 2017. The following timetable applies with regard to the Noise Action Plan for the 3rd Round:

Round 3 dates for the noise action planning tasks are as follows:

- March 2018: Draft Noise Action Plans to be submitted to the EPA for review;
- April to June 2018: Public consultation (6 – 8 weeks) on Draft Noise Action Plan;
- 18 July 2018: Draft Action Plans (including comments) are to be "drawn up" prior to this date;
- September 2018: Action Plans to be submitted to the EPA for final review;
- 18 January 2019: Details of noise control programs and measures to be reported to the EC by the EPA for 3rd round – ENDRM DF9; and
- 18 January 2019: Summary Noise Action Plans to be reported to the EC by the EPA for 3rd round – ENDRM DF10.

2. Existing Noise Management Legislation and Guidance

2.1 National and Local Legislation, Regulations and Guidance

In addition to European Commission regulations, there is national legislation and guidance and local policy that relate to the management and control of environmental noise. The following provides an overview of the relevant literature.

2.2 Environmental Protection Agency Act 1992

The existing statutory provisions have primarily come about from the EPA Act of 1992. The Act identifies noise as a form of environmental pollution and contains provisions for dealing with noise 'which is a nuisance, or would endanger human health or damage property or harm the environment'. Sections 106 to 108 of the Act are of direct relevance to noise, and can be summarised as follows:

- Section 106 gives the relevant Minister certain powers to regulate noise that may give rise to a nuisance or be harmful to health or property.
- Section 107 gives powers to local authorities and the EPA to serve notice to take steps to control noise from any premises, process or work;
- Section 108 sets out a process whereby noise issues may be taken to the District Court, which may make an order requiring that the person or body responsible for the noise takes steps to eliminate or ameliorate the noise in question.

The powers set out within the EPA Act 1992 largely relate to the control of noise nuisance, and therefore may be applicable to neighbourhood noise, music, industry or other such activities. Arising from the Act, Dún Laoghaire Rathdown County Council has developed policy statements dealing with issues arising from the provisions with the 1992 Act that can be found on the following link:
http://www.dlrcoco.ie/en/environment/environmental-health/noise-pollution

2.3 Irish Roads Act 1993

The Roads Act 1993 grants powers to the Minister, under Section 77, to make regulations requiring relevant road authorities to take measures to mitigate the effects of road traffic noise. The Act also empowers the Minister to specify limits for road traffic noise which would lead to a requirement for mitigating measures by roads authorities, if exceeded. At present there are no limit values or standards for controlling road traffic noise, or its assessment on either new or existing roads.

In the absence of a regulatory assessment method or limit values the National Road Authority (now know as TII) published the document *'Guidelines for the Treatment of*

Noise and Vibration in National Road Schemes' in 2004. A further good practice guide was issued by Transport Infrastructure Ireland (formerly the NRA) in 2014 titled 'Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes'. The new Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes is based on the lessons learned from post EIA noise evaluations studies and research undertaken on the design of noise barriers. It provides advice and information for use by acousticians and it is also relevant for traffic, motorway and pavement engineers. The advice supplements the original noise guidelines and it should be read in conjunction with that document.

The guidelines indicate that all new national road schemes should be designed, where feasible' to meet a day-evening-night sound level of 60 dB Lden in the opening year and design years. Essentially what this means is that for any new road scheme the Environmental Impact Statement must take this target into account with regard to any existing sensitive residential property likely to be affected by the road scheme.

2.4 Irish Planning Guidance

Local Authorities can set conditions relating to noise as part of a planning permission. However, there is currently no national policy or guidance that addresses the issue of noise during planning leading to inconsistencies in relation to both the assessment and conditioning of planning applications.

On 16 February 2018, the Government launched *Project Ireland 2040* comprising the National Development Plan 2018-2027 (NDP) and the National Planning Framework (NPF). The former is designed to commit significant Exchequer funding over the next decade to help support the spatial planning objectives of the NPF. Under Chapter 9 of the NPF, Policy Objective 65 relates to noise as follows:

"Promote the pro-active management of noise where it would have significant adverse impacts on health and quality of life and support the aims of the Environmental Noise Regulations through national planning guidance and Noise Action Plans".

Three Regional Spatial and Economic Strategies that are currently being prepared and will include new Metropolitan Area Strategic Plans for the cities of Dublin, Cork, Limerick, Galway and Waterford will guide where population increase and economic growth is to be focused.

2.4.1 Planning Design Guidance

The following lists a number of documents relating to sustainable development in the urban environment:

- Design Manual for Urban Road and Streets, April 2013;
- Our Sustainable Future, A Framework for Sustainable Development in Ireland, June 2012;
- Sustainable Urban Housing: Design Standards for New Apartments (Guidelines for Planning Authorities), March 2018;
- Sustainable Residential Development in Urban Areas: Guidelines for Planning Authorities, May 2009;
- Urban Design Manual: A best practice guide (A companion document to the Draft Planning Guidelines on Sustainable Residential Development in Urban Areas), February 2008.

The Guidelines for Sustainable Residential Development highlight the need to 'Deliver a quality of life which residents and visitors are entitled to expect, in terms of amenity, safety and convenience'. They go on to state that 'Privacy is an important element of residential amenity'. Whilst they are not mentioned specifically, it is appropriate to consider environmental noise and noise transfer between dwellings in respect of amenity and privacy. The recently published new design standards for New Apartments make very little reference to noise.

The Urban Design Manual lists Privacy & Amenity as one of twelve key issues, with specific reference to the need to prevent sound transmission in homes by way of appropriate acoustic insulation or layout. There is some comment in relation to the use of appropriate building materials and also the zoning of dwellings to minimize the potential for excessive noise transfer.

2.5 IPPC Licensing

Certain activities that are required to be licensed may be subject to controls relating to sound emissions. The relevant guidance is set out in the EPA document, '*Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)*' was originally published in April 2012 and was updated in 2016. This revised Noise Guidance Note (NG4) is intended to assist licensed sites with the assessment of their potential and actual noise impact on the local environment. It recommends a "Best Available Technique" approach to the assessment and mitigation of noise pollution.

2.6 Wind Energy Planning Guidelines

With specific regard to wind energy developments, Department of the Environment, Heritage and Local Government guidance suggests a *'lower fixed limit of 45 dB(A) or a maximum increase of 5 dB(A) above background noise at nearby noise sensitive locations'*. The latter requirement may be relaxed in areas with low background levels. A fixed limit of 43 dB(A) at night-time is deemed appropriate by DoEHLG as there is no requirement to protect external amenity. A review is currently underway on the Wind Energy Guidelines as announced in June 2017.

2.7 Quarries and Ancillary Activities

EPA Guidance on Quarries and Ancillary Activities in 2004 contain a discussion of the primary sources of noise associated with quarrying and offers guidance in relation to the correct approach to be followed in respect of assessment and mitigation. Suggested noise limit values are 55dB $L_{Aeq,1hr}$ and 45dB $L_{Aeq,15min}$ for daytime and night-time respectively, although it suggests that more onerous values may be considered appropriate in areas with low levels of pre-existing background noise. EPA guidance also states that *'blasting should not give rise to air overpressure values at the nearest occupied dwelling in excess of 125 dB(Lin) maximum peak with a 95% confidence limit'*.

2.8 Building Regulations 1997 - 2014

The design and construction of buildings is regulated under the Building Control Acts 1990 to 2014, in order to ensure the safety of people within the built environment. The current Irish Building Regulations call for certain constructions to offer *'reasonable resistance'* to both airborne and impact sound. In the absence of any form of objective criteria, reference is often made to the guidance values put forward in the *'Similar Construction'* method described in Technical Guidance Document E.

The Regulations apply to the transmission of sound between adjoining residential dwellings, such as within apartment blocks, or semi-detached properties, they do not relate to the transmission of sound from the outside environment into the living accommodation.

The Department of Housing, Environment, Community and Local Government (DoHECLG) published new Building Regulations pertaining to sound in December 2014. An updated and enhanced Technical Guidance Document (TGD) E Sound followed in January 2015. The key aspects of the new guidance may be summarised as follows:

- For the first time in Ireland, minimum standards of sound insulation

performance have been used to define 'reasonable resistance to sound';

- Reverberation in common internal parts of buildings has been introduced as an issue requiring consideration, and;
- Mandatory pre-completion testing is required in order to demonstrate compliance with the requirements of the regulations.

2.9 Regional or Local Legislation or Guidance

This document is a Noise Action Plan for Environmental Noise generated mainly by road traffic in the County. Currently there is no regional or local legislation relating to noise. However, there are a number of guidance documents that are relevant in the context of noise action planning, including:

2.9.1 Regional Planning Guidelines

The Regional Planning Guidelines for the Greater Dublin Area 2010-2022 set out the planned direction for growth within the Greater Dublin Area up to 2022 by giving regional effect to national planning policy. Within the RPG's it is stated that, 'Planning policies need to consider the added health burden from the effects of air and noise pollution, road traffic accidents, sedentary lifestyles, lack of safe community space or spaces with poor access…'. Reference is also made to noise mitigation in the design of Green infrastructure in the guidelines. Section 2.4 of this Noise Action Plan also makes reference to noise in the Draft National Planning Framework 2040.

2.9.2 Development Plans and Local Area Plans

Transportation, environment and development control policies and objectives that aim to reduce the negative and harmful effects arising from the exposure to environmental noise are contained in the Development Plans and Local Area Plans of each of four Dublin Local Authorities, with details of policies shown on their websites.

2.9.3 Transportation Policy for the Greater Dublin Area

There are on-going sustainability policies being implemented at a regional and local level that aim to increase the mode share of sustainable travel modes in the Dublin region with a resultant reduction in noise and air pollution levels arising from less car traffic on the roads: These are as follows:

- **Transport strategy for the Greater Dublin Area, 2016 to 2035.**
  This transport strategy provides a framework for the planning and delivery of transport infrastructure and services in the Greater Dublin Area (GDA) over the next two decades. It also provides a transport planning policy around which other agencies involved in land use planning, environmental protection, and delivery of other infrastructure such as housing, water and power, can align their investment priorities. Little reference is made on noise in this document.

- **Smarter Travel – A Sustainable Transport Future 2009-2020**
  This sets out a broad vision for the future and establishes objectives and targets for transportation. It also supports greater integration between spatial planning and transport policy and sets a target to reduce car based commuting from 65% to 45% by 2020. No reference is made to noise in this document.

- **National Cycle Policy Framework 2009-2020**
  This sets out actions to deliver a new culture of cycling in Ireland by 2020, with 10% of all trips to work being made by bicycle by 2020.

2.9.4 County Development Plan

Policies were included in the County Development Plan 2016-2022 to ensure noise was considered as part of major development and as part of development alongside rail lines and along main strategic roads, in particular Policy ST28 dealing with traffic noise and Section 8.292 dealing with Noise Pollution.

3. Description of the Action Planning Area

3.1 Introduction

Under the Environmental Noise Regulations 2006, the four 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 action planning authorities for the following categories within their areas:

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

Before producing and implementing the Noise Action Plan, the Local Authorities must consult with the EPA and the noise-mapping body for the noise-map involved, i.e. Transport Infrastructure Ireland, Iarnród Éireann, and Dublin Airport Authority. 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.

3.2 Description of Topography

DLRCC varies substantially throughout the County from busy town centres to rural landscapes and developing suburban residential developments. It is bounded by the Irish Sea at the east of the County and by the Wicklow mountains in the South West of the County. The area of the County is approximately 127km^2.

3.3 Extent of Action Planning Area

Figure 3.1 shows a map of Dún Laoghaire Rathdown County Council. Based on the 2016 Census data, the population of the County now stands at 217,274, an increase of 5.3% or 11,013 people from 2011 with population increases occurring across the County. The housing stock also rose during this period to approximately 87,700 dwellings in 2016.

Figure 3.1 Map of Dún Laoghaire Rathdown County Council

The entire County was mapped in Round 3 including the area in the First Schedule of the Air Pollution Act 1987 (Marketing, Sale and Distribution of Fuels) Regulations 1998 (S.I. No. 118 of 1998) as follows:

1. The District Electoral Division of Tibradden,
2. That parts of the District Electoral division of Glencullen situated west of an imaginary line drawn as follows: Commencing at the junction of Slate Cabin Lane and Woodside Road, thence in a south-easterly direction and proceeding along Woodside Road and Ballyedmonduff Road to the county boundary at Glencullen Bridge.

3.3.1 Roads

Approximately 460km of road was input into the noise calculation models with 49% being designated as Major Roads i.e. carrying more than 8,220 vehicles per 24 hours. The area modelled was slightly larger than the area mapped as a two kilometre buffer outside the County boundary was included in the model in order to take into consideration the influence of traffic outside of the area to be mapped in the County.

3.3.1.1 Traffic

In recent years there have been significant changes in vehicle ownership and traffic flows on roads as economic activity and employment levels have been growing. Table 3.1 outlines the changes in numbers of licensed vehicles from 2010 to 2016.

