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**Follow-Up Information Regarding 18 May 2022  
Planning Commission Hearing on PA 2020-CW-3CP, Airport Noise Policy**

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**1. Introduction**

The following is an effort to clarify testimony provided in the 18 May Planning Commission hearing on PA 2020-CW-3CP. Section 2 emphasizes the need for an effective standard for noise mitigation in living areas of homes located between 60 and 65 DNL contours. It provides an example of just how noisy 45 DNL aircraft noise is, and it mentions staff comments in the hearing regarding their analysis of noise-mitigation proffers in the four recent Land Unit J applications. The conclusion is that the county should consult airports that have successfully accommodated residential uses between 60 and 65 DNL to craft effective regulations for Dulles.

In the hearing, I pointing out the fact that aircraft noise peaks greatly exceed their DNL values. Section 3 provides examples from Dulles showing that the exceedance there today is on the order of 25 to 30 dBA. Finally Section 4 provides an example of how noise from simultaneous sources adds up, a question that was raised in the hearing.

Hopefully, this information will aid commissioners in their deliberations.

**2. Effective Standard for Noise Mitigation Is Required**

The plan amendment proposes two pertinent standards for interior noise level mitigation:

- All new residential developments should mitigate interior noise to 45 DNL or less, and
- For residential development between the 60 and 65 DNL contours, commitments should be made to limiting interior noise to 45 dBA or less.

The 45 DNL standard has been in the Comp Plan for a number of years. The 45 dBA guidance was introduced by the May 2019 Westfields amendment, which recommended residential uses between the contours in Land Unit J. Neither standard is limited to aircraft noise. Both include road noise as well.

Aircraft noise levels at Dulles can exceed 85 dBA. Meeting the 45 dBA guidance would require building shell attenuations exceeding 40 dBA, construction that would be more expensive than one would expect to find between the contours at Dulles. The opinion that meeting the 45 dBA standard at Dulles is impractical economically is reinforced by the fact that none of the four Land Unit J developments reviewed by the Planning Commission since May 2019 proffered to meet the 45 dBA guidance. Three applicants proffered to meet the 45 DNL guidance. The fourth (Stonebrook) offered to provide 25 dBA building shell attenuation, which should be adequate to meet the 45 DNL standard (but not the 45 dBA standard).

Putting the 45 dBA guidance aside as infeasible leaves only the 45 DNL standard. As illustrated in the table on the last page, many people would find 45 DNL aircraft noise in living areas highly annoying. The data in the table was derived from 6287 aircraft noise events (flybys) recorded at NMT #25 at Dulles over the month of May 2019. This data averaged 58 DNL. Recorded noise

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measurements were reduced by 13 dBA to produce a record of the interior noise that would be expected inside a dwelling meeting the 45 DNL standard and located in the vicinity of NMT#25. From the table:

- 85% of the flybys (5355 events or 173 per day) would produce noise exceeding 45 dBA
- 20% (1235 events or 40 per day) would exceed 60 dBA
- 3% (161 events or 5 per day) would exceed 65 dBA

As traffic grows at Dulles over decades to come, the noise per flyby is unlikely to increase, but the number of flybys in a 24-hr period is expected to increase by a factor between two and three. The 45 DNL noise mitigation standard seems inadequate for effectively protecting residents in homes located between the contours at Dulles, at least in the vicinity of NMT #25.

At 3:16:40 on the video record of the 18 May hearing, Kelly Atkinson described staff's review of the four Land Unit J applications. She stated that the environmental element of the Policy Plan measures transportation noise in terms of DNL levels, consistent with HUD and FAA, and that's what staff used (presumably, the 45 DNL guidance) to analyze the applications. She mentioned that there had been "negotiations" with applicants but did not mention discussions regarding the 45 dBA standard.

The county should develop effective standards for interior noise mitigation that adequately would protect the health and wellbeing of residents. The standards should be based on documented experience and best practices at major hub airports that have successfully accommodated residential development between 60 and 65 DNL contours. Regardless of whether the standards are prescriptive or performance-based, they should be added to Sect 3103.2 of the Zoning Ordinance. Discretionary standards can be waived by applicants and staff. They are not sufficient for protecting the welfare of residents in the Dulles noise environment.

