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Balanced Approach study Schiphol Airport

Third addendum

Aviation Consultants

Balanced Approach study Schiphol Airport

Third addendum

Report

Ministry of Infrastructure and Water Management
Directorate-General for Aviation and Maritime Affairs
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Summary

The Dutch Ministry of Infrastructure and Water Management (IenW) has commissioned To70 to update the Balanced Approach study report (our reference 22.171.20[1], 23.171.27[2] and 23.171.37[3]). In this third addendum, an updated combination of measure(s) is presented that contributes to meeting the noise abatement objective in november 2025. This summary provides an overview of the main results. The most cost-effective combination of measure to meet the noise abatement objectives in November 2025 is presented in the table below.

Pillar	Combination of measures
Reduce noise at source	Use of quieter aircraft during nighttime period
	Stimulate use of quieter aircraft through airport charges
	Additional fleet renewal
Operating restrictions	Ban aircraft with cumulative margin lower than 13 EPNdB during nighttime
	Cap the number of movements during the nighttime to 27,000 movements

The reduction in terms of noise exposure of the proposed combination of measures has been calculated, resulting in the following reduction compared to the baseline scenario (november 2025):

Measure	Number of highly annoyed people within 48 dB(A) L_{den}	Number of houses within 58 dB(A) L_{den}	Number of severely sleep disturbed people within 40 dB(A) L_{night}	Number of houses within 48 dB(A) L_{night}
Baseline scenario	111,955	6,962	24,502	5,750
Noise abatement objective	-17%	-17%	-15%	-15%
Impact of combination of measures	96,616 (-13.7%)	6,178 (-11.3%)	15,412 (-36.8%)	3,356 (-41.6%)
Impact on noise abatement objectives	Objective is not met (-3,3%)	Objective is not met (-5.7%)	Objective is met	Objective is met
Impact of combination of measures incl. capacity reduction to 470.000 movements	90,571 (-19.1%)	5,817 (-16.4%)	15,412 (-37.1%)	3,356 (-41.6%)
Impact on noise abatement objectives	Objective is met	Objective is not met (-0.5%)	Objective is met	Objective is met
Impact of combination of measures incl. capacity reduction to 465.000 movements	89,509 (-20.0%)	5,763 (-17.2%)	15,412 (-37.1%)	3,356 (-41.6%)
Impact on noise abatement objectives	Objective is met	Objective is met	Objective is met	Objective is met

[1] https://www.internetconsultatie.nl/balanced_approach_schiphol/document/11061

[2] https://www.luchtvaartindetoekomst.nl/documenten/besluiten/2023/09/01/annex-ii---balanced-approach-study-schiphol-airport-to70

[3] https://www.internetconsultatie.nl/aanvullende_raadpleging_ba/document/12645

The results of this combination of measures leads to the following observations:

- Based on the results it can be concluded that the L_{night} noise abatement objectives of -15% are met with a significant margin;
- The L_{den} noise abatement objectives of -17% are not met with the combination of measures. A capacity reduction measure of the total number of movements is required to meet the L_{den} noise abatement objectives;
- The required capacity reduction of the total number of movements to meet all the noise abatement objectives (without overshooting the objectives) lies approximately between 466.000 movement and 467.000 movements per year. This bandwidth is based on the results of the calculations of the combination of measures including capacity reduction to 470.000 and 465.000 movements per year.

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1 Introduction

1.1 Introduction

The Dutch Ministry of Infrastructure and Water Management (IenW) has commissioned To70 to update the Balanced Approach study report and its addenda (our references 22.171.20, 23.171.27 and 23.171.37). This third addendum contains an updated combination of measures to meet the noise abatement objectives for november 2025.

1.2 Research question

IenW has commissioned To70 to update the Balanced Approach study. The following has been asked to perform:

- Refinement of existing measures on the shortlist based on more detailed information gathered from stakeholders;
- Develop a new combination of measures with the existing measures (refined with stakeholder input), but excluding the measure 'Minimize the use of the secondary runways between 13:00 – 15:00';
- Calculate the most cost effective (combination of) measure(s) to meet the noise abatement objectives.

1.3 Scope and assumptions

- IenW has provided To70 with more detailed information regarding the measures;
- IenW commissioned To70 to establish a new combination of measures that would result in a reduction of 17% (relative to the baseline scenario) for the L_{den} noise abatement objectives in November 2025 instead of the 20% in the initial study and the 15-17% in the second addendum published in May 2024;
- The baseline scenario which was developed to represent the situation of November 2024 will also be used as baseline scenario for November 2025;
- This update has been performed in line with the same methodology and tools as used in the Balanced Approach study report (our reference 22.171.20);
- This research is performed in close parallel with research performed by Decisio and Beelining about the cost-effectiveness of the (combination of) measures to meet the noise abatement objectives.