Table 3.1 Number of licensed Vehicles in Dublin and Nationally			
Year	**Dublin City and County**	**Goods Vehicles Dublin**	**Nationally**
2010	595,322	59,512	2,416,387
2011	595,033	58,215	2,425,156
2012	592,841	56,570	2,403,223
2013	596,418	57,203	2,482,557
2014	605,546	57,766	2,515,322
2015	620,469	61,724	2,570,294
2016	637,297	66,621	2,624,958
2010 to 2016 – diff	41,975	7,109	208,571
2010 to 2016 - %	7.1%	11.9%	8.6%
2014 to 2016 - %	5.2%	15.3%	4.4%
Source: Irish Bulletin of Vehicle and Driver statistics 2010 to 2016, DoEHLG / DTTaS			

From Table 3.1, we can see that over the period 2010 to 2016, there has been an increasing trend in the number of licensed vehicles in Dublin City and County and nationally with a higher increase in Goods Vehicles in the Dublin area.

Table 3.2 outlines the trend in traffic flows on the main national roads in the County over the period 2014 to 2017. We can see that there has been a significant increase in traffic volumes on the M50.

Table 3.2 Traffic Flows on dlr National Roads 2014 to 2017					
TII Traffic Flows AADT	**2017**	**2016**	**2015**	**2014**	**2014 to 2017%**
M50 Sandyford J13-J14	74345	72379	69023	65265	13.9%
M50 Ballyogan J14-J15	72399	70745	68095	65103	11.2%
M50 Carrickmines J15-J16	69113	67851	64993	61973	11.5%
Mount Merrion Avenue N31	10608	12064	11905	11957	-11.3%
Brewery Road N31	16038	15530	15824	16018	0.1%
Source: www.nratrafficdata.ie					

In August 2017, the Central Statistics Office (CSO) published Census 2016 *Profile 6 Commuting in Ireland*. The report shows that in April 2016 the number of people nationally travelling to work, school or college stood at 2,962,550, an increase of 9.3% on the 2011 figure.

Table 3.3 outlines the trend in travel mode share in DLRCC for those travelling to work, school or college. From this we see that there has been an increase in the percentage of people using sustainable travel modes to travel to work or education.

Table 3.3 DLRCC Travel Mode Share

Means of Travel	2016%	2011%	Increase
On foot	14.1%	14.1%	0%
Bicycle	6.6%	5.3%	26%
Bus, minibus or coach	11.2%	10.6%	5%
Train, DART or LUAS	13.9%	11.9%	17%
Motorcycle or scooter	0.6%	0.7%	-12%
Car driver	36.6%	37.9%	-3%
Car passenger	15.2%	15.0%	1%
Van	1.7%	1.7%	-1%
Other (incl. lorry)	0.1%	2.9%	-95%
Total excl. 'working at home' and 'not stated'	100.0%	100.0%	
Source: CSO Census 2011 & 2016 - Trips to work, school and college			

3.3.2 Rail

Ireland has a network of rail lines that have been in place for almost 150 years over which a significant number of public transport rail services are provided. The network supports the economic and social development of the state in providing accessible transport to many key destinations. There are two rail lines running through DLRCC, the Dart and Heavy Rail Line and the Green Luas line.

3.3.2.1 Dart Line

The length of track through the County is 20.14km with the length of network within Dublin comprising 111.3km. The track within the entirety of DLRCC is electrified twin track. The County is served by 72 DARTs per direction per day and 8 Intercity Dublin to Rosslare services as seen in the NTA National Heavy Rail Census report 2016.

Nationally, the number of Irish Rail passengers has increased in recent years as follows:

- 36.7 million journeys in 2013;
- 37.8m in 2014;
- 39.7m in 2015;
- 42.8m in 2016; and
- 45.5m in 2017.

DART passenger numbers have increased from:

- 15.9 million journeys in 2013;
- 16.3m in 2014;
- 17.1m in 2015;
- 19.0m in 2016; and
- 20.1m in 2017.

3.3.2.2 Luas

The Green Line is 25km in length and has 35 Stops running from Brides Glen through Sandyford in DLRCC to Broombridge in Dublin City Council.

The Red Line is 20km in length and has 32 Stops and services currently run from Tallaght in South Dublin County Council to The Point in Dublin City Council and from Saggart to Connolly Station.

Passenger numbers on the Luas have been increasing in recent years as follows:

- 32.4 million passengers were carried in 2014;
- 34.6 million passengers were carried in 2015; and
- 34.2 million passengers were carried in 2016.

4. Responsible Authority for Action Planning

4.1 Name and contact details for the Responsible Authority

Dublin City Council and the County Councils of Dún Laoghaire-Rathdown, Fingal and South Dublin are the designated Action Planning Authorities under the noise regulations and are responsible for the preparation and implementation of the Noise Action Plan for the Dublin Agglomeration. This plan has been prepared by DLRCC with support, assistance and information supplied by the EPA and neighbouring County Councils.

The address in DLRCC in relation to strategic noise mapping and action planning is as follows:

> *Dún Laoghaire – Rathdown County Council – County Hall, Municipal Services Department, Marine Road, Dún Laoghaire, Co. Dublin.*

4.2 Description of existing noise reduction measures

4.2.1 Noise Limit Values

There are no specific noise limit values currently in place within each Local Authority except for those in the guidelines outlined in Chapter 2. In general, Local Authorities can only specify advisory levels.

4.3 Review of Dublin Agglomeration Noise Plan 2013-2018

A number of measures were proposed in Chapter 9 of the Dublin Agglomeration Noise Action Plan 2013 to 2018 to prevent noise and reduce, avoid or relocate the various types of noise source under the following headings;

- 9.2.1 Traffic noise reduction and prevention measures;
- 9.2.2 Rail noise reduction and prevention measures;
- 9.2.3 Noise in the Planning Process;
- 9.2.4 Sound Monitoring Network;
- 9.2.5 Protecting 'Quiet Areas'; and
- 9.2.6 Noise Complaint Investigation and Control procedures.

The following sections provide a review of what was Actions were carried out as part of the Plan.

4.3.1 Traffic noise reduction and prevention measures

A number of measures were outlined in the Noise Action Plan to support the use of sustainable travel modes for daily travel. The following measures were carried out in DLRCC over the past 5 years:

a. Development of Sustainable travel (walking and cycling) infrastructure. A number of schemes were completed in the past 5 years, namely:

- Pottery Road Improvement scheme.
- Frascati Road / Temple Hill Improvement scheme.
- N11 Johnstown Road junction improvement scheme.
- Leopardstown Road junction improvement scheme.
- Wyattville Road Pedestrian and cycle scheme.
- Monkstown Village improvement scheme.
- The Metals Public Realm Scheme.
- Commons Road Improvement scheme.

b. Continued promotion and development of sustainable travel modes in conjunction with transport providers and local communities.

- DLRCC worked closely with the National Transport Authority to develop cycling infrastructure schemes, as above.
- Sustainable travel is a key consideration in all major planning applications, Part 8's and Local Area Plans. It was also considered as part of mixed-use development areas such as the Cherrywood SDZ and the Sandyford Urban Framework Plan.
- Website www.dlrcoco.ie was updated to include details of cycling related activity.
- A series of cycling activities were held during National Bike Week each year over the past 5 years.
- A pilot Stationless bike share scheme was established in the County in conjunction with Bleeperbike (www.bleeperbike.ie).

c. Introduction of Local Transport Plans - No National Guidance has been developed on Local Transport Plans. However, transport planning has been a key element of two main development areas in the County; the Cherrywood SDZ and the Sandyford Urban Framework Plan.

d. Supported the introduction of Electric Vehicle charge points

- DLRCC worked with ESB as part of the National Programme to roll out EV charge points in Dún Laoghaire, Blackrock, Stillorgan, Dundrum
- Residential and non-residential development is required to make provision for Electric Charging through the planning proceed as per Section 8.2.4.12 of the County Development Plan.

e. Facilitated the introduction of car share clubs - A pilot car club was set up in the County in conjunction with Gocar (www.gocar.ie). Bye-laws are currently being prepared to regulate the use of car clubs in the County.

f. Adoption of best practice / guideline documents and policy in Transportation Planning. Application of DMURS and National Cycling Manual principles was a key element is the design of all infrastructure schemes in the County.

g. Reduction in excessive driving speeds in the County. A 30km/h Speed limit has been introduced on 742 roads in housing estates and residential areas in line with the mandatory 'Guidelines for Setting and Managing Speed Limits in Ireland' issued by the Department of Transport, Tourism and Sport (March 2015). Noise was not raised as an issue during the public consultation process.

h. Promotion of the use of low-noise road surfaces where appropriate. Stone Mastic Asphalt is provided on roads with speed limits less than 60kph and this has been found to have a significant reduction (about 3 dB(A)) in type /road interface noise levels when compared to dense grader asphalts.

i. Use Roadside Noise Barriers for new road construction projects. No major new road construction schemes have been completed in the past 5 years.

j. Review of key national roads with TII where noise issues have been identified arising from the noise mapping. Discussions were held with Transport Infrastructure Ireland on a number of noise issues along the N11 and M50 but no measures have been implemented along these strategic routes.

4.3.2 Rail noise reduction and prevention measures

As part of the previous Dublin Agglomeration Noise Action Plan 2008 to 2013, Iarnród Éireann and the TII (Luas Light Rail) were required to undertake the following actions in relation to noise:

- To produce a sound impact assessment and apply mitigation measures where appropriate, for any new rail infrastructure or ancillary developments or any major intensification on any existing rail infrastructure 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.

No new rail infrastructure or ancillary developments or any major intensification on any existing rail infrastructure occurred in the County during the period of the plan and thus no sound impact assessment was carried out.

4.3.3 Noise in the Planning Process

As part of the previous Dublin Agglomeration Noise Action Plan 2008 to 2013, the following measures relating to planning and development were implemented.

4.3.3.1 County Development Plan

During the period of the Noise Plan 2013-2018, DLRCC adopted a County Development Plan covering the period 2016 to 2022. In the development Plan noise was considered in the following sections:

2.2.10.4 Policy ST28: Traffic Noise

It is Council policy to ensure that traffic noise levels are considered as part of new developments along major roads/rail lines in accordance with best practice guidelines.

Along major transport corridors, the effect of traffic noise on the development must be considered and appropriate measures undertaken to mitigate the effect of noise. This should be considered in the context of the 'Dublin Agglomeration Environmental Noise Action Plan 2013 – 2018'.

In the planning and design of National Road schemes, cognisance must be given to the National Road Authority document 'Guidelines for the Treatment of Noise and Vibration in National Road Schemes' (2004) and to the subsequent supplementary good practice guidance document titled, 'Treatment of Noise during the Planning of National Road Schemes'.

Transportation, environment and development control policies and objectives that aim to reduce the negative and harmful effects due to exposure to environmental noise are contained in each of the Development Plans. Also, it is policy in each Council to reduce the number of people exposed to noise.

8.2.9.2 Noise Pollution

The Planning Authority will have regard to the 'Dublin Agglomeration Environmental Noise Action Plan 2013 – 2018' when assessing planning applications along major road and rail transport corridors – the objective being to reduce noise from new sources and to identify and protect and create areas of low sound levels.

Acceptable noise levels are subjective and perception varies from person to person. Taking these factors into account through design and practice can reduce the impacts of noise and improve amenity. Good design should minimise noise intrusion and nuisance to all nearby buildings that are occupied. Residential development should be set back from roads/rail lines such that amenities of residents are not unduly impacted upon by reason of noise. Mitigation measures should be undertaken, where appropriate, between the residential development and road/rail line. Similar mitigation measures may also be required when dealing with commercial development in close proximity to residential areas where there may be noise generated from the completed development – such developments will be assessed on a case by cases basis.

