

2025 May 29

# Bonneville Ln Sound Monitoring comparison with Great Oaks monitoring

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# Summary of new data

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- 4682 Bonneville Ln is located away from Data Centers, near regional roads, and about 2.6 miles from I-95.
  - No industrial sources or Data Centers reported nearby
- The data highlights characteristics of traffic noise similar to earlier Great Oaks noise monitoring
- Specifically:
  - Daily “V-shaped” cycle of changing sound levels driven by traffic flow
    - Begins ramping up steadily around 3 AM independent of temperature
  - “Double Hump” traffic sound spectrum
    - Engines at 63 Hz, tires at 1000 Hz

# Ramifications of Comparison with Great Oaks

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- Great Oaks monitoring data
  - Represent a period when Tanner Way was believed to be operating throughout and complaints were registered
  - Varies like traffic noise (level vs. time profile)
  - Looks like traffic noise (spectral shape)
  - Sounds like traffic noise (audio)
- Data Center noise at Great Oaks is embedded within the total sound dominated by traffic noise

# Ramifications for Enforcement

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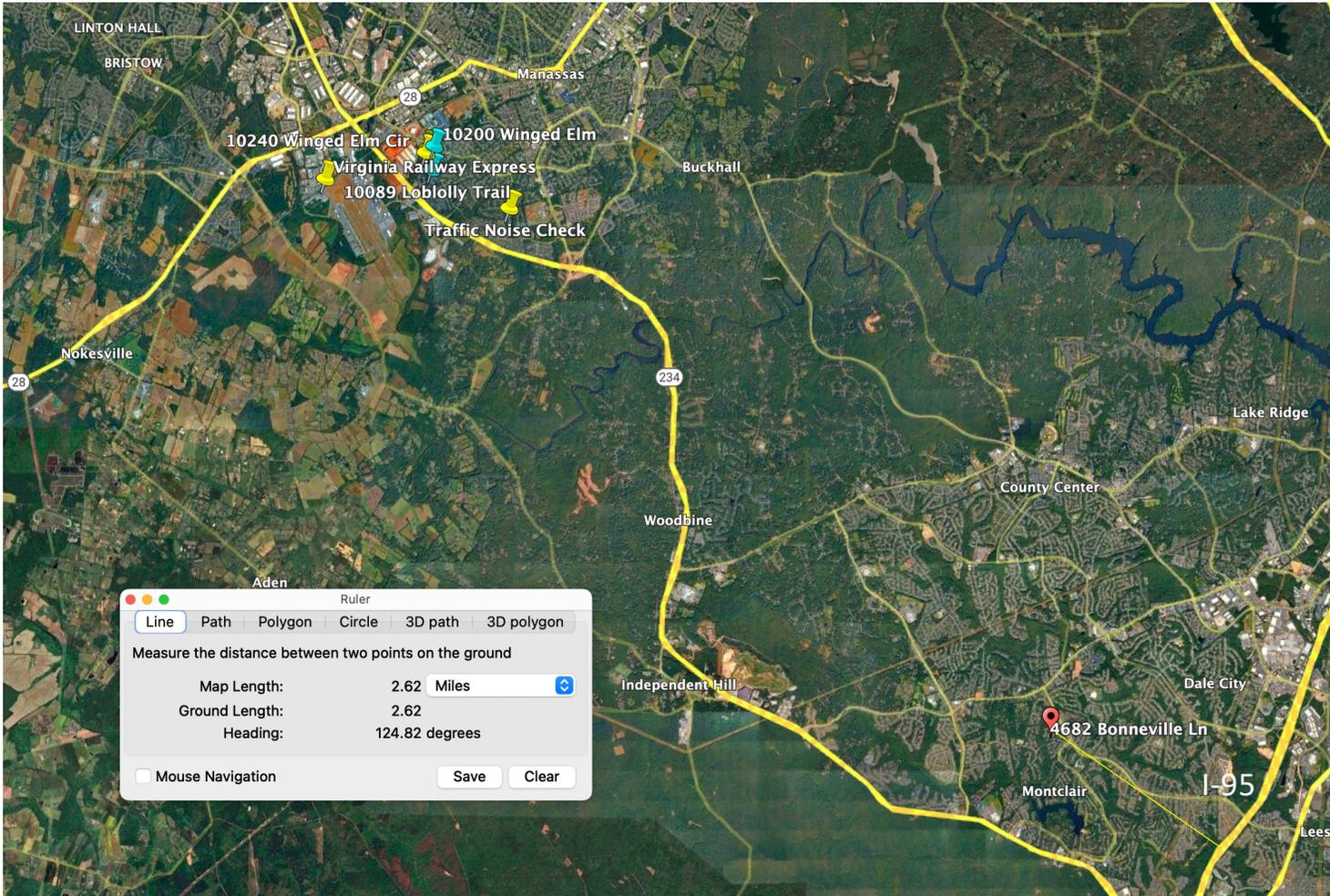
- Current criteria and enforcement recommendations were based on very different expectations:
  - Continuous, unchanging 24/7 sound that “never stops”
  - Perceptually distinct from background (“alien spaceship”, “unlike anything you’ve experienced before”)
  - Measurably distinct from background (> neighborhood residual)
  - Tones (possibly time-varying) as typical from industrial equipment
  - No interference from intermittent strong secondary sources that create “false positives” (e.g., early morning VRE locomotive warmup)