1.4 Reading guide

It is advisable to read this (third) addendum alongside the mentioned Balanced Approach study report and addenda. Chapter 2 provides an overview updates and reassessments of the measures. Chapter 3 closes this addendum with the calculation of the combination of measure(s) to meet the noise abatement objectives.

2 Updates and reassessments

2.1 Noise abatement objectives

IenW has decided to shift the noise abatement objectives to november 2025 (from november 2024). As a result the L_{den} noise abatement objectives are set at -17% compared to the -15% to -17% for the L_{den} noise abatement objectives as presented in the second addendum. Based on this decision, To70 was tasked by IenW to establish a combination of measures that would meet all the objectives as presented in Table 1.

Table 1 - noise abatement objectives

Criteria related to the noise abatement objective	Noise abatement objectives November 2025
Number of houses within the 58 dB(A) L_{den} contour	-17%
Number of highly annoyed people within the 48 dB(A) L_{den} contour	-17%
Number of houses within the 48 dB(A) L_{night} contour	-15%
Number of severely sleep disturbed people within the 40 dB(A) L_{night} contour	-15%

2.2 Updated baseline scenario

The decision to refine the measures has also resulted in an updated noise load database that is being used for this study. The noise load database is filled with noise grids, containing the average noise exposure around the airport for a specific aircraft/runway/route/procedure combination. The noise load database as used in the previous calculations was deemed unfit to use for the calculation with the refined measures. This is mainly due to insufficient availability of noise grids of latest generation aircraft (such as the Embraer 195-E2 and the Airbus A321neo) in the noise load database. These aircraft are present in the baseline scenario and increased use of these aircrafts can be found in the measures. Therefore, the noise load database was updated and filled with noise grids that were required to accurately calculate the noise exposure for the refined measures.

However, the baseline scenario needed to be recalculated with the update noise load database to properly compare the result of the baseline scenario to the result of the updated (combination) of measures. Table 2 provides a comparison between the result of the initial baseline scenario and the result of the baseline scenario with the updated noise load database.

Table 2 - noise abatement objectives

Criteria related to the noise abatement objective	Result of initial baseline scenario	Result of updated baseline scenario
Number of houses within the 58 dB(A) L_{den} contour	7,081	6,962
Number of highly annoyed people within the 48 dB(A) L_{den} contour	113,862	111,955
Number of houses within the 48 dB(A) L_{night} contour	5,685	5,750
Number of severely sleep disturbed people within the 40 dB(A) L_{night} contour	24,365	24,502

The total annual average noise exposure (L_{den}) of the baseline scenario has decreased as a result of using the updated noise load database. This can be explained by the fact that the noise grids of latest generation aircrafts were not available and that these movements were previously calculated using an

average noise exposure footprint. Given that the average noise exposure footprint is bigger than the noise exposure footprint of a latest generation aircraft (as they are less noisy), the new calculation results in a smaller noise exposure footprint and subsequently in less houses and people within the relevant noise contours.

There is no significant change of the total annual average noise exposure for the night period (L_{night}) of the baseline scenario as a result of using the updated noise load database. This can be explained by the fact that the largest part of the update of the noise load database is related to the addition of the noise grids of latest generation aircraft, which are only present in small numbers in the nighttime period of the baseline scenario.

2.3 Selection and refinement of existing measures

IenW has commissioned To70 to refine the existing measures with input provided by stakeholders. The following measures are refined and part of the combination of measures:

- Use of quieter aircraft during nighttime period;
- Additional fleet renewal;
- Stimulate use of quieter aircraft through airport charges;
- Ban aircraft with cumulative margin lower than 13 EPNdB during nighttime;
- Cap the number of movements during the nighttime to 27,000 movements;

The measure 'Minimize the use of the secondary runways between 13:00 – 15:00' was removed from the shortlist of measures as this measures was deemed operationally unfeasible by the stakeholders.

2.3.1 Use of quieter aircraft during nighttime period

A measure was proposed to shift noisier wide body aircraft movements from the nighttime period to the daytime period and use quieter aircraft during the nighttime period. This measure is based on input from KLM and contains two elements:

- Shift wide-body aircraft (A330-220, A330-300 and B777-300ER) movements during nighttime to the daytime period and fill that slot with a narrow-body aircraft (E195-E2) during nighttime;
- Replacing a noisier wide-body aircraft with a less-noisy wide-body aircraft, e.g. replacing a B777-200 for a B787-10.

With this measure, the number of night movements remains the same, but the L_{den} penalty for the nighttime movements (10x penalty) is applied to a (quieter) aircraft instead of a (noisier) wide-body aircraft.

Around 1,400 wide-body aircraft (A330-220, A330-300 and B777-300ER) movements were moved out of the night-time period and replaced with an equal amount of latest generation narrow-body aircraft (E195-E2). Roughly 850 night-time movements with a noisier wide-body aircraft (B777-200) were substituted by latest generation and less-noisy wide-body aircraft (B787-9 and B787-10) from the daytime. Table 3 provides an overview of the number of movements per aircraft type.