The Planning Authority will use the Development Management process for larger developments:

- *To require developers to produce a Sound Impact Assessment, and Mitigation Plan where deemed necessary, for any new development that the Planning Authority considers will impact negatively on pre-existing environmental sound levels.*
- *To ensure that future developments are designed and constructed in such a way as to minimise noise disturbances.*
- *Placing screens (fences, hedges, mounds) between the noise source and residential units.*
- *Locating bedrooms as far away from noise sources as possible without compromising passive design principles. Locating windows away from noise sources if possible.*

- *Avoid hard exterior surfaces such as concrete paving that reflect sound rather than absorbing it. Locating noise sources away from property boundaries and noise sensitive areas. To incorporate 'Shared Spaces'/'Home Zones'/or 'Streets for People' in new developments, which recognize that residential streets have multifunction uses for pedestrians, cyclists and vehicles - in that priority order. The noise maps will be used to identify and classify the priority areas and streets.*
- *To reduce/avoid traffic by decentralising amenities into local areas. To interposing less sensitive uses between noise sources and sensitive uses.*
- *Where noise barriers are provided at the boundaries of large developments, access routes must be provided to allow for the ongoing maintenance of the barriers.*

4.3.3.2 Noise as part of Large Development

As part of the Development Management process, noise is a considered as part of most major developments. In the Cherrywood SDZ, the following objective was inserted into the Framework:

> ***Objective PD33:*** *It is an objective to require all development proposals to undertake a detailed noise impact assessment, including noise survey, prior to the lodgement of any planning application. The noise survey shall be carried out in general accordance with International Standards Organisation (ISO) 1996: 2007: Acoustics – Assessment, Description and Measurement of Environmental Noise. In residential plots, this survey shall be undertaken for a period of not less than two weeks, and in non-residential areas it shall be undertaken for a period of not less than 1 day. The noise impact assessment shall include an assessment of the survey findings, and recommendations on mitigation and control measures to protect amenity. The noise impact assessment shall be lodged with the relevant planning application.*

4.3.4 Sound Monitoring Network

DLRCC installed five units in 2010 in areas considered to be sites of public amenity or potentially noisy locations. These are;

- People's Park, Dún Laoghaire;
- Stillorgan Library;
- Dundrum Library;
- Marlay Park, Ballinteer; and

- Cherrywood Technology Park, Loughlinstown.

The units are designed to operate continuously, recording sound levels and statistical information to allow analysis of trends in noise emissions and the entire network has been upgraded to include Global System for Mobile (GSM) communications capabilities.

During the period Dublin Noise Action Plan 2013 to 2018, the network was extended to include the following sites:

- Shankill Library
- Loughlinstown – near dlr Leisure Services

In addition, a website was developed for Dún Laoghaire-Rathdown County Council, Fingal County Council and South Dublin County Council, as follows, that shows the locations of the permanent sound level monitoring stations in the Dublin County Region. The website records the sound levels in each monitor and provides statistical information to allow analysis of trends in noise emissions.

http://dublin-noise.sonitussystems.com/locations.php

4.3.5 Protecting 'Quiet Areas'

As part of the Dublin Agglomeration Noise Action Plan 2008 to 2013, an action was included to identify Quiet Areas and preparation of submissions for approval by the Minister for the Environment, Community and Local Government for delimiting as Quiet Areas. Due to funding and resource constraints, no quiet areas were identified.

4.3.6 Prioritising locations

As part of the Dublin Agglomeration Noise Action Plan 2013 to 2018, a prioritisation exercise based on the results of the strategic noise mapping and the decision support matrix was to be carried out and an ordered shortlist of areas drawn up for further exemption with a view to either reducing excessive sound levels or to preserve low sound levels where they exist. Due to funding and resource constraints, this process was not carried out.

5. Summary of the Results of the Noise Mapping

5.1 Introduction

Under EU Directive 2002/49/EC relating to The Assessment and Management of Environmental Noise, the four local authorities, within the agglomeration of Dublin, are required to review and revise, if necessary, 'Strategic Noise Maps' every 5 years. The first sets of maps were produced in June 2007 and second in June 2012. A report was presented to the EPA in October 2016 reviewing changes between Round 2 and Round 3 in relation to the population, traffic volumes, significant infrastructure schemes, large developments and noise emissions from industrial sites and the following summarises the findings.

- Based on the 2016 Census data, the population of the County increased by 5.3% since 2011;
- Traffic volumes increased by about 2% on the 30 main roads used in Round 2;
- Only one new road link has been constructed since 2011, i.e. the Burton Hall Link Road (0.2km);
- A limited number of major developments have been built;
- Emissions from these IPPC licenced industrial sites fall below the reporting thresholds for strategic noise mapping.

A decision was made by DLRCC to proceed with a revision of the strategic noise maps in order to take advantage of significant improvements in data available since Round 2 and advancements in calculation methods. The improved data and calculation methods included the following:

- Improved roads network and traffic data for the majority of the County;
- Improved building height data;
- Improved terrain model data- 1m contours for Round 3, 10m contours for Round 2;
- Revised Census Data;
- Revised Calculation Methods - i.e. from calculated grid points (excluding buildings);
- Resolution of census data – Small Area Population Statistics (SAPS) for Round 3, Electoral Division (ED) for Round 2.

5.2 Noise Map Preparation

Preparation of strategic noise maps is mainly a technical process requiring an array of different input datasets across large geographical areas. The strategic noise mapping process results in grids of calculated noise levels at specified contour intervals and the output from the mapping process allows the determination of the location and magnitude of noise levels within an area using 5dB(A) noise bands. This gives an indication of the number of people and households exposed to different levels of environmental noise.

Preparation of strategic noise maps was carried out by Dún Laoghaire Rathdown County Council with Dublin City Council assisting with running the noise model and the EPA assisting with the population and household exposure assessment and the collation of the maps and tables of statistics. Indicative maps for DLRCC can be seen in Appendix C.

5.3 Sound Calculation method

5.3.1 Method of Assessment

The Environmental Noise Regulations prescribes two methods that can be used for the assessment of noise from road sources. These are CRTN (Calculation of Road Traffic Noise) and the 'Interim Method' as described in the Environmental Noise Directive.

In the interest of consistency with the Round 2 Noise mapping, it was decided to use the adapted version of the UK CRTN methodology for the assessment of road traffic sound levels. Within this assessment procedure, Method 3 was used for conversion of 18Hr AADT to L_{den} and L_{night}.

5.3.2 Dataset Specification

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. In general, the calculation of sound levels takes place in two stages within the 'noise mapping' software:

1) The assessment of the level of sound emitted from a source - the "source noise emission";
2) The assessment of the attenuation of the emitted sound en-route from the point of emission to the receptor - the "propagation attenuation".

After the assessment of sound levels across the area of the strategic noise mapping is performed, it is then necessary to undertake statistical analysis to determine the area, dwelling and population exposure data required to be reported to the EC. Following this concept, the input dataset required can be classified into:

- Source input data which defines the position and characteristics of the noise sources;
- 3D model pathway input data which defines the environment within which propagation occurs;
- Population input data which defines the location of the population exposed to the long term environmental noise sources.

5.3.3 Noise Model Data Sources

Noise maps are developed by inputting data into 'noise mapping' software. The information required for the source emission model for the road traffic is specific to each method of assessment. The following input information is required for each road section for an assessment of road noise using the adapted UK CRTN method:

- Road centrelines and Traffic Data (Traffic volume, %HGV's, and mean vehicle speed, direction of vehicle flow, road width, road surface type, texture depth, road gradient and road classification;
- Ground region and surface contours;
- Barriers/Screening – Heights and locations; and
- Buildings – Heights and locations.

The model infrastructure data sets for Buildings, Road Centre lines, Contours and Green areas were supplied by OSI under license and dated 2010. Traffic counts were based on an annual average daily traffic for 2017 and the percentage of heavy goods (HGV) vehicles was estimated for those roads that did not have manual HGV counts. Loop detector data from the SCATS traffic control system was used to produce annual hourly traffic volumes, where it was available.

5.4 Noise Exposure Data Sources

The Noise Directive requires information on the total number of dwellings exposed to noise from all roads and major roads with the agglomeration. It also requires information on the estimated number of people living in dwellings that are exposed to noise for the various scenarios mapped:-

The type of information used for the agglomeration of Dublin was:-

- GeoDirectory 'Buildings' table; 'Address Point' Table;
- CSO census data – Population of each electoral division;
- Geo referenced DED object layer attributed with CSO data to Ordnance Survey Ireland (OSI) Electoral Divisions (ED).

The Environmental Noise Directive requires that data should not be more than 3 years old. All data sets used in the model were less than a year old with the most up-to-date data set being the 'Geodirectory' containing address point and building use information.

5.5 Noise Level Calculations

The Predictor / Lima software suite, version 11.2 was used in the processing of the noise maps. The default settings for CRTN were used for computation, except for the setting of the fetching radius, which was set to 2000m. The grid spacing's were set to 10m spacing's. The models were subdivided automatically (tiled) into 1Km^2 grids with 1Km^2 buffers to improve calculation efficiency. This resulted in each model being 9Km^2 in size. For the area near the boundaries of each local authority, a buffer region of 2Km was used. These smaller models were then recombined automatically on export into the GIS environment.

5.6 Noise levels Indicators and exposure levels

To provide a standardised approach to the description of long term environmental noise, Article 6.2 of the Directive specifies the use of two noise level indicators when preparing environmental noise maps and action plans, namely Lden and Lnight. The Lden is a noise rating indicator, rather than a sound level, and is based upon the day, evening and night time noise levels, with weightings applied for the different periods. Lnight is typically used to assess sleep disturbance.

- Lnight is the A-weighted long-term average sound level between 23.00 and 07.00
- Lden is the 24 hour noise rating level determined by the averaging of the Lday with the Levening plus a 5 dB penalty, and the Lnight plus a 10 dB penalty

The long term, annual average, day, evening and night values are determined and then combined to provide the indicated Lden yearly average, with the definitions shown in Appendix A. The penalties are applied to the evening and night time periods during the assessment of Lden to take into account evidence that response to noise levels is not uniform throughout the 24 hour period. For example, a given indicated

level of noise during the day may be deemed acceptable by the majority of people. However that same level of noise at night may be deemed less acceptable.

There are currently no national criteria in relation to noise limit values. In 2009, the EPA issued guidance notes on the development of noise action plans with updates provided in 2011 and 2018. The guidance on sound values where and action should be invoked, are in terms of average night time and 24hour values. The EPA guidance suggests a desirable night time level of 45dB (A) whereas the existing Dublin Agglomeration Noise Action Plan sets it at 50dB (A).

In 2009, the World Health Organisation's European Office published guidance in relation to night time sound levels (Night Noise Guidelines for Europe). In this it stated that, 'considering the scientific evidence on the thresholds of night noise exposure indicated by Lnight, outside, as defined in the Environmental Noise Directive (2002/49/EC), an Lnight, outside of 40 dB should be the target of the night noise guideline (NNG) to protect the public, including the most vulnerable groups such as children, the chronically ill and the elderly.

Lnight, outside value of 55 dB is recommended as an interim target for the countries where the Night Noise Guideline cannot be achieved in the short term for various reasons, and where policy-makers choose to adopt a stepwise approach'. For this reason, it is proposed to use an Lnight desirable level of 50dB (A) and undesirable level of 55dB (A) for the new Noise Plan that are in line with the recommended interim target. In addition, daytime noise levels greater than 70 dB are considered to be undesirable.

5.7 Summary of Noise exposure levels

5.7.1 Noise exposure levels – DLRCC

Tables 5.1 and 5.2 set out the population exposure to sound from traffic sources on all roads in the Dún Laoghaire - Rathdown County Council Area. For the purpose of the Noise Action Plan, targets are set out as to what sound emissions are desirable and undesirable. These targets indicate that a night time level greater than 55 decibels and a daytime level greater than 70 decibels is undesirable. It should be noted that rounding up or down to the nearest '100' is a requirement of the Environmental Noise Directive and the 'error' is not considered significant.

Table 5.1 Lden Noise exposure levels from all roads – DLRCC 2017			
Decibels dB(A)	**Lden number people Exposed**	**Lden % people Exposed 2017**	**Lden % people Exposed 2012**
< 55	137,600	63%	32%
55-59	33,300	15%	31%
60-64	22,500	10%	14%
65-69	19,200	9%	11%
70-74	4,300	2%	10%
>75	1,100	1%	2%
	218,000		

Table 5.2 Lnight Noise exposure levels from all roads – DLRCC 2017			
Decibels dB(A)	**Lnight number people Exposed**	**Lnight % people Exposed 2017**	**Lnight % people Exposed 2012**
< 50	157,000	72%	50%
50-55	28,400	13%	20%
55-59	23,700	11%	12%
60-64	5,700	3%	11%
65-69	2,100	1%	5%
> 70	300	0%	1%
	218,000		

The following can be observed from Tables 5.1 and 5.2;

- Of the 218,000 people living in the DLRCC area in 2017, 37% of people are exposed to noise levels greater than 55 dB(A) Lden, reducing from 68% in 2012.
- The percentage of people exposed to the desirable night time noise levels has been found to be 72% in 2017, which represents an improvement from less 50% in 2012.
- The number of people exposed to the undesirable night time levels above 55 dB(A) has reduced from 29% in 2012 to 15% in 2017 with low numbers exposed to night time sound levels above 70 dB(A), i.e. 300 people.

There are a number of factors that may have contributed towards these reductions including the use of amended calculation methods in the noise model.

5.7.2 Noise exposure levels – Luas

Tables 5.3 and 5.4 provide details of the population exposures to sound from the Luas in the Dublin Agglomeration Area. No breakdown of data was available in the TII report for DLRCC.

