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An Advance Study to Perform Regression Analysis on Noise Level at Prominent Intersection Under Peak Hours

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Abstract: Jaipur faces significant challenges with noise pollution due to a confluence of factors such as vehicular traffic, construction activities, industrial operations, and social events. The city's increasing population and rapid urbanization exacerbate these noise issues, contributing to a rise in overall noise levels. Vehicular traffic is a primary source of noise pollution, particularly in congested areas and during peak hours. The constant honking of horns, engine noises, and loud music emanating from vehicles contribute to the elevated ambient noise levels. Construction activities, which are prevalent in rapidly developing cities like Jaipur, add another layer of noise pollution. The cacophony from heavy machinery, equipment, and ongoing construction work disrupts the tranquility of residential and commercial areas. Furthermore, industrial operations, including manufacturing plants and factories, emit continuous noise that can penetrate surrounding neighborhoods.

In this study data collected from major intersection of Jaipur city. All sites selected as per flow of traffic. Total six sites are selected and noise data collected for 7days. Model of regression analysis also prepared and predict future position of noise level. With the help of regression model get values of R-square. All measurement of noise level conducts in peak hours of traffic.

Keyword: Noise level, Regression model, Sound Meter, Road Traffic and Traffic Flow etc.

INTRODUCTION

1.1General

Sound refers to atmospheric or airborne vibrations that the ear can detect. On the other hand noise after some level is typically undesired, unpleasant, or disagreeable sound that causes discomfort. It is considered a form of pollution due to its potential to cause various physiological and psychological effects on humans. Factors such as rural-to-urban migration, urban expansion, infrastructure development, population growth, and urbanization contribute to increased motorization and subsequently raise the levels of various urban pollutants, including noise.

Noise is a subjective term, as what may be unpleasant to one person might be tolerable or even pleasant to another. The rise in industrialization, urbanization, and commercial activity in urban areas contributes to the escalation of noise pollution, with traffic being a primary source of noise.The health effects of noise pollution encompass physical impacts such as hearing impairment, physiological effects like elevated blood pressure and irregular heart rhythms, as well as psychological effects such as sleep disturbances, irritability, annoyance, and stress.

1.2Noise pollution

The cacophony of urban life in India is often marked by a symphony of sounds, ranging from the incessant honking of vehicles to the clamor of construction activities. As India undergoes rapid urbanization, propelled by burgeoning populations and economic development, the problem of noise pollution has escalated, posing significant challenges to the health, well-being, and quality of life of its residents.Noise pollution from traffic is a prevalent issue in urban areas worldwide, including India. It occurs due to the constant sounds generated by vehicles on roads, such as cars, buses, motorcycles, and trucks.In India, the problem of traffic-related noise pollution is particularly pronounced in densely populated cities where traffic congestion is rampant.

1.3Effect of Noise Pollution

The effects of noise pollution are wide-ranging and can impact various aspects of human health, the environment, and society as a whole. Here are some of the key effects:

- Prolonged exposure to high levels of noise can lead to temporary or permanent hearing loss.
- Noise pollution has been linked to various health problems, including stress, anxiety, hypertension, cardiovascular diseases, and sleep disturbances.
- Excessive noise can make it difficult to communicate effectively, both in indoor and outdoor settings.
- Ultimately, noise pollution diminishes the quality of life for individuals and communities, depriving them of peace, tranquility, and the ability to enjoy their surroundings. It can erode the sense of well-being and satisfaction that people derive from their living and working environments.

1.4Objectives

- Utilize the Sound Level Meter NL-42 to assess the sound levels at various sites over a span of seven days.
- Identify the peak periods throughout the day when the highest levels of noise are observed.
- Create graphical representations illustrating the variations in noise levels across different times of the day and days of the week at all six locations.
- Recommend optimal times for implementing traffic control measures and diversion strategies based on the identified peak noise periods.

2 LITERATURE REVIEW

2.1Past Study

Mazumdar et al, 2024 [1]: Inspect the mental and physical health challenges faced by traffic police personnel in North Bengaluru, aiming to uncover how their demanding roles impact their well-being. The study employs a mixed-methods approach, combining quantitative health assessments with qualitative interviews to provide a comprehensive view of the issues. The study identifies high levels of stress, chronic physical strain, and mental health issues among traffic police, underscoring the need for specialized health interventions and improved working conditions.

Singh et al, 2024 [2]: Investigate how road traffic noise affects the health of children and adolescents, with a focus on developmental, cognitive, and psychological impacts. The study uses a combination of noise exposure measurements and health assessments to establish a link between noise pollution and adverse health outcomes.. The main weakness is the potential difficulty in controlling for other environmental and socioeconomic

factors that may influence health outcomes. Findings reveal significant negative effects of road traffic noise on hearing, sleep quality, and cognitive development in children and adolescents.

Wickramathilaka et al, 2024 [3]: Evaluate various spatial interpolation techniques for mapping traffic noise across different terrain types, including undulating and level areas.. The research addresses a significant gap in noise mapping by considering the effects of terrain variations on interpolation accuracy. However, the technical nature of the study may limit its accessibility to practitioners who are not specialists in geodesy or cartography. The findings indicate that certain interpolation techniques perform better on specific terrains, providing valuable insights for enhancing the accuracy of traffic noise maps.

Kar et al, 2024 [4]: Explore the health impacts of air pollution on traffic police personnel in Kolkata, revealing significant health risks such as respiratory issues, cardiovascular problems, and overall decreased quality of life. The study utilizes air quality monitoring data alongside health assessments to draw correlations between pollution levels and health outcomes. The study highlights the urgent need for improved air quality control measures and protective health strategies tailored for traffic police personnel.

Bhattacharya Debajyotiet al, 2024 [5]A cross-sectional noise survey was carried out as part of the study in 2015 using the levels of noise at the Pondicherry City studied site. The results were examined based on the limits specified by CPCB instructions, and several noise indexes were calculated. Cities in Pondicherry had louder noise levels than residential, commercial, industrial, and highway intersections. Thirty-three of the 36 locations that were inspected went above the BPK's daily time restriction. There was an urgent need to lower noise levels after a noise survey at a few chosen locations in the town of Loch Derry revealed that about 92% of the areas evaluated were significantly above state CPCB limits. The study's findings showed the quantity of transportation and vehicular traffic at the investigation site may be responsible for the increased noise levels.

Moreno Ricardo et al, 2023 [6]: The goal of the research is to present a modified CPB consider that will increase the method's applicability and provide reliable results. In addition, the ground speed of the automobile being tested is not taken into consideration by CPB measurements like LA max. Their recommendation can be used to produce a substitute metric that takes sound activity duration into factor.

