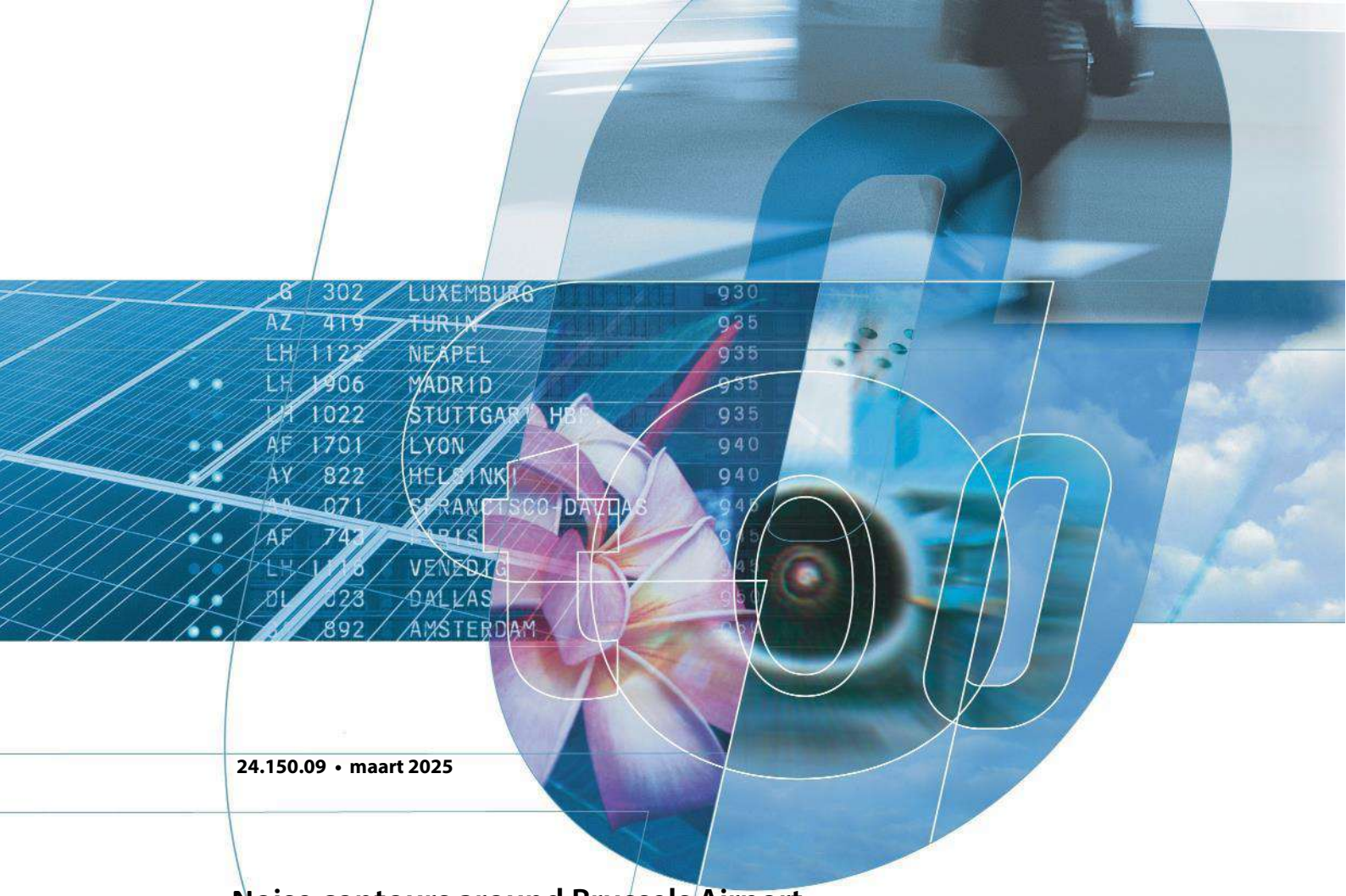

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Noise contours around Brussels Airport

for the year 2024

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for the year 2024

Report

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Brussels, March 2025

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1 Introduction

1.1 Background

The Government imposes an obligation on Brussels Airport Company to annually calculate noise contours in order to perform an assessment of the noise impact caused by departing and landing aircraft on the area surrounding the airport. For Brussels Airport, these calculations are imposed in the Environmental Legislation (VLAREM).

These noise contours are calculated according to a strictly-defined methodology (see §1.3) and reflect evolutions in the number of movements and fleet changes, as well as the actual use of runways and flight paths. Weather conditions and other events in the year affect this actual use.

To check their accuracy of the calculations, the noise contours are compared with the sound measurements at a number of locations around the airport.

Between 1996 and 2014, these contours were calculated by the Acoustics and Thermal Physics Laboratory of the Belgian university KU Leuven. Between 2015 and 2020, this assignment was carried out by the WAVES research group of the Ghent University (UGent). From 2021, these calculations have been carried out by To70. The calculations are commissioned by the airport operator, Brussels Airport Company.

1.2 Disclaimer

This assignment is performed by recognised sound experts working at To70 with the explicit assignment to submit a report in compliance with the legal obligations imposed on Brussels Airport Company pertaining to the applicable legislation. The recognised sound experts at To70 are responsible for the conformity of this result, but are not responsible for the quality and comprehensiveness of the raw data provided to them.

This report does not contain information, opinions or advice on the applicable (environmental) legislation at federal or regional level and is not suitable to be used for this purpose.

1.3 Mandatory calculations

The operator of an aerodrome classified as first class[1] is required by VLAREM environmental legislation to have the following noise contours calculated annually:

- L_{den} noise contours of 55, 60, 65, 70 and 75 dB(A) to show noise impact over 24 hours, and to determine the number of people who are potentially seriously inconvenienced;
- L_{day} noise contours of 55, 60, 65, 70 and 75 dB(A) to show noise impact during the day from 07:00 to 19:00;
- $L_{evening}$ noise contours of 50, 55, 60, 65, 70 and 75 dB(A) to show noise impact during the evening from 19:00 to 23:00;
- L_{night} noise contours of 45, 50, 55, 60, 65 and 70 dB(A) to show noise impact at night from 23:00 to 07:00;

[1] Class 1 Airports: airports that comply with the definition of the 1944 Chicago Convention establishing the International Civil Aviation Organization and have a runway of at least 800 metres

The VLAREM environmental legislation stipulates that the noise contours are calculated using a calculation model that is compatible with the methodology, as stated in ECAC Doc. 29, 3rd edition (2005) or a later edition. On 7 December 2016, the 4th edition of ECAC Doc. 29 was adopted. The 4th edition is thus decisive for the method of calculation.

Supplementary to the VLAREM obligations, the environmental permit of Brussels Airport Company imposes extra noise contour calculations for:

- L_{den} noise contours from 45 dB(A) upwards, and L_{night} noise contours from 40 dB(A) upwards
- Frequency contours for 70 dB(A) and 60 dB(A):
    - Frequency contours for 70 dB(A) during the daytime period (07:00 to 19:00) with frequencies 5x, 10x, 20x, 50x and 100x;
    - Frequency contours for 70 dB(A) during the evening period (19:00 to 23:00) with frequencies 1x, 5x, 10x, and 20x;
    - Frequency contours for 70 dB(A) during the night period (23:00 to 07:00) with frequencies 1x, 5x, 10x, and 20x;
    - Frequency contours for 60 dB(A) during the daytime period (07:00 to 19:00) with frequencies 50x, 100x, 150x, and 200x;
    - Frequency contours for 60 dB(A) during the evening period (19:00 to 23:00) with frequencies 10x, 15x, 20x, and 30x;
    - Frequency contours for 60 dB(A) during the night period (23:00 to 07:00) with frequencies 10x, 15x, 20x, and 30x.

The number of potentially seriously inconvenienced people within the different L_{den} contour zones (from 55 dB(A)) should be determined on the basis of the dose-response relationship included in the VLAREM. The number of seriously inconvenienced people (from 45 dB(A) L_{den}) and number of seriously sleep disturbed people (from 40 dB(A) L_{night}) must be determined in accordance with the environmental permit on the basis of the dose-response relationship established by the WHO.

The noise zones must be shown on a 1/25 000 scale map.

1.4 History of noise contours

The annual calculation of noise contours started in 1996. Until VLAREM was amended to comply with the European guideline on environmental noise (2002/49/EG) in 2005, the following division of the operational day was used (day: 06:00 – 23:00; night: 23:00 – 06:00). Following the adaptation of VLAREM to the Directive, the officially reportable noise contours are calculated according to the day format of the Directive (day: 07:00 – 19:00; evening: 19:00 – 23:00; night: 23:00 – 07:00).

Since 2011 the INM 7 model (sub-version INM 7.0b) has been used for the calculation of the noise contours. Model version 6.0c was used for the officially-reported noise contours every year from 2000 to 2010. As the model used and the associated aircraft database affect the calculated noise contours, the

noise contours for the year 2000 and for the years 2006 to 2010 were recalculated with the version 7.0b[2]. In this way, the evolution of the noise contours since the year 2000 can be mapped without the influence of the calculation model used.

From the beginning of 2021, the calculations are made with the Echo calculation model, developed by AerLabs B.V. With Echo, the calculations are performed according to the methodology stated in ECAC Doc. 29 4th edition. In addition to this, refinements have been implemented since 2021 with respect to previous annual calculations in the data used and the input data in the calculations. In addition, the year 2019 has also been recalculated in the context of the EIA, using the updated calculation model. Further explanations of the changes in the method of calculation and the effects on the calculated noise levels are described in Annex F.

1.5 Noise calculation model: Echo

From 2021, the calculation of the noise contours has been performed with the Echo noise calculation model. Echo is configured according to the specifications of ECAC Doc. 29, 4th edition (2016). Echo has been verified on the basis of the verification framework of ECAC Doc. 29, 4th edition, Volume 3. Echo makes use of ANP database version 2.3.

This software meets the conditions stated in Vlarem: "The noise contours are calculated using a calculation model compatible with the methodology, as stated in ECAC Doc. 29, 3rd edition (2005) or a later edition." The software also complies with the European Environmental Noise Directive 2002/49/EC.

1.6 Population data

To determine the number of inhabitants and the number of potentially seriously inconvenienced people within the contour zones, the most recent population data as of 1 January 2025 is used. Additionally, population data as of 1 January 2022 shall be used to determine the number of seriously inconvenienced and seriously sleep disturbed people in accordance with the provisions included in the special conditions of the environmental permit.

For 2017, the noise contours reports determined the exposed population on the basis of a homogeneous distribution of population over the area of the statistical sector. From 2017, the calculation method was refined, whereby the actual location of the address points were included. Based on the address files in the Brussels-Capital Region, Wallonia, and Flanders, in combination with the population information per statistic sector, the number of persons is calculated for each address location. This is done by uniformly distributing the number of persons per statistic sector over the number of address locations. In Flanders, address locations on business estates were excluded, unless there are several address locations in a statistical sector on business estates. The above is only applicable to locations in Flanders since an address file for industrial parks within the Brussels-Capital Region was not available.

[2] For the frequency contours of 60 and 70 dB(A), only the year 2010 was calculated using the version 7.0b of the INM calculation model

1.7 Source data

For the calculation of the noise contours, and in order to be able to compare the results against those of the noise monitoring network, Brussels Airport Company has made source data available. A complete overview of this source data with references to the relevant files can be found in Annex G.

2 Definitions

2.1 Explanation of a few frequently-used terms

2.1.1 Noise contours

As a result of flight traffic, noise impact is either observed or calculated for every point around the airport. Due to a difference in distance from the noise source, these values may vary sharply from one point to another. Noise contours are isolines or lines of equal noise impact. These lines connect together points where equal noise impact is observed or calculated.

The noise contours with the highest values are those situated closer to the noise source. Further from the sound source, the value of the noise contours is lower.

2.1.2 Frequency contours

The acoustic impact of overflight by an aircraft can be characterised at every point around the airport by, for example, the maximum noise level observed during overflight. This maximum noise level can be determined, for example, as the maximum of the equivalent sound pressure levels over 1 second ($L_{Aeq,1s,max}$) during this overflight.

The number of times that the maximum sound pressure level exceeds a particular value can be calculated for the passage of all aircraft overflights during a year. The number of times on average that this value is exceeded each day is the excess frequency. Frequency contours connect locations where this number is equal.

2.1.3 Noise zones

A noise zone is the zone delimited by two successive noise contours. The noise zone 60-65 dB(A) is, for example, the zone delimited by the noise contours of 60 and 65 dB(A).

2.1.4 The A-weighted equivalent sound pressure level $L_{Aeq,T}$

The noise caused by overflying aircraft is not a constant noise, but has the characteristic of rising sharply to a maximum level and thereafter declining sharply again. Noise impact at a specific place resulting from fluctuating sounds over a period is represented by the A-weighted equivalent sound pressure level $L_{Aeq,T}$.

The A-weighted equivalent sound pressure level $L_{Aeq,T}$, over a period T, is the sound pressure level of the *constant* sound that contains the same acoustic energy as the fluctuating sound during the same period. The unit for an A-weighted equivalent sound pressure level is the dB(A).

The designation A-weighted (index A) means that an A-filter is used to determine the sound pressure levels. This filter reflects the pitch sensitivity of the human ear. Sounds at frequencies to which the ear is sensitive are weighted more than sounds at frequencies to which our hearing is less sensitive. Internationally, A-weighting is accepted as the standard measurement for determining noise impact around airports. This A-weighting is also applied in the VLAREM legislation on airports.

This report calculates 3 types of $L_{Aeq,T}$contours, namely:

- L_{day}: the A-weighted equivalent sound pressure level for the daytime period, defined as the period between 07:00 and 19:00;
- $L_{evening}$: the A-weighted equivalent sound pressure level for the evening period, defined as the period between 19:00 and 23:00;
- L_{night}: means the A-weighted equivalent sound pressure level for the night period, defined as the period between 23:00 and 07:00.

2.1.5 L_{den}

The European directive on the control and assessment of environmental noise (transposed in VLAREM II), recommends using the L_{den} parameter to determine the exposure to noise over a longer period. The L_{den} (**L**evel **D**ay-**E**vening-**N**ight) is the A-weighted equivalent sound pressure level over 24 hours, with a (penalty) correction of 5 dB(A) applied for noise during the evening period (equivalent to an increase of the number of evening flights by a factor of 3.16), and 10 dB(A) during the night (equivalent to an increase of the number of night flights by a factor of 10). For the calculation of the L_{den} noise contours, the day is divided as per section 57 of VLAREM II, with the evening period from 19:00 to 23:00 and the night period from 23:00 to 07:00. L_{den} is the weighted energetic sum of these three periods with a weighting according to the number of hours in each period (12 hours for the day, 4 hours for the evening and 8 hours for the night).

2.2 Link between annoyance and noise impact

An exposure relationship is imposed by Vlarem II - Chapter 5.57 to determine the number of people who are potentially seriously inconvenienced within the L_{den} noise contour of 55 dB(A). This formula gives the percentage of the population that is potentially severely inconvenienced in terms of the noise level expressed in L_{den} (Figure 1).

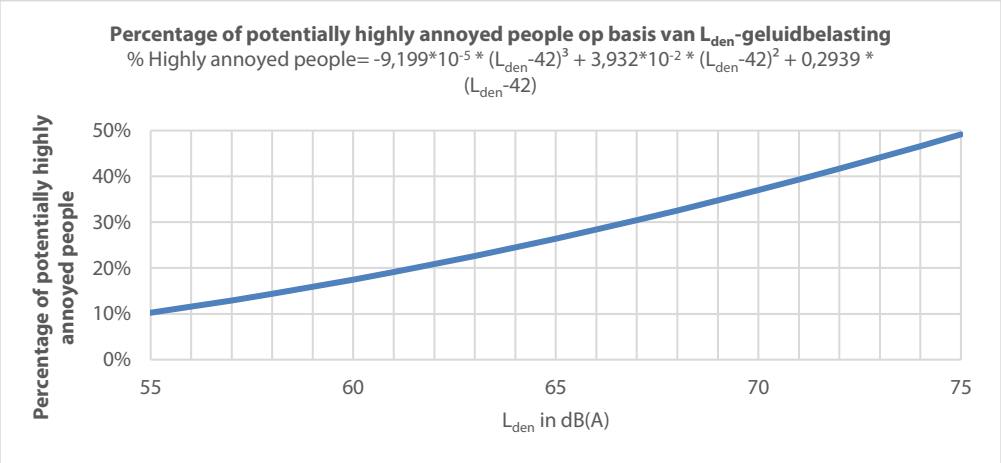


Figure 1: Percentage of potentially seriously inconvenienced people as a function of L_{den} for aircraftnoise

(Source: VLAREM – environmental legislation based on Miedema 2000)

The above formula derives from a synthesis-analysis of various noise studies conducted by Miedema around several European and American airports[3] and was adopted by the WG2 Dose/Effect of the European Commission[4]. Note that L_{den} only determines about 30% of the variance in reported severe inconvenience[5,6].

The special conditions of the airport's planning permission include the additional requirement to also annually determine the number of seriously inconvenienced people within the L_{den} noise contour of 45 dB(A) (Figure 2) and seriously sleep disturbed people within the L_{night} noise contour of 40 dB(A) (Figure 3) using the exposure-effect relationship specified by the WHO[7]. In a recent extension of the European Environmental Noise Directive (EU Directive 2002/49/EC)[8], the new WHO exposure-effect relationships are adopted in the EU Directive.

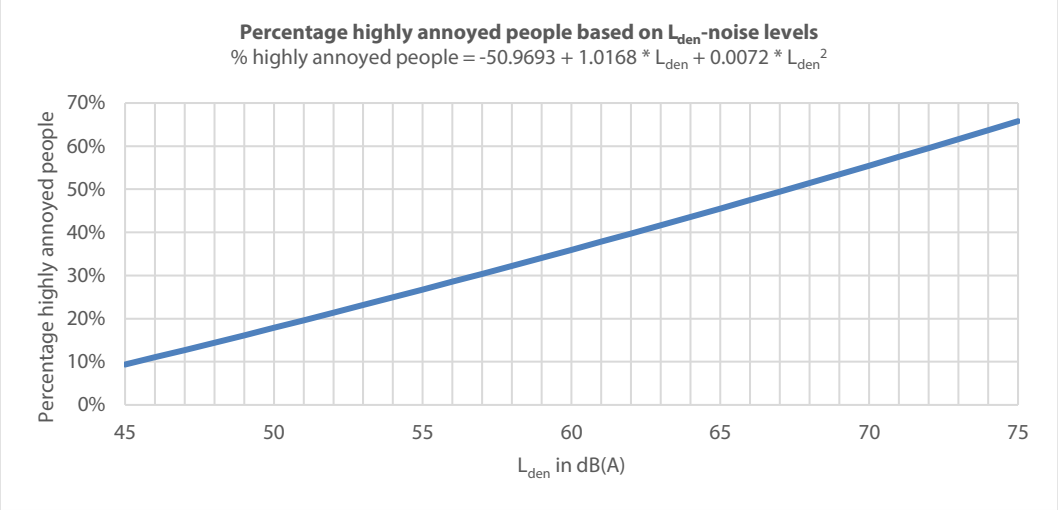


Figure 2: Percentage of people who are seriously inconvenienced as a function of L_{den} due to aircraft noise.

[3] Miedema H.M.E., Oudshoorn C.G.M., Elements for a position paper on relationships between transportation noise and annoyance, TNO report PG/VGZ/00.052, July 2000

[4] European Commission, WG2 – Dose/effect, Position paper on dose response relationships between transport noise and annoyance, 20 February 2002

[5] van Kempen EEMM et al.. Selection and evaluation of exposure-effect relationships for health impact assessment in the field of noise and health, RIVM Report No. 630400001/2005. Bilthoven: RIVM; 2005.

[6] Kroesen M, Molin EJE, van Wee B. Testing a theory of aircraft noise annoyance: a structural equation analysis. J Acoust Soc Am 2008;123:4250–60.

[7] WHO Europe, Environmental Noise Guidelines for the European Region (2018), ISBN 978 92 890 53563

[8] COMMISSION DIRECTIVE (EU) 2020/367 of 4 March 2020 amending Annex III to Directive 2002/49/EC of the European Parliament and of the Council as regards the determination of methods for determining the harmful effects of environmental noise.

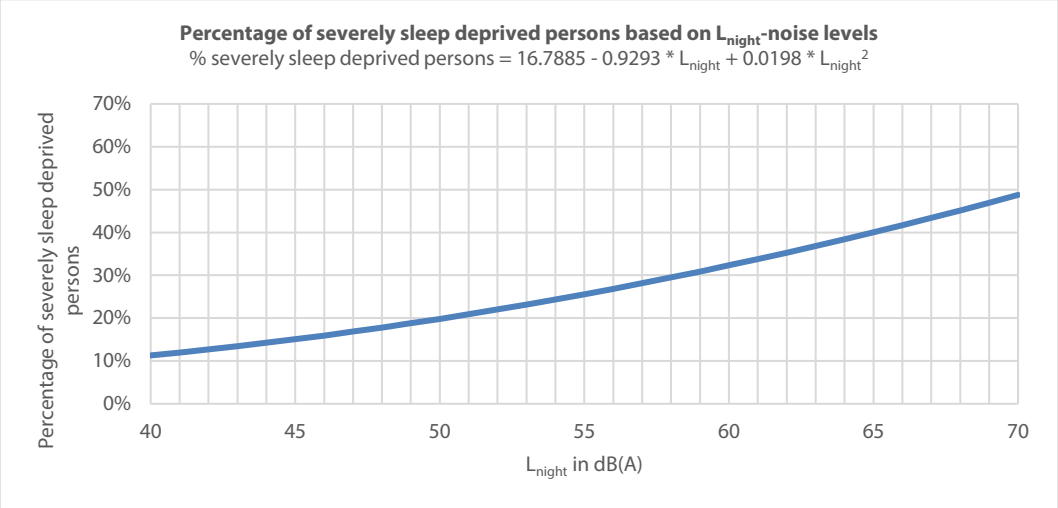


Figure 3: Percentage of individuals experiencing severe sleep disturbance as a function of L_{night} due to aircraft noise.

3 Methodology

From the start of 2021, use has been made for the calculation of noise contours of the Echo calculation model, developed by AerLabs B.V. This model and the methodology used comply with the methodology prescribed in the VLAREM legislation (Chapter 5.57 Airports). 29, 4th edition (2016). Supplementary to this, several details have been implemented in the calculation methodology compared to the previous annual calculations from 2021 onwards. This chapter gives a description of the working method.

The procedure for calculating noise contours consists of three phases:

- Collection of information concerning the flight movements, the routes flown, aircraft characteristics and meteorological data.
- Performing the noise calculations with the Echo calculation model.
- Processing of the contours using a Geographic Information System (GIS).

3.1 Data input

The year calculations are based on the actual number of flights, divided into the number of flights during the day (07:00 - 19:00), evening (19:00 - 23:00) and night (23:00 - 07:00).

The following data is required to specify aircraft movements:

- Aircraft type
- Time
- Nature of the movement (departure/arrival)
- Destination or origin
- Landing/take-off runway used
- Flight path followed

The flight information is provided by Brussels Airport Company as an export of the flight movements from the central database (CDB). All the necessary information is stored in this database. The quality of the data is very good.

Each aircraft type is linked to an aircraft type for which the noise and performance data needed for noise calculations are included in the Aircraft Noise and Performance (ANP) database, see §3.2. In most cases, the aircraft type is present in the ANP database. For a small fraction of aircraft that cannot be directly linked, a suitable type is sought based on number of type of engines and starting weight.

Helicopters are not included specifically in the calculations, but they are added proportionally to the flight movement type (landing/take-off) and the time of day. In 2024, helicopter flights were responsible for about 1.0% of movements.

3.1.1 Radar data

Aircraft follow certain routes which are essentially determined by the runway used and the SID flown (Standard Instrument Departure) for take-offs, or by the runway used and the STAR ('Standard Arrival Route') for arrivals. The existing SIDs and STARs are shown in the AIP ('Aeronautical Information

Publication'). This official documentation specifies the procedures to be followed for the flight movements at a specific airport.

These descriptions for departure are not strict spatial specifications but established procedures. For example, when reaching a certain height or orientation point, a manoeuvre must be performed. Reaching this height and/or geographical location depends on the aircraft type, weight (and indirectly on the destination), as well as weather conditions. This may result in a very large geographical distribution of the actual flight paths for the same SID. This creates bundles of movements that use the same or similar SIDs.

In the reporting up to and including 2020, a statistical division of the routes actually flown was used in the noise calculations per bundle based on radar data and translated to representative flights paths with a distribution of the traffic over these paths. For commonly used SIDs, these were further refined by a further breakdown based on aircraft type. The representation of the flight paths was thus a statistical approach to the actual flights paths.

Noise calculations since 2021 have been based on the actual flight paths of the flights, using radar data directly. This radar data gives the position of the aircraft every 4 seconds. Based on these data, the flight path can be accurately represented.

Various start points (position where the aircraft comes onto the runway) are available on one runway. This start point is available for each flight based on information that originates from skeyes and is supplied by Brussels Airport Company. In the noise calculations, take-offs are modelled from the actual start point on the runway. Approaches are modelled on the basis of the runway threshold, whereby a flight height is assumed of 50 foot above the runway threshold.

3.1.2 Meteorological data

For the calculation of the noise contours, the actual average meteorological conditions are used. These meteorological conditions are available for each thirty minutes (METAR) via Brussels Airport Company. The wind direction, wind speed and temperatures are linked to the individual flight movements. The headwind is calculated for each individual flight movement and for the runway used. In this way, an annual averaged meteorological condition, which is weighted for the number of flights under each meteorological condition, is obtained.

The wind speed is provided in accordance with the calculation method and converted to knots (kn). The meteorological parameters for 2024 are:

- Average headwind (annual average across all runways, take-off and landing): 3.7kn.
- Average temperature: 11.9°C.
- Average humidity: 81%.
- Average air pressure: 1014.83 mBar.

3.1.3 Take-off profile

The weight of the aircraft at departure influences the take-off profile. Given that this actual weight is not available in the CDB, a method proposed by ECAC Doc. 29 is used to take into account this effect ('stage

length'). The Aircraft Noise and Performance (ANP) database gives an assumed take-off weight per stage length. It is assumed that the greater the distance from Brussels Airport to the destination, the more this aircraft will operate at its maximum take-off weight. This is justified, inter alia, by the fact that the kerosene constitutes a significant part of the total weight of an aircraft. This complies with the methodology of the preceding annual reports.

The coordinates of all airports can be found on the website 'http://openflights.org/data'. This list is used to calculate the distance to Brussels Airport from any airport.

The profiles for take-offs are modelled according to the Noise Abatement Departure Procedure (NADP) 1, with acceleration at a height of 3000 foot. This corresponds with the stipulated take-off procedure on Brussels Airport.

3.1.4 Approach profiles

Flights approaching Brussels Airport descend in practice from a great height in a continuous descent to the runway or fly before the final approach for a while at a fixed height. Until 2020, one standard approach profile for approaching traffic was used in the noise calculations. In order to take into account the impact of the different approaches on noise, three approach profiles have been made available for approaching traffic for the calculation from 2021, and thus also this year:

- An approach profile with a continuous descent.
- An approach profile with a horizontal segment at c. 560 metres above the airport. This corresponds with an approach altitude of 2,000 foot above sea-level.
- An approach profile with a horizontal segment at c. 870 metres above the airport. This corresponds with an approach altitude of 3,000 foot above sea-level.

The allocations of the most appropriate approach profile for a flight is based on the radar data. Based on this coupling, 39.2% of approaching traffic is linked to a continuous descent, 37.5% to a descent with a horizontal segment at 2,000ft and 23.3% to a descent with a horizontal segment at 3,000ft.

3.2 Aircraft source data

Alongside the relevant data about aircraft movements, runway use and flight paths, the calculation of the noise impact also demands appropriate noise and performance data for the aircraft concerned. The source of the information is the international Aircraft Noise and Performance (ANP) databased, approved by the ECAC.

The ANP database gives noise and performance data of aircraft. The data in the database cover most larger, modern aircraft models and variants. Aircraft models and variants that are not included in the ANP database must be represented by substitutes (often designated as 'proxy' aircraft): aircraft with comparable noise and performance characteristics that are included in the ANP database, whereby a correction is applied based on the difference in noise impact based on noise certification data.

For the year calculation, use is made of ANP version 2.3 (October 2020). In 2022, seven aircraft types were added as 'proxy' aircraft to the ANP database, including NEO variants of the A320 and A321. These types have been considered in the performance of the annual calculations from 2022 onwards.

For the annual calculation, all registered passages are linked to a 'proxy' based on the 'ANP Aircraft Substitution Tables'.[9] The link is made based on aircraft type and engine type. A number of aircraft types cannot be linked on the basis of the substitution list. For those types, the allocation of the proxy aircraft is done based on the number and type of engines and start weight.

With regard to the proxy aircraft, a correction factor is applied in the noise calculations for the difference in noise impact between the actual aircraft type and the proxy aircraft. This correction is made on the basis of noise certification data. For most movements (98.93%), Brussels Airport Company has the noise certification data of the aircraft concerned. For the movements for which this is not the case, the correction is based on the correction in the ANP substitution list. That correction is each time based on the most noisy model variant of the aircraft concerned.

3.3 Match between measurements (NMS) and calculations (INM)

Echo enables calculations at specific locations around the airport. To check the assumptions concerning the input data and the accuracy of Echo, the calculated noise impact is compared with sound measurements taken at 31 locations.

The comparison with measurements provides a validation of the calculations. Both the noise calculations as well as the noise measurements imply limitations and uncertainties. The noise calculations do not, for example, take the actual height at which an aircraft flies overhead into account (this is determined by the assigned standard departure and approach profiles, not by the actual radar data). The measuring stations are unmanned because they are monitored continuously throughout the year. Local deviations caused by local noise events or background noise, for example, may affect the measured levels. Although these are removed as far as possible from the measurements (for example, through an automatic link between noise events and aircraft, based on the radar data), such contributions to the measured levels cannot be completely excluded.

If there is a sufficient correspondence between the annual averages of the measured noise vents and the annual average forecast based on the average day, over a sufficient number of measuring units, confidence can still be gained regarding the calculation method.

3.4 Technical data

The calculations are performed with Echo within a grid of 70 x 70 kilometres around the airport, with a mesh size of the grid of 250 metres. The altitude of the airport reference measuring point in relation to sea level is 175 ft.

[9] The ANP substitution list has been prepared for ANP version 2.2. In ANP version 2.3, the noise and performance data has been added for several new aircraft types. These types were added to the substitution list by To70.

3.5 Changes in calculation method compared to of 2020 and previous

An overview of the main changes in the method of calculation applied since the 2021 calculations and their effects on the results is described in Annex F.

4 Results

4.1 Background information about interpreting the results

This section describes a number of air traffic statistics in order to get a better picture of the evolution in the traffic picture of 2024 compared to previous years. For this, information such as the number of movements, the evolution of the fleet, and runway usage has been mapped.

4.1.1 Number of flight movements

One of the most important factors for the annual noise contours around an airport is the number of movements which occurred during the past year. Following the decline of the number of movements between 2011 and 2013, there was an increase of 6.9% in 2014 and a further increase of 3.4% in 2015. In 2016 the number of aircraft movements fell to 223.688 (-6.5%). This is largely a result of a temporary closure following the attacks on the airport on 22 March 2016. In 2017, the number of movements increased by 6.3% to 237.888. In 2018, the number of movements increased by 1.0% to 235.459. In 2019 there was one again a slight decline of 0.4% and the total number of movements was 234.460. In 2020, the picture was entirely defined by the impact of the global pandemic and the consequences for international travel. The number of flight movements fell by 59.1% to 95,811. In 2022 there were 178,930 aircraft movements, which is an increase of 50.7% compared to 2021. In 2023, the number of flight movements increased by 7.4% compared to 2022, to 192.257 movements. The number of aircraft movements increased for the fourth consecutive year in 2024 to 198,617, up 3.3% from 2023. Despite this growth, the number of movements is still 15.3% lower than in 2019 and the airport has not yet reached its pre-pandemic level.

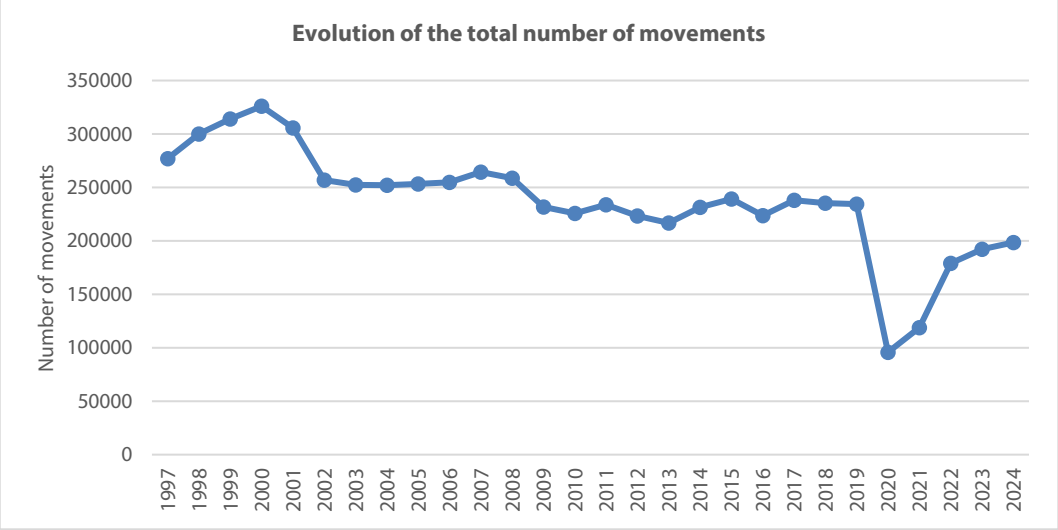


Figure 4: Evolution of flight traffic (all movements) at Brussels Airport.

The number of night movements (23:00 to 06:00) decreased by 1.2% from 16,573 in 2023 to 16,380 in 2024, shown in Figure 5. As a result, there are about 1,000 fewer night movements in 2024 compared to 2019 (17,347 night movements). In 2024, there were 5,100 night-time departures. This includes helicopter movements and flight movements exempt from slot coordination, such as government and military flights. The primary reason for the reduction in night flights is the decrease in flights lacking a night slot;

these flights frequently operated at night due to operational issues like delays or technical problems. Recent years have seen active cooperation among Brussels Airport Company, the slot coordinator, and the involved airlines, all aimed at minimising this proportion of flights.

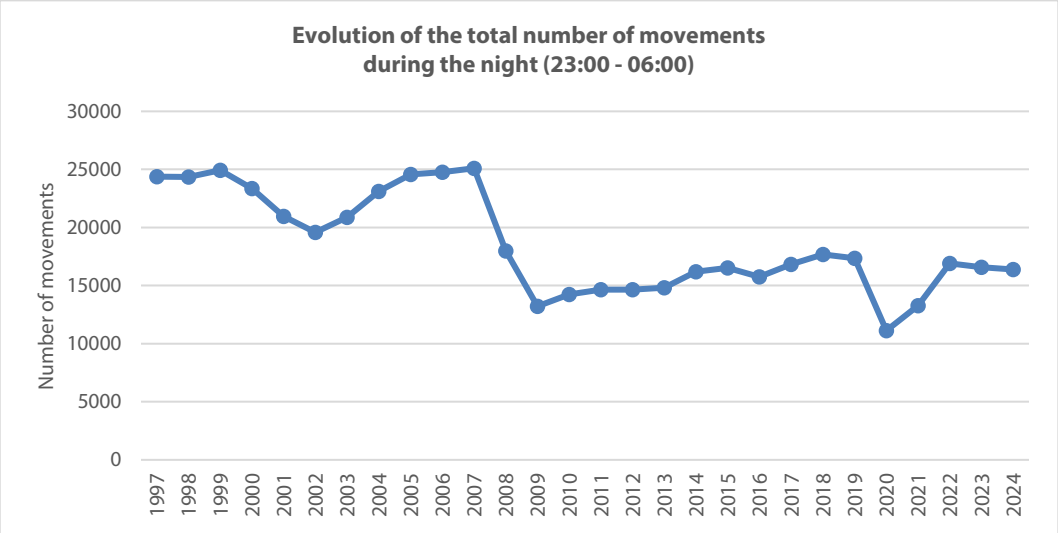


Figure 5: Evolution of flight traffic during the night (23:00-06:00) at Brussels Airport.

The number of night slots allocated for aircraft movements for the year 2024 remained within the limits imposed on the Brussels Airport slot coordinator at 15,866 (15,733 in 2023) of which 4,743 for departure (4,496 in 2023) for which a maximum of 16,000 night slots have been allocated[10] annually since the year 2009, of which a maximum of 5,000 for departure (MB 21/1/2009, official change of environmental permit).

The number of movements during the operational day period (06:00 to 23:00) rose by 3.7% from 175,684 in 2023 to 182,237 in 2024. The evolution of the number of movements in 2024 compared to 2023 is reflected in Table 1. The numbers for the night period are further broken down into operational night (23:00 - 06:00) and the morning period (06:00 - 07:00).

Table 1: Number of movements (including helicopter movements) in 2024 and evolution compared to 2023

	2023			2024			relative difference compared to 2023		
period	landings	departures	total	landings	departures	total	landings	departures	total
day (07:00 - 19:00)	62,396	62,833	125,229	64,873	65,702	130,575	+4.0%	+4.6%	+4.3%
evening (19:00 - 23:00)	20,161	21,498	41,659	20,845	21,496	42,341	+3.4%	-0.0%	+1.6%
night (23:00 - 07:00)	13,579	11,790	25,369	13,593	12,108	25,701	+0.1%	+2.7%	+1.3%
00:00 - 24:00	96,136	96,121	192,257	99,311	99,306	198,617	+3.3%	+3.3%	+3.3%
06:00 - 23:00	84,609	91,075	175,684	88,031	94,206	182,237	+4.0%	+3.4%	+3.7%
23:00 - 06:00	11,527	5,046	16,573	11,280	5,100	16,380	-2.1%	+1.1%	-1.2%
06:00 - 07:00	2,052	6,744	8,796	2,313	7,008	9,321	+12.7%	+3.9%	+6.0%

[10] night slot: By the coordinator of Brussels-National airport, in accordance with Council Regulation (EEC) No 95/93 of 18 January 1993 on common rules for the allocation of slots at Community airports, permission granted to use the entire infrastructure necessary for the operation of an air service at Brussels National airport at a specified date and time of landing or take-off during the night as allocated by the coordinator.

The general increase of 3.3% in the number of movements on an annual basis between 2024 and 2023 is evenly distributed throughout the day (+4.3%) and morning between 06:00 and 07:00 (+6.0%). The relative increase in the number of night-time flights (between 23:00 and 07:00) is considerably lower (+1.3%). The number of movements in the operational night period (between 23:00 and 06:00) has decreased by -1.2%.

4.1.2 Other important evolutions

In addition to the number of flight movements, there are a number of other parameters that also determine the size and the position of the noise contours, such as the runway and the route used, flight procedures and the deployed fleet. The most important changes are summarised in the following paragraphs.

Fleet changes during the day and in the evening (07:00 and 23:00).

Figure 6 reflects the evolution of the most commonly used aircraft types during the day and evening (between 7:00 and 23:00:00) for heavy aircraft (starting weight from 136 tons, heavy aircraft) and Figure 7 for lighter aircraft (starting weight up to 136 tons). Shown are the aircraft types in 2023 and 2024 that on average have flown 1x per day.