Table 5.3 Lden Noise exposure levels from major rail – Luas (TII)			
Decibels dB(A)	**Lden number people Exposed**	**Lden % people Exposed 2017**	**Lden % people Exposed 2012**
<50	1,326,200	99%	99%
50-54	8000	0%	1%
55-59	6000	0%	0%
60-64	5400	0%	0%
65-69	1500	0%	0%
>70	200	0%	0%
	1,347,300	100.0%	

Table 5.4 Lnight Noise exposure levels from major rail – Luas (TII)			
Decibels dB(A)	**Lnight number people Exposed**	**Lnight % people Exposed 2017**	**Lnight % people Exposed 2012**
< 50	1,337,900	99%	99%
50-55	6900	1%	1%
55-59	2200	0%	0%
60-64	300	0%	0%
65-69	100	0%	0%
>70	0	0%	0%
	1,347,400	100.0%	0%

From Tables 5.3 and 5.4, we can see that the noise exposure levels from the Luas in the Dublin area are low. In Table 5.4, we can see that the number of people exposed

to the undesirable night time levels above 55 dB(A) from the Luas is 2600, i.e. 0.2% of the total population.

5.7.3 Noise exposure levels – All Heavy Rail

Tables 5.5 and 5.6 provide details of the population exposures to sound from the Heavy Rail (Dart and Mainline Rail) in the Dublin Agglomeration Area. No breakdown of data was available in the Irish Rail report for DLRCC.

Table 5.5 Lden Noise exposure levels from major rail – Heavy Rail*

Decibels dB(A)	Lden number people Exposed	Lden % people Exposed 2017	Lden % people Exposed 2012
<50	1,318,720	98%	99%
50-54	12,900	1%	1%
55-59	80,00	1%	0%
60-64	6,400	0%	0%
65-69	1,300	0%	0%
70-74	100	0%	0%
>75	0	0%	0%
* See the full Table in Appendix C			

Table 5.6 Lnight Noise exposure levels from major rail – Heavy Rail

Decibels dB(A)	Lnight number people Exposed	Lnight % people Exposed 2017	Lnight % people Exposed 2012
< 50	1,339,420	99.4%	99%
50-55	5,600	0.4%	1%
55-59	2,100	0.2%	0%
60-64	300	0.0%	0%
65-69	0	0.0%	0%
70-74	0	0.0%	0%
> 75	0	0.0%	0%
* See the full Table in Appendix C			

From Tables 5.5 and 5.6, we can see that the noise exposure levels from the Heavy Rail in the Dublin area are low. In Table 5.4, we can see that the number of people

exposed to the undesirable night time levels above 55 dB(A) from the Heavy Rail is 2600, i.e. 0.2% of the total population.

6. Noise Management Areas Identification

6.1 Introduction

Low environmental sound levels contribute significantly to the good health and quality of life for the population in the DLRCC. 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 can be 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.

6.2 Confirmation of onset of Assessment Thresholds

The results of the strategic noise maps provide an indication of the extent of environmental noise exposure in an area. However, they do not necessarily indicate where noise mitigation measures are required or where they would be cost effective. For this reason it is necessary to set out an approach which seeks to identify locations where noise mitigation measures are necessary and cost effective. Initially, some form of noise level needs to be identified from the onset of the process for the assessment of need. The following sections outline the proposed levels for the assessment of noise mitigation measures due to noise from all road traffic in DLRCC.

6.2.1 Areas with desirable low and undesirable high sound levels

Following a review of existing guidance, as outlined in Chapter 2, and of the levels set the previous noise action plan, the following are the proposed targets for desirable low and undesirable high sound levels:

Desirable Low Sound levels
< 50 dB(A) Lnight
<55 dB(A) Lday

Undesirable High Sound levels
> 55 dB(A) Lnight
<70 dB(A) Lday

6.2.2 Protection Thresholds for Quiet Areas

The Environmental Noise Regulations defines a 'Quiet Area in an agglomeration' as 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.

A Quiet Area could be an area with low sound levels or an area that 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. However, in general natural sounds can be soothing regardless of their level. For instance sound levels on St Stephens Green East can occasionally exceed daytime levels of 70 dB, while sound levels in the centre of the Park, range from 57 to 60 dB. 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. Some quiet areas may not be noise sensitive at night as they are not in use as an amenity at this time, e.g. parks closed at night.

In this Noise Action Plan, it is proposed to use the following values as one criterion for defining a Quiet Area.

< 45 dB(A) Lnight
< 55 dB(A) Lday
< 55 dB(A) Lden

A second criterion to cover what are perceived as Relatively Quiet Areas is also 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.

During the implementation of this noise action plan, it is proposed to identify locations that have noise levels below these criteria and review their use. If appropriate or necessary, locations could be identified as quiet areas where the existing noise levels are to be preserved or reduced if possible.

6.3 Application of the Decision/Selection Criteria Matrix

Having identified locations where the threshold has been exceeded, it will be necessary to develop a ranking that seeks to identify locations where noise mitigation measures are necessary, feasible and will be cost effective. To do this, a noise decision support matrix will be used, with details shown in Appendix E.

A decision support matrix is a chart which 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, such as the noise exposure level, the type of noise receptor, the type of noise source and the number of people affected. It also facilitates assessing the relative importance of each. As part of this Noise Action Plan, 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. The following sections outline how the results of the application of the decision support matrix analysis will be applied in DLRCC.

6.4 Results from the Matrix analysis - Residential

Arising from the noise mapping, it is possible to identify the number of residential properties exposed to the various bands of sound levels. Although not defined as noise sensitive locations, residential properties are ranked just one point below noise sensitive locations in the decision matrix. Therefore it is essential to know the sound exposure level at each property. The following section outline noise exposure data for residential dwellings in the County with the number of households exposed rounded up or down to the nearest 100.

6.4.1 Residential Areas – DLR Noise Exposure

Table 6.1 provides details of noise exposure levels for various bands arising from all traffic for the 87,700 residential dwellings in the DLRCC Area.

From this we can see that the number of household exposed to high night time levels has reduced since Round 2 of the Noise Action plan. It should be noted that rounding up or down to the nearest '100' of population in each decibel band, causes an over or under estimation of the total true population. However this 'rounding' is a requirement of the Environmental Noise Directive and the 'error' is not considered significant.

Table 6.1 Lnight Noise exposure levels from all roads – DLRCC 2017			
Decibels dB(A)	**Lnight number people Exposed 2017**	**Lnight % people Exposed 2017**	**Lnight % people Exposed 2012**
< 50	74,100	85%	70%
50-55	10,100	12%	12%
55-59	2,500	3%	11%
60-64	900	1%	6%
65-69	100	0	1%
> 70	0	0	0
	87,700		

Further analysis of the noise decision support matrix will be required is to identify the number of residential properties that's have been identified as having a score of 17 or greater thus suggesting priority action should be considered for that location. In addition, application of the noise decision support matrix is required to identify noise sensitive locations.

7. Noise Mitigation and Protection Measures

7.1 Principles for deciding on action

As part of this Noise Action Plan, a strategic approach will be undertaken to managing environmental noise. In line with the previous Noise Action Plan, it is proposed that the following principles will be adhered to when deciding on the appropriate actions to reduce sound levels and to maintain noise levels where they are considered satisfactory:

- As the noise maps are developed for strategic use only, it is proposed that the basis of the Noise Action Plan should be strategic in nature also and shall not include proposals relating to noise from domestic activity, noise created by neighbours, noise caused by the exposed person themselves or noise at work.
- It is proposed to include actions to manage environmental noise only, primarily from road traffic as this is the dominant sound source.
- Mitigation measures will be prioritised using the decision support matrix. 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.
- The plan shall address priorities that have been identified by the relevant noise target value being exceeded or other relevant criteria established by the EPA and shall in the first instance, address the most important areas identified by the strategic mapping process. The following are the proposed targets.
    - Desirable low sound levels are defined as areas with a night time level less than 50 dB and\or a daytime level less than 55 dB.
    - Undesirable high sound levels are defined areas with a night time level greater than 55 dB and a daytime level greater than 70 dB.
    - Absolute value of below 55 dB(A) daytime, below 45 decibels at night time and below an Lden of 55 dB(A) will be one criterion for defining a Quiet Area.
    - A second criterion for defining for perceived or 'Relatively Quiet' areas. will be defined by their proximity to areas of high sound levels, but which provide a perceived area of tranquillity
- There will be earlier integration of noise abatement planning into the planning process and certain transportation schemes.

7.2 Processing areas above the onset of assessment criteria

Following the prioritisation exercise based on the results of the strategic noise mapping and the decision support matrix, an ordered shortlist of areas will be drawn up which will proceed to the next stage in the process. The aim of this stage is to confirm that the noise levels assessed by the strategic noise mapping are experienced by population and residential dwellings within the areas being addressed.

Prior to the review of potential noise mitigation measures, and any subsequent commitment of budget to undertake any necessary actions, it is considered appropriate to confirm that the noise levels indicated by the strategic noise maps are being experienced by the population within DLRCC.

This will be undertaken by undertaking field survey work and using the noise monitoring network in DLRCC to measure noise levels prior to the commencement of any works.

Field survey work would help with calibration of the strategic noise map, as well as provide information on whether the properties being assessed had noise sensitive rooms exposed on the most exposed facades, or whether noise mitigation measures were already present which may not be indicated within the calculation model.

Once the extent of the existing noise impact has been confirmed for the locations under review, the potential noise mitigation measures will then be investigated, and a cost benefit analysis undertaken for each, with the aim of developing a selection matrix which leads towards a recommendation for action.

This staged approach will help to ensure that any work undertaken is cost effective and will deliver genuine benefit to the residents.

7.3 Preservation of areas below protection threshold

Where areas are identified as being below the onset of 'desirable' threshold, they will be considered for review in the context of the review for quiet areas. In addition to this, if the locations identified have amenity value then the planning process may then be used to help preserve the nature and level of the existing sound environment.

7.4 Management of Areas between the Thresholds

Careful consideration of environmental noise pollution when planning for new developments will be a key factor in the management of the noise environment in the interest of sustainable development. Setting out clear planning policy relating to noise, and incorporating environmental mitigation noise strategies into the development,

planning and local area planning processes will help to ensure that the existing noise climate is preserved where appropriate.

With the twin focus on mitigation of noise for the most exposed residents, and preservation through designated quiet areas of the least exposed areas, there is a risk that the majority of households, which sit between these two categories, are not provided for within the action planning process. It is acknowledged that the action plan needs to provide a means of preventing and avoiding detrimental levels of long term noise exposure, and the development of planning guidance plays a key role in support of this target.

The new National Planning Framework has a stated objective of developing national planning guidance relating to environmental noise, until such time as national guidance is available DLRCC will investigate the possibility of developing local planning policy on noise.

7.5 Possible Noise mitigation measures

There are a wide range of potential noise mitigation measures, some of which may act at a national or regional level, others which may be purely localised. Likewise there are a number of levels of authority which may be capable of making actions. A non-exhaustive list of measures includes the following:

- Vehicle noise emissions and tyre noise regulations will be set at EU level;
- National planning guidance or noise regulations will be set at national level;
- Transport policy objectives may be set at regional level;
    - Improved public transport;
    - Getting people out of cars; and
    - Increasing bus, train, bicycle journeys.
- At Local Authority level there are powers to act as follows:
    - Replace diesel vehicles with compressed natural gas / electric;
    - Truck routes;
    - Night time delivery restrictions or limits;
    - Planning permissions;
    - Road closures / traffic routing;
    - Road re-surfacing;
    - Planning zones;
    - Facade insulation requirements;
    - Noise barriers;
    - Public liaison groups; and

        - Long term targets.
    - Roads Authorities can undertake the following:
        - Traffic management – routes and HGV's;
        - New road construction (bypass);
        - Re-surface roads;
        - Vehicle speed management;
        - Noise screening measures; and
        - Facade insulation measures.

7.6 Assessment of Options and Cost Benefit Analysis

In general, no one design intervention can provide a solution in an area and often a range of measures will be needed. In general, the best way to minimise the costs of noise prevention and noise reduction is as follows:

- 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 resources 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.

For the locations where noise has been identified as being an issue, a list of potential noise mitigation actions will be drawn up. In order to undertake an assessment of feasibility and develop a prioritised list of actions, a cost-benefit analysis will be undertaken in order to maximise value for money from investment. The cost-benefit analysis will address lifetime construction and maintenance cost against noise reduction benefit.

The benefit of noise reduction may be viewed in terms of decibels / people / time, and may be considered using an assessment of changes in estimated levels of annoyance or sleep disturbance, or could be monetised to fully process the analysis. Monetisation of noise is becoming increasing common. The monetary assessment of noise levels tends to take two different approaches;

(i) impact upon property market value and

(ii) willingness to pay by residents exposed to noise to produce a reduction.

