NOISE MAPPING STUDY

Proponent

CHENNAI AIRPORT

Meenambakkam, Chennai
Doc No: HECS/NS/015

AIRPORTS AUTHORITY OF INDIA

HECS
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(An ISO 9001: 2015 Company) (Accredited by NABL, Recognized by MoEF)

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FOREWORD

Since noise pollution adversely affects the lives of millions of people and studies have shown that there are direct links between noise and health. The **Airport Authority of India,** Chennai, invited environmental agencies to conduct noise mapping study and entrusted the work to **Hubert Enviro Care Systems (P) Ltd.**, Chennai, an environmental consultant with CPCB/MoEF approved Environmental Testing Laboratory via work order No. Engg./CMD-II/03/2020-21/07

A comprehensive noise mapping study to monitor noise levels in the Chennai Airport vicinity had been planned and executed. The findings have been presented in this report.

Our sincere thanks are due to the Airport Authority of India, Chennai, for awarding this work. Extensive thanks to the authorities for their kind cooperation during the study period.

Place: Chennai

Date: 04/04/2024

Authorized Signatory

HUBERT ENVIRO CARE SYSTEMS (P) LTD. Chennai 600 032

Hubert Enviro Care Systems (P) Ltd.

1.0 INTRODUCTION

Chennai International Airport (previously known as Madras International Airport) is located in Tirusulam, a suburb 7km south of Chennai in the state of Tamil Nadu, India.

It was one of the first airports of India and served Air India flights from Mumbai during the 1950s. The airport is owned by the Government of India and is operated by the Airport Authority of India (AAI).

The airport's first passenger terminal was built at Meenambakkam town and now acts as a major cargo base. In 1988, a new terminal complex was built at Tirusulam, adjacent to Meenambakkam.

The terminal complex includes an international and a domestic terminal adjacent to each other. The airport has two runways.

2.0 DESCRIPTION OF AIRPORT

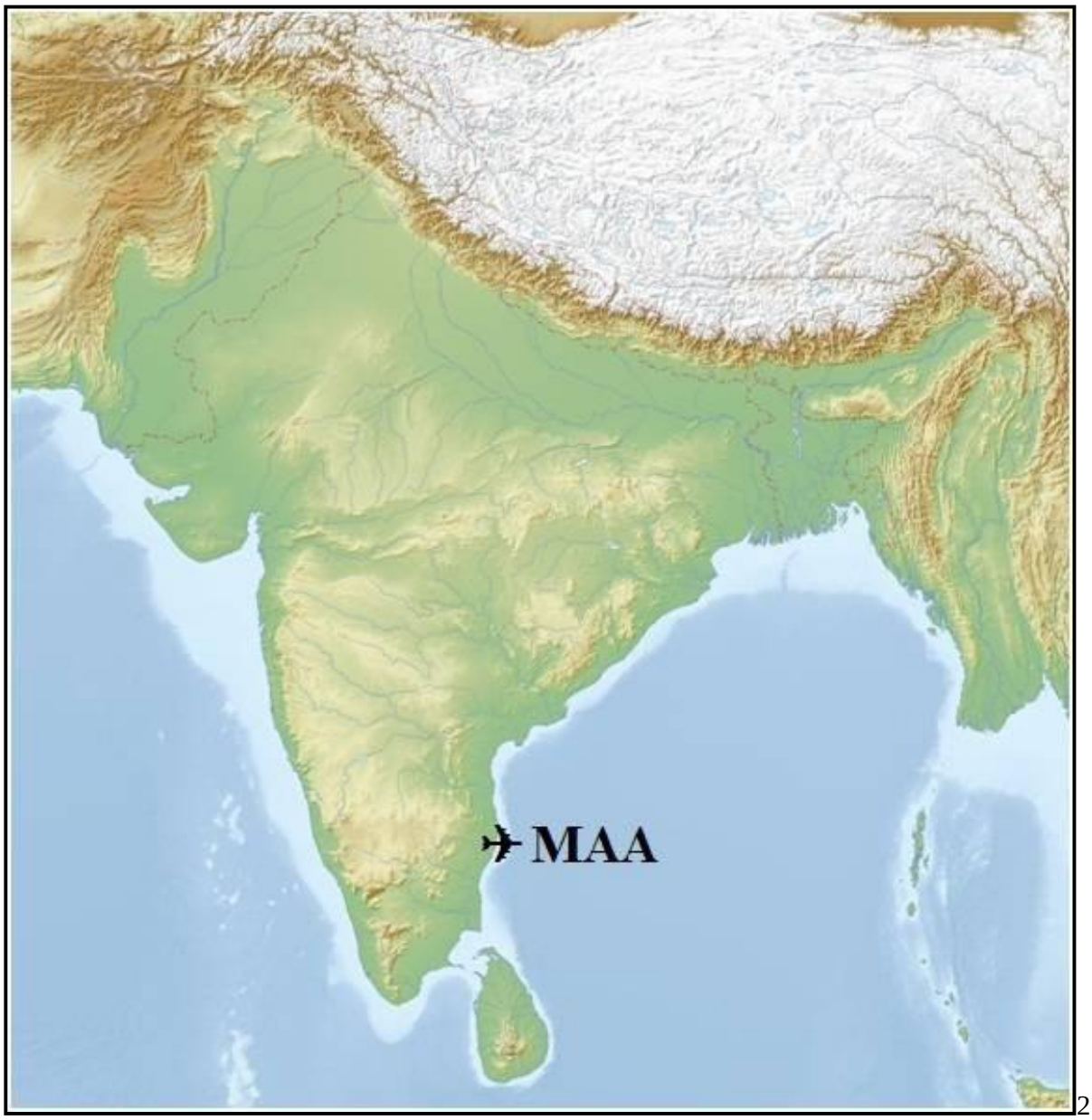
The airport served 18,571,393 passengers and handles 137,693 aircraft movements and 342,737 cargo tonnage in the period between April 2022 and March 2023.

In 2001, Chennai Airport became the first international airport in the country to receive ISO-9001-2000 certification.

The domestic and the international terminals are named after former chief ministers of Tamil Nadu K. Kamaraj and C. N. Annadurai respectively. It is the first airport in India to have international and domestic terminals located adjacent to each other.

The airport serves as the regional headquarters of the Airports Authority of India (AAI) for the southern region of India comprising the states of Tamil Nadu, Andhra Pradesh, Telengana, Karnataka, and Kerala and the union territories of Pondicherry and Lakshadweep. About 9 domestic airlines and 30 international airlines connect 53 domestic and 27 international destinations from Chennai to the airport. The airport serves as the main hub for Spice Jet, Blue Dart Aviation and as a secondary hub for Air India. It also serves as focus city for Go Air and Indigo. Blue Dart Aviation is an all-cargo airline based in Chennai International Airport. It operates scheduled night express cargo flights including domestic and regional charters. The terminal complexes have a flyover travelator

connecting the domestic and international terminals for a distance of about 1 km. (*ref CAR Section Annexure I Phase 2 noise plan b*).



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3.0 SCOPE OF THE REPORT

The important objectives of Noise Mapping are to provide a common framework to avoid, prevent or reduce the harmful effects of exposure to noise Pollution includes:

Monitoring environmental noise pollution by requiring competent authorities like CPCB to draw up "strategic noise maps" for major roads, railways, airports and agglomerations, using harmonised noise indicators Lday (day-evening-night equivalent level) and Lnight (night equivalent level). These maps are to be used to assess the number of people annoyed and sleep-disturbed respectively in the study area.

Informing and consulting the public about noise exposure, its effects, and the measures to be considered to address noise problems.

Addressing local noise issues by requiring competent authorities to draw up action plans to reduce noise where necessary and maintain the environmental acoustic quality where it is good.

Figure 1 Chennai Airport

4.0 OBJECTIVE OF STUDY

The objective of the study to ensure that Airport Authority of India to meet the criteria Ambient Noise Monitroing Level due to Airfacts issued by the Central Pollution Control Board, Ministry of Environment & Forest (MOEF) in June 2008 to study the Lmax and boundary noise Study For CNMS as per the Environment Protection Amendment Rules, 2018 as per the requirement of CAR Section 10 to develop the Noise studies and Noise Management actions plans accordingly.