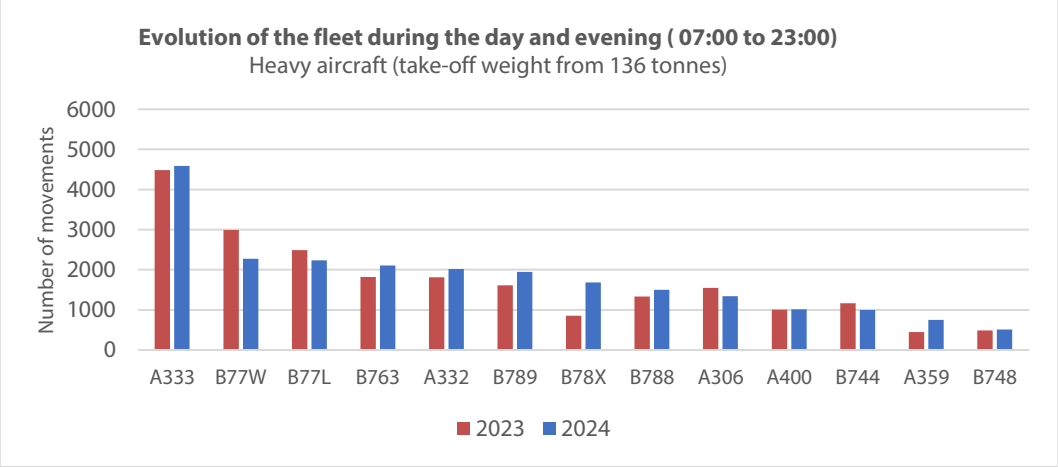


Figure 6: Evolution of the number of aircraft movements with heavy aircraft between 07:00 and 23:00.

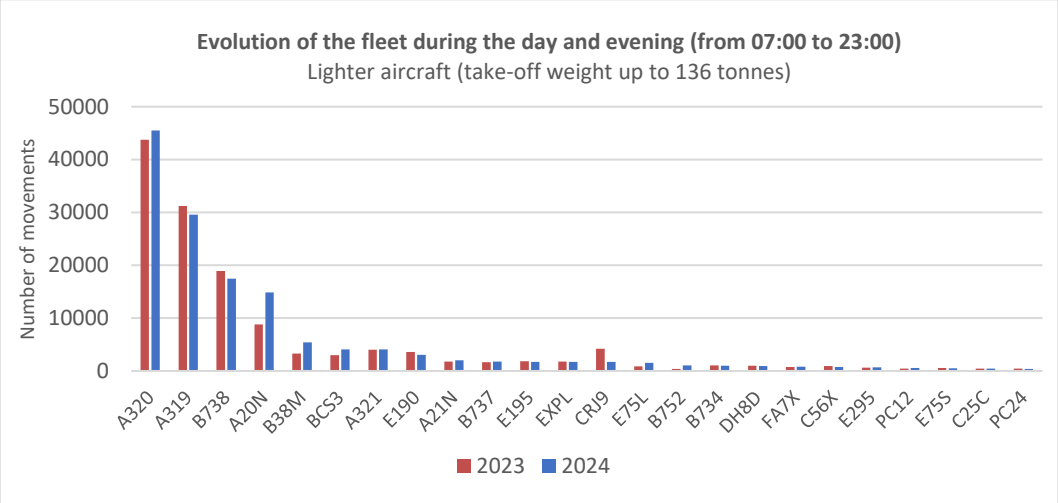


Figure 7: Evolution of the number of aircraft movements with lighter aircraft between 07:00 and 23:00.

In general, the most-used aircraft were the A320, the A319 and the B738 (together responsible for 53.5% of all movements in 2024 between 07:00 and 23:00). The number of movements with these aircraft increased with 1.5% compared to 2023. In addition, the fleet's development in 2024 relative to 2023 is visible with the increase in the number of movements with aircraft types A20N (8.829 movements in 2023 and 14.864 movements in 2024), B38M (3,287 movements in 2023 and 5,415 movements in 2024) and the E75L (861 movements in 2023 and 1525 movements in 2024). In contrast, the use of E190 and CRJ9 decreased by 15.2% and 59.7% respectively. The A333 remains the most common heavy aircraft with an increase of 2.2%, followed by the B77W and the B77L, whose movements actually decreased compared to 2023. Furthermore, an increasing number of movements is also visible for the B789 (+20.9%), the A359 (+69.3%) and the A310 (+89.5%). A drop in the number of movements with heavy aircraft is also visible for the A306 and the B744.

Fleet changes in the night period (from 23:00 to 07:00)

The evolution of the most commonly used aircraft types in the night (between 23:00 and 07:00) is available in Figure 8 for arrivals and in Figure 9 for departures. Shown are the aircraft types in 2023 and 2024 that on average flew a minimum of 1x flight per week.

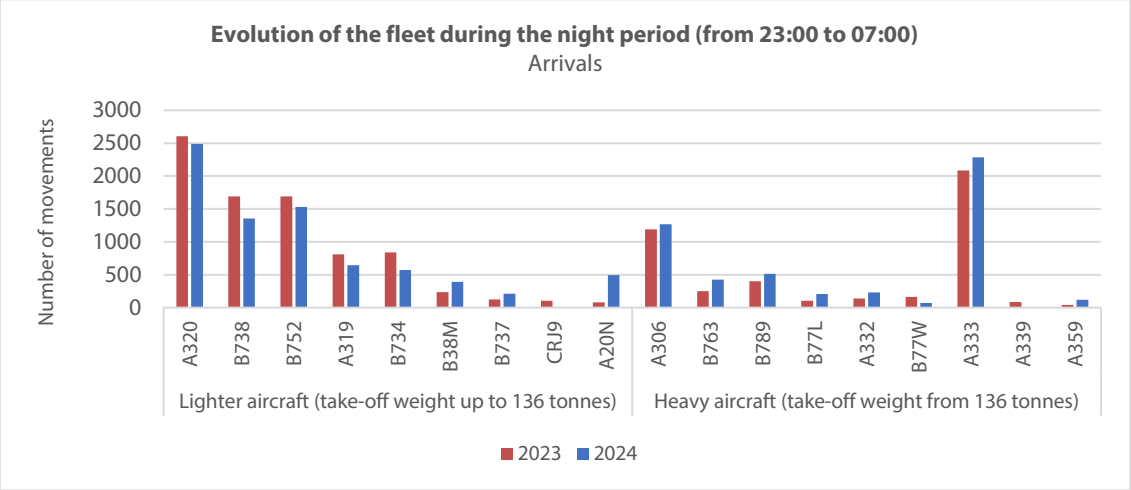


Figure 8: Evolution of the number of arrivals in the night period (from 23:00 to 07:00).

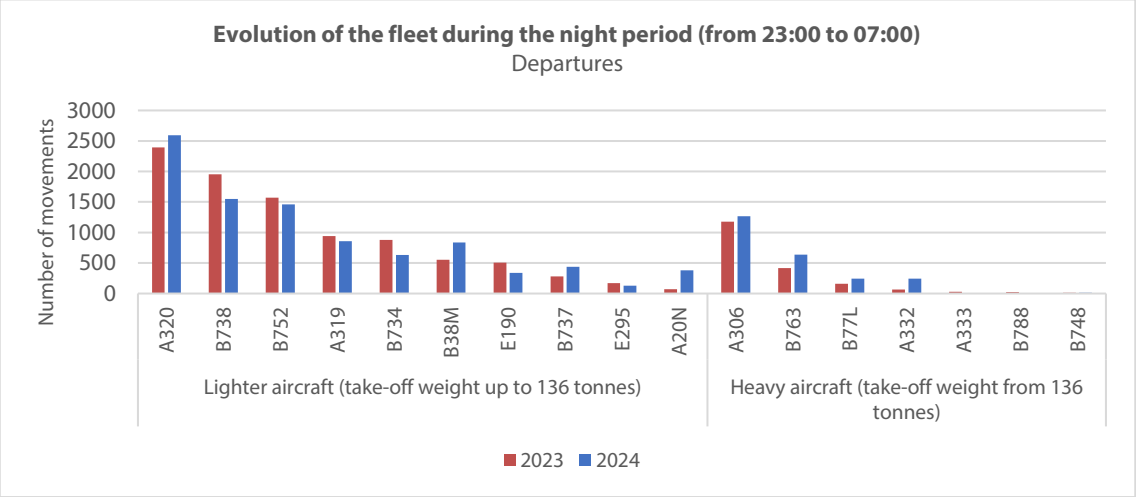


Figure 9: Evolution of the number of departures in the night period (from 23:00 to 07:00 hours).

The number of arrivals by lighter aircraft at night dropped by 7.4% compared to 2023. The number of departures also decreased by 2.0%, mainly attributable to a decreasing number of the most frequently used aircraft at night: the B738 (-20.7%) and B752 (-7.3%). On the other hand, the use of the A320, B38M, A20N and the B737 has increased. The number of arrivals with heavy aircraft in the night increased by 14.0% compared to 2023. The number of departures with heavy aircraft in the night has increased by 27.0% compared to 2023. The A306 remains the most common heavy aircraft, followed by the B763, B77L and the A332.

Runway and route usage

Preferential runway usage

The preferential runway usage, published in the AIP (skeyes), indicates, depending on the time the movement occurs, which runway is preferentially used. Optionally, preferential runway use also considers the aircraft's destination and maximum take-off weight. No changes were made to this scheme during 2024 (see Table 2).

If the preferential runway configuration cannot be used (e.g. due to meteorological conditions, runway maintenance, etc.), skeyes will choose the most appropriate alternative configuration, taking into account weather conditions, runway equipment, traffic demand, etc. For this purpose, the preferential runway usage scheme includes wind limits, expressed as maximum crosswinds and maximum tailwind for each runway. To prevent these limits being exceeded, air traffic control must, when the situation arises, switch to an alternative configuration. Under preferential runway usage conditions, the maximum tailwind is 7 kt and the maximum crosswind is 20 kt. In the event of alternative runway usage, the maximum speeds are also 20 kt for crosswind but only 3 kt for tailwind.

Table 2: Preferential runway use since 19/09/2013 (source: AIP)

		Day		Night
		06:00 to 15:59	16:00 to 22:59	23:00 to 05:59
Mon, 06:00 – Tue 05:59	Departure	25R		25R/19(1)
	Landing	25L/25R		25R/25L(2)
Tue, 06:00 – Wed 05:59	Departure	25R		25R/19(1)
	Landing	25L/25R		25R/25L(2)
Wed, 06:00 – Thur 05:59	Departure	25R		25R/19(1)
	Landing	25L/25R		25R/25L(2)
Thu, 06:00 – Fri 05:59	Departure	25R		25R/19(1)
	Landing	25L/25R		25R/25L(2)
Fri, 06:00 – Sat 05:59	Departure	25R		25R(3)
	Landing	25L/25R		25R
Sat, 06:00 – Sun 05:59	Departure	25R	25R/19(1)	25L(4)
	Landing	25L/25R	25R/25L(2)	25L
Sun, 06:00 – Mon 05:59	Departure	25R/19(1)	25R	19(4)
	Landing	25R/25L(2)	25L/25R	19

(1) Runway 25R for traffic via ELSIK, NIK, HELEN, DENUT, KOK and CIV / Runway 19 for traffic via LNO, SPI, SOPOK, PITES and ROUSY (aircraft with MTOW between 80 and 200 tonnes can use runway 25R or 19, aircraft with MTOW > 200 tonnes must use runway 25R, regardless of their destination).
(2) Runway 25L only if air traffic control considers this necessary.
(3) Between 01:00 and 06:00, no slots may be allocated for departures.
(4) Between 00:00 and 06:00, no slots may be allocated for departures.

Use of the runways

Compared to 2023, the number of movements on runways 25R and 25L increased for both arrivals and departures. For the other runway combinations, the number of movements actually decreased. This is shown in Figure 10 for the daytime and evening period (from 07:00 to 23:00) and in Figure 11 for the night period (from 23:00 to 07:00). A complete account of the runway use is given in appendix A.

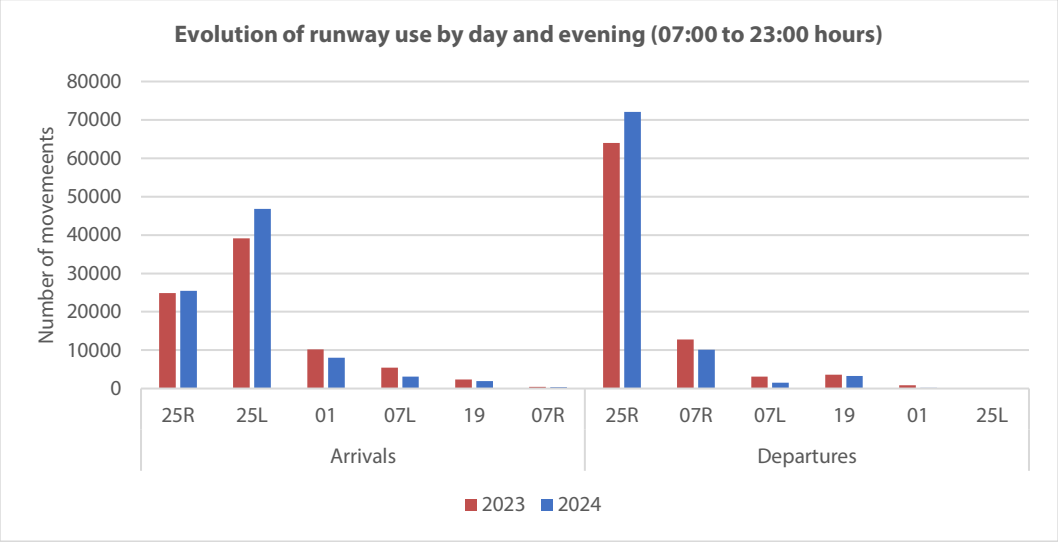


Figure 10: Evolution of the runway use between 07:00 and 23:00.

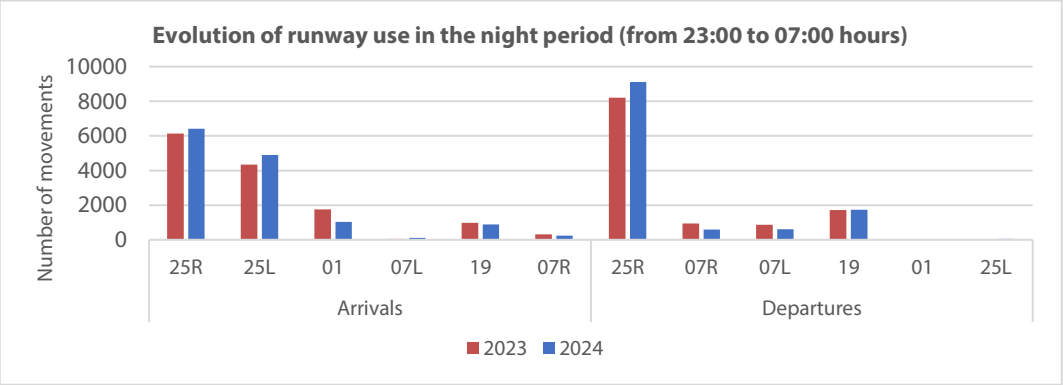


Figure 11: Evolution of the runway use in the night period (from 23:00 to 07:00).

Runway 25R remains the most used runway direction for departures in 2024 due to the preferential runway use and the prevailing wind conditions. The use of 07R for departures decreased by 20.8% during the day and evening period. This is also the case for runway 01 (-76.1%), runway 07L (-51.2%) and runway 19 (-7.4%) where a decreasing number of departures is visible. Runway 25L is with a relative increase of 19.6% the most commonly used runway for arrivals in the day- and evening periods. An increase in the use of 25R as a runway is also visible during the night period. Furthermore, the number of night arrivals increased by 4.6% on runway 25R and by 12.8% on runway 25L, while the number of landings on 01 actually decreased by 40.7% (1,760 landings in 2023 and 1,043 landings in 2024).

4.2 Comparison of measurements and calculations

Echo enables a number of acoustic parameters to be calculated at a specified location around the airport The extent to which the calculated values correspond to the values registered and processed by the measuring system can be evaluated by performing these calculations at the Noise Monitoring System (NMS) measuring station locations. Different data sources are used in the NMS system and are correlated with each other: noise measurements, flight lists (cdb), radar tracks and weather. The comparison between measurements and calculations is made for the level indicators $L_{Aeq,24h}$, L_{night} and L_{den}.

The calculated values are compared with the values of the aircraft correlated measured noise events. These are noise events whereby an automatic link could be made in the NMS with the flight and radar data.

The system of correlation is imperfect and it is possible for events to be incorrectly attributed to overflying traffic and vice versa. To minimise the contribution of such incorrect classifications, a trigger level is set with a minimum duration time: an event is expected only when the trigger level of 10 s is exceeded. The event ends when the trigger level is not achieved during 5 s. The trigger levels are set for each measuring station and depend on the local noise in the area. These trigger levels were evaluated in the beginning of 2015 and adjusted for several measuring stations. At that time, the maximum duration of an event was increased from 75 s (for 2014) to 125 s. As in previous years, this criterion was retained for 2024. In events of even longer duration, the chance of this being caused by an aircraft is quite small. Note that beyond the conditions relating to the event duration and trigger level, a correlation with a registered aircraft movement is also necessary based on its radar track results.

In the table below, a comparison is made between the values simulated with Echo at the different measuring station locations and the values measured/calculated on the basis of the correlated events for the chosen parameters. Aside from data from the measuring stations of Brussels Airport Company, results from the Environment, Nature and Energy Department (LNE) measuring stations (with codes NMT 40-2 and higher) are also recorded. The measurement data from these measuring stations are input and linked to flight data in the NMS of the airport.

For the measurement stations of the OIM in the Brussels-Capital Region, the above procedure is not possible because the measurement data are not provided to BAC (until 2009 the measurement data of the OIM for two measuring stations- Haren and Evere - were provided). An overview of the location of all measuring stations is given in Annex B.

The measuring stations NMT01-2, NMT03-3, NMT15-3 and NMT23-1 are located at the airport site and/or in the immediate vicinity of the runway system and airport installations. The flight-correlated noise events comprise contributions from ground noise as well as overflights. The link to specific flight movements is not always equally reliable for these measuring stations. For these reasons, the measured values at these measuring stations are less relevant for assessing noise emission from overflying aircraft, and while they are reported, they are not considered in the assessment of the accuracy of the simulations.

The fraction of time the metering system was active (called 'uptime') was higher in 2024 than in 2023. The average uptime for the BAC measurement units was 99.14%, the measurement stations of the Department of Environment were active 99.84% of the time. The overall average is thus 99.37%. The sites with the lowest 'uptime' are locations 01-02 (96.62%) and 10-03 (96.19%). Nevertheless, these values remain very high. For the comparison of the measurements with the calculations (for a whole year), a correction is made per measuring stations for the uptime fraction. It is also assumed that during the periods lacking measurements, there was the same proportion of exposure to aircraft noise as during the

periods in which the measuring station was active. The correction is, as a consequence of the high uptime, virtually negligible.

The comparison between calculations and measurements based on the $L_{Aeq,24h}$ shows that the discrepancy between the calculated values and the measured values across all measuring stations, except NMT09-2 (Perk), NMT42-2 (Diegem) and NMT48-3 (Bertem), is smaller than 2 dB(A) (after also excluding the measuring points NMT01-2, NMT03-3, NMT15-3 and NMT23-1 as discussed above). Measuring stations Perk and Bertem have few overflights and have a relatively low measured noise pressure level (41.7 and 26.3 dB(A) L Aeq,24h respectively) which results in a higher error rate in comparison with the calculated noise pressure levels. At 10 measuring stations, the deviation is limited to up to 0.5 dB(A). At 15 measuring stations, the measurements are higher than the calculations, at 12 measuring stations the measurements are lower than the calculations (in each case with the abovementioned exclusions). The overall discrepancy between simulations and measurements is 1.0 dB(A) ('root-mean-square error', RMSE) when Perk and Bertem (as well as NMT01-2, NMT03-3, NMT15-3 and NMT23-1) are excluded from this evaluation.

For L_{NIGHT}, equivalent limited deviations between measurements and simulations are obtained globally (1.4 dB(A) RMSE, excluding measurement points NMT01-2, NMT03-3, NMT15-3, NMT23-1, Perk and Bertem). At 9 measuring stations, the differences are less than or equal to 0.5 dB(A).

For the noise indicator L_{den} the RMSE is 1.1 dB(A) (excluding NMT01-2, NMT03-3, NMT15-3, NMT23-1, Perk and Bertem). At most of the other measuring stations (22), the deviations were within 2 dB(A). There are 8 measuring stations that give a deviation of up to 0.5 dB(A). At 16 measuring stations the calculations result in an underestimation of the measured levels, at 11 measuring stations they lead to an overestimation (excluding NMT01-2, NMT03-3, NMT15-3, and NMT23-1).

Table 3: Correspondence between calculations and measurements for noise indicator $L_{Aeq,24h}$ (in dB(A)). The grey rows in the table indicate comparisons between measurements and calculations which are difficult to perform (see text).

Location code	Location name	Measurements 2024 (dB(A))	Calculations 2024 (dB(A))	Difference (dB(A))
NMT01-2	STEENOKKERZEEL	56.8	63.0	-6.2
NMT02-2	KORTENBERG	66.4	67.3	-0.9
NMT03-3	HUMMELGEM	61.5	61.9	-0.4
NMT04-1	NOSSEGEM	60.3	61.0	-0.7
NMT06-1	EVERE	50.3	49.6	0.7
NMT07-2	STERREBEEK	47.6	47.3	0.2
NMT08-1	KAMPENHOUT	54.8	55.0	-0.2
NMT09-2	PERK	41.7	47.0	-5.3
NMT10-3	NEDER-OVER-HEEMBEEK	53.8	52.9	0.9
NMT11-2	SINT-PIETERS-WOLUWE	50.9	50.6	0.3
NMT12-1	DUISBURG	45.9	45.3	0.7
NMT13-2	GRIMBERGEN	43.7	44.5	-0.8
NMT14-1	WEMMEL	47.1	46.7	0.4
NMT15-3	ZAVENTEM	44.8	53.2	-8.4
NMT16-2	VELTEM	56.3	56.5	-0.3
NMT19-4	VILVOORDE	51.4	50.9	0.6
NMT20-3	MACHELEN	50.7	52.4	-1.7
NMT21-1	STROOMBEEK-BEVER	51.5	49.8	1.7
NMT23-1	STEENOKKERZEEL	64.4	66.1	-1.6
NMT24-1	KRAAINEM	52.4	51.8	0.6
NMT26-3	SCHAARBEEK	49.4	49.8	-0.4
NMT40-2*	KONINGSLO	52.3	51.4	0.9
NMT41-1*	GRIMBERGEN	46.2	46.3	-0.1
NMT42-2*	DIEGEM	63.6	60.8	2.8
NMT43-2*	ERPS-KWERPS	55.8	56.9	-1.2
NMT44-2*	TERVUREN	45.7	45.5	0.2
NMT45-1*	MEISE	43.7	44.0	-0.3
NMT46-2*	WEZEMBEEK-OPPEM	54.4	53.1	1.2
NMT47-3*	STERREBEEK	49.6	48.1	1.5
NMT48-3*	BERTEM	26.3	32.8	-6.5
NMT70-1*	ROTSELAAR	50.1	50.0	0.1

* noise data Department of the Environment, off-line correlated by the NMS

Table 4: Correspondence between calculations and measurements for L_{night} sound indicator (in dB(A)).
The grey rows in the table indicate comparisons between measurements and calculations which are difficult to perform (see text).

Location code	Location name	Measurements 2024 (dB(A))	Calculations 2024 (dB(A))	Difference (dB(A))
NMT01-2	STEENOKKERZEEL	54.9	61.9	-7.1
NMT02-2	KORTENBERG	62.1	63.0	-0.9
NMT03-3	HUMMELGEM	57.0	55.5	1.5
NMT04-1	NOSSEGEM	58.6	58.6	-0.1
NMT06-1	EVERE	44.3	43.9	0.4
NMT07-2	STERREBEEK	48.8	47.4	1.4
NMT08-1	KAMPENHOUT	53.3	53.7	-0.5
NMT09-2	PERK	41.0	45.4	-4.4
NMT10-3	NEDER-OVER-HEEMBEEK	50.4	48.8	1.5
NMT11-2	SINT-PIETERS-WOLUWE	46.9	46.9	0.0
NMT12-1	DUISBURG	43.6	42.3	1.3
NMT13-2	GRIMBERGEN	38.3	39.4	-1.1
NMT14-1	WEMMEL	42.5	42.7	-0.2
NMT15-3	ZAVENTEM	46.6	51.4	-4.8
NMT16-2	VELTEM	52.4	52.5	-0.1
NMT19-4	VILVOORDE	48.3	47.3	1.0
NMT20-3	MACHELEN	48.1	49.1	-1.0
NMT21-1	STROOMBEEK-BEVER	48.4	45.9	2.5
NMT23-1	STEENOKKERZEEL	62.8	65.0	-2.2
NMT24-1	KRAAINEM	47.6	47.8	-0.1
NMT26-3	SCHAARBEEK	44.9	45.5	-0.6
NMT40-2*	KONINGSLO	48.9	47.4	1.5
NMT41-1*	GRIMBERGEN	43.0	42.6	0.3
NMT42-2*	DIEGEM	59.2	56.1	3.2
NMT43-2*	ERPS-KWERPS	50.9	52.5	-1.5
NMT44-2*	TERVUREN	46.0	44.0	2.0
NMT45-1*	MEISE	37.8	39.7	-1.9
NMT46-2*	WEZEMBEEK-OPPEM	50.5	49.5	1.0
NMT47-3*	STERREBEEK	50.4	48.0	2.5
NMT48-3*	BERTEM	17.7	27.9	-10.2
NMT70-1*	ROTSELAAR	46.0	46.0	0.0

* noise data Department of the Environment, off-line correlated by the NMS

Table 5: Correspondence between calculations and measurements for noise indicator L_{den} (in dB(A)).
The grey rows in the table indicate comparisons between measurements and calculations which are difficult to perform (see text).

Location code	Location name	Measurements 2024 (dB(A))	Calculations 2024 (dB(A))	Difference (dB(A))
NMT01-2	STEENOKKERZEEL	62.2	68.7	-6.6
NMT02-2	KORTENBERG	70.4	71.3	-0.9
NMT03-3	HUMMELGEM	65.3	65.1	0.2
NMT04-1	NOSSEGEM	65.6	66.0	-0.4
NMT06-1	EVERE	53.7	53.2	0.6
NMT07-2	STERREBEEK	54.7	53.7	1.0
NMT08-1	KAMPENHOUT	60.3	60.7	-0.4
NMT09-2	PERK	47.5	52.4	-4.9
NMT10-3	NEDER-OVER-HEEMBEEK	58.1	56.9	1.2
NMT11-2	SINT-PIETERS-WOLUWE	55.2	55.1	0.1
NMT12-1	DUISBURG	50.8	49.9	0.9
NMT13-2	GRIMBERGEN	47.4	48.3	-0.9
NMT14-1	WEMMEL	50.9	50.8	0.1
NMT15-3	ZAVENTEM	52.4	58.4	-6.0
NMT16-2	VELTEM	60.4	60.6	-0.2
NMT19-4	VILVOORDE	56.1	55.3	0.8
NMT20-3	MACHELEN	55.6	57.0	-1.3
NMT21-1	STROOMBEEK-BEVER	56.0	53.9	2.1
NMT23-1	STEENOKKERZEEL	69.9	71.8	-2.0
NMT24-1	KRAAINEM	56.3	56.0	0.3
NMT26-3	SCHAARBEEK	53.2	53.7	-0.5
NMT40-2*	KONINGSLO	56.6	55.5	1.1
NMT41-1*	GRIMBERGEN	50.7	50.6	0.1
NMT42-2*	DIEGEM	67.6	64.6	2.9
NMT43-2*	ERPS-KWERPS	59.5	60.9	-1.4
NMT44-2*	TERVUREN	52.2	50.9	1.2
NMT45-1*	MEISE	47.0	48.0	-0.9
NMT46-2*	WEZEMBEEK-OPPEM	58.7	57.6	1.1
NMT47-3*	STERREBEEK	56.4	54.3	2.1
NMT48-3*	BERTEM	28.8	36.6	-7.8
NMT70-1*	ROTSELAAR	54.2	54.1	0.1

* noise data Department of the Environment, off-line correlated by the NMS

4.3 Noise contours

This section gives the results of the noise contour calculations for the parameters described above (L_{day}, $L_{evening}$, L_{night}, L_{den}, freq.70,day, freq.70,evening, freq.70,night, freq.60,day, freq.60,evening and freq.60,night)[11]. These illustrations display the results for the years 2024, 2023 and 2019. In the contour report for 2019, the contours were still calculated with INM 7.0b. For the comparability of results, the contours of 2019 were re-modelled with the Echo calculation model (as used for contours from 2021). As described earlier, censuses are calculated using the most recent population data as of 1 January 2025. To quantify the effect of population evolution, censuses are also conducted using population data from January 1, 2024 To aid legibility of the figures, two contour values are visualised for each figure. Annex D displays the visualisation of all contour values for the years 2024 and 2023.

The surface area and the number of residents is calculated for each noise contour. Additionally, the number of potentially seriously and severely inconvenienced people (based on Lden contours) and seriously sleep disturbed people (based on Lnight contours) was calculated according to the method described in paragraph 2.2. The appendices offer more details per municipality (appendix C). Appendix D shows the visualisation of the contours. The evolution of the area and inhabitants per contour over several years is shown in Appendix E.

4.3.1 L_{day} – contours

The L_{day} contours give the A-weighted equivalent sound pressure level over the period 07:00 to 19:00 and are reported from 55 dB(A) to 75 dB(A) in steps of 5 dB(A). The evolution of the contours for 2019, 2023 and 2024 is shown in Figure 12, where only the 55 dB(A) and 60 dB(A) contours are presented.

The evaluation period for the L_{day} contours falls entirely within the operational day period (06:00 to 23:00) as determined at Brussels Airport. This means that the 'Departure 25R – Landing 25L/25R' runway usage is to be preferred at all times, except at the weekend on Saturdays after 16:00 and on Sundays before 16:00, when departures are to be distributed over 25R and 19. When this preferential runway usage cannot be applied, due to weather conditions (often with easterly winds), the combination of departing at 07R/07L and landing at 01, 07L or07R is generally applied.

There are a number of relevant findings. In the first place, there was an increase in the number of landings (+4.0%) and departures (+4.6%) during the day. This explains the local increases in contours in 2024 compared to 2023. This increase in daytime movements is divided into an increase in light aircraft types (+4.0%) and an increase in heavy aircraft types (+5.9%).

There are also evolutions in the use of runways, with the number of daytime landings decreasing on almost all runways except runways 25L/R. The largest relative increase is seen on runway 25L (+20.8%), where the number of landings has increased from 29,820 in 2023 to 36,013 in 2024. The number of landings on runway 25R remained almost stable (+0.3%). Partly because of this, the size of the contour in

[11] Compared to previous years, the frequency contours for the day and evening periods are split. Consequently, these contours are not compared to those of the previous year.

line with 25L east of the airport increased. The number of landings from the south towards runway 01 decreased by 20.4%, reducing the noise contour south of the airport.

During the day between 07:00 and 19:00, 25R remains the most commonly used runway. The number of departures on this runway increased by 13.4% from 47,614 departures in 2023 to 53,979 departures in 2024. There was also a 2.6% increase in departures on runway 19, from 2,711 departures in 2023 to 2,782 departures in 2024. On the other runways, the number of departures actually decreased.

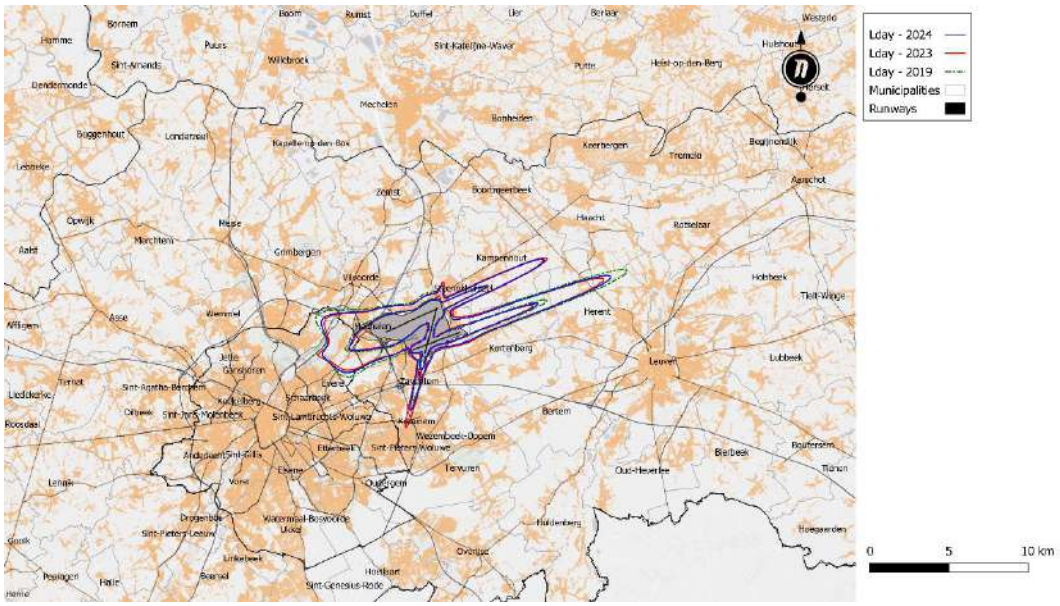


Figure 12: L_{day} noise contours of 55 and 60 dB(A) around Brussels Airport in 2019 (green), 2023 (red) and 2024 (blue).

The total surface area within the L_{day} contour of 55 dB(A) decreased in 2024 by 1.3% compared to 2023 (from 4,456 to 4,400 ha). The number of residents within the L_{day} contour of the 55 dB(A) noise contour dropped by 0.6% (from 33,252 to 33,047). The number of inhabitants within the contour has increased by 636 (+2.0%) due to changes in population numbers. Compared to the year 2019, the total area is 9.9% smaller (area in 2019 was 4,886 ha) and the number of inhabitants is 5.6% lower (population in 2019 was 35,003, based on the population register of 1 January 2022).

4.3.2 $L_{evening}$ contours

The $L_{evening}$ contours give the A-weighted equivalent sound pressure level over the period 19:00 to 23:00 and are reported from 50 dB(A) to 75 dB(A) in steps of 5 dB(A). The evolution of the contours for 2019, 2023 and 2024 is shown in Figure 13, with only 50 dB(A) and 55 dB(A) contour presented. As a lower level is reported compared to L_{day}, there is a visually magnifying effect. The 50 dB(A) contour becomes as important as the L_{day} contour of 55 dB(A) by correcting 5 dB(A) for the calculation of L_{den}. The evaluation period for the $L_{evening}$ contours falls entirely within the operational daytime period (06:00 to 23:00) as determined at Brussels Airport.

There are a number of relevant findings, which differ from the daytime period findings. Firstly, there was only an increase in the number of landings during the evening (+3.4%), the number of departures

remained the same. In the evening, only the number of movements with lighter aircraft increased (+2.1%), whereas the number of movements with heavy ones dropped (-1.9%).

Also during the evening, the use of runway 25L (+15.7%) for arrivals increases more than the use of runway 25R (+8.0%). The number of arrivals in the evening on runway 07L decreased from 691 movements in 2023 to 418 movements in 2024. The number of departures decreased on each runway except runways 25R and 25L, where the number of departures on runway 25R increased by 10.3% (16,374 departures in 2023 to 18,064 departures in 2024). On runway 25L, the number was negligible, considering this involved 1 start in 2024.

Despite the increase in the number of landings on runways 25L and 25R, noise levels hardly increased. This is partly due to the level of fleet renewal, where the share of newer generation aircraft like the A20N and B38M has increased compared to the older generations of these aircraft (A320 and B738).

To the west of the airport in the extension of runway 25L/R, there is a slight increase in contours, except for the area under the landings on runway 07L where there is a decrease compared to the 2023 contours. On the contrary, a decrease in noise levels is observed in the extension of runway 01/19, due to reduced use of the runway in these directions.

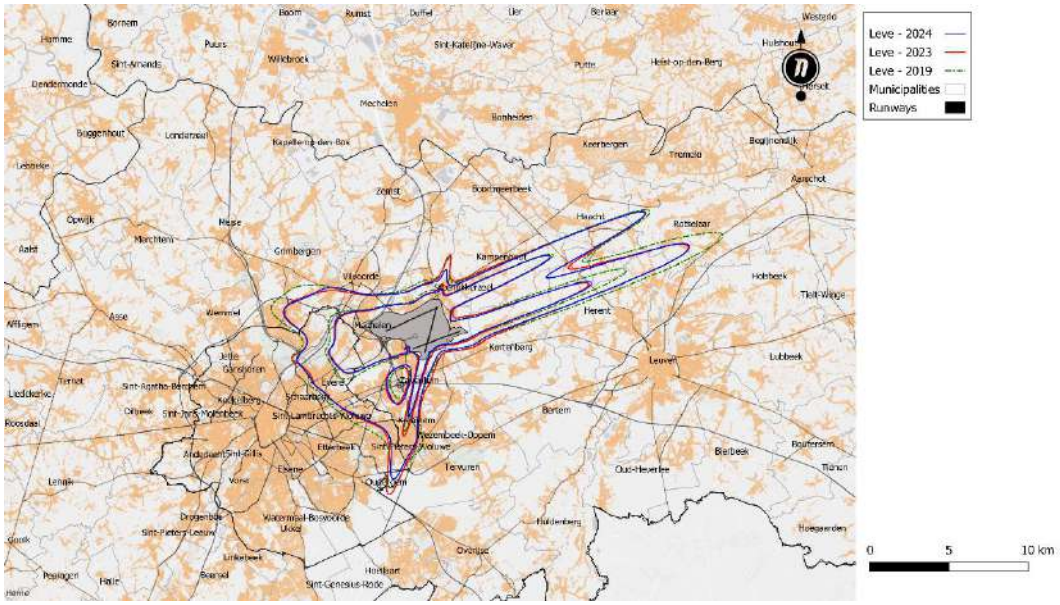


Figure 13: $L_{evening}$ noise contours of 50 and 55 dB(A) around Brussels Airport in 2019 (green), 2023 (red) and 2024 (blue).

The total area within the $L_{evening}$ contour of 50 dB(A) in 2024 is 4.5% larger than 2023 (from 12,254 ha to 11,703 ha). The number of residents within the $L_{evening}$ contour of 50 dB(A) decreased by 0.3% (from 192,009 to 191,496). The number of inhabitants within the contour has increased by 2,404 (+1.3%) due to changes in population numbers. Compared to the year 2019, the total area is 16.7% smaller (area in 2019

was 14,010 ha) and the number of inhabitants is 14.8% lower (population in 2019 was 224,882, based on the population register of 1 January 2022).

4.3.3 L_{night} contours

The L_{night} contours give the A-weighted equivalent sound pressure level over the period 23:00 to 07:00 and are reported from 40 dB(A) to 70 dB(A) in steps of 5 dB(A). In accordance with the regulations in Brussels Airport's new environmental permit, these contours are now reported starting at 40 dB(A), whereas in previous years, they were reported from 45 dB(A). The evolution of the contours for 2019, 2023 and 2024 is shown in Figure 14 where only the 40 dB(A) and 45 dB(A) contours are presented. By reporting an additional contour, there is a visually magnifying effect compared to the day and evening. The 45 dB(A) L_{night} contour is larger than the 55 dB(A) contour for the daytime and, by correcting 10 dB(A) for the calculation of L_{den}, becomes as important as the L_{day} contour of 55 dB(A) and the $L_{evening}$ contour of 50 dB(A).

The evaluation period for the L_{night} contours does not concur with the operational night-time period (23:00 to 06:00) but also includes the flights of the operational daytime period between 06:00 and 07:00. The noise contours are a combination of the runway and route usage during the operational night and during the operational day.

