

Abbreviation

Lden- Equivalent continuous Noise Level Day, Evening and Nighttime

Ld- Equivalent continuous Noise Level Day time

Le- Equivalent continuous Noise Level Evening time

Ln- Equivalent continuous Noise Level Nighttime

Ldn- Equi

Leq- Equivalent continuous Noise Level of location

LAmpr- Equivalent continuous Noise Level with frequency weighting A for maximum noise level

Dnp- Day-Night average

# NOISE MAPPING

Netaji Subhash Chandra Bose  
International Airport  
CCU AIRPORT

Kolkata - India

NM\_CCU\_June24\_RevC



*Alankar  
10/02/25  
NSCBI Airport, Kolkata*

*ARUN (E-B)  
10/2/25*

**ARUN  
GOPINATHAN NAIR**

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**Creating environments of possibility**

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*निर्मल कुमार गायन*

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उप महाप्रबंधक (इंजीनियरिंग-विद्युत)  
Dy. General Manager (Engg-Elect)  
भा.वि.प्रा., ने.सु.चं.ब.अं. हवाई अड्डा  
AAI, NSCBI Airport  
कोलकाता / Kolkata-700052.



## **Abbreviation**

Lden- Equivalent continuous Noise Level Day, Evening and Nighttime

Ld- Equivalent continuous Noise Level Day time

Le- Equivalent continuous Noise Level Evening time

Ln- Equivalent continuous Noise Level Nighttime

Lde- Equivalent continuous Noise Level Day and Evening time

Leq-24h- Equivalent continuous Noise Level for 24 hours of duration

LAm<sub>ax</sub>- Equivalent continuous Noise Level with frequency weighting A for maximum noise level.

DNL- Day -Night average noise level

**Records of Amendments**

Sr. NO	Section /Page	Reference Date Applicable	Référence Revision Date	Revised by	Subject	Reason
<b>NM_CCU_June_ RevA</b> Inclusion of Ld and Ln values, Noise Curve Validation and 10 Year master plan projection						
1	All the changes has been done after submission of report NM_CCU_June24_Rev0	21-Aug-2024	21-Aug-2024	Rodrigo, Acoustic Engineer	Suggested and Requested by DGCA Email on 21-08-2024	“After submission of Rev0 report DGCA raise verbally communicated to add Lmax Points “
<b>NM_CCU_June24_RevB</b> Inclusion of Noise Zone Study’						
2	All the changes has been done after submission of report NM_CCU_June24_RevA	20-09-2024	20-09-2024	Rodrigo, Acoustic Engineer	Suggested and Requested by DGCA Email on 21-08-2024	“Validation of Model with monitored Values”
<b>NM_CCU_June24_RevC</b> Lmax study and noise contours for 62 and 57 dB(A) and Boundary level study						
3	All the changes has been done after submission of report NM_CCU_June24_RevB	30-Dec-2024	30-Dec-2024	Rodrigo, Acoustic Engineer	Suggested and Requested by DGCA Verbally in 02 December 2024 email from DGCA	Proposed Lmax, Noise Contour and Boundary level Ld and Ln Study

**Elaboration**

Issue/Date	Author	Inspector	Approval
O. 21/06/2024	R. DAL FIUME	M. MATIAZZO	H. ABRÃO
A. 19/09/2024	M. MATIAZZO	R. DAL FIUME	H. ABRÃO
B. 11/10/2024	R. DAL FIUME	M. MATIAZZO	H. ABRÃO
C. 30/12/2024	R. DAL FIUME	M. MATIAZZO	H. ABRÃO

The current issue of the report supersedes all previous revisions

**Revision Control**

Revision	Page	Item	Modification/Justification
0	-	-	First issue
A	7	1.2	Noise limits for Ld and Ln
	25 - 29	3.1	Noise Curves Validation added
	30 - 33	3.2	10 Year Master Plan Projection
B	34-38	3.3	Noise Zone Study
C	41-43	3.3 / 3.4	Lmax study and noise contours for 62 and 57 dB(A)

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## 1. INTRODUCTION

The objective of this study is to investigate the noise impact generated by the activities of Netaji Subhas Chandra Bose International Airport (Kolkata Airport), located in the city of Kolkotta, Bengal, India, and considering the following period: from 01/04/2023 to 31/03/2024. The Kolkata airport has an total of 71015 Arrivals and 71008 departures in a year, which the Kolkata Airport one of the busiest airport in India.

The study is based on acoustic computational simulation, which allows calculating noise curves representing the noise impact at the airport and surrounding areas, as a function of the movement of fixed-wing and rotary-wing aircraft.

The simulation and evaluation methodology follows the recommendations of *Civil Aviation Requirements Section 10 – Aviation Environment Protection Series 'A' Part I Issue I, 18th December, 2014* and the calculation methods of ICAN - Instruction for the Calculation of Aircraft Noise.

### 1.1. Location

The airport is the largest in eastern India and it is located in West Bengal, in the city of Kolkata, on Airport Service Rd, International Airport, Figure 1, extracted from Google Earth, represents the location of the airport.

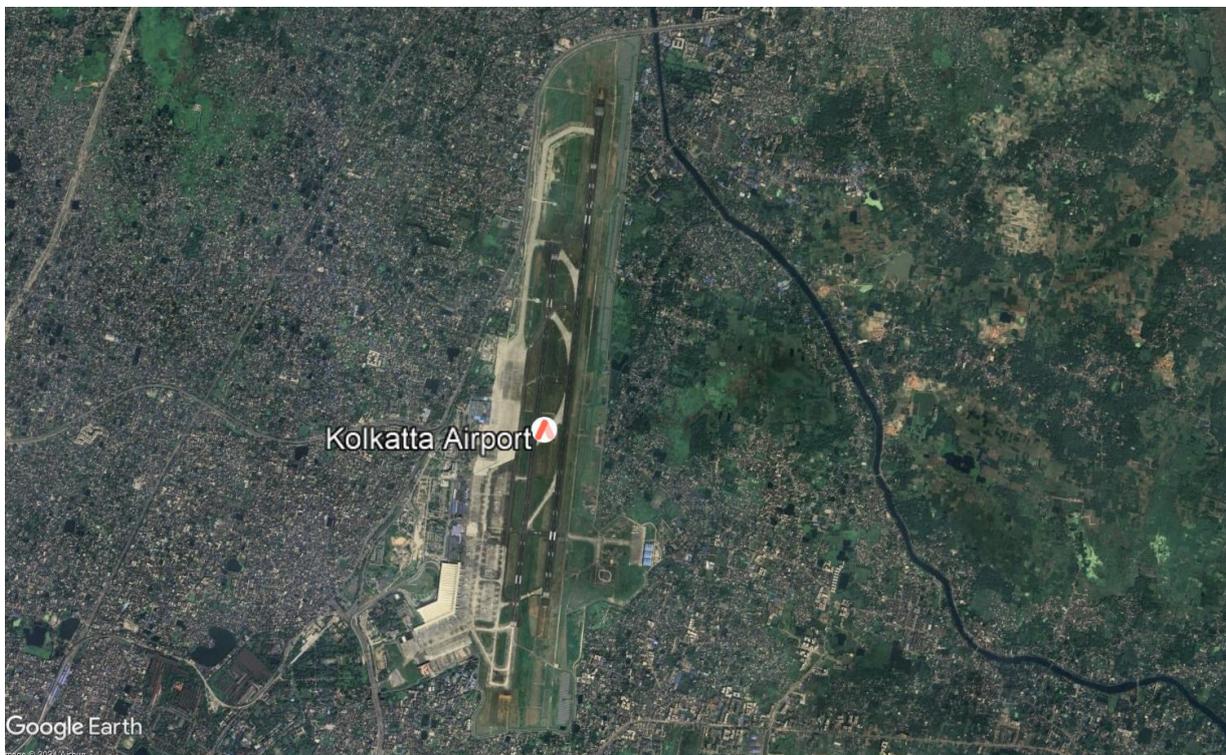


Figure 1 – Location of Netaji Subhas Chandra Bose International Airport.

## 1.2. Airport Characteristics

This item brings some characteristics of Kolkata Airport.

- **Name:** Netaji Subhas Chandra Bose International Airport (NSCBI)
- **IATA Code:** CCU
- **ICAO Code:** VECC
- **Primary Function:** Passenger and cargo transportation
- **Runways:**
  - Runway:** 19L - 19R
  - Runway:** 01L - 01R
- **Terminals:**
  - Terminal 1:** Domestic passengers
  - Terminal 2:** International passengers
  - Cargo Terminal:** Air cargo
- **Coordinates:** 22°41'06"N 88°26'24"E
- **Location:** 10.5 miles (17 km) northeast of Kolkata city center
- **Direction and Distance from City to Airport:**
  - Direction:** NE
  - Distance:** 10.5 miles (17 km)
- **Elevation/Reference Temperature**
  - Elevation:** 49 ft (15 m) AMSL
  - Mean annual temperature:** 79°F (26°C)
- **Ld and Ln for 50,000 flights per year**
  - Ld =** 62 dB(A)
  - Ln =** 57 dB(A)

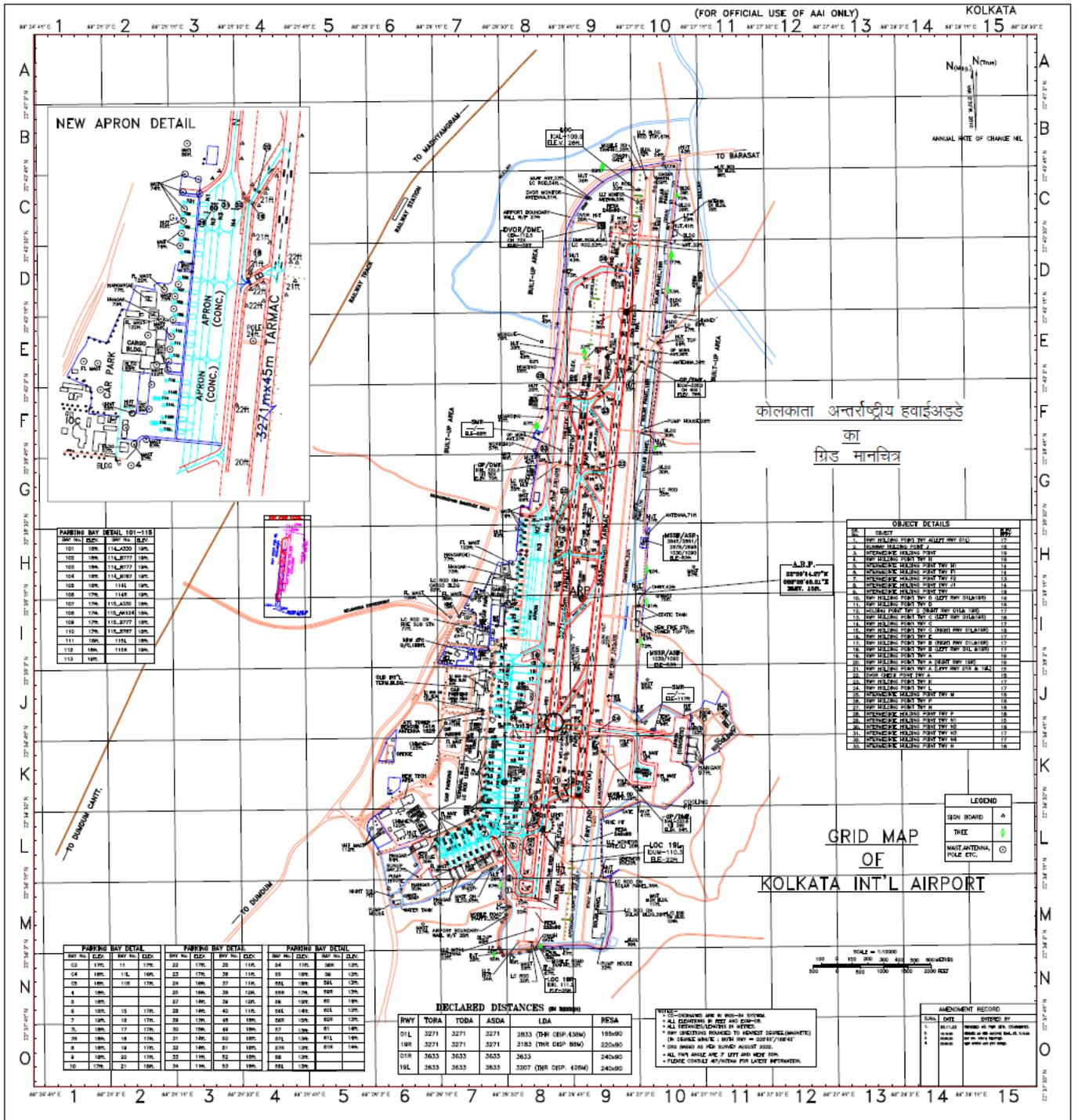


Figure 2 - Grid Map Edited 2024.

### 1.3. Normative context

Noise Zoning Plans (NZPs) are essential tools for managing aircraft noise around airports. They provide a framework for assessing and mitigating noise impacts on communities, ensuring sustainable airport development. The document *Civil Aviation Requirements Section 10 – Aviation Environment Protection Series 'A' Part I Issue I, 18th December, 2014*, establishes guidelines for NZPs in India, aligning with international best practices.

The NZP methodology involves a comprehensive assessment of noise emissions, propagation, and exposure. Noise propagation models account for factors such as wind, temperature, humidity, and topography, while noise emission models estimate noise levels generated by different aircraft types and operational phases. Noise exposure models combine these factors to predict noise levels experienced by communities around the airport.

The document emphasizes the use of the Day-Night Level (DNL) metric (and others metrics), which represents the average A-weighted sound energy over a 24-hour period, with a 10 dB penalty applied to nighttime operations (22:00 to 06:00). DNL is internationally recognized as a comprehensive measure of noise exposure and is widely used in NZPs worldwide.

NZP results are typically presented in the form of noise contour maps, which depict areas exposed to different noise level descriptors. These maps provide a visual representation of the noise impact and serve as a basis for informed decision-making regarding noise mitigation measures.

## 2. COMPUTER SIMULATION

Acoustic simulation of the airport was performed using acoustic modeling software called CadnaA v.2023, developed by the German company Datakustik GmbH.

The CadnaA noise impact assessment model is based on the ISO 9613:1993 standard, Part 1: “Calculation of the absorption of sound by the atmosphere“ and Part 2: “General calculation method, for the definition of the outdoor noise propagation model“. This standard describes and equations the calculation protocols used in the model. The ICAN - Instruction for the Calculation of Aircraft Noise calculation methodology, implemented in CadnaA, was used to describe the sound emission and flight profiles of the aircraft.

### 2.1. Geometric modeling

Outdoor sound propagation equations are functions of the distance between the different objects in the model (sources, obstacles, and receivers). Therefore, the control of the model geometry becomes a crucial factor.

The geometric model of the site was created from a set of Google Earth© satellite images and topographic data provided by SRTM Worldwide Elevation Data, which has a resolution of 3 arcsec. The model was constructed in such a way as to ensure its georeferencing.

### 2.2. Calculation parameters

The following general parameters of calculation must be set correctly so that the model can be representative:

- Number of reflections;
- Ground absorption coefficient, G;
- Meteorological conditions;
- Geometrical model.

### 2.3. Number of reflections

The Figure bellow represents a simplified representation of the sound propagation between a sound source S and a receiver R. In this case, there's an object near, it can be an equipment, a warehouse, or a wall – for example. The noise level calculated at the Receiver is the combination of two propagation path:

- The direct path;
- The reflected (by the object) path.

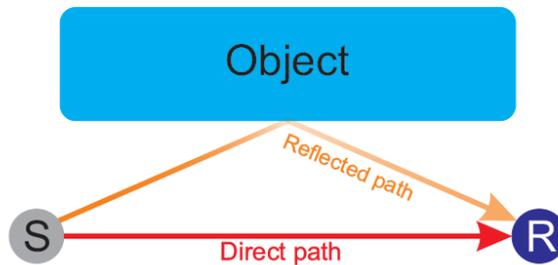


Figure 3 – Sound propagation between a source F and a Receiver R – with first order reflection.

In Figure 3, there is what is called first order reflection – that means, the sound wave hits the object once, and then travels until the receiver. Therefore, there's only one reflected path. Thus, the sound level calculated at the receiver, for this situation is a combination of the direct sound and the reflect sound. Although, in most of the situations there are other reflections happening simultaneously. That is shown in Figure 4.

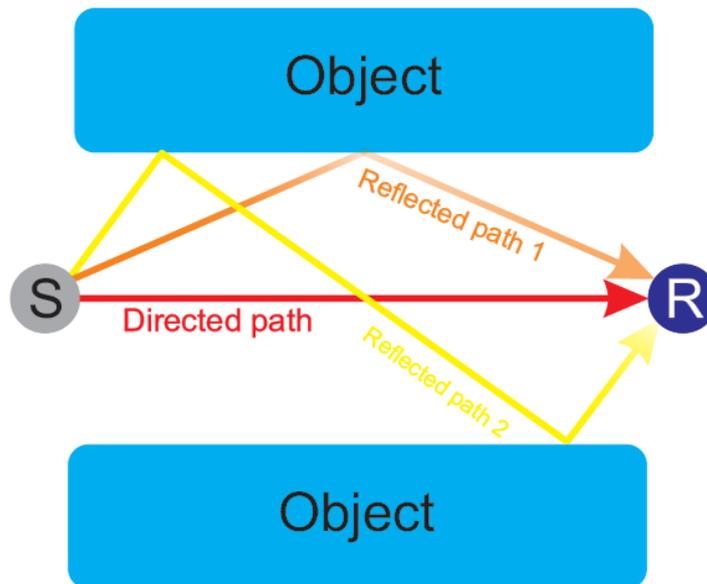


Figure 4 – Sound propagation between a source S and a receiver R, with second order reflection.