2.2Research gap

- There might be a lack of comprehensive and up-to-date data on noise levels at major intersections in Jaipur city, especially considering variations across different times of the day and days of the week.
- Existing studies may not adequately assess the full range of health and environmental impacts associated with noise pollution at major intersections in Jaipur. Further research could delve into the specific effects on vulnerable populations, wildlife, and ecosystems.
- There could be a gap in integrating noise pollution management strategies with broader urban planning and development initiatives in Jaipur city. Research could explore opportunities for incorporating noise reduction measures into urban design, transportation planning, and infrastructure development projects.

- These Research gaps can contribute to a more comprehensive understanding of noise pollution at major intersections in Jaipur city and the development of effective mitigation strategies tailored to the local context.

3 METHODOLOGY

The research work titled "An Advanced Study to Perform Regression Analysis on Noise Level at Prominent Intersection under Peak Hours". The research aims to employ regression analysis techniques to explore the relationship between various variables and noise pollution levels at prominent intersections during peak hours.

By conducting regression analysis, the researchers seek to identify the primary contributors to noise pollution and elucidate the complex interactions between different variables.The findings of this study are expected to provide valuable insights for policymakers, urban planners, and environmentalists in devising effective strategies for noise reduction and urban development.

3.1Working Steps

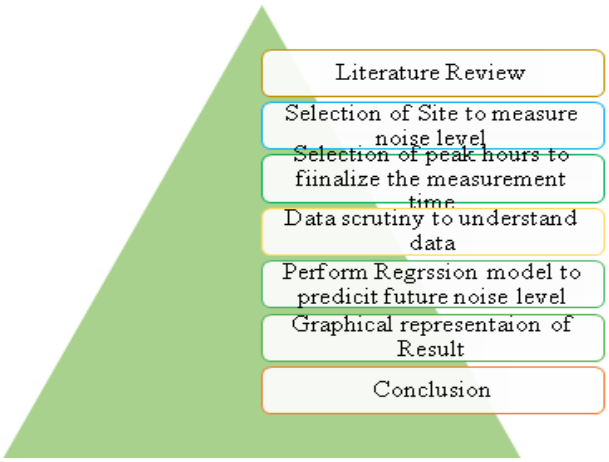

Figure 3.1Flow diagram of working steps

3.2Problem Statement

Urbanization and increasing vehicular traffic have significantly contributed to rising noise pollution levels, especially at major intersections during peak hours.This research aims to conduct an advanced study utilizing regression analysis techniques to quantify the impact of various factors such as vehicle volume, vehicle speed, road geometry, and environmental conditions on noise pollution levels at prominent intersections during peak traffic hours.

3.3Sound Measurement Devices

Sound measurement devices, commonly known as sound level meters (SLMs) or noise meters, are instruments used to measure the intensity or level of sound in a given environment. These devices are essential tools in various industries, including environmental monitoring, occupational safety, urban planning, and industrial hygiene. Sound measurement devices typically consist of the following components:

1. Microphone: The microphone is the primary sensing element of the sound level meter. It converts sound waves into electrical signals, which are then processed to determine the sound level.

2. Preamplifier: In some sound level meters, especially those used for measuring low-level sounds, a preamplifier is employed to boost the signal from the microphone before further processing

3. Frequency Weighting Networks: Sound level meters typically employ frequency weighting networks to simulate the human ear's response to different frequencies. The most commonly used frequency weightings are A, B, and C,

4. Time Weighting: Time weighting is used to adjust the meter's response time to changes in

sound level. Common time weightings include Fast (F), Slow (S), and Impulse (I),

5. Display: Modern sound level meters feature digital displays that provide real-time readings of sound levels in decibels (dB).

6. Data Logging and Connectivity: Advanced sound level meters may include features for data logging, allowing for the storage of measurement data over time.

7. Calibration Controls: Calibration controls are provided to ensure the accuracy and reliability of the sound level meter.

8. Battery or Power Source: Depending on their design and intended uses, the Sound level meters are normally powered by batteries or external power sources.

3.4Sound Level Meter NL-42

The NL-42 Sound Level Meter is a cutting-edge instrument designed to accurately measure and monitor sound levels in various environments. Developed by leading manufacturers in the field of noise measurement, the NL-42 combines advanced technology with user-friendly features to provide precise and reliable measurements for a wide range of applications.In addition to its standalone operation, the NL-42 Sound Level Meter is equipped with advanced connectivity options, including USB and Bluetooth capabilities.

NL-42 IEC 61672-1:2002 Class

- Main processing (Main channel)
- Instantaneous sound pressure level= Lp
- Equivalent continuous sound pressure level=Leq
- Sound exposure level=LE
- Maximum sound pressure level= L max
- Minimum sound pressure level= L min

Figure 3.2Sound Level Meter NL-42 IEC

3.5Data Collection

Data collection entails the systematic measurement and gathering of information concerning variables of interest, facilitating the answering of research questions, hypothesis testing, and outcome evaluation.

Area Coverage and Timing of Exposure

An important aspect of noise exposure is to gather information on the noise level, the noise source and the exposure time. This is another audio source for recording observations.

The following measurements were carried out:

- C-weighted peak sound level=LC peak
- C-weighted minimum sound level=LCmin
- C-weighted equivalent continuous sound level=LCeq

3.6Government Initiatives

Raising awareness is recommended by international organizations such as the WHO to combat noise pollution. Avoid vigorous recreational activities, replace bicycles or electric vehicles with cars, impose curfews, and insulate homes with soundproof materials, among other recommendations.

- The first Klakson Day in Sukabumi was held in 2008 and produced 16,000 car tickets.

- In 2022, Delhi bans modified silencers, pressure horns and excessive noise. Many commuters expressed their support for the Delhi Traffic Police on Twitter on Saturday announcing a special operation for drivers using modified pressure horns and whistles.
- The police commissioner said that in 2022, 301 mosques, temples, shrines and other institutions have received letters from the Bengaluru police asking them to use loudspeakers within the permissible decibel range.
- As many as 3,022 mosques, temples, shrines and other institutions have received notices from the Bengaluru police in 2022 asking them to use loudspeakers within the permissible decibel limit, the police commissioner said. 301 warnings were sent to 59 pubs, bars and restaurants. ; 12 businesses; 83 temples; 22 meetings; and 125 mosques.

3.7Recommendation of Noise Level as per Indian Standard

- The National Institute for Occupational Safety and Health (NIOSH) recommends exposure to a noise level of 85 decibels (dBA) for no more than eight hours a day. Every three decibel increase in sound level results in a 50% reduction in the recommended sound exposure limit.
- To prevent hearing loss, the World Health Organization (WHO) recommends that noise exposure should not exceed 70 dB for 24 hours.
- In 2018, the Indian government's National Environmental Engineering Research Institute (NEERI) studied noise measurements from Mumbai and around 24 cities in the state of Maharashtra. Sukabumi has been identified as having one of the highest noise levels; Noise levels of 70-80 dB are not uncommon in the city.
- According to environmental engineer Ritesh Vijay, lead author of NEERI's 2018 Noise Survey, the horn is the loudest noise generator. Horns are considered by Indian drivers as a form of self-expression rather than a safety device.
- Apart from honking, some of the biggest noise producers in India are traffic, factories, fire engines, loudspeakers and DJs.
- Environment Protection Act, 1986, Industries Act and Motor Vehicles Act, 1988 are some of the government regulations in India to reduce noise pollution.
- As part of the Noise Pollution regulations 2000, quiet zones and areas are divided into industrial, commercial and residential categories, each with acceptable decibel limits during the day and night.
- In industrial zones, the maximum allowed is 75 dB during the day and 70 dB at night.
- 65 dB and 55 dB in the commercial zone and 55 dB and 45 dB in the residential zone during daytime and afternoon respectively.