The relative increase in the number of movements in the night is lower than the increase in the day and evening periods. The number of landings in the evening period increased by 0.1% and the number of departures increased by 2.7%. The number of movements with heavier aircraft increased by 17.8%. The A306 has, just as in 2023, the largest share of departing night flights with heavier aircraft.

Runway 25L saw an increase in its share of landings, even during the night. For example, the number of arrivals at runway 25L has increased from 4,351 arrivals in 2023 to 4,907 arrivals in 2024. The number of landings at 25R increased from 6,135 in 2023 to 6,415 in 2024. In contrast, the number of landings on runway 01 decreased. Runway 01 saw its share of landings decrease from 13.0% in 2023 to 7.7% in 2024.

The number of departures on runway 25R in the night increased by 10.9% in 2024, making it by far the most frequently used for departing traffic at night.

As a result of the increasing number of movements, noise pollution at night has increased almost everywhere. A reduction in noise pollution is visible to the south of the airport due to the decrease in the use of runway 01 for night landings.

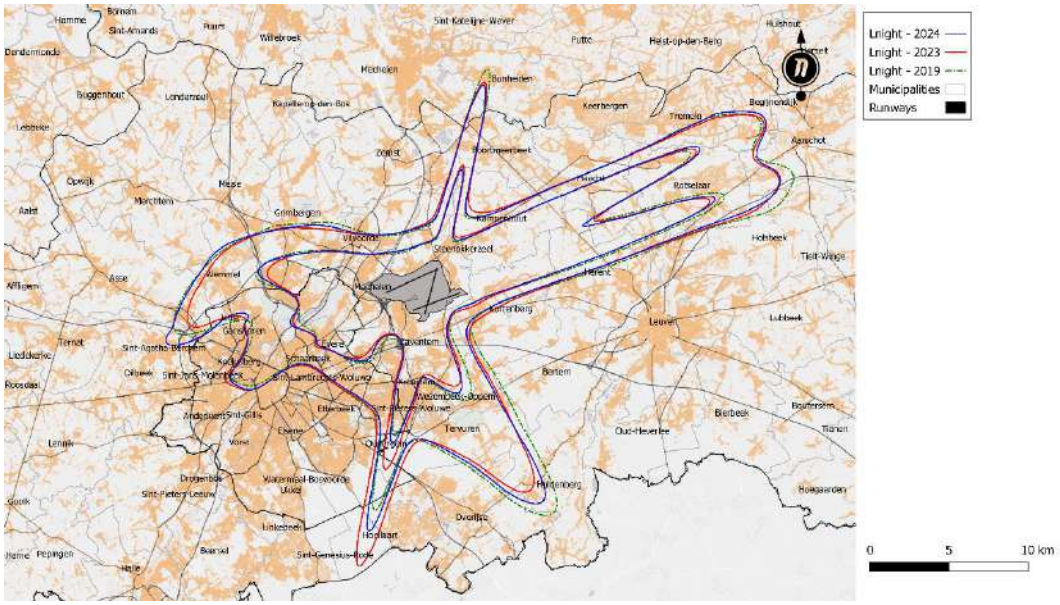


Figure 14: L_{night} noise contours of 40 and 45 dB(A) around Brussels Airport in 2019 (green), 2023 (red) and 2024 (blue).

The total area within the L_{night} contour of 40 dB(A) in 2024 is 0.2% larger than in 2023 (from 33,867 ha to 33,810). The number of residents within the L_{night} contour of 40 dB(A) increased by 0.2% (from 718,478 to 719,725). The number of inhabitants within the contour has increased by 6,042 (+0.8%) due to changes in population numbers. Compared to the year 2019, the total area is 3.5% smaller (area in 2019 was 35.049 ha) and the population 3.3% higher (population in 2019 was 696,610, based on the population register of 1 January 2022).

4.3.4 L_{den} contours

The size of L_{den} is a composite of L_{day}, $L_{evening}$, and L_{night}, and is reported in increments of 5 dB(A) from 45 dB(A) to 75 dB(A). The evening flight movements are penalised with 5 dB(A) and the night flight movements with 10 dB(A). In accordance with the regulations in Brussels Airport's new environmental permit, these contours are now reported starting at 45 dB(A), whereas in previous years, they were reported from 55 dB(A). The evolution of the contours for 2019, 2023 and 2024 is shown in Figure 15 where only the 45 dB(A) and 50 dB(A) contours are presented.

The modified form is a weighted combination of all the effects that have been dealt with in detail in the discussion of the L_{day}, $L_{evening}$ and L_{night} contours. The findings for the different periods are confirmed.

Noise levels in 2024 have generally increased slightly compared to 2023. This does not apply to the noise levels in the extension of runway 01/19, as the use of runway 01/19 has decreased. All other changes are the same for the day, evening and night, which is reflected in the L_{den} contour.

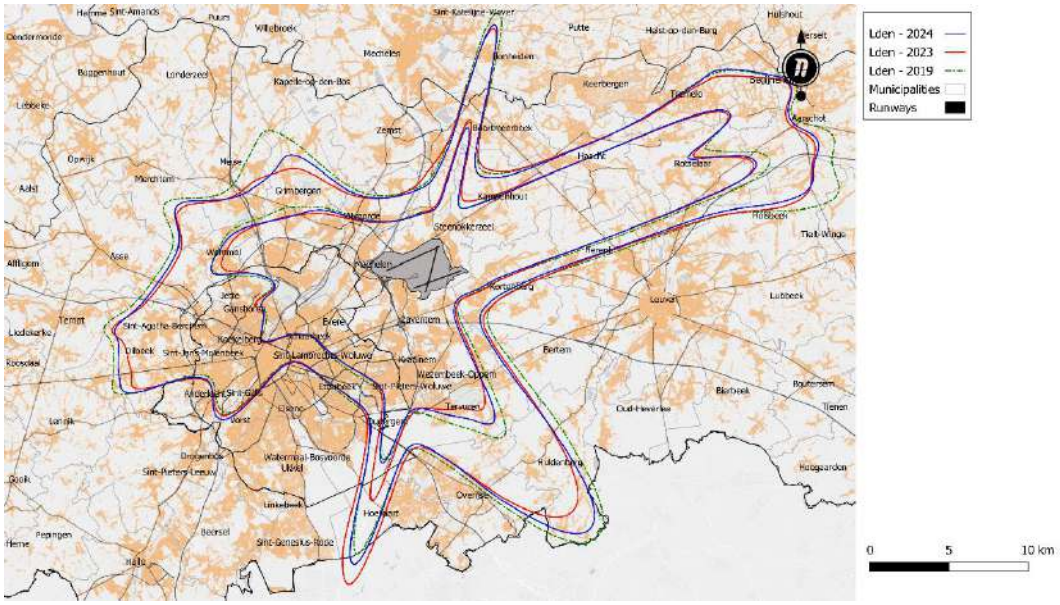


Figure 15: L_{den} noise contours of 45 and 50 dB(A) around Brussels Airport in 2019 (green), 2023 (red) and 2024 (blue).

The total surface area within the L_{den} noise contour of 45 dB(A) decreased in 2024 by 1.5% compared with 2023 (from 52,996 ha to 52,203 ha). The number of residents within the L_{den} contour of 45 dB(A) increased by 1.7% (from 1,180,661 to 1,200,242). The number of inhabitants within the contour has increased by 8,758 (+0.7%) due to changes in population numbers. Compared to the year 2019, the total area is 9.3% smaller (area in 2019 was 57.527 ha) and the population 2.3% higher (population in 2019 was 1,117,804, based on the population register of 1 January 2022).

4.3.5 Freq.70,day – contours (day 07:00 - 19:00)

The Freq.70,day contours are calculated over the evaluation period consisting of the same evaluation period as L_{day}. This differs from previous years, where the frequency contours were calculated for the combined day and evening periods. Figure 16 therefore shows only the 2024 frequency contours where noise levels of 70 dB(A) or more occurred on average 5x and 10x per day during the daytime period (07:00 - 19:00).

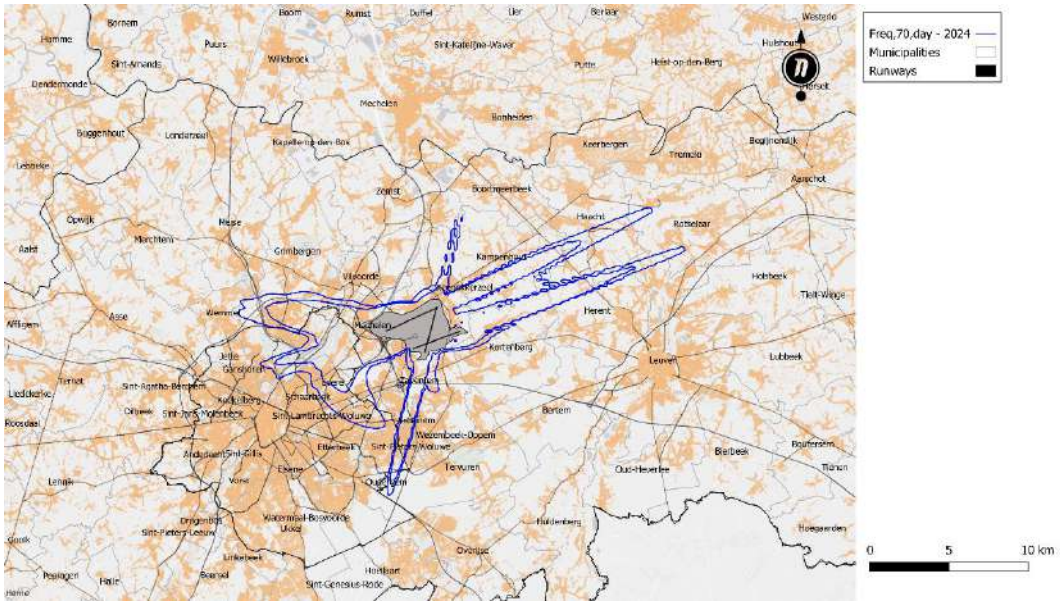


Figure 16: Freq.70,day contours (5x and 10x above 70 dB(A)) around Brussels Airport for 2024

The total surface area within the '5x above 70 dB(A)' Freq.70.day contour in 2024 is 11,040 ha. The number of residents within this contour is 202,631 based on the housing stock on 1 January 2025. The number of inhabitants within the contour has increased by 3,160 (+1.6%) due to changes in population numbers.

4.3.6 Freq.70,evening– contours (evening 19:00 - 23:00)

The Freq.70,evening contours are calculated over the evaluation period consisting of the same evaluation period as $L_{evening}$. This differs from previous years, where the frequency contours were calculated for the combined day and evening periods. The Freq.70,evening contours were, however, previously calculated for 2019.

Figure 17 shows the frequency contours of both 2019 and 2024 where noise levels of 70 dB(A) or more occurred on average once and 5x per evening during the evening period (19:00 - 23:00).

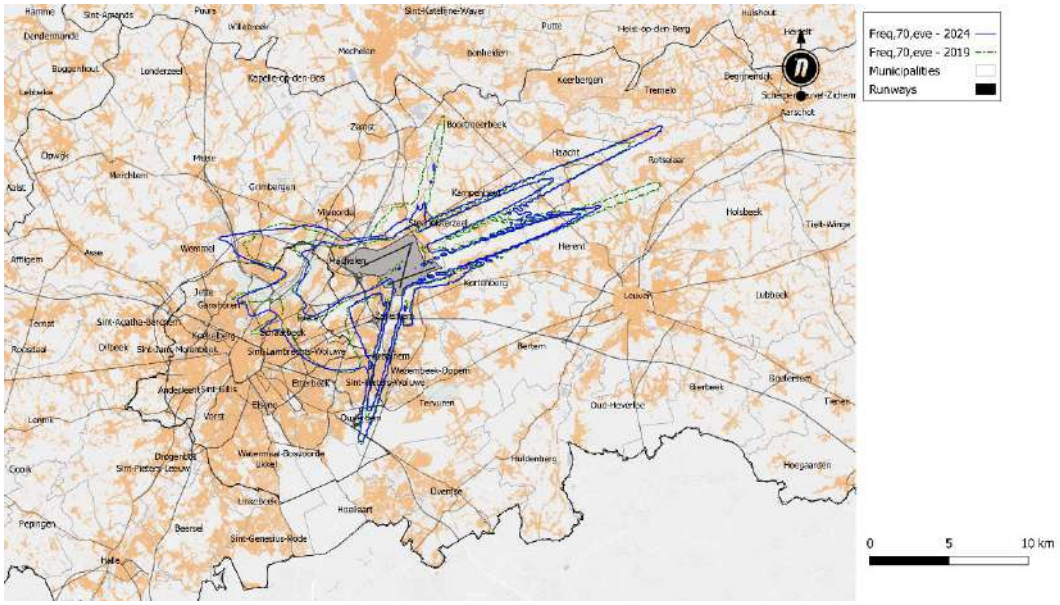


Figure 17: Freq.70,evening contours (1x and 5x above 70 dB(A)) around Brussels Airport in 2019 (green) and 2024 (blue).

The total surface area within the '1x above 70 dB(A)' Freq.70.evening contour in 2024 is 13,043 ha. The number of residents within this contour is 274,045 based on the housing stock on 1 January 2025. The number of inhabitants within the contour has increased by 3,028 (+1.1%) due to changes in population numbers. Compared to 2019, the total area is 8.9% smaller (area in 2019 was 11,973 ha) and the number of residents 14.2% lower (number of residents in 2019 was 240,060 based on the population file of 1 January 2022).

4.3.7 Freq.70,night contours (night 23:00-07:00)

The Freq.70,night contours are calculated for the same evaluation period as the L_{night}. The evolution of the Freq.70,night contours reflects the general changes in traffic numbers, the changes in the runway usage and the changes in the fleet that were discussed for L_{night}. The figure shows the contours of 2019, 2023 and 2024 where an average noise level of 70 dB(A) occurred 1x and 5x per day during the night period (23:00 to 7:00 hours).

The frequency concentrations of 2023 and 2024 are often overlapping, similarly to the development of the L_{night} noise levels. Due to an increase in the number of landings at 25R and 25L, the contours east of the airport increased.

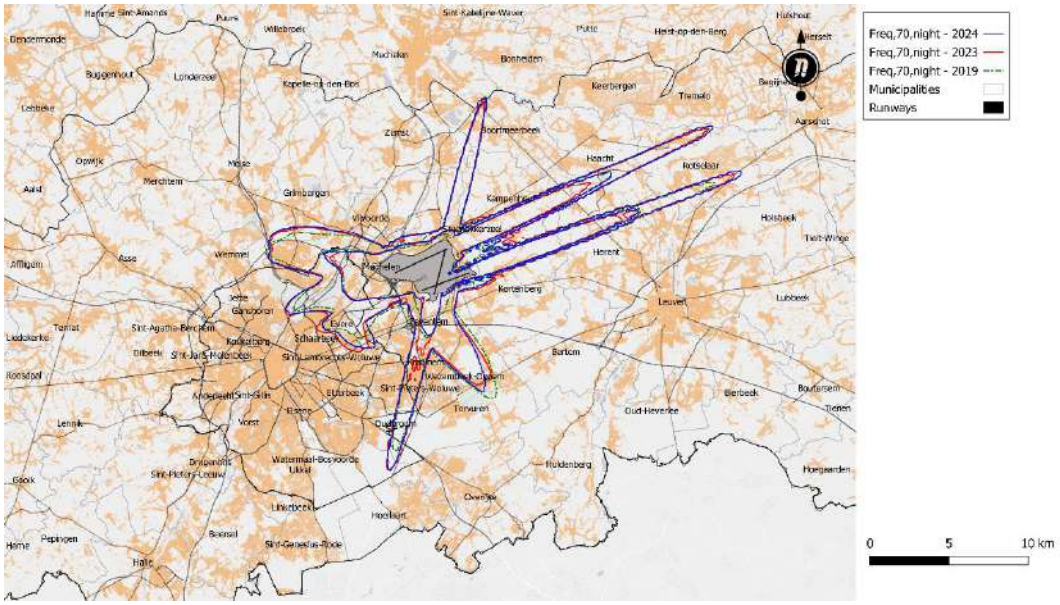


Figure 18: Freq.70,night contours (1x and 5x above 70 dB(A)) around Brussels Airport in 2019 (green), 2023 (red) and 2024 (blue).

The total surface area within the '1x above 70 dB(A)' Freq.70,night contour in 2024 increased by 0.3% compared to 2023 (from 12,570 ha to 12,612 ha). The number of residents within this contour has decreased by 11.0% (from 191,060 to 170,060). The number of inhabitants within the contour has increased by 2,017 (+1.2%) due to changes in population numbers. Compared to 2019, the total area is 5.8% smaller (area in 2019 was 11,920 ha) and the number of residents 20.1% lower (number of residents in 2019 was 141,583 based on the population file of 1 January 2022).

4.3.8 Freq.60,day contours (day 07:00-19:00)

The Freq.60,day contours are calculated over the evaluation period consisting of the same evaluation period as L_{day}. This differs from previous years, where the frequency contours were calculated for the combined day and evening periods. Figure 16 therefore shows only the 2024 frequency contours where noise levels of 60 dB(A) or more occurred on average 50x and 100x per day during the daytime period (07:00 - 19:00).

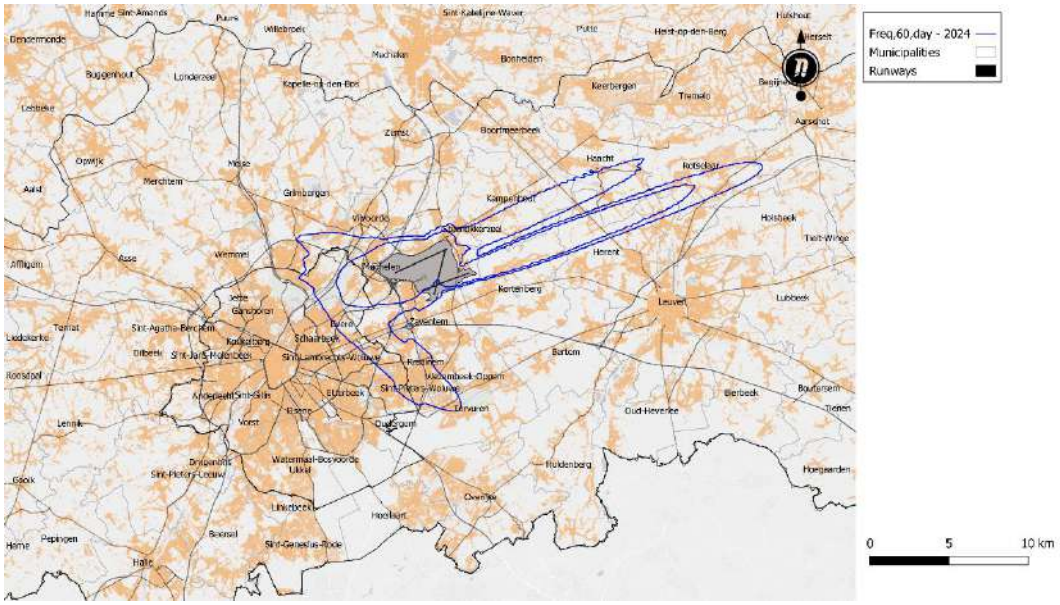


Figure 19: Freq.60,day contours (50x and 100x above 60 dB(A)) around Brussels Airport 2024

The total surface area within the '50x above 60 dB(A)' Freq.60,day contour in 2024 is 12,189 ha. The number of residents within this contour is 177,500 based on the housing stock on 1 January 2025. The number of inhabitants within the contour has increased by 2,547 (+1.5%) due to changes in population numbers.

4.3.9 Freq.60,evening– contours (evening 19:00 - 23:00)

The Freq.60,evening contours are calculated over the evaluation period consisting of the same evaluation period as $L_{evening}$. This differs from previous years, where the frequency contours were calculated for the combined day and evening periods. The Freq.60,evening contours were, however, previously calculated for 2019.

Figure 20 shows the frequency contours of both 2019 and 2024 where noise levels of 70 dB(A) or more occurred on average 10x and 15x per evening during the evening period (19:00 - 23:00).

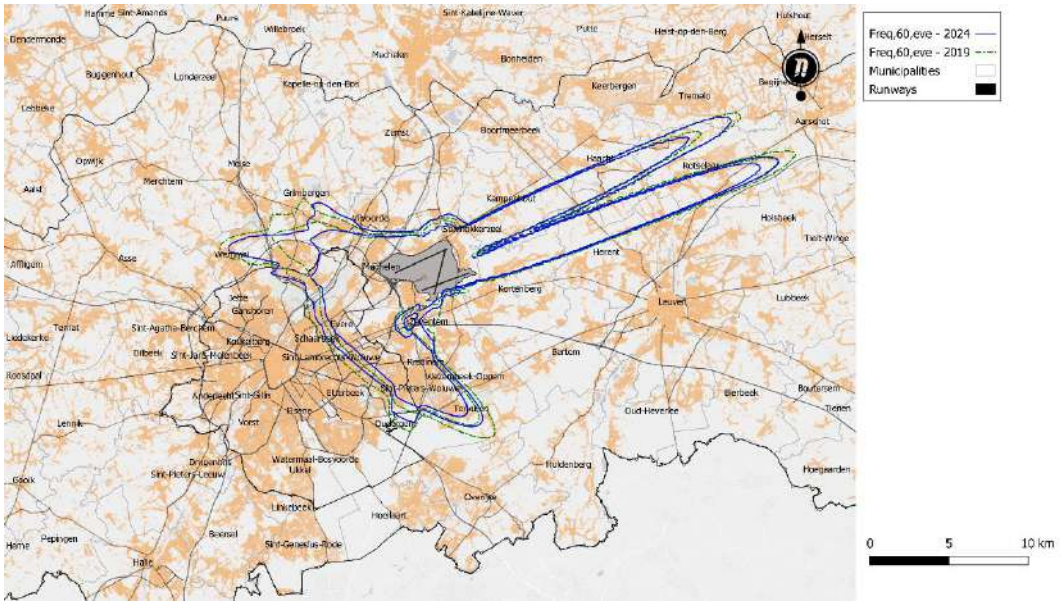


Figure 20: Freq.60,evening contours (10x and 15x above 60 dB(A)) around Brussels Airport in 2019 (green) and 2024 (blue)

The total surface area within the '10x above 60 dB(A)' Freq.60,evening contour in 2024 is 17,799 ha. The number of residents within this contour is 309,099 based on the housing stock on 1 January 2025. The number of inhabitants within the contour has increased by 4,050 (+1.3%) due to changes in population numbers. Compared to the year 2019, the total area is 9.6% smaller (area in 2019 was 19.688 ha) and the number of inhabitants is 7.6% lower (population in 2019 was 334.372, based on the population register of 1 January 2022).

4.3.10 Freq.60,night - contours (night 23:00-07:00)

The Freq.60,night contours are calculated for the same evaluation period as the L_{night}. The evolution of the Freq.60,night contours reflects the general changes in traffic numbers, changes in the runway usage and the changes in the fleet. The figure shows the contours where on average a noise level of 60 dB(A) occurs 10x and 15x per day during the night period (23:00 to 07:00).

To the east of the airport, frequency contours increase due to the increasing number of landings. This is offset by the visible decrease in the contour south of the airport. North of the airport there are no contours of 10x or higher as there were on average less than 10 events per day between 23:00 and 07:00 hours.

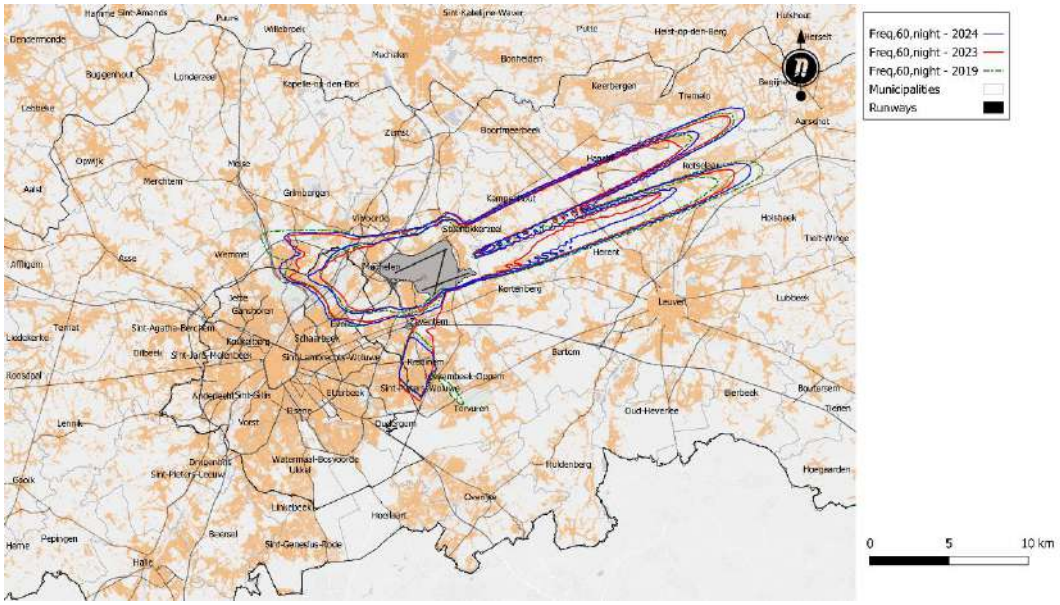


Figure 21: Freq.60,night contours (10x and 15x above 60 dB(A)) around Brussels Airport in 2019 (green), 2023 (red) and 2024 (blue).

The total surface area within the '10x above 60 dB(A)' Freq.60.night contour in 2024 increased by 6.6% compared to 2023 (from 12,980 ha to 13,838 ha). The number of residents within this contour has risen by 16.4% (from 138,855 to 161,591). The number of inhabitants within the contour has increased by 1,778 (+1.1%) due to changes in population numbers. Compared to the year 2019, the total area is 2.6% smaller (area in 2019 was 14.204 ha) and the population 3.2% higher (population in 2019 was 156,569, based on the population register of 1 January 2022).

4.4 Health effects

4.4.1 Number of potentially seriously inconvenienced people

The number of potentially seriously inconvenienced people within the L_{den} 55 dB(A) contour was determined on the basis of the calculated L_{den} and exposure-effect relationship included in Vlarem II (see paragraph 2.2). The number of potentially seriously inconvenienced people is also reported per municipality. This report uses the most recent population figures (1 January 2025).

Table 6 shows the results for the number of potentially seriously inconvenienced people. The results are also shown graphically in

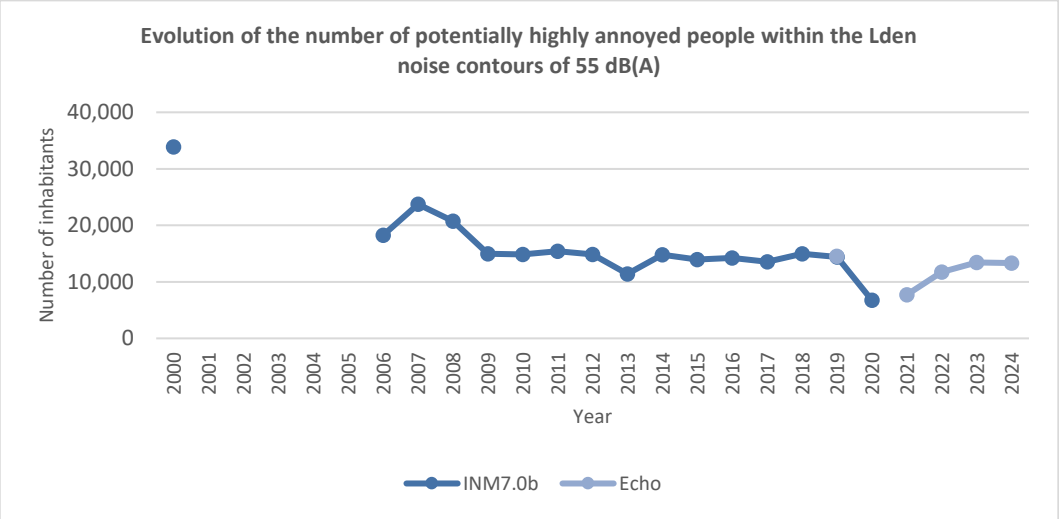


Figure 22. Table 6 shows that the year 2019 has been modelled both with INM7.0b (official noise contours reporting 2019) and later resumed with Echo (comparability with contours from 2021).

The total number of potentially seriously inconvenienced persons in 2024 within the contour of 55 dB(A) is 13,323, a decrease of 0.8% in comparison to 2023. The number of potentially seriously inconvenienced people within the contour of 55 dB(A) increased by 242 (+1.9%) due to changes in population numbers in 2024.
In nine municipalities, the number of potentially seriously inconvenienced people increased compared to 2023. The largest increases are in the municipalities of Evere (+103), Brussels (+188), Vilvoorde (+175), Machelen (+70), and Zaventem (+57). In the remaining municipality, the number of potentially seriously inconvenienced people actually decreased or remained the same compared to 2023. The largest decreases are in the municipality of Sint-Pieters-Woluwe (-285), Kraainem (-129), Wezembeek-Oppem (-108), Kampenhout (-89) and Steenokkerzeel (-58).

The most exposed municipalities in absolute numbers are Machelen, Zaventem, Steenokkerzeel, Brussels, Evere and Kampenhout, with in total 11.077 potentially seriously inconvenienced or 83.1% of the total number.

Table 6: Evolution of the number of people who are potentially seriously inconvenienced within the L_{den} 55 dB(A) noise contour

Year	2000	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2019	2020	2021	2022	2023	2024
Noise model	INM 7.0b	INM 7.0b	INM 7.0b	INM 7.0b	INM 7.0b	INM 7.0b	INM 7.0b	INM 7.0b	INM 7.0b	INM 7.0b	INM 7.0b	INM 7.0b	INM 7.0b	INM 7.0b	INM 7.0b	Echo	INM 7.0b	Echo	Echo	Echo	Echo
Method	opp	opp	opp	opp	opp	opp	opp	opp	opp	opp	opp	opp	address	address	address	address	address	address	address	address	address
Population data	1jan'00	1jan'03	1jan'06	1jan'07	1jan'07	1jan'08	1jan'08	1jan'10	1jan'10	1jan'10	1jan'11	1jan'11	1jan'16	1jan'17	1jan'19	1jan'22	1jan'20	1jan'22	1jan'23	1jan'24	1jan'25
Brussel	2,441	1,254	1,691	1,447	1,131	1,115	1,061	1,080	928	1,780	1,739	1,789	1,803	1,889	1,898	1,933	959	1,151	1,554	1,830	2,018
Evere	3,648	2,987	3,566	3,325	2,903	2,738	2,599	2,306	1,142	2,975	1,443	1,850	1,505	1,875	1,754	1,902	0	100	1,237	1,542	1,645
Grimbergen	3,111	479	1,305	638	202	132	193	120	0	175	428	517	449	440	485	8	0	0	0	0	0
Haacht	96	103	119	58	36	31	37	37	24	50	115	70	78	66	51	164	2	74	136	152	157
Herent	186	88	140	162	119	115	123	134	107	152	111	161	133	136	136	183	3	88	144	156	160
Huldenberg	112	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kampenhout	529	747	727	582	453	483	461	399	430	469	648	566	457	563	439	632	329	481	635	659	570
Kortenberg	664	548	621	604	512	526	497	422	603	443	366	438	431	521	495	654	101	301	571	618	573
Kraainem	1,453	934	1,373	1,277	673	669	667	500	589	111	368	379	388	524	393	400	22	256	487	524	395
Leuven	70		9	22	2	1	3	5	0	11	0	0	13	18	22	114	0	0	35	47	49
Machelen	3,433	2,411	2,724	2,635	2,439	2,392	2,470	2,573	2,278	2,505	2,598	2,649	3,015	2,995	3,032	2,872	2,194	2,242	2,557	2,825	2,895
Meise	506	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Overijse	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rotselaar	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	78	0	0	0	2	3
Schaarbeek	2,026	995	1,937	1,440	603	1,153	1,652	1,703	76	1,647	354	956	6	165	0	0	0	0	0	0	0
Sint-L.-Woluwe	1,515	382	1,218	994	489	290	196	150	0	0	0	1	142	44	241	16	0	0	0	0	0
Sint-P.-Woluwe	642	411	798	607	396	477	270	82	390	0	79	102	90	338	85	78	0	7	284	356	71
Steenokkerzeel	1,769	1,530	1,584	1,471	1,327	1,351	1,360	1,409	1,455	1,439	1,675	1,525	1,506	1,595	1,545	1,583	1,388	1,298	1,587	1,725	1,667
Tervuren	1,550	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vilvoorde	2,622	1,158	1,483	1,177	894	812	868	851	302	1,012	1,120	1,136	1,146	1,103	1,129	879	139	7	76	352	527
Wemmel	142	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wezembeek-O.	1,818	739	878	670	359	425	408	399	457	172	282	252	268	360	250	302	35	226	401	419	311
Zaventem	5,478	3,490	3,558	3,628	2,411	2,152	2,544	2,716	2,618	1,884	2,638	1,835	2,144	2,315	2,464	2,670	1,582	1,485	2,039	2,225	2,282
Zemst	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Eindtotaal	**33,889**	**18,257**	**23,732**	**20,737**	**14,950**	**14,861**	**15,409**	**14,886**	**11,399**	**14,825**	**13,965**	**14,226**	**13,575**	**14,948**	**14,420**	**14,469**	**6,756**	**7,716**	**11,744**	**13,432**	**13,323**

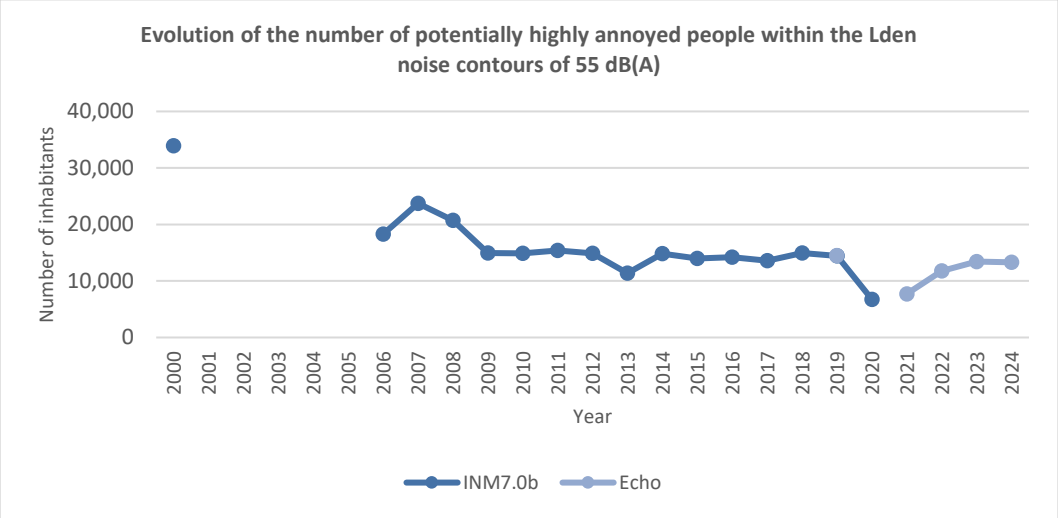


Figure 22: Evolution of the number of potentially seriously inconvenienced people within the L_{den} sound contour of 55 dB(A).

4.4.2 Number of severely inconvenienced

The number of seriously inconvenienced people within the L_{den} contour of 45 dB(A) was determined based on the calculated L_{den} and exposure-effect relationship for serious inconvenience specified by WHO (see paragraph 2.2). The number of seriously inconvenienced is also reported by municipality. This paragraph uses population data as of 1 January 2022 in accordance with the requirements included in the special conditions of the environmental permit. The counts based on the most recent population data are available in Appendix C.3.

Table 7: Evolution of the number of seriously inconvenienced people within the Lden noise contour of 45 dB(A)

Year	2019	2024
Noise model	Echo	Echo
Method	address	address
Population data	1jan'22	1jan'22
Aarschot	832	538
Anderlecht	9,420	10,263
Asse	1,925	1,844
Begijnendijk	653	667
Bertem	33	10
Bonheiden	413	301
Boortmeerbeek	593	520
Brussel	29,164	29,500
Dilbeek	4,056	3,819
Etterbeek	757	570
Evere	11,296	11,037
Ganshoren	3,471	3,338
Graven	1	0
Grimbergen	7,262	6,704
Haacht	1,746	1,703
Herent	1,330	1,106
Hoeilaart	29	32
Holsbeek	369	259
Huldenberg	1,011	822
Jette	8,173	7,901
Kampenhout	2,739	2,665
Kapelle-op-den-Bos	19	0
Koekelberg	3,049	3,122
Kortenberg	3,286	2,981
Kraainem	3,468	3,400
Leuven	1,376	1,159
Machelen	5,877	5,787
Mechelen	89	78
Meise	1,396	890
Merchtem	293	222
Oudergem	152	83
Overijse	758	544
Rotselaar	3,705	3,536
Schaarbeek	24,094	24,040
Sint-Agatha-Berchem	2,855	2,892
Sint-Gillis	937	1,427
Sint-Jans-Molenbeek	14,260	14,352
Sint-Joost-ten-Node	3,210	3,304
Sint-Katelijne-Waver	3	0
Sint-Lambrechts-Woluwe	11,679	11,028
Sint-Pieters-Woluwe	6,732	6,291
Steenokkerzeel	3,843	3,865
Ternat	1	0
Tervuren	4,136	3,843
Tielt-Winge	4	0
Tremelo	956	964
Vilvoorde	8,806	8,483
Vorst	779	1,278
Waver	1	0
Wemmel	3,156	3,115
Wezembeek-Oppem	3,371	3,306
Zaventem	10,070	9,653
Zemst	109	80
Eindtotaal	**207,741**	**203,322**

4.4.3 Number of seriously sleep disturbed people

The number of seriously sleep disturbed people within the L_{night} noise contour of 40 dB(A) was determined based on the calculated L_{night} and exposure-effect relationship for serious sleep disturbance specified by WHO (see paragraph 2.2). The number of seriously sleep disturbed people is also reported by municipality. This uses population data as of 1 January 2022 The counts based on the most recent population data are available in Appendix C.3.

Table 8: Evolution of the number of seriously sleep disturbed people within the L_{night} 40 dB(A) noise contour

Year	2019	2024
Noise model	Echo	Echo
Method	address	address
Population data	1jan'22	1jan'22
Aarschot	240	192
Anderlecht	78	351
Asse	1,203	1,252
Begijnendijk	296	365
Bertem	5	0
Bonheiden	152	1
Boortmeerbeek	399	384
Brussel	16,309	17,041
Dilbeek	1	193
Evere	6,676	6,678
Grimbergen	3,958	3,791
Haacht	1,042	1,048
Herent	628	531
Hoeilaart	2	7
Holsbeek	39	2
Huldenberg	373	277
Jette	2,971	3,782
Kampenhout	1,659	1,675
Koekelberg	1,236	1,308
Kortenberg	1,664	1,473
Kraainem	2,119	2,120
Leuven	672	505
Machelen	3,508	3,513
Mechelen	58	48
Meise	150	148
Overijse	141	118
Rotselaar	2,462	2,388
Schaarbeek	12,714	13,047
Sint-Jans-Molenbeek	6,905	7,039
Sint-Joost-ten-Node	478	593
Sint-Lambrechts-Woluwe	5,615	5,127
Sint-Pieters-Woluwe	2,904	2,660
Steenokkerzeel	2,377	2,482
Tervuren	2,936	2,492
Tremelo	448	459
Vilvoorde	5,403	5,118
Wemmel	2,169	2,189
Wezembeek-Oppem	2,169	2,163
Zaventem	6,526	6,289
Zemst	35	32
Eindtotaal	**98,723**	**98,882**

Annex A. Runway usage

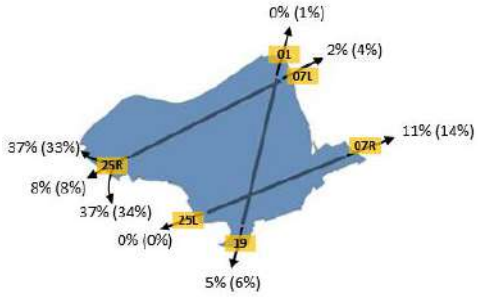
This appendix gives a complete description of the runway usage. The number of departures and arrivals are given for each runway, both absolute or percentage-wise, for 2024 and place against those for 2023, for:

- The total
- The day period, from 07:00 to 19:00
- The evening period, from 19:00 to 23:00
- The night period, from 23:00 to 07:00

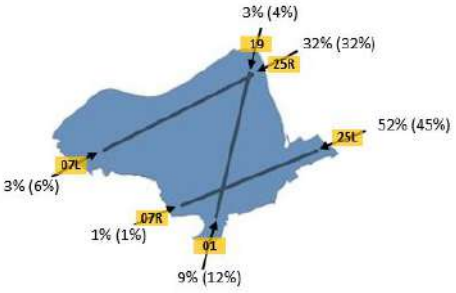
The figures give the share of departures and arrivals for each runway, with runway usage in 2023 between brackets. The tables also give the absolute number of movements.

