

Noise at the East Greenwich Waterfront

A report prepared for
Town of East Greenwich

By

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1. Introduction and summary of results

The purpose of this report is to provide information on measured sound levels at various locations in the East Greenwich waterfront near bars that have live bands with electronic amplification. Two types of sound level meters are used in this study: a B&K 2250L Handheld Analyzer and an NTi-Audio Outdoor Noise Monitoring System. These systems are described below. Sound levels are provided in A- and C-weighted decibels (L_A in dBA and L_C in dBC). (Gracey, 2017) In addition, we consider the effects of buildings and structures on the sound levels. We make recommendations for both short-term and long-term mitigation measures. Finally, we make recommendations on the levels that could be incorporated into a town noise ordinance.

Section 2 of this report provides a summary of our company. A short review of air acoustics and effects of noise is provided in Section 3. Section 4 describes the measurements systems used in this study. Information about the site is provided in Section 5. A summary of the results is shown in Section 6. Section 7 provides a number of short term and long-term mitigation measures. Section 8 describes the recommendations for a revised noise ordinance for the Town. Section 9 provides conclusions. A list of references is also provided at the end of this report.

2. Background

James H. Miller, LLC is a Rhode Island company specializing in measurement and modeling of sound propagation and the effects of noise. Dr. James H. Miller, P.E. is the Principal of the company and has 30 years of experience in acoustics both in air and underwater. See Appendix D for 1-page resume for Dr. Miller.

3. Short review of air acoustics and noise effects

Sound in the atmosphere is the vibration of air molecules that can propagate from a sound source such as a speaker to a receiver such as a human ear. These longitudinal vibrations travel at the speed of sound, which is dependent on temperature, pressure, and humidity. The speed of sound is usually near 340 meters per second or 1100 feet per second. The vibrations are associated with pressure fluctuations about the local atmospheric pressure. The atmospheric pressure is usually around 100,000 pascals or 1000 hectopascals or 1000 millibars or 14.7 pounds per square inch. The acoustic pressure amplitudes are usually much less than 200 pascals. Sound pressure level L is a descriptor of relative acoustic intensity and is given in units of decibels or dB. The reference pressure in air is 20 micropascals or μPa and that is about the smallest acoustic pressure detectable by a human ear (Kinsler et al., 1999). To provide some context, 200 pascals is equivalent to a sound pressure level L of 140 dB. Acousticians use weightings to take human hearing capabilities into account. The most common weighting is A-weighting. A-weighting is an approximation to the human hearing audiogram where a tone with a frequency of 3 kilohertz or 3 kHz is easily detected by the human ear while tones

with other frequencies are not as easily detected. Sound with frequencies less than 20 Hz and more than 20 kHz is not detectable. When sound levels are described using A-weighting, the name of the variable is L_A and dBA are the traditional level units. Figure 1 shows A-level and other weightings as a function of frequency. (Harris, 1995)

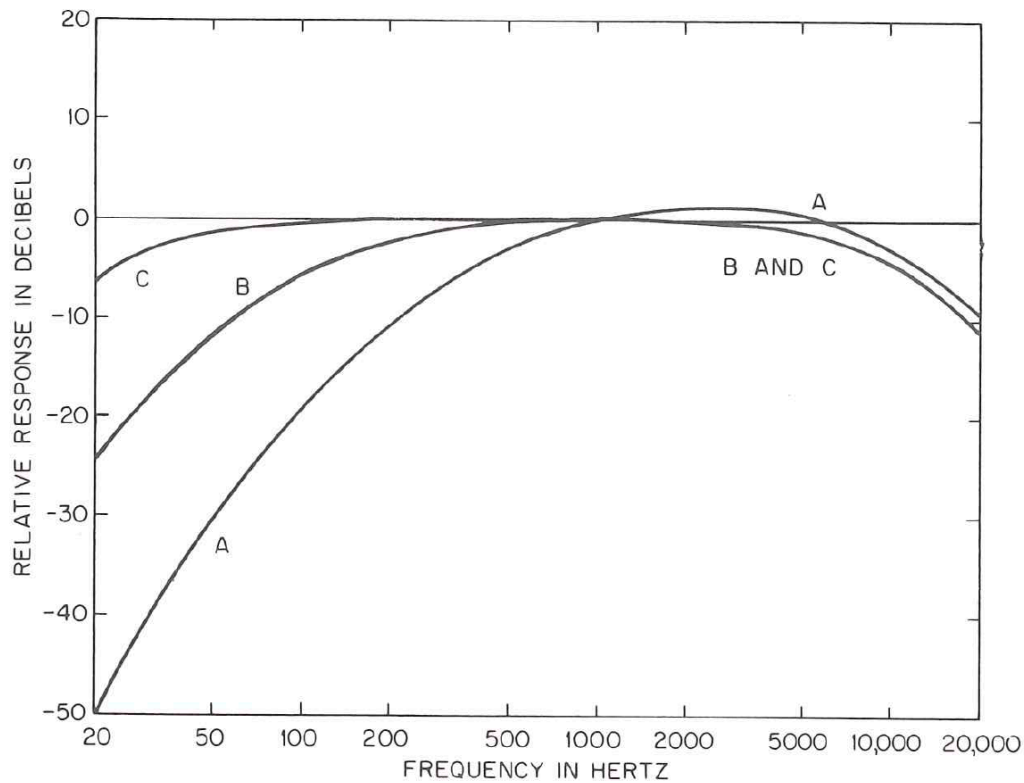


Figure 2. Frequency weighting response characteristics. A-weighting is used in this report. (Harris, 1995)

While L_{AF} is a measure of the A-weighted noise with a fast averaging time (typically 125 ms), L_{AS} is a measure of the noise with a slow average time (typically 1 s). The C-weighted measures, L_{CF} and L_{CS} are similarly defined. Here, we use the slow averaging time appropriate for community noise assessments (Harris, 1995).

4. Sound Measurement Systems

One of the main sound measurement instruments was the Bruel and Kjaer Type 2250 Light or 2250-L Sound Level Meter (B&K, 2019). The Type 2250 Light is a basic class 1 sound level meter. A Class 1 Sound Level Meter is a noise measurement instrument that meets the requirements of IEC 61672-1:2002 (or an equivalent such as BS EN 61672-1:2003) to Class 1 performance. (Roberts, 2011) The B&K 2250-L sound level meters have been developed specifically for measuring occupational, environmental and product noise and is shown in Figure 3.

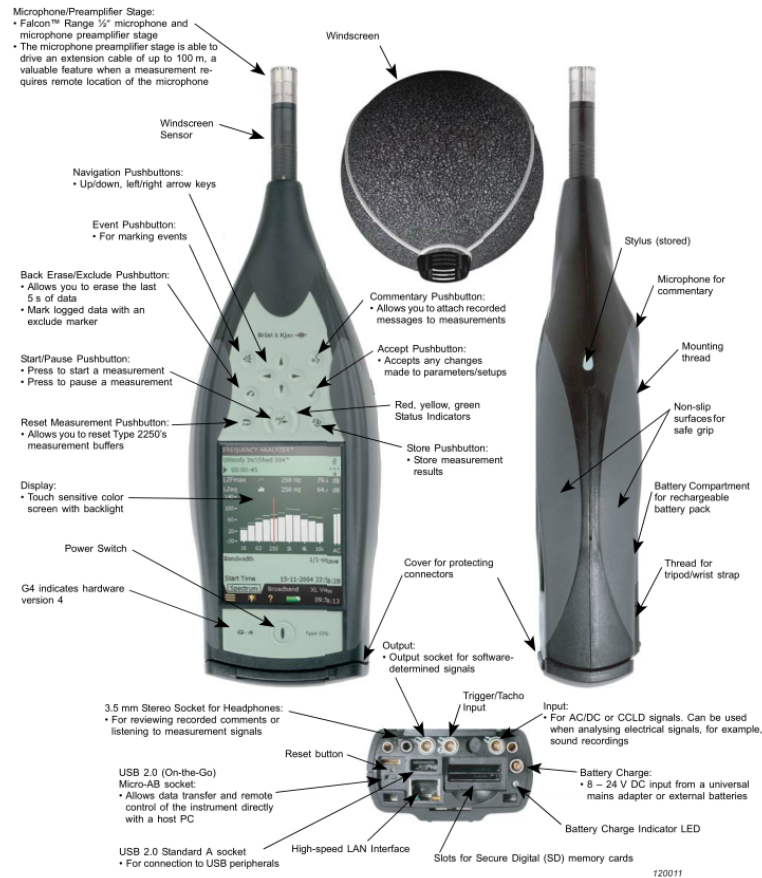


Figure 3. The B&K 2250-L Sound Level Meter and details.

The B&K system was used for attended short-term (~ 4-5 hour) measurements at a number of locations described in the next section. This system was calibrated before and after the measurement program and the systems was found to be accurate to 0.1 dB.

The NTi-Audio Outdoor Noise Monitoring System complemented the B&K system and was used as an unattended noise monitoring system for long-term (7-14 days) at a few locations. The systems consisted of an XL2 sound level meter in a weather-resistant box, batteries, along with an externally-mounted M2230 microphone as shown in Figure 4. (NTi, 2019)



Figure 4. The NTi Noise Monitoring System.

5. Description of the site

Images of the site are shown in Figures 5, 6 and 7. The area on the East Greenwich waterfront has three bars which play electronically-amplified music on some nights until 12:30 AM. Figures 6 and 7 show the locations of a number of measurement stations in which sound levels were collected by the B&K system with human attendance on two nights, July 5-6, 2019 and July 12-13, 2019. In addition, longer term measurements were autonomously collected by the NTi Noise Monitoring System (the “Box”) described above. These locations were at 88 King Street and at the Fireman’s Club at 80 Queen Street.



Figure 5. Google Earth image of the East Greenwich, Rhode Island waterfront with three venues that play live music: Finn's Harborside, Nautika, and BLU on the Water.

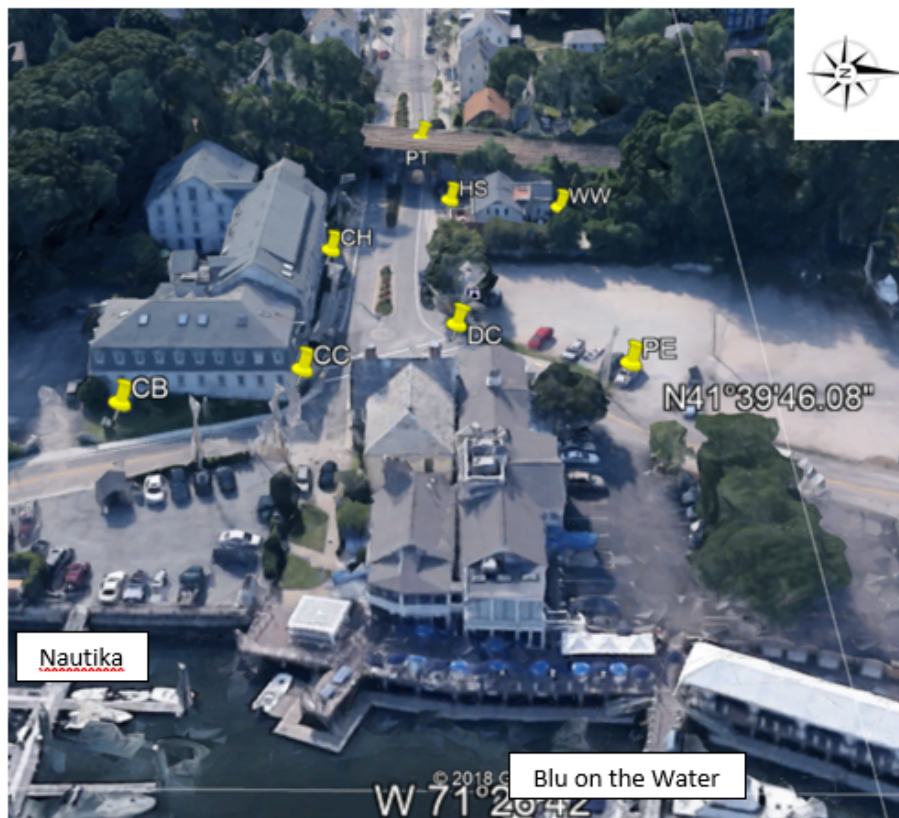


Figure 6. Map of measurement locations near Nautika and BLU on the Water.

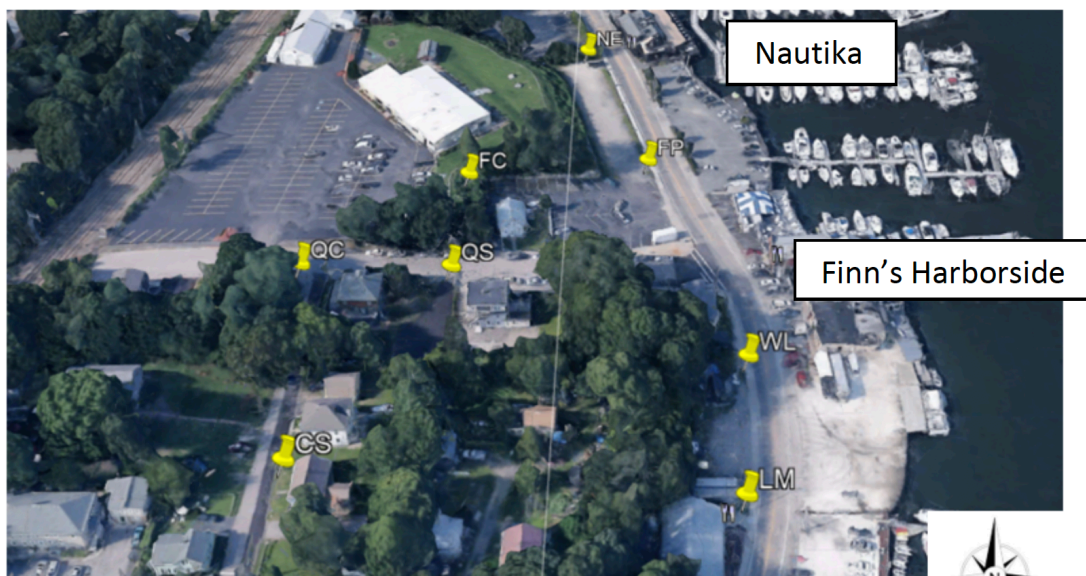


Figure 7. Map of measurement locations near Nautika and Finn's Harborside.

6. Summary of Results

Table 1 provides a summary of the dB-averaged noise levels at each of the measurement stations on July 5, 2019. The station locations are provided in Appendix C. The highest recorded average noise levels on July 5, 2019 were found to be at Station PT (Past Trestle) 11:45PM to 1200AM and the noise there was dominated by vehicular traffic and trains. This station had little noise from the bars. However, music was easily detectable at Station HS (Hot Spot) near 88 King Street 12:00AM to 12:30 AM and the average measured levels were 66.3 dBA and 75.0 dBC.

Table 1. Average noise levels measured on July 5, 2019 at each station.

Time	Description	Label	Average dBA levels	Average dBC levels
08:00 – 09:00 PM	Widows Walk	WW	59.3	70.6
09:00 – 10:00 PM	Hot Spot	HS	66.6	78.9
10:00 – 10:30 PM	Condo Hot Spot	CH	64.2	76.1
10:30 – 11:00 PM	Condo Corner	CC	67.6	79.7
11:00 – 11:15 PM	Condo Back	CB	62.8	75.3
11:15 – 11:30 PM	Directory Corner	DC	67.8	81.7
11:30 – 11:45 PM	Parking Entrance for BLU	PE	66.6	81.2
11:45 – 12:00 AM	Past Trestle	PT	75.9	82.1
12:00 – 12:30 AM	Hot Spot	HS	66.3	75.0

Table 2. Average noise levels measured on July 12, 2019 at each station.

