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ARCHITECTURAL | ENVIRONMENTAL

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SOUNDSCAPE STUDY REPORT

for

CITY OF FORT LAUDERDALE FLORIDA

By

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Introduction

The City of Fort Lauderdale has evolved into a robust urban community with 24-hours each day of commercial activity, dense mixed-use activity centers, growing amounts of infill downtown housing, burgeoning destination retail, an active urbane nightlife, historic buildings, commuter rail transit, a street grid that is automobile and pedestrian friendly, and is home to the notable Riverwalk with an exceptional marine and pedestrian culture. This dynamic mix of uses, urban density, and high levels of activity with a benevolent climate that supports outdoor living leads to a complex soundscape with many desirable qualities. The City is looking to enhance compatibility among the different uses and stakeholders with different time schedules as the city continues to grow and become more complex.

Siebein Associates, Inc., in collaboration with the University of Florida School of Architecture, was engaged to conduct a study of the soundscape at multiple locations in the downtown area, designated activity centers, and locations that have been identified in collaboration with the City of Ft. Lauderdale Noise Control Advisory Committee. The study included 'sound walks' with Committee members and citizens in the designated areas, acoustical measurements of the soundscape, photographs, and maps of the areas under investigation. Short-term and long-term measurements of the soundscapes were conducted to assist in understanding the complexities of the soundscapes and how sounds change from early morning, throughout the day into the afternoon, and into the late evening. The acoustical data, field observations, and discussions with City staff, Committee members, and the general public, have been considered, and organized toward a comprehensive assessment of the areas of study in the City of Fort Lauderdale. This information is intended to support the work of the Noise Control Advisory Committee in making well-informed decisions on the priorities and balance for managing an active urban center with regard to shaping the soundscape. This report also provides recommendations for consideration to help improve compatibility among the various sound sources, entertainment venues, public spaces, residents and other stakeholders in the City of Fort Lauderdale. Fort Lauderdale's downtown, is unique in that there is both the 'main street' of Los Olas Boulevard and the second 'main street' of the New River and Riverwalk. Both are linked to transportation networks and host highly desirable pedestrian activities including dining, shopping, recreation, and nightlife. According to the Fort Lauderdale Downtown Development Authority (DDA), more than 50 developments are in the pipeline, some already underway, bringing more than 8,500 new residential units and 725,800 square feet of new restaurant and retail space (New York Post, February 2023). Fort Lauderdale is emerging as a unique model for growing a dense, demographically diverse, coastal urban lifestyle. As new residents come to Fort Lauderdale for the attractive mix of people, recreation, and entertainment they contribute to an active soundscape that includes all of the sounds found in complex urban environments including active socialization, gathering, special events of many types, cars, trains, boats, mechanical equipment, construction and amplified music. These sounds are balanced with the desire of residents to have normal repose inside their homes in the presence of activities in the urban core.

The current noise ordinance, Chapter 17 – Noise Control, of the City of Fort Lauderdale Code of Ordinances, designates A-weighted (dBA) sound level limits for daytime and nighttime hours with both A-weighted and C-weighted (dBC) maximum sound levels for use when measuring amplified sound. There is sometimes confusion about which sound levels and times of day are to be applied to different areas of the City. The measurement locations are also defined in the ordinance. The sound level limits and measurement procedures for foreseeable boundary situations are also defined in the ordinance. However, there are some indications of reported situations where sounds may be measured within the current sound level limits at points of enforcement, but are found as potentially disturbing at receiving locations in some

instances. A major focus of this work, as overseen by the Noise Control Advisory Committee, is to offer alternatives for consideration that can potentially be prioritized and implemented by the Committee toward enhancing sonic compatibility among the different uses as the city continues to grow.

The Soundscape Team including Siebein Associates, Inc., staff, and University of Florida faculty and students surveyed multiple locations, selected in consultation with the Noise Control Advisory Committee. Each site was visited multiple times during 2 weekends in the daytime, evening, late evening, and early morning hours. Each site was visited multiple times in February and again in April of 2023. Sound walks were conducted at each location. A soundwalk is a unique way of experiencing and measuring the acoustical aspects of urban environments. Consultants with sound measuring equipment walk through an environment documenting the sound levels, frequency content, sources of sound and other technical aspects of the soundscape while also discussing acoustical issues of concern with project stakeholders and observing the sonic and urban context. The sound walks in Fort Lauderdale included walks through the selected study areas with stakeholders to discuss issues of concern, their impression of possible strategies that could be implemented to enhance sonic compatibility among different uses, and to document the sonic context with sound level measurements, video recordings, and photographs at a variety of moments within the designated neighborhood locations. Two sets of unattended long-term acoustical measurements were also made. The first set was made at locations near entertainment venues where there had been acoustical concerns expressed in the past. The second set was made at locations near residential receivers where issue had been raised in the past.

METHOD

1. Sound walks were conducted with the soundscape team and residents, entertainment venue operators, City staff, and members of the Noise Control Advisory Committee through the neighborhoods in the designated study areas to document the range of conditions that are experienced daily. These soundwalks were made at different times of the day to qualify the different sonic conditions that occur throughout the day, evening, late night, and early morning on a typical weekend. Stakeholder concerns were noted and videos and photographs of the neighborhood conditions along with various spot sound level measurements were taken to qualify the types and levels of ambient and transient sounds in the neighborhoods.

2. Short-term sound level measurements were made of individual specific acoustic events to the extent that the sounds could be isolated and identified from the other sounds present at the time. This was done in the day, evening, late evening, and early morning hours at multiple sites within the designated study areas.

3. Long-term acoustical measurements were taken near identified sound sources and receiver locations. These measurements are taken continuously for 5 to 7 days at each of 12 locations. The data were used to calculate long-term average sound levels, document ambient sound levels, and identify sonic events that occurred during the measurement periods.

4. The data were analyzed, grouped, and presented to document existing conditions and to understand the quantitative sound levels of different sound sources, receivers and locations in the |City.

5. Three dimensional computer models were built of selected sound transmission paths to understand the relative sound levels experienced at grade and above grade at selected locations for different sound sources and receivers.
6. The current Noise Ordinance was reviewed relative to the measured data and documented concerns expressed by stakeholders.
7. Building infrastructure was observed at selected locations to understand how the building elements may contribute to sound propagation and to determine the potential for planning, zoning, and code adjustments to contribute to future enhanced sonic compatibility in new and renovated construction.
8. The data were synthesized and recommendations provided to address each issue for consideration by the Committee and City.

Sound Levels and Decibels

Sound is defined as a pressure disturbance in the air caused by a vibrating body that is capable of being heard or detected by the human ear. The average sound pressure level or equivalent continuous sound level (LAeq) of a time-varying sound is defined as the level of an equivalent steady sound at a specific location for the same measurement duration that has the same A-weighted sound energy as the time-varying sound. The maximum A-weighted sound level or LAmax is the greatest sound level measured on a sound level meter using fast time averaging during a designated time duration and an A-weighted filter.

An A-weighted sound level (dBA) is one to which an A-weighting filter has been applied. The A-weighting filter approximates the sensitivity of the human ear being less responsive to low frequency sounds. A-weighting deducts significant amounts of sound energy from the low frequencies preferencing the high-mid frequencies that the ear is most sensitive to. The mid-high frequencies are actually increased by (1.3 dB at the 2,500Hz frequency band) in the A-weighting process. Conversely, lower frequency or bass sounds are decreased by substantial amounts (-26 dB in the 63Hz Frequency band, -16 dB in the 125 Hz octave band, - 7 dB in the 250 Hz octave band among others). C-weighted sound levels filter out much less low frequency sound (-1 dB in the 63Hz frequency octave band) than A-weighted sound levels while both A and C weightings are more similar in the high frequencies. A 'flat' or unweighted measurement is referred to as Z-weighted. In this Z-weighted case, no weighting is applied to the measured sound levels in different frequency bands. There are no deductions or additions of any level in different frequency bands with the Z-or flat-weighting.

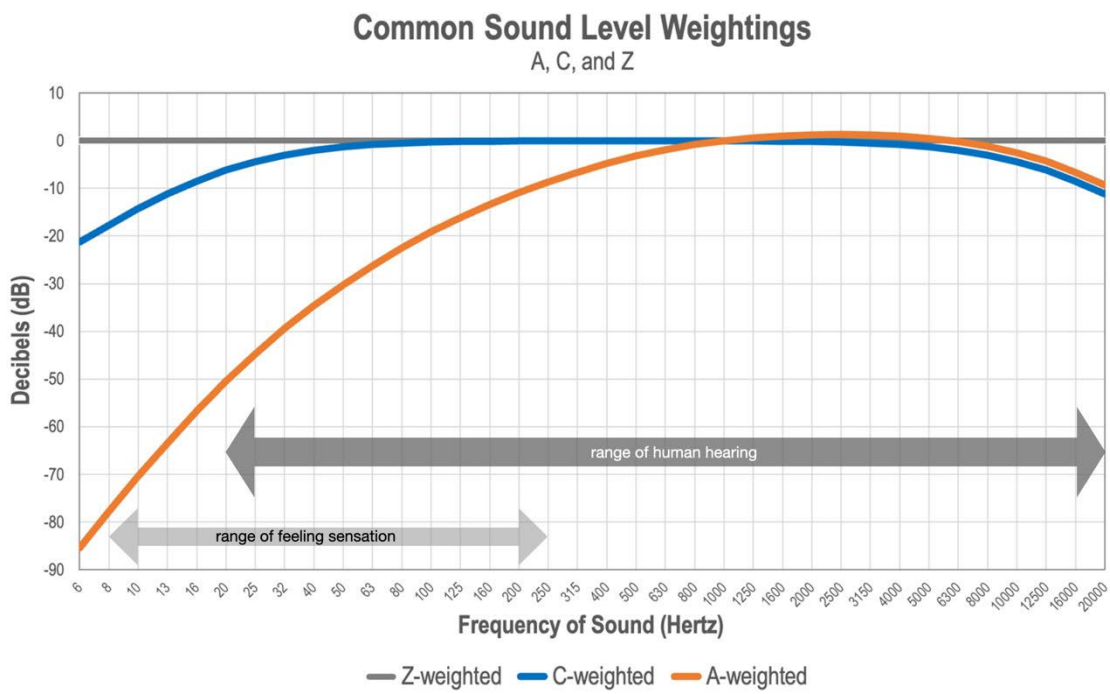


Figure 1. Common sound level weightings showing corresponding reductions in the 1/3 octave frequency bands for each weighting factor. Note that A-weighting adds approximately 0.5 to 1.3 dB to each 1/3 octave band sound level in the 1,250 Hz to 5,000 Hz 1/3 octave bands and deducts substantial amounts of lower frequency or bass energy from the overall sound level.

Sounds are typically measured in decibels. A decibel is 10 times the logarithm to the base 10 of the pressure disturbance in the air compared to the pressure at the threshold of human hearing. Decibels cannot be simply added by summation because they are logarithmic ratios. For example, 2 sounds of 50 decibels each added together result in a sound of 53 dB, not 100 dB as simple addition would achieve. A summary of the way that sounds with different sound levels are added together is shown in Table 1.

Table 1. Examples of the addition of sound levels (dBA).

Sound level 1	Sound level 2	Combined sound level	Explanation
50 dBA	50 dBA	53 dBA	When two sounds of equal level are combined, the result is a 3 dB increase in sound level
50 dBA	52 dBA	54 dBA	When one sound is combined with another sound that is 2-3 dB louder than first sound, the combined sound level is 2 dB louder than the louder sound
50 dBA	55 dBA	56 dBA	When one sound is combined with another sound that is 4-7 dB louder than the first sound, the combined sound level is 1 dB louder than the louder sound
50 dBA	60 dBA	60 dBA	When one sound is 10 dB louder than another, the combined sound level is approximately equal to the louder sound level

The differences in sound levels are not perceived by people linearly either. One sound must be 10 dB louder than another sound for it to be heard as approximately twice as loud as the first sound. A sound that is 0 to 1 dB louder than another sound is heard as approximately the same loudness as the first sound. A sound that is 2 to 3 dB louder than another sound is heard as barely louder than the first sound. A sound that is 5 to 6 dB louder than another sound is heard as noticeably louder, but not twice as loud as the first sound. A summary of the perception of the relative loudness of two sounds is shown in Table 2. An acoustic thermometer showing the sound levels associated with different sounds is shown in figure 1. The sound levels are measured in A-weighted decibels or dBA. An A-weighted decibel is one that has been adjusted so it corresponds to the relative loudness of middle level sounds as they are heard by human listeners. The low frequency or bass sounds are reduced by the A-weighting process and the higher pitch sounds that human ears are more sensitive to are increased slightly by the A-weighting process.

Table 2. Perception of the relative loudness of 2 sounds.

Difference in sound level between two sounds	The louder sound is perceived as ____ the quieter sound
0 to 1 dB	Not noticeably louder than
2-3 dB	Barely noticeably louder than
5-6 dB	Noticeably louder than, but not twice as loud as
10-12 dB	Approximately twice as loud as
15 dB	Approximately three times as loud as
20 dB	Approximately four times as loud as

In general terms, sound levels of 30 to 40 dBA are usually perceived by people as being relatively quiet. Normal conversation measured at approximately 3 feet from the person speaking is 60 to 65 dBA. Cars passing on a street or a residential air-conditioning unit are approximately 65 to 75 dBA. Loud night clubs and amplified music at concerts are often played at levels of 100 to 110 dBA.

Sounds can also be feelable. In particular, sounds below 250Hz can be felt through the mechanoreceptors that sense vibration and pressure as part of our sense of touch. High levels of low frequency sound, extending to frequencies as low as 5Hz, can be felt in the chest, legs, arms, and head – even though the sounds cannot be heard. Low frequency sounds from mechanical equipment or amplified music both within a building and outside a building can impart vibrations within building structural and enclosure systems that can be re-radiated as airborne sound, typically in the low frequencies, to the occupants inside the spaces. This reradiated sound can result in people feeling and hearing sound inside a space that may not be measurable, audible or feelable outside the space.

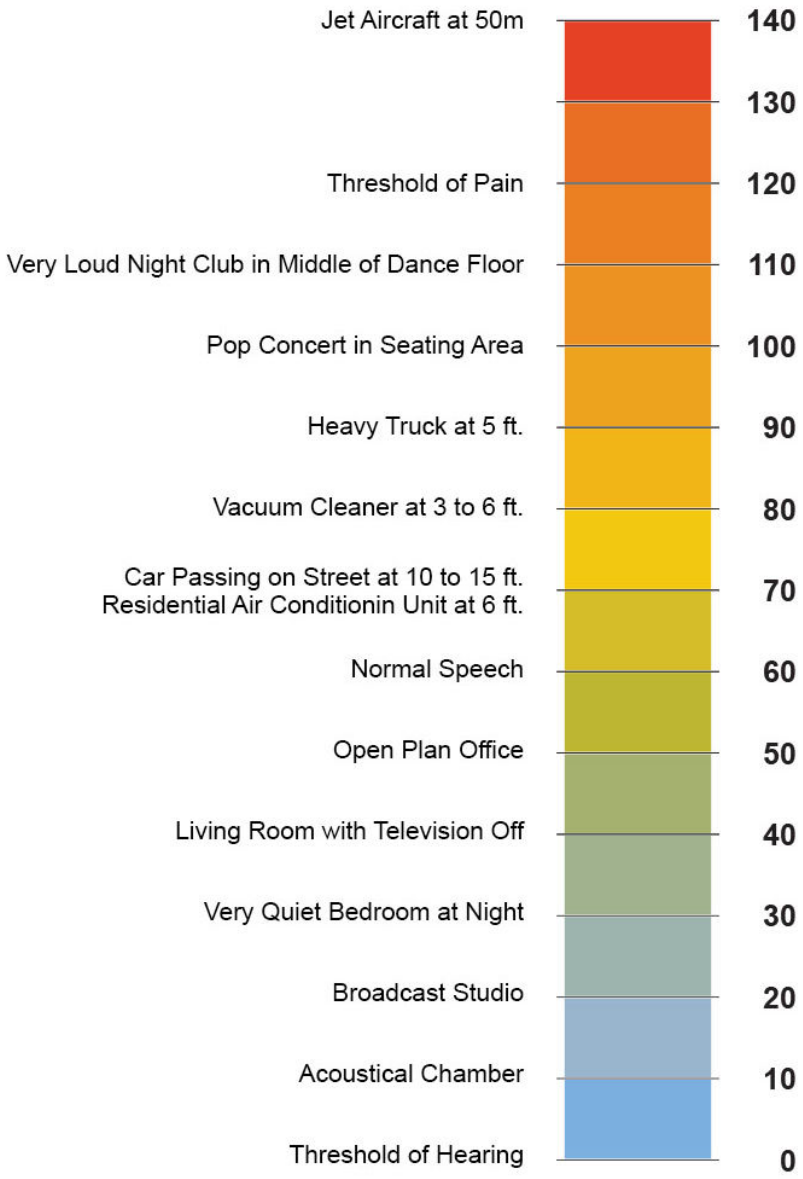


Figure 2. Acoustical thermometer showing the relative loudness in dBA of various sounds.

MEASUREMENT TIMES

Acoustical measurements were made by the Consultants during two trips to Fort Lauderdale. The first trip was from Thursday, February 16, 2023, until Sunday, February 20, 2023. The long-term meters were picked up on February 26, 2023 after recording data continuously for 9 to 10 days. The second trip began on Friday, April 21, 2023, and lasted until Sunday, April 23, 2023. The long-term meters were picked up on April 25, 2023 after recording data continuously for 5 days.

INSTRUMENTATION

Three types of acoustical measurements were made; long-term measurements of existing ambient sound levels; continuous measurements made during soundwalks at different times of the day and night; and short-term sound levels of specific acoustical events.

Long-term Instrumentation.

The long-term measurements were made with 3 Svantek SV 307A meters and 2 Rion NL-52 sound level meters on Trip 1 in February and with 6 Svantek and 2 Rion NL-52 and 1 Rion NL 32 sound level meters in April. The Rion NL-52 and NL-32 meters meet ANSI requirements for type I sound level meters. The Rion equipment was calibrated with a Larson Davis CAL200 pistonphone prior to and after testing. The calibration levels were 114 dBA and varied by < ±0.1 dB from the beginning of the measurement periods to the end. The microphones on the Rion meters were attached to an extension rod and the environmental cases strapped to trees or mounted on a tripod on a residential balcony approximately 6 ft. to 8 ft. above ground level.

The Svantek SV307A meters meet the IEC 61672-1:2013 for Class I sound level meters. The meters were set to the fast, A-weighted mode to acquire data. The Svantek SV 307A meters are internally calibrated before and after each use. The Svantek meters record files continuously during the measurement period and the files are uploaded to a cloud server for later use and analysis. The microphones were covered with wind screens and positioned approximately 6 ft. to8 ft (above reach height) above grade chained to trees or mounted on tripods or chained to balcony railings in residential units.

The meters were placed in secure weatherproof boxes and set to record sound levels every second for approximately 5 to 10 days. Graphs illustrating the A-weighted the maximum A-weighted and C-weighted sound levels (LA max and LC max), plotted vs. time for each time period are shown in Appendix A. Data were downloaded from the meter's memory card to a laptop computer and analyzed in our office.

Short-term Instrumentation.

The soundwalks and short-term measurements were made with Larson Davis 831 sound level meters as the basic instrumentation. These meters can record overall, octave and one-third octave band sound pressure levels over user programmed time periods. The meters meet ANSI standards for Type 1 sound level meters. Calibration of the meters with a Larson Davis Cal 200 calibrator occurred before and after each measurement period. The calibration levels were within ±0.1 dB from the beginning of the measurement period to the end. The meters were hand held or tripod mounted with the microphones on the meters at a height of approximately 5 ft. 6 in. above grade. Windscreens were attached to the microphones for all measurements. Overall A-weighted, C-weighted, and octave band spectra of significant acoustic events were recorded at all locations. The data were downloaded to desktop computers in our laboratory where the data were analyzed.

Soundwalk Instrumentation

The Larson Davis type 831 sound level meters described in the section above were also used to take the measurements during the soundwalks. The meters were handheld at approximately 5 ft. 6 inches above grade during the sound walks. A windscreen was attached to the microphone for all of the measurements. The same calibration procedures described in the section above were used for the meters during the soundwalks.

LONG-TERM ACOUSTIC MEASUREMENT LOCATIONS

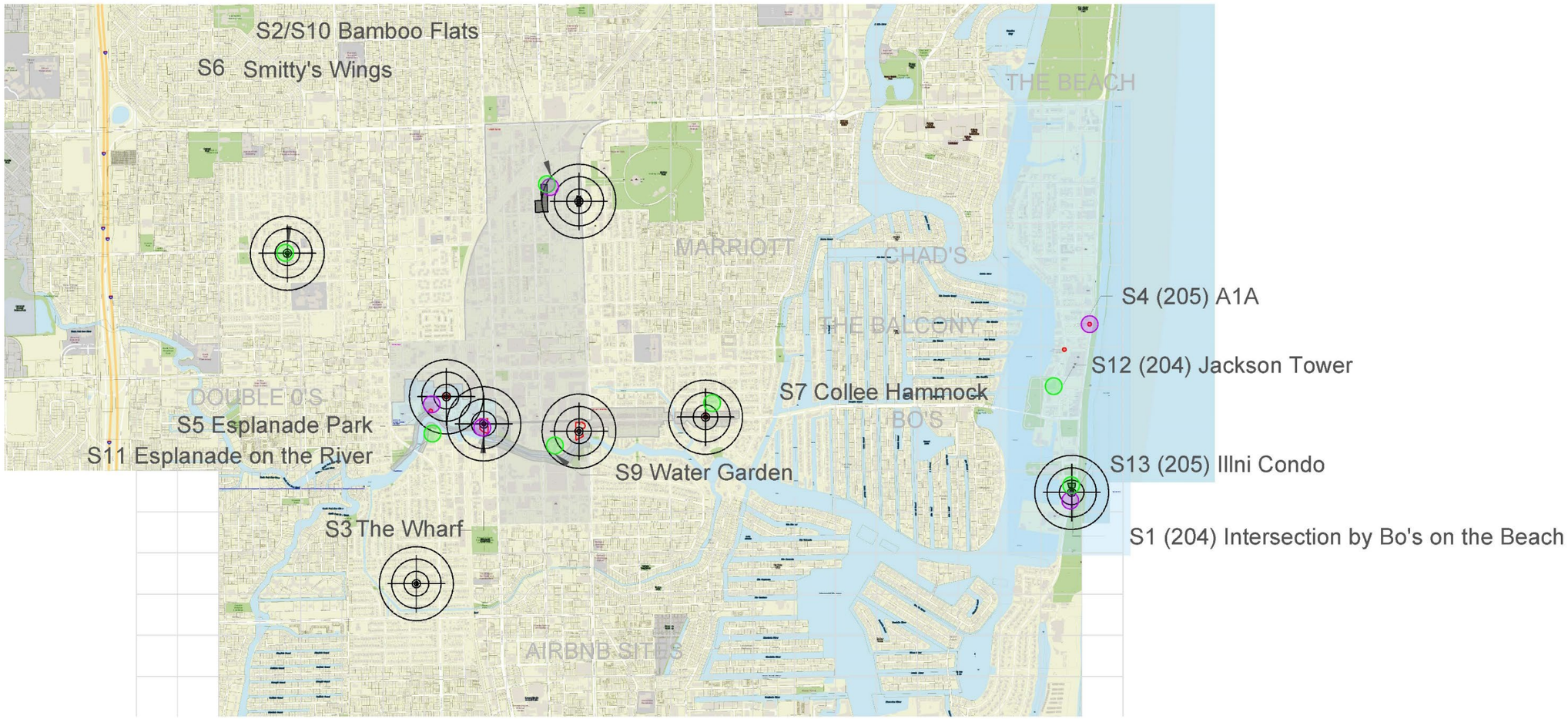


Figure X. Map of Ft. Lauderdale showing the long-term measurement locations. Purple circles indicate long-term meter locations from Trip 1. Green circles indicate long-term meter locations from Trip 2.

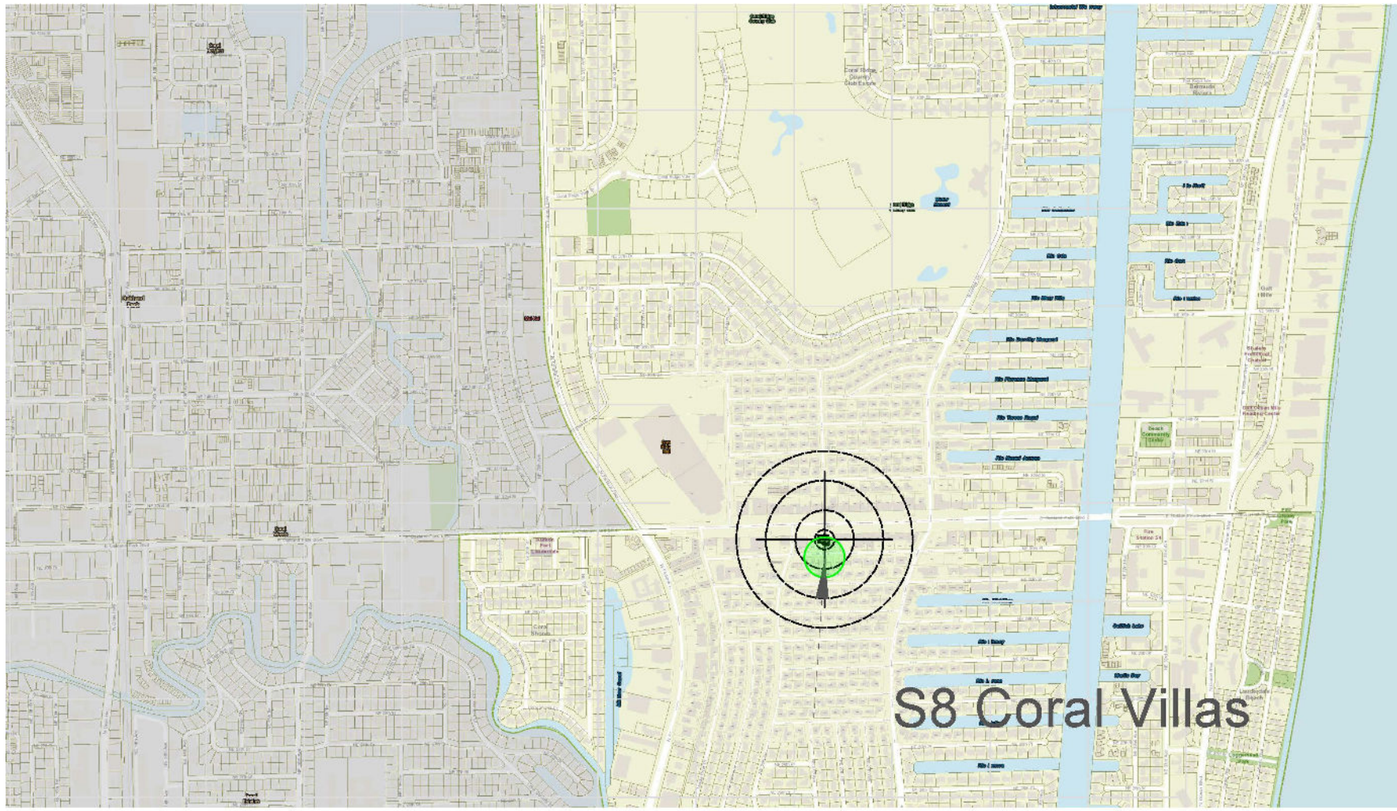


Figure X. Map of Ft. Lauderdale showing the long-term measurement location in the residential area outside of Truth Lounge. The green circle indicates this is a long-term meter location from Trip 2.

Long-term measurements were made during 2 trips to Fort Lauderdale. Measurement locations during the first trip were at locations near entertainment venues where noise issues had been identified in the past. Measurement locations during the second trip were at locations near residential receivers who had expressed concerns about entertainment noise in the past. Sound level meters were placed in each of the zones identified by City staff and the Noise Control Advisory Committee (NCAC) as being representative of the different sections of the City described above. Appendix A contains graphs of the data from the long-term measurements plotted as dBA and dBC vs. time for each day (24-hour period of time). Appendix B summarizes the long-term data in tables where the measured sound levels are broken out by the times of day and night when they occurred.

Trip 1 Measurement Locations

1. **The Riverwalk near The Wharf**
   Rion 7 was mounted in a tree in a small garden in the Riverwalk adjacent to the New River across a public open space from the Wharf. The Wharf is an entertainment district that is adjoined on 2 sides by residential/mixed use towers. There are openings between the towers across the New River to the south and into the city center via SW 1st Avenue to the north. The meter recorded sounds of activities in the public open space, boats and people moving along the New River and activities in and around The Wharf. This is a very active area with pedestrians moving along the Riverwalk all day long, the active Wharf and the water craft moving along New River.

2. **Esplanade Park between the Stage and the Restroom Building**

   Rion 8 was located in a tree between the stage and the Restroom Building in Esplanade Park. This is a relatively quiet location when there are no events in the park because it is reasonably far away from SW 2nd Street. There was a special event in the park on Saturday during the measurement week. There was also Jazz in the Park on the Sunday of the measurement week. The Himmarshee Entertainment District is located to the east of the park.

3. **Median of AIA on the north**

   Svantek 205 was located in a tree in the median on the northern side of A1A where it separates into separate northbound and southbound lanes. Data were only recorded for 4 days with this meter due to a malfunction of the external battery for the unit. Sounds at this location are primarily vehicles traveling on A1A.

4. **Median of AIA on the south**

   Svantek 204 was located in a tree in the median on the southern side of A1A where it separates into separate northbound and southbound lanes. Sounds at this location are primarily vehicles traveling on A1A and secondarily sounds from Bo's on the Beach and events in the beachfront park.

5. **Flagler Village.**

   Svantek 203 was located in a tree on the side of NW 4th Avenue street at the northern end of Flagler Village just south of NW 6th Street. The north side of Flagler Village adjoins an area that has several entertainment venues located in it, some of which play amplified music. Flagler Village is a relatively quiet residential development with a commercial area located on NE Flagler Drive. There is a train line on the west side of Flagler Village and there are several entertainment venues

located across the railroad tracks that have amplified entertainment in them. These venues are buffered from residential occupancies at the present time by distance and the commercial activities along NE Flagler Drive. Future development on open parcels in this area may need special planning to provide acoustical compatibility with the existing venues.

6. Smitty's Wings

A sixth sound level meter (Rion 7) was placed in a tree in a parking lot just west of Smitty's Wings. There was a technical error in the writing of the measured data to the meter hard drive so data were not available from this meter. The meter was successfully deployed during Trip 2 at the same location.

Trip 2 Measurement Locations

1. Illni Condominium upper floor unit balcony/Bo's on the Beach

Bo's on the Beach was identified as a source of noise complaints for residents living in the Illni Condominium in the past along with loud cars and motorcycles traveling on AIA. Bo's has an operable louvered roof and operable windows that are opened frequently while amplified music is played in the dining establishment. The music is usually played on weekends. The Illni tower is across an alley from Bo's on the Beach and residential units overlook the roof of Bo's. Svantek Green 205 was located on the balcony of a residential unit on the 10th floor of the building.

According to the resident, the music had been loud enough in the past to shake glasses in the cabinets, however it has not been that loud anymore. The resident stated that they have called the establishment when the music gets too loud and asks them to turn it down. According to the current noise ordinance, because this building is located within 200 ft of a commercial establishment, the residential sound limit would be 65 dBA during the day.

2. Jackson Tower 6th floor mezzanine/Rock Bar backyard patio

The Rock Bar was identified as a source of complaints for residents living in Jackson Tower in the past. The Rock Bar has an outdoor dining area to the east on A1A and a patio with a pool area to the rear. Residents have identified sounds coming from the pool area as being the source of amplified music that is heard. The east side of the residential tower has a direct line of sight both visually and acoustically to the rear pool area. There is a solid fence along the west side of the outdoor activity area that would possibly reduce sounds measured at 5 ft. from the property boundary to be within the sound level limits of the noise ordinance, while sounds can move over the top of the wall and propagate to the multi-story condominium across Seabreeze. Svantek Red 204 was located on the mezzanine walkway on the sixth floor of the building facing the Rock Bar and Sea Breeze.

Music from the Rock bar was plainly audible on grade and on 6th floor facing Rock bar. Bass music was plainly audible during afternoon hours when the long-term meter was placed at this location.

3. Bamboo Flats/Rose and other entertainment venues

Svantek 291 Pink was placed in a tree at the top of the fence separating one of the residential units on the north side of Bamboo Flats from the adjacent properties on the north. The location is diagonally across NE NE 8th Street from the measurement location. The Bamboo Flats neighborhood was described in the section on Trip 1 measurement locations.

4. Water Garden upper floor unit balcony/Yolo

Yolo has been identified as a source of noise complaints in the past for the residents in the Water Garden. Yolo has an outdoor area covered with a canopy that has amplified music. Measurements were taken on the balcony of a residential unit on the 26th floor of the Water Garden facing Yolo with Svantek 284 orange. Data were only available for 4 days with this meter due to a malfunction of the cord connecting the meter to the external battery. There is a direct line of sight from the balcony to Yolo. The lower floors of the Water Garden are partially blocked from a direct sound path to the entertainment sounds by the parking garage that is located between the 2 buildings. Furthermore, the ambient sound levels at grade are elevated compared to those above due to the presence of mechanical equipment and traffic on the streets at the street level.

The resident stated that on Friday and Saturday nights she typically has to wear ear plugs when she goes outside on the balcony and wears ear buds when she is inside the unit.

5. Esplanade on the New River upper floor unit/Himmarshee Entertainment District and The Wharf

The Esplanade on the New River is a multi-story condominium building that is located on the south side of the New River across from the Esplanade Park. The Himmarshee Entertainment District is located approximately 630 to 750 ft. to the north-northeast of the building. The Wharf Entertainment District is located approximately 1,100 ft. to the east-northeast. Svantek 282 Purple was located on the balcony of an upper floor unit in the building. There are clear direct sound paths from the balconies on the northwest, north and northeast sides of the building both entertainment districts and also to the Riverwalk and Esplanade Band Shell where special events are held in addition to Sunday Jazz Brunch in the park. Boats in New River with loud engines and/or playing amplified music also have direct acoustical lines-of-sight to the units. Interestingly, the configuration of balconies on multi-story residential buildings captures the direct sound from the sound sources. In addition, sounds propagating upwards strike the underside and side walls of the balconies are reflected back to the balcony increasing the perceived loudness of the sounds.

Sounds at this location were especially difficult when a night club that has since closed was operational. The amplified sounds, especially the bass sounds, could be clearly heard inside the units even when the large, hurricane patio doors were closed. Residents also spoke of how the sounds from the entertainment districts now last until 4:00 am when previously the limit was at midnight.

6. Colee Hammock/The Balcony and the service alley

Colee Hammock is a traditional residential neighborhood about ½ block off Las Olas Boulevard. The first row of residences are separated from the Las Olas commercial strip by a service alley. There are many activities in the service alley such as trucks coming to service the restaurants along Las Olas during night time hours that residents expressed concerns about as well as building equipment and amplified music. Rion7 was placed on an exterior balcony at a residence whose rear yard was along the alley. The residence was diagonally across the alley from The Balcony. There is a large opening on the rear of The Balcony covered with a screen mesh through which sounds propagate across the alley to the near by residences.

7. Coral Villas/Truth lounge

Svantek 203 was located in a tree at the edge of the driveway of a residence on NE 30th Place across the street and to the south of the rear of the Truth Lounge. Truth Lounge is located on East Oakland Park Boulevard which is a east-west roadway. Coral Villas is a relatively quiet residential area. Residents have complained about sounds from the Truth Lounge propagating to their homes in the past. Truth Lunge is an enclosed building with solid walls on the sides and rear of the building that face Coral Villas with several doors located in the walls. The front or north side of Truth Lounge is glass. Amplified sounds occur inside the closed building.

8. Smitty's Wings

Smitty's Wings is located on NW 6th Street which is a busy road on the edge of a low density residential district. Complaints from residents in the past were related to sounds from people parking a lot across the street from Smitty's and playing loud music in their cars while they gathered and talked. The sound level meter was originally located at this location during trip 1, but the data did not record and store properly, so the Rion 4 sound level meter was placed again at the location in a tree in the parking lot across the street from Smitty's where people congregate. Smitty's does have amplified music played sometimes, but this has not historically been a source of noise concerns from residents. Sunday afternoon/evening was identified as a time when noise-related activities occurred in the past near Smitty's.

SHORT-TERM ACOUSTIC MEASUREMENT LOCATIONS

A number of short-term spot measurements were taken throughout the city of specific acoustic events to isolate the events of interest from other background or intruding sounds to the extent that this was possible at each location.

A table that contains these measurement summaries as well as graphs of the sound level plotted vs. time for each event are contained in Appendix C. The specific locations are identified in each graph. ADD A MAP IN THE NEXT VERSION

SOUNDWALK MEASUREMENTS

A soundwalk is an acoustic measurement process where the consultants are outfitted with sound level meters and a method of taking notes on paper or digitally. The consultants walk through the City as a citizen does, and records the sounds as they move through the streets or areas. Soundwalks are performed to capture the experience of citizens as they inhabit the areas of interest, recording the sound levels, frequencies and .wav files of the soundscape in real time. The soundwalks were taken at different times of day during the measurement times.

Soundwalks were taken throughout the 2 weekends at different times and locations. Appendix D contains the soundwalk maps showing the locations of the measurements. It also contains graphs of the sound levels recorded on those sound walks. Soundwalks were taken around Bamboo Flats and the surrounding area, AIA and Seabreeze on the Beach, the Riverwalk and surroundings, Himmarshee Entertainment District, and Las Olas Boulevard along its entire length,

LONG-TERM MEASUREMENT RESULTS

Long-term measurements were made with sound level meters that continuously record sound levels from February 16-26, 2023 and April 21-25, 2023. The meters were placed at 13 locations selected by the Noise Control Advisory Committee as representative of key sound complaints in Fort Lauderdale. A summary of the measurements is included in Table 5. Graphs of the average sound levels plotted vs. time for each day are included in Appendix A. The data recorded were average sound levels or LAeq's, LAFmax and LCFmax when available and Day-Night Average Sound levels or LDN's in dBA that were calculated from the measured average sound levels.

S1 (204) was located a in the median by Bo's of the Beach off A1A. The LDNs ranged from 70-76 dBA. The range of average day time sound levels at this location varied between 68 and 85 dBA over the measurement period. This location is on grade at a main thoroughfare on the Beaches. It is adjacent to a restaurant. Sound levels tended to remain fairly consistent, picking up sounds from the traffic, wind, amplified music from venues and the motorcycles and loud cars on the road. Sound levels between 2am and 5am dropped off to approximately 47 dBA at the lowest to 70 dBA. Day time sound levels between 70-85 dBA were typical. At this location, it was difficult to see any major increase in sound level from amplified music during the evening hours. This is likely because the busy A1A tended to mask some of the sound levels. There were over 30 to up to 90 events above 90 dBC each day at this location, likely due to motorcycles and loud cars.

S2 (203) was located in a tree in the Bamboo Flats residential area located near the restaurants and nightlife. The LDNs at this location ranged from 62-65 dBA at this location with one day having a 72 dBA LDN from Feb 16-25, 2023. The range of average sound levels at this location varied between 53 and 75 dBA over the measurement period. This is a residential location adjacent to a neighborhood street so individual car pass bys would increase the sound level to the 70's. Sound levels during the weekend tended to increase around 10:00 pm and decrease around 2:00 am. Sound levels during the late evening and early morning hours were measured between 60-80 dBA. The sound levels began to decrease to 45-65dBA during the early morning hours between 3:00 am-7:00 am. Sound levels would then increase in the morning and remain fairly consistent until approximately 10:00 pm on the weekend. The increased sound levels are seen more clearly in the LCFmax (dBC) metric, with those levels increasing to 78-95 dBC and then decreasing to 60-75 dBC in the early morning. The A-weighted sound levels do not appear to increase dramatically during the late nights and early mornings, however, the increase in C-weighted sound level is clearly seen.

This indicates that bass sounds from amplified music are impacting the area, even though the middle and higher frequencies remain relatively the same as those measured at other times of day.

S3 (Rion 7) was located at rear of the Wharf. The LDN at this location ranged from 71- 79 dBA from Feb 16-25, 2023. Short-term sound levels increased in the day and night hours on Friday and Saturday to approximately 70-75 dBA, and tended to decrease around 2:00 am during the weekend to approximately 55-60 dBA. Tuesday had sound levels that rose in the evening around 10:00 pm and varied until approximately 4:00 am. This day had a sound signature that was unlike the other weekend days. Sound levels during the evenings without amplified music were approximately 55-60 dBA.

S4 (205) was located in the median at the intersection of A1A and Seabreeze at the northern point where A1A divides into separate northbound and southbound lanes. The LDN at this location ranged from 73-74 dBA. This location was another area in the Beach that is heavily travelled by automobiles. Day time sound levels ranged from 70-85 dBA. On Feb 19, 2023, a resident noted that a large number of motorcycles and ATV's had just passed by. Sound levels at that time were 102 dBA and 104 dBC. Many spikes in the vicinity of these levels are seen in the graphs, with 32 events above 100 dBC on that same day alone.

S5 (Rion 8) was located in a tree in Esplanade Park located between the stage and the Restroom building. The LDN at this location ranged from 61-66 dBA dBA from Feb 16-25, 2023. Day time sound levels tended to vary between 50-60 dBA and remained relatively constant during the evening and nighttime hours on the weekend with several spikes over 80 and 90 dBA. Night time sound levels drop to approximately 45-55 dBA during the late night and early mornings. Saturday between 11:00 am to 4:00 pm sound levels increased to 60-78 dBA during the chili cookoff.

S6 (Rion 4) was located in a tree in the parking lot adjacent to Smitty's Wings. The LDN at this location ranged from 69-71dBA dBA from April 21-25, 2023. This location is adjacent to a fairly busy road Sistrunk, in a residential area with Smitty's serving the local community. On Sunday April 23, 2023, sound levels increased to 63-87 dBA with a number of spikes over 90 and 100 dBA during this 3 ½ hour period. Night time and early morning sound levels tended to decrease to 45-65 dBA, with day time sound levels increasing to 58-65 dBA LAeq and 75-85 dBA LAFmax largely attributed to traffic on Sistrunk except for Sunday afternoon/evening.

S7 (Rion 7) was located on the 2nd story balcony in a residence at the rear of The Balcony and other establishments in the Colee Hammock residential area. The LDN's ranged from 64 to 65 dBA. The LAeq sound levels tended to remain fairly constant from day to night, however the LAFmax values show that louder specific acoustic events were taking place. The fairly constant LAeq is typical of a location near HVAC units that are on almost constantly. Saturday – Sunday shows a decrease in sound level around 1:00 to2:00 am from 60-70 dBA, with quieter sound levels between 2:00 am to7:00 am ranging from 50-60 dBA. There are a number of spikes over 70 and 80 dBA during the late night and early morning hours. The resident at this location observed that the music from the venues was not necessarily an issue at this location. The music was heard by residents who lived closer to the Balcony. Their street was apparently being disturbed by delivery trucks, cleaning trucks, etc. using the alley at times during the early morning hours.

S8(203) was located in a tree at the rear of the Truth Lounge in the Coral Villas residential neighborhood. The LDN's varied from 63-65 dBA. Sound levels tended to increase during the day and decreased during the evening. Day time sound levels ranged from 65-80 dBA LAFmax. On Saturday evening, the sound levels increased to approximately 75-80 dBA LCFmax around 11:00 pm, while the A-weighted sound levels were 55-70 dBA LAFmax. Sound levels from Friday early morning were also raised to 76-80 dBC from 12:00 am-2:00 am, and began to decrease and level off around 3:00 am through 5:00 am. The amplified

music is seen using the C-weighted metric at this location more so than the A-weighted sound levels. On Monday, there were a number of events over 90 and at 100 dBC throughout the early morning and day time hours at this location.

S9 (284) was located on the balcony of the Water Garden on the 26th floor. The LDN's varied between 68-70 dBA. Day time sound levels ranged from 65-75 dBA and 75-90 dBC. Sound levels tended to reduce in the early morning by approximately 2:00 to 2:30am and stayed low until approximately 6:00 am with levels in the high 50's and low 60's dBA as the quietest sound levels. The resident explained that Friday and Saturdays were typically the noisiest and that she needed to wear ear plugs outside and ear buds inside to maintain acoustical comfort. The graphs for Friday and Saturday do not show an increase in sound level in the late night hours that was seen in many of the other locations. On Monday at this location, there was an increase in sound levels in the morning and early afternoon.

S10 (291) was located in a tree in a residential courtyard that adjoins the lively entertainment area in Bamboo Flats. The LDN's ranged from 61-63 dBA. On Saturday, sound levels increased around 10:00 pm and stayed elevated until past 2:00 am (80-90 dBC and 60-70 dBA), then lowering to (48-60 dBA and 58-70 dBC) until about 6:00 am. Day time sound levels tended to range from 55-70 dBA and 65-80 dBC. There were a number of events that went over 90 dBC during the late night and early morning hours.

S11 (282) was located on the balcony of an upper level unit at the Esplanade on the New River Condominium. The LDN's ranged from 68-70 dBA. This location sits across the water from Esplanade Park, The Himmarshee Entertainment District is further across the river to the north. The Wharf is to the east approximately 1,100 ft. up the river and across from the River Walk. It is also located along the waterway and as such, boats with amplified music come along the waterway. According to the resident, the amplified music from the entertainment districts, boats traveling on the river and Jazz in the Park is heard through the windows at this location. It was mentioned that at this location previously, the amplified music was finished at 12 midnight. Now with the revision of the entertainment district requirements, amplified music is played until 4:00 am. The resident stated that it is difficult to find respite at night. Data from this location appears to generally agree with the resident's observations. There is an increase in sound level starting around 10:00 pm on Saturday that stays consistent through approximately 4:00 am (65-70 dBA and 73-78 dBC), then gradually decreases. Sound levels are lower from approximately 5:00 am to 7:00 am with levels of 55-68 dBA and 68-75 dBC. Because the sound levels fall off around 4:00 am, it is assumed that the Himmarshee district is a major contributor to the sound level at this location, as some of the other nearby entertainment establishments close earlier than 4:00 am.

S12 (204) was located on the mezzanine balcony on the 6th floor of Jackson Tower. This location was chosen to take representative sound levels measurements of sounds that residents in living units above experience that are in close proximity to the entertainment district. The LDN's at this location ranged between 72 dBA all 3 days. Elevated sound levels were recorded on Saturday between 2:00 to7:00 pm, (85-95 dBC) and 70-80 dBA. This was also recorded on Sunday from 4:00 -7:00 pm as well. There appears to be an increase in sound level around 11:00 pm on Saturday to 85-95 dBC and 70-80 dBA. The level decreases around 1:00 am.

S13 (205) was located on an upper floor balcony at the Illni Condominium overlooking the roof of Bo's on the Beach. The LDN's ranged from 69-70 dBA. Sound levels tended to increase in the late afternoon from 5:00 pm through 9:00 pm on Saturday and Sunday. Several residents stated that during the times when the measurements were taken, the louvered roof of the restaurant was left closed. This condition was studied in a 3D computer model to simulate sound levels if the louvered roof were open compared to being closed. Results from that analysis are presented in section X. Sound levels during this time (5:00 -9:00 pm) ranged

from 70-80 dBA and 83-95 dBC. Sound levels then decrease to 65-75 dBA and 70-80 dBC. A large number of events are recorded in this location with sound levels above 90 dBC, some of which are attributable to loud vehicles on AIA and Seabreeze.

Table 5. Summary of Day-Night Average Sound Levels (LDN) (dBA) at the long-term measurement locations for Trips 1 and 2.

Meter	Date	LDN, dBA
Riverwalk Near The Wharf		
Rion 7	1Feb2023	73-79
Esplanade Park Between Rest Room and Stage		
Rion 8	16-Feb-23	61=66
Bamboo Flats on Street		
Svantek 203	16-Feb-23	62-72
Median in A1A South on the Beach		
Svantek 204	17-Feb-23	70-76
Median in A1A North on the Beach		
		73-74

Meter	Date	LDN, dBA
Svantek 205	17-Feb-23 thru 20-Feb 23	

Meter	Date	LDN, dBA
Parking Lot Across from Smitty's Wings		
Rion 4	21-Apr-23	69-71
Colee Hammock near The Balcony and Service Alley		
Rion 7	21-Apr-23	64-65
Coral Villas near Truth Lounge		
Svantek 203	21-Apr-23	63-65-

Water Garden Upper from Living Unit		
Svantek 284	21-Apr-23	68-70
Bamboo Flats in Yard Closest to NE 8 th Street		
Svantek 291	22-Apr-23	61-63

Meter	Date	LDN, dBA
Esplanade on New River Upper Floor Living Unit		
Svantek 282	21-Apr-23	68-70
Jackson Tower 6th Floor Mezzanine		
Svantek 204	22-Apr-23	72

ILLNI Upper Floor Living Unit		
Svantek 205	21-Apr-23	69-70

THE FORT LAUDERDALE SOUNDSCAPE

Neighborhood and District Discussion

The soundscape team worked closely with the Noise Control Advisory Committee to identify areas within the greater Fort Lauderdale area that were representative of locations where acoustical issues have been historically identified. There is a desire to explore the soundscape in these areas to identify potential strategies and regulations that could help to balance sounds from entertainment establishments and other sources and the residents who live near those establishments that sometimes find the sounds disturbing. Some of the locations are within or adjacent to designated entertainment districts and others are at or near establishments in commercial districts that are adjacent to residential occupancies and neighborhoods. The study locations represent a range of occupancies including single-family residential neighborhoods, low-rise residential neighborhoods, high-rise residential and high-rise mixed-use buildings. The locations also represent the range of conditions in Fort Lauderdale including the urban core, beach areas, arterial roads, and low-density residential fabric.

Entertainment Districts

The City of Fort Lauderdale has implemented, through the Code of Ordinances, Special Entertainment Overlay Districts (Chapter 5: Alcoholic Beverages, Article III Special Entertainment Overlay District). These special areas are located in urban areas with mixed uses noted as Regional Activity Centers (RAC) and are intended to:

> *... create the opportunity to and encourage the development of areas which promote the cultural, economic educational and general welfare of the people of Fort Lauderdale in conjunction with the development of areas catering to and promoting tourism and providing entertainment centers for the utilization and enjoyment of the public.*
>
> Sec 5-51. Code of Ordinances, City of Fort Lauderdale

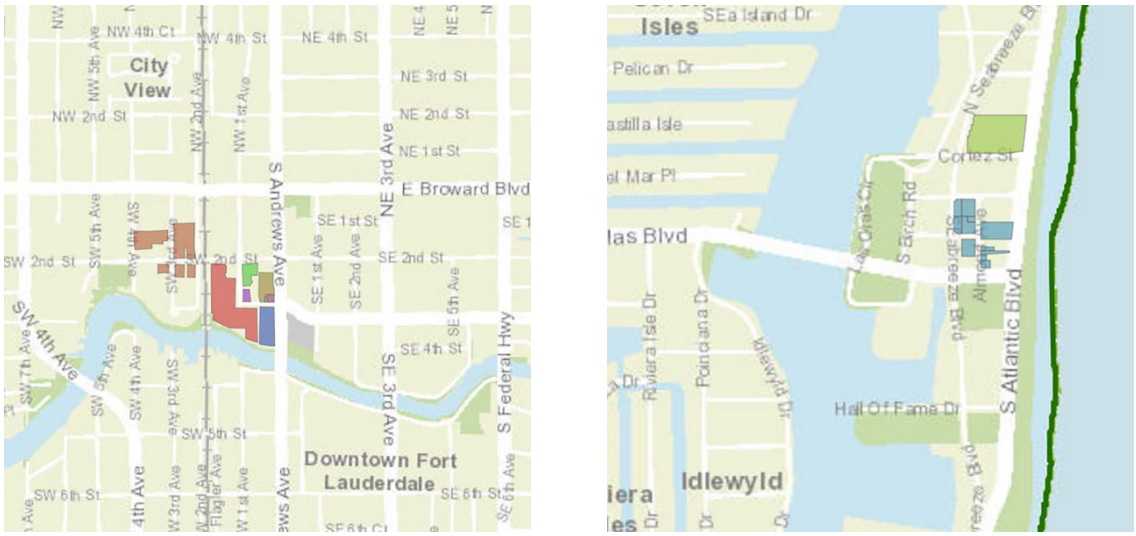


Figure 3. Maps showing Downtown (left) and Beach Entertainment Districts.

As illustrated in the maps in Figure 3, the special overlay districts are generally limited to individual properties or a collection of properties within a single urban block. Amplified music generated in the overlay districts is given specific limits crafted to specific hours, days of the week, and any holidays allowing activities to occur until 2:00 am on weeknights and 3:00 am on weekends and holidays. Sound level measurements taken to evaluate compliance with the ordinance are designated to be taken at five feet (5') from the property line of the sound source. The measurement duration is a 30 second period and there are to be no less than three (3) 30 second measurement durations. Measurement of the Lmax (maximum level) during the 30 second period is used to determine if the sound is in compliance with the code. A-weighted or C-weighted Lmax levels may be used to evaluate the sound based on the limits and times of day/week graphed in Figure 4 below.

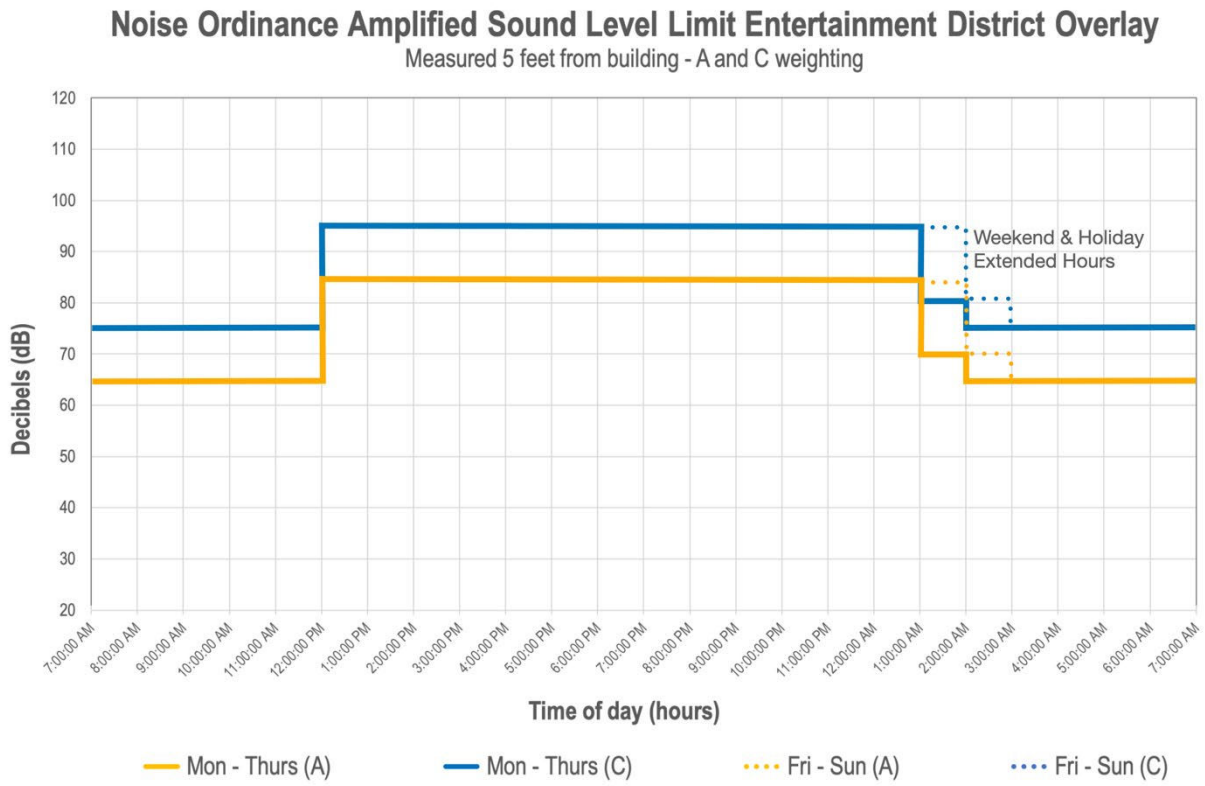


Figure 4. Allowable amplified sound levels within Entertainment District Overlays. The blue lines are for C-weighted sound levels (dBC). The orange lines show the limitis for A-weighted sound levels (dBA).

The Soundscape Team traveled with code enforcement officials on sound walks, observed various acoustic event spaces, talked with stakeholders, and measured sound levels at multiple times during the day and night, using the criteria in the Ordinance in addition to other sound level metrics which were stored for presentation later in this report. The equipment being utilized by the noise enforcement staff is not capable of recording or storing data so the person measuring must visually observe the sound levels over the designated 30 second period while the level is rapidly changing constantly over that time. When code enforcement officers observe what they believe to be the maximum level, they write that down on a piece of paper and then take two or more additional 30 second measurements to determine the maximum sound level. The meters they are using only measure A-weighted levels and are not capable of measuring C-weighted levels. As noted previously, the C-weighted sound level is a better measurement to use in cases where low frequencies are prominent in the amplified sound because it does not deduct substantial amounts of sound in the lower or bass frequencies the way that the A-weighted sound levels do.

The Soundscape team conducted multiple sound walks in these entertainment districts and adjacent areas on weeknights and weekends in February and April of 2023. The sound walks occurred during the mornings, afternoons, early evenings, late nights, and early morning hours allowing a full contextual evaluation of the soundscape as daily activities change. The team cataloged many notable acoustic events and identified sound levels that are representative of the ambient sounds at multiple locations in the entertainment districts. Summarized sound levels are included for specific locations in the entertainment overlay districts in this section in addition to the full data sets that are included in the appendices to this report.

Ambient Sounds around the Riverwalk and Entertainment Overlay Districts

The urban center of Fort Lauderdale is a bustling urban hub. Ambient sounds are dominated by people talking as they walk through the city, breezes in in trees, automobiles moving through the city, bridge crossings, fountains, mechanical equipment in the many large buildings, and various amplified music sources from commercial establishments. Even in quieter evening hours ambient sounds, exceed the residential nighttime sound level limit of 50dBA. This was generally true for many of the measurements taken around the Special Overlay and Commercial districts surveyed,

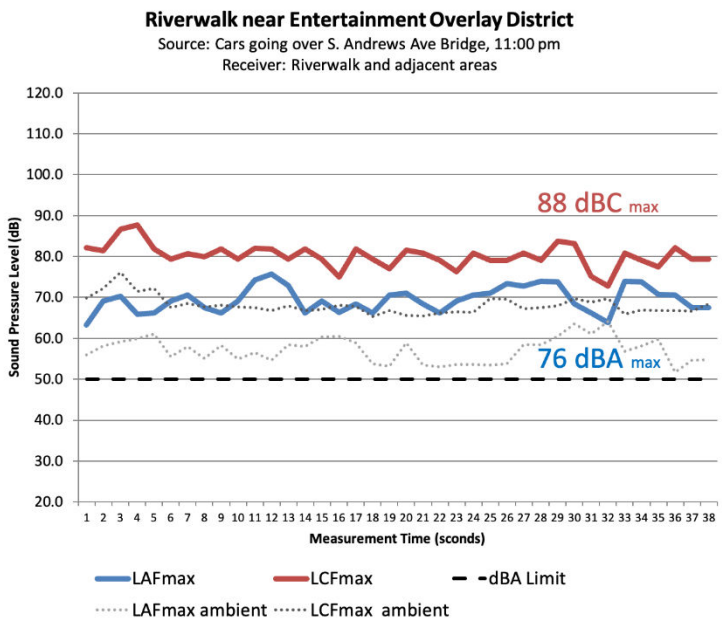


Figure XX. Cars transit the South Andrews Avenue bridge along with ambient sounds around the Riverwalk and Downtown. Please note that the cars driving on the bridge exceed the residential nighttime sound level limits of 50 dBA by 15 to 20 dB or 65 dBA by 5 dB or more.

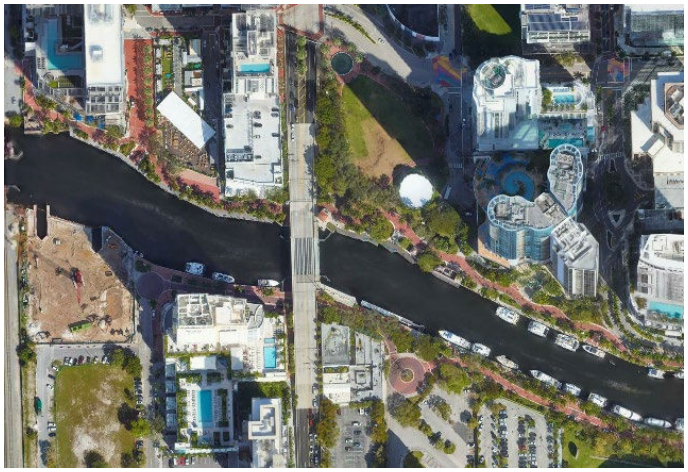


Figure XX. Andrews Street bridge showing proximity to residential high-rise buildings.

Measurement data shows that cars transiting the bridge can be quite loud and clearly audible against the ambient sound levels measured. The measurements were taken at a distance of approximately 100' from the bridge. The cars themselves were not loud or playing loud music but rather the primary sound is from the tires rolling over the steel grating of the drawbridge.

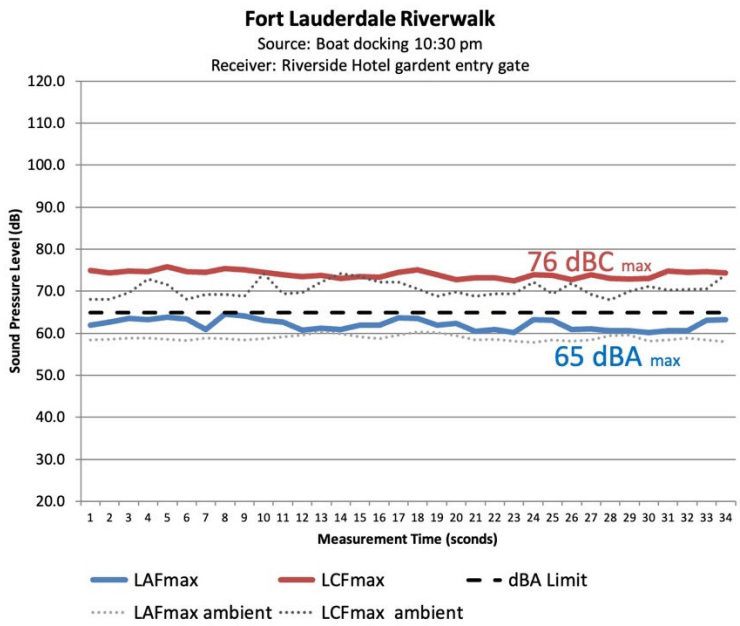


Figure XX. Measurement of large commercial boat docking near the Riverside Hotel. The sound levels are very close to the ambient levels with the lower frequencies somewhat above the ambient. Docking is louder than general operation and the duration is typically less than 10 minutes.;

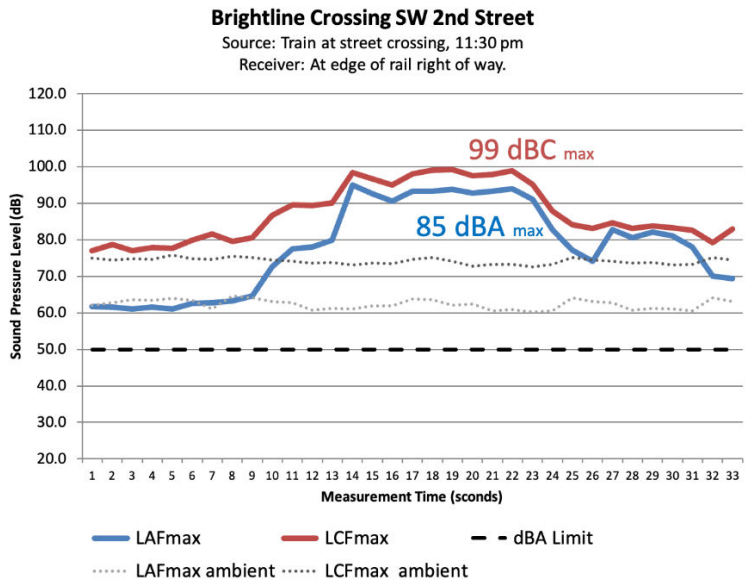


Figure XX. Measurement of the Brightline commuter rail transiting SW 2nd Street.

