

**MAPA ESTRATÉGICO  
DE RUÍDO  
RESUMO NÃO TÉCNICO (RNT)  
ANO 2021**

AEROPORTO HUMBERTO DELGADO  
LISBOA

março 2024

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**STRATEGIC NOISE MAP  
NON-TECHNICAL SUMMARY (RNT)  
YEAR 2021**

HUMBERTO DELGADO AIRPORT  
LISBON

march 2024

# MAPA ESTRATÉGICO DE RUÍDO 2021 (RNT)– STRATEGIC NOISE MAP 2021 (RNT)

## Aeroporto Lisboa | Lisbon Airport – Humberto Delgado (AHD)

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# MAPA ESTRATÉGICO DE RUÍDO 2021 (RNT)– STRATEGIC NOISE MAP 2021 (RNT)

## Aeroporto Lisboa | Lisbon Airport – Humberto Delgado (AHD)

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### SIGLAS

07h-20h: Período diurno do RGR  
20h-23h: Período do entardecer do RGR  
23h-07h: Período noturno do RGR  
AEDT: Ferramenta de Desenho Ambiental de Aviação (*software* de previsão de ruído)  
AHD: Aeroporto Humberto Delgado (Lisboa)  
AIP: Publicação de Informação Aeronáuticas  
ANA: Aeroportos de Portugal, S.A.  
APA: Agência Portuguesa do Ambiente  
ARP: Ponto de referência do aeródromo  
CE: Comunidades Europeias  
CNOSSOS-EU: Métodos comuns de avaliação de ruído na Europa  
COVID-19: Doença por coronavírus 2019  
DEMR2022: “APA – Diretrizes para Elaboração de Mapas de Ruído: Métodos CNOSSOS-EU. Versão 1. Agosto 2022”  
ECAC: Conferência Europeia de Aviação Civil  
EMR: Estação de Monitorização de Ruído  
END: Diretiva de Ruído Ambiente<sup>1</sup>  
FAA: USA Federal Aviation Administration  
GITa: Grande Infraestrutura de Transporte Aéreo (mais de 50000 movimentos por ano)

### ACRONYMS

07h-20h: Day time of RGR  
20h-23h: Evening time of RGR  
23h-07h: Night time of RGR  
AEDT: Aviation Environmental Design Tool (noise prediction software)  
AHD: Humberto Delgado Airport (Lisbon)  
AIP: Aeronautical Information Publication  
ANA: Airports of Portugal, S.A.  
APA: Portuguese Environment Agency  
ARP: Aerodrome reference point  
EC: European Communities  
CNOSSOS-EU: Common Noise Assessment Methods in Europe.  
COVID-19: Coronavirus disease 2019  
DEMR2022: “APA – Guidelines for the Elaboration of Noise Maps: CNOSSOS-EU Methods. Version 1. August 2022”  
ECAC: European Civil Aviation Conference  
EMR: Noise Monitoring Terminal  
END: Environmental Noise Directive<sup>2</sup>  
FAA: USA Federal Aviation Administration  
GITa: Major Airport (more than 50000 movements per year)

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<sup>1</sup> Diretiva 2002/49/CE (END), revista por Regulamento (CE) 1137/2008, Diretiva (UE) 2015/996 (transposta pelo Decreto-Lei n.º 136-A/2019, que republica o Decreto-Lei n.º 146/2006) Regulamento (UE) 2019/1010, Regulamento (UE) 2019/1243, Diretiva (UE) 2020/367, Diretiva Delegada (UE) 2021/1226.

<sup>2</sup> Directive 2002/49/EC (END), revised by Regulation (EC) 1137/2008, Directive (EU) 2015/996 (transposed to Portugal by Decree-Law n.º 136-A/2019, which republishes Decree-Law n.º 146/2006) Regulation (EU) 2019/1010, Regulation (EU) 2019/1243, Directive (EU) 2020/367, Delegated Directive (EU) 2021/1226.

# MAPA ESTRATÉGICO DE RUÍDO 2021 (RNT)– STRATEGIC NOISE MAP 2021 (RNT)

## Aeroporto Lisboa| Lisbon Airport – Humberto Delgado (AHD)

GPRD-2022: “APA – Guia de Procedimentos para o Reporte de Dados no Âmbito da Diretiva Ruído Ambiente DF4-8 Mapas Estratégicos de Ruído. Versão 5. Agosto 2022”

ICAO: Organização Internacional da Aviação Civil

LAU: Unidade Administrativas Locais

$L_d$ : Nível sonoro diurno

$L_{den}$ : Nível sonoro dia-entardecer-noite

$L_e$ : Nível sonoros do entardecer

$L_n$ : Nível sonoro noturno

LPPT: Código ICAO do AHD

MER: Mapa Estratégico de Ruído

NAPs: Procedimentos de redução de ruído

NAV: Regulador da Navegação Aérea de Portugal

RGR: Regulamento Geral do Ruído<sup>3</sup>

RNT: Resumo Não Técnico

SCHIU: Engenharia de Vibração e Ruído, Lda.

SEF: Serviço de Estrangeiros e Fronteiras

UE: União Europeia

GPRD-2022: “APA – Procedural Guide for Data Reporting under the Environmental Noise Directive DF4-8 Strategic Noise Maps. Version 5. August 2022”

ICAO: International Civil Aviation Organization

LAU: Local Administrative Units

$L_d$ : Day Noise Level

$L_{den}$ : Day-evening-night Noise Level

$L_e$ : Evening Noise Level

$L_n$ : Night Noise Level

LPPT: ICAO code of the AHD.

MER: Strategic Noise Map

NAPs: Noise Abatement procedures

NAV: Portuguese Air Navigation Regulator

RGR: Portuguese General Noise Regulation<sup>4</sup>

RNT: Non-Technical Summary

SCHIU: Vibration and Noise Engineering, Lda.

SEF: Immigration and Border Control

EU: European Union

<sup>3</sup> Decreto-Lei n.º 9/2007, revisto pela Declaração de Retificação n.º 18/2007 e pelo Decreto-Lei n.º 278/2007.

<sup>4</sup> Decree-Law n.º 9/2007, revised by Declaration of Rectification n.º 18/2007 and Decree-Law n.º 278/2007.

# MAPA ESTRATÉGICO DE RUÍDO 2021 (RNT)– STRATEGIC NOISE MAP 2021 (RNT)

## Aeroporto Lisboa | Lisbon Airport – Humberto Delgado (AHD)

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### 1. INTRODUÇÃO

O Mapa Estratégico de Ruído (MER) do Aeroporto Humberto Delgado (AHD), relativo ao ano 2021, foi elaborado pela SCHIU, Engenharia de Vibração e Ruído, Lda., para a ANA, Aeroportos de Portugal, S.A., através da seguinte Equipa Técnica:

- ANA: Jorge Melgueira; Sílvia Pereira.
- SCHIU: Vitor Rosão; André Pires; Alice Ramos, Alexandra Reis.

Este MER foi antecedido pelo MER relativo ao ano de 2016, publicado pela Agência Portuguesa do Ambiente (APA) no seu *website* (atualmente: <https://apambiente.pt/ar-e-ruído/mapas-estrategicos-de-ruído-git-aereo>).

O presente Resumo Não Técnico (RNT), constitui um documento independente, que resume e “esclarece”, de forma que se procura acessível ao público em geral, o conteúdo de Relatório Técnico mais completo.

### 1. INTRODUCTION

The Strategic Noise Map (MER) of Humberto Delgado Airport (AHD; Lisbon), for the year 2021, was prepared by SCHIU, Vibration and Noise Engineering, Lda., for ANA, Airports of Portugal, S.A., through the following Technical Team:

- ANA: Jorge Melgueira; Sílvia Pereira.
- SCHIU: Vitor Rosão; André Pires; Alice Ramos; Alexandra Reis.

This MER was preceded by the MER for the year 2016, published by the Portuguese Environment Agency (APA) on its *website* (currently: <https://apambiente.pt/ar-e-ruído/mapas-estrategicos-de-ruído-git-aereo>).

The following non-technical report presents an independent document which is intended to resume and clarify the Technical Report so that the general audience can have a better understanding of the contents.

## 2. ENQUADRAMENTO

Os Mapas Estratégicos de Ruído (MER) estão alicerçados na Diretiva de Ruído Ambiente (END) 2002/49/CE, que obriga à elaboração de MERs. A Diretiva 2002/49/CE (END) foi revista por:

- Regulamento (CE) 1137/2008.
- Diretiva (UE) 2015/996, transposta pelo Decreto-Lei n.º 136-A/2019, que republica o Decreto-Lei n.º 146/2006.
- Regulamento (UE) 2019/1010.
- Regulamento (UE) 2019/1243.
- Diretiva (UE) 2020/367.
- Diretiva Delegada (UE) 2021/1226.
- Os Regulamentos e Diretivas referidas foram traspostos pelo Decreto-Lei n.º 84-A/2022, de 9 de setembro, que corresponde também à 2.ª alteração do Decreto-Lei n.º 146/2006.
- A Portaria n.º 42/2023, de 9 de fevereiro, corresponde ao estabelecido no Artigo 4.º do DL 84-A/2022.

Na Figura 1 apresenta-se, de forma aproximada e para melhor perceção dos níveis sonoros em causa, quais as relações típicas entre os valores dos níveis sonoros e as sensações auditivas em situações comuns.

## 2. FRAMEWORK

Strategic Noise Maps (MER) are based on the so-called Environmental Noise Directive [(END) Directive 2002/49/EC, which obliges to develop the Noise Maps. The Directive 2002/49/EC was revised by:

- Regulation (EC) 1137/2008.
- Directive (EU) 2015/996, transposed to Portugal by Decree-Law n.º 136-A/2019, which republishes Decree-Law n.º 146/2006.
- Regulation (EU) 2019/1010.
- Regulation (EU) 2019/1243.
- Directive (EU) 2020/367.
- Delegated Directive (EU) 2021/1226.
- The Regulations and Directives mentioned were transposed by Decree-Law n.º 84-A/2022, of 9 September, which also corresponds to the 2<sup>nd</sup> amendment of Decree-Law no. 146/2006.
- Ordinance n.º 42/2023, of 9 February, corresponds to the provisions of Article 4 of DL 84-A/2022.

In order to give a better understanding of the sound levels, in Figure 1 are presented the typical relation between the levels of the sound levels and the associated auditive sensation.

# MAPA ESTRATÉGICO DE RUÍDO 2021 (RNT)– STRATEGIC NOISE MAP 2021 (RNT) Aeroporto Lisboa | Lisbon Airport – Humberto Delgado (AHD)

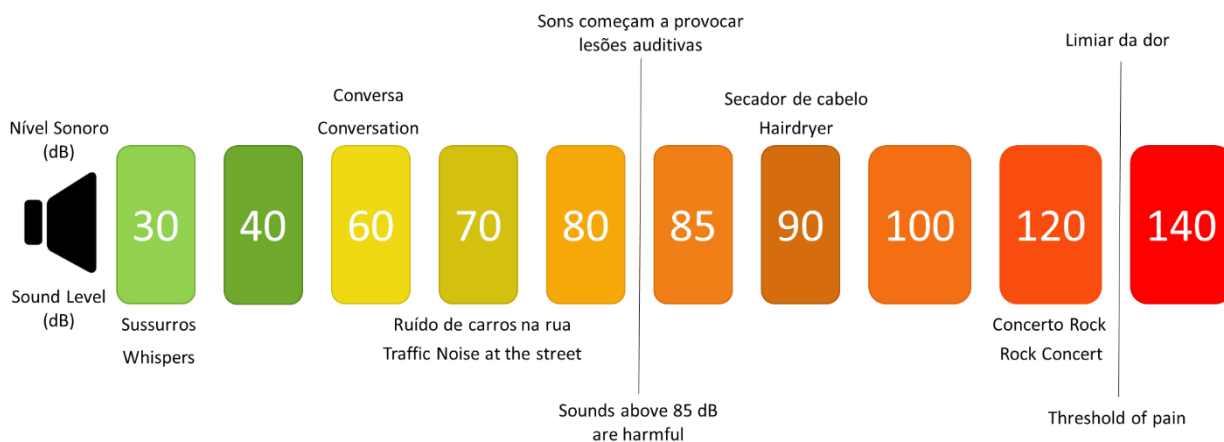


Figura 1 – Níveis típicos de ruído em decibéis (dB).  
Figure 1 – Typical Noise levels in decibels (dB).