# Ramifications for Next Steps

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- Additional effort to attempt to isolate the DC contribution
  - Frontyard – backyard measurements – use houses to shield the DC
  - Indoor – outdoor measurements to assess the sound isolation of homes in case an anomalous condition exists
  - "Similar neighborhood" measurements to estimate the pre-existing background
- Will require a close-in measurement method if individual embedded sources are to be evaluated
  - Method for extrapolating far- from close-in levels will be complex and will likely be scrutinized.

# Map

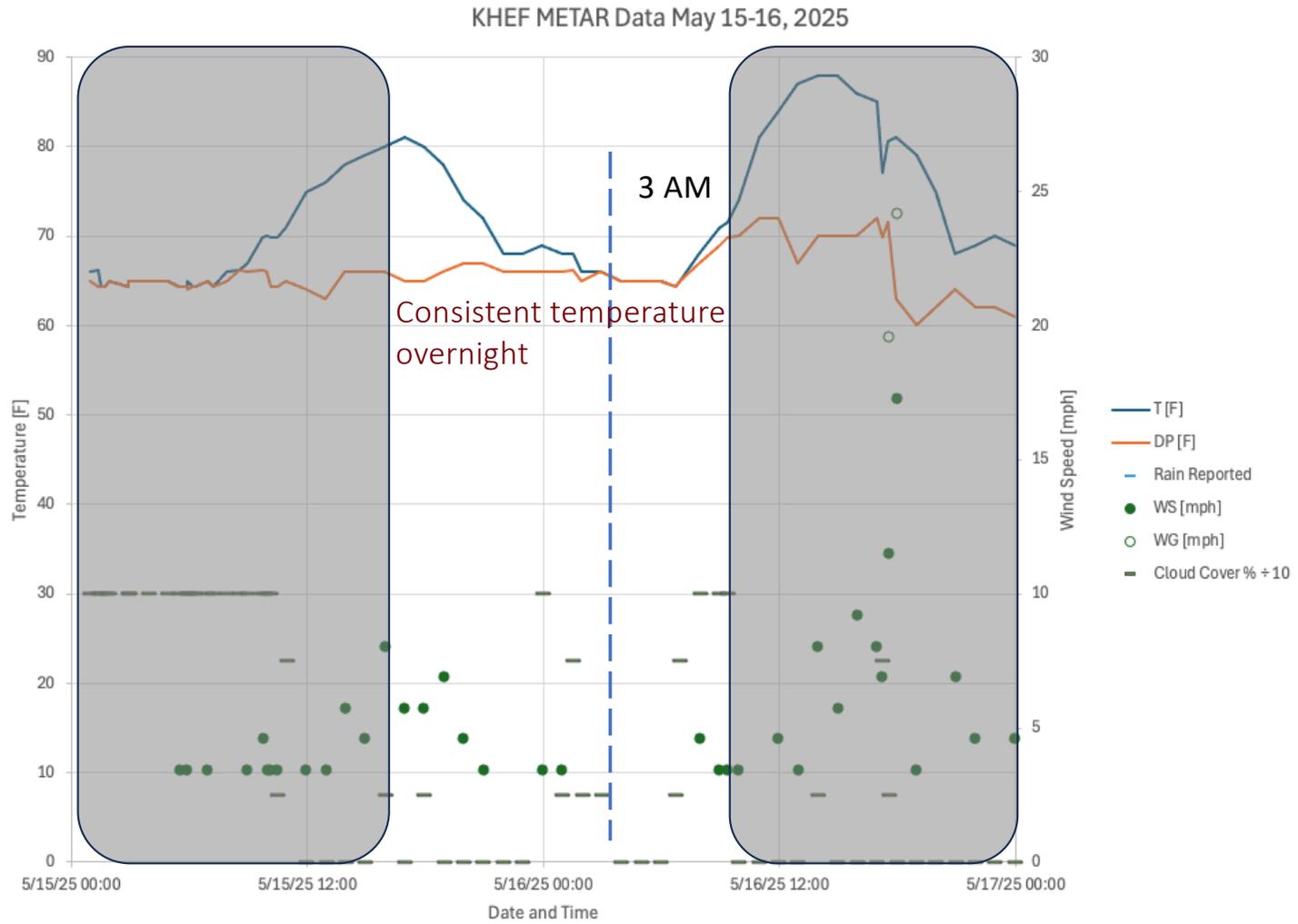


# Dates and Locations

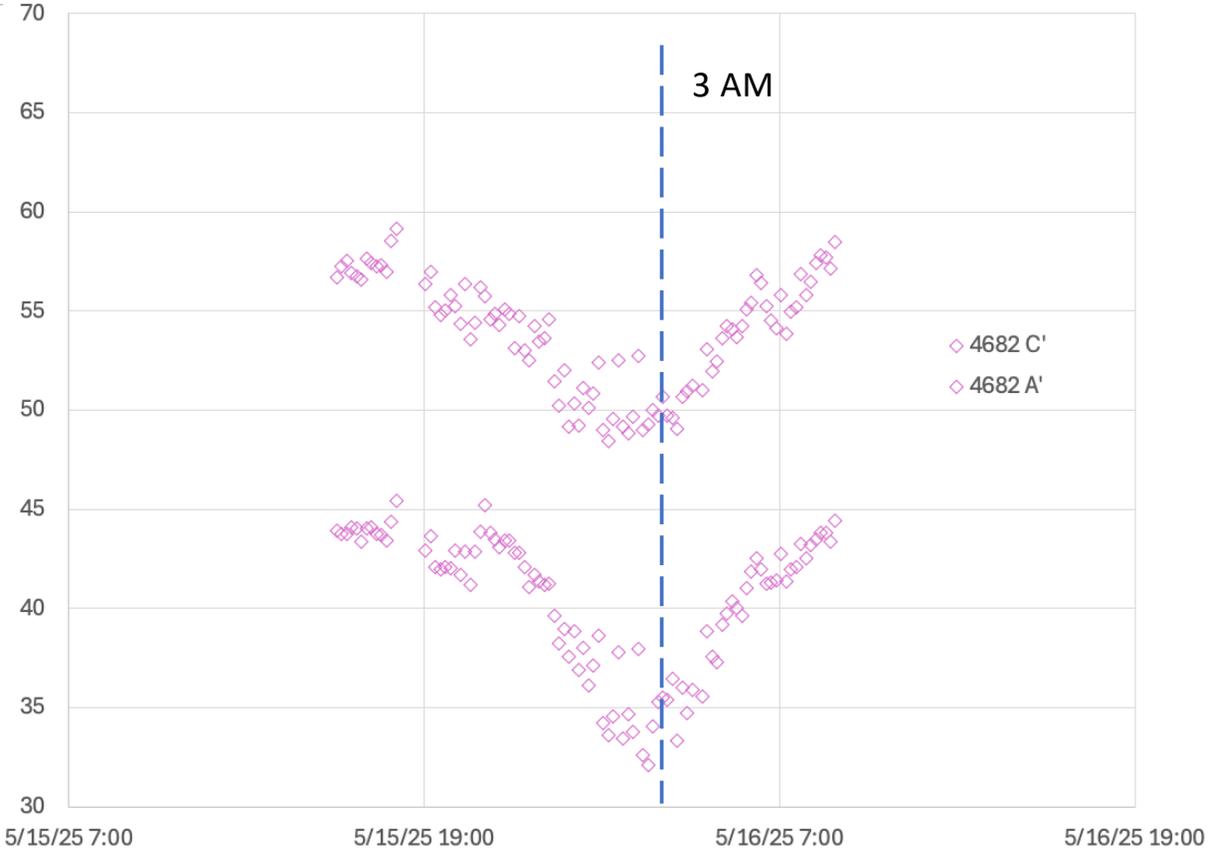
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- Thursday afternoon May 15, 2025 to Friday morning May 16, 2025
- 10-minute  $L_{eq}$ ,  $L_{10}$ ,  $L_{50}$ ,  $L_{90}$
- 30-seconds of audio reviewed for each 10-minute segment
- Remove from analysis
  - Direct interference (e.g., operator setting up gear)
  - Weather (e.g., wind and rain)
  - Yard work (e.g., mowing, leafblowing etc)