The train event consists of the warning bells and low frequency sound prior to the train arriving which are indicated in the measurement from 1 to 8 seconds – approximately 60 dBA. When the train passes, it is quite a short time (from 8 seconds to 33 seconds) with a substantial increase in both A and C weighted levels. It is important to note the large difference between A and C weighted levels as the train approaches – approximately 16 dB. This is an indicator of the low frequency sound radiated from the ground and rail surfaces as the train vibrates those surfaces.

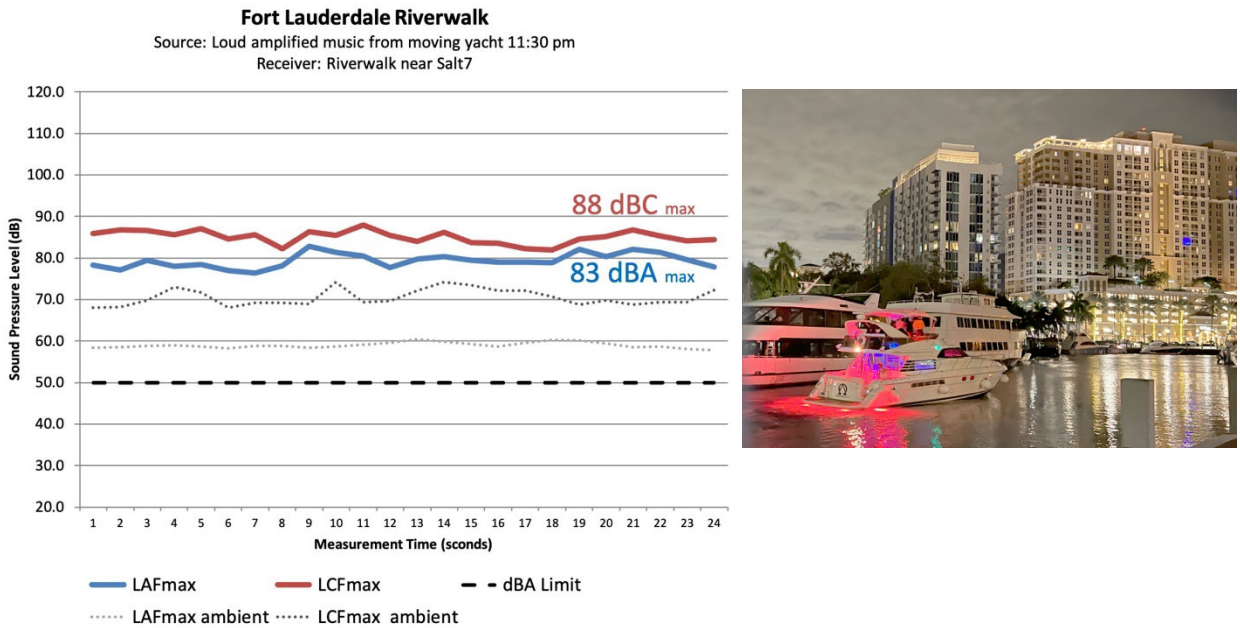


Figure XX Sound levels and image of loud music from yacht traveling down the New River at approximately 11:30 pm.

With the requirement for slow-speed no wake navigation, it took some time for the yacht to clear the downtown area, perhaps 20 to 30 minutes. During the time of the measurement the boat was clearly audible as the primary and dominant sound source in the Riverwalk District.

Riverwalk at the Wharf

The Wharf is an open-air restaurant and entertainment establishment located at 20 West Las Olas Boulevard and spans a city block between Los Olas Boulevard and the New River. The site is bounded by multiple tall and mid-rise buildings with mixed-use commercial/residential, commercial, and parking garage uses. The site is located within the Downtown Reginal Activity Center (RAC) and the site is designated as a *Special Entertainment Overlay District*

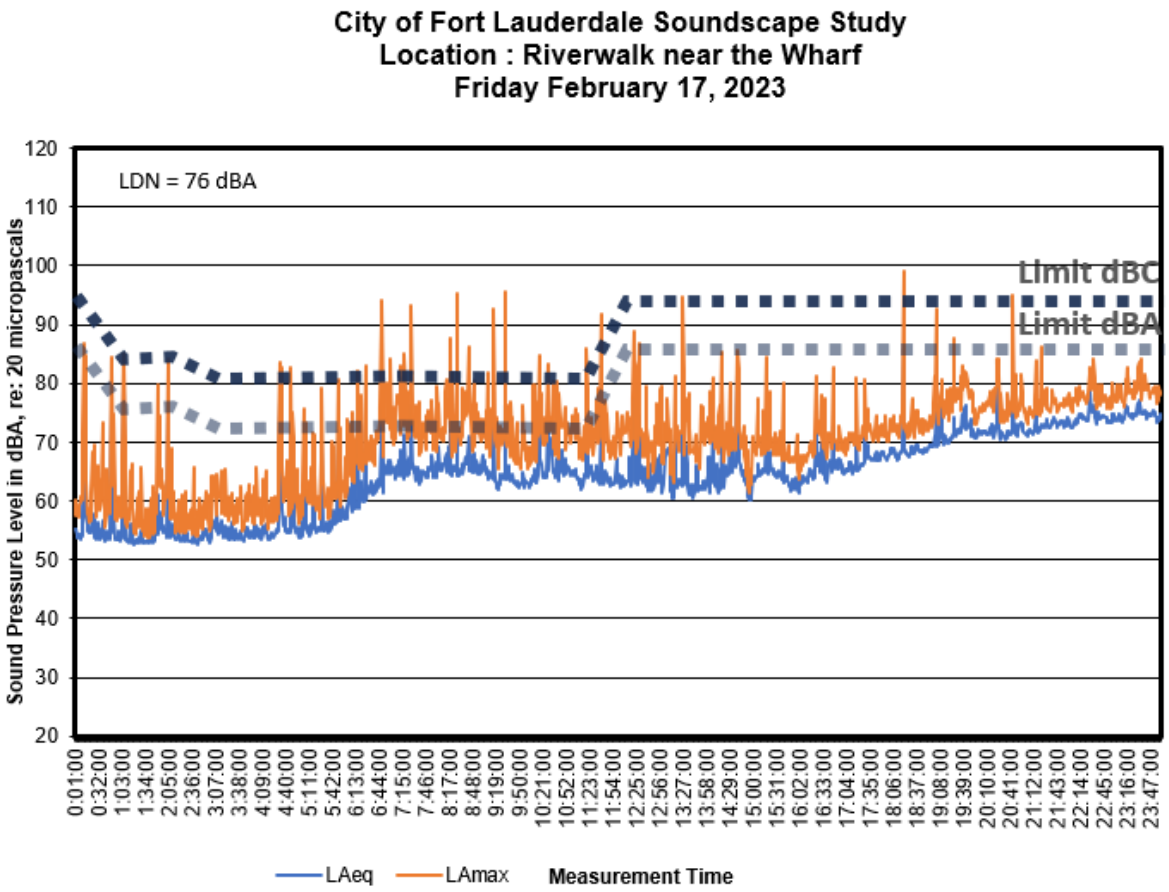


Figure X. Graph of overall A-weighted sound levels measured on the Riverwalk near the Wharf. The short-term transient sounds shown as "spikes" in the graph are from boats passing on the waterway, pedestrians or others playing music as they walk along the Riverwalk, sounds from boats passing playing music and other short-term sources of sound. There is a general increase in sound levels shown by the blue line during times when the Wharf is open that remains below 80 dBA at this location indicating that The Wharf is operating within the requirements of the ordinance.

It has been expressed by some residents living near the Wharf, that they clearly hear the music, that it is typically low frequency sound they hear, and that it can be disturbing even when measurements at the sound source indicate the Ordinance levels are being met.

Measurements conducted at the Wharf at various locations around the open-air structure at five (5) feet from the building (in this case a wooden fence) were generally in compliance with the sound level limits of the noise ordinance. Measurements were conducted at various times throughout the 24-hour day including late night and early morning on weekdays and weekends. Continuous noise monitoring was conducted at the site for a period of one week. Measurement results are summarized in Figure XX above.

Figure XX. Aerial view of the Wharf looking south.

The context of high and mid-rise structures around the open-air venue has a substantial impact on how sound radiates from the source into the city. There are four dominant phenomenon that effect the loudness and frequency content of sound in dense urban environments that might be heard at a given residence or receiver location in the vicinity of the sound source.

1. **Acoustical line of sight** is the primary path from the sound source to the receiver and in this high-rise context, multiple residences have a direct line of sight from their balcony or window to the Wharf, which is also a direct, unobstructed sound path from the source to the receiver.
2. **Reflective Amplification** is the increase in loudness of sounds reflecting off building surfaces that can subsequently reinforce and increase the loudness of the sounds at specific receiver locations.
3. **Acoustic Shadows** can reduce the sound levels near the source, if there is a physical barrier or obstacle between the sound source and the receiver.
4. **Environmental Filtering** occurs as sound is reflected by buildings, travels through the air, encounters vegetation, and then is transmitted through building materials. In the context of downtown Fort Lauderdale, higher frequencies are typically filtered out when being reflected, traveling through the air, encountering trees or vegetation, and transmitting through building materials such as walls and windows. The remaining sound energy is often in the lower frequencies or bass sounds. As amplified music also typically has repetitive low-frequency sounds, the remaining bump, bump, bump, without the musical context, can be annoying to people of normal hearing sensitivities and also difficult to measure using typical overall A-weighted sound levels.

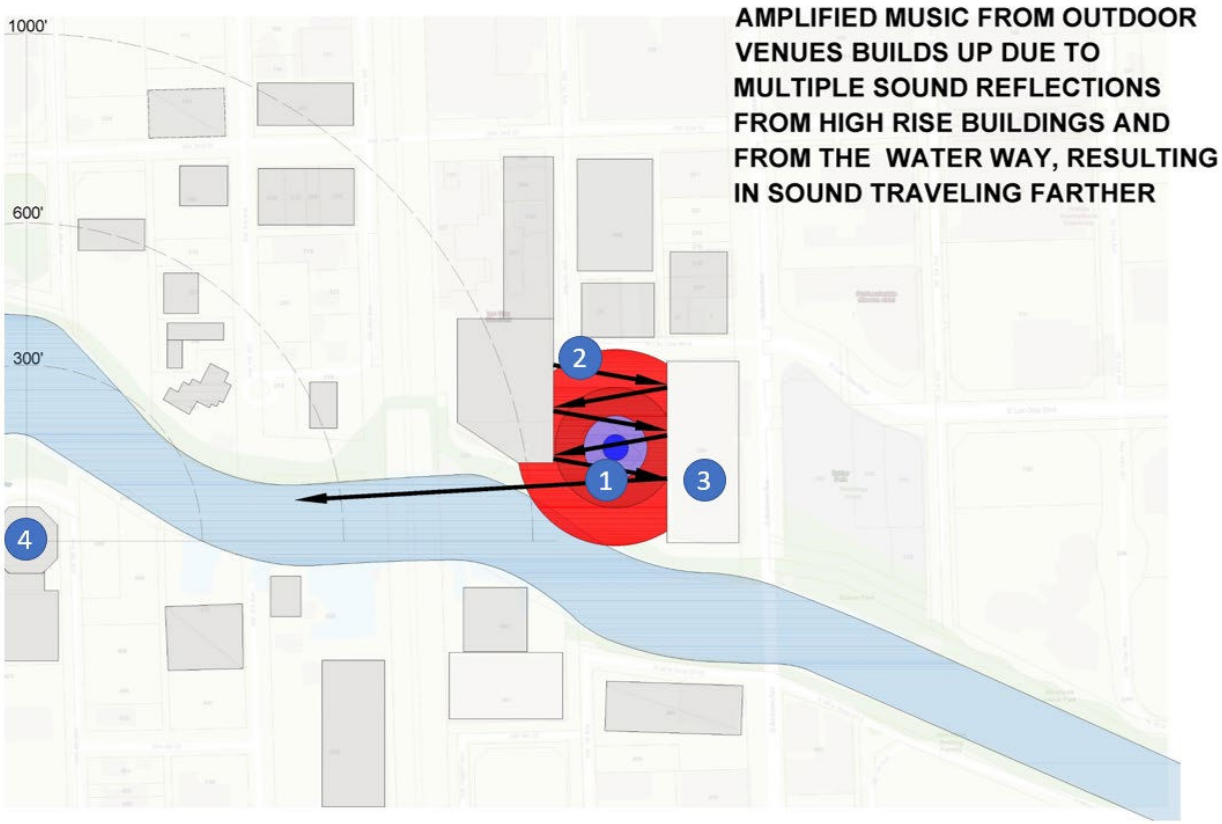


Figure XX. Conceptual sketch showing reflected sound from the Wharf building up as it reflects off the buildings that surround it and then propagates off site.

When measuring the amplified sound at locations with fences or other barriers in Entertainment Districts such as the Wharf or the Rock Bar, the wooden fences could potentially reduce sound levels in the vicinity of the fence outside the establishment at 5 feet from the fence depending upon the exact height and distance relationships between the loudspeakers making the sounds, the top of the fence and the location of the sound level meter. The fence could have an attenuating effect reducing the sound level measured at the five-foot distance designated in the Ordinance. Consideration could be given to measuring the sound levels above the fence line at a specified distance, finding a location along the source property boundary that is open with no obstructions in the sound path, measuring at a vertical height that represents the acoustical line-of-sight to the potential receivers, or measuring at affected receiving properties. One of these strategies would help to measure the sound that is propagating to potentially affected properties nearby so that the measured sound levels are more representative of the sounds heard by people in their homes or on their balconies.

Measuring amplified music on the A-weighted scale greatly reduces the impact of low frequency or bass sounds on the overall measurement. Using a C-weighting measurement or octave band measurement could improve the correlation between the measured levels and concerns of receivers in and near the Entertainment Overlay Districts.

Alternately, measurements at the receiver locations could account for the factors of sight line, reflective amplification, and environmental filtering. Identifying locations of historic, present and potential future concerns and outfitting them with sound monitoring equipment, could provide the necessary information in real time to control the sound level at the source to reduce disturbances.

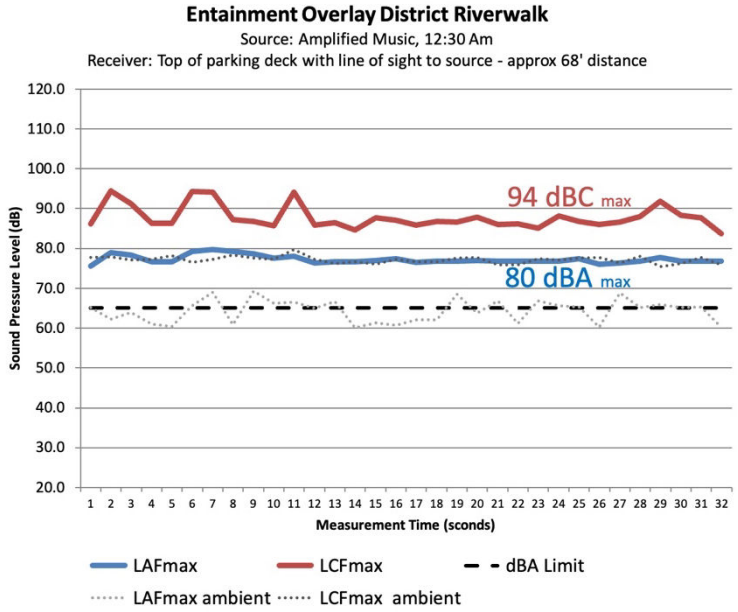


Figure xx. Sound levels measured from parking garage overlooking entertainment district establishment from an adjacent parking deck (approximately 68' distance above source).

Measurements taken in the overlay district at a distance of 5 feet from the property line (as prescribed by the code) were largely in compliance with the 85 dBA limit. In the case shown in Figure XX above, measurements were taken at distances equivalent to nearby residences (68 feet above grade), the levels were substantially higher than the residential property line limit of 65 dBA within 200 feet of commercial establishments. Additionally, the A-weighted measurement of 80 dBA is well below the 85 dBA limit prescribed at the sound source property line. However, the 94 dBC level at this distance is only 1 decibel below the prescribed limit at the 68-foot distance. Accounting for distance, the amplified music from the sound source, would be exceeding the dBC limit (95 dBC) even though it was likely meeting the dBA limit (85 dBA) if measured 5' from the source property line. In this case, measuring dBC rather than dBA, would be a better characterization of the sound and would also be in compliant with the current Ordinance.

Add LD summary date from measurements at 5' distance.

Himmarshee District

Figure XX: Himmarshee district from rooftop of municipal parking garage.

Acoustical measurements were taken in the Himmarshee district during the day as well as late at night. The Himmarshee district is an area where many bars and clubs are located. It is in an entertainment district. When walking down the street passing by a number of clubs, sound levels were measured at 98-111 dBC and 85 to over 90 dBA. These levels do exceed the noise ordinance values for source locations and begin to approach levels that could potentially cause health effects for pedestrians walking on the street. NIOSH and OSHA have sound level limits of 85 and 90 dBA respectively as sound levels where hearing protection is advised for those working in environments with these sound levels. These levels are shown to be dangerous over an 8-hour duration. NIOSH recommends that people should be exposed to sound levels of 91 dBA for less than 2 hours per day. If the sound levels inside the venues are calculated, it could be estimated that sound levels inside the buildings were 90-95 dBA or higher depending on where the loudspeakers are located and 101-117 dBC or higher depending on the locations of the loudspeakers. This is estimated based on 1 doubling of distance from the sound source. With these levels, staff who work at these establishments and patrons who spend a significant amount of time in these establishments are at risk for potential temporary or permanent threshold shifts and also hearing damage.

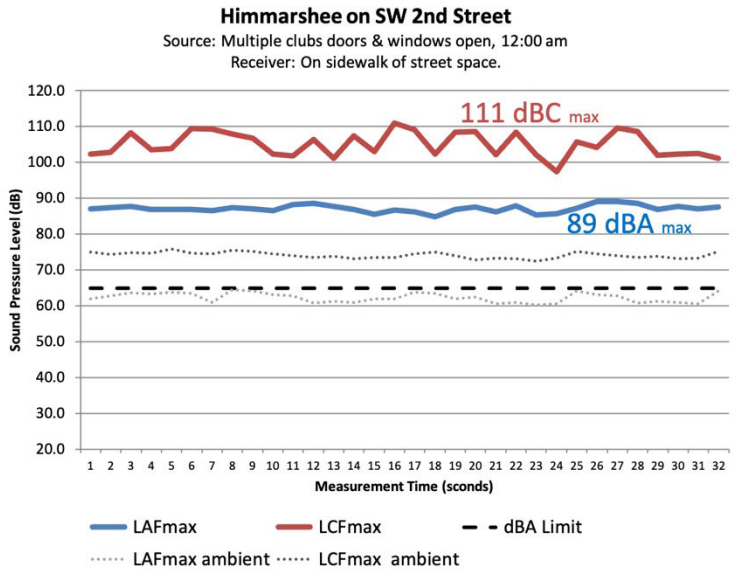


Figure XX. Sound levels measured during a soundwalk on the street in the Himmarshee Entertainment District. Both the A-weighted and |C-weighted sound levels exceed the sound level limits in the noise ordinance. Sound levels measured during other sound walks show equal and higher sound levels in this area.

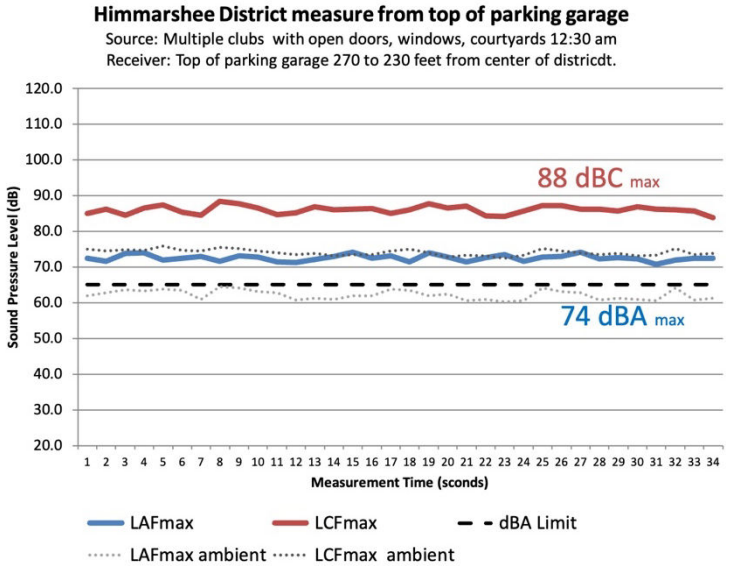
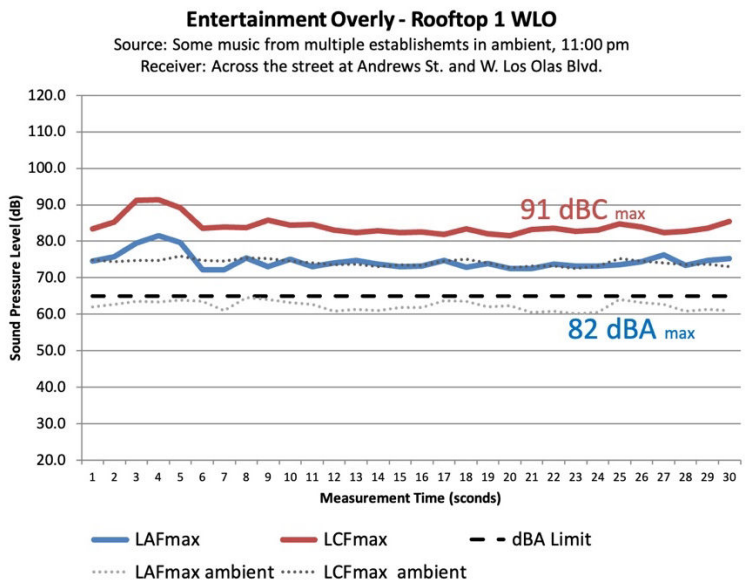


Figure XX. Sound levels measured from the parking garage located at the Brightline and SW 2nd Street crossing with a clear line of sight to multiple sources of amplified music.

The data in Figure XX above illustrates the propensity of sound to travel and maintain strength in the low frequencies. At this measurement location nominally 250 ft from the center of the district, sound levels are well above the limits for residences within 200 feet of the commercial area and twice as loud (another 10dB higher) for residential districts farther than 200 feet from commerce.

Rooftop @1WLO



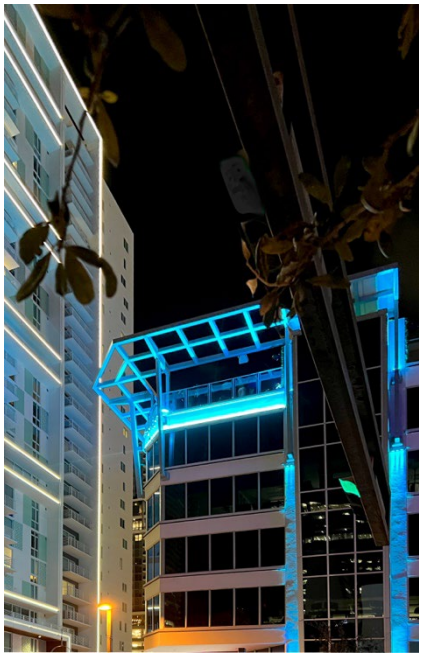


Figure XX. Shows sound levels measured at the street level near the location of the Rooftop 1 WLO and the site as seen from the street.

During the late evening/early morning, music was audible from the Rooftop @1WLO at the street below and across the street in Huizenga Plaza. Standing close to the fountain, the music from the Rooftop was masked but audible again, farther away, from the fountain. In the localized area of the fountain, it was the dominant sound source.

As an Entertainment Overlay District Establishment, amplified music noise monitoring and enforcement requires measurements to be taken at five (5) feet from the property line of the entertainment establishment. In the case of the Rooftop, located on the 7th floor roof terrace, one can only effectively measure the sound at ground level. This measurement would not be consistent with measuring equivalent establishments that are located at the ground level. Alternate sound level measurement protocols that could be considered for use at this establishment could include a permanent noise monitoring device structurally mounted to the facility 5 ft. off the edge of the roof deck; having enforcement staff use a tripod with a 5 ft extension arm that could be projected out from the edge of the facility to a distance of 5 ft from the roof, selecting an alternate, practical measurement location for these types of venues, and other means that could also effective notification to staff and potential enforcement if needed.

Party Bus – Veza Sur Tourbus

The 'Veza Sur Tour' bus was traveling down Los Olas Boulevard at approximately 8:00 pm February 17th (Friday) playing loud music with substantial bass sound energy. This amplified music, occurring in the right of way (city street) could be regulated under the current regulation that the sound cannot be "plainly audible a distance of twenty-five (25) feet or more from the source. This restriction would also apply to boats on the New River playing loud music. However, the mobility of these sources makes it difficult to enforce as the source has typically moved on before enforcement officers could measure it. One strategy, could be to conduct proactive stops with warnings and then citations toward building a consensus on acceptability. A second would be to have sound level meters at some intervals in areas where these activities occur that could record their pass-by sound levels.

The Rock Bar (Beach Entertainment Overlay District)

Narrative

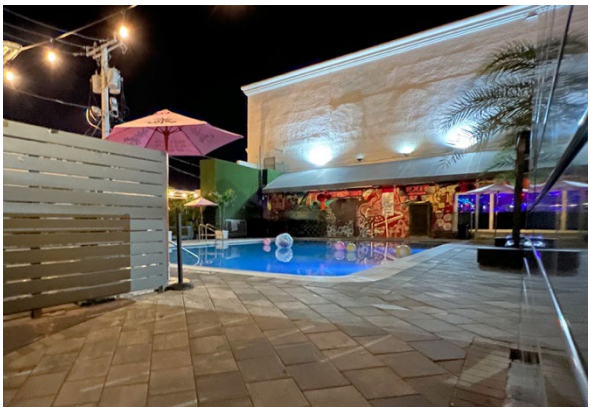


Figure XX Rock Bar front on SR A1A (left) and the Rock Bar outdoor pool area (right).

The Rock Bar is one of a number of establishments in the Beach Entertainment Overlay District just north of Los Olas Boulevard and facing the Atlantic Ocean along Florida State Road A1A. During sound walks along SR A1A, Las Olas Boulevard and the adjacent street grid to the north and west of A1A, amplified music was generally mixed with people talking, laughing, and generally enjoying dining and drinking in the open air and patios along the streets. Automobile traffic was a prominent element in the soundscape with an ebb and flow of autos, music, and people being the dominant ambient sources of sound in the area. Loud mufflers from cars, motorcycles, and motor scooters and amplified music playing from these vehicles dominated the soundscape in the area when present.

Much of the area to the north and west of the establishments along Los Olas Boulevard and SR A1A is dedicated to municipal parking lots and on-street parking. During visits in the day, evening, late night and early morning, the sound levels in this area included automobile traffic, some mechanical equipment noise, and breezes in the trees comprising the ambient sounds. Long-term sound level meters were placed at several locations along the beach areas. There were a number of occasions where loud sound levels from motorcycles and other vehicles were documented.

Some of the entertainment venues in this area have outdoor areas that face Almond Avenue and Seabreeze to the west. There are residential condominiums across Seabreeze from the entertainment venues. There is a tall fence that surrounds the outdoor areas of the entertainment venue. If one were to measure sound levels for compliance at a distance of 5 ft. from the property line of the entertainment venue the fence would significantly reduce the level of the sounds propagating in this direction likely showing compliance with the ordinance. However, concerns are expressed by residents of the near-by multi-story buildings that suggest that sound levels at their units which are elevated above street level may be worthwhile to look at.

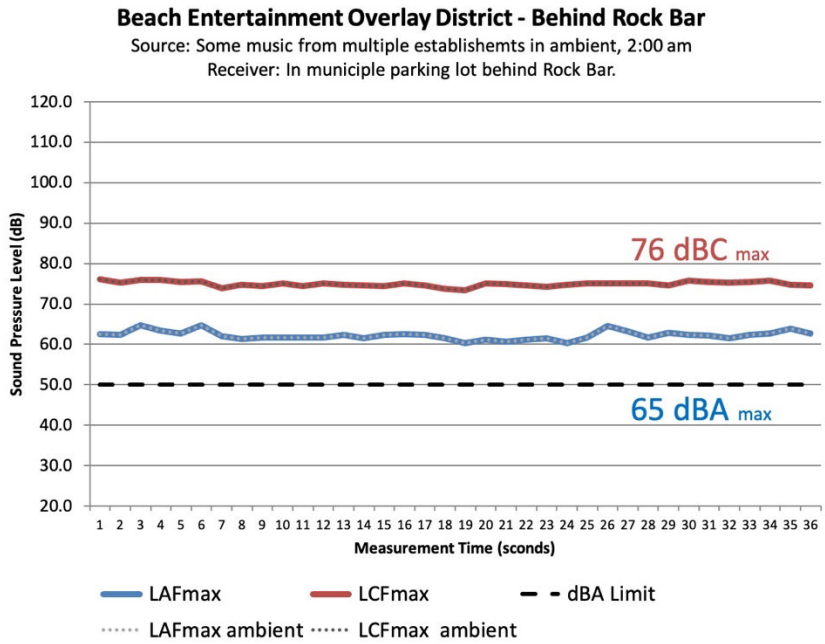


Figure XX Sound level measurements taken at the rear of the Rock Bar in accordance with the Overlay District Guidelines.

The sound levels measured in early morning hours at the Rock Bar were the same as the ambient measurements. In other words, there was no sound emanating from the Rock Bar during the measurement period at 2:00am. The ambient sounds in the area were the only sounds heard on multiple occasions on weekend early mornings and early evenings at this location.

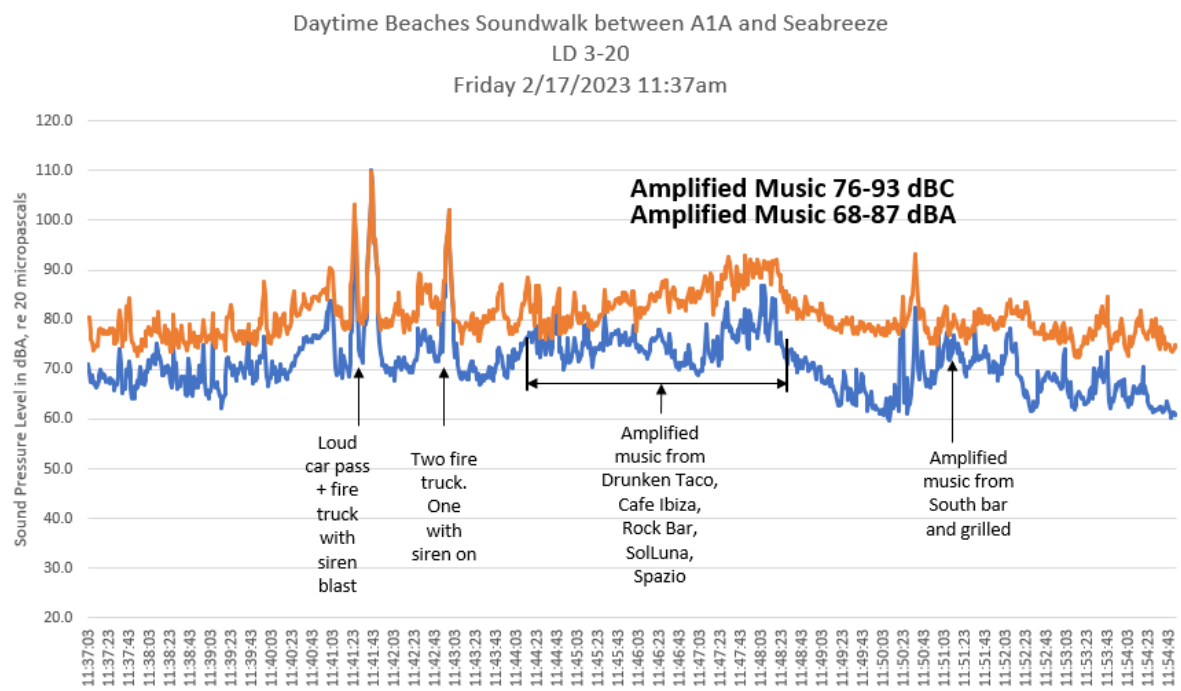


Figure X. Day time sound walk walking from A1A and Seabreeze.

Commercial, Mixed Use, Industrial and Adjacent Residential Districts

Commercial, Mixed-Use, and Industrial areas are regulated differently than the Entertainment Overlay Districts noted earlier in this report. Both within these areas and when they are adjacent to residential properties, sounds emanating from given sources, are measured at the property line of the resident or commercial property owner's property line who complains about the noise. Allowable sound level limits for the complainant's property designation, such as Residential Use, apply during the measurement. Table XX lists the allowable levels of noise sources.

In addition to the sound level limitations noted in Table XX, for general noise, the Fort Lauderdale municipal code also prescribes Specific Restrictions (Section 17-7 of the Code of Ordinances) on amplified sound of any type. Amplified sound shall not be plainly audible for a period of one (1) minute or longer at a distance of twenty-five (25) feet or more when measured from the source property line between the hours of 10:00 p.m. and 7:00 a.m. daily. Amplified sound shall not be plainly audible for a period of one (1) minute or longer at a distance of fifty (50) feet or more when measured from the source property line between the hours of 7:00 a.m. and 10:00 p.m. daily.

Amplified sound covers all forms of content including music, bass sound, speech, and any other type of amplified sound. In 2017, Florida Statute, F.S. §316.3045 was ruled unconstitutional based on an exception to amplified sound for businesses (ice cream truck) and political content. In 2022, the Florida Legislature revised F.S. §316.3045 to remove the exception for business and political content. Courts in the US have generally agreed that 'clearly audible', 'plainly audible', or 'loud and raucous' are sufficiently clear and can be used as a basis to regulate sound.

The Fort Lauderdale Code of Ordinances also identifies specific limitations for impulsive sounds, animal sounds, HVAC equipment, emergency generators, boats, construction, and commercial sanitation. The latter two are limited to operations between 7:00 a.m. and 10:00 p.m. and all equipment used during those hours must have the muffling equipment provided by the original manufacturer installed.

Table XX: Allowable noise levels at the complainant's property for sounds other than amplified music.

	Times	Outdoor	Indoor
Residential	7 am – 10 pm	**60 dBA** ***65 dBA** if residential is within Commercial, Industrial or Mixed or within 200 ft of such **80 dBA** (Impulsive sounds that occur less than 4 times in 1 hour)	45 dBA
	10 pm – 7am	**50 dBA** **70 dBA** (Impulsive sounds that occur less than 4 times in 1 hour)	35 dBA
Commercial	24 hours	65 dBA	55 dBA
Industrial	24 hours	75 dBA	65 dBA

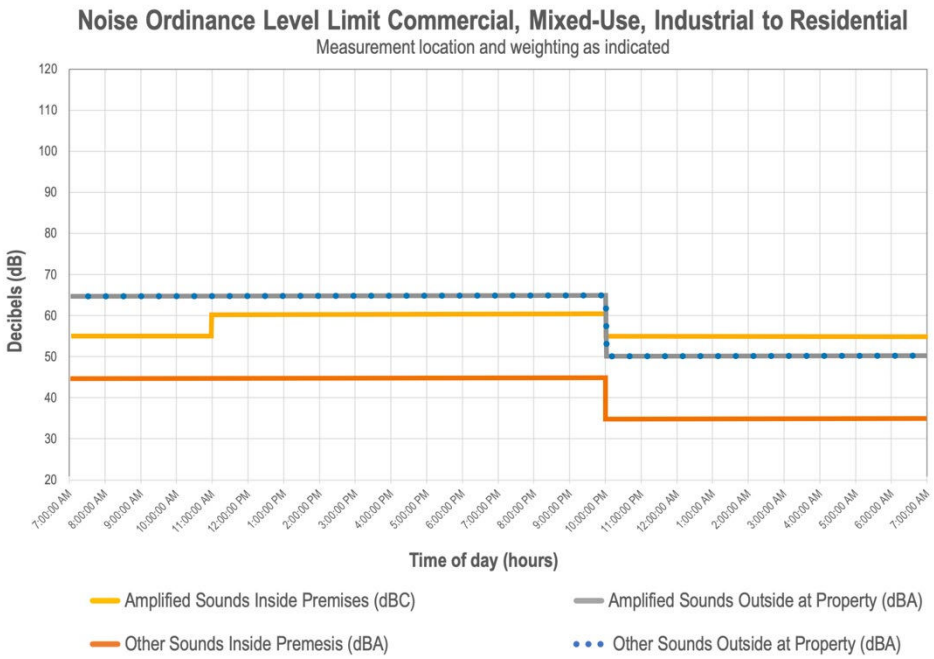


Figure XX. Noise level limits in commercial, mixed-use, industrial, and residential districts plotted over twenty-four (24) hours.

Riverwalk and Salt7

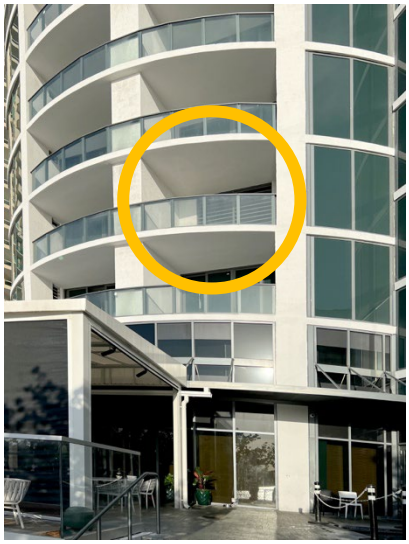


Figure XX: Salt7 during the evening with outside dining and soft music playing (left) and during the daytime with mechanical sound source emanating from the third level of the building (right).

Figure to be added ADD FIGURE

Figure xx: Evening at Salt7 (left) and morning outside Salt7 (right) illustrating the context around Salt7 and the Riverwalk.

In the late evening, the ambient sounds at the Riverwalk near Salt7 are mostly wind blowing through the trees, people talking was they walk along the Riverwalk, and nominal noise from occasional cars and boats passing by or boats docking. The amplified music from Salt7 is just barely audible within the mix of ambient sounds. Other sound sources outside the terrace at Salt7 included water fall sounds from the fountain at Figure X and breezes in trees. During the daytime breezes in the trees, cars, and boats comprised the ambient sound levels. There was a repetitive banging noise emanating from an apparent mechanical space with a louvered exterior façade on the fourth floor of the building over Salt7 (Figure xx right). Additionally, the sound of a mechanical fan, perhaps with a bad bearing, seemed to dominate the ambient sounds with some other construction noise.

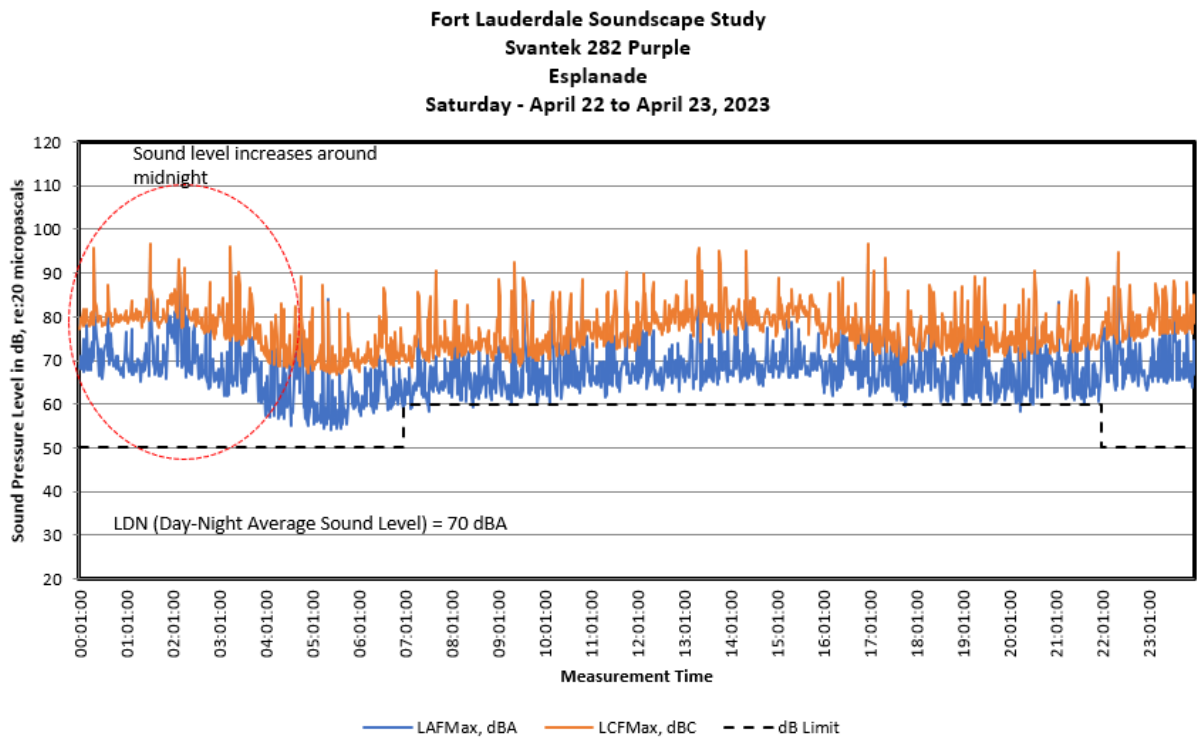


Figure X. Overall sound levels (dBA and dBC) measured on the balcony of an upper floor unit in the Esplanade in the New River residential tower across the river from the Esplanade Park. Notice the increase in sound level that begins around 10:00 pm on the right side of the graph and continues after midnight until 3:00 to 4:00 am on the left side of the graph.

Across from the Esplanade (Esplanade on the River Condominium)

Sound levels across from the Esplanade tended to be higher on the upper floors of the residential tower than in the Esplanade Park below. This is likely because the Esplanade park area is somewhat shielded on grade from the amplified music sound sources at Himmarshee and The Wharf. As one moves up higher, the ambient sound levels are higher, and there are high sound levels in the evening until approximately 4:00 am. At 4:00 am, sound levels decrease for approximately 2 hours, and then begin to increase after 6:00 am as day time activity in the city begins. The sound levels tend to rise until approximately 4:00 pm, when they drop slightly until approximately 10:00 pm. At 10:00 pm, the sound levels tend to rise, likely from amplified nightlife and do not decrease until 3:00 am to 4:00 am.

Los Olas Boulevard at YOLO (You Only Live Once) and the O lounge

Figure XX: YOLO patio dining in the foreground (green awning) and O Lounge beyond (maroon awning).

The YOLO and O Lounge are adjacent dining, drinking, and dancing establishments. The YOLO bar and restaurant has an outdoor patio and plays amplified music during the early evening hours. The O lounge, is an indoor bar/club that plays amplified music until 2:00 a.m. on Saturday night (Feb 18/19). Music emanating in the early morning hours from the O Lounge was barely audible above the ambient sounds of wind in trees and distant automobiles. At approximately 1:45 a.m., the double doors at the entry were held open while the loud music was still playing inside. At that time, the music was clearly audible in the areas outside the O Lounge.

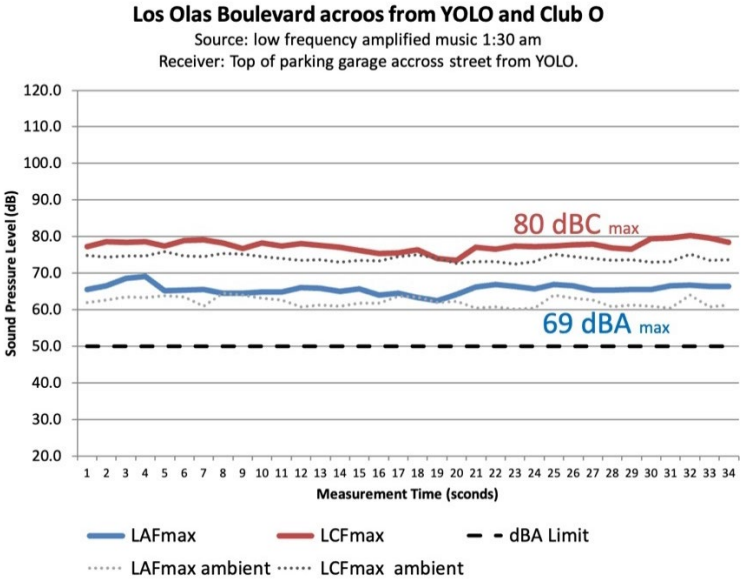


Figure X. Measurements taken from the parking deck across the street from Yolo and O club with line of sight to the establishments.

Colee Hammock

Sound levels were measured at Collee Hammock, as it is fairly close to a number of eating establishments. Discussion with the homeowner revealed that one source of noise complaints in this area was actually not from the amplified music at the eating establishments, but rather from sounds in the service alley directly behind the residential street. The alley adjoins the back yards of the homes and faces the eating establishments. It was used as access by delivery trucks, service trucks and other vendors during late night hours to the commercial properties. The back up beepers, sounds of trucks unloading, vacuuming, etc., associated with these vehicles were a primary source of noise issues according to the homeowners at this location. The long-term measurement graph shows a relatively uniform LAeq sound level over 24 hours, which means this location likely has HVAC units on at the neighboring properties and road traffic that keep the ambient sound level fairly consistent.

Potential strategies for improving this difficult adjacency could include:

- Planning: Residential adjacency to service area for restaurants. Orient the buildings away from service areas. Require solid walls or other buffers between service areas and adjacent properties.
- Operational: Require service trucks to come between hours of 8:00 am to 7:00 pm so residents aren't disturbed by their activities.
- Require acoustic controls on HVAC operation, kitchen exhausts and other building equipment for commercial occupancies.

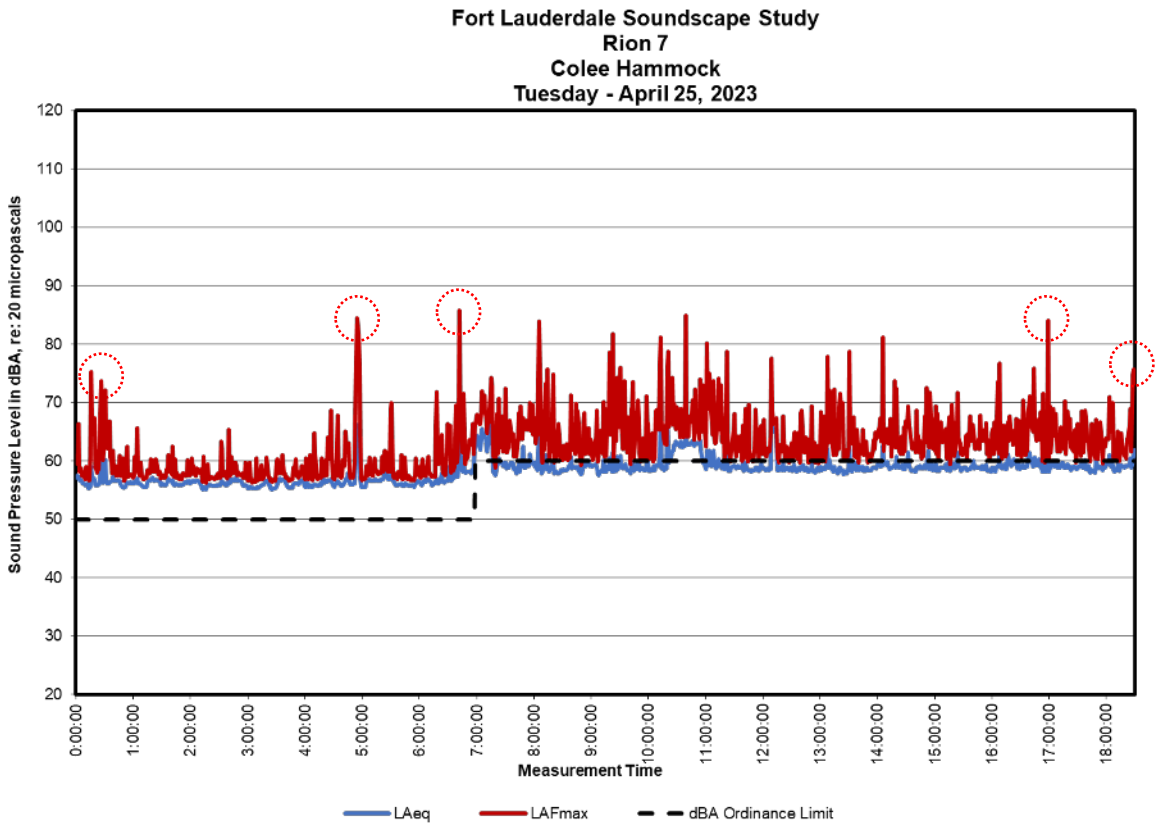


Figure X. Sound levels in Collee Hammock. Red circles show loud sound levels during late night and early morning hours right outside the bedroom window of a residence. Short-term intermittent sounds that are 10 to 20 dB above the ambient sound levels are loud enough to cause disturbed sleep or to wake older people or young children who are light sleepers.

Colee Hammock at The Balcony

Figure XX: The Balcony and Bo's Pub across a municipal parking lot in the Colee Hammock neighborhood at 2:15 am.

The Balcony is located at 1309 E. Los Olas Boulevard with a restaurant at ground level (Bo's Pub) and a bar and nightclub on the second level (The Balcony). The commercial establishment is located across an alley and within a city block of the established Colee Hammock neighborhood.

Although there is an opaque wall at the rear of The Balcony, significant amplified music dominated by low frequency bass energy was heard emanating from the establishment and recorded at a neighboring property approximately 180 feet from the rear of The Balcony/Bo's Pub. Figure XX illustrates the levels of the low frequency sounds measured with a C-weighting (dBC) at 18 decibels above the A-weighted (dBA) sound levels. This C-weighted measurement is indicative of the impact of low frequency sound as an annoyance that is not well measured using A-weighted sound levels.

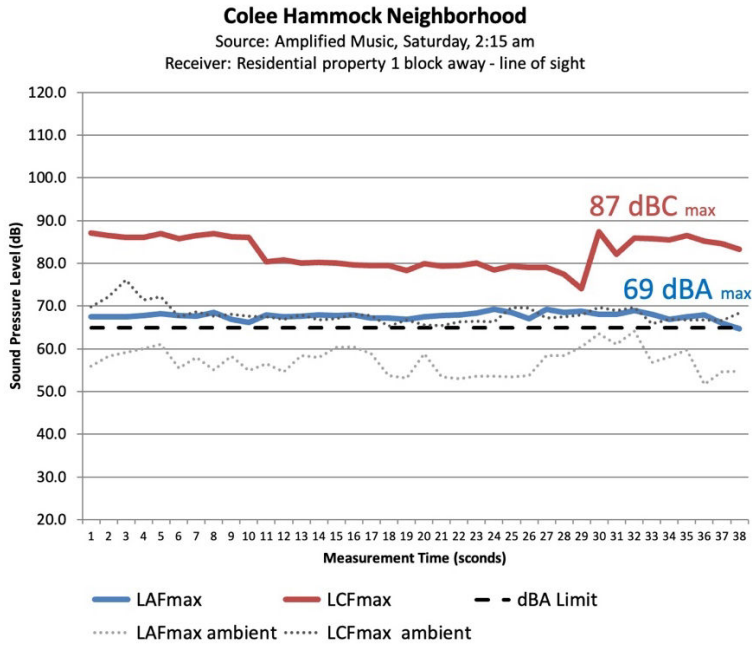


Figure XX: Sound levels measured approximately 180 feet from The Balcony, at a residential property at 2:15 a.m. February 18, 2023.

Bamboo Flats

The residential areas of Bamboo Flats are adjacent to a lively restaurant and entertainment area, where amplified sounds from the nearby establishments are a source of complaints to some of the residents. It was found the sound levels at the residential location tended to increase in the evening beginning at approximately 10:00 pm, and stayed relatively high until approximately 3:30 am, as shown in Figure X. There is a direct line of sight from a number of the residential areas to the bars and establishments with amplified music. Sound levels at this location tended to be above the 50 dBA residential sound level limit in the evening.

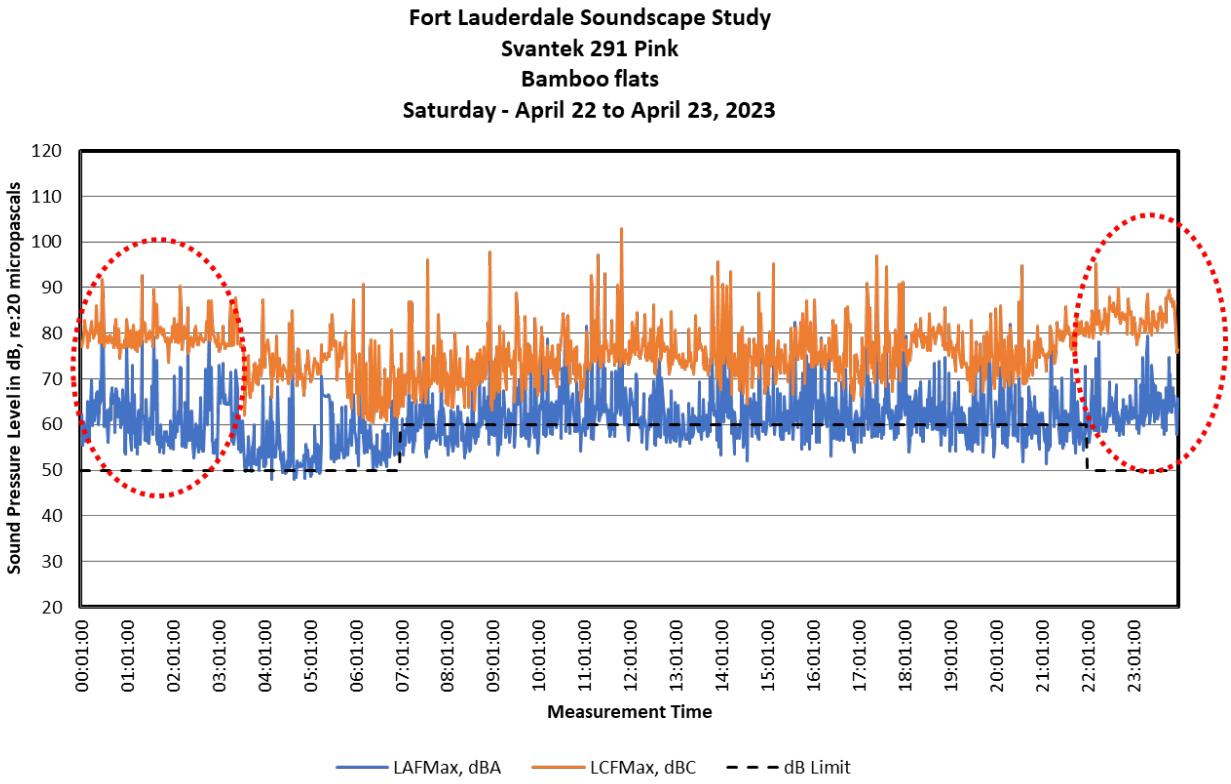


Figure X. Sound levels measured in the Bamboo Flats residential area that show an increase in sound level in the evening hours from approximately 10:00 pm to 3:30 am.

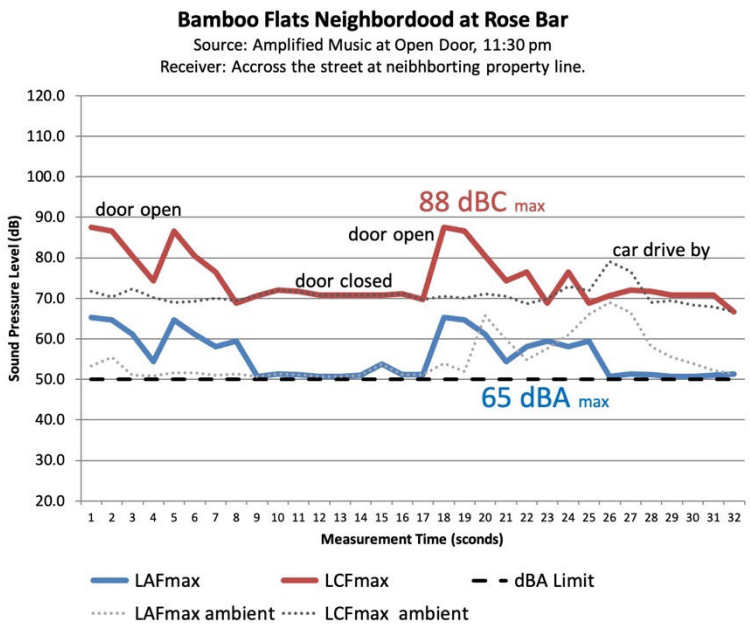


Figure X. Measurements across the street (south side of the road) from the Rose Bar showing door open and door closed levels.

Measurements at this location show the clear difference in amplified music sounds emanating from the establishment when the doors were open and closed. When the doors are closed, the sounds emitted were commensurate with the ambient levels in the neighborhood. When cars drove by, they were the dominant sounds source near the Rose Bar location.

Truth Lounge

Sound levels in a residential area behind the Truth Lounge were measured. Short-term sound level measurement made behind Truth Lounge included levels from 51-64 dBA and 68-76 dBC. The music sounds from the club tended to be within the ambient sound levels when the doors were closed at the front and rear of the building. When the doors opened, sound was more audible and sound levels increased. Providing a sound lock vestibule at the entrance could be a possible design intervention that could be considered to help reduce sound from escaping when the doors open as guests enter and exit the building. Some low frequency sounds may also be radiating out through the roof of the building. Roof assemblies of typical commercial buildings that have a metal roof deck on bar joists with insulation and an acoustical tile ceiling below have a relatively low sound transmission loss in the lower or bass frequencies. This means that sounds from subwoofers inside a typical commercial building could radiate out of the roof and propagate to adjacent properties. Sounds also propagated across the street when the doors in the rear of the building were opened.

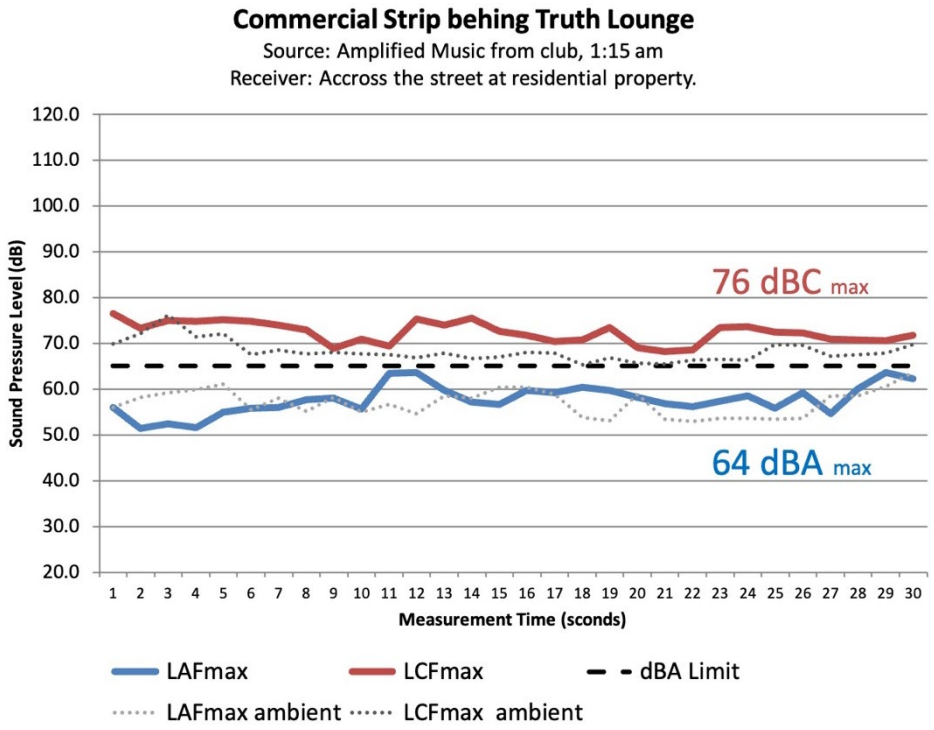


Figure X. Sound levels measured in the residential area behind Truth Lounge.

Smitty's

Sound levels were measured in the parking area of Smitty's Wings several times. Historically, sound complaints from this location were not associated with the operations of Smitty's, but rather with people who would congregate in the parking lots surrounding the establishment, playing amplified music in their cars. This was historically noticed on Sunday afternoons and evenings. Sound level measurements were made for 4 days in this location. Typical sound levels ranged from 75-85 dBA LAFmax during the day time hours, due to the large amount of traffic on the NW 6th Street or Sistrunk Boulevard. However, amplified music in the parking lot was measured at levels of 80-105 dBA LAFmax from approximately 6:00 pm-8:30 pm on Sunday April 23, 2023. Figure X shows the data from this day with the red dotted ellipse showing the sound levels from the amplified music in the parking lots.

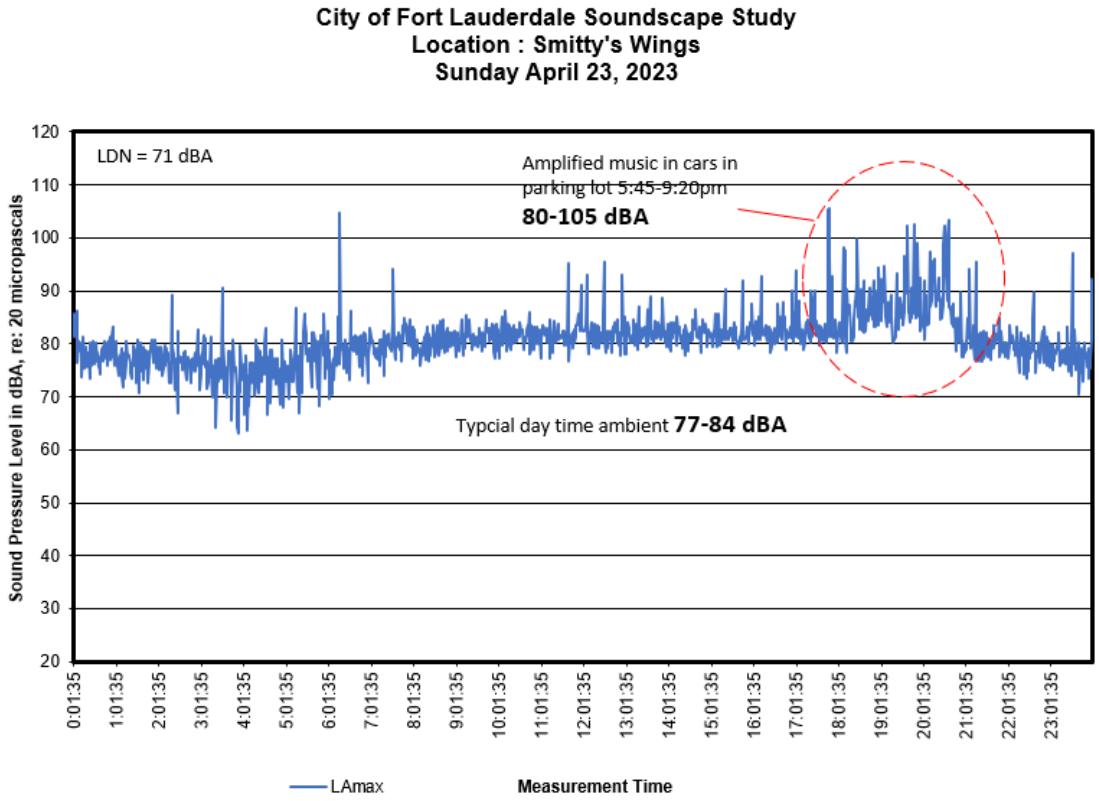


Figure X. Data from Sunday April 23, 2023 showing the sound levels from cars playing amplified music in the parking lots. Notice the increase in sound levels between approximately 6:30 to 8:30 pm on this Sunday evening.