## MAPA ESTRATÉGICO DE RUÍDO 2021 (RNT) – STRATEGIC NOISE MAP 2021 (RNT) Aeroporto Lisboa | Lisbon Airport – Humberto Delgado (AHD)

Conforme estabelecido, são apresentados Mapas de Ruído para os seguintes dois parâmetros:

- Nível sonoro dia-entardecer-noite:  $L_{den}$ .
- Nível sonoro noturno (23h-7h):  $L_n$ .

O parâmetro composto  $L_{den}$ , é calculado com base em  $L_n$  e com base em:

- Nível sonoro diurno (7h-20h):  $L_d$ .
- Nível sonoro do entardecer (20h-23h):  $L_e$ .

As definições dos parâmetros encontram-se no Decreto-Lei n.º 9/2007 [Regulamento geral do Ruído (RGR)], correspondendo a médias anuais, sendo que o parâmetro  $L_{den}$  corresponde a uma “média” de 24h – representativa de um ano - dos níveis sonoros, em que é dado mais peso (5 dB) ao período do entardecer e ainda mais peso (10dB) ao período noturno.

Os valores limite em Portugal, a cumprir nos Recetores Sensíveis: (RGR: “*o edifício habitacional, escolar, hospitalar ou similar ou espaço de lazer, com utilização humana*”) são, para um Grande Infraestrutura de Transporte Aéreo (GITA; mais de 50000 movimentos por ano), de acordo com a alíneas a) e c) do Artigo 11.º do RGR:

- $L_{den} \leq 65$  dB(A).
- $L_n \leq 55$  dB(A).

As it was previously established, the Noise Maps are presented for the following noise indicators:

- Day-evening-night Noise Level:  $L_{den}$ .
- Night Noise Level (23h-7h):  $L_n$ .

The composed noise indicator  $L_{den}$  is based on the indicator  $L_n$  as well as the following noise indicators:

- Day Noise Level (7h-20h):  $L_d$ .
- Evening Noise Level (20h- 23h):  $L_e$ .

The definitions of the parameters are found in the Decree-Law no. 9/2007 [Portuguese General Noise Regulation (RGR)], corresponding to annual averages, where the parameter  $L_{den}$  corresponds to a 24h "average" - representative of one year - of the sound levels, in which more ponderation (5 dB) is given to the evening period and even more (10dB) to the night period.

The limit values in Portugal, to be complied in the Sensitive Receivers: (RGR: “*the residential building, school, hospital or similar or leisure space, with human use*”) are, for a Major Airport (GITA; more than 50000 movements per year), in accordance with paragraphs a) and c) of Article 11 of the RGR:

- $L_{den} \leq 65$  dB(A).
- $L_n \leq 55$  dB(A).

### **3. MAPAS DE RUÍDO**

Apresentam-se no Anexo 3 os Mapas de Ruído para o Aeroporto Humberto Delgado (AHD), em Lisboa, respeitantes aos indicadores  $L_{den}$  e  $L_n$ , para o ano de 2021.

Adicionalmente, é igualmente apresentada a marcação das isófonas  $L_n = 53$  dB(A) e  $L_{den} = 63$  dB(A).

### **3. NOISE MAPS**

The Noise Maps for Humberto Delgado Airport (AHD), in Lisbon, for the year 2021 are shown in Annex 3, with regards to the indicators  $L_{den}$  and  $L_n$ .

Additionally, the noise contour lines  $L_n = 53$  dB(A) and  $L_{den} = 63$  dB(A) are also presented.

# MAPA ESTRATÉGICO DE RUÍDO 2021 (RNT) – STRATEGIC NOISE MAP 2021 (RNT)

## Aeroporto Lisboa | Lisbon Airport – Humberto Delgado (AHD)

### 4. METODOLOGIA

Os Mapas de Ruído anteriores são calculados com o programa de modelação: “AEDT- Aviation Environmental Design Tool, version 3e (May 2022)”, desenvolvido pela FAA (USA *Federal Aviation Administration*), compatível com:

- a) CNOSSOS-EU;
- b) Documentos de suporte à aplicação do método:
  - a. “Report on Standard Method of Computing Noise Contours around Civil Airports”;
  - b. International Civil Aviation Organization (ICAO) Doc 9911 (2<sup>nd</sup> Edition)”;
  - c. “Recommended Method for Computing Noise Contours Around Airports”.

Os mapas de Ruído são calculados de acordo com a situação acústica relativa aos movimentos ocorridos no ano de 2021, resumidos na seguinte tabela:

### 4. METHDOLOGY

The noise maps are calculated with the Modelling program: “AEDT- Aviation Environmental Design Tool, version 3e (May 2022)”, developed by the FAA (USA *Federal Aviation Administration*), which is compatible with:

- a) CNOSSOS-EU;
- b) Documents supporting the application of the method:
  - a. “Report on Standard Method of Computing Noise Contours around Civil Airports”;
  - b. “International Civil Aviation Organization (ICAO) Doc 9911 (2<sup>nd</sup> Edition)”;
  - c. “Recommended Method for Computing Noise Contours Around Airports”.

Noise maps are calculated according to the acoustic situation concerning the movements that occurred in 2021 that are resumed in the following table:

Tabela 1 - Movimentos simulados, por pista do Aeroporto Humberto Delgado, em 2021

Table 1 - Simulated movements, by runway at Humberto Delgado Airport, in 2021

Operação   Operation	Pista   Runway	Dia   Day	Entardecer   Evening	Noite   Night
Aterragens   Arrivals (A)	02	29544	6626	7524
	20	9363	1659	1818
Total Parcial   Parcial Total (A)		38907	8285	9342
Descolagens   Departures (D)	02	31901	7454	4395
	20	9694	1900	1092
Total Parcial   Parcial Total (D)		41595	9354	5487
<b>Total 2021</b>		<b>80502</b>	<b>17639</b>	<b>14829</b>

## **5. DESCRIÇÃO DO AEROPORTO**

O Aeroporto Humberto Delgado situa-se na Portela de Sacavém, a 7 km na direção Noroeste do centro da cidade de Lisboa, no limite dos concelhos de Lisboa e Loures, abrangendo as freguesias de Olivais (concelho de Lisboa) e Camarate (concelho de Loures).

Dada a sua integração no meio urbano, toda a envolvente do Aeroporto é caracterizada por uma elevada densidade populacional, embora se verifique uma densidade de ocupação mais elevada a este e a sul. Nas envolventes próximas - noroeste e este / nordeste - observam-se ainda, em alguma extensão, áreas de utilização industrial, nomeadamente armazéns e pequenas unidades fabris. A vertente oeste encontra-se marcada pela urbanização da Alta de Lisboa.

Refira-se ainda a proximidade do Instituto Ricardo Jorge, do Centro Hospitalar Psiquiátrico de Lisboa, do Hospital de Santa Maria, e da Cidade Universitária a Sudoeste do Aeroporto, sendo que estes três últimos se encontram no alinhamento da Pista 02-20.

Em termos de acessibilidades viárias, o Aeroporto localiza-se junto da 2ª Circular de Lisboa, e Eixo Norte-Sul, próximo das ligações com a A1 – Autoestrada do Norte e com a A12 – Ponte Vasco da Gama, o que permite a sua rápida ligação ao IP1 para norte e para sul.

## **5. AIRPORT'S DESCRIPTION**

Humberto Delgado Airport is located in Portela de Sacavém, 7 km northwest from the centre of Lisbon, on the edge of the municipalities of Lisbon and Loures, covering the parishes of Olivais (municipality of Lisbon) and Camarate (municipality of Loures).

Given its integration into the urban environment, the entire surroundings of the Airport are characterised by a high population density, although there is a higher occupancy density to the East and South. There is some extension of industrial activity, in the neighbouring Northwest and East/Northeast areas, namely warehouses and small manufacturing units. The west side is outlined by the Alta de Lisboa neighbourhood.

It is also worth mentioning the proximity of the Ricardo Jorge Institute (Portuguese health laboratory), the Lisbon Psychiatric Hospital Centre, the Santa Maria Hospital, and the University City to the southwest of the Airport. The latter three areas are located along the lane 02-20.

In terms of road accessibility, the Airport is located next to two important road networks, the 2.ª Circular de Lisboa and the Eixo Norte-Sul, and it is in the proximity of A1 – North motorway and the A12 motorway – Vasco da Gama Bridge, allowing therefore an easy and quick access from the airport to the IP1 highway, both Northbound and Southbound

## **6. OPÇÕES DE CÁLCULO E VALIDAÇÃO DE LONGA DURAÇÃO**

Cumprindo as indicações do capítulo “2.7.26 Cálculo e aperfeiçoamento da grelha normalizada” do Decreto-Lei n.º 136-A/2019”, foi verificado que uma grelha de 50x50 m possui rigor semelhante (isolinha exatamente no mesmo sítio) a uma grelha de 10x10 m ou mesmo 5x5m, para as partes “retas” das isolinhas, enquanto nas zonas de curvatura das isolinhas, foi necessário alterar a grelha base de 50x50 m ( $\Delta G = 50$  m) para 5x5 m ( $\Delta G = 5$  m) para um maior detalhe ( $\Delta L \leq 1$  dB).

Para efeitos de validação dos modelos utilizados na produção dos Mapas de Ruído, o Aeroporto Humberto Delgado dispõe de uma rede fixa de 7 estações de monitorização contínua de ruído. Estas encontram-se distribuídas pelos corredores de aproximação às pistas permitindo monitorizar com rigor a operação das aeronaves que utilizam o Aeroporto. As estações de monitorização contínua estão localizadas nas seguintes coordenadas:

- 1- Pirescoxe (38°50'3.96"N 9° 5'23.43"W)
- 2- Alcântara (38°42'29.10"N 9°10'34.02"W)
- 3- Camarate (38°48'23.66"N 9° 7'20.37"W)
- 4- Campolide (38°44'0.34"N 9° 9'33.67"W)
- 5- Cidade Universitária (38°44'55.03"N 9° 9'14.95"W)
- 7- Aeroporto (38°47'26.02"N 9° 8'5.15"W)

## **6. CALCULATION METHODS AND LONG-TERM VALIDATION**

Complying with the indications in chapter “2.7.26 Calculation and improvement of the standardized grid” of Decree-Law n.º 136-A/2019”, it was verified that a grid of 50x50 m has similar accuracy (isolines in exactly the same place) to a grid of 10x10 m or even 5x5m, for the “straight” parts of the isolines, while in the zones of curvature of the isolines, it was necessary to change the base grid from 50x50 m ( $\Delta G = 50$  m) to 5x5 m ( $\Delta G = 5$  m) for greater detail ( $\Delta L \leq 1$  dB)

For the purpose of validating the models used in the production of the Noise Maps, Humberto Delgado Airport has a fixed network of 7 continuous Noise Monitoring Terminals. These are distributed along the runway approach corridors, allowing for the accurate monitoring of the operation of aircraft using the Airport. The Noise Monitoring Terminals are located in the following coordinates:

- 1- Pirescoxe (38°50'3.96"N 9° 5'23.43"W)
- 2- Alcântara (38°42'29.10"N 9°10'34.02"W)
- 3- Camarate (38°48'23.66"N 9° 7'20.37"W)
- 4- Campolide (38°44'0.34"N 9° 9'33.67"W)
- 5- Cidade Universitária (38°44'55.03"N 9° 9'14.95"W)
- 7- Aeroporto (38°47'26.02"N 9° 8'5.15"W)

## MAPA ESTRATÉGICO DE RUÍDO 2021 (RNT) – STRATEGIC NOISE MAP 2021 Aeroporto Lisboa | Lisbon Airport – Humberto Delgado (AHD)

Nestas estações foram recolhidos os valores sendo estes posteriormente comparados aos valores simulados para os mesmos locais.