As may be expected these tend to lead to somewhat differing suggested levels of financial benefit. The best information available at present comes from an European Commission working group position paper from December 2003 *"Working Group on Health and Socio-Economic Valuation of Noise"* which proposes a median value in noise perceived by households from road traffic of €25 per dB Lden per household, per year based upon the noise level change compared to the initial situation. The validity range of this interim value is between 50/55 Lden and 70/75 Lden, to be adjusted as new research on the value of noise becomes available.

Applying this data to the priority residential properties arising from the matrix analysis, we can estimate that moving from the priority action status to a lower status equates to a positive benefit.

8. Noise Implementation Plan

8.1 Objective of the Noise Action Plan

The key objective of the Noise Action Plan 2018-2023 is to avoid, prevent and reduce, where necessary, on a prioritised basis the harmful effects, including annoyance, due to long term exposure to environmental noise. This will be achieved by taking a strategic approach to managing environmental noise and undertaking a balanced approach in the context of sustainable development.

It is proposed that the Noise Action Plan will be implemented through a staged process over 5 years with DLRCC endeavouring to follow the time frame set out below in relation to the programme of works under various headings. Although the Council directly funds and provides resources for the preparation of the Noise Maps and the Noise Action Plan, specific funding in relation to the implementation of the END has not been made available at national level to DLRCC. Accordingly, the level of progress and resourcing in the implementation of the plan is affected by the economic and overall budgetary constraints experienced by the Council from year to year.

8.2 Proposed Action Plan measures

A number of measures are proposed as part of this plan to prevent noise and reduce, avoid or relocate the various types of noise source. As per the previous plan, these measures focus mainly on road traffic sound emissions. These measures will be the primary measures considered when deciding on action to prevent, reduce avoid or relocate sources of high sound levels.

8.2.1 Identify Priority Areas

The initial stage of the management of areas, which are indicated to be above the threshold where noise mitigation measures are deemed necessary, is to conduct a review of existing noise mapping. The review shall identify the order of priority of potential areas for subsequent treatment. On completion of the initial assessment, a field survey of actual noise levels shall be carried out to verify the initial findings and confirm the order of priority for treatment. As part of the establishment of the order of priority, the most appropriate and cost effective mitigation measures shall be identified to optimise the return from the mitigation process.

A decision support matrix as outlined in Section 6.3 and similar to that in Appendix E will be generated to facilitate this process. On implementation of the noise mitigation measures, the areas in question shall be resurveyed to establish the effectiveness and extent of the mitigation measures.

Prior to the review of potential noise mitigation measures, and any subsequent commitment of budget to undertake any necessary actions, the noise levels assessed by the strategic noise mapping will be validated to ensure there are being experienced by population and residential dwellings within the areas being addressed. External noise consultants will be appointed for the purpose of carrying out the field verification studies.

8.2.2 Traffic noise reduction and prevention measures

Significant road/cycle infrastructure schemes are being progressed in the County and sustainable travel initiatives developed on a continual basis as development needs arise and funding is made available. Further development of the cycle, bus and rail network is essential to cater for a growing population and increased demand for multi-modal travel options.

As part of the plan, the following strategic measures will be introduced in the coming years over each year of the Noise Action Plan:

Action	Agencies
Work with key agencies in the development of cycle infrastructure schemes and sustainable road schemes along key routes in the County including the following schemes: - Rock Road corridor cycle and bus improvements - Stillorgan Road cycle and bus improvements - Clonskeagh to Sandyford cycle improvements - Development of the Dodder Greenway - Blackglen Road / Harold's Grange Road improvements - Bracken Road link in Sandyford	NTA, TII DTTAS
Work with key agencies in the implementation the Bus Connect Project in the County and in particular focussing on the following corridors: - Rock Road Corridor - Stillorgan Road Corridor - Dundrum to Dun Laoghaire Orbital Route	NTA, Dublin Bus
Work with key agencies in the development of key rail links in the County - Green Luas Line extension to Bray - Metrolink – Sandyford to North Dublin	NTA, TII

Work with key agencies and Energy suppliers in the expansion of the network of Electric Vehicle Charge Points in the County.	DCCAE
Further expansion of the County Stationless Bike Share Scheme and the development of bye-laws	DLRCC, NTA
Review of County Wide Speed Limits and further implementation of 30kph speed limit and slow zones.	DLRCC, DTTAS
Ongoing maintenance of the road network and examine the use of noise reduction road surfacing material	DLRCC
Upgrade of the Council Fleet vehicles to more environmentally friend options	DLRCC

8.2.3 Noise in the Planning Process

The planning system has the potential to exercise a significant influence on the control of future exposure to environmental noise and can play a key role in the improvement of amenity. The appropriate use of the planning system can help avoid, or minimise, the adverse impacts of noise without placing unreasonable restrictions on development. Scope exists within the planning and development management process to manage increased levels of noise arising from new development where exposure levels can be harmful to health.

There are two main scenarios in development where noise could be considered as being a material issue, namely:

1) Introducing people into potentially noisy areas through the provision new residential housing, hospital, schools nursing homes etc in the vicinity of existing road rail industrial or airport noise, or where there are potential high levels of noise with buildings or in adjoining gardens or public open spaces.
2) Introducing potentially noisy developments such as new or altered roads, railways, industrial sites, and airports, commercial or large sporting recreational developments into the vicinity of noise sensitive locations.

In the scenario where new residential development or other noise sensitive development is proposed in an area with an existing climate of environmental noise, there is currently no clear national guidance on appropriate noise exposure levels. The EPA has suggested that in the interim that Action Planning Authorities should examine the planning policy guidance notes issued in England titled, 'ProPG Planning and Noise: Professional Practice Guidance on Planning and Noise'. This has been produced to

provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England.

In advance of any national guidance relating to noise in the Planning Process, the following actions relating to planning and development will be considered for implementation:

a) To review existing guidelines and policy relating to Noise in the County Development Plan and to ensure noise is a consideration in Local Area Plans and Part 8's and enhanced in the next County Development Plan.
b) To develop guidance note on Noise considerations in the planning process that can be issued to developers at pre- planning stage.
c) To require developers to produce a sound impact assessment and mitigation plans, where necessary, for any new development where the Planning Authority considers that any new development will impact negatively on pre-existing environmental sound levels within their Council area.
d) To ensure that future developments are designed and constructed in accordance with best Irish practice to minimise noise disturbances through good acoustic design and take into account the multi-function uses of street (e.g. movement, recreation).

The following are some timelines to be considered as part of the Noise Action Plan relation to further incorporation of noise in the planning process.

Action	2018	2019	2020	2021	2022
Work with Planners to identify how Noise can become a key consideration in the planning of major development and LAP's					
Examine means of making the Noise Maps readily available for use by Planners. This may include inclusion of noise contours in internal planning systems such as APAS (or similar).					
Carry our research on the UK experience in dealing with noise in the planning process and prepare a Guidance Note to be issued at pre-planning stage in relation to best practice.					
Develop a policy statement on Noise in the Planning process that could be incorporated into the next County Development Plan.					

8.2.4 Protecting 'Quiet Areas'

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. As part of the plan, there will be an ongoing process of identifying Quiet Areas and forwarding them to the Minister for the Environment, Community and Local Government for delimiting as Quiet Areas.

The following are some timelines to be considered as part of the Noise Action Plan relation to the protection of Quiet Areas in the County.

Action	2018	2019	2020	2021	2022
Hold preliminary discussions with the Parks Section and identify potential parks in the County					
Carry some out some noise monitoring within the identified parks					
Prepare report on findings and present to the Area Committee					
Commence the process for preparing a Quiet Area					

8.2.5 Sound Monitoring network

As outlined in Section 4.3.4, a permanent ambient sound monitoring network was established in the Dublin area with units set up in each of the Local Authorities with seven locations in DLRCC. The units are designed to operate continuously, recording sound levels and statistical information to allow analysis of trends in noise emissions. Data form the sound monitor can be found at the following link; http://dublin-noise.sonitussystems.com/. As part of Year 1 and 2 of this Noise Action Plan, further locations will be identified and added to the network.

8.2.6 Noise Complaint Investigation and Control procedures

Although 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 this 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. Local noise issues will be dealt with by each Local Authority as required by the Environmental Protection Agency Act 1992 (EPA Act 1992).

9. Public Consultation

In preparing and revising Noise Action Plans, Action Planning Authorities must ensure the following as per Article 11 of the Regulations:

- The public is consulted about proposals for Action Plans;
- The public is given early and effective opportunities to participate in the preparation and review of the Action Plans;
- The results of the public participation are taken into account;
- The public is informed of the decisions taken; and
- Reasonable time frames are provided allowing sufficient time for each stage of public participation.

The following is the timeline associated with meeting this requirement

Action	Timeline
Pre-Draft Noise Action Plan to brought to the Transportation and County Wide Movement SPC and feedback sought	March 13 2018.
Draft Noise Action Plan to be submitted to the EPA for review	March 29, 2018
Revised Draft Noise Action Plan to brought to the Dundrum Area Committee and feedback sought	April 4th, 2018
Revised Noise Action Plan to brought to the Dun Laoghaire Area Committee and feedback sought	April 23rd, 2018
EPA to revert with comments on the draft Noise Action Plan	March 23rd, 2018
Public Consultation – Online dlrcc Hub and Maps placed on www.dlrcoco.ie, Advert in local papers, Draft sent to prescribed bodies and other interested parties	May 1st to June 20th, 2018
Final Noise Action Plan drawn up and presented to the Full Council	July 2018
Final Noise Action Plan submitted to EPA for final approval	September 2018

10. Summary and Conclusions

This Noise Action Plan has been prepared as required by the Environmental Noise Regulations 2006, Statutory Instrument 140 of 2006. These Regulations give effect to EU Directive 2002/49/EC relating to the assessment and management of environmental noise.

The objective of the Noise Action Plan is to avoid, prevent and reduce, where necessary, on a prioritised basis the harmful effects, including annoyance, due to long term exposure to environmental noise. This will be achieved by taking a strategic approach to managing environmental noise and following a balanced approach which promotes in the context of sustainable development.

This Noise Action Plan primarily considers the long term environmental noise impact from road traffic noise sources, and sets out an approach to review noise impact levels near to the major sources assessed during the strategic noise mapping in 2017. In the interests of equality and promotion of best practice the Action Plan also sets out a number of proposals for the prevention and avoidance of environmental noise levels detrimental to human health to be implemented through the planning process.

The following highlights the main finding from the noise assessment arising from the noise mapping:

- Of the 218,000 people living in the Dún Laoghaire - Rathdown County Council area in 2017, 37% of people have been found to be exposed to noise levels greater than 55 dB(A) Lden, reducing from 68% in 2012.
- The percentage of people exposed to the desirable night time noise levels has been found to be 72% in 2017, which represents an improvement from less 50% in 2012.
- The number of people exposed to the undesirable night time levels above 55 dB(A) has reduced from 29% in 2012 to 15% in 2017 with low numbers exposed to night time sound levels above 70 dB(A), i.e. 300 people.

At the end of the Noise Action Plan, a review of the programme of works and policies developed over the first 5 years assessing the effectiveness of the measures adopted and determining if the measures were cost effective and value for money.

Appendices

Appendix A - Glossary of Acoustic and Technical Terms

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;

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. Noise is sometimes defined as unwanted sound.

Decibel dB(A) : A unit of measurement of sound.

L_{den}: (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. L_{den} is calculated as follows:

L_{den} = 10 * log 1/24 {12*10 10^((L_{day})/10) + 4^10(($L_{evening}$+5)/10) + 8*`10^((L_{night}+10)/10)}

Daytime: Between the hours of 7am and 7pm

L_{day}: (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

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

$L_{evening}$: (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.

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

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

'Major intensification': An Action(s) that is likely to lead to a breach of any statutory sound limit, or national guide value or standard, or an action(s) that leads to an increase in sound levels above the undesirable sound levels' or likely to increase the pre-existing annual L_{den} by more than 5dB

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

Appendix B - Bibliography and References

Legislation

European Communities (Access to Information on the Environment) Regulations 2007, (S.I. No. 133 of 2007).

European Communities (Noise Emission by Equipment for Use Outdoors) (Amendment) Regulations 2006, (S.I. No. 241 of 2006).

Environmental Noise Regulations 2006, (S.I. No. 140 of 2006).

Safety, Health and Welfare at Work (Control of Noise at Work) Regulations 2006 (S.I. No. 371 of 2006).

Planning and Development (Strategic Environmental Assessment) Regulations 2004, (S.I. No. 436 of 2004).

Protection of the Environment Act, 2003.

Waste Management Acts 1996 to 2003.

Environmental Protection Agency Acts 1992 and 2003.

Environmental Protection Agency Act, 1992 (Noise) Regulations, 1994 (S.I. No. 179 of 1994).

First Schedule to the Air Pollution Act 1987 (Marketing, Sale and Distribution of Fuels) Regulations 1998 (S.I. No. 118 of 1998).

European Commission (2003). Directive 2003/4/EC of the European Parliament and of the Council of 28 January 2003 on public access to environmental information. OJ L 41, 14/02/2003, Luxemburg 2003.