Table 3.1Average Sound Levels, which is Relatable to Human Hearing

Area code	Category of Area/Zone	Limit in dbs	
		Day time	Night time
A	Industrial Area	75 dbs	70 dbs
B	Commercial Area	65 dbs	55 dbs
C	Residential Area	55 dbs	45 dbs
D	Silence Zones	50 dbs	40 dbs

3.8Selected Sites

Site-1	Police Choki, Heerapura	200 Feet Road
Site-2	Shiv industries	14no. Flyover
Site-3	Sindhi Camp Metro Station	Sindhi Camp
Site-4	Jaipur Junction Circle	Railway Station
Site-5	S.S. Jain Subodh P.G. College	Subodh College
Site-6	Sanganeri Gate	Sanganeri Gate

4 RESULT AND DISCUSSION

4.1Sound Measurement Level at Different Sites

Table 4.1Sound Level Data from Site-1 (Police Choki, Heerapura 200feet)

Sound Level of Site-1 (Police Choki, Heerapura 200feet)					
Days	**Date**	**7:00-8:00 am**	**8:00-9:00 am**	**9:00-10:00 am**	**10:00-11:00 am**
Day 1	22/04/2024	74.3	75.3	79.9	78.1
Day 2	23/04/2024	72.5	74.5	85.2	83.3
Day 3	24/04/2024	70.5	72.5	82.1	80.2
Day 4	25/04/2024	74.6	76.6	88.4	86.5
Day 5	26/04/2024	71.8	74.8	95.3	93.4
Day 6	27/04/2024	72.9	76.9	92.3	90.1
Day 7	28/04/2024	73.4	74.4	84.2	82.3
Average		72.9	75.0	86.8	84.8
Days	**Date**	**3:00-4:00 pm**	**4:00-5:00 pm**	**5:00-6:00 pm**	**6:00-7:00 pm**
Day 1	22/04/2024	74.9	76.1	81.1	79.2
Day 2	23/04/2024	80.1	81.3	86.3	84.2
Day 3	24/04/2024	77	78.2	83.2	81.1
Day 4	25/04/2024	83.3	84.5	89.5	87.4
Day 5	26/04/2024	90.2	91.4	96.4	94.3
Day 6	27/04/2024	86.9	88.1	93.1	91.2
Day 7	28/04/2024	79.1	80.3	85.3	83.2
Average		81.6	82.8	87.8	85.8
Days	**Date**	**7:00-8:00 pm**	**8:00-9:00 pm**	**9:00-10:00 pm**	**10:00-11:00 pm**
Day 1	22/04/2024	78.7	69.2	67.8	66.4
Day 2	23/04/2024	73.7	63.2	61.8	60.4
Day 3	24/04/2024	70.6	60.1	58.7	57.3
Day 4	25/04/2024	76.9	66.4	65	63.6
Day 5	26/04/2024	83.8	73.3	71.9	70.5
Day 6	27/04/2024	80.7	70.2	68.8	67.4
Day 7	28/04/2024	72.7	62.2	60.8	59.4
Average		76.7	66.4	65.0	63.6

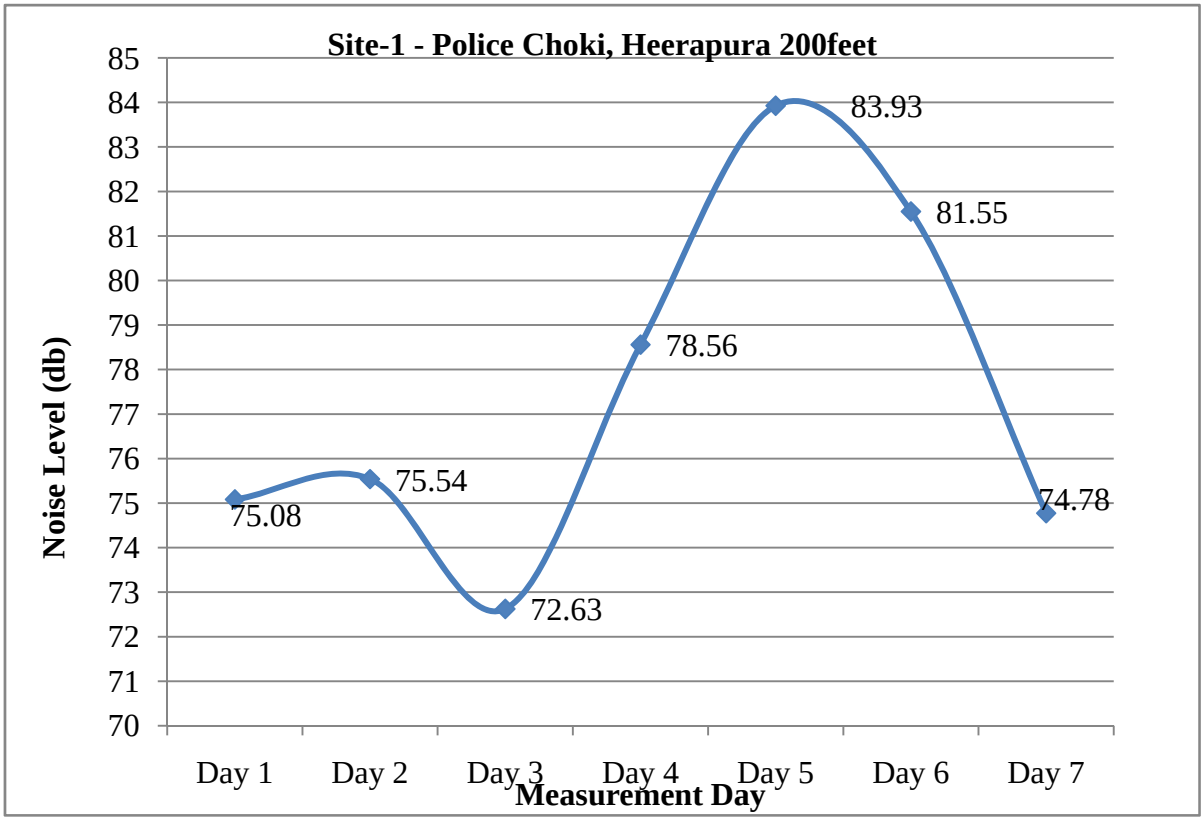

Figure 4.1Average Sound Level of a Day from Site-1

Table 4.2Sound Level Data from Site-2(Shiv Industries, 14no. Flyover)