In the Noise Monitoring Terminals mentioned above, the noise values were collected and then compared to the simulated values for the same locations.



Figura 2 - Localização das EMR's

Figure 2 - Location of EMR's

**b. Tempos de medição:**

Os tempos de medição, como já foi referido no ponto anterior, são recolhidos e consolidados nas EMR's com intervalos de 1s em períodos contínuos de 24 horas.

**c. Altura dos pontos de medição:**

A altura do ponto de medição está fixada pela altura do mastro onde está instalado o microfone e é aproximadamente de 6 metros a partir da altura do solo.

**d. Valores de  $L_{den}$  e  $L_n$  medidos nas Estações de Monitorização de Ruído:**

Apresentam-se no quadro seguinte, os valores de  $L_{den}$  e  $L_n$ , em dB(A), medidos nas Estações de Monitorização de Ruído para o período em referência.

**b. Measuring times:**

The measurement times, as mentioned above, are collected and consolidated in the EMR's with intervals of 1s in continuous periods of 24 hours.

**c. Height of measuring points:**

The height of the measurement point is fixed by the height of the pole where the microphone is installed at approximately 6 meters from ground level.

**d.  $L_{den}$  and  $L_n$  values measured at the Noise Monitoring Stations:**

The values of  $L_{den}$  and  $L_n$ , in dB(A), measured at the Noise Monitoring Stations for the reference period are shown in the following table.

## MAPA ESTRATÉGICO DE RUÍDO 2021 (RNT) – STRATEGIC NOISE MAP 2021 Aeroporto Lisboa | Lisbon Airport – Humberto Delgado (AHD)

Tabela 2 - Quadro dos valores de  $L_{den}$  e  $L_n$ , em dB(A), registados para o ruído de tráfego aéreo nas Estações de Monitorização de Ruído relativos a 2021.

Table 2 - Table of  $L_{den}$  and  $L_n$  values, in dB(A), recorded for air traffic noise at Noise Monitoring Terminals for 2021.

Estação de Monitorização Monitoring Station	$L_{den}$ [dB(A)]	$L_n$ [dB(A)]
(1) Pirescoxe	54,0	45,1
(2) Alcântara	58,3	50,4
(3) Camarate	65,4	57,1
(4) Campolide	62,0	53,9
(5) Cidade Universitária	67,1	59,1
(7) Aeroporto	66,6	58,2

Nota: A EMR (7) Aeroporto não é representativa para efeitos de exposição da população, pois encontra-se localizada nas instalações do aeroporto. Neste contexto, é maioritariamente utilizada para efeitos de aferição interna do Sistema.

Note: EMR (7) Aeroporto is not representative for the purpose of the population exposure, as it is located on the airport premises. In this context, it is mostly used for the purposes of internal measurement of the System

Apresenta-se na Tabela seguinte a comparação dos valores simulados pelo Mapa de Ruído, nos pontos de Monitorização, para a altura considerada nos Mapas de Ruído, com os valores medidos nesses pontos e apresentados no quadro anterior.

The following table presents a comparison of the values simulated by the Noise Map, at the Monitoring points, for the height considered in the Noise Maps, with the values measured at those points and presented in the previous table.

Tabela 3 - Quadro de valores de  $L_{den}$  e  $L_n$ , em dB(A)- Comparativo dos valores simulados e monitorizados.

Table 3 - Table of values for  $L_{den}$  and  $L_n$ , in dB(A)- Comparison of simulated and monitored values.

Estação de Monitorização Monitoring Station	Valores Simulados Simulated values		Diferencial Simulados - Medidos Differential Simulated - Measured	
	$L_{den}$ [dB(A)]	$L_n$ [dB(A)]	$L_{den}$ [dB(A)]	$L_n$ [dB(A)]
(1) Pirescoxe	59,9	50,0	5,9	4,9
(2) Alcântara	59,6	51,8	1,3	1,3
(3) Camarate	67,5	57,6	2,1	0,5
(4) Campolide	63,4	55,7	1,4	1,8
(5) Cidade Universitária	68,0	60,3	0,9	1,2
(7) Aeroporto	69,8	60,7	3,2	2,5



## MAPA ESTRATÉGICO DE RUÍDO 2021 (RNT) – STRATEGIC NOISE MAP 2021 Aeroporto Lisboa | Lisbon Airport – Humberto Delgado (AHD)

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A análise do quadro anterior permite verificar que os valores simulados são sempre superiores aos valores medidos – o que coloca o AHD numa posição de segurança – com um desvio médio global de 2,3 dB (2,5 dB para  $L_{den}$  e 2,0 dB para  $L_n$ ).

The analysis of the previous table shows that the simulated values are always higher than the measured values - which puts AHD in a safe position - with an overall average deviation of 2.3 dB (2.5 dB for  $L_{den}$  and 2.0 dB for  $L_n$ ).

# MAPA ESTRATÉGICO DE RUÍDO 2021 (RNT) – STRATEGIC NOISE MAP 2021

## Aeroporto Lisboa | Lisbon Airport – Humberto Delgado (AHD)

### 7. CÁLCULO DA POPULAÇÃO EXPOSTA

O cálculo da população exposta foi feito seguindo as recomendações do documento GPRD-2022 (“APA – Guia de Procedimentos para o Reporte de Dados no Âmbito da Diretiva Ruído Ambiente DF4-8 Mapas Estratégicos de Ruído. Versão 5. Agosto 2022”), utilizando as informações do CENSOS 2021.

Assim, apresenta-se, nas Tabelas seguintes, a população exposta ao ruído do Aeroporto Humberto Delgado, no ano 2021:

### 7. EXPOSED POPULATION CALCULUS

The calculation of the exposed population was carried out following the recommendations of the document GPRD-2022 (“APA – Procedural Guide for Data Reporting under the Environmental Noise Directive DF4-8 Strategic Noise Maps. Version 5. August 2022”), using the information from the 2021 Portuguese CENSUS.

Thus, taken into account this information, the following Tables show the population exposed to noise at the Humberto Delgado Airport in the year 2021:

Tabela 4 - Quadros relativos ao número estimado de pessoas residentes fora das aglomerações urbanas, em toda a área envolvida pelas isófonas consideradas e expostas às diferentes gamas de valores  $L_{den}$  e  $L_n$  calculadas a 4 metros de altura.

Table 4 - Values regarding the estimated number of people living outside the urban agglomerations, in the whole area involved by the noise contours considered and exposed to the different ranges of  $L_{den}$  and  $L_n$  values calculated at a height of 4 metres.

Classes do indicador   Indicator classes [dB(A)]	Nº estimado de pessoas residentes   Estimated number of residents
$55 < L_{den} \leq 60$	47590
$60 < L_{den} \leq 65$	24312
$65 < L_{den} \leq 70$	6741
$70 < L_{den} \leq 75$	839
$L_{den} > 75$	0
-	-
<b>Total</b>	<b>79482</b>

Classes do indicador   Indicator classes [dB(A)]	Nº estimado de pessoas residentes   Estimated number of residents
$45 < L_n \leq 50$	66388
$50 < L_n \leq 55$	28364
$55 < L_n \leq 60$	7820
$60 < L_n \leq 65$	1310
$65 < L_n \leq 70$	0
$L_n > 70$	0
<b>Total</b>	<b>103882</b>

Nota: O nº estimado de pessoas residentes não está arredondado à centena, conforme indicado no novo Guia da APA.

Note: The estimated number of residents is not rounded to the nearest hundred, as indicated in the new APA Guide.

## MAPA ESTRATÉGICO DE RUÍDO 2021 (RNT) – STRATEGIC NOISE MAP 2021 Aeroporto Lisboa | Lisbon Airport – Humberto Delgado (AHD)

Tabela 5 - Área total (em km<sup>2</sup>) e número estimado de habitações e de pessoas residentes expostas a diferentes classes de valores de  $L_{den}$  a 4 m altura.

Table 5 - Total area (in km<sup>2</sup>) and estimated number of dwellings and resident people exposed to different classes of  $L_{den}$  values at a height of 4 metres.

Classes do indicador   Indicator classes [dB(A)]	Área total   Total area [km <sup>2</sup> ]	N.º estimado de habitações/ fogos   Estimated n.º of dwellings	N.º estimado de pessoas residentes   Estimated n.º of residents
$L_{den} > 75$	0	4	17
$L_{den} > 65$	3	8014	14101
$L_{den} > 55$	37	95304	177048

## MAPA ESTRATÉGICO DE RUÍDO 2021 (RNT) – STRATEGIC NOISE MAP 2021 Aeroporto Lisboa | Lisbon Airport – Humberto Delgado (AHD)

### 8. ANÁLISE EVOLUTIVA

Nos quadros seguintes apresenta-se, o comparativo entre 2021 (valores expostos anteriormente) e 2016 (valores explicitados em seguida), respetivamente para o número de movimentos simulados, para a exposição da população ao ruído e para os níveis sonoros medidos nas estações de monitorização.

### 8. EVOLUTIVE ANALYSIS

The following tables show the comparison between 2021 (values exposed above) and 2016 (values explained below), respectively for the number of simulated movements, for the exposure of the population to noise and for the sound levels measured at the monitoring stations.

Tabela 6 - Quadro comparativo de movimentos, alvo de simulação, 2021/2016

Table 6 - Comparative table of movements used in the simulation, 2021/2016

Operação   Operation	Dia   Day (07h-20h)	Entardecer   Evening (20h-23h às)	Noite   Night (23h-07h)	Total
<b>Total 2021</b>	80453	17634	14821	<b>112908</b>
<b>Total 2016</b>	128930	30606	22612	<b>182148</b>
<b>10log(2021/2016)</b>	≈ -2 dB	≈ -2 dB	≈ -2 dB	≈ -2 dB

Nota: A variação do ruído com a variação do n.º de movimentos ocorre tipicamente numa proporção de 10log(n).

Note: The variation of noise with the variation of the number of movements typically occurs in a proportion of 10log(n).

Tabela 7 - Quadro comparativo de população exposta, 2021/2016.

Table 7 - Comparative table of exposed population, 2021/2016.

Classes do indicador   Indicator classes [dB(A)]	Nº estimado de pessoas residentes   Estimated n.º of residents		Classes do indicador   Indicator classes [dB(A)]	Nº estimado de pessoas residentes   Estimated n.º of residents	
	2016	2021-2016		2016	2021-2016
55 < L <sub>den</sub> ≤ 60	65600	-18010	45 < L <sub>n</sub> ≤ 50	63800	2588
60 < L <sub>den</sub> ≤ 65	42600	-18288	50 < L <sub>n</sub> ≤ 55	48800	-20436
65 < L <sub>den</sub> ≤ 70	14600	-7859	55 < L <sub>n</sub> ≤ 60	16200	-8380
70 < L <sub>den</sub> ≤ 75	5200	-4361	60 < L <sub>n</sub> ≤ 65	5600	-4290
L <sub>den</sub> > 75	0	0	65 < L <sub>n</sub> ≤ 70	200	-200
-	-	-	L <sub>n</sub> > 70	0	0
<b>Total</b>	<b>128000</b>	<b>-48518</b>	<b>Total</b>	<b>134600</b>	<b>-30718</b>

Tabela 8 - Quadro comparativo de níveis sonoros nas estações de monitorização, 2021/2016

## MAPA ESTRATÉGICO DE RUÍDO 2021 (RNT) – STRATEGIC NOISE MAP 2021 Aeroporto Lisboa | Lisbon Airport – Humberto Delgado (AHD)

Table 8 - Comparative table of sound levels at monitoring stations, 2021/2016

Estação de Monitorização Monitoring Station	Valores medidos em 2016 Values measured in 2016		Diferencial 2021 - 2016 Difference between 2021 - 2016	
	$L_{den}$ [dB(A)]	$L_n$ [dB(A)]	$L_{den}$ [dB(A)]	$L_n$ [dB(A)]
(1) Pirescoxe	51,6	59,8	-6,5	-5,8
(2) Alcântara	56,0	64,2	-5,5	-5,9
(3) Camarate	61,4	69,4	-4,3	-4,0
(4) Campolide	57,9	65,6	-4,0	-3,6
(5) Cidade Universitária	62,9	70,4	-3,8	-3,3
(7) Aeroporto	61,3	70	-3,1	-3,4
Média   Average			-4,5	-4,3

De uma maneira geral, da análise comparativa da informação entre 2021/2016, observou-se uma diminuição dos movimentos de aeronaves ocorridos. Esta diminuição resultou em grande medida dos efeitos associados com a pandemia COVID-19 que, embora com recuperação em 2021, ainda se fez sentir ao nível do tráfego ocorrido.