Total runway usage: all flights day, evening and night.

Departures



Arrivals

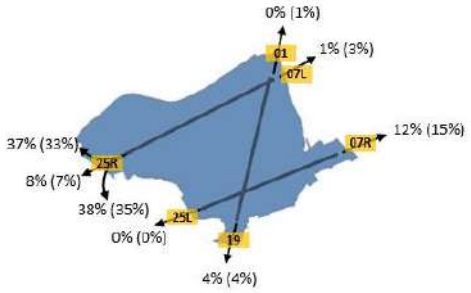


All flights (day, evening, and night)				
Departures				
	Quantity		Proportion	
Runway	2023	2024	2023	2024
01	858	199	0.9%	0.2%
07L	3,977	2,132	4.1%	2.1%
07R	13,717	10,702	14.3%	10.8%
19	5,290	5,052	5.5%	5.1%
25L	77	69	0.1%	0.1%
25R	72,202	81,152	75.1%	81.7%

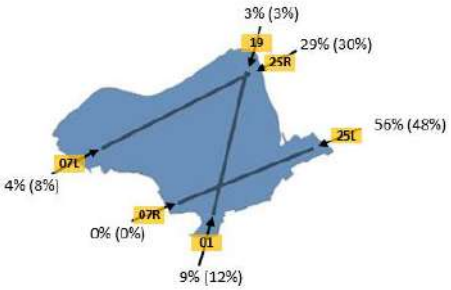
All flights (day, evening, and night)				
Arrivals				
	Quantity		Proportion	
Runway	2023	2024	2023	2024
01	11,995	9,054	12.5%	9.1%
07L	5,523	3,257	5.7%	3.3%
07R	726	594	0.8%	0.6%
19	3,377	2,843	3.5%	2.9%
25L	43,474	51,679	45.2%	52.0%
25R	31,041	31,884	32.3%	32.1%

Runway usage for the day period, from 07:00 to 19:00

Departures



Arrivals

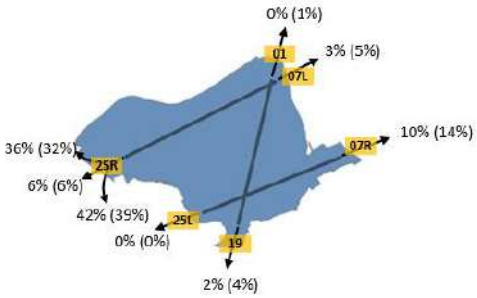


Day flights Departures				
	Quantity		Proportion	
Runway	2023	2024	2023	2024
01	637	119	1.0%	0.2%
07L	2,119	889	3.4%	1.4%
07R	9,707	7,925	15.4%	12.1%
19	2,711	2,782	4.3%	4.2%
25L	45	8	0.1%	0.0%
25R	47,614	53,979	75.8%	82.2%

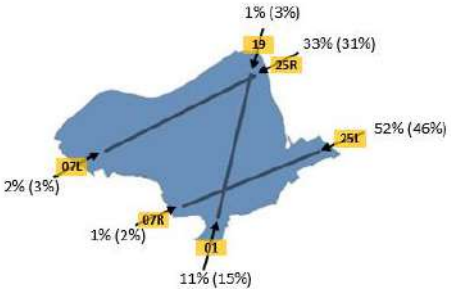
Day flights Arrivals				
	Quantity		Proportion	
Runway	2023	2024	2023	2024
01	7,280	5,797	11.7%	8.9%
07L	4,781	2,731	7.7%	4.2%
07R	64	46	0.1%	0.1%
19	1,878	1,654	3.0%	2.5%
25L	29,820	36,013	47.8%	55.5%
25R	18,573	18,632	29.8%	28.7%

Runway usage for the evening period, from 19:00 to 23:00

Departures



Arrivals

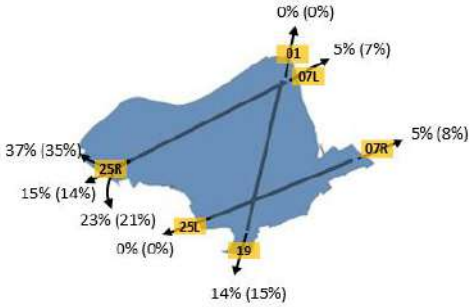


Evening flights Departures				
	Quantity		Proportion	
Runway	2023	2024	2023	2024
01	192	79	0.9%	0.4%
07L	997	631	4.6%	2.9%
07R	3,070	2,193	14.3%	10.2%
19	865	528	4.0%	2.5%
25L	0	1	0.0%	0.0%
25R	16,374	18,064	76.2%	84.0%

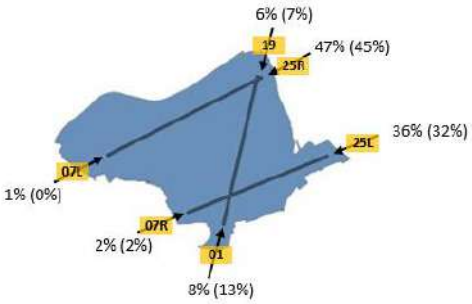
Evening flights Arrivals				
	Quantity		Proportion	
Runway	2023	2024	2023	2024
01	2,955	2,214	14.7%	10.6%
07L	691	418	3.4%	2.0%
07R	358	309	1.8%	1.5%
19	521	308	2.6%	1.5%
25L	9,303	10,759	46.1%	51.6%
25R	6,333	6,837	31.4%	32.8%

Runway usage for the night period from 23:00 to 07:00

Departures



Arrivals



Night flights				
Departures				
	Quantity		Proportion	
Runway	2023	2024	2023	2024
01	29	1	0.2%	0.0%
07L	861	612	7.3%	5.1%
07R	940	584	8.0%	4.8%
19	1,714	1,742	14.5%	14.4%
25L	32	60	0.3%	0.5%
25R	8,214	9,109	69.7%	75.2%

Night flights				
Arrivals				
	Quantity		Porportion	
Runway	2023	2024	2023	2024
01	1,760	1,043	13.0%	7.7%
07L	51	108	0.4%	0.8%
07R	304	239	2.2%	1.8%
19	978	881	7.2%	6.5%
25L	4,351	4,907	32.0%	36.1%
25R	6,135	6,415	45.2%	47.2%

Annex B. Location of the measuring stations

This appendix gives the locations of the measuring station.

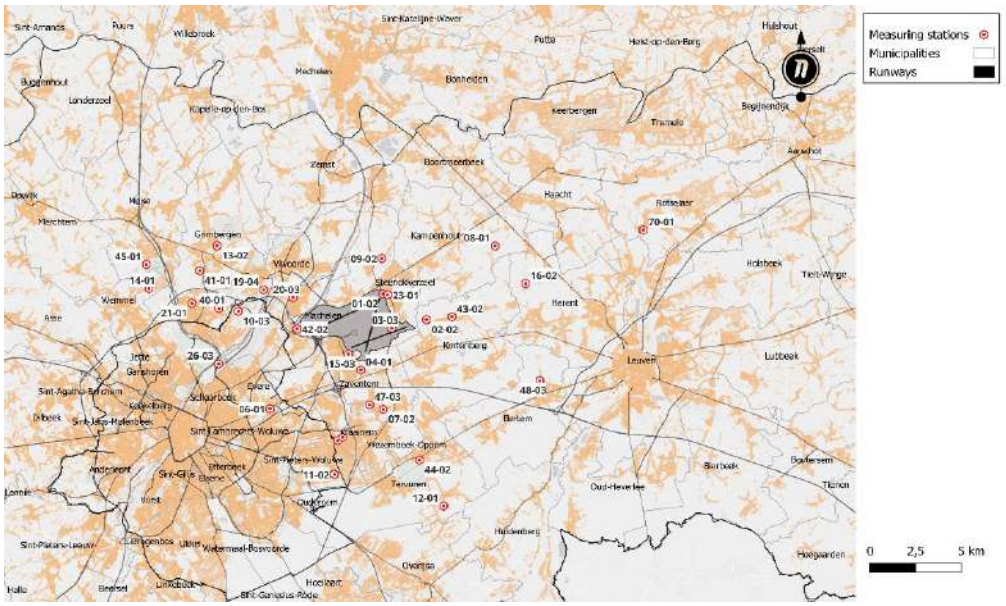


Figure 19: Location of the measuring stations

Table 9: Overview of the measuring stations

Location code	Location name
01-02	Steenokkerzeel
02-02	Kortenberg
03-03	Hummelgem
04-01	Nossegem
06-01	Evere
07-02	Sterrebeek
08-01	Kampenhout
09-02	Perk
10-03	Neder-Over-Heembeek
11-02	Sint-Pieters-Woluwe
12-01	Duisburg
13-02	Grimbergen
14-01	Wemmel
15-03	Zaventem
16-02	Veltem
19-04	Vilvoorde
20-03	Machelen
21-01	Stroombeek-Bever
23-01	Steenokkerzeel
24-01	Kraainem
26-03	Schaarbeek

Location code	Location name
40-02*	Koningslo
41-01*	Grimbergen
42-02*	Diegem
43-02*	Erps-Kwerps
44-02*	Tervuren
45-01*	Meise
46-02*	Wezembeek-Oppem
47-03*	Sterrebeek
48-03*	Bertem
70-01*	Rotselaar

*noise data Department Environment off-line correlated by NMS

Annex C. Results of contour calculations, 2024

This appendix gives the number of residents per contour zone and per municipality.

C.1 Surface area per contour zone and per municipality

Table 10: Surface area per L_{day} contour zone and municipality 2024

Area (ha)	Lday - contour zones in dB(A) (d. 07h-19h)					
Municipality	**55-60**	**60-65**	**65-70**	**70-75**	**>75**	**Totaal**
Brussel	589	28	0	0	0	**618**
Evere	11	0	0	0	0	**11**
Haacht	47	0	0	0	0	**47**
Herent	261	0	0	0	0	**261**
Kampenhout	325	39	0	0	0	**364**
Kortenberg	394	178	35	1	0	**608**
Kraainem	9	0	0	0	0	**9**
Machelen	398	290	111	35	0	**834**
Steenokkerzeel	453	282	185	94	75	**1,090**
Vilvoorde	14	0	0	0	0	**14**
Wezembeek-Oppem	5	0	0	0	0	**5**
Zaventem	357	110	43	23	8	**540**
Total	**2,862**	**928**	**374**	**153**	**83**	**4,400**

Table 11: Surface area per $L_{evening}$ contour zone and municipality 2024

Area (ha)	Levening - contour zones in dB(A) (ev. 19h-23h)						
Municipality	**50-55**	**55-60**	**60-65**	**65-70**	**70-75**	**>75**	**Totaal**
Brussel	624	452	5	0	0	0	**1,080**
Evere	485	0	0	0	0	0	**485**
Grimbergen	21	0	0	0	0	0	**21**
Haacht	700	0	0	0	0	0	**700**
Herent	607	177	0	0	0	0	**784**
Kampenhout	992	361	54	0	0	0	**1,407**
Kortenberg	494	359	132	21	0	0	**1,006**
Kraainem	365	19	0	0	0	0	**384**
Leuven	249	0	0	0	0	0	**249**
Machelen	258	450	270	90	33	1	**1,104**
Rotselaar	225	0	0	0	0	0	**225**
Schaarbeek	72	0	0	0	0	0	**72**
Sint-Lambrechts-Woluwe	287	0	0	0	0	0	**287**
Sint-Pieters-Woluwe	203	0	0	0	0	0	**203**
Steenokkerzeel	444	461	275	180	84	69	**1,514**
Tervuren	20	0	0	0	0	0	**20**
Vilvoorde	558	4	0	0	0	0	**562**
Wezembeek-Oppem	169	6	0	0	0	0	**175**
Zaventem	880	381	100	40	20	4	**1,425**
Total	**7,654**	**2,670**	**836**	**332**	**137**	**74**	**11,703**

Table 12: Surface area per L_{night} contour zone and municipality 2024

Area (ha)	Lnight - contour zones in dB(A) (n. 23h-07h)							
Municipality	**40-45**	**45-50**	**50-55**	**55-60**	**60-65**	**65-70**	**>70**	**Totaal**
Aarschot	454	0	0	0	0	0	0	**454**
Anderlecht	20	0	0	0	0	0	0	**20**
Asse	514	0	0	0	0	0	0	**514**
Begijnendijk	519	0	0	0	0	0	0	**519**
Bonheiden	39	0	0	0	0	0	0	**39**
Boortmeerbeek	329	0	0	0	0	0	0	**329**
Brussel	1,274	775	420	0	0	0	0	**2,470**
Dilbeek	187	0	0	0	0	0	0	**187**
Evere	147	365	0	0	0	0	0	**513**
Ganshoren	18	0	0	0	0	0	0	**18**
Grimbergen	1,124	319	0	0	0	0	0	**1,442**
Haacht	648	921	122	0	0	0	0	**1,691**
Herent	378	729	258	0	0	0	0	**1,365**
Hoeilaart	128	0	0	0	0	0	0	**128**
Holsbeek	28	0	0	0	0	0	0	**28**
Huldenberg	654	0	0	0	0	0	0	**654**
Jette	322	0	0	0	0	0	0	**322**
Kampenhout	742	950	565	180	13	0	0	**2,450**
Koekelberg	51	0	0	0	0	0	0	**51**
Kortenberg	541	471	338	140	25	0	0	**1,516**
Kraainem	343	214	28	0	0	0	0	**586**
Leuven	195	276	0	0	0	0	0	**471**
Machelen	20	265	511	259	66	26	3	**1,150**
Mechelen	118	0	0	0	0	0	0	**118**
Meise	147	0	0	0	0	0	0	**147**
Oudergem	165	0	0	0	0	0	0	**165**
Overijse	281	0	0	0	0	0	0	**281**
Rotselaar	2,454	967	0	0	0	0	0	**3,421**
Schaarbeek	573	33	0	0	0	0	0	**606**
Sint-Agatha-Berchem	0	0	0	0	0	0	0	**0**
Sint-Jans-Molenbeek	296	0	0	0	0	0	0	**296**
Sint-Joost-Ten-Node	38	0	0	0	0	0	0	**38**
Sint-Lambrechts-Woluwe	574	8	0	0	0	0	0	**582**
Sint-Pieters-Woluwe	313	129	0	0	0	0	0	**442**
Steenokkerzeel	315	520	502	280	241	115	72	**2,047**
Tervuren	2,357	26	0	0	0	0	0	**2,383**
Tremelo	608	0	0	0	0	0	0	**608**
Vilvoorde	560	616	17	0	0	0	0	**1,194**
Watermaal-Bosvoorde	158	0	0	0	0	0	0	**158**
Wemmel	815	0	0	0	0	0	0	**815**
Wezembeek-Oppem	413	255	18	0	0	0	0	**686**
Zaventem	707	1,269	504	217	53	23	1	**2,773**
Zemst	107	26	0	0	0	0	0	**132**
Total	**19,675**	**9,134**	**3,285**	**1,077**	**398**	**165**	**76**	**33,810**

Table 13: Surface area per L_{den} contour zone and municipality 2024

Area (ha)	Lden - contour zones in dB(A) (d. 07h-19h, ev. 19h-23h, n. 23h-07h)							
Municipality	**45-50**	**50-55**	**55-60**	**60-65**	**65-70**	**70-75**	**>75**	**Totaal**
Aarschot	1,349	41	0	0	0	0	0	**1,390**
Anderlecht	807	0	0	0	0	0	0	**807**
Asse	1,006	0	0	0	0	0	0	**1,006**
Begijnendijk	938	47	0	0	0	0	0	**985**
Bertem	84	0	0	0	0	0	0	**84**
Bonheiden	288	0	0	0	0	0	0	**288**
Boortmeerbeek	381	41	0	0	0	0	0	**422**
Brussel	796	1,025	783	195	0	0	0	**2,799**
Dilbeek	2,471	0	0	0	0	0	0	**2,471**
Etterbeek	48	0	0	0	0	0	0	**48**
Evere	0	274	239	0	0	0	0	**513**
Ganshoren	243	0	0	0	0	0	0	**243**
Graven	1	0	0	0	0	0	0	**1**
Grimbergen	1,465	1,154	0	0	0	0	0	**2,619**
Haacht	424	891	579	0	0	0	0	**1,894**
Herent	529	608	533	67	0	0	0	**1,737**
Hoeilaart	697	0	0	0	0	0	0	**697**
Holsbeek	866	0	0	0	0	0	0	**866**
Huldenberg	2,288	0	0	0	0	0	0	**2,288**
Jette	519	0	0	0	0	0	0	**519**
Kampenhout	871	848	801	327	49	0	0	**2,896**
Koekelberg	119	0	0	0	0	0	0	**119**
Kortenberg	734	490	416	303	85	9	0	**2,038**
Kraainem	8	425	153	0	0	0	0	**586**
Leuven	323	190	187	0	0	0	0	**700**
Machelen	0	110	374	414	181	54	17	**1,150**
Mechelen	175	0	0	0	0	0	0	**175**
Meise	746	22	0	0	0	0	0	**769**
Merchtem	523	0	0	0	0	0	0	**523**
Oudergem	314	88	0	0	0	0	0	**402**
Overijse	1,658	0	0	0	0	0	0	**1,658**
Rotselaar	1,090	2,542	54	0	0	0	0	**3,686**
Schaarbeek	320	470	0	0	0	0	0	**790**
Sint-Agatha-Berchem	294	0	0	0	0	0	0	**294**
Sint-Gillis	88	0	0	0	0	0	0	**88**
Sint-Jans-Molenbeek	586	15	0	0	0	0	0	**601**
Sint-Joost-Ten-Node	118	0	0	0	0	0	0	**118**
Sint-Lambrechts-Woluwe	178	551	0	0	0	0	0	**729**
Sint-Pieters-Woluwe	413	364	26	0	0	0	0	**802**
Steenokkerzeel	400	359	554	384	261	173	130	**2,260**
Terhulpen	43	0	0	0	0	0	0	**43**
Tervuren	2,216	1,079	0	0	0	0	0	**3,295**
Tremelo	1,013	148	0	0	0	0	0	**1,161**
Vilvoorde	676	646	308	0	0	0	0	**1,630**
Vorst	132	0	0	0	0	0	0	**132**
Waterloo	1	0	0	0	0	0	0	**1**
Watermaal-Bosvoorde	252	24	0	0	0	0	0	**276**
Waver	64	0	0	0	0	0	0	**64**
Wemmel	464	413	0	0	0	0	0	**877**
Wezembeek-Oppem	0	579	107	0	0	0	0	**686**
Zaventem	132	1,435	710	352	92	40	14	**2,774**
Zemst	144	61	0	0	0	0	0	**205**
Total	**29,293**	**14,940**	**5,823**	**2,042**	**667**	**277**	**160**	**53,203**

Table 14: Surface area per Freq.70,day contour zone and municipality 2024

Area (ha)	Freq.70,day - contour zones (day 07h-19h)					
Municipality	**5-10**	**10-20**	**20-50**	**50-100**	**>100**	**Totaal**
Brussel	274	430	545	112	0	**1,362**
Evere	231	265	16	0	0	**512**
Grimbergen	420	123	0	0	0	**543**
Haacht	366	92	42	0	0	**500**
Herent	151	68	71	143	27	**460**
Kampenhout	655	179	433	102	0	**1,368**
Kortenberg	229	147	123	130	335	**965**
Kraainem	32	162	0	0	0	**195**
Leuven	129	8	0	0	0	**137**
Machelen	72	87	221	218	348	**946**
Rotselaar	141	0	0	0	0	**141**
Schaarbeek	129	0	0	0	0	**129**
Sint-Lambrechts-Woluwe	367	0	0	0	0	**367**
Sint-Pieters-Woluwe	38	87	0	0	0	**125**
Steenokkerzeel	216	62	467	240	428	**1,412**
Tervuren	45	28	0	0	0	**73**
Vilvoorde	119	349	20	0	0	**487**
Wemmel	5	0	0	0	0	**5**
Wezembeek-Oppem	23	110	0	0	0	**133**
Zaventem	439	254	376	46	54	**1,168**
Zemst	11	0	0	0	0	**11**
Total	**4,092**	**2,451**	**2,314**	**991**	**1,191**	**11,040**

Table 15: Surface area per Freq.70, evening contour zone and municipality 2024

Area (ha)	Freq,70,evening - contour zones in dB(A) (av. 19h-23h)				
Municipality	**1-5**	**5-10**	**10-20**	**>20**	**Totaal**
Brussel	800	357	178	24	**1,360**
Evere	420	93	0	0	**513**
Grimbergen	371	0	0	0	**371**
Haacht	422	53	1	0	**476**
Herent	193	45	64	121	**422**
Kampenhout	778	159	465	16	**1,418**
Kortenberg	411	96	78	409	**994**
Kraainem	503	137	0	0	**640**
Machelen	134	177	200	484	**995**
Oudergem	16	0	0	0	**16**
Rotselaar	231	0	0	0	**231**
Schaarbeek	439	0	0	0	**439**
Sint-Lambrechts-Woluwe	583	0	0	0	**583**
Sint-Pieters-Woluwe	142	63	0	0	**204**
Steenokkerzeel	272	356	249	576	**1,453**
Tervuren	100	5	0	0	**105**
Vilvoorde	564	20	0	0	**585**
Wezembeek-Oppem	51	92	0	0	**143**
Zaventem	1,522	350	141	83	**2,095**
Total	**7,949**	**2,004**	**1,375**	**1,714**	**13,043**

Table 16: Surface area per Freq.70,night contour zone and municipality 2024

Area (ha)	Freq.70,night - contour zones (night 23h-07h)					
Municipality	**1-5**	**5-10**	**10-20**	**20-50**	**>50**	**Totaal**
Boortmeerbeek	189	0	0	0	0	**189**
Brussel	804	323	98	0	0	**1,226**
Evere	427	0	0	0	0	**427**
Grimbergen	519	0	0	0	0	**519**
Haacht	295	229	28	0	0	**552**
Herent	161	164	183	0	0	**507**
Kampenhout	489	183	610	0	0	**1,282**
Kortenberg	224	104	454	0	0	**782**
Kraainem	231	0	0	0	0	**231**
Leuven	160	1	0	0	0	**161**
Machelen	236	200	252	327	0	**1,014**
Oudergem	77	0	0	0	0	**77**
Rotselaar	637	0	0	0	0	**637**
Schaarbeek	40	0	0	0	0	**40**
Sint-Lambrechts-Woluwe	49	0	0	0	0	**49**
Sint-Pieters-Woluwe	160	0	0	0	0	**160**
Steenokkerzeel	620	188	419	438	0	**1,665**
Tervuren	223	0	0	0	0	**223**
Vilvoorde	562	21	0	0	0	**583**
Watermaal-Bosvoorde	37	0	0	0	0	**37**
Wezembeek-Oppem	229	0	0	0	0	**229**
Zaventem	1,268	434	161	71	0	**1,933**
Zemst	87	0	0	0	0	**87**
Total	**7,725**	**1,847**	**2,204**	**836**	**0**	**12,612**

Table 17: Surface area per Freq.60,day contour zone and municipality 2024

Area (ha)	Freq.60,day - contour zones (day 07h-19h)				
Municipality	**50-100**	**100-150**	**150-200**	**>200**	**Totaal**
Aarschot	15	0	0	0	**15**
Brussel	667	390	31	0	**1,088**
Evere	371	0	0	0	**371**
Grimbergen	70	0	0	0	**70**
Haacht	542	243	0	0	**785**
Herent	277	637	0	0	**914**
Kampenhout	1,165	62	0	0	**1,227**
Kortenberg	136	802	0	0	**937**
Kraainem	447	0	0	0	**447**
Leuven	82	244	0	0	**326**
Machelen	194	469	413	0	**1,076**
Rotselaar	781	148	0	0	**929**
Sint-Lambrechts-Woluwe	306	0	0	0	**306**
Sint-Pieters-Woluwe	180	0	0	0	**180**
Steenokkerzeel	340	434	479	150	**1,403**
Tervuren	166	0	0	0	**166**
Vilvoorde	438	0	0	0	**438**
Wezembeek-Oppem	397	0	0	0	**397**
Zaventem	737	145	231	0	**1,114**
Total	**7,310**	**3,575**	**1,154**	**150**	**12,189**

Table 18: Surface area per Freq.60, evening contour zone and municipality 2024

Area (ha)	Freq,60,evening - contour zones in dB(A) (av. 19h-23h)				
Municipality	**10-15**	**15-20**	**20-30**	**>30**	**Totaal**
Aarschot	125	4	0	0	**129**
Begijnendijk	7	0	0	0	**7**
Brussel	273	200	318	454	**1,244**
Evere	94	183	235	0	**513**
Grimbergen	876	36	0	0	**912**
Haacht	179	447	266	234	**1,126**
Herent	115	69	213	618	**1,015**
Kampenhout	254	239	1,030	61	**1,585**
Kortenberg	78	46	90	788	**1,002**
Kraainem	56	179	342	0	**577**
Leuven	16	15	69	233	**334**
Machelen	41	51	111	934	**1,138**
Rotselaar	663	589	485	105	**1,842**
Schaarbeek	146	0	0	0	**146**
Sint-Lambrechts-Woluwe	160	151	212	0	**523**
Sint-Pieters-Woluwe	177	87	140	0	**403**
Steenokkerzeel	219	87	213	1,110	**1,629**
Tervuren	337	207	50	0	**594**
Tremelo	82	0	0	0	**82**
Vilvoorde	419	211	122	1	**753**
Wemmel	118	0	0	0	**118**
Wezembeek-Oppem	119	149	313	0	**580**
Zaventem	405	211	537	392	**1,545**
Total	**4,960**	**3,161**	**4,748**	**4,930**	**17,799**

Table 19: Surface area per Freq.60,night contour zone and municipality 2024

Area (ha)	Freq.60,night - contour zones (night 23h-07h)				
Municipality	**10-15**	**15-20**	**20-30**	**>30**	**Totaal**
Begijnendijk	79	0	0	0	**79**
Brussel	358	508	326	0	**1,192**
Evere	193	14	0	0	**207**
Grimbergen	180	0	0	0	**180**
Haacht	243	982	0	0	**1,225**
Herent	575	484	2	0	**1,061**
Kampenhout	98	1,250	314	1	**1,663**
Kortenberg	193	767	31	0	**991**
Kraainem	270	0	0	0	**270**
Leuven	213	123	0	0	**337**
Machelen	108	146	830	51	**1,135**
Rotselaar	1,283	585	0	0	**1,867**
Sint-Pieters-Woluwe	48	0	0	0	**48**
Steenokkerzeel	110	197	582	733	**1,622**
Tremelo	184	0	0	0	**184**
Vilvoorde	539	50	0	0	**589**
Wezembeek-Oppem	231	0	0	0	**231**
Zaventem	337	127	203	290	**956**
Total	**5,243**	**5,234**	**2,287**	**1,075**	**13,838**

C.2 Number of inhabitants per contour zone and per municipality based on housing stock 01-01-2025

Table 20: Number of inhabitants per L_{day} contour zone and municipality 2024

Number of inhabitants	Lday - contour zones in dB(A) (d. 07h-19h)					
Municipality	**55-60**	**60-65**	**65-70**	**70-75**	**>75**	**Totaal**
Brussel	7,291	393	0	0	0	**7,684**
Evere	258	0	0	0	0	**258**
Haacht	7	0	0	0	0	**7**
Herent	695	0	0	0	0	**695**
Kampenhout	693	166	0	0	0	**859**
Kortenberg	2,026	310	2	0	0	**2,338**
Kraainem	36	0	0	0	0	**36**
Machelen	5,798	4,950	118	0	0	**10,866**
Steenokkerzeel	4,687	779	123	0	0	**5,589**
Vilvoorde	89	0	0	0	0	**89**
Wezembeek-Oppem	7	0	0	0	0	**7**
Zaventem	4,187	432	0	0	0	**4,619**
Total	**25,774**	**7,030**	**243**	**0**	**0**	**33,047**

Table 21: Number of inhabitants per $L_{evening}$ contour zone and municipality 2024

Number of inhabitants	Levening - contour zones in dB(A) (ev. 19h-23h)						
Municipality	**50-55**	**55-60**	**60-65**	**65-70**	**70-75**	**>75**	**Totaal**
Brussel	10,512	7,208	106	0	0	0	**17,826**
Evere	42,802	0	0	0	0	0	**42,802**
Grimbergen	972	0	0	0	0	0	**972**
Haacht	1,854	0	0	0	0	0	**1,854**
Herent	888	407	0	0	0	0	**1,295**
Kampenhout	3,685	828	186	0	0	0	**4,699**
Kortenberg	2,835	1,581	175	0	0	0	**4,591**
Kraainem	10,499	98	0	0	0	0	**10,597**
Leuven	895	0	0	0	0	0	**895**
Machelen	5,623	6,394	4,297	52	0	0	**16,366**
Rotselaar	832	0	0	0	0	0	**832**
Schaarbeek	13,741	0	0	0	0	0	**13,741**
Sint-Lambrechts-Woluwe	17,679	0	0	0	0	0	**17,679**
Sint-Pieters-Woluwe	9,227	0	0	0	0	0	**9,227**
Steenokkerzeel	3,802	4,382	693	161	0	0	**9,038**
Vilvoorde	12,081	15	0	0	0	0	**12,096**
Wezembeek-Oppem	4,442	8	0	0	0	0	**4,450**
Zaventem	16,418	5,817	301	0	0	0	**22,536**
Total	**158,787**	**26,738**	**5,758**	**213**	**0**	**0**	191,496

Table 22: Number of inhabitants per L_{night} contour zone and municipality 2024

Number of inhabitants	Lnight - contour zones in dB(A) (n. 23h-07h)							
Municipality	**40-45**	**45-50**	**50-55**	**55-60**	**60-65**	**65-70**	**>70**	**Totaal**
Aarschot	1,619	0	0	0	0	0	0	**1,619**
Anderlecht	3,191	0	0	0	0	0	0	**3,191**
Asse	11,465	0	0	0	0	0	0	**11,465**
Begijnendijk	3,067	0	0	0	0	0	0	**3,067**
Bonheiden	7	0	0	0	0	0	0	**7**
Boortmeerbeek	3,086	0	0	0	0	0	0	**3,086**
Brussel	105,126	18,499	6,524	0	0	0	0	**130,149**
Dilbeek	1,748	0	0	0	0	0	0	**1,748**
Evere	17,016	28,010	0	0	0	0	0	**45,026**
Grimbergen	12,947	14,349	0	0	0	0	0	**27,296**
Haacht	3,126	3,704	34	0	0	0	0	**6,864**
Herent	1,447	1,280	639	0	0	0	0	**3,366**
Hoeilaart	63	0	0	0	0	0	0	**63**
Holsbeek	17	0	0	0	0	0	0	**17**
Huldenberg	2,391	0	0	0	0	0	0	**2,391**
Jette	33,027	0	0	0	0	0	0	**33,027**
Kampenhout	3,823	4,230	1,574	376	125	0	0	**10,128**
Koekelberg	11,071	0	0	0	0	0	0	**11,071**
Kortenberg	5,670	2,449	1,587	191	0	0	0	**9,897**
Kraainem	8,276	5,511	170	0	0	0	0	**13,957**
Leuven	2,581	1,091	0	0	0	0	0	**3,672**
Machelen	7	4,812	8,681	3,045	25	0	0	**16,570**
Mechelen	433	0	0	0	0	0	0	**433**
Meise	1,164	0	0	0	0	0	0	**1,164**
Oudergem	2	0	0	0	0	0	0	**2**
Overijse	1,001	0	0	0	0	0	0	**1,001**
Rotselaar	12,244	5,026	0	0	0	0	0	**17,270**
Schaarbeek	91,610	5,415	0	0	0	0	0	**97,025**
Sint-Agatha-Berchem	8	0	0	0	0	0	0	**8**
Sint-Jans-Molenbeek	56,468	0	0	0	0	0	0	**56,468**
Sint-Joost-ten-Node	4,889	0	0	0	0	0	0	**4,889**
Sint-Lambrechts-Woluwe	41,152	443	0	0	0	0	0	**41,595**
Sint-Pieters-Woluwe	14,913	4,546	0	0	0	0	0	**19,459**
Steenokkerzeel	1,861	2,714	5,281	1,866	329	12	0	**12,063**
Tervuren	19,887	0	0	0	0	0	0	**19,887**
Tremelo	3,832	0	0	0	0	0	0	**3,832**
Vilvoorde	22,939	14,318	94	0	0	0	0	**37,351**
Watermaal-Bosvoorde	1	0	0	0	0	0	0	**1**
Wemmel	17,971	0	0	0	0	0	0	**17,971**
Wezembeek-Oppem	8,922	5,657	157	0	0	0	0	**14,736**
Zaventem	7,721	19,659	9,044	230	0	0	0	**36,654**
Zemst	179	60	0	0	0	0	0	**239**
Total	**537,968**	**141,773**	**33,785**	**5,708**	**479**	**12**	**0**	**719,725**

Table 23: Number of inhabitants per L_{den} contour zone and municipality 2024

Number of inhabitants	Lden - contour zones in dB(A) (d. 07h-19h, ev. 19h-23h, n. 23h-07h)							
Municipality	**45-50**	**50-55**	**55-60**	**60-65**	**65-70**	**70-75**	**>75**	**Totaal**
Aarschot	4,016	189	0	0	0	0	0	**4,205**
Anderlecht	92,955	0	0	0	0	0	0	**92,955**
Asse	13,370	0	0	0	0	0	0	**13,370**
Begijnendijk	4,748	188	0	0	0	0	0	**4,936**
Bertem	111	0	0	0	0	0	0	**111**
Bonheiden	2,943	0	0	0	0	0	0	**2,943**
Boortmeerbeek	3,813	20	0	0	0	0	0	**3,833**
Brussel	96,869	64,444	7,904	5,209	0	0	0	**174,426**
Dilbeek	34,209	0	0	0	0	0	0	**34,209**
Etterbeek	5,551	0	0	0	0	0	0	**5,551**
Evere	0	31,078	13,949	0	0	0	0	**45,027**
Ganshoren	25,577	0	0	0	0	0	0	**25,577**
Grimbergen	11,306	23,592	0	0	0	0	0	**34,898**
Haacht	2,915	4,194	1,361	0	0	0	0	**8,470**
Herent	3,333	1,520	1,080	28	0	0	0	**5,961**
Hoeilaart	255	0	0	0	0	0	0	**255**
Holsbeek	2,454	0	0	0	0	0	0	**2,454**
Huldenberg	6,748	0	0	0	0	0	0	**6,748**
Jette	54,027	0	0	0	0	0	0	**54,027**
Kampenhout	3,545	4,366	2,803	732	175	0	0	**11,621**
Koekelberg	22,556	0	0	0	0	0	0	**22,556**
Kortenberg	8,104	3,540	2,503	1,060	62	0	0	**15,269**
Kraainem	0	10,649	3,308	0	0	0	0	**13,957**
Leuven	5,418	1,413	431	0	0	0	0	**7,262**
Machelen	0	1,225	6,851	7,520	965	9	0	**16,570**
Mechelen	690	0	0	0	0	0	0	**690**
Meise	6,748	564	0	0	0	0	0	**7,312**
Merchtem	2,043	0	0	0	0	0	0	**2,043**
Oudergem	791	0	0	0	0	0	0	**791**
Overijse	4,329	0	0	0	0	0	0	**4,329**
Rotselaar	3,268	14,376	28	0	0	0	0	**17,672**
Schaarbeek	56,729	73,377	0	0	0	0	0	**130,106**
Sint-Agatha-Berchem	25,767	0	0	0	0	0	0	**25,767**
Sint-Gillis	13,639	0	0	0	0	0	0	**13,639**
Sint-Jans-Molenbeek	96,004	2,095	0	0	0	0	0	**98,099**
Sint-Joost-ten-Node	26,804	0	0	0	0	0	0	**26,804**
Sint-Lambrechts-Woluwe	23,047	37,628	0	0	0	0	0	**60,675**
Sint-Pieters-Woluwe	17,837	16,680	664	0	0	0	0	**35,181**
Steenokkerzeel	1,448	1,890	4,697	3,521	644	152	0	**12,352**
Tervuren	11,103	11,938	0	0	0	0	0	**23,041**
Tremelo	6,989	451	0	0	0	0	0	**7,440**
Vilvoorde	17,618	21,694	4,789	0	0	0	0	**44,101**
Vorst	12,838	0	0	0	0	0	0	**12,838**
Watermaal-Bosvoorde	1	0	0	0	0	0	0	**1**
Waver	4	0	0	0	0	0	0	**4**
Wemmel	5,318	12,850	0	0	0	0	0	**18,168**
Wezembeek-Oppem	0	12,250	2,485	0	0	0	0	**14,735**
Zaventem	523	20,883	11,091	4,157	0	0	0	**36,654**
Zemst	511	98	0	0	0	0	0	**609**
Total	**738,872**	**373,192**	**63,944**	**22,227**	**1,846**	**161**	**0**	**1,200,242**

Table 24: Number of residents per Freq.70,day contour zone and municipality 2024

Number of inhabitants	Freq.70,day - contour zones (day 07h-19h)					
Municipality	**5-10**	**10-20**	**20-50**	**50-100**	**>100**	**Totaal**
Brussel	16,531	4,573	5,697	2,462	20	**29,283**
Evere	27,270	17,548	209	0	0	**45,027**
Grimbergen	7,111	8,973	0	0	0	**16,084**
Haacht	1,136	89	4	0	0	**1,229**
Herent	117	118	248	364	11	**858**
Kampenhout	1,896	511	1,037	313	0	**3,757**
Kortenberg	1,855	906	619	847	740	**4,967**
Kraainem	613	3,566	0	0	0	**4,179**
Leuven	256	47	0	0	0	**303**
Machelen	2,052	2,007	2,653	3,656	3,310	**13,678**
Rotselaar	106	0	0	0	0	**106**
Schaarbeek	18,248	0	0	0	0	**18,248**
Sint-Lambrechts-Woluwe	25,025	0	0	0	0	**25,025**
Sint-Pieters-Woluwe	2,199	2,003	0	0	0	**4,202**
Steenokkerzeel	1,382	1,234	3,644	1,509	291	**8,060**
Vilvoorde	2,410	8,696	77	0	0	**11,183**
Wemmel	5	0	0	0	0	**5**
Wezembeek-Oppem	807	2,510	0	0	0	**3,317**
Zaventem	7,009	1,886	2,646	1,151	397	**13,089**
Zemst	31	0	0	0	0	**31**
Total	**116,059**	**54,667**	**16,834**	**10,302**	**4,769**	**202,631**

Table 25: Number of residents per Freq.70,evening contour zone and municipality 2024