SOURCE-PATH-RECEIVER INVESTIGATION: 3D Models

Measurements were taken on the 2nd trip to help identify the specific sound paths that the sounds from entertainment sources must travel to reach the potentially affected receivers. Sound level measurements were taken on grade, as well as on floors where residents have been affected by noise.

It is our understanding that the City of Ft. Lauderdale previously took sound measurements in the residences or on the balconies of residences where noise complaints originated. This many times included measurements on the balcony of the affected residences. Recently, the protocol has changed, and sound measurements are only permitted on grade level, not in the affected residence.

This study was performed to investigate the differences in sounds perceived and sound level at various heights above grade to understand the acoustical issues involved with selecting a measurement location..

The entertainment sounds measured on grade were often mixed in with ambient sounds so that a clear measurement of only the entertainment sounds could not be taken. Furthermore, the ambient sounds on or near grade were often louder than those above grade due to traffic on the street, pedestrian activity and building equipment sounds such as garage fans contributing to the ambient. At upper levels direct acoustical lines-of-sight between the entertainment sound source and the residential occupancy resulted in clear and plainly audible sounds being heard at these locations. The grade level ambient sounds were also

reduced in level due to increased distance from these sources resulting in possibly cleaner sound level measurements of the entertainment sounds. City staff has commented that there are practical difficulties encountered in accessing residential living units that may preclude this as an option for enforcement measurements.

Open Vs Closed Building Infrastructure Investigation

Using the building infrastructure as a way of providing noise mitigation was explored in a 3-dimensional computer model. The model shows the approximate effects of having an operable roof structure open versus closed on the sounds propagating from inside the venue to the surrounding environment.

The model assumes sound levels of 95 dBA played inside the entertainment venue. With the roof open, the sound spread covers the near side of the adjacent building and wraps around the sides of the building. The figure on the left shows the open condition. The sound levels of xx to xx are shown by the darker colors.

With the roof closed, the sound levels would likely be reduced by 15-20 dBA. The figure on the right shows this condition. The spread of sound is much more contained and sound levels of xx dBA are projected across the facade of the building.

This is a noticeable sound reduction, and would be heard as 3-4 times quieter with the roof open versus closed.

This concept can be applied to many of the existing entertainment venues, especially those who might be located in or around residential areas, who may have operable roofs, windows, doors, roll up doors or other features.

Operational controls could be considered at different times of day or for different activities inside the building such as special performances that may play louder music than typical activities as a feasible sound control strategy to contain sound spread to the extent possible. Keeping the roof, windows and doors closed will help contain the spread of sound to neighboring areas.

The use of sound lock vestibules at entry and exit points to entertainment occupancies might also be considered in establishments. This would essentially create a small entry vestibule with a second door whereby people could enter the establishment, the first door would open while the second door remained closed. After the guests entered the vestibule, the first door would close and then the second door would open into the main area. This strategy would result in blocking the direct sound path from inside the facility to the exterior through the single open door reducing sound propagation to near by properties. Similar strategies are often used in theaters and performance spaces to contain the spread of sound and light into a performance space.

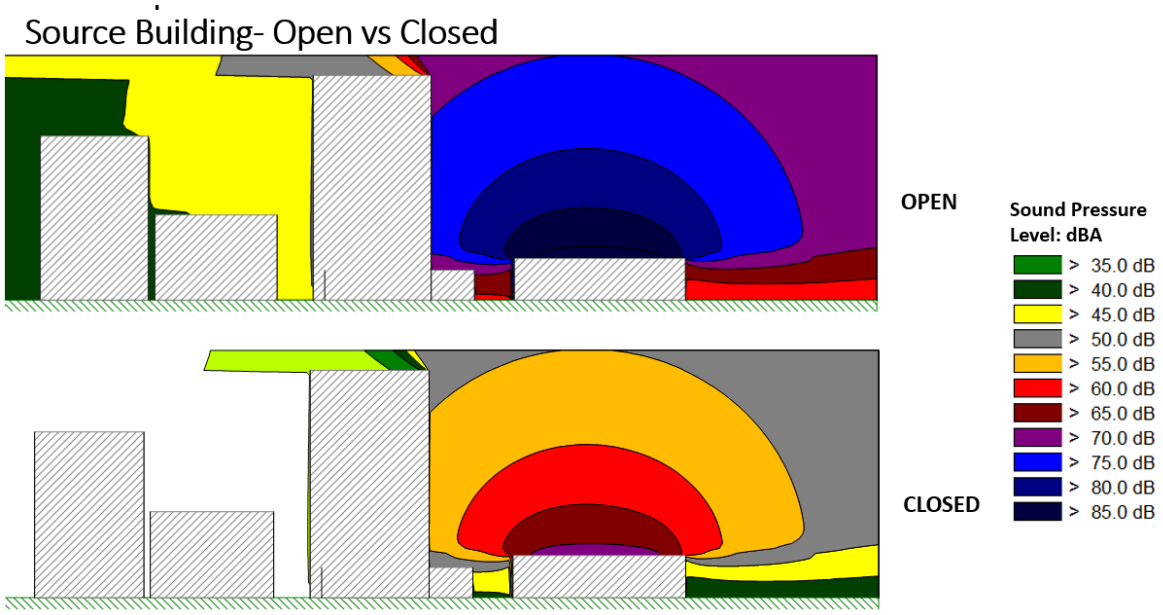


Figure X. 3D model showing conceptually an entertainment establishment with the roof open (top) versus with the roof closed (bottom). There is a 20 dB difference between the 2 conditions. Sounds propagating out of the building through the roof in the roof open condition is heard as 4 times louder to a person of normal hearing sensitivities than sounds propagating through the roof closed condition. This is based on typical insertion loss values of a closed building as having at least 20 dB reduction.

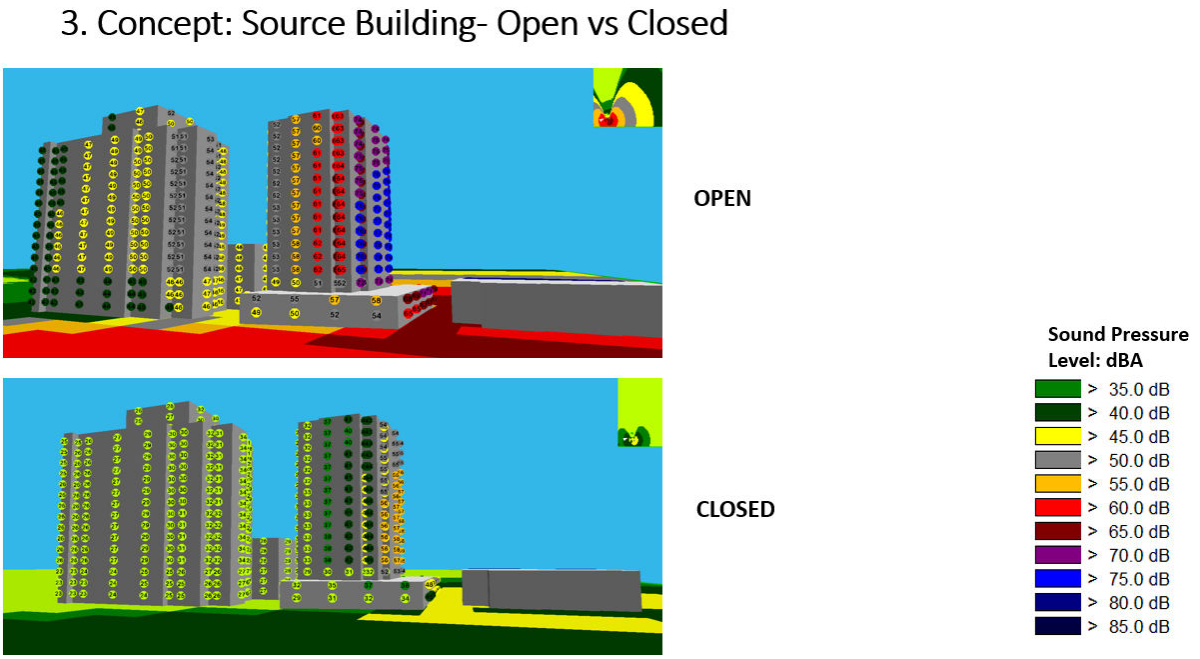


Figure X. 3D model showing conceptually an entertainment establishment with the roof open (top) versus with the roof closed (bottom). The elevated sound levels cover the front façade of the adjacent residential building that faces the entertainment venue and wrap part of the side walls as well.

Low frequency sound propagation

Low frequency bass energy is a major component of amplified music. It includes frequencies from 20-150 to 250 Hz typically and results in the feelable perception of music in one's chest and body. Low frequency sounds have extremely long wavelengths and are reduced less than middle and higher frequency sounds as they travel through the air and as they pass through building walls, windows, doors and roofs . They carry farther and with less reduction due to distance than the middle and higher frequency sounds. The low frequency sound waves can also cause building vibrations and window shaking.

A 3D model was built to study the spread of low frequency sound versus overall A-weighed sound level. The overall A-weighted sound level because it reduces the low frequency sound level, does not include the effect of low frequency sound.

The model on the left shows the A-weighted sound level on the facades of buildings with an entertainment establishment playing music. The A-weighted sound level across the facade of the building is xx dBA.

The model on the right shows the sound levels in the 63 Hz octave band. The 63 Hz octave band is one of the lower or bass frequencies. The spread of this frequency is much farther than the overall.

This means that even if sounds are measured with an A-weighting, that the measured sound level in dBA may not tell the whole story about what the low frequency sounds may be doing in that area.

This brings up two items for consideration:

1. Using an A-weighting to measure sound level, especially at the residences, may not show the low frequency sound from the establishments. Consider using a C-weighted sound level limit in addition to the A-weighted sound level. Alternately, sound level limits could also be required in individual octave bands similar to Rule 4 of the Duval County Environmental Protection Board which is used in the City of Jacksonville.

2. Because low frequency sounds travel much farther, propagate with less reduction into adjacent buildings, and sometimes result in vibrations of building infrastructure that are perceived by people, consider limiting low frequency sound levels after specified times.

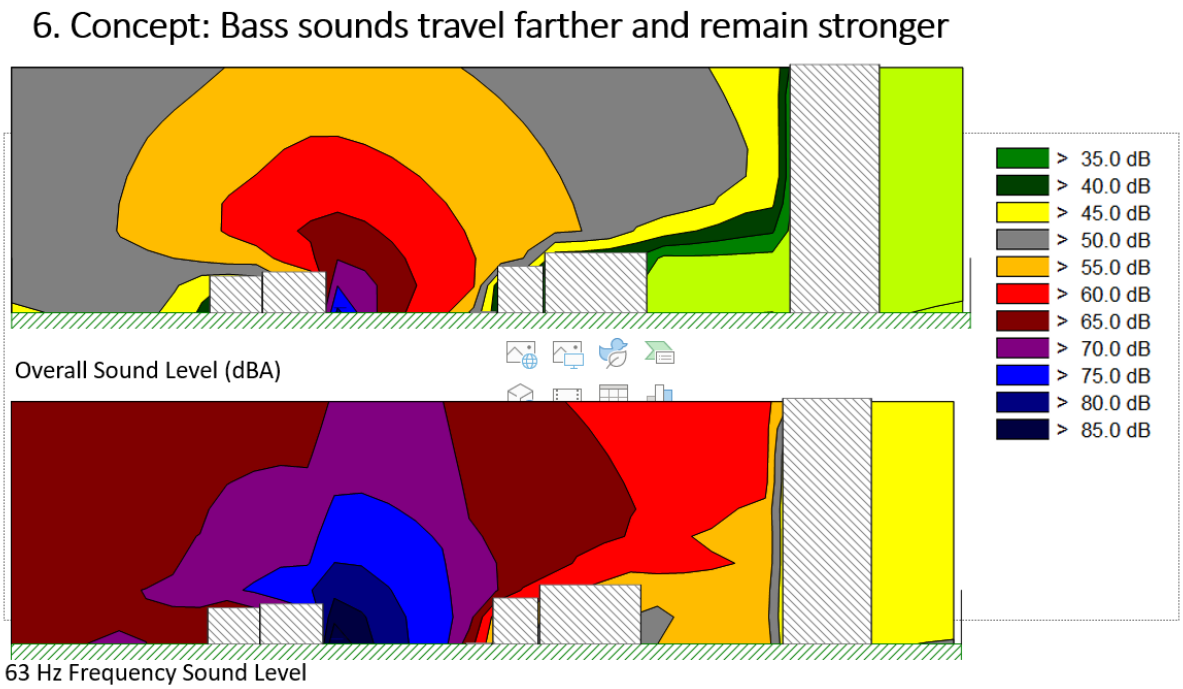


Figure X. Overall A-weighted sound level spread from entertainment establishment (top). And low frequency 63 Hz octave band sound level (bottom). Low frequency sounds travel farther with more energy than middle and higher frequency sounds and the overall A-weighted sound levels do not show the intensity of these low frequency sounds.

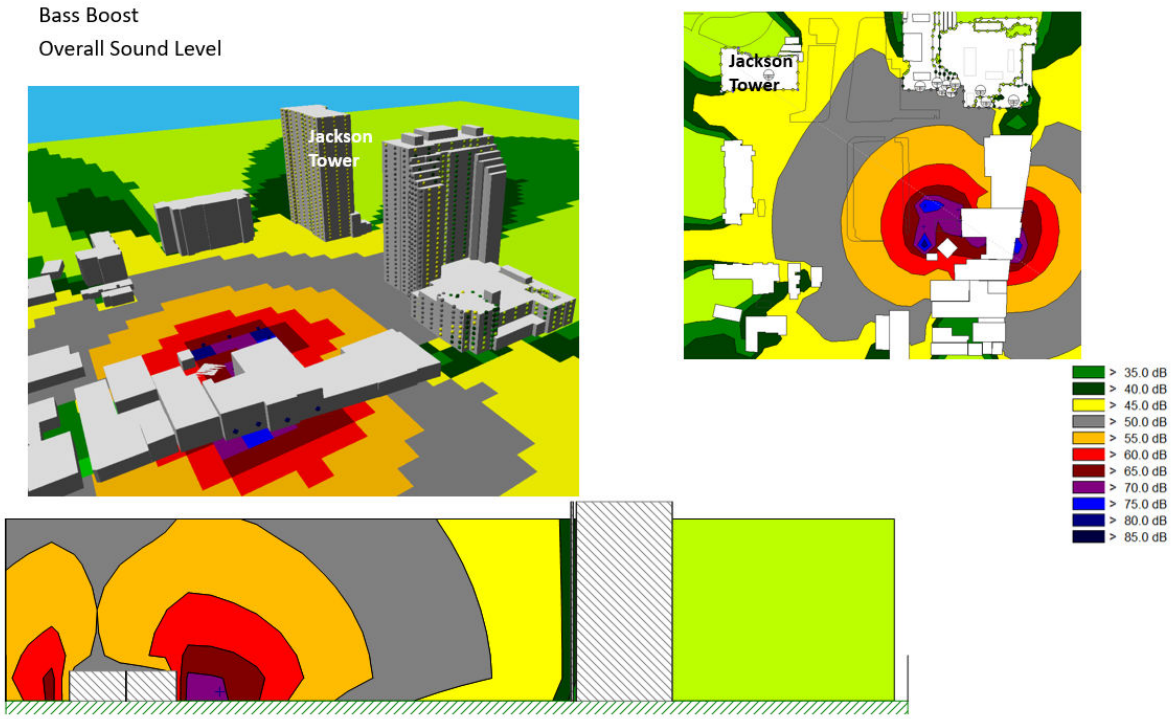


Figure X. Overall A-weighted sound level from entertainment establishment. Notice the overall sound level at Jackson Tower in the 45 dBA contour.

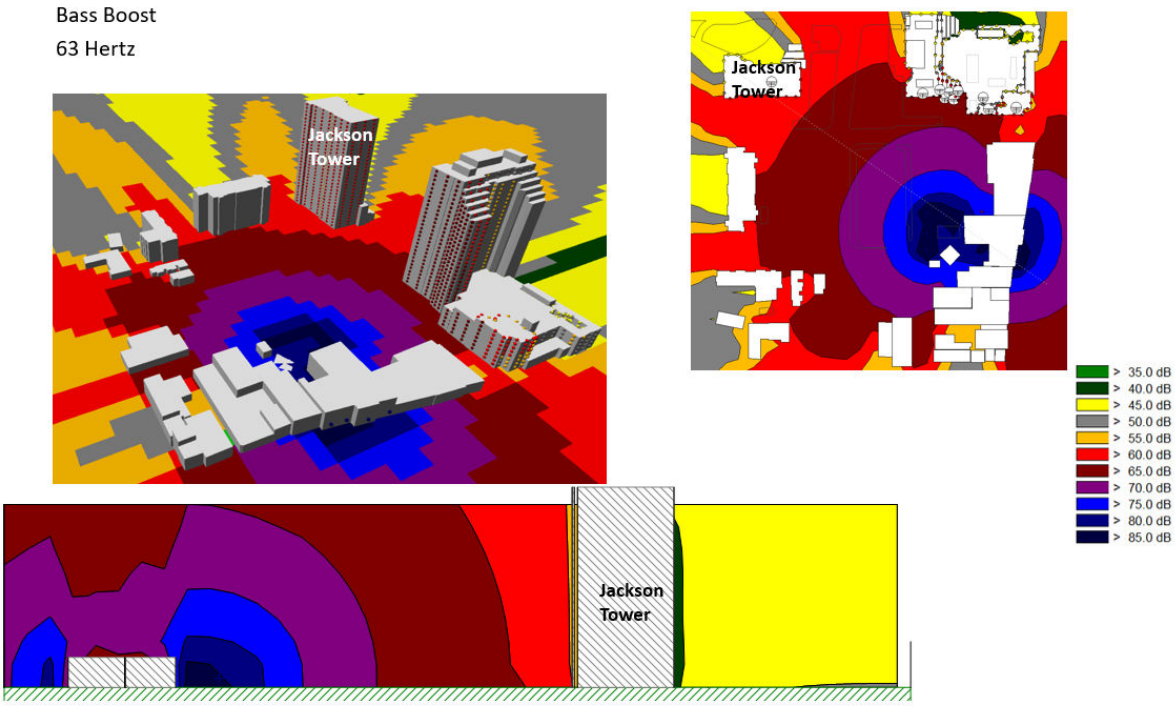


Figure X. 63 Hz sound level from entertainment establishment. Notice the sound level at Jackson Tower in the 60 dBA contour.

Figure XXX

Time of respite

There are a number of residential locations that have raised sound levels starting in the late evening and continue until 2:00-4:00 am. The sound levels may stay somewhat low until approximately 6:00 am when they begin to increase again as day time activities in the city start. This means that in many areas, there are only 2-4 hours of relative quiet between the time when amplified music stops and the time when the city begins to wake up. These elevated sound levels likely make it difficult to sleep, which can have negative health impacts. Would it be desirable to address this concept of time or repose as it relates to the daily cycle of activities and sounds in the city? What are possible methods that could be used to address this concept?

EXISTING FT LAUDERDALE NOISE ORDINANCE SUMMARY

The current noise ordinance of the City of Fort Lauderdale has a number of strategies to limit noise from disturbing its inhabitants.

It includes the following:

1. **Special entertainment Overlay District.** Dedicated areas where entertainment venues are classified as special entertainment overlay districts. Large cities often have areas where night time entertainment establishments exist. These are often categorized as entertainment districts and include a fairly dense geographical area, typically in the downtown, that allows higher sounds levels from amplified music in these areas. Where these directs are located, in terms of acoustic land use compatibility, these districts would be better located in a commercial district where only commercial adjacencies are located.

Table X. Sound level limits contained in the Ft. Lauderdale Noise Ordinance compiled from Table and text

MAXIMUM PERMISSIBLE SOUND LEVEL LIMITS			
	Times	Outdoor	Indoor
Residential	7 am – 10 pm 10 pm – 7am	**60 dBA** ***65 dBA** if residential is within Commercial, Industrial or Mixed or within 200 ft of such **80 dBA** (Impulsive sounds that occur less than 4 times in 1 hour) **50 dBA** **70 dBA** (Impulsive sounds that occur less than 4 times in 1 hour)	45 dBA 35 dBA
Commercial	24 hours	65 dBA	55 dBA
Industrial	24 hours	75 dBA	65 dBA
SPECIAL ENTERTAINMENT DISTRICT			
Measured 5 ft from building, structure or establishment	Mon-Thur 12pm to 12am	85 dBA, 95 dBC	
	Mon – Thur 12am-2am	70 dBA, 80 dBC	

	Mon-Thur 2am-12pm	65 dBA, 75 dBA	
	Fri-Sun 12pm to 1am and Legal holidays	85 dBA, 95 dBC	
	Fri-Sun 1am-3am and Legal holidays	70 dBA, 80 dBC	
	Fri-Sun 3am-12pm and Legal holidays	65 dBA, 75 dBC	

2. **Sound level change for days/times**. Different sound level limits at different days and times for source measurements enforcement.

3. **Sound Level Limit Weighting**. Provides A and C weighted sound level limits at the source. The difference between the A and C weighted sound level limits is 10 dB.

4. **Measurement Metric**. An Lmax is defined as the maximum sound level measured during the sound measurement period and is the measurement metric for source sound levels.

5. **Receiver sound level limits**. Provides receiver sound level limits measured at grade during the day and night for residential, commercial and industrial uses.

6. **Indoor and Outdoor limits**. Provides residential, commercial and industrial sound level limits both outdoors and indoors.

7. **C-weighted sound level limit within "premises" from "amplified sound device".** There is a provision to limit sound level limits "within premises" for commercial, mixed use or industrial uses. This may be an attempt to limit amplified music entertainment sound levels inside mixed use spaces, however "premises" is not defined in the noise ordinance. It may mean inside the physical building or it may mean the entire property including the building, site and outdoor spaces on the property.

Table X. Sound level limits contained in the Ft. Lauderdale noise ordinance that relate to Commercial, Mixed Use or Industrial occupancies.

COMMERCIAL, MIXED USE OR INDUSTRIAL			
Measured within the premises of a complainant	12pm-10 pm	Use limits in Table 1	60 dBC
Sound level limits from Table 1 apply when measurements are taken outdoors or within the property line of the complainant	10pm – 12 pm	Use limits in Table 1	55 dBC

9. **Continuous sound**. Continuous sound is defined as any sound with a duration of more than 1 seconds, as measured with a sound level meter set to the "slow" response.

10. **Plainly audible limit in residential area.** In residential areas, Section 17-7 states that amplified "sound shall not be plainly audible for a period of one (1) minute or longer at a distance of twenty-five feet or more when measured from the source property line between 10pm-7am, or at a distance of fifty feet or more when measured at the source property line between 7am and 10pm.

11. **Noise Management Plan for Construction of large public works transportation projects**. If large scale transportation projects exist, the noise ordinance calls for a fairly robust noise management plan, which includes among others, a "description of the anticipated noise impact of the construction on adjacent properties, how the plan might mitigate negative impacts, continuous noise monitoring during the construction period, the results of a baseline ambient A-weighted sound level noise study, etc.

NOISE ORDINANCE STRATEGIES.

The primary sources of excessive noise initially identified by the City and the Noise Control Advisory Committee as the basis for the study were amplified music from entertainment facilities, amplified music from residential rental units, cars playing amplified music in parking lots, and motorcycles, cars, trucks, and other vehicles with loud mufflers specifically in the Beaches area. The recent enforcement actions by police have reduced the numbers of loud vehicles on the streets in the Beaches. Sounds from businesses

and entertainment venues where measurements were taken during the study are generally within the current regulations. A three-tiered approach is usually required to address sonic issues in the built environment. Administrative controls, engineering controls and controls for specific sources of sound of interest such as amplified sounds and motor vehicles in the case of Fort Lauderdale.

Administrative controls may include adjustments to the noise ordinance such as adding a C-weighted or low frequency sound level limit, including references to measurement methods where the measurements would be made in accordance with appropriate national standards; using type 1 sound level meters that store data so that records of the measured levels are included as part of the measurement process, reviewing the permissible hours for outdoor amplified music; adding controls during the building permitting process requiring noise studies and designed mitigation systems in buildings that are either potential producers of sound that will propagate off-site to possibly impact other buildings or may be potential receivers of sounds produced by new and existing projects. Consideration could also be given to linking the planning and zoning process with the noise ordinance so that future projects must be shown to comply with the noise ordinance requirements at the time of permitting with the possibility of enacting a commissioning study to verify performance after completion of the project.

Engineering controls could include requiring future entertainment venues and dining facilities to reduce noise propagated onto the street and other public spaces or to contain noise within the physical boundaries of their facilities; and requiring residential and hotel occupancies built and renovated to construct the exterior walls, windows and roofs of the buildings to reduce interior sound levels to criteria levels based on current and projected future sound levels for the specific location of the facility.

Specific Sound Controls could include recommendations for the reduction of amplified sounds and motor vehicle sounds. It may involve the installation and operation of sound monitoring system in entertainment venues to record on a continuous basis sound levels at specific locations produced by the sound systems in venues and possibly requiring motor vehicles driven on city streets to have the original equipment mufflers and exhaust systems installed on their vehicles.

In an effort to maintain acoustic compatibility of the diverse uses of the city, the following are suggested recommendations.

CITY OF FT LAUDERDALE NOISE ORDINANCE STRATEGIES

The strategies contained in this section contain a mix of Administrative, Engineering and Specific Sound Controls that could work together toward achieving a more compatible sonic environment in the City. This approach of compatibility is necessary to find a balance between highly active and diverse urban living with the need for respite and a healthy environment that supports the long-term well-being of citizens of the City of Fort Lauderdale.

DISCUSSION POINTS

1. **Sound Level Limits - Source** The limit of xx dBA at a 5 ft. distance outside the source allows entertainment establishments in Entertainment Districts to play amplified sounds outside at fairly high levels. These sounds can travel long distances and travel up the sides of buildings. In areas where regional activity zones exist and sounds may be played until 4:00 am, the amplified sounds have been measured at upper level balconies of residences. These sounds add to the other environmental sounds and increase the sounds level by 5 to 10-20 dBA on the balconies of residences. Permitting sounds levels to be this loud

outside may mean that the establishments play sounds at potentially damaging sound levels inside the boundaries of the establishment.

2. **Sound Level Limits – Residential Receivers** The 50 dBA sound level limit for residential areas was exceeded in most residential areas in the downtown and built up areas of the City. This means that the 50 dBA from the establishments will likely not be measurable due to the existing ambient sound levels. The 50 dBA sound level limit at residential properties in areas with single family detached homes on streets that are not near major roadways is likely appropriate during night time hours. There are areas of the City where this limit should be reconsidered.

3. **Sound Level Limits – Weighting Discussion** Including sound level limits specifically for low frequency sound such as an overall C-weighted sound level (dBA) or octave band sound level limits should be considered.

4. **Sound Level Limits - Metric** Maximum sound levels are defined as Lmax. This is interpreted as LAFmax, which is the maximum sounds level with a 125ms. time constant. Consider applying plainly audible to sound from the entertainment districts - this may not be viable from the club owners standpoint.

5. **Sound Level Limits – Time of Day** Consider reducing the times that amplified music can be played outdoors in Special Entertainment Districts to reduce the acoustic footprint of the establishments on their residential neighbors.

6. **Enforcement Protocol**. Measurements taken on grade versus at complainants property. Consider allowing the measuring of amplified sound from Entertainment Overlay Districts at the receiver location when a complaint is made (option of the complainant). Possibly measure amplified sound at the window or balcony at receiver locations when a complaint is made (option of the complainant) - acceptable levels need to be set for this. Consider restricting the low frequency content of amplified sound when measuring 5' from the property line in Entertainment Overlay districts (if this will be kept as an option). Possibly allow for options for the measurement procedure - at sources (metric set) or at receiver (metric set) and the enforcement personal can choose which is more representative of the situation or both and neither can be exceeded - this might be too cumbersome and would have to be developed as a concept.

8. **Indoor Sound Level Limit**. Define "premises" that means inside the building.

9. **Sound Level Limits - Globally.** Multiple sound level limits that reflect the differences within areas of the City such as different zoning classifications, days of week and times of day are currently used. These differing sound level limits or procedures are not all contained in one accessible table. Rather indicies are tabulated while others are in narrative paragraphs. Consider consolidating and simplifying the sound level limits for ease of understanding by enforcement personnel, residents, entertainment venue operators and other stakeholders.

10. Consider developing strategies for **enhanced compatibility** of existing and future entertainment venues in Special Entertainment Districts and Regional Activity Centers with existing and future residential and mixed-use buildings.

11. **Enforcement Protocol** – **Meters Used for Enforcement**. Are the meters the code enforcement officials use able to take LAFmax, LCFmax data simultaneously? Can the measurements be stored and saved? Do they also record WAV files? Consider purchasing sound level meters that can take this data simultaneously.

12. **Enforcement Protocol – Noise Measurement Training** Consider a noise measurement training program for code enforcement and other staff to include proper measurement protocol. Consider annual refresher courses to allow officials to become more comfortable with the program.

13 + **For additional strategic recommendations**.

OTHER CONSIDERATIONS

1. The current nuisance language and/or plainly audible language should be maintained in the residential areas. This should be clarified with Code Officials so that the plainly audible standard is used for sounds generated within residential areas by private residences.
2. The measurement method should be revised to address the particular needs of the unique parts of the City. The measurement time period should be relatively short to capture the transient sounds that comprise amplified music sounds from passing cars loud mufflers from cars.

3. **Definitions and standards**
    a. Definitions from sources such as the American National Standards Institute (ANSI) and the American Society for Testing and Materials (ASTM) standards are preferred for technical acoustical issues.
    b. ANSI and ASTM standards should be referenced for meter type, filters, use of windscreens, measurement techniques, measurement and other technical requirements.
    c. Corrections for background noise levels should be made in accordance with ANSI and ASTM standards for all measurement data used for citation purposes.
    d. Consider specifying a measurement duration and sampling period as appropriate to capture the nature of the disturbing sound.
    e. A table listing many of the specific standards that can be cited for specific issues is included in Appendix F in our report.
    f. Consider developing standard operating procedures for City staff and enforcement personnel if the ordinance is modified.

4. ***Other provisions***
    a. **Time of day limits**. Consider limiting the times of that playing of amplified music and speech are permitted.
    b. **Muffler restrictions**. Consider including verbiage to limit any mufflers besides factory installed mufflers and exhaust systems. See Appendix E for example verbiage in the Florida State Statute 315.593.5a. – d.
    c. **Increase Fines**. Consider increasing fines for repeat offenses.
    d. **Planning and Zoning Approvals**. Consider implementing acoustical and noise-related requirements in planning and zoning applications for new construction and renovations of buildings in and near entertainment venues and other sources of sound. The requirements of the noise ordinance should be linked with planning and zoning submissions, building plans approval and Certificates of Occupancy for new and remodeled buildings.

Trial Period. The proposed ordinance should be enacted for a trial period of time for perhaps 90 days to allow residents, entertainment establishment owners and operators and city officials to gain first hand experience with the requirements with the possibility of adjusting requirements before a formal ordinance

is passed. No citations would be given for first or second offenses during the trial period unless extremely excessive noise is propagated and not turned down when requested by enforcement personnel.

ITEMS TO CONSIDER FOR THE FUTURE

Items presented below are suggestions that could be implemented as part of Planning and Zoning efforts in Fort Lauderdale that are not necessarily included in the Noise Ordinance but could be included in other planning or zoning documents.

1. **Noise Study for Differing Zoned Uses**. Planning efforts for new developments, especially those projects near Special Entertainment Districts, Regional Activity Centers, railroads, roadways, airports or in downtown areas could include a noise study to protect the soundscape of the existing city fabric and the new development.

2. **Noise Study Stipulation for Residential Developments Located Near Transportation and Industrial Sources of Sound**. Consider requiring any residential development that is within 1,000 feet of a major roadway or 3,000 ft from a rail line to provide adequate noise mitigation to the site, exterior areas and interior spaces to meet HUD, FTA, FAA and FHWA requirements at a minimum with options for Grade A, B and C housing to have stricter requirements. Any site that has an average Day Night Sound Level of 65 or higher would need to provide noise mitigation to the building façade to meet interior sound levels of 45 dBA or lower. See Manatee County Requirements in Appendix E for example verbiage of this concept. Lower criterion levels should be set for "market" and "luxury" residential properties.

3. **Noise Study for Establishments with Indoor and Outdoor Amplified Music**. New indoor, outdoor or partially open to the outside air establishments proposing amplified music should have to demonstrate that they can meet the requirements of the City ordinance before a permit is issued. A *Site Noise Study or Environmental Acoustic Assessment* and *Noise Mitigation Plan* (if needed) should be prepared by an acoustical consultant who is a member of the Institute of Noise Control Engineers (INCE) and the National Council of Acoustical Consultants as a part of the permit process. Consideration should be given to a specific clause in the ordinance regarding outdoor amplified music because of the inherent difficulties presented by these establishments. Similar consideration should be given to Balcony and Rooftop venues.

4. **Noise Enforcement Training Program**. Consider formal training of police and/or code enforcement officers to take measurements for noise ordinance enforcement. This should include the correct use of sound level meters, proper documentation, measurements in compliance with noise ordinance requirements and national standards, background sound correction, etc.

5. **Planning strategies** already used in the City could be formalized to address sonic compatibility issues in new developments

6. **Building façade requirements**. Considerations could include zoning or plans approval requirement for STC/OITC ratings for the building facades of hotels and residences that limit the propagation of sounds from Special Entertainment Districts, Regional Activity Centers or planned indoor and outdoor entertainment activities into sleeping and living areas and buffering of outdoor activity areas from adjacent existing or future projects.

a. Similarly, off-site sounds such as from rail lines, road traffic, aircraft flyovers, commercial, industrial and entertainment sounds could be considered during planning phases of projects so that requirements for STC/OITC ratings of the exterior skin of new buildings can reduce existing sounds to reasonable interior sound levels for the specific occupancy being planned.

7. **Sound Isolation for Mixed Use Guidelines**. In mixed-use buildings consideration could be given to requirements for sound separations between mixed-use activities within a single building as well as within a complex of buildings. For example, having requirements for sound isolation systems for residential occupancies and hotel sleeping rooms in buildings with restaurants and nighttime amplified sounds on lower floors, rooftops or mid- level amenity spaces could be enacted.

8. Requirements to limit sounds produced inside or outside venues to the confines of the venue or to meet noise ordinance sound level limits if implemented at the property boundaries per the appropriate zoning district would help control potential off-site noise impacts.

9. **MEP Noise Control Requirements**. Building mechanical equipment or central plant equipment; loading activities at commercial buildings, indoor and outdoor dining; entertainment; animal facilities and any other potentially noisy building types of activities could all be considered for control.

PLANNING STRATEGIES FOR CITIES

1. **Self Contained Activated Mixed Use Areas**. Create activated areas that are self -contained. IE Mixed use areas with restaurants and outdoor seating on lower levels, intermediate levels, upper levels or rooftops. Interior courtyards with surrounding properties, rooftop venues with direct sound paths to adjacent or nearby buildings. If residences, potentially face residences away from the activated areas and put offices on the activates side.
   a. Require STC/OITC ratings of windows for residences within xxxx feet.
   b. Require isolated construction of restaurants/nightclubs and or buffer spaces between restaurant, club and residential.
   c. Low frequency sound level limits for mixed use
   d. Limit sound levels played at the outdoor restaurant or activated areas outside
   e. Require all lessees and/or purchasers to acknowledge they are in an activated area and noise levels may be higher than in a residential area.

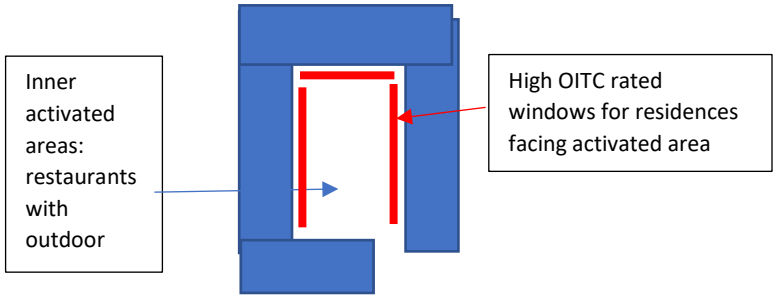


Figure X. Conceptual sketch of a self contained mixed use area with an inner activated core, high OITC rated windows, and possible sound diffusing elements on the inner exterior of the building.

2. **Vertical Zoning**. Requirements for mixed use buildings to provide buffer spaces and sound isolation systems between high sound level occupancies and sensitive occupancies.
    a. Require sound isolation ceilings and walls for Noise Producing Spaces

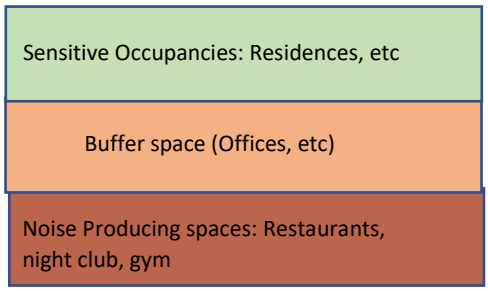


Figure X. Conceptual sketch of a vertical zoning strategy that could be applied in Mixed Use buildings that requires a buffer space to help shield residential or other sensitive occupancies from loud noise producing spaces on grade.

CONCLUSIONS

Ft. Lauderdale is a highly livable, mixed use urban soundscape with a diversity of uses and vitality. The City, its residents, business owners, and visitors are very respectful of each other and the current regulations. As a result, the soundscape of Ft. Lauderdale is well managed by many citizens at this time and only relatively minor "tweaking" of sound-related regulations are recommended.

With the many vertical residential towers that populate the city skyline come some challenges in effectively managing the soundscape at these upper levels, where the sounds from grade level reflect up the vertical landscape off the reflective buildings and direct sounds to the many residences. This presents a challenging ecosystem to attempt to control and collaboration between the varying user groups is necessary to effectively deal with this unique sonic flow that only densely populated urban areas experience. By illuminating some of the acoustic phenomenon that take place in this area, by showing how these phenomena can be measured and modeled, it is our hope that the city will be able to use these tools to help guide the design of any new construction or renovation of buildings. By understanding how the sound level limits, time of day limits, weighting limits and other limits put in place work together in creating the soundscape that is Ft. Lauderdale, it is possible to creatively and collaboratively address these issues, to allow for a thriving and lively economy that is also sensitive to the surrounding adjacencies.

A common sense approach to incremental changes in sound and noise policies can be enacted as the City grows to preserve the desirable qualities of the City while optimizing opportunities for growth. Preserving and enhancing the "personality" of Fort Lauderdale is essential to the high quality, urban life style that residents enjoy and that has allowed the City to thrive.

Some of the recommendations described in this report could possibly help Ft. Lauderdale in maintaining the balance between vibrant urban life and high quality living environments for residents and visitors as the City grows and enjoys its prosperous and vibrant life.

Please do not hesitate to call us if you have any questions in this regard.

Sincerely,

SIEBEIN ASSOCIATES, INC.

Keely M. Siebein, ASA, INCE, LEED AP BD+C
Associate Principal Consultant

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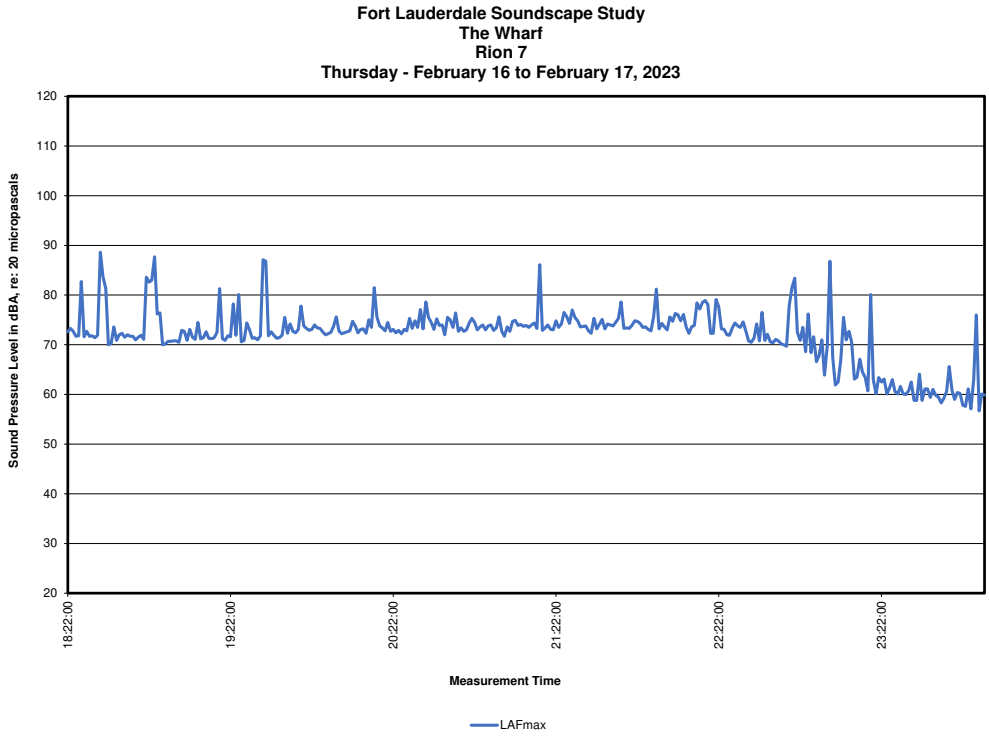
Senior Principal Consultant

Martin Gold, FAIA
Associate Professor | Architect

APPENDIX A-1:
SUMMARY GRAPHS OF LONG-TERM ACOUSTICAL DATA
TRIP 1


Fort Lauderdale Soundscape Study
The Wharf
Rion 7
Thursday - February 16 to February 17, 2023
Sound Pressure Level in dBA, re: 20 micropascals
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110
100
90
80
70
60
50
40
30
20
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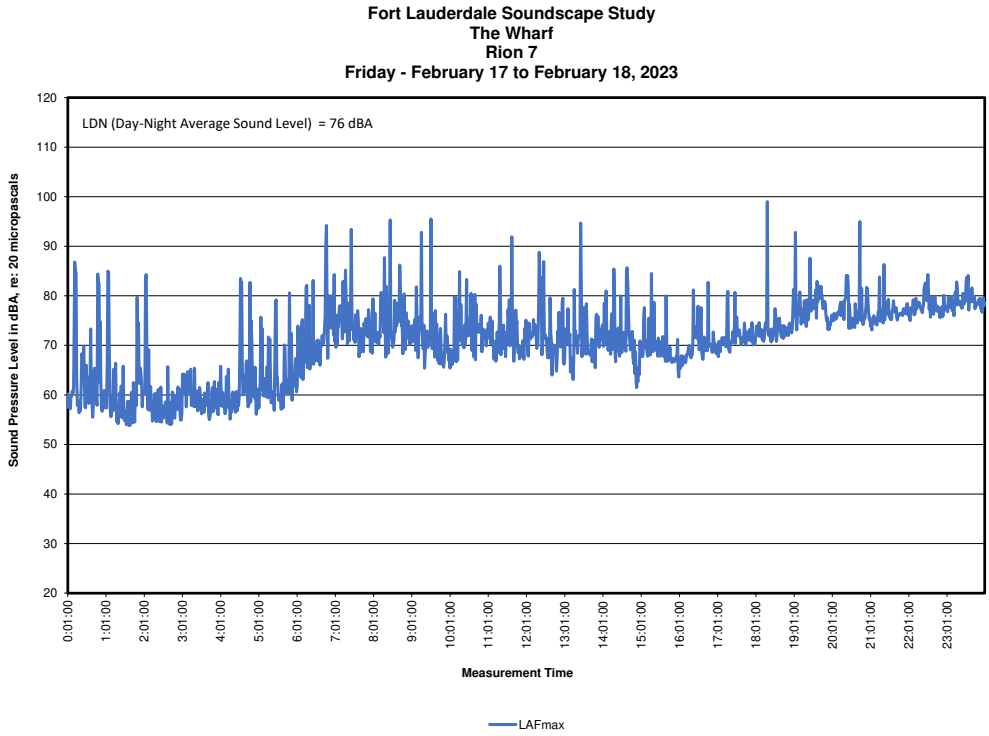
20:22:00
21:22:00
22:22:00
23:22:00
Measurement Time
LAFmax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The Wharf
Rion 7
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90
80
70
60
50
40
30
20
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2:01:00
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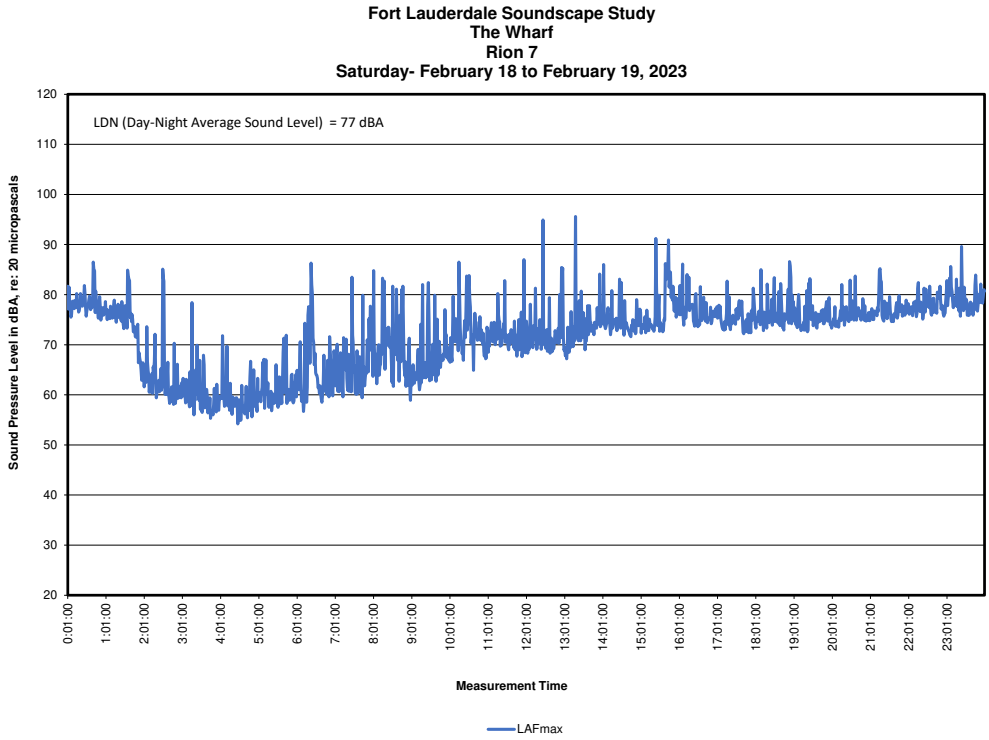
23:01:00
Measurement Time
LAFmax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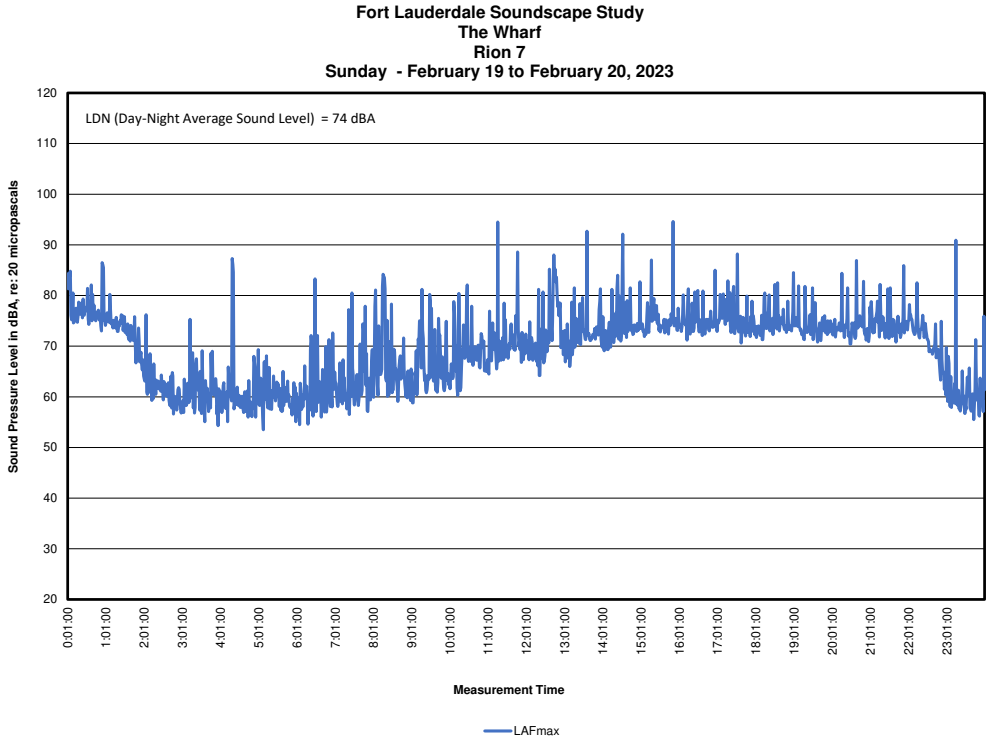
Measurement Time
LAFmax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Measurement Time
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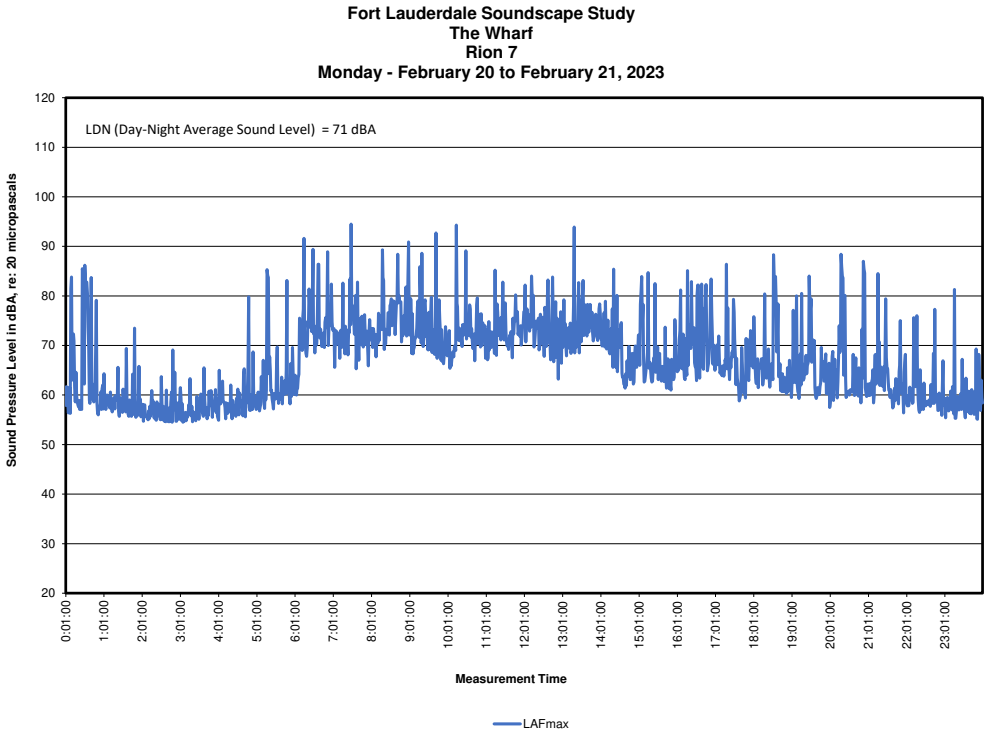
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Measurement Time
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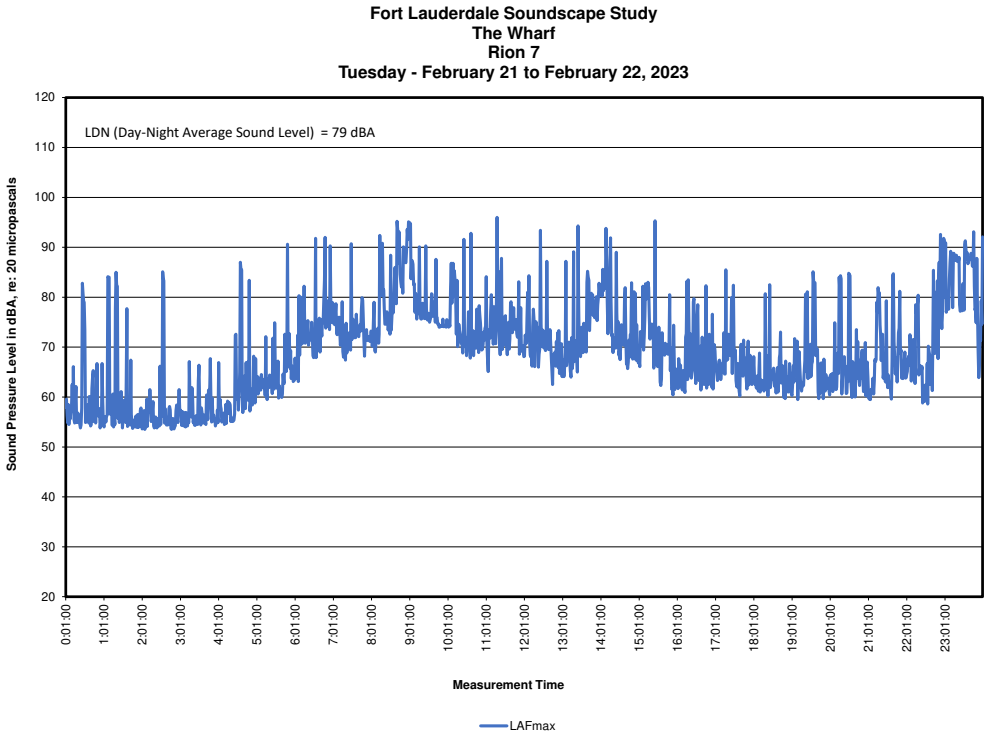
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Measurement Time
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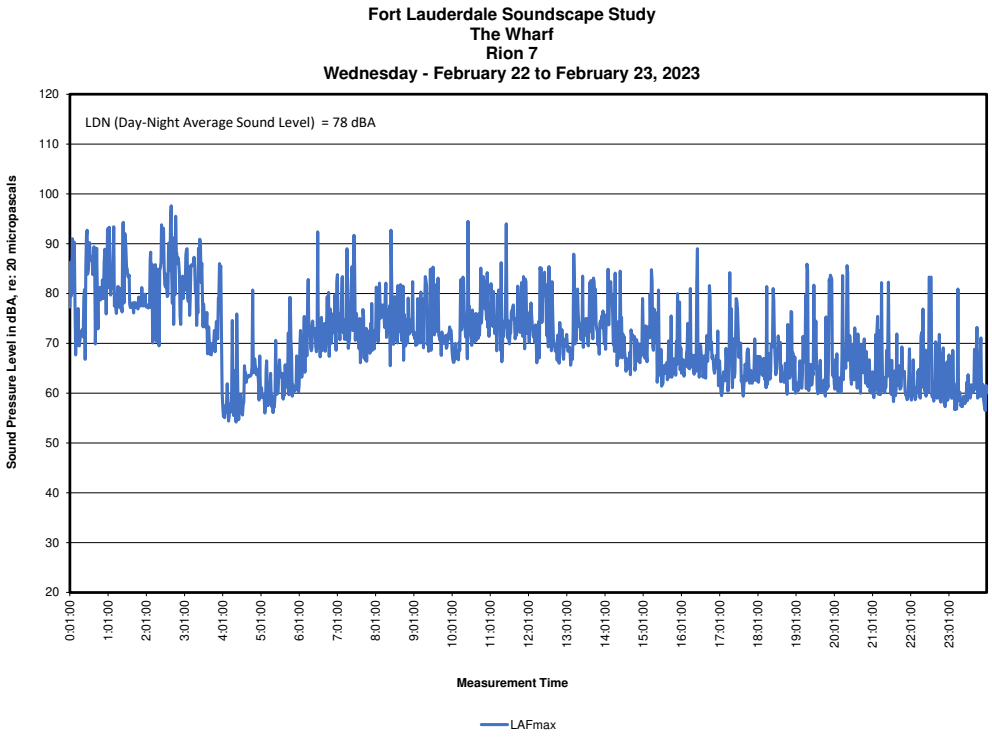
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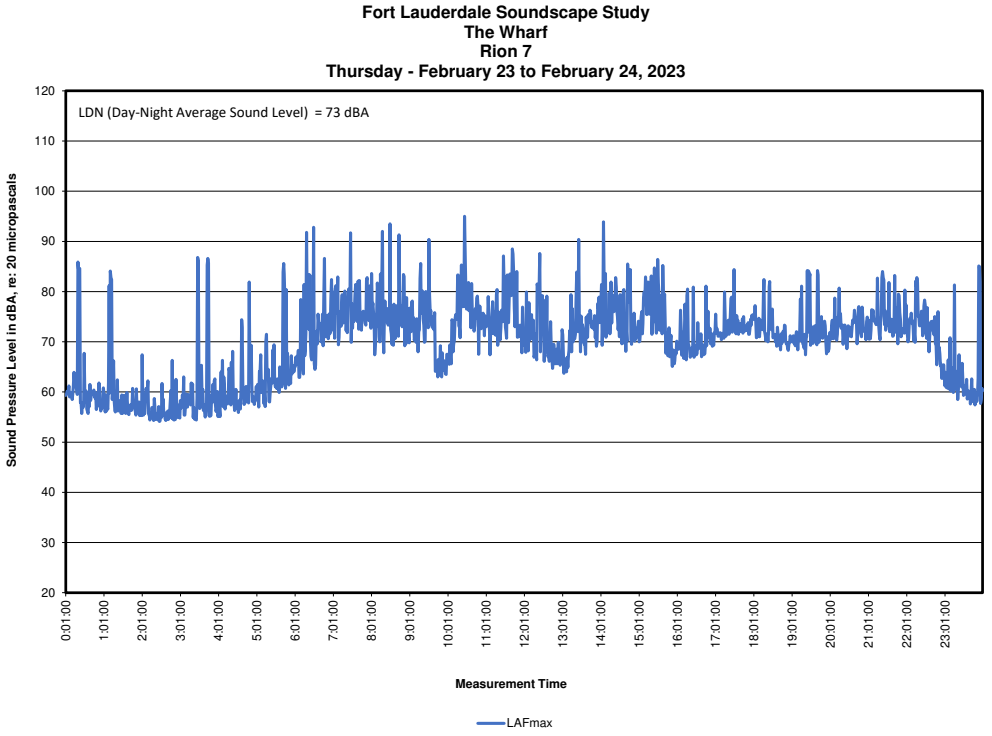
Measurement Time
LAFmax


Fort Lauderdale Soundscape Study
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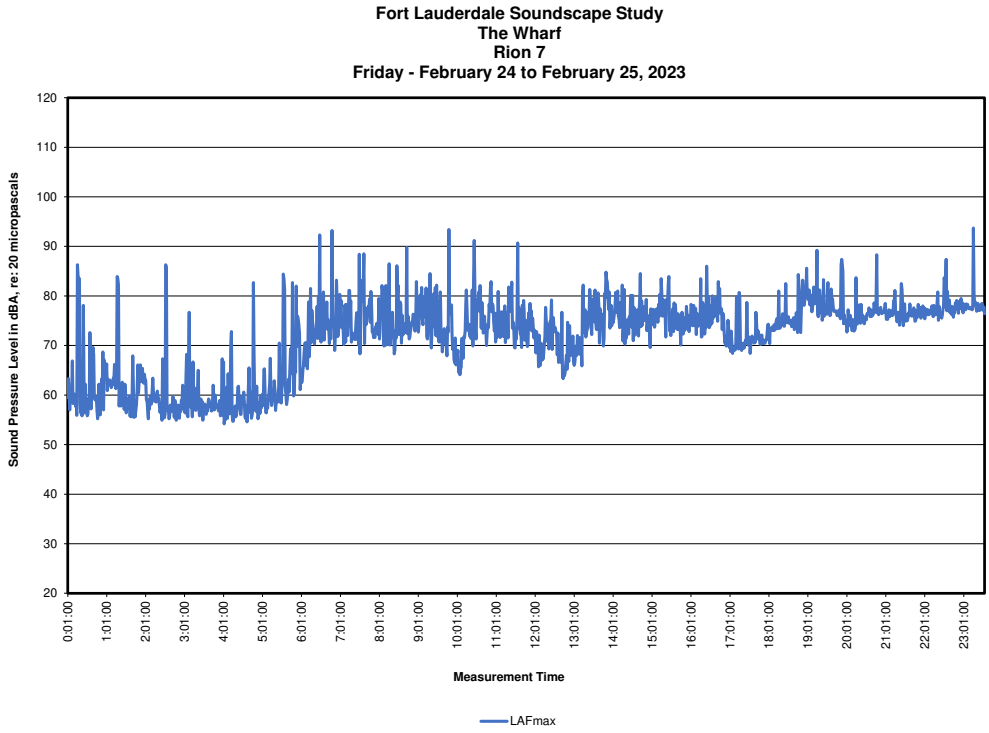
Measurement Time
LAFmax


Fort Lauderdale Soundscape Study
The Wharf
Rion 7
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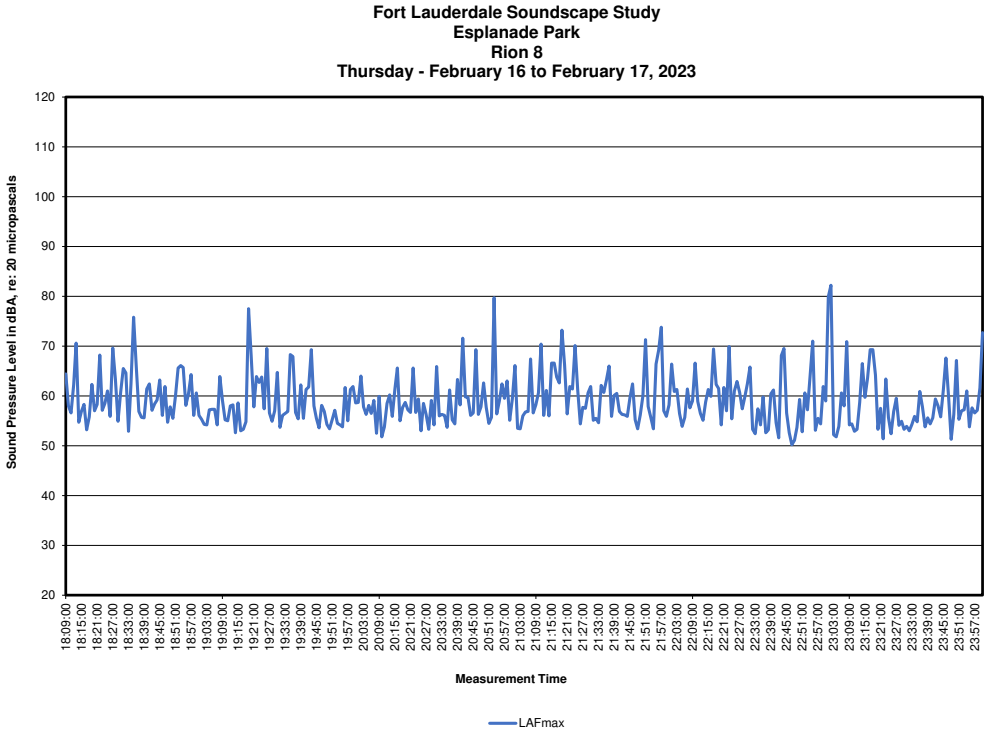
Measurement Time
LAFmax