Verificou-se também um decréscimo significativo da exposição da população ao ruído: um total de cerca de 22000 residentes expostos a  $L_n > 55$  dB(A) em 2016 passou para 9130 residentes em 2021 (menos 12870 residentes sobre-expostos).

In general, from the comparative analysis of the information between 2021/2016, a decrease in aircraft movements was observed. This decrease was largely resulted from the effects associated with the COVID-19 pandemic which, although showing signs of recovery in 2021, was still felt in terms of the level of occurred traffic.

There was also a significant decrease in the population's exposure to noise: a total of about 22000 residents exposed to  $L_n > 55$  dB(A) in 2016 dropped to 9130 residents in 2021 (less 12870 over-exposed residents).

## MAPA ESTRATÉGICO DE RUÍDO 2021 (RNT) – STRATEGIC NOISE MAP 2021 Aeroporto Lisboa | Lisbon Airport – Humberto Delgado (AHD)

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Tal diminuição ficou a dever-se a um menor número de movimentos (menor número de tráfego) em 2021 [estima-se uma redução associada de cerca de -2 dB, assumindo uma variação típica de  $10\log(n)$ ] mas também devido a um aumento progressivo de operações de aeronaves mais recentes, de tipologia NEO, que vêm introduzir melhorias ao nível das emissões de ruído, e que, em conjunto com a redução de tráfego, conduziu a uma redução global média nas estações de monitorização de ruído de cerca de -4 dB.

This decrease was due to a lower number of movements (lower number of traffic) in 2021 [an associated reduction of around -2 dB is estimated, assuming a typical variation of  $10\log(n)$ ] but also due to a progressive increase in operations with more recent aircraft, of the NEO type, which introduce improvements in terms of noise emissions, and which, together with the reduction in traffic, led to an overall average reduction in Noise Monitoring Terminals of around -4 dB.

**MAPA ESTRATÉGICO DE RUÍDO 2021 (RNT) – STRATEGIC NOISE MAP 2021**  
**Aeroporto Lisboa | Lisbon Airport – Humberto Delgado (AHD)**

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**ANEXO 1 - FOLHA LPPT AD 2.24.01 - 1**

**ANNEX 1 – SHEET LPPT AD 2.24.01 - 1**

AERODROME CHART - ICAO

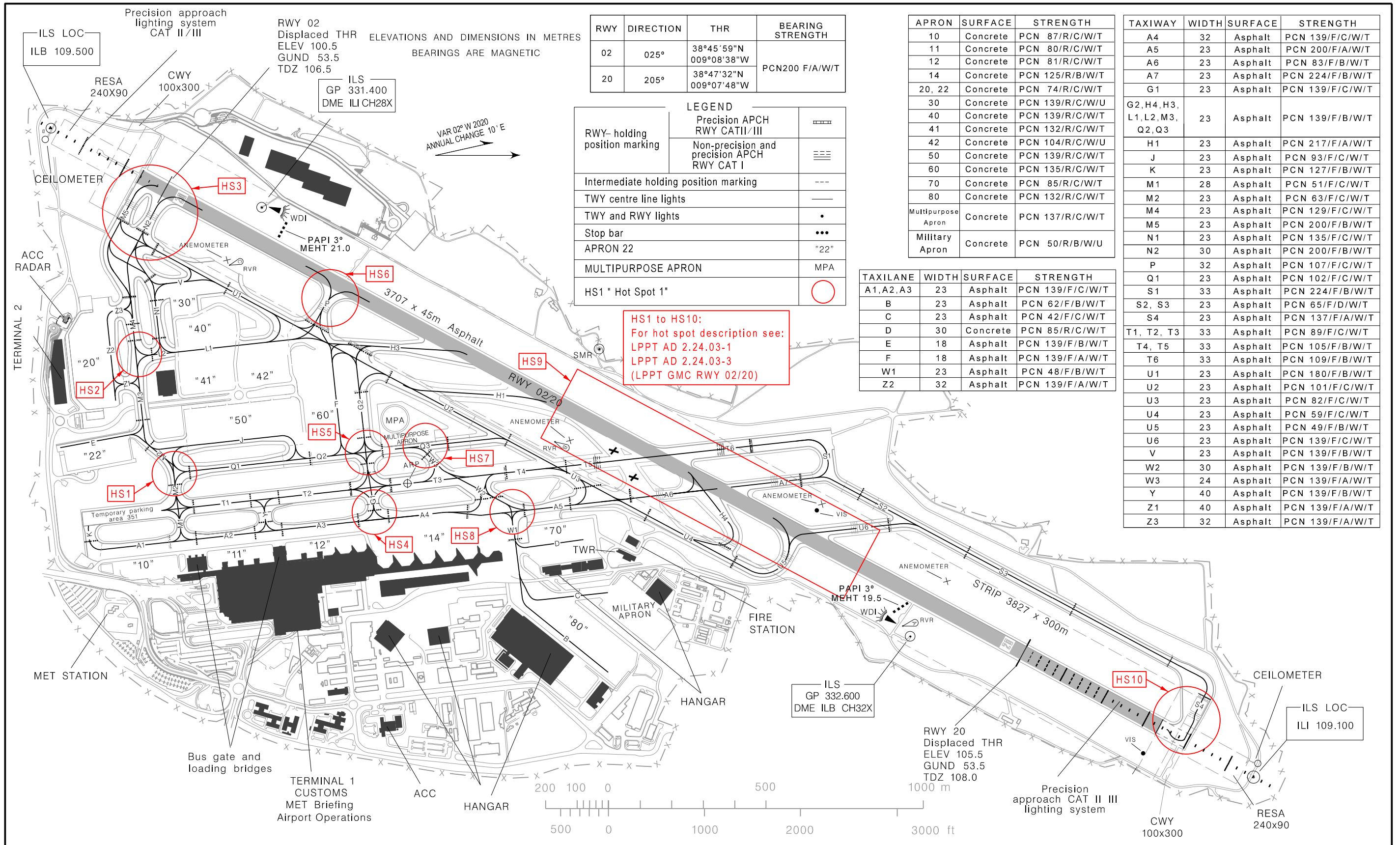
38°46'27"N  
009°08'03"W

ELEV 108 m

LISBOA ARR INFORMATION 124.155  
LISBOA DEP INFORMATION 121.955  
LISBOA DELIVERY 118.955

LISBOA GROUND 121.755  
LISBOA TOWER 118.105

LISBOA, Humberto Delgado (LPPT)



RWY	DIRECTION	THR	BEARING	STRENGTH
02	025°	38°45'59"N 009°08'38"W	PCN200 F/A/W/T	
20	205°	38°47'32"N 009°07'48"W		

MARKING	DESCRIPTION
	Precision APCH RWY CAT II/III
	Non-precision and precision APCH RWY CAT I
	Intermediate holding position marking
	TWY centre line lights
	TWY and RWY lights
	Stop bar
	APRON 22
	MULTIPURPOSE APRON
	HS1 * Hot Spot 1*

APRON	SURFACE	STRENGTH
10	Concrete	PCN 87/R/C/W/T
11	Concrete	PCN 80/R/C/W/T
12	Concrete	PCN 81/R/C/W/T
14	Concrete	PCN 125/R/B/W/T
20, 22	Concrete	PCN 74/R/C/W/T
30	Concrete	PCN 139/R/C/W/U
40	Concrete	PCN 139/R/C/W/T
41	Concrete	PCN 132/R/C/W/T
42	Concrete	PCN 104/R/C/W/U
50	Concrete	PCN 139/R/C/W/T
60	Concrete	PCN 135/R/C/W/T
70	Concrete	PCN 85/R/C/W/T
80	Concrete	PCN 132/R/C/W/T
Multipurpose Apron	Concrete	PCN 137/R/C/W/T
Military Apron	Concrete	PCN 50/R/B/W/U

TAXIWAY	WIDTH	SURFACE	STRENGTH
A4	32	Asphalt	PCN 139/F/C/W/T
A5	23	Asphalt	PCN 200/F/A/W/T
A6	23	Asphalt	PCN 83/F/B/W/T
A7	23	Asphalt	PCN 224/F/B/W/T
G1	23	Asphalt	PCN 139/F/C/W/T
G2, H4, H3, L1, L2, M3, Q2, Q3	23	Asphalt	PCN 139/F/B/W/T
H1	23	Asphalt	PCN 217/F/A/W/T
J	23	Asphalt	PCN 93/F/C/W/T
K	23	Asphalt	PCN 127/F/B/W/T
M1	28	Asphalt	PCN 51/F/C/W/T
M2	23	Asphalt	PCN 63/F/C/W/T
M4	23	Asphalt	PCN 129/F/C/W/T
M5	23	Asphalt	PCN 200/F/B/W/T
N1	23	Asphalt	PCN 135/F/C/W/T
N2	30	Asphalt	PCN 200/F/B/W/T
P	32	Asphalt	PCN 107/F/C/W/T
Q1	23	Asphalt	PCN 102/F/C/W/T
S1	33	Asphalt	PCN 224/F/B/W/T
S2, S3	23	Asphalt	PCN 65/F/D/W/T
S4	23	Asphalt	PCN 137/F/A/W/T
T1, T2, T3	33	Asphalt	PCN 89/F/C/W/T
T4, T5	33	Asphalt	PCN 105/F/B/W/T
T6	33	Asphalt	PCN 109/F/B/W/T
U1	23	Asphalt	PCN 180/F/B/W/T
U2	23	Asphalt	PCN 101/F/C/W/T
U3	23	Asphalt	PCN 82/F/C/W/T
U4	23	Asphalt	PCN 59/F/C/W/T
U5	23	Asphalt	PCN 49/F/B/W/T
U6	23	Asphalt	PCN 139/F/C/W/T
V	23	Asphalt	PCN 139/F/B/W/T
W2	30	Asphalt	PCN 139/F/B/W/T
W3	24	Asphalt	PCN 139/F/A/W/T
Y	40	Asphalt	PCN 139/F/B/W/T
Z1	40	Asphalt	PCN 139/F/A/W/T
Z3	32	Asphalt	PCN 139/F/A/W/T

TAXILANE	WIDTH	SURFACE	STRENGTH
A1, A2, A3	23	Asphalt	PCN 139/F/C/W/T
B	23	Asphalt	PCN 62/F/B/W/T
C	23	Asphalt	PCN 42/F/C/W/T
D	30	Concrete	PCN 85/R/C/W/T
E	18	Asphalt	PCN 139/F/B/W/T
F	18	Asphalt	PCN 139/F/A/W/T
W1	23	Asphalt	PCN 48/F/B/W/T
Z2	32	Asphalt	PCN 139/F/A/W/T

HS1 to HS10:  
For hot spot description see:  
LPPT AD 2.24.03-1  
LPPT AD 2.24.03-3  
(LPPT GMC RWY 02/20)

Military apron, new PCN.