Table 3 – Changes per aircraft type between day-time and night-time

Change	Aircraft type	Change in number of movements
From night-time period (23:00 – 07:00) to day-time period (07:00 – 19:00)	A332	468
	A333	260
	B772	832
	B77W	676
Total		**-2,236**
From day-time period (07:00 – 19:00) to night-time period (23:00 – 07:00)	B789	364
	B78X	468
	E295	1404
Total		**+2,236**

It is expected that the noise exposure will significantly decrease as a result of this measure compared to the previous calculations due to the availability of Embraer 190-E2 (E295) noise grids in the noise load database. This measure will effectively reduce the noise impact of 20,124 movements (90% of the 2,236 movements multiplied by penalty factor 10 in the L_{den} calculations) by a less noisy aircraft.

2.3.2 Stimulate use of quieter aircraft through airport charges

A differentiation in airport charges based on the aircraft noise performance is already in place at Schiphol Airport. Schiphol distinguishes aircrafts in 7 categories, ranging from S1 (noisiest aircraft class) to S7 (least noisy aircraft class). The measure to (further) stimulate use of quieter aircraft through airport charges is aimed at further reducing the noise impact by encouraging airlines to replace noisy aircraft with quieter aircraft. This measure aims to do this through stronger differentiation of airport charges.

Schiphol Airport provided an overview of all the airlines/aircraft combinations that served the airport in 2023, including their noise category (S1, S2, S3 etc.). Based on expert judgment, the airline/aircraft combinations that will be affected by this measure are identified and a substitute aircraft was selected by looking at the airline's options within their current fleet. It remains uncertain whether this measure will make airlines change aircraft types for all of their movements. Therefore, IenW provided To70 with a table (see Table 4) containing the probability per airline type/noise category to identify the number of movements that need to be replaced for the purpose of the noise calculations.

Table 4 – Probability per airline type/noise category

Noise category	Legacy carrier	Low cost carrier	Freight carrier	Easyjet
S1	100%	100%	100%	n/a
S2	25%	12,5%	12,5%	25%
S3	12,5%	6,25%	6,25%	12,5%
S4	6,25%	3,125%	3,125%	6,25%
S5	0%	0%	0%	0%

Table 5 provides an overview of the resulting change in the number of movements per aircraft type as a result of this measure (taking into consideration the probability as presented in Table 4).

Table 5 – Number of movements changes due to stronger differentiation of airport charges

Aircraft type	Increased number of movements due to measure	Aircraft type	Decreased number of movements due to measure
A20N	+4366	A320	-3423
B38M	+2538	B738	-2669
A339	+2014	A333	-2402
B788	+1581	B763	-1249
A359	+993	A319	-817
A21N	+578	A321	-513
BCS3	+334	B77W	-426
A388	+120	A332	-418
B748	+112	E170	-250
B789	+69	B772	-188
B78X	+38	B764	-148
		B744	-112
		E190	-68
		B737	-60
Total	**+ 12,743**	**Total**	**- 12,743**

It is expected that the noise exposure will significantly decrease as a result of this measure compared to the previous calculations since the number of movements affected by this measure have increased from 850 movements to 12,743 movements. The steep increase in the number of movements that has changed is a result from taking into account all noise categories instead of only taking into account a change in noise category S1 (as was done in the previous calculations).

It must also be noted that the majority of the aircraft types with increased number of movements are also heavier and therefore can lead to increased noise exposure at specific locations (primarily at locations that are predominantly affected by arrivals).

2.3.3 Additional fleet renewal

It was already mentioned in our second addendum that the fleet renewal until November 2025 is exceeding the rate of the historic trends at Schiphol Airport. Main driver for this is the fleet renewal process of KLM and Transavia. The updated noise load database is compatible to accurately calculate the reduction of noise exposure as a result of the latest generation aircraft expected to be introduced until November 2025. KLM and Transavia provided information on when aircrafts will be added to their fleet and which aircrafts it will replace. The exact number of aircrafts expected to be delivered until November 2025 by KLM and Transavia cannot be disclosed in this report, since it was deemed confidential by KLM and Transavia. Table 6 provides an high-level overview of the changes in number of movements per aircraft type of these airlines.

Table 6 – Number of movements changes due to fleet renewal by KLM and Transavia

Aircraft type	Increased number of movements due to measure	Aircraft type	Decreased number of movements due to measure
A21N	+43,988	B737	-15,217
E295	+16,163	B738	-13,102
B78X	+2,880	E190	-31,832
		B772	-2,880
Total	**+ 63,031**	**Total**	**- 63,031**

IenW has requested To70 to use a 20% margin on the aircrafts expected to be delivered in the last three months up to November 2025 to take into account any delayed introduction of new aircraft.