Sound Level of Site-2 (Shiv Industries, 14no. Flyover)					
Days	**Date**	**7:00-8:00 am**	**8:00-9:00 am**	**9:00-10:00 am**	**10:00-11:00 am**
Day 1	01/05/2024	61.4	65.6	77.3	96.7
Day 2	02/05/2024	62.5	70.1	82.6	85.9
Day 3	03/05/2024	60.1	68.6	79.5	95.6
Day 4	04/05/2024	64.7	62.9	85.8	98.5
Day 5	05/05/2024	62.1	73.7	92.7	100.8
Day 6	06/05/2024	63.7	66.5	89.4	97.2
Day 7	07/05/2024	60.3	63.4	81.6	89.3
Average		62.1	67.3	84.1	94.9
Days	**Date**	**3:00-4:00 pm**	**4:00-5:00 pm**	**5:00-6:00 pm**	**6:00-7:00 pm**
Day 1	01/05/2024	79.9	99.5	96.1	94.5
Day 2	02/05/2024	85.3	91.6	91.5	92.7
Day 3	03/05/2024	84.1	89.4	81.5	90.4
Day 4	04/05/2024	88.4	75.3	68.2	99.9
Day 5	05/05/2024	91.3	87.7	70.6	91.6
Day 6	06/05/2024	86.2	95.3	92.5	93.7
Day 7	07/05/2024	82.5	71.6	93.9	100.1
Average		85.4	87.2	84.9	94.7
Days	**Date**	**7:00-8:00 pm**	**8:00-9:00 pm**	**9:00-10:00 pm**	**10:00-11:00 pm**
Day 1	01/05/2024	96.1	87.1	84.5	49.5
Day 2	02/05/2024	94.3	88.3	85.7	52.1
Day 3	03/05/2024	94.6	90.1	87.5	54.2
Day 4	04/05/2024	97.5	93.5	90.9	56.8
Day 5	05/05/2024	97.2	97.2	94.6	54.2
Day 6	06/05/2024	98.6	97.9	95.3	60.8
Day 7	07/05/2024	96.3	94.3	91.7	61.1
Average		96.4	92.6	90.0	55.5

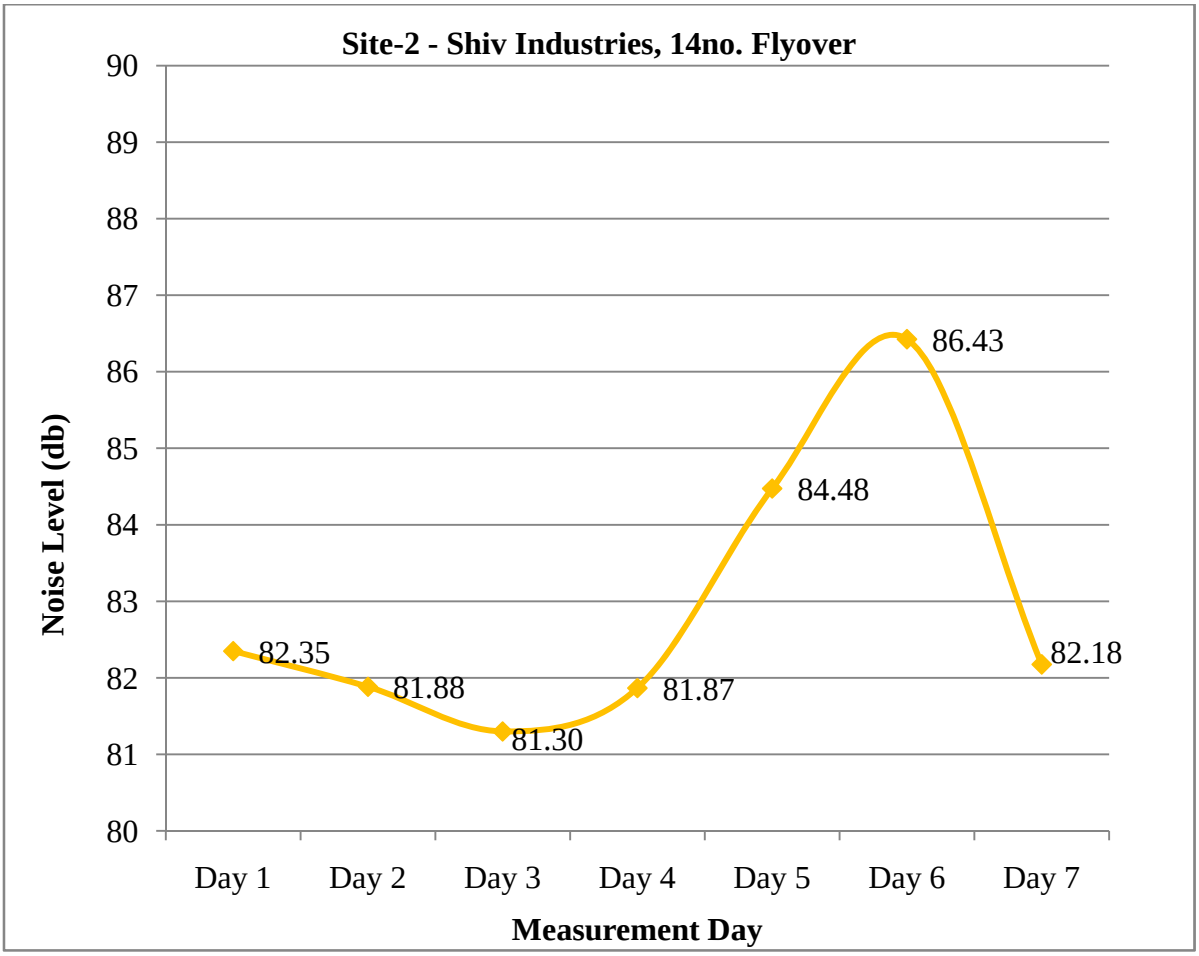

Figure 4.2Average Sound Level of a Day from Site-2

Table 4.3Sound Level Data from Site-3(Sindhi Camp Metro Station)