Time	Location	Label	Average dBA levels	Average dBC levels
08:20 – 09:30 PM	Fireman’s Club	FC	59.7	74.1
09:30 – 10:00 PM	Corner of Queens & Castle Streets	QC	59.6	75.0
10:00 – 10:15 PM	Castle Street	CS	48.8	62.3

10:15 – 10:45 PM	Queen Street	QS	59.1	75.3
10:45 – 11:00 PM	Finn’s Parking Entrance	FP	68.5	80.6
11:00 – 11:15 PM	Water St. & London St.	WL	67.3	79.9
11:15 – 11:45 PM	London Marina	LM	70.9	80.5
11:45 – 12:15 AM	Nautika Edge	NE	59.4	73.4
12:15 – 12:45 Am	Finn’s Parking Entrance Final	FP	63.3	75.2

On July 12-13, 2019, we collected noise measurements at a number of stations shown in Figure 7. Table 2 shows the A-level and C-level noise measurements. Music from Finn’s Harborside was detectable at all measurement stations along with traffic noise, voices, and trains. The average noise levels near Finn’s was measured to be 63.3 dBA and 75.2 dBC from 12:15AM to 12:45AM at station FP. However, the music was turned off before 12:30AM and the average dB levels don’t tell the whole story. Figure A18 in Appendix A shows that the C-weighted level was well above 80 dB until about 12:22AM and an audio recording confirms that this was due to music from Finn’s.

Appendix B provides data collected by the NTi system. The data is presented in 2-minute dB averages for each day of measurement. Figure B11 and shows the A- and C-weighted noise levels measured at the Fireman’s Club location on July 12 and 13, 2019. Noise levels were slightly lower than that measured near Finn’s parking due to the longer distance. However, noise levels were over 75 dBC until the music was turned off at around 12:22 AM on July 13.

Appendix A shows graphs for the B&K measurements on July 5 and 12. Levels are provided in dBA and dBC in 1-second, 2-minute and overall station averages. Appendix B shows the graphs of the NTi measurements of dBA and dBC levels on various days from June 15 to July 20, 2019 in 2-minute dB averages.

7. Short- and Long-Term Mitigation Measures

As evidenced by reports from the neighboring residents, the most disturbing sound was electronically-amplified music in the bass frequency range (less than 250 Hz). The C-weighted noise level L_C was a good proxy for disturbance. When the L_C levels were above 65 dBC, residents reported significant disturbance. When these levels were below 65 dBC, fewer residents reported significant disturbance. In particular, Mr. Joseph Gelineau at 88 King Street noted that lower L_C occurred on nights with larger crowds, likely due to the absorption of bass sounds by the bodies of the bar patrons. We met with the owners of BLU on the Water and Finn’s Harborside on June 11, 2019. In that meeting, we recommended that speakers be oriented away

from the neighborhood and towards the sea. We also recommended that speakers be placed as low to the floor as possible. We also discussed long-term mitigation measures including hay or straw bales, water filled barrels or structures to absorb the bass frequencies that cause the most disturbance. (Azcorra et al., 2015) In addition, we put the bar owners in contact with Mr. Joseph Drago at New England Soundproofing of Easton, Massachusetts. We have successfully worked with Mr. Drago on another challenging noise mitigation project. We understand that the bars will be installing 15' tall noise barriers with the appropriate design to absorb the bass frequencies. Note that the measurements documented in this report were taken after the meetings with owners of BLU and Finn's. But the bars had not yet installed the noise barriers from New England Soundproofing.

8. Recommended Levels for a Noise Ordinance

There are two approaches to addressing noise levels with ordinances. One approach addresses the sound levels associated with some disturbance above the ambient noise levels. Another approach addresses the absolute noise levels. In the case of the East Greenwich, Rhode Island waterfront, we recommend that absolute levels be used because 1) the acoustic propagation characteristics of neighborhood including the presence of significant reflections from buildings and the train trestle near King Street, 2) refraction effects associated with upslope propagation on Queen Street, and 3) the C-weighted levels measured showed very high bass levels higher than ambient levels (sometimes as much as 80 dBC or higher). The Town of East Greenwich, RI has a complicated noise ordinance (Town of East Greenwich, 2019) that could be simplified. We therefore recommend that maximum levels of 60 dBA and 65 dBC be used in a revised noise ordinance for the Town of East Greenwich, Rhode Island with appropriate time intervals as simple and few as possible. We recommend that a 5-dB safety zone not be used. Sound levels meters used for enforcement should be set to Slow or 1-second averaging.

9. Conclusions

A number of conclusions can be stated after the data collection and analysis effort:

- 1) Electronically-amplified music from bars on the East Greenwich, Rhode Island waterfront significantly impact local residents.
- 2) Discussions with residents indicate that sound levels from the music above 65 dBC and 60 dBA at the property lines of the bars are particularly annoying, especially late in the night and early in the morning. Other sources of noise are also annoying to residents, especially motorcycles, during the same time periods.
- 3) Measurements of electronically-amplified music near one of the bars (Finn's Harborside) by our team show that the levels can reach 70 dBA and 80 dBC.

4) We recommend that 60 dBA and 65 dBC be used in a revised noise ordinance for the Town of East Greenwich, Rhode Island. Sound levels meters used for enforcement should be set to Slow or 1-second averaging.

10. References

Azcorra, Z., G. Pérezc, J. Comac, L. F. Cabezac, S. Buresd, J. E. Álvaroe, A. Erkorekaab, M. Urrestarazuf, "Evaluation of green walls as a passive acoustic insulation system for buildings." *Applied Acoustics*, 89, 46-56, March 2015.

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Roberts, Clarke, "What is a Class 1 Sound Level Meter?", Cirrus Research, <https://www.cirrusresearch.co.uk/blog/2011/10/what-is-a-class-1-sound-level-meter/>, accessed July 14, 2019.

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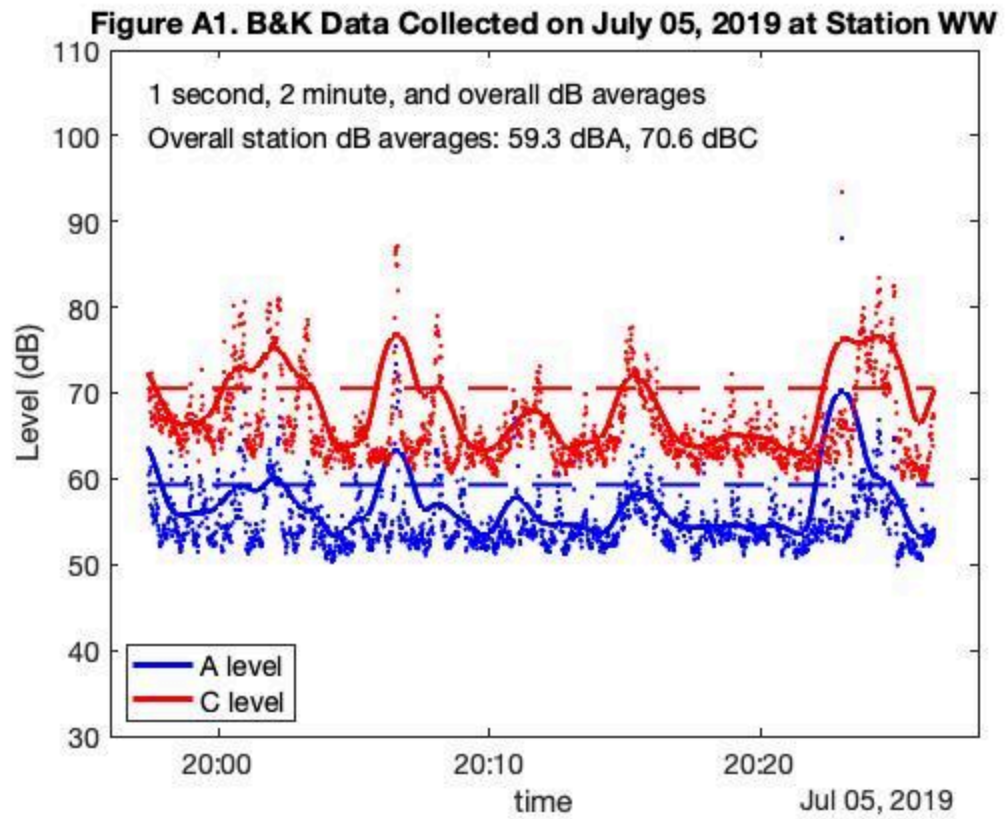