European Commission (2002). Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise. OJ L 189, 18/07/2002, Luxemburg 2002.

European Commission (1996). Council Directive 96/61/EC concerning integrated pollution prevention and control. OJ L 257, 10/10/96, Luxemburg 1996.

Irish Publications

Department of the Environment, Heritage and Local Government, Sustainable Residential Development in Urban Areas - Consultation draft guidelines for planning authorities, February 2008.

Department of the Environment, Heritage and Local Government, Urban Design Manual: A best practice guide. A companion document to the Draft Planning Guidelines on Sustainable Residential Development in Urban Areas, February 2008.
Department of the Environment, Heritage and Local Government, Sustainable Urban Housing: Design Standards for New Apartments - Guidelines for Planning Authorities, September 2007.

Department of the Environment, Heritage and Local Government, European Communities (Access to Information on the Environment) Regulations 2007 (S.I. No.

133 of 2007) - Guidance for Public Authorities and others in relation to implementation of the Regulations, 2007.

Department of the Environment, Heritage and Local Government, Wind Energy Planning Guidelines, 2006.

Department of the Environment, Heritage and Local Government, Quarries and Ancillary Activities – Guidelines for Planning Authorities, April 2004.

Department of the Environment, Heritage and Local Government, Building Regulations 1997, Technical Guidance Document E – Sound, 1997.

Department of the Taoiseach, Reaching Out – Guidelines on Consultation for Public Sector Bodies, 2005.

National Roads Authority, Environmental Impact Assessment of National Road Schemes – A Practical Guide, 2005.

National Roads Authority, Guidelines for the Treatment of Noise and Vibration in National Road Schemes, Revision 1, October 2004.

Community Support Framework (CSF) Evaluation Unit, Proposed Working Rules for Cost-Benefit Analysis, June 1999.

EPA Publications

Environmental Protection Agency, Guidance Note for Strategic Noise Mapping for the Environmental Noise Regulations 2006, Version 2.0 August 2011

Environmental Protection Agency, Revised Section 10 (Stage 7 – Post Processing and Analysis) of the Guidance Note for Strategic Noise Mapping for the Environmental Noise Regulations 2006, October 2017

Environmental Protection Agency, Guidance Note for Noise in relation to Scheduled Activities, 2nd Edition, 2006.

Environmental Protection Agency, Environmental Management Guidelines, Environmental Management in the Extractive Industry (Non-Scheduled Minerals, 2006.

Environmental Protection Agency, Environmental Noise Survey Guidance Document, 2003.

Environmental Protection Agency, Advice Notes on Current Practice (in the preparation of Environmental Impact Statements), 2003.

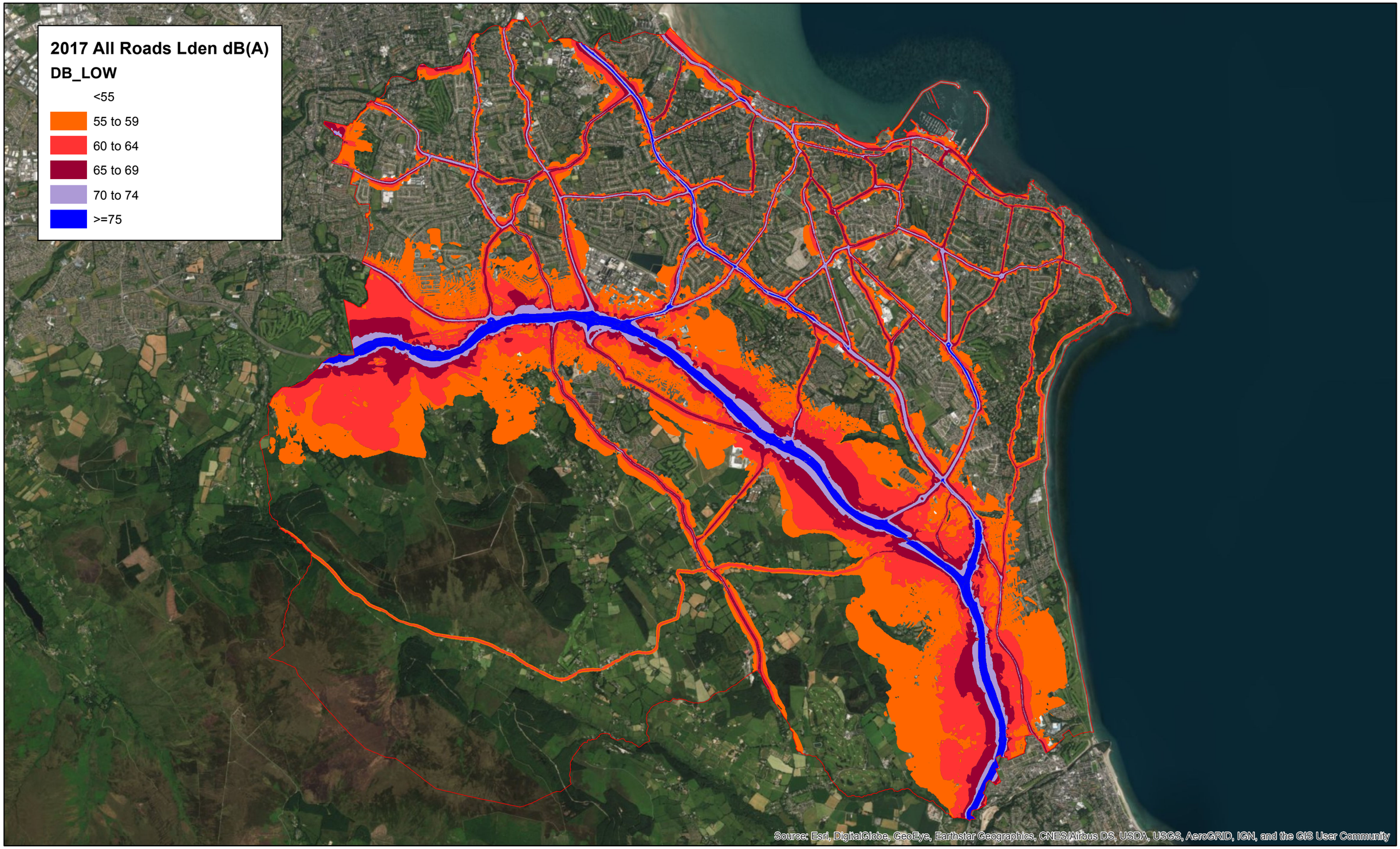
Environmental Protection Agency, Environmental Quality Objectives – Noise in Quiet Areas (2000-MS-14-M1), Environmental RTDI Programme 2000 – 2006. (Authors Waugh, D., Durucan, et. al.), 2003.

Appendix - C

DLRCC – Noise Exposure Tables and Maps

Table 1.0: Sound Emissions from All Road and Major Roads within DLRCC

Element	Data	ALL ROAD	MAJOR ROAD		ALL ROAD	MAJOR ROAD
Lden<55	Number of people in dwellings Lden <55dB	137600	144300			
Lden5559	Number of people in dwellings Lden 55-59dB	33300	31600	**People>55**	80400	73700
Lden6064	Number of people in dwellings Lden 60-64dB	22500	19200			
Lden6569	Number of people in dwellings Lden 65-69dB	19200	17800	**People>65**	24600	22900
Lden7074	Number of people in dwellings Lden 70-74dB	4300	4200			
Lden75	Number of people in dwellings Lden >75dB	1100	900	**People>75**	1100	900
Lnight<50	Number of people in dwellings Lnight 50-54dB	157800	163100			
Lnight5054	Number of people in dwellings Lnight 50-54dB	28400	25300	**People>50**	60200	54900
Lnight5559	Number of people in dwellings Lnight 55-59dB	23700	21700			
Lnight6064	Number of people in dwellings Lnight 60-64dB	5700	5600	**People>60**	8100	7900
Lnight6569	Number of people in dwellings Lnight 65-69dB	2100	2000			
Lnight70	Number of people in dwellings Lnight >70dB	300	300	**People>70**	300	300
AreaLden<55	Area in km2 Lden <55dB	83	87			
AreaLden5559	Area in km2 Lden 55-59dB	19	18	**Area>55**	44	40
AreaLden6064	Area in km2 Lden 60-64dB	12	11			
AreaLden6569	Area in km2 Lden 65-69dB	7	6	**Area>65**	13	11
AreaLden7074	Area in km2 Lden 70-74dB	4	3			
AreaLden75	Area in km2 Lden >75dB	2	2	**Area>75**	2	2
DwellingsLden<55	Number of dwellings Lden <55dB	54200	57100			
DwellingsLden5559	Number of dwellings Lden 55-59dB	13300	12600	**Dwellings>55**	33500	30600
DwellingsLden6064	Number of dwellings Lden 60-64dB	9500	8100			
DwellingsLden6569	Number of dwellings Lden 65-69dB	8300	7700	**Dwellings>65**	10700	9900
DwellingsLden7074	Number of dwellings Lden 70-74dB	1900	1900			
DwellingsLden75	Number of dwellings Lden >75dB	500	300	**Dwellings>75**	500	300



Project: Strategic Noise Mapping 2017. Produced by the Traffic & Road Safety Section Dun Laoghaire Rathdown County Council.

TRAFFIC SECTION
MUNICIPAL SERVICES
1 HARBOUR SQUARE
CROFTON ROAD
DUN LAOGHAIRE
TEL: 01 2054700 WEB:

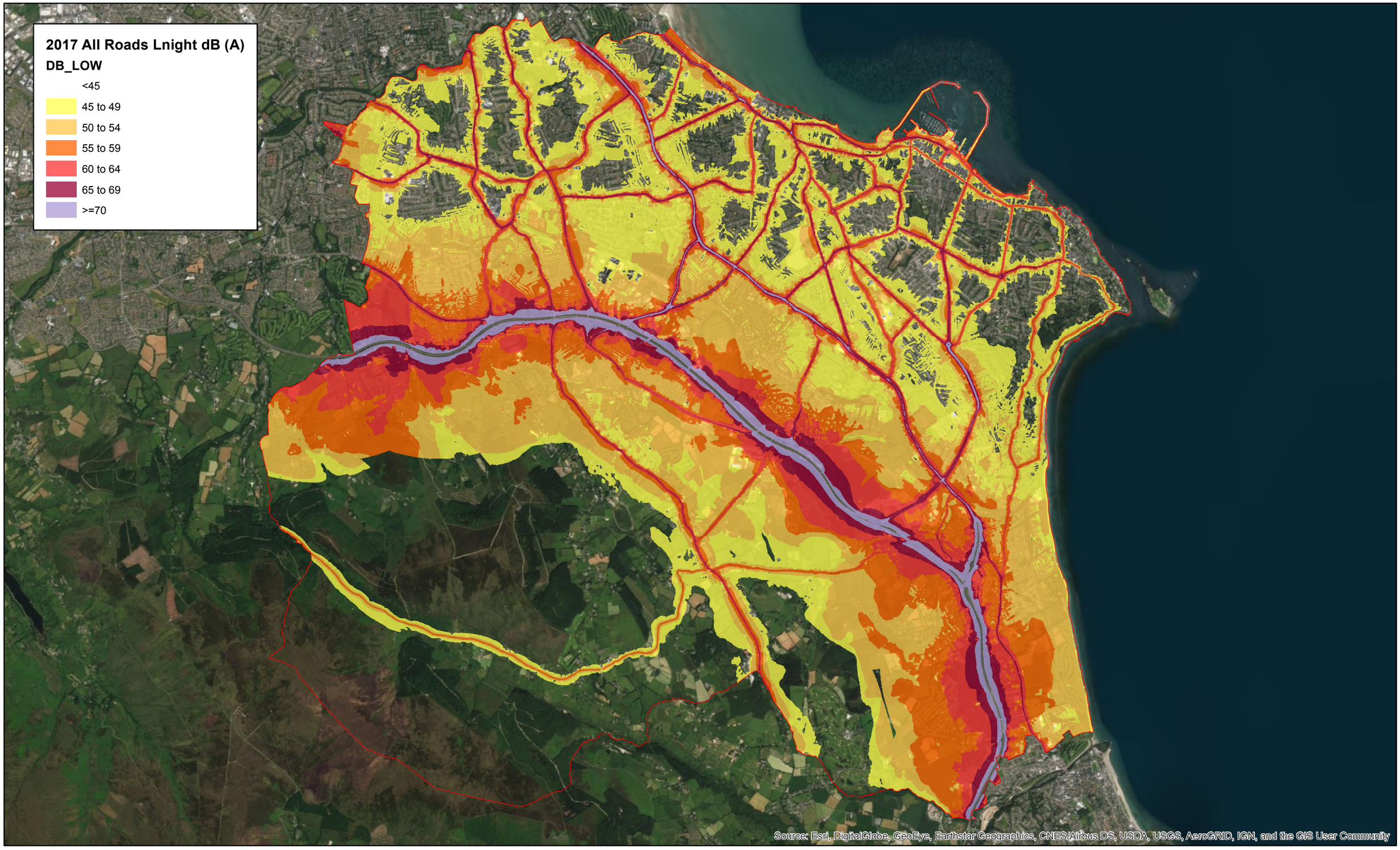
This strategic noise map presents a graphical representation of weighted predicted annual average road traffic sound levels in Dun Laoghaire Rathdown County Council. The map has been developed in accordance with S.I. No. 140/2006 (the Environmental Noise Regulations) and is a representation of the average environmental sound levels over one complete year. This map forms part of a national noise mapping strategy which can be primarily used as a strategic tool for large scale planning or policy matters and not suitable for local noise assessments.