In Figure 4, there are three paths being considered: the direct path, where the soundwave does not reflect in any of the near surfaces, in the path from the source to the receiver; and the reflected path 1 and 2 – in which the soundwaves are reflected one and twice, respectively, after leaving the source until arrive in the receiver. Like the first case, the noise level calculated in the receiver is a combination of the sound energy of the three paths.

The higher the order of the reflection – that is, as the number obstacles in which the soundwave hits increase, before arriving in the receiver, the less in the contribution in the sound energy level at the receiver point. In fact, for each reflection there's a loss of acoustic energy due the properties of acoustic absorption of the object.

This study considers only first order reflections.

## 2.4. Ground absorption coefficient, G

The ground absorption coefficient (represented here by G) specifies how much the terrain surface in which the simulation is being done and capable of absorbing the acoustic energy. The absorption coefficient is a dimensionless parameter; it can vary from 0 to 1. This parameter is important to determinate the contribution of the soundwaves that hit the ground.

- $G=0$  corresponds to a terrain with very low acoustic absorption. That is, the soundwave, when hits the ground, is reflected without loss of energy, and contributes in a significant way in the sound level calculated in the receiver. An example of  $G=0$  can be a concrete floor.
- $G = 1$  corresponds to a porous ground. The incident soundwave is fully absorbed (example: ground covered with grass and/or trees and another kinds of vegetation)

In this study, the ground corresponds of areas of vegetation and concrete. Therefore, the G parameter will be set to 0.5.

The terrain of the airport and its surroundings is mainly composed of reflective paved areas. Therefore, an average absorption coefficient of 0.5 was considered for the terrain and its surroundings.

## 2.1. Meteorological conditions

The meteorological conditions are considered in the standard ISO 9613-2 as a calculation parameter. For this study, the temperature conditions (T) and humidity (H) were set as follows:  $T = 27^{\circ}\text{C}$  e  $H = 70\%$ .

## 2.2. Calculation grid

Acoustic mapping software calculates sound pressure levels only at certain points and interpolates the remaining points based on the equations of ISO standard 9613:1993. The larger the number of points in the calculation grid, the higher the accuracy and the calculation time. For this project, a grid of receptors with a spacing of 50 meters by 50 meters was considered, ensuring the representativeness of the noise maps, calculated at a height of 4 meters above ground level in accordance with international standards.

## 2.3. Calculated Indices

According to *Civil Aviation Requirements Section 10 – Aviation Environment Protection Series 'A' Part I Issue I, 18th December, 2014* the following indices must be calculated:

- Lden (where day is 0600-1800, evening 1800-2200, and night 2200-0600)
- Lday
- Levening
- Lnight
- LDE (where day is 0600-1800 and evening 1800-2200 with no penalty)
- Leq-24h
- DNL (where day is 0600-2200 and night 2200-0600)
- LAmax

## 2.4. Input Data

The model was created based on daily data provided by CCU Airport, such as the number and type of aircraft per route, among others, considering the traffic data from April 2023 to March 2024

In accordance with *Civil Aviation Requirements Section 10 – Aviation Environment Protection Series 'A' Part I Issue I, 18th December, 2014*, Lden, Lday, Levening, Lnight, Lde, Leq-24h and Ldn (A-weighted) are presented.

The following tables summarize the input data considered for the calculation of the noise curves.

**Table 1 – Aircraft mix.**

Model	Quantity	Model	Quantity	Model	Quantity	Model	Quantity
200B	2	B744	12	D328	6	GLEK	22
A109	8	B747	2	DA42	6	GLF4	2
A20N	11722	B752	591	DA62	12	GLF5	6
A21N	9367	B757	84	DF20	95	GLF6	8
A30B	8	B763	62	DH8A	556	GLV9	2
A318	2	B772	34	DH8C	526	H25B	14
A319	7460	B773	450	DH8D	1570	H4XP	2
A320	66164	B777	164	DHC6	2	H8XP	70
A321	10521	B77F	26	E110	20	H90P	2
A330	210	B77L	24	E135	74	IL76	22
A332	56	B77W	554	E145	8	IL78	12
A333	176	B787	62	E170	2	K32T	4
A359	512	B788	332	E190	8	L193	2
A35K	2	B789	12	E295	2	LJ40	2
A3ST	2	BD70	8	E35L	8	LJ45	56
A748	42	BE20	68	E50P	2	LJ60	8
ALO3	4	BE30	4	E550	4	M339	24
AN32	80	BE35	16	E55P	2	MB33	8
AT42	1031	BE9L	75	EC45	2	M117	34
AT45	180	C130	18	F2TH	118	MU2B	2
AT46	2	C208	1168	F900	6	ODC3	4
AT72	8154	C25A	4	FA10	2	P180	6
AT75	400	C500	2	FA6X	2	P28A	2
AT76	6385	C510	2	FA7X	4	P750	2
B200	86	C525	6	FA8X	4	PC12	224
B2GT	12	C56X	52	G100	4	PRM1	10
B350	18	C90A	72	G150	6	RJ1H	14
B38M	2953	CB20	2	G200	20	SF50	8
B429	166	CL30	8	G500	2	SR22	2
B733	44	CL35	8	G550	14	Y12E	4
B737	4552	CL60	32	GA6C	2	ZZZH	24
B738	3434	CL85	2	GL5T	103		
B739	320	D228	124	GL6T	8		
B742	10	D229	36	GL7T	20		
B737	309	C650	12	GL7T	6		

**Table 2 - Movements on the period.**

Aircraft type	Total movements (landing + take off)	Day	Evening	Night
Fixed wing	141847	87036	28617	26194
Rotary wing	176	105	69	2

**Table 3 - Distribution of Operation per runway.**

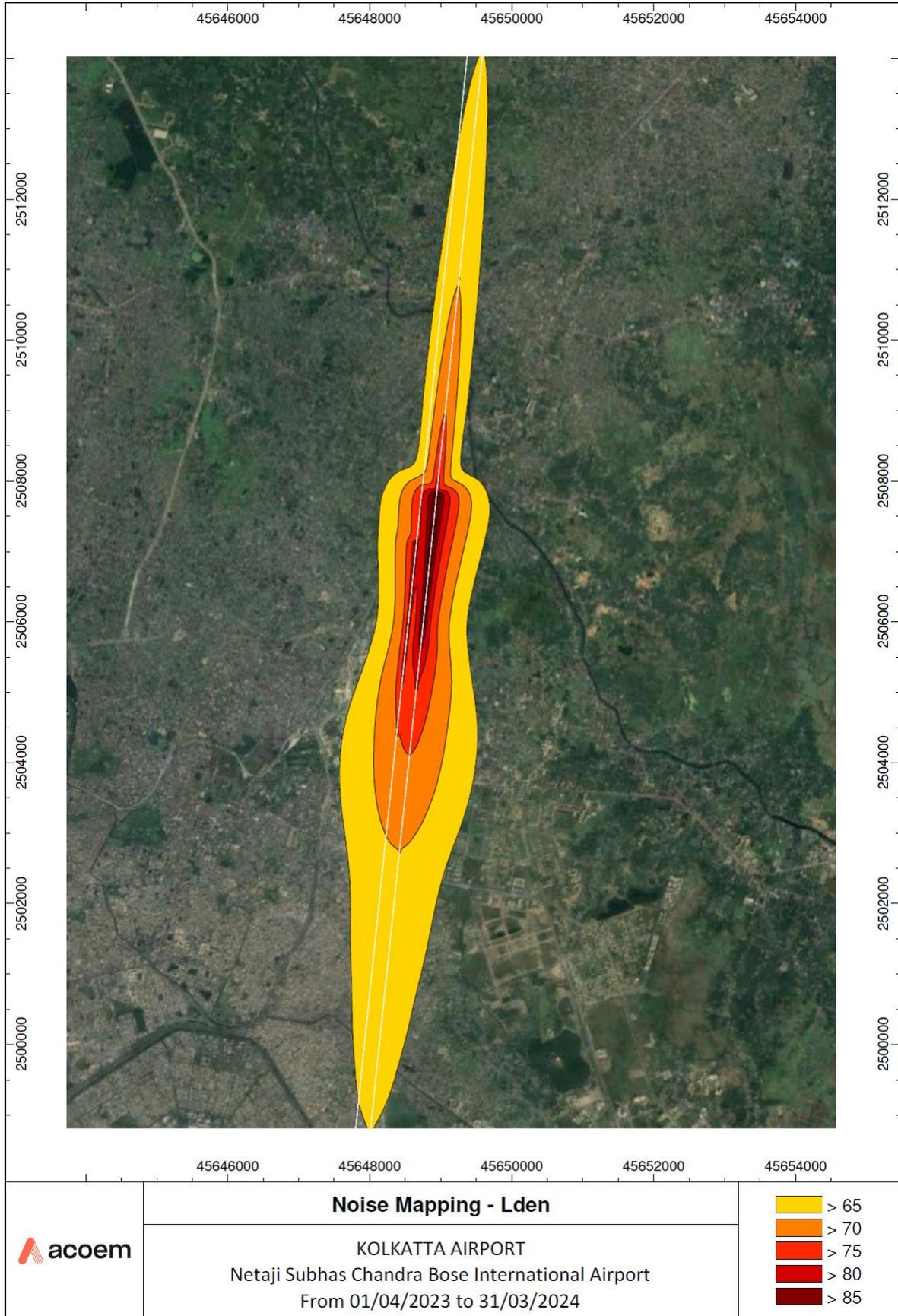
Runway	Usage
19R	4,09%
19L	45,96%
01R	46,40%
01L	3,55%

**Table 4 - CadnaA aircraft groups.**

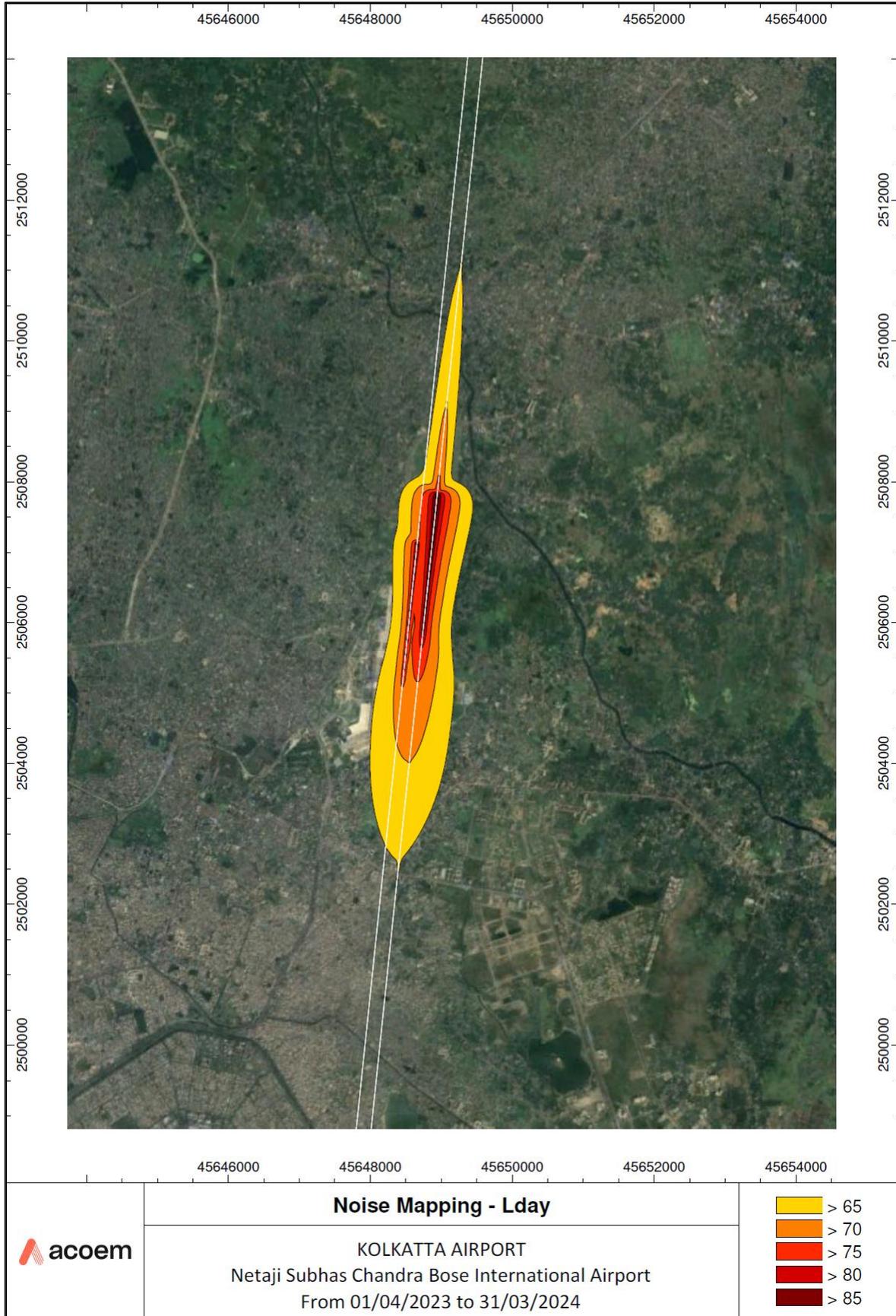
Group	Day	Evening	Night
H1.1	7	1	2
H1.2	98	68	0
P1.3	7	2	1
P1.4	1709	105	19
P2.2	12745	4758	1381
S1.0	91	31	18
S3.1	2	6	0
S5.1	319	92	60
S5.2	64387	20991	19908
S5.3	5967	1989	3303
S6.1	1003	468	759
S6.3	4	76	434
S7a)	323	2	278

### 3. RESULTS

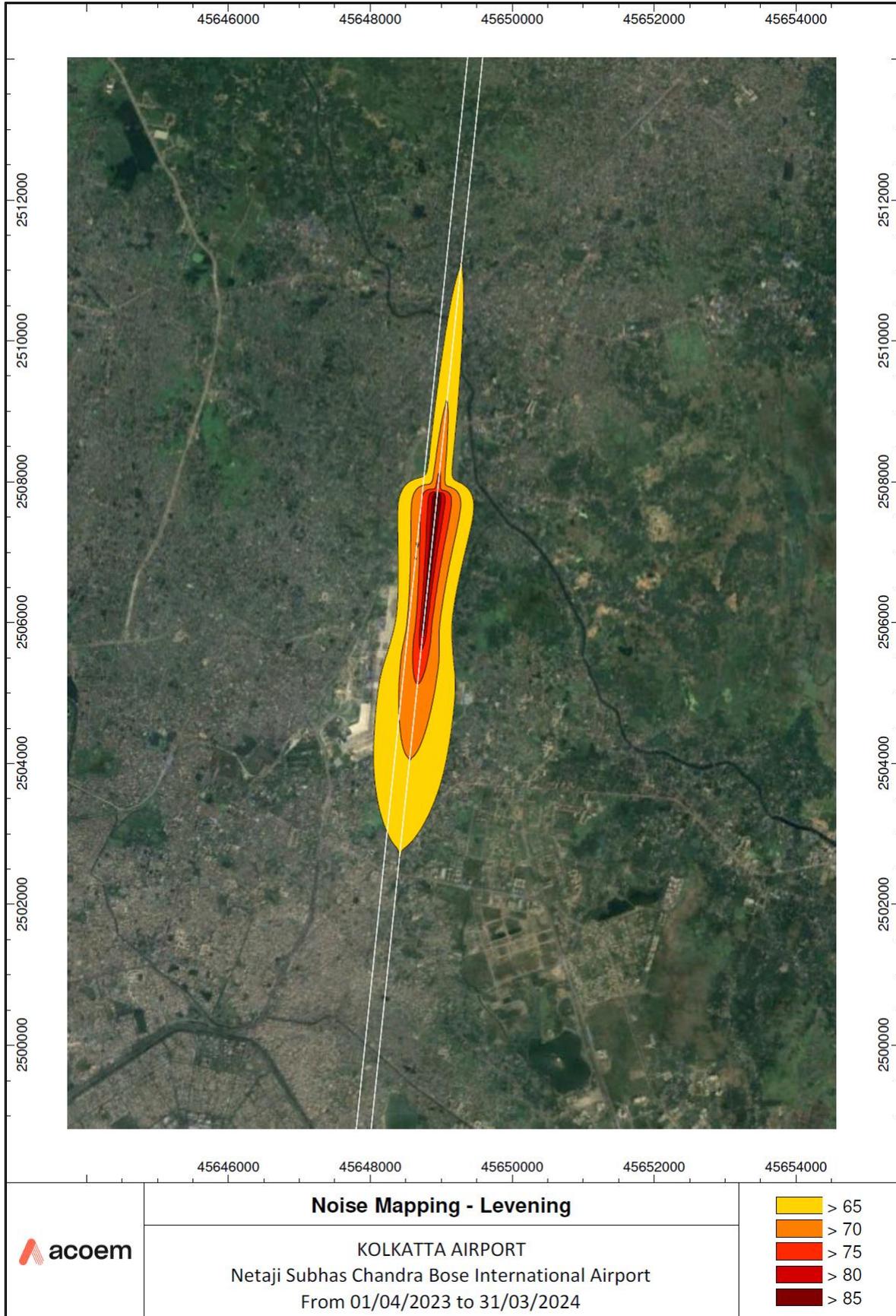
The following pages present the curves calculated for Kolkata Airport, in accordance with Civil Aviation Requirements Section 10 – Aviation Environment Protection Series 'A' Part I Issue I, 18th December, 2014 and using the ICAN methodology.