2.3.4 Ban aircraft with cumulative margin lower than 13 EPNdB during nighttime

Banning aircraft with a poor noise performance is possible through EU regulation 598/2014. Currently, Chapter 3 aircrafts with a cumulative margin of less than 10 EPNdB can be banned based on this regulation. The Royal Schiphol Group proposed a measure to ban aircrafts with a cumulative margin less than 13 EPNdB during nighttime.

Schiphol Airport provided an overview of all the airlines/aircraft combinations with a cumulative margin less than 13 EPNdB that has flown to/from the airport in 2023. In total, 46 unique airline/aircraft type combinations fall within this category which together accounted for 2,326 movements in 2023. These movements can be categorized in the following different ways:

- Movements of airlines that have sufficient alternative compliant aircraft types available in their fleet to absorb the measure without changing the aircraft type operating to/from Schiphol;
    - E.g. A legacy carrier swapping an Airbus A320 with a cumulative margin less than 13 EPNdB with an Airbus A320 with a cumulative margin higher than 13 EPNdB;
- Movements of airlines that don't have a direct alternative aircraft type available in their fleet have been assigned an alternative aircraft type;
- KLM, Transavia and Martinair specific changes:
    - All Airbus A330-200 and Airbus A330-300 movements and 75% of the Boeing 747-400 movements (3 out of 4 aircrafts) of KLM/Martinair will reduce their maximum take-off weight in order to achieve a cumulative margin higher than 13 EPNdB.
    - The remaining 25% of the Boeing 747-400 movements of Martinair during the night-time period will be substituted with day-time movements of KLM and Transavia
    - Boeing 737-900 and Boeing 737-800 aircraft from KLM and Transavia with a cumulative margin less than 13 EPNdB will not be used during the night-time period. Boeing 737-900 and Boeing 737-800 aircraft from KLM and Transavia with a with a cumulative margin higher than 13 EPNdB will operate at night.

Table 7 contains an overview of the number of movements changed as a result of implementation of this measure.

Table 7 – Change in number of movements per aircraft type by implementing measure to ban aircraft with a cumulative margin lower than -13 EPNdB during nighttime

Aircraft type	Increased number of movements due to measure	Aircraft type	Decreased number of movements due to measure
B738	+50	B734	-50
A332	+72	A306	-72
B748	+25	B744	-25
Total	**+147**	**Total**	**- 147**

In addition, the reduction of the take-off weight for the Airbus A330-200, Airbus A330-300 and the Boeing 747-400 of KLM and Martinair will decrease the noise exposure of all movements with these aircrafts.

It is expected that the reduction of the noise exposure as a result of this measure will be less significant compared to the previous calculations since the number of movements affected by this measure have decreased from 2,600 movements to 147 movements. The steep decrease in the number of movements that has changed is a result of a more detailed analysis into which airlines can absorb this measure with similar aircraft within their fleet.

2.3.5 Cap the number of movements during the nighttime to 27,000 movements

A cap on the number of movements during the nighttime to 27,000 movements was already part of our second addendum. As described in our initial study, the number of movements in the night period is first reduced to 29,000 movements through a pro rata reduction per airline. The flights were removed from the first and last hour of the night period (between 23:00 – 00:00 and between 06:00 – 07:00) as was assumed to be expected. In case this method did not yield the target of flights that were to be removed, flights were removed in the adjacent hour blocks, that are further away from the edges of the night period. This iterative process of selecting adjacent hour blocks to remove flights was performed until the target was reached. This results in most flights being removed closest to the edge of the night period. A further reduction of the number of flights 27,000 movements was achieved by (linear) downscaling the number of night movements of the scenario with 29,000 movements to 27,000 movements. No change is expected of the impact of this measure compared to our previous calculations.

3 Combination of measures and results

3.1 Combination of measures

A combination of measures was made based on the philosophy of the Balanced Approach, starting with measures from the 'Reduce noise at source' pillar and moving down to the last pillar 'operating restrictions'. To meet the noise abatement objectives, a combination of measures was made as described in Table 8.

Table 8 - Proposed combination of measures

Pillar	Combination of measures
Reduce noise at source	Use of quieter aircraft during nighttime period
	Stimulate use of quieter aircraft through airport charges
	Additional fleet renewal
Operating restrictions	Ban aircraft with cumulative margin lower than 13 EPNdB during nighttime
	Cap the number of movements during the nighttime to 27,000 movements

The order in which measures are implemented on the baseline scenario has impact on the effectiveness of the measure. For example, the measure to ban aircraft with cumulative margin less than 13 EPNdB during nighttime is less effective if airline already decide to change aircraft as a result of the measure stimulate use of quieter aircraft through airport charges. Following the philosophy of the Balanced Approach regulation, the impact of the combination has been determined as follows:

