

# Portable Noise Measurement Report

3rd Ave. SW, Glen Burnie, MD 21061

Maryland Aviation Administration

May 2023

 MARYLAND DEPARTMENT OF TRANSPORTATION

MARYLAND AVIATION ADMINISTRATION

# BW324 Summary

## ? WHEN WAS NOISE MEASURED

Thursday, April 27, 2023 to  
Thursday, May 11, 2023



May   April 2023	S	M	T	W	T	F	S
	23	24	25	26	27	28	29
	30	1	2	3	4	5	6
	<i>measurements</i>						
	7	8	9	10	11	12	13
	<i>measurements</i>						
	14	15	16	17	18	19	20

## ✈ HOW MANY AIRCRAFT NOISE EVENTS OCCURRED AND WHAT WERE THEY



### TOP 3 MOST FREQUENT AIRCRAFT DURING THE MEASUREMENT PERIOD

Rank	Aircraft Type	Operation Type and Runway
1	Boeing 737-800 	Departure, 15R
2	Cessna Grand Caravan 	Arrival, 33R
3	Boeing 737-800 	Departure, 28

## 🔍 CONCLUSION

During the 15-day measurement period, the Day Night Average Noise Level (DNL) from aircraft noise events was 50 decibels (dB), while the DNL from community noise was 58 dB.

FAA's threshold for land use compatibility is an aircraft-only DNL of 65 dB based on annual average daily aircraft operations.

Aircraft DNL	Community DNL	Total DNL	FAA Threshold
50 dB	58 dB	59 dB	65 dB

# Introduction

The purpose of the portable noise monitoring report is to summarize aircraft and community noise levels at a specific location upon request of a homeowner. The program is offered by the Maryland Aviation Administration (MAA), with technical support and report preparation provided by Harris Miller Miller & Hanson Inc. (HMMH) and Airport Design Consultants, Inc. (ADCI).

It should be noted that the noise data provided in this report represents noise and operating levels only during the period of the measurements. Noise levels associated with aircraft overflights can vary with the number of operations, wind and weather patterns, temperatures, pilot procedures and Air Traffic Control instruction, and other variables.

This report presents the measured aircraft and community noise levels from April 27, 2023, to May 11, 2023, at 3rd Ave. SW, Glen Burnie, MD 21061. The monitoring location is approximately 2 statute miles from the center of Baltimore/Washington International Thurgood Marshall (BWI Marshall) Airport. The figure to the right shows the location of the measurement site (marked as BW324) relative to BWI Marshall.