Fort Lauderdale Soundscape Study
Esplanade Park
Rion 8
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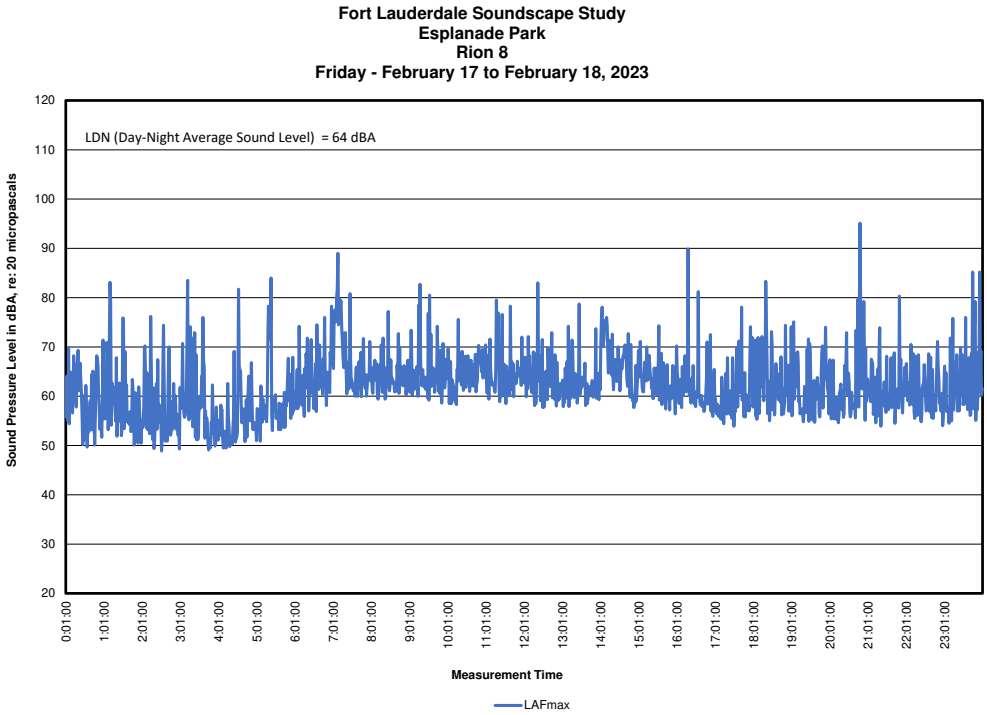
Measurement Time
LAFmax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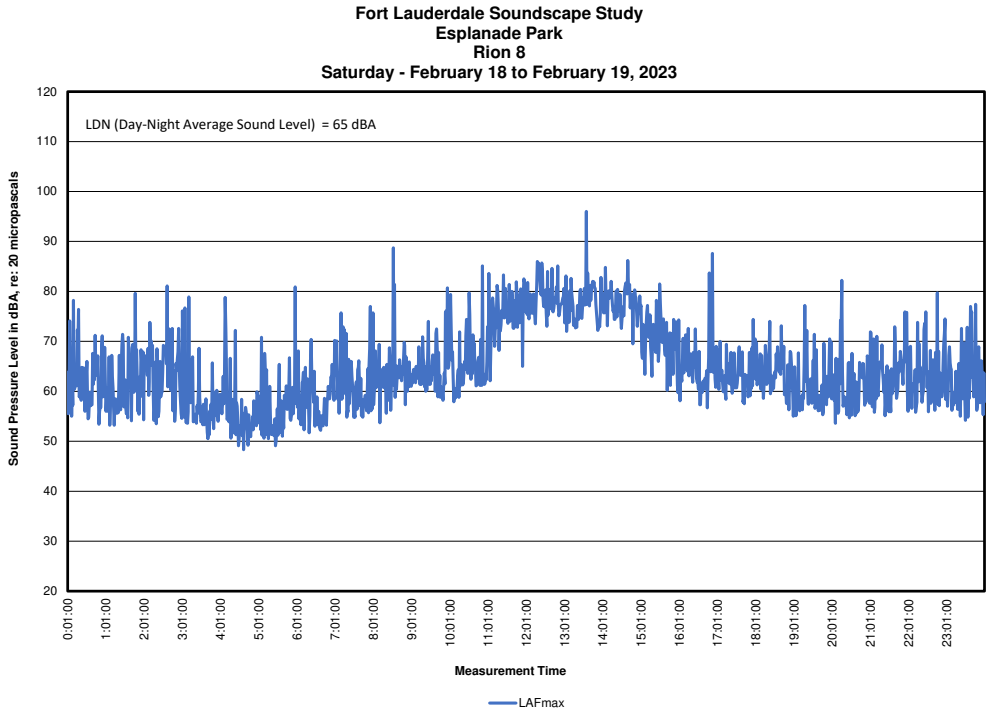
Measurement Time
LAFmax


Fort Lauderdale Soundscape Study
Esplanade Park
Rion 8
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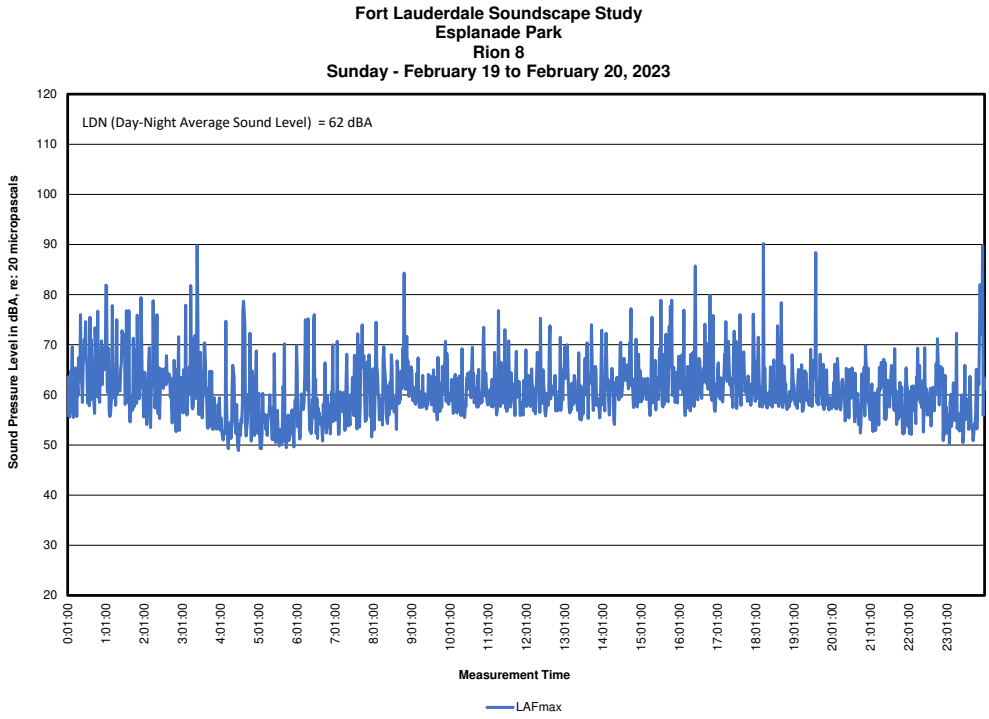
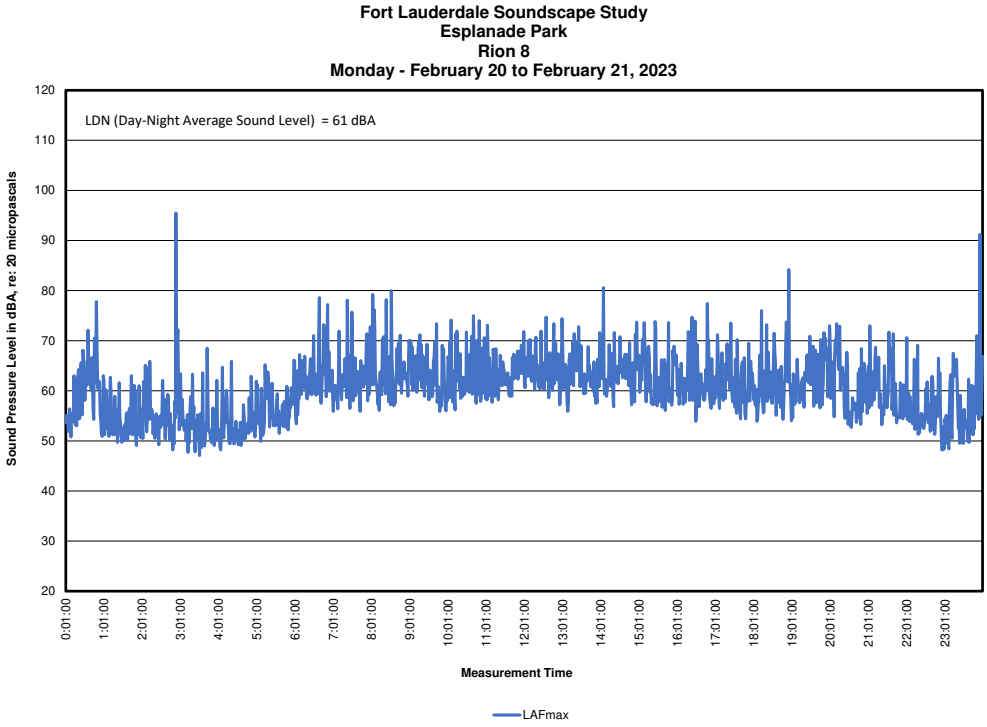
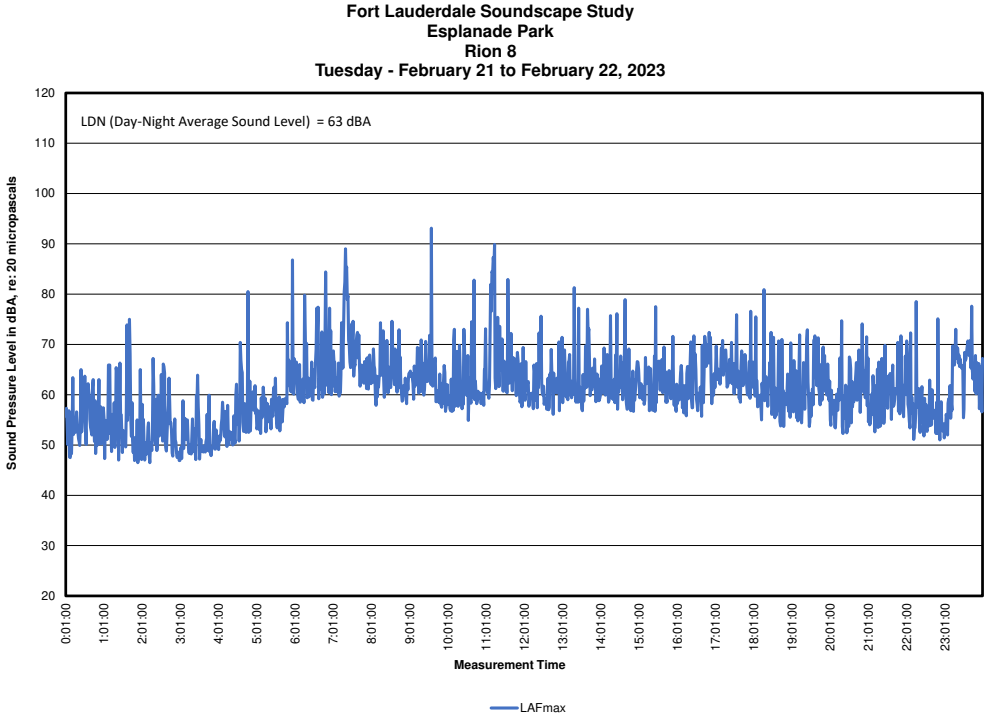
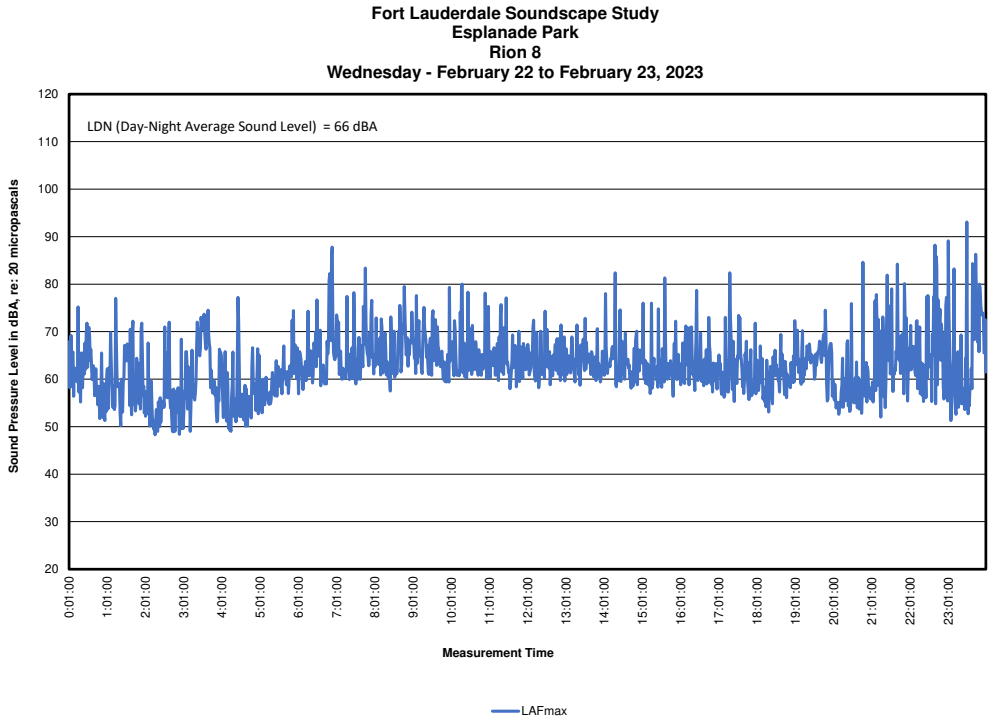
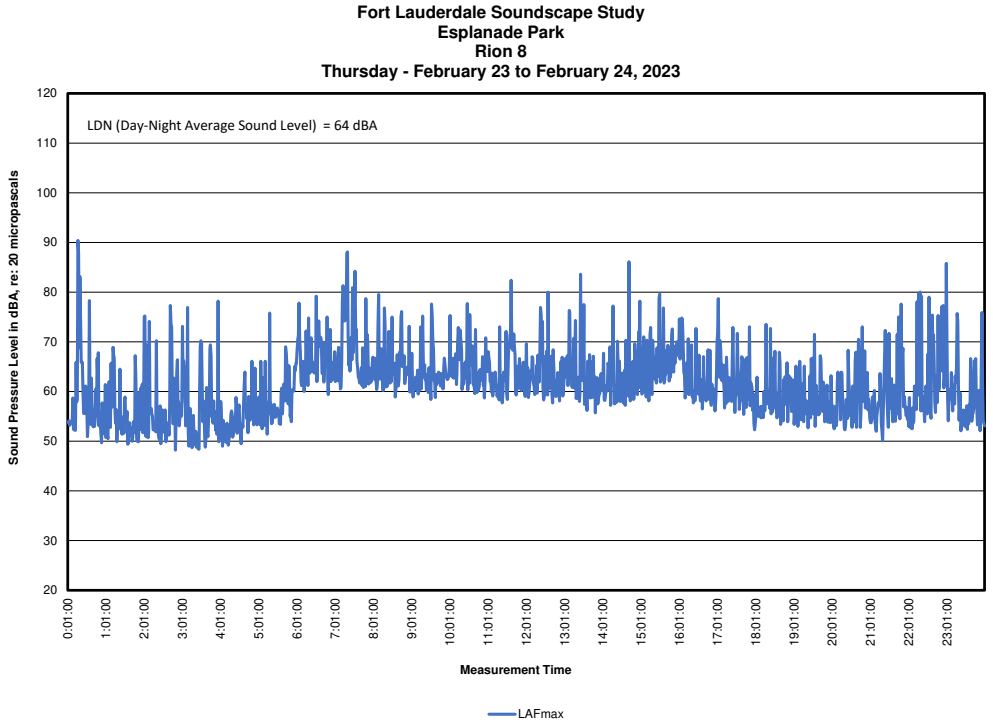
Measurement Time
LAFmax

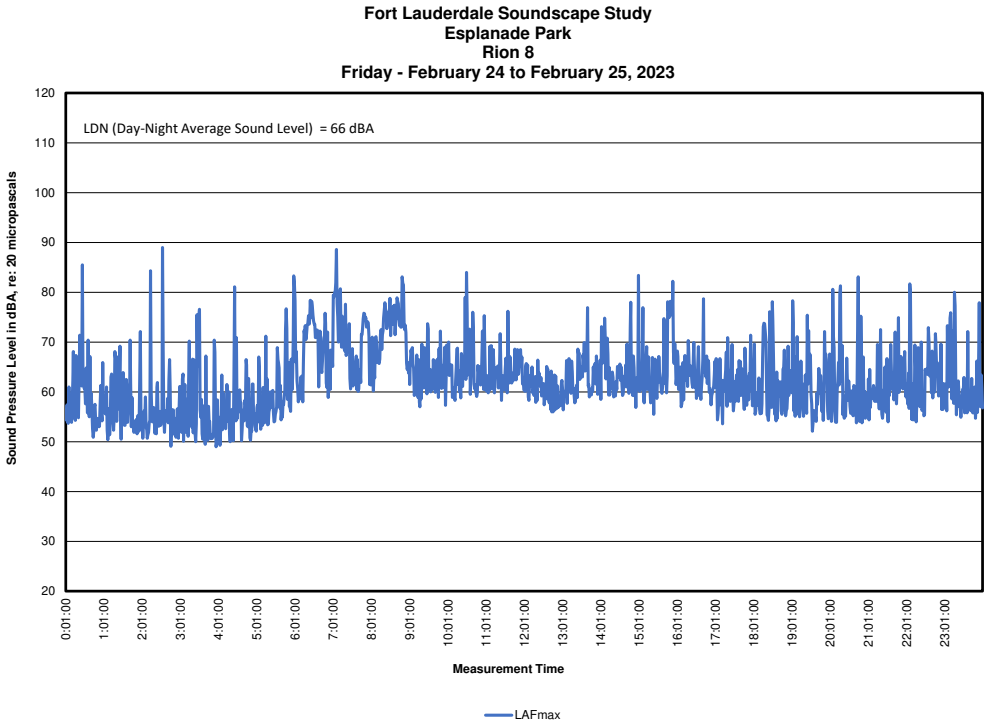

Fort Lauderdale Soundscape Study
Esplanade Park
Rion 8
Sunday - February 19 to February 20, 2023
LDN (Day-Night Average Sound Level) = 62 dBA
Sound Pressure Level in dBA, re: 20 micropascals
Measurement Time
LAFmax

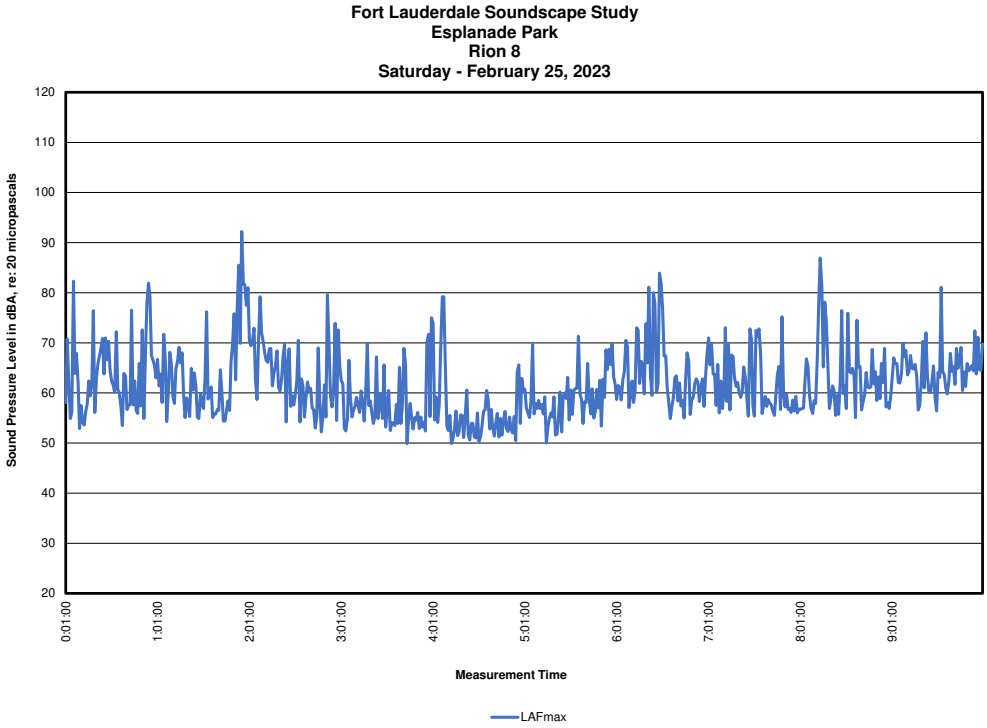

Fort Lauderdale Soundscape Study
Esplanade Park
Rion 8
Monday - February 20 to February 21, 2023
LDN (Day-Night Average Sound Level) = 61 dBA
Sound Pressure Level in dBA, re: 20 micropascals
Measurement Time
LAFmax

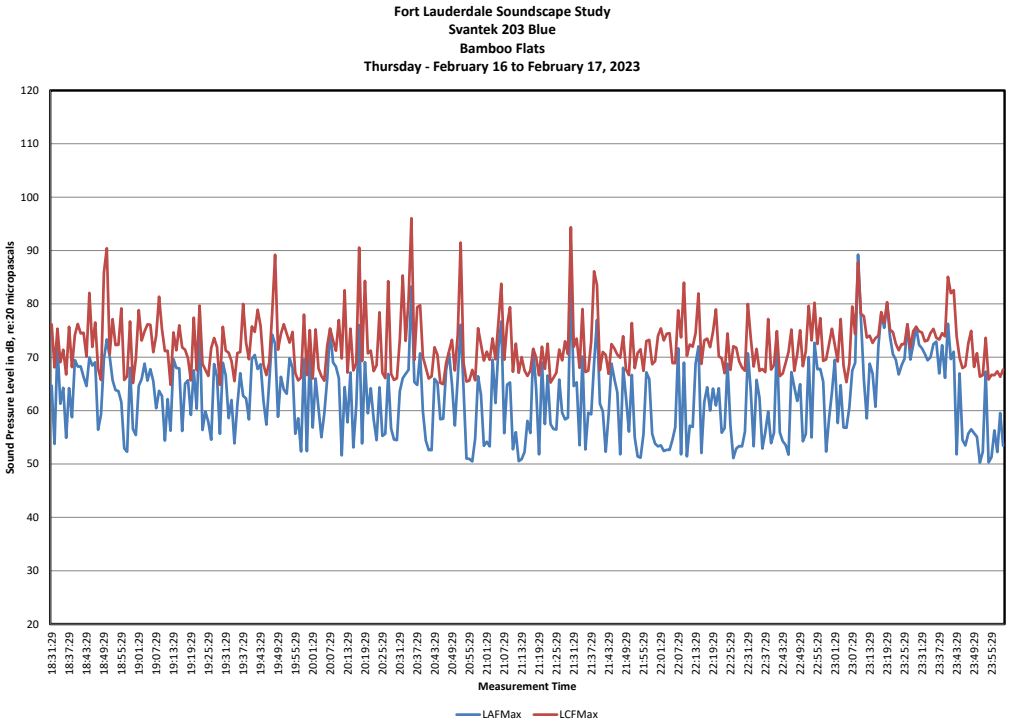

Fort Lauderdale Soundscape Study
Esplanade Park
Rion 8
Tuesday - February 21 to February 22, 2023
LDN (Day-Night Average Sound Level) = 63 dBA
Sound Pressure Level in dBA, re: 20 micropascals
Measurement Time
LAFmax

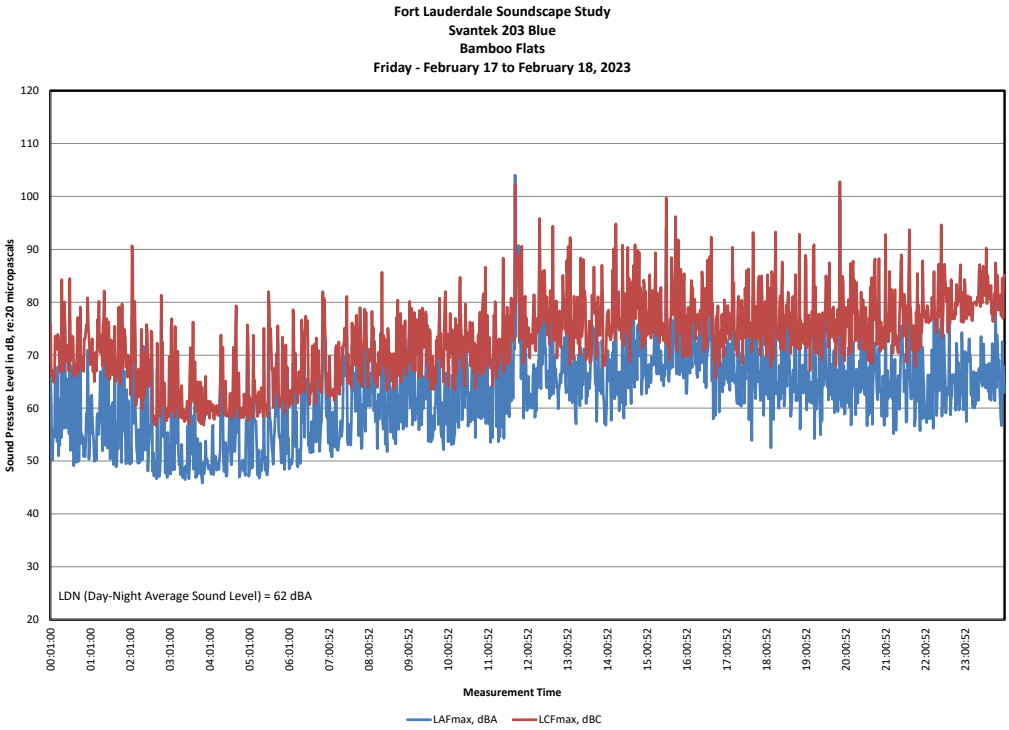

Fort Lauderdale Soundscape Study
Esplanade Park
Rion 8
Wednesday - February 22 to February 23, 2023
LDN (Day-Night Average Sound Level) = 66 dBA
Sound Pressure Level in dBA, re: 20 micropascals
Measurement Time
LAFmax

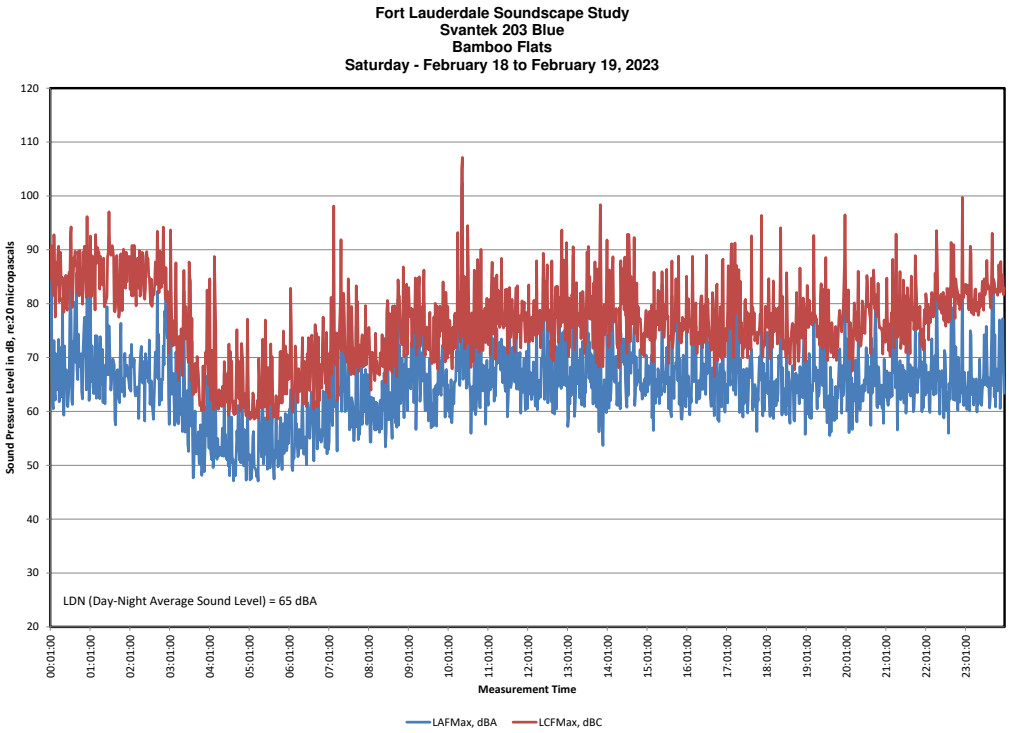

Fort Lauderdale Soundscape Study
Esplanade Park
Rion 8
Thursday - February 23 to February 24, 2023
LDN (Day-Night Average Sound Level) = 64 dBA
Sound Pressure Level in dBA, re: 20 micropascals
Measurement Time
LAFmax

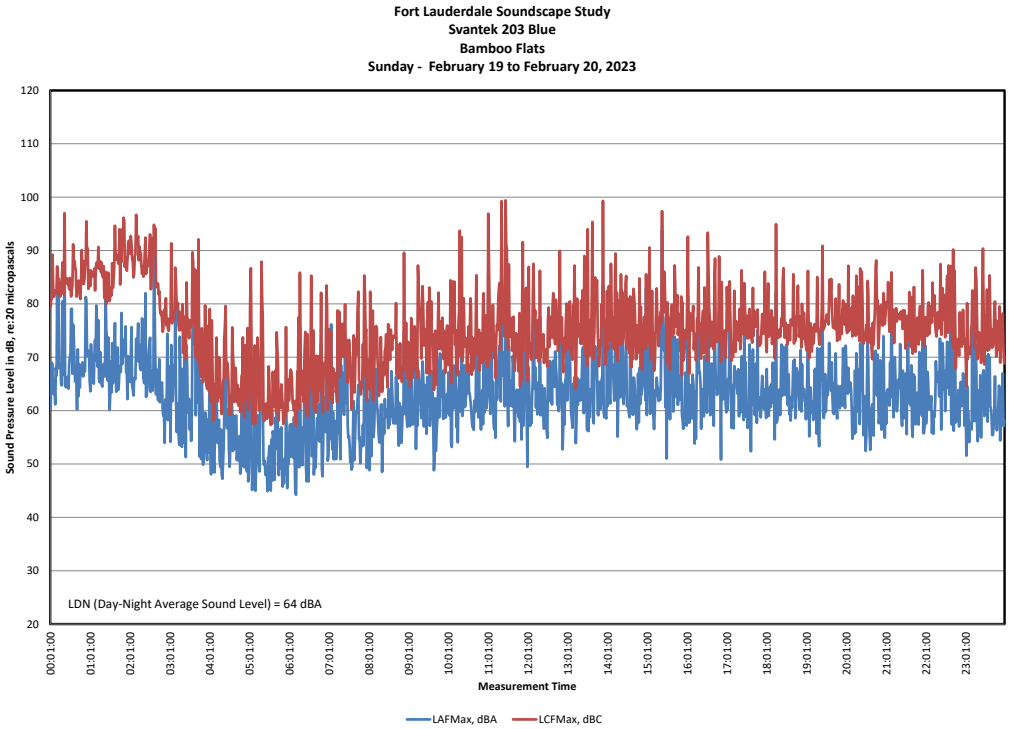

Fort Lauderdale Soundscape Study
Esplanade Park
Rion 8
Friday - February 24 to February 25, 2023
LDN (Day-Night Average Sound Level) = 66 dBA
Sound Pressure Level in dBA, re: 20 micropascals
120
110
100
90
80
70
60
50
40
30
20
0:01:00
1:01:00
2:01:00
3:01:00
4:01:00
5:01:00
6:01:00
7:01:00
8:01:00
9:01:00
10:01:00
11:01:00
12:01:00
13:01:00
14:01:00
15:01:00
16:01:00
17:01:00
18:01:00
19:01:00
20:01:00
21:01:00
22:01:00
23:01:00
Measurement Time
LAFmax

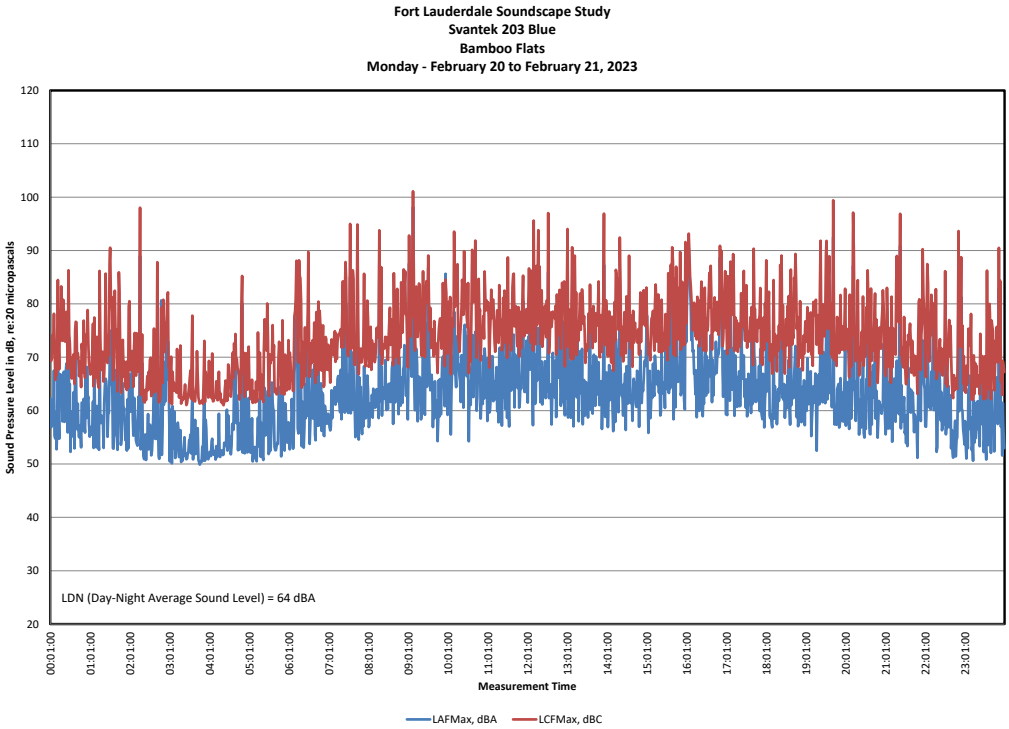

Fort Lauderdale Soundscape Study
Esplanade Park
Rion 8
Saturday - February 25, 2023
Sound Pressure Level in dBA, re: 20 micropascals
120
110
100
90
80
70
60
50
40
30
20
0:01:00
1:01:00
2:01:00
3:01:00
4:01:00
5:01:00
6:01:00
7:01:00
8:01:00
9:01:00
Measurement Time
LAFmax

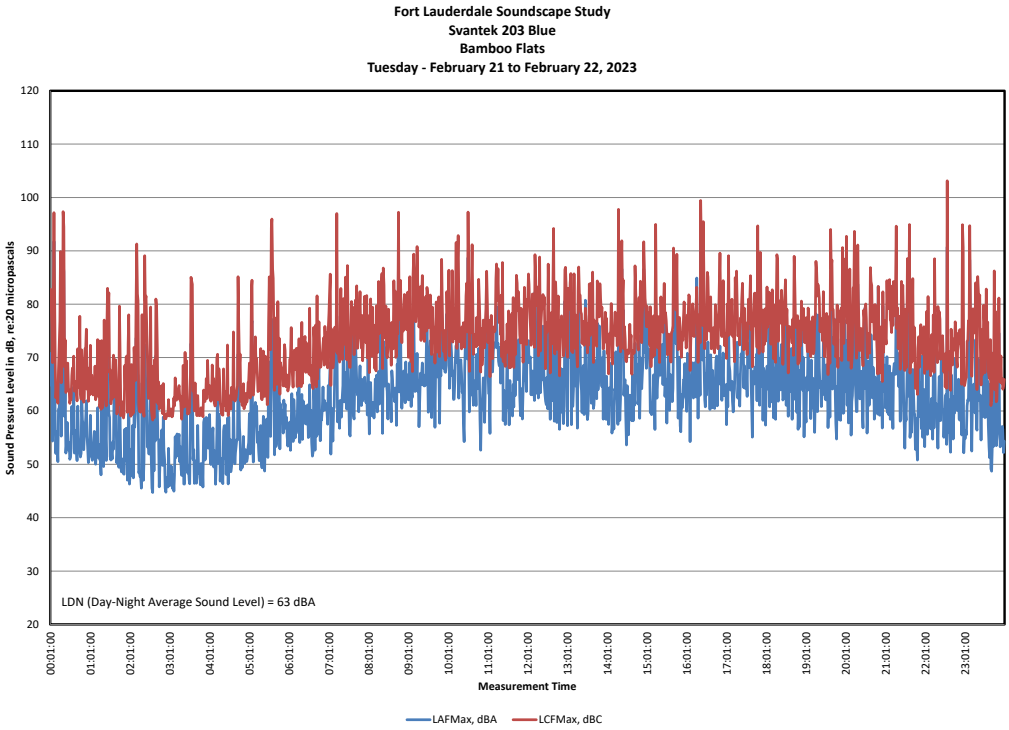

Fort Lauderdale Soundscape Study
Svantek 203 Blue
Bamboo Flats
Thursday - February 16 to February 17, 2023
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFMax
LCFMax

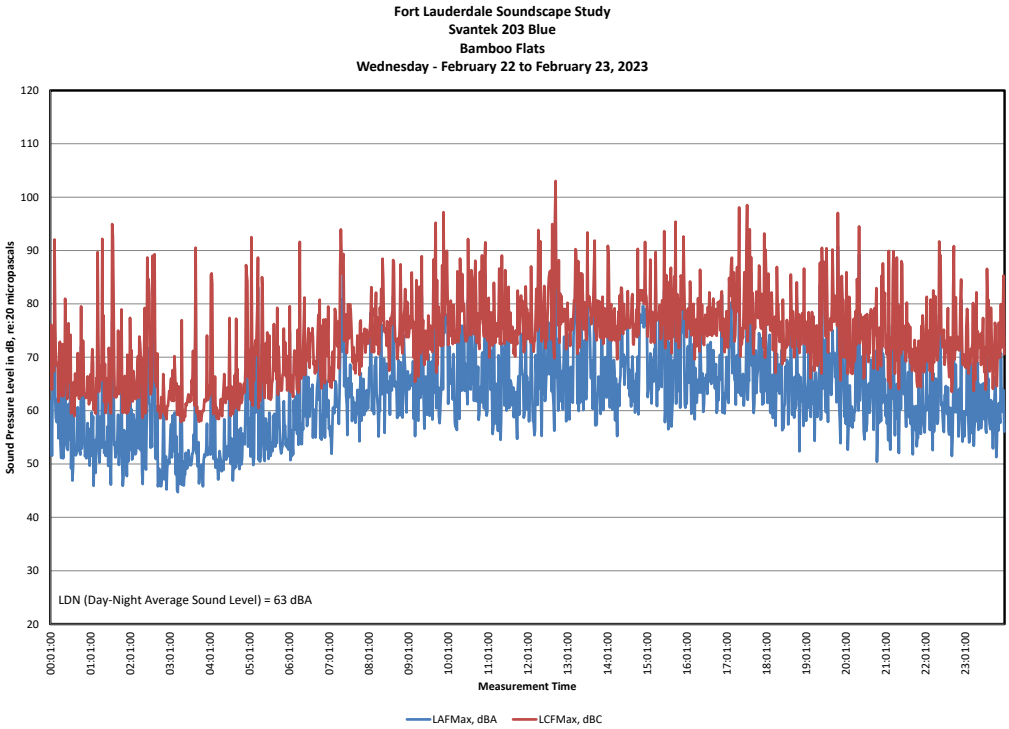

Fort Lauderdale Soundscape Study
Svantek 203 Blue
Bamboo Flats
Friday - February 17 to February 18, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 62 dBA
Measurement Time
LAFmax, dBA
LCFmax, dBC

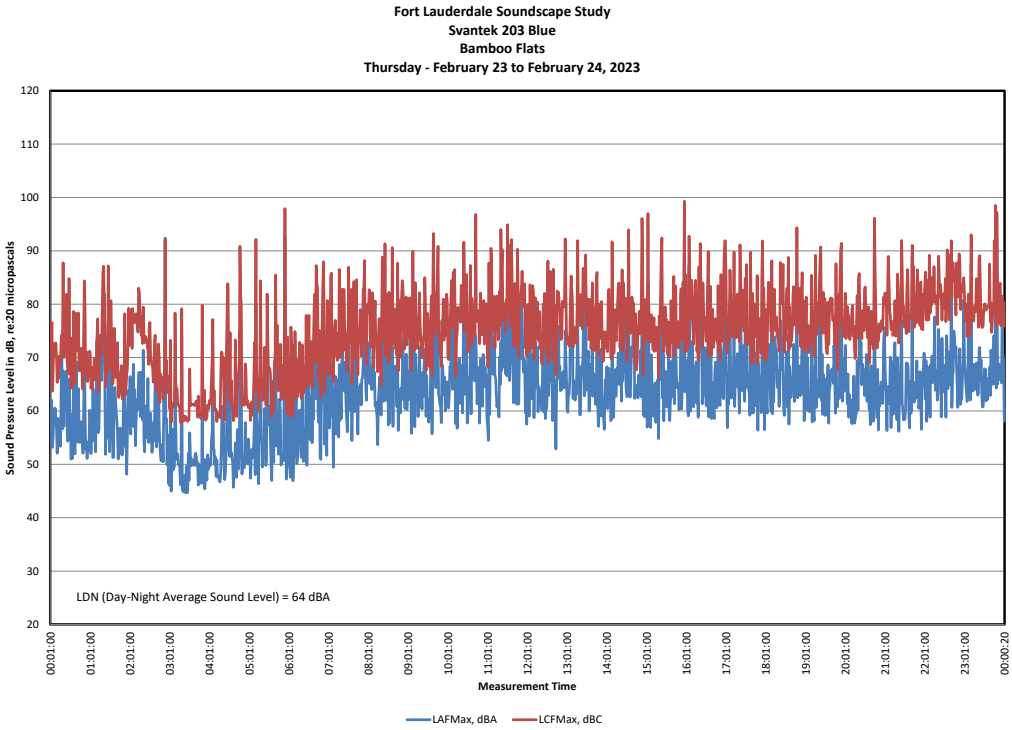

Fort Lauderdale Soundscape Study
Svantek 203 Blue
Bamboo Flats
Saturday - February 18 to February 19, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 65 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC

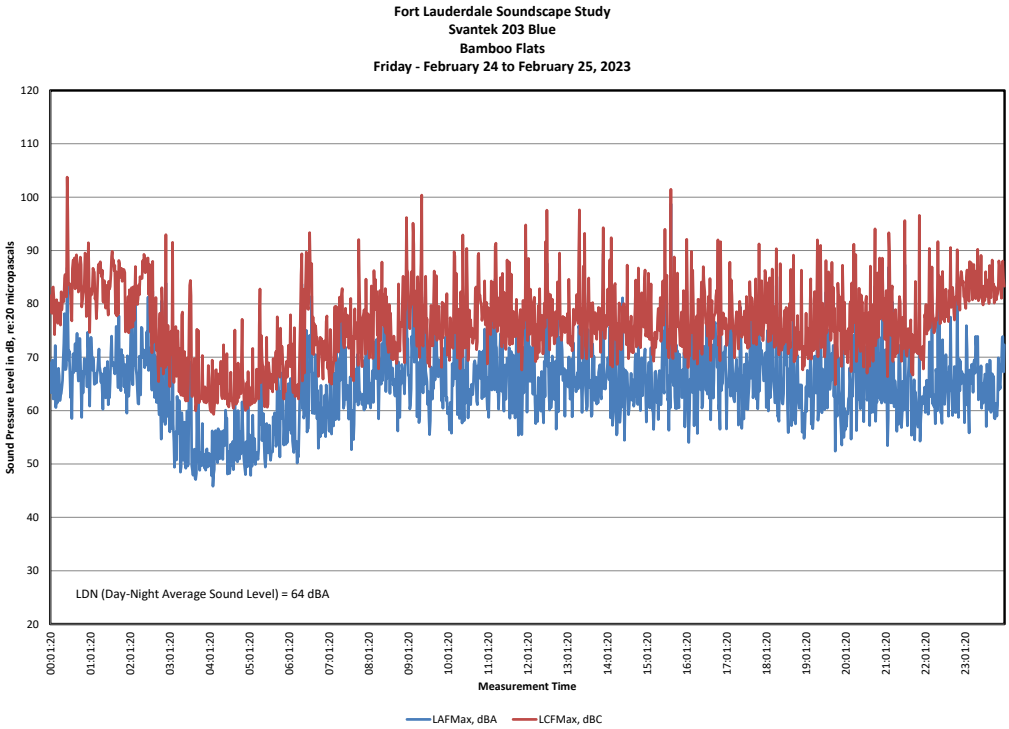

Fort Lauderdale Soundscape Study
Svantek 203 Blue
Bamboo Flats
Sunday - February 19 to February 20, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 64 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC

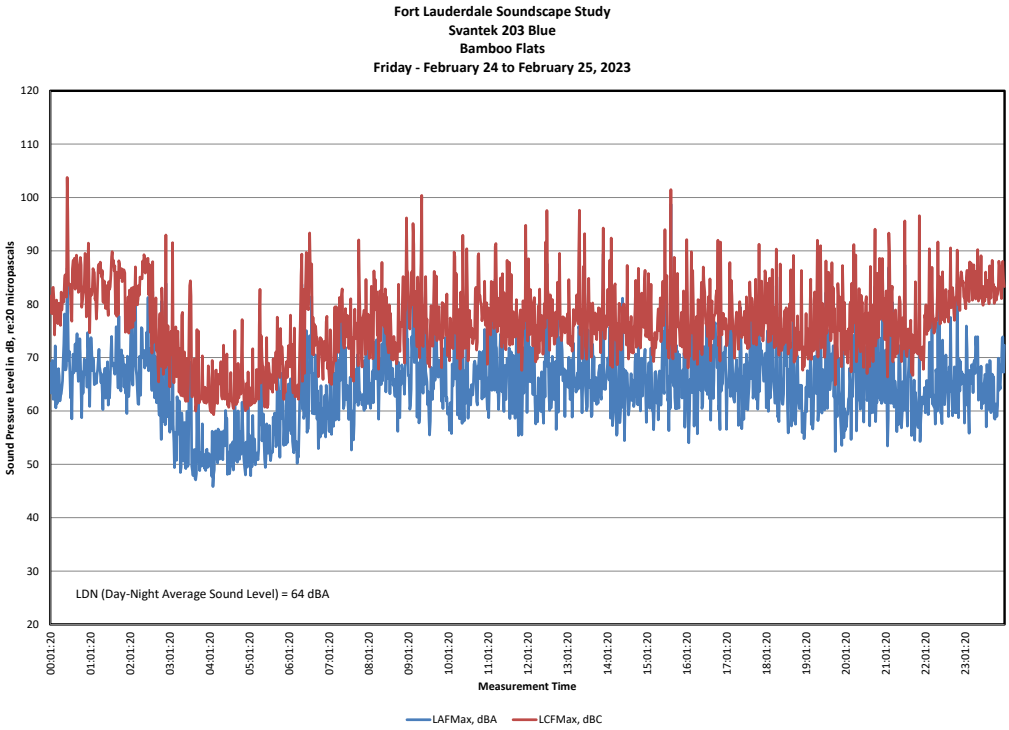

Fort Lauderdale Soundscape Study
Svantek 203 Blue
Bamboo Flats
Monday - February 20 to February 21, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 64 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC

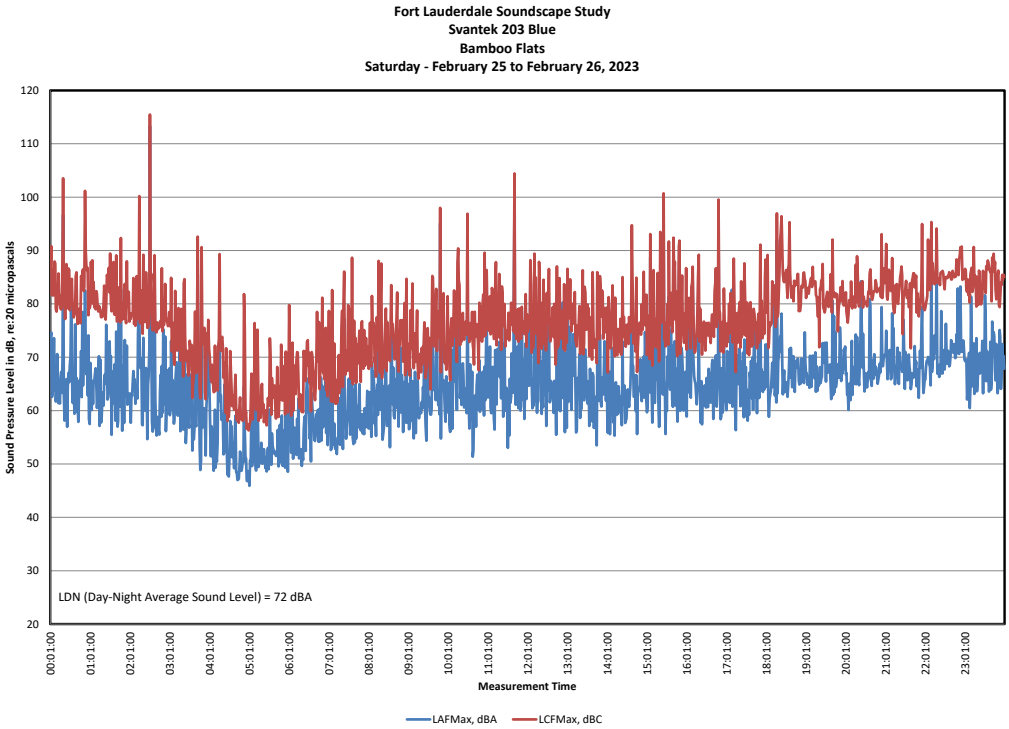

Fort Lauderdale Soundscape Study
Svantek 203 Blue
Bamboo Flats
Tuesday - February 21 to February 22, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 63 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC

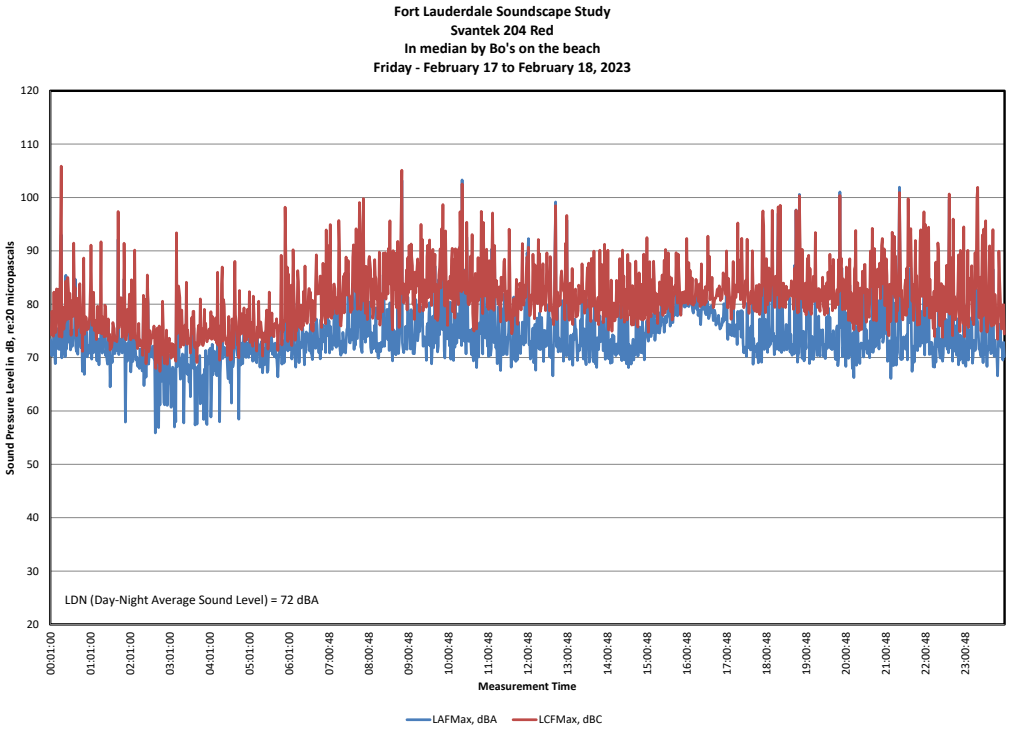

Fort Lauderdale Soundscape Study
Svantek 203 Blue
Bamboo Flats
Wednesday - February 22 to February 23, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 63 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC

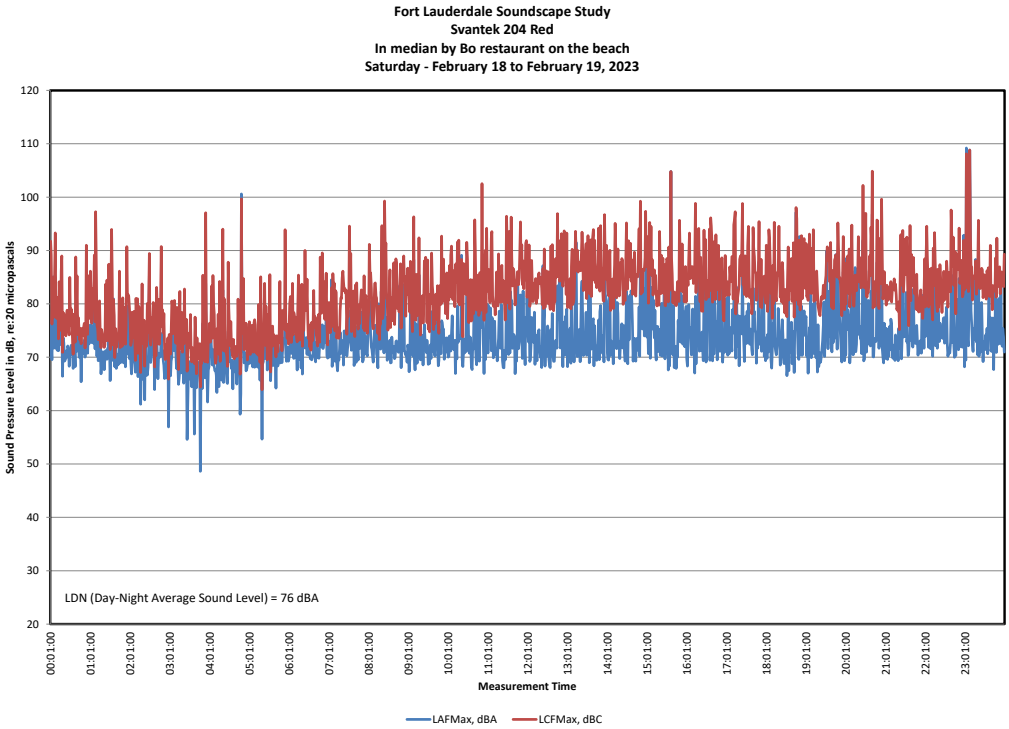

Fort Lauderdale Soundscape Study
Svantek 203 Blue
Bamboo Flats
Thursday - February 23 to February 24, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 64 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC

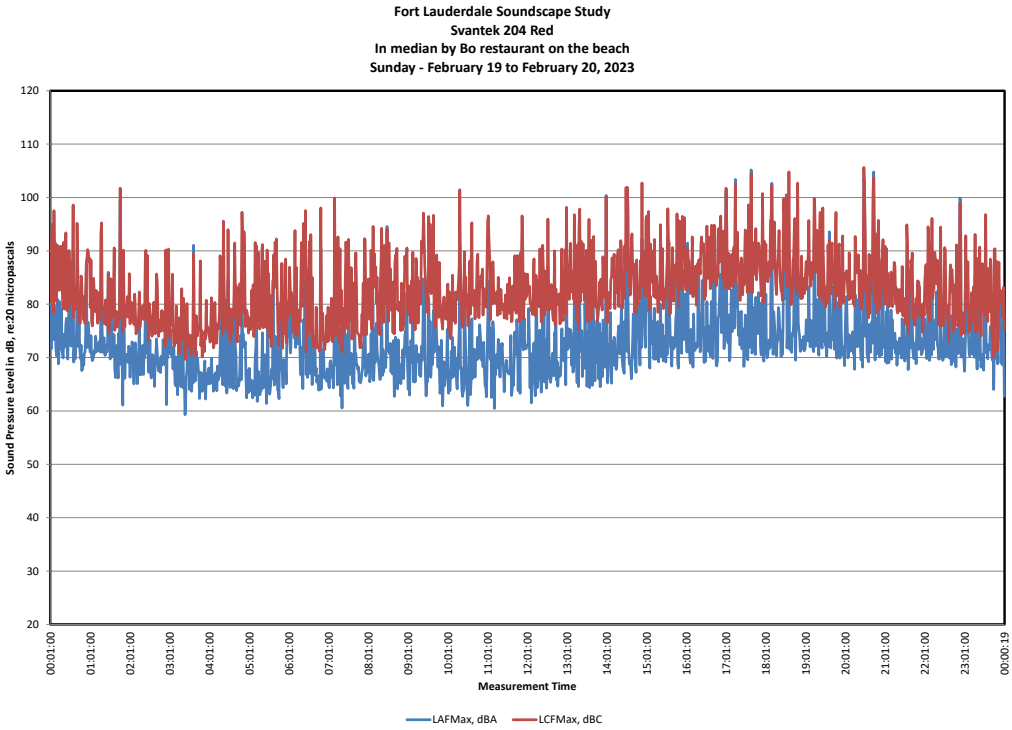

Fort Lauderdale Soundscape Study
Svantek 203 Blue
Bamboo Flats
Friday - February 24 to February 25, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 64 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC

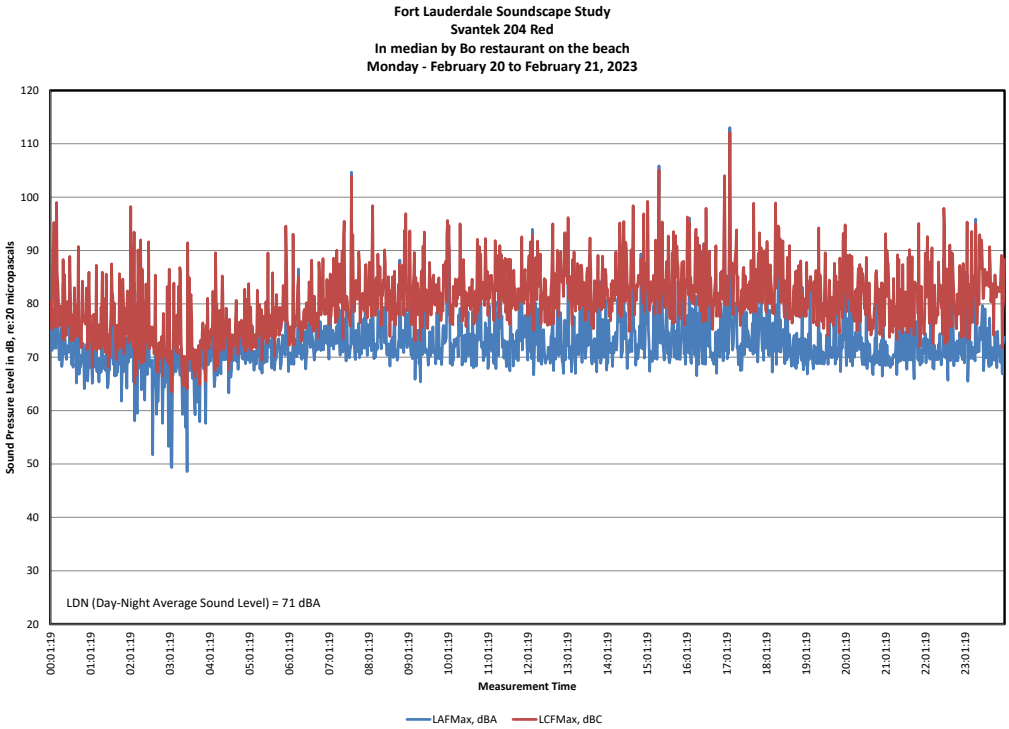

Fort Lauderdale Soundscape Study
Svantek 203 Blue
Bamboo Flats
Friday - February 24 to February 25, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 64 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC

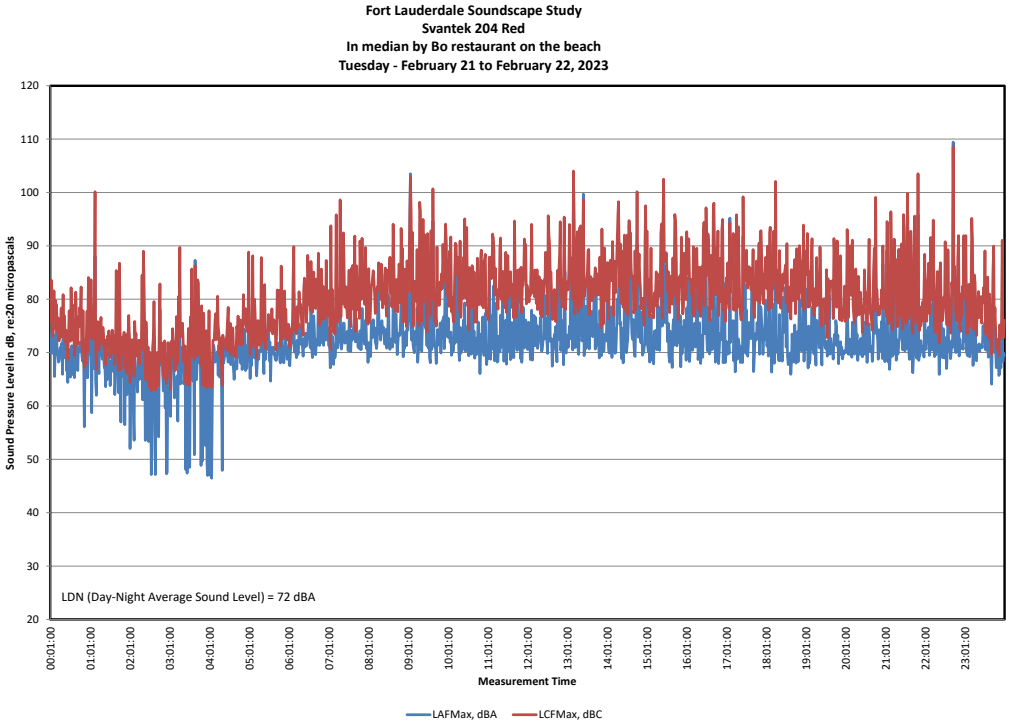

Fort Lauderdale Soundscape Study
Svantek 203 Blue
Bamboo Flats
Saturday - February 25 to February 26, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 72 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC

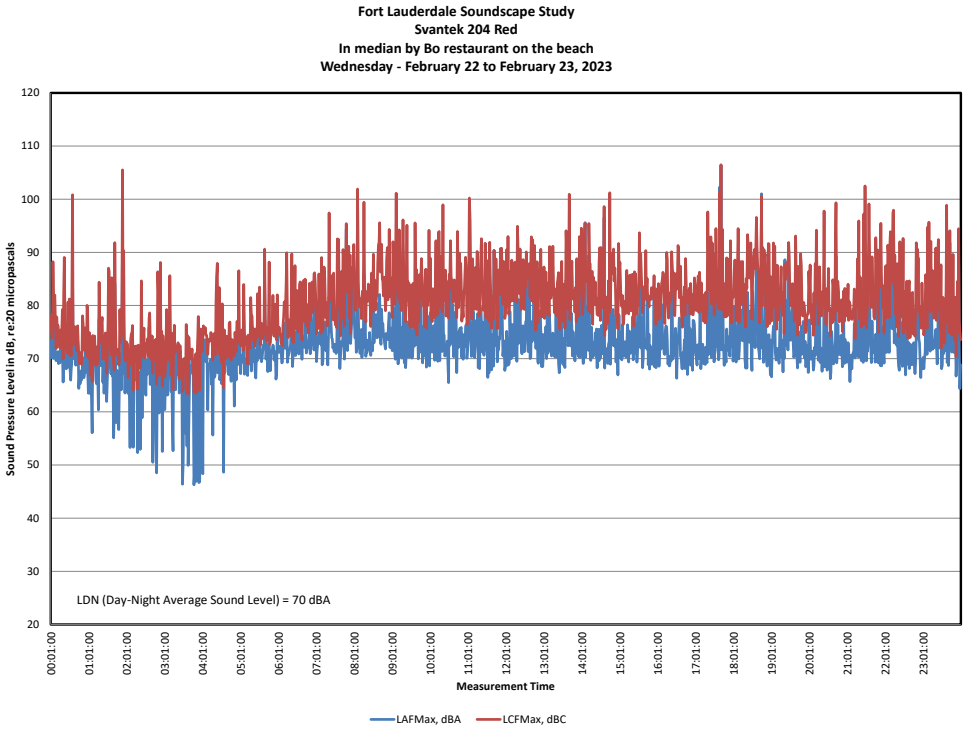

Fort Lauderdale Soundscape Study
Svantek 204 Red
In median by Bo's on the beach
Friday - February 17 to February 18, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 72 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC

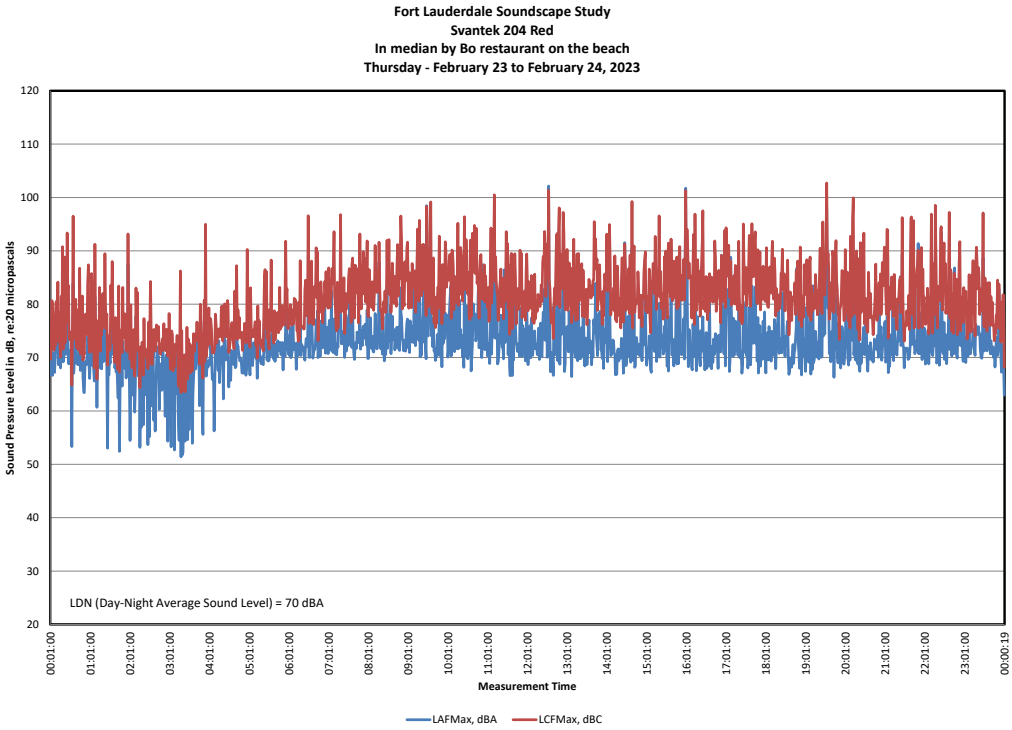

Fort Lauderdale Soundscape Study
Svantek 204 Red
In median by Bo restaurant on the beach
Saturday - February 18 to February 19, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 76 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC

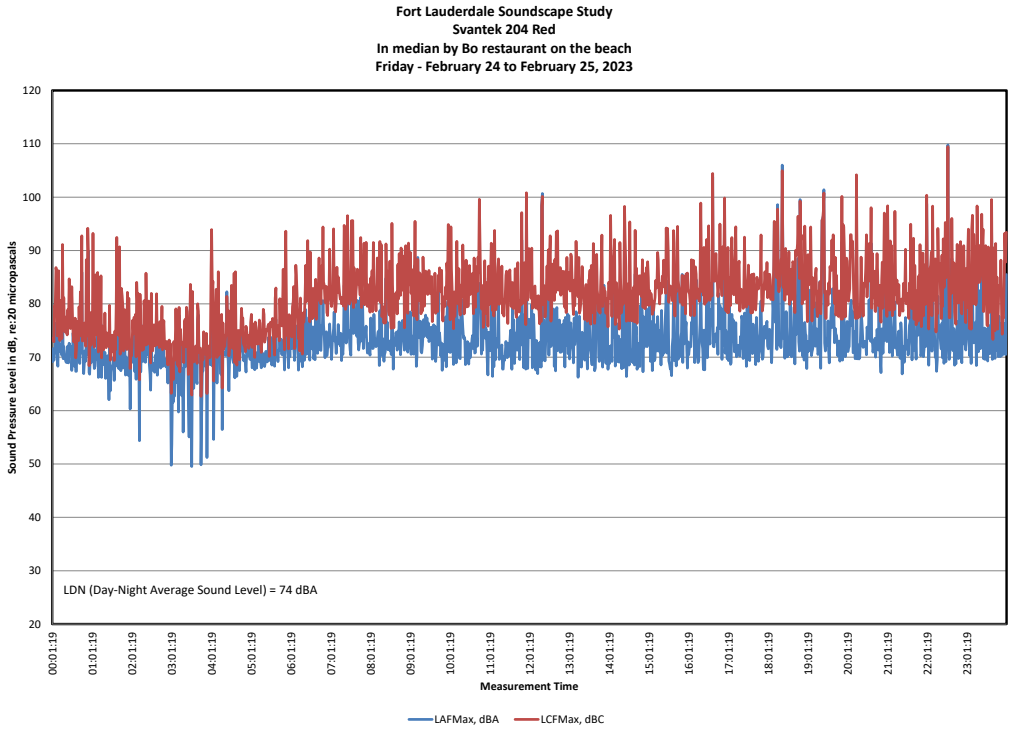

Fort Lauderdale Soundscape Study
Svantek 204 Red
In median by Bo restaurant on the beach
Sunday - February 19 to February 20, 2023
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFMax, dBA
LCFMax, dBC

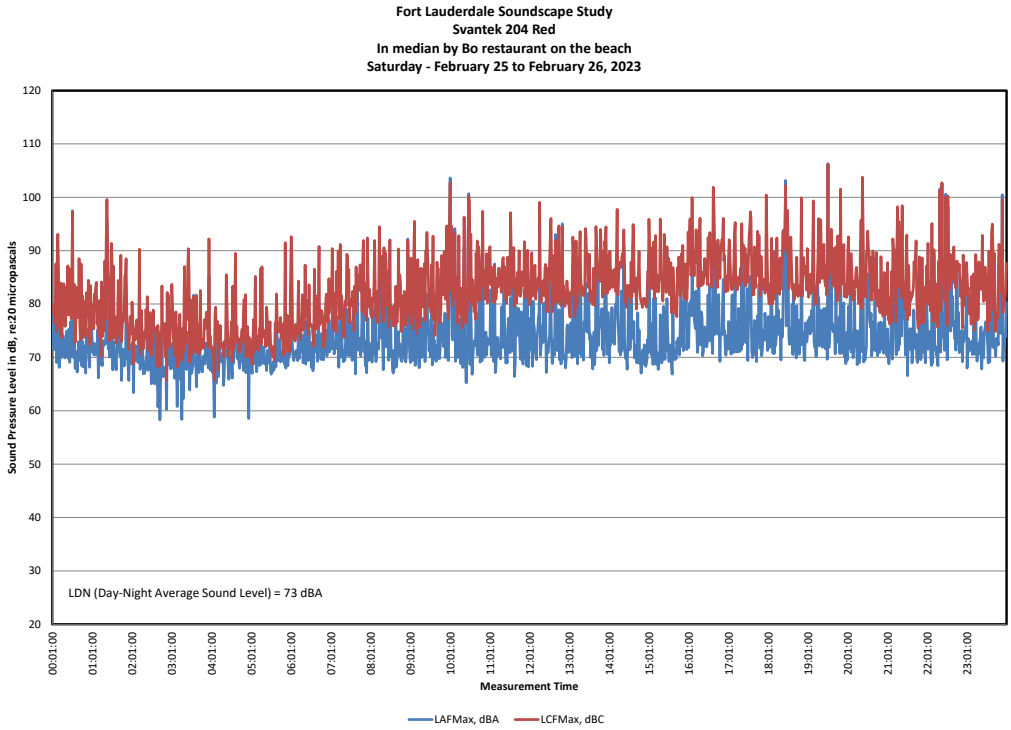

Fort Lauderdale Soundscape Study
Svantek 204 Red
In median by Bo restaurant on the beach
Monday - February 20 to February 21, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 71 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC

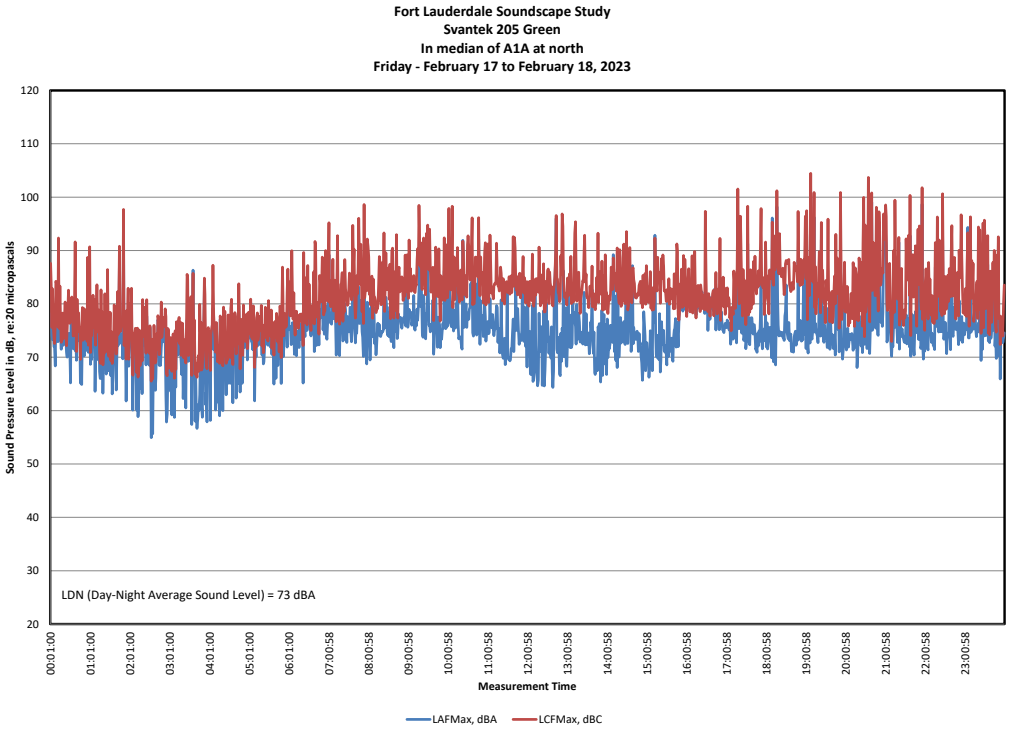

Fort Lauderdale Soundscape Study
Svantek 204 Red
In median by Bo restaurant on the beach
Tuesday - February 21 to February 22, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 72 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC

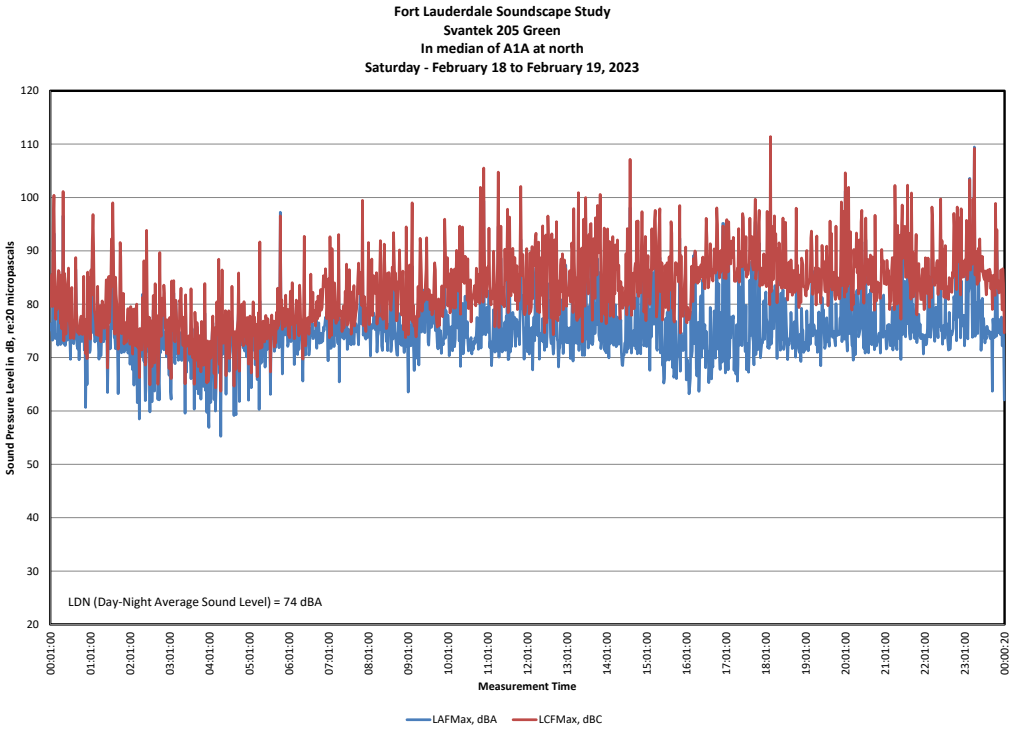

Fort Lauderdale Soundscape Study
Svantek 204 Red
In median by Bo restaurant on the beach
Wednesday - February 22 to February 23, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 70 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC

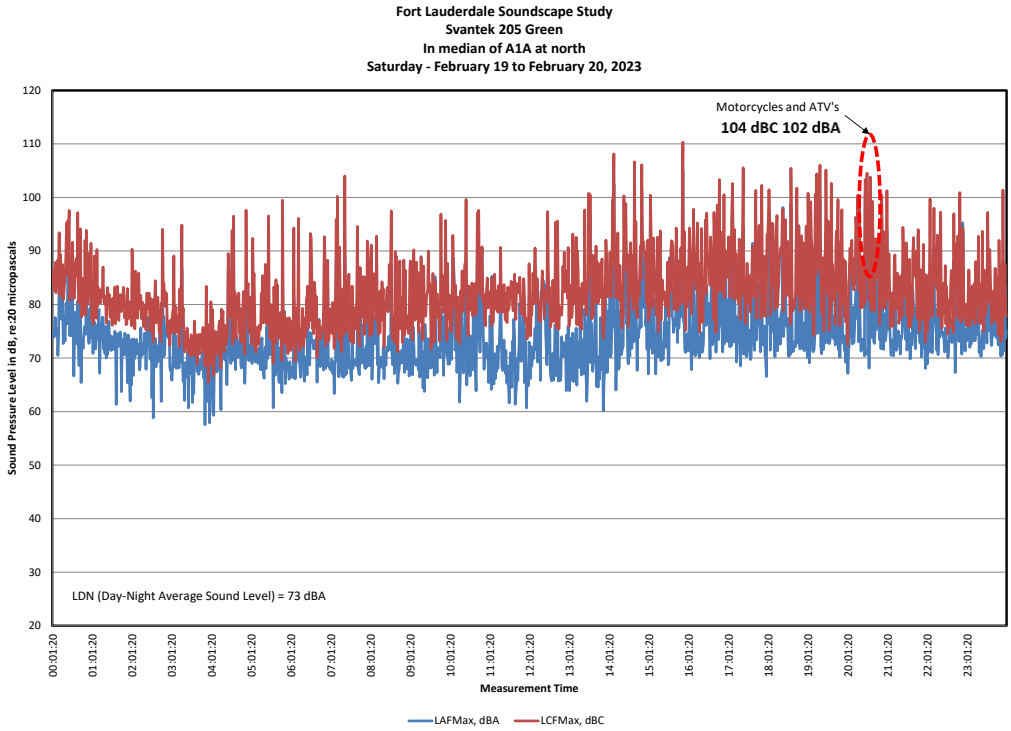

Fort Lauderdale Soundscape Study
Svantek 204 Red
In median by Bo restaurant on the beach
Thursday - February 23 to February 24, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 70 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC

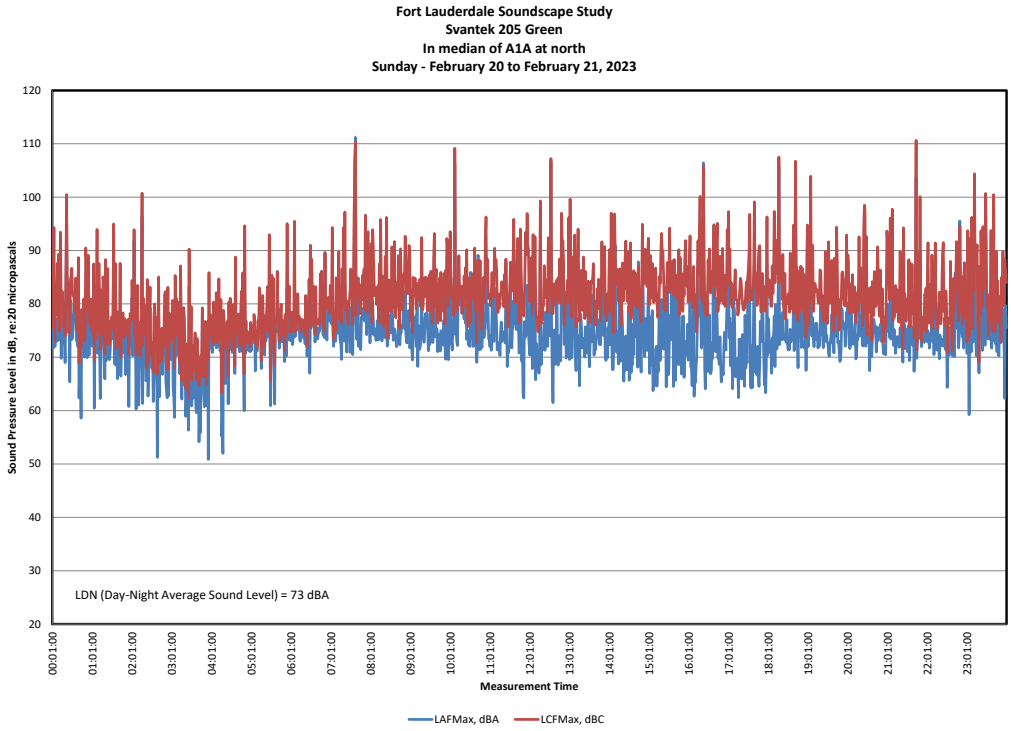

Fort Lauderdale Soundscape Study
Svantek 204 Red
In median by Bo restaurant on the beach
Friday - February 24 to February 25, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 74 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC


Fort Lauderdale Soundscape Study
Svantek 204 Red
In median by Bo restaurant on the beach
Saturday - February 25 to February 26, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 73 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC

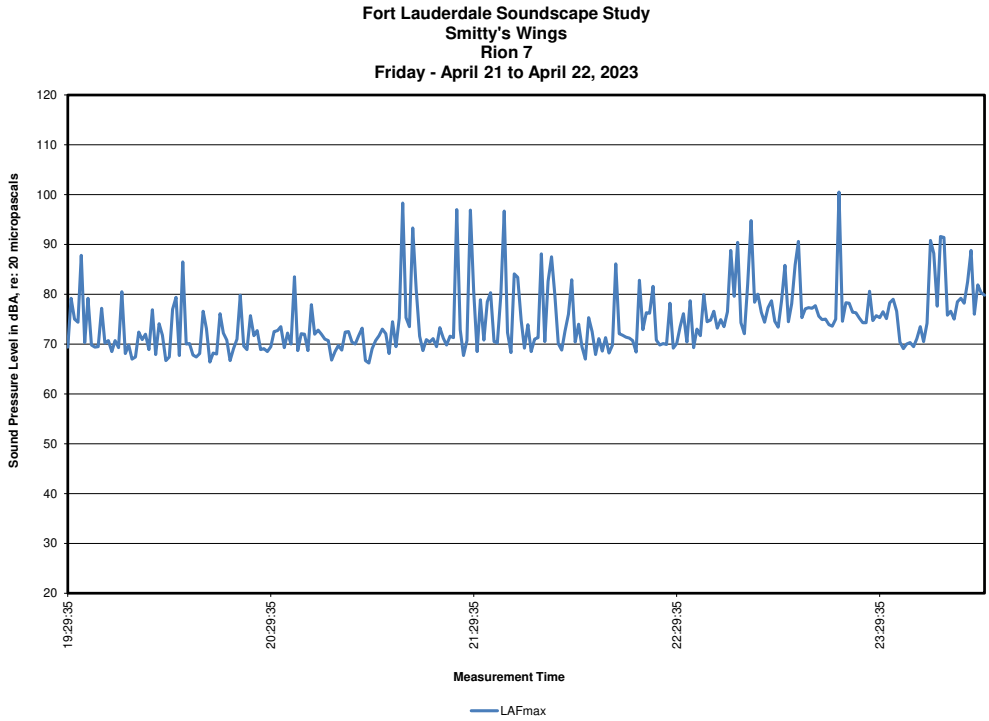

Fort Lauderdale Soundscape Study
Svantek 205 Green
In median of A1A at north
Friday - February 17 to February 18, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 73 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC

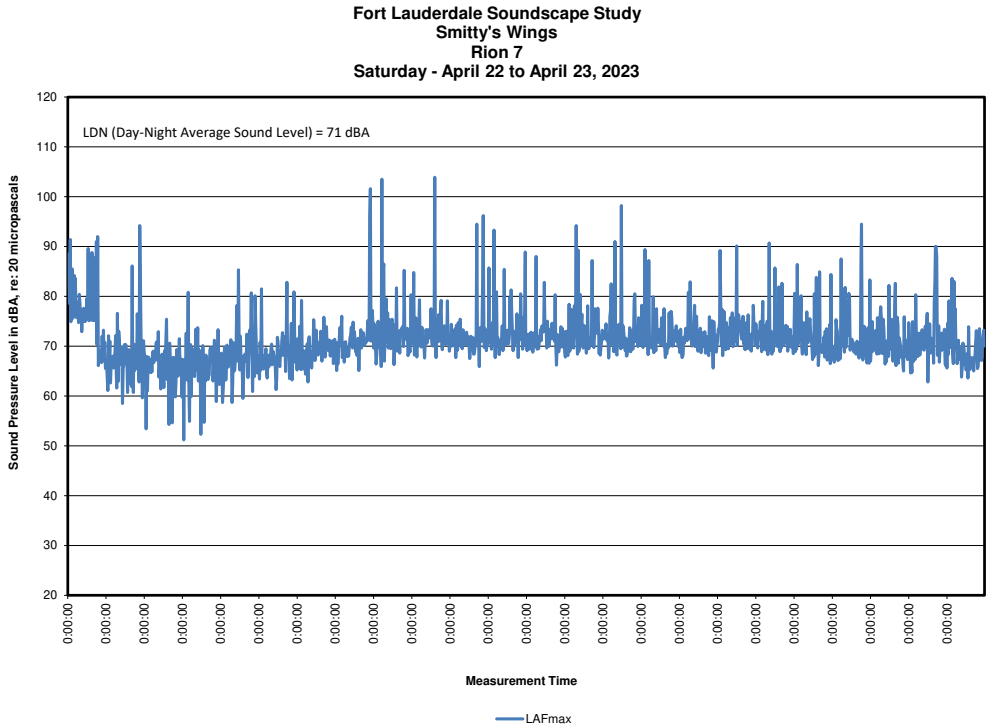

Fort Lauderdale Soundscape Study
Svantek 205 Green
In median of A1A at north
Saturday - February 18 to February 19, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 74 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC

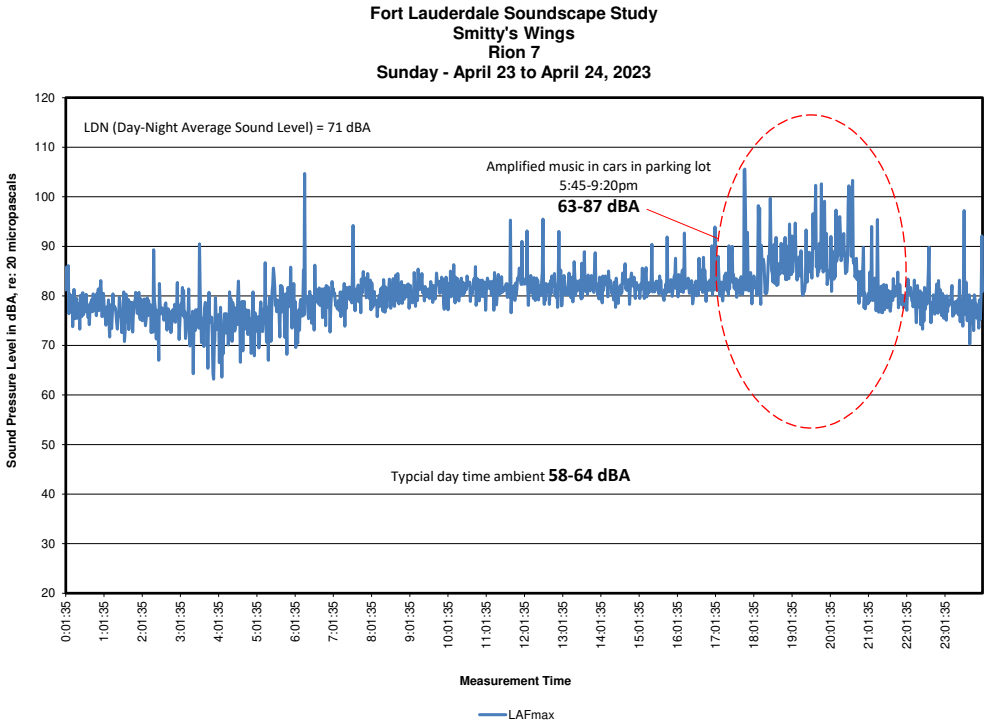

Fort Lauderdale Soundscape Study
Svantek 205 Green
In median of A1A at north
Saturday - February 19 to February 20, 2023
Motorcycles and ATV's
104 dBC 102 dBA
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 73 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC

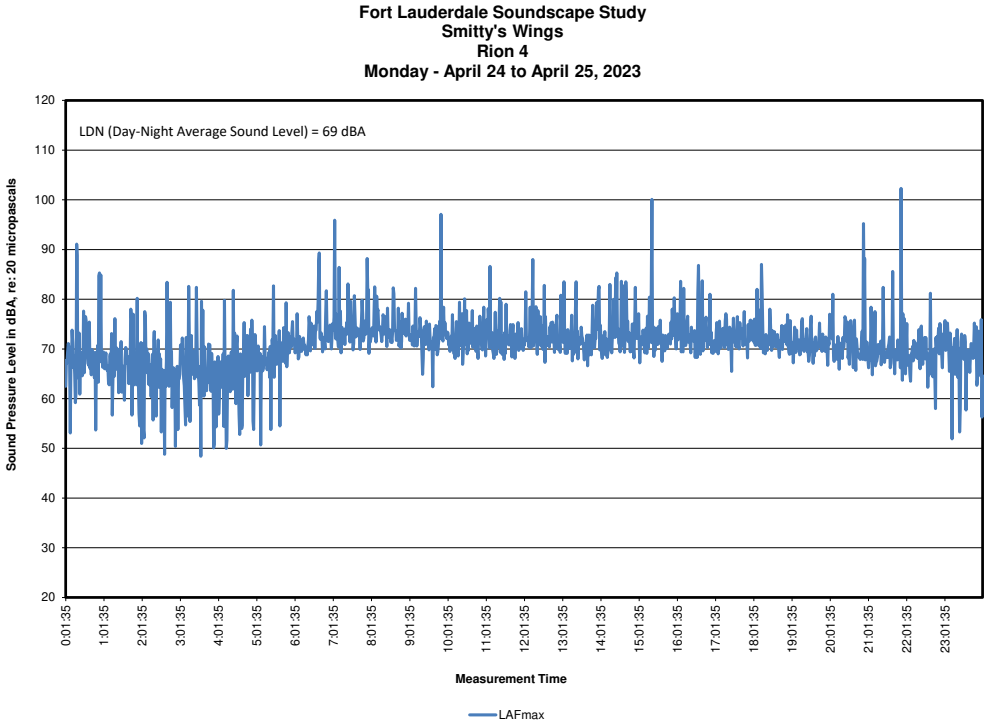

Fort Lauderdale Soundscape Study
Svantek 205 Green
In median of A1A at north
Sunday - February 20 to February 21, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 73 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC

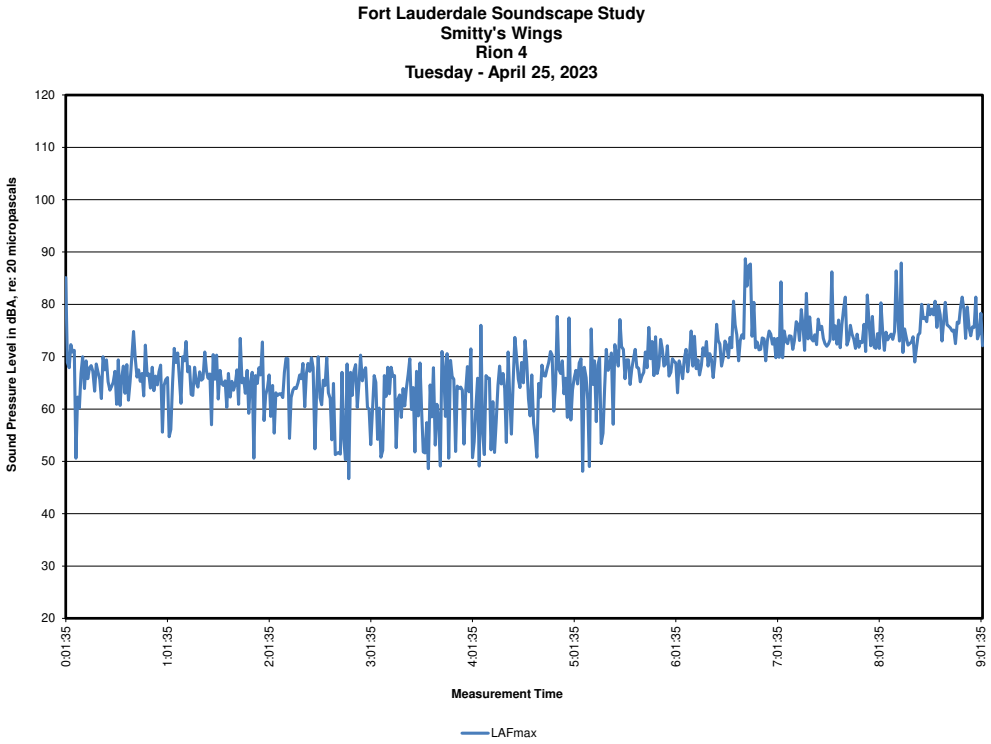
APPENDIX A-2:
SUMMARY GRAPHS OF LONG-TERM ACOUSTICAL DATA
TRIP 2

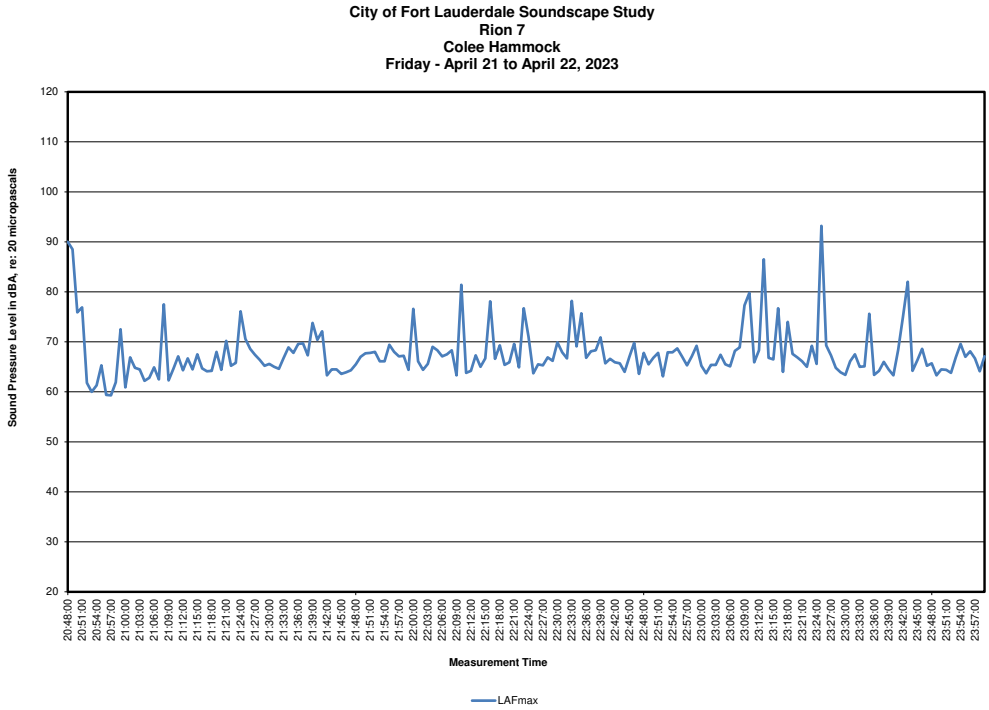

Fort Lauderdale Soundscape Study
Smitty's Wings
Rion 7
Friday - April 21 to April 22, 2023
Sound Pressure Level in dBA, re: 20 micropascals
120
110
100
90
80
70
60
50
40
30
20
19:29:35
20:29:35
21:29:35
22:29:35
23:29:35
Measurement Time
LAFmax

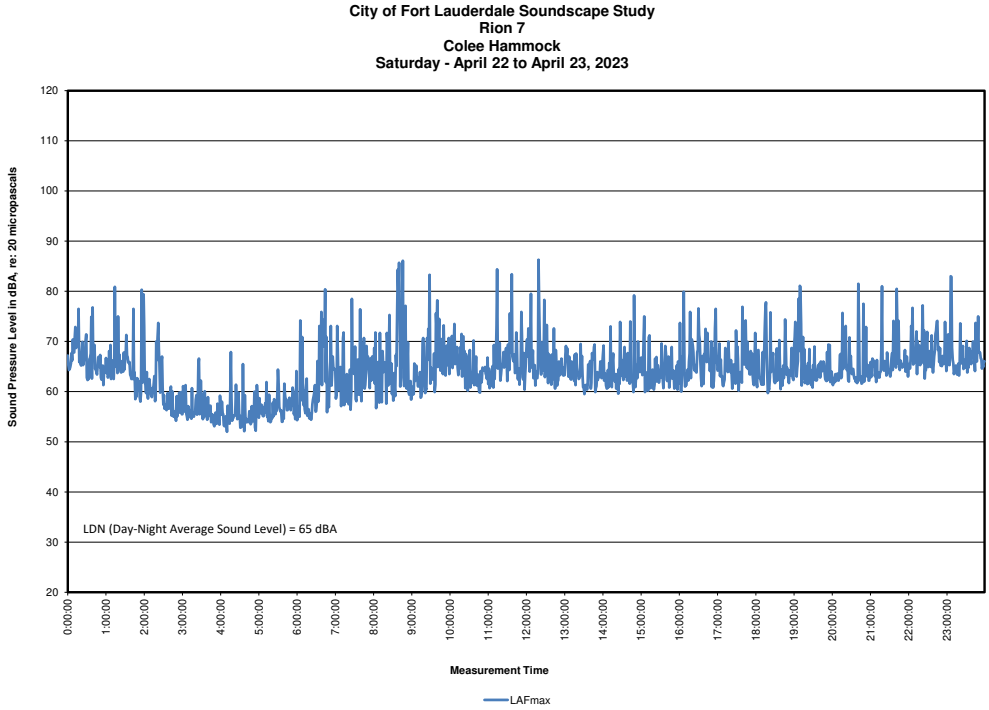

Fort Lauderdale Soundscape Study
Smitty's Wings
Rion 7
Saturday - April 22 to April 23, 2023
LDN (Day-Night Average Sound Level) = 71 dBA
Sound Pressure Level in dBA, re: 20 micropascals
120
110
100
90
80
70
60
50
40
30
20
0:00:00
Measurement Time
LAFmax

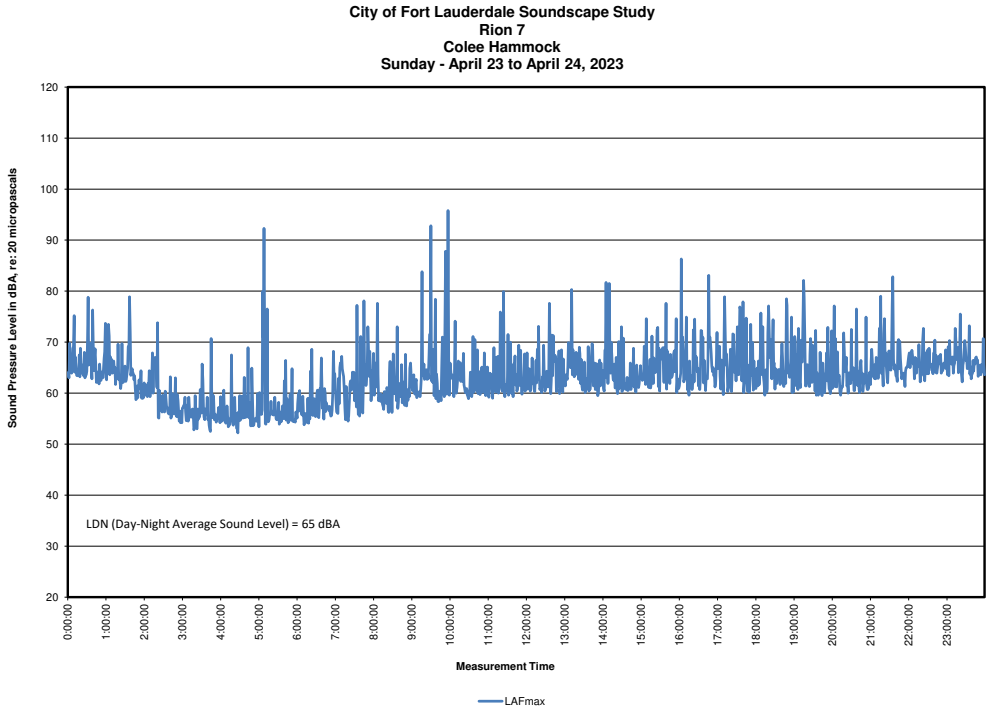

Fort Lauderdale Soundscape Study
Smitty's Wings
Rion 7
Sunday - April 23 to April 24, 2023
LDN (Day-Night Average Sound Level) = 71 dBA
Amplified music in cars in parking lot
5:45-9:20pm
63-87 dBA
Typcial day time ambient 58-64 dBA
Sound Pressure Level in dBA, re: 20 micropascals
Measurement Time
LAFmax

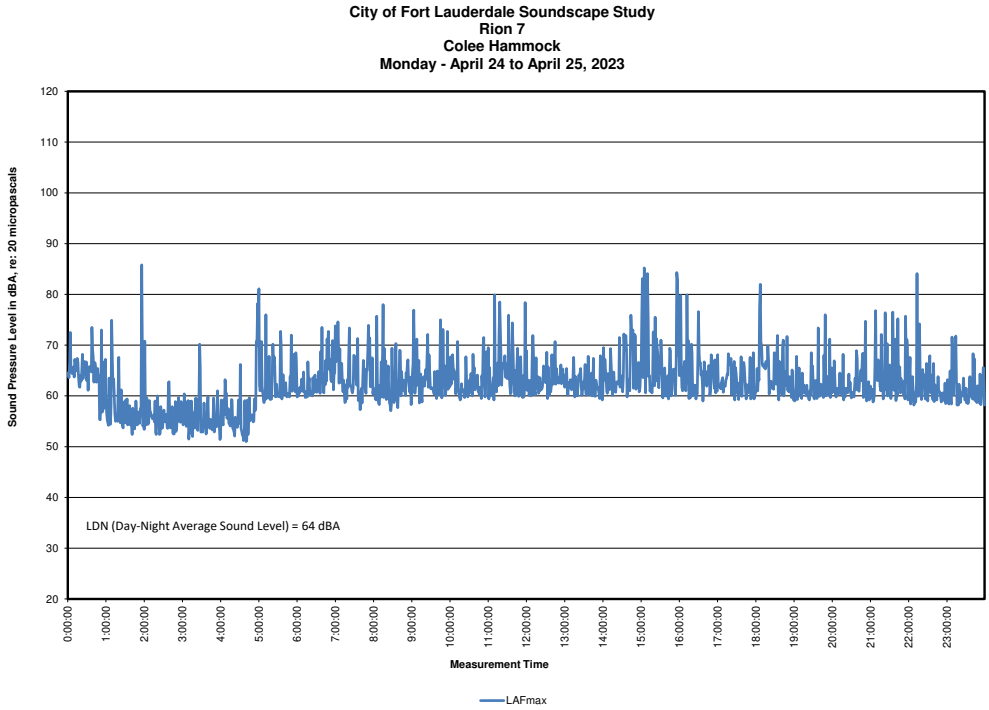

Fort Lauderdale Soundscape Study
Smitty's Wings
Rion 4
Monday - April 24 to April 25, 2023
LDN (Day-Night Average Sound Level) = 69 dBA
Sound Pressure Level in dBA, re: 20 micropascals
Measurement Time
LAFmax

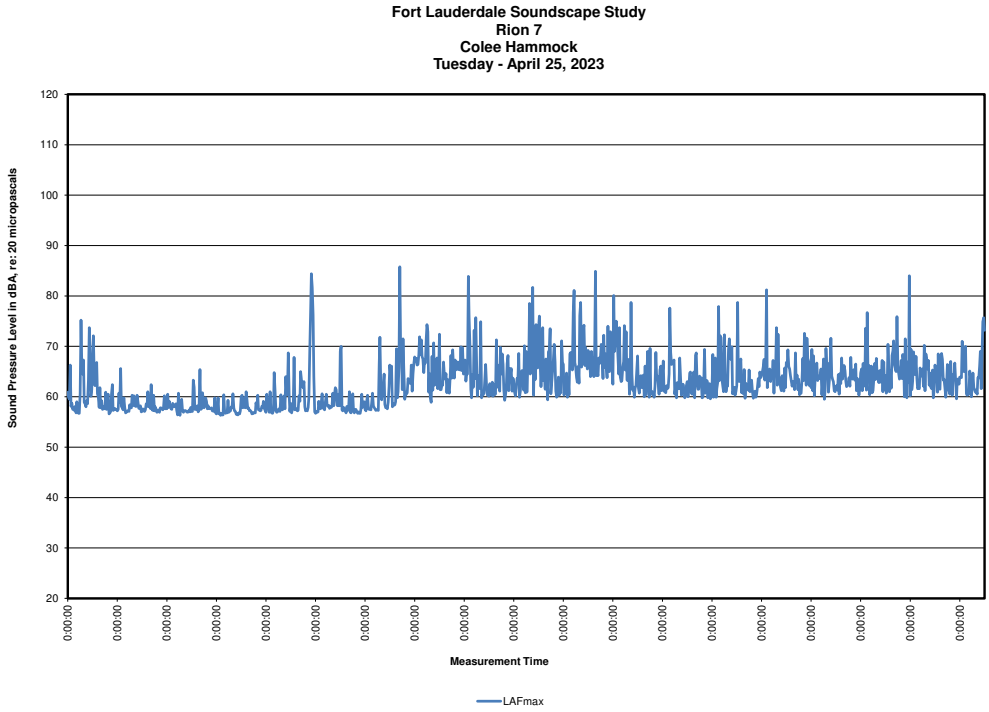

Fort Lauderdale Soundscape Study
Smitty's Wings
Rion 4
Tuesday - April 25, 2023
Sound Pressure Level in dBA, re: 20 micropascals
120
110
100
90
80
70
60
50
40
30
20
0:01:35
1:01:35
2:01:35
3:01:35
4:01:35
5:01:35
6:01:35
7:01:35
8:01:35
9:01:35
Measurement Time
LAFmax

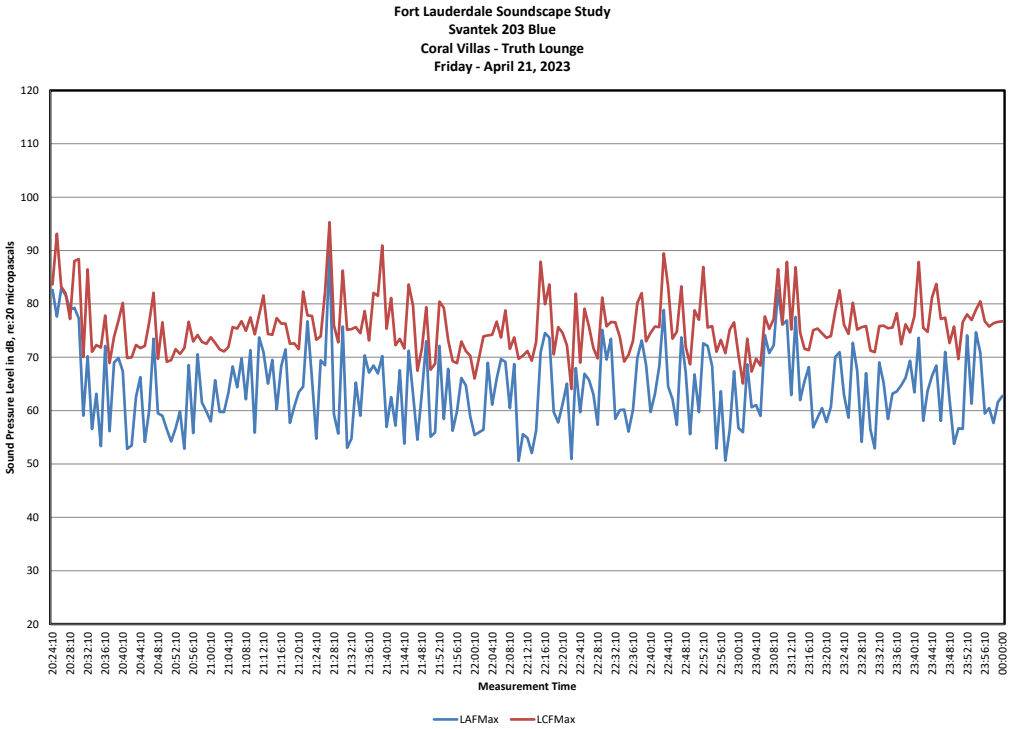

City of Fort Lauderdale Soundscape Study
Rion 7
Colee Hammock
Friday - April 21 to April 22, 2023
Sound Pressure Level in dBA, re: 20 micropascals
Measurement Time
LAFmax

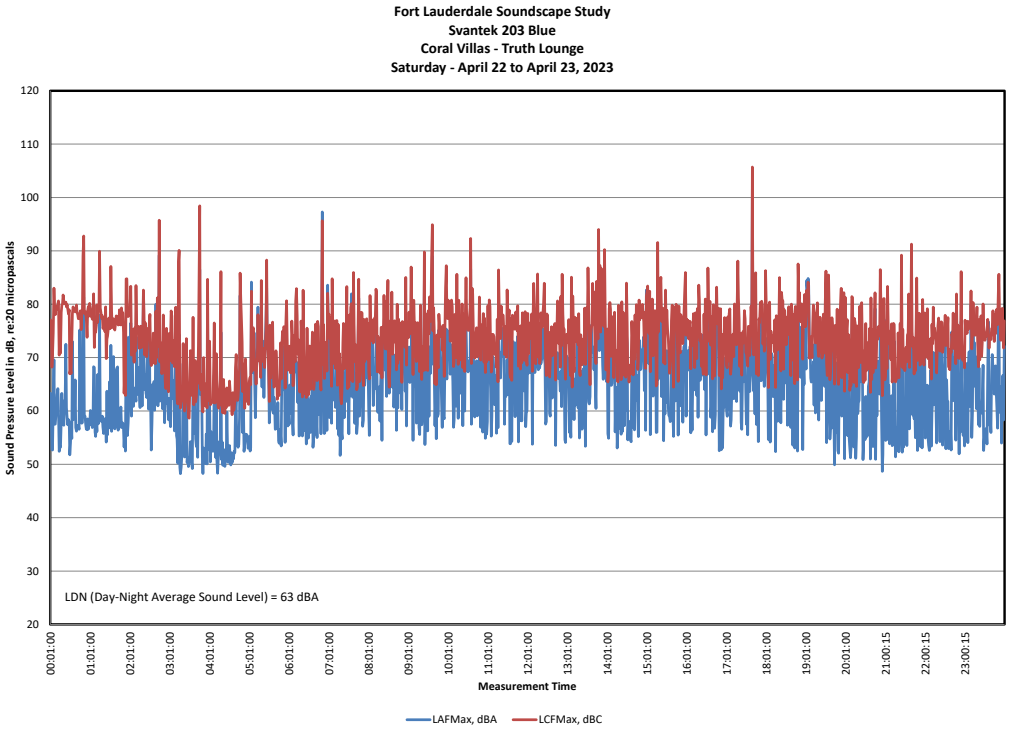

City of Fort Lauderdale Soundscape Study
Rion 7
Colee Hammock
Saturday - April 22 to April 23, 2023
Sound Pressure Level in dBA, re: 20 micropascals
LDN (Day-Night Average Sound Level) = 65 dBA
Measurement Time
LAFmax

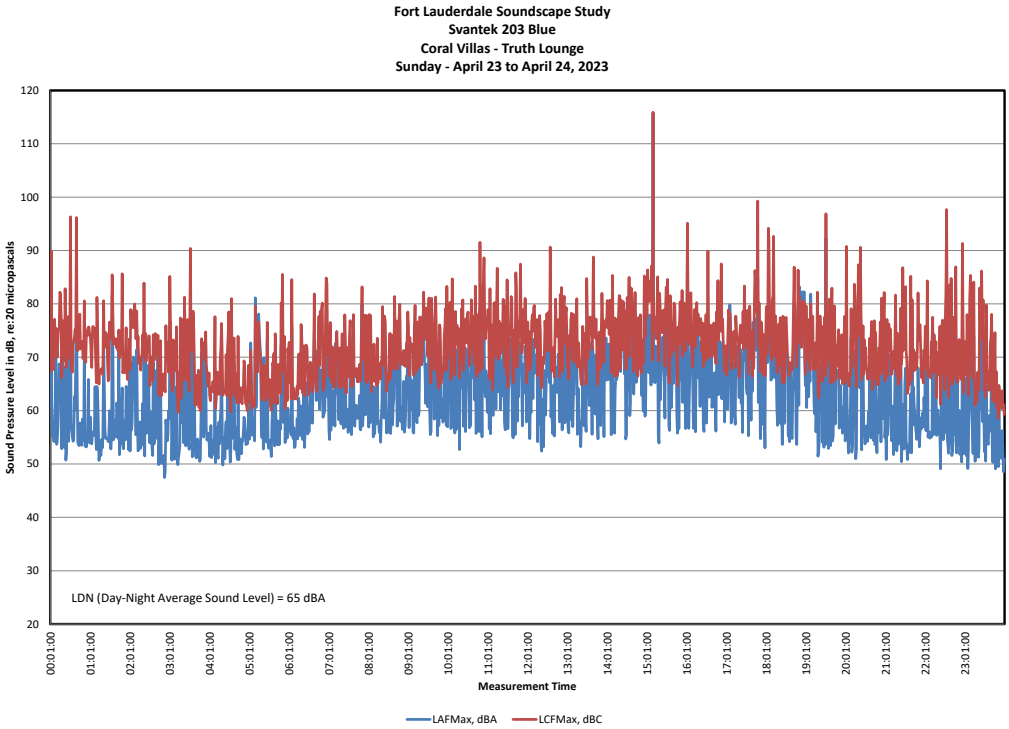

City of Fort Lauderdale Soundscape Study
Rion 7
Colee Hammock
Sunday - April 23 to April 24, 2023
Sound Pressure Level in dBA, re: 20 micropascals
LDN (Day-Night Average Sound Level) = 65 dBA
Measurement Time
LAFmax

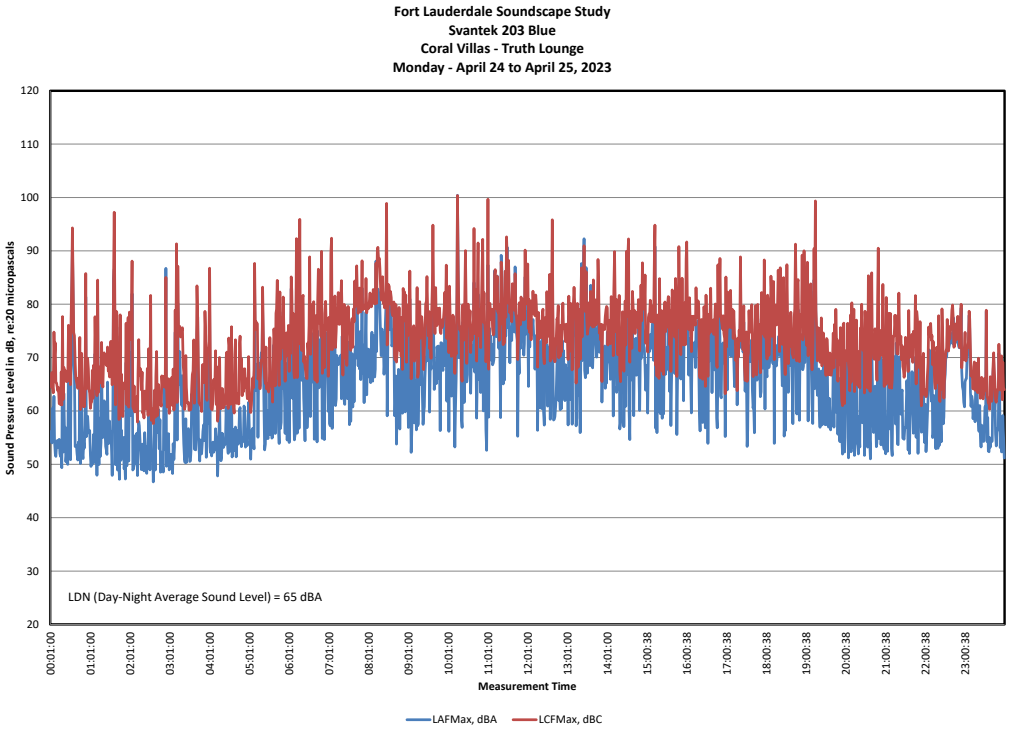

City of Fort Lauderdale Soundscape Study
Rion 7
Colee Hammock
Monday - April 24 to April 25, 2023
Sound Pressure Level in dBA, re: 20 micropascals
LDN (Day-Night Average Sound Level) = 64 dBA
Measurement Time
LAFmax

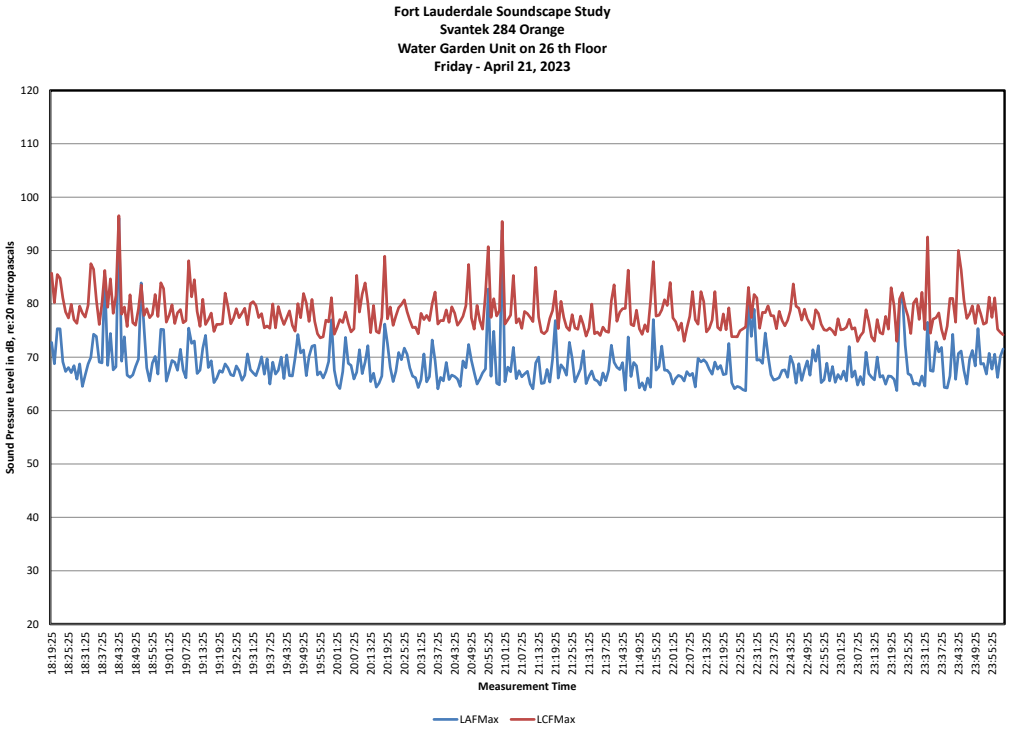

Fort Lauderdale Soundscape Study
Rion 7
Colee Hammock
Tuesday - April 25, 2023
Sound Pressure Level in dBA, re: 20 micropascals
120
110
100
90
80
70
60
50
40
30
20
0:00:00
Measurement Time
LAFmax

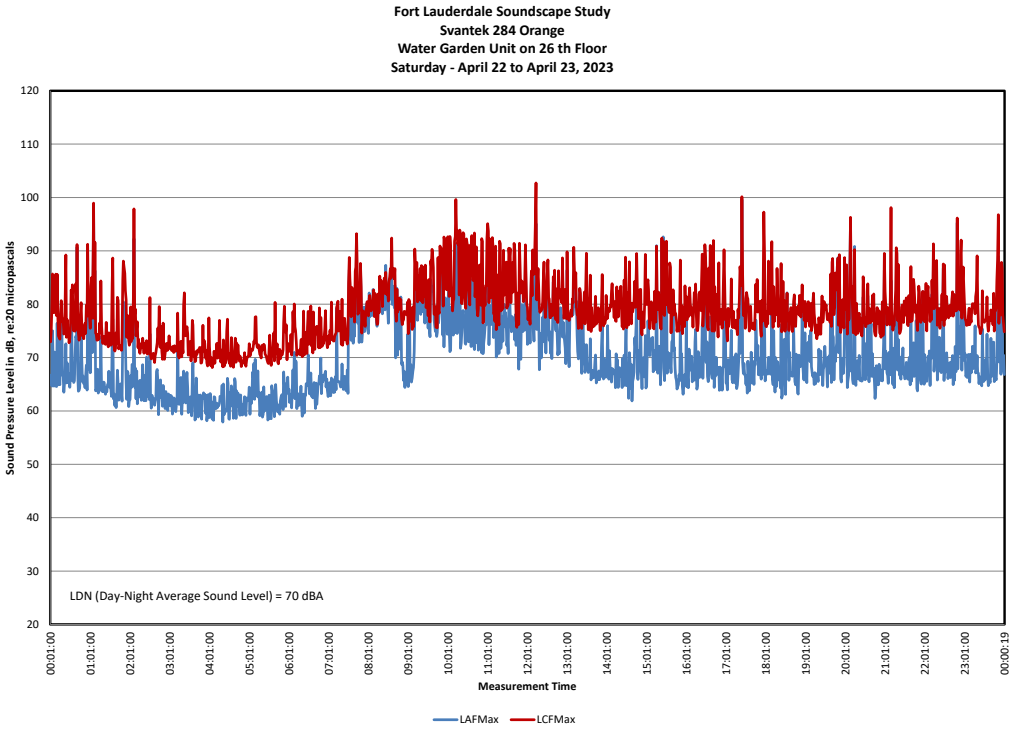

Fort Lauderdale Soundscape Study
Svantek 203 Blue
Coral Villas - Truth Lounge
Friday - April 21, 2023
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFMax
LCFMax

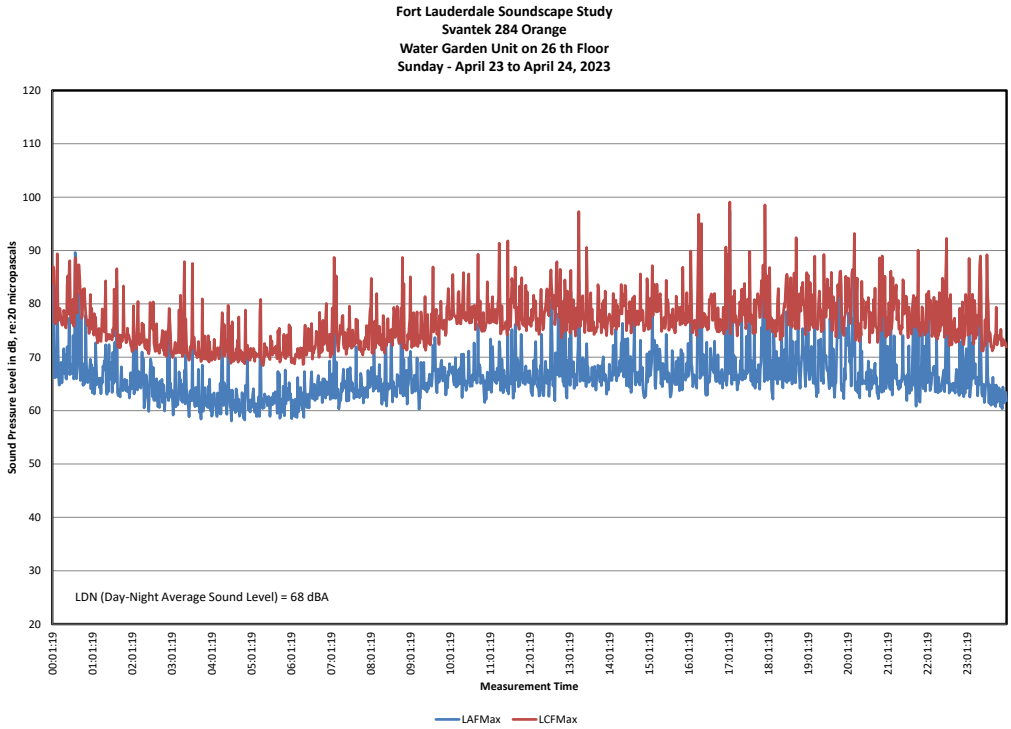

Fort Lauderdale Soundscape Study
Svantek 203 Blue
Coral Villas - Truth Lounge
Saturday - April 22 to April 23, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 63 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC

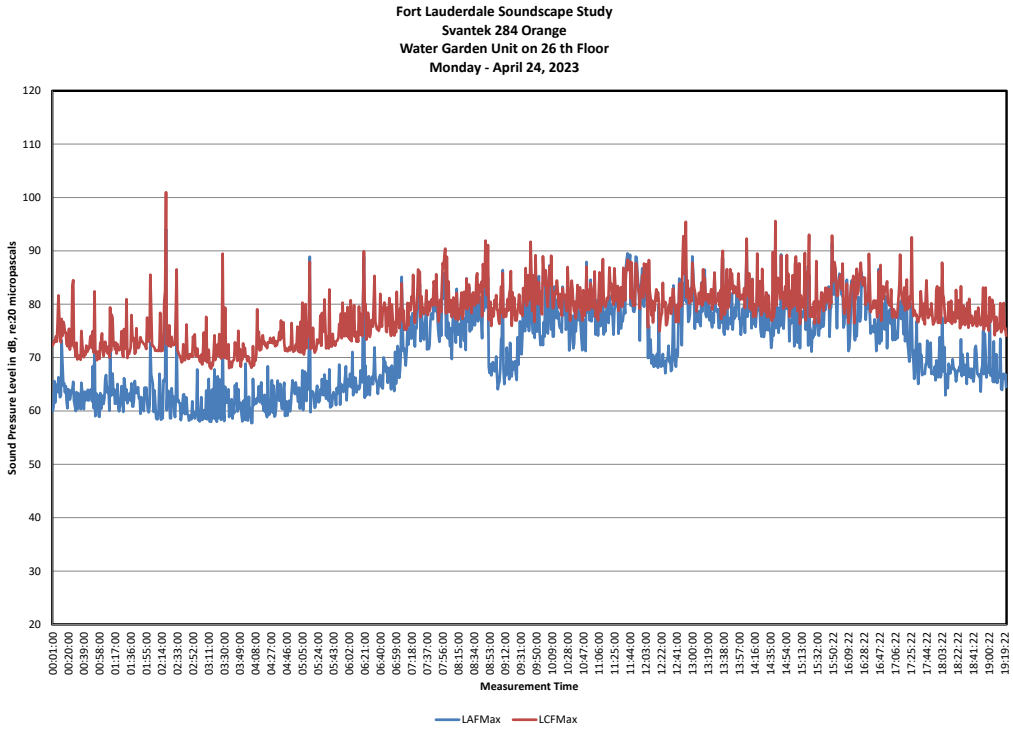

Fort Lauderdale Soundscape Study
Svantek 203 Blue
Coral Villas - Truth Lounge
Sunday - April 23 to April 24, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 65 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC

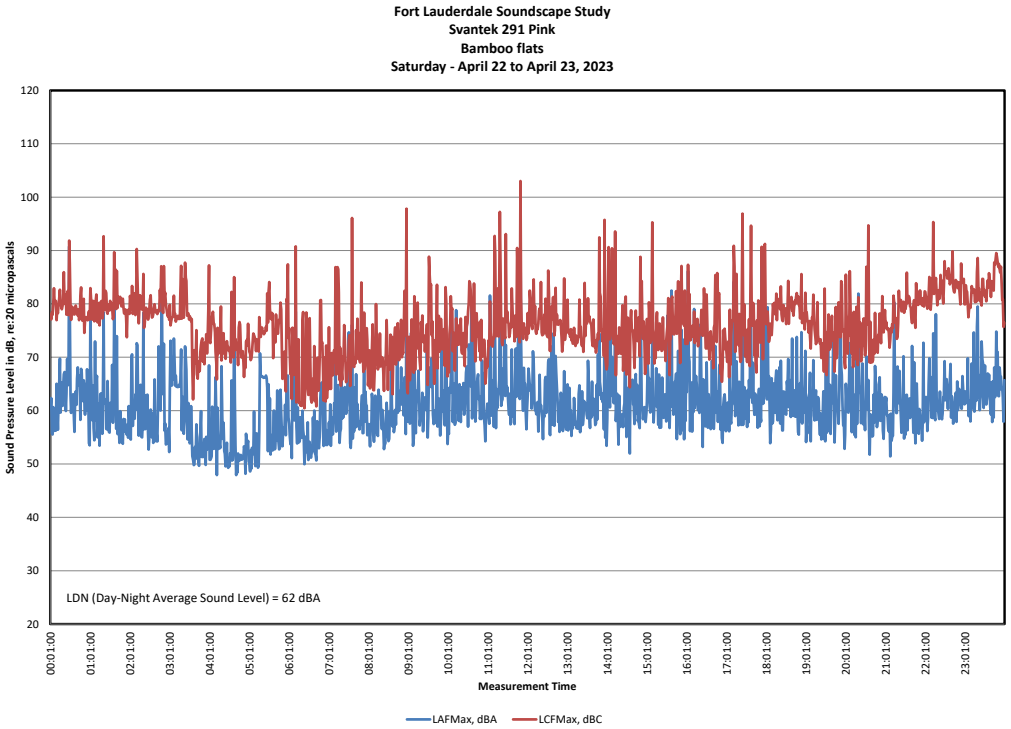

Fort Lauderdale Soundscape Study
Svantek 203 Blue
Coral Villas - Truth Lounge
Monday - April 24 to April 25, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 65 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC

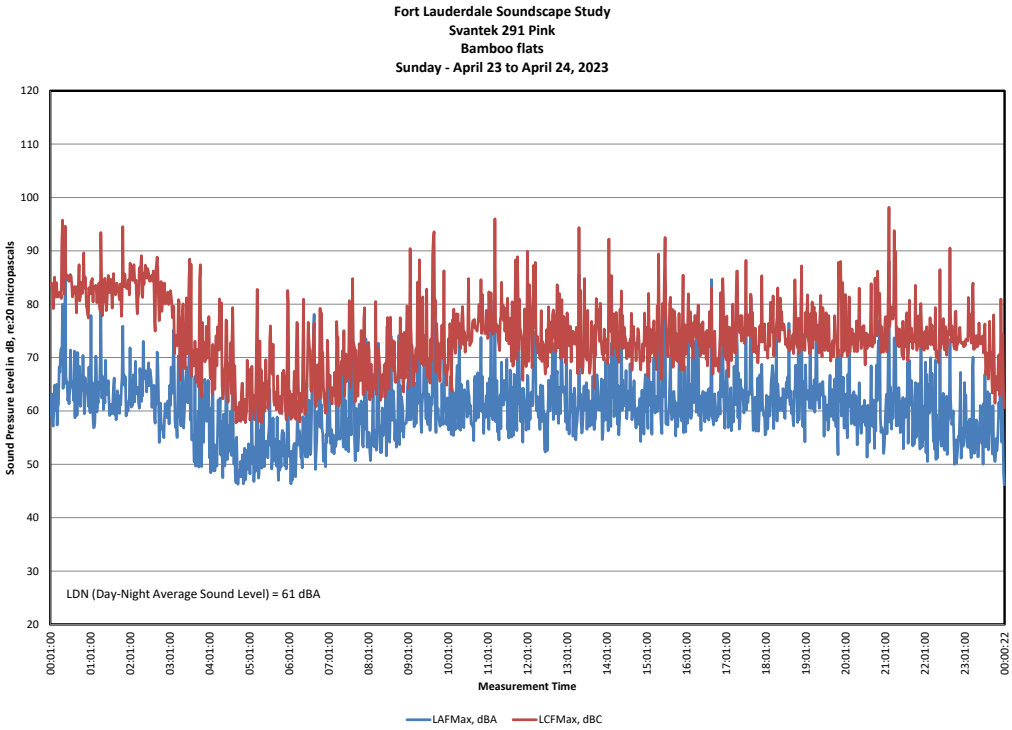

Fort Lauderdale Soundscape Study
Svantek 284 Orange
Water Garden Unit on 26 th Floor
Friday - April 21, 2023
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFMax
LCFMax

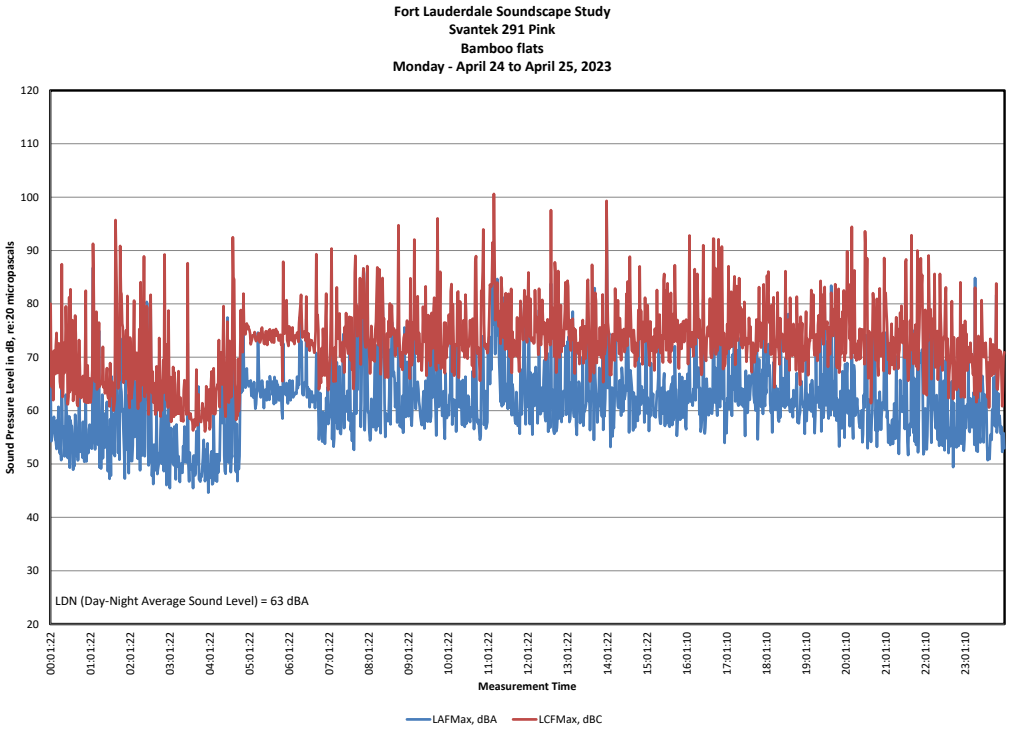

Fort Lauderdale Soundscape Study
Svantek 284 Orange
Water Garden Unit on 26 th Floor
Saturday - April 22 to April 23, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 70 dBA
Measurement Time
LAFMax
LCFMax

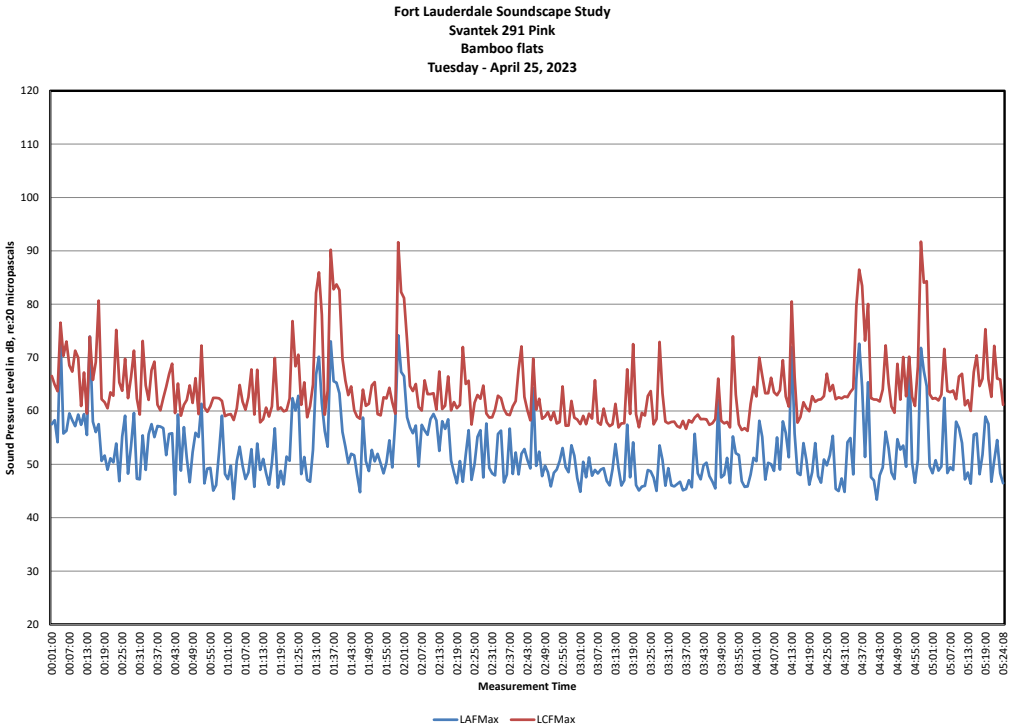

Fort Lauderdale Soundscape Study
Svantek 284 Orange
Water Garden Unit on 26 th Floor
Sunday - April 23 to April 24, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 68 dBA
Measurement Time
LAFMax
LCFMax

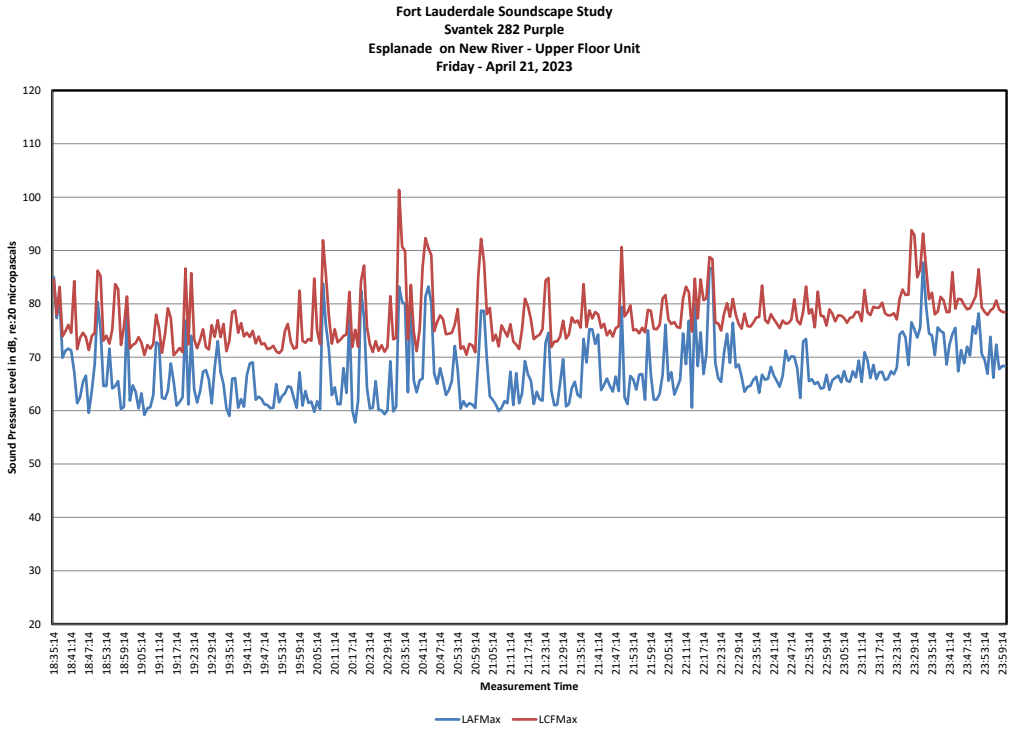

Fort Lauderdale Soundscape Study
Svantek 284 Orange
Water Garden Unit on 26 th Floor
Monday - April 24, 2023
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFMax
LCFMax

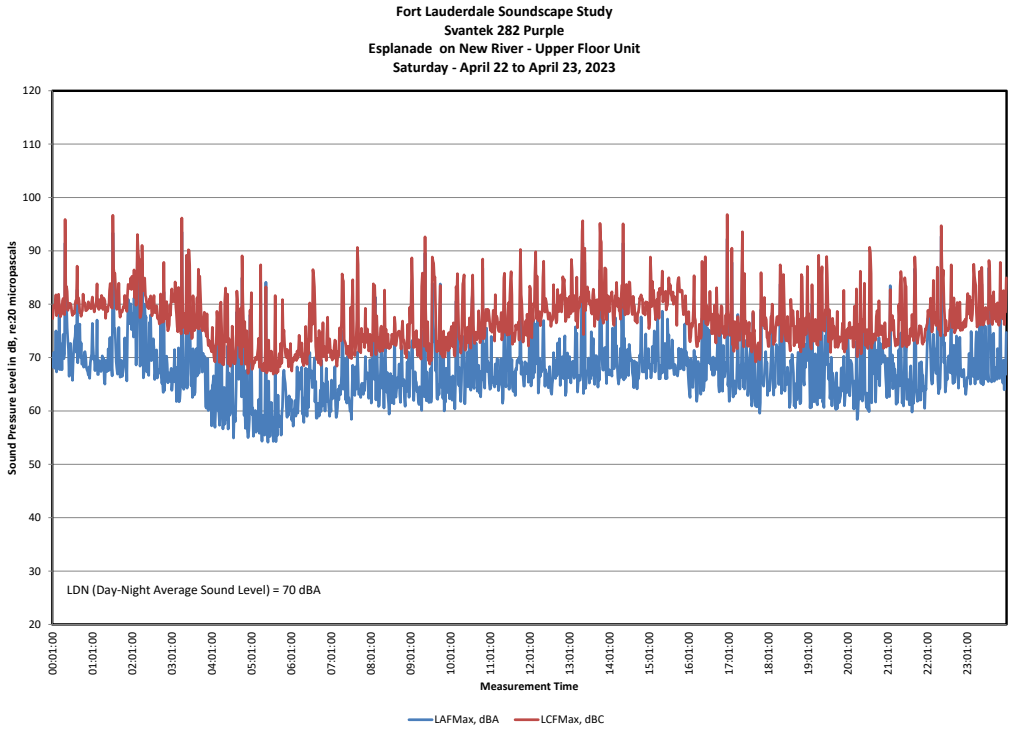

Fort Lauderdale Soundscape Study
Svantek 291 Pink
Bamboo flats
Saturday - April 22 to April 23, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 62 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC

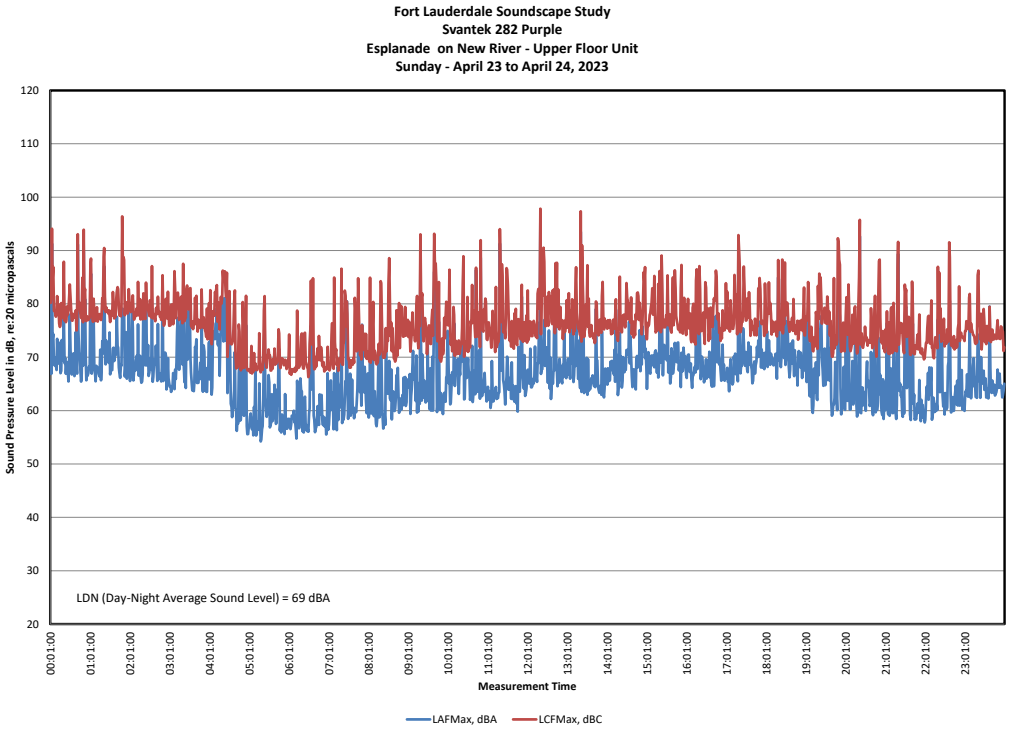

Fort Lauderdale Soundscape Study
Svantek 291 Pink
Bamboo flats
Sunday - April 23 to April 24, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 61 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC

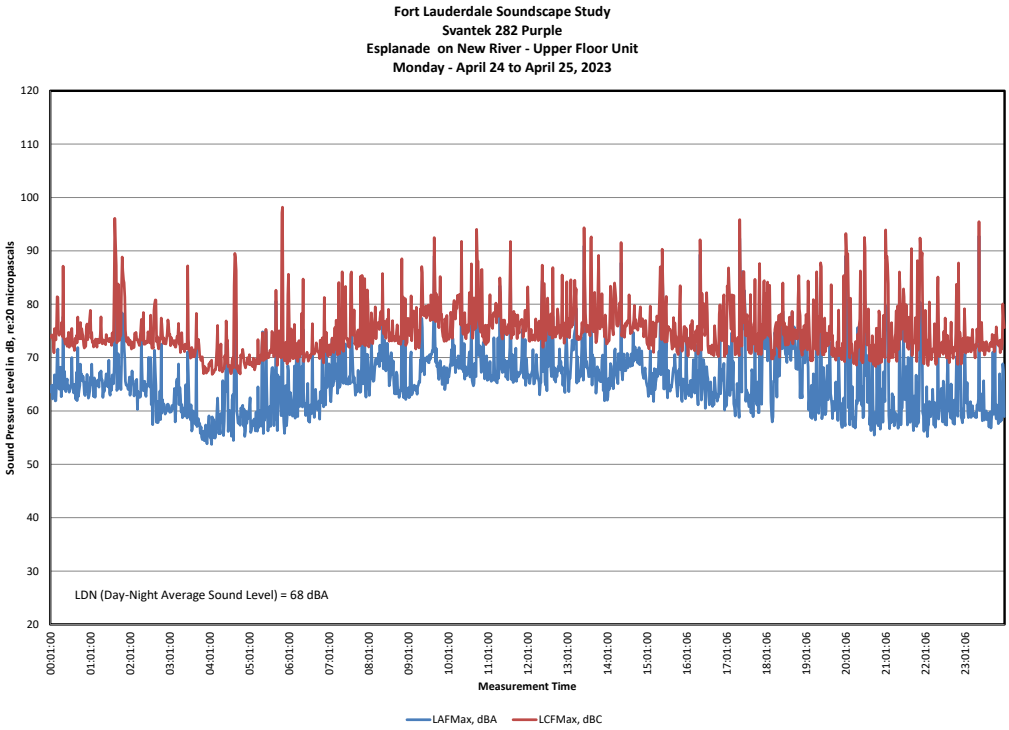

Fort Lauderdale Soundscape Study
Svantek 291 Pink
Bamboo flats
Monday - April 24 to April 25, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 63 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC

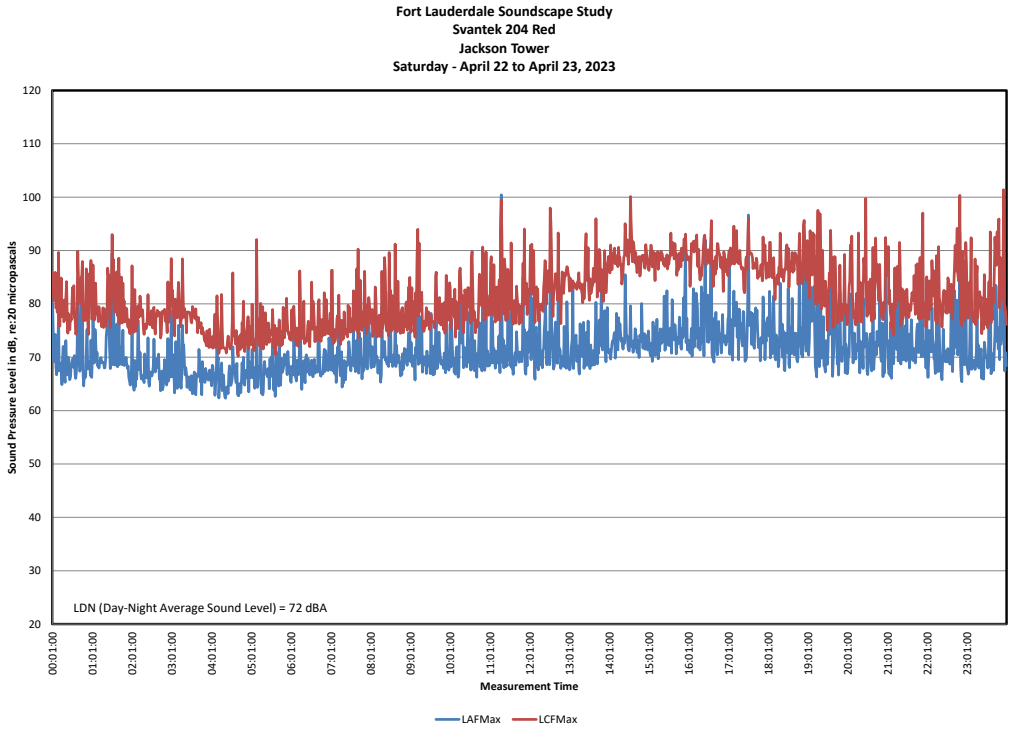

Fort Lauderdale Soundscape Study
Svantek 291 Pink
Bamboo flats
Tuesday - April 25, 2023
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFMax
LCFMax

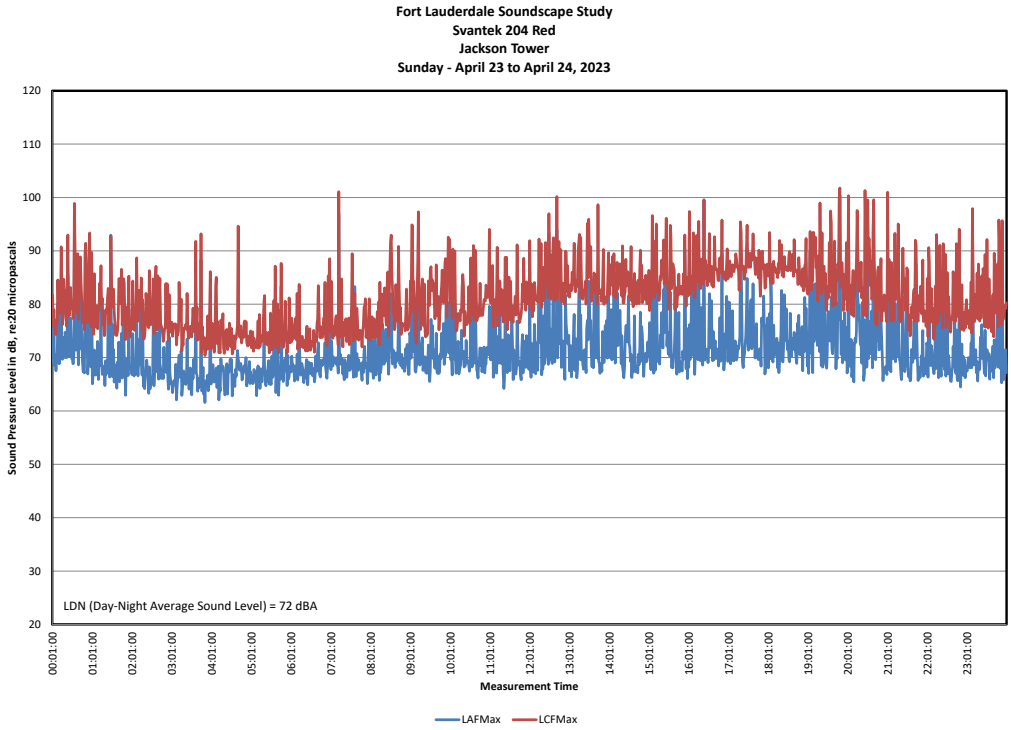

Fort Lauderdale Soundscape Study
Svantek 282 Purple
Esplanade on New River - Upper Floor Unit
Friday - April 21, 2023
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFMax
LCFMax

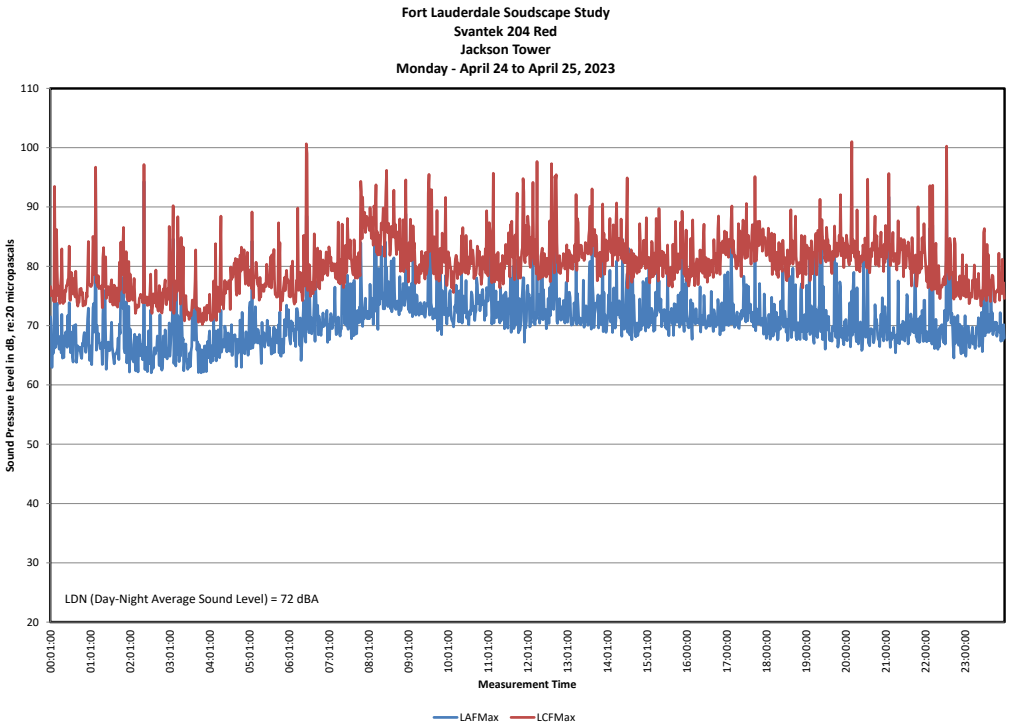

Fort Lauderdale Soundscape Study
Svantek 282 Purple
Esplanade on New River - Upper Floor Unit
Saturday - April 22 to April 23, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 70 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC

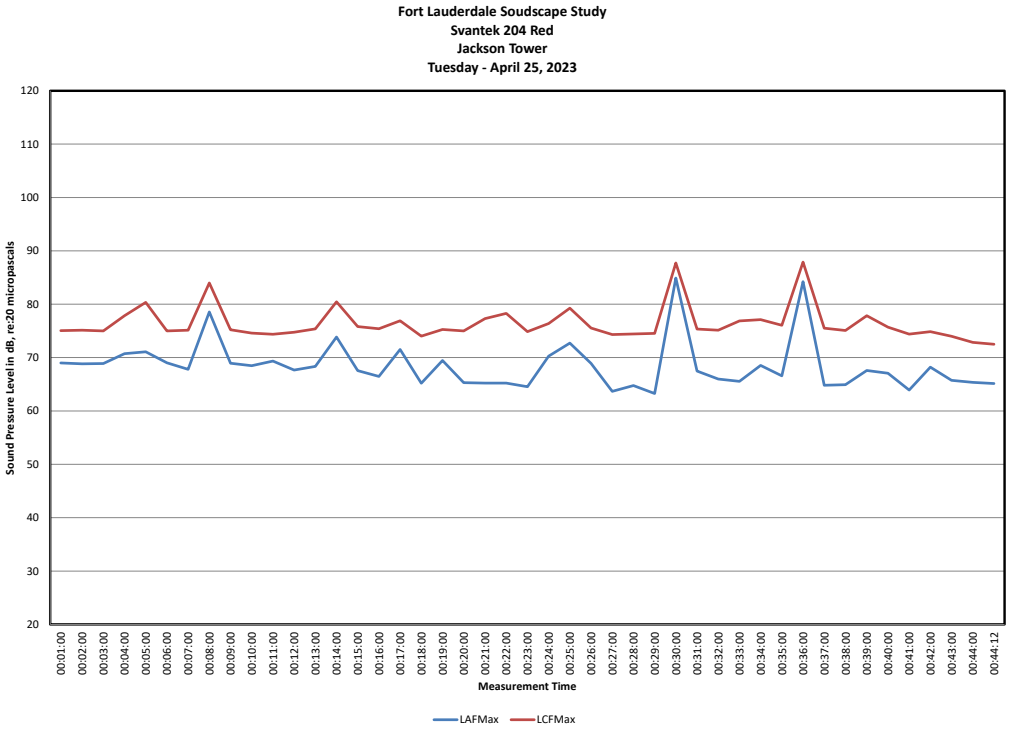

Fort Lauderdale Soundscape Study
Svantek 282 Purple
Esplanade on New River - Upper Floor Unit
Sunday - April 23 to April 24, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 69 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC

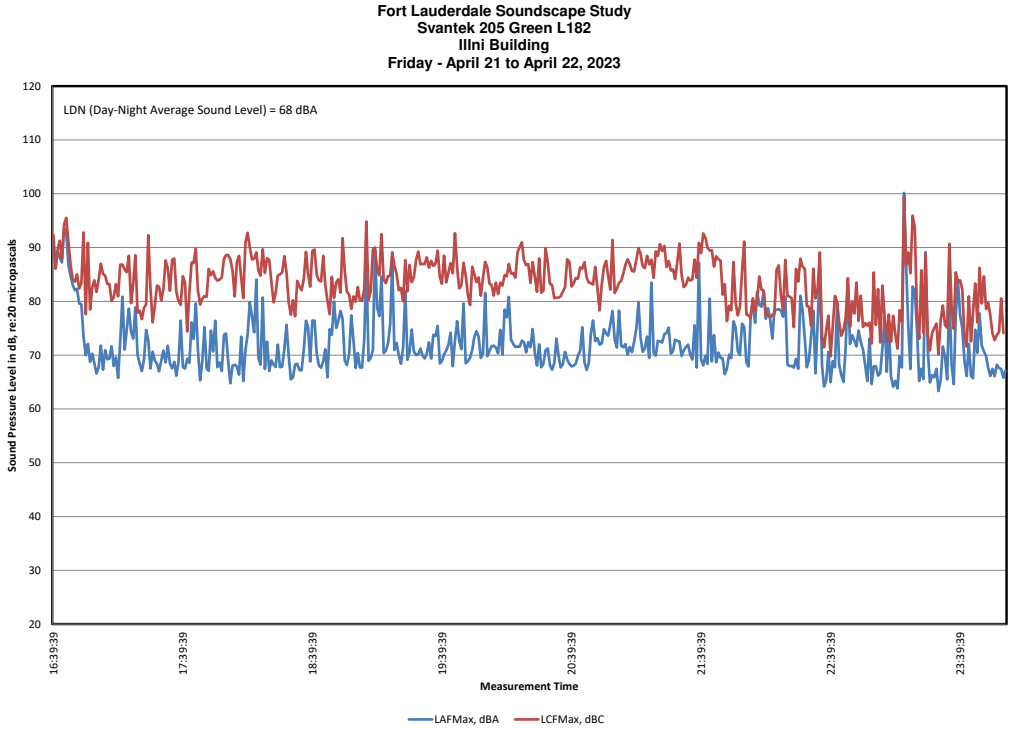

Fort Lauderdale Soundscape Study
Svantek 282 Purple
Esplanade on New River - Upper Floor Unit
Monday - April 24 to April 25, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 68 dBA
Measurement Time
LAFMax, dBA
LCFMax, dBC

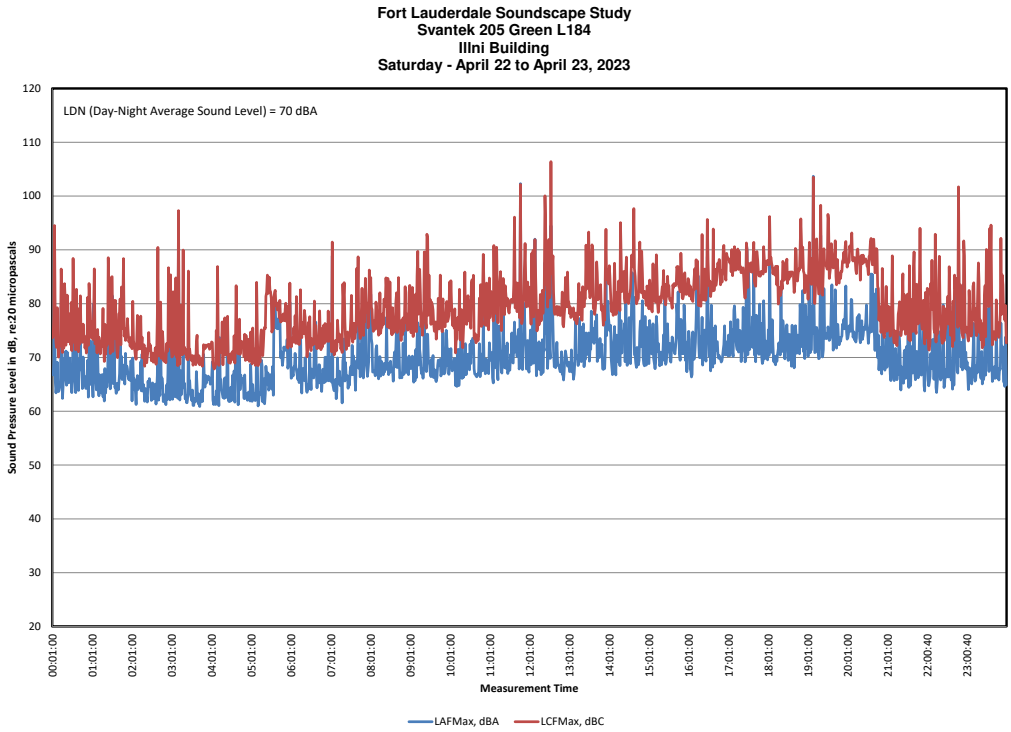

Fort Lauderdale Soundscape Study
Svantek 204 Red
Jackson Tower
Saturday - April 22 to April 23, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 72 dBA
Measurement Time
LAFMax
LCFMax

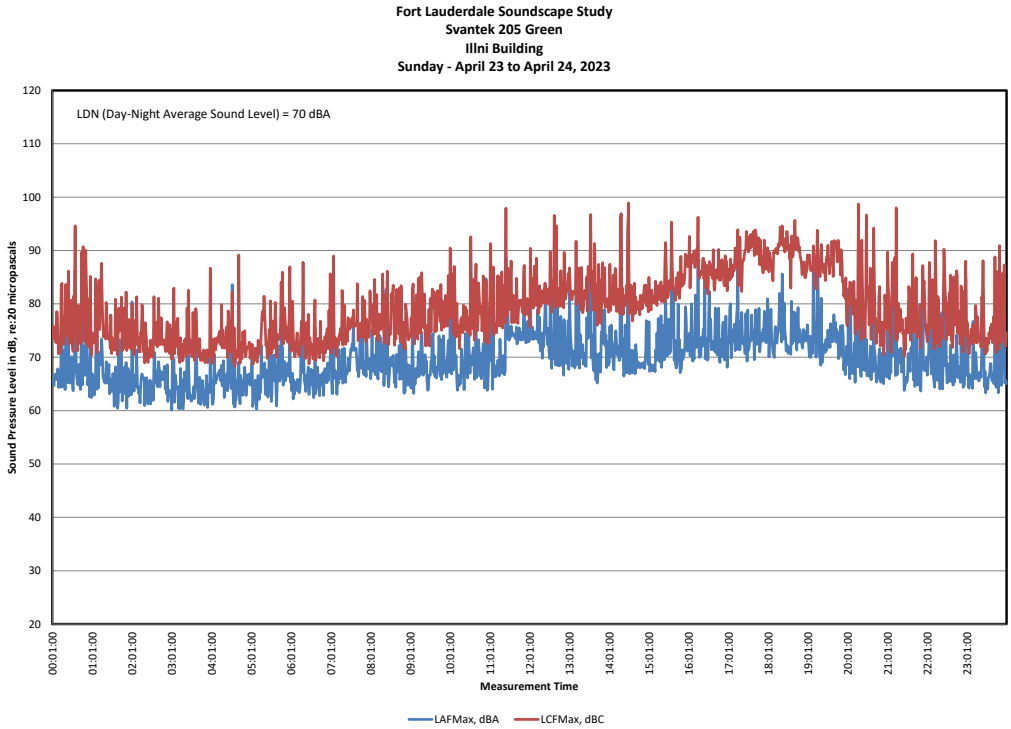

Fort Lauderdale Soundscape Study
Svantek 204 Red
Jackson Tower
Sunday - April 23 to April 24, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 72 dBA
Measurement Time
LAFMax
LCFMax

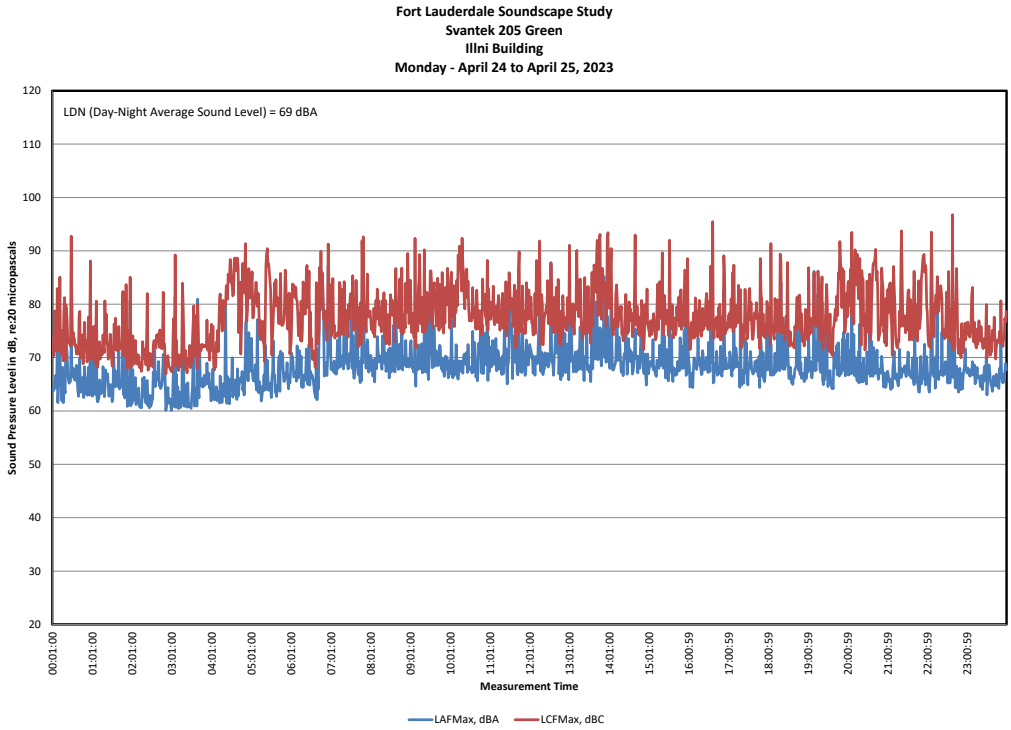

Fort Lauderdale Soudscape Study
Svantek 204 Red
Jackson Tower
Monday - April 24 to April 25, 2023
Sound Pressure Level in dB, re:20 micropascals
LDN (Day-Night Average Sound Level) = 72 dBA
Measurement Time
LAFMax
LCFMax


Fort Lauderdale Soudscape Study
Svantek 204 Red
Jackson Tower
Tuesday - April 25, 2023
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFMax
LCFMax


Fort Lauderdale Soundscape Study
Svantek 205 Green L182
Illni Building
Friday - April 21 to April 22, 2023
LDN (Day-Night Average Sound Level) = 68 dBA
Sound Pressure Level in dB, re:20 micropascals
120
110
100
90
80
70
60
50
40
30
20
16:39:39
17:39:39
18:39:39
19:39:39
20:39:39
21:39:39
22:39:39
23:39:39
Measurement Time
LAFMax, dBA
LCFMax, dBC


Fort Lauderdale Soundscape Study
Svantek 205 Green L184
Illni Building
Saturday - April 22 to April 23, 2023
LDN (Day-Night Average Sound Level) = 70 dBA
Sound Pressure Level in dB, re:20 micropascals
120
110
100
90
80
70
60
50
40
30
20
00:01:00
01:01:00
02:01:00
03:01:00
04:01:00
05:01:00
06:01:00
07:01:00
08:01:00
09:01:00
10:01:00
11:01:00
12:01:00
13:01:00
14:01:00
15:01:00
16:01:00
17:01:00
18:01:00
19:01:00
20:01:00
21:01:00
22:00:40
23:00:40
Measurement Time
LAFMax, dBA
LCFMax, dBC


Fort Lauderdale Soundscape Study
Svantek 205 Green
Illni Building
Sunday - April 23 to April 24, 2023
LDN (Day-Night Average Sound Level) = 70 dBA
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFMax, dBA
LCFMax, dBC


Fort Lauderdale Soundscape Study
Svantek 205 Green
Illni Building
Monday - April 24 to April 25, 2023
LDN (Day-Night Average Sound Level) = 69 dBA
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFMax, dBA
LCFMax, dBC

APPENDIX B-1:
SUMMARY TABLE
DAY AND NIGHT SOUND LEVEL RANGES
TRIP 1

TRIP 1: FEBRUARY 16 - 21, 2023

Meter	Date	LDN, dBA	Night Time Sound Level Range Early Morning	Day Time Sound Level Range 1	Day Time Sound Level Range 2	Night Time Sound Level Range Late Nights
Riverwalk Near The Wharf						
Rion 7	16-Feb-23	-	-	*6 pm - 10:22 pm*	-	-
			-	66 - 83 dBA	-	-
Rion 7	17-Feb-23	76	*12 am - 6 am*	*7 am - 4 pm*	-	*7 pm - 12 am*
			53 - 81 dBA	60 - 81 dBA	-	69 - 80 dBA
Rion 7	18-Feb-23	77	*12 am - 1:30 am*	*3 am - 11 am*	*2 pm - 7 pm*	*7 pm - 12 am*
			70 - 80 dBA	53 - 78 dBA	68 - 81 dBA	69 - 81 dBA
Rion 7	19-Feb-23	74	*12 am - 1:30 am*	*2 am - 8 am*	*1 pm - 10 pm*	-
			69 - 82 dBA	52 - 81 dBA	62.9 - 76 dBA	-
Rion 7	20-Feb-23	71	*12 am - 5:30 am*	*6:30 am - 10 pm*	-	*10 pm - 12 am*
			54 - 82 dBA	53 - 80 dBA	-	53 - 73 dBA
Rion 7	21-Feb-23	79	*12 am - 4:30 am*	*7:30 am - 7 pm*	-	*10:30 pm - 12 am*
			52- 81 dBA	53 - 82 dBA	-	55 - 87 dBA
Rion 7	22-Feb-23	78	*12 am - 4 am*	*7:30 am - 10 pm*	-	*10 pm - 12 am*
			54 - 87 dBA	56 - 82 dBA	-	55 - 79 dBA
Rion 7	23-Feb-23	73	*12 am - 5 am*	*7 am - 10 pm*	-	*11:30 pm - 12 am*
			53 - 83 dBA	60 - 80 dBA	-	56 - 81 dBA
Rion 7	24-Feb-23	-	*12 am - 5 am*	*7 am - 6 pm*	-	*6 pm - 12 am*
			53 - 81 dBA	60 - 80 dBA	-	68 - 84 dBA
Esplanade Park Between Rest Room and Stage						
Rion 8	16-Feb-23	-	-	-	-	*6:09 pm - 12 am*
			-	-	-	48 - 66 dBA
Rion 8	17-Feb-23	64	*12 am - 5:30 am*	*7 am - 3 pm*	-	*5:30 pm - 12 am*
			47 - 69 dBA	54 - 82 dBA	-	51 - 76 dBA
Rion 8	18-Feb-23	65	*12 am - 8 am*	*11 am - 3 pm*	-	*4:30 pm - 12 am*
			47 - 71 dBA	58 - 78 dBA	-	52 - 72 dBA
Rion 8	19-Feb-23	62	*12 am - 4 am*	*8:30 am - 7:30 pm*	-	*9 pm - 12 am*
			49 - 74 dBA	51 - 72 dBA	-	48 - 68 dBA
Rion 8	20-Feb-23	61	*12 am - 5 am*	*6 am - 10 pm*	-	*10 pm - 12 am*
			45 - 77 dBA	49 - 65 dBA	-	47 - 73 dBA
Rion 8	21-Feb-23	63	*12 am - 4 am*	*5:30 am - 11 pm*	-	*11 pm - 12 am*
			44.6 - 64 dBA	48 - 82 dBA	-	49 - 67 dBA
Rion 8	22-Feb-23	66	*12 am - 4 am*	*6 am - 10 pm*	-	*10 pm - 12 am*
			46.5 - 67.3 dBA	50.1 - 80.8 dBA	-	48 - 76 dBA
Rion 8	23-Feb-23	64	*12 am - 4 am*	*6 am - 3 pm*	-	*6 pm - 12 am*
			46 - 74 dBA	53 - 80 dBA	-	49 - 69 dBA
Rion 8	24-Feb-23	66	*12 am - 2 am*	*6 am - 12 am*	-	-
			48 - 68 dBA	50 - 82 dBA	-	-
Rion 8	25-Feb-23	-	*12 am - 9 am*	-	-	-

Meter	Date	LDN, dBA	Night Time Sound Level Range Early Morning	Day Time Sound Level Range 1	Day Time Sound Level Range 2	Night Time Sound Level Range Late Nights
			47 - 75 dBA	-	-	-
Bamboo Flats on Street						
Svantek 203	16-Feb-23	-	-	-	-	*6:30 pm - 12 am*
			-	-	-	50 - 89 dBA
Svantek 203	17-Feb-23	62	*12 am - 3 am*	*7 am - 10 pm*	-	*10 pm - 12 am*
			47 dBA - 77 dBA	51 - 104 dBA	-	56 - 83 dBA
Svantek 203	18-Feb-23	65	*12 am - 3 am*	*7 am - 10 pm*	-	*10 pm - 12 am*
			57 - 89 dBA	53 - 102 dBA	-	56 - 86 dBA
Svantek 203	19-Feb-23	64	*12 am - 3 am*	*7 am - 10 pm*	-	*10 pm - 12 am*
			54 - 90 dBA	49 - 94 dBA	-	52 - 83 dBA
Svantek 203	20-Feb-23	64	*12 am - 3 am*	*7 am - 12 am*	-	*10 pm - 12 am*
			51 - 89 dBA	51 - 98 dBA	-	51 - 86 dBA
Svantek 203	21-Feb-23	63	*12 am - 3 am*	*7 am - 9 pm*	-	*10 pm - 12 am*
			45 - 92 dBA	52 - 96 dBA	-	49 - 91 dBA
Svantek 203	22-Feb-23	63	*12 am - 3 am*	*7 am - 10 pm*	-	*10 pm - 12 am*
			45 - 80 dBA	50 - 99 dBA	-	51 - 81 dBA
Svantek 203	23-Feb-23	64	*12 am - 3 am*	*7 am - 10 pm*	-	*10 pm - 12 am*
			46 - 92 dBA	49 - 95 dBA	-	56 - 95 dBA
Svantek 203	24-Feb-23	64	*12 am - 3 am*	*6:30 am - 9 pm*	-	*10 pm - 12 am*
			55 - 87 dBA	52 - 99 dBA	-	56 - 84 dBA
Svantek 203	25-Feb-23	72	*12 am - 3 am*	*8 am - 6 pm*	-	*6 pm - 12 am*
			55 - 113 dBA	51 - 100 dBA	-	59 - 92 dBA
Median in A1A South on the Beach						
Svantek 204	17-Feb-23	72	*12 am - 5 am*	*7 am - 2 pm*	*2 pm - 6 pm*	*6 pm - 12 am*
			56 - 93 dBA	67 - 103 dBA	68 - 88 dBA	66 - 102 dBA
Svantek 204	18-Feb-23	76	*12 am - 3 am*	*7 am - 10 pm*	-	*10 pm - 12 am*
			57 - 85 dBA	67 - 105 dBA	-	68 - 105 dBA
Svantek 204	19-Feb-23	73	*12 am - 3 am*	*3 am - 3 pm*	*3 pm - 9 pm*	*10 pm - 12 am*
			61 - 99 dBA	59 - 100 dBA	68 - 75 dBA	63 - 100 dBA
Svantek 204	20-Feb-23	71	*12 am - 2 am*	*7 am - 10 pm*	-	*10 pm - 12 am*
			62 - 89 dBA	67 - 105 dBA	-	68 - 105 dBA
Svantek 204	21-Feb-23	72	*12 am - 3 am*	*7 am - 10 pm*	-	*10 pm - 12 am*
			47 - 88 dBA	66 - 104 dBA	-	64 - 110 dBA
Svantek 204	22-Feb-23	70	*12 am - 3 am*	*7 am - 10 pm*	-	*10 pm - 12 am*
			49 - 93 dBA	66 - 106 dBA	-	64 - 92 dBA
Svantek 204	23-Feb-23	70	*12 am - 3 am*	*7 am - 10 pm*	-	*10 pm - 12 am*
			52 - 88 dBA	66 - 102 dBA	-	67 - 94 dBA
Svantek 204	24-Feb-23	74	*12 am - 3 am*	*7 am - 10 pm*	-	*10 pm - 12 am*
			50 - 90 dBA	66 - 106 dBA	-	67- 110 dBA
Svantek 204	25-Feb-23	73	*12 am - 3 am*	*7 am - 10 pm*	-	*10 pm - 12 am*
			58 - 95 dBA	65 - 106 dBA	-	67 - 103 dBA

Meter	Date	LDN, dBA	Night Time Sound Level Range Early Morning	Day Time Sound Level Range 1	Day Time Sound Level Range 2	Night Time Sound Level Range Late Nights
Median in A1A North on the Beach						
Svantek 205	17-Feb-23	73	*12 am - 3 am*	*6:30 am - 4 pm*	-	*6 pm - 12 am*
			55 - 94 dBA	64 - 71 dBA	-	66 - 101 dBA
Svantek 205	18-Feb-23	74	*12 am - 3 am*	*7 am - 4 am*	-	*6 pm - 12 am*
			55 - 64 dBA	64 - 99 dBA	-	62 - 109 dBA
Svantek 205	19-Feb-23	73	*12 am - 3 am*	*4 am - 1 pm*	-	*2 pm - 12 am*
			59 - 89 dBA	59 - 90 dBA	-	64 - 105 dBA
Svantek 205	20-Feb-23	73	*12 am - 3 am*	*7 am - 12 pm*	*12 pm - 6 pm*	*6 pm - 12 am*
			51 - 98 dBA	62 - 111 dBA	62 - 107 dBA	59 - 106 dBA

APPENDIX B-2:
SUMMARY TABLE DAY AND NIGHT SOUND LEVEL RANGES
ACOUSTICAL DATA
TRIP 2

TRIP 2: April 21 - 25, 2023

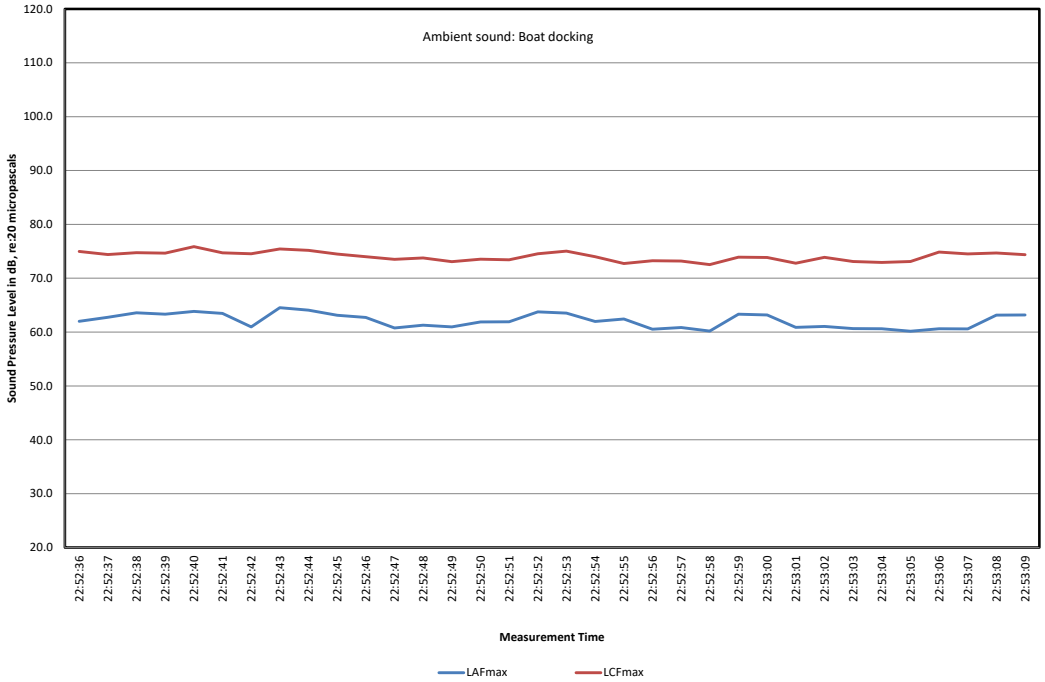
Meter	Date	LDN, dBA	Night Time Sound Level Range Early Morning 12 am - 4 am	Day Time Sound Level Range 1	Day Time Sound Level Range 2	Night Time Sound Level Range Late Nights
Parking Lot Across from Smitty's Wings						
Rion 4	21-Apr-23	-	*7:30 pm - 12 am*	-	-	-
			61 - 82 dBA	-	-	-
Rion 4	22-Apr-23	71	*12 am - 1 am*	*7 am - 9 pm*	-	*9 pm - 12 am*
			57 - 77 dBA	56 - 88 dBA	-	57 - 74 dBA
Rion 4	23-Apr-23	71	*12 am - 4 am*	*8 am - 5 pm*	*5 pm - 9 pm*	*9 pm- 12 am*
			45 - 73 dBA	58 - 78 dBA	60 - 88 dBA	53 - 79 dBA
Rion 4	24-Apr-23	69	*12 am - 3 am*	*7 am - 8 pm*	-	*10 pm - 12 am*
			43 - 76 dBA	54 - 86 dBA	-	47 - 88 dBA
Rion 4	25-Apr-23	-	*12 am - 5 am*	*7 am - 9 am*	-	-
			42 - 65 dBA	60 - 77 dBA	-	-
Colee Hammock near The Balcony and Service Alley						
Rion 7	21-Apr-23		-	-	-	*8:48 pm - 12 am*
			-	-	-	58 - 72 dBA
Rion 7	22-Apr-23	65	*12 am - 3 am*	*9 am - 10 pm*	-	*10 pm - 12 am*
			53 - 77 dBA	57 - 73 dBA	-	59 - 68 dBA
Rion 7	23-Apr-23	65	*12 am - 3 am*	*9 am - 10 pm*	-	*10 pm - 12 am*
			52 - 73 dBA	57 - 74 dBA	-	58 - 68 dBA
Rion 7	24-Apr-23	64	*12 am - 5 am*	*7 am - 8 pm*	-	*8 pm - 12 am*
			47 - 91 dBA	52 - 100 dBA	-	51 -79 dBA
Coral Villas near Truth Lounge						
Svantek 203	21-Apr-23	-	-	-	-	*8 pm - 12 am*
			-	-	-	56 - 90 dBA
Svantek 203	22-Apr-23	63	*12 am - 2 am*	*6 am - 7:30 am*	-	*7:30 pm - 12 am*
			52 - 81 dBA	52 - 81 dBA	-	51 - 80 dBA
Svantek 203	23-Apr-23	65	*12 am - 7 am*	*7 am - 10 pm*	-	*10 pm - 12 am*
			47 - 85 dBA	50 - 116 dBA	-	49 - 93 dBA
Svantek 203	24-Apr-23	65	*12 am - 5 am*	*7 am - 10 pm*	-	*10 pm - 12 am*
			47 - 91 dBA	52 - 100 dBA	-	51 - 79 dBA