**ANEXO 2 - PROCEDIMENTOS DE NOISE ABATEMENT,  
PUBLICADOS EM AIP**

(Publicação de Informações Aeronáuticas)

**ANNEX 2 - NOISE ABATEMENT PROCEDURES,  
PUBLISHED IN AIP**

(Aeronautical Information Publication)

## LPPT AD 2.21 NOISE ABATEMENT PROCEDURES

### 1. GENERAL

Landing and/or take-off is forbidden by law between 00:00 (23:00) and 06:00 (05:00), except in cases of force majeure. However, according to governmental deliberation, exception regime has been granted for Lisboa Airport in which landing and/or take-off of aircraft engaged in commercial aviation or aerial work are allowed in a limited number

**The authorisation for air movements during this period is conditioned to:**

1. The number of movements per week, shall not exceed a total limit of 91.
2. In any case the number of air movements per night period (NP) shall not exceed the double of the daily movements in which

NP=	Limit per week
	Number of days of the week

3. The authorization for the air movements during the night period is also conditioned to the noise levels of the aircraft concerned, under the provisions of the items below.
4. For the purposes of effective perceived noise levels established by ICAO, aircraft are classified as follows

Level 0	below 87 EPNdB
Level 0,5	between 87 and 89.9 EPNdB
Level 1	between 90 and 92.9 EPNdB
Level 2	between 93 and 95.9 EPNdB
Level 4	between 96 and 98.9 EPNdB
Level 8	between 99 and 101.9 EPNdB
Level 16	above 101.9 EPNdB

5. The noise level classification of an aircraft either at landing or at take-off is given by the values indicated in the aircraft manufacturer's noise certificate, taking into account the reference points specified in the technical standards applicable to the approach to landing, overflight for take-off and sideline procedures, at full power.
6. Without prejudice to provisions of article 7 and 8 of Decreto-Lei nrº. 293/2003 of 19 November 2003, on the exemption of aircraft registered in the developing countries and applicability of an exemption to the operation of aircraft under exceptional circumstances, respectively, the aircraft to operate in the night air movements allowed during this period shall comply with the following requirements: The aircraft classified in levels 8 and 16 cannot be scheduled for the night period; The aircraft classified in level 4 cannot be scheduled to take-off during night period on regular air services; The aircraft classified in level 2 can be scheduled to take-off between 00:00 (23:00) and 00:30 (23:30) as well as from 05:00 (04:00) thereon; The aircraft classified in levels 0, 0.5 and 1 are not subject to restrictions.
7. The aircraft falling into the criteria set out in 5- of this number authorized to land during the night period are forbidden to reverse thrust, right after landing.

**2. The following approach procedures are established to reduce noise level in the city by over flying aircraft.**

Visual Approach Procedures

## MAPA ESTRATÉGICO DE RUÍDO 2021 – STRATEGIC NOISE MAP 2021 (AHD LISBON)

From the South to:

RWY 02: The descent to final approach altitude will be done over the river and maintained until the aircraft is aligned with runway (the city will only be over flown on final and when lined up with runway).

RWY 20: The descent to final approach altitude should be made over the river and maintained on the left down wind sea until the aircraft is aligned with runway.

From the North to:

RWY 20 - No restrictions

RWY 02 - Left-hand traffic circuit

Final approaches for landing shall be carried out at an angle of not less than 3º and the indicated approach slope of the PAPI shall be followed for each runway.

Flat approaches flown with relatively high engine thrust at low altitude and great distance from airport are prohibited.

SID's are also established in accordance with Noise Abatement criteria (see [AD 1.1 - 1.1.5](#)).

### Local flights

Local flights (test, training, etc.) with successive take-offs and landings are only permitted between 08:00/22:00 (07:00-21:00) and only if the operator has an open bank account with Lisboa Airport.

### 1.1.5 OTHER INFORMATION

Noise abatement procedures

#### General

The following procedures may at any time be departed from to the extent necessary for avoiding immediate danger. Every operator of aircraft using the airport, shall ensure at all times that aircraft are operated in a manner calculated to cause the least disturbance practicable in areas surrounding the airport.

#### Departures

For aircraft licensed in accordance with ICAO ANNEX 16, Chapter 2:

TAKE - OFF TO 1500 FT AGL	TAKE - OFF POWER
	TAKE - OFF FLAPS

## MAPA ESTRATÉGICO DE RUÍDO 2021 – STRATEGIC NOISE MAP 2021 (AHD LISBON)

	CLIMB AT V2 + 10 KT (OR AS LIMITED BY BODY ANGLE)
AT 1500 FT AGL	REDUCE POWER TO NOT LESS THAN CLIMB POWER
1500 FT - 3000 FT AGL.	CLIMB AT V2 + 10 KT
AT 3000 FT AGL	NORMAL SPEED AND FLAP RETRACTION SCHEDULES TO ENROUTE CLIMB

For aircraft licensed in accordance with ANNEX 16, Chapter 3 as well as B737 - 200 as far as the noise levels for take - off pursuant to ICAO ANNEX 16, Chapter 3 have provably been reached by supplementary equipment:

TAKE - OFF TO 1000 FT AGL	TAKE - OFF POWER  TAKE - OFF FLAPS  CLIMB AT V2 + 10KT (OR AS LIMITED BY BODY ANGLE)
At 1000 FT AGL	Maintaining a positive Rate of climb, accelerate to zero flap minimum safe manoeuvring speed (Vzf) retracting flap on schedule;
	Thereafter reduce thrust consistent with the following: a) For high by-pass ratio engines reduce to normal climb power/thrust; b) for low by-pass ratio engines, reduce power/thrust to below normal climb thrust but not less than that necessary to maintain the final take-off engine-out climb gradient; and c) for aeroplanes with slow flap retracting reduce power / thrust at an intermediate flap setting.
1000 FT - 3000 FT AGL	Continue climb at not greater than Vzf + 10 KT

## MAPA ESTRATÉGICO DE RUÍDO 2021 – STRATEGIC NOISE MAP 2021 (AHD LISBON)

AT 3000 FT AGL	Accelerate smoothly to en route climb speed.
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**Note:** Aeroplanes such as supersonic aeroplanes not using wing flaps for take-off should reduce thrust before attaining 1000 FT but not lower than 500 FT.

ANEXO 3 – OPERAÇÕES ALVO DE SIMULAÇÃO

ANNEX 3 – SIMULATED MOVEMENTS

## Aeroporto Humberto Delgado 2021 Operações alvo de simulação

## MAPA ESTRATÉGICO DE RUÍDO 2021 – STRATEGIC NOISE MAP 2021 (AHD LISBON)

Airframe	Operation Type	Voos Numéricos	Stage Length	Departure Runway End	Arrival Runway End
Tupolev 204	Arrival	1	1		20
Tupolev 204	Arrival	54	1		20
Tupolev 204	Arrival	13	1		20
Tupolev 204	Arrival	154	1		2
Tupolev 204	Arrival	2	1		2
Tupolev 204	Arrival	39	1		2
Tupolev 204	Departure	1	4	20	
Tupolev 204	Departure	63	5	20	
Tupolev 204	Departure	1	5	20	
Tupolev 204	Departure	3	5	20	
Tupolev 204	Departure	1	5	2	
Tupolev 204	Departure	188	5	2	
Tupolev 204	Departure	5	5	2	
Eclipse 500 / PW610F	Arrival	9	1		20
Eclipse 500 / PW610F	Arrival	1	1		20
Eclipse 500 / PW610F	Arrival	2	1		2
Eclipse 500 / PW610F	Arrival	2	1		2
Eclipse 500 / PW610F	Arrival	13	1		2
Eclipse 500 / PW610F	Departure	1	1	20	
Eclipse 500 / PW610F	Departure	7	1	2	
Eclipse 500 / PW610F	Departure	1	1	2	
Eclipse 500 / PW610F	Departure	1	1	2	
Eclipse 500 / PW610F	Departure	8	2	2	
Eclipse 500 / PW610F	Departure	5	2	20	
Eclipse 500 / PW610F	Departure	1	3	20	
Eclipse 500 / PW610F	Departure	2	3	2	
Dornier 228-200 Series	Arrival	1	1		2
Dornier 228-200 Series	Departure	1	1	2	
Cessna 421 Piston	Arrival	1	1		2
Cessna 421 Piston	Arrival	8	1		2
Cessna 421 Piston	Arrival	1	1		20
Cessna 421 Piston	Departure	3	1	20	
Cessna 421 Piston	Departure	2	1	2	
Cessna 421 Piston	Departure	1	1	2	
Cessna 421 Piston	Departure	3	1	2	
Cessna 650 Citation III	Arrival	20	1		20
Cessna 650 Citation III	Arrival	5	1		20
Cessna 650 Citation III	Arrival	2	1		20
Cessna 650 Citation III	Arrival	62	1		2
Cessna 650 Citation III	Arrival	9	1		2
Cessna 650 Citation III	Arrival	2	1		2
Cessna 650 Citation III	Departure	65	1	2	



## MAPA ESTRATÉGICO DE RUÍDO 2021 – STRATEGIC NOISE MAP 2021 (AHD LISBON)

Airframe	Operation Type	Voos Numéricos	Stage Length	Departure Runway End	Arrival Runway End
Cessna 650 Citation III	Departure	8	1	2	
Cessna 650 Citation III	Departure	3	1	2	
Cessna 650 Citation III	Departure	22	1	20	
Cessna 650 Citation III	Departure	3	1	20	
Cessna 650 Citation III	Departure	2	1	20	
Bombardier Challenger 600	Arrival	22	1		2
Bombardier Challenger 600	Arrival	55	1		2
Bombardier Challenger 600	Arrival	243	1		2
Bombardier Challenger 600	Arrival	13	1		20
Bombardier Challenger 600	Arrival	16	1		20
Bombardier Challenger 600	Arrival	78	1		20
Bombardier Challenger 600	Departure	6	1	20	
Bombardier Challenger 600	Departure	9	1	20	
Bombardier Challenger 600	Departure	86	1	20	
Bombardier Challenger 600	Departure	23	1	2	
Bombardier Challenger 600	Departure	41	1	2	
Bombardier Challenger 600	Departure	256	1	2	
Bombardier Challenger 601	Arrival	54	1		20
Bombardier Challenger 601	Arrival	12	1		20
Bombardier Challenger 601	Arrival	1	1		20
Bombardier Challenger 601	Arrival	127	1		2
Bombardier Challenger 601	Arrival	52	1		2
Bombardier Challenger 601	Departure	126	1	2	
Bombardier Challenger 601	Departure	52	1	2	
Bombardier Challenger 601	Departure	2	1	2	
Bombardier Challenger 601	Departure	53	1	20	
Bombardier Challenger 601	Departure	11	1	20	
Lancair 360	Arrival	2	1		2
Lancair 360	Arrival	4	1		2
Lancair 360	Arrival	9	1		2
Lancair 360	Arrival	1	1		20
Lancair 360	Arrival	6	1		20
Lancair 360	Departure	5	1	20	
Lancair 360	Departure	4	1	2	
Lancair 360	Departure	1	1	2	
Lancair 360	Departure	13	1	2	
Cessna 441 Conquest II	Arrival	2	1		20
Cessna 441 Conquest II	Arrival	2	1		20
Cessna 441 Conquest II	Arrival	5	1		2
Cessna 441 Conquest II	Arrival	1	1		2
Cessna 441 Conquest II	Departure	3	1	2	
Cessna 441 Conquest II	Departure	1	1	2	