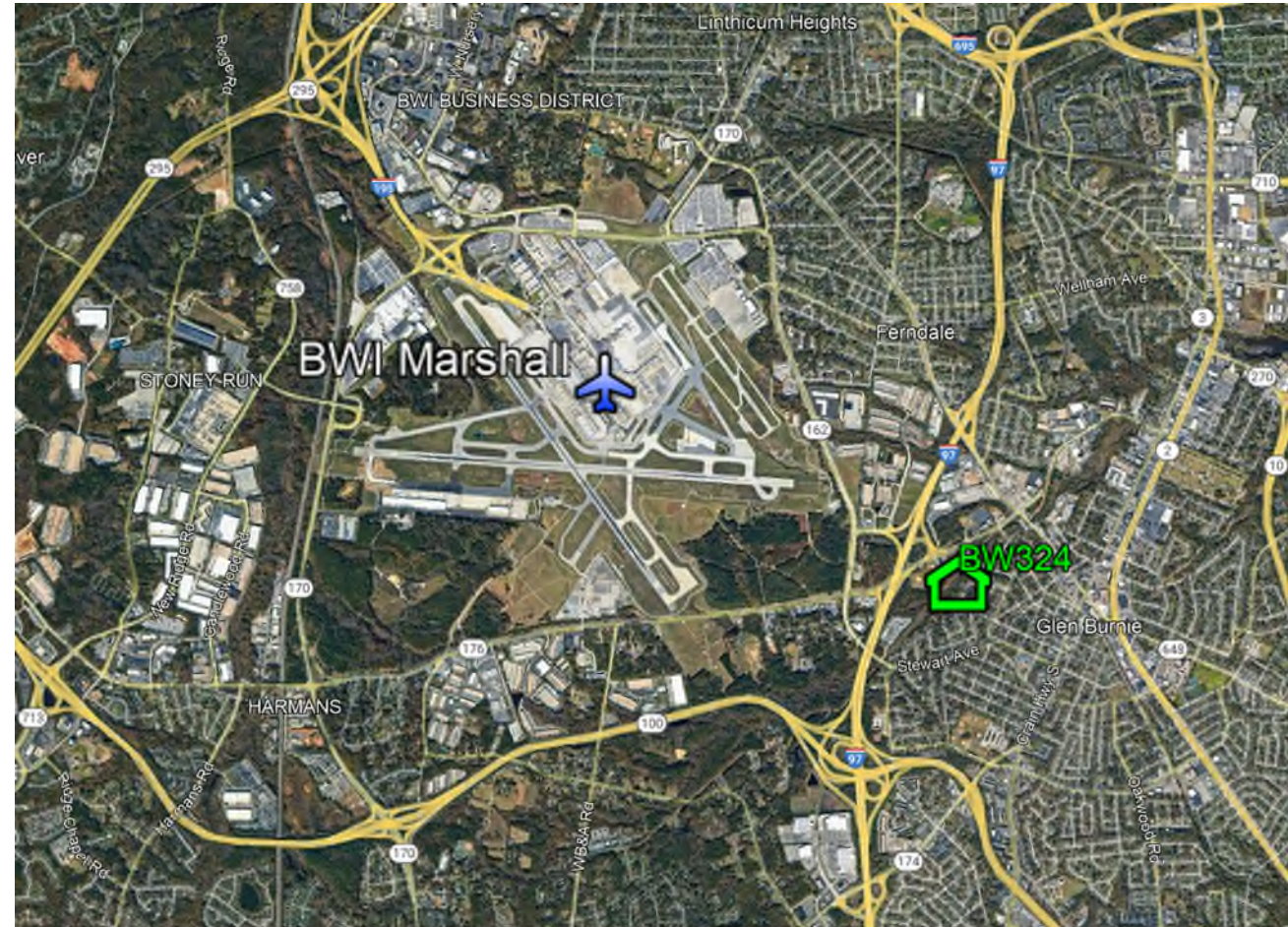


Figure 1. Noise Monitoring Location in Relation to BWI Marshall

# Aircraft Operations

Operations at BWI Marshall fluctuate on a daily basis. During the measurement period, there were 9,866 flights in and out of BWI Marshall (4,919 arrivals, 4,947 departures), in addition to overflights to other airports. The number of flights per day ranged from 570 to 692. Flights in the vicinity of this site are primarily departures from BWI Marshall Runway 15R and 15L.

BWI Marshall has three runways, designated as Runway 10/28, Runway 15R/33L, and Runway 15L/33R. Runway 10/28 is 10,502 feet in length, while Runway 15R/33L is 9,500 feet in length. Runway 15L/33R is 5,000 feet in length and is only used by certain aircraft. The figures to the right present runway use during the measurement period. As aircraft cannot arrive and depart from the same runway, BWI Marshall generally operates in two configurations – west flow (primarily departures from Runway 28 and arrivals to Runway 33L) and east flow (primarily departures from Runway 15R and arrivals to Runway 10). On an annual basis, west flow is used approximately 70% of the time while east flow is used approximately 30% of the time. During west flow, aircraft operations primarily consist of departures from BWI Marshall Runways 28 and arrivals to Runway 33R. During east flow, aircraft operations primarily consist of departures from BWI Marshall Runway 15R and arrivals to Runway 10. Arrivals to BWI Marshall were generally 400 to 600 feet above ground level at their point of closest approach to the measurement site. Departures from BWI Marshall were generally 1,300 to 1,800 feet above ground level at their point of closest approach to the measurement site.

The figures to the right display runway use for west and east flow during the measurement period. Differences in percentages are due to rounding. Operational levels throughout the country and at BWI Marshall specifically remain lower than in the recent past due to the COVID-19 pandemic.

West Flow Runway Use was 65% during the measurement period (Historical Annual Average of 70%)

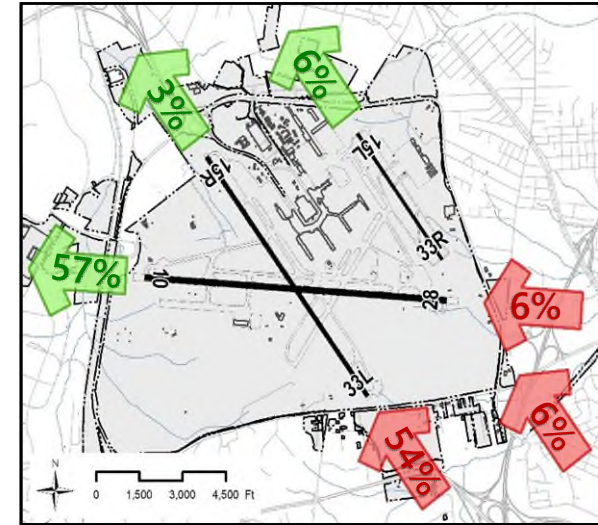


Figure 2. West Flow Runway Use During Measurement Period

East Flow Runway Use was 35% during the measurement period (Historical Annual Average of 30%)