Sound Level of Site-3 (Sindhi Camp Metro Station)					
Days	**Date**	**7:00-8:00 am**	**8:00-9:00 am**	**9:00-10:00 am**	**10:00-11:00 am**
Day 1	09/05/2024	75.5	76.5	81.1	79.3
Day 2	10/05/2024	73.7	75.7	86.4	84.5
Day 3	11/05/2024	71.7	73.7	83.3	81.4
Day 4	12/05/2024	75.8	77.8	89.6	87.7
Day 5	13/05/2024	73.6	76	96.5	94.6
Day 6	14/05/2024	74.1	78.1	93.5	91.3
Day 7	15/05/2024	74.6	75.6	85.4	83.5
Average		74.1	76.2	88.0	86.0
Days	**Date**	**3:00-4:00 pm**	**4:00-5:00 pm**	**5:00-6:00 pm**	**6:00-7:00 pm**
Day 1	09/05/2024	76.1	77.3	82.3	80.4
Day 2	10/05/2024	81.3	82.5	87.5	85.4
Day 3	11/05/2024	78.2	79.4	84.4	82.3
Day 4	12/05/2024	84.5	85.7	90.7	88.6
Day 5	13/05/2024	91.4	92.6	97.6	95.5
Day 6	14/05/2024	88.1	89.3	94.3	92.4
Day 7	15/05/2024	80.3	81.5	86.5	84.4
Average		82.8	84.0	89.0	87.0
Days	**Date**	**7:00-8:00 pm**	**8:00-9:00 pm**	**9:00-10:00 pm**	**10:00-11:00 pm**
Day 1	09/05/2024	79.9	70.4	69.3	67.6
Day 2	10/05/2024	74.9	64.4	63.1	61.6
Day 3	11/05/2024	71.8	61.3	59.9	58.5
Day 4	12/05/2024	78.1	67.6	66.2	64.8
Day 5	13/05/2024	85	74.5	73.1	71.7
Day 6	14/05/2024	81.9	71.4	70.6	68.6
Day 7	15/05/2024	73.9	63.4	62	60.6
Average		77.9	67.6	66.3	64.8

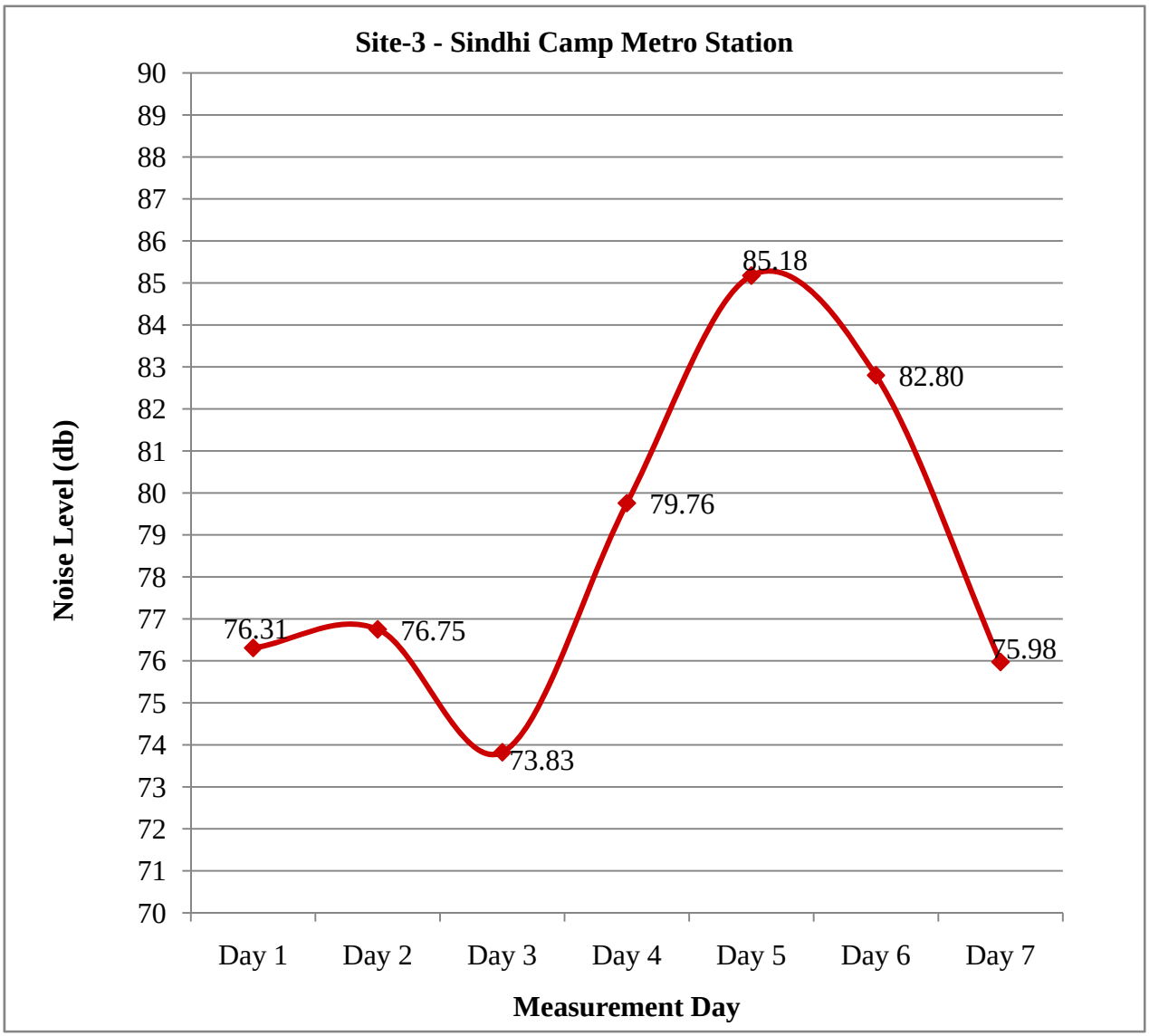

Figure 4.3Average Sound Level of a Day from Site-3

Table 4.4Sound Level Data from Site-4(Jaipur Junction Circle, Railway Station)

Sound Level of Site-4 (Jaipur Junction Circle, Railway Station)					
Days	**Date**	**7:00-8:00 am**	**8:00-9:00 am**	**9:00-10:00 am**	**10:00-11:00 am**
Day 1	18/05/2024	62.4	72.4	81.3	96.3
Day 2	19/05/2024	64.5	76.5	86.6	85.5
Day 3	20/05/2024	63.1	75.4	83.5	95.2
Day 4	21/05/2024	61.7	69.7	89.8	98.1
Day 5	22/05/2024	64.4	80.5	96.7	100.4
Day 6	23/05/2024	59.7	73.3	93.4	96.6
Day 7	24/05/2024	58.3	70.2	85.6	88.9
Average		62.0	74.0	88.1	94.4
Days	**Date**	**3:00-4:00 pm**	**4:00-5:00 pm**	**5:00-6:00 pm**	**6:00-7:00 pm**
Day 1	18/05/2024	81.3	100.6	99.3	98.6
Day 2	19/05/2024	84.6	99.8	94.7	96.3
Day 3	20/05/2024	83.5	97.2	84.7	94
Day 4	21/05/2024	87.8	83.5	71.4	97.5
Day 5	22/05/2024	90.7	95.9	73.8	95.2
Day 6	23/05/2024	85.4	99.5	95.7	96.4
Day 7	24/05/2024	68.6	79.8	97.4	99.8
Average		83.1	93.8	88.1	96.8
Days	**Date**	**7:00-8:00 pm**	**8:00-9:00 pm**	**9:00-10:00 pm**	**10:00-11:00 pm**
Day 1	18/05/2024	90.7	84.2	54.1	50.1
Day 2	19/05/2024	91.9	87.9	56.7	52.3
Day 3	20/05/2024	93.6	86.7	58.8	51.4
Day 4	21/05/2024	97.2	82.5	53.1	53.2
Day 5	22/05/2024	100.8	91.1	50.4	50.2
Day 6	23/05/2024	95.2	89.3	57.3	54.8
Day 7	24/05/2024	97.7	81.8	62.3	60.5
Average		95.3	86.2	56.1	53.2