(***Ref: Page No 2 of CAR 3.1.5 Airport operators shall establish a fully operational real-time permanent Noise Monitoring System (NMS) in accordance to the provisions of the 'Requirement and Procedure for Monitoring Ambient Noise Level due to Aircraft' issued by the Central Pollution Control Board of Ministry of Environment & Forest (MOEF) in June 2008 and the Minimum Technical Characteristics of the NMS as contained in Annexure II to this CAR.)***

5.0. LMAX STUDY

5.1. Methodology for the Definition of Lmax

Analyze Lmax single event data for each noise monitoring location filter out non-valid events to determine maximum noise level at each location to define the limit on Lmax for each location.

5.2. Input Data

In order to determine the Lmax[1] at two locations, the actual monitored data from years **2022** and **2023** was analyzed along with the following information:

Lmax of individual aircraft operations measured at the various noise monitoring locations

Information on operation (Aircraft type, runway/track used, distance to microphone, etc) Data for the years **2022** and **2023**.

5.3. Monitoring Locations

The permanent Noise Monitoring Station were installed to monitor continuous noise coming from aircrafts at the two ends of main runway: The methodology use to identify the Locations of monitoring station based runway of the flight

(***Ref Page No 7 of CAR Section 10 Annexure II b At least two permanent Noise Monitoring Terminals (NMTs) shall be installed per runway with more than 25,000 movements (where a movement is a take-off or a landing). The permanent NMTs shall be located on both sides of the runway, in the nearest residential area and, as far as possible, under the flight paths of the aircraft. At least one mobile NMT (e.g., portable/mobile) shall be used for measurements in the residential areas/silence zones and under the flight paths, where noise levels are expected to be high***)

Location 1: **CNMS1** – Andal Nagar at Cowl Bazzar, Near 07 end of Main Runway

Location 2: CNMS2 – HP Petrol Bunk, Adjacent to Radisson Blu Hotel, near 25 end of Main Runway

Figure-2: Location of permanent noise monitoring stations

5.4. Determination of Lmax at Each Location

The Noise monitoring data determined for every month from the April 2022 and March 2023 all the aircraftnoise events were identified at Two different location and the Lmax level of each location event was determined (see Figure 3 & 4).

Figure-3: Definition of Lmax of an aircraft noise event at Location-1 from April 2022 to March 2023.

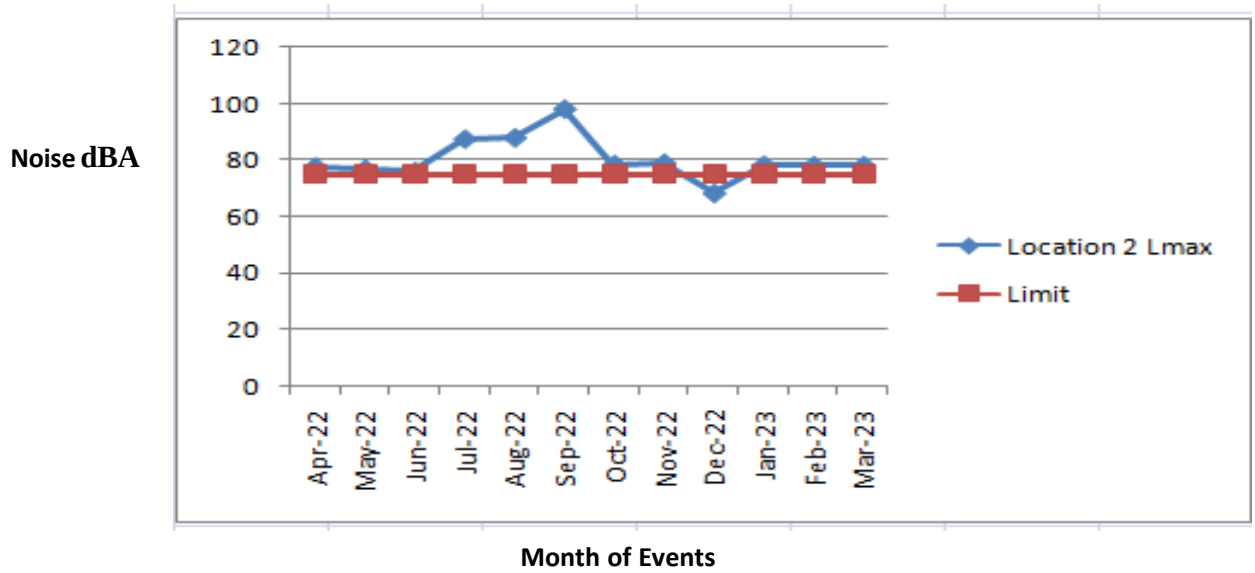


Figure-4: Definition of Lmax of an aircraft noise event at Location-2 from April 2022 to March 2023.

5.5. Proposed Lmax Limit

When establishing the limits for Lmax 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

In order to avoid an arbitrary definition of the Lmax level, it is proposed to set the limit at each location such that the 10 highest noise events detected in the period **2022-2023** should be considered excessive. **Figure 3&4** presents the highest noise levels detected at the two locations, in the total period **2022-2023**, and independent of operation type (departure or arrival). From **Figure 3&4** it can be deduced that at Location 1 the 10 highest noise levels are above 86 dBA, whereas at Location 2 the 10 highest noise levels are above 76 dBA. Therefore, these levels are proposed as the limits for Lmax:

Location 1: 86 dBA

Location 2: 76 dBA

With these limits only few operations would have been in excess, whereas they will safeguard t he currently existing noise climate at both locations.

6.0 BOUNDARY NOISE STUDY

As per the Environment Protection Amendment Rules, June 2018 the noise at the boundary of the airport premises needs to be determined.

The original plan to determine this level was to use a combination of noise contours and a measurement campaign to enhance the data.. Therefore it was decided to determine the boundary noise level by means of calculation by using **CAUSTIC 3.2.** as per **(*Ref: CAR Section Page No . 5 Annexure I Noise maps shall be developed with the use of specialized software (such as INM 7 or higher, CadnaA, IMMI, or others) The noise maps shall take into consideration actual air traffic data (e.g., types of aircraft, number of movements,***

distribution of runway use, landing and take-off paths), meteorological data, sensitive receptors, and (if necessary/possible) 3D terrain model and land uses).

6.1. Methodology for Boundary Noise Study

Methodology carried out to identify the location of noise monitoring station installed was based on the Runway pattern of the airport has considered. The following methodology was adopted to determine boundary noise study. The interpretation of Available different level of Noise data for the year 2022 to 2023 determined at airport boundary for airport operations.

The details of the boundary along with the points for noise level calculation are given in. total receptor points at an interval of 200m.

(***Ref : Page No 7 CAR Section 10 Annexure II b At least two permanent Noise Monitoring Terminals (NMTs) shall be installed per runway with more than 25,000 movements (where a movement is a take-off or a landing). The permanent NMTs shall be located on both sides of the runway, in the nearest residential area and, as far as possible, under the flight paths of the aircraft. At least one mobile NMT (e.g., portable/mobile) shall be used for measurements in the residential areas/silence zones and under the flight paths, where noise levels are expected to be high.)***