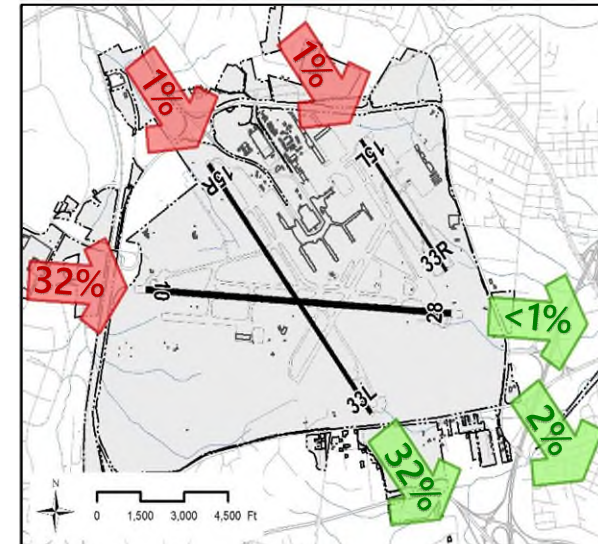


Figure 3. East Flow Runway Use During Measurement Period

# Methodology & Location

Aircraft noise levels were measured from April 27, 2023, through May 11, 2023, at 3rd Ave. SW, Glen Burnie, MD 21061. The noise monitor is a Type I sound level meter and was regularly calibrated. Additionally, the system was checked every two to four days during the measurements to ensure proper operation. The meter ran continuously during all days of testing. During setup, a baseline threshold was established for the noise monitor. Once the sound level exceeded the baseline threshold for five seconds, a noise event was recorded. The sound level meter recorded the following information about each noise event: date, time, duration and noise levels. The noise monitor was placed in the backyard of the residence. Notable noise sources at this site included aircraft overflights to and from BWI Marshall as well as overflights to and from other airports, and other typical suburban sounds such as local and landscaping equipment and local vehicle traffic.

Once the temporary noise monitoring period was complete, the noise event data was collected from MAA 's Noise and Operating Monitoring System (NOMS) to analyze the times of noise events at the site to its database of aircraft radar flight paths. The NOMS conservatively attributes any noise event to an aircraft if the aircraft is within 8,000 feet of the measurement site at an altitude no greater than 10,000 ft. Noise events which occurred while aircraft were passing within the vicinity were associated with an actual aircraft flight and therefore assigned as aircraft noise events. Noise events that did not correlate with an aircraft overflight were assigned as community noise events. Using this methodology, some noise events that are correlated with aircraft overflights may include other community noise, which may or may not exceed the noise level from the aircraft overflight. Figure 4 on the next page displays all arrivals and departures to and from BWI Marshall during the measurement period. Figure 5 displays all arrivals and departures to and from BWI Marshall that were correlated with aircraft noise events.