**Figure 5 – Lden Curves.**



**Figure 6 - Lday Curves.**



**Figure 7 – Levening Curves.**

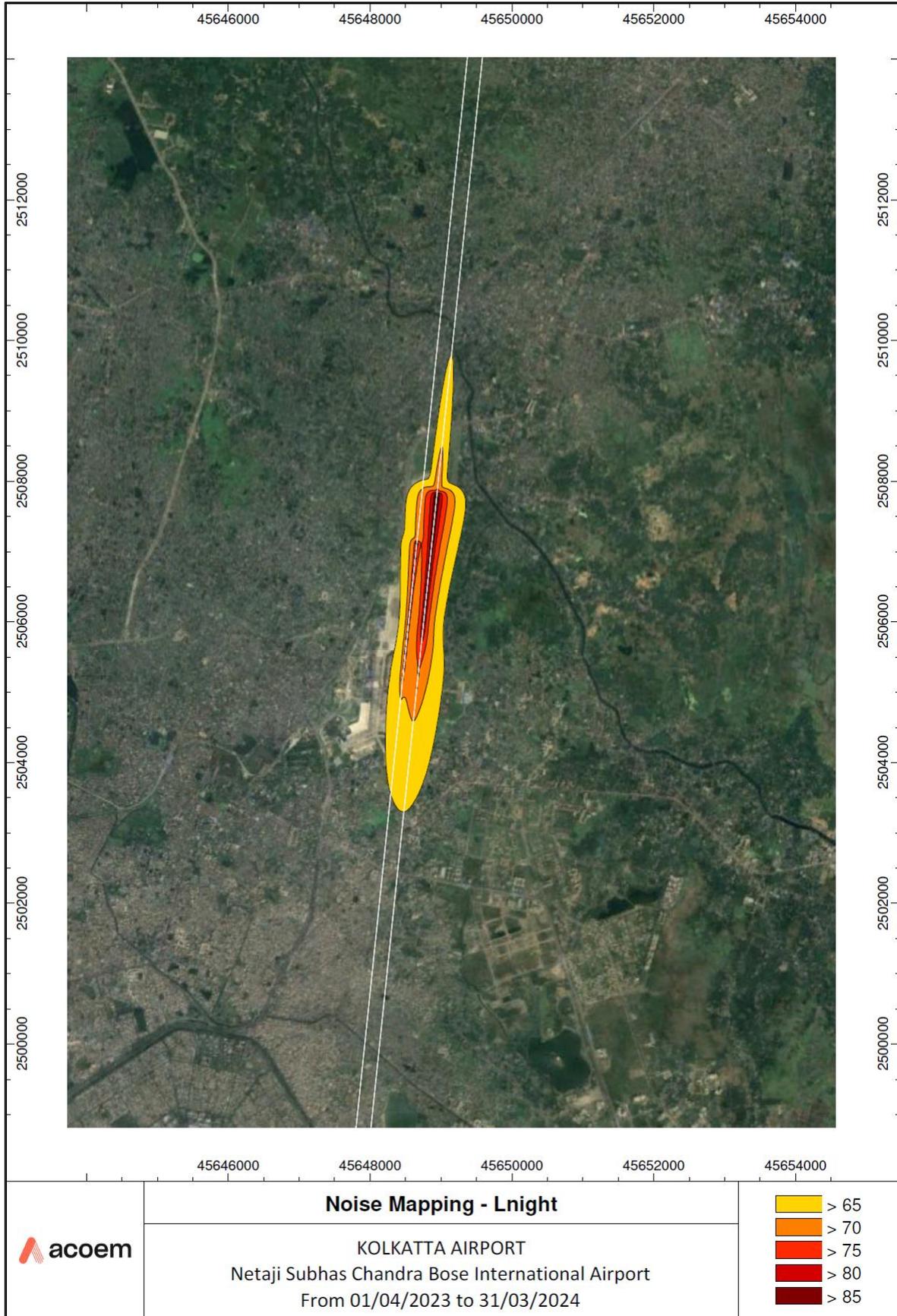


Figure 8 - Night Curves.

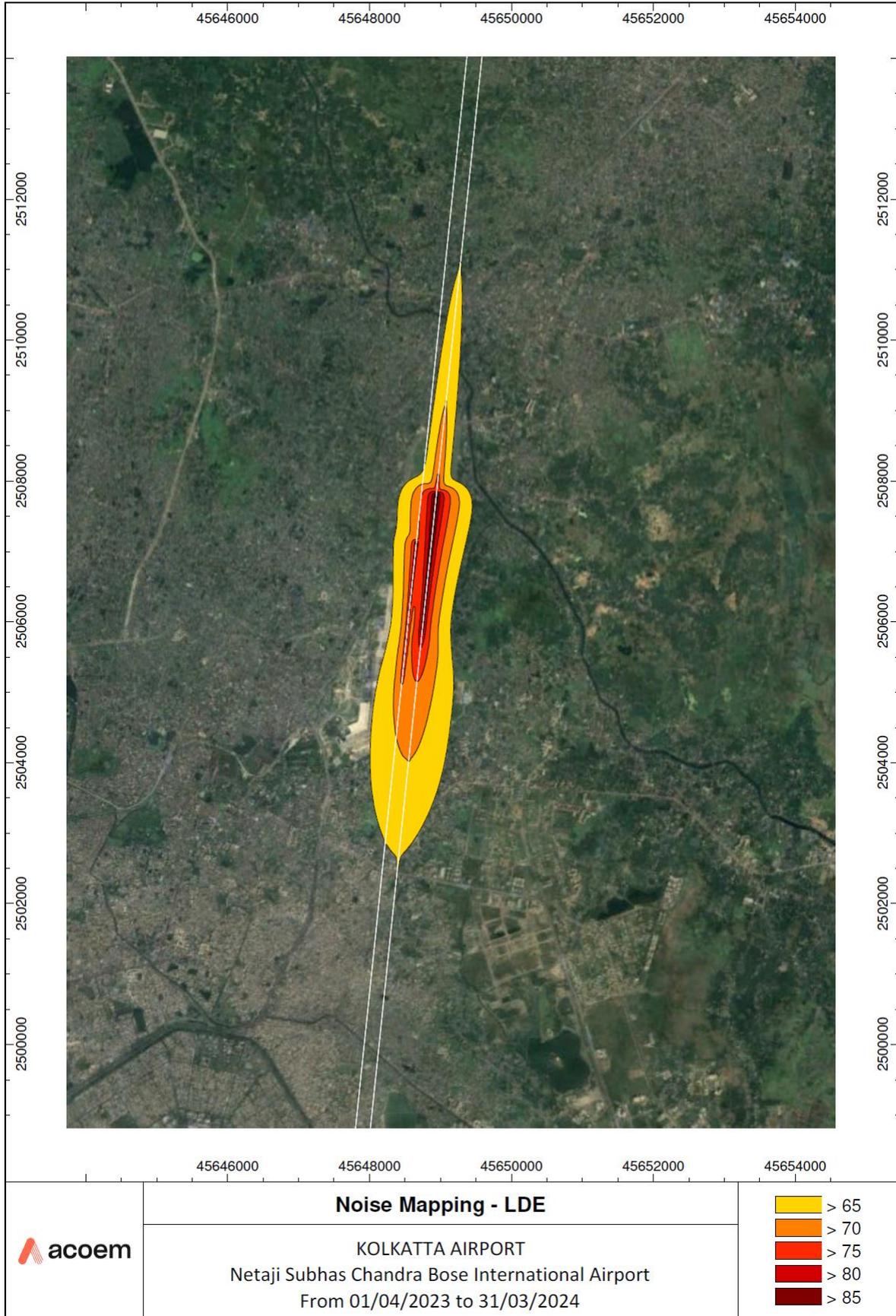


Figure 9 - LDE Curves.

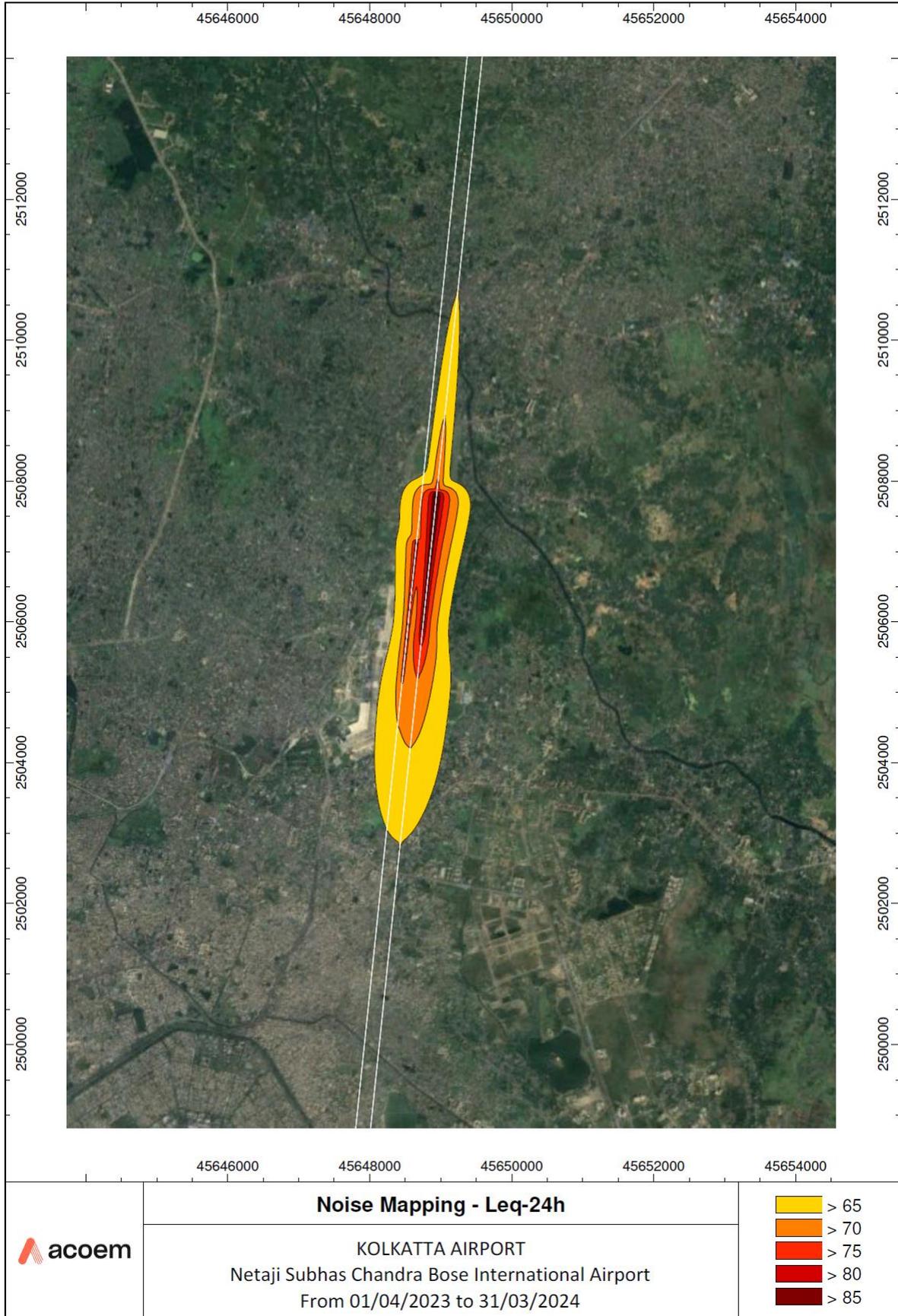


Figure 10 - Leq-24h Curves.

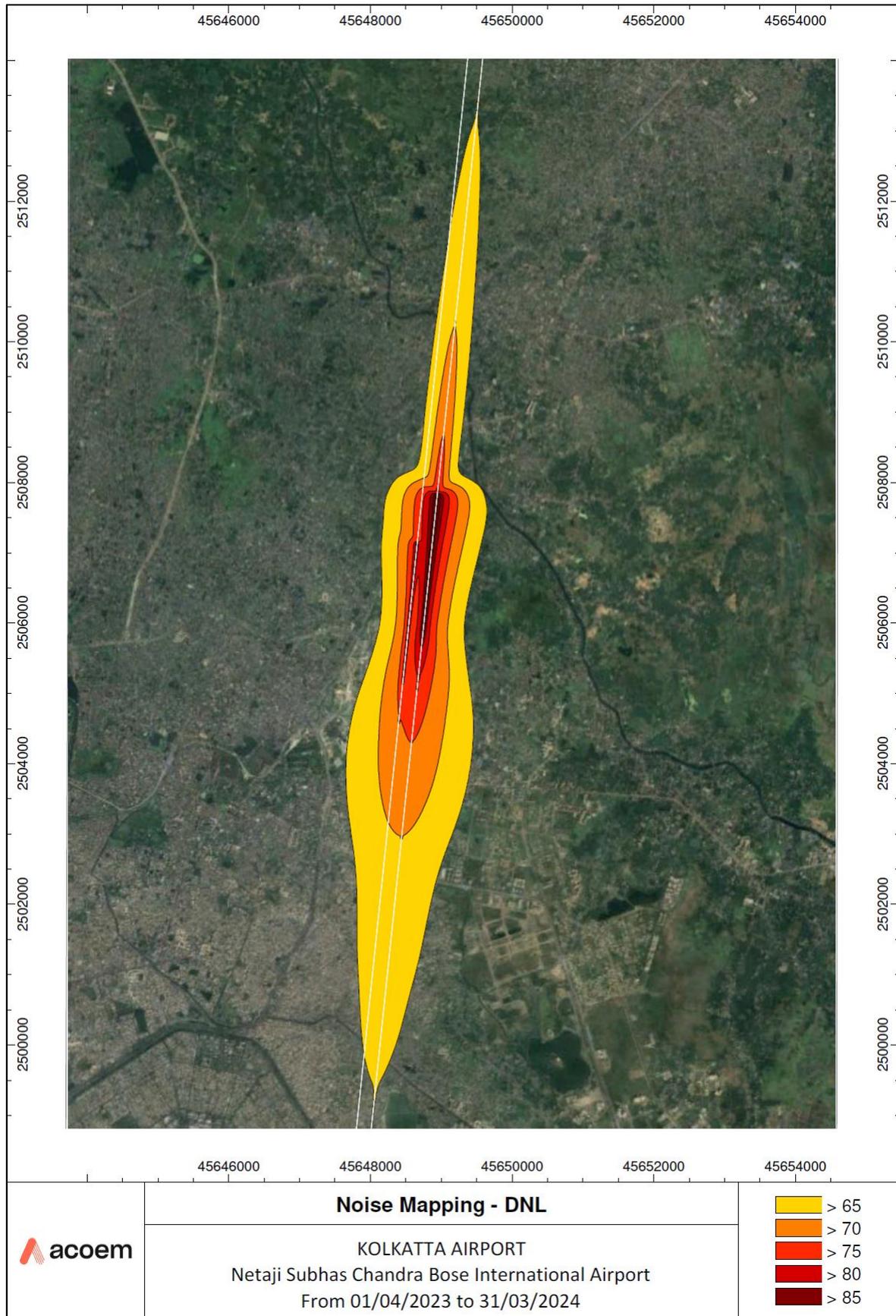


Figure 11 - DNL Curves.

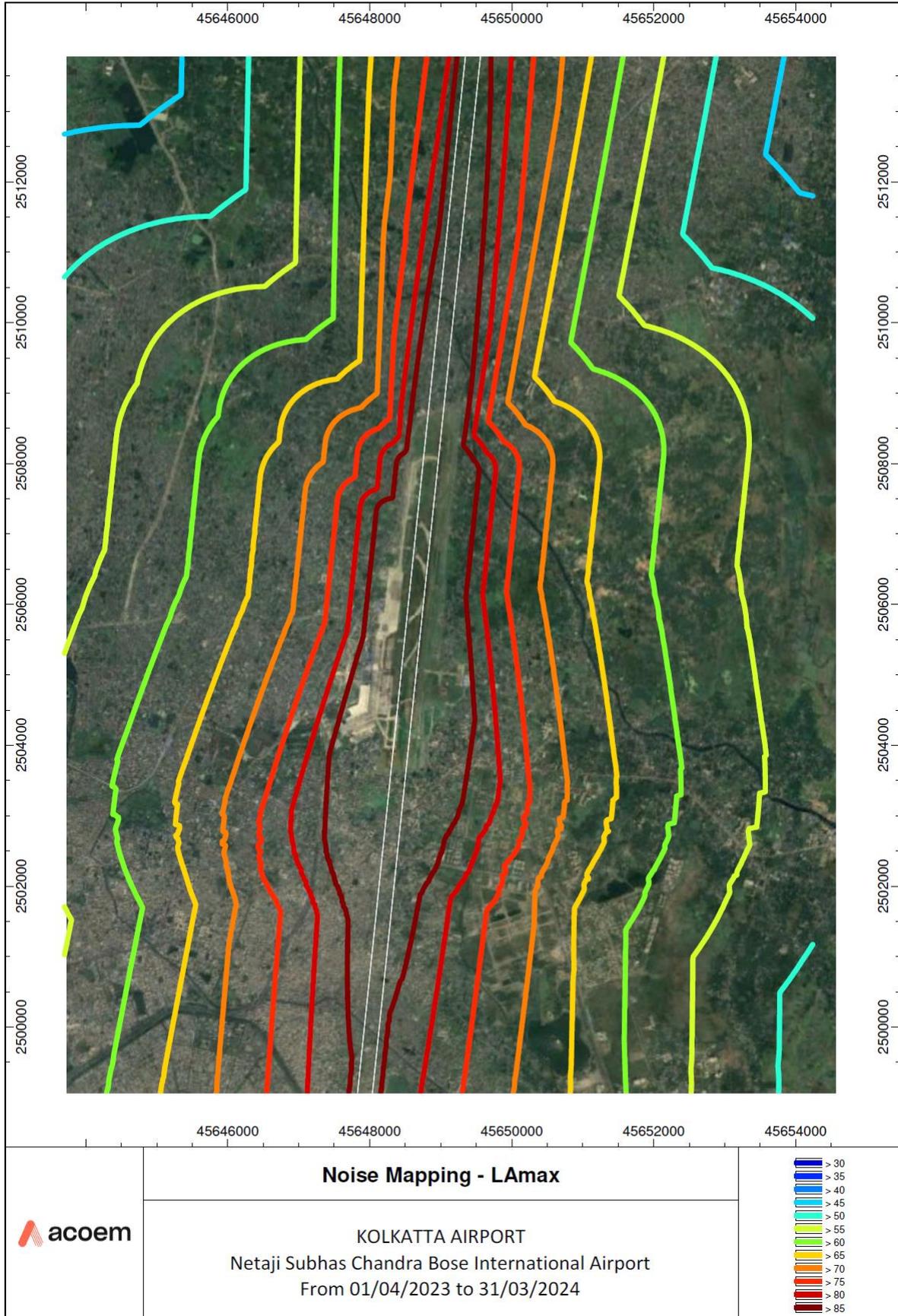


Figure 12 - LAmox Curves.