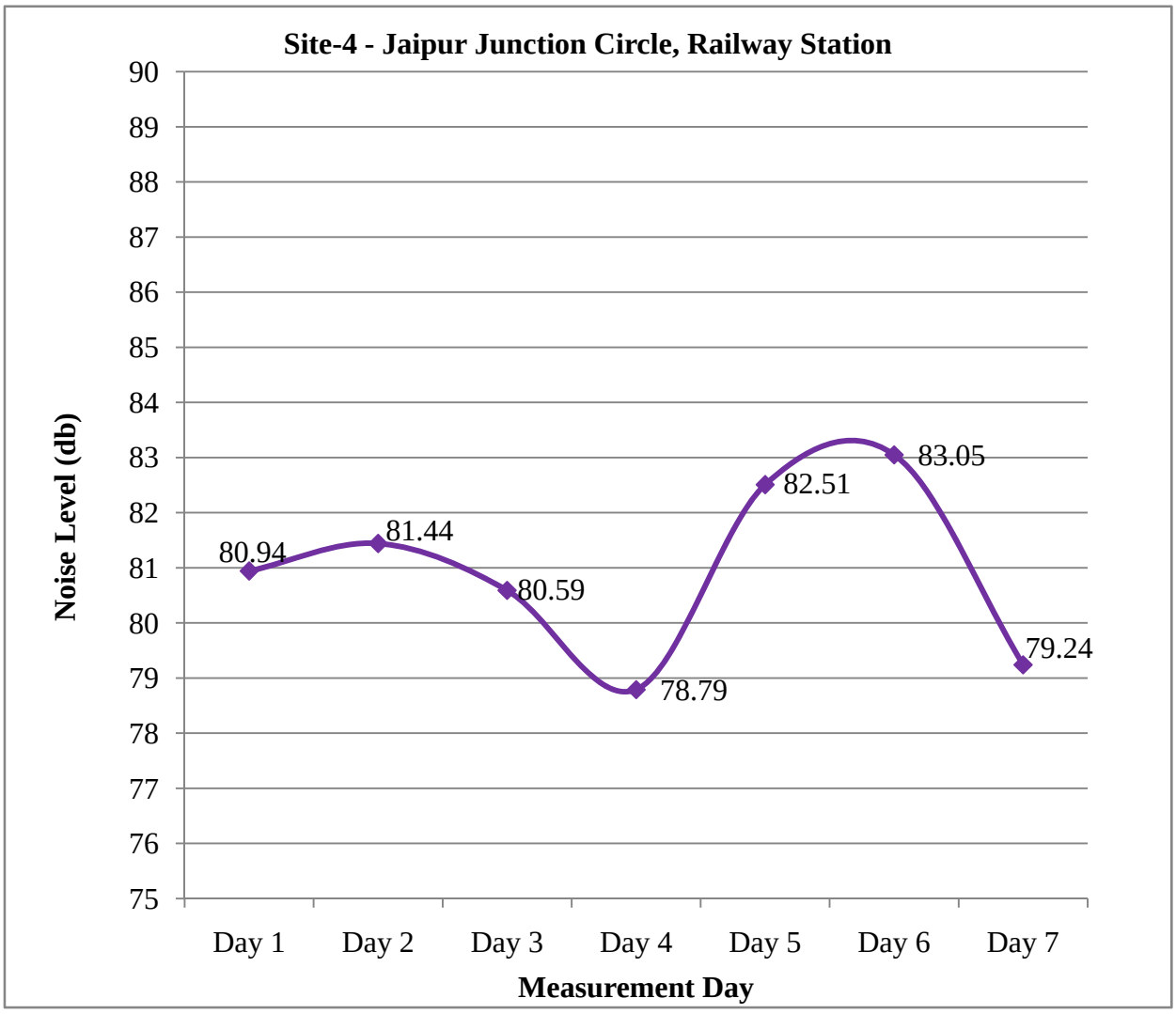

Figure 4.4Average Sound Level of a Day from Site-4

Table 4.5Sound Level Data from Site-5(S.S. Jain Subodh P.G. College)

Sound Level of Site-5 (S.S. Jain Subodh P.G. College)					
Days	**Date**	**7:00-8:00 am**	**8:00-9:00 am**	**9:00-10:00 am**	**10:00-11:00 am**
Day 1	25/05/2024	55.2	61.4	70.3	85.3
Day 2	26/05/2024	57.8	65.5	75.6	74.5
Day 3	27/05/2024	55.9	64.4	72.5	84.2
Day 4	28/05/2024	60.5	58.7	78.8	87.1
Day 5	29/05/2024	57.9	69.5	85.7	89.4
Day 6	30/05/2024	59.5	62.3	82.4	85.6
Day 7	31/05/2024	56.1	59.2	74.6	77.9
Average		57.6	63.2	77.1	83.4
Days	**Date**	**3:00-4:00 pm**	**4:00-5:00 pm**	**5:00-6:00 pm**	**6:00-7:00 pm**
Day 1	25/05/2024	72.3	98.7	90.3	89.3
Day 2	26/05/2024	75.6	90.8	85.7	87.5
Day 3	27/05/2024	74.5	88.2	75.7	85.2
Day 4	28/05/2024	78.8	74.5	62.4	94.7
Day 5	29/05/2024	81.7	86.9	64.8	86.4
Day 6	30/05/2024	76.4	96.5	86.7	87.8
Day 7	31/05/2024	59.6	70.8	88.1	99.3
Average		74.1	86.1	79.1	90.3
Days	**Date**	**7:00-8:00 pm**	**8:00-9:00 pm**	**9:00-10:00 pm**	**10:00-11:00 pm**
Day 1	25/05/2024	86.3	78.6	55.5	45.2
Day 2	26/05/2024	87.5	82.3	58.4	47.8
Day 3	27/05/2024	89.2	81.1	55.9	49.9
Day 4	28/05/2024	92.7	76.9	60.5	52.5
Day 5	29/05/2024	96.4	85.4	54.9	49.9
Day 6	30/05/2024	97.8	83.5	56.5	56.5
Day 7	31/05/2024	78.3	90.2	56.2	62.8
Average		89.7	82.6	56.8	52.1