Figure A2. B&K Data Collected on July 05, 2019 at Station HS

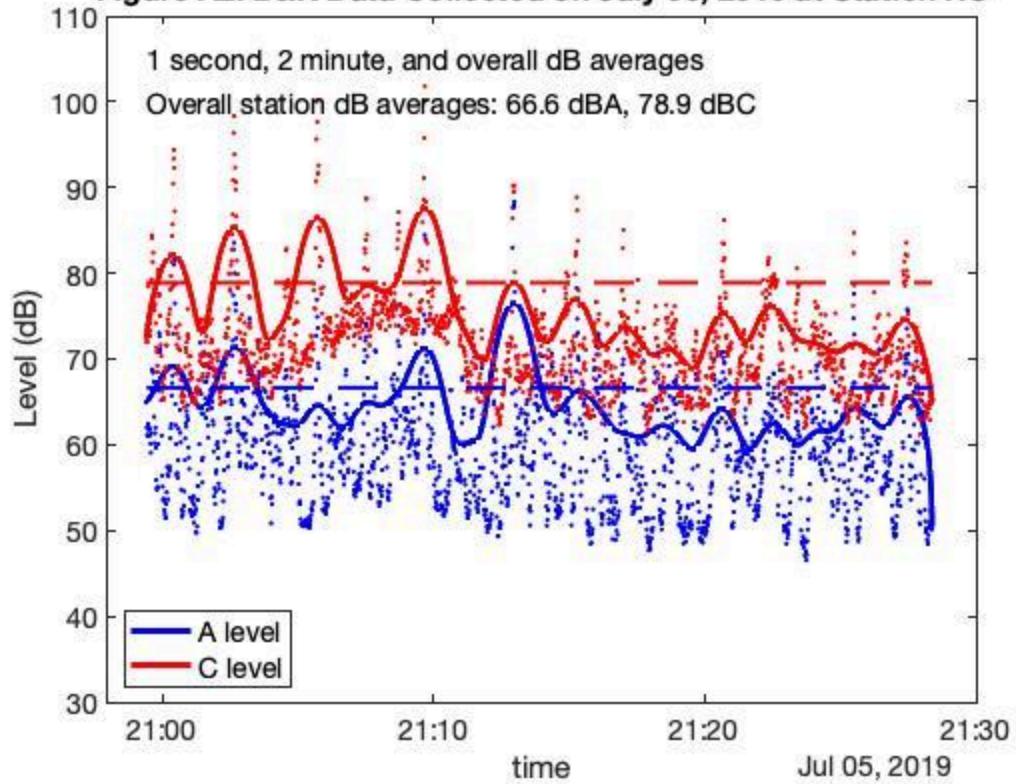


Figure A3. B&K Data Collected on July 05, 2019 at Station CH

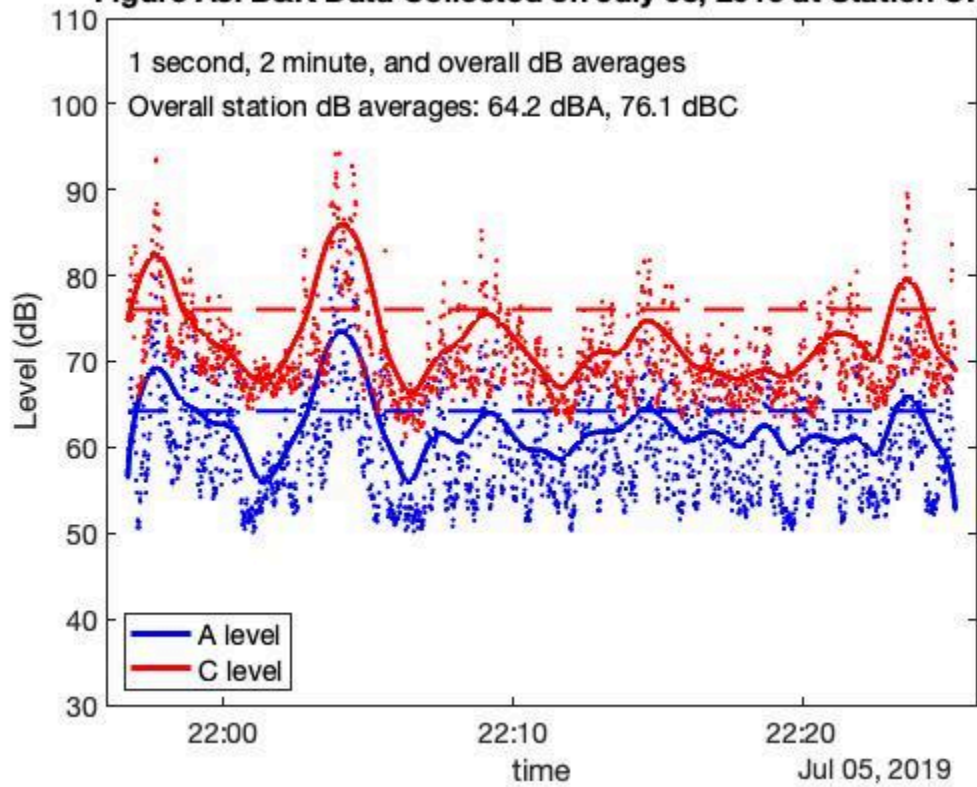


Figure A4. B&K Data Collected on July 05, 2019 at Station CC

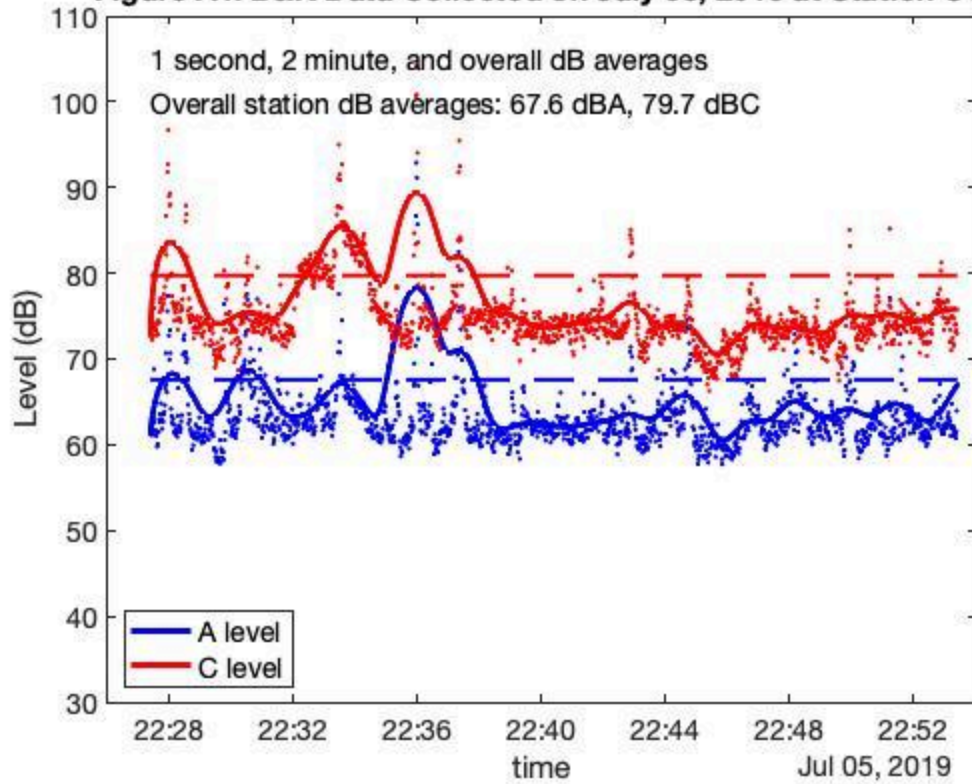


Figure A5. B&K Data Collected on July 05, 2019 at Station CB

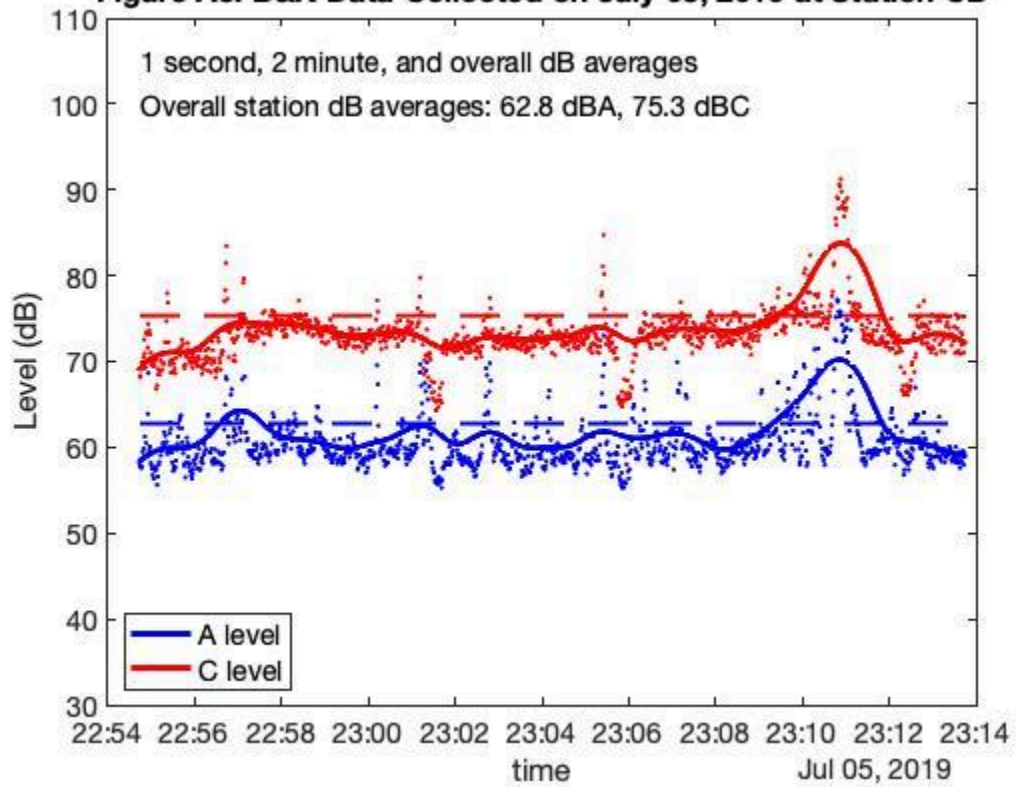


Figure A6. B&K Data Collected on July 05, 2019 at Station DC

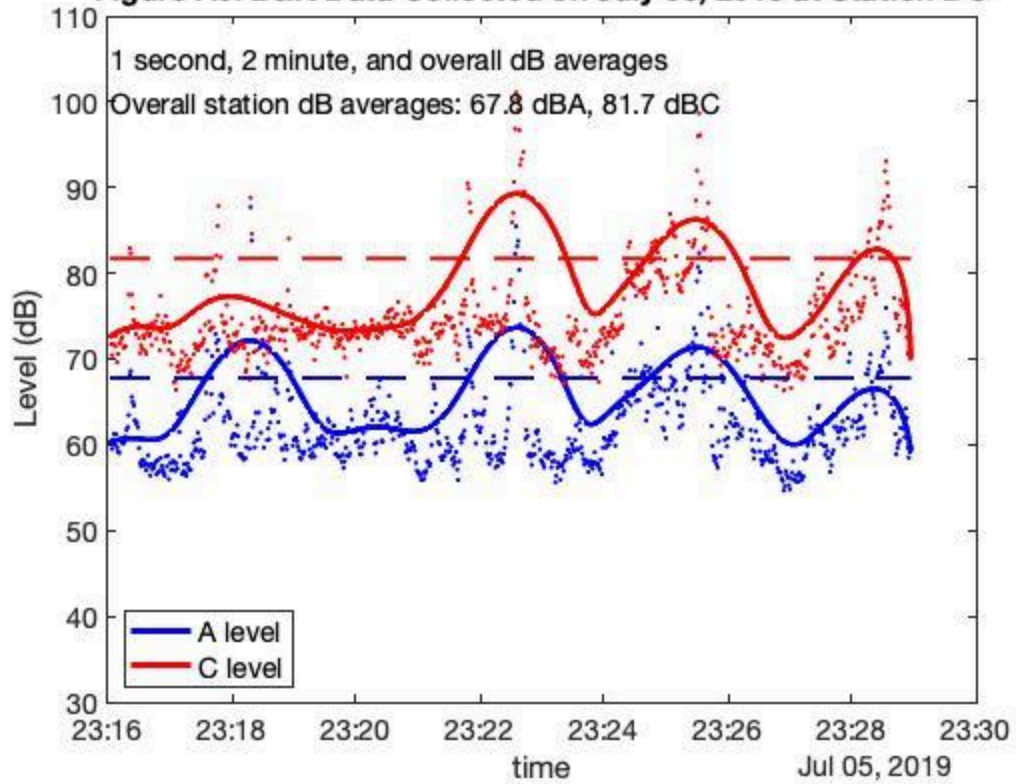


Figure A7. B&K Data Collected on July 05, 2019 at Station PE

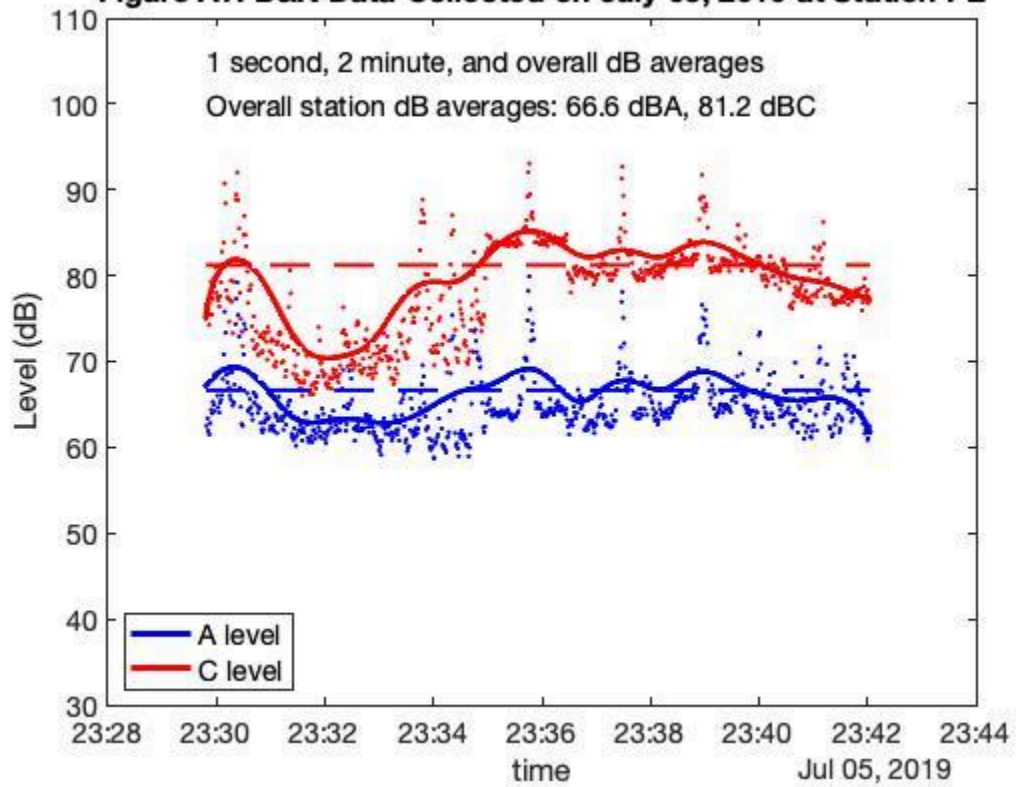