### 3.1. Noise Curves Validation

To validate the computed noise curves, aeronautical noise data was collected at four locations surrounding the airport over a one-week period. At each measurement point, a Noise Monitoring Terminal (NMT) was deployed to measure continuous data 24 hours a day.



Figure 13 – Monitoring points.

Table 5 – Geographic locations of noise monitoring sites.

Point	GPS Coordinates	
P1	22°37'51.98"N	88°26'28.99"L
P2	22°37'58.75"N	88°26'50.26"L
P3	22°41'1.33"N	88°27'11.89"L
P4	22°41'2.87"N	88°27'0.03"L

Subsequently, aeronautical events were identified and coded, then the Day-Night Level (DNL) metric was calculated.

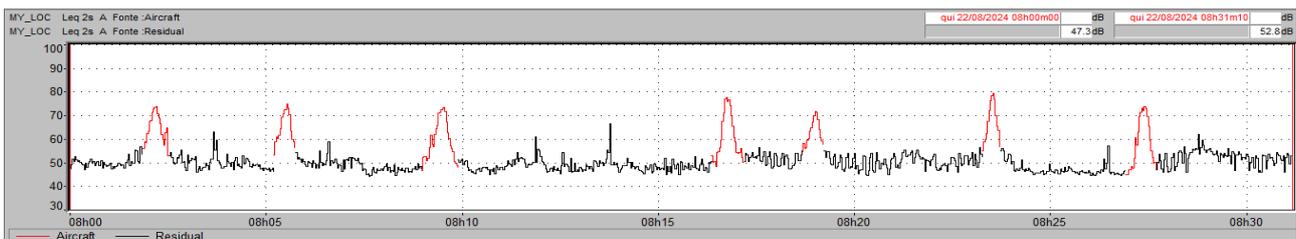


Figure 14 – Coded aeronautical events.

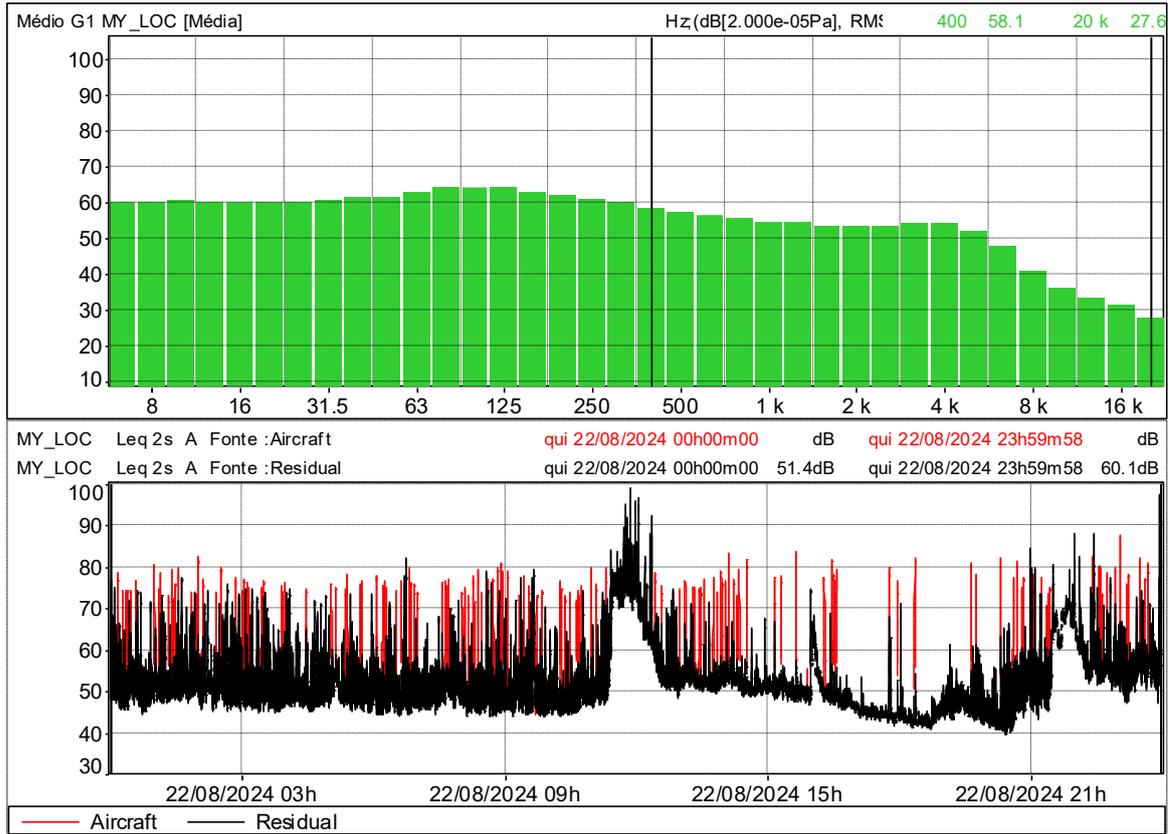


Figure 15 - Coded measurement example, P1, August 22, 2024.

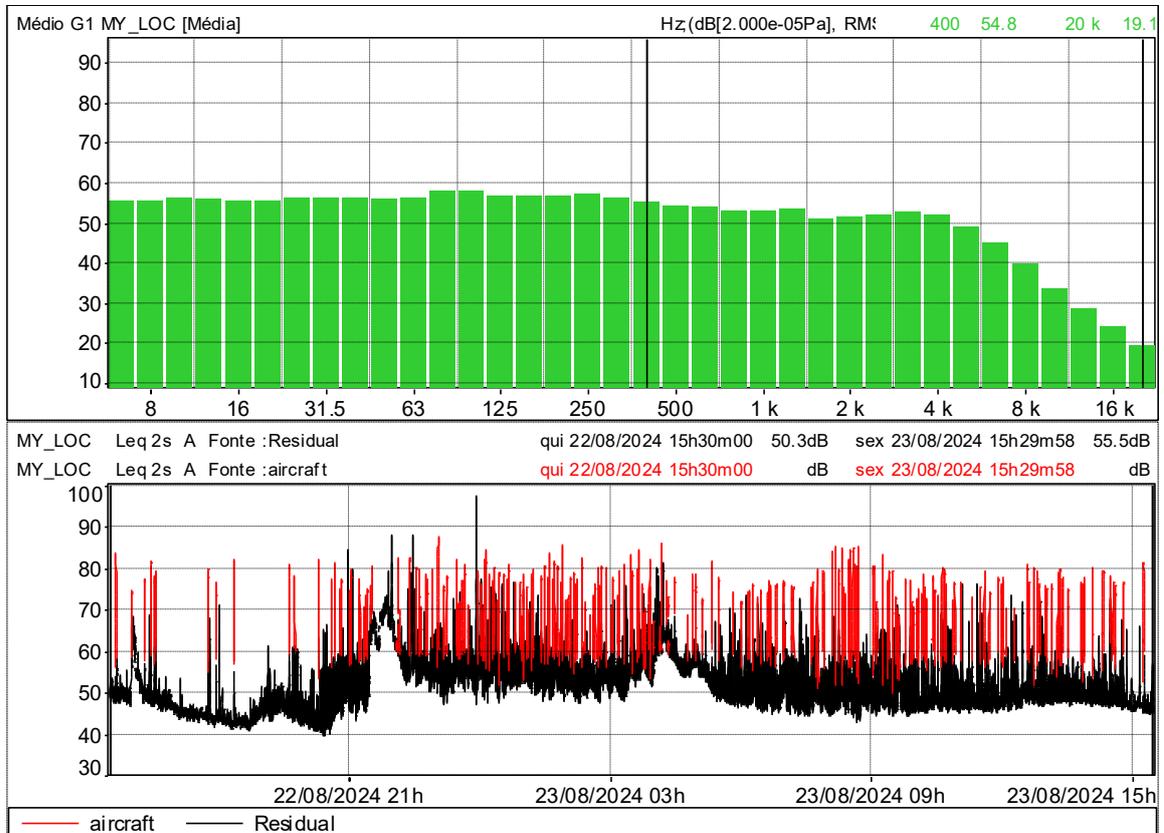


Figure 16 - Coded measurement example, P2, August 22, 2024.

### Creating environments of possibility

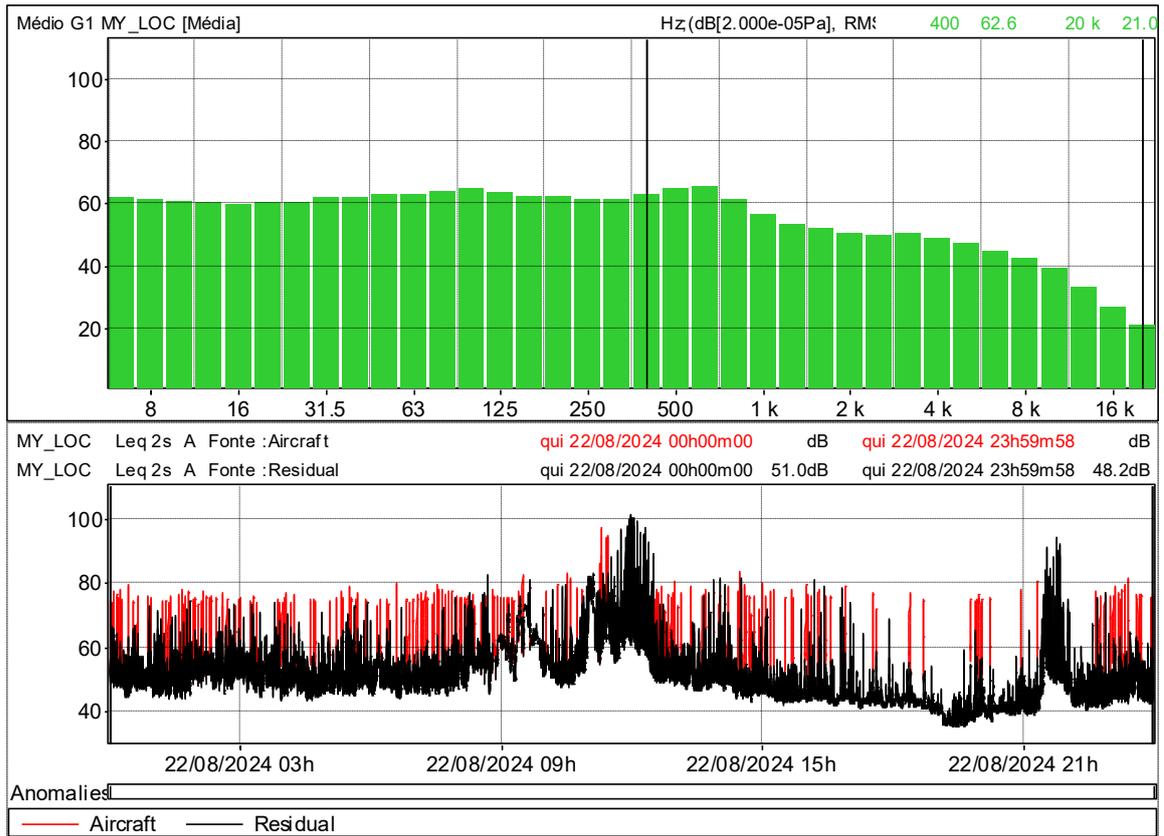


Figure 17 – Coded measurement example, P3, August 22, 2024.

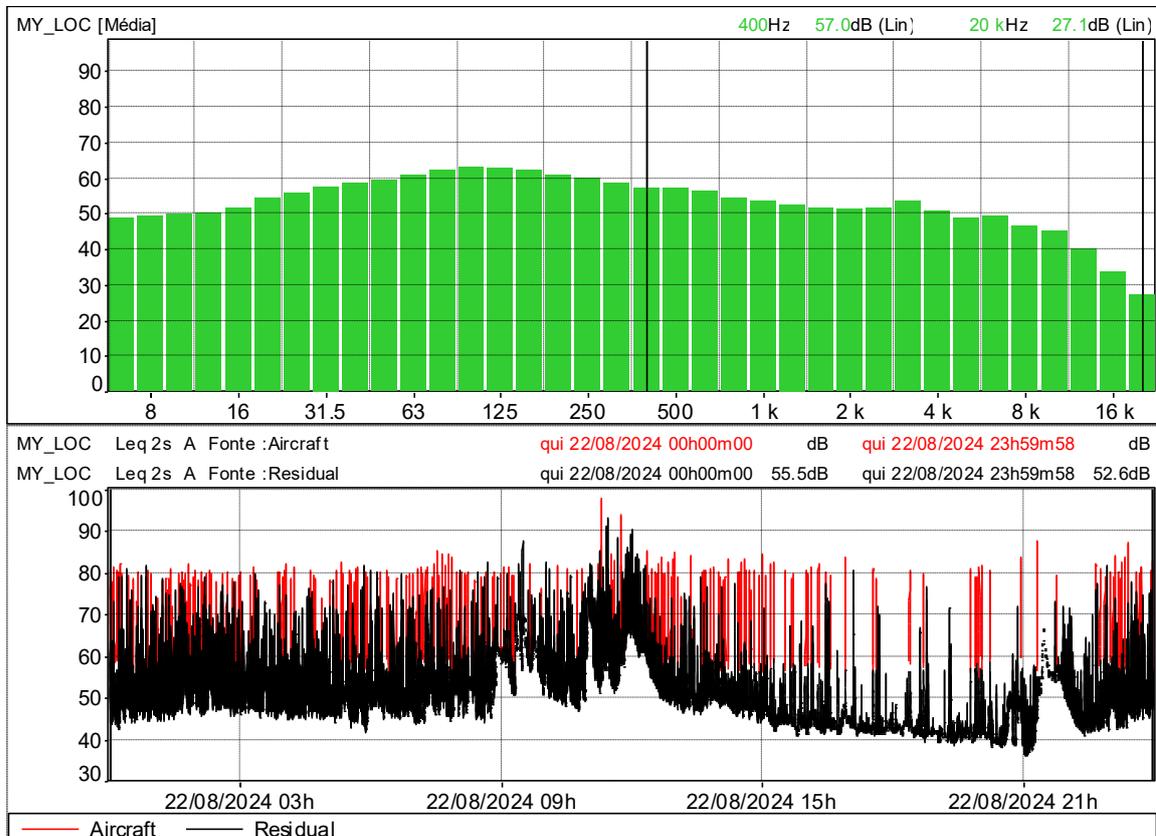


Figure 18 – Coded measurement example, P4, August 22, 2024.

### Creating environments of possibility

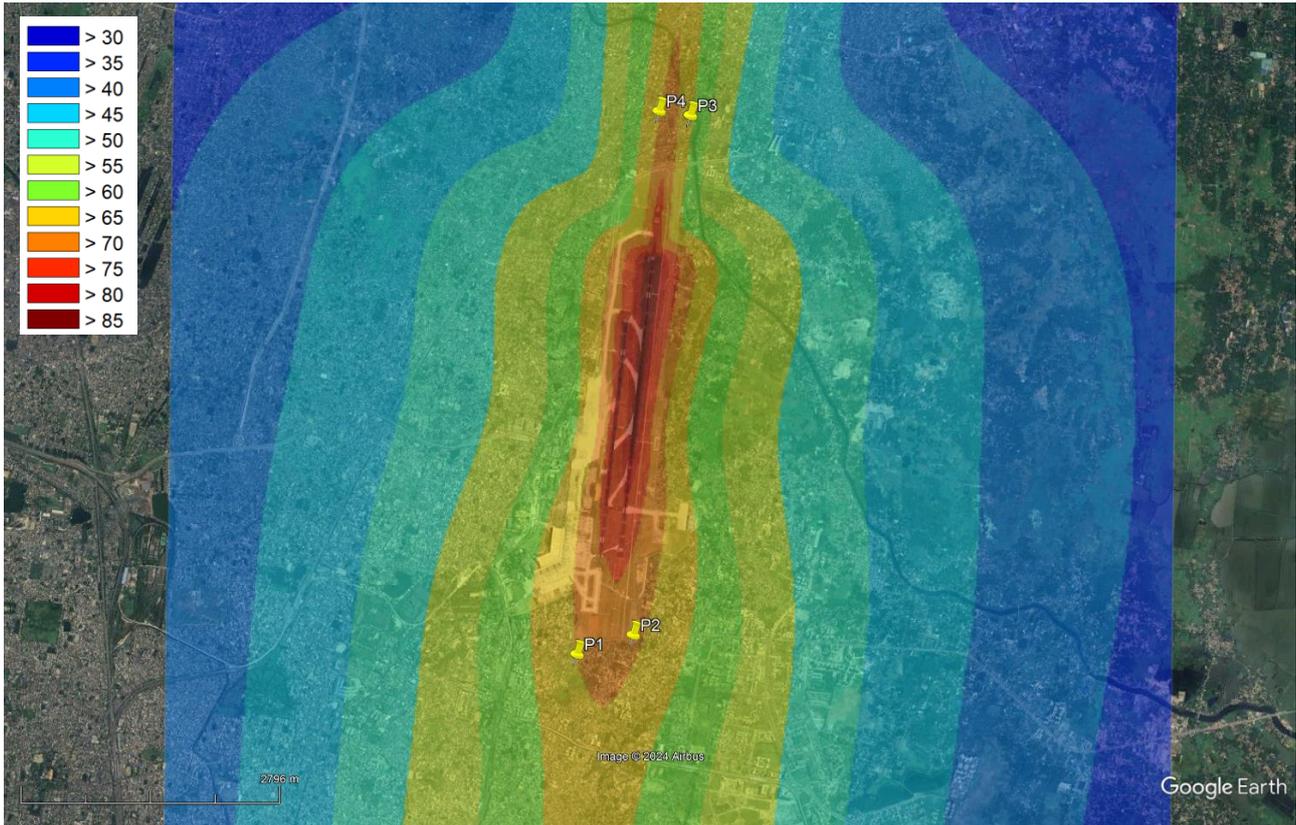


Figure 19 - DLN Noise curves and monitoring points.