Meter	Date	LDN, dBA	Night Time Sound Level Range Early Morning 12 am - 4 am	Day Time Sound Level Range 1	Day Time Sound Level Range 2	Night Time Sound Level Range Late Nights
Water Garden Upper from Living Unit						
Svantek 284	21-Apr-23	-	-	-	-	*6:20 pm - 12 am*
			-	-	-	64 - 96 dBA
Svantek 284	22-Apr-23	70	*12 am - 3 am*	*3 am - 7 am*	*7 am - 10 pm*	*10 pm - 12 am*
			59 - 98 dBA	58 - 74 dBA	62 - 100 dBA	65 - 95 dBA
Svantek 284	23-Apr-23	68	*12 am - 2:30 am*	*2:30 am - 7 am*	*7 am - 10 pm*	*10 pm - 12 am*
			60 - 90 dBA	58 - 78 dBA	60 - 97 dBA	60 - 79 dBA
Svantek 284	24-Apr-23	-	*12 am - 7 am*	*7 am - 7:20 pm*	-	-
			58 - 94 am	63 - 91 dBA	-	-
Bamboo Flats in Yard Closest to NE 8 th Street						
Svantek 291	22-Apr-23	62	*12 am - 5 am*	*5 am - 10 pm*	-	*10 pm - 12 am*
			48 - 91 dBA	49 - 91 dBA	-	56 - 80 dBA
Svantek 291	23-Apr-23	61	*12 am - 3:30 am*	*3:30 am - 7 am*	*7 am - 10 pm*	*10 pm - 12 am*
			54 - 89 dBA	46 - 78 dBA	51 - 88 dBA	50 - 88 dBA
Svantek 291	24-Apr-23	63	*12 am - 5 am*	*5 am - 9 pm*	-	*10 pm - 9 am*
			45 - 87 dBA	53 - 98 dBA	-	49 - 85 dBA
Svantek 291	25-Apr-23	-	*12 am - 5:24 am*	-	-	-
			43 - 74 dBA	-	-	-
Esplanade on New River Upper Floor Living Unit						
Svantek 282	21-Apr-23	-	-	-	-	*6:35 pm - 12 am*
			-	-	-	58 - 88 dBA
Svantek 282	22-Apr-23	70	*12 am - 3 am*	*3 am - 7 am*	*7 am - 10 pm*	*10 pm - 12 am*
			63 -93 dBA	54 - 94 dBA	58 - 92 dBA	63 - 93 dBA
Svantek 282	23-Apr-23	69	*12 am - 4 am*	*4 am - 7 am*	*7 am - 10 pm*	*10 pm - 12 am*
			64 - 91 dBA	54 - 82 dBA	56 - 96 dBA	58 - 81 dBA
Svantek 282	24-Apr-23	68	*12 am - 2 am*	*7 am - 10 pm*	-	*10 pm - 12 am*
			62 - 80 dBA	55 - 92 dBA	-	55 - 93 dBA
Jackson Tower 6th Floor Mezzanine						
Svantek 204	22-Apr-23	72	*12 am - 3 am*	*7 am - 2 pm*	*2 pm - 7 pm*	*7 pm - 12 am*
			64 - 90 dBA	64 - 100 dBA	67 - 97 dBA	65 - 93 dBA
Svantek 204	23-Apr-23	72	*12 am - 3 am*	*3 am - 7 am*	*7 am - 10 pm*	*10 pm - 12 am*
			63 - 94 dBA	62 - 88 dBA	64 - 100 dBA	65 - 94 dBA
Svantek 204	24-Apr-23	72	*12 am - 3 am*	*8 am - 10 pm*	-	*10 pm - 12 am*
			62 - 96 dBA	65 - 94 dBA	-	65 - 96 dBA
Svantek 204	25-Apr-23	-	*12 am - 12:44 am*	-	-	-
			63 - 85 dBA	-	-	-

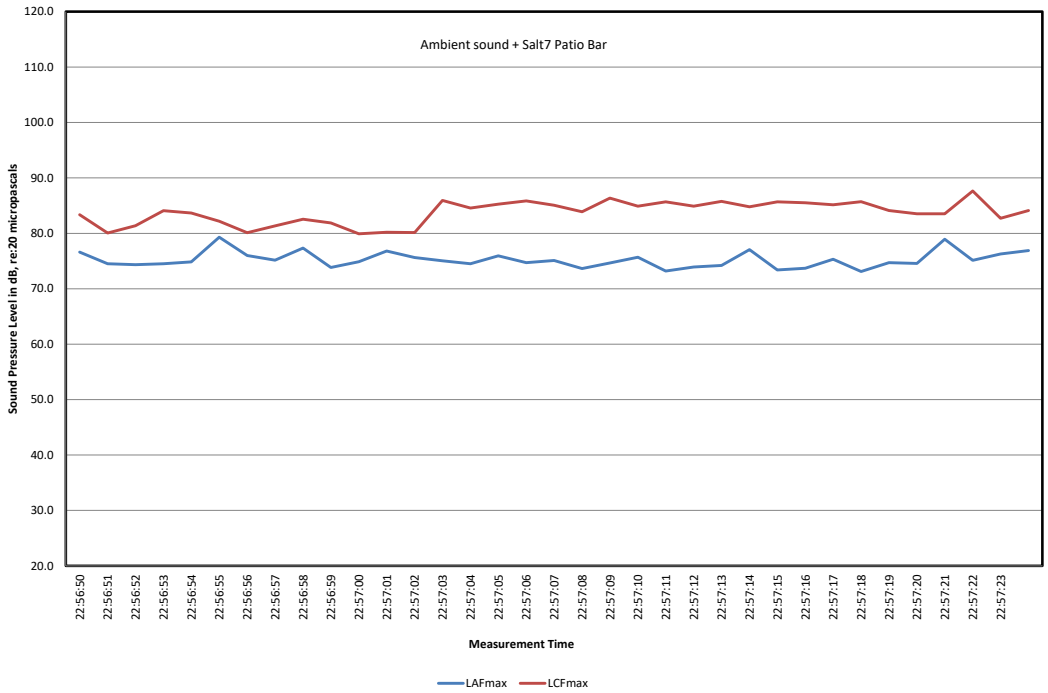
Meter	Date	LDN, dBA	Night Time Sound Level Range Early Morning 12 am - 4 am	Day Time Sound Level Range 1	Day Time Sound Level Range 2	Night Time Sound Level Range Late Nights
ILLNI Upper Floor Living Unit						
Svantek 205	21-Apr-23	-	-	-	-	*4:40 pm 12 am*
			-	-	-	63 - 100 dBA
Svantek 282	22-Apr-23	70	*12 am - 5:30 am*	*5:30 am - 8 pm*	-	*8 pm - 12 am*
			61 - 95 dBA	62 - 104 dBA	-	63 - 90 dBA
Svantek 282	23-Apr-23	70	*12 am - 7 am*	*7 am - 8 pm*	-	*8 pm - 12 am*
			60 - 86 dBA	63 - 97 dBA	-	63 - 98 dBA
Svantek 282	24-Apr-23	69	*12 am - 7 am*	*7 am - 12 am*	-	-
			60 - 87 dBA	63 - 92 dBA	-	-

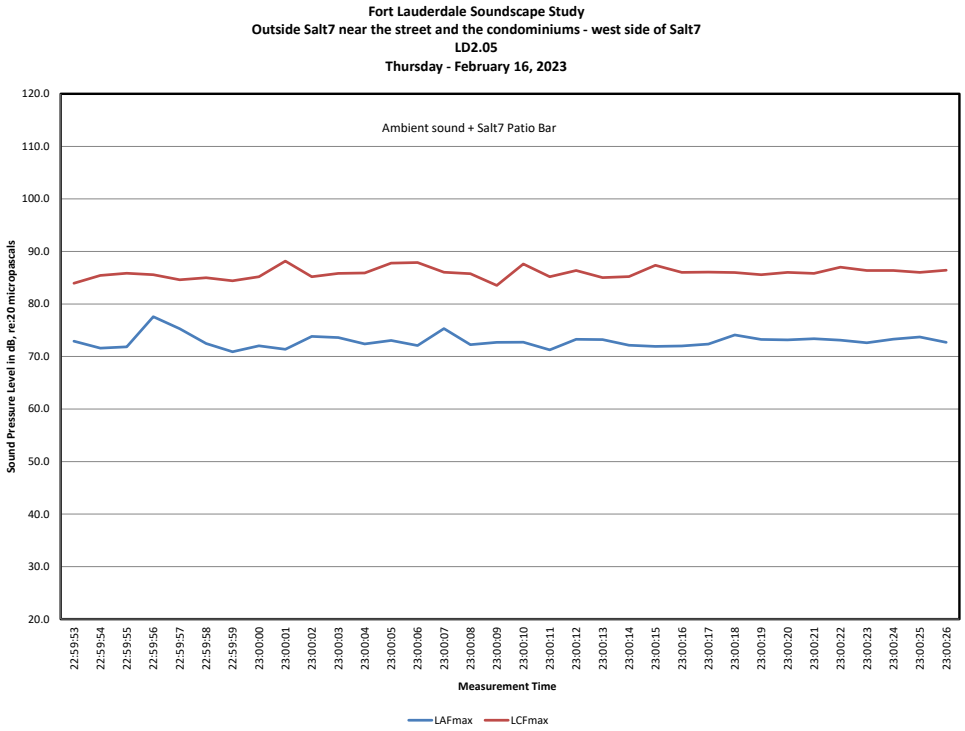
APPENDIX C-1:
SUMMARY OF SHORT TERM ACOUSTICAL MEASUREMENTS

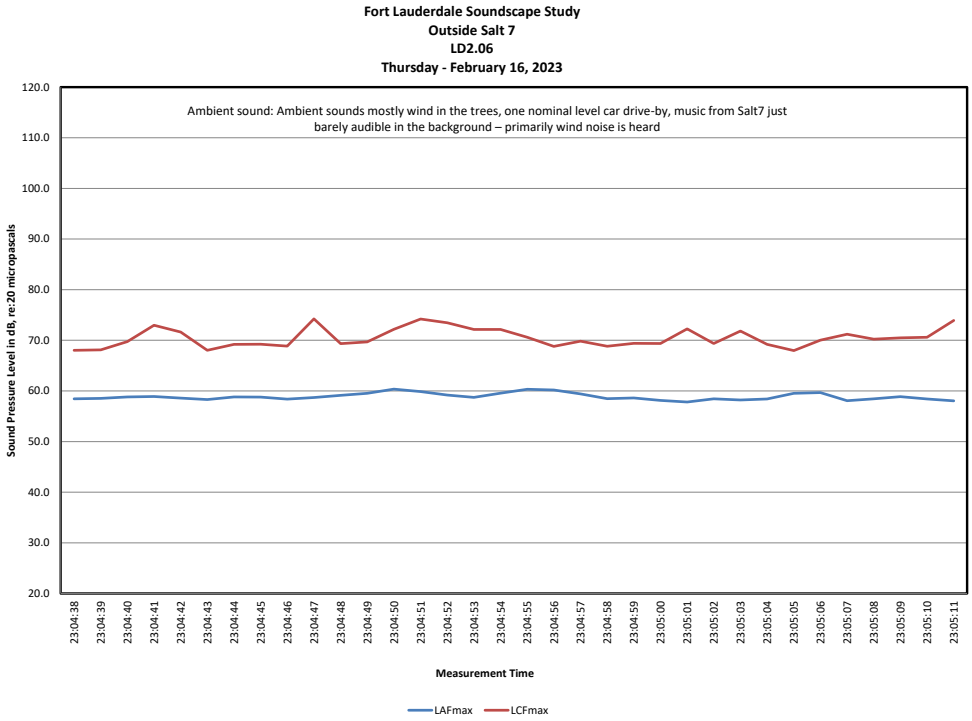
Fort Lauderdale Soundscape Study
Entry of the Riverside hotel
LD2.03
Thurday - February 16, 2023



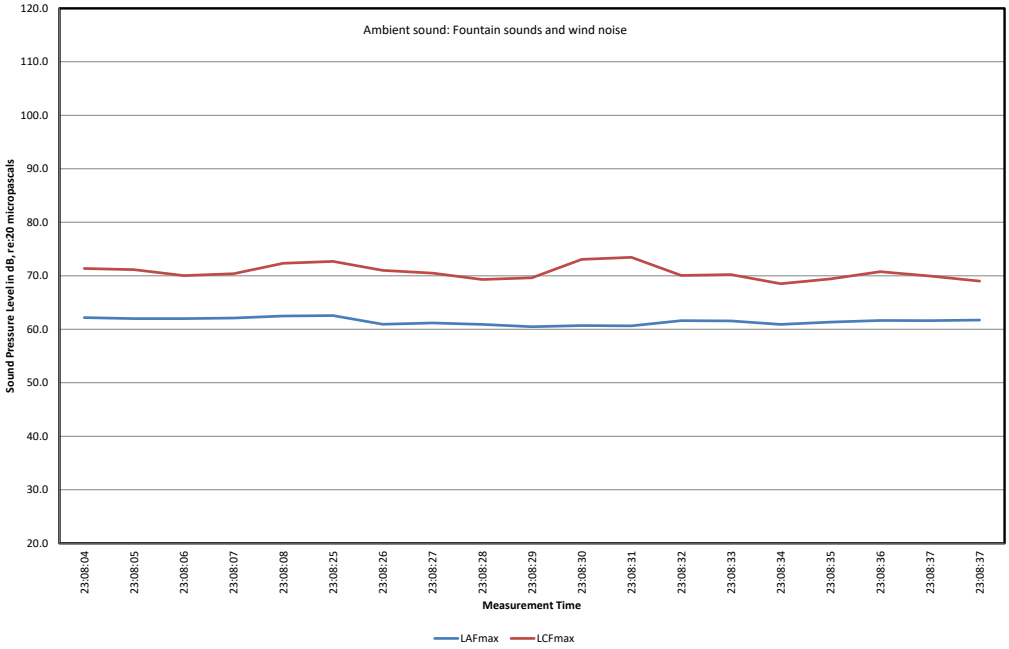
Fort Lauderdale Soundscape Study
Outside the Salt7 patio bar – east side
LD2.04
Thursday - February 16, 2023



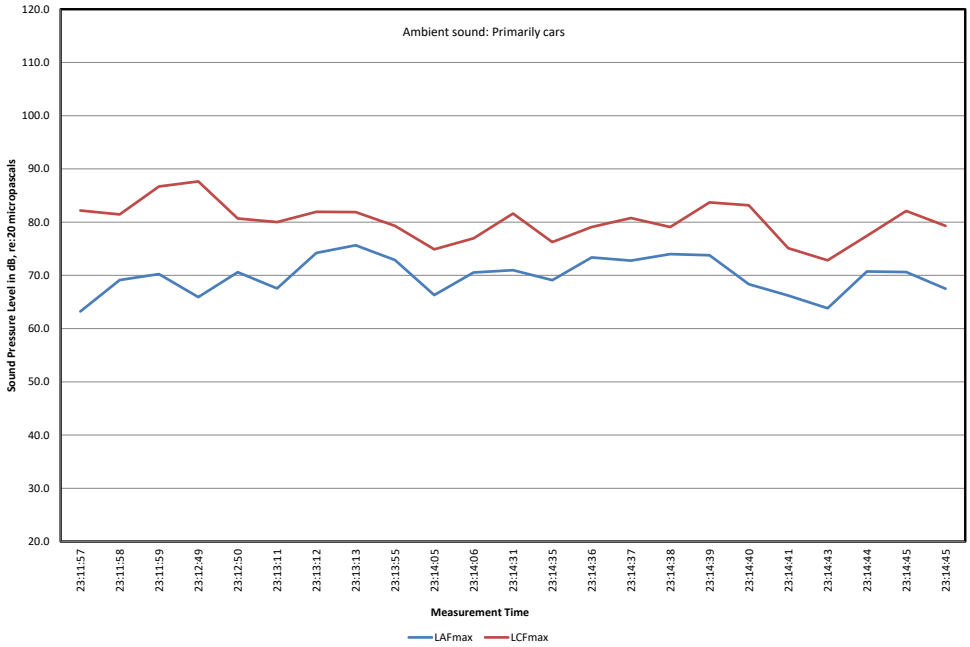

Fort Lauderdale Soundscape Study
Outside Salt7 near the street and the condominiums - west side of Salt7
LD2.05
Thursday - February 16, 2023
Ambient sound + Salt7 Patio Bar
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

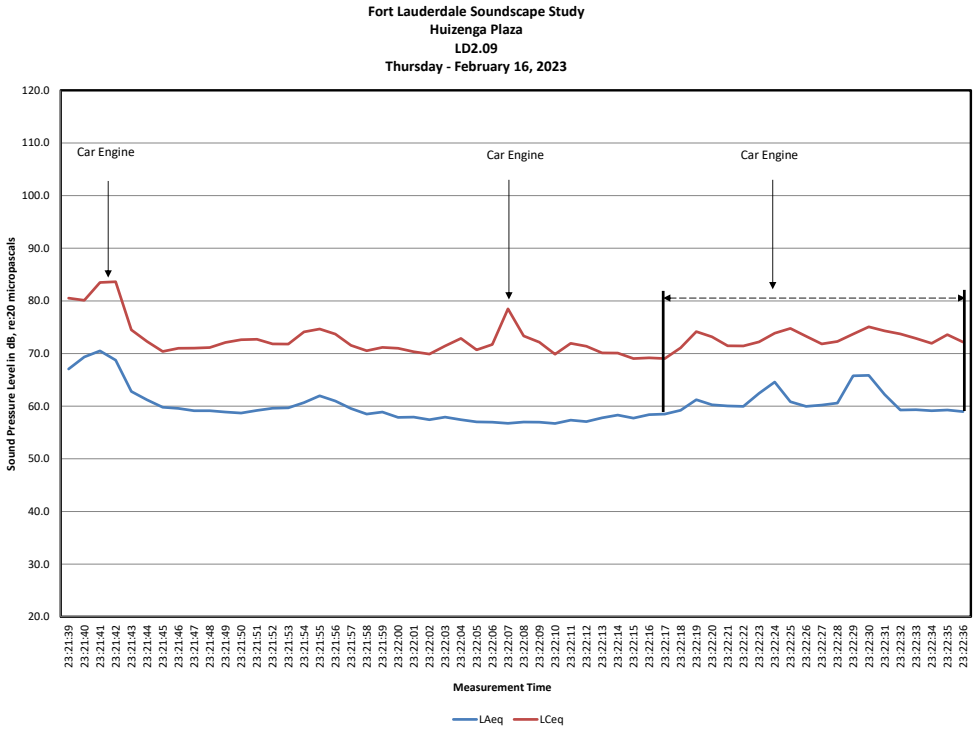

Fort Lauderdale Soundscape Study
Outside Salt 7
LD2.06
Thursday - February 16, 2023
Ambient sound: Ambient sounds mostly wind in the trees, one nominal level car drive-by, music from Salt7 just barely audible in the background – primarily wind noise is heard
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

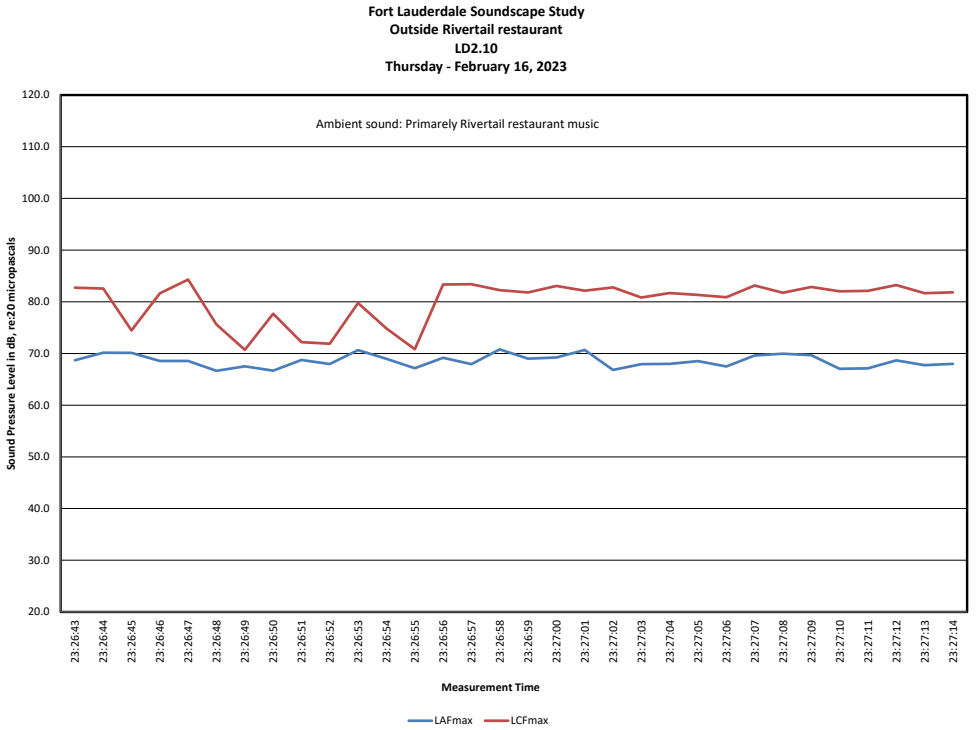
Fort Lauderdale Soundscape Study
Across the street from Water Garden
LD2.07
Thursday - February 16, 2023

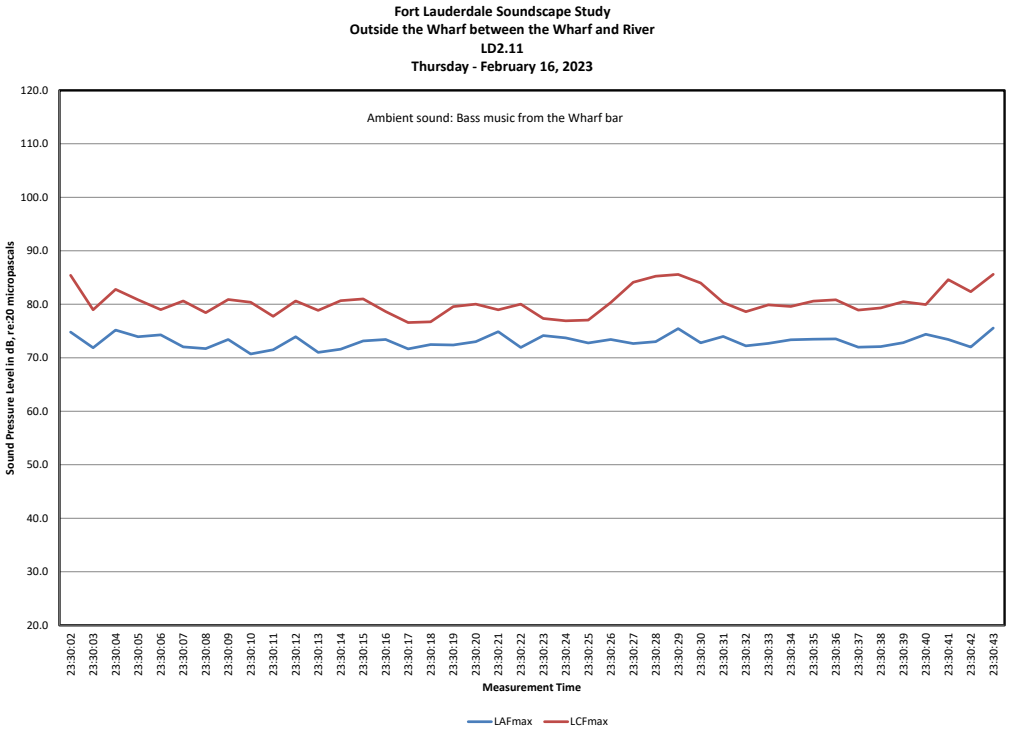


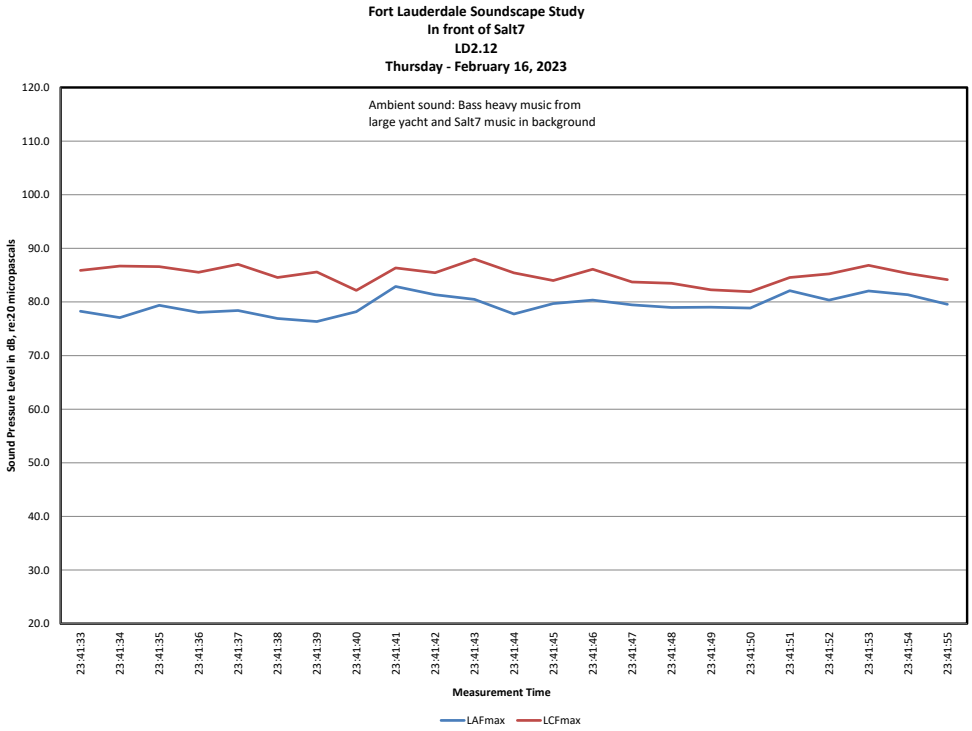
Fort Lauderdale Soundscape Study
New River, which is crossed by a grand overpass
LD2.08
Thursday - February 16, 2023



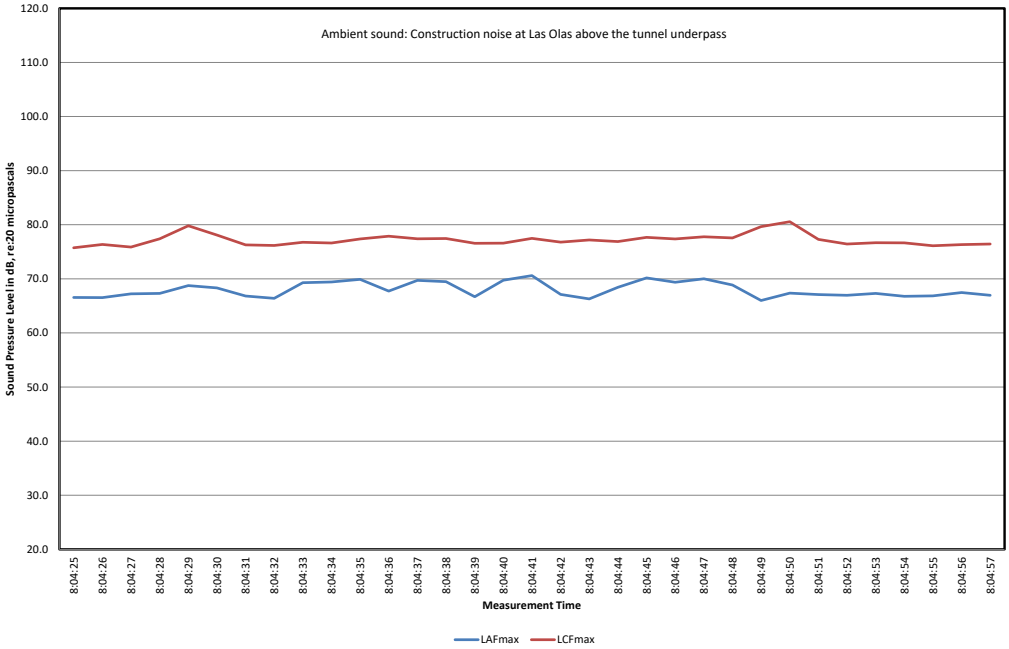

Fort Lauderdale Soundscape Study
Huizenga Plaza
LD2.09
Thursday - February 16, 2023
Car Engine
Car Engine
Car Engine
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAeq
LCeq


Fort Lauderdale Soundscape Study
Outside Rivertail restaurant
LD2.10
Thursday - February 16, 2023
Ambient sound: Primarely Rivertail restaurant music
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

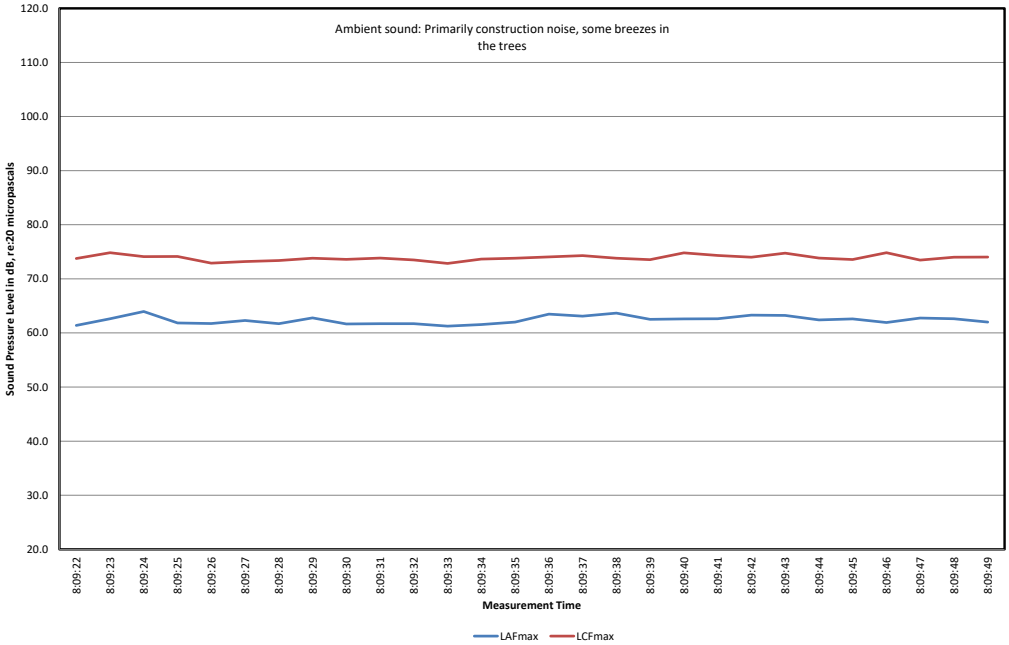

Fort Lauderdale Soundscape Study
Outside the Wharf between the Wharf and River
LD2.11
Thursday - February 16, 2023
Ambient sound: Bass music from the Wharf bar
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax


Fort Lauderdale Soundscape Study
In front of Salt7
LD2.12
Thursday - February 16, 2023
Ambient sound: Bass heavy music from
large yacht and Salt7 music in background
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

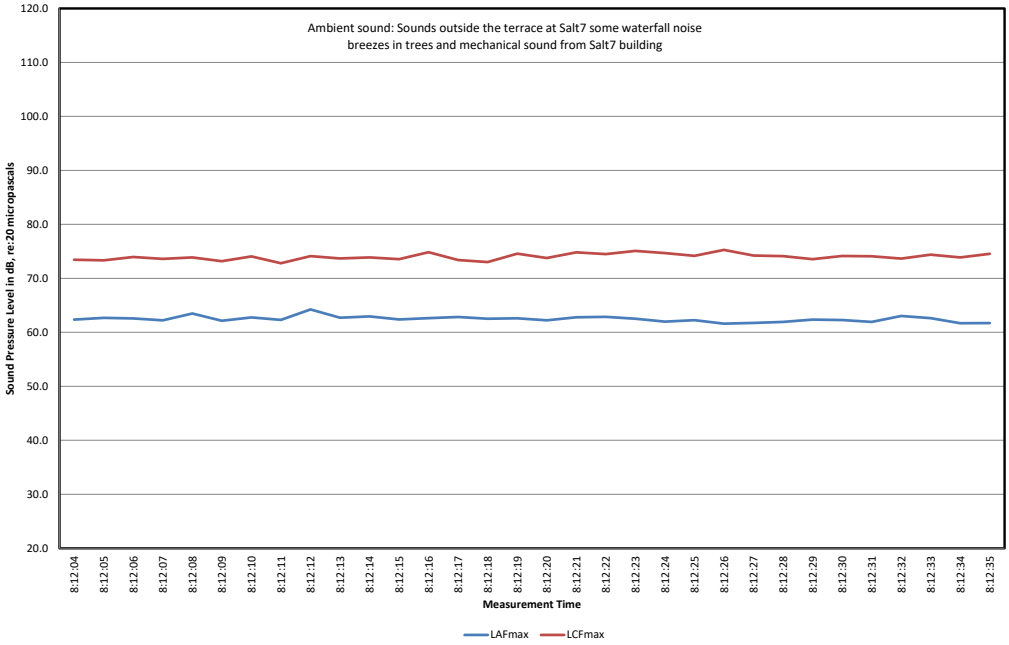
Fort Lauderdale Soundscape Study
Las Olas above the tunnel underpass
LD2.13
Friday - February 17, 2023



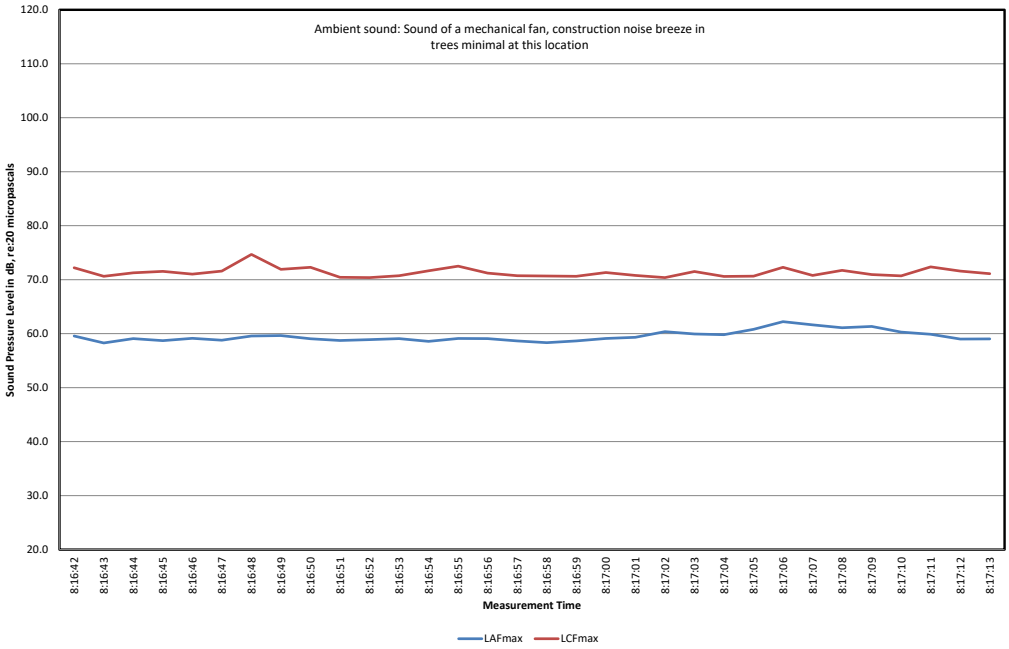
Fort Lauderdale Soundscape Study
Riverside Hotel entrance
LD2.14
Friday- February 17, 2023

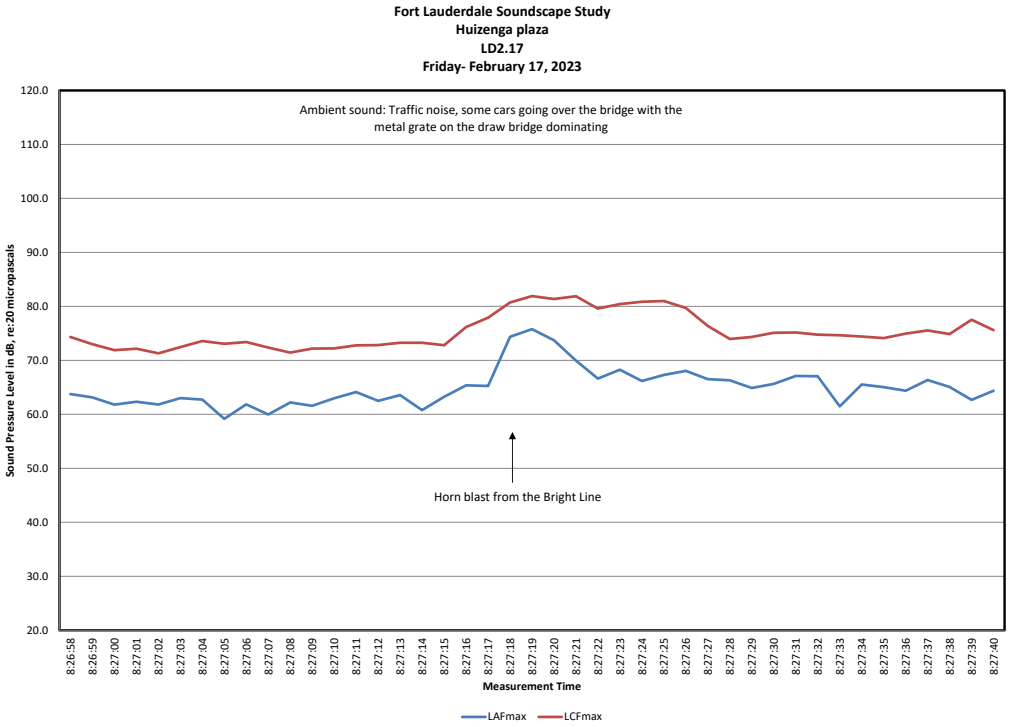


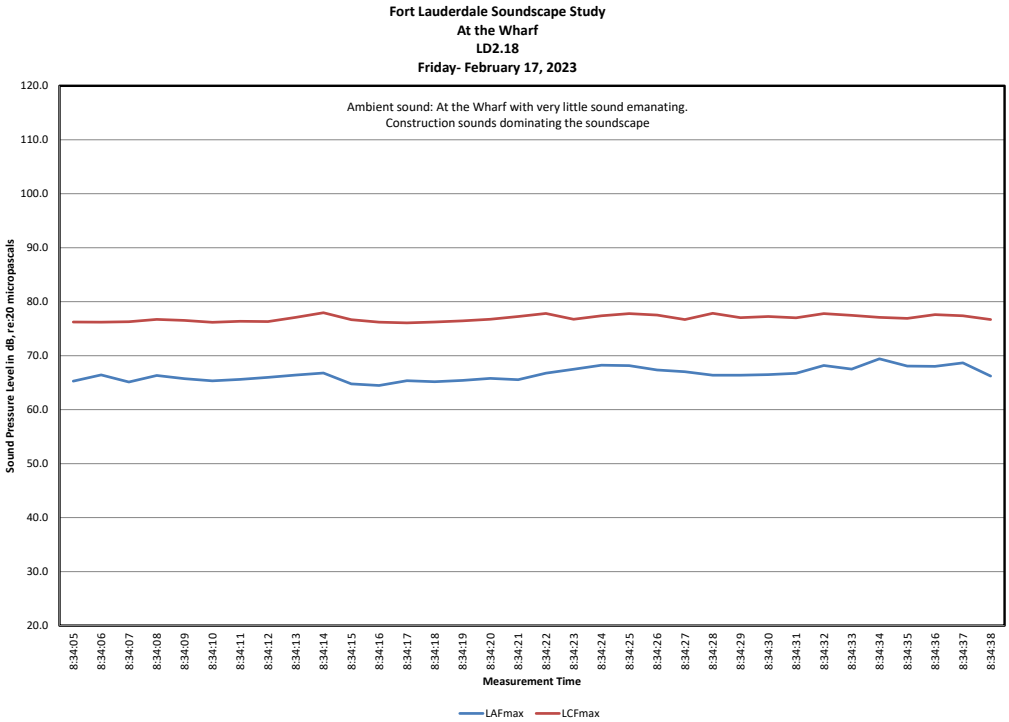
Fort Lauderdale Soundscape Study
Sounds outside the terrace at Salt7 some waterfall noise breezes in trees and some repetitive banging noise
LD2.15
Friday- February 17, 2023



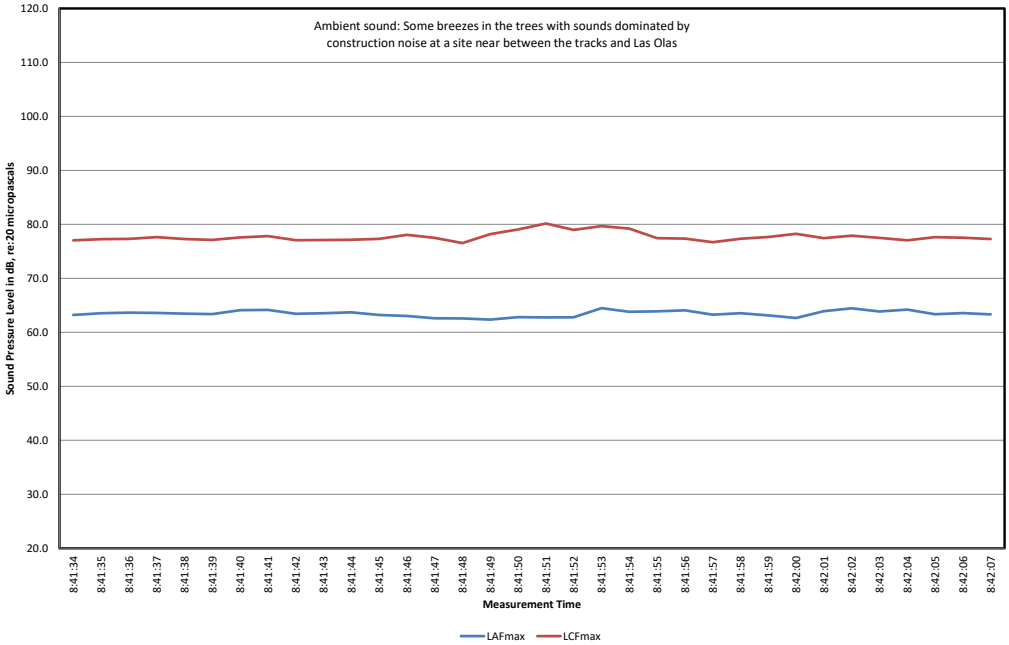
Fort Lauderdale Soundscape Study
Outside Salt7 on the west side
LD2.16
Friday- February 17, 2023



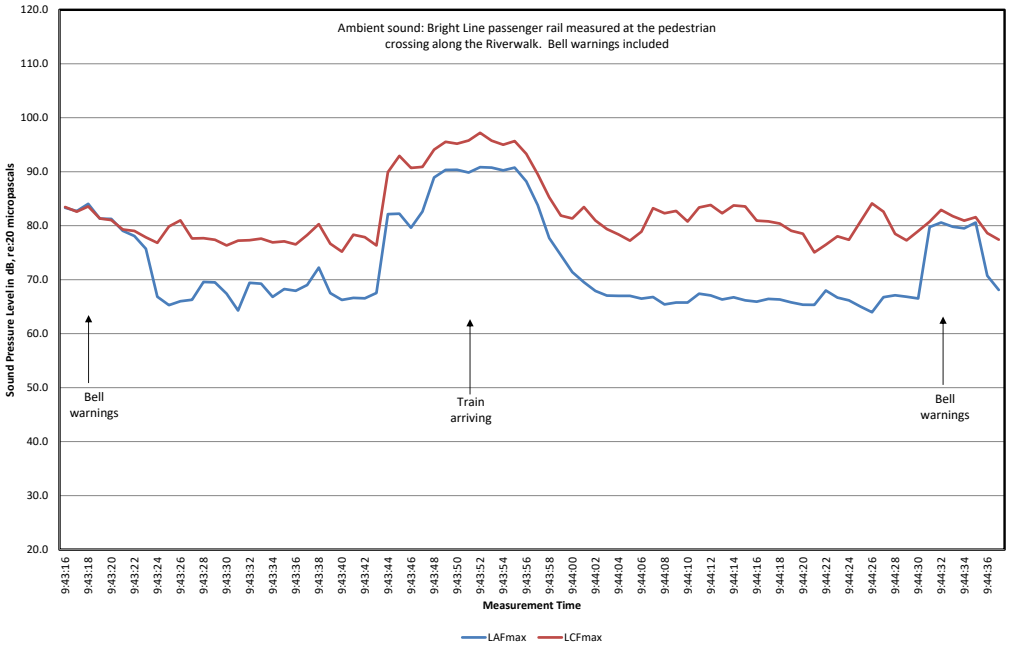

Fort Lauderdale Soundscape Study
Huizenga plaza
LD2.17
Friday- February 17, 2023
Ambient sound: Traffic noise, some cars going over the bridge with the metal grate on the draw bridge dominating
Horn blast from the Bright Line
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

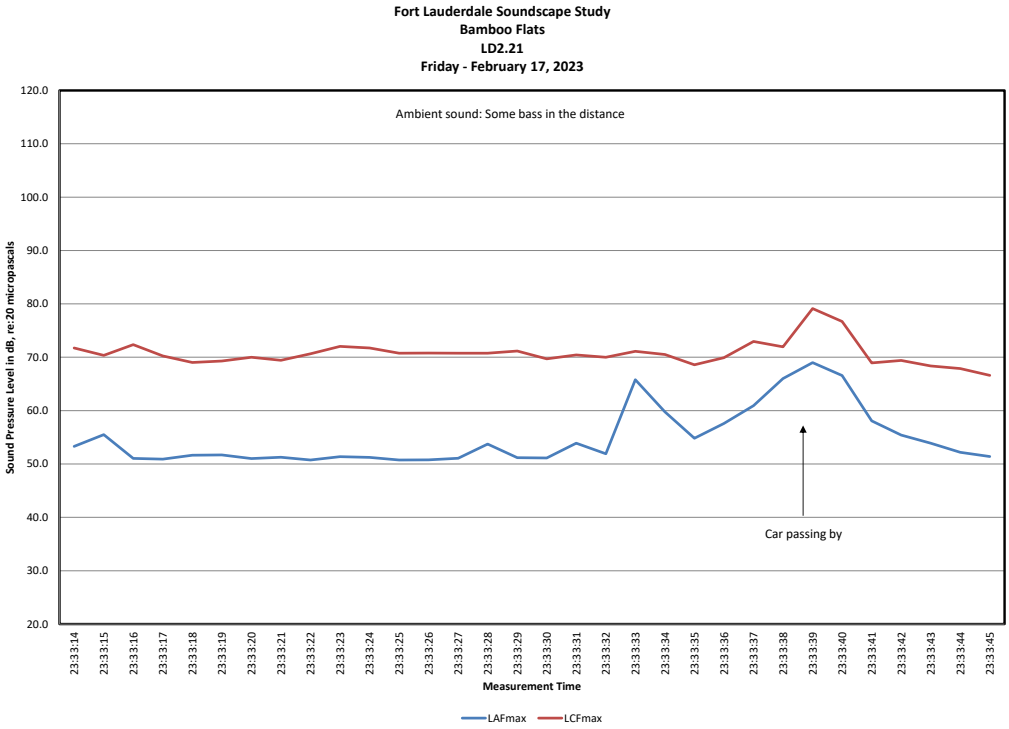

Fort Lauderdale Soundscape Study
At the Wharf
LD2.18
Friday- February 17, 2023
Ambient sound: At the Wharf with very little sound emanating. Construction sounds dominating the soundscape
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

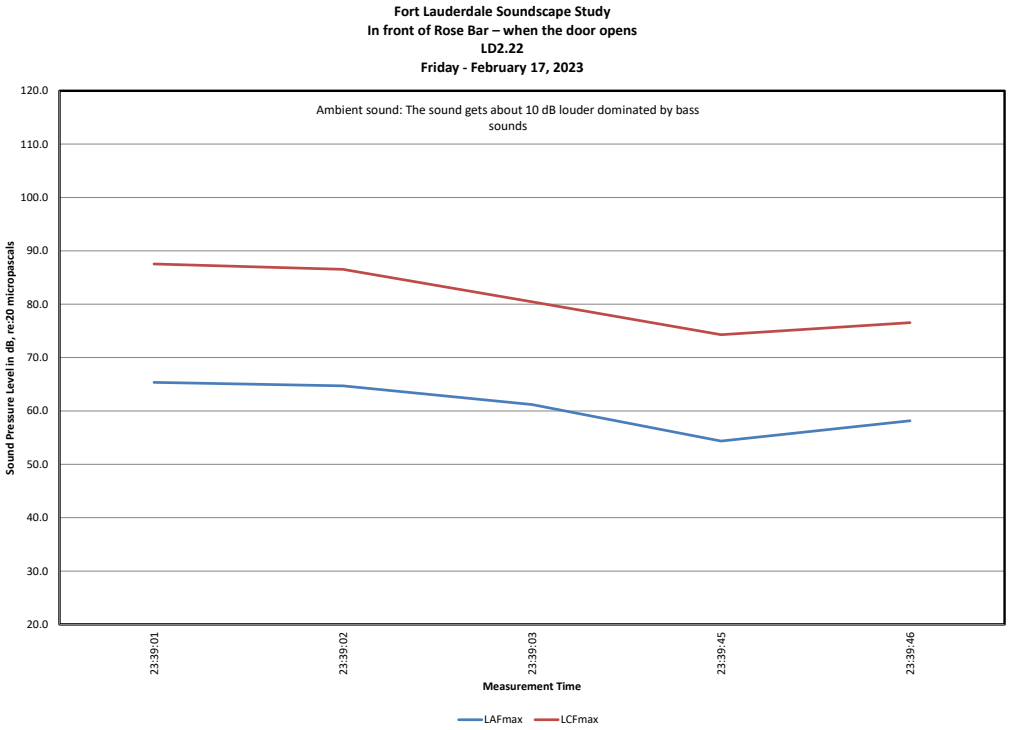
Fort Lauderdale Soundscape Study
In front of King Cromartie House
LD2.19
Friday- February 17, 2023

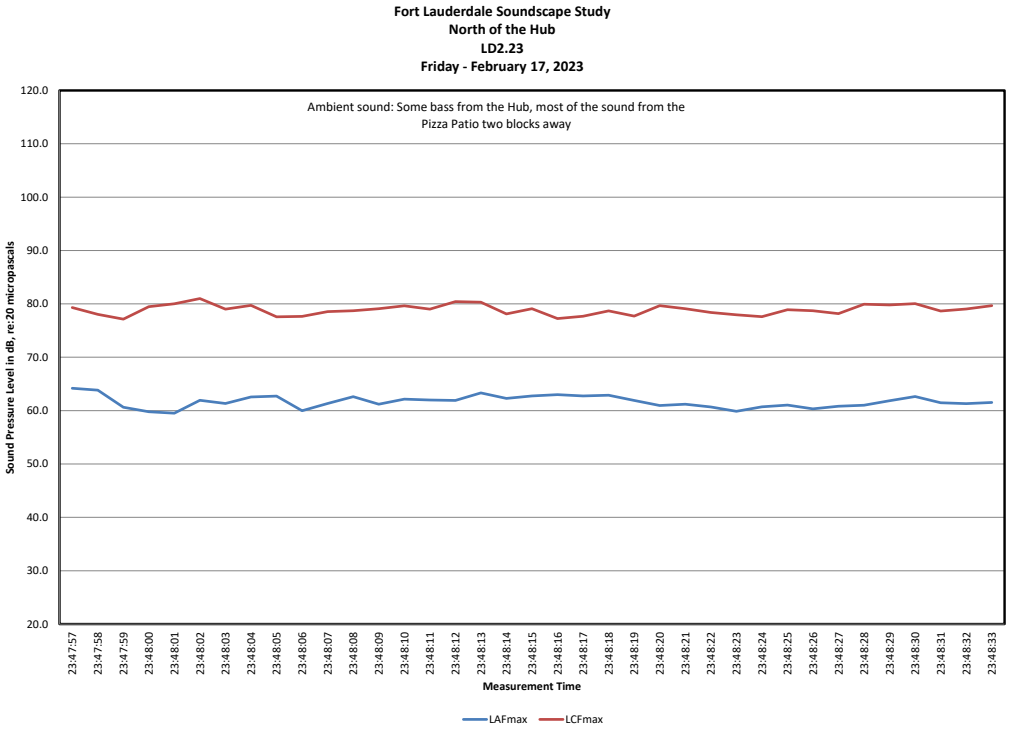


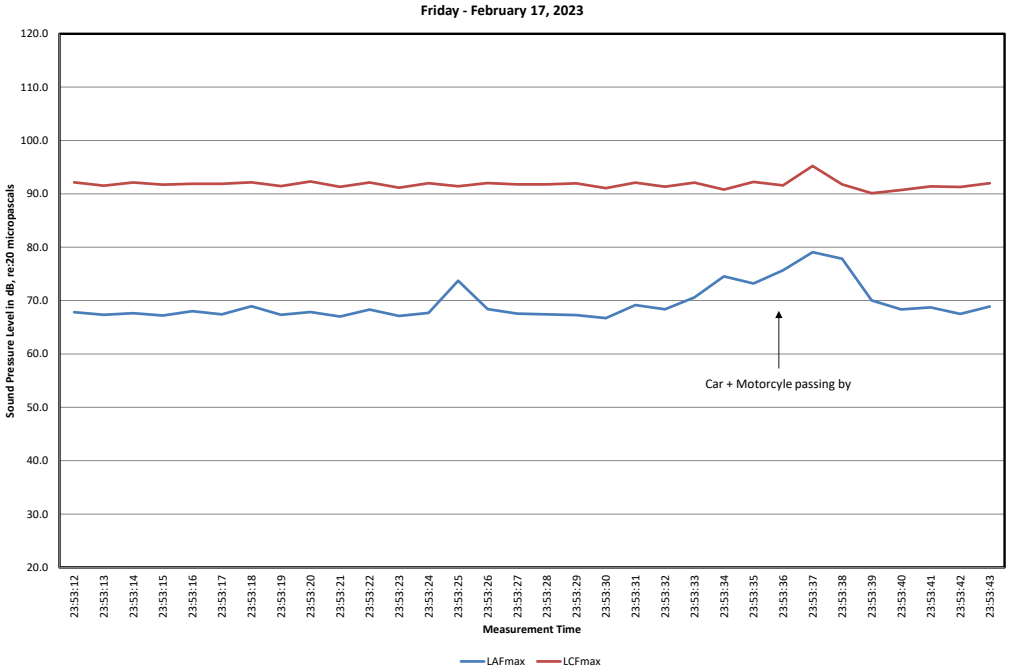
Fort Lauderdale Soundscape Study
At the pedestrian crossing along the Riverwalk
LD2.20
Friday - February 17, 2023



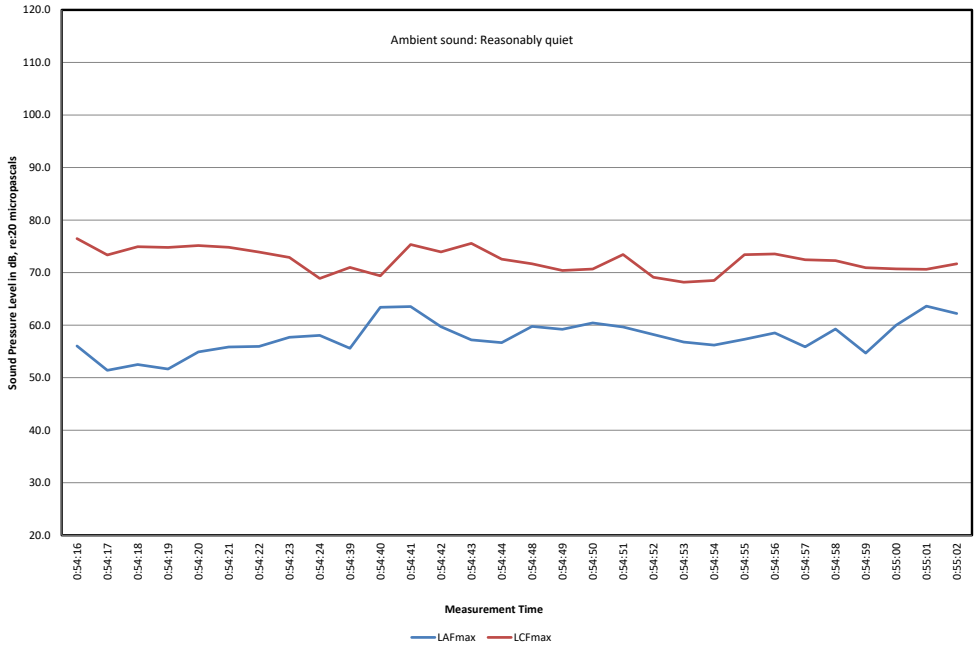

Fort Lauderdale Soundscape Study
Bamboo Flats
LD2.21
Friday - February 17, 2023
Ambient sound: Some bass in the distance
Car passing by
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax


Fort Lauderdale Soundscape Study
In front of Rose Bar – when the door opens
LD2.22
Friday - February 17, 2023
Ambient sound: The sound gets about 10 dB louder dominated by bass sounds
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

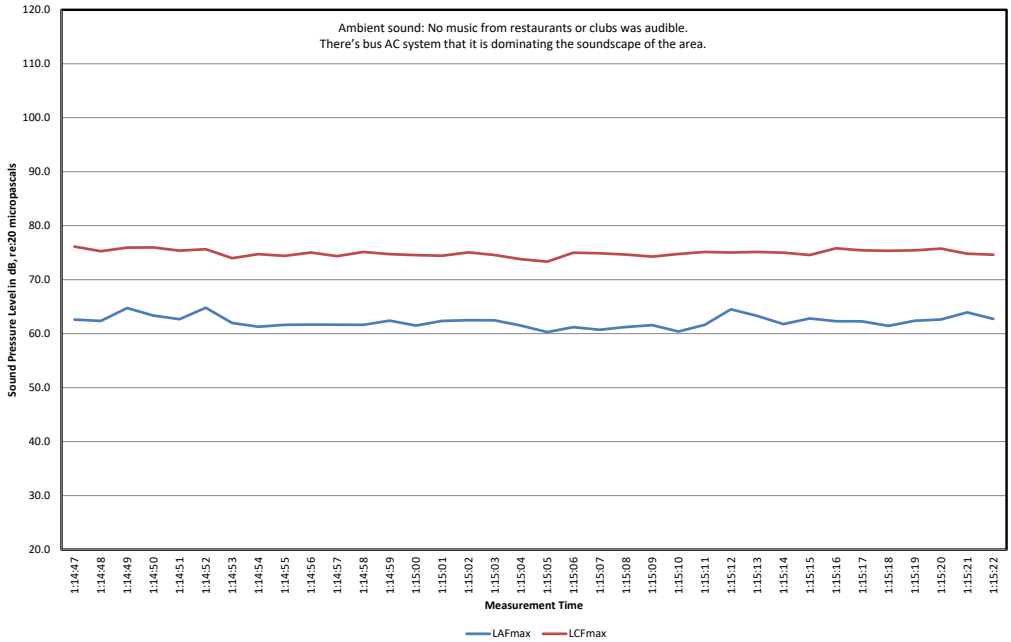

Fort Lauderdale Soundscape Study
North of the Hub
LD2.23
Friday - February 17, 2023
Ambient sound: Some bass from the Hub, most of the sound from the Pizza Patio two blocks away
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

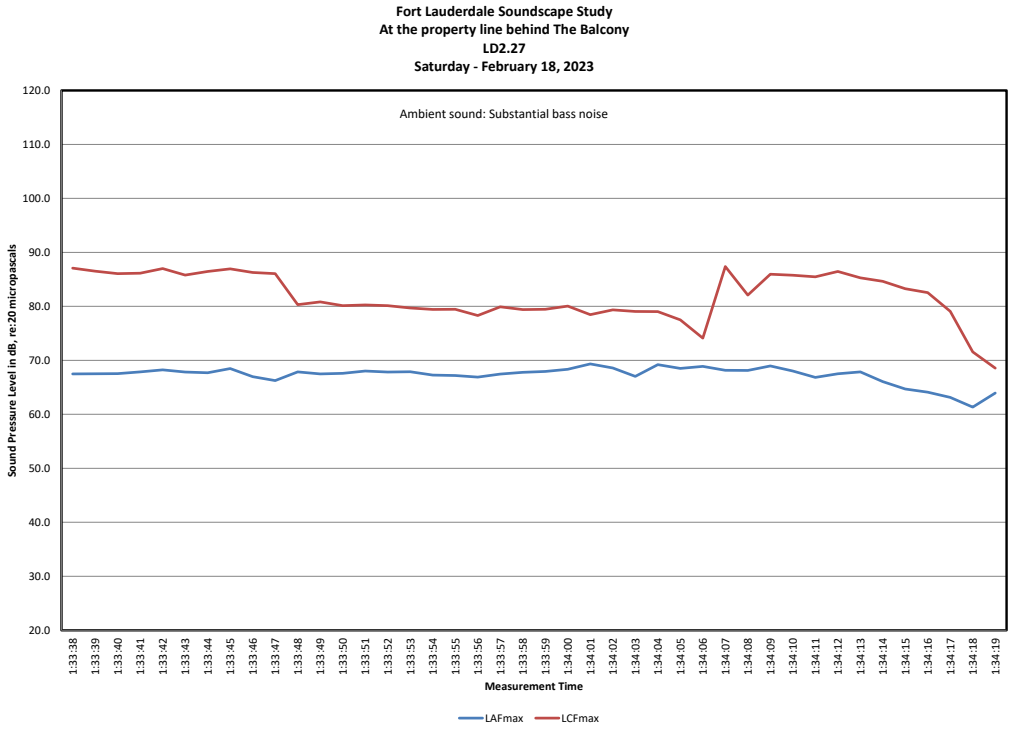

Fort Lauderdale Soundscape Study
Closer to the Pizza Patio, about 600 to 700 feet across the street and railroad tracks
LD2.24
Friday - February 17, 2023
Car + Motorcyle passing by
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

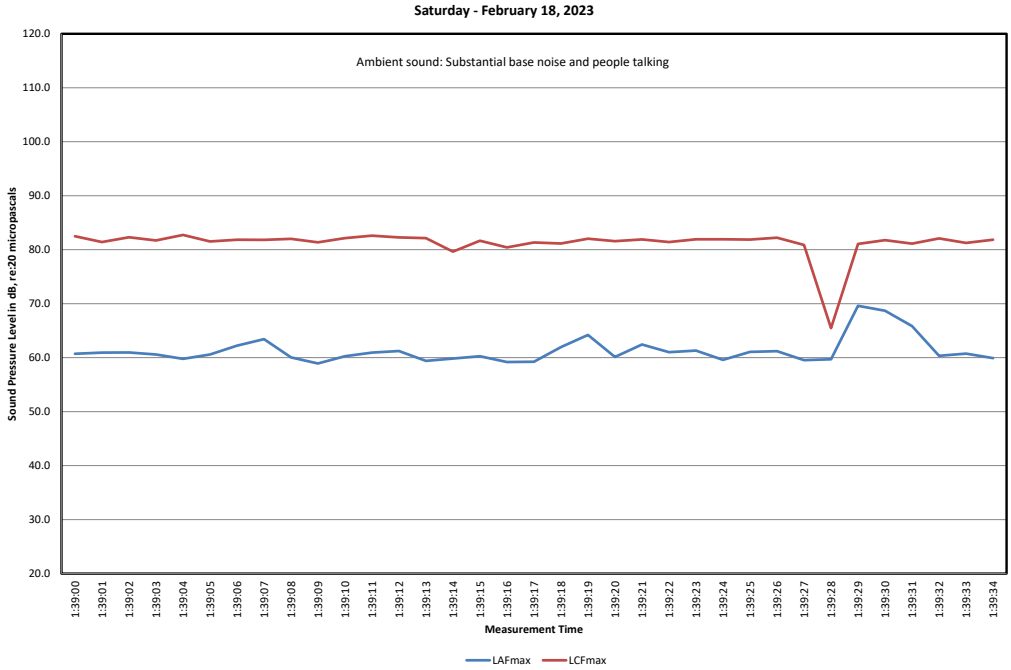
Fort Lauderdale Soundscape Study
Behind the Truth Lounge
LD2.25
Saturday - February 18, 2023