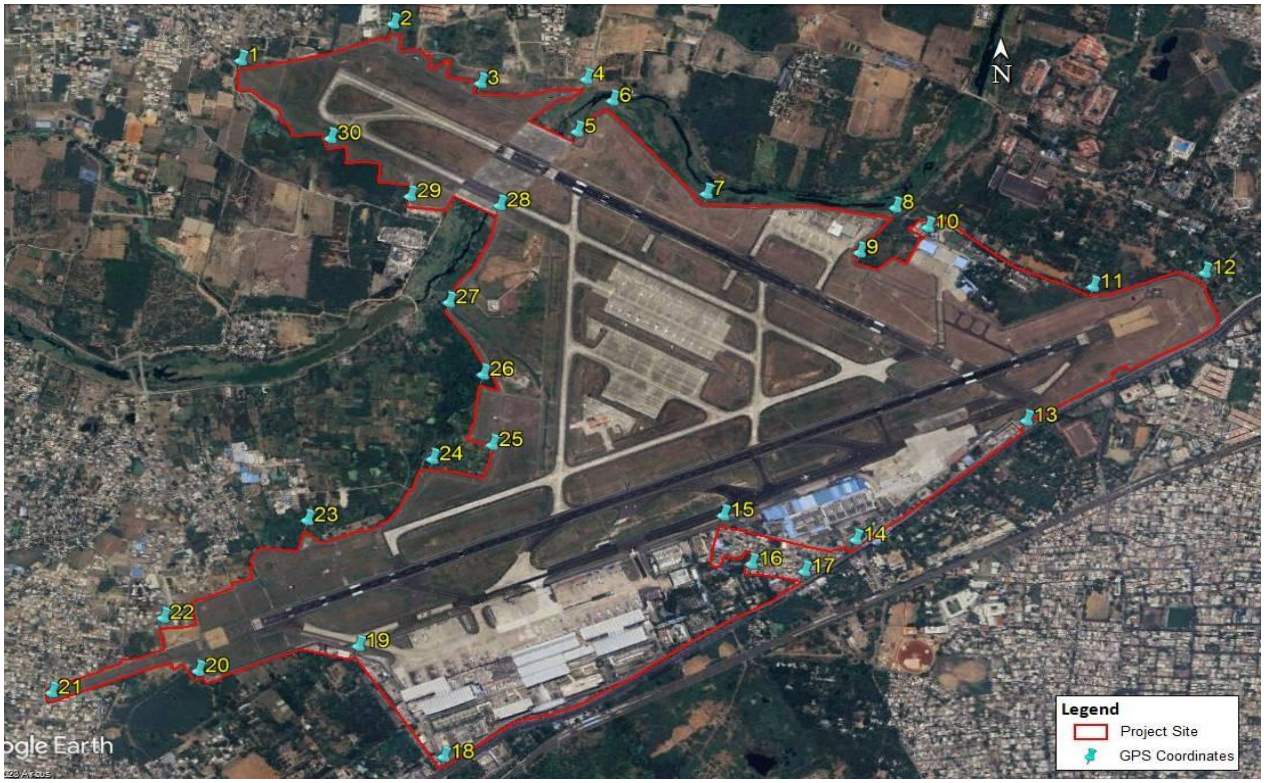


Figure-5: Definition of points on boundary, every 200m

6.2. Input Data for Boundary Noise Study

The following are the input data used to calculate the noise contours.

Existing tracks for both runways

Existing data from monitoring system for years **2022-2023**

Forecast for Traffic

- □ Fleet mix
- □ Nº movements, based on forecasted
- □ Distribution of flights
- □ Runway and track usage for main/secondary runway

The fleet mix is based on **the April'2022-March'2023** monitoring data, resulting in the following:

Aircraft	Arrivals	Departure
A320	44%	44%
A321	9%	9%
AT72	9%	9%
A20N	7%	7%
B738	5%	5%
A21N	4%	4%
AT76	3%	3%
B38M	3%	3%
B737	2%	2%
Others	14%	14%
Total	100%	100%

Based the aircraft types is maintained, maximum A320 family is captured as per data analysis. (**CAR Section Annexure III b Summary distribution of flight movements per aircraft type)**

Results :

Lday and Lnight noise levels were calculated using the model. The Lday noise details are shown in figure 6. The Lnight noise details are shown in **figure 7.**