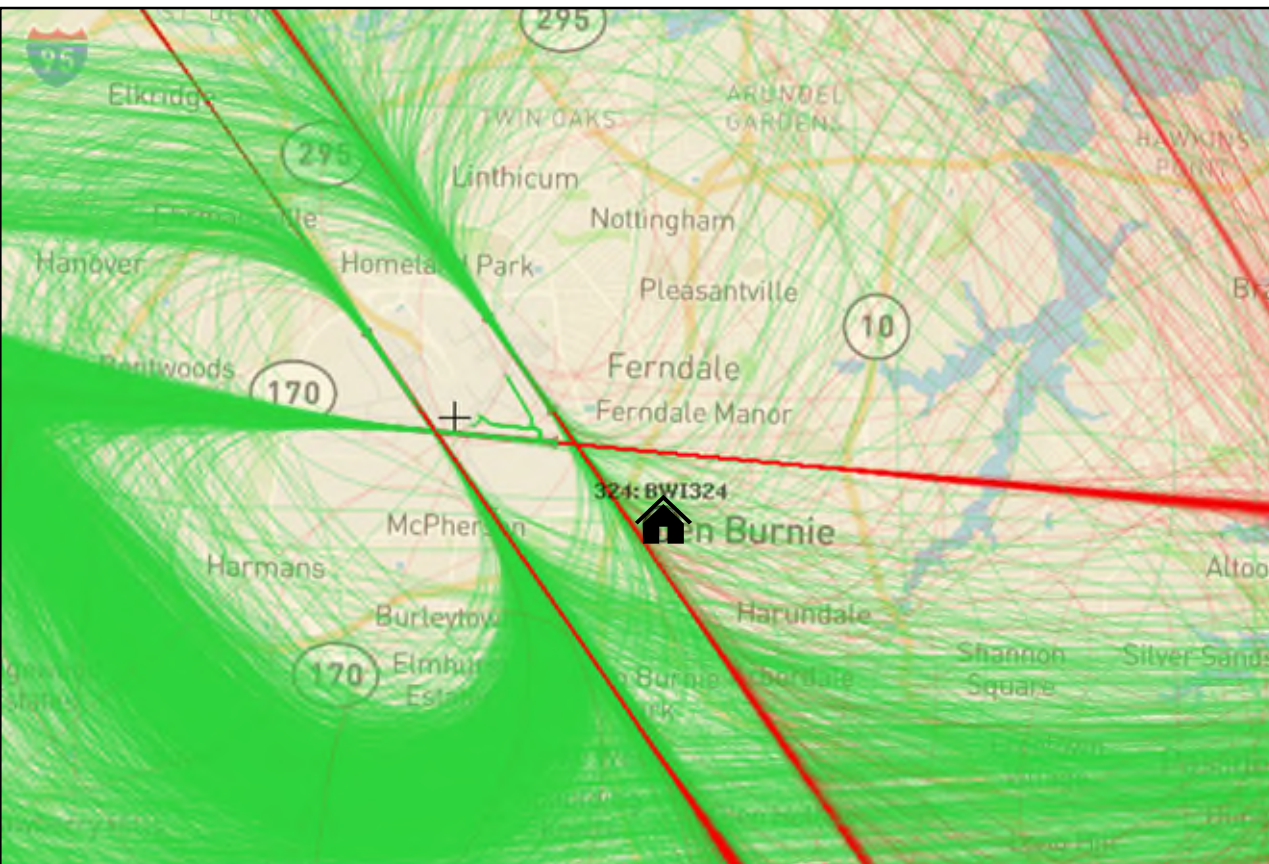


Figure 4. All BWI Marshall Arrivals and Departures During the Measurement Period  
(Green = Departures, Red = Arrivals)