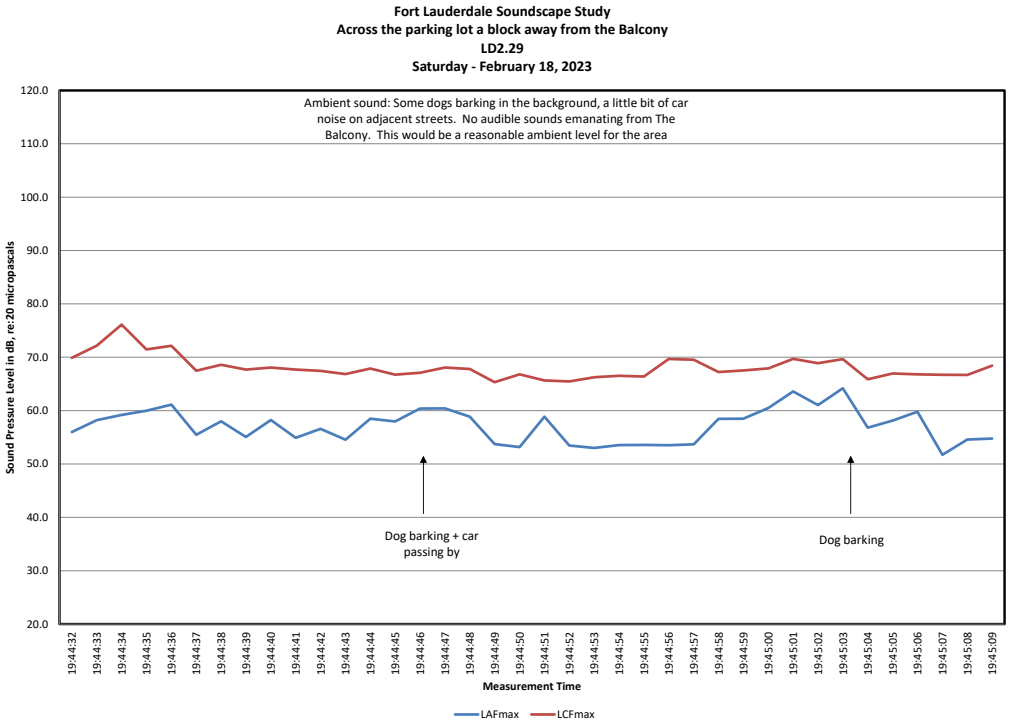


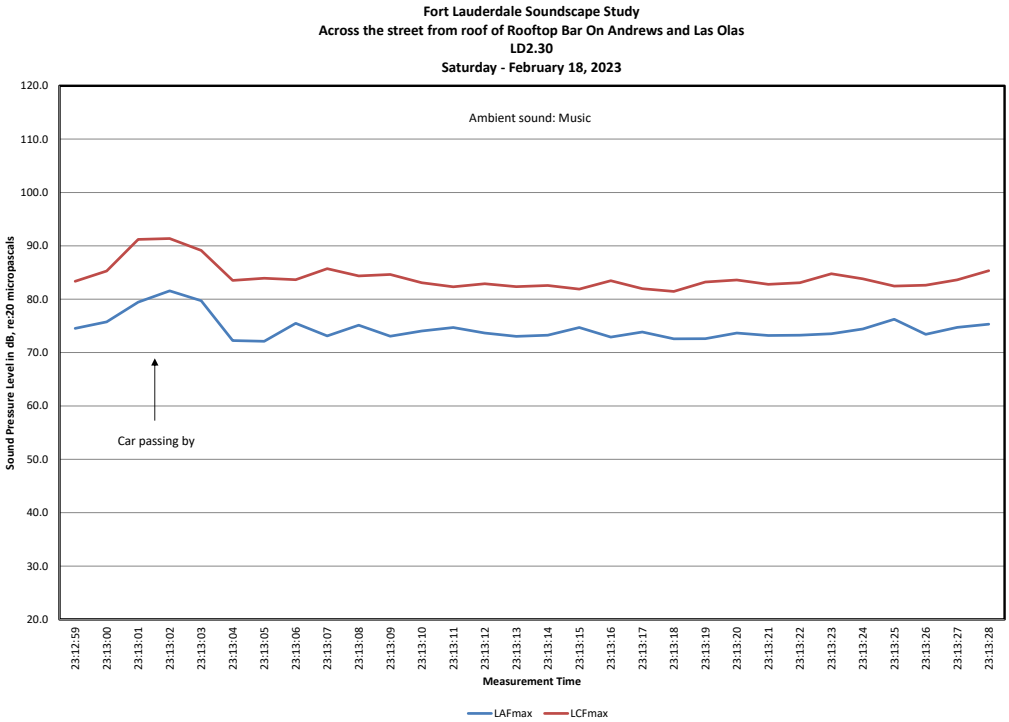
Fort Lauderdale Soundscape Study
Beach entertaiment distric. Behind Drunken Taco in the clubs along the beach near Las Olas
LD2.26
Saturday - February 18, 2023

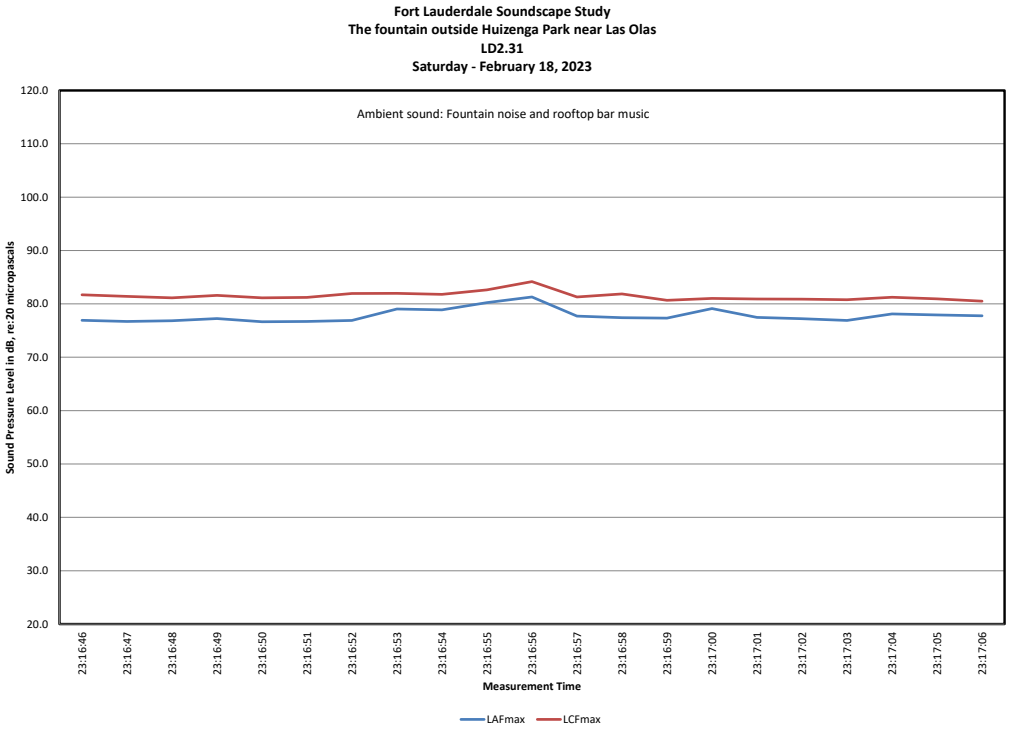


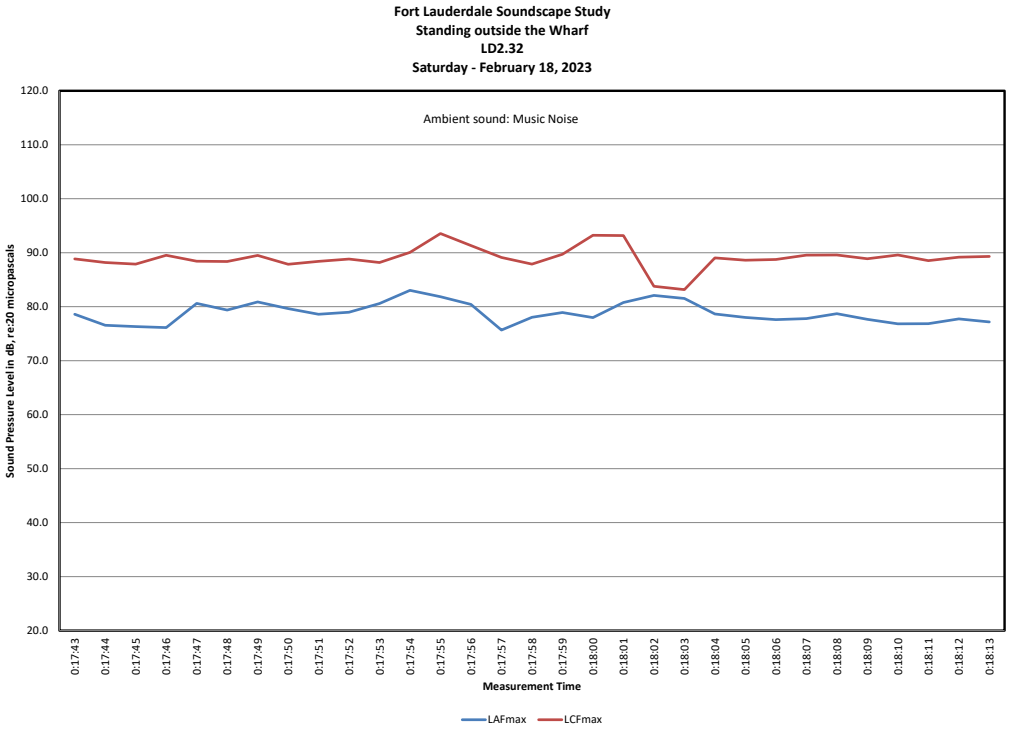

Fort Lauderdale Soundscape Study
At the property line behind The Balcony
LD2.27
Saturday - February 18, 2023
Ambient sound: Substantial bass noise
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax


Fort Lauderdale Soundscape Study
Measuring behind The Balcony, a block away
LD2.28
Saturday - February 18, 2023
Ambient sound: Substantial base noise and people talking
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

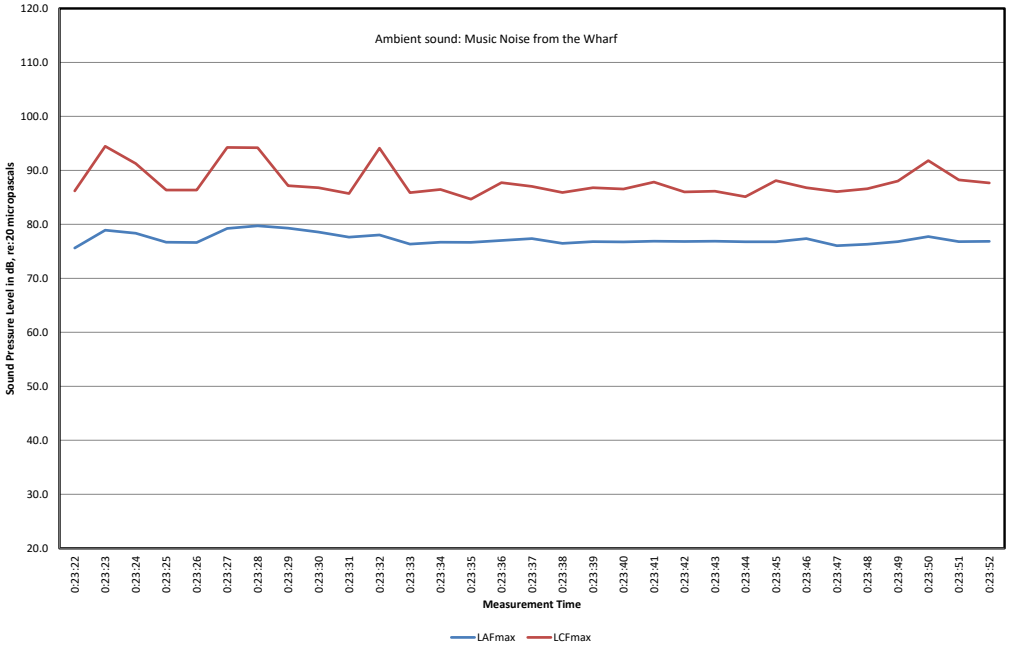

Fort Lauderdale Soundscape Study
Across the parking lot a block away from the Balcony
LD2.29
Saturday - February 18, 2023
Ambient sound: Some dogs barking in the background, a little bit of car noise on adjacent streets. No audible sounds emanating from The Balcony. This would be a reasonable ambient level for the area
Sound Pressure Level in dB, re:20 micropascals
Dog barking + car passing by
Dog barking
Measurement Time
LAFmax
LCFmax


Fort Lauderdale Soundscape Study
Across the street from roof of Rooftop Bar On Andrews and Las Olas
LD2.30
Saturday - February 18, 2023
Ambient sound: Music
Sound Pressure Level in dB, re:20 micropascals
Car passing by
Measurement Time
LAFmax
LCFmax

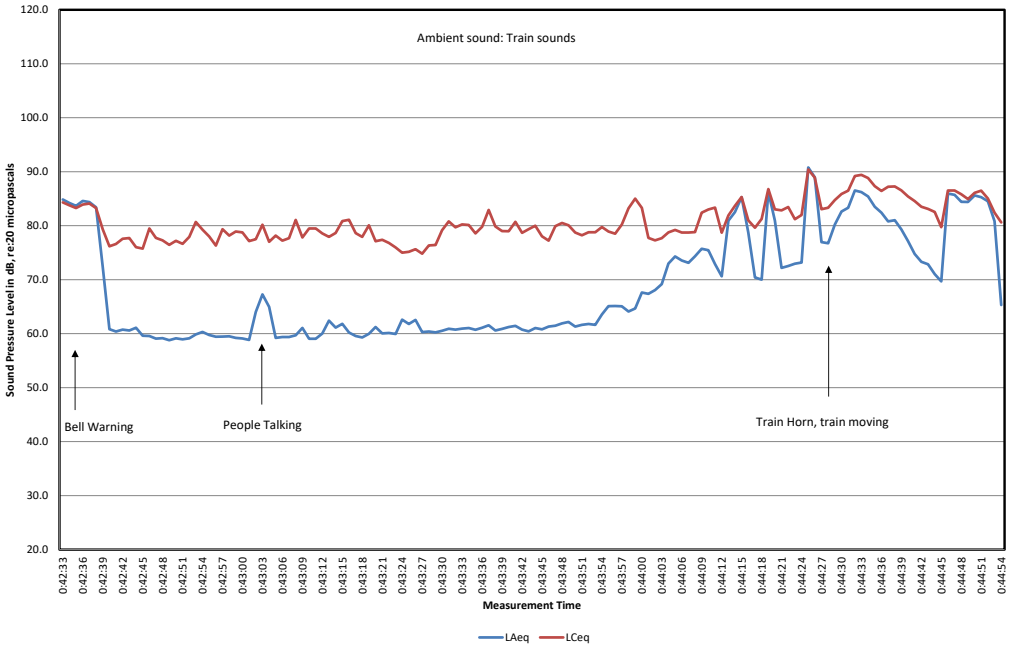

Fort Lauderdale Soundscape Study
The fountain outside Huizenga Park near Las Olas
LD2.31
Saturday - February 18, 2023
Ambient sound: Fountain noise and rooftop bar music
Sound Pressure Level in dB, re:20 micropascals
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
23:16:46
23:16:47
23:16:48
23:16:49
23:16:50
23:16:51
23:16:52
23:16:53
23:16:54
23:16:55
23:16:56
23:16:57
23:16:58
23:16:59
23:17:00
23:17:01
23:17:02
23:17:03
23:17:04
23:17:05
23:17:06
Measurement Time
LAFmax
LCFmax

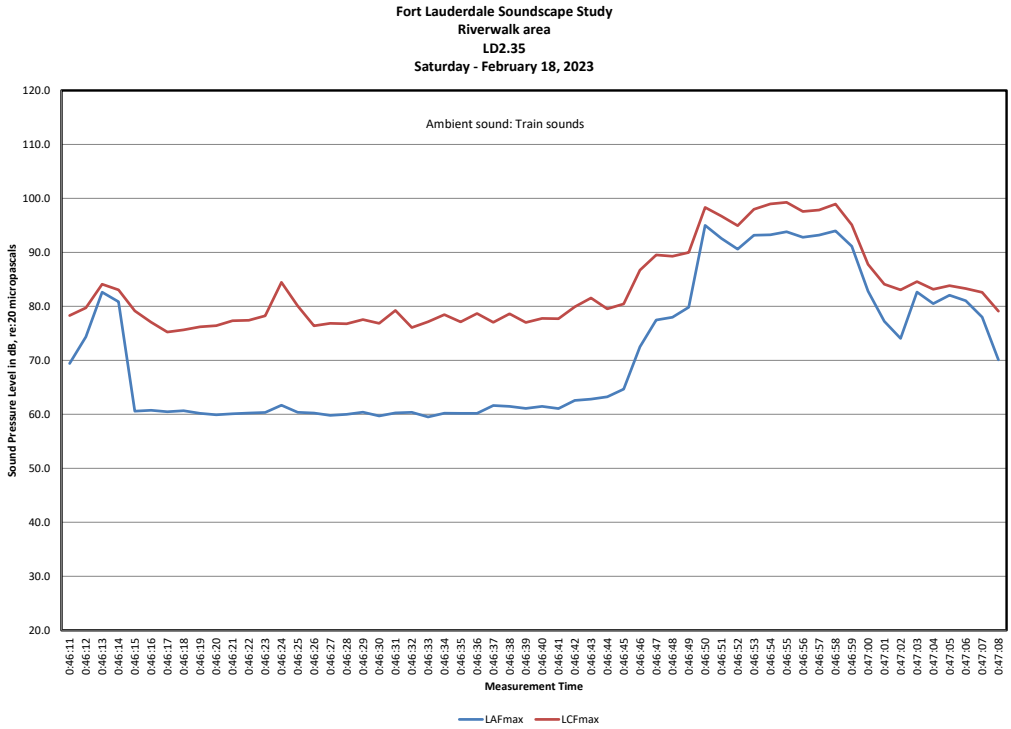

Fort Lauderdale Soundscape Study
Standing outside the Wharf
LD2.32
Saturday - February 18, 2023
Ambient sound: Music Noise
Sound Pressure Level in dB, re:20 micropascals
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
0:17:43
0:17:44
0:17:45
0:17:46
0:17:47
0:17:48
0:17:49
0:17:50
0:17:51
0:17:52
0:17:53
0:17:54
0:17:55
0:17:56
0:17:57
0:17:58
0:17:59
0:18:00
0:18:01
0:18:02
0:18:03
0:18:04
0:18:05
0:18:06
0:18:07
0:18:08
0:18:09
0:18:10
0:18:11
0:18:12
0:18:13
Measurement Time
LAFmax
LCFmax

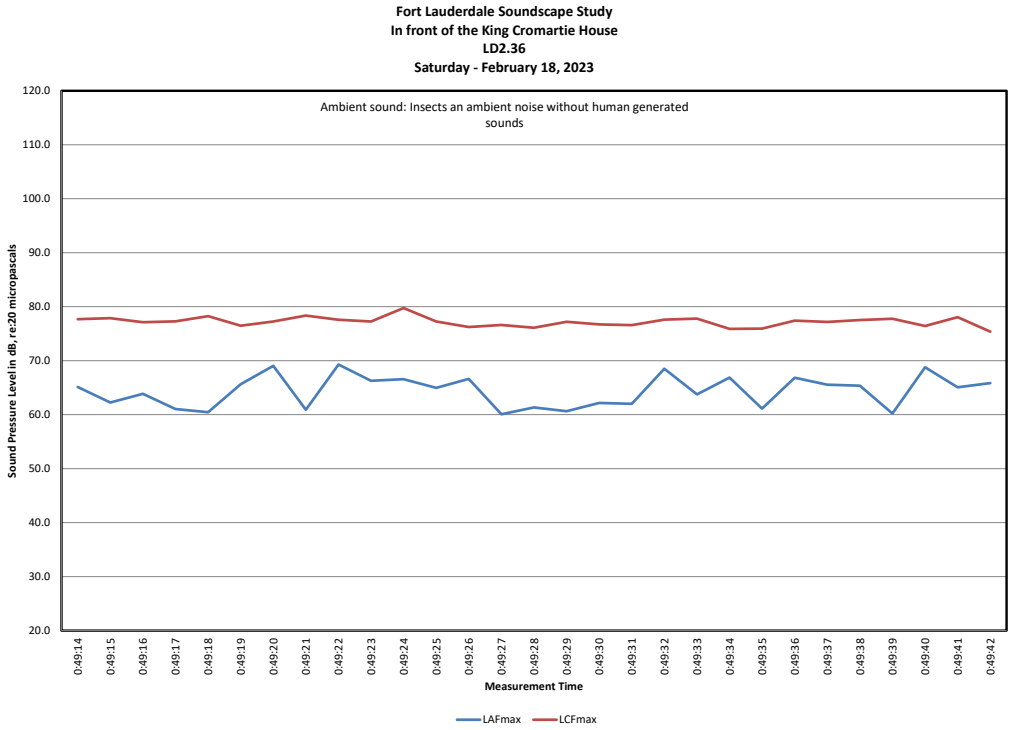
Fort Lauderdale Soundscape Study
On the top level (seventh floor) of the parking garage to the east of the Wharf on the second floor
LD2.33
Saturday - February 18, 2023



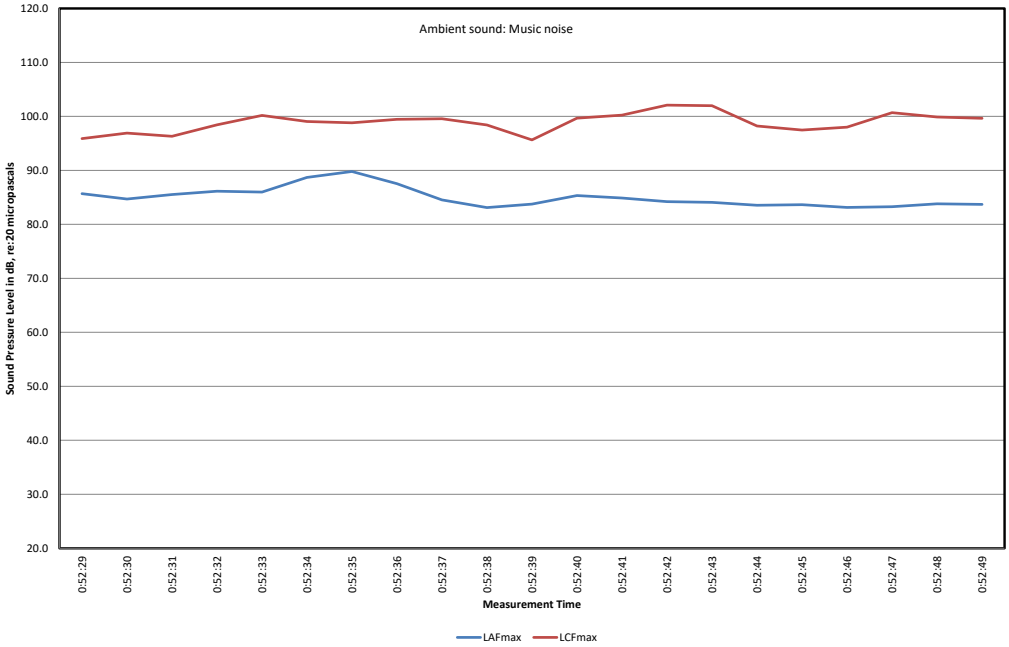
Fort Lauderdale Soundscape Study
Maintenance train moving down the track with horns and moving fairly slowly
LD2.34
Saturday - February 18, 2023



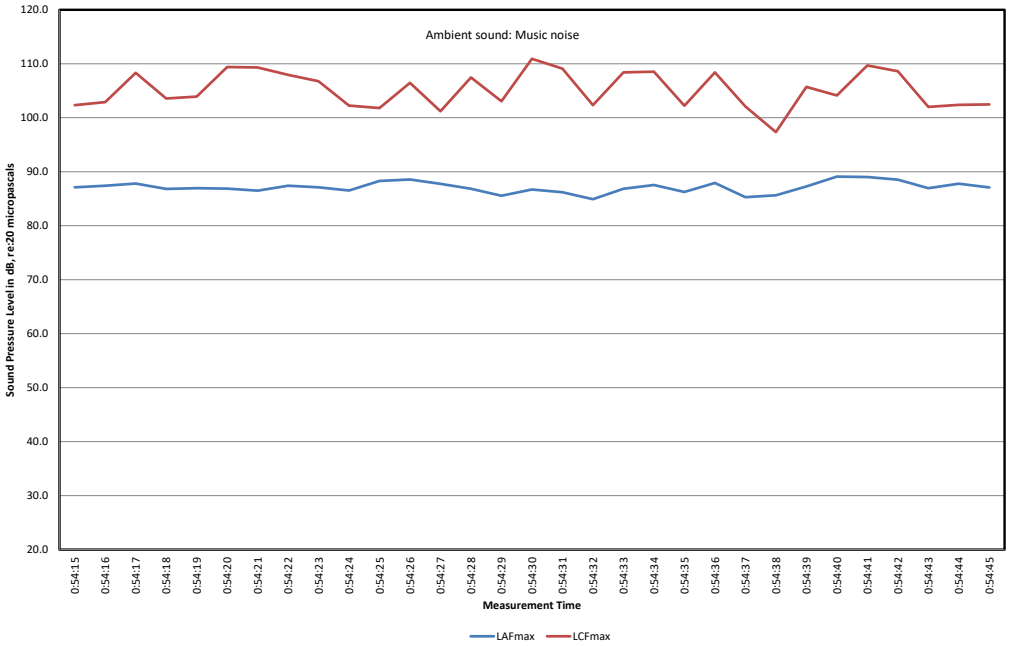

Fort Lauderdale Soundscape Study
Riverwalk area
LD2.35
Saturday - February 18, 2023
Ambient sound: Train sounds
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax


Fort Lauderdale Soundscape Study
In front of the King Cromartie House
LD2.36
Saturday - February 18, 2023
Ambient sound: Insects an ambient noise without human generated sounds
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

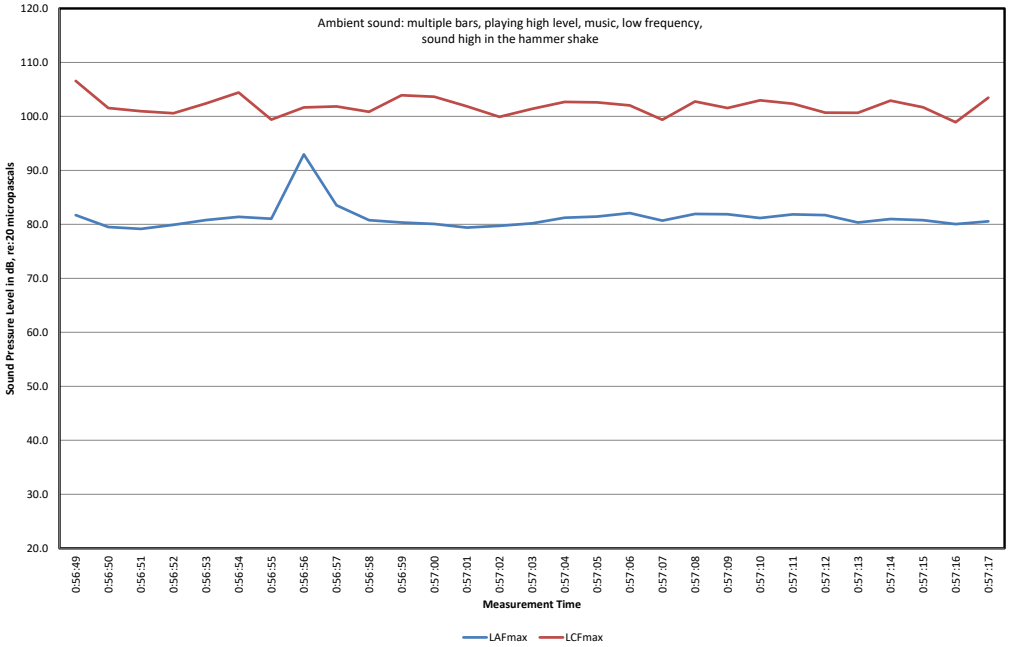
Fort Lauderdale Soundscape Study
In front of the clubs at the corner of Himmarshee district the first club on the corner
LD2.37
Sunday - February 19, 2023



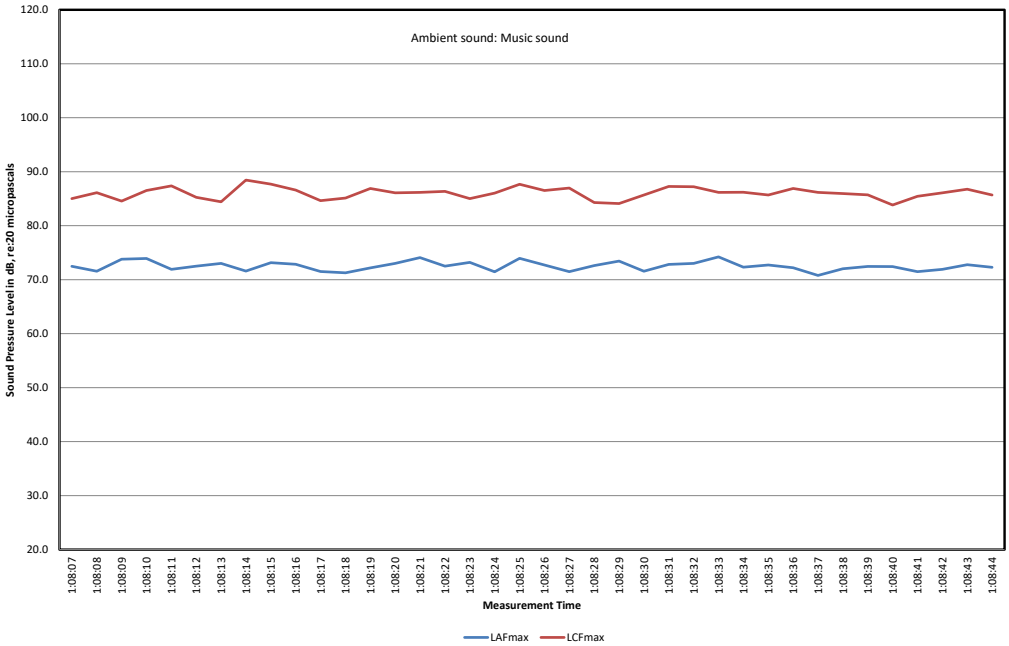
Fort Lauderdale Soundscape Study
In front of the Clovis in the Himmarshee district wide open outdoors
LD2.38
Sunday - February 19, 2023



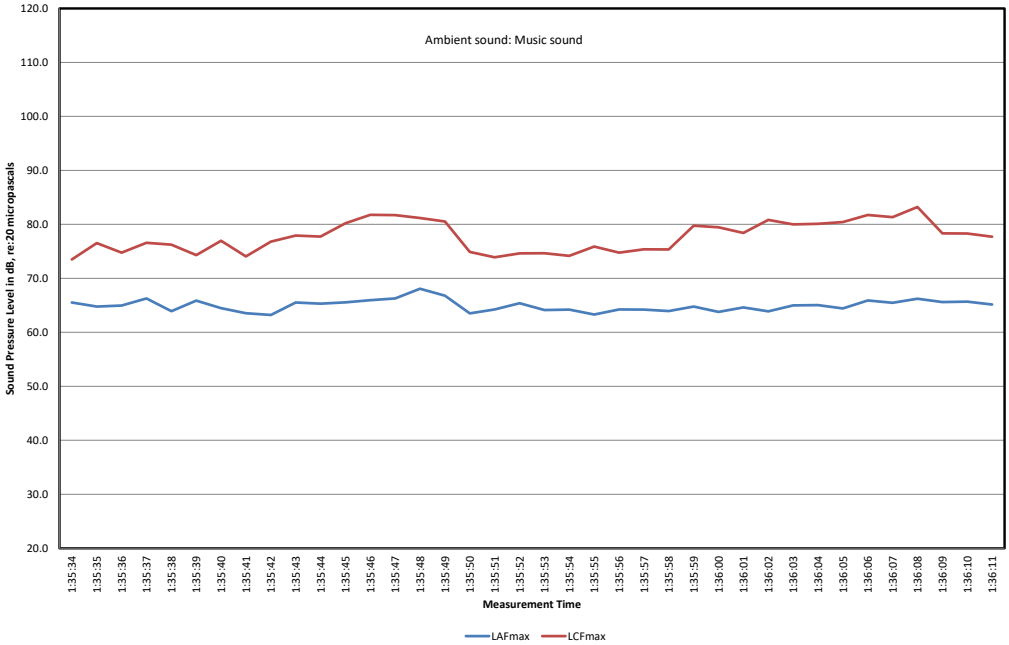
Fort Lauderdale Soundscape Study
Himmarshee District
LD2.39
Sunday - February 19, 2023



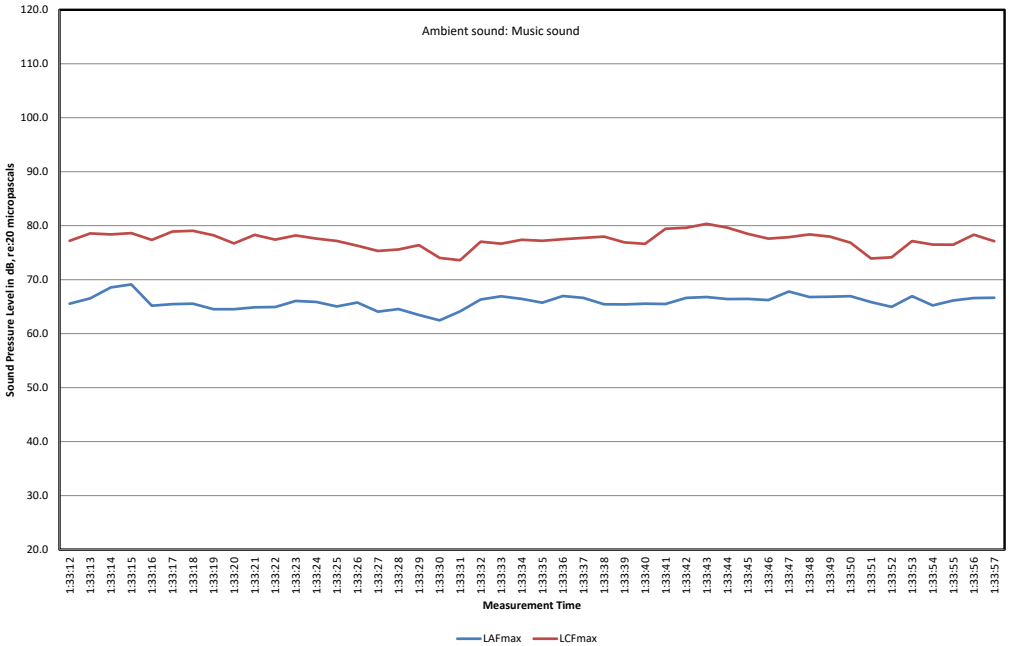
Fort Lauderdale Soundscape Study
On the roof of the garage looking out over the Himmarshee District
LD2.40
Sunday - February 19, 2023



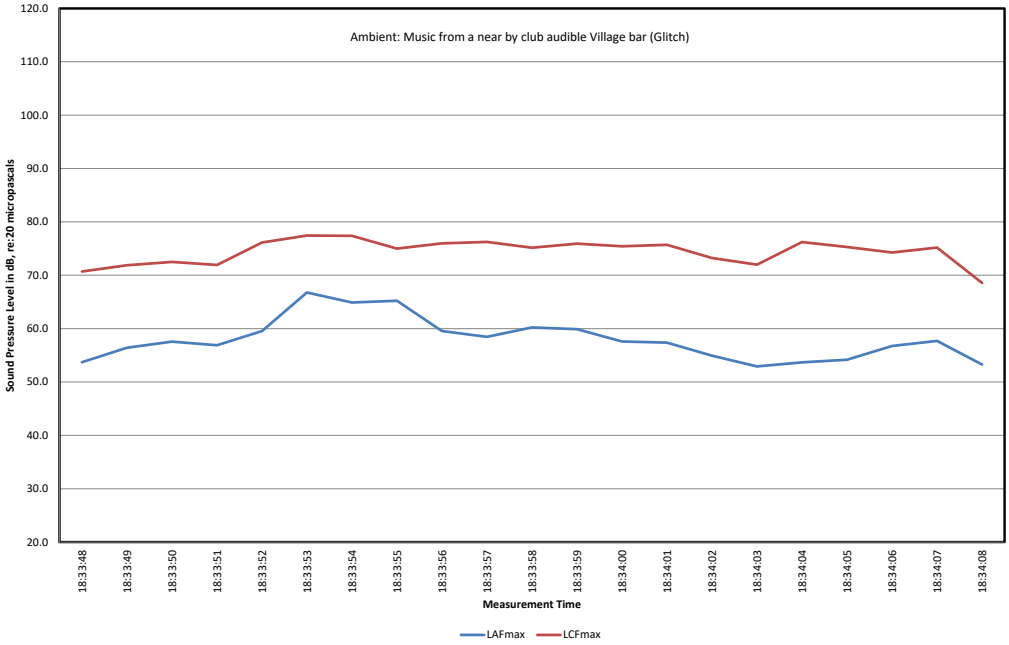
Fort Lauderdale Soundscape Study
On the parking deck at the gap between the parking garage across from Yolo at the bridge between two parking decks
LD2.42
Sunday - February 19, 2023



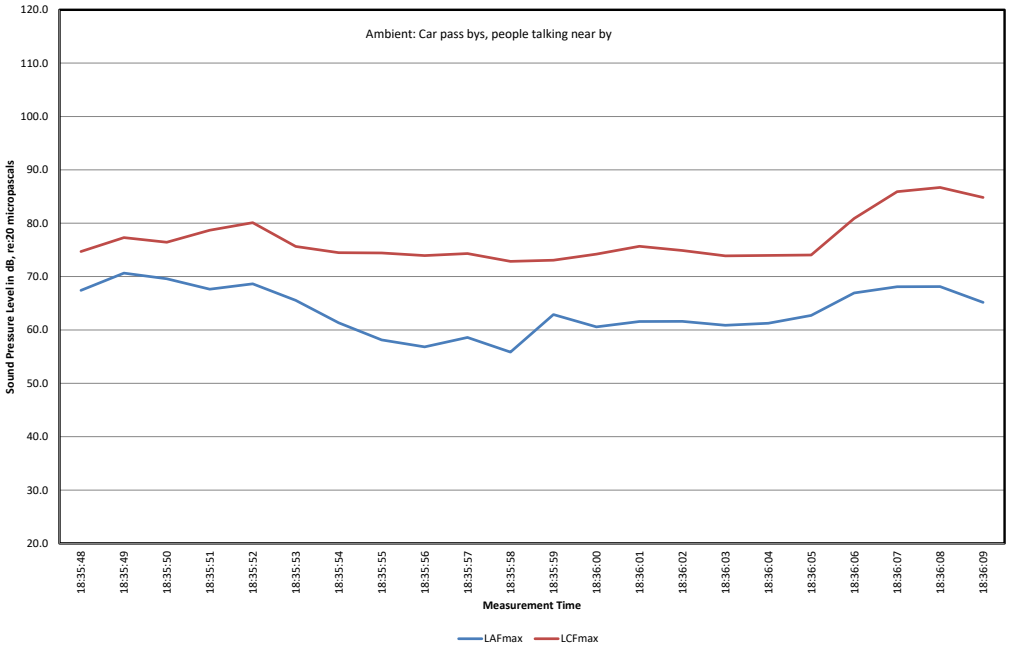
Fort Lauderdale Soundscape Study
Across the street from Yolo on top of the parking deck
LD2.41
Sunday - February 19, 2023

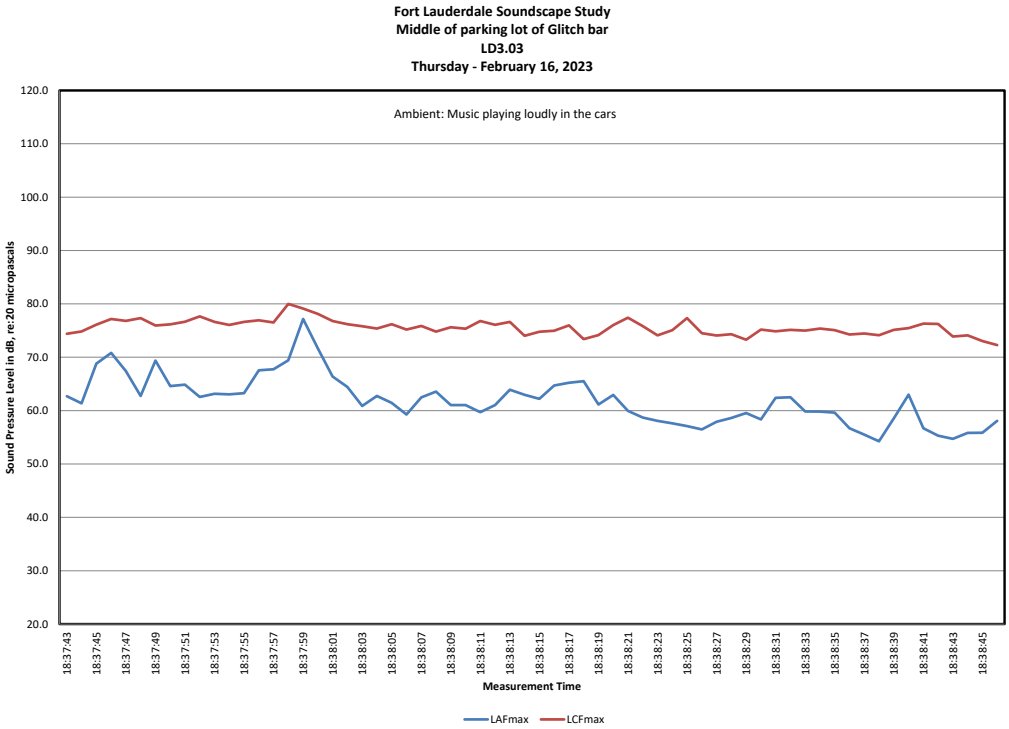


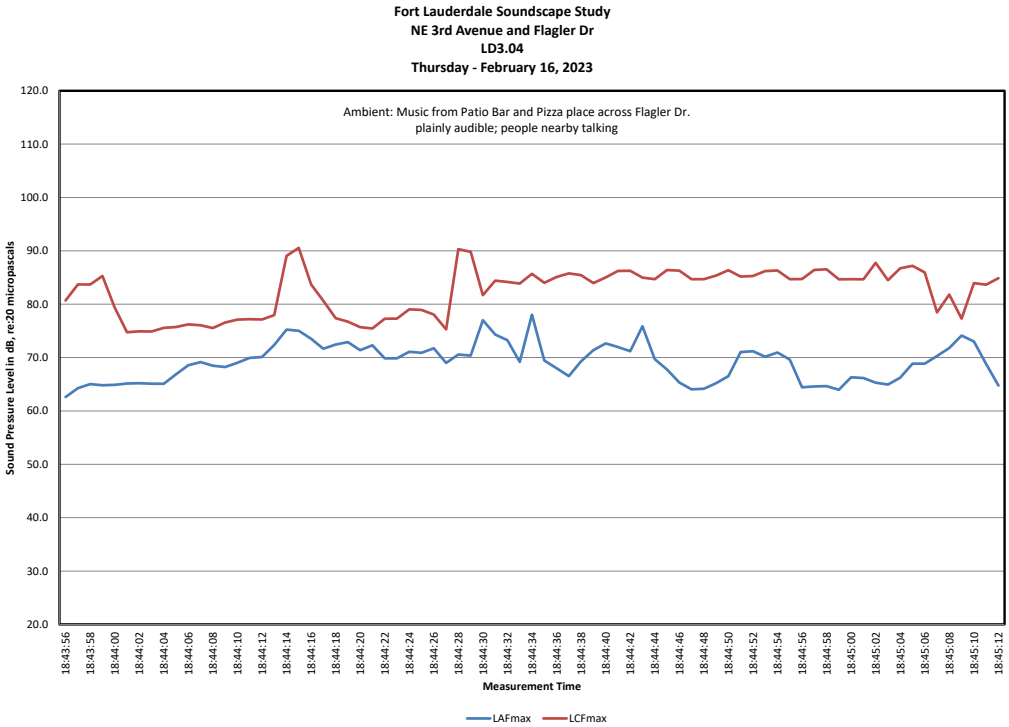
Fort Lauderdale Soundscape Study
Across the street from the Hub (828 NE Fourth Ave)
LD3.01
Thursday - February 16, 2023

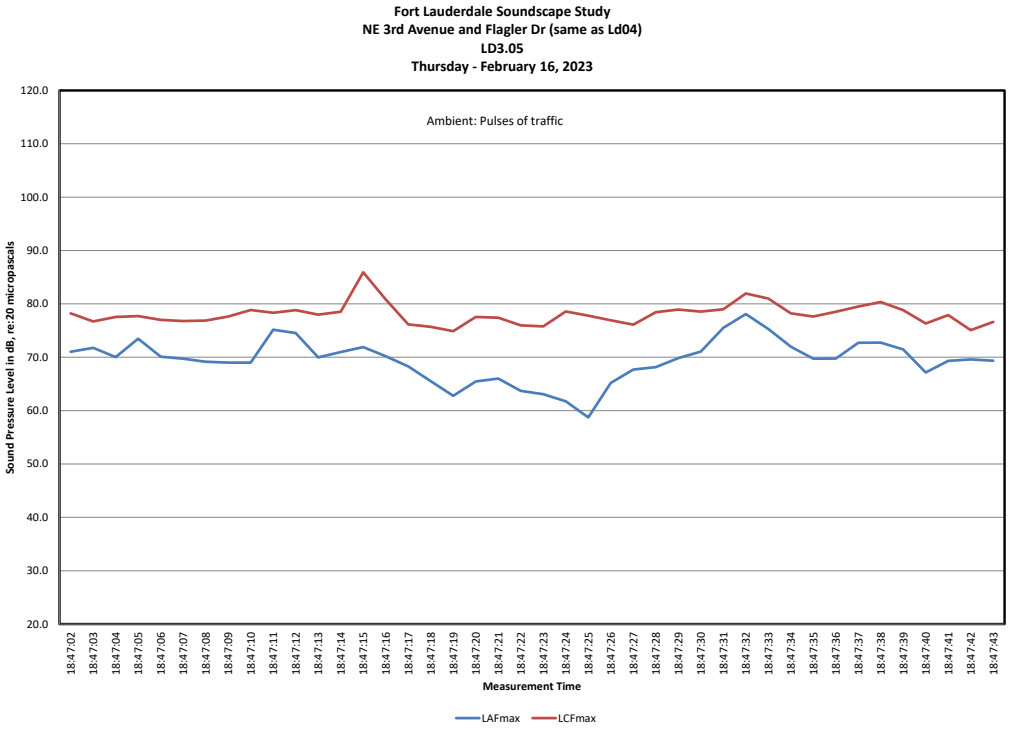


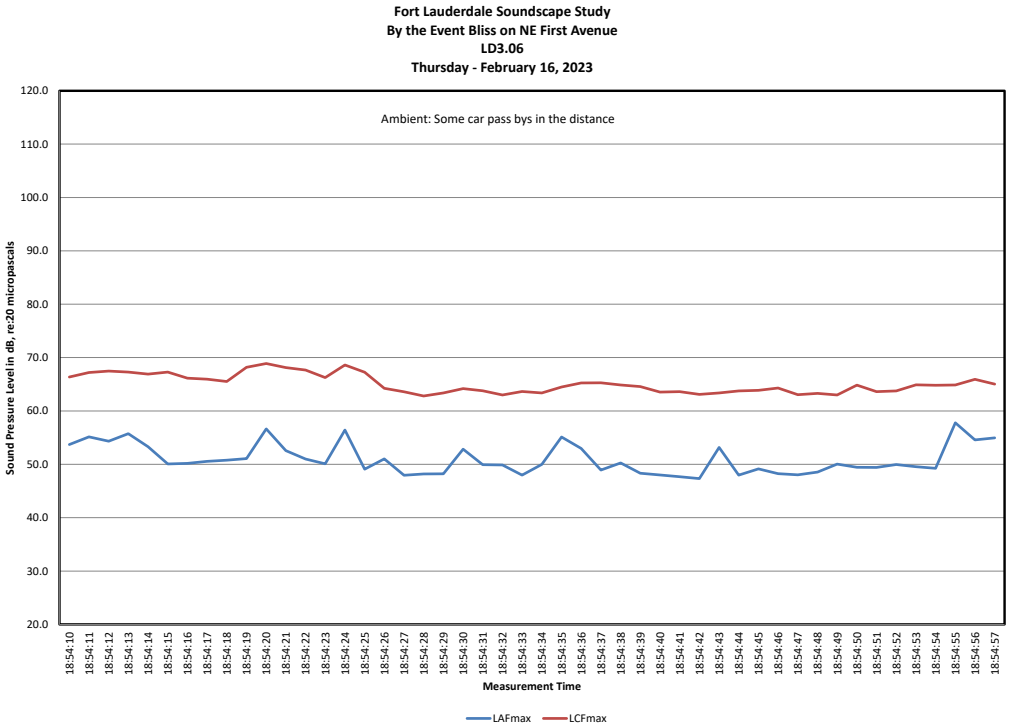
Fort Lauderdale Soundscape Study
Corner of parking lot in front of rail line with sight line to the Glitch
LD3.02
Thursday - February 16, 2023

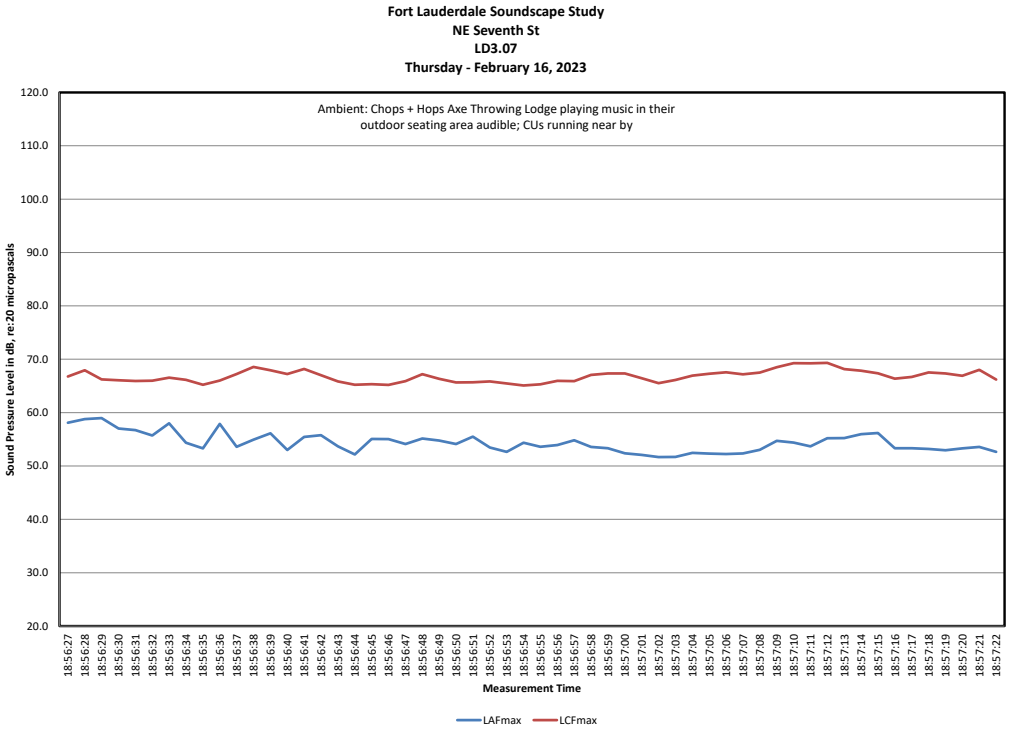


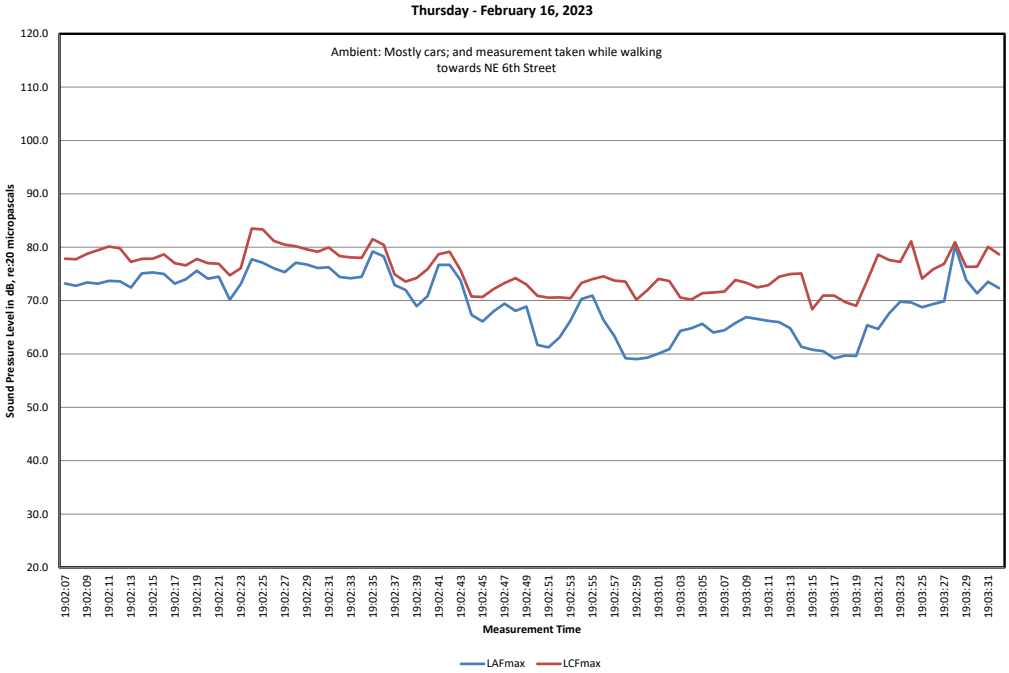

Fort Lauderdale Soundscape Study
Middle of parking lot of Glitch bar
LD3.03
Thursday - February 16, 2023
Ambient: Music playing loudly in the cars
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax


Fort Lauderdale Soundscape Study
NE 3rd Avenue and Flagler Dr
LD3.04
Thursday - February 16, 2023
Ambient: Music from Patio Bar and Pizza place across Flagler Dr.
plainly audible; people nearby talking
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

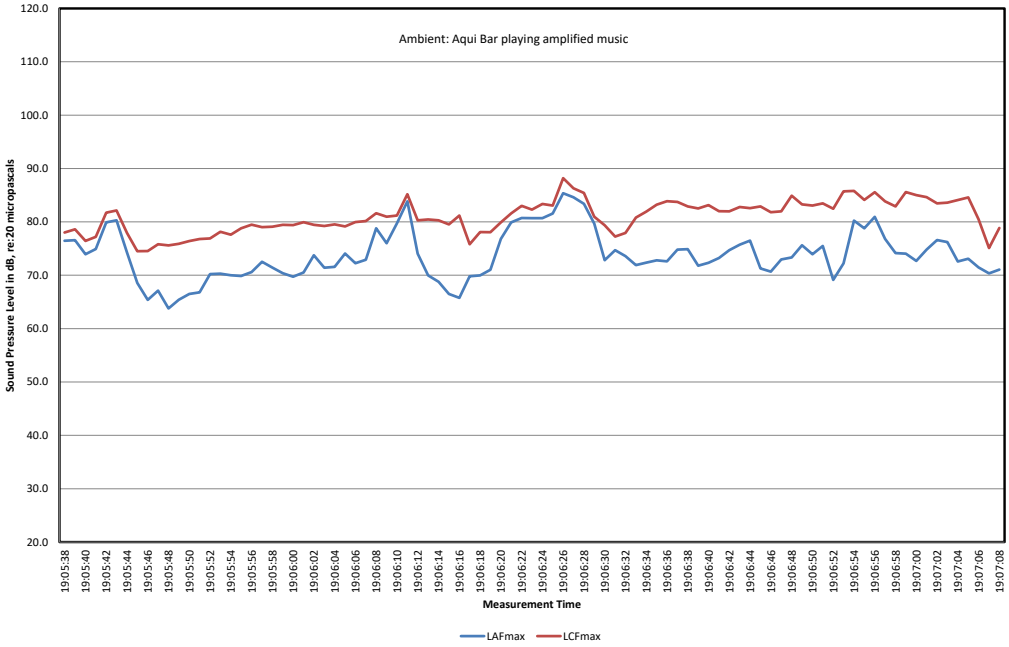

Fort Lauderdale Soundscape Study
NE 3rd Avenue and Flagler Dr (same as Ld04)
LD3.05
Thursday - February 16, 2023
Ambient: Pulses of traffic
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax


Fort Lauderdale Soundscape Study
By the Event Bliss on NE First Avenue
LD3.06
Thursday - February 16, 2023
Ambient: Some car pass bys in the distance
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

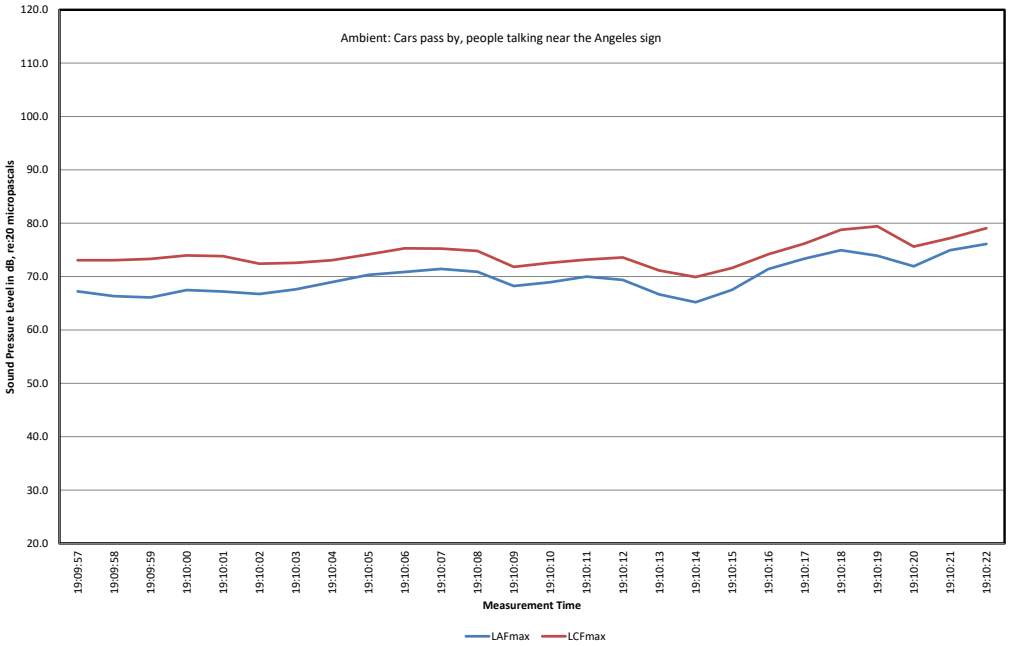

Fort Lauderdale Soundscape Study
NE Seventh St
LD3.07
Thursday - February 16, 2023
Ambient: Chops + Hops Axe Throwing Lodge playing music in their outdoor seating area audible; CUs running near by
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

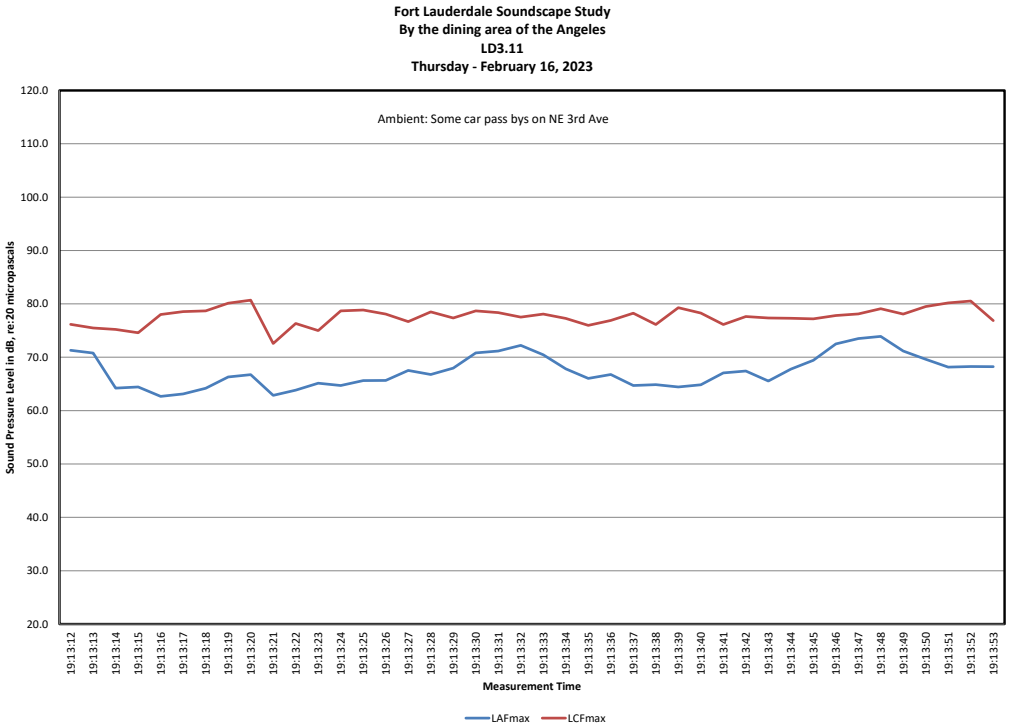

Fort Lauderdale Soundscape Study
Along NE 3rd Avenue from NW 7th Street to NE 6th Street
LD3.08
Thursday - February 16, 2023
Ambient: Mostly cars; and measurement taken while walking towards NE 6th Street
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

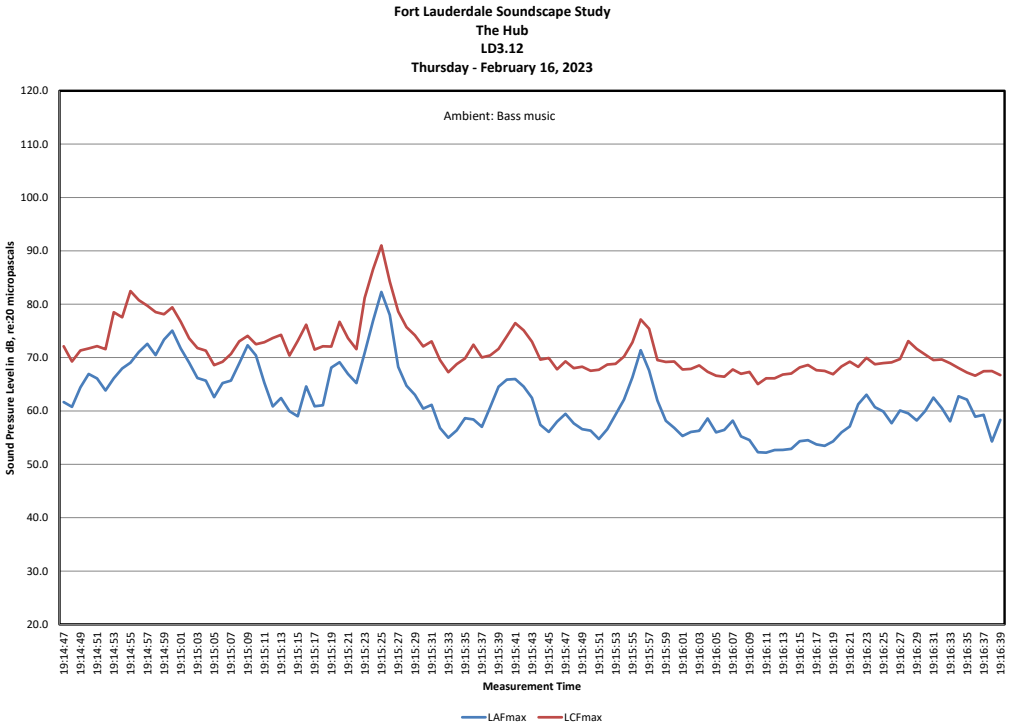
Fort Lauderdale Soundscape Study
From Circle T food store which was across the street
LD3.09
Thursday - February 16, 2023