Figure A8. B&K Data Collected on July 05, 2019 at Station PT

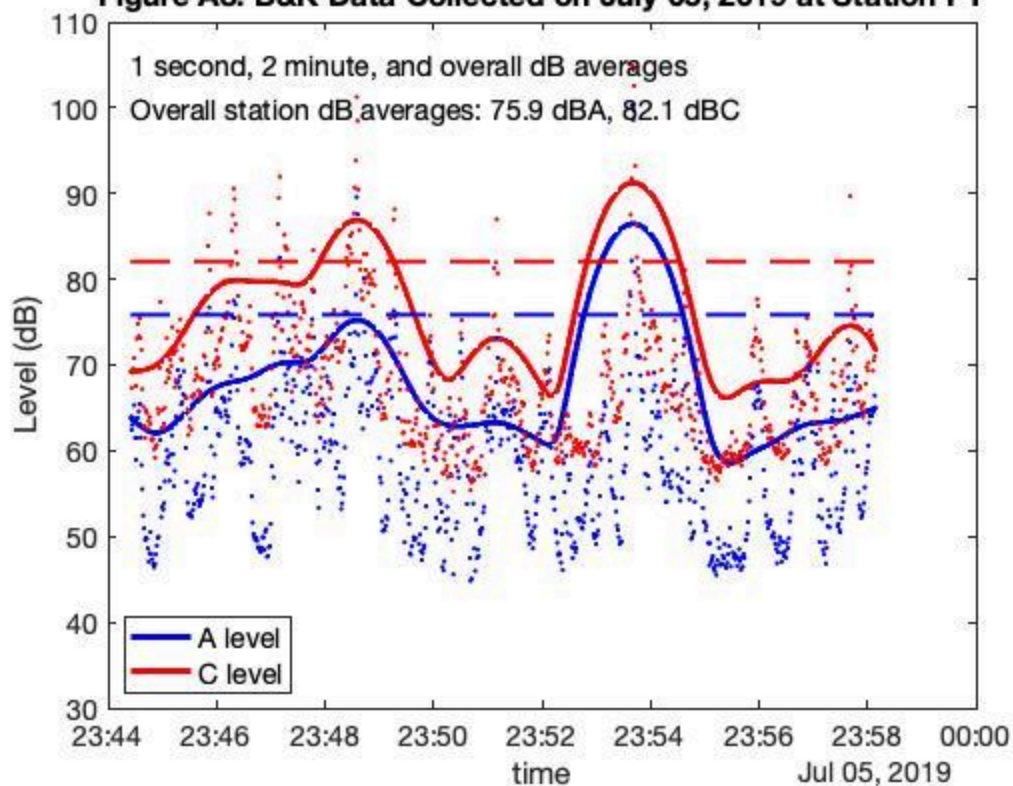


Figure A9. B&K Data Collected on July 05, 2019 at Station HS

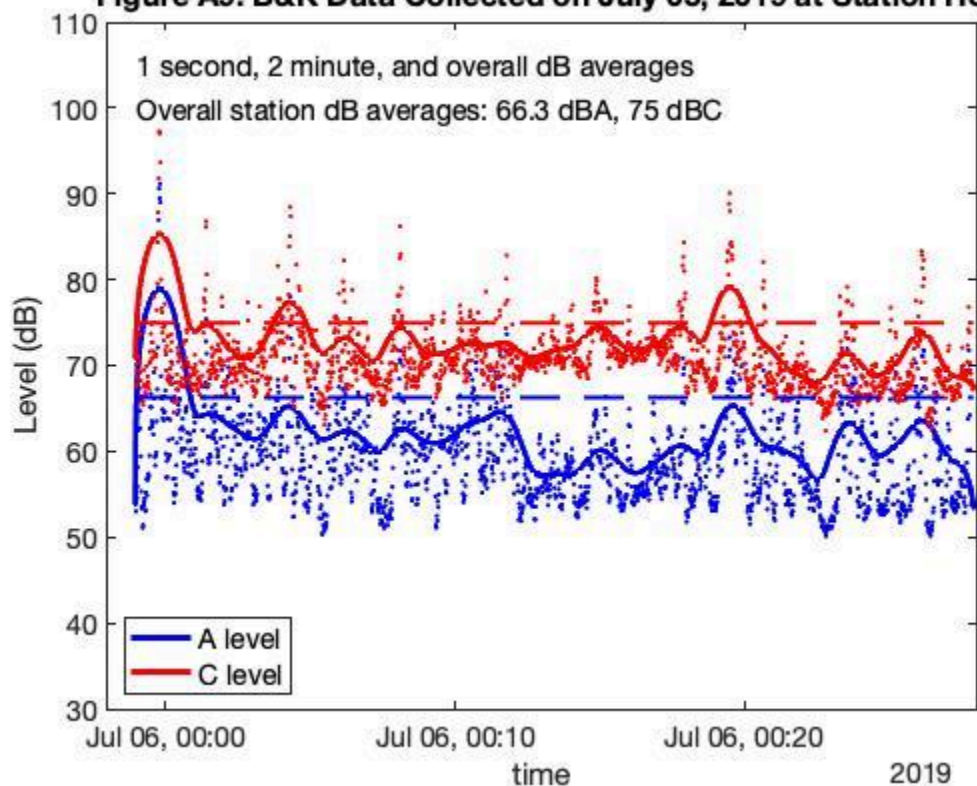


Figure A10. B&K Data Collected on July 12, 2019 at Station FC

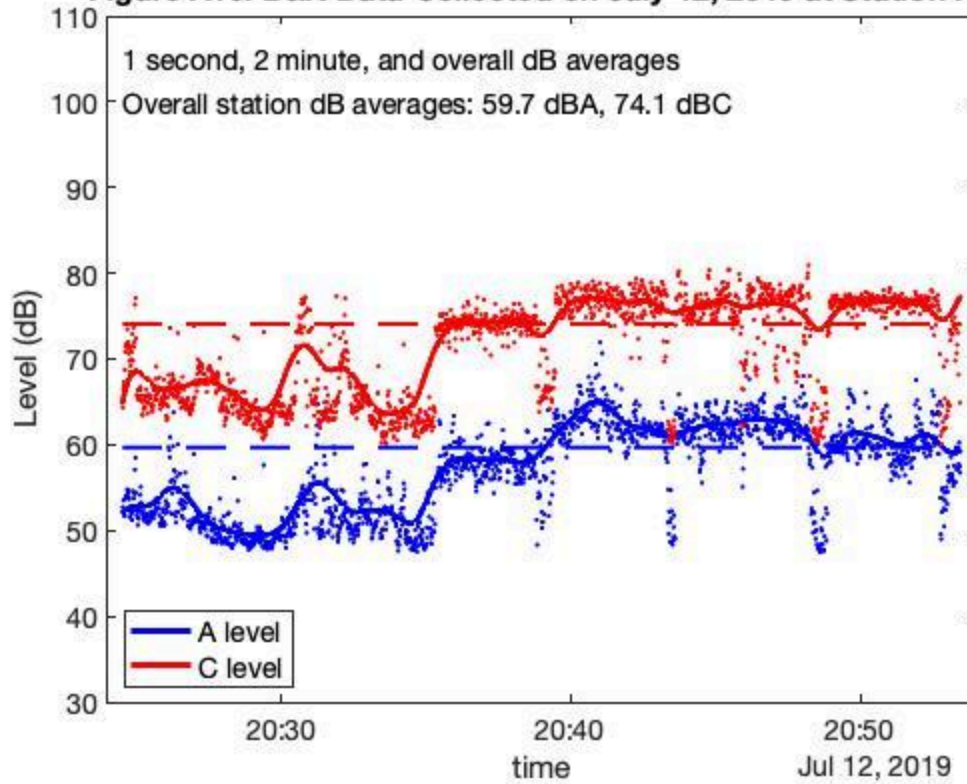


Figure A11. B&K Data Collected on July 12, 2019 at Station QC

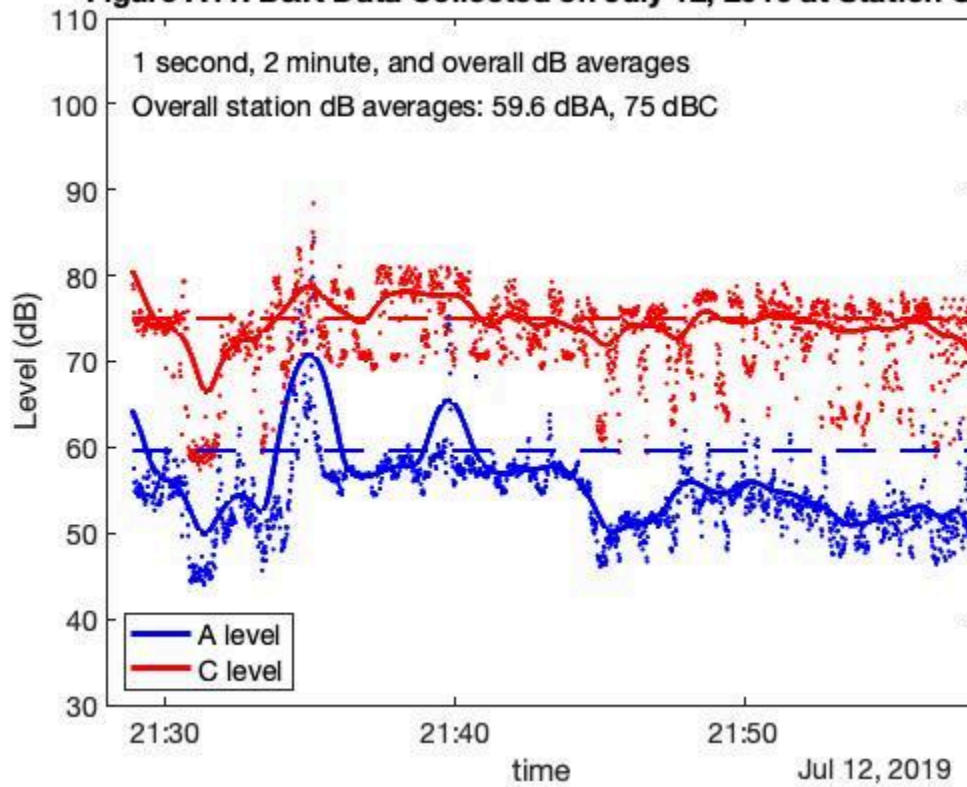


Figure A12. B&K Data Collected on July 12, 2019 at Station CS

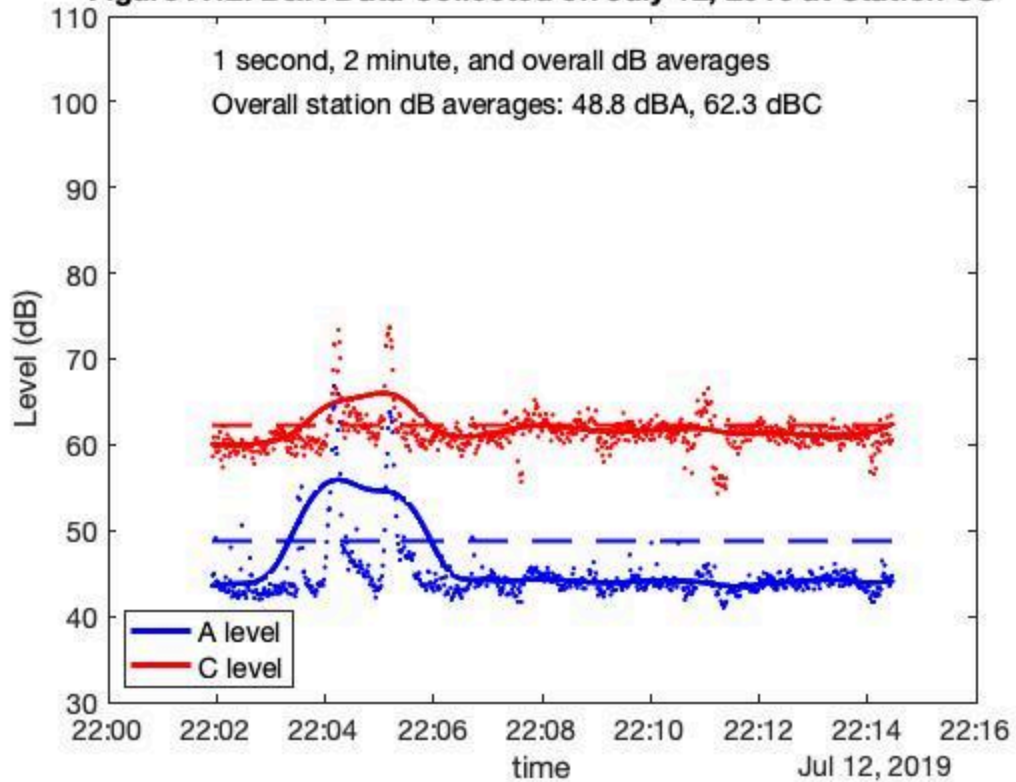


Figure A13. B&K Data Collected on July 12, 2019 at Station QS

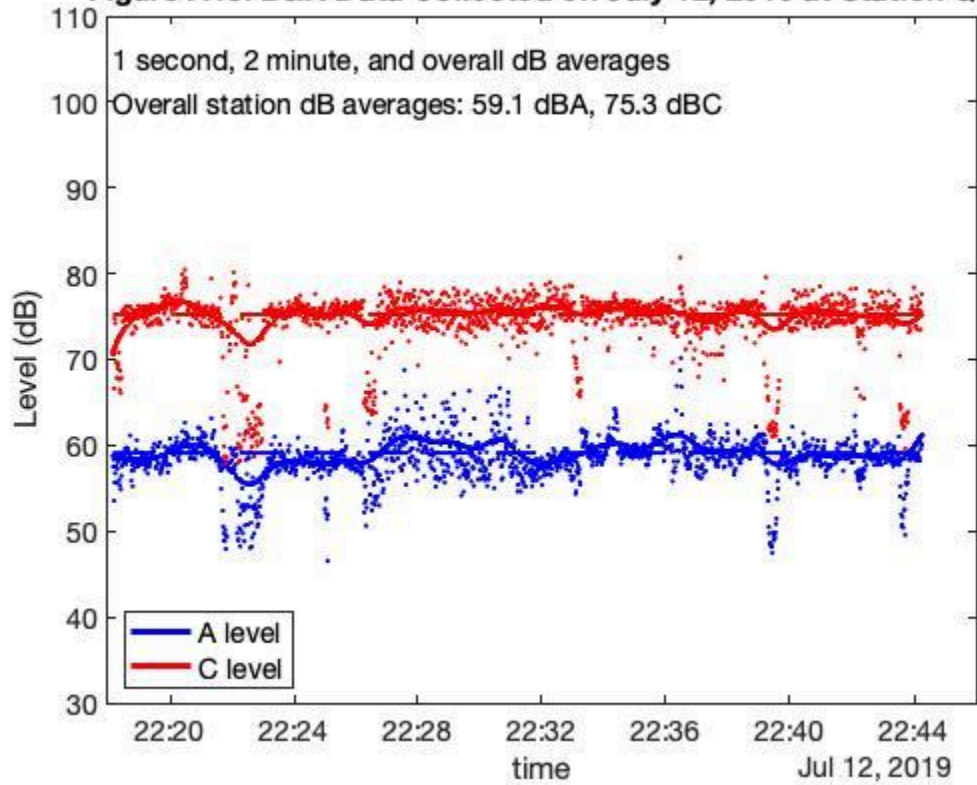