1. As a first step, the three measures from pillar 'Reduce noise at source' are implemented on the baseline scenario;
    a. First, the measure 'Use of quieter aircraft during nighttime period' was implemented;
    b. Secondly, the measure 'Stimulate use of quieter aircraft through airport charges' was implemented;
    c. Thirdly, the measure 'Additional fleet renewal' was implemented.
2. After step 1 was completed, it was concluded that none of the noise abatement objectives were met and that measures from the 'Operating restrictions' pillar are required to meet the noise abatement objectives;
3. The first operating restriction that was added was the measure 'Ban aircraft with a cumulative margin lower than 13 EPNdB during nighttime'. This didn't result in the required reduction to meet the noise abatement objectives;
4. Finally, the cap the number of movements during the nighttime to 27,000 movements was added to the combination of measures, which also didn't result in the required reduction to meet the noise abatement objectives;

The methodology to calculate the impact of the combination of measures has been optimised to ensure that the desired outcome of the proposed measures:

- It was stated by KLM that the measures 'Use of quieter aircraft during nighttime period' and 'additional fleet renewal' will not be affected by the measure 'Cap the number of movements during the nighttime to 27,000 movements'. Therefore the calculations have been performed by

starting with the reduction to 27,000 movements during the nighttime in order to prevent that the effectiveness of these measure as intended will be compromised.

- The cap on the number of movements during the nighttime to 27,000 movements results in a shift between the number of departures and arrivals. This is caused by the non-even distribution of departures and arrivals across the day, evening and night period. The number of departures and arrivals has been scaled back to the distribution between departure and arrivals (near 50/50 distribution) as present in the baseline scenario. Scaling has been done on the number of departures and arrivals in the day an evening period to minimise the impact that this scaling has on the measures.

3.2 Results of (combination of) measures

Table 9 contains an overview of the noise impact of the individual measures compared to the baseline scenario.

Table 9 - overview results of individual measures

Measure	Number of highly annoyed people within 48 dB(A) L_{den}	Number of houses within 58 dB(A) L_{den}	Number of severely sleep disturbed people within 40 dB(A) L_{night}	Number of houses within 48 dB(A) L_{night}
Use of quieter aircraft during nighttime period	-1.2%	-1.1%	-6.3%	-8.1%
Stimulate use of quieter aircraft through airport charges	-1.4%	-1.3%	-0.7%	-2.1%
Additional fleet renewal	-4.9%	-3.6%	-7.2%	-8.2%
Ban aircraft with cumulative margin lower than 13 EPNdB during nighttime	-1.0%	-0.7%	-3.3%	-2.0%
Cap the number of movements during the nighttime to 27,000 movements	-5.0%	-4.2%	-18.7%	-22.4%

Table 10 contains an overview of the noise impact of the combination of measures compared to the baseline scenario. The noise abatement objective per criterion is also displayed in the table. The results of the combination using the END criteria are presented in Appendix A .

Table 10 - overview results of combination of measures

Measure	Number of highly annoyed people within 48 dB(A) L_{den}	Number of houses within 58 dB(A) L_{den}	Number of severely sleep disturbed people within 40 dB(A) L_{night}	Number of houses within 48 dB(A) L_{night}
Baseline scenario	111,955	6,962	24,502	5,750
Noise abatement objective	-17%	-17%	-15%	-15%
Impact of combination of measures	96,616 (-13.7%)	6,178 (-11.3%)	15,412 (-36.8%)	3,356 (-41.6%)
Impact on noise abatement objectives	Objective is not met (-3,3%)	Objective is not met (-5.7%)	Objective is met	Objective is met

Based on the results it can be concluded that the L_{night} noise abatement objectives of -15% are met with a significant margin. The L_{den} noise abatement objectives of -17% are not met with this combination of measures. A capacity reduction measure of the total number of movements is required to meet the L_{den} noise abatement objectives. The estimated required capacity reduction of the total number of movements to meet all the noise abatement objective has been determined based on the results of previous calculations:

1. Combination of measures including a capacity reduction to 470,000 movements;
2. Combination of measures including a capacity reduction to 465,000 movements;

The reduction of the total number of movements has been modelled by (linear) downscaling the day- and evening movements. Scaling down the traffic in a linear way has was used since it is unclear how the reduction of the number of movements will take place, given that this will be determined by airlines reacting to a capacity reduction, and how this will affect the number of movements per runway. Therefore, a possible shift in runway use as a result of less movements is not taken into account in these calculations.