Number of inhabitants	Freq.70,evening - contour zones (eve. 19h-23h)				
Municipality	**1-5**	**5-10**	**10-20**	**>20**	**Totaal**
Brussel	20,927	2,709	4,594	326	**28,556**
Evere	38,324	6,703	0	0	**45,027**
Grimbergen	14,130	0	0	0	**14,130**
Haacht	1,259	14	0	0	**1,273**
Herent	186	123	339	123	**771**
Kampenhout	2,926	615	1,127	21	**4,689**
Kortenberg	2,658	474	398	1,306	**4,836**
Kraainem	2,180	2,936	0	0	**5,116**
Machelen	3,126	2,457	3,274	5,506	**14,363**
Rotselaar	1,188	0	0	0	**1,188**
Schaarbeek	59,332	0	0	0	**59,332**
Sint-Lambrechts-Woluwe	43,412	0	0	0	**43,412**
Sint-Pieters-Woluwe	7,115	1,020	0	0	**8,135**
Steenokkerzeel	2,677	2,837	1,961	1,407	**8,882**
Vilvoorde	13,194	96	0	0	**13,290**
Wezembeek-Oppem	1,579	2,020	0	0	**3,599**
Zaventem	12,438	1,900	1,972	1,136	**17,446**
Total	**226,651**	**23,904**	**13,665**	**9,825**	**274,045**

Table 26: Number of residents per Freq.70,night contour zone and municipality 2024

Number of inhabitants	Freq.70,night - contour zones (night 23h-07h)				
Municipality	**1-5**	**5-10**	**10-20**	**>20**	**Totaal**
Boortmeerbeek	1,820	0	0	0	**1,820**
Brussel	10,649	4,130	2,392	0	**17,171**
Evere	34,557	0	0	0	**34,557**
Grimbergen	15,944	0	0	0	**15,944**
Haacht	1,188	218	12	0	**1,418**
Herent	197	310	470	0	**977**
Kampenhout	1,368	576	1,646	0	**3,590**
Kortenberg	1,190	666	1,515	0	**3,371**
Kraainem	5,170	0	0	0	**5,170**
Leuven	315	0	0	0	**315**
Machelen	4,498	2,794	5,003	2,106	**14,401**
Rotselaar	3,435	0	0	0	**3,435**
Schaarbeek	6,102	0	0	0	**6,102**
Sint-Lambrechts-Woluwe	1,522	0	0	0	**1,522**
Sint-Pieters-Woluwe	5,721	0	0	0	**5,721**
Steenokkerzeel	3,633	1,819	2,506	1,496	**9,454**
Tervuren	1,251	0	0	0	**1,251**
Vilvoorde	13,094	97	0	0	**13,191**
Wezembeek-Oppem	4,888	0	0	0	**4,888**
Zaventem	18,630	4,232	2,209	572	**25,643**
Zemst	119	0	0	0	**119**
Total	**135,291**	**14,842**	**15,753**	**4,174**	**170,060**

Table 27: Number of residents per Freq.60,day contour zone and municipality 2024

Number of inhabitants	Freq.60,day - contour zones (day 07h-19h)				
Municipality	**50-100**	**100-150**	**150-200**	**>200**	**Totaal**
Aarschot	31	0	0	0	**31**
Brussel	17,511	6,661	311	0	**24,483**
Evere	26,408	0	0	0	**26,408**
Grimbergen	1,206	0	0	0	**1,206**
Haacht	1,863	322	0	0	**2,185**
Herent	556	1,114	0	0	**1,670**
Kampenhout	3,993	17	0	0	**4,010**
Kortenberg	529	3,816	0	0	**4,345**
Kraainem	11,818	0	0	0	**11,818**
Leuven	501	868	0	0	**1,369**
Machelen	3,335	7,185	5,243	0	**15,763**
Rotselaar	6,333	815	0	0	**7,148**
Sint-Lambrechts-Woluwe	17,344	0	0	0	**17,344**
Sint-Pieters-Woluwe	9,367	0	0	0	**9,367**
Steenokkerzeel	2,435	4,017	2,112	0	**8,564**
Tervuren	5,017	0	0	0	**5,017**
Vilvoorde	6,694	0	0	0	**6,694**
Wezembeek-Oppem	9,579	0	0	0	**9,579**
Zaventem	13,059	2,875	4,565	0	**20,499**
Totaal	**137,579**	**27,690**	**12,231**	**0**	**177,500**

Table 28: Number of residents per Freq.60,evening contour zone and municipality 2024

Number of inhabitants	Freq.60,evening - contour zones (eve. 19h-23h)				
Municipality	**10-15**	**15-20**	**20-30**	**>30**	**Totaal**
Aarschot	519	0	0	0	**519**
Begijnendijk	24	0	0	0	**24**
Brussel	19,531	7,796	1,737	6,847	**35,911**
Evere	9,465	21,496	14,065	0	**45,026**
Grimbergen	19,590	1,285	0	0	**20,875**
Haacht	913	2,159	610	307	**3,989**
Herent	383	184	373	1,101	**2,041**
Kampenhout	825	1,231	3,525	14	**5,595**
Kortenberg	181	176	313	3,771	**4,441**
Kraainem	509	4,441	9,006	0	**13,956**
Leuven	85	90	449	787	**1,411**
Machelen	286	1,000	2,166	13,115	**16,567**
Rotselaar	2,909	3,347	4,514	398	**11,168**
Schaarbeek	18,420	0	0	0	**18,420**
Sint-Lambrechts-Woluwe	11,906	12,288	10,050	0	**34,244**
Sint-Pieters-Woluwe	6,527	3,548	7,728	0	**17,803**
Steenokkerzeel	1,476	479	1,375	6,736	**10,066**
Tervuren	1,595	6,735	455	0	**8,785**
Tremelo	156	0	0	0	**156**
Vilvoorde	15,461	2,579	1,831	0	**19,871**
Wemmel	1,007	0	0	0	**1,007**
Wezembeek-Oppem	2,393	2,292	8,234	0	**12,919**
Zaventem	3,054	6,462	7,137	7,652	**24,305**
Total	**117,215**	**77,588**	**73,568**	**40,728**	**309,099**

Table 29: Number of residents per Freq.60,night contour zone and municipality 2024

Number of inhabitants	Freq.60,night - contour zones (night 23h-07h)				
Municipality	**10-15**	**15-20**	**20-30**	**>30**	**Totaal**
Begijnendijk	301	0	0	0	**301**
Brussel	21,920	9,266	6,142	0	**37,328**
Evere	16,821	681	0	0	**17,502**
Grimbergen	4,400	0	0	0	**4,400**
Haacht	1,134	3,151	0	0	**4,285**
Herent	1,070	1,087	0	0	**2,157**
Kampenhout	1,327	3,687	1,345	0	**6,359**
Kortenberg	925	3,423	0	0	**4,348**
Kraainem	7,535	0	0	0	**7,535**
Leuven	1,181	259	0	0	**1,440**
Machelen	1,509	2,796	12,258	4	**16,567**
Rotselaar	7,991	2,968	0	0	**10,959**
Sint-Pieters-Woluwe	3,947	0	0	0	**3,947**
Steenokkerzeel	720	941	3,359	4,979	**9,999**
Tremelo	630	0	0	0	**630**
Vilvoorde	12,640	175	0	0	**12,815**
Wezembeek-Oppem	6,544	0	0	0	**6,544**
Zaventem	3,005	2,576	3,320	5,574	**14,475**
Total	**93,600**	**31,010**	**26,424**	**10,557**	**161,591**

C.3 Number of seriously inconvenienced and seriously sleep disturbed people per contour zone and per municipality based on WHO guideline

Table 30: Number of seriously inconvenienced people Lden contour zone per municipality 2024 based on housing stock 01-01-2025 and WHO guideline

Number of severely annoyed people	Lden - contour zones in dB(A) (d. 07h-19h, av. 19h-23h, n. 23h-07h)							
Municipality	**45-50**	**50-55**	**55-60**	**60-65**	**65-70**	**70-75**	**>75**	**Totaal**
Aarschot	509	35	0	0	0	0	0	**544**
Anderlecht	10,625	0	0	0	0	0	0	**10,625**
Asse	1,970	0	0	0	0	0	0	**1,970**
Begijnendijk	644	35	0	0	0	0	0	**679**
Bertem	11	0	0	0	0	0	0	**11**
Bonheiden	312	0	0	0	0	0	0	**312**
Boortmeerbeek	544	4	0	0	0	0	0	**548**
Brussel	13,336	13,392	2,383	1,977	0	0	0	**31,088**
Dilbeek	3,928	0	0	0	0	0	0	**3,928**
Etterbeek	593	0	0	0	0	0	0	**593**
Evere	0	7,564	4,023	0	0	0	0	**11,587**
Ganshoren	3,386	0	0	0	0	0	0	**3,386**
Grimbergen	1,565	5,425	0	0	0	0	0	**6,990**
Haacht	377	962	388	0	0	0	0	**1,727**
Herent	425	343	346	11	0	0	0	**1,125**
Hoeilaart	32	0	0	0	0	0	0	**32**
Holsbeek	267	0	0	0	0	0	0	**267**
Huldenberg	826	0	0	0	0	0	0	**826**
Jette	8,076	0	0	0	0	0	0	**8,076**
Kampenhout	500	992	851	290	87	0	0	**2,720**
Koekelberg	3,224	0	0	0	0	0	0	**3,224**
Kortenberg	1,122	768	778	415	30	0	0	**3,113**
Kraainem	0	2,468	960	0	0	0	0	**3,428**
Leuven	730	319	122	0	0	0	0	**1,171**
Machelen	0	309	2,178	3,076	457	5	0	**6,025**
Mechelen	85	0	0	0	0	0	0	**85**
Meise	797	104	0	0	0	0	0	**901**
Merchtem	225	0	0	0	0	0	0	**225**
Oudergem	82	0	0	0	0	0	0	**82**
Overijse	540	0	0	0	0	0	0	**540**
Rotselaar	530	3,130	8	0	0	0	0	**3,668**
Schaarbeek	8,585	15,268	0	0	0	0	0	**23,853**
Sint-Agatha-Berchem	2,932	0	0	0	0	0	0	**2,932**
Sint-Gillis	1,403	0	0	0	0	0	0	**1,403**
Sint-Jans-Molenbeek	13,957	379	0	0	0	0	0	**14,336**
Sint-Joost-ten-Node	3,290	0	0	0	0	0	0	**3,290**
Sint-Lambrechts-Woluwe	3,532	8,064	0	0	0	0	0	**11,596**
Sint-Pieters-Woluwe	2,501	3,699	182	0	0	0	0	**6,382**
Steenokkerzeel	219	430	1,516	1,395	316	88	0	**3,964**
Tervuren	1,638	2,245	0	0	0	0	0	**3,883**
Tremelo	895	85	0	0	0	0	0	**980**
Vilvoorde	2,632	4,879	1,329	0	0	0	0	**8,840**
Vorst	1,271	0	0	0	0	0	0	**1,271**
Watermaal-Bosvoorde	0	0	0	0	0	0	0	**0**
Wemmel	892	2,446	0	0	0	0	0	**3,338**
Wezembeek-Oppem	0	2,680	740	0	0	0	0	**3,420**
Zaventem	85	4,970	3,390	1,601	0	0	0	**10,046**
Zemst	59	21	0	0	0	0	0	**80**
Total	**99,152**	**81,016**	**19,194**	**8,765**	**890**	**93**	**0**	**209,110**

Table 31: Number of seriously inconvenienced people Lden contour zone per municipality 2024 based on housing stock 01-01-2022 and WHO guideline

Number of severely annoyed people	Lden - contour zones in dB(A) (d. 07h-19h, av. 19h-23h, n. 23h-07h)							
Municipality	**45-50**	**50-55**	**55-60**	**60-65**	**65-70**	**70-75**	**>75**	**Totaal**
Aarschot	503	35	0	0	0	0	0	**538**
Anderlecht	10,263	0	0	0	0	0	0	**10,263**
Asse	1,844	0	0	0	0	0	0	**1,844**
Begijnendijk	633	34	0	0	0	0	0	**667**
Bertem	10	0	0	0	0	0	0	**10**
Bonheiden	301	0	0	0	0	0	0	**301**
Boortmeerbeek	516	4	0	0	0	0	0	**520**
Brussel	12,854	12,775	2,079	1,792	0	0	0	**29,500**
Dilbeek	3,819	0	0	0	0	0	0	**3,819**
Etterbeek	570	0	0	0	0	0	0	**570**
Evere	0	7,239	3,798	0	0	0	0	**11,037**
Ganshoren	3,338	0	0	0	0	0	0	**3,338**
Grimbergen	1,492	5,212	0	0	0	0	0	**6,704**
Haacht	365	954	384	0	0	0	0	**1,703**
Herent	413	343	340	10	0	0	0	**1,106**
Hoeilaart	32	0	0	0	0	0	0	**32**
Holsbeek	259	0	0	0	0	0	0	**259**
Huldenberg	822	0	0	0	0	0	0	**822**
Jette	7,901	0	0	0	0	0	0	**7,901**
Kampenhout	493	942	844	299	87	0	0	**2,665**
Koekelberg	3,122	0	0	0	0	0	0	**3,122**
Kortenberg	1,062	736	722	435	26	0	0	**2,981**
Kraainem	0	2,465	935	0	0	0	0	**3,400**
Leuven	708	323	128	0	0	0	0	**1,159**
Machelen	0	305	2,040	2,983	455	4	0	**5,787**
Mechelen	78	0	0	0	0	0	0	**78**
Meise	784	106	0	0	0	0	0	**890**
Merchtem	222	0	0	0	0	0	0	**222**
Oudergem	83	0	0	0	0	0	0	**83**
Overijse	544	0	0	0	0	0	0	**544**
Rotselaar	521	3,008	7	0	0	0	0	**3,536**
Schaarbeek	8,666	15,374	0	0	0	0	0	**24,040**
Sint-Agatha-Berchem	2,892	0	0	0	0	0	0	**2,892**
Sint-Gillis	1,427	0	0	0	0	0	0	**1,427**
Sint-Jans-Molenbeek	13,960	392	0	0	0	0	0	**14,352**
Sint-Joost-ten-Node	3,304	0	0	0	0	0	0	**3,304**
Sint-Lambrechts-Woluwe	3,450	7,578	0	0	0	0	0	**11,028**
Sint-Pieters-Woluwe	2,452	3,660	179	0	0	0	0	**6,291**
Steenokkerzeel	207	435	1,494	1,341	310	78	0	**3,865**
Tervuren	1,638	2,205	0	0	0	0	0	**3,843**
Tremelo	873	91	0	0	0	0	0	**964**
Vilvoorde	2,534	4,824	1,125	0	0	0	0	**8,483**
Vorst	1,278	0	0	0	0	0	0	**1,278**
Watermaal-Bosvoorde	0	0	0	0	0	0	0	**0**
Wemmel	858	2,257	0	0	0	0	0	**3,115**
Wezembeek-Oppem	0	2,579	727	0	0	0	0	**3,306**
Zaventem	81	4,788	3,231	1,553	0	0	0	**9,653**
Zemst	60	20	0	0	0	0	0	**80**
Total	**97,232**	**78,684**	**18,033**	**8,413**	**878**	**82**	**0**	**203,322**

Table 32: Number of seriously sleep disturbed people Lnight contour zone per municipality 2024 based on housing stock 01-01-2025 and WHO guideline

Number of severely sleep deprived persons	Lnight - contour zones in dB(A) (n. 23h-07h)							
Municipality	**40-45**	**45-50**	**50-55**	**55-60**	**60-65**	**65-70**	**>70**	**Totaal**
Aarschot	196	0	0	0	0	0	0	**196**
Anderlecht	365	0	0	0	0	0	0	**365**
Asse	1,333	0	0	0	0	0	0	**1,333**
Begijnendijk	375	0	0	0	0	0	0	**375**
Bonheiden	1	0	0	0	0	0	0	**1**
Boortmeerbeek	395	0	0	0	0	0	0	**395**
Brussel	13,451	3,077	1,444	0	0	0	0	**17,972**
Dilbeek	199	0	0	0	0	0	0	**199**
Evere	2,407	4,602	0	0	0	0	0	**7,009**
Grimbergen	1,728	2,243	0	0	0	0	0	**3,971**
Haacht	421	629	7	0	0	0	0	**1,057**
Herent	186	215	133	0	0	0	0	**534**
Hoeilaart	7	0	0	0	0	0	0	**7**
Holsbeek	2	0	0	0	0	0	0	**2**
Huldenberg	279	0	0	0	0	0	0	**279**
Jette	3,845	0	0	0	0	0	0	**3,845**
Kampenhout	500	723	349	104	42	0	0	**1,718**
Koekelberg	1,321	0	0	0	0	0	0	**1,321**
Kortenberg	710	426	351	52	0	0	0	**1,539**
Kraainem	1,176	927	35	0	0	0	0	**2,138**
Leuven	319	182	0	0	0	0	0	**501**
Machelen	1	867	1,968	813	8	0	0	**3,657**
Mechelen	52	0	0	0	0	0	0	**52**
Meise	145	0	0	0	0	0	0	**145**
Oudergem	0	0	0	0	0	0	0	**0**
Overijse	119	0	0	0	0	0	0	**119**
Rotselaar	1,672	802	0	0	0	0	0	**2,474**
Schaarbeek	12,099	826	0	0	0	0	0	**12,925**
Sint-Agatha-Berchem	1	0	0	0	0	0	0	**1**
Sint-Jans-Molenbeek	6,882	0	0	0	0	0	0	**6,882**
Sint-Joost-ten-Node	582	0	0	0	0	0	0	**582**
Sint-Lambrechts-Woluwe	5,362	68	0	0	0	0	0	**5,430**
Sint-Pieters-Woluwe	1,968	724	0	0	0	0	0	**2,692**
Steenokkerzeel	240	483	1,176	522	119	5	0	**2,545**
Tervuren	2,525	0	0	0	0	0	0	**2,525**
Tremelo	468	0	0	0	0	0	0	**468**
Vilvoorde	2,958	2,358	19	0	0	0	0	**5,335**
Wemmel	2,347	0	0	0	0	0	0	**2,347**
Wezembeek-Oppem	1,254	952	32	0	0	0	0	**2,238**
Zaventem	1,122	3,332	2,033	60	0	0	0	**6,547**
Zemst	22	10	0	0	0	0	0	**32**
Total	**69,035**	**23,446**	**7,547**	**1,551**	**169**	**5**	**0**	**101,753**

Table 33: Number of seriously sleep disturbed people Lnight contour zone per municipality 2024 based on housing stock 01-01-2022 and WHO guideline

Number of severely sleep deprived persons	Lnight - contour zones in dB(A) (n. 23h-07h)							
Municipality	**40-45**	**45-50**	**50-55**	**55-60**	**60-65**	**65-70**	**>70**	**Totaal**
Aarschot	192	0	0	0	0	0	0	**192**
Anderlecht	351	0	0	0	0	0	0	**351**
Asse	1,252	0	0	0	0	0	0	**1,252**
Begijnendijk	365	0	0	0	0	0	0	**365**
Bonheiden	1	0	0	0	0	0	0	**1**
Boortmeerbeek	384	0	0	0	0	0	0	**384**
Brussel	12,901	2,832	1,308	0	0	0	0	**17,041**
Dilbeek	193	0	0	0	0	0	0	**193**
Evere	2,257	4,421	0	0	0	0	0	**6,678**
Ganshoren	0	0	0	0	0	0	0	**0**
Grimbergen	1,685	2,106	0	0	0	0	0	**3,791**
Haacht	427	616	5	0	0	0	0	**1,048**
Herent	189	211	131	0	0	0	0	**531**
Hoeilaart	7	0	0	0	0	0	0	**7**
Holsbeek	2	0	0	0	0	0	0	**2**
Huldenberg	277	0	0	0	0	0	0	**277**
Jette	3,782	0	0	0	0	0	0	**3,782**
Kampenhout	475	695	356	107	42	0	0	**1,675**
Koekelberg	1,308	0	0	0	0	0	0	**1,308**
Kortenberg	676	405	340	52	0	0	0	**1,473**
Kraainem	1,172	914	34	0	0	0	0	**2,120**
Leuven	316	189	0	0	0	0	0	**505**
Machelen	1	828	1,844	835	5	0	0	**3,513**
Mechelen	48	0	0	0	0	0	0	**48**
Meise	148	0	0	0	0	0	0	**148**
Oudergem	0	0	0	0	0	0	0	**0**
Overijse	118	0	0	0	0	0	0	**118**
Rotselaar	1,614	774	0	0	0	0	0	**2,388**
Schaarbeek	12,228	819	0	0	0	0	0	**13,047**
Sint-Agatha-Berchem	1	0	0	0	0	0	0	**1**
Sint-Jans-Molenbeek	7,039	0	0	0	0	0	0	**7,039**
Sint-Joost-ten-Node	593	0	0	0	0	0	0	**593**
Sint-Lambrechts-Woluwe	5,086	41	0	0	0	0	0	**5,127**
Sint-Pieters-Woluwe	1,944	716	0	0	0	0	0	**2,660**
Steenokkerzeel	230	488	1,142	504	115	3	0	**2,482**
Tervuren	2,492	0	0	0	0	0	0	**2,492**
Tremelo	459	0	0	0	0	0	0	**459**
Vilvoorde	2,887	2,223	8	0	0	0	0	**5,118**
Wemmel	2,189	0	0	0	0	0	0	**2,189**
Wezembeek-Oppem	1,205	927	31	0	0	0	0	**2,163**
Zaventem	1,060	3,207	1,966	56	0	0	0	**6,289**
Zemst	23	9	0	0	0	0	0	**32**
Total	**67,577**	**22,421**	**7,165**	**1,554**	**162**	**3**	**0**	**98,882**

C.4 Number of potentially seriously inconvenienced people per contour zone and per municipality based on VLAREM II, chapter 5.57

Table 34: Number of potentially seriously inconvenienced Lden contour zone per municipality 2024 based on housing stock 01-01-2025 and VLAREM II, chapter 5.57

Number of potentially highly annoyed people	Lden - contour zones in dB(A) (d. 07h-19h, ev. 19h-23h, n. 23h-07h)					
Municipality	**55-60**	**60-65**	**65-70**	**70-75**	**>75**	**Totaal**
Brussel	1,015	1,003	0	0	0	**2,018**
Evere	1,645	0	0	0	0	**1,645**
Haacht	157	0	0	0	0	**157**
Herent	155	5	0	0	0	**160**
Kampenhout	364	152	54	0	0	**570**
Kortenberg	339	216	18	0	0	**573**
Kraainem	395	0	0	0	0	**395**
Leuven	49	0	0	0	0	**49**
Machelen	965	1,654	273	3	0	**2,895**
Rotselaar	3	0	0	0	0	**3**
Sint-Pieters-Woluwe	71	0	0	0	0	**71**
Steenokkerzeel	680	733	194	60	0	**1,667**
Vilvoorde	527	0	0	0	0	**527**
Wezembeek-Oppem	311	0	0	0	0	**311**
Zaventem	1,460	822	0	0	0	**2,282**
Total	**8,136**	**4,585**	**539**	**63**	**0**	**13,323**

Table 35: Number of potentially seriously inconvenienced Lden contour zone per municipality 2024 based on housing stock 01-01-2022 and VLAREM II, chapter 5.57

Number of potentially highly annoyed people	Lden - contour zones in dB(A) (d. 07h-19h, ev. 19h-23h, n. 23h-07h)					
Municipality	**55-60**	**60-65**	**65-70**	**70-75**	**>75**	**Totaal**
Brussel	886	910	0	0	0	**1,796**
Evere	1,553	0	0	0	0	**1,553**
Haacht	156	0	0	0	0	**156**
Herent	152	5	0	0	0	**157**
Kampenhout	361	157	54	0	0	**572**
Kortenberg	313	226	16	0	0	**555**
Kraainem	385	0	0	0	0	**385**
Leuven	51	0	0	0	0	**51**
Machelen	904	1,605	272	3	0	**2,784**
Rotselaar	3	0	0	0	0	**3**
Sint-Pieters-Woluwe	70	0	0	0	0	**70**
Steenokkerzeel	670	704	190	53	0	**1,617**
Vilvoorde	444	0	0	0	0	**444**
Wezembeek-Oppem	305	0	0	0	0	**305**
Zaventem	1,393	797	0	0	0	**2,190**
Total	**7,646**	**4,404**	**532**	**56**	**0**	**12,638**

Annex D. Noise contour maps: evolution 2023-2024

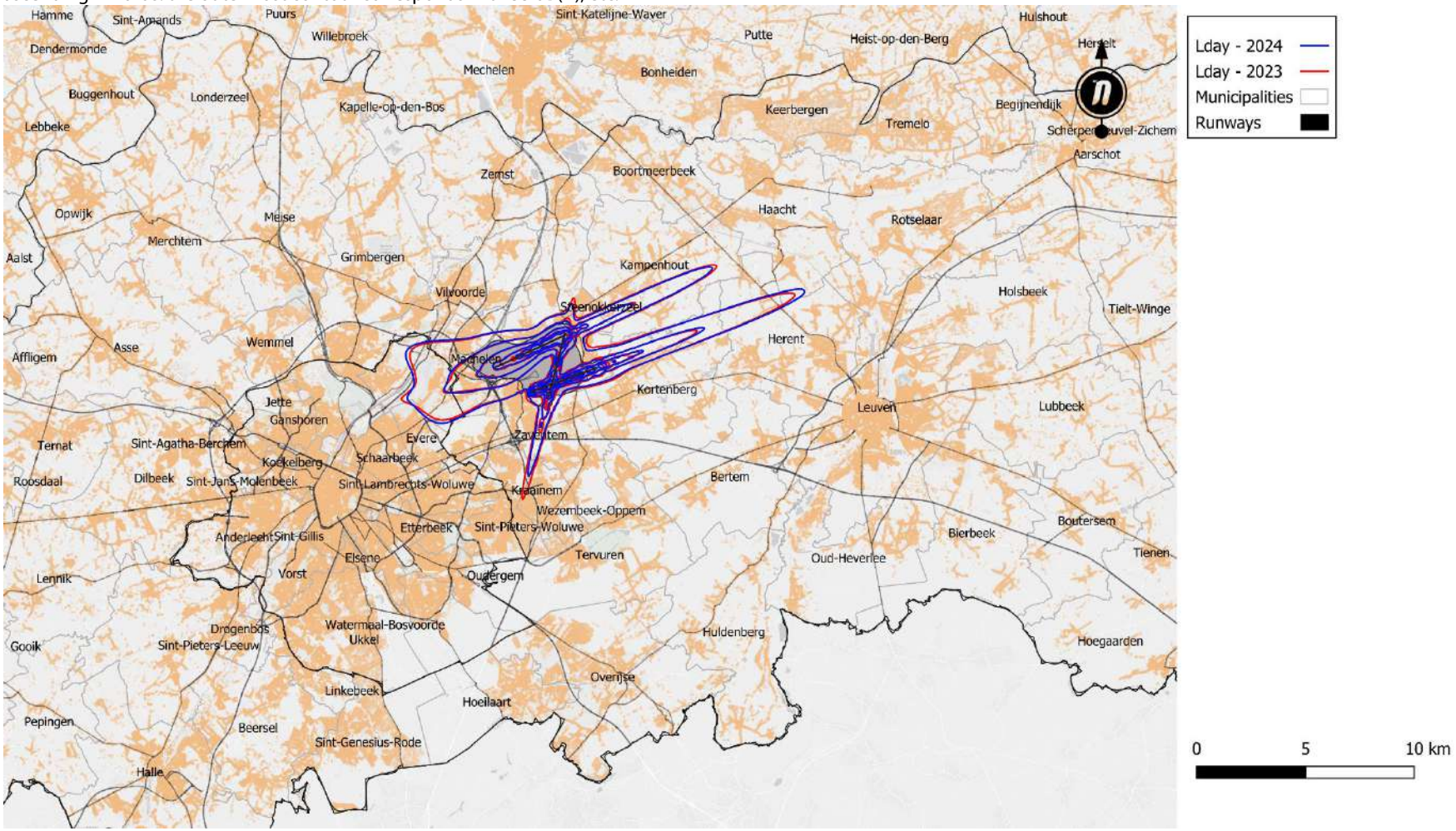
In this appendix the noise maps are available in A4 format.

- L_{day} noise contours for 2023 and 2024, background population map 2024
- $L_{evening}$ noise contours for 2023 and 2024, background population map 2024
- L_{night} noise contours for 2023 and 2024, background population map 2024
- L_{den} noise contours for 2023 and 2024, background population map 2024
- Freq.70,day noise contours for 2024, background population map 2024
- Freq.70,evening noise contours for 2024, background population map 2024
- Freq.70,night noise contours for 2023 and 2024, background population map 2024
- Freq.60,day noise contours for 2024, background population map 2024
- Freq.60,evening noise contours for 2024, background population map 2024
- Freq.60,night noise contours for 2023 and 2024, background population map 2024

- L_{day} noise contours for 2023 and 2024, background NGI topographic map
- $L_{evening}$ noise contours for 2023 and 2024, background NGI topographic map
- L_{night} noise contours for 2023 and 2024, background NGI topographic map
- L_{den} noise contours for 2023 and 2024, background NGI topographic map
- Freq.70,day – noise contours for 2024, background NGI topographical map
- Freq.70.evening - noise contours for 2024, background NGI topographic map
- Freq.70,night noise contours for 2023 and 2024, background NGI topographical map
- Freq.60,day – noise contours for 2024, background NGI topographical map
- Freq.60.evening - noise contours for 2024, background NGI topographic map
- Freq.60,night noise contours for 2023 and 2024, background NGI topographical map

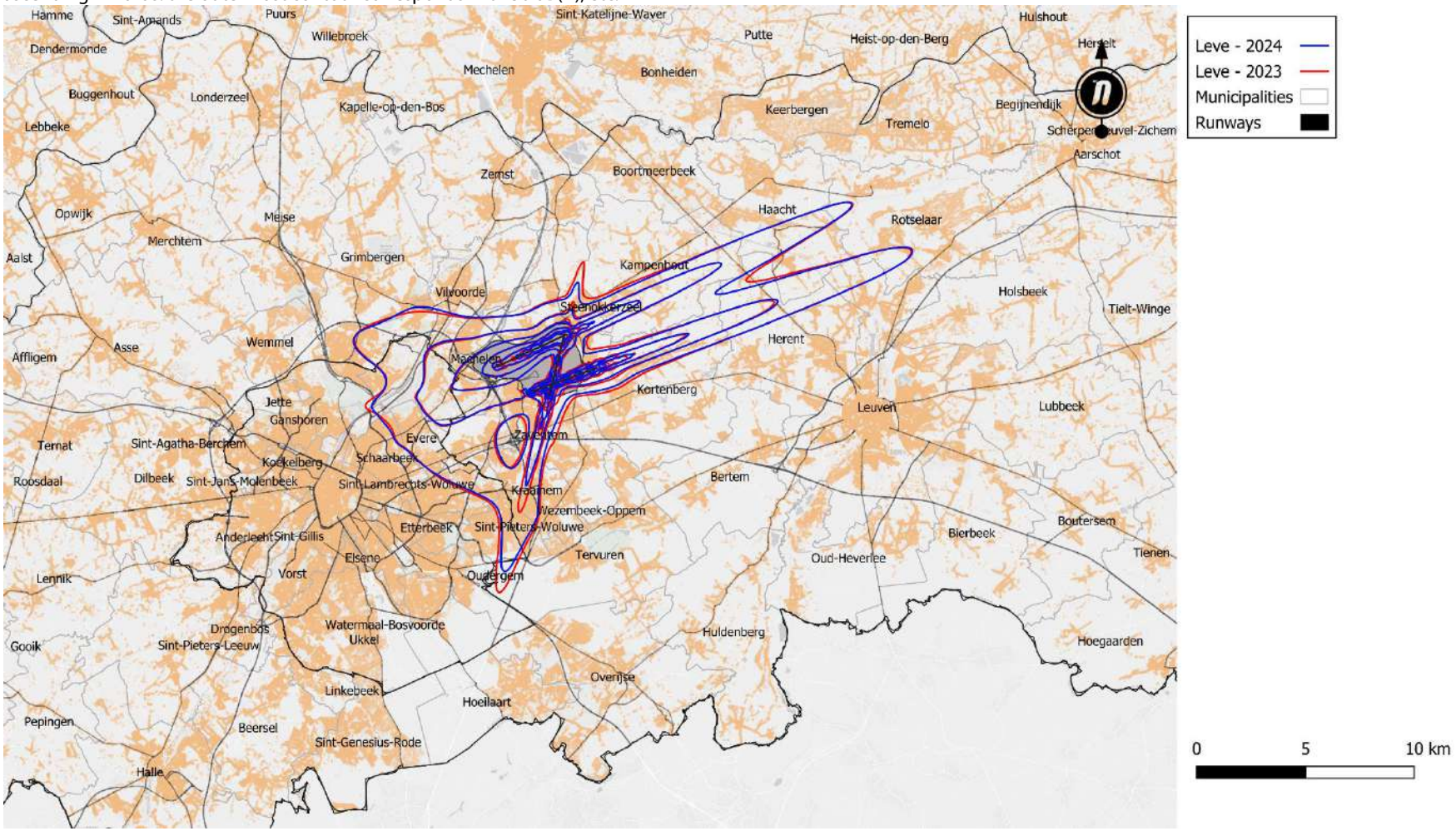
Evolution of L_{day} (07:00 to 19:00) noise contours – background population map 2024

The contours are shown here for 2023 and 2024 where, between 07:00 and 19:00, the noise impact by air traffic is, on average, 55, 60, 65, 70 and 75 dB(a). The values are ascending inwards: the outermost contour corresponds with 55 dB(A), etc.



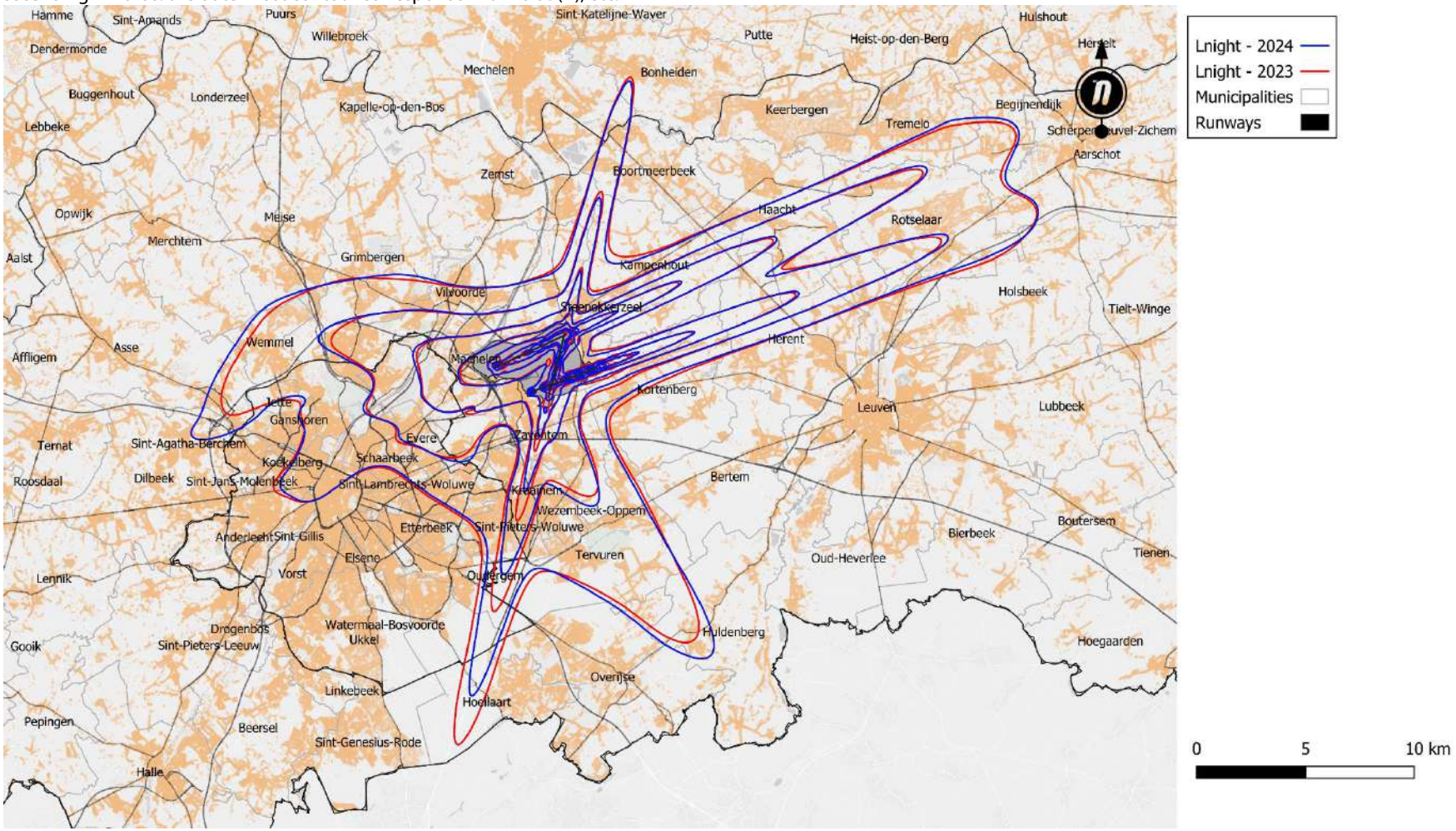
Evolution of $L_{evening}$ (19:00 to 23:00) noise contours – background population map 2024

The contours are shown here for 2023 and 2024 where, between 19:00 and 23:00, the noise impact by air traffic is, on average, 50, 55, 60, 65, 70 and 75 dB(a). The values are ascending inwards: the outermost contour corresponds with 50 dB(A), etc.



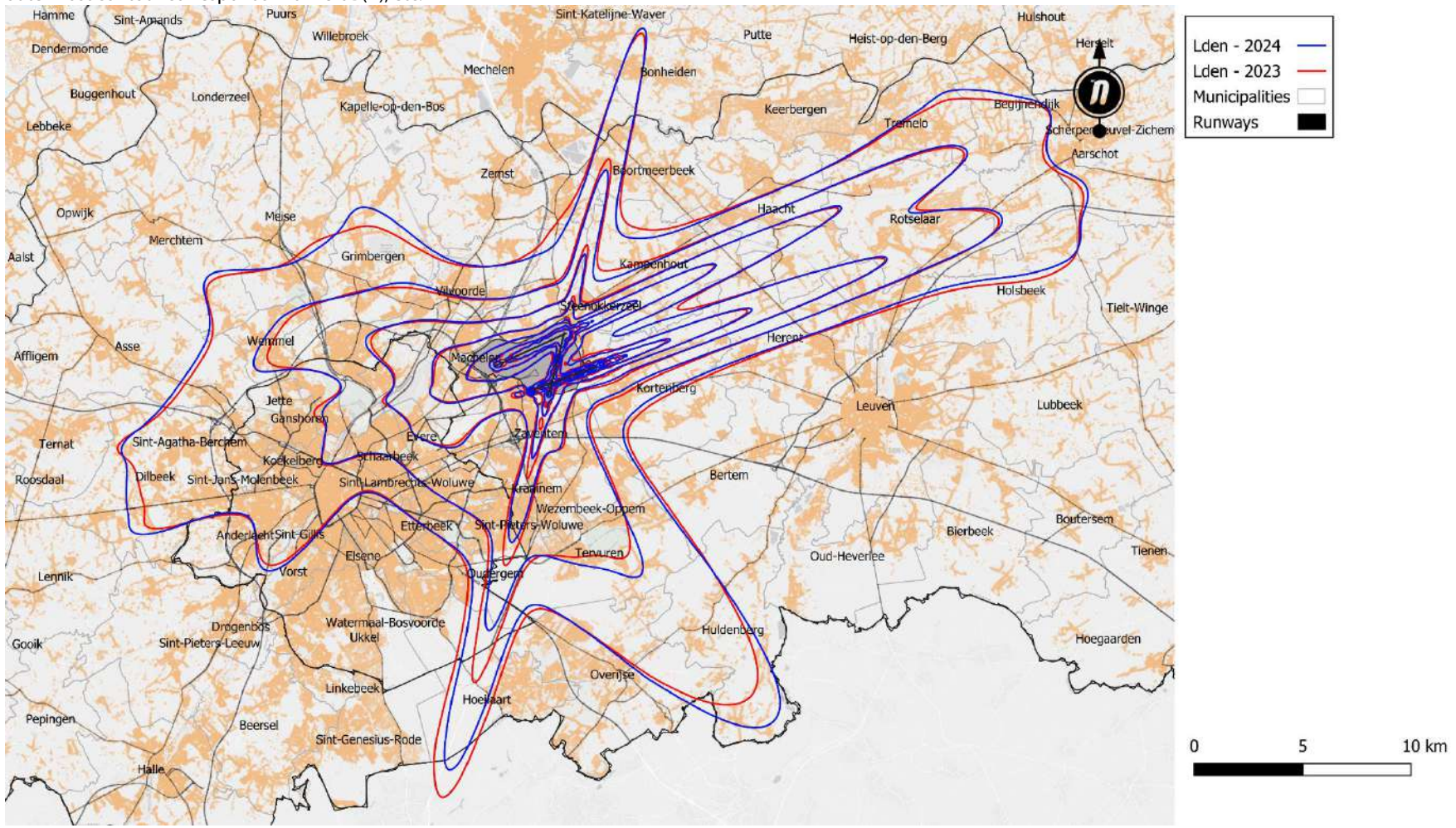
Evolution of L_{night} (23:00 to 7:00) noise contours – background population map 2024

The contours are shown here for 2023 and 2024 where, between 23:00 and 07:00, the noise impact by air traffic is, on average, 40, 45, 50, 55, 60, 65, and 70 dB(a). The values are ascending inwards: the outermost contour corresponds with 40 dB(A), etc.