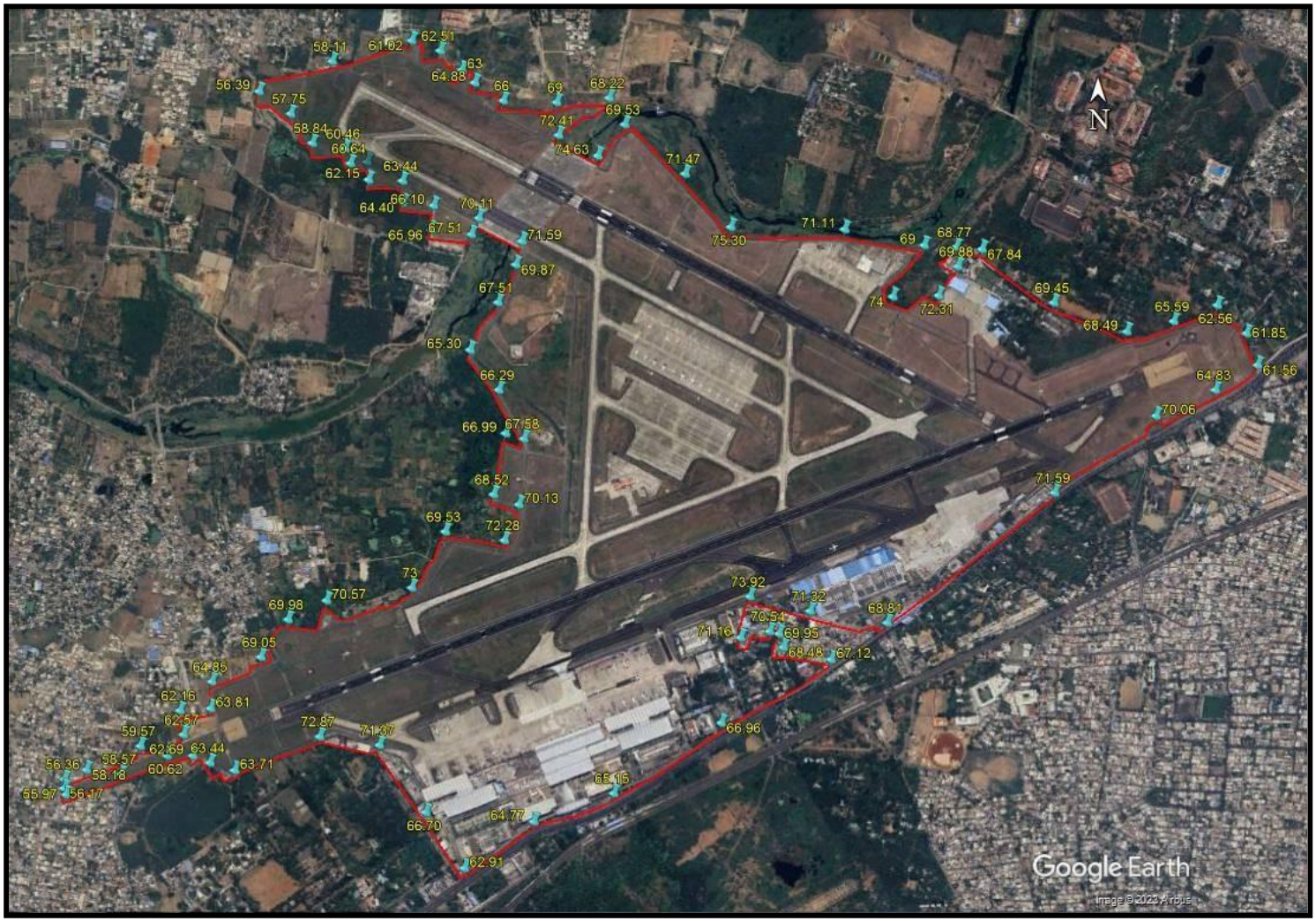


Figure-6: Lday levels at boundary points

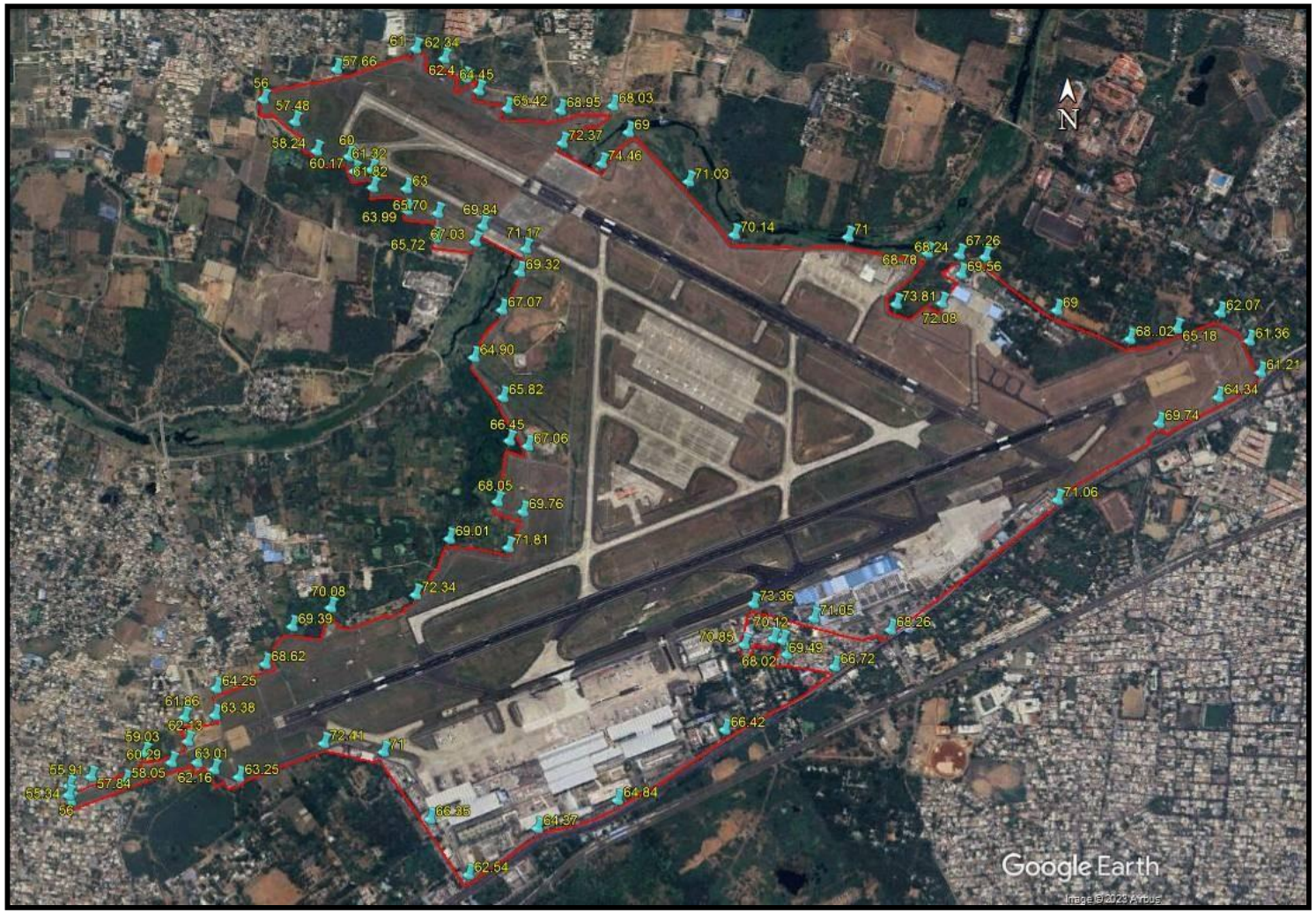


Figure-7: Lnight levels at boundary points

At present a 67%/33% distribution between Day and Night operations is found. For the future scenario this same distribution is maintained.

The following table is complied as per Traffic Distribution of Aircraft runway

Table : 1 Traffic Distribution of Aircraft runway

Traffic Distribution										
			ARRIVAL				DEPARTURE			
Total Movement	Direction	Runway	% Day flow direction (Traffic)	% Day (Traffic)	% Night flow direction (Traffic)	% Night (Traffic)	% Day flow direction (Traffic)	% Day (Traffic)	% Night flow direction (Traffic)	% Night (Traffic)
139800	East to West	7	35.115	52.41	18.176	55.08	35.644	53.20	16.774	50.83
	West to East	25	28.689	42.82	14.817	44.9	29.051	43.36	16.223	49.16
	Northwest to South East	12	2.332	3.48	0.007	0.02	1.809	2.70	0.000	0
	Southeast to Northwest	30	0.864	1.29	0.000	0.000	0.496	0.74	0.003	0.01

6.3. Flight Runway Data

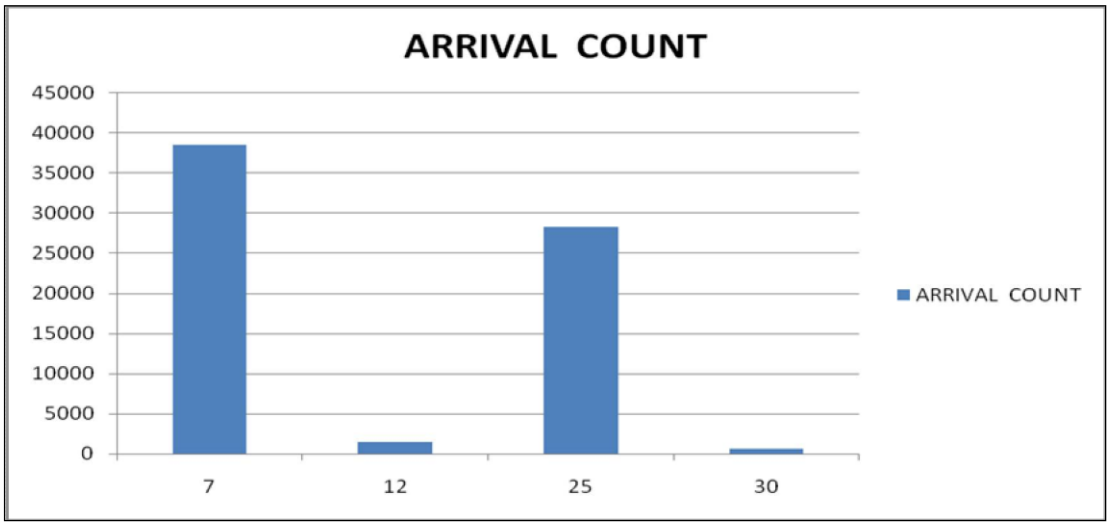


Figure-8: Definition of points on boundary, every 200m

ARRIVAL COUNT	
RWY	**Grand Total**
7	38587
12	1492
25	28240
30	583
Grand Total	**68902**

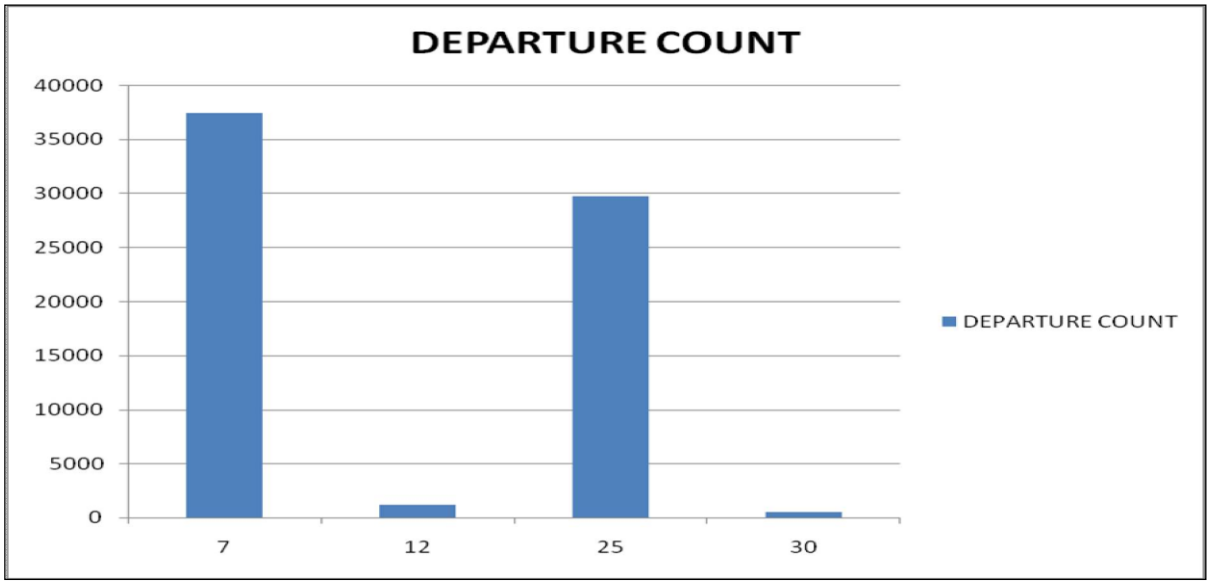


Figure-9: Definition of points on boundary, every 200m

DEPARTURE COUNT	
RWY	**Grand Total**
7	37459
12	1186
25	29787
30	466
Grand Total	**68898**

6.4 Validation of Model Results with Measurements

The **Caustic 3.2** modeling software used to measure the results. In order to be able to validate the model results, use was made of data from measurements performed by **Caustic 3.2.**

The following tables present the comparison between the model results and the levels measured at the closest point, for Lday and Lnight respectively. Boundary Noise Maps Lday and Lnight **Figure 10 .**