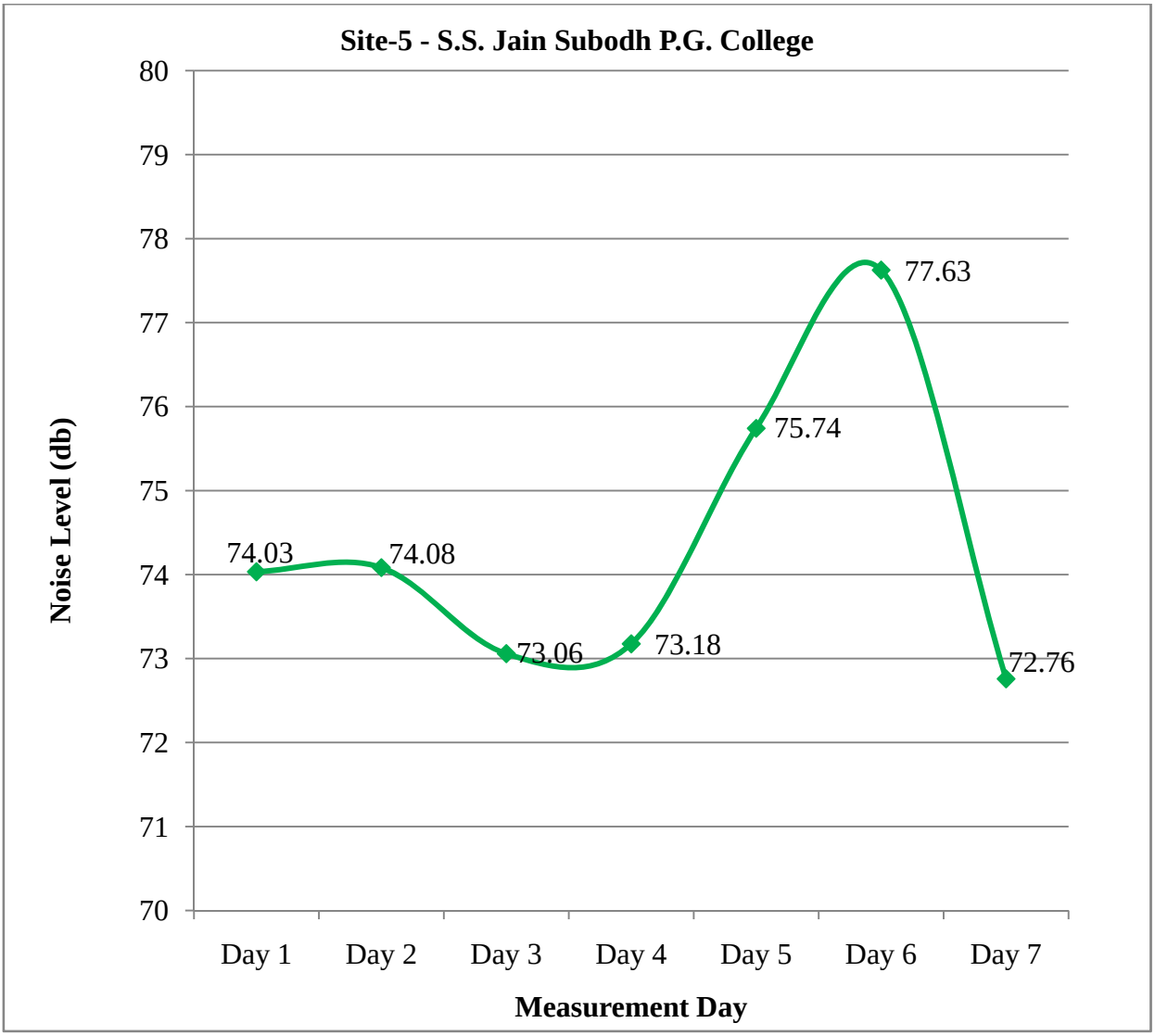

Figure 4.5Average Sound Level of a Day from Site-5

Table 4.6Sound Level Data from Site-6(Sanganeri Gate)

Sound Level of Site-6 (Sanganeri Gate)					
Days	**Date**	**7:00-8:00 am**	**8:00-9:00 am**	**9:00-10:00 am**	**10:00-11:00 am**
Day 1	03/06/2024	63.2	69.4	78.3	93.3
Day 2	04/06/2024	61.8	73.5	83.6	82.5
Day 3	05/06/2024	63.9	72.4	80.5	92.2
Day 4	06/06/2024	59.5	66.7	86.8	95.1
Day 5	07/06/2024	63.9	77.5	93.7	97.4
Day 6	08/06/2024	62.5	70.3	90.4	93.6
Day 7	09/06/2024	60.1	67.2	82.6	85.9
Average		62.1	71.0	85.1	91.4
Days	**Date**	**3:00-4:00 pm**	**4:00-5:00 pm**	**5:00-6:00 pm**	**6:00-7:00 pm**
Day 1	03/06/2024	78.3	99.7	96.3	95.3
Day 2	04/06/2024	81.6	96.8	91.7	93.5
Day 3	05/06/2024	80.5	94.2	81.7	91.2
Day 4	06/06/2024	84.8	80.5	68.4	100.7
Day 5	07/06/2024	87.7	92.9	70.8	92.4
Day 6	08/06/2024	82.4	102.5	92.7	93.8
Day 7	09/06/2024	65.6	76.8	94.1	98.3
Average		80.1	91.9	85.1	95.0
Days	**Date**	**7:00-8:00 pm**	**8:00-9:00 pm**	**9:00-10:00 pm**	**10:00-11:00 pm**
Day 1	03/06/2024	88.3	80.6	58.5	53.2
Day 2	04/06/2024	89.5	84.3	61.1	55.6
Day 3	05/06/2024	91.2	83.1	63.2	49.7
Day 4	06/06/2024	94.7	78.9	63.1	46.3
Day 5	07/06/2024	98.4	87.4	60.4	52.7
Day 6	08/06/2024	99.8	85.5	67	51.9
Day 7	09/06/2024	93.3	78.2	72.3	53.6
Average		93.6	82.6	63.7	51.9