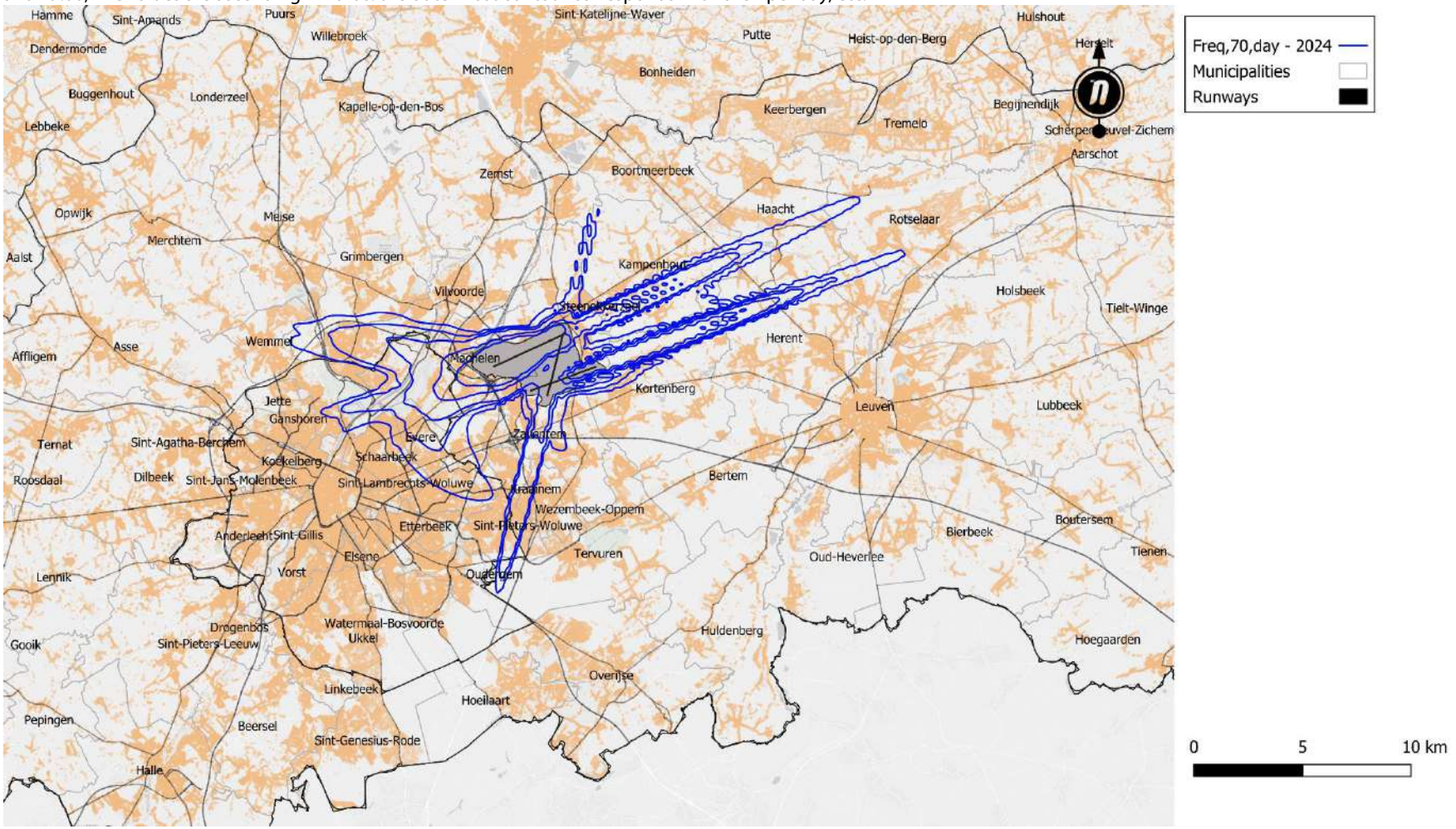
Evolution of L_{den} noise contours – background population map 2024

The contours are shown here for 2023 and 2024 where the noise impact by air traffic is, on average, 45, 50, 55, 60, 65, 70 and 75 dB(a). The values are ascending inwards: the outermost contour corresponds with 45 dB(A), etc.



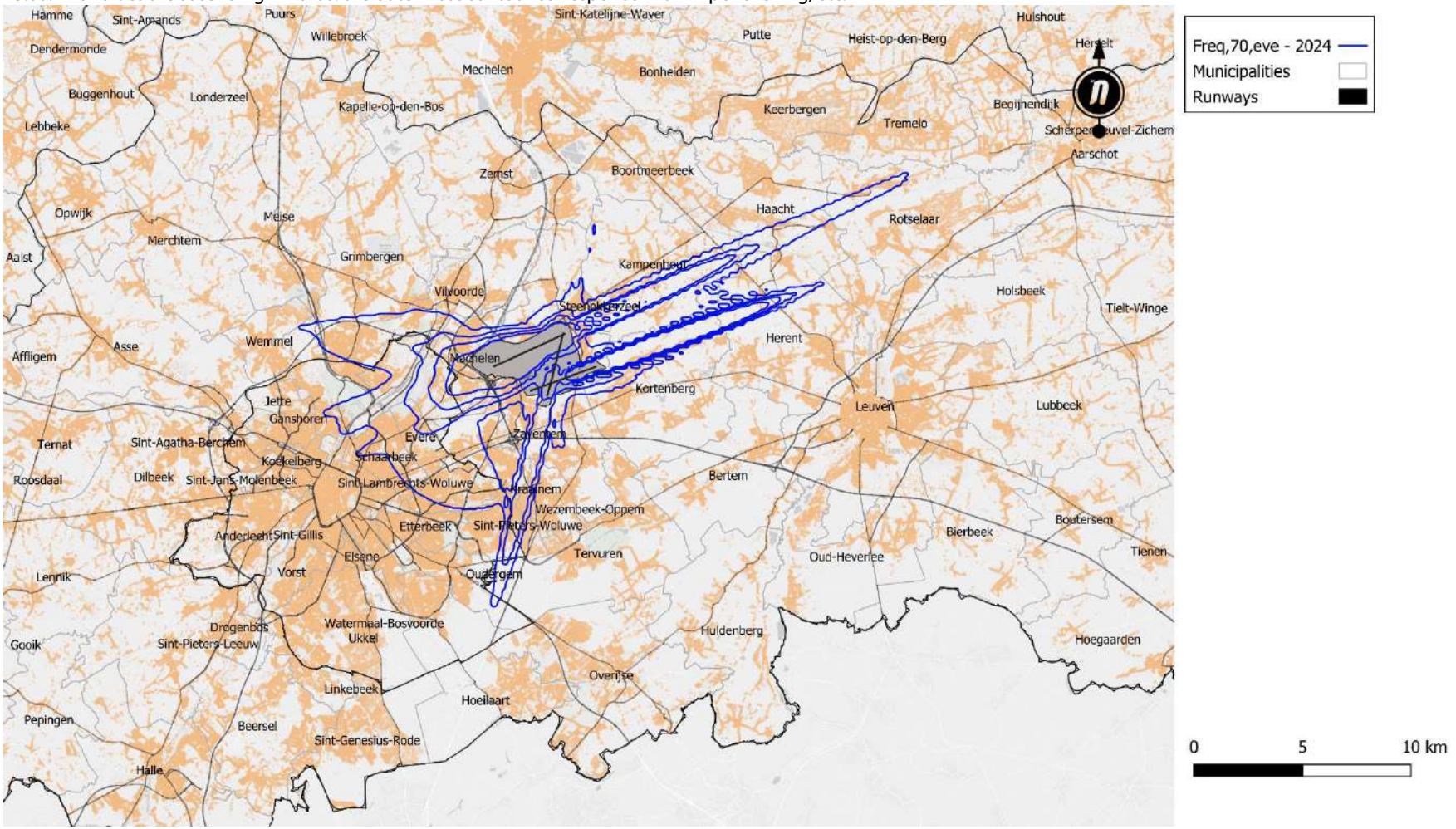
Evolution of Freq.70,day - background population map 2024

The contours are shown here for 2024 where on average a noise level of 70 dB or higher is observed 5x, 10x, 20x, 50x and 100x per day during an aircraft passage between 07:00 and 19:00, The values are ascending inwards: the outermost contour corresponds with of 5x per day, etc.



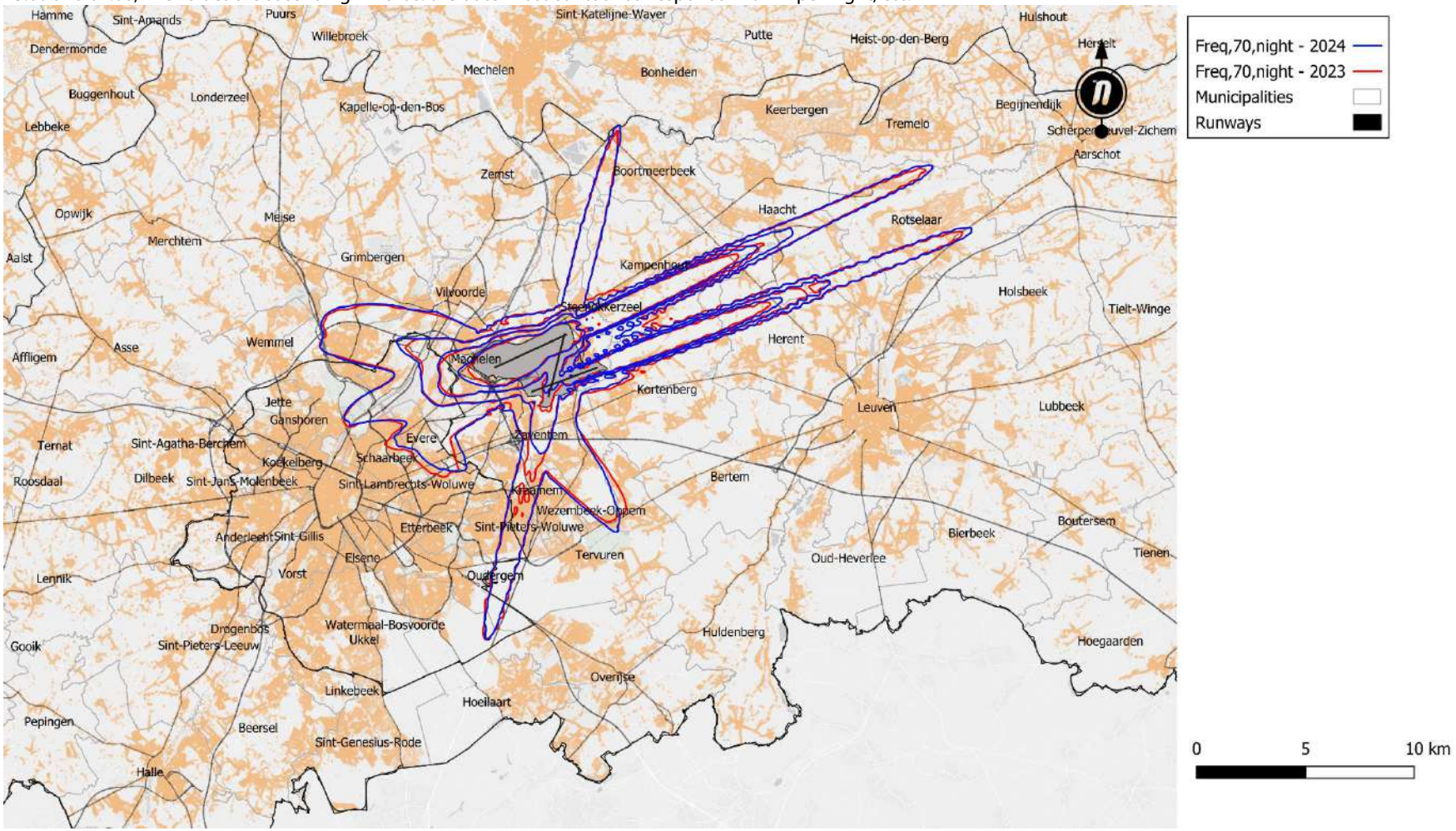
Evolution of Freq.70, evening - background population map 2024

The contours are shown here for 2024 where on average a noise level of 70 dB or higher is observed 1x, 5x, 10x and 20x per day during an aircraft passage between 07:00 and 23:00. The values are ascending inwards: the outermost contour corresponds with 1x per evening, etc.



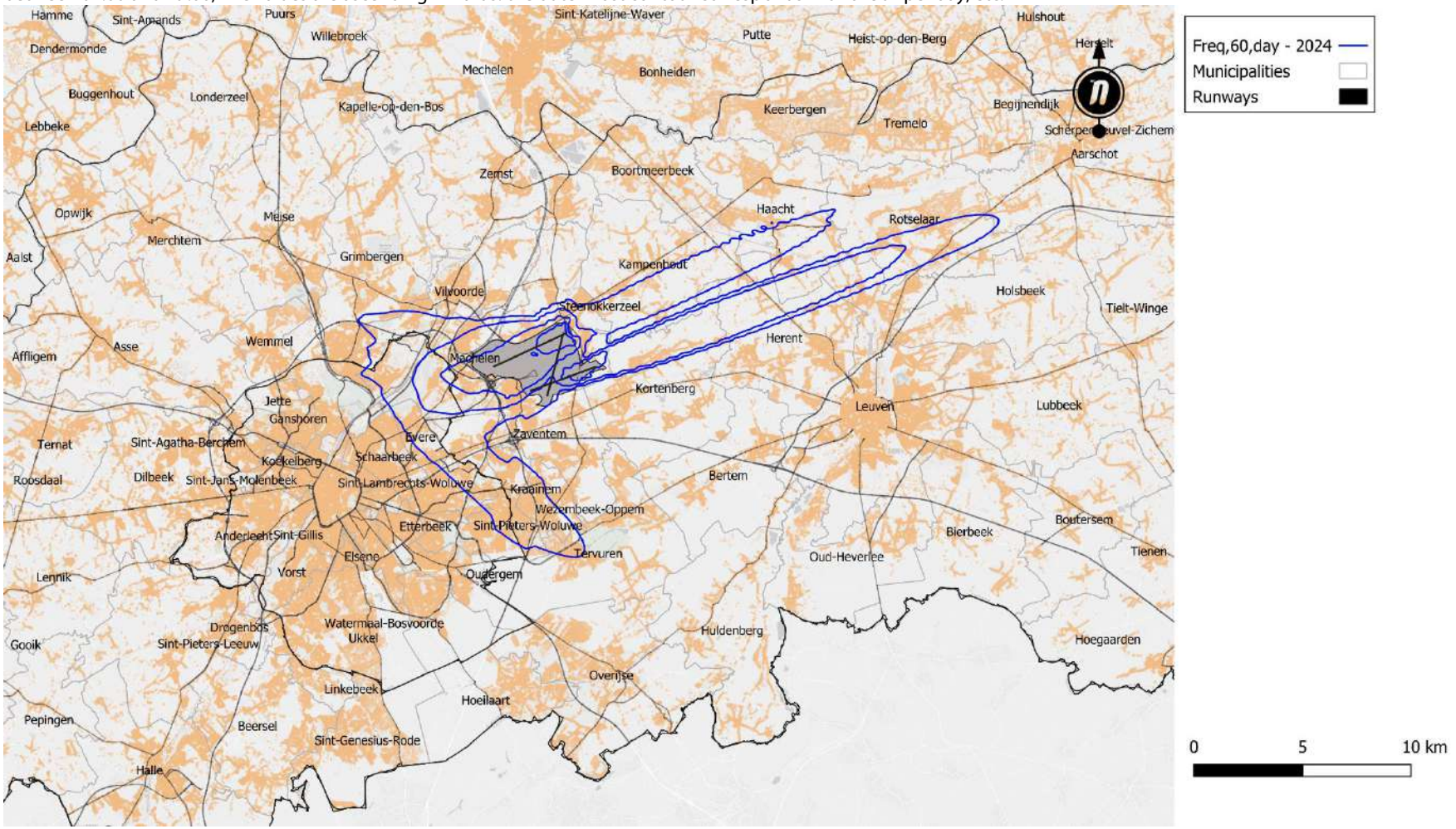
Evolution of Freq.70, night - background population map 2024

The contours are shown here for 2023 and 2024 where on average a noise level of 70 dB or higher is observed 1x, 5x, 10x and 20x per day during an aircraft passage between 23:00 and 07:00, The values are ascending inwards: the outermost contour corresponds with 1x per night, etc.



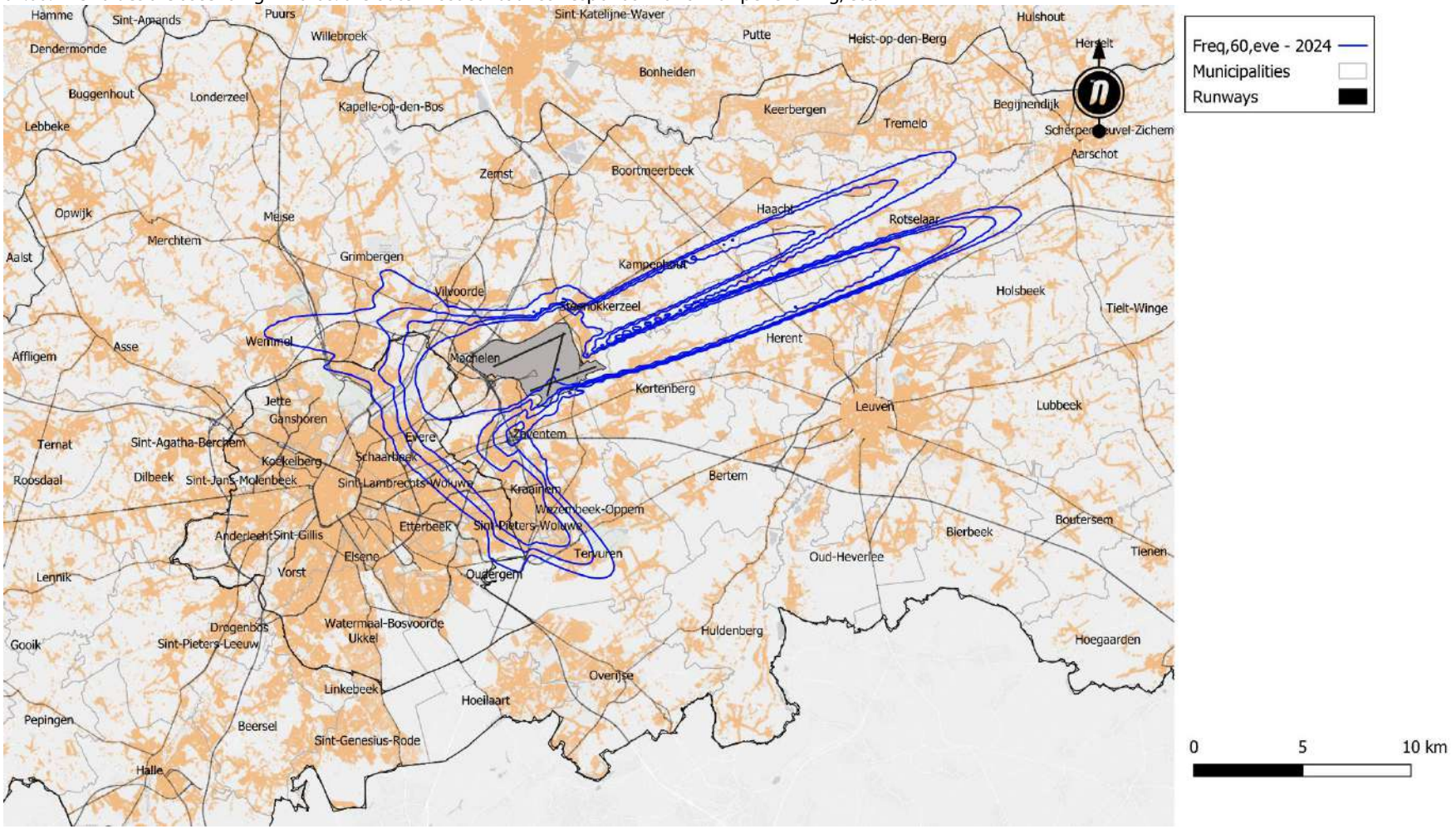
Evolution of Freq.60,day - background population map 2024

The contours are shown here for 2023 and 2024 where on average a noise level of 60 dB or higher is observed 50x, 100x, 150x and 200x per day during an aircraft passage between 07:00 and 19:00, The values are ascending inwards: the outermost contour corresponds with of 50x per day, etc.



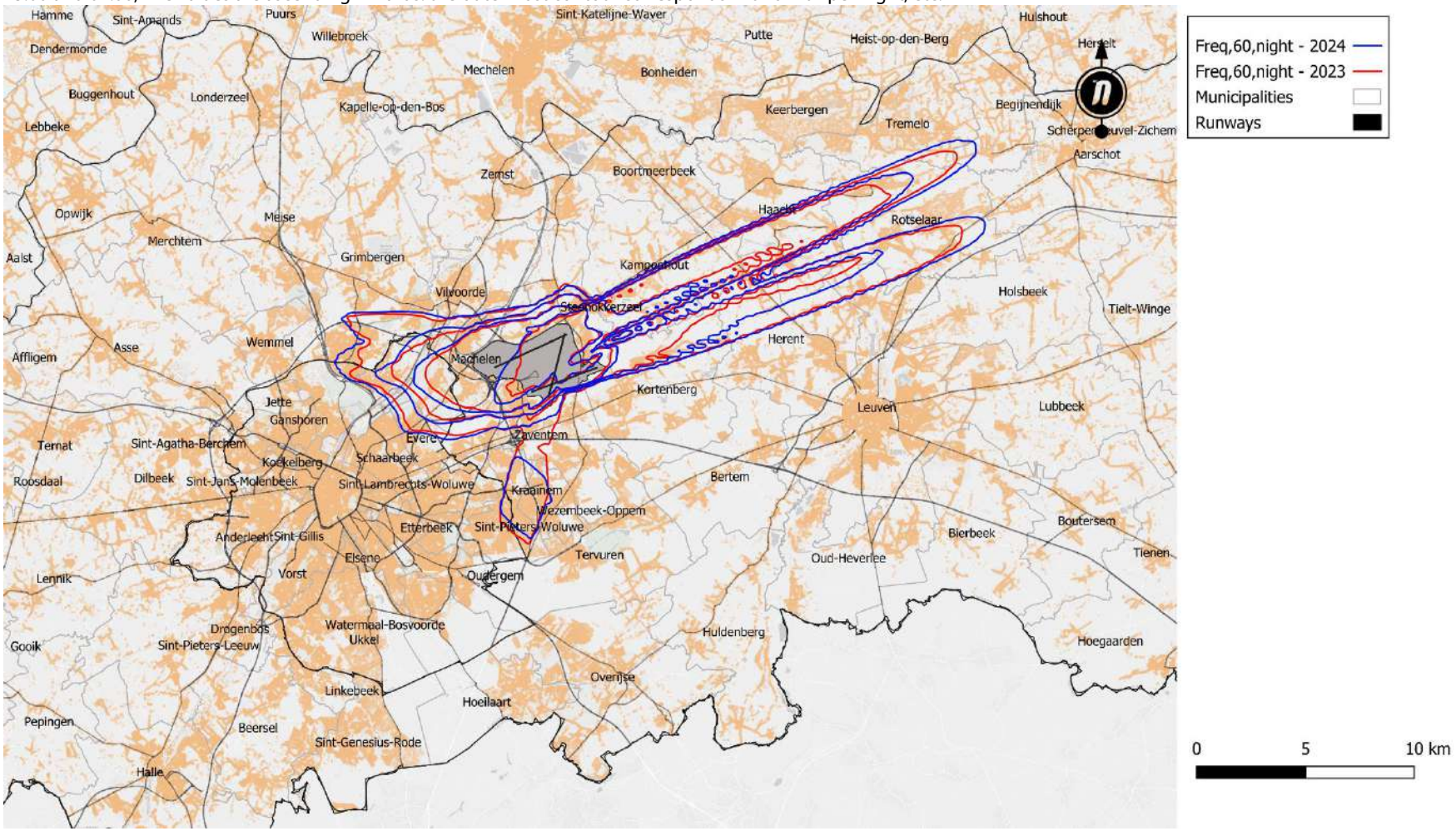
Evolution of Freq.60, evening - background population map 2024

The contours are shown here for 2024 where on average a noise level of 60 dB or higher is observed 10x, 15x, 20x and 30x per day during an aircraft passage between 23:00 and 07:00. The values are ascending inwards: the outermost contour corresponds with of 10x per evening, etc.



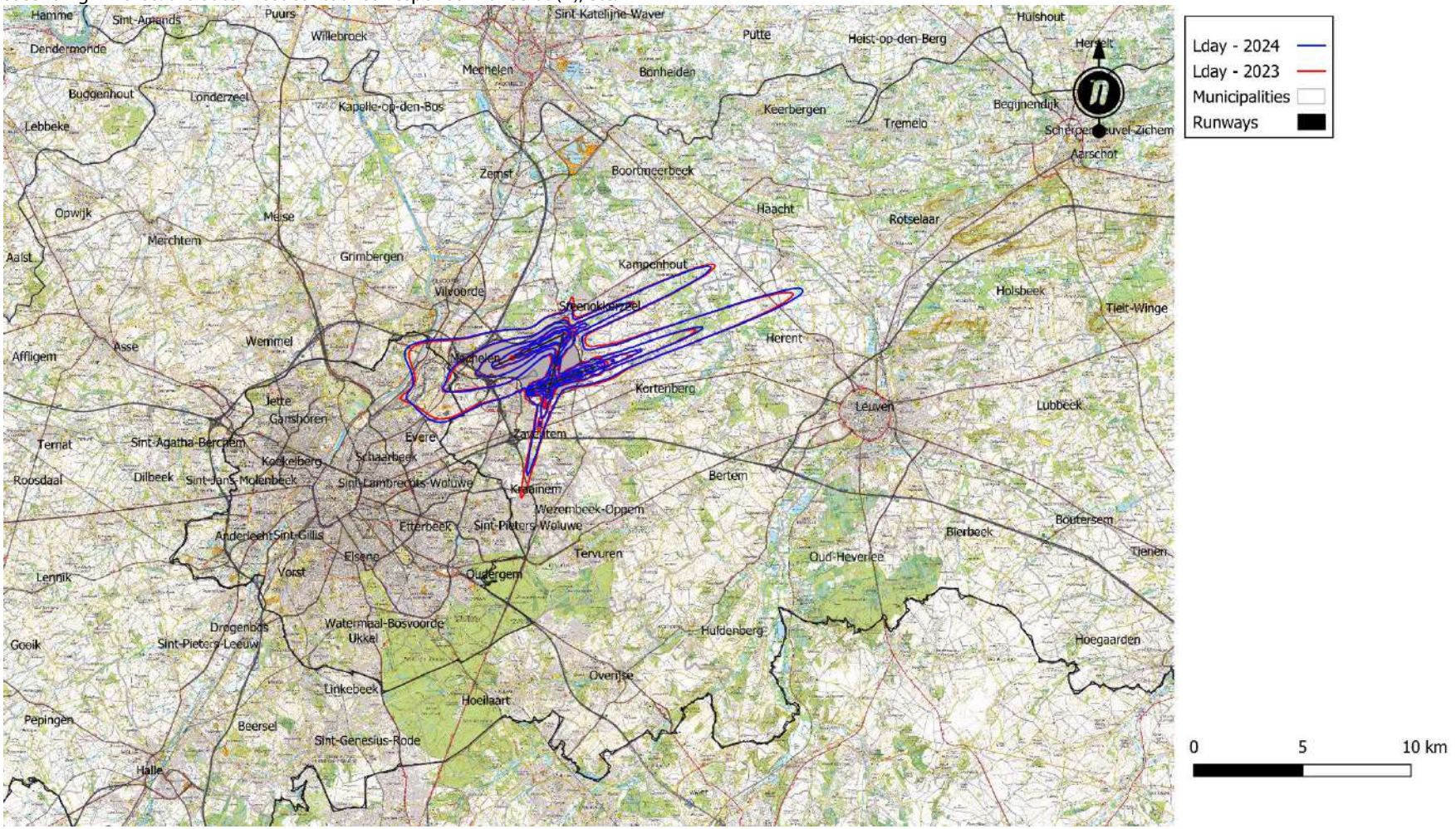
Evolution of Freq.60, night - background population map 2024

The contours are shown here for 2023 and 2024 where on average a noise level of 60 dB or higher is observed 10x, 15x, 20x and 30x per day during an aircraft passage between 23:00 and 07:00, The values are ascending inwards: the outermost contour corresponds with of 10x per night, etc.



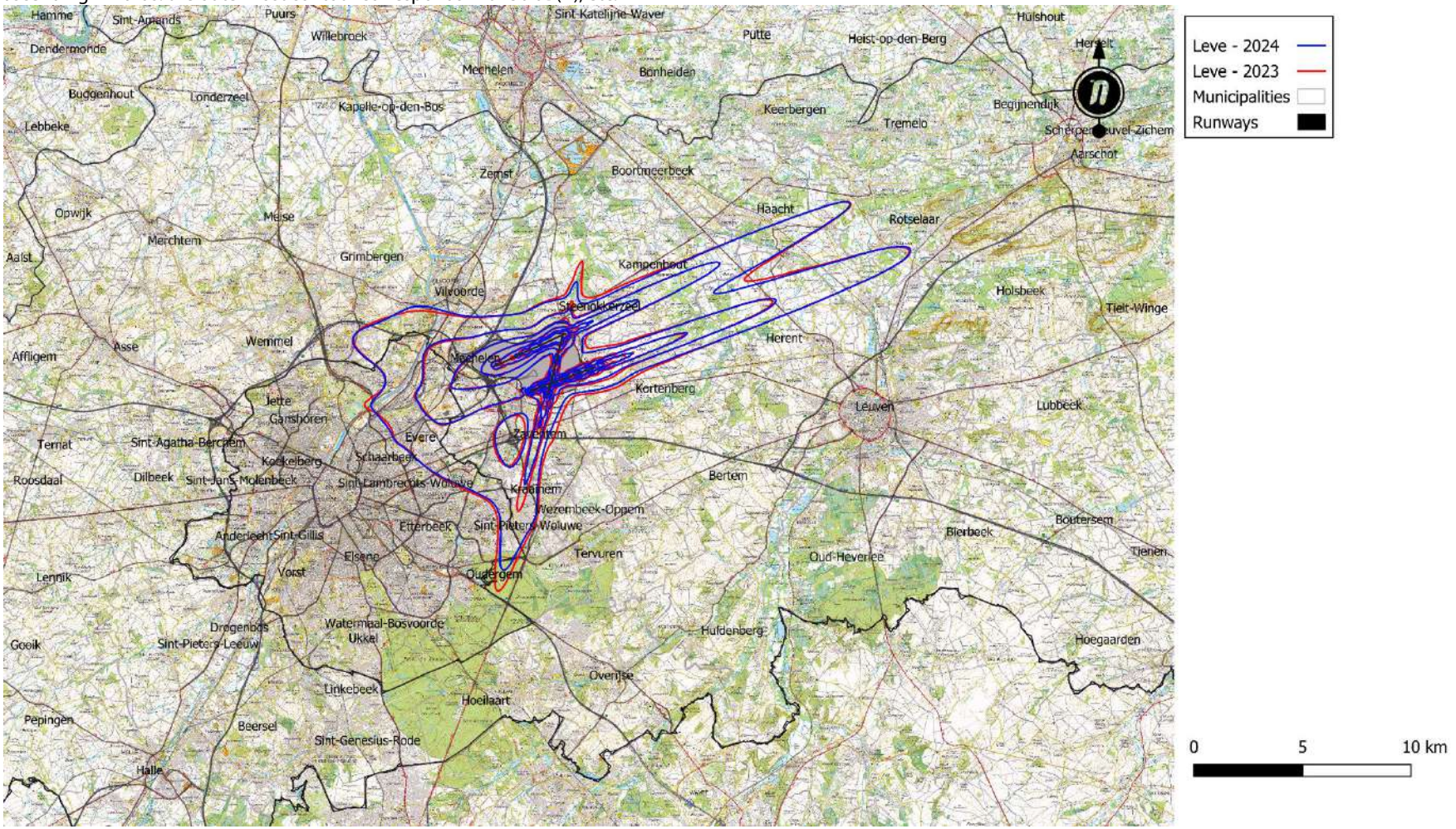
Evolution of L_{day} (07:00 to 19:00) noise contours – background NGI topographic map

The contours are shown here for 2023 and 2024 where, between 07:00 and 19:00, the noise impact by air traffic is, on average, 55, 60, 65, 70 and 75 dB(a). The values are ascending inwards: the outermost contour corresponds with 55 dB(A), etc.



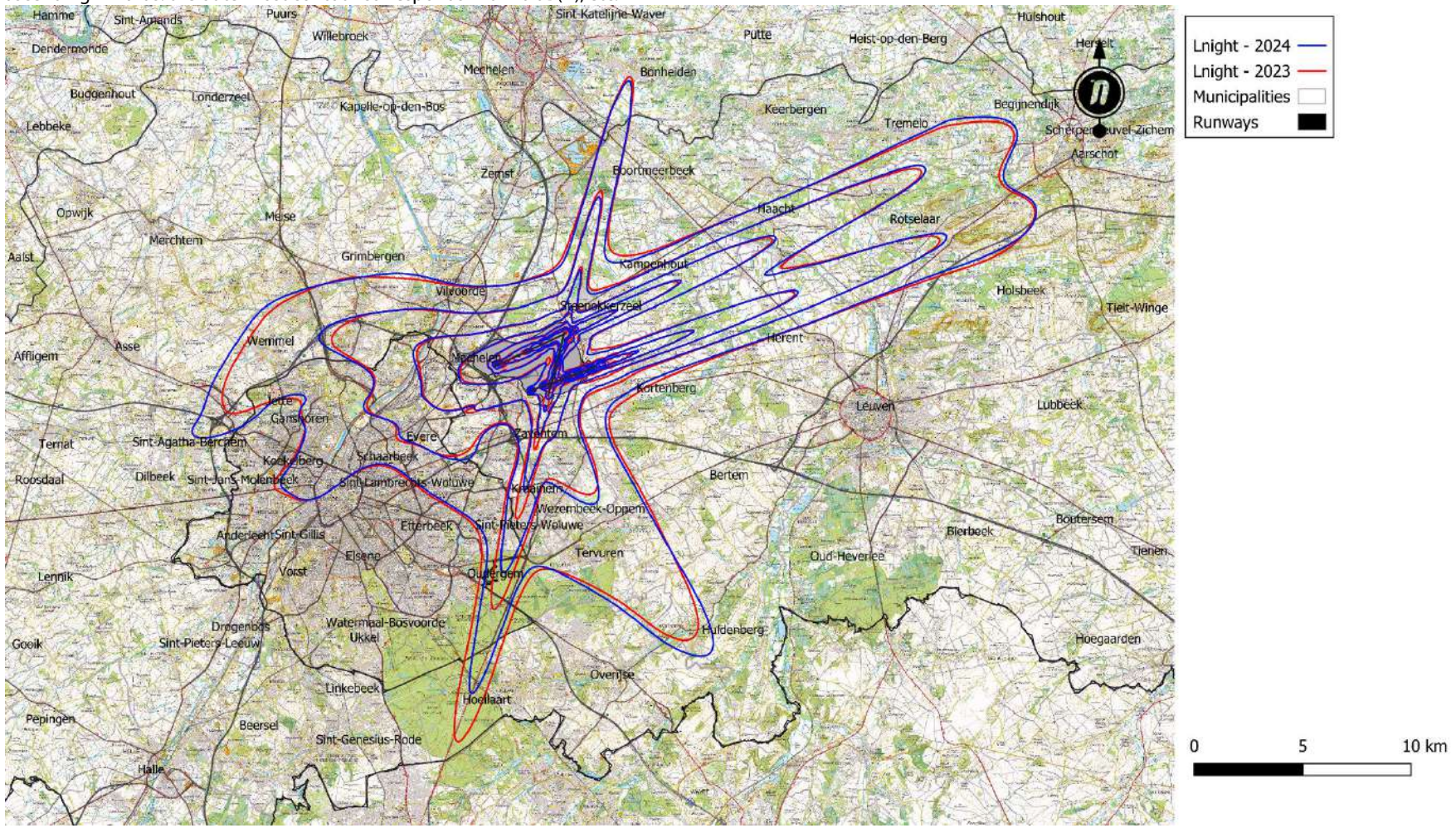
Evolution of $L_{evening}$ (19:00 to 23:00) noise contours – background NGI topographic map

The contours are shown here for 2023 and 2024 where, between 19:00 and 23:00, the noise impact by air traffic is, on average, 50, 55, 60, 65, 70 and 75 dB(a). The values are ascending inwards: the outermost contour corresponds with 50 dB(A), etc.