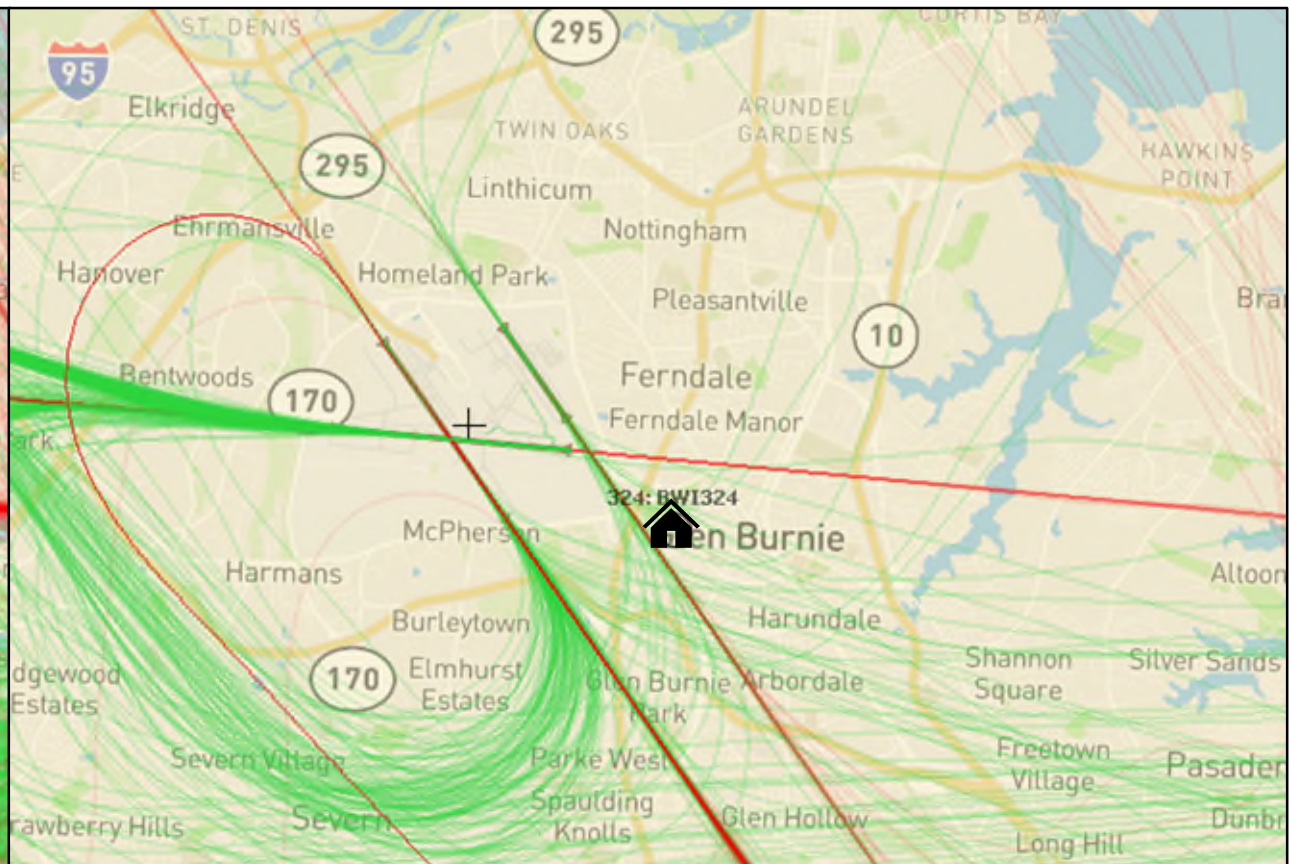


Figure 5. All BWI Marshall Arrivals and Departures Correlated to Aircraft Noise Events During the Measurement Period  
(Green = Departures, Red = Arrivals)

# Measured Noise Levels

There are several key metrics which are used to describe aircraft and community noise on a single-event and cumulative basis. The appendix titled “How Do We Describe Aircraft Noise” provides a more detailed overview of the metrics which are discussed in this section. Single event metrics such as Maximum A-Weighted Sound Level (Lmax) are indicators of the intrusiveness, loudness, or noisiness of individual noise events while cumulative metrics like Day-Night Average Sound Level (DNL) are generally used to measure long term noise and are indicators of community annoyance and land use compatibility.

Figure 6 presents the range of maximum single event sound levels for 660 aircraft overflights at the measurement site for the complete measurement period. For a particular noise event, such as an aircraft overflight, the loudest level at any instant during the event is the Lmax. For typical conversational speech at a distance of approximately three feet, speech is interrupted by noise levels at or above 65 dB. Any noise events shown in this figure with a maximum level at or above 65 dB would, briefly for quieter events and longer for louder events, interrupt typical conversations outdoors. Figure 7 shows common environmental A-weighted noise levels for typical outdoor sounds.

Figure 8 on the following page shows the top 15 loudest aircraft events that occurred during the measurement period including details about the date and time the event occurred, airline, aircraft type, operation type, runway, and slant range (the line-of-sight distance between the receptor and the aircraft ). Note that these events only represent the noisiest aircraft events at the measurement site and that the majority of aircraft overflights at the measurement site were less noisy than those shown in Figure 8. In some cases, community events may occur simultaneously with aircraft overflights, causing aircraft overflights to have higher recorded sound levels than were actually present.