Table 11 - overview results of combination of measures including capacity reduction

Measure	Number of highly annoyed people within 48 dB(A) L_{den}	Number of houses within 58 dB(A) L_{den}	Number of severely sleep disturbed people within 40 dB(A) L_{night}	Number of houses within 48 dB(A) L_{night}
Baseline scenario	111,955	6,962	24,502	5,750
Noise abatement objective	-17%	-17%	-15%	-15%
Impact of combination of measures	96,616 (-13.7%)	6,178 (-11.3%)	15,412 (-36.8%)	3,356 (-41.6%)
Impact on noise abatement objectives	Objective is not met (-3,3%)	Objective is not met (-5.7%)	Objective is met	Objective is met
Impact of combination of measures incl. capacity reduction to 470.000 movements	90,571 (-19.1%)	5,817 (-16.4%)	15,412 (-37.1%)	3,356 (-41.6%)
Impact on noise abatement objectives	Objective is met	Objective is not met (-0.5%)	Objective is met	Objective is met
Impact of combination of measures incl. capacity reduction to 465.000 movements	89,509 (-20.0%)	5,763 (-17.2%)	15,412 (-37.1%)	3,356 (-41.6%)
Impact on noise abatement objectives	Objective is met	Objective is met	Objective is met	Objective is met

Table 11 shows that the combination of measures including a capacity reduction to 470.000 movements does result in meeting the number of highly annoyed people within 48 dB(A) L_{den} noise objective. However, the noise objective for the number of houses within 58 dB(A) L_{den} has not been met with the reduction to 470.000 movements. The combination of measures including a capacity reduction to 465.000 movements will result in also meeting the noise objective for the number of houses within 58 dB(A) L_{den} with a margin of 0,2%.

Appendix B contains the noise contours of the baseline scenario compared to the combination of measures that will result in meeting the noise abatement objectives.

A Appendix A – EU Directive 2002/49/EC (END) criteria

This annex contains the impact of the combinations of measures (excluding and including capacity redcutions) for the following EU Directive 2002/49/EC (END) criteria:

- Number of highly annoyed people within the 55 dB(A) L_{den} contour;
- Number of houses within the 55 dB(A) L_{den} contour;
- Number of severely sleep disturbed people within the 50 dB(A) L_{night} contour;
- Number of houses within the 50 dB(A) L_{night} contour.

Measure or combination	**Reduction compared to the baseline scenario**			
	Number of highly annoyed people within 55 dB(A) L_{den}	Number of houses within 55 dB(A) L_{den}	Number of severely sleep disturbed people within 50 dB(A) L_{night}	Number of houses within 50 dB(A) L_{night}
Baseline scenario	17,792	19,389	1,493	2,843
Combination of measures	14,885 (-16.3%)	16,059 (-17.2%)	302 (-79.8%)	547 (-80.8%)
Combination of measures incl. capacity reduction to 470.000 movements	13,623 (-23.4%)	14,620 (-24.6%)	302 (-79.8%)	547 (-80.8%)
Combination of measures incl. capacity reduction to 465.000 movements	13,447 (-24.4%)	14,429 (-25.6%)	302 (-79.8%)	547 (-80.8%)