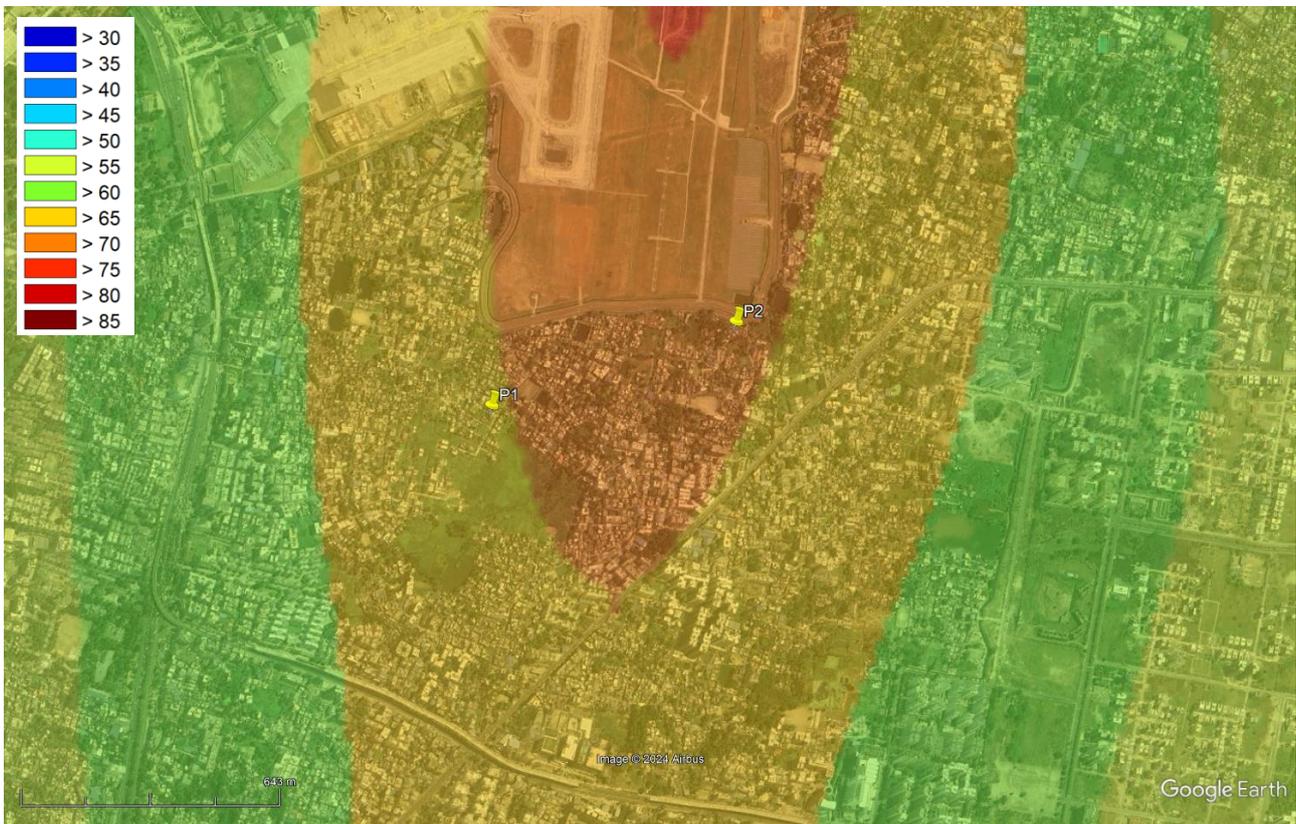
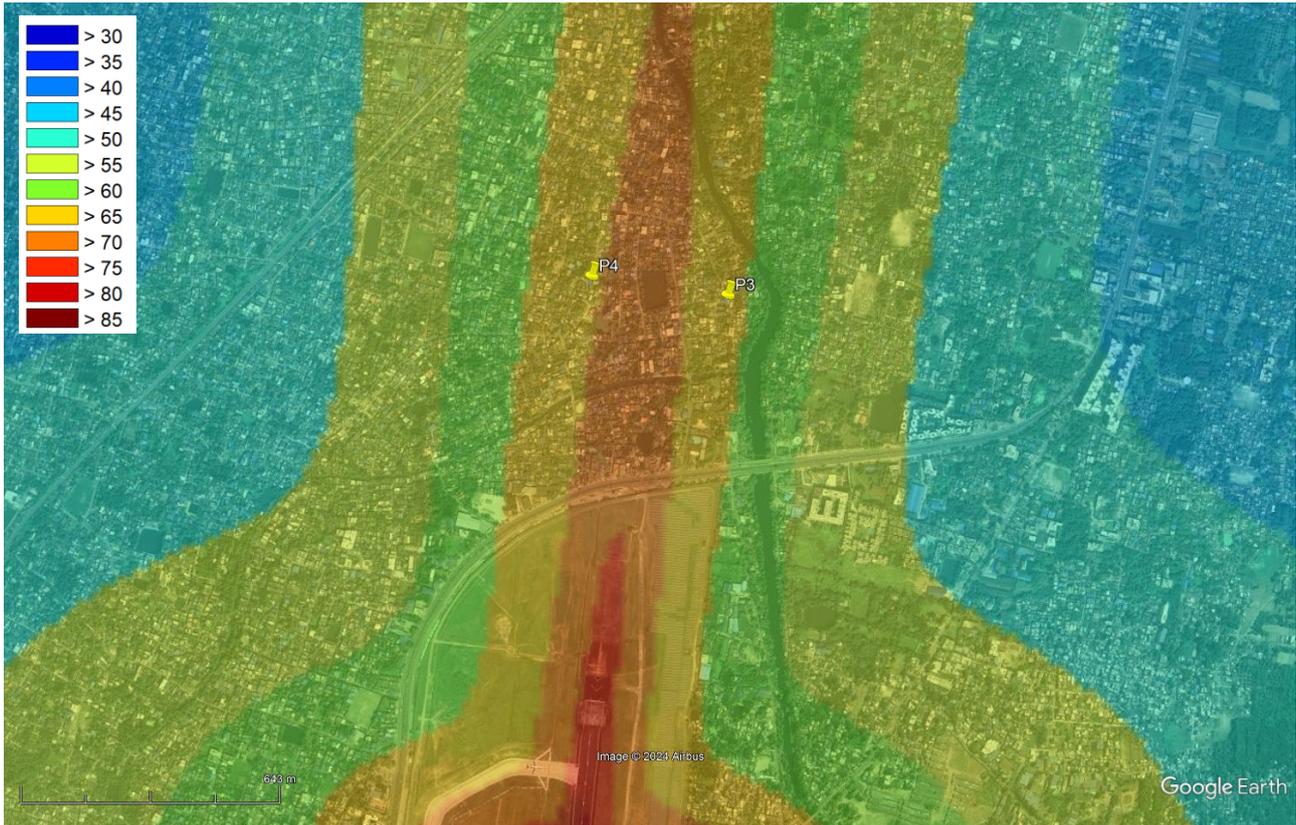


Figure 20 - DNL Noise curves and monitoring points, P1 and P2.

### Creating environments of possibility

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**Figure 21 – DNL Noise curves and monitoring points, P3 and P4.**

The following table compares measured values with simulated values.

**Table 6 – Results DNL measured and simulated.**

Point	Measured airport noise	Noise Curves
	DNL	DNL
P1	69	65 - 70
P2	69	70 - 75
P3	66	65 - 70
P4	70	65 - 70

The results demonstrate that, at all measurement points, the measured values fall within the calculated noise contours, except for point P2, which is 1 dB below the predicted range. This difference is considered acceptable, given the numerous factors that can influence aircraft noise monitoring, such as weather conditions, wind direction, runway usage, aircraft type, and others. The deviation of results is also influenced by a small uncertainty in the simulated data. This is due to the use of annual average input data, while the validation data does not span a complete year of measurements. Therefore, the curves are validated, as the results obtained are satisfactory.

### 3.2. 10 Year Master Plan Projection

A noise simulation of Kolkata Airport was performed to predict future conditions, based on projected changes over the next 10 years. This projection assumes only an increase in aircraft movements and passengers, without any modifications to the airport’s infrastructure, such as runways. The input data for the 2033 simulation was identical to the current scenario (2024) presented earlier, except for a proportional increase, as shown in the table below.

The input data for the 2033 simulation was the same as the current scenario (2024) presented earlier, except for a proportional increase, based on the table below.

**Table 7 – Movement forecast.**

TRAFFIC FORECAST - KOLKATA AIRPORT						
YEAR	AIRCRAFT MOVEMENTS (in Nos.)			PASSENGERS (in Nos.)		
FORECAST						
	International	Domestic	Total	International	Domestic	Total
2024-25	22832	153343	176175	3131709	21808061	24939770
2025-26	25229	170211	195440	3601465	24425029	28026494
2026-27	27878	188934	216813	4141685	27356032	31497717
2027-28	30527	204049	234576	4638687	29818075	34456762
2028-29	33427	220373	253800	5195330	32501702	37697032
2029-30	36602	238003	274605	5818769	35426855	41245624
2030-31	39896	254663	294559	6400646	38261003	44661650
2031-32	43487	272490	315976	7040711	41321884	48362595
2032-33	47401	291564	338965	7744782	44627634	52372416

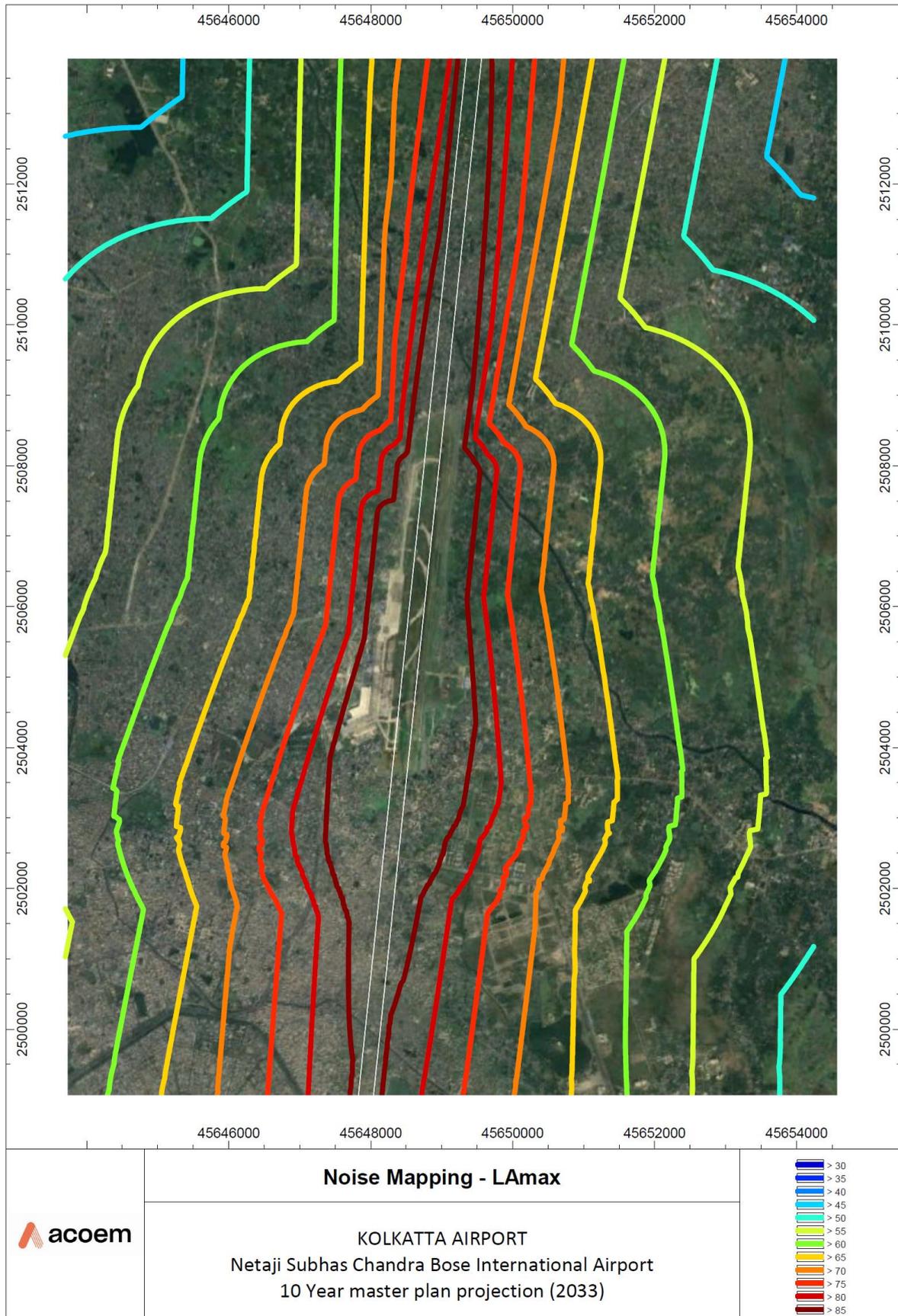
The 2033 projection shows a 92.4% increase in current operations. The DNL contour map represents this increase, where it is possible to verify the expansion of all contour areas.

Since there was no addition of aircraft models, the same aircraft mix was maintained. Thus, there was no change in the noise map presenting the Lmax contours, as this parameter represents the maximum noise level of an aircraft movement. In short, this parameter does not consider the number of aircraft simulated, but only the maximum emission level of the sound source.

Therefore, to better understand the behavior of the future projection, comparing the maps with the DNL contours is the best option. The DNL map illustrates the impact generated by aircrafts over 24 hours, with an added 10dB during the nighttime period to represent the time of greatest disturbance for the exposed population. Additionally, the DNL calculation

considers the noise level of each aircraft and the total number of operations throughout the day.

Figures 22 and 23 shows the noise map for Lmax and DNL, in order to clarify what was exposed in this section.



**Figure 22 -Lmax Noise curves for 10 year projection.**

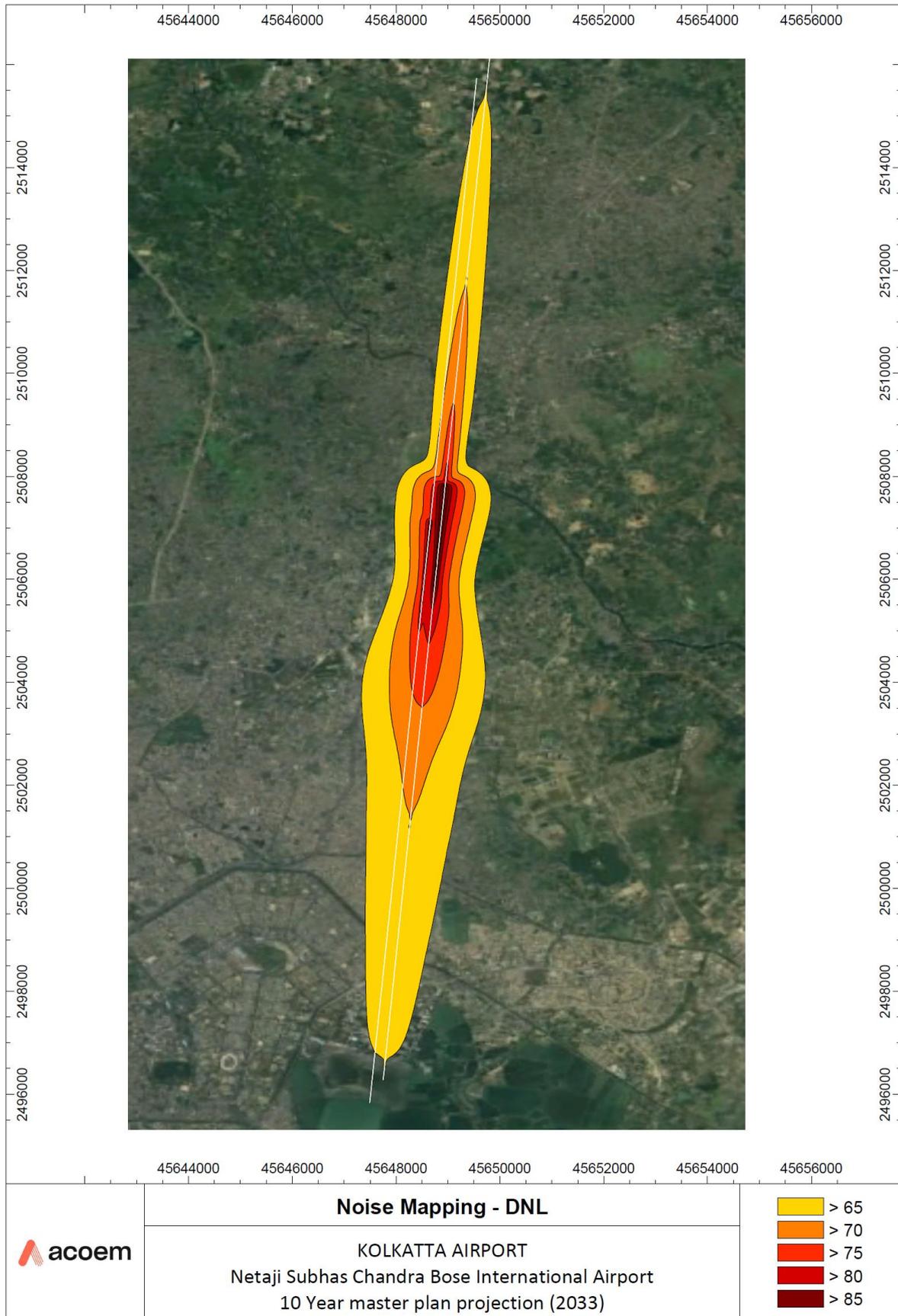


Figure 23 - DNL Noise curves for 10 year projection.