## MAPA ESTRATÉGICO DE RUÍDO 2021 – STRATEGIC NOISE MAP 2021 (AHD LISBON)

Airframe	Operation Type	Voos Numéricos	Stage Length	Departure Runway End	Arrival Runway End
Cessna 441 Conquest II	Departure	1	1	20	
Cessna 441 Conquest II	Departure	1	1	20	
Cessna 500 Citation I	Arrival	2	1		2
Cessna 500 Citation I	Arrival	8	1		2
Cessna 500 Citation I	Arrival	63	1		2
Cessna 500 Citation I	Arrival	1	1		20
Cessna 500 Citation I	Arrival	21	1		20
Cessna 500 Citation I	Departure	1	1	20	
Cessna 500 Citation I	Departure	1	1	20	
Cessna 500 Citation I	Departure	20	1	20	
Cessna 500 Citation I	Departure	5	1	2	
Cessna 500 Citation I	Departure	12	1	2	
Cessna 500 Citation I	Departure	57	1	2	
Cessna 550 Citation II	Arrival	1	1		2
Cessna 550 Citation II	Arrival	4	1		2
Cessna 550 Citation II	Arrival	12	1		2
Cessna 550 Citation II	Arrival	1	1		20
Cessna 550 Citation II	Arrival	6	1		20
Cessna 550 Citation II	Departure	1	1	20	
Cessna 550 Citation II	Departure	7	1	20	
Cessna 550 Citation II	Departure	1	1	2	
Cessna 550 Citation II	Departure	14	1	2	
Cessna 750 Citation X	Arrival	29	1		20
Cessna 750 Citation X	Arrival	4	1		20
Cessna 750 Citation X	Arrival	1	1		20
Cessna 750 Citation X	Arrival	50	1		2
Cessna 750 Citation X	Arrival	11	1		2
Cessna 750 Citation X	Arrival	2	1		2
Cessna 750 Citation X	Departure	60	1	2	
Cessna 750 Citation X	Departure	5	1	2	
Cessna 750 Citation X	Departure	3	1	2	
Cessna 750 Citation X	Departure	25	1	20	
Cessna 750 Citation X	Departure	3	1	20	
Cessna 750 Citation X	Departure	1	1	20	
Cirrus SR20	Arrival	11	1		2
Cirrus SR20	Arrival	2	1		2
Cirrus SR20	Arrival	1	1		20
Vickers Vanguard	Arrival	2	1		2
Vickers Vanguard	Departure	2	2	2	
Vickers Vanguard	Departure	1	2	2	
Boeing DC-9-30 Series Freighter	Arrival	310	1		2
Boeing DC-9-30 Series Freighter	Arrival	791	1		2

## MAPA ESTRATÉGICO DE RUÍDO 2021 – STRATEGIC NOISE MAP 2021 (AHD LISBON)

Airframe	Operation Type	Voos Numéricos	Stage Length	Departure Runway End	Arrival Runway End
Boeing DC-9-30 Series Freighter	Arrival	2432	1		2
Boeing DC-9-30 Series Freighter	Arrival	865	1		20
Boeing DC-9-30 Series Freighter	Arrival	226	1		20
Boeing DC-9-30 Series Freighter	Arrival	71	1		20
Boeing DC-9-30 Series Freighter	Departure	933	3	20	
Boeing DC-9-30 Series Freighter	Departure	130	3	20	
Boeing DC-9-30 Series Freighter	Departure	2920	3	2	
Boeing DC-9-30 Series Freighter	Departure	522	3	2	
Boeing DC-9-30 Series Freighter	Departure	41	3	20	
Boeing DC-9-30 Series Freighter	Departure	107	3	2	
BAE Jetstream 31	Arrival	3	1		20
BAE Jetstream 31	Arrival	14	1		2
BAE Jetstream 31	Arrival	2	1		2
BAE Jetstream 31	Arrival	2	1		2
DeHavilland DHC-6-300 Twin Otter	Arrival	1	1		20
DeHavilland DHC-6-300 Twin Otter	Departure	1	1	20	
BAE Jetstream 31	Departure	4	1	2	
BAE Jetstream 31	Departure	12	1	2	
BAE Jetstream 31	Departure	1	1	20	
BAE Jetstream 31	Departure	1	1	20	
BAE Jetstream 31	Departure	2	1	2	
ATR 42-400	Arrival	2	1		2
ATR 42-400	Arrival	1	1		2
ATR 42-400	Arrival	10	1		2
ATR 42-400	Arrival	2	1		20
ATR 42-400	Departure	8	1	2	
ATR 42-400	Departure	2	1	2	
ATR 42-400	Departure	1	1	20	
ATR 42-400	Departure	1	1	20	
ATR 42-400	Departure	3	1	2	
Convair CV-580	Arrival	5	1		20
Convair CV-580	Arrival	1	1		20
Convair CV-580	Arrival	2	1		2
Convair CV-580	Arrival	2	1		2
Convair CV-580	Arrival	1	1		2
Convair CV-580	Departure	3	1	20	
Convair CV-580	Departure	1	1	20	
Convair CV-580	Departure	2	1	20	
Convair CV-580	Departure	1	1	2	
Convair CV-580	Departure	1	1	2	
Convair CV-580	Departure	3	1	2	
Embraer EMB120 Brasilia	Arrival	13	1		2

## MAPA ESTRATÉGICO DE RUÍDO 2021 – STRATEGIC NOISE MAP 2021 (AHD LISBON)

Airframe	Operation Type	Voos Numéricos	Stage Length	Departure Runway End	Arrival Runway End
Embraer EMB120 Brasilia	Arrival	3	1		20
Embraer EMB120 Brasilia	Departure	1	1	20	
Embraer EMB120 Brasilia	Departure	1	1	20	
Embraer EMB120 Brasilia	Departure	11	1	2	
Embraer EMB120 Brasilia	Departure	3	1	2	
Embraer Legacy 600	Arrival	25	1		20
Embraer Legacy 600	Arrival	2	1		20
Embraer Legacy 600	Arrival	3	1		20
Embraer Legacy 600	Arrival	12	1		2
Embraer Legacy 600	Arrival	5	1		2
Embraer Legacy 600	Arrival	80	1		2
Embraer Legacy 600	Departure	26	1	2	
Embraer Legacy 600	Departure	4	1	2	
Embraer Legacy 600	Departure	1	1	2	
Embraer Legacy 600	Departure	5	1	20	
Embraer Legacy 600	Departure	7	2	20	
Embraer Legacy 600	Departure	2	2	20	
Embraer Legacy 600	Departure	2	2	2	
Embraer Legacy 600	Departure	3	2	2	
Embraer Legacy 600	Departure	28	2	2	
Embraer Legacy 600	Departure	14	3	2	
Embraer Legacy 600	Departure	2	3	2	
Embraer Legacy 600	Departure	2	3	2	
Embraer Legacy 600	Departure	1	3	20	
Embraer Legacy 600	Departure	13	3	20	
Embraer Legacy 600	Departure	1	4	20	
Embraer Legacy 600	Departure	1	4	20	
Embraer Legacy 600	Departure	1	4	2	
Embraer Legacy 600	Departure	15	4	2	
Dassault Falcon 20-C	Arrival	2	1		2
Dassault Falcon 20-C	Arrival	19	1		2
Dassault Falcon 20-C	Arrival	1	1		2
Dassault Falcon 20-C	Arrival	3	1		20
Dassault Falcon 20-C	Departure	4	1	20	
Dassault Falcon 20-C	Departure	1	1	20	
Dassault Falcon 20-C	Departure	19	1	2	
Dassault Falcon 20-C	Departure	1	1	2	
Pilatus Turbo Trainer PC-9	Arrival	3	1		20
Pilatus Turbo Trainer PC-9	Arrival	1	1		20
Pilatus Turbo Trainer PC-9	Arrival	8	1		2
Pilatus Turbo Trainer PC-9	Departure	1	1	20	
Pilatus Turbo Trainer PC-9	Departure	8	1	2	

## MAPA ESTRATÉGICO DE RUÍDO 2021 – STRATEGIC NOISE MAP 2021 (AHD LISBON)

Airframe	Operation Type	Voos Numéricos	Stage Length	Departure Runway End	Arrival Runway End
Pilatus Turbo Trainer PC-9	Departure	1	1	20	
Pilatus Turbo Trainer PC-9	Departure	1	1	20	
Maule MT-7-235	Arrival	1	1		2
Maule MT-7-235	Arrival	5	1		2
Maule MT-7-235	Arrival	1	1		2
Maule MT-7-235	Departure	1	1	2	
Maule MT-7-235	Departure	3	1	2	
Maule MT-7-235	Departure	2	1	2	
Maule MT-7-235	Departure	2	1	20	
Gulfstream II-B	Arrival	26	1		2
Gulfstream II-B	Arrival	5	1		2
Gulfstream II-B	Arrival	1	1		2
Gulfstream II-B	Arrival	9	1		20
Gulfstream II-B	Departure	3	1	2	
Gulfstream II-B	Departure	29	1	2	
Gulfstream II-B	Departure	1	1	2	
Gulfstream II-B	Departure	8	1	20	
Gulfstream G300	Arrival	14	1		20
Gulfstream G300	Arrival	1	1		20
Gulfstream G300	Arrival	2	1		20
Gulfstream G300	Arrival	7	1		2
Gulfstream G300	Arrival	5	1		2
Gulfstream G300	Arrival	36	1		2
Gulfstream G300	Departure	2	1	20	
Gulfstream G300	Departure	15	1	20	
Gulfstream G300	Departure	1	1	20	
Gulfstream G300	Departure	4	1	2	
Gulfstream G300	Departure	39	1	2	
Gulfstream G300	Departure	7	1	2	
Gulfstream G-5 Gulfstream 5 / G-5SP Gulfstream G500	Arrival	126	1		2
Gulfstream G-5 Gulfstream 5 / G-5SP Gulfstream G500	Arrival	22	1		2
Gulfstream G-5 Gulfstream 5 / G-5SP Gulfstream G500	Arrival	20	1		2
Gulfstream G-5 Gulfstream 5 / G-5SP Gulfstream G500	Arrival	9	1		20
Gulfstream G-5 Gulfstream 5 / G-5SP Gulfstream G500	Arrival	7	1		20
Gulfstream G-5 Gulfstream 5 / G-5SP Gulfstream G500	Arrival	46	1		20

## MAPA ESTRATÉGICO DE RUÍDO 2021 – STRATEGIC NOISE MAP 2021 (AHD LISBON)

Airframe	Operation Type	Voos Numéricos	Stage Length	Departure Runway End	Arrival Runway End
Gulfstream G-5 Gulfstream 5 / G-5SP Gulfstream G500	Departure	21	1	2	
Gulfstream G-5 Gulfstream 5 / G-5SP Gulfstream G500	Departure	135	1	2	
Gulfstream G-5 Gulfstream 5 / G-5SP Gulfstream G500	Departure	18	1	2	
Gulfstream G-5 Gulfstream 5 / G-5SP Gulfstream G500	Departure	3	1	20	
Gulfstream G-5 Gulfstream 5 / G-5SP Gulfstream G500	Departure	51	1	20	
Gulfstream G-5 Gulfstream 5 / G-5SP Gulfstream G500	Departure	3	1	20	
Saab 2000	Arrival	607	1		20
Saab 2000	Arrival	46	1		20
Saab 2000	Arrival	113	1		20
Saab 2000	Arrival	458	1		2
Saab 2000	Arrival	183	1		2
Saab 2000	Arrival	1675	1		2
Saab 2000	Departure	91	1	20	
Saab 2000	Departure	618	1	20	
Saab 2000	Departure	28	1	20	
Saab 2000	Departure	134	1	2	
Saab 2000	Departure	1853	1	2	
Saab 2000	Departure	356	1	2	
Israel IAI-1121 Commodore	Arrival	108	1		2
Israel IAI-1121 Commodore	Arrival	19	1		2
Israel IAI-1121 Commodore	Arrival	24	1		2
Israel IAI-1121 Commodore	Arrival	7	1		20
Israel IAI-1121 Commodore	Arrival	4	1		20
Israel IAI-1121 Commodore	Arrival	42	1		20
Israel IAI-1121 Commodore	Departure	14	1	2	
Israel IAI-1121 Commodore	Departure	111	1	2	
Israel IAI-1121 Commodore	Departure	22	1	2	
Israel IAI-1121 Commodore	Departure	3	1	20	
Israel IAI-1121 Commodore	Departure	46	1	20	
Israel IAI-1121 Commodore	Departure	2	1	20	
Rockwell Sabreliner 40	Arrival	1	1		20
Rockwell Sabreliner 40	Arrival	1	1		20
Rockwell Sabreliner 40	Arrival	1	1		2
Rockwell Sabreliner 40	Arrival	1	1		2
Rockwell Sabreliner 40	Departure	1	1	20	
Rockwell Sabreliner 40	Departure	3	1	2	