(***Ref Page No .8 CAR Section 10 Annexure II (n) The NMS should have the capability to generate daily, weekly, monthly and annual reports for each and all of the stations for at least the following indicators (daily, monthly, annually): Lday (0600-1800), Levening (1800-2200), Lnight (2200- 0600), Lde (0600-2200), Lden (day: 0600-1800, evening: 1800-2200, night: 2200- 0600), LAmax, DNL, TDNL, EDNL, BDNL (as defined in the Requirement and Procedure for Monitoring Ambient Noise Level due to Aircrafts, CPCB, MOEF, 2008), Ln10, Ln90, Ln50, and Lmin.)***

Location 1: **CNMS1** – Andal Nagar at Cowl Bazzar, Near 07 end of Main Runway

Parameter	Sound level dB(A)
Average LAeq(T)	64.53
Average LAmax(T)	87.96
Average LA90(T)	47.76
Average LA10(T)	65.72
Average LCeq(T)	79.35
Average LCmax(T)	97.88
Average LC90(T)	63.60
Average LC10(T)	83.68
Average Lday(T)	71.13
Average Leve(T)	69.65
Average L night(T)	67.16
Average Lde(T)	73.72
Average Lden(T)	73.15
Average DNL (T)	71.68
Average TDNL(T)	72.19
Average EDNL (T)	82.35
Average BTDNL(T)	74.59

Location 2: CNMS2 – HP Petrol Bunk, Adjacent to Radisson Blu Hotel, near 25 end of Main Runway.

Parameter	Sound level dB(A)
Average LAeq(T)	64.06
Average LAmax(T)	79.71
Average LA90(T)	50.17
Average LA10(T)	65.75
Average LCeq(T)	78.44
Average LCmax(T)	90.37
Average LC90(T)	62.85
Average LC10(T)	83.22
Average Lday(T)	63.55
Average Leve(T)	65.95
Average L night(T)	64.09
Average Lde(T)	65.58
Average Lden(T)	63.42
Average DNL (T)	66.23
Average TDNL(T)	62.15
Average EDNL (T)	68.12
Average BTDNL(T)	64.22

Table 2: Over all Noise Data for the year April 2022 to March 2023
(Location 1: **CNMS1** – Andal Nagar at Cowl Bazzar, Near 07 end of Main Runway)

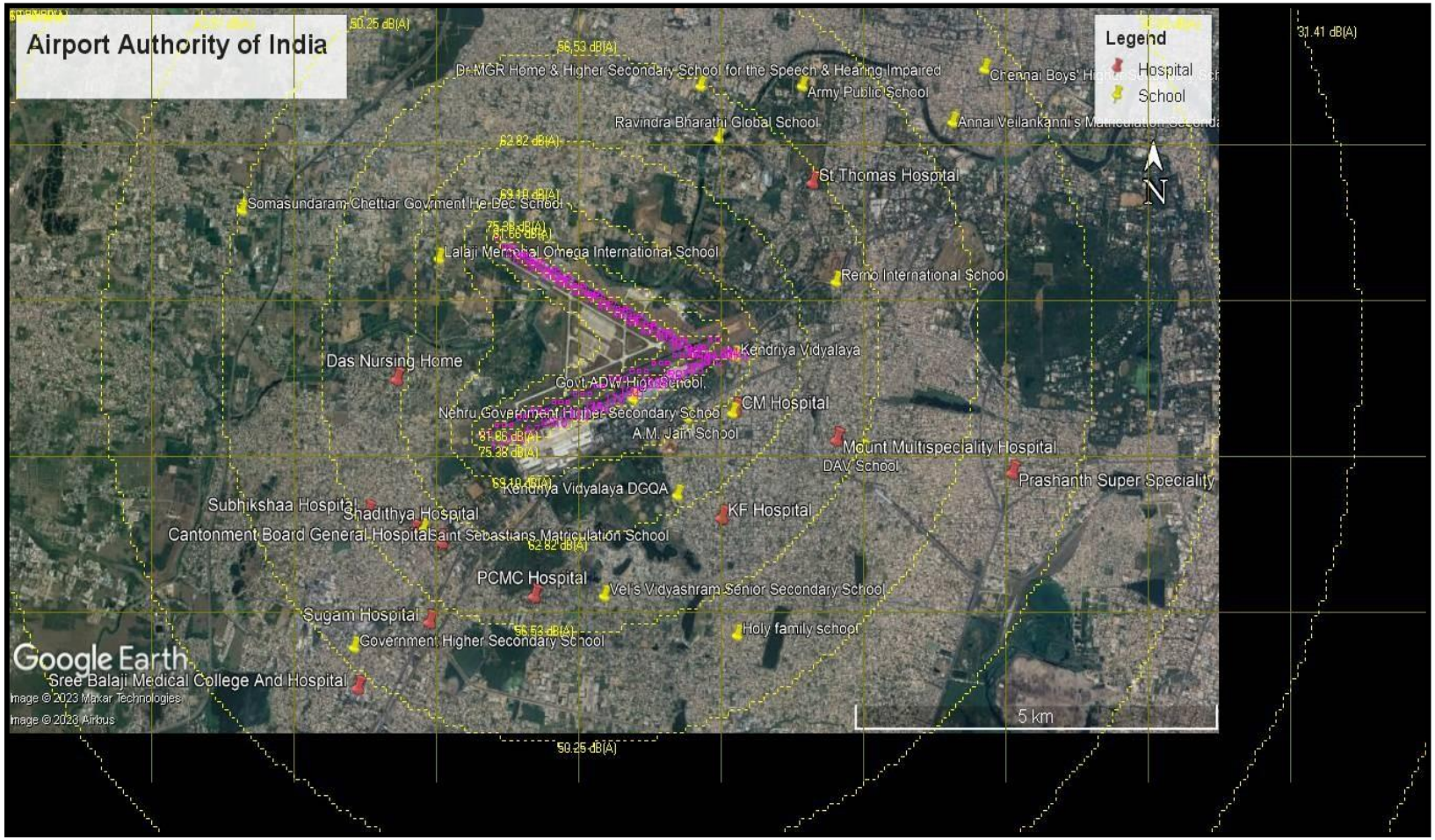
Parameter	Sound level dB(A)											Average
Average LAeq(T)	60.91	62.51	60.77	59.64	65.99	72.28	72.48	72.72	61.49	60.29	60.7	64.53
Average LAmax(T)	75.6	77.63	76.96	76.71	75.23	87.59	87.76	87.96	77.69	76.07	76.18	87.96
Average LA90(T)	42.87	46.09	44.94	42.5	43.53	55.76	55.84	56.08	48.28	43.7	45.73	47.76
Average LA10(T)	63.92	63.48	62.9	63.17	60.39	73.62	72.35	71.11	65.64	63.76	62.53	65.72
Average LCeq(T)	78.7	78.72	77.85	75.81	75.17	86	85.65	85.32	77.74	76.42	75.44	79.35
Average LCmax(T)	91.98	91.78	90.33	87.25	89.02	97.88	97.44	97.02	89.19	88.03	87.04	97.88
Average LC90(T)	60.85	62.16	60.68	59.51	58.52	71.88	72.15	72.39	61.07	60.06	60.35	63.60
Average LC10(T)	84.75	79.93	79.1	80.55	78.32	90.9	90.88	90.8	82.33	81.24	81.63	83.68
Average Lday(T)	69.88	70.87	70.11	70.45	70.64	74.58	74.25	74.64	69.28	68.86	68.86	71.13
Average Leve(T)	67.54	68.59	67.78	67.56	67.81	73.64	73.89	73.77	68.33	68.48	68.79	69.65
Average L night(T)	64.22	65.36	64.69	64.52	64.66	70.66	70.91	70.82	67.14	67.56	68.24	67.16
Average Lde(T)	70.51	71.98	71.55	70.96	71.09	77.69	77.89	77.71	73.41	73.74	74.35	73.72
Average Lden(T)	71.94	73.27	72.44	72.67	72.76	75.64	75.96	75.82	71.08	71.18	71.89	73.15
Average DNL (T)	69.56	71.45	71.08	70.92	71.11	73.56	74.05	74.38	70.14	70.67	71.56	71.68
Average TDNL(T)	68.33	69.61	69.22	69.05	69.25	76.51	76.35	76.66	72.71	72.86	73.58	72.19
Average EDNL (T)	78.42	80.25	79.88	78.16	78.36	86.58	86.86	86.71	83.38	83.57	83.68	82.35
Average BTDNL(T)	71.08	71.92	71.56	71.88	71.46	78.65	78.29	78.68	75.45	75.69	75.78	74.59