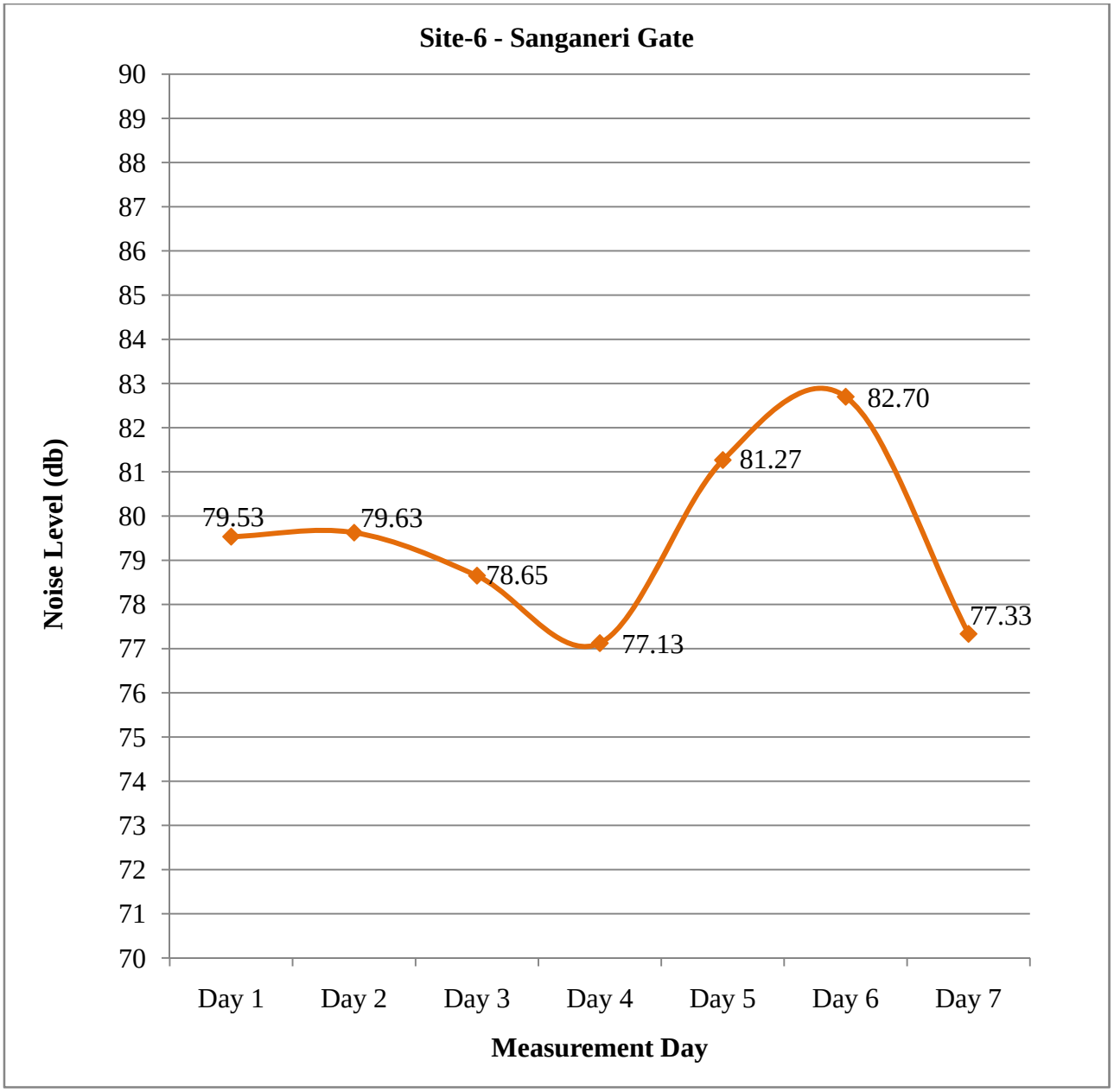

Figure 4.6Average Sound Level of a Day from Site-6

4.2Regression Analysis

Table 4.7Regression Analysis of Noise level in different time-periods

Time	Site-1	Site-2	Site-3	Site-4	Site-5	Site-6
	dB	dB	dB	dB	dB	dB
7:00-8:00 am	72.9	62.1	74.1	62.0	57.6	62.1
8:00-9:00 am	75.0	67.3	76.2	74.0	63.2	71.0
9:00-10:00 am	86.8	84.1	88.0	88.1	77.1	85.1
10:00-11:00 am	84.8	94.9	86.0	94.4	83.4	91.4
3:00-4:00 pm	81.6	85.4	82.8	83.1	74.1	80.1
4:00-5:00 pm	82.8	87.2	84.0	93.8	86.1	91.9
5:00-6:00 pm	87.8	84.9	89.0	88.1	79.1	85.1
6:00-7:00 am	85.8	94.7	87.0	96.8	90.3	95.0
7:00-8:00 pm	76.7	96.4	77.9	95.3	89.7	93.6
8:00-9:00 pm	66.4	92.6	67.6	86.2	82.6	82.6
9:00-10:00 pm	65.0	90.0	66.3	56.1	56.8	63.7
10:00-11:00 pm	63.6	55.5	64.8	53.2	52.1	51.9

Table 4.8Values of R^2 at Different Sites

S. No.	Sites	R^2 Value
1	Site-1	0.2604
2	Site-2	0.0426
3	Site-3	0.2599
4	Site-4	0.0342
5	Site-5	0.00004
6	Site-6	0.0171

5 CONCLUSIONS

5.1 Concluded Remarks

- Highest noise level occurred at 5th day of week was 83.93dB and lowest noise level occurred at 3rd day of week was 72.63dB. Percentage change of lowest and highest sound value at site-1 was 15.55% and value of R^2 at site-1 was 0.2604 calculated from regression analysis.
- Highest noise level occurred at 6th day of week was 86.43dB and lowest noise level occurred at 3rd day of week was 81.30dB. Percentage change of lowest and highest sound value at site-2 was 3.62%. In addition, value of R^2 at site-2 was 0.0426 calculated from regression analysis.
- Highest noise level occurred at 5th day of week was 85.18dB and lowest noise level occurred at 3rd day of week was 73.83dB. Percentage change of lowest and highest sound value at site-3 was 13.32%. In addition, value of R^2 at site-3 was 0.2599 calculated from regression analysis.
- Highest noise level occurred at 5th day of week was 83.05dB and lowest noise level occurred at 4th day of week was 78.79dB. Percentage change of lowest and highest sound value at site-4 was 5.12%. In addition, value of R^2 at site-4 was 0.0342 calculated from regression analysis.
- Highest noise level occurred at 5th day of week was 77.63dB and lowest noise level occurred at 7th day of week was 72.76dB. Percentage change of lowest and highest sound value at site-5 was 6.27%. In addition, value of R^2 at site-5 was 0.00004 calculated from regression analysis.
- Highest noise level occurred at 5th day of week was 82.70dB and lowest noise level occurred at 3rd day of week was 77.13dB. Percentage change of lowest and highest sound value at site-6 was 6.73%. In addition, value of R^2 at site-6 was 0.0171 calculated from regression analysis.

5.2Future Scope of Work

- Investigate the impact of different vehicle types on noise levels at prominent intersections during peak hours.
- Explore the correlation between weather conditions and noise levels at prominent intersections during peak hours.
- Examine the effectiveness of noise barriers or sound-absorbing materials in reducing noise levels at prominent intersections during peak hours.
- Analyze the relationship between urban development factors and noise levels at prominent intersections during peak hours.

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