TITLE:

Lden dB(A) Dun Laoghaire Rathdown Council – All Roads

dlr Comhairle Contae County Council

3 1.5 0 3 Kilometers



Project: Strategic Noise Mapping 2017. Produced by the Traffic & Road Safety Section Dun Laoghaire Rathdown County Council.

TRAFFIC SECTION
MUNICIPAL SERVICES
1 HARBOUR SQUARE
CROFTON ROAD
DUN LAOGHAIRE
TEL: 01 2054700 WEB:

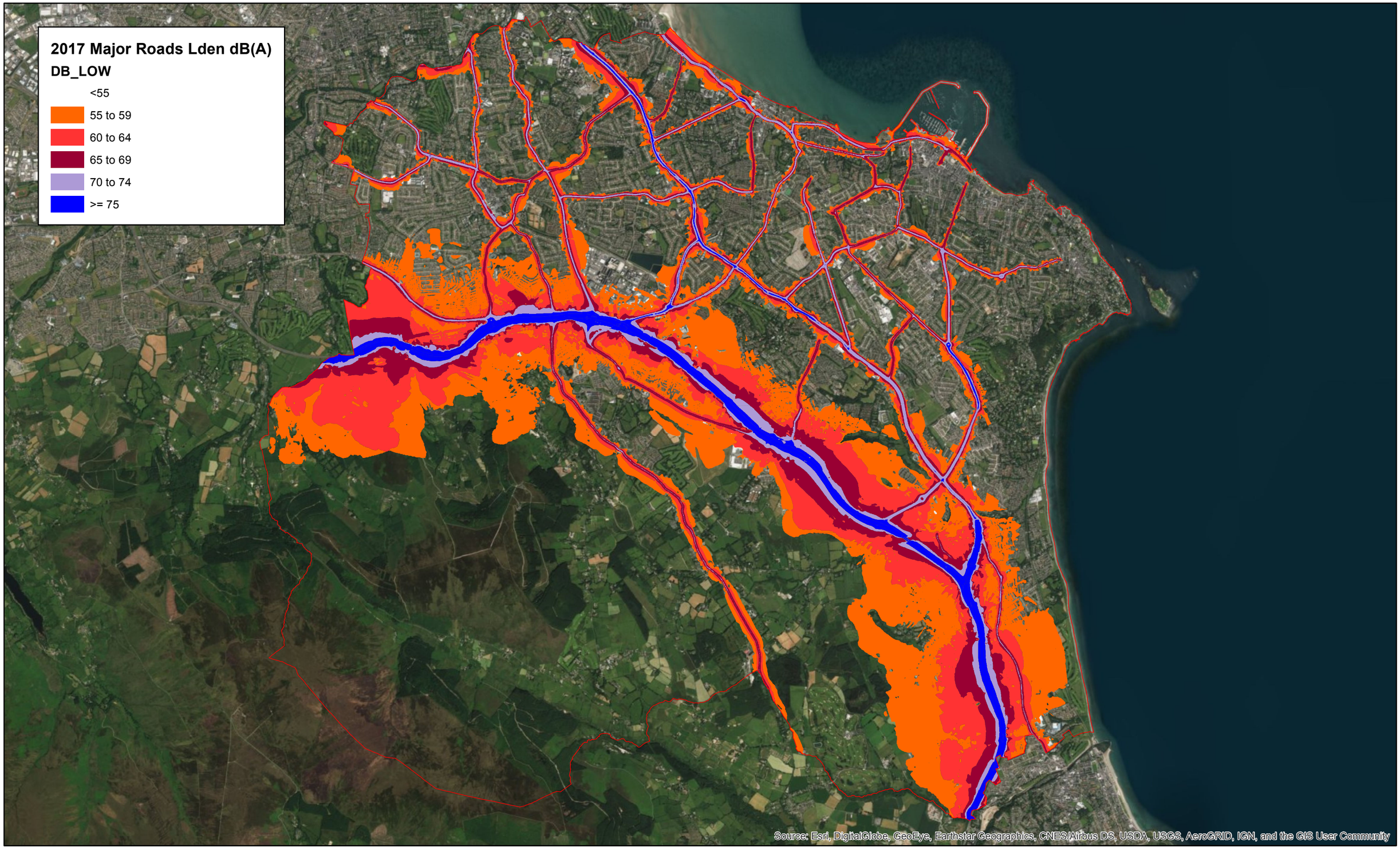
This strategic noise map presents a graphical representation of weighted predicted annual average road traffic sound levels in Dun Laoghaire Rathdown County Council. The map has been developed in accordance with S.I. No. 140/2006 (the Environmental Noise Regulations) and is a representation of the average environmental sound levels over one complete year. This map forms part of a national noise mapping strategy which can be primarily used as a strategic tool for large scale planning or policy matters and not suitable for local noise assessments.

TITLE:

Lnight dB(A) Dun Laoghaire Rathdown Council – All Roads

dlr Comhairle Contae County Council

3 1.5 0 3 Kilometers



Project: Strategic Noise Mapping 2017. Produced by the Traffic & Road Safety Section Dun Laoghaire Rathdown County Council.

TRAFFIC SECTION
MUNICIPAL SERVICES
1 HARBOUR SQUARE
CROFTON ROAD
DUN LAOGHAIRE
TEL: 01 2054700 WEB:

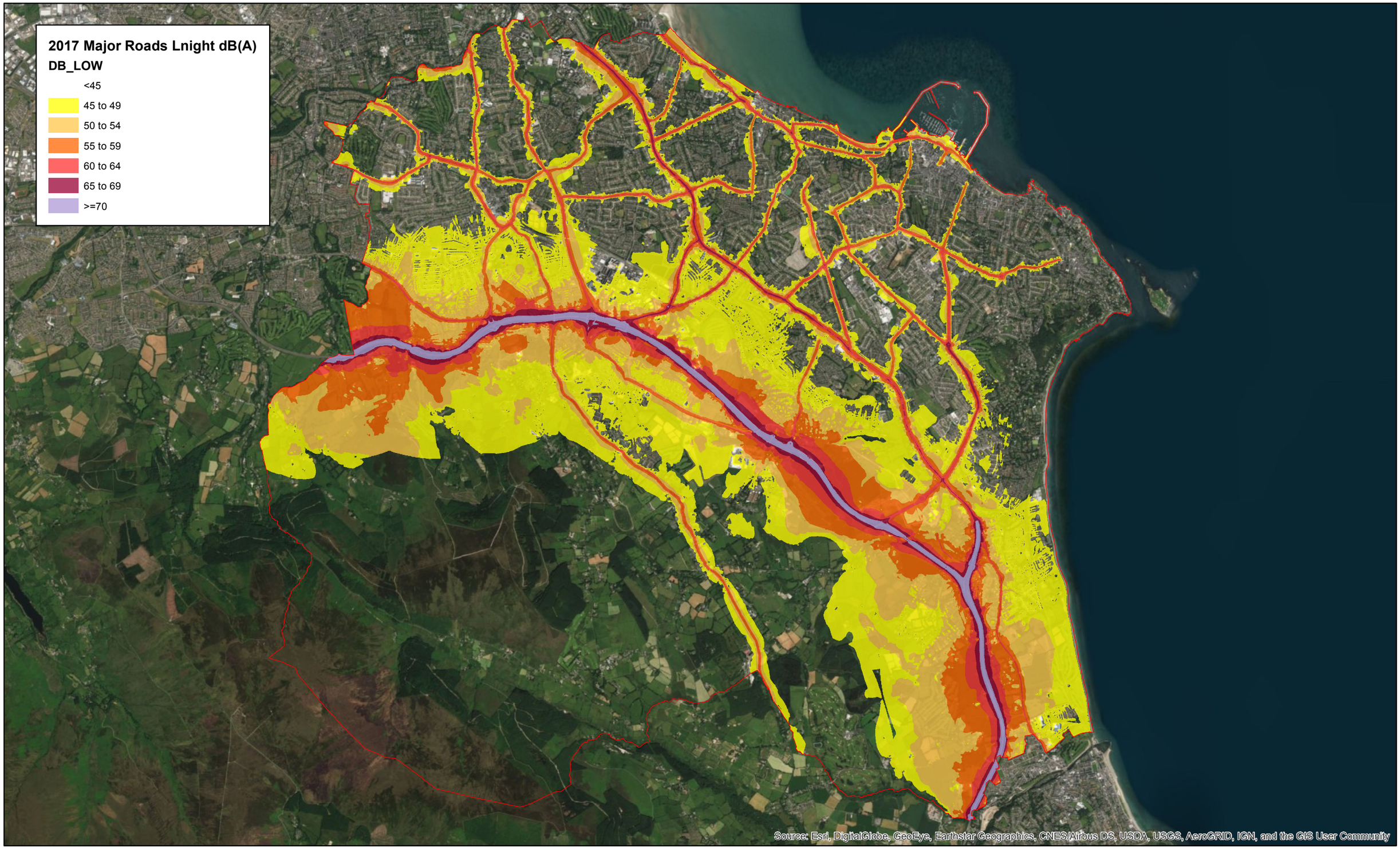
This strategic noise map presents a graphical representation of weighted predicted annual average road traffic sound levels in Dun Laoghaire Rathdown County Council. The map has been developed in accordance with S.I. No. 140/2006 (the Environmental Noise Regulations) and is a representation of the average environmental sound levels over one complete year. This map forms part of a national noise mapping strategy which can be primarily used as a strategic tool for large scale planning or policy matters and not suitable for local noise assessments.

TITLE:

Lden dB(A) Dun Laoghaire Rathdown Council – Major Roads

dlr Comhairle Contae County Council

3 1.5 0 3 Kilometers



Project: Strategic Noise Mapping 2017. Produced by the Traffic & Road Safety Section Dun Laoghaire Rathdown County Council.

TRAFFIC SECTION
MUNICIPAL SERVICES
1 HARBOUR SQUARE
CROFTON ROAD
DUN LAOGHAIRE
TEL: 01 2054700 WEB:

This strategic noise map presents a graphical representation of weighted predicted annual average road traffic sound levels in Dun Laoghaire Rathdown County Council. The map has been developed in accordance with S.I. No. 140/2006 (the Environmental Noise Regulations) and is a representation of the average environmental sound levels over one complete year. This map forms part of a national noise mapping strategy which can be primarily used as a strategic tool for large scale planning or policy matters and not suitable for local noise assessments.