As all noise contours expand in the 2033 scenario, it is important to highlight that they will extend 1.5 km northward, 2 km southward. Consequently, a larger population will be exposed to elevated noise levels.

In order to minimize noise emissions and protect the community near Kolkata Airport, the following measures are recommended:

- Investigate the possibility of airlines using quieter aircraft;
- Decrease nighttime operations;
- Explore lower-impact flight paths;
- Evaluate the actual need to increase the airport's operational capacity;
- Ensure land use compatibility with environmental agencies and local government.

### **3.3. Noise Zone Study**

The following presents a study of noise zones, assuming a noise limit of 75 dB(A) for daytime and 70 dB for nighttime.

The methodology adopted was to use the calculated L<sub>day</sub> and L<sub>night</sub> noise curves and subtract the values of the daytime and nighttime criteria (L<sub>day</sub> = 75 and L<sub>night</sub> = 70 - A-weighted). The resulting curve consists of the amount (in dB) that exceeds each of these criteria for each evaluated period.

Each of the maps presents the contour of the airport site, and in them, it is possible to see in which regions there is noise emission above the established limit, in addition to the airport perimeter.

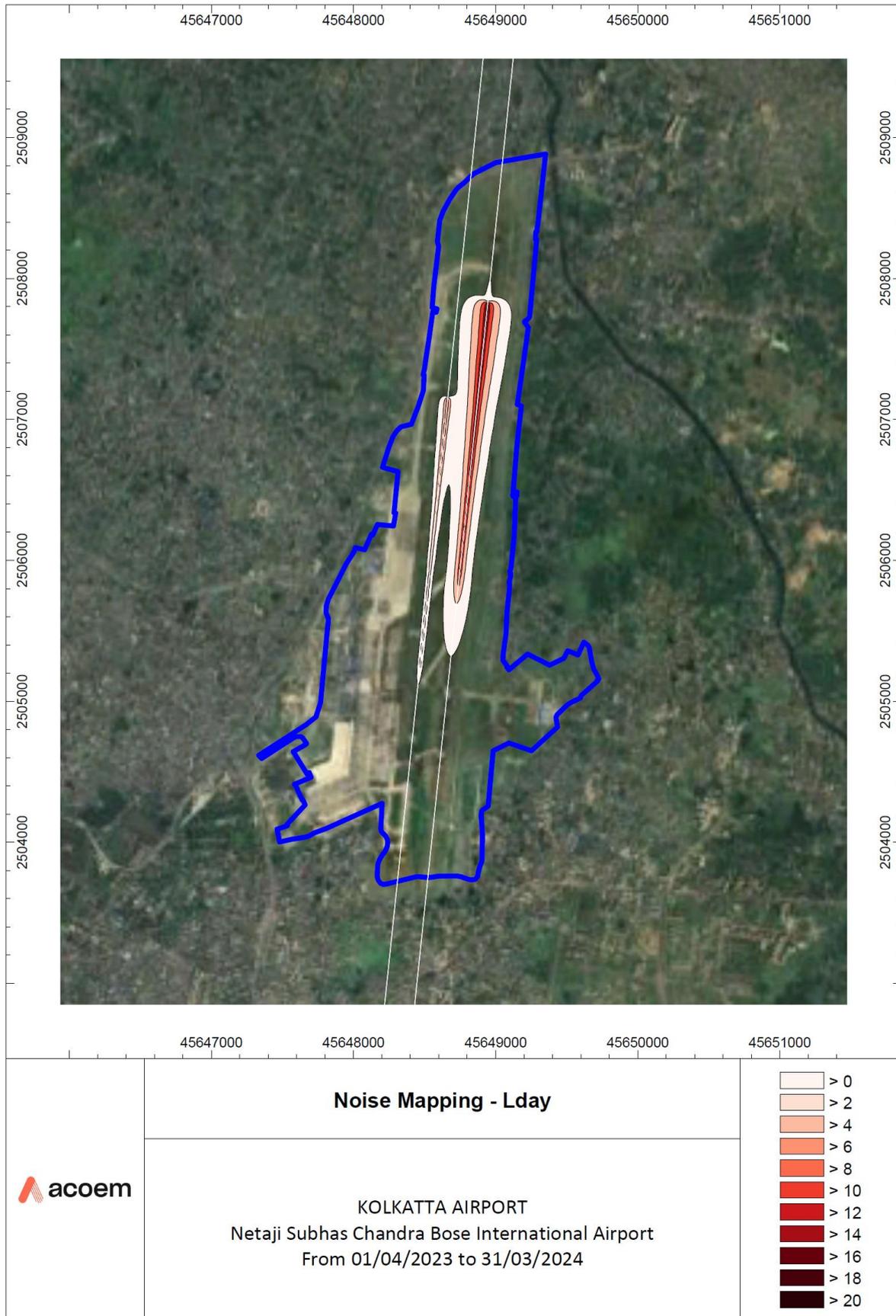


Figure 24 - Lday curve for Noise Zone Study.

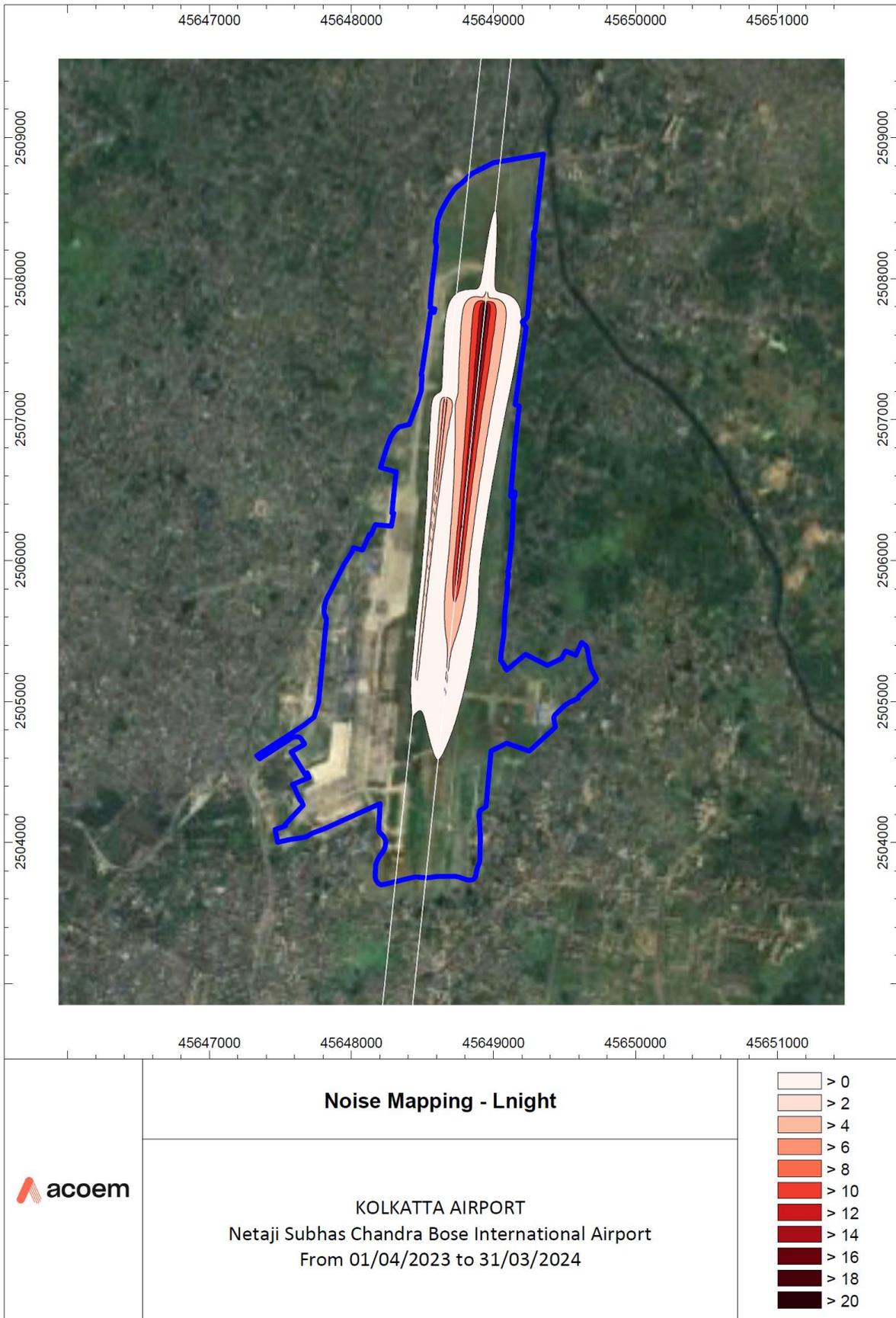


Figure 25 - Lnight curve for Noise Zone Study.

A boundary noise study was also carried out at 300 meters. The table above shows the values measured for Lday and Lnight, for each point measured and the coordinates for each point.

**Table 8 – Values of LAeq for each point of measurement.**

Sr. No	Latitude / Longitude	Lday	Lnight
1	22.679882 / 88.453451	62,3	59,5
2	22.678199 / 88.453698	59,8	56,4
3	22.676031 / 88.454147	57,4	55,5
4	22.674442 / 88.454427	60,5	57,2
5	22.671585 / 88.454683	67,5	62,9
6	22.669338 / 88.452211	62,2	58,7
7	22.666191 / 88.451615	59,8	55,2
8	22.663594 / 88.451489	57,4	53,5
9	22.663034 / 88.455463	55,8	51,8
10	22.660400 / 88.456085	61,5	57,5
11	22.656499 / 88.454111	59,5	53,6
12	22.654519 / 88.452116	57,5	51,5
13	22.651373 / 88.452393	62,8	58,6
14	22.648660 / 88.455268	64,2	57,5
15	22.645055 / 88.455440	63	58,2
16	22.641293 / 88.454367	60,9	54,2
17	22.639734 / 88.453472	61	55,9
18	22.635636 / 88.454161	58,8	54,1
19	22.630800 / 88.448565	57,5	52,5
20	22.632116 / 88.444317	57	50,2
21	22.633489 / 88.439310	58	53,5
22	22.634471 / 88.434932	58,9	55,4
23	22.639003 / 88.433679	57,5	54,2
24	22.642635 / 88.431694	56,5	52,5
25	22.652324 / 88.437972	58,5	52,9
26	22.659642 / 88.441610	58	54,7
27	22.664171 / 88.443955	59,4	54,2
28	22.668833 / 88.445002	60,5	55,6
29	22.674046 / 88.445383	61,5	58
30	22.676683 / 88.446047	62	57,6
31	22.678755 / 88.447986	62,2	58,5
32	22.679850 / 88.450343	61,9	57,8

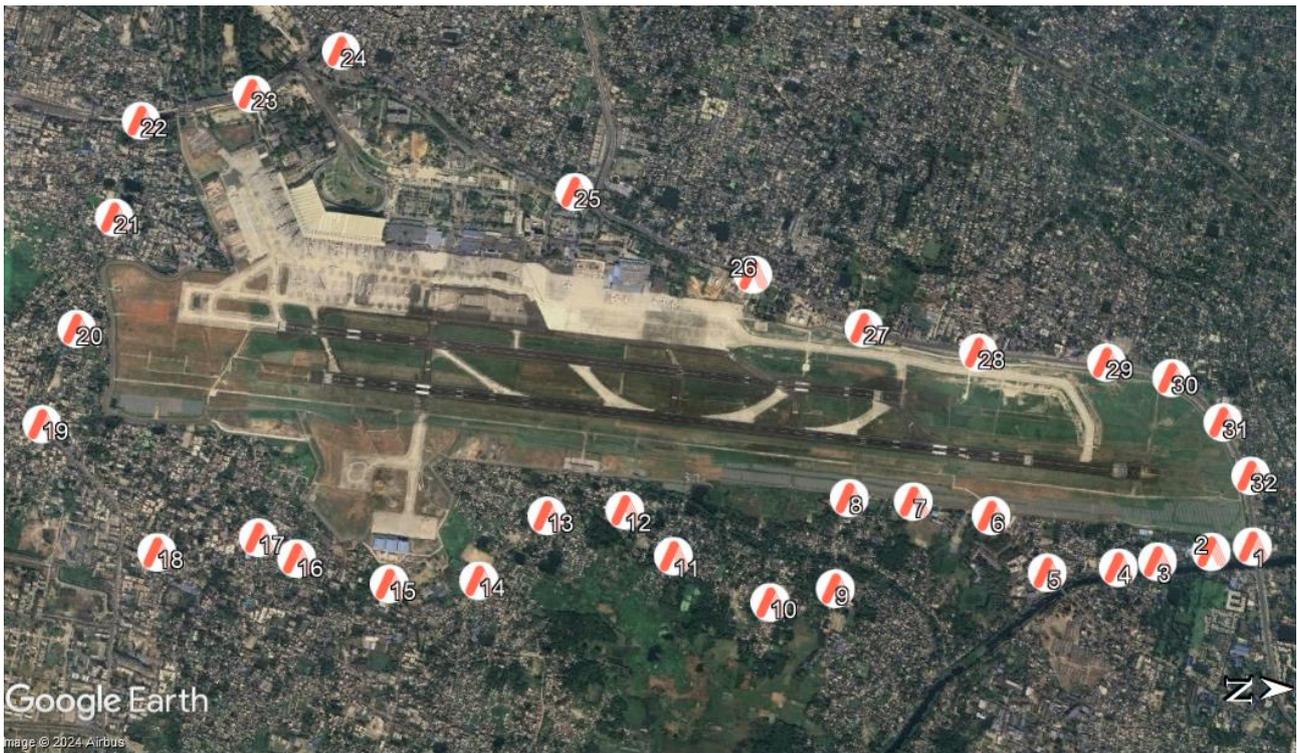
Based on the information from the table above, the following boundary noise level were generated for Netaji Subhas Chandra Bose International Airport.

**Table 9 - Boundary noise levels.**

	Lday	Lnight
Boundary	60.9	56.5
Limit	75	70
Margin	14.1	13.5

Considering the applicable limits of Industrial zone as per Noise Pollution (Control and Regulation) Rules 2000, 75 and 70 dBA are noise limits for Day and Night period respectively. Boundary noise was compared with these noise limits and found that the boundary noise level is far (14.1-13.5 dB(A)) below the limit.

The Figure below shows the location of each measurement point.



**Figure 26 - Lnight curve for Noise Zone Study.**

There were also calculated two noise contours for Lday = 62 dB(A) and Lnight = 57dB(A).

The three following Figures show the Lday, Lnight and de combined countours.

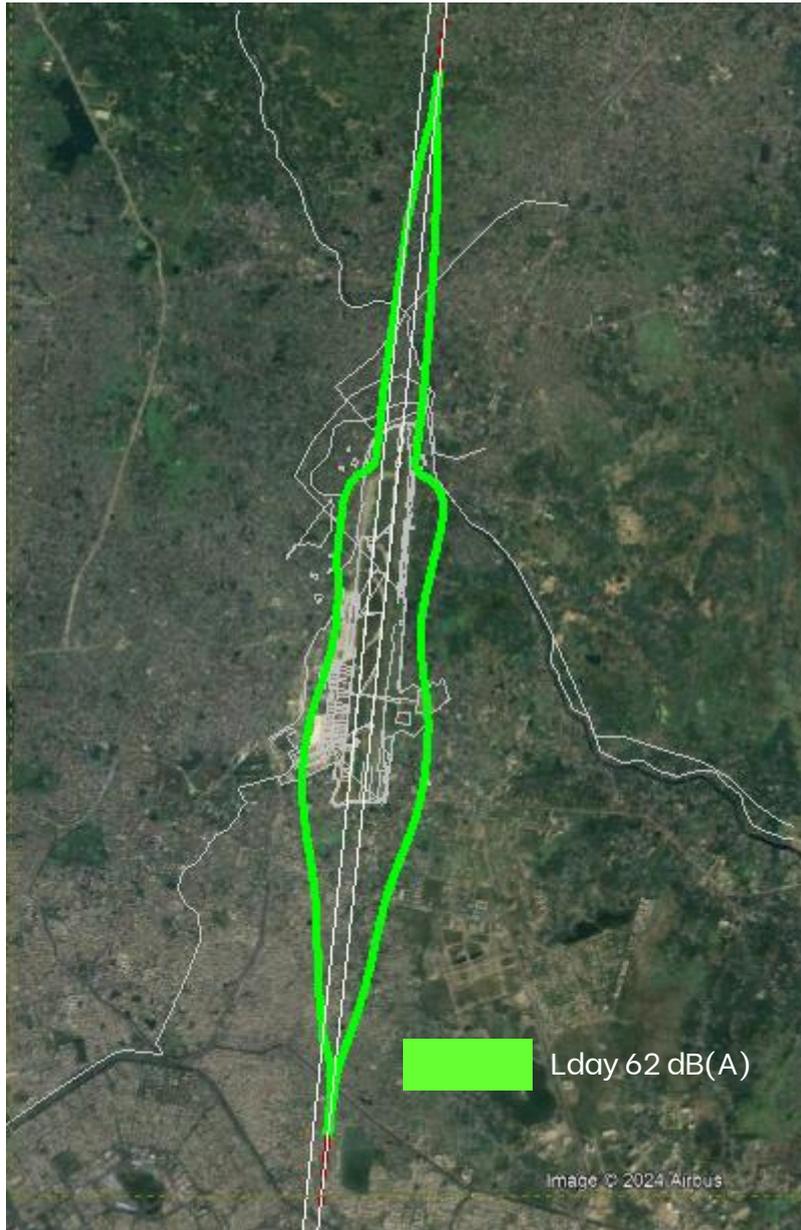


Figure 27 – Airport noise zone for day time (based on Lday 62 noise contour).