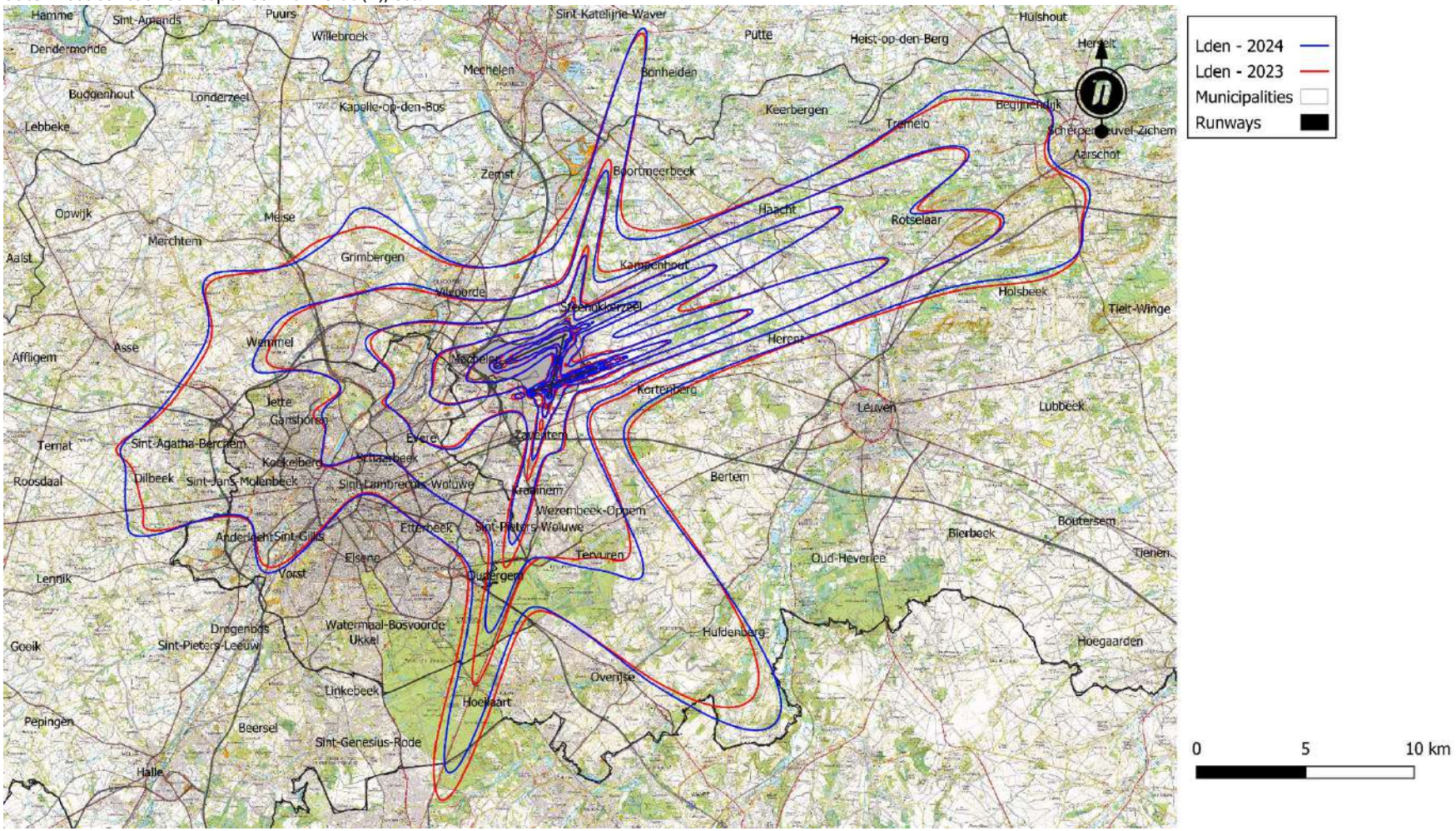
Evolution of L_{night} (23:00 to 7:00) noise contours – background NGI topographic map

The contours are shown here for 2023 and 2024 where, between 23:00 and 07:00, the noise impact by air traffic is, on average, 40, 45, 50, 55, 60, 65, and 70 dB(a). The values are ascending inwards: the outermost contour corresponds with 40 dB(A), etc.



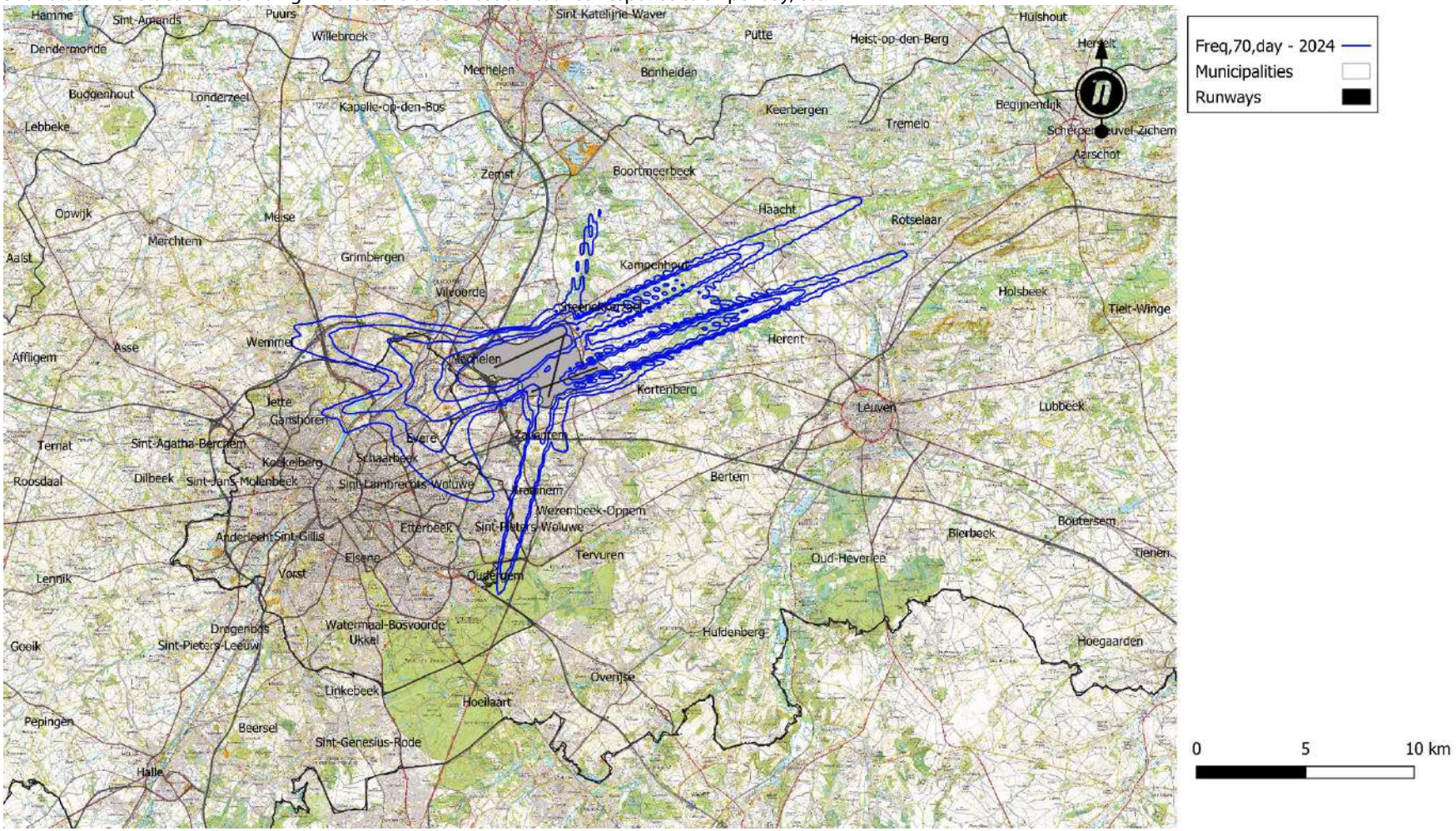
Evolution of L_{den} noise contours – background NGI topographic map

The contours are shown here for 2023 and 2024 where the noise impact by air traffic is, on average, 45, 50, 55, 60, 65, 70 and 75 dB(a). The values are ascending inwards: the outermost contour corresponds with 45 dB(A), etc.



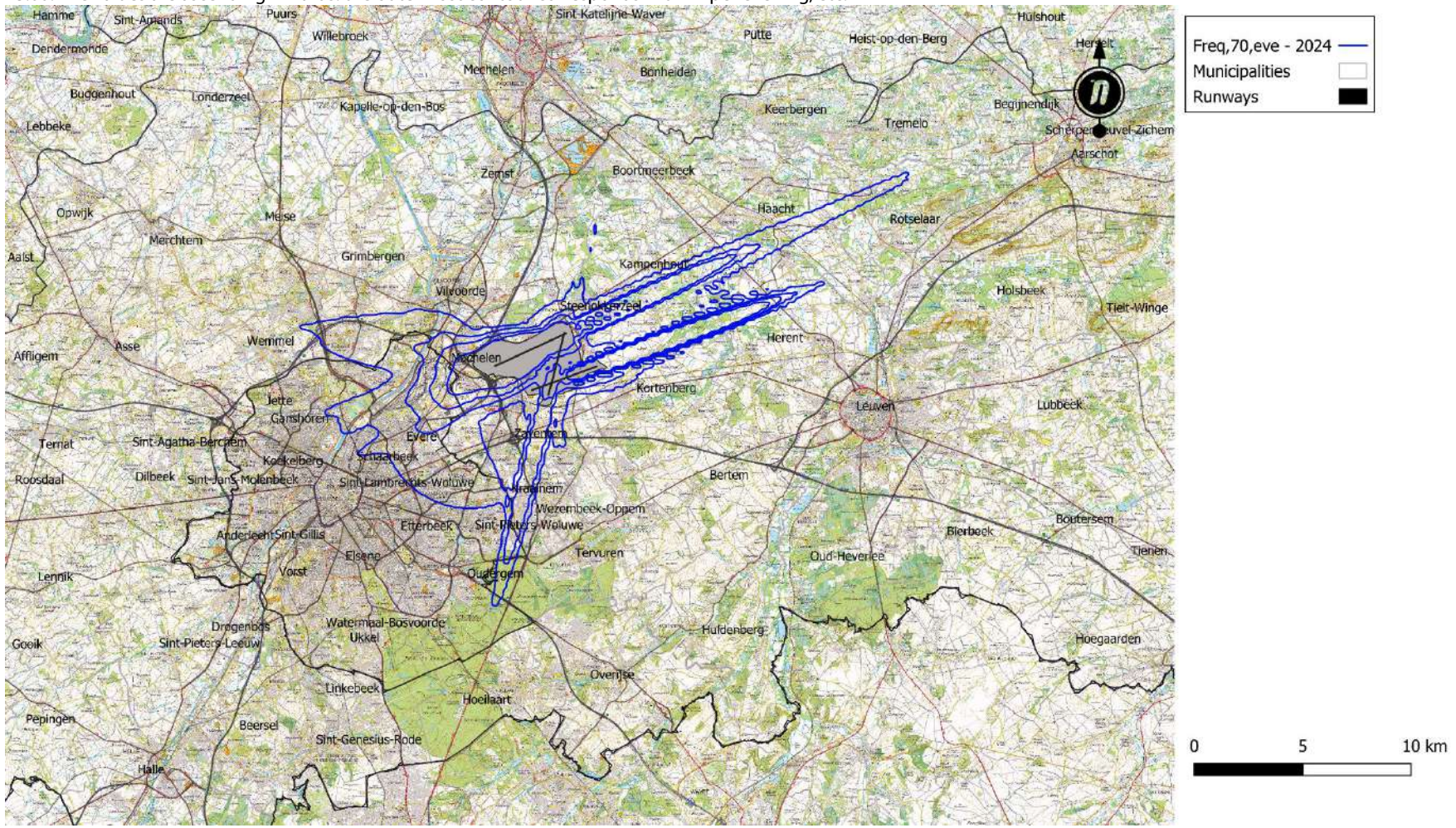
Evolution of Freq.70,day - background NGI topographical map

The contours are shown here for 2024 where on average a noise level of 70 dB or higher is observed 5x, 10x, 20x, 50x and 100x per day during an aircraft passage between 07:00 and 19:00. The values are ascending inwards: the outermost contour corresponds to 5x per day, etc.



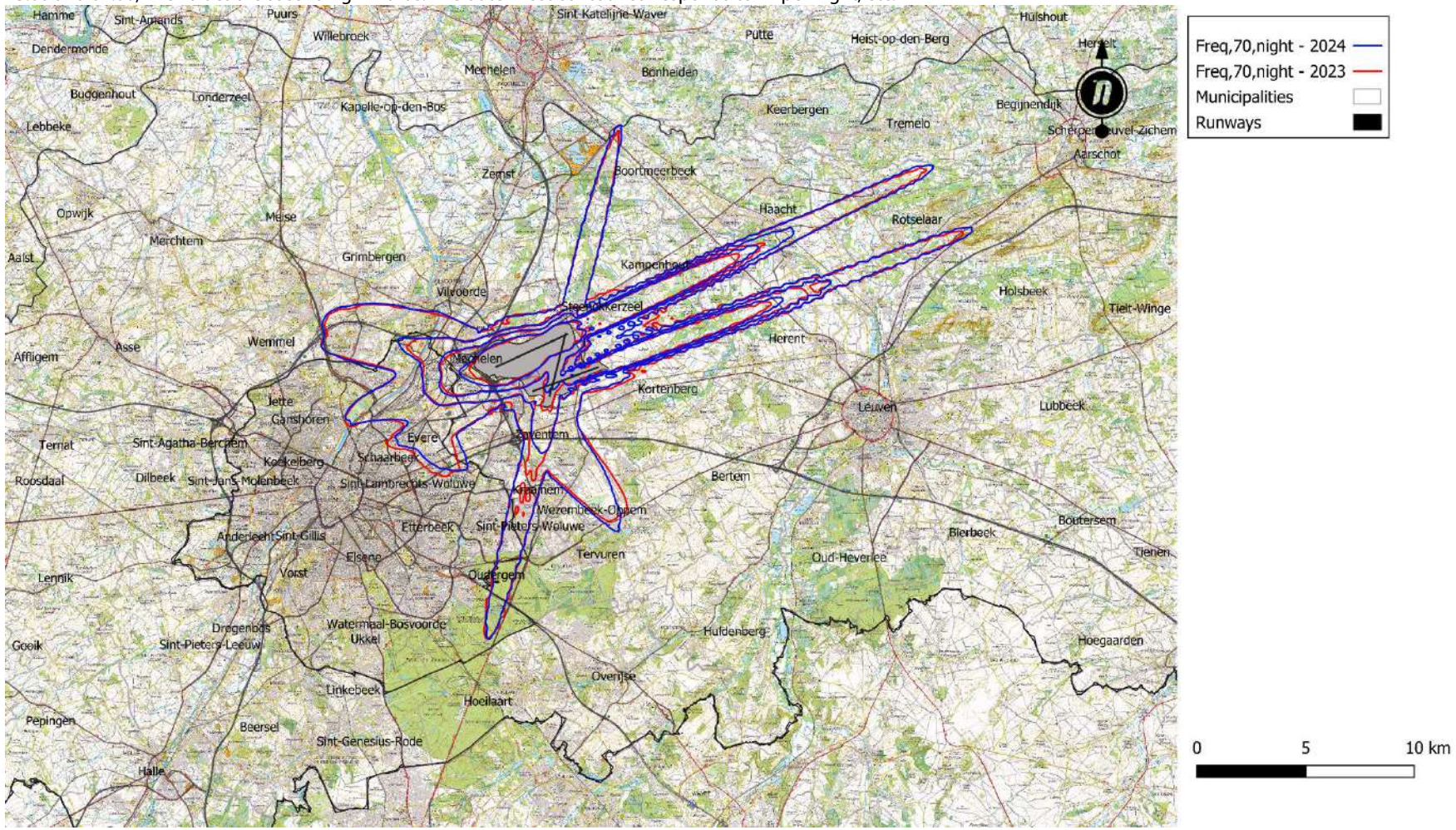
Evolution of Freq.70,evening - background NGI topographical map

The contours are shown here for 2024 where on average a noise level of 70 dB or higher is observed 1x, 5x, 10x and 20x per day during an aircraft passage between 07:00 and 23:00. The values are ascending inwards: the outermost contour corresponds with 1x per evening, etc.



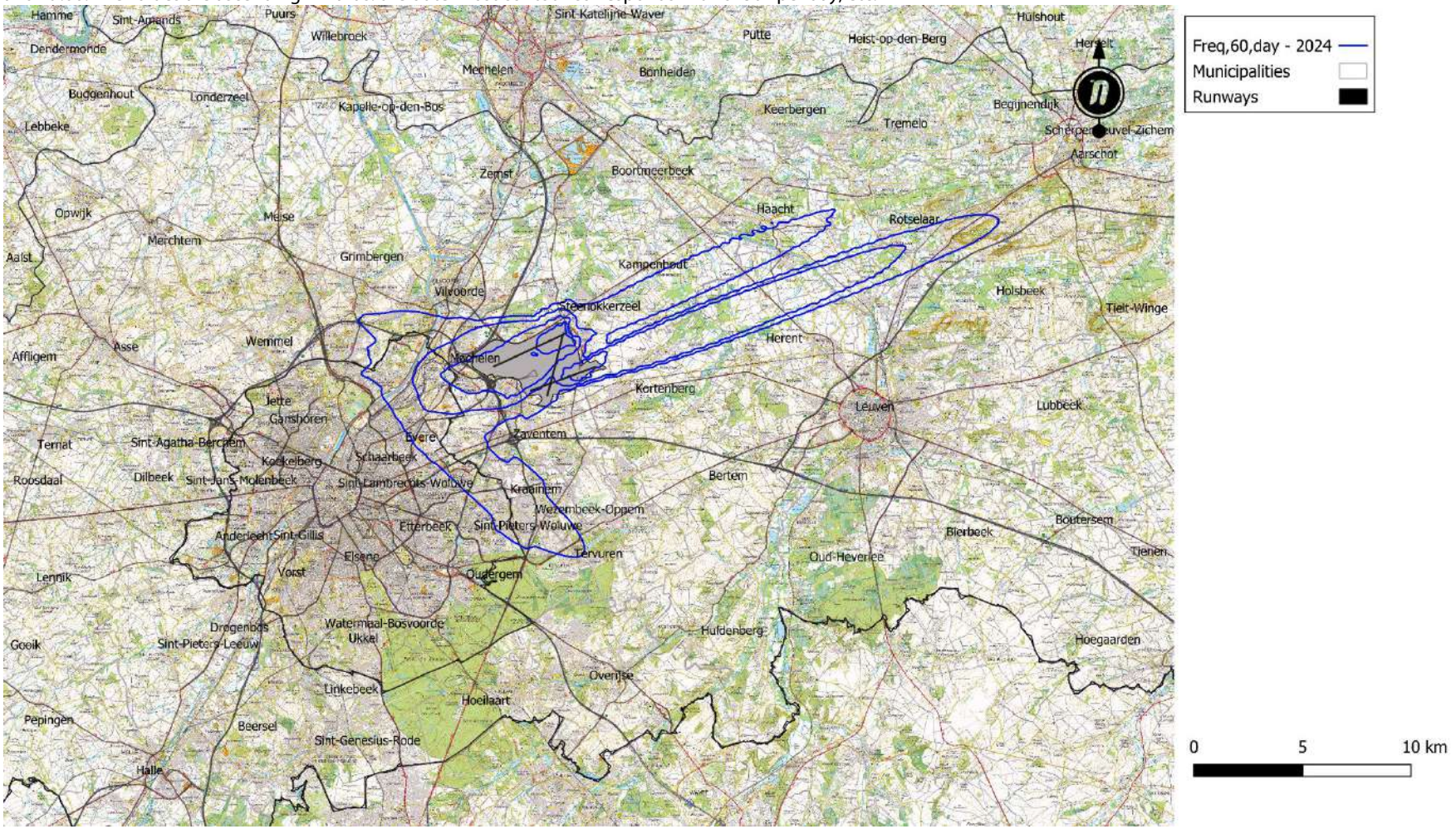
Evolution of Freq.70, night - background NGI topographical map

The contours are shown here for 2023 and 2024 where on average a noise level of 70 dB or higher is observed 1x, 5x, 10x and 20x per day during an aircraft passage between 23:00 and 07:00, The values are ascending inwards: The outermost contour corresponds to 1x per night, etc.



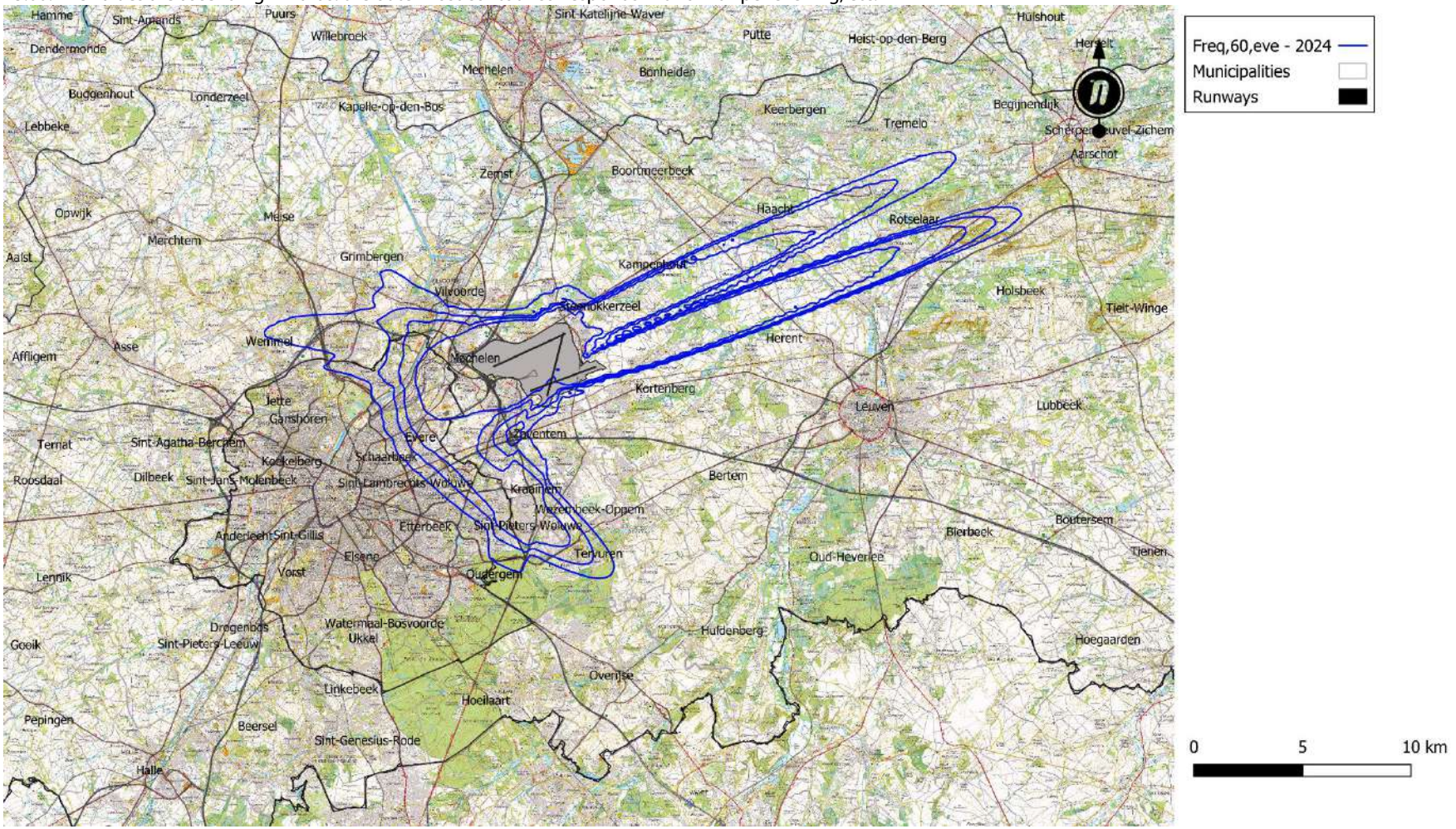
Evolution of Freq.60,day - background NGI topographical map

The contours are shown here for 2024 where on average a noise level of 60 dB or higher is observed 50x, 100x, 150x and 200x per day during an aircraft passage between 07:00 and 19:00. The values are ascending inwards: the outermost contour corresponds with of 50x per day, etc.



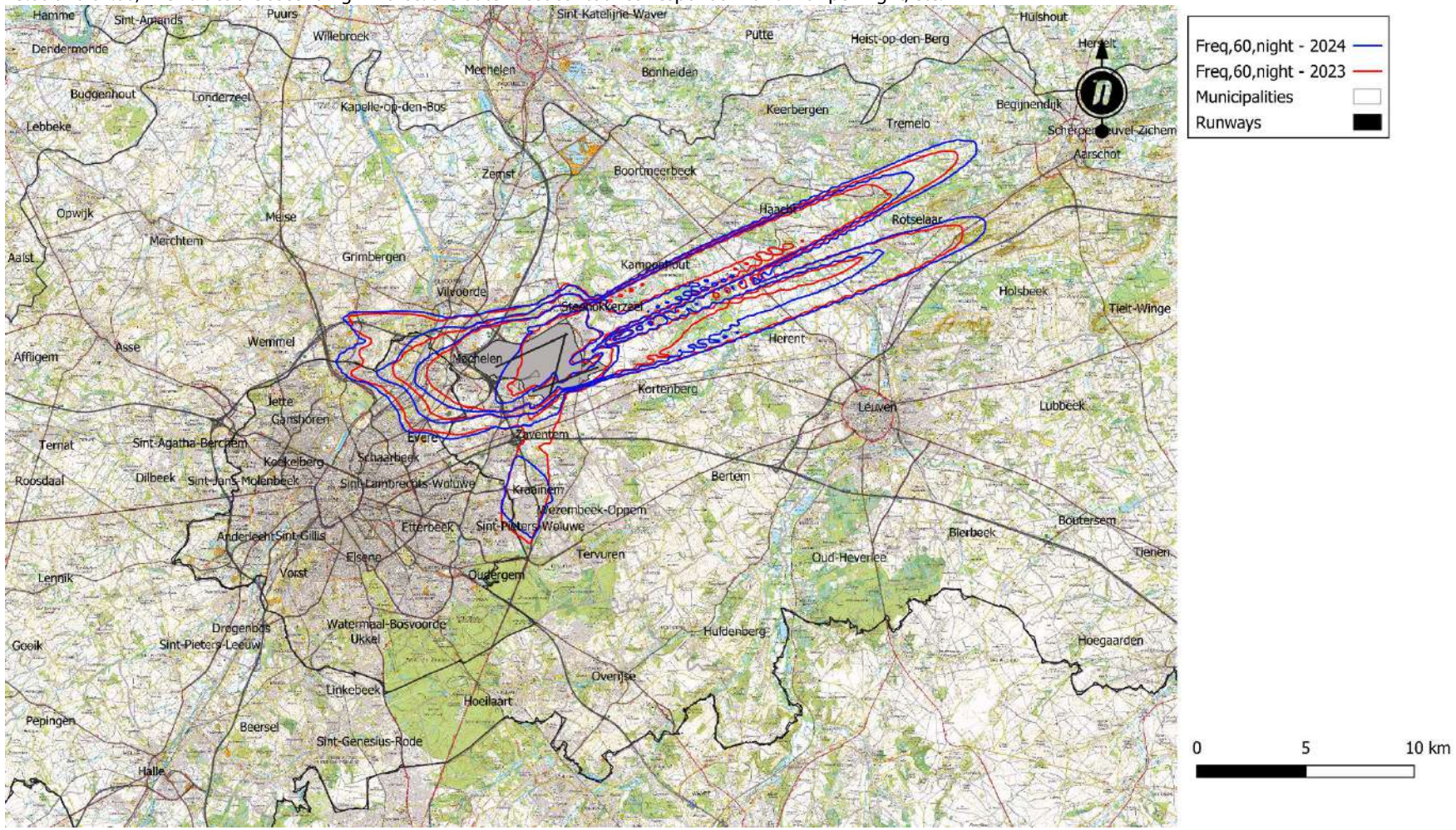
Evolution of Freq.60,evening - background NGI topographical map

The contours are shown here for 2024 where on average a noise level of 60 dB or higher is observed 10x, 15x, 20x and 30x per day during an aircraft passage between 19:00 and 23:00. The values are ascending inwards: the outermost contour corresponds with of 10x per evening, etc.



Evolution of Freq.60, night - background NGI topographical map

The contours are shown here for 2023 and 2024 where on average a noise level of 60 dB or higher is observed 10x, 15x, 20x and 30x per day during an aircraft passage between 23:00 and 07:00, The values are ascending inwards: the outermost contour corresponds with of 10x per night, etc.



Annex E. Evolution of the surface area and the number of residents

E.1 Evolution of the surface area per contour zone: L_{day}, $L_{evening}$, L_{night}, L_{den}, Freq.70 day, Freq.70 evening, Freq.70 night, Freq.60 day, Freq.60 evening, Freq.60, night

Table 36: Evolution of the surface area within the L_{day} contours (2000, 2006-2024).

Area (ha)	L_{day} - contour zones in dB(A) (day 07:00-19:00)					
Year	55-60	60-65	65-70	70-75	>75	Total
2000*	5,919	2,113	827	383	242	**9,485**
2001						
2002						
2003						
2004						
2005						
2006*	3,787	1,379	545	213	150	**6,073**
2007*	3,978	1,431	575	227	153	**6,364**
2008*	4,072	1,492	596	232	161	**6,553**
2009*	3,461	1,300	523	206	133	**5,622**
2010*	3,334	1,261	514	196	126	**5,431**
2011*	3,330	1,241	509	199	127	**5,406**
2012*	2,978	1,121	466	189	117	**4,871**
2013*	2,779	1,106	455	176	121	**4,637**
2014*	2,924	1,120	474	187	116	**4,821**
2015*	3,143	1,180	489	230	93	**5,135**
2016*	2,886	1,087	545	123	82	**4,723**
2017*	2,990	1,109	471	216	90	**4,876**
2018*	3,037	1,150	486	227	87	**4,987**
2019*	2,963	1,105	554	138	91	**4,851**
2020*	1,521	602	247	176	0	**2,547**
2021**	1,936	649	258	115	65	**3,024**
2022**	2,647	881	330	143	82	**4,083**
2023**	2,889	959	363	165	80	**4,456**
2024**	2,862	928	374	153	83	**4,400**

* Calculated with INM 7.0b, ** Calculated with Echo

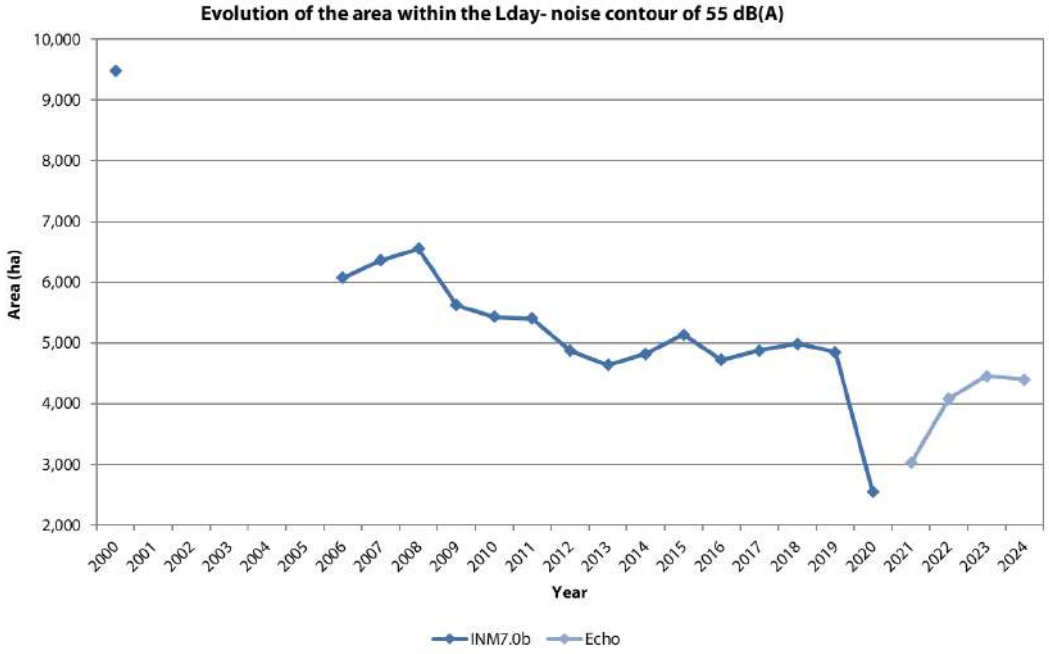


Figure 23: Evolution of the surface area within the L_{day} contours (2000, 2006-2024).

Table 37: Evolution of the surface area within the $L_{evening}$ contours (2000, 2006-2024).

Area (ha)	$L_{evening}$ - contour zones in dB(A) (evening 19:00-23:00)						
Year	50-55	55-60	60-65	65-70	70-75	>75	Total
2000*	11,266	5,265	1,889	741	346	216	**19,723**
2001							
2002							
2003							
2004							
2005							
2006*	8,483	3,000	1,106	449	178	113	**13,329**
2007*	9,106	3,369	1,223	506	200	124	**14,528**
2008*	10,052	3,730	1,354	548	218	135	**16,037**
2009*	8,313	3,126	1,146	463	178	109	**13,336**
2010*	7,821	3,073	1,124	452	171	106	**12,747**
2011*	7,711	3,004	1,106	446	175	105	**12,547**
2012*	7,608	2,881	1,046	427	171	103	**12,237**
2013*	6,998	2,668	994	401	161	104	**11,222**
2014*	7,421	3,087	1,106	445	175	50	**12,283**
2015*	8,244	3,051	1,108	450	205	89	**13,147**
2016*	8,402	3,188	1,137	536	135	91	**13,488**
2017*	8,556	3,172	1,108	457	205	92	**13,590**
2018*	9,134	3,445	1,207	489	225	99	**14,599**
2019*	8,836	3,283	1,138	542	142	97	**14,038**
2020*	4,440	1,751	621	441	0	0	**7,252**
2021**	5,117	1,637	632	213	91	67	**7,757**
2022**	7,425	2,512	802	304	133	75	**11,251**
2023**	7,997	2,796	906	325	153	77	**12,254**
2024**	7,654	2,670	836	332	137	74	**11,703**

* Calculated with INM 7.0b, ** Calculated with Echo

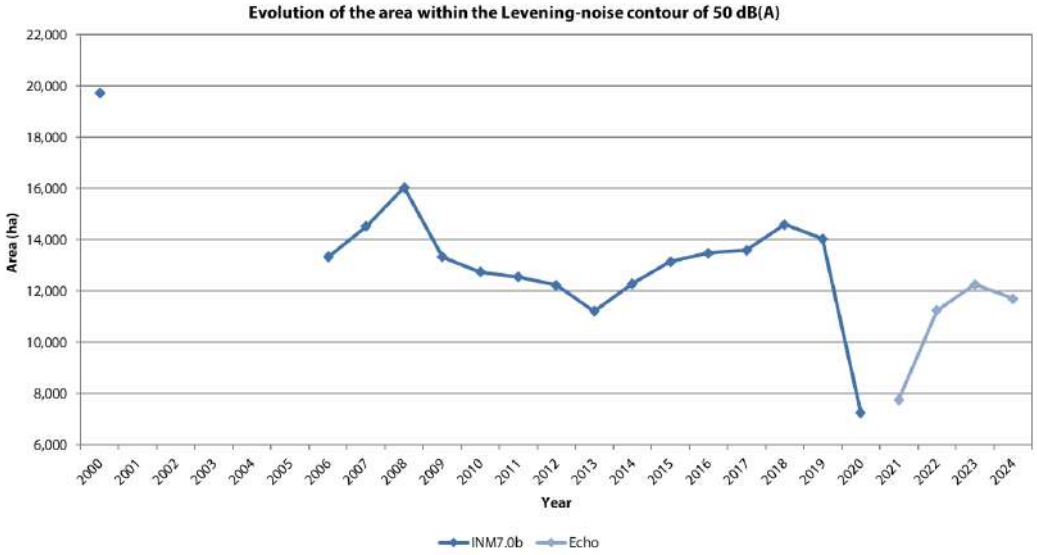


Figure 24: Evolution of the surface area within the $L_{evening}$ contours (2000, 2006-2024).