# Weather



# Level vs Time Profile – Bonneville Ln



LpC follows traffic flow

LpA follows traffic flow

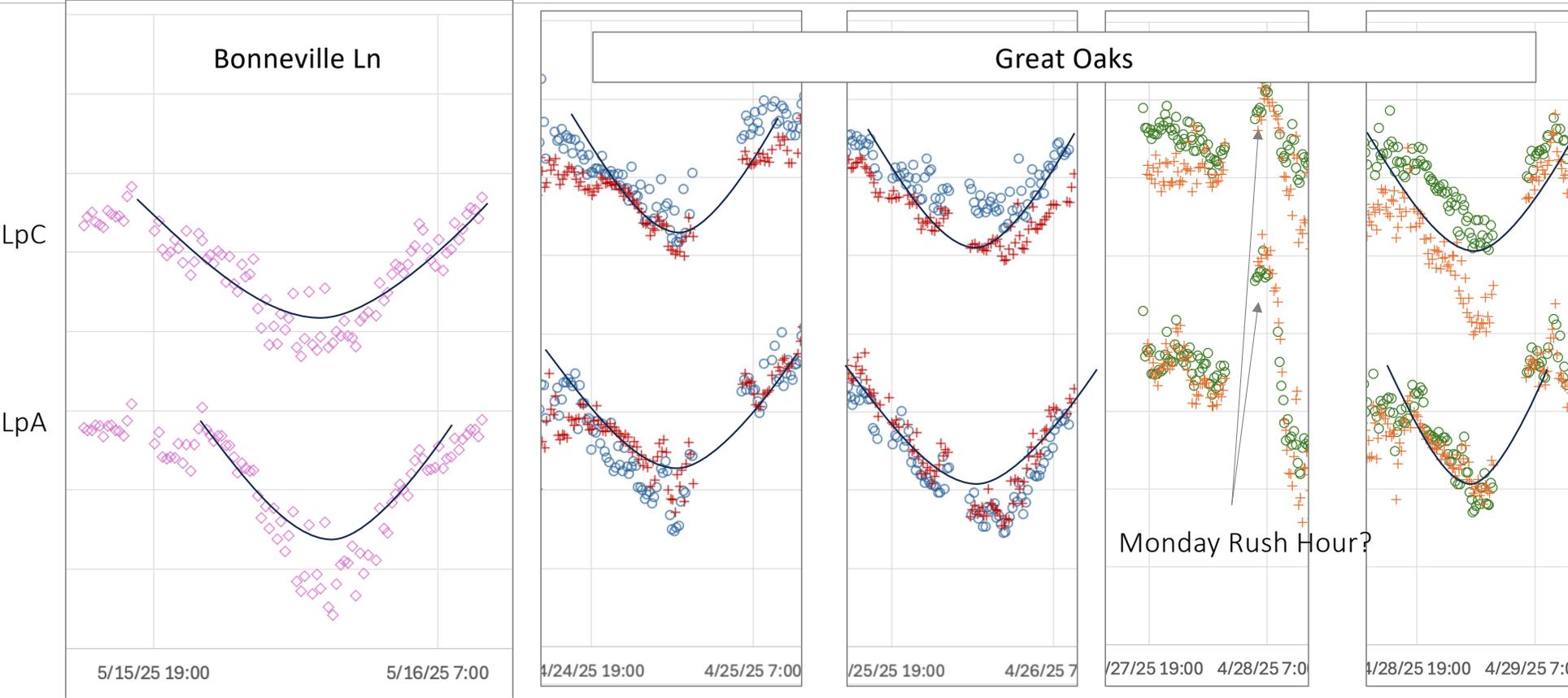


# Compare to Previous, Nighttime

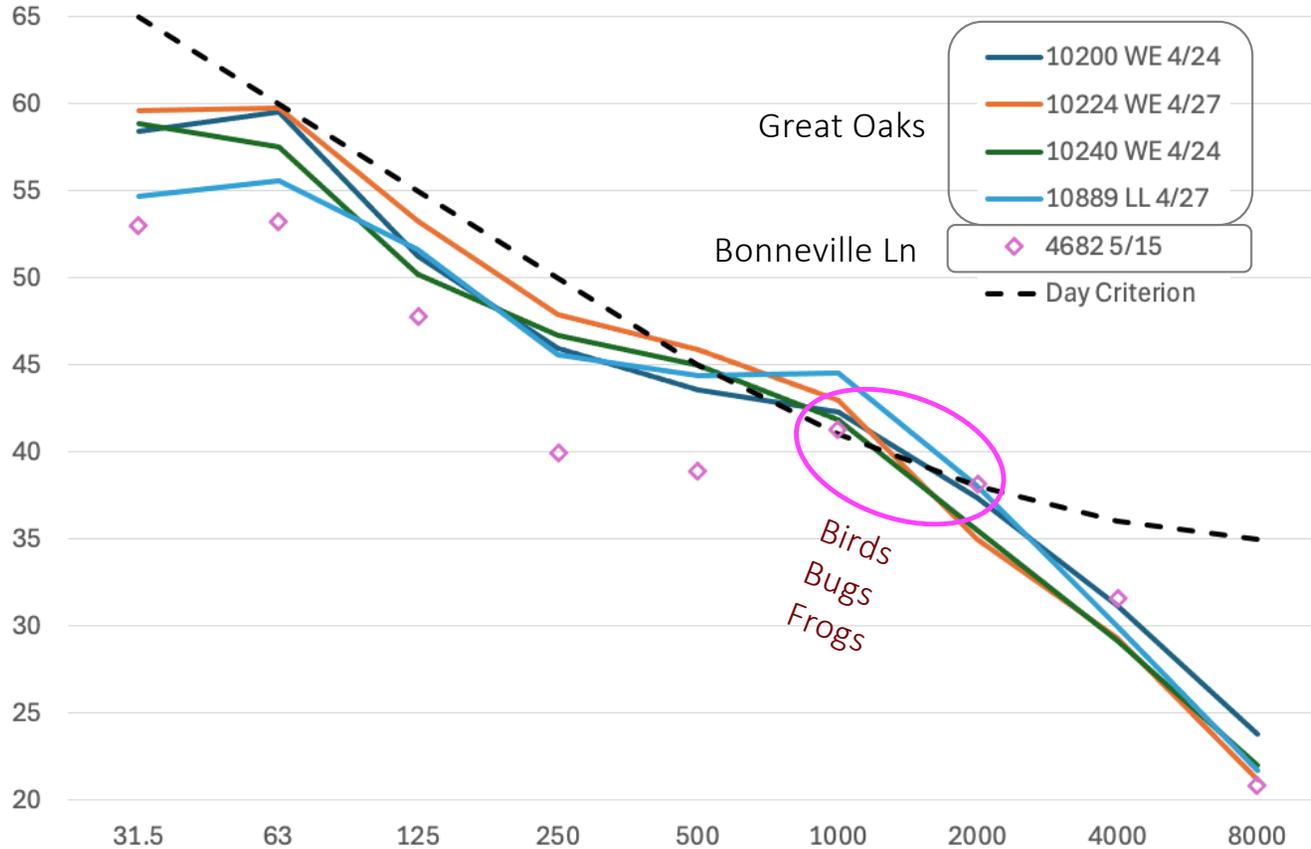
NIGHTTIME			Some Exceedances												
			Lp,50 OBSPL												
			LpAeq	LpC,eq	LpA,50	LpC,50	31.5	63	125	250	500	1000	2000	4000	8000
<b>Multi-day averages</b>															
4/24/25	4/26/25	10200 Winged Elm	51		41	59	55	56	48	43	39	37	30	24	19
4/27/25	4/30/25	10224 Winged Elm	51		46	61	57	59	53	48	45	41	32	26	17