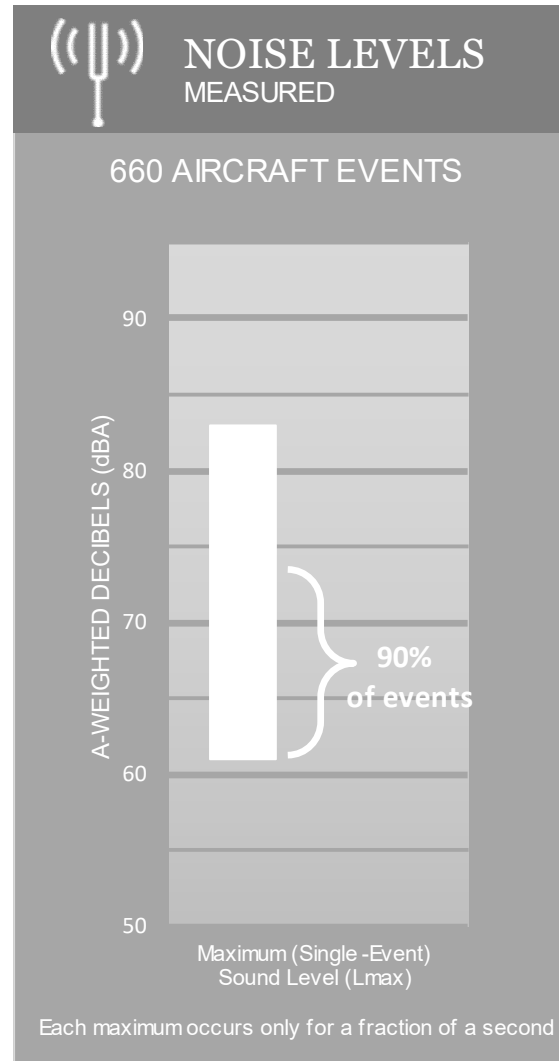


Figure 6. Maximum Single Event Aircraft Noise Levels

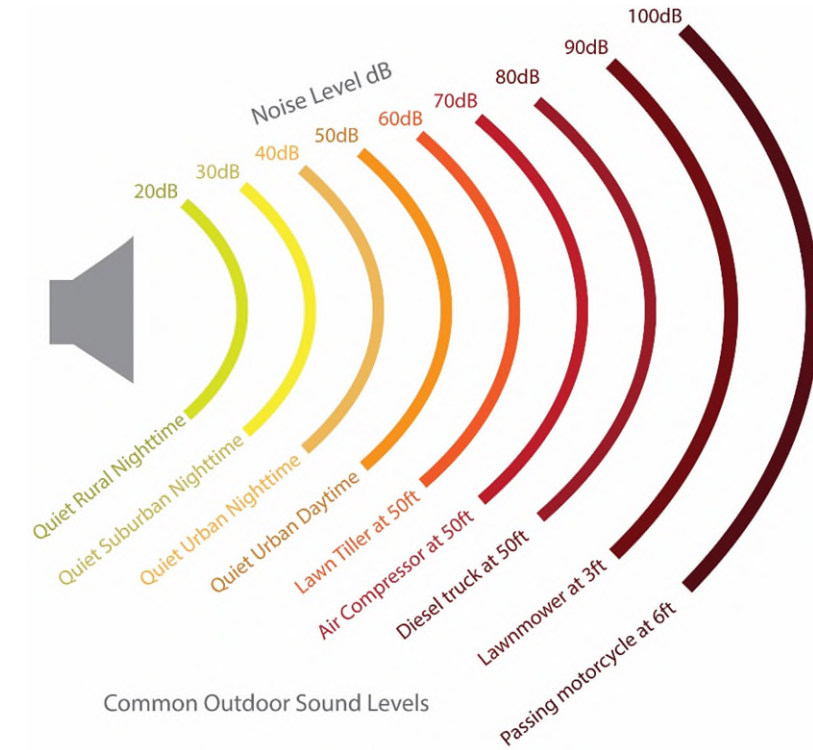


Figure 7. Common Environmental Noise Levels

# Loudest Aircraft Events













Rank	Flight Time	Airline	Aircraft Type	Operation Type	Runway	Altitude (ft. AGL)	Slant Range (ft.)	Maximum Sound Level (dBA)
1	4/29/2023 8:56	N/A	Dassault Falcon 50	Departure	15L	1,294	2,008	83
2	5/5/2023 8:52		Boeing 737-800	Arrival	33L	210	7,008	82
3	5/7/2023 16:05		Hawker 400	Departure	15L	1,199	2,201	82
4	4/29/2023 19:25		Boeing 767-300	Departure	10	2,061	2,402	81
5	5/5/2023 8:47		Learjet 45	Arrival	33R	327	3,146	80
6	4/27/2023 12:17	N/A	Cirrus SR22	Departure	15L	982	1,132	80
7	5/7/2023 18:10		Cessna Citation 560X Excel	Departure	15L	1,222	1,257	79
8	5/5/2023 4:16		Cessna Grand Caravan	Arrival	33R	551	676	79
9	4/28/2023 15:47		Boeing 737-800	Departure	10	1,614	2,746	78
10	5/11/2023 18:04		Boeing 737-800	Arrival	33L	489	6,043	78
11	5/5/2023 5:10		Cessna Grand Caravan	Arrival	33R	656	1,145	77
12	5/7/2023 12:26		Raytheon Hawker 800	Departure	15L	1,381	1,883	77
13	4/29/2023 3:01		Beechcraft Baron	Departure	15L	1,383	1,414	77
14	5/7/2023 15:54		Cessna 680 Sovereign	Departure	15L	1,363	1,388	77
15	5/9/2023 13:17	N/A	Cessna Citation CJ3	Departure	15L	1,035	2,027	77