Figure 28 – Airport noise zone for night time (based on Lnight 57 noise contour).

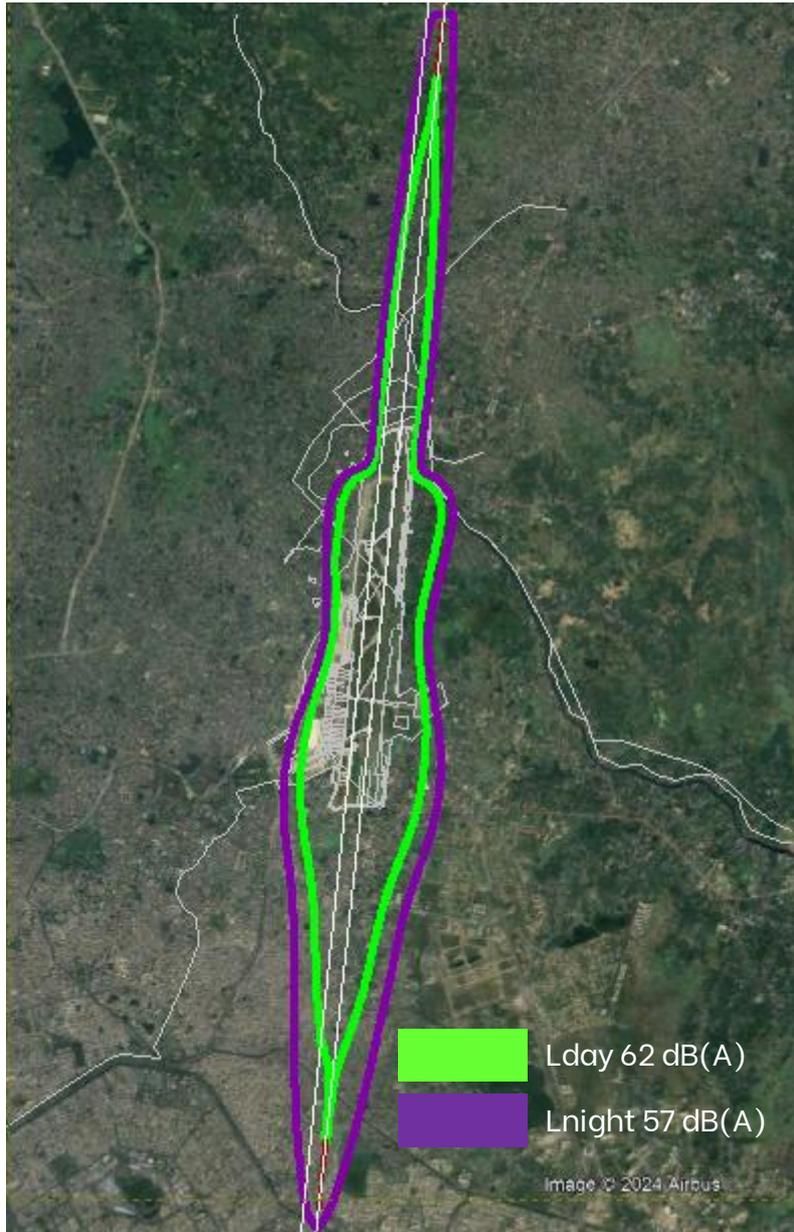


Figure 29 – Airport noise zone for day time (based on Lday 62 and Lnight 57 noise contours).

### 3.4. $L_{max}$ of Airport

According to the Environment Protection Amendment Rules of June 2018, maximum noise levels must be determined at specific locations. To this end, four sites have been identified on either side of the extended runways centerline.

The flight data measured in 2024 was analyzed and the max levels were extracted, considering the following information:

#### Creating environments of possibility

- Lmax of individual aircraft operations measured at the four noise monitoring locations.
- Measured data at four locations.

### 3.4.1. Methodology for the definition of Lmax

- Analyze Lmax single event data for each location;
- Filter non-valid events;
- Determine maximum noise level at each location;
- Define limit on Lmax for each location.

### 3.4.2. L<sub>max</sub> of Netaji Subhas Chandra Bose International Airport

When establishing the limits for L<sub>max</sub>, several considerations should be made:

- Should be sufficiently high to allow for the vast majority of operations to comply with.
- Should be sufficiently low to avoid the (unnecessary) noisiest operations.
- What to do with those events that exceed the limit.

The table above shows the values of Lmax (A-Weighted) for each point of measurement.

**Table 10 - Values of Lmax for each point of measurement.**

Points	Runway	Lmax	Coordinates	
			Latitude	Longitude
1	01L	112.8	22°37'51.98"N	88°26'28.99"L
2	01R	115.7	22°37'58.75"N	88°26'50.26"L
3	19L	111.8	22°41'1.33"N	88°27'11.89"L
4	19R	119.1	22°41'2.87"N	88°27'0.03"L

The location of the points of measurement is shown in the Figure below.



**Figure 30 – Monitoring points used for Lmax study.**

## 4. REFERENCE DOCUMENTS

- [1]. APA-24-2986 - ACOEM France - Kolkata Airport Noise Mapping - India;
- [2]. CIVIL AVIATION REQUIREMENTS SECTION 10 - AVIATION ENVIRONMENT PROTECTION SERIES 'A' PART I - ISSUE I, 18TH DECEMBER, 2014;
- [3]. Circular 01 of 2024 - Aviation Noise Management at Airports;
- [4]. Grid Map Edited 2024;
- [5]. Excel Documents: 2023-2024 movement and AAI - Daily Data 01.04.23-31.03.24;
- [6]. CADNAA FLG MANUAL.

## 5. ANNEX

ANNEX A - CadnaA - Kolkata\_Airport\_Jun24\_Rev0

ANNEX B - Google Earth - Kolkata\_Airport - Noise Mapping - 2024\_Rev0

Ref: VECC/Noise/Stakeholders Meeting/2024/299

Date: 11.07.2024

## Record of Discussion

**Subject:** Noise mapping and noise monitoring.

A stakeholders' meeting has been conducted under the Chairmanship of Airport Director, AAI, Kolkata, on 11.07.2024 at 11:00 Hrs., to discuss on the Draft Report of Noise mapping and aircraft noise monitoring of NSCBI Airport Kolkata. The list of participants is attached herewith. The following points have been discussed

In order to comply the DGCA CAR Section 10 – Aviation Environment Protection, Series 'A' Part I, Issue I, 18th December, 2014 F. No. 04-01/2010-AED (Vol. II), the work of Noise mapping is awarded.

- The work has been awarded to M/s. Acoem Ecotech Industries Private Limited vide GeM service contract no. GEMC-511687711818404, dated 12-Apr-2024, for 05 years having date of start 19-Apr-2024 and date of completion 18-Apr-2029.

Scope of work includes (a) Yearly noise mapping and submission of report to DGCA for approval (b) Noise monitoring by establishing Noise Monitoring terminals at the nearest residential area of Kolkata Airport.

Accordingly, AAI has provided aircraft details, distribution of runway usage for last financial year, airport plot plan, obstacle chart, landing path of aircraft etc. meteorological data etc. to the contractor.

Based on the data, contractor has submitted **Draft Noise Mapping report using CadnaA software (as per DGCA CAR)** noise impact assessment model. The report has been presented and discussed in the meeting.

Noise Monitoring Terminal (NMT) installation in nearest residential areas of airport and its configuration are under progress.

Final report on noise mapping will be submitted by 10.08.2024.

As advised by Environment cell CHQ, draft noise mapping report along with MOM of stakeholders' meeting in this regard shall be submitted to DGCA, for approval.

Meeting ended with thanks the chairs.

Encl.: - Attendance sheet.

  
11/07/2024.  
Shri Sandeep Pimplapure  
Jt. GM(E-E), NSCBI Airport Kolkata

Distribution:-

All participants; Through GM (Ops. - ASM), NSCBI Airport Kolkata.

Date: 11.07.2024 1100 hrs.

Venue: Arrival Conference Hall, Terminal Building, Kolkata Airport.

Page: 01

**ATTENDANCE SHEET****Subject: Stakeholders' meeting regarding noise mapping and monitoring at NSCBI Airport Kolkata.**

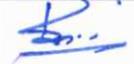
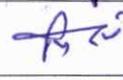
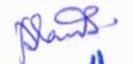
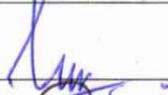
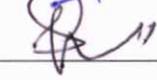
S/N.	Name	Designation	Organization	Mail ID	Mob. No.	Signature
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11. 12.	Mukund Kumar Sinha	JOT	AIASL	gsd205.ccu@aiasl.in	8420367202	
12. 13.	Md. Shareef	Dy. Mgr-Tech	AIASL	rod_client.ccu@aiasl.in	9042634668	

ATTENDANCE SHEETSubject: Stakeholders' meeting regarding noise mapping and monitoring at NSCBI Airport Kolkata.

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23.	24. Bilal	Mgr. Ops	AAI	bilal@aaiaero	8218017993	
24.	25. Akash Saha	SE (Ops)	AAI	akash.saha@aaiaero	6289043919	

## ATTENDANCE SHEET

**Subject: Stakeholders' meeting regarding noise mapping and monitoring at NSCBI Airport Kolkata.**

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## ATTENDANCE SHEET

**Subject: Stakeholders' meeting regarding noise mapping and monitoring at NSCBI Airport Kolkata.**

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46.						
47.						
48.						

### Compliance of DGCA Observation in the Report

Sr. No.	DGCA Findings	Inputs Added	Reference Date
<b>NM_CCU_June_ RevA .</b>			
1	Traffic movement as per 2023 data, for the classification of airport	This information can be found in section 2.4 (you can check Table 2), it was built based on the information sent by the airport containing all the aircraft movement during the period simulated. Page 15/58	As per mail dated 21 Aug 2024 requirement from DGCA officer. keerthig.dgca@gov.in
2	Methodology for Noise Zone must cater plan for next 10 years, whether it was considered and the details thereof	Added in section 3.2, Page 30/58	As per mail dated 21 Aug 2024 requirement from DGCA officer. keerthig.dgca@gov.in
3	Lmax study and proposed Lmax values	Lmax study is already in the report, Table 10. As explained in the Lmax parameter is not a good indicator for future projection. This explanation (with more details) is also in section 3.4. Even so, we have simulated the future scenario and presented this version of the report. Page 42/58	As per mail dated 02 Dec 2024 & 21 Aug 2024 requirement from DGCA officer. keerthig.dgca@gov.in
<b>NM_CCU_June_ RevB as per 21 Aug 2024 mail.</b>			
4	Validation of model results and measured values	Presented in section 3.1 Page 25/58	As per mail dated 21 Aug 2024 requirement from DGCA officer. keerthig.dgca@gov.in
5	Input data for noise boundary study	Table 8, Page 37/58	As per mail dated 02 Dec 2024 & 21 Aug 2024 requirement from DGCA officer. keerthig.dgca@gov.in
6	Noise contour for Lday and Lnight; also for Lday 62 dB (A) and Lnight 57 dB (A) as per DGCA suggestions	Noise contour for Lday and Lnight it is already in the report, Figure 40,41 and 42 Limits (62 and 57) were added in section 3.3, Page 34/58	As per mail dated 02 Dec 2024 & 21 Aug 2024 requirement from DGCA officer. keerthig.dgca@gov.in
7	Mitigation plans when noise limits exceed	Added in section 3.2. Page 30/58	As per mail dated 21 Aug 2024 requirement from DGCA officer. keerthig.dgca@gov.in
<b>NM_CCU_June_ RevC as per 02 Dec 2024.</b>			
8	Lady and night range/limits	In section 3.3 , Page 38/58	As per mail dated 02 Dec 2024 & 21 Aug 2024 from DGCA officer. keerthig.dgca@gov.in
9	Noise study Airport Boundary Level	In section 3.3 ,Page 38/58	As per mail dated 02 Dec 2024 from DGCA officer. keerthig.dgca@gov.in

### Creating environments of possibility

10	Addition of Circular 01 of 2024 - Aviation Noise Management at Airports.	Annex	As per mail dated 02 Dec 2024 requirement from DGCA officer. keerthig.dgca@gov.in
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### Submission of Data to DGCA Compliance

NM_CCU_June_ RevC as per 10 Jan 2025.			
Sr. No.	DGCA Requested Data	Submission Format	Requested Date
1	Analysis carried out to perform the noise mapping/zone study	Physically in USB drive Folder 1	As per mail dated 10 Jan 2025 requirement from DGCA officer. keerthig.dgca@gov.in
2	Details of the software and the calibration/validation of the same	Physically in USB drive Folder 2	As per mail dated 10 Jan 2025 requirement from DGCA officer. keerthig.dgca@gov.in
3	Input data to the software	Physically in USB drive Folder 3	As per mail dated 10 Jan 2025 requirement from DGCA officer. keerthig.dgca@gov.in
4	Executable files of the software, submission of the same	Physically in USB drive Folder 4	As per mail dated 10 Jan 2025 requirement from DGCA officer. keerthig.dgca@gov.in
5	Output files and data from the software	Physically in USB drive Folder 5	As per mail dated 10 Jan 2025 requirement from DGCA officer. keerthig.dgca@gov.in
6	Performance database used, submission of the same	Physically in USB drive Folder 6	As per mail dated 10 Jan 2025 requirement from DGCA officer.
7	Aircraft substitutions used, submission of the same	Physically in USB drive Folder 7	As per mail dated 10 Jan 2025 requirement from DGCA officer. keerthig.dgca@gov.in
8	Flight profiles used, submission of the same	Physically in USB drive Folder 8	As per mail dated 10 Jan 2025 requirement from DGCA officer. keerthig.dgca@gov.in

### Creating environments of possibility



# भारत का राजपत्र The Gazette of India

असाधारण

EXTRAORDINARY

भाग II—खण्ड 3—उप-खण्ड (i)

PART II—Section 3—Sub-section (i)

प्राधिकार से प्रकाशित

PUBLISHED BY AUTHORITY

सं. 413]

नई दिल्ली, सोमवार, जून 18, 2018/ज्येष्ठ 28, 1940

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NEW DELHI, MONDAY, JUNE 18, 2018/JYAISTHA 28, 1940

पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय

अधिसूचना

नई दिल्ली, 18 जून, 2018

**सा.का.नि. 568(अ)**—केन्द्रीय सरकार पर्यावरण (संरक्षण) अधिनियम, 1986 (1986 का 29) की धारा 6 और धारा 25 में प्रदत्त शक्तियों का उपयोग करते हुए पर्यावरण (संरक्षण) नियमावली, 1986 में और संशोधन करने के लिए एतद्वारा निम्नलिखित नियम बनाती है, अर्थात्:-

- (1) इन नियमों का संक्षिप्त नाम पर्यावरण (संरक्षण) संशोधन नियम, 2018 है।  
(2) ये राजपत्र में प्रकाशन की तारीख को प्रवृत्त होंगे।
- पर्यावरण (संरक्षण) नियम, 1986 में, अनुसूची-I में क्रम सं.111 और उससे संबंधित प्रविष्टियों के बाद निम्नलिखित क्रम संख्या और प्रविष्टियां अंतःस्थापित की जाएंगी, अर्थात् :-

क्रम सं.	उद्योग	प्राचल	मानदंड	
1	2	3	4	
		विमानपत्तन ध्वनि परिक्षेत्र में ध्वनि के संबंध में परिवेशी वायु गुणवत्ता मानक		
"112	विमानपत्तन	विमानपत्तनों के प्रकार	db (A) Leq* में सीमाएं	
			दिन का समय	रात्रि का समय
		व्यस्त विमानपत्तन	70	65
		प्रस्तावित विमानपत्तनों से इतर सभी अन्य विमानपत्तन	65	60

**परिभाषाएं:**

- (क)  $^{\circ}$ dB (A) Leq माप A पर डेसीबल में ध्वनि स्तर में भारित औसत में लगे समय को सूचित करता है, जो मानवीय श्रवण से संबंधित है। भारित औसत के लिए समय सीमा के लिए दिन में 6.00 प्रातः से 10.00 बजे रात्रि तक और रात्रि समय में 10.00 बजे रात्रि से 6.00 बजे प्रातः तक की समय सीमा पर विचार किया जाता है।
- (ख) db (A) Leq "A" से ध्वनि के मापन में भारिता बारम्बारता और मानव श्रवण की बारम्बारता प्रतिक्रिया विशेषताओं के प्रति समनुरूपता को सूचित करता है। (मानव श्रवण सीमा 20 Hz से 20 KHz तक है)
- (ग) "डेसीबल" वह इकाई है जिसमें ध्वनि मापित की जाती है।
- (घ) Leq : B यह एक विनिर्दिष्ट समय सीमा में ध्वनि स्तर का ऊर्जा औसत है।
- (ङ.) व्यस्त विमानपत्तन- विमानपत्तनों पर ध्वनि प्रबंधन के प्रयोजनार्थ एक व्यस्त विमान पत्तन को "उस नागर विमानपत्तन, जहां हल्के यानों के केवल प्रशिक्षण प्रयोजनार्थ संचालन को छोड़कर, 50,000 प्रति वर्ष यानीय संचालन (विमान के उड़ान भरने अथवा उसे उतारने की क्रिया) से अधिक हो, के रूप में पारिभाषित किया जाएगा।
- (च) उड़ान भरना- उड़ान भरने की शक्ति के प्रयोग से उड़ान भरने की अंतिम उच्च सीमा तक की अवस्था
- (छ) जमीन पर उतरना –लैंडिंग फ्लेयर की शुरुआत से उड़ान का एक चरण, जब तक कि जमीन पर उतरने के लिए विमान, धावन पथ (रनवे) पर रुक नहीं जाता जब अथवा टच-एण्ड-गो लैंडिंग के मामले में उड़ान भरने के लिए शक्ति प्रयुक्त की जाती है।
- (ज) Lmax – यह db (A) में विमान की अधिकतम ध्वनि स्तर के लिए इकाई है, जो संबंधित विमानपत्तनों के लिए नागर विमानन महानिदेशालय द्वारा अधिसूचित ध्वनि मानकों के अनुसार अनुवीक्षण अवस्थान पर विमानों के लिए अधिकतम अथवा उच्चतम ध्वनि मान है।
- (झ) अन्य विमानपत्तन- ऐसा विमानपत्तन, जहां 15000 से अधिक किंतु 50000 से कम वार्षिक यानीय संचालन हो रहे हैं।
- (ञ) प्रस्तावित विमानपत्तन-ऐसा विमानपत्तन जो अभी प्रचालनात्मक नहीं है किंतु निर्माणाधीन है।