### **3. Maximum Flyover Noise Levels at Dulles Exceed DNL Levels By 25 to 30 DBA**

Aircraft noise surveys frequently publish their results in terms of DNL values, day-night averages, and FAA and others provide guidance regarding residential uses in these terms. However, the noise levels most likely to annoy residents are the peak values that occur when aircraft pass overhead. As the following illustrates, these peak noise values at Dulles exceed the DNL averages by 25-30 dBA.

MWAA summarizes aircraft noise data collected by its Noise Monitor Terminals monthly. Data includes the average aircraft noise for the month (the DNL level) as well as the maximum noise level (Max) recorded during the month. The table below compares Max and DNL levels for the 31-day periods shown. Referring to the table:

- NMT #25 is close to the final approach course to Runway 1R a half-mile closer to the airport than Stonebrook. NMT #21 is close to the final approach course to Runway 1C a half-mile farther from the airport than The Retreat.
- May 2019 is pre-pandemic data, May 2021 is mid-pandemic. DNL values are average noise levels for the month, Max is the maximum noise recorded over all of the flyby events during the month, Delta is the subtraction (Max – DNL), and Events are the number of flybys recorded during the month.

**DNL and Max Noise Levels at Dulles and the Difference (Delta = Max – DNL)  
(All Noise Levels in dBA)**

<b>MWAA Terminal</b>	<b>DNL</b>	<b>Max</b>	<b>Delta (Max – DNL)</b>	<b>Events</b>
NMT #25 May 2019	58	87	29	6287
NMT #21 May 2019	55	85	30	5918
NMT#25 May 2021	56	84	28	4679
NMT #21 May 2021	43	78	35	3561

For the four Dulles samples tabulated above, the Max noise levels exceed the DNL averages by 28-35 dBA.

**4. Noise Sources Are Additive**

The question of addition of noise sources was discussed during the 18 May hearing. The sound pressure resulting from a number of simultaneous noise sources is the sum of the sound pressure from each of the individual sources, but the sum is not the sum of their dBA levels.

- dBA values are logarithms of sound pressures. To calculate the total noise level from several sources given the dBA level of each source, one must convert each dBA level back to a sound pressure level, then add up the sound pressures, and finally convert the total back to dBA. The table shows the results of adding noise from Source A to noise from Source B. Source B has a fixed level of 30 dBA. If Source A is 22 dBA, the sum of the two produces a noise level of 30.6 dBA. When A and B are equal at 30 dBA, the sum is noise at 33 dBA.
- If the less loud source is more than 6 dBA below the louder source, it makes less than 1 dBA contribution to the sum. For example, when Source A is louder than 36 dBA, the weaker Source B at 30 dBA makes less than a 1 dBA contribution to the total. For practical purposes, a 40 dBA noise plus a 30 dBA noise produces 40 dBA noise.

**Addition of Sound (Noise) Pressure Levels**

<b>A (dBA)</b>	<b>B (dBA)</b>	<b>A+B (dBA)</b>	<b>Weaker Sources's Contribution to Sum (dBA)</b>
22	30	30.6	0.6
24	30	31.0	1.0
26	30	31.5	1.5
28	30	32.1	2.1
30	30	33.0	3.0
32	30	34.1	2.1
34	30	35.5	1.5
36	30	37.0	1.0
38	30	38.6	0.6

**Sample of 45 DNL Aircraft Noise  
(6287 Events Derived from Dulles NMT #25 Data Recorded in May 2019)**

<b>Noise Level (dBA)</b>	<b>Number of Events Exceeding Noise Level</b>	<b>Percent Exceeding Noise Level</b>
38	6283	99.9%
39	6258	99.5%
40	6200	98.6%
41	6107	97.1%
42	5961	94.8%
43	5787	92.0%
44	5579	88.7%
45	5355	85.2%
46	5183	82.4%
47	5024	79.9%
48	4881	77.6%
49	4758	75.7%
50	4647	73.9%
51	4493	71.5%
52	4309	68.5%
53	4073	64.8%
54	3787	60.2%
55	3408	54.2%
56	2831	45.0%
57	2189	34.8%
58	1746	27.8%
59	1450	23.1%
60	1235	19.6%
61	941	15.0%
62	665	10.6%
63	416	6.6%
64	265	4.2%
65	161	2.6%
66	87	1.4%
67	44	0.7%
68	20	0.3%
69	11	0.2%
70	7	0.1%
71	4	0.1%
72	2	0.0%
73	1	0.0%