4/24/25	4/26/25	10240 Winged Elm	46		42	57	55	54	47	43	41	38	33	29	19
4/27/25	4/30/25	10889 Loblolly	50		45	59	53	55	52	44	43	42	36	31	17
<b>Spot measurements</b>			<b>47</b>	<b>60</b>	<b>43</b>	<b>60</b>	<b>60</b>	<b>55</b>	<b>50</b>	<b>45</b>	<b>40</b>	<b>36</b>	<b>33</b>	<b>31</b>	<b>30</b>
1/30/25	1/30/25	Tanner Way Easement*	52	65	52	63	61	60	56	50	50	48	37	22	17
1/30/25	1/30/25	10200 Winged Elm*	48	61	47	60	57	58	51	47	45	43	32	23	20
1/30/25	1/30/25	10224 Winged Elm*	52	63	48	62	59	58	56	48	46	44	33	20	17
1/30/25	1/30/25	10087 Post Oak Terrace*	49	60	48	58	54	56	50	46	45	45	35	20	17
10/23/24	10/23/24	Tanner Way Easement	47	61	47	60	58	57	54	49	45	40	37	41	19
* Includes 90 Hz VRE tone							DC Noise?		Traffic Noise						
5/15/25	5/16/25	4682 Bonneville Ln	42		38	51	48	49	43	35	34	35	34	26	15
10/23/24	10/23/24	Kingsbrooke	35	49	36	49	47	46	41	36	34	29	28	25	23
11/12/24	11/12/24	Kingsbrooke	45	58	37	48	45	43	41	39	35	30	25	20	15
11/29/24	11/29/24	Nokesville	32	48	31	47	45	44	40	33	27	26	15	12	12