Figure 8. Top Fifteen Loudest Aircraft Events During the Measurement Period

*Note: In some cases, community events may occur simultaneously with aircraft overflights, causing aircraft overflights to have higher recorded sound levels*



# Conclusion

Figure 9 presents the cumulative DNL at the measurement site for the fifteen complete days of the measurement period for community, aircraft and total noise exposure. Figure 10 presents the daily DNL at the site. DNL sums the noise from every noise event over the day. The formula for DNL gives an extra ten decibel weighting to nighttime noise events to account for the intrusive nature of these events. The aircraft DNL ranged from 45 to 54 dB during the measurement period. The total aircraft DNL for the measurement period was 50 dB. The DNL for all recorded community noise events (wildlife, landscaping, weather, etc.) during the measurement period was 58 dB. The total DNL at the measurement site, which includes both aircraft and community noise events, was 59 dB.

Aircraft noise levels at this site are higher when BWI Marshall operates in west flow. During the measurement period, BWI Marshall operated in east flow 35% of the time and in west flow 65% of the time, which is a lower usage of west flow than the annual average of 70% west flow operations and 30% east flow operations. The site also experiences noise events from the start of take off roll for aircraft departing from Runway 28 during west flow operations.

The results of the portable noise monitoring are for informational purposes only and capture the aircraft noise environment for a snapshot in time. The conditions during a monitoring period can vary greatly due to wind and weather (atmospheric conditions), the runway(s) in use at the time for arrivals and departures, and the number and type of operations occurring during the monitoring period. From the data collected, aircraft noise levels in terms of the Day-Night Average Sound Level (DNL) were calculated and resulted in a 15-day average of 50 decibels (dB).

In Appendix A of 14 CFR Part 150, the Federal Aviation Administration provides guidelines for the compatibility of land uses with various annual DNL values. See also COMAR 11.03.03.03 which establishes limits for cumulative noise exposure for certain land uses around BWI Marshall. These guidelines consider residential land use to be noncompatible when the DNL is 75 dB or greater. For noise levels between 65 dB and 75 dB DNL, residential land use is considered noncompatible, but where the community determines that this land use must be allowed, measures to achieve greater than typical outdoor to indoor noise level reduction should be incorporated into building codes. The guidelines designate all land uses, including residential, as compatible for DNL values below 65 dB.