## MAPA ESTRATÉGICO DE RUÍDO 2021 – STRATEGIC NOISE MAP 2021 (AHD LISBON)

Airframe	Operation Type	Voos Numéricos	Stage Length	Departure Runway End	Arrival Runway End
Rockwell Sabreliner 65	Arrival	139	1		2
Rockwell Sabreliner 65	Arrival	22	1		2
Rockwell Sabreliner 65	Arrival	15	1		2
Rockwell Sabreliner 65	Arrival	2	1		20
Rockwell Sabreliner 65	Arrival	5	1		20
Rockwell Sabreliner 65	Arrival	41	1		20
Rockwell Sabreliner 65	Departure	47	1	2	
Rockwell Sabreliner 65	Departure	112	1	2	
Rockwell Sabreliner 65	Departure	20	1	2	
Rockwell Sabreliner 65	Departure	2	1	20	
Rockwell Sabreliner 65	Departure	41	1	20	
Rockwell Sabreliner 65	Departure	3	1	20	
Raytheon Beechjet 400	Arrival	10	1		2
Raytheon Beechjet 400	Arrival	21	1		2
Raytheon Beechjet 400	Arrival	109	1		2
Raytheon Beechjet 400	Arrival	34	1		20
Raytheon Beechjet 400	Arrival	6	1		20
Raytheon Beechjet 400	Arrival	3	1		20
Raytheon Beechjet 400	Departure	4	1	20	
Raytheon Beechjet 400	Departure	45	1	20	
Raytheon Beechjet 400	Departure	3	1	20	
Raytheon Beechjet 400	Departure	8	1	2	
Raytheon Beechjet 400	Departure	111	1	2	
Raytheon Beechjet 400	Departure	11	1	2	
CESSNA CITATION 510	Arrival	2	1		20
CESSNA CITATION 510	Arrival	4	1		2
CESSNA CITATION 510	Arrival	1	1		2
CESSNA CITATION 510	Departure	5	1	2	
CESSNA CITATION 510	Departure	1	1	2	
CESSNA CITATION 510	Departure	2	1	20	
Boeing DC-9-30 Series Freighter	Departure	11	4	2	
Boeing DC-9-30 Series Freighter	Departure	19	4	2	
Boeing DC-9-30 Series Freighter	Departure	3	4	20	
Boeing DC-9-30 Series Freighter	Departure	5	4	20	
Raytheon Beech 1900-C	Arrival	1	1		20
Raytheon Beech 1900-C	Departure	1	2	20	
Boeing 737-200 Series	Arrival	2	1		2
Boeing 737-200 Series	Arrival	22	1		20
Boeing 737-200 Series	Arrival	2	1		20
Boeing 737-200 Series	Arrival	94	1		20
Boeing 737-200 Series	Arrival	280	1		2
Boeing 737-200 Series	Arrival	21	1		2

## MAPA ESTRATÉGICO DE RUÍDO 2021 – STRATEGIC NOISE MAP 2021 (AHD LISBON)

Airframe	Operation Type	Voos Numéricos	Stage Length	Departure Runway End	Arrival Runway End
Boeing 737-200 Series	Arrival	72	1		2
Boeing 737-200 Series	Departure	14	3	20	
Boeing 737-200 Series	Departure	89	3	20	
Boeing 737-200 Series	Departure	43	3	2	
Boeing 737-200 Series	Departure	244	3	2	
Boeing 737-200 Series	Departure	2	3	2	
Boeing 737-200 Series	Departure	18	3	20	
Boeing 737-200 Series	Departure	82	3	2	
Boeing 737-200 Series	Departure	1	4	2	
Ilyushin 76 Candid	Arrival	4	1		2
Ilyushin 76 Candid	Arrival	5	1		2
Ilyushin 76 Candid	Arrival	12	1		2
Ilyushin 76 Candid	Arrival	2	1		20
Ilyushin 76 Candid	Arrival	1	1		20
Ilyushin 76 Candid	Arrival	3	1		20
Ilyushin 76 Candid	Departure	10	4	2	
Ilyushin 76 Candid	Departure	1	4	20	
Ilyushin 76 Candid	Departure	1	4	20	
Ilyushin 76 Candid	Departure	4	4	20	
Ilyushin 76 Candid	Departure	5	4	2	
Ilyushin 76 Candid	Departure	2	4	2	
Ilyushin 76 Candid	Departure	1	5	2	
Ilyushin 76 Candid	Departure	1	6	2	
Ilyushin 76 Candid	Departure	1	6	20	
Ilyushin 76 Candid	Departure	1	7	20	
Boeing 737-200 Series	Arrival	2	1		2
Boeing 737-200 Series	Arrival	3	1		2
Boeing 737-200 Series	Arrival	6	1		2
Boeing 737-200 Series	Arrival	1	1		20
Boeing 737-200 Series	Arrival	1	1		20
Boeing 737-200 Series	Departure	5	3	2	
Boeing 737-200 Series	Departure	1	3	2	
Boeing 737-200 Series	Departure	3	3	20	
Boeing 737-200 Series	Departure	1	3	20	
Boeing 737-200 Series	Departure	3	3	2	
Airbus A300F4-600 Series	Arrival	1	1		2
Airbus A300F4-600 Series	Arrival	45	1		2
Airbus A300F4-600 Series	Arrival	10	1		20
Airbus A300F4-600 Series	Departure	9	4	2	
Airbus A300F4-600 Series	Departure	1	4	20	
Airbus A300F4-600 Series	Departure	9	4	20	
Airbus A300F4-600 Series	Departure	1	4	20	



## MAPA ESTRATÉGICO DE RUÍDO 2021 – STRATEGIC NOISE MAP 2021 (AHD LISBON)

Airframe	Operation Type	Voos Numéricos	Stage Length	Departure Runway End	Arrival Runway End
Airbus A300F4-600 Series	Departure	2	4	2	
Airbus A300F4-600 Series	Departure	34	4	2	
Airbus A318-100 Series	Arrival	344	1		20
Airbus A318-100 Series	Arrival	177	1		20
Airbus A318-100 Series	Arrival	1173	1		20
Airbus A318-100 Series	Arrival	3737	1		2
Airbus A318-100 Series	Arrival	642	1		2
Airbus A318-100 Series	Arrival	1594	1		2
Airbus A318-100 Series	Departure	612	3	2	
Airbus A318-100 Series	Departure	1127	3	20	
Airbus A318-100 Series	Departure	802	3	2	
Airbus A318-100 Series	Departure	3741	3	2	
Airbus A318-100 Series	Departure	155	3	20	
Airbus A318-100 Series	Departure	183	3	20	
Airbus A318-100 Series	Departure	9	4	20	
Airbus A318-100 Series	Departure	1	4	20	
Airbus A318-100 Series	Departure	64	4	2	
Airbus A318-100 Series	Departure	47	4	2	
Airbus A318-100 Series	Departure	13	4	20	
Airbus A318-100 Series	Departure	16	4	2	
Airbus A318-100 Series	Departure	55	5	2	
Airbus A318-100 Series	Departure	173	5	20	
Airbus A318-100 Series	Departure	45	5	2	
Airbus A318-100 Series	Departure	585	5	2	
Airbus A318-100 Series	Departure	20	5	20	
Airbus A318-100 Series	Departure	20	5	20	
Airbus A320-200 Series	Arrival	2302	1		2
Airbus A320-200 Series	Arrival	2046	1		2
Airbus A320-200 Series	Arrival	9133	1		2
Airbus A320-200 Series	Arrival	2866	1		20
Airbus A320-200 Series	Arrival	505	1		20
Airbus A320-200 Series	Arrival	566	1		20
Airbus A320-200 Series	Departure	2886	3	20	
Airbus A320-200 Series	Departure	524	3	20	
Airbus A320-200 Series	Departure	9542	3	2	
Airbus A320-200 Series	Departure	2059	3	2	
Airbus A320-200 Series	Departure	311	3	20	
Airbus A320-200 Series	Departure	1229	3	2	
Airbus A320-200 Series	Departure	12	4	2	
Airbus A320-200 Series	Departure	8	4	20	
Airbus A320-200 Series	Departure	127	4	2	
Airbus A320-200 Series	Departure	508	4	2	

## MAPA ESTRATÉGICO DE RUÍDO 2021 – STRATEGIC NOISE MAP 2021 (AHD LISBON)

Airframe	Operation Type	Voos Numéricos	Stage Length	Departure Runway End	Arrival Runway End
Airbus A320-200 Series	Departure	27	4	20	
Airbus A320-200 Series	Departure	146	4	20	
Airbus A320-200 Series	Departure	1	5	20	
Airbus A320-200 Series	Departure	1	5	2	
Airbus A320-200 Series	Arrival	2	1		20
Airbus A320-200 Series	Departure	1	3	20	
Airbus A320-200 Series	Departure	1	3	20	
Airbus A321-100 Series	Arrival	1128	1		20
Airbus A321-100 Series	Arrival	174	1		20
Airbus A321-100 Series	Arrival	281	1		20
Airbus A321-100 Series	Arrival	3730	1		2
Airbus A321-100 Series	Arrival	689	1		2
Airbus A321-100 Series	Arrival	1204	1		2
Airbus A321-100 Series	Departure	3353	3	2	
Airbus A321-100 Series	Departure	696	3	2	
Airbus A321-100 Series	Departure	390	3	2	
Airbus A321-100 Series	Departure	945	3	20	
Airbus A321-100 Series	Departure	160	3	20	
Airbus A321-100 Series	Departure	103	3	20	
Airbus A321-100 Series	Departure	2	4	20	
Airbus A321-100 Series	Departure	25	4	20	
Airbus A321-100 Series	Departure	48	4	20	
Airbus A321-100 Series	Departure	13	4	2	
Airbus A321-100 Series	Departure	85	4	2	
Airbus A321-100 Series	Departure	203	4	2	
Airbus A321-100 Series	Departure	779	5	2	
Airbus A321-100 Series	Departure	124	5	2	
Airbus A321-100 Series	Departure	217	5	20	
Airbus A321-100 Series	Departure	47	5	20	
Airbus A321-100 Series	Departure	1	5	20	
Airbus A330-200 Series	Arrival	71	1		2
Airbus A330-200 Series	Arrival	15	1		2
Airbus A330-200 Series	Arrival	76	1		2
Airbus A330-200 Series	Arrival	28	1		20
Airbus A330-200 Series	Arrival	2	1		20
Airbus A330-200 Series	Arrival	20	1		20
Airbus A330-200 Series	Departure	2	4	20	
Airbus A330-200 Series	Departure	6	4	20	
Airbus A330-200 Series	Departure	26	4	2	
Airbus A330-200 Series	Departure	1	5	20	
Airbus A330-200 Series	Departure	46	5	2	
Airbus A330-200 Series	Departure	4	5	2	