Bonneville Ln highest dBC level among nighttime samples

# Compare Profiles: V-shape suggests traffic noise



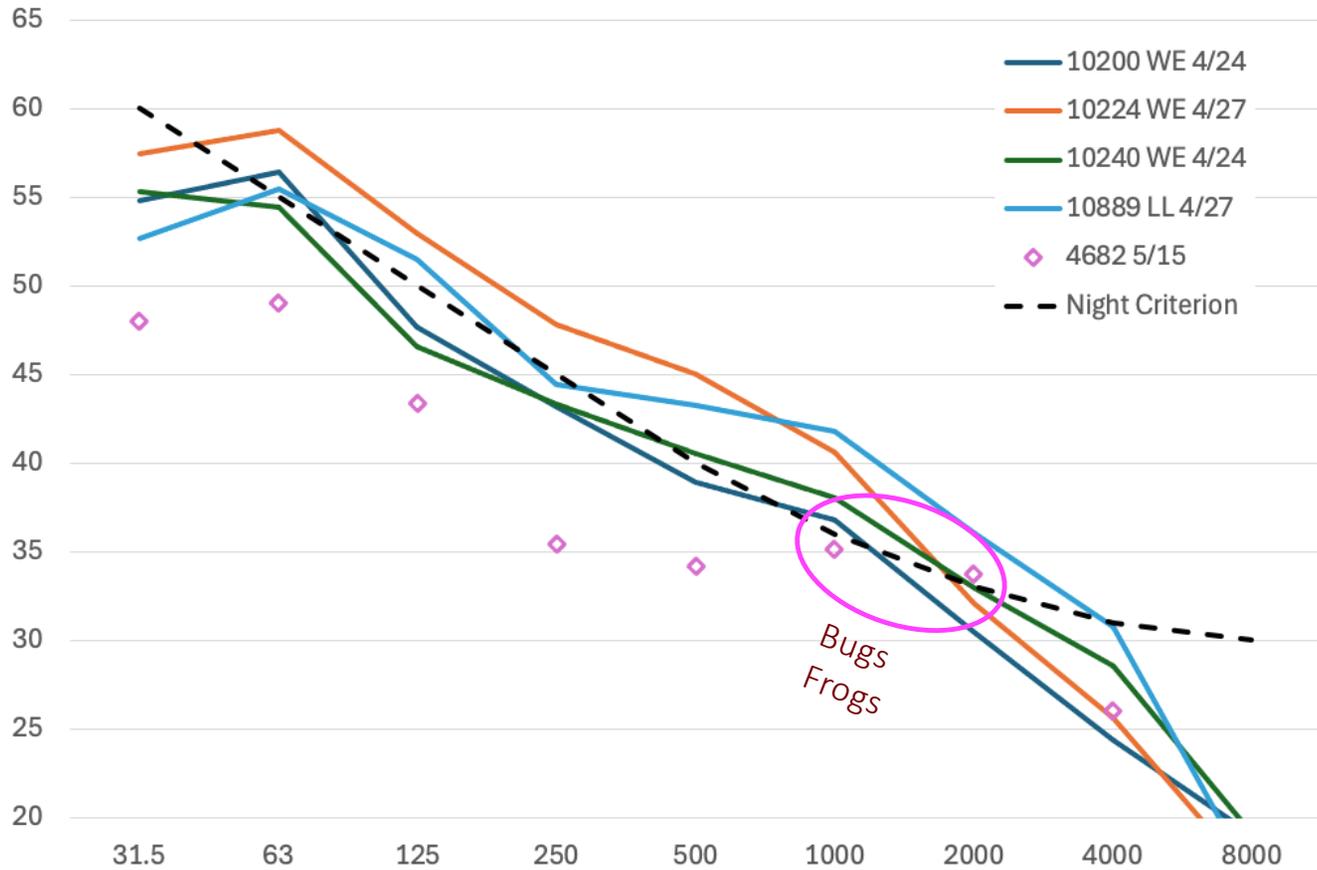
# 70 Double Hump suggests traffic, Daytime



Sound spectra are broadly similar:

- Great Oaks: traffic + DC
- Bonneville Ln: traffic only
  - Lower levels due to greater distance
  - Animal and insect noises in the 1000 and 2000 Hz octave bands

# Double Hump suggests traffic, Nighttime



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# Conclusion

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- Great Oaks monitoring compared to Bonneville Ln
- Bonneville Ln is dominated by traffic noise
- Great Oaks exhibits similar characteristics most of the time
- Therefore, Great Oaks noise was dominated by traffic noise
- Data Center noise is embedded within traffic noise, which has a
  - Characteristic daily cycle
  - Characteristic spectral shape
- DC contribution needs to be determined through additional measurements
- Measurement methods need to be expanded and refined