**टिप्पणी :**

- (i) दिन का समय 6.00 प्रातः से 10.00 बजे रात्रि तक और रात्रि समय 10.00 बजे रात्रि से 6.00 बजे प्रातः तक अभिप्रेत है।
- (ii) उपरोक्त विनिर्दिष्ट सीमाओं की 10 dB (A) Leq की सहनीय सीमा होगी।
- (iii) निर्धारित सीमा में सभी धावन पथों (रनवे) से रक्षा विमान और विमान के उतरने और उड़ान भरने के दौरान ध्वनि और विमान इंजन/ग्राउंड रनअप्स, इस प्रयोजनार्थ विमानपत्तन संचालक द्वारा अभिनिर्धारित की गई हेलीपैड अवस्थानों को शामिल नहीं किया गया है।
- (iv) तथापि, यानीय ध्वनि के लिए Lmax के रूप में सीमा, इस अधिसूचना के पैरा 1 में यथा उल्लिखित विमानपत्तनों द्वारा संस्थापित यानीय ध्वनि अनुवीक्षण अवस्थानों पर नागर विमानन महानिदेशालय के अनुमोदन से विमानपत्तन संचालकों द्वारा अधिसूचित की जाएगी।
- (v) उपरोक्त विनिर्दिष्ट ध्वनि सीमाएं, निम्नलिखित मौजूदा परिक्षेत्रों की ध्वनि सीमाओं के संबंध में परिवेशी वायु गुणवत्ता को प्रतिस्थापित और अधिकांत करेगी;
  - (क) शांत;
  - (ख) आवासीय; और
  - (ग) वाणिज्यिक क्षेत्रों;

- (vi) जैसा कि विमानपत्तन ध्वनि परिक्षेत्रों के अंतर्गत सीधे तौर पर आ रहे क्षेत्रों में ध्वनि प्रदूषण (विनियमन और नियंत्रण) नियम, 2000 में विनिर्दिष्ट किया गया है।
- (vii) विमानपत्तनों की समूची चारदीवारी के भीतर ध्वनि मानक, औद्योगिक क्षेत्रों के लिए लागू किए गए अनुसार होंगे अर्थात् ध्वनि (विनियमन और नियंत्रण) नियम, 2000 के अनुसार दिन के समय 75 dB (A) Leq होंगे और रात्रि के समय 70 dB (A) Leq होंगे और विमानपत्तन की चारदीवारी पर भिन्न-भिन्न बिंदुओं पर मापित किया जाएगा और तब उसका औसत निकाला जाएगा।
- (viii) यह अधिसूचना उस नागर विमानपत्तन पर लागू नहीं होगी जहां वार्षिक यानीय संचालन 15,000 से कम है।
- 1 (1) नए प्रस्तावित विमानपत्तनों को छोड़कर, विमानपत्तनों के लिए:
- dB (A) Leq जैसा उल्लेख किया गया है, "विमानपत्तन ध्वनि परिक्षेत्र" में लागू के अतिरिक्त, dB (A) में Lmax मान को केवल 50,000 से अधिक वार्षिक यानीय संचालन कर रहे विमानपत्तनों के लिए नागर विमानन महानिदेशालय के अनुमोदन से विमानपत्तन संचालकों द्वारा प्रकाशित किया जाएगा। इन Lmax मानों का एयरलाईन्स द्वारा अनुपालन किया जाएगा और इन विमानपत्तन के संचालकों द्वारा अनुवीक्षण किया जाएगा। नागर विमानन महानिदेशालय के सूचित किया जाएगा है। भविष्य में जब भी आवश्यकता होगी, इन Lmax मान की समीक्षा की जाएगी।
- (2) प्रस्तावित विमानपत्तनों के लिए (अभी संचालन किया जाना है):
- (i) किसी भी नए/नवनिर्मित विमानपत्तनों के लिए ध्वनि मोडलिंग, विमानपत्तन संचालकों द्वारा की जाएगी और पर्यावरण प्रभाव मूल्यांकन अधिसूचना, 2006 के तहत पर्यावरणीय स्वीकृति प्राप्त करते समय पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय को परिणाम प्रस्तुत किए जाएंगे।
- (ii) विमानपत्तन संचालक पैरा 4 में विनिर्दिष्ट किए अनुसार विमानपत्तन ध्वनि परिक्षेत्र भी विकसित करेंगे और विमानपत्तन के आस-पास आवश्यक भूमि उपयोग आयोजना के लिए उसे आवास और शहरी कार्य मंत्रालय और संबंधित राज्य विकास प्राधिकरण के साथ साझा करेंगे।
- (iii) संबंधित राज्य/संघ शासित प्रदेश विकास प्राधिकरण किसी ध्वनि न्यूनीकरण उपाय के बिना विमानपत्तन ध्वनि परिक्षेत्र में आ रहे नए आवासीय, संस्थागत और वाणिज्यिक सुविधाओं और अन्य ध्वनि संवेदनशील क्षेत्र को अनुमति नहीं देंगे।
2. जैसा कि ऊपर विनिर्दिष्ट किया गया है विमानपत्तन ध्वनि परिक्षेत्र में लागू ध्वनि स्तरों का अनुपालन विमानपत्तन संचालकों द्वारा किया जाएगा और नागर विमानन महानिदेशालय द्वारा उसका पर्यवेक्षण किया जाना है।
3. विमानपत्तन प्रचालक, विमानपत्तन-ध्वनि मानकों के अनुपालन हेतु ध्वनि प्रबंधन योजनातैयार करेंगे।
4. **विमानपत्तन ध्वनि परिक्षेत्र:**
- (1) प्रत्येक विमानपत्तन के लिए, विमानपत्तन ध्वनि परिक्षेत्र को विमानपत्तन के मास्टर प्लान के अनुसार विमानपत्तनों के एयर नेविगेशन सेवा प्रदाता के साथ परामर्श करके सभी प्रवेश और प्रस्थान फनलों और उपकरण उड़ान प्रक्रियाओं (अर्थात् उपकरण प्रवेश प्रक्रिया, मानक उपकरण प्रस्थान एवं मानक टर्मिनल आगमन मार्ग) पर विचार करते हुए विमान संचालन की सुरक्षा के लिए ऊंचाई प्रतिबंध पर समय-समय पर यथा-संशोधित, 30 सितम्बर, 2015 को प्रकाशित नागर विमानन मंत्रालय (विमान प्रचालनों की सुरक्षा के लिए ऊंचाई प्रतिबंध) नियम, 2015 द्वारा जारी मौजूदा सा.का.नि. 751 (अ) के आधार पर संबंधित विमानपत्तन प्रचालक द्वारा दिन और रात की अवधि के लिए ध्वनि रूप-रेखा के रूप में परिभाषित किया जाएगा। इसे नागर विमानन महानिदेशालय द्वारा अनुमोदित किया जाएगा और संबंधित विमानपत्तन प्रचालकों की वेबसाइट पर प्रदर्शित किया जाएगा। यह कार्य अंतिम अधिसूचना जारी करने की तारीख से दो साल के भीतर पूरा किया जाएगा।

(2) राज्य/संघ शासित प्रदेश विकास प्राधिकरणों को विमानपत्तन के आस-पास भूमि उपयोग योजना के लिए विमानपत्तन ध्वनि परिक्षेत्र में विमानपत्तन प्रचालनअपेक्षाओं पर विचार करना चाहिए।

**5. विमानपत्तन ध्वनि मैपिंग:**

सभी विमानपत्तनों के लिए ध्वनि मैपिंग का कार्य विमानपत्तन के मास्टर प्लान के अनुसार, विमानपत्तन भावी विमान संचलन और यातायात अनुमानों पर विचार करते हुए विमानपत्तन के प्रचालकों द्वारा नागर विमानन महानिदेशक की अपेक्षाओं में निर्दिष्ट आवश्यकताओं के अनुसार किया जाना चाहिए। यह जानकारी विमानपत्तनों के प्रमुख स्थानों के साथ-साथ संबंधित विमानपत्तन प्रचालक और राज्य/संघ शासित प्रदेश विकास प्राधिकरण की वेबसाइट में प्रदर्शित की जाएगी।

**6. प्रोटोकाल और मापन प्रक्रिया:**

पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय और केंद्रीय प्रदूषण नियंत्रण बोर्ड की वेबसाइट पर प्रदर्शित विमानपत्तन ध्वनि परिक्षेत्र के लिए निगरानी प्रोटोकाल और मापन प्रक्रिया का अनुपालन किया जाएगा।

7. विकास प्राधिकरण/क्षेत्रीय आयोजना विभाग, विमानपत्तन ध्वनि परिक्षेत्रों के अंतर्गत आने वाले किसी भी भवन निर्माण के लिए मौजूदा भवन कोडों और उप-कानूनों के तहत भीतरी वातावरण में सुधार के लिए डिज़ाइन, निर्माण और सामग्रियों के चयन में नई इमारतों, सुविधाओं और आवासीय, संस्थागत, अस्पताल और वाणिज्यिक सुविधाओं की परियोजनाओं में ध्वनि प्रतिरोध को शामिल करने के लिए प्रावधान निर्दिष्ट करेंगे।

8. सभी विमानपत्तन, एयरलाइन और प्राधिकरण अधिसूचना की तारीख से दो साल के भीतर अधिसूचना में निर्दिष्ट अपेक्षाओं का पालन करेंगे।”

[फा. सं. क्यू-15017/31/2015-सीपीडब्ल्यू]

डॉ. ए. सेंथिल वेल, वैज्ञानिक 'जी'

**टिप्पण:** प्रमुख नियम, भारत के राजपत्र, असाधारण, भाग-II, खंड 3, उप-खंड (i) में दिनांक 19 नवम्बर, 1986 की संख्या – का.आ 844 (अ) के द्वारा प्रकाशित किए गए थे और अंतिम संशोधन दिनांक 22 मार्च, 2018 की अधिसूचना सा.का.नि. 263 (अ) द्वारा किया गया।

## MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

### NOTIFICATION

New Delhi, the 18th June, 2018

**G.S.R. 568(E).**—In exercise of the powers conferred by sections 6 and 25 of the Environment (Protection) Act, 1986 (29 of 1986), the Central Government hereby makes the following rules further to amend the Environment (Protection) Rules, 1986, namely:

1. (1) These rules may be called the Environment (Protection) Amendment Rules, 2018.
- (2) They shall come into force on the date of their publication in the Official Gazette.

2. In the Environment (Protection) Rules, 1986, in Schedule-I, after serial number 111 and the entries relating thereto, the following serial number and the entries shall be inserted, namely:-

Sl. No.	Industry	Parameters	Standards	
1	2	3	4	
		Ambient Air Quality Standards with respect to Noise in Airport Noise Zone		
"112	Airports	Type of Airports	Limits in dB (A) Leq*	
			Day Time	Night Time
		Busy Airports	70	65
		All other Airports excluding proposed airports	65	60

**Definitions:**

- (a) \*dB(A) Leq denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing. A day time from 6.00 a.m. to 10.00 p.m. and night time from 10.00 p.m. to 6.00 a.m. are considered for time weighted average.
- (b) "A", in dB(A) Leq, denotes the frequency weighting in the measurement of noise and corresponds to frequency response characteristics of the human ear (The range of human hearing is 20 Hz to 20 kHz).
- (c) A "decibel" is a unit in which noise is measured.
- (d) Leq: It is energy mean of the noise level over a specified period.
- (e) Busy Airport - For the purpose of noise management at airports, a busy airport shall be defined as "a civil airport which has more than 50,000 aircraft movements per year (a movement being a take-off or a landing)" excluding those purely for training purposes on light aircraft.
- (f) Take-off – A phase of flight from the application of takeoff power to an altitude of final take-off segment.
- (g) Landing – A phase of flight from the beginning of the landing flare until aircraft exits the landing runway comes to a stop on the runway, or when power is applied for takeoff in the case of a touch-and-go landing.
- (h) Lmax is unit for aircraft maximum noise level in units dB(A) which is maximum or peak noise value for aircrafts at the monitoring location in accordance with the noise standards notified by the Directorate General of Civil Aviation for respective airports.
- (i) Other Airports – an airport having more than 15000 but less than 50000 aircraft movement annually.
- (j) Proposed Airports – airport that is not functional yet and is under development.

- Note :**
- (i) Day time shall mean from 6.00 a.m. to 10.00 p.m and night time shall mean from 10.00 p.m. to 6.00 a.m.
  - (ii) The above specified limits shall have a tolerance limit of 10dB (A) Leq.
  - (iii) The specified limit excludes defense aircraft and aircraft landing and take-off noise from all runways and aircraft engine/ground run-ups, helipad locations earmarked by Airport Operator for this purpose.
  - (iv) However, the limit for aircraft noise as Lmax will be notified by the airport operator with approval of the Directorate General of Civil Aviation at the aircraft noise monitoring locations installed by the airports as mentioned in paragraph 1 of this notification.
  - (v) The noise limits specified in above shall replace and supersede the ambient air quality in respect of noise limits of the following existing zones:
    - (a) Silence;
    - (b) Residential; and
    - (c) Commercial areas;

- (vi) As specified in the Noise Pollution (Regulation and Control) Rules, 2000 in the areas falling directly under Airport Noise Zone.
  - (vii) The noise standards within the overall boundary of airports shall be applicable as Industrial Areas i.e. day time 75 dB (A) Leq and night time 70 db (A) Leq as per the Noise (Regulation and Control) Rules 2000 and shall be measured at different points of airport boundary and then averaged.
  - (viii) These standards will not be applicable to a civil airport which has less than 15,000 aircraft movement annually.
- 1(1) For Airports excluding newly proposed airports:
- In addition to dB(A) Leq applicable in the 'airport noise zones' specified above, Lmax value in dB(A) shall be published by the airport operator with approval of the Directorate General of Civil Aviation only for airports having more than 50,000 annual traffic movements. These Lmax values shall be complied by airlines and to be monitored and communicated by Airport Operator to the Directorate General of Civil Aviation. These Lmax value shall be reviewed as and when there is a requirement in future.
- (2) For Proposed Airports (yet to be operationalized):
- (i) For any upcoming/New Airports, noise modeling shall be conducted by the airport operators and results should be submitted to the Ministry of Environment, Forest and Climate Change while seeking Environment Clearance under the Environment Impact Assessment Notification, 2006.
  - (ii) The airport operators should also develop airport noise zone as specified in paragraph 4 and share the same with Ministry of Housing and Urban Affairs and concerned State Development Authority for necessary land use planning around airport.
  - (iii) The concerned State / Union Territory Development Authorities should not allow any new residential, institutions & commercial facilities and other noise sensitive area falling in the airport noise zone area without any noise reduction measure.
2. Compliance of noise levels applicable to Airport Noise Zone as specified above shall lie with the airport operator and overseen by the Directorate General of Civil Aviation.
3. Airport operators shall prepare Noise Management Plan for compliance of the Airport Noise Standards.
4. Airport Noise Zones:
- (1) The Airport Noise Zone area for each Airport shall be defined as Noise Contour for day and night period by the respective Airport Operator on the basis of existing GSR 751 (E), issued by the Ministry of Civil Aviation (Height Restrictions for Safeguarding of Aircraft Operations) Rules, 2015 published on 30<sup>th</sup> September, 2015 as amended from time to time on Height Restriction for Safeguarding of Aircraft Operation considering all approach and departure funnels and Instrument Flight Procedures (i.e. Instrument Approach Procedures, Standard Instrument Departure & Standard Terminal Arrival Route) in consultation with airports Air Navigation Service Provider as per the Master Plan of the Airport. The same shall be approved by the Directorate General of Civil Aviation and displayed on the website of respective Airport Operators. This activity shall be completed within two years from the date of issuance of the final notification.
  - (2) State / Union Territory Development Authorities should take into consideration of Airport Operations requirements in the airport noise zone area for the land use planning around the airport.
5. Airport Noise Mapping:
- Noise mapping in for all airports should be carried out as per the requirements specified in the Director General Civil Aviation's requirements by the airport operators considering future aircraft movement and traffic projections of the airport as per the Master Plan of the Airport. This information to be displayed at a prominent places at Airports as well as in the website of respective Airport Operator and State / Union Territory Development Authority.
6. Protocol and Measurements Procedure:
- Monitoring protocol and measurements procedure for airport noise zone displayed on the website of the Ministry of Environment, Forest and the Climate Change and the Central Pollution Control Board shall be followed.
7. Development Authorities / Regional Planning Department shall specify provisions for inclusion of sound resistance in new buildings, facilities and projects of residential, institutional, hospital and commercial facilities in the design, construction and materials selections for improving indoor environment under existing building codes and bye laws for any building constructions coming under airport noise zones.

8. All the Airport, Airline and Authority shall comply with the requirements specified in the notification within two years from the date of notification. ”.

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**Note :** The principal rules were published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (i), *vide* number S.O. 844 (E), dated the 19<sup>th</sup> November, 1986 and last amended *vide* notification G.S.R. 263(E), dated the 22<sup>th</sup> March, 2018.