B Noise contours

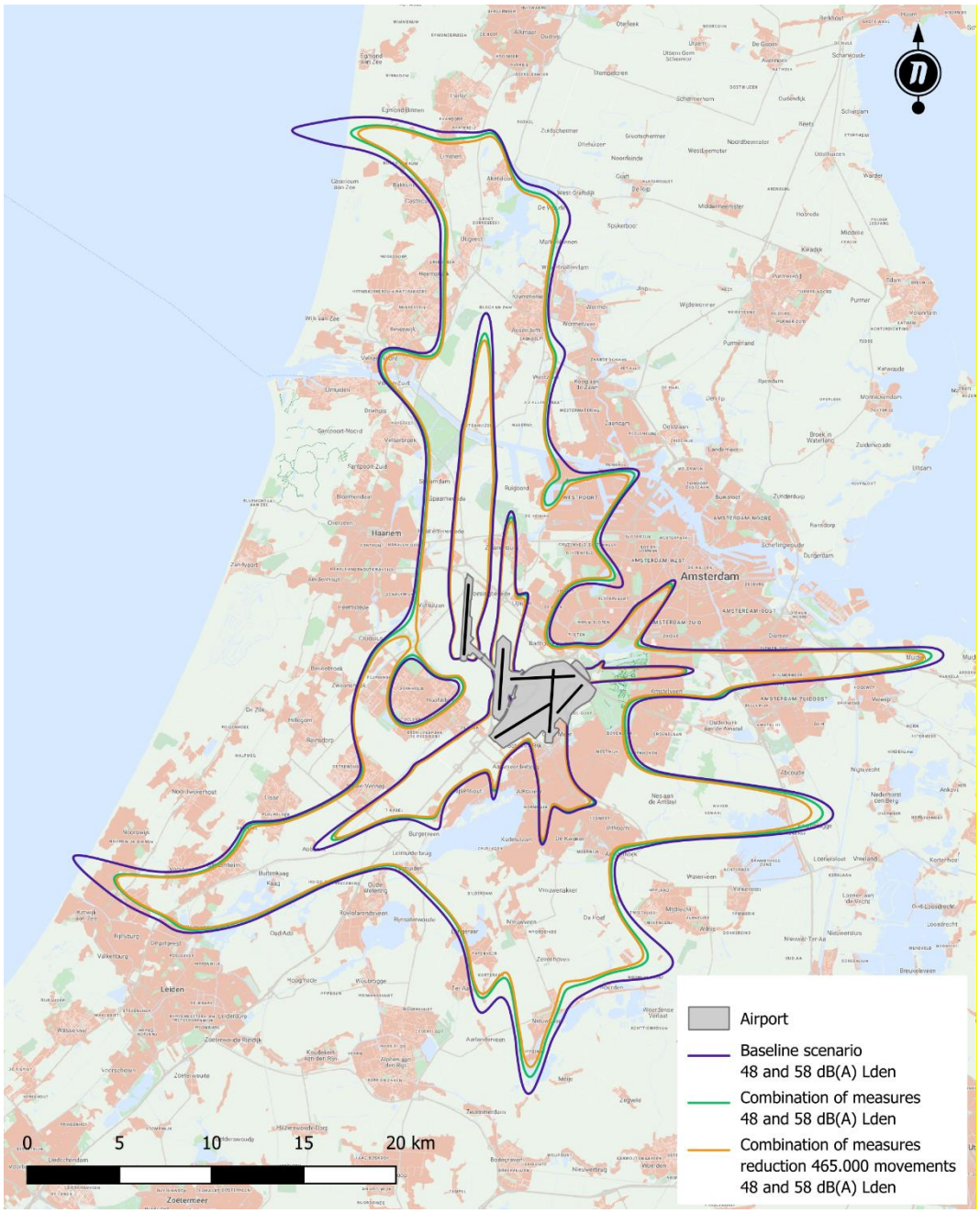

Figure 1 – Baseline scenario and combination of measures - 48 and 58 dB(A) Lden contour