TITLE:

Lnight dB(A) Dun Laoghaire Rathdown Council – Major Roads

dlr Comhairle Contae County Council

3 1.5 0 3 Kilometers

Irish Rail – Noise Exposure Tables

Table 2.0: Sound Emissions from Iarnród Éireann Major Heavy Rail within Dublin Agglomeration Area

dB	LDEN IÉ Major Rail	LD IÉ Major Rail	LE IÉ Major Rail	LN IÉ Major Rail	No. of Quiet Facades (QFs)	No. of people with Quiet Facades (LDEN)	No. of people with Quiet Facades (LNIGHT)	Area Exposed (LDEN) km2	No. Of Dwellings Exposed (LDEN)
0-44	1312120	1315720	1320220	1334320	4100	9400	16400	0	519493
45-49	13100	12300	11000	6700	1300	2900	3600	0	5500
50-54	9300	8200	7200	4400	1800	4100	3200	0	4100
55-59	6400	6900	5800	1700	1500	3300	1200	0	2800
60-64	5400	3900	3000	300	1600	4100	300	0	2100
65-69	1100	400	200	0	300	900	0	0	500
70-74	100	0	0	0	0	0	0	0	0
>=75	0	0	0	0	0	0	0	0	0
Total	1347500	1347400	1347400	1347400	10600	24700	24700	6	534500

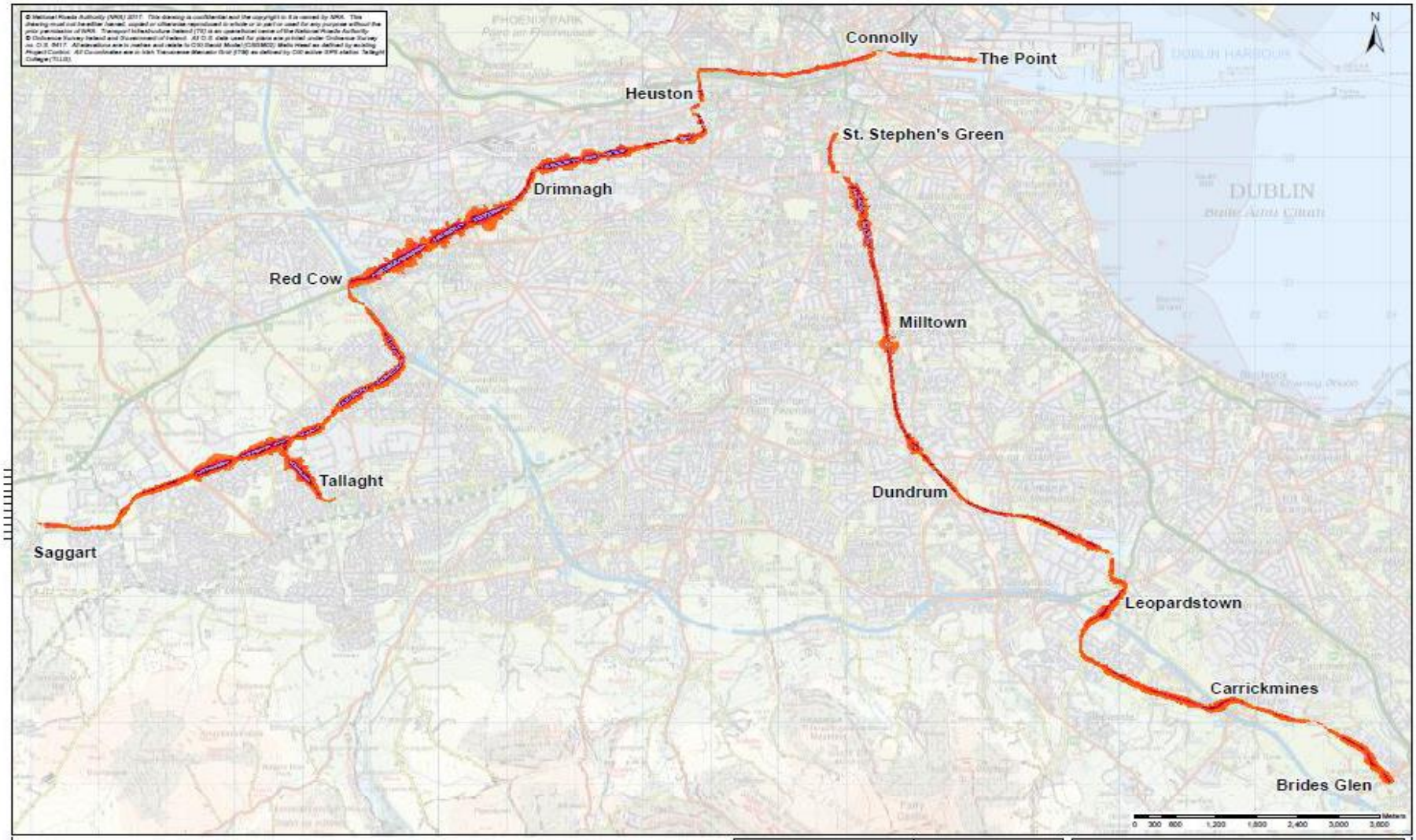
Table 3.0: Sound Emissions from Iarnród Éireann All Heavy Rail within Dublin Agglomeration Area

dB	LDEN IÉ All Rail	LDay IÉ All Rail	LEvening IÉ All Rail	LNight IÉ All Rail	No. of Quiet Facades (QFs)	No. of people with Quiet Facades (LDEN)	No. of people with Quiet Facades (LNIGHT)	Area Exposed (LDEN) km2	No. Of Dwellings Exposed (LDEN)
0-44	1300920	1307120	1313420	1330720	4100	9600	17200	0	514893
45-49	17800	16100	14500	8700	1400	3200	3700	0	7500
50-54	12900	10800	9100	5600	2000	4700	3900	0	5400
55-59	8000	8200	6700	2100	1600	3700	1300	0	3500
60-64	6400	4600	3400	300	1700	4200	400	0	2600
65-69	1300	600	300	0	400	1100	0	0	600
70-74	100	0	0	0	0	0	0	0	0
>=75	0	0	0	0	0	0	0	0	0
Total	1347400	1347400	1347400	1347400	11200	26500	26500	13	534500

Transport Infrastructure Ireland – Luas Noise Exposure Tables and Maps

Table 4.0: Sound Emissions from Transport Infrastructure Ireland All Light Rail within Dublin Agglomeration Area

Major Rail – Luas dBA	L_{DEN}	L_{DAY}	$L_{EVENING}$	L_{NIGHT}	No. of Quiet Façades (QFs)	No. of people with QF (L_{DEN})	No. of people with QF (L_{NIGHT})	Area Exposed (L_{DEN}) km²	No. of Dwellings Exposed (L_{DEN})
0-44	1313400	1320100	1323200	1331900	2300	6100	13100		522400
45-49	12800	10400	9000	6000	1900	4300	3300		5400
50-54	8000	6200	5800	6900	1500	3900	5500		3200
55-59	6000	6900	6700	2200	1800	4100	1700		2600
60-64	5400	3200	2300	300	1600	4100	200		2000
65-69	1500	400	300	100	500	1200	100		600
70-74	200	200	100	0	0	100	0		100
>55	13200	10400	9400	2600	3900	9600	1900	3.24	5400
>65	1700	500	400	100	500	1300	100	1.98	700
>=70	300	200	100	0	0	200	0	0.00	100
>=75	100	0	0	0	0	100	0	0.08	0
Total	1347400	1347400	1347400	1347400	9600	23900	23900	5.30	536300



Lden dB(A)

- Less Than 55
- 55 - 59
- 60 - 64
- 65 - 69
- 70 - 74
- Greater Than 75

TII

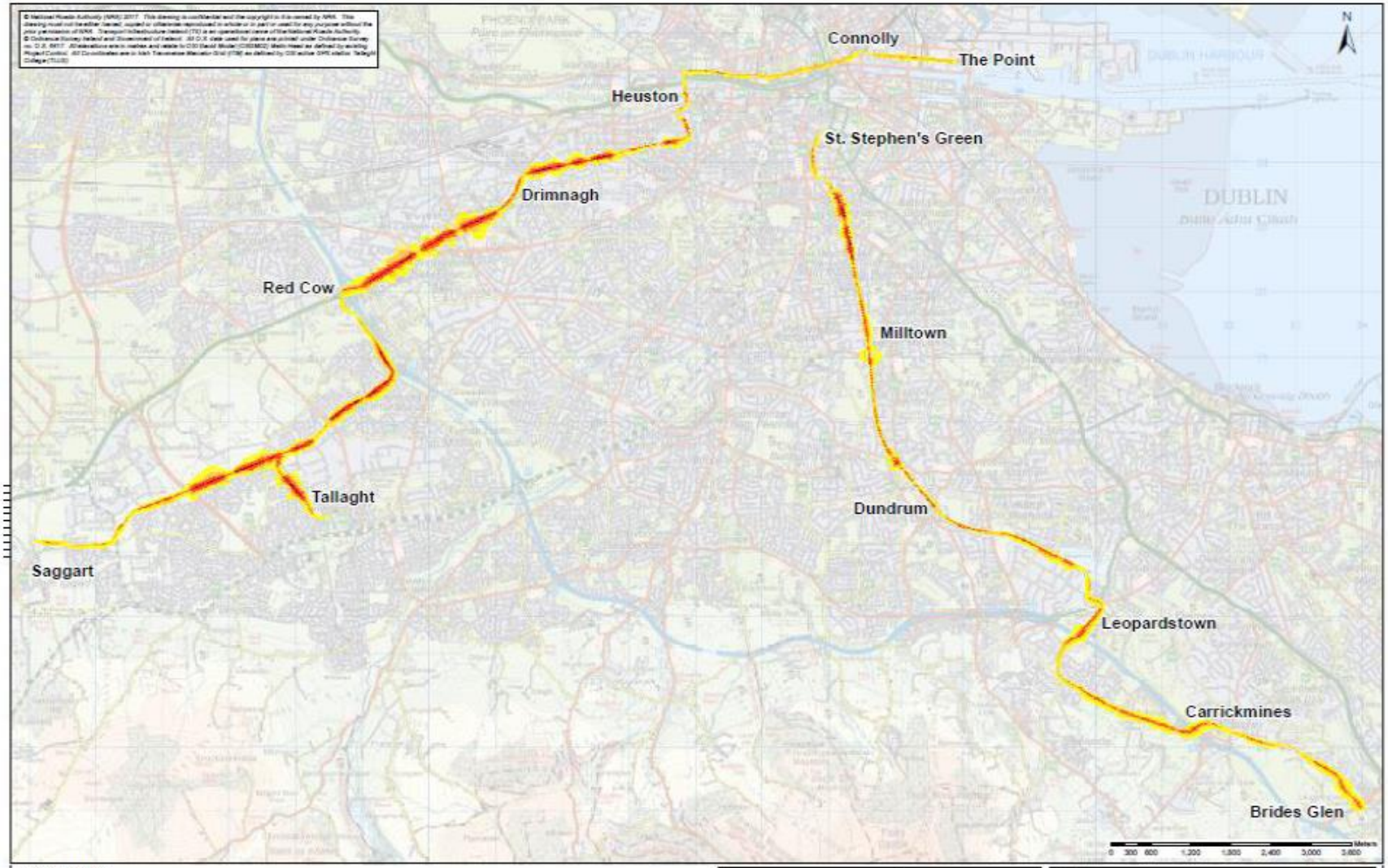
LUAS

LOCATION: Luas Red and Green Lines

SPECIALIST TOPIC: Strategic Noise Mapping Round 3 (2017) Average 24 Hour Sound Values (Lden)

PREPARED: COP	REVIEWED: BB	APPROVED: BB
	CHECKED: BB	DATE: September 2017
		SCALE: 1:50,000

AREA NO: | PLAN NO: - | SUBJECT: NOISE MAPPING



Lnight dB(A)

- Less Than 45
- 45 - 49
- 50 - 54
- 55 - 59
- 60 - 64
- 65 - 69
- Greater Than 70

TII

LUAS

LOCATION: Luas Red and Green Lines

SPECIALIST TOPIC: **Strategic Noise Mapping Round 3 (2017) Average Night Time Sound Values (Lnight)**

PREPARED: COP	REVIEWED: DB	APPROVED: DB
	CHECKED: DB	DATE: September 2017
		SCALE: 1:36,000

AREA NO: -

PLAN NO: -

SUBJECT: NOISE MAPPING

Appendix D - Noise Level Bands Colour scheme

The EPA Guidance Note for Noise Action Planning recommends the colour bands outlined below for use in the production of noise level contour maps. The colour bands are based upon those set out within ISO 1996-2 (1987). Furthermore, it is recommended that the colour bands are made semi-transparent such that the base mapping below remains partly visible such that orientation and location remains possible.

Table A - Recommended noise Level Bands for Maps of L_{den}

Noise zone dB	Colour	Code	Red	Green	Blue
< 55	Transparent				
55 to 59	Orange	# FF 66 00	255	102	0
60 to 64	Cinnabar	# FF 33 33	255	51	51
65 to 69	Carmine	# 99 00 33	153	0	51
70 to 74	Lilac red	# AD 9A D6	173	154	214
≥75	Blue	# 00 00 FF	0	0	255

Table B - Recommended Noise Level Bands for Maps of L_{night}

Noise zone dB	Colour	Code	Red	Green	Blue
<45	Transparent				
45 to 49	Yellow	# FF FF 00	255	255	0
50 to 54	Ochre	# FF C7 4A	255	199	74
55 to 59	Orange	# FF 66 00	255	102	0
60 to 64	Cinnabar	# FF 33 33	255	51	51
65 to 69	Carmine	# 99 00 33	153	0	51
≥70	Lilac red	# AD 9A D6	173	154	214

Appendix E - Decision Matrix

A decision support matrix is a chart which 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 the assessment of the relative importance of each.

For this Noise 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. For example an address, which falls within the Sound level Lden 65-69dB (2) and 55-59dB at night (3), in a noise sensitive 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.

Table C - Noise Decision Support Matrix

Decision Selection Criteria		**Score Range Lden**	**Score Range Lnight**	**Subtotal**
Noise Band dB(A)	<45	5	6	
	45-49	4	5	
	50-54	3	4	
	55-59	2	**2**	**2**
	60-64	1	3	
	65-69	**2**	4	**2**
	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**	**6**
	Quiet Area	3	3	
	Recreational open space	2	2	
Type of Noise	Road	**2**	**3**	**5**
	Rail	1	2	
	Airport	3	4	
			Total	**15**