Figure A14. B&K Data Collected on July 12, 2019 at Station FP

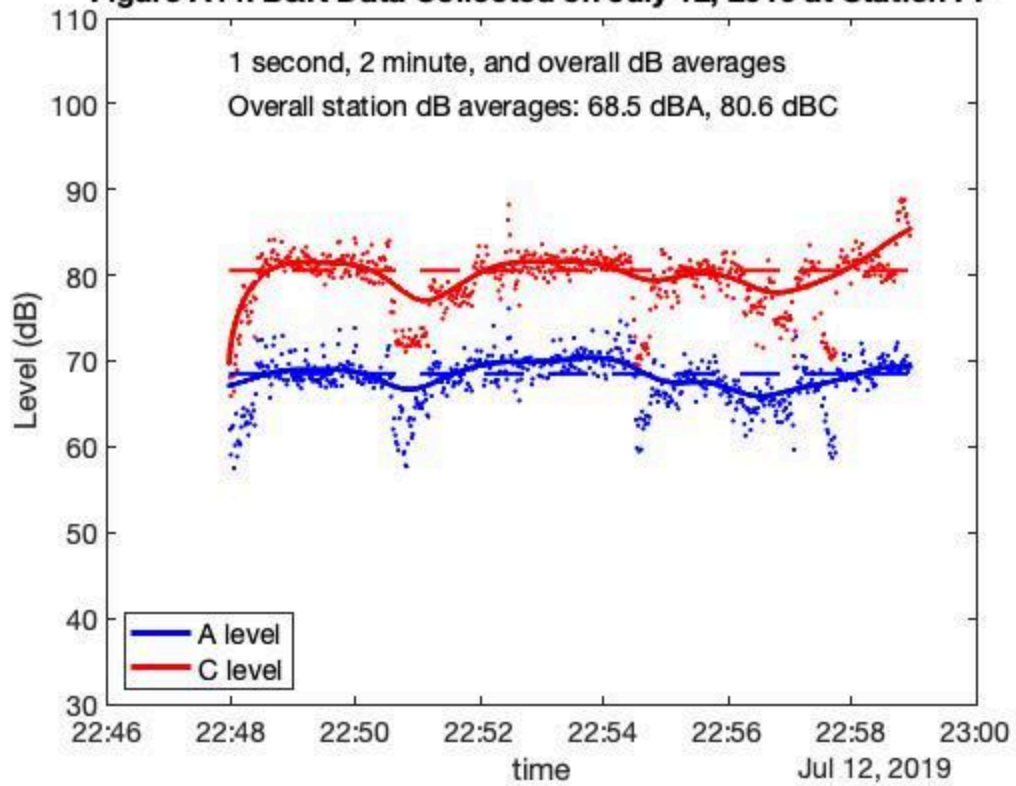


Figure A15. B&K Data Collected on July 12, 2019 at Station WL

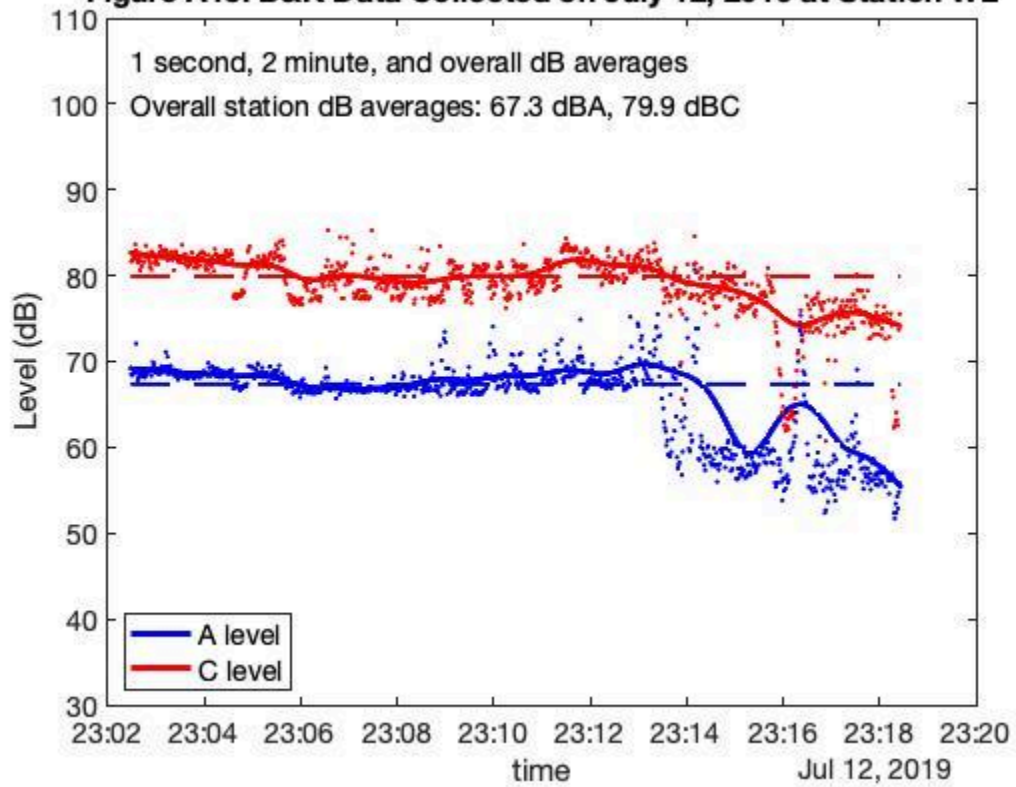


Figure A16. B&K Data Collected on July 12, 2019 at Station LM

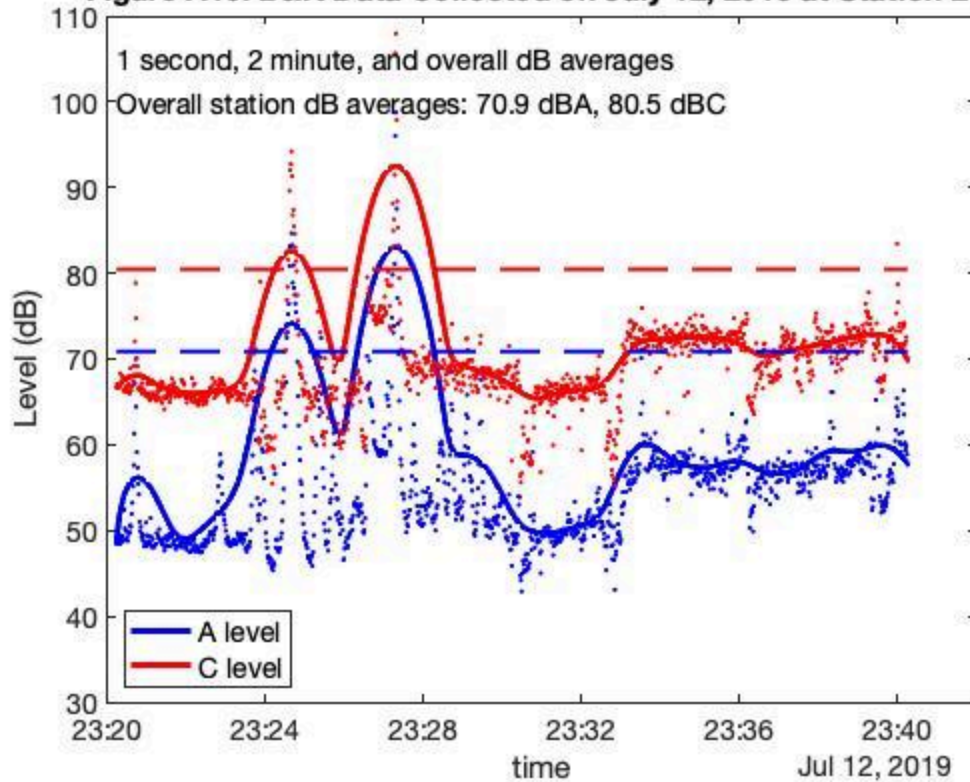


Figure A17. B&K Data Collected on July 12, 2019 at Station NE

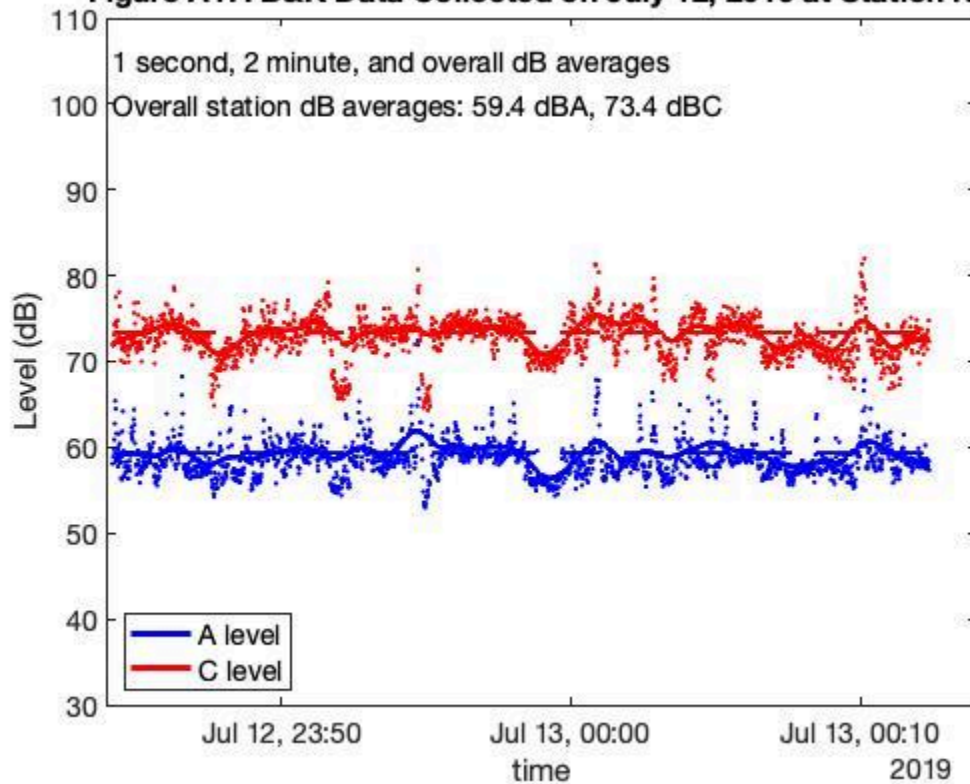
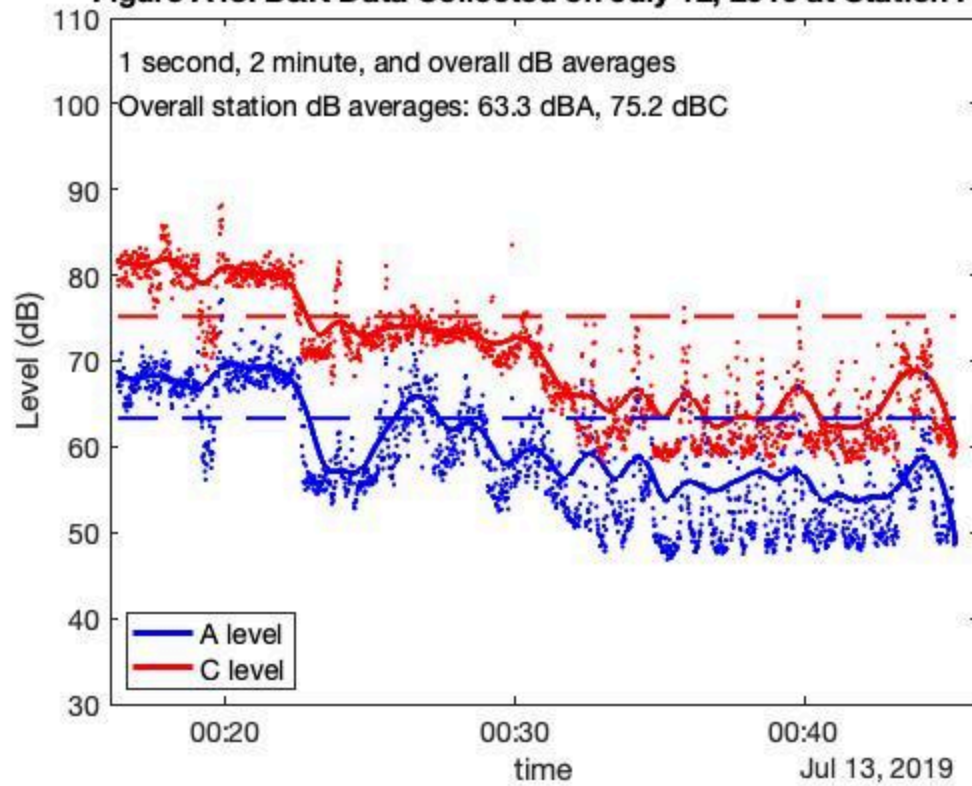
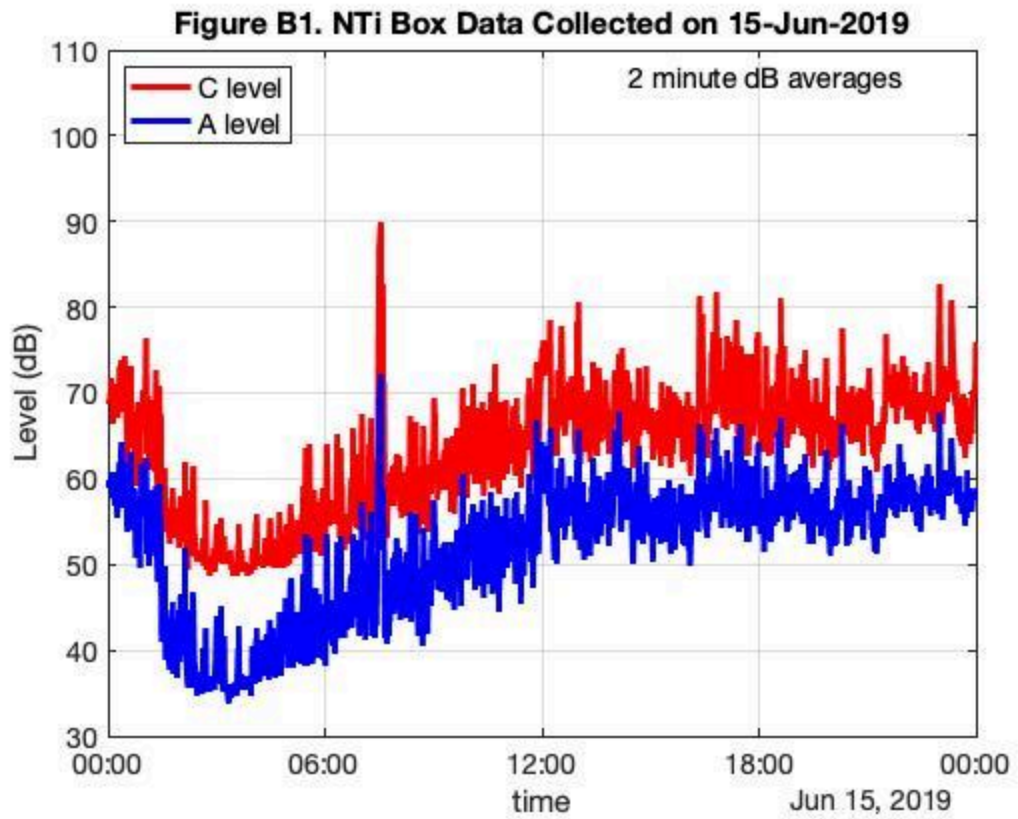
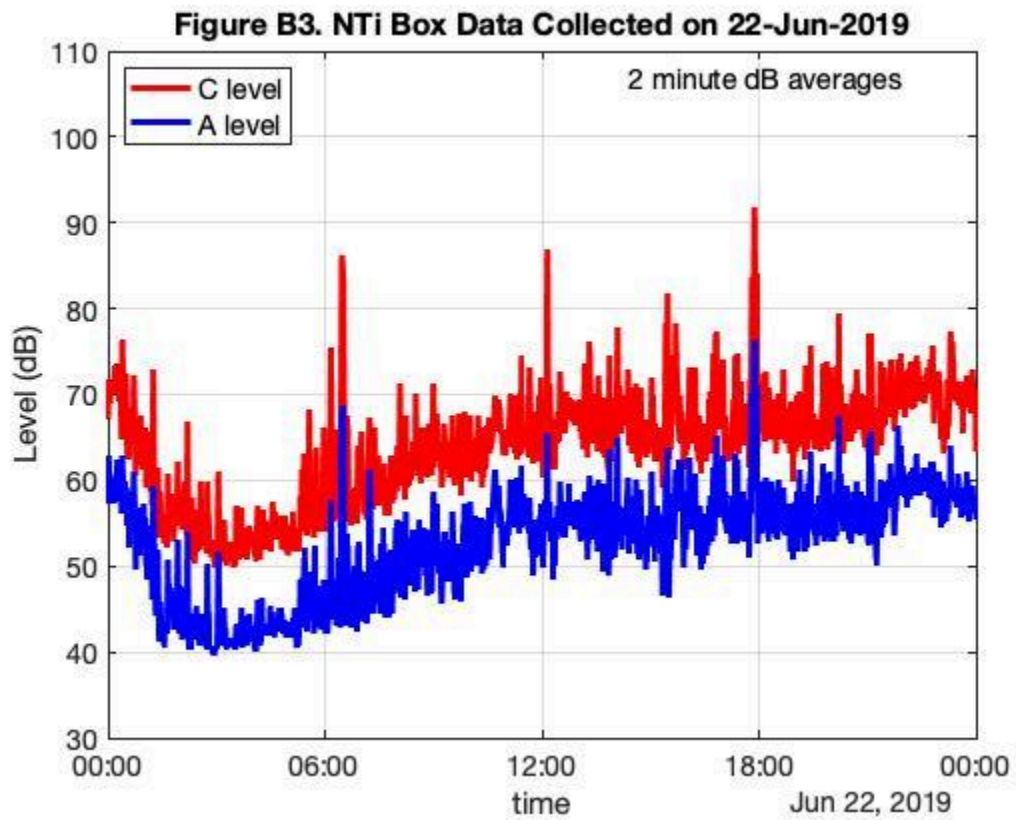
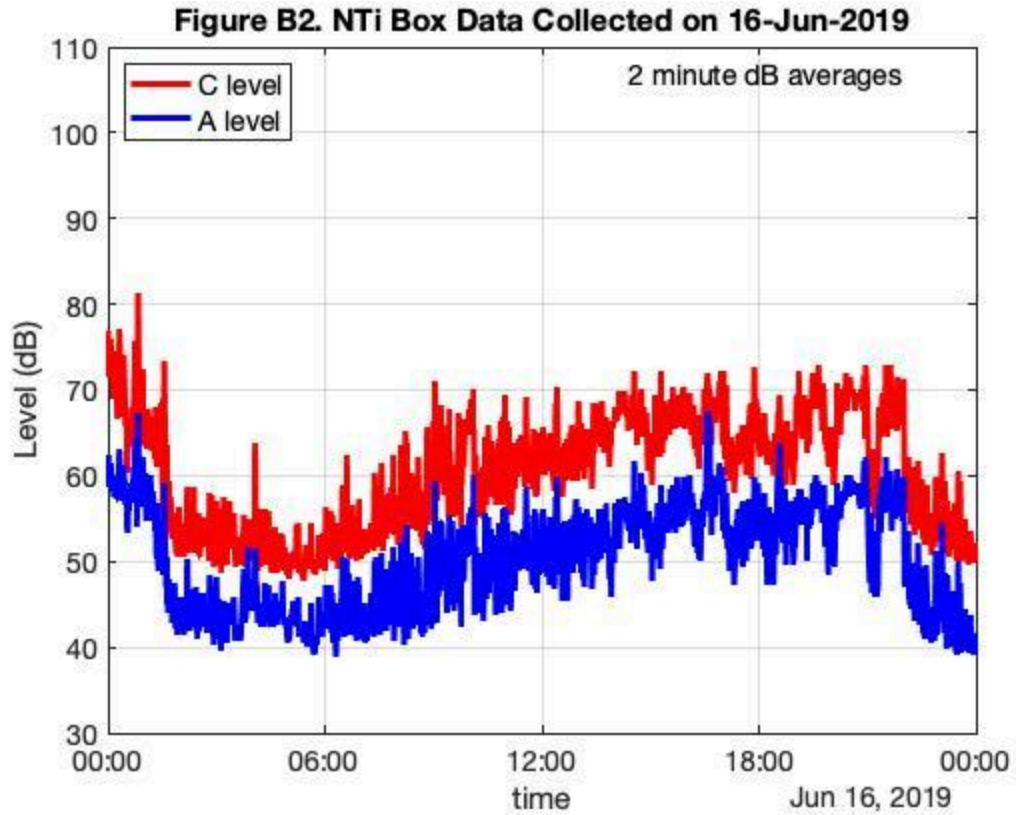
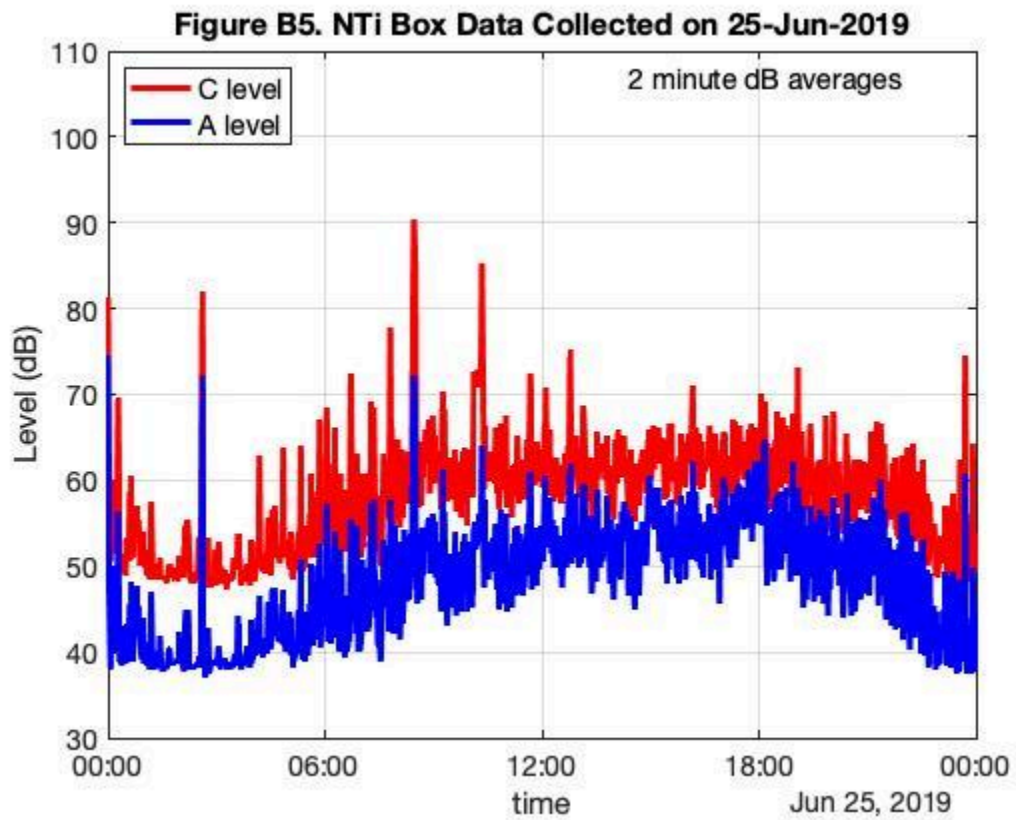
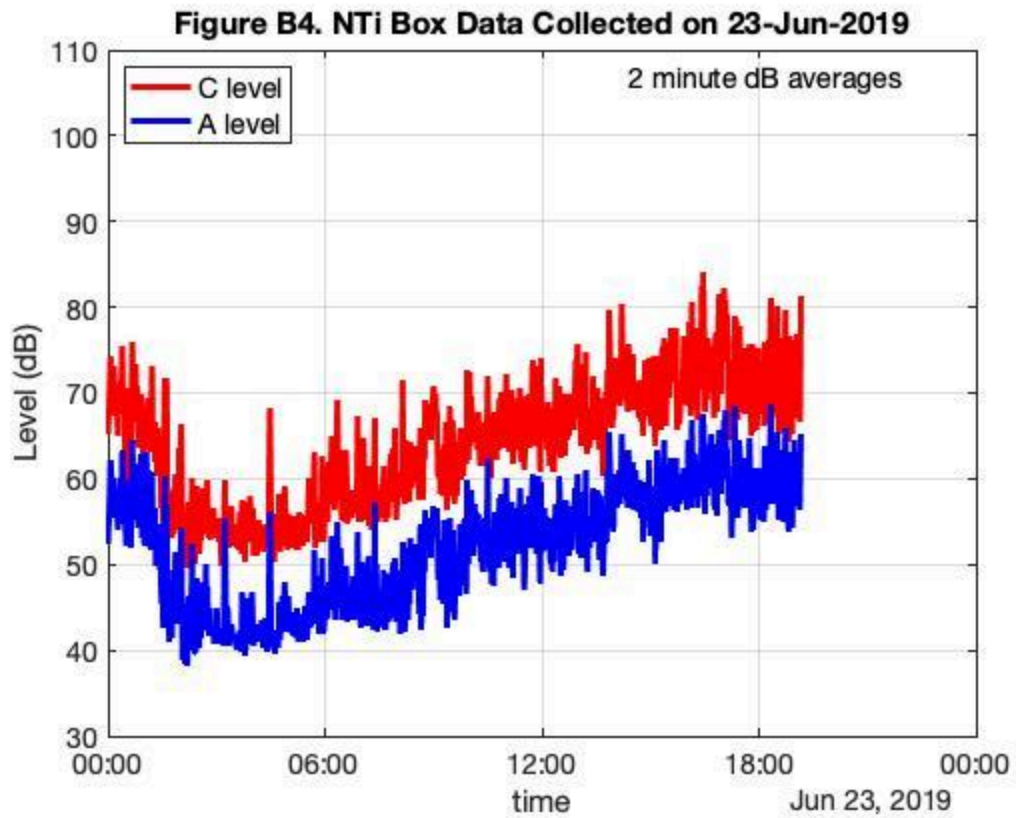