Table 3: Over all Noise Data for the year April 2022 to March 2023
(Location 2: CNMS2 – HP Petrol Bunk, Adjacent to Radisson Blu Hotel, near 25 end of Main Runway)

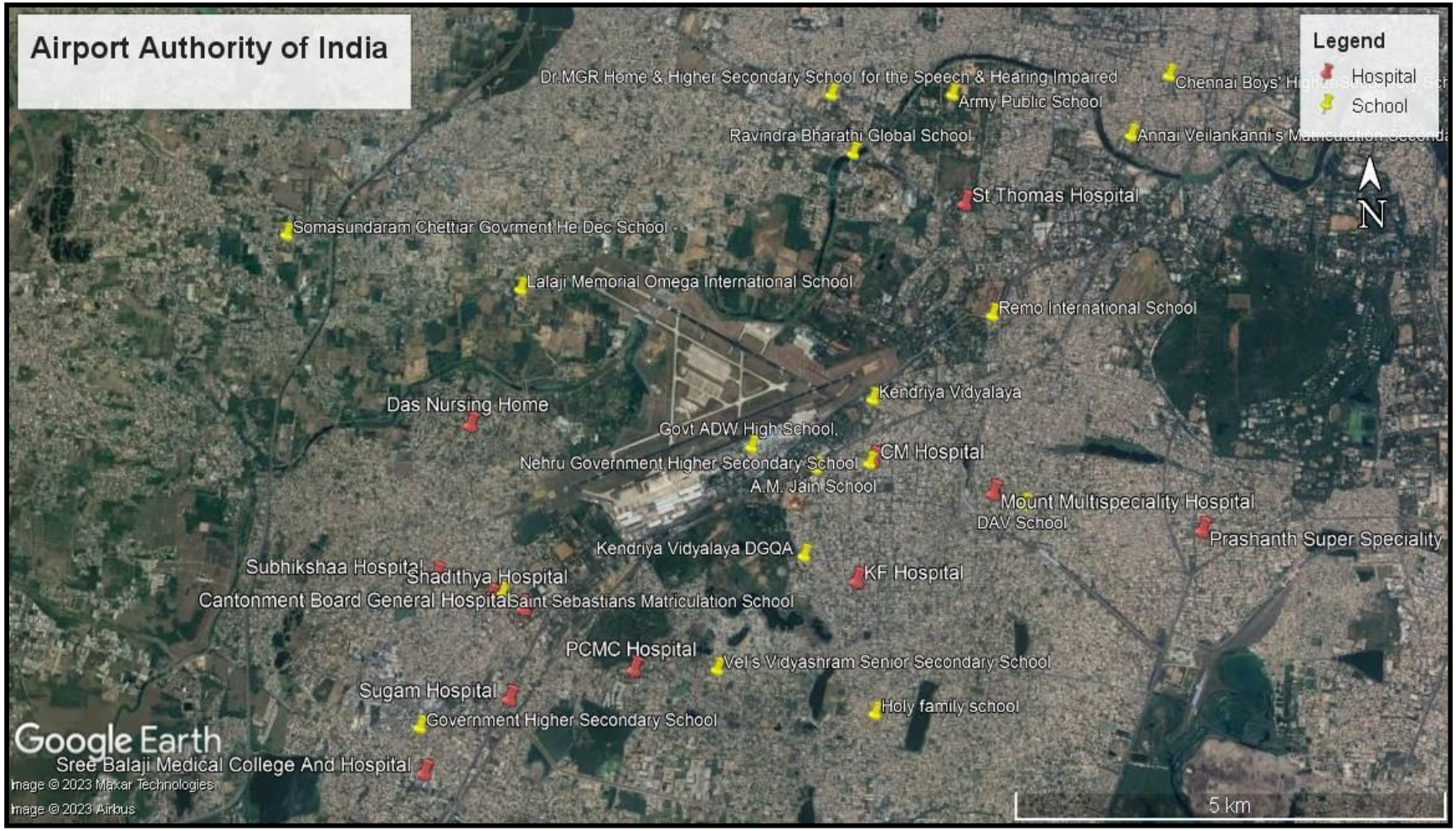
Parameter	Sound level dB(A)											Average
Average LAeq(T)	62.41	62.92	61.87	72.1	68.47	61.78	61.18	70.18	61.42	60.95	61.35	64.06
Average LAmax(T)	77.75	77.03	76.13	87.52	87.99	78.11	78.58	79.04	78.36	78.15	78.17	79.71
Average LA90(T)	46.18	48.05	46.91	66.24	66.95	47.03	47.7	48.45	44.19	43.94	46.27	50.17
Average LA10(T)	63.1	63.79	63.18	74.88	74.71	62.95	62.81	62.64	65.62	65.53	64.09	65.75
Average LCeq(T)	76.78	78.08	77.19	86.41	86.15	75.57	75.39	75.06	78.01	77.64	76.54	78.44
Average LCmax(T)	89.77	91.96	90.84	97.82	97.6	86.91	86.68	86.13	89.5	88.96	87.88	90.37
Average LC90(T)	61.8	62.3	61.41	70.78	70.19	61.33	60.8	60.17	61.09	60.61	60.92	62.85
Average LC10(T)	79.8	80.77	79.97	91.85	91.25	82.41	81.9	81.25	82.33	81.77	82.14	83.22
Average Lday(T)	62.44	63.09	62.48	70.23	70.56	62.53	62.88	62.45	60.41	60.86	61.08	63.55
Average Leve(T)	65.21	66.14	65.64	70.68	70.51	64.15	64.76	64.39	64.34	64.69	64.94	65.95
Average L night(T)	63.33	63.89	63.22	69.89	69.72	62.15	62.65	62.89	62.17	62.57	62.56	64.09
Average Lde(T)	64.18	64.94	64.37	71.05	70.97	63.54	63.58	63.94	64.55	64.86	65.45	65.58
Average Lden(T)	63.58	64.52	63.56	68.77	68.86	60.17	60.56	60.85	61.94	62.13	62.68	63.42
Average DNL (T)	65.29	66.33	65.45	71.25	71.36	63.89	64.05	64.34	65.24	65.38	65.97	66.23
Average TDNL(T)	62.77	63.42	62.64	66.58	66.75	59.61	59.94	60.25	60.37	60.47	60.88	62.15
Average EDNL (T)	69.71	70.21	69.81	73.65	73.81	64.58	64.86	65.08	65.46	65.58	66.57	68.12
Average BTDNL(T)	63.28	63.88	63.22	70.58	70.69	61.38	61.69	61.94	62.64	63.24	63.89	64.22

The following tables present the comparison between the model results and the levels measured at Boundary Noise Level for Lday and Lnight respectively.

S.NO	Measured Value		Model Value		Observation
	Lday	Lnight	Lday	Lnight	
1.	71.13	67.16	63.2	65.73	From CNMS1
2.	63.55	64.09			From CNMS2



Boundary Noise Map **Figure 10**


Airport Authority of India
Legend
Hospital
School
N
Dr.MGR Home & Higher Secondary School for the Speech & Hearing Impaired
Army Public School
Chennai Boys' Higher Secondary School
Ravindra Bharathi Global School
Annai Veilankanni's Matriculation Second
St Thomas Hospital
Somasundaram Chettiar Govrment He Dec School
Lalaji Memorial Omega International School
Remo International School
Kendriya Vidyalaya
Das Nursing Home
Govt ADW High School,
CM Hospital
Nehru Government Higher Secondary School
A.M. Jain School
Mount Multispeciality Hospital
DAV School
Prashanth Super Speciality
Kendriya Vidyalaya DGQA
Subhikshaa Hospital
Shadithya Hospital
KF Hospital
Cantonment Board General Hospital
Saint Sebastians Matriculation School
PCMC Hospital
Vel's Vidyashram Senior Secondary School
Sugam Hospital
Holy family school
Government Higher Secondary School
Google Earth
Sree Balaji Medical College And Hospital
Image © 2023 Maxar Technologies
Image © 2023 Airbus
5 km