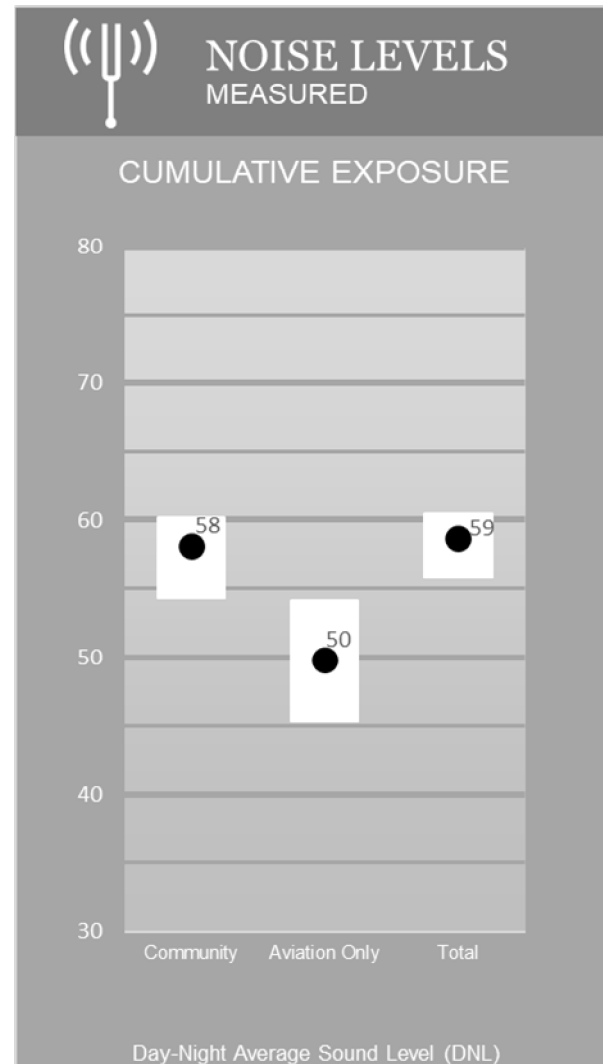


Figure 9. Cumulative Noise Exposure from Aircraft and Community Sources

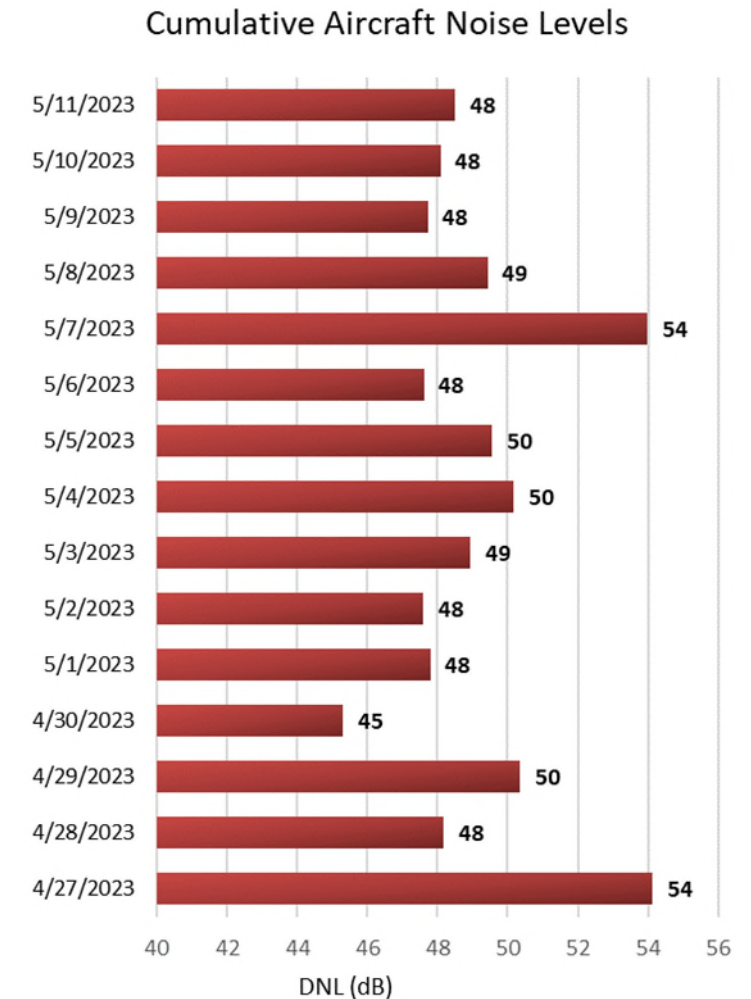


Figure 10. Measured Daily Aircraft Noise Levels

# For More Information

Information about Maryland Department of Transportation Maryland Aviation Administration's (MAA) Noise Program activities can be found at <https://marylandaviation.com/>. Frequent topics of interest include:

**Noise Complaints:** MAA provides multiple methods to submit aircraft noise complaints, including an on-line form (<https://marylandaviation.com/environmental/environmental-compliance-sustainability/noise-complaints/>) or 24-hour noise complaint and information hotline at 410-859-7021. MAA reviews noise complaints daily, and logs, reviews, and analyzes all noise complaints on a regular basis.

**Quarterly Noise Reports:** Each quarter, MAA prepares and publishes a quarterly noise report. The report provides information on operational trends (including the number of jet and cargo operations, and the number of nighttime operations), runway use, flight corridors/flight density maps, noise complaints received, outreach efforts, permanent noise monitoring data and MAA's noise assistance programs.

**eNews Express:** Stay up-to-date on planned runway closures, as well as other important aviation topics, by subscribing to the BWI Marshall eNews Express, by sending an email to <https://marylandaviation.com/environmental/environmental-compliance-sustainability/enews-express-signup/>.

**Airport Noise Zone:** The BWI Noise Abatement Plan and Airport Noise Zone, first established in 1976, includes a wide variety of strategies that are intended to reduce noise impacts for communities around the Airport while maintaining efficient airport operations. Noise abatement at BWI includes operational procedures such as aircraft arrival and departure procedures and a preferential runway use system intended to direct aircraft operations over less populated areas, where and when possible. Other elements of the Noise Abatement Plan include land use restrictions and programs such as land acquisition and soundproofing.

## Additional Resources:

Website - [www.bwiairport.com](http://www.bwiairport.com)

Facebook - [www.facebook.com/BWIairport/](https://www.facebook.com/BWIairport/)

Twitter - @BWI\_Airport

Instagram - @bwi\_airport



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