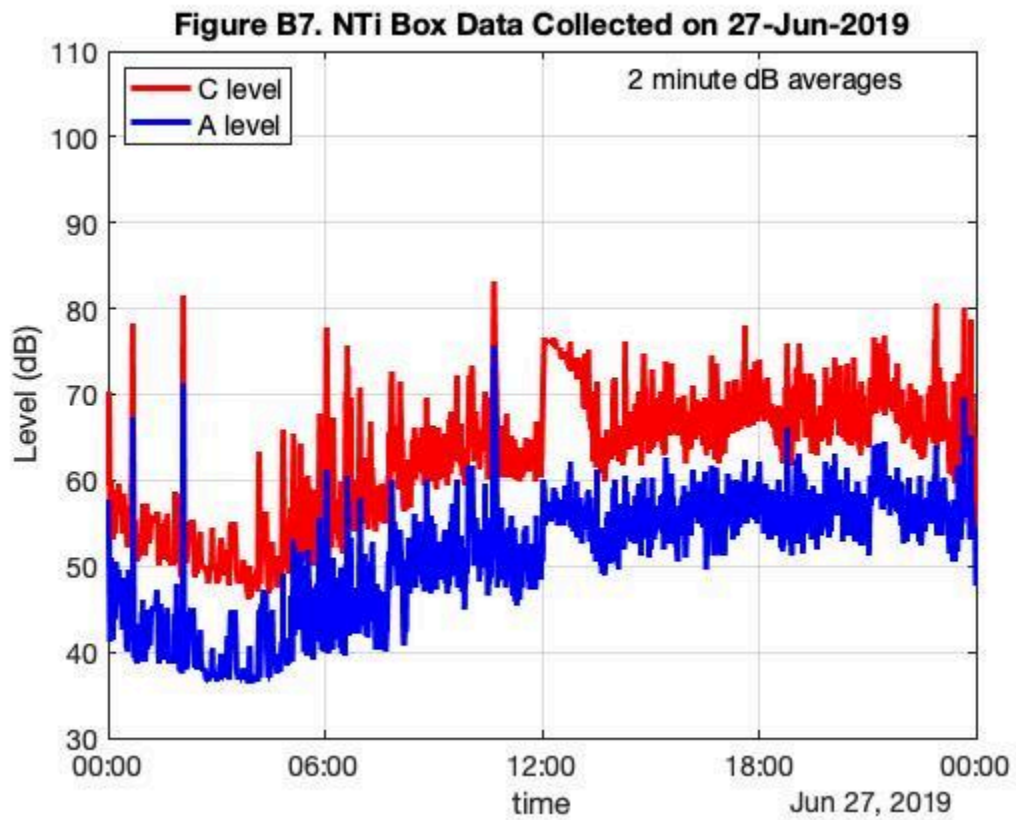
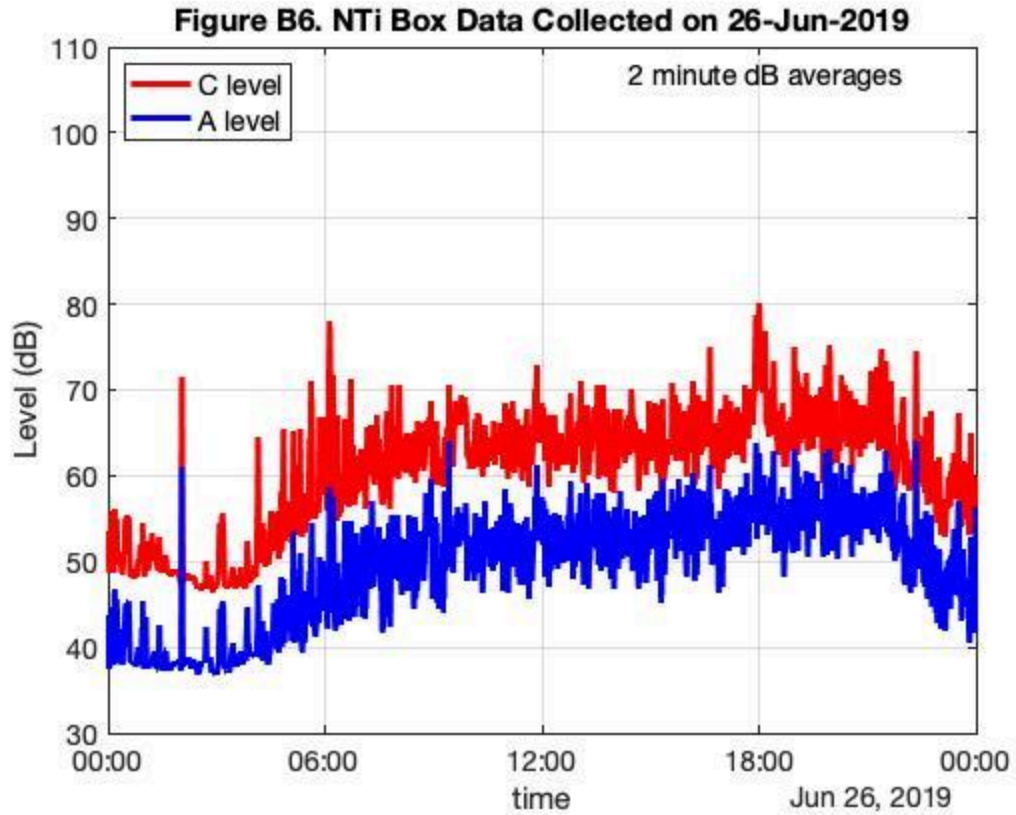
Figure A18. B&K Data Collected on July 12, 2019 at Station FP

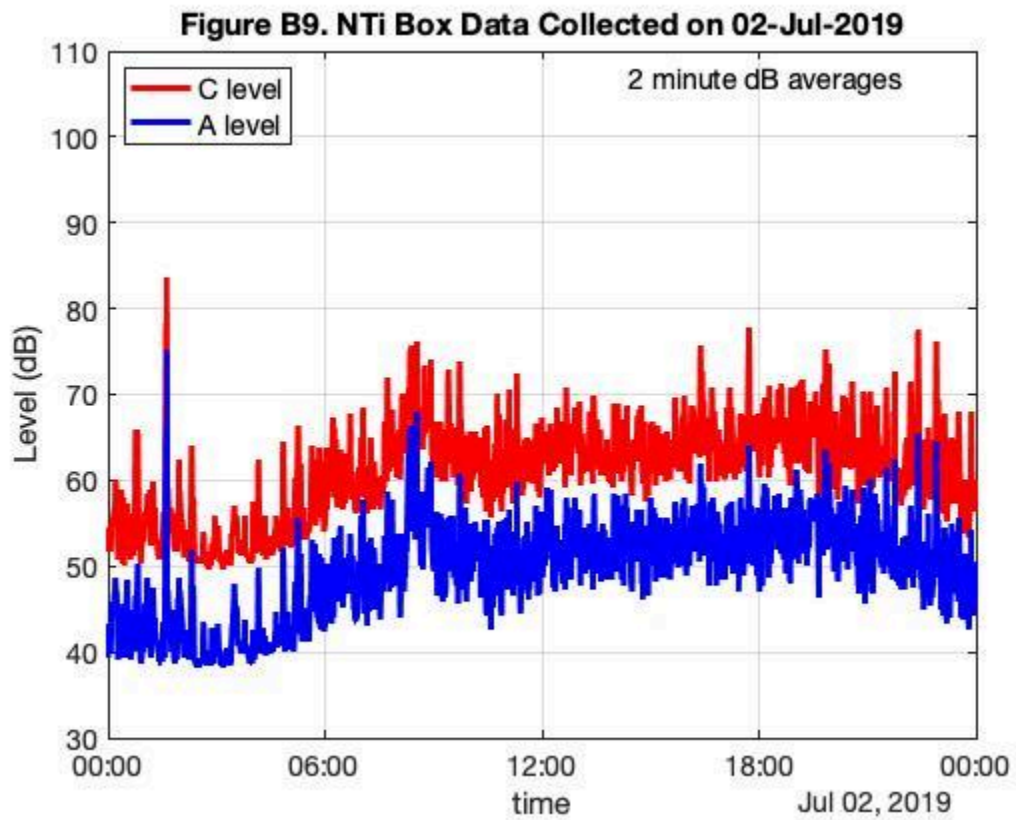
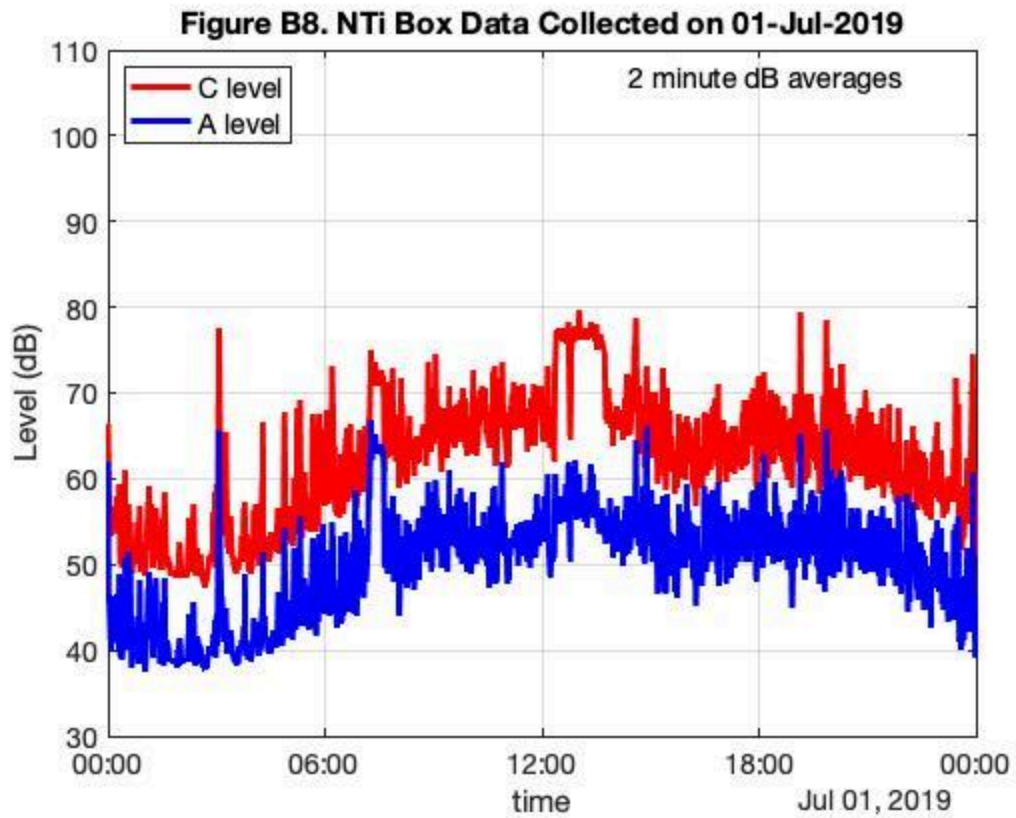