7.0 NOISE ZONING STUDY

A third requirement of the Environment Protection Amendment Rules, 2018 is the establishment of noise zones. For this purpose the noise contours for a determined from the Lday and LNight noise covering the Location 1 and Location 2. Based on the noise zoning results from studies performed at two locations within 200m from CNMS airports, the Lday **71.13** and L night **67.16** of Location 1 and Lday **63.55** and L night **64.99** Location 2 noise contours shall be used as the airport noise zones for day and night period respectively as per the **Figure 10.** Meanwhile **for** the future fleet and Flight distribution and runway track usage noise contour study carried out as per **Figure 11 , Figure 12 & Figure 13.**

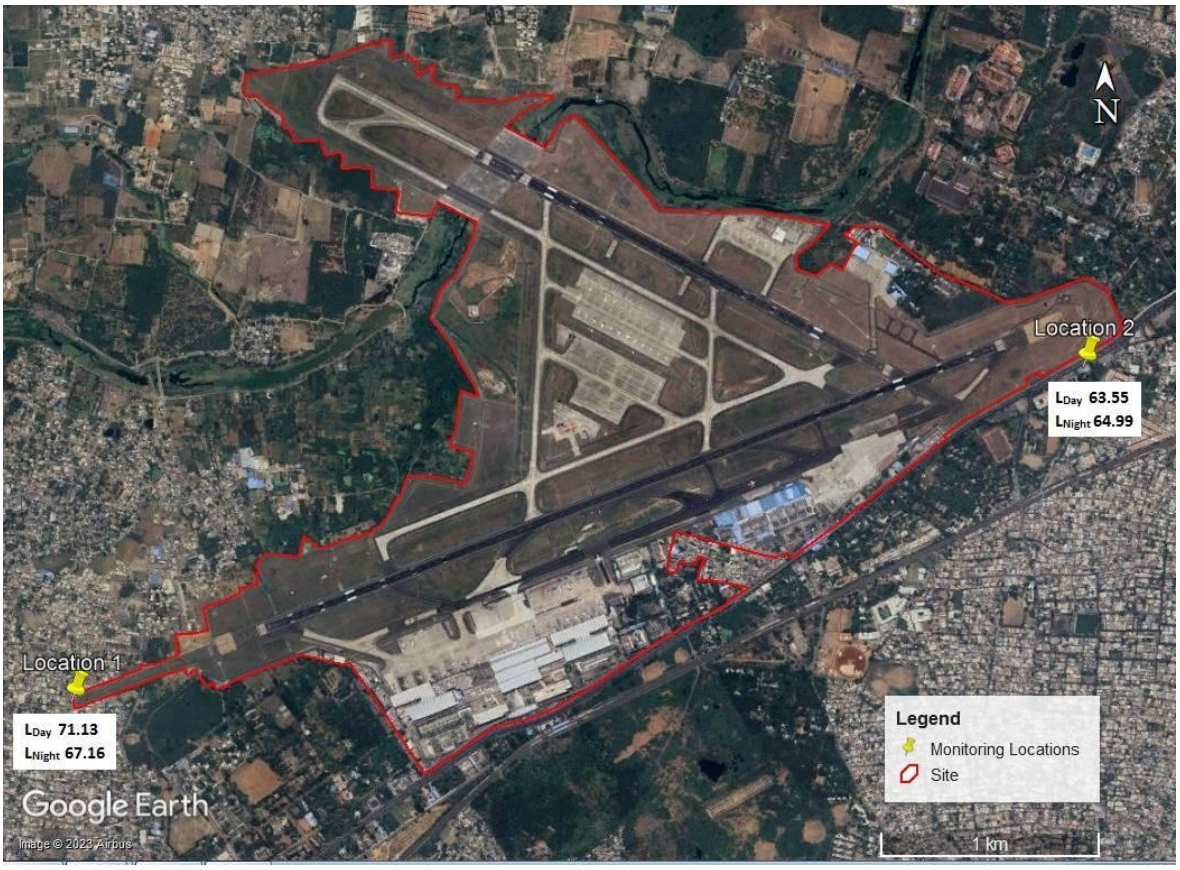


Figure-11: Lday & LNight for Location 1 & Location 2

7.1. Methodology for Noise Zone study

Methodology carried out to identify the location of noise monitoring station installed was based on the Runway pattern of the airport has considered. The proposed action plan based on the data for the period of **April 2022** to **March 2023** and future forecast data of aircrafts movements and passenger's tendency figure of Airport authority. The following data Traffic Forecast for existing and forecast data future are following as **(*Ref Page 5 Annexure I Phase 2 Action Plan)*.**

TRAFFIC FORECAST - CHENNAI AIRPORT				
YEAR	**AIRCRAFT MOVEMENTS (in Nos.)**	**PASSENGERS (in Nos.)**	**% Distribution**	
			AIRCRAFT MOVEMENTS (in Nos.)	**PASSENGERS (in Nos.)**
2019-20	167982	22266722	145	153
2020-21	64590	5495707	56	46
2021-22	91602	9533301	79	73
2022-23	137693	18571393	119	128
Average	115467	13966781	100	100
FORECAST DATA				
2023-24	171281	23457373	148	160
2024-25	189266	26037684	164	177
2025-26	204897	28310908	177	193
2026-27	221824	30783108	192	211
2027-28	239043	33317829	207	228
2028-29	257602	36061862	223	248
2029-30	277608	39032540	240	269
2030-31	292343	41374492	253	285
2031-32	307862	43856962	267	302
2032-33	324204	46488379	281	320

Table 4 : Monitoring Noise Data for the year 2021 to 2023

Location 1: **CNMS1** – Andal Nagar at Cowl Bazzar, Near 07 end of Main Runway		
Year	**2021-2022**	**2022-2023**
Average LAeq(T)	71.65	64.53
Average LAmax(T)	85.35	87.96
Average LA90(T)	61.37	47.76
Average LA10(T)	73.45	65.72
Average LCeq(T)	88.65	79.35
Average LCmax(T)	100.63	97.88
Average LC90(T)	78.08	63.60
Average LC10(T)	92.13	83.68
Average Lday(T)	73.72	71.13
Average Leve(T)	73.57	69.65
Average L night(T)	70.66	67.16
Average Lde(T)	73.86	73.72
Average Lden(T)	73.60	73.15
Average DNL (T)	72.27	71.68
Average TDNL(T)	71.79	72.19
Average EDNL (T)	80.22	82.35
Average BTDNL(T)	73.34	74.59
Location 2: CNMS2 – HP Petrol Bunk, Adjacent to Radisson Blu Hotel, near 25 end of Main Runway		
Average LAeq(T)	65.54	64.06
Average LAmax(T)	79.56	79.71
Average LA90(T)	47.98	50.17
Average LA10(T)	68.53	65.75
Average LCeq(T)	82.60	78.44
Average LCmax(T)	94.99	90.37
Average LC90(T)	67.02	62.85
Average LC10(T)	86.53	83.22
Average Lday(T)	65.42	63.55
Average Leve(T)	66.51	65.95
Average L night(T)	65.37	64.09
Average Lde(T)	66.09	65.58
Average Lden(T)	65.87	63.42
Average DNL (T)	66.02	66.23
Average TDNL(T)	65.87	62.15
Average EDNL (T)	72.95	68.12
Average BTDNL(T)	65.30	64.22

8.0 NOISE CONTOUR STUDY

The noise contours for future scenario are calculated with Caustic 3.2 noise model software both Lday and Lnight based on noise monitoring data. **2021 to 2023.**