## MAPA ESTRATÉGICO DE RUÍDO 2021 – STRATEGIC NOISE MAP 2021 (AHD LISBON)

Airframe	Operation Type	Voos Numéricos	Stage Length	Departure Runway End	Arrival Runway End
Airbus A330-200 Series	Departure	3	5	2	
Airbus A330-200 Series	Departure	12	5	20	
Airbus A330-200 Series	Departure	2	5	20	
Airbus A330-200 Series	Departure	1	6	20	
Airbus A330-200 Series	Departure	27	6	20	
Airbus A330-200 Series	Departure	5	6	2	
Airbus A330-200 Series	Departure	2	6	2	
Airbus A330-200 Series	Departure	76	6	2	
Airbus A330-200 Series	Departure	1	6	20	
Airbus A330-200 Series	Arrival	29	1		20
Airbus A330-200 Series	Arrival	13	1		20
Airbus A330-200 Series	Arrival	93	1		2
Airbus A330-200 Series	Arrival	2	1		2
Airbus A330-200 Series	Arrival	33	1		2
Airbus A330-200 Series	Departure	17	4	2	
Airbus A330-200 Series	Departure	1	4	2	
Airbus A330-200 Series	Departure	1	4	2	
Airbus A330-200 Series	Departure	5	4	20	
Airbus A330-200 Series	Departure	21	5	20	
Airbus A330-200 Series	Departure	71	5	2	
Airbus A330-200 Series	Departure	1	6	2	
Airbus A330-200 Series	Departure	1	6	20	
Airbus A330-200 Series	Departure	15	7	20	
Airbus A330-200 Series	Departure	37	7	2	
Airbus A340-500 Series	Arrival	1	1		20
Airbus A340-500 Series	Arrival	5	1		2
Airbus A340-500 Series	Arrival	2	1		2
Airbus A340-500 Series	Departure	3	4	2	
Airbus A340-500 Series	Departure	1	5	2	
Airbus A340-500 Series	Departure	1	5	20	
Airbus A340-500 Series	Departure	3	5	2	
Boeing 737-300 Series	Arrival	205	1		2
Boeing 737-300 Series	Arrival	364	1		2
Boeing 737-300 Series	Arrival	534	1		20
Boeing 737-300 Series	Arrival	90	1		20
Boeing 737-300 Series	Arrival	41	1		20
Boeing 737-300 Series	Arrival	1468	1		2
Boeing 737-300 Series	Departure	46	3	2	
Boeing 737-300 Series	Departure	26	3	20	
Boeing 737-300 Series	Departure	87	3	20	
Boeing 737-300 Series	Departure	535	3	20	
Boeing 737-300 Series	Departure	358	3	2	

## MAPA ESTRATÉGICO DE RUÍDO 2021 – STRATEGIC NOISE MAP 2021 (AHD LISBON)

Airframe	Operation Type	Voos Numéricos	Stage Length	Departure Runway End	Arrival Runway End
Boeing 737-300 Series	Departure	1645	3	2	
Boeing 737-300 Series	Departure	1	4	20	
Boeing 737-400 Series	Arrival	155	1		2
Boeing 737-400 Series	Arrival	16	1		20
Boeing 737-400 Series	Arrival	59	1		20
Boeing 737-400 Series	Arrival	1	1		2
Boeing 737-400 Series	Arrival	57	1		2
Boeing 737-400 Series	Departure	27	3	2	
Boeing 737-400 Series	Departure	186	3	2	
Boeing 737-400 Series	Departure	62	3	20	
Boeing 737-400 Series	Departure	9	3	20	
Boeing 737-400 Series	Departure	4	3	2	
Boeing 737-400 Series	Departure	1	4	2	
Boeing 737-500 Series	Arrival	4	1		2
Boeing 737-500 Series	Arrival	2	1		20
Boeing 737-500 Series	Arrival	1	1		2
Boeing 737-500 Series	Departure	1	3	20	
Boeing 737-500 Series	Departure	2	3	2	
Boeing 737-500 Series	Departure	4	4	2	
Boeing 737-600 Series	Arrival	55	1		2
Boeing 737-600 Series	Arrival	4	1		20
Boeing 737-600 Series	Arrival	4	1		20
Boeing 737-600 Series	Arrival	9	1		20
Boeing 737-600 Series	Arrival	22	1		2
Boeing 737-600 Series	Arrival	18	1		2
Boeing 737-600 Series	Departure	9	3	20	
Boeing 737-600 Series	Departure	15	3	2	
Boeing 737-600 Series	Departure	49	3	2	
Boeing 737-600 Series	Departure	2	3	20	
Boeing 737-600 Series	Departure	23	3	2	
Boeing 737-600 Series	Departure	4	3	20	
Boeing 737-600 Series	Departure	1	4	20	
Boeing 737-600 Series	Departure	2	4	2	
Boeing 737-600 Series	Departure	2	4	20	
Boeing 737-600 Series	Departure	1	4	2	
Boeing 737-600 Series	Departure	2	4	2	
Boeing 737-600 Series	Departure	1	5	20	
Boeing 737-800 Series	Arrival	765	1		2
Boeing 737-800 Series	Arrival	1470	1		2
Boeing 737-800 Series	Arrival	1266	1		20
Boeing 737-800 Series	Arrival	328	1		20
Boeing 737-800 Series	Arrival	181	1		20

## MAPA ESTRATÉGICO DE RUÍDO 2021 – STRATEGIC NOISE MAP 2021 (AHD LISBON)

Airframe	Operation Type	Voos Numéricos	Stage Length	Departure Runway End	Arrival Runway End
Boeing 737-800 Series	Arrival	4516	1		2
Boeing 737-800 Series	Departure	1018	3	2	
Boeing 737-800 Series	Departure	225	3	20	
Boeing 737-800 Series	Departure	1145	3	20	
Boeing 737-800 Series	Departure	4108	3	2	
Boeing 737-800 Series	Departure	339	3	20	
Boeing 737-800 Series	Departure	1436	3	2	
Boeing 737-800 Series	Departure	33	4	2	
Boeing 737-800 Series	Departure	4	4	20	
Boeing 737-800 Series	Departure	80	4	2	
Boeing 737-800 Series	Departure	26	4	20	
Boeing 737-800 Series	Departure	18	4	20	
Boeing 737-800 Series	Departure	72	4	2	
Boeing 737-800 Series	Departure	2	5	2	
Boeing 747-400 Series	Departure	1	1	2	
Boeing 757-200 Series	Arrival	1	1		2
Boeing 757-200 Series	Departure	5	5	2	
Boeing 767-200 ER	Arrival	175	1		2
Boeing 767-200 ER	Arrival	25	1		2
Boeing 767-200 ER	Arrival	296	1		2
Boeing 767-200 ER	Arrival	85	1		20
Boeing 767-200 ER	Arrival	11	1		20
Boeing 767-200 ER	Arrival	49	1		20
Boeing 767-200 ER	Departure	19	4	20	
Boeing 767-200 ER	Departure	37	4	2	
Boeing 767-200 ER	Departure	186	4	2	
Boeing 767-200 ER	Departure	72	4	2	
Boeing 767-200 ER	Departure	24	4	20	
Boeing 767-200 ER	Departure	63	4	20	
Boeing 767-200 ER	Departure	2	5	2	
Boeing 767-200 ER	Departure	1	5	2	
Boeing 767-200 ER	Departure	45	5	2	
Boeing 767-200 ER	Departure	12	5	20	
Boeing 767-200 ER	Departure	32	6	20	
Boeing 767-200 ER	Departure	144	6	2	
Boeing 767-200 ER	Departure	1	6	2	
Boeing 767-200 ER	Departure	1	6	20	
Boeing 767-200 ER	Departure	1	7	2	
Boeing 767-200 ER	Departure	1	7	2	
Boeing 767-400	Arrival	132	1		2
Boeing 767-400	Arrival	30	1		20
Boeing 767-400	Departure	130	5	2	

## MAPA ESTRATÉGICO DE RUÍDO 2021 – STRATEGIC NOISE MAP 2021 (AHD LISBON)

Airframe	Operation Type	Voos Numéricos	Stage Length	Departure Runway End	Arrival Runway End
Boeing 767-400	Departure	32	5	20	
Boeing 777-200 Series	Arrival	4	1		2
Boeing 777-200 Series	Arrival	2	1		2
Boeing 777-200 Series	Arrival	24	1		2
Boeing 777-200 Series	Arrival	5	1		20
Boeing 777-200 Series	Arrival	2	1		20
Boeing 777-200 Series	Arrival	2	1		20
Boeing 777-200 Series	Departure	1	1	20	
Boeing 777-200 Series	Departure	1	1	2	
Boeing 777-200 Series	Departure	1	4	20	
Boeing 777-200 Series	Departure	5	4	2	
Boeing 777-200 Series	Departure	2	4	20	
Boeing 777-200 Series	Departure	9	5	2	
Boeing 777-200 Series	Departure	1	5	2	
Boeing 777-200 Series	Departure	1	5	2	
Boeing 777-200 Series	Departure	1	5	20	
Boeing 777-200 Series	Departure	1	6	20	
Boeing 777-200 Series	Departure	5	6	2	
Boeing 777-200 Series	Departure	3	6	2	
Boeing 777-200 Series	Departure	4	6	2	
Boeing 777-200 Series	Departure	2	8	2	
Boeing 777-200 Series	Departure	1	8	20	
Boeing 777-300 Series	Arrival	23	1		20
Boeing 777-300 Series	Arrival	64	1		20
Boeing 777-300 Series	Arrival	18	1		20
Boeing 777-300 Series	Arrival	219	1		2
Boeing 777-300 Series	Arrival	79	1		2
Boeing 777-300 Series	Arrival	69	1		2
Boeing 777-300 Series	Departure	192	5	2	
Boeing 777-300 Series	Departure	28	5	2	
Boeing 777-300 Series	Departure	123	5	2	
Boeing 777-300 Series	Departure	32	5	20	
Boeing 777-300 Series	Departure	8	5	20	
Boeing 777-300 Series	Departure	92	5	20	
Fokker F100	Arrival	2	1		2
Fokker F100	Departure	2	2	2	

### ANEXO 4 – DESENHOS DOS MAPAS DE RUÍDO

Nas páginas seguintes constam os seguintes Desenhos:

Des A1: Mapa de Ruído para o indicador  $L_{den}$  (Global; escala 1:100000)

Des A2.1: Mapa de Ruído para o indicador  $L_{den}$  (Parte 1/15 (norte); escala 1:10000)

...

Des A2.15: Mapa de Ruído para o indicador  $L_{den}$  (Parte 15/15 (sul); escala 1:10000)

Des B1: Mapa de Ruído para o indicador  $L_n$  (Global; escala 1:100000)

Des B2.1: Mapa de Ruído para o indicador  $L_n$  (Parte 1/15 (norte); escala 1:10000)

...

Des B2.15: Mapa de Ruído para o indicador  $L_n$  (Parte 15/15 (sul); escala 1:10000)

Des C1: Abrangência da Isófona 63  $L_{den}$  (Parte 01/01; escala 1:50000)

Des C2: Abrangência da Isófona 53  $L_n$  (Parte 01/01; escala 1:50000)

### ANNEX 4 - NOISE MAPS DRAWINGS

The following drawings appear on the following pages:

Des A1: Noise map for the  $L_{den}$  indicator (Global; scale 1:100000)

Des A2.1: Noise map for the  $L_{den}$  indicator (Part 1/15 (north); scale 1:10000)

...

Des A2.15: Noise map for the  $L_{den}$  indicator (Part 15/15 (south); scale 1:10000)

Des B1: Noise map for the  $L_n$  indicator (Global; scale 1:100000)

Des B2.1: Noise map for the  $L_n$  indicator (Part 1/10 (north); scale 1:10000)

...

Des B2.15: Noise map for the  $L_n$  indicator (Part 15/15 (south); scale 1:10000)

Des C1: Range of contour line 63  $L_{den}$  (Part 01/01; scale 1:50000)

Des C2: Range of contour line 53  $L_n$  (Part 01/01; scale 1:50000)

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