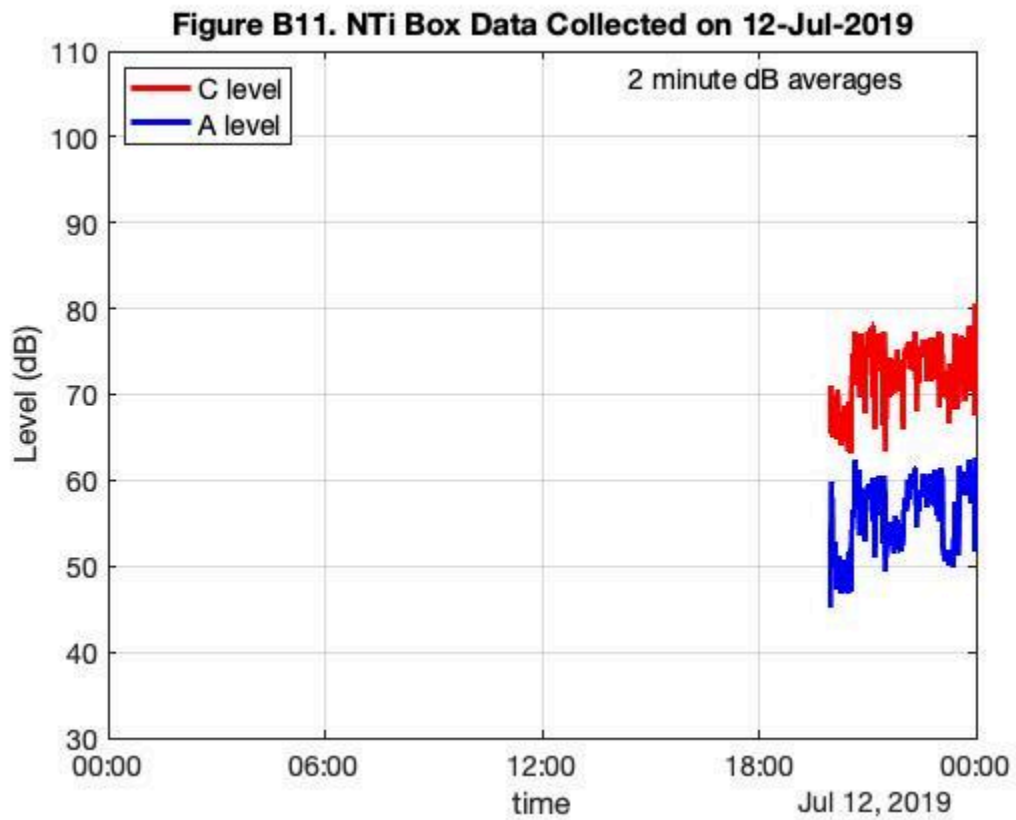
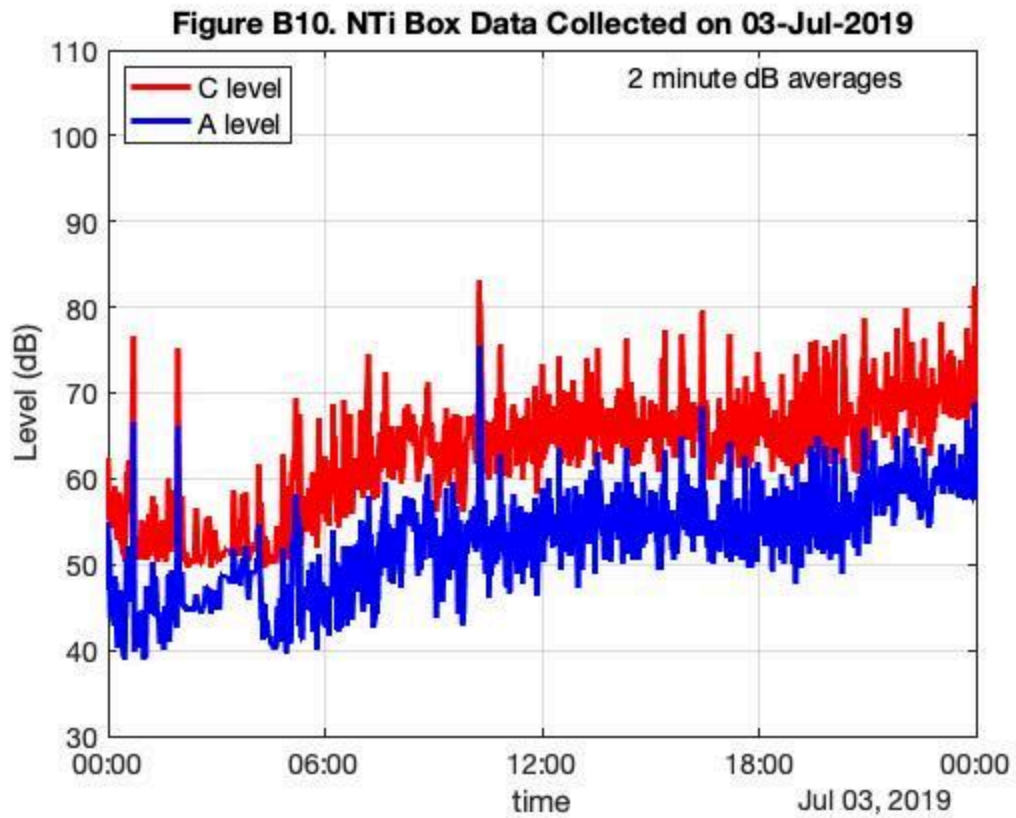


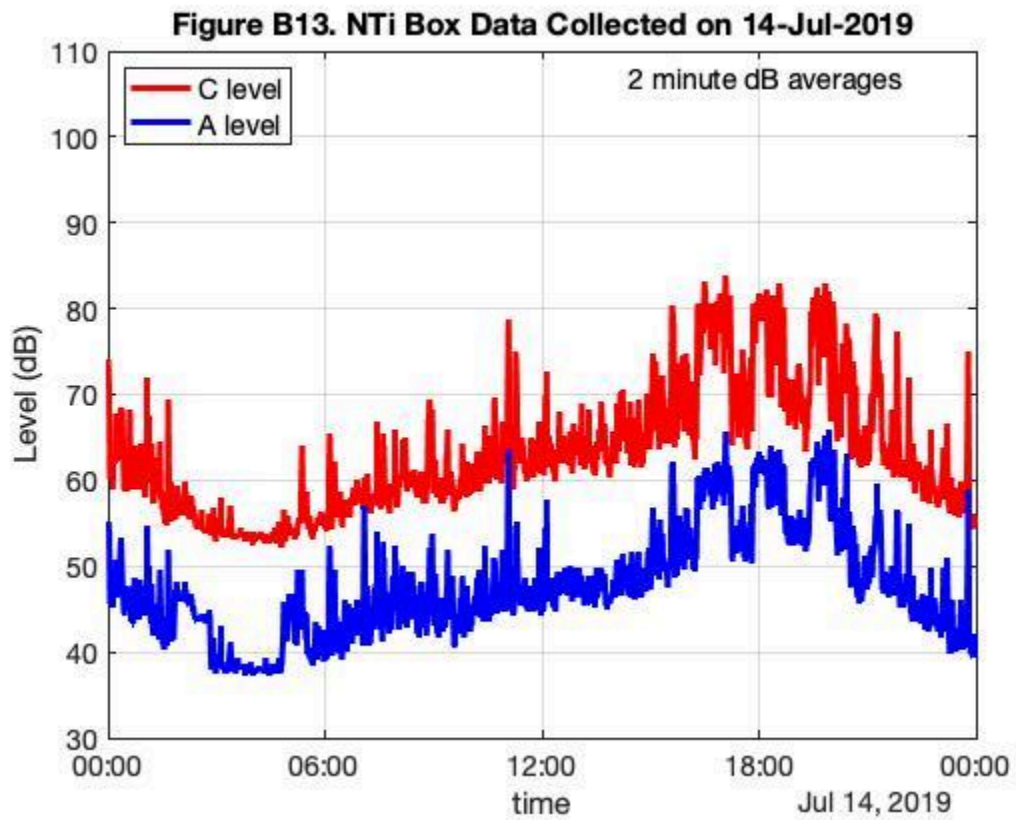
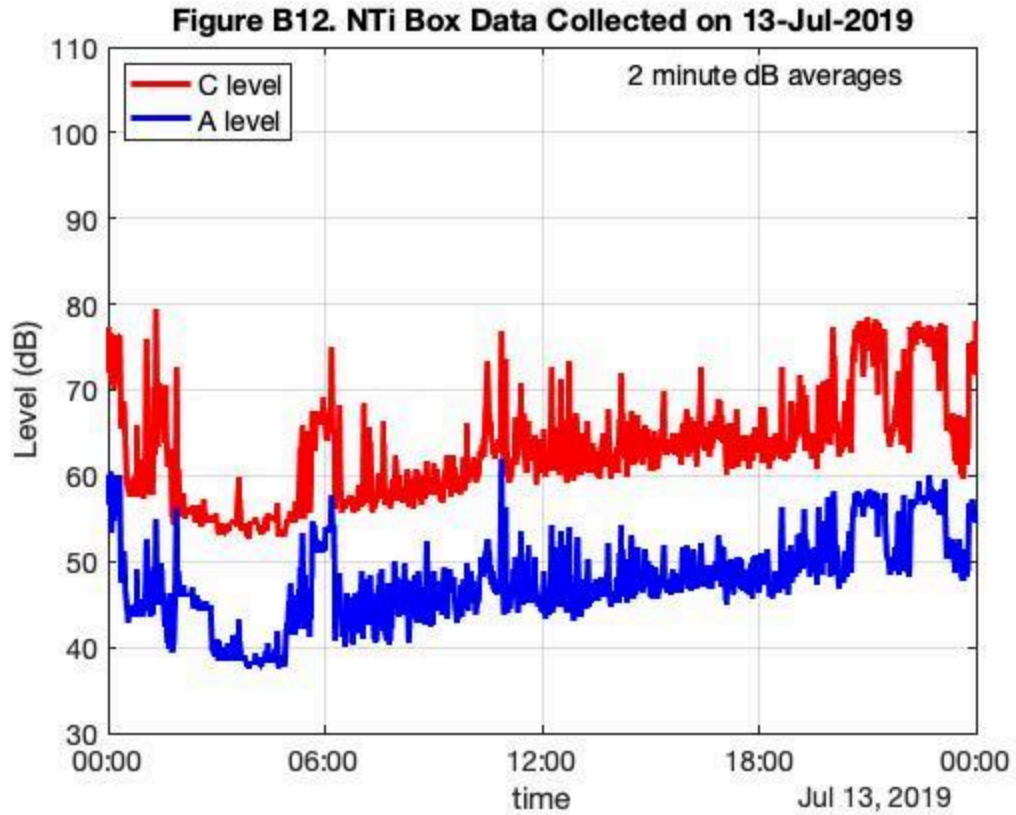


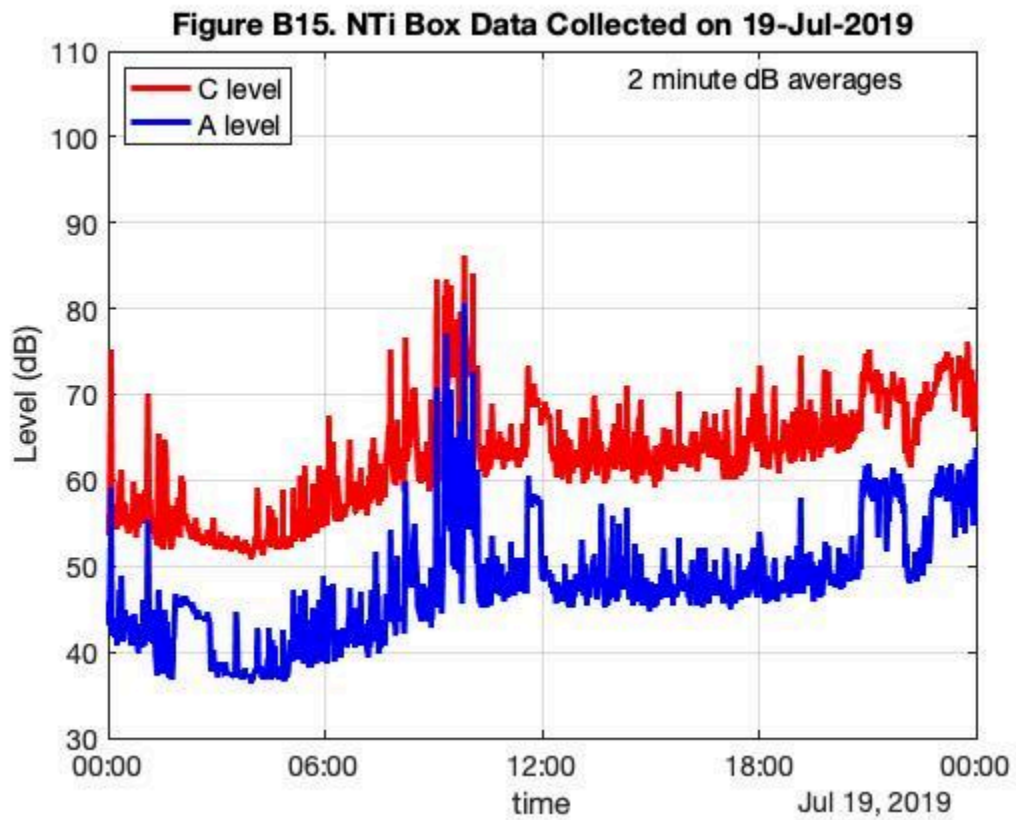
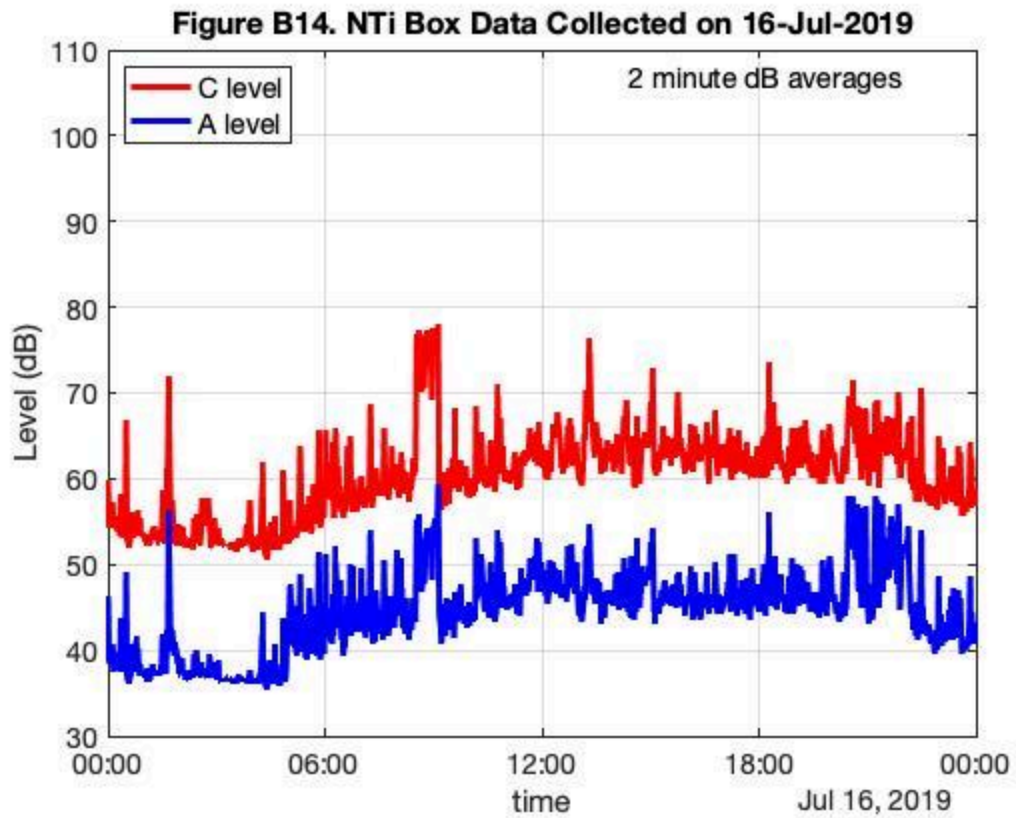