Table 38: Evolution of the surface area within the L_{night} contours (2000, 2006-2024)

Area (ha)	L_{night} - contour zones in dB(A) (night 23:00-07:00)								
Year	40-45	45-50	50-55	55-60	60-65	65-70	>70	Total (>40)	Total (>45)
2000*		13,927	6,145	2,366	1,090	492	290		**24,310**
2001									
2002									
2003									
2004									
2005									
2006*		10,135	3,571	1,450	554	211	153		**16,075**
2007*		10,872	3,936	1,597	625	236	165		**17,430**
2008*		9,375	3,232	1,260	495	189	123		**14,673**
2009*		7,638	2,613	1,014	397	155	96		**11,913**
2010*		7,562	2,633	999	390	154	96		**11,835**
2011*		8,184	2,803	1,066	413	164	106		**12,736**
2012*		8,525	2,827	1,074	419	168	105		**13,118**
2013*		7,817	2,857	1,525	172	130	0		**12,501**
2014*		7,800	2,921	1,120	448	179	115		**12,583**
2015*		8,451	3,019	1,172	460	194	117		**13,413**
2016*		7,969	2,930	1,111	441	188	109		**12,748**
2017*		7,995	2,929	1,112	427	186	104		**12,754**
2018*		8,495	3,084	1,148	442	178	128		**13,476**
2019*		8,172	3,016	1,124	437	190	105		**13,044**
2020*		5,418	2,016	756	308	193	0		**8,691**
2021**		7,129	2,428	840	282	123	68		**10,870**
2022**		8,817	3,160	1,010	351	158	77		**13,572**
2023**	19,596	9,170	3,391	1,075	389	167	79	**33,867**	**14,271**
2024**	19,675	9,134	3,285	1,077	398	165	76	**33,810**	**14,136**

* Calculated with INM 7.0b, ** Calculated with Echo

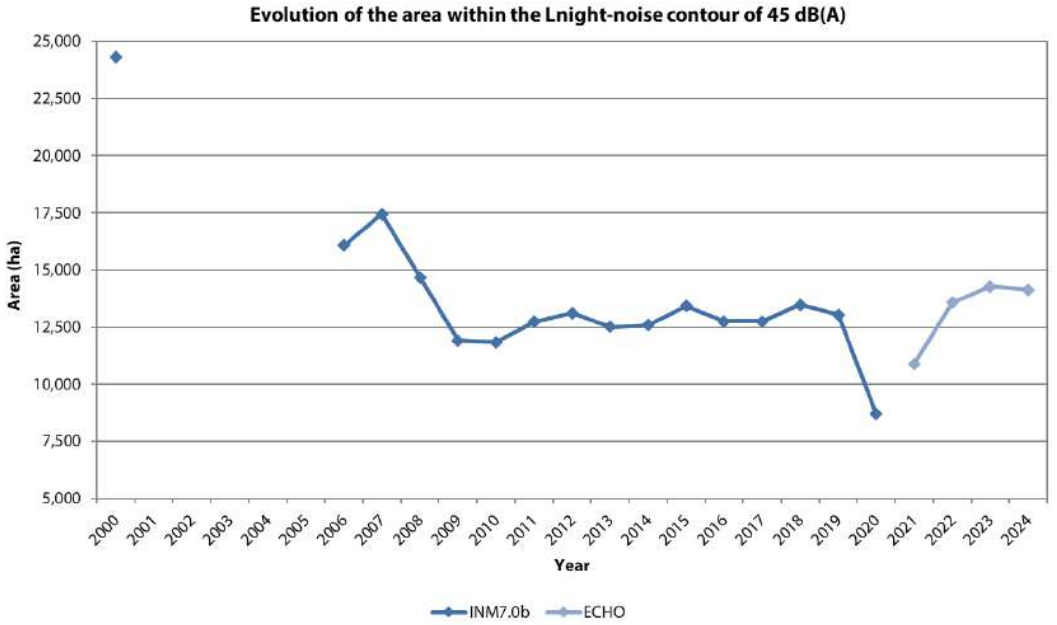


Figure 25: Evolution of the surface area within the L_{night} contours (2000, 2006-2024)

Table 39: Evolution of the surface area within the L_{den} contours (2000, 2006-2024)

Area (ha)	Lden - contour zones in dB(A) (d. 07h-19h, ev. 19h-23h, n. 23h-07h)								
Year	45-50	50-55	55-60	60-65	65-70	70-75	>75	Total (>45)	Total (>55)
2000*			10,664	4,063	1,626	745	497		**17,594**
2001									
2002									
2003									
2004									
2005									
2006*			6,963	2,448	957	373	251		**10,992**
2007*			7,632	2,640	1,036	416	271		**11,996**
2008*			7,118	2,483	953	379	246		**11,178**
2009*			5,771	2,077	797	316	203		**9,163**
2010*			5,576	2,052	782	308	199		**8,917**
2011*			5,767	2,076	800	316	208		**9,167**
2012*			5,623	1,998	771	308	205		**8,905**
2013*			5,152	1,981	767	299	216		**8,415**
2014*			5,429	2,066	800	325	136		**8,756**
2015*			5,695	2,159	825	332	224		**9,236**
2016*			5,554	2,085	797	326	213		**8,974**
2017*			5,579	2,088	795	325	213		**9,000**
2018*			5,957	2,186	832	336	228		**9,540**
2019*			5,646	2,115	802	331	220		**9,115**
2020*			3,445	1,270	494	208	133		**5,549**
2021**			4,290	1,378	543	176	132		**6,520**
2022**			5,681	1,935	622	247	163		**8,648**
2023**	28,834	14,880	6,087	2,063	703	257	172	**52,996**	**9,282**
2024**	29,293	14,940	5,823	2,042	667	277	160	**53,203**	**8,790**

* Calculated with INM 7.0b, ** Calculated with Echo

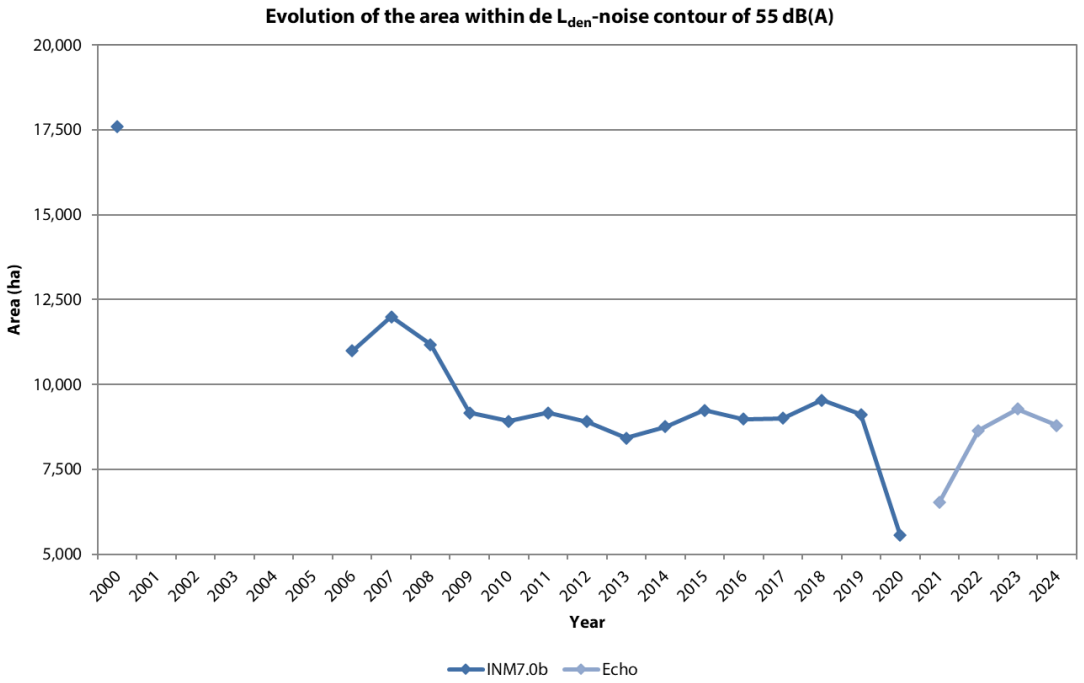


Figure 26: Evolution of the surface area within the L_{den} contours (2000, 2006-2024)

Table 40: Evolution of the surface area within the Freq.70,day contours (2024)

Area (ha)	Freq.70,day - contour zones (day 07:00-19:00)					
Year	5-10	10-20	20-50	50-100	>100	Total
2024**	4,092	2,451	2,314	991	1,191	**11,040**

** Calculated with Echo

Table 41: Evolution of the surface area within the Freq.70,evening contours (2019, 2024).

Area (ha)	Freq.70,evening - contour zones (evening 19:00-23:00)				
Year	1-5	5-10	10-20	>20	Total
2019**	6,646	2,043	1,156	2,128	**11,973**
2024**	7,949	2,004	1,375	1,714	**13,043**

** Calculated with Echo

Table 42: Evolution of the surface area within the Freq.70,night contours (2006-2024).

Area (ha)	Freq.70,night - contour zones (night 23:00-07:00)					
Year	1-5	5-10	10-20	20-50	>50	Total
2006						
2007						
2008						
2009						
2010*	9,535	2,679	1,948	748	0	**14,910**
2011*	9,557	2,662	2,095	801	0	**15,115**
2012*	9,226	2,846	2,005	861	0	**14,938**
2013*	9,083	2,821	2,223	723	0	**14,944**
2014*	8,169	2,586	2,030	1,001	27	**13,813**
2015*	7,949	2,928	1,876	1,133	0	**13,885**
2016*	8,104	2,439	2,149	998	0	**13,690**
2017*	7,813	2,512	2,142	959	0	**13,427**
2018*	8,207	2,508	2,362	957	0	**14,034**
2019*	7,834	2,345	2,299	1,012	0	**13,489**
2020*	7,397	1,990	1,385	204	0	**10,976**
2021**	6,797	2,475	1,627	188	0	**11,087**
2022**	7,015	2,098	2,217	686	0	**12,016**
2023**	7,905	1,836	2,088	741	0	**12,570**
2024**	7,725	1,847	2,204	836	0	**12,612**

* Calculated with INM 7.0b, ** Calculated with Echo

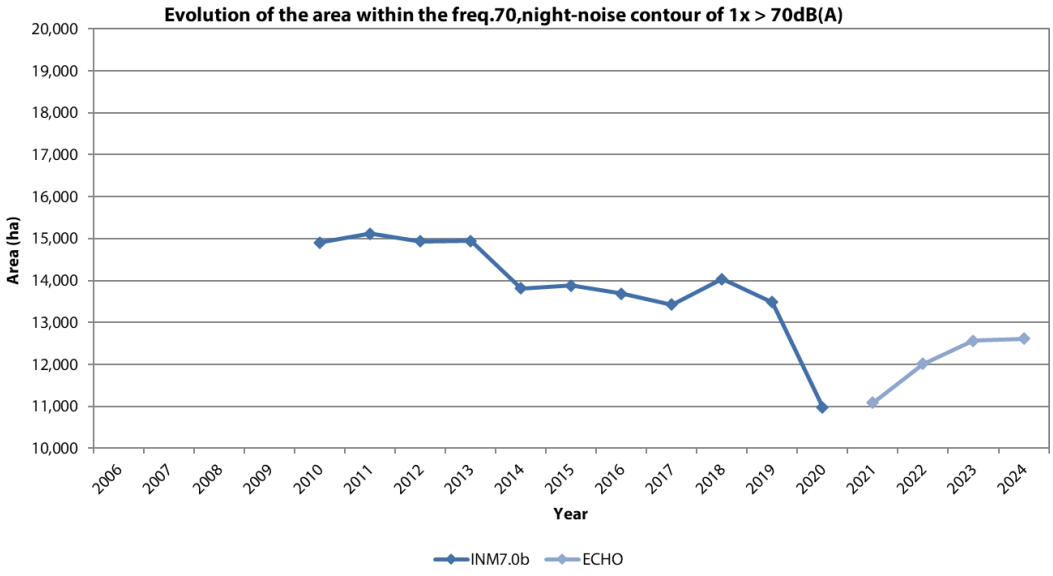


Figure 27: Evolution of the surface area within the Freq.70,night contours (2006-2024).

Table 43: Evolution of the surface area within the Freq. 60,day contours (2024)

Area (ha)	Freq.60,day - contour zones (day 07:00-19:00)				
Year	50-100	100-150	150-200	>200	Total
2024**	7,310	3,575	1,154	150	**12,189**

** Berekend met Echo

Table 44: Evolution of the surface area within the Freq. 60,evening contours (2024)

Area (ha)	Freq.60,evening - contour zones (evening 19:00-23:00)				
Year	10-15	15-20	20-30	>30	Total
2019**	4,888	2,918	5,502	6,380	**19,688**
2024**	4,960	3,161	4,748	4,930	**17,799**

** Berekend met Echo

Table 45: Evolution of the surface area within the Freq.60,night contours (2006-2024).

Area (ha)	Freq.60,night - contour zones (night 23:00-07:00)				
Year	10-15	15-20	20-30	>30	Total
2006					
2007					
2008					
2009					
2010*	5,577	1,797	1,930	725	**10,030**
2011*	6,436	1,972	1,930	905	**11,242**
2012*	7,522	1,778	1,932	1,004	**12,236**
2013*	5,083	2,367	1,888	1,031	**10,369**
2014*	4,807	2,542	1,845	1,670	**10,864**
2015*	5,819	1,786	3,064	1,295	**11,964**
2016*	5,142	3,635	2,053	1,222	**12,052**
2017*	5,612	3,310	2,349	1,183	**12,454**
2018*	5,580	3,434	2,746	1,301	**13,061**
2019*	5,802	3,774	2,480	1,296	**13,352**
2020*	4,111	882	567	267	**5,827**
2021**	2,845	3,459	869	318	**7,491**
2022**	6,584	2,884	2,597	732	**12,796**
2023**	6,081	3,557	2,478	864	**12,980**
2024**	5,243	5,234	2,287	1,075	**13,838**

* Calculated with INM 7.0b, ** Calculated with Echo

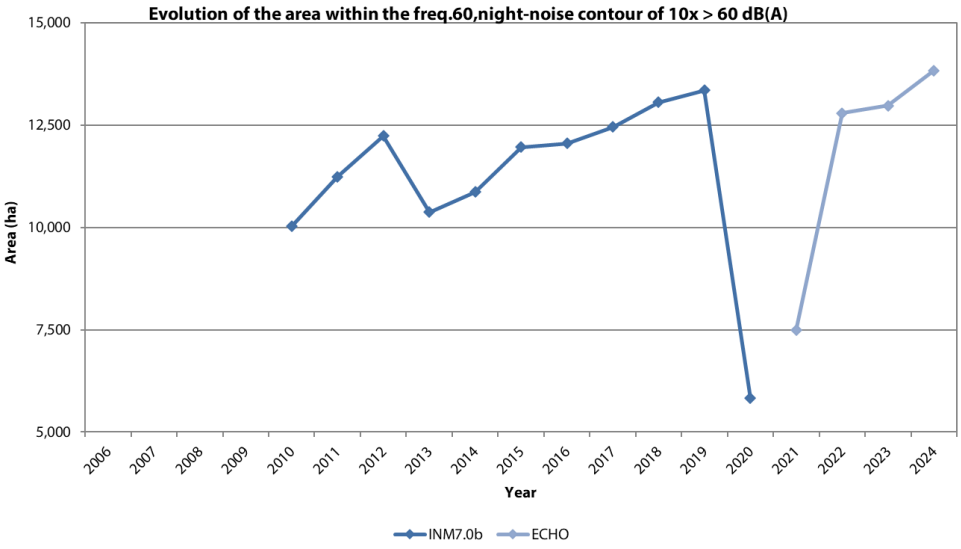


Figure 28: Evolution of the surface area within the Freq.60,night contours (2006-2024).

Evolution of the number of residents per contour zone: L_{day}, $L_{evening}$, L_{night}, L_{den}, Freq.70, day Freq.70, night, Freq.60, day, Freq.60, night

Table 46: Evolution of the number of residents within the L_{day} contours (2000, 2006-2024).

Number of inhabitants		L_{day} - contour zones in dB(A) (day 07:00-19:00)					
Year	Population data	55-60	60-65	65-70	70-75	>75	Total
2000*	01jan00	106,519	13,715	5,660	1,134	20	**127,048**
2001							
2002							
2003							
2004							
2005							
2006*	01jan03	39,478	9,241	2,714	74	3	**51,511**
2007*	01jan06	47,260	9,966	3,168	102	3	**60,499**
2008*	01jan07	44,013	10,239	3,217	101	4	**57,575**
2009*	01jan07	32,144	8,724	2,815	58	3	**43,745**
2010*	01jan08	30,673	8,216	2,393	35	7	**41,323**
2011*	01jan08	28,828	8,486	2,460	46	7	**39,828**
2012*	01jan10	23,963	8,277	2,110	22	2	**34,375**
2013*	01jan10	22,737	7,482	1,318	7	2	**31,546**
2014*	01jan11	22,998	8,649	2,249	22	2	**33,920**
2015*	01jan11	23,662	8,945	2,350	99	0	**35,056**
2016*	01jan11	20,554	8,380	2,094	28	0	**31,057**
2017[1]*	01jan16	21,950	9,003	3,108	0	0	**34,062**
2018[1]*	01jan17	23,289	8,993	2,798	3	0	**35,083**
2019[1]*	01jan19	21,875	9,342	3,270	3	0	**34,489**
2020[1]*	01jan20	14,195	4,191	122	0	0	**18,507**
2021[1]**	01jan22	17,686	3,670	45	0	0	**21,401**
2022[1]**	01jan23	24,080	5,570	148	0	0	**29,797**
2023[1]**	01jan24	26,201	6,830	215	6	0	**33,252**
2024[1]**	01jan25	25,774	7,030	243	0	0	**33,047**

1 evaluation according to address

* Calculated with INM 7.0b, ** Calculated with Echo

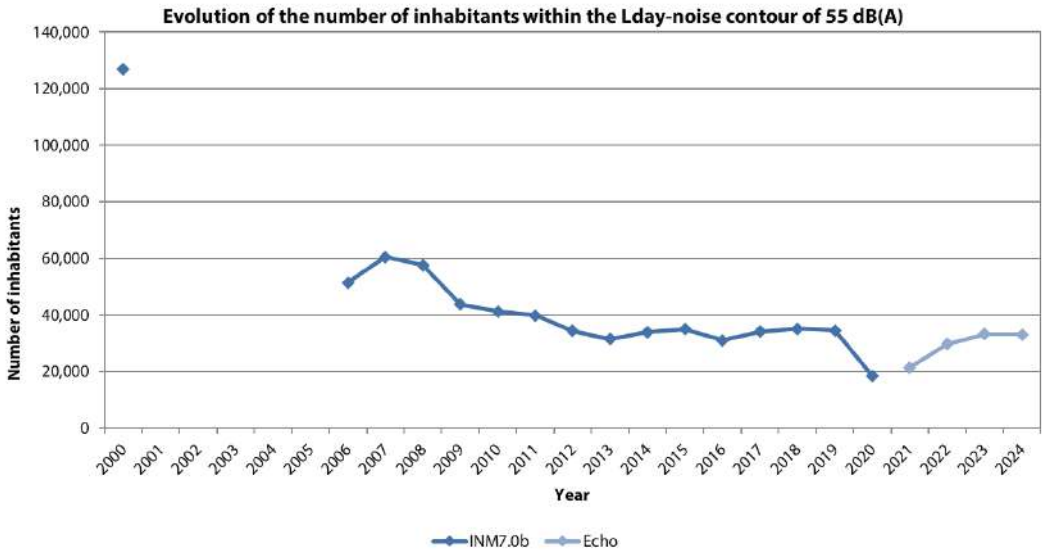


Figure 29: Evolution of the number of residents within the L_{day} contours (2000, 2006-2024).

Table 47: Evolution of the number of residents within the $L_{evening}$ contours (2000, 2006-2024).

Number of inhabitants		$L_{evening}$ - contour zones in dB(A) (evening 19:00-23:00)						
Year	Population data	50-55	55-60	60-65	65-70	70-75	>75	Total
2000*	01jan00	209,265	86,637	13,246	4,990	602	9	**314,750**
2001								
2002								
2003								
2004								
2005								
2006*	01jan03	185,699	24,488	7,138	2,030	28	3	**219,386**
2007*	01jan06	214,616	35,445	8,217	2,583	38	2	**260,901**
2008*	01jan07	249,024	43,589	9,514	2,969	52	3	**305,152**
2009*	01jan07	198,351	29,774	7,448	2,186	32	2	**237,793**
2010*	01jan08	198,934	37,729	7,127	2,057	25	5	**245,878**
2011*	01jan08	198,540	41,951	7,110	2,077	32	5	**249,716**
2012*	01jan10	213,799	46,427	7,309	2,072	27	1	**269,635**
2013*	01jan10	148,866	25,888	6,432	1,054	7	1	**182,247**
2014*	01jan11	187,698	23,913	9,632	2,052	29	0	**223,324**
2015*	01jan11	168,549	22,593	8,790	2,424	88	0	**202,444**
2016*	01jan11	204,319	29,643	9,140	2,796	52	0	**245,949**
2017[1]*	01jan16	206,220	26,880	9,055	3,173	5	0	**245,334**
2018[1]*	01jan17	226,101	34,113	10,033	3,538	57	0	**273,841**
2019[1]*	01jan19	213,243	28,965	9,814	3,531	5	0	**255,558**
2020[1]*	01jan20	54,642	16,266	5,093	261	0	0	**76,262**
2021**	01jan22	56,816	16,283	3,676	37	0	0	**76,812**
2022[1]**	01jan23	130,068	24,876	4,859	145	0	0	**159,949**
2023[1]**	01jan24	157,712	28,274	5,839	184	0	0	**192,009**
2024[1]**	01jan25	158,787	26,738	5,758	213	0	0	**191,496**

1 evaluation according to address

* Calculated with INM 7.0b, ** Calculated with Echo

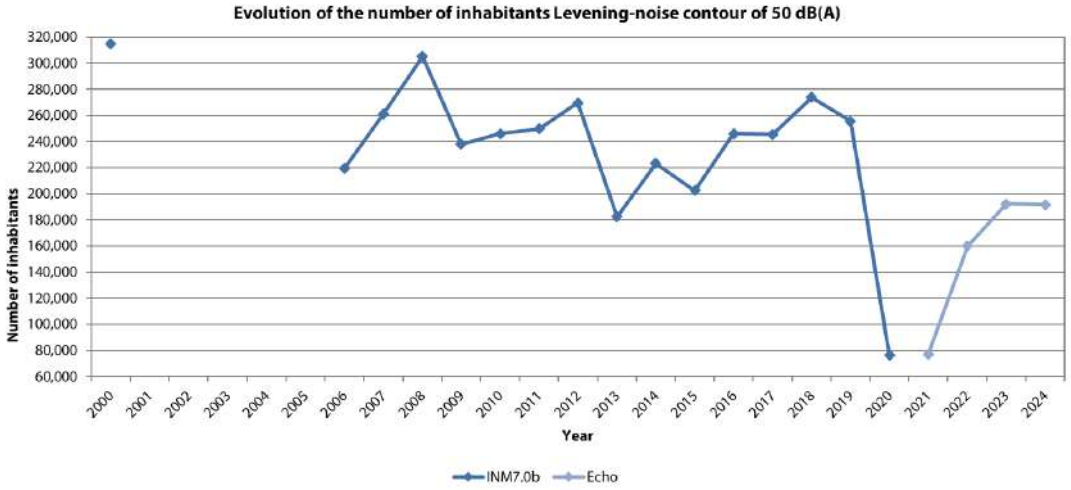


Figure 30: Evolution of the number of residents within the $L_{evening}$ contours (2000, 2006-2024).

Table 48: Evolution of the number of residents within the L_{night} contours (2000, 2006-2024).

Area (ha)	L_{night} - contour zones in dB(A) (night 23:00-07:00)								
Year	40-45	45-50	50-55	55-60	60-65	65-70	>70	Total (>40)	Total (>45)
2000*		13,927	6,145	2,366	1,090	492	290		**24,310**
2001									
2002									
2003									
2004									
2005									
2006*		10,135	3,571	1,450	554	211	153		**16,075**
2007*		10,872	3,936	1,597	625	236	165		**17,430**
2008*		9,375	3,232	1,260	495	189	123		**14,673**
2009*		7,638	2,613	1,014	397	155	96		**11,913**
2010*		7,562	2,633	999	390	154	96		**11,835**
2011*		8,184	2,803	1,066	413	164	106		**12,736**
2012*		8,525	2,827	1,074	419	168	105		**13,118**
2013*		7,817	2,857	1,525	172	130	0		**12,501**
2014*		7,800	2,921	1,120	448	179	115		**12,583**
2015*		8,451	3,019	1,172	460	194	117		**13,413**
2016*		7,969	2,930	1,111	441	188	109		**12,748**
2017*		7,995	2,929	1,112	427	186	104		**12,754**
2018*		8,495	3,084	1,148	442	178	128		**13,476**
2019*		8,172	3,016	1,124	437	190	105		**13,044**
2020*		5,418	2,016	756	308	193	0		**8,691**
2021**		7,129	2,428	840	282	123	68		**10,870**
2022**		8,817	3,160	1,010	351	158	77		**13,572**
2023**	19,596	9,170	3,391	1,075	389	167	79	**33,867**	**14,271**
2024**	19,675	9,134	3,285	1,077	398	165	76	**33,810**	**14,136**

* Calculated with INM 7.0b, ** Calculated with Echo

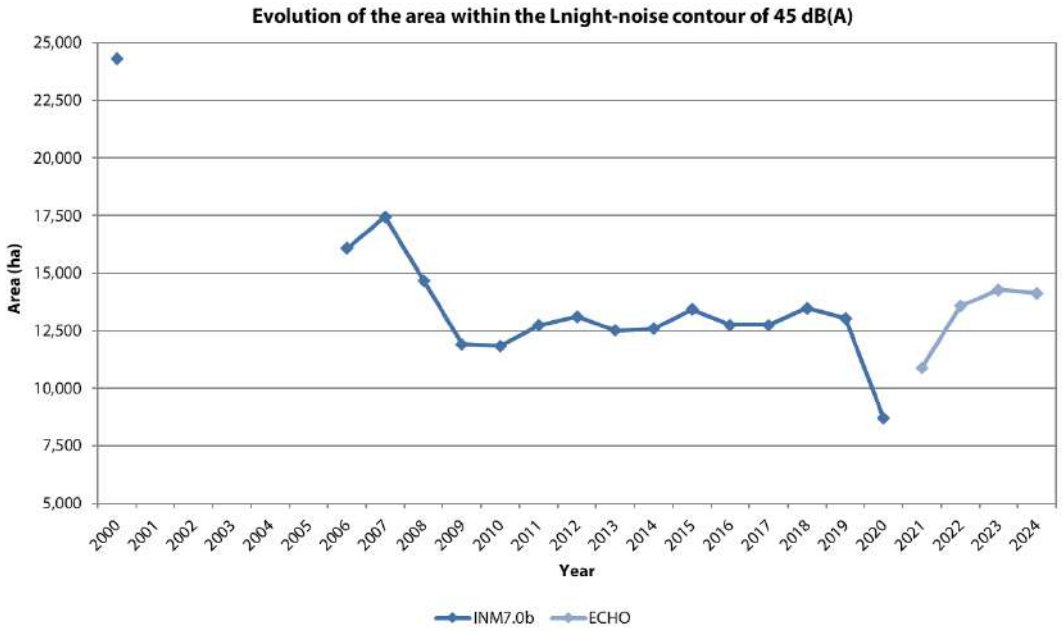


Figure 31: Evolution of the number of residents within the L_{night} contours (2000, 2006-2024).

Table 49: Evolution of the number of residents within the L_{den} contours (2000, 2006-2024).

Number of inhabitants		L_{den} - contour zones in dB(A) (d. 07h-19h, av. 19h-23h, n. 23h-07h)								
Year	Population data	45-50	50-55	55-60	60-65	65-70	70-75	>75	Total (>45)	Total (>55)
2000*	01jan00			166,767	36,797	14,091	3,952	264		**221,871**
2001										
2002										
2003										
2004										
2005										
2006*	01jan03			107,514	18,697	5,365	560	63		**132,198**
2007*	01jan06			147,349	19,498	6,565	946	82		**174,442**
2008*	01jan07			125,927	19,319	5,938	717	24		**151,925**
2009*	01jan07			87,766	15,105	4,921	404	9		**108,205**
2010*	01jan08			87,083	15,619	4,506	337	11		**107,556**
2011*	01jan08			90,988	15,941	4,664	362	13		**111,969**
2012*	01jan10			86,519	16,220	4,617	319	6		**107,680**
2013*	01jan10			56,516	16,517	3,994	197	5		**77,229**
2014*	01jan10			84,747	16,525	5,076	368	9		**106,725**
2015*	01jan11			72,628	17,721	5,244	428	55		**96,075**
2016*	01jan11			77,229	16,694	5,284	450	23		**99,680**
2017[1]*	01jan16			70,139	17,645	5,264	257	0		**93,305**
2018[1]*	01jan17			77,812	19,476	5,413	413	0		**103,114**
2019[1]*	01jan19			72,561	19,231	5,448	383	0		**97,624**
2020[1]*	01jan20			34,236	9,801	1,361	110	0		**45,508**
2021[1]**	01jan22			40,787	9,371	931	30	0		**51,119**
2022[1]**	01jan23			58,491	18,472	1,245	117	0		**78,326**
2023[1]**	01jan24	723,261	368,185	65,425	21,920	1,727	143	0	**1,180,661**	**89,215**
2024[1]**	01jan25	738,872	373,192	63,944	22,227	1,846	161	0	**1,200,242**	**88,178**

1 evaluation according to address

* Calculated with INM 7.0b, ** Calculated with Echo

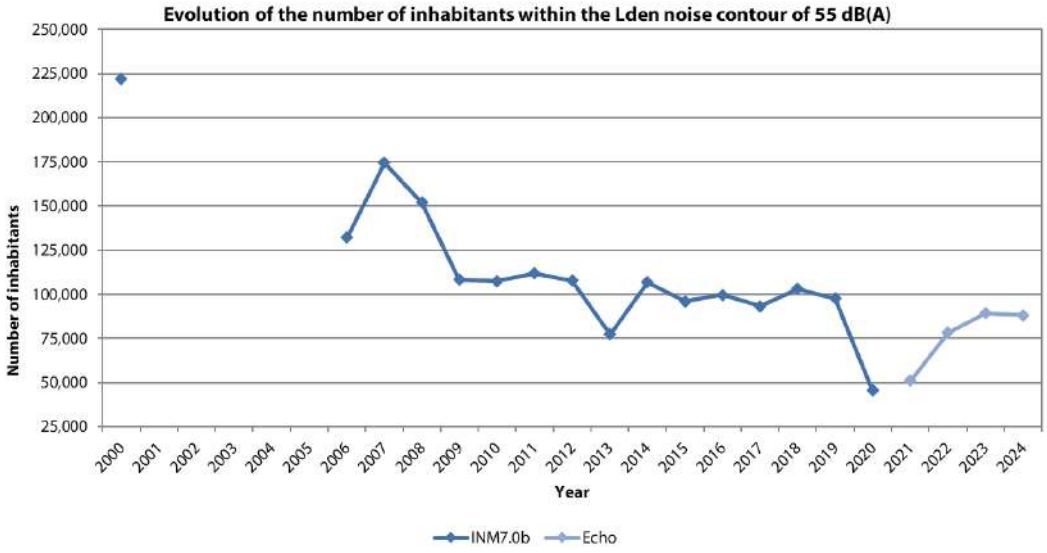


Figure 32: Evolution of the number of residents within the L_{den} contours (2000, 2006-2024).

Table 50: Evolution of the number of residents within the Freq.70,day contours (2024)

Number of inhabitants		Freq.70,day - contour zones (day 07:00-19:00)					
Year	Population data	5-10	10-20	20-50	50-100	>100	Total
2024[1]**	01jan25	116,059	54,667	16,834	10,302	4,769	**202,631**

1 evaluation according to address

** Calculated with Echo

Table 51: Evolution of the number of residents within the Freq.70,evening contours (2019, 2024)

Number of inhabitants		Freq.70,evening - contour zones (evening 19:00-23:00)				
Year	Population data	1-5	5-10	10-20	>20	Total
2019[1]**	01jan22	190,261	26,510	11,829	11,460	**240,060**
2024[1]**	01jan25	226,651	23,904	13,665	9,825	**274,045**

1 evaluation according to address

** Calculated with Echo

Table 52: Evolution of the number of residents within the Freq.70,night contours (2006-2024).

Number of inhabitants		Freq.70,night - contour zones (night 23:00-07:00)					
Year	Population data	1-5	5-10	10-20	20-50	>50	Total
2006							
2007							
2008							
2009							
2010*	01jan08	239,529	23,583	12,968	2,597	0	**278,677**
2011*	01jan08	232,090	22,587	13,071	3,261	0	**271,010**
2012*	01jan10	195,400	21,774	12,858	4,078	0	**234,110**
2013*	01jan10	158,701	22,985	15,876	1,774	0	**199,913**
2014*	01jan11	240,106	19,794	13,018	6,333	0	**279,251**
2015*	01jan11	167,925	22,934	13,681	6,400	0	**210,939**
2016*	01jan11	183,776	18,616	14,079	6,151	0	**222,622**
2017[1]*	01jan16	155,257	19,411	14,408	5,854	0	**194,930**
2018[1]*	01jan17	172,835	21,478	14,948	6,020	0	**215,281**
2019[1]*	01jan19	184,024	20,072	15,028	6,574	0	**225,698**
2020[1]*	01jan20	89,653	17,902	6,243	496	0	**114,295**
2021[1]**	01jan22	80,278	18,228	10,346	0	0	**108,852**
2022[1]**	01jan23	117,025	21,970	14,417	1,288	0	**154,700**
2023[1]**	01jan24	155,985	17,916	15,518	1,641	0	**191,060**
2024[1]**	01jan25	135,291	14,842	15,753	4,174	0	**170,060**

1 evaluation according to address

* Calculated with INM 7.0b, ** Calculated with Echo

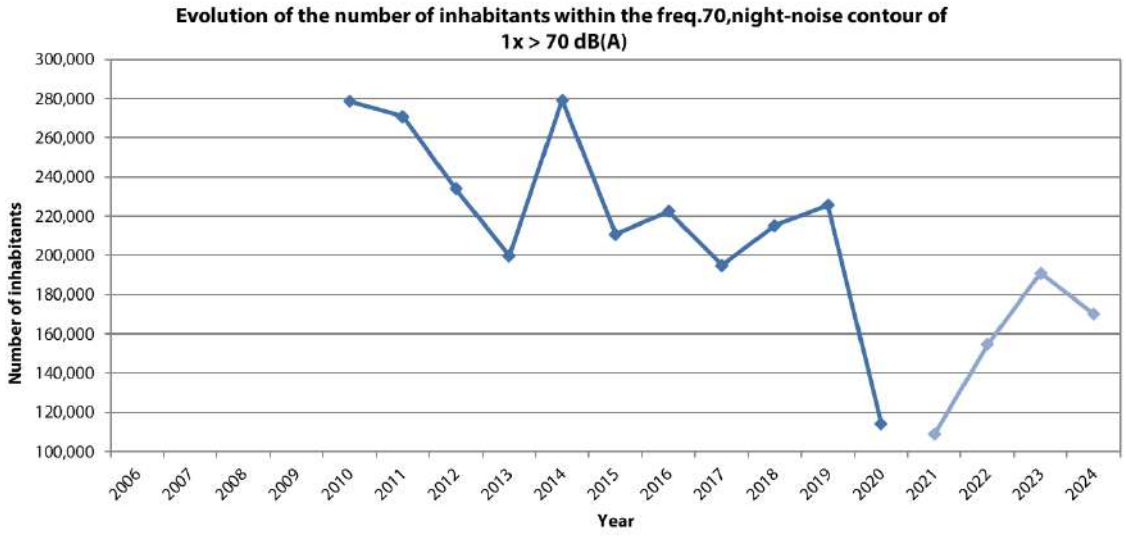


Figure 33: Evolution of the number of residents within the Freq.70,night contours (2006-2024).

Table 53: Evolution of the number of residents within the Freq.60,day contours (2024)

Number of inhabitants		Freq.60,day - contour zones (day 07:00-19:00)				
Year	Population data	50-100	100-150	150-200	>200	Total
2024[1]**	01jan25	137,579	27,690	12,231	0	**177,500**

1 evaluation according to adress

** Calculated with Echo

Table 54: Evolution of the number of residents within the Freq.60,evening contours (2019, 2024)

Number of inhabitants		Freq.70,evening - contour zones (evening 19:00-23:00)				
Year	Population data	10-15	15-20	20-30	>30	Total
2019[1]**	01jan20	106,110	72,045	134,909	21,307	**334,372**
2024[1]**	01jan25	117,215	77,588	73,568	40,728	**309,099**

1 evaluation according to adress

** Calculated with Echo

Table 55: Evolution of the number of residents within the Freq.60,night contours (2006-2024).

Number of inhabitants		Freq.60,night - contour zones in dB(A)				
Year	Population data	10-15	15-20	20-30	>30	Total
2006						
2007						
2008						
2009						
2010*	01jan08	62,090	9,411	21,231	3,262	**95,994**
2011*	01jan08	65,246	9,522	20,695	5,450	**100,913**
2012*	01jan10	80,911	8,723	20,642	7,009	**117,284**
2013*	01jan10	52,151	14,679	20,269	6,340	**93,438**
2014*	01jan11	79,725	27,741	18,637	12,317	**138,420**
2015*	01jan11	84,429	12,453	24,502	10,351	**131,736**
2016*	01jan11	81,235	20,356	21,869	8,779	**132,238**
2017[1]*	01jan16	93,532	15,687	23,488	9,538	**142,245**
2018[1]*	01jan17	98,609	16,849	24,728	10,016	**150,202**
2019[1]*	01jan19	110,835	17,770	24,096	10,817	**163,518**
2020[1]*	01jan20	30,334	10,565	4,365	539	**45,803**
2021[1]**	01jan22	26,888	28,001	10,397	740	**66,026**
2022[1]**	01jan23	73,064	19,541	26,822	3,866	**123,293**
2023[1]**	01jan24	83,990	19,750	28,279	6,836	**138,855**
2024[1]**	01jan25	93,600	31,010	26,424	10,557	**161,591**

1 evaluation according to address

* Calculated with INM 7.0b, ** Calculated with Echo

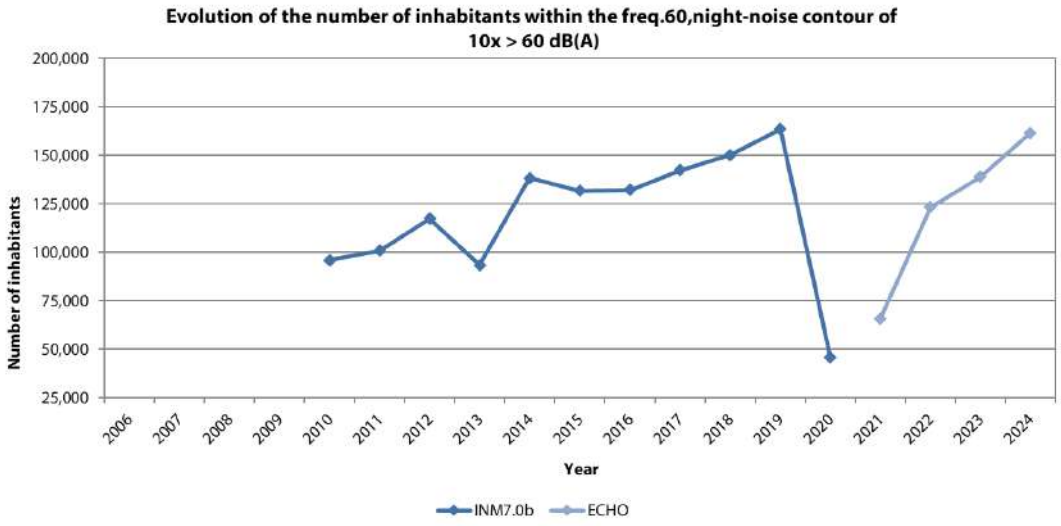


Figure 34: Evolution of the number of residents within the Freq.60,night contours (2006-2024).

Annex F. Impact change to calculation method

The following table shows the impact on the calculated noise load for the main changes in the calculation method.

Table 56: Description of the impact per change in the calculation method of the contours.

Change	Impact on the noise levels
Changes calculation model: INM → Echo	The most significant change as a consequence of applying Doc. 29 calculation method, is the advice for the use of a more recent method to determine atmospheric absorption. This leads to a rise in the noise levels. The impact close to the airport is small, farther away the differences can be 1 to 2 dB.
Updating source data	The correction of the noise levels for approaches by Airbus aircraft lead to higher noise levels for approaches. The noise impact for Brussels Airport thus increases to the order of 1 dB (larger contours). The addition of data of a number of aircraft has a marginal effect.
Correction factor compared to the proxy aircraft type	The application of the factor 'corrects' for the differences in noise levels of the proxy aircraft type in the calculation and the actual aircraft type. The application of the correction factor leads to around 1 dB lower noise level for departures and 0.5 dB for arrivals and thus to smaller contours.
Modelling based on actual flight paths	A calculation based on the actual flight paths is locally more accurate and can have an effect on the location of the contours. The impact overall is, however, marginal.
Modelling departures based on NADP1 procedure	In line with the prescribed departure procedure at Brussels Airport, departures are modelled based on the NADP1 instead of the NADP2 procedure. The calculated noise levels for take-offs are thus 1 to 3 dB lower in the area under the flight path at c. 5 to 10 km measured from the beginning of the runway and around 1 dB higher in the area to the side of the flight path.
Distinction in approach profiles	By taking account of the 'level flying' (whereby a section of the approach is flown at a fixed altitude) in the modelling, the calculated noise levels for approaches is somewhat higher. The impact is only visible at a greater distance (10+ km) before the runway.

Annex G. Documentation provided files

Radar data for the year 2024 (source: BAC-TANOS)

2024-JAN-APR_flights.xlsx	08/01/2025	25.776 KB
2024-JAN-JUN_ops.csv	08/01/2025	1,115,288 KB
2024-JUL-DEC_flights.xlsx	08/01/2025	28.709 KB
2024-JUL-DEC_ops.csv	08/01/2025	1,239,544 KB

Flight data for the year 2024 (source: BAC-CDB)

ENV002_AT_202401_202412.csv	08/01/2025	68.963 KB

Data entry point per flight for 2024 (source Skeyes)

EBBR_2024_DEP.xlsx	08/01/2025	9.758 KB

Weather data for the year 2024 (source: BAC-TANOS)

2024_meteo.xls	08/01/2025	1.234 KB

Noise events for the year 2024 (source: BAC-TANOS / dOMG)

2024-01_03_events TANOS.xlsx	08/01/2025	81.469 KB
2024-01_06_events OMGEVING.xlsx	08/01/2025	58.425 KB
2024-04_06_events TANOS.xlsx	08/01/2025	68.103 KB
2024-07_09_events TANOS.xlsx	08/01/2025	46.848 KB
2024-07_12_events OMGEVING.xlsx	08/01/2025	63.539 KB
2024-09_12_events TANOS.xlsx	08/01/2025	68.006 KB

hour reports noise measuring network for the year 2024 (BAC-TANOS / dOMG)

status_2024.xls	08/01/2025	1.060 KB
uur-rapporten_2024_0106_TANOS.xls	08/01/2025	11.497 KB
uur-rapporten_2024_0712_TANOS.xls	08/01/2025	9.927 KB

Adress files Flanders and Brussels

Centraal Referentieadressenbestand (CRAB)	01/01/2025	Government of Flanders
OSLO business estates	01/01/2025	Government of Flanders
UrBis-Adm	01/01/2025	CIBG
ICAR - Address Points Wallonia	01/01/2025	Walloon Government