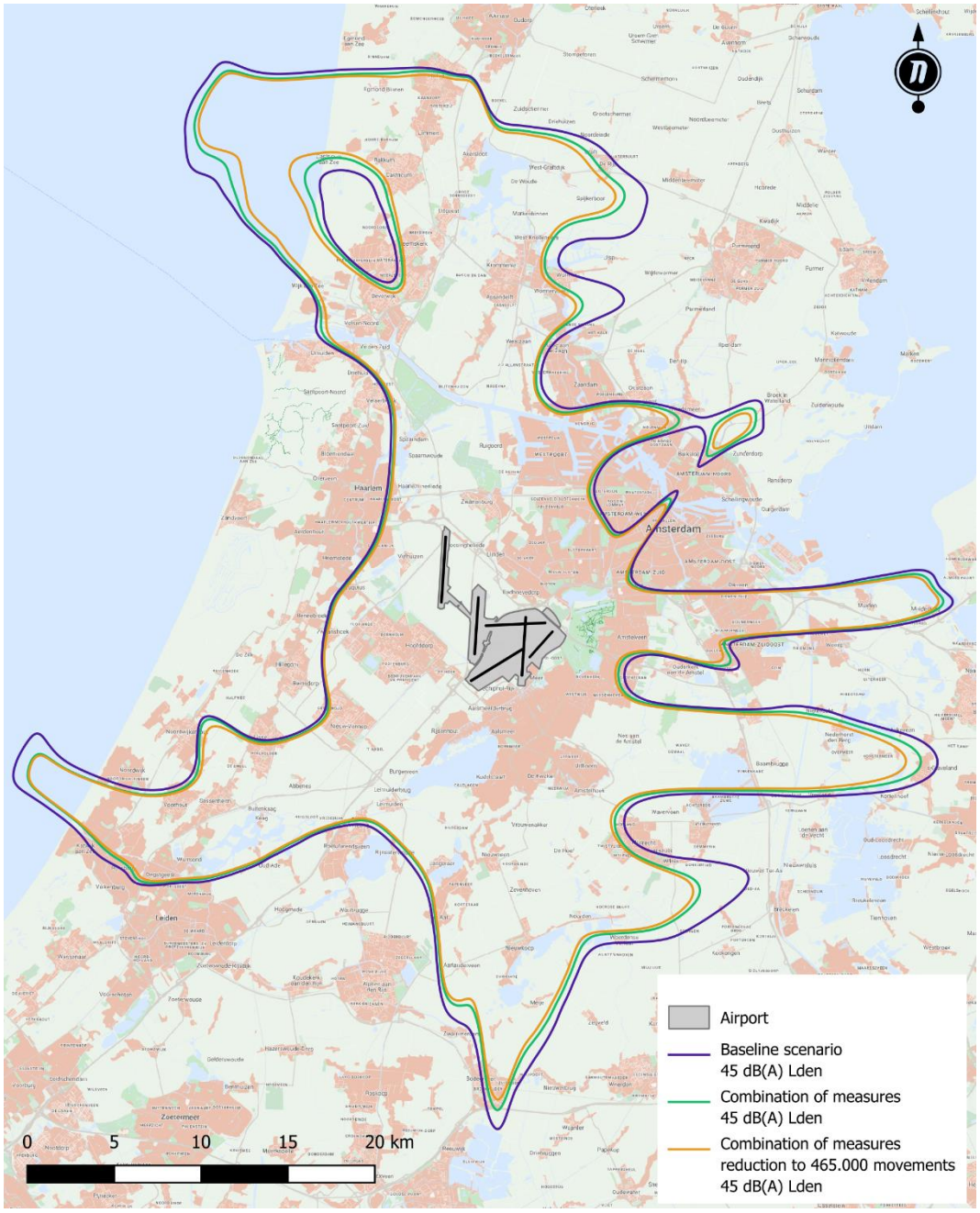

Figure 2 - Baseline scenario and combination of measures - 45 dB(A) Lden contour

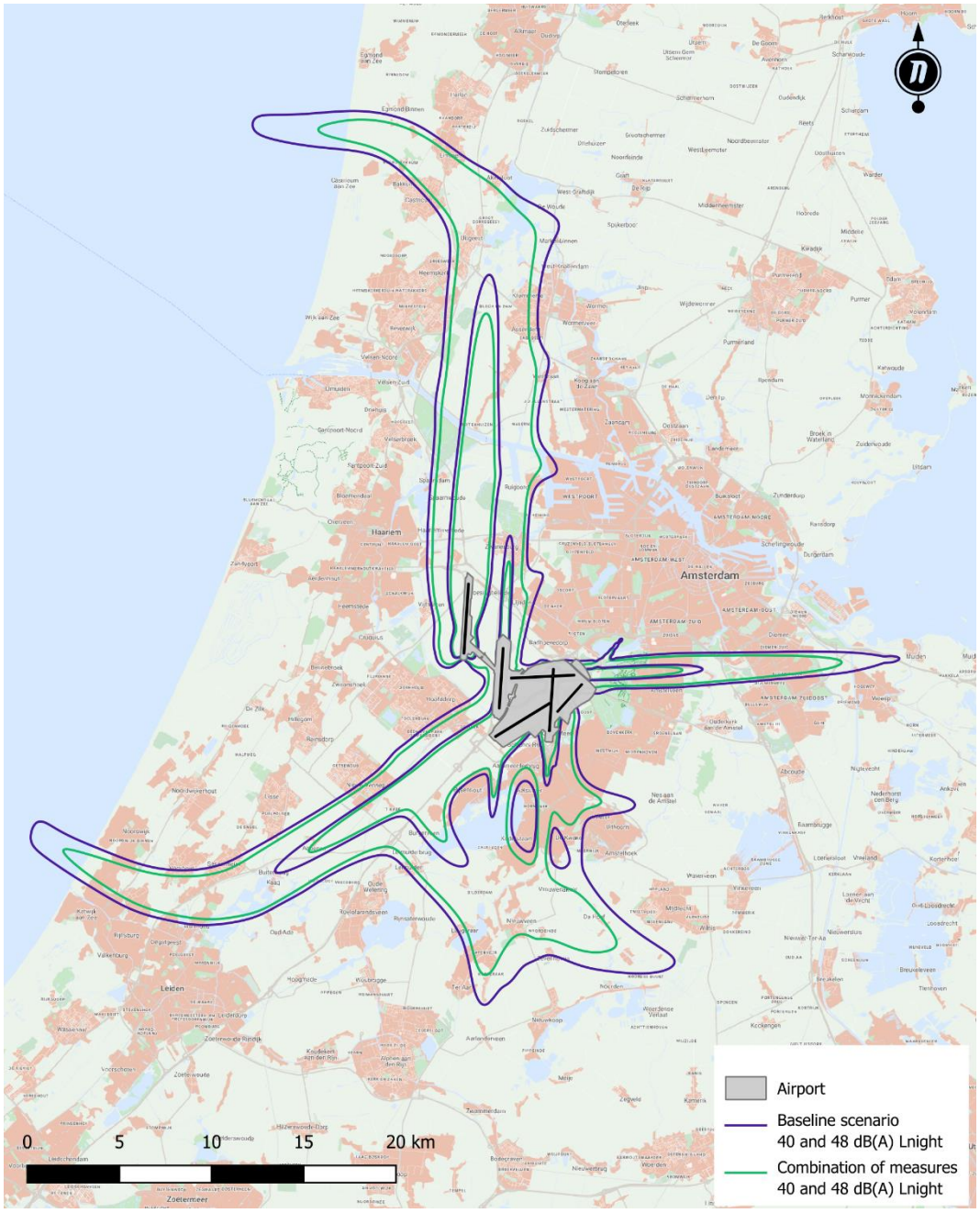

Figure 3 - Baseline scenario and combination of measures - 40 and 48 dB(A) Lnight contour