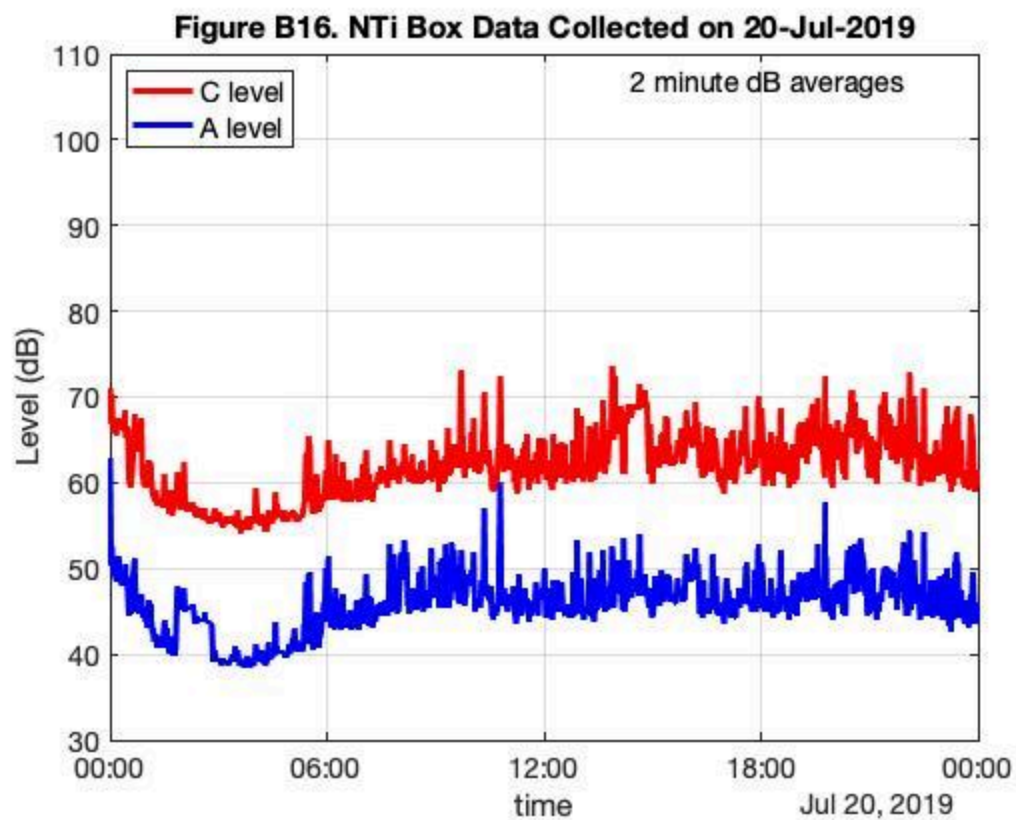












Appendix C. Measurement Locations and Notes

Information about area:

Three bars are in the area: BLU on the Water, Nautika and Finn's Harborside. These three locations all had music playing for both tests.

The first test on July 5th took recordings through the night covered the area closest to the BLU on the Water and Nautika.

The test on July 12th covered the area closest to Finn's Harborside.

Schedule on July 5, 2019:

Time	Location #	Description	Label
08:00 – 09:00	1	Widows Walk	WW
09:00 – 10:00	2	Hot Spot	HS
10:00 – 10:30	3	Condo Hot Spot	CH
10:30 – 11:00	4	Condo Corner	CC
11:00 – 11:15	5	Condo Back	CB
11:15 – 11:30	6	Directory Corner	DC
11:30 – 11:45	7	Parking Entrance for BLU	PE
11:45 – 12:00	8	Past Trestle	PT
12:00 – 12:30	9	Widows Walk	WW

Location 1 Widows Walk (WW):

7:57 – Started recording on the Widows Walk

8:17 – Talked to Mr. Gelineau

8:22 – Fireworks

8:32 – Music started, sounds faint, not the band yet just recorded music

8:33 – Train

8:35 – Opened the box to make sure that I did start it **For Box Data**

8:46 – Fireworks, three throughout the minute, coming from the Nautika direction

8:47 – Fireworks, four throughout the minute, coming from the Nautika direction

8:50 – Opened the box to make sure that I did start it again **For Box Data**

Note: Up at widows walk, there is a lot more wind

Location 2 Hot Spot (HS):

9:00 – Started recording at the hot spot in front of 88 King Street, on the sidewalk leading to the front door.

Note: The light pole has a Welcome to East Greenwich Flag that has a metal piece that bangs against the pole sometimes

9:07 – Train

9:12 – Train

Note: When people talk on the opposite side of the train trestle talking is echoed louder and is more audible than when they are on the same side as the equipment

9:16 – Can hear the band warming up

9:24 – Loud ladies yelling in a car

9:28 – Man blasting loud music in car

9:31 – Music started at BLU on the Water

Note: Cricket loud and close by

9:33 – Music is heard loud and clear, little to no wind

9:36 – Man yelled right in front of the system “WHAT ARE YOU DOING”

Location 3 Condo Hot Spot (CH):

9:57 – Started recording across the King street at the Condo’s hot spot. This location is almost directly across the street from Location 2.

10:03 – Loud bike

Note: Streets were quieter than the previous weekend, related to 4th of July maybe?

10:23 – Talked to stranger

10:24 – Music break, I could no longer hear music

Location 4 Condo Corner (CC):

10:27 – Started recording at the corner of the Condo where King Street meets Water Street. Recorded music is playing

10:33 – Boat motor is VERY loud

10:35 – Train; Large truck and obnoxiously large exhaust pipes passed by

10:38 – Mr. Gelineau takes reading

Note: Weird noise, sounds like a generator at the back of BLU. Could be their refrigeration unit according to the security guard

10:46 – Can hear the bass from the band

Note: Nautika also has a band playing

Location 5 Condo Back (CB):

10:56 – Started recording behind the condos, closer to condo's parking entrance

11:09 – Man yelling standing out the sunroof of a vehicle

Note: I can't hear BLU at this time

11:10 – Bikers pass

Note: The music I hear, comes out the back of Nautika. It gets difficult to hear BLU's normal recorded music in the back area bar because of Nautika's band

Location 6 Directory Corner (DC):

11:16 – Started recording in front of the Directory at the corner of King street and Water street, the corner closer to BLU.

Note: BLU music is audible, but when there is no traffic passing by so is Nautika

11:18 – Man grabbed the microphone and yelled into it saying "TESTING"

Note: Swarm of drunk people begin to come from Finn's Harbourside direction to BLU. Bar hoping but was this due to a band ending at Nautika? Seem's weird that the changing of bars happened all at the same time without cause

11:23 – Nautika and BLU are both audible

11:26 – Nautika overpowers the sound of BLU, only with some spots BLU becomes audible in spurts

Location 7 Parking Entrance for BLU (PE):

11:30 – Started recording in front of BLU on the Water, to the left of the electric pole and the right of the entrance of the valet parking. This is the same location that the employees measure sound levels for BLU

Note: Crowds of people are coming to BLU at this point, foot traffic and cars both

11:35 – Music off, cop gets out of car and walks into BLU

11:36 – Only car engines and people talking are audible, creating a muffled sound overall

Location 8 Past Trestle (PT):

11:44 – Started recording just past the train trestle on the side of the road closer to BLU. At this point music is still not audible, unsure if this is because the music was not turned back on yet or due to location

11:47 – Loud truck passes by; a lot of drivers are leaving with unsafe speeds; bikers as well. This is a key time to leave apparently

11:48 – Very drunk man talking on the other side of the trestle and then walks by the system. House owner and man begin yelling at each other

11:53 – Bikes

11:55 – Music back on, drunk man still yelling

Location 9 Widows Walk (WW):

11:59 – Started recording at the hot spot in front of 88 King Street. This is the same location as Location 2

12:19 – Firetrucks backing up

12:27 – Crowd begins singing with the band, bass guitar is clearly audible

12:29 – Cheering music ends; loud couple fighting/yelling across the street

Schedule on July 12, 2019:

Time	Location #	Location	Label
08:20 – 09:30	1	Fireman’s Club	FC
09:30 – 10:00	2	Queens st Castle st Corner	QC
10:00 – 10:15	3	Castle Street	CS
10:15 – 10:45	4	Queen Street	QS
10:45 – 11:00	5	Finn’s Parking Entrance	FP
11:00 – 11:15	6	Water St. & London St.	WL
11:15 – 11:45	7	London Marina	LM
11:45 – 12:15	8	Nautika Edge	NE
12:15 – 12:45	9	Finn’s Parking Entrance Final	FP

Location 1 (FC):

8:20 – Stopped touching the box system. This note is for the box data mostly

8:24 – Started measurements at the Fireman’s Club

8:30 – Super loud bass drum

9:05 – Train

Note: Many people asked about the system during this time, there were at least three occurrences of people talking near the system. This can either be found using the Tascam or ignored. Durations of talks were very short except one.

Location 2 (QC):

9:28 – Started measurements at the corner of Queen Street and Corner Street

Note: Accidentally turned on TASCAM on 20 seconds after the B&K was started, they are stopped at the same time so this can be fixed by cutting out the first 20 seconds of the B&K or just recognizing that there is a 20 second offset.

9:34 – Tow truck begins backing up and parking towards the back of the Fireman’s Club parking lot. Very loud, waiting for opportunity to tow someone by keeping the engine on.

9:39 – Train; Personally, the singing/music was hardly audible, I could hear the bass though.

9:44 – The engine is turned off and people in Finns can be heard enjoying their night

9:47 – Aircraft/plane flew over the system

9:50 – Car stops in front of system to ask some questions. At this point I realize that the band music had stopped, and prerecorded music is being played. I am unsure to when this started though.

Location 3 (CS):

10:02 – Started recording on Castle Street in front of house for sale

10:03 – Drunk man asked if I was channel 7

10:04 – Truck drives by

10:05 – Train; the duration that the train is heard for was much longer due to angle. Also, at this point the snare drum echoes and sounds like it is coming from Main street

10:08 – Music heard perfectly

10:13 – Oddly can hear one man over EVERYONE from Finn's

Location 4 (QS):

10:18 – Started recording halfway up Queen street; echo from music makes it appear that music is coming from the Fireman's club. Noticed that it is back to live music

10:25 – Police officer chatted with me for a bit

10:30 – Police officer left

10:34 – Train

Location 5 (FP):

10:48 – Started recording at Finn's parking entrance; Nautika is playing music at this time when Finn was not due to a break. Heard on TASCAM the song "This is how we do it" is Nautika

10:49 – Lots of foot traffic

10:52 – Talked to Mr. Gelineau for a bit

Note: Spotted by Finn as I left this location. Music may have been turned down

Location 6 (WL):

11:01 – Started recording across from the Rhode Island Clam, close to where Water street and London street meet

Note: There is a 18 wheeler truck across the street with the engine running

11:11 – I can only hear the low frequency tones

11:12 – Truck “exhales” air, engine revs, and the truck begins to leave

11:14 – Man stopped to talk to me

11:15 – Man from Finn’s dragging garbage can by

Location 7 (LM):

11:20 – Started recording in front of the East Greenwich Marina on London Street

11:24 – Biker

11:26 – Bike turned on at Finns, and drives toward the system passing at 11:27

11:33 – Band begins playing again

11:34 – Train

11:36 – Unusual bird chirp.

Location 8 (NE):

11:44 – Started recording slightly in front of Nautika at Finn’s parking lot edge

Note: Nautika’s music very faint, hardly audible

12:00 – Train; Nautika’s music is audible again

Note: The area seems pretty dead, very few people out tonight

12:02 – Only Nautika music, no Finn’s

12:09 – Two cars pull out next to system, with some music on

Location 9 (FP):

12:15 – Started recording in front of Finn’s at the corner of their parking lot entrance.
Song playing: “Bust a move”

12:22 – Finn’s music stopped, band begins packing up and Nautika is still playing music

12:24 – Man talking

12:31 – Nautika shuts off music, all music from all bars are off at this point

12:34 – Music from car

12:40 – Wind strengthens

12:44 – Truck leaving

Appendix D.

JAMES H. MILLER, ScD, PE

URI ADDRESS

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Department of Ocean Engineering
Narragansett, RI 02882

HOME ADDRESS

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EXPERIENCE

8/95 - present	UNIVERSITY OF RHODE ISLAND Narragansett, Rhode Island
1/06 - present	Professor of Ocean Engineering and Oceanography
7/08 - 6/11	Chair of Ocean Engineering
7/00 - 12/05	Professor of Ocean Engineering
8/95 - 6/00	Associate Professor of Ocean Engineering
6/11 – 8/13	NATO CENTRE FOR MARITIME RESEARCH AND EXPERIMENTATION La Spezia, Italy
7/12 – 8/13	Deputy Chief Scientist and Head, Strategic Development
6/11 - 6/12	Head, Department of Applied Research
8/87 - 8/95	NAVAL POSTGRADUATE SCHOOL Monterey, California
7/92 - 8/95	Associate Professor of Electrical and Computer Engineering
7/94	Tenure Awarded
8/87 - 7/92	Assistant Professor of Electrical and Computer Engineering

EDUCATION

6/83 - 8/87	MASSACHUSETTS INSTITUTE OF TECHNOLOGY WOODS HOLE OCEANOGRAPHIC INSTITUTION, Cambridge and Woods Hole, Massachusetts Joint Program in Oceanographic Engineering Doctor of Science.
9/79 - 3/81	STANFORD UNIVERSITY Stanford, California Master of Science in Electrical Engineering.
9/75 - 6/79	WORCESTER POLYTECHNIC INSTITUTE Worcester, Massachusetts Bachelor of Science in Electrical Engineering with Distinction.

NOTABLE ACCOMPLISHMENTS, ACTIVITIES AND HONORS

Dr. Miller is a Fellow of the Acoustical Society of America (ASA) and was President of the ASA for 2013-2014. In addition to 54 refereed publications in the area of acoustics, acoustical oceanography, sonar and bioacoustics, Dr. Miller has more than 130 other publications and 5 patents. In 2004, URI presented Dr. Miller with the Albert E. Carlotti Faculty Excellence Award for Research. In 1999, he was awarded the URI Marshall Award for Faculty Excellence in Engineering. He won the Naval Postgraduate School Menneken Faculty Award for Excellence in Scientific Research in 1993. He been Principal Investigator on more than 30 research projects in fields of ocean acoustics, noise, air acoustics, bioacoustics, acoustic tomography, signal processing and other areas funded by the Office of Naval Research, National Oceanographic and Atmospheric Administration, National Science Foundation and Naval Undersea Warfare Center. Besides the ASA, he is a member of Sigma Xi, Tau Beta Pi, Eta Kappa Nu, IEEE, TOS, SNAME, and MTS. He is a registered Professional Engineer (License #9595) in the State of Rhode Island.