Noise Contours for Both Lday and Lnight are determined

- From 50 to 55 Db(A) in 1 dB Steps
- From 55 to 65 Db(A) in 5 dB Steps

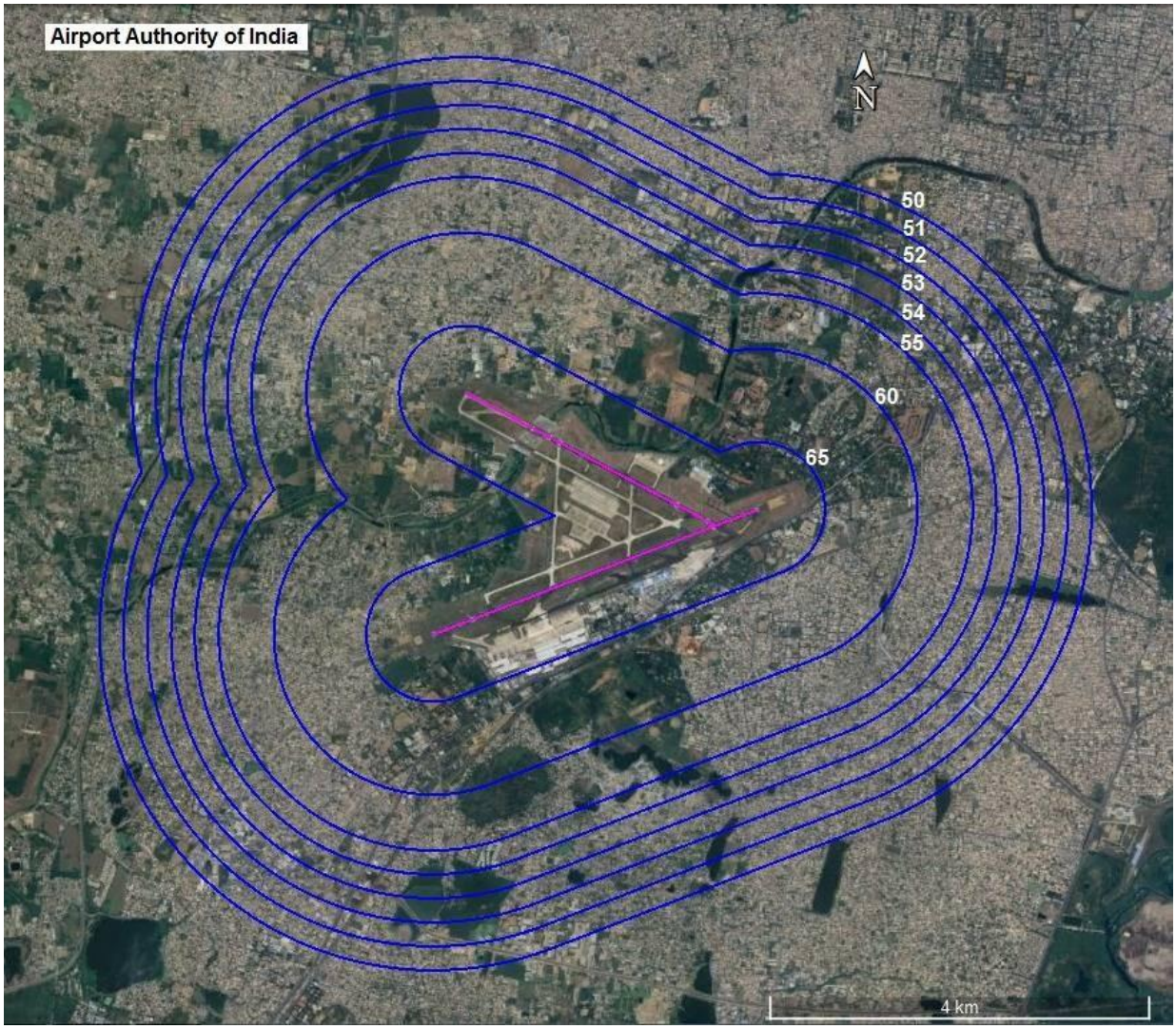


Figure-12: Noise Contours for Lday 50 to 65 dBA

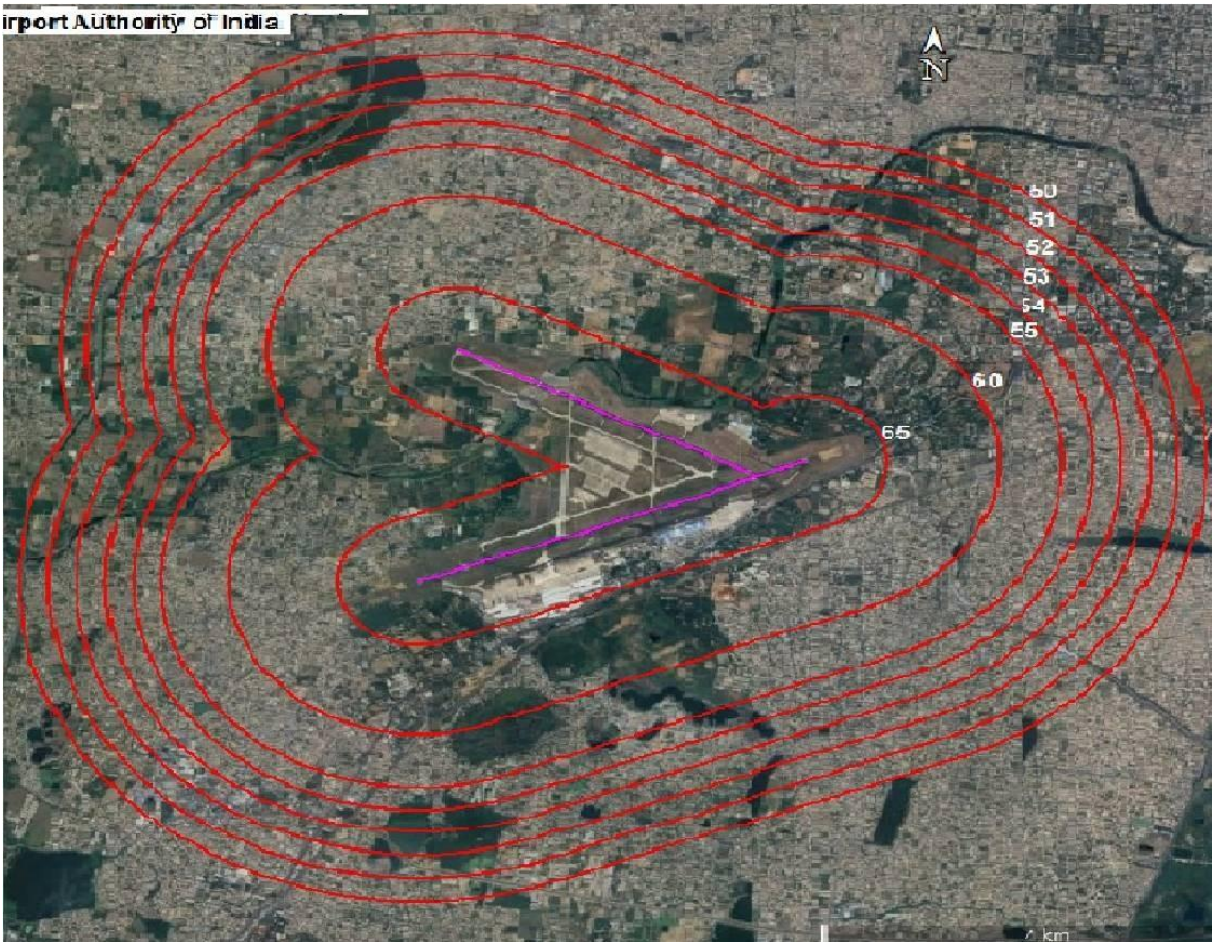


Figure-13: Noise Contours for Lnight 50 to 65 dBA

8.1 Definition of Noise Zones

The noise study performed at Various Indian airports, DGCA concluded that the Lday 62 and Lnight 57 noise contours shall be used as the airport zones for day and night period respectively.

Figure 14 presents these contours for CNMS.

Figure-14: Airport Noise Zone for day and night time (Based on Lday 62 and L night 57 noise Contours)41

9.0 Conclusion and Noise Action Plan

The Noise levels based on sound levels starts at 2021 to 2023. Based on monitoring data analyzed Lday ranges from 2021 to 2023 mentioned in Table 4 : Monitoring Noise Data for the year 2021 to 2023 for both CNMS1 and CNMS2 63 to 73 dB (A) and Lnight 64 to 70 dB (A).

Based on Central Pollution Control Board, the limits for noise levels are set out in 24Hrs Time Noise Levels (L den), most of the population in Airport vicinity was exposed to sound levels from traffic below 70dB (A). The proposed noise limits based on the earlier data desirable Limit with Lday 70 dB (A).and Lnight 65 dB (A).

The incremental percentage of noise based on forecast will not be much as per the contour study. As per the contour study it may be concluded that the Lday 62 dB(A) and Lnight 57 dB(A) noise contours shall be used as the airport zones for day and night.

The following action plans are to be followed ,when the noise limits exceed:

1. Airport operators will have existing measures in place to mitigate noise impacts. This requirement can be met out by describing the current noise control measures, including those setout in any existing noise Action Plan and updating them as appropriate.
2. Airport operators will primarily have two pieces of information available to them for action plan:
    i. The current noise impact of their operations as shown by the results of the noise mapping; and
    ii. The current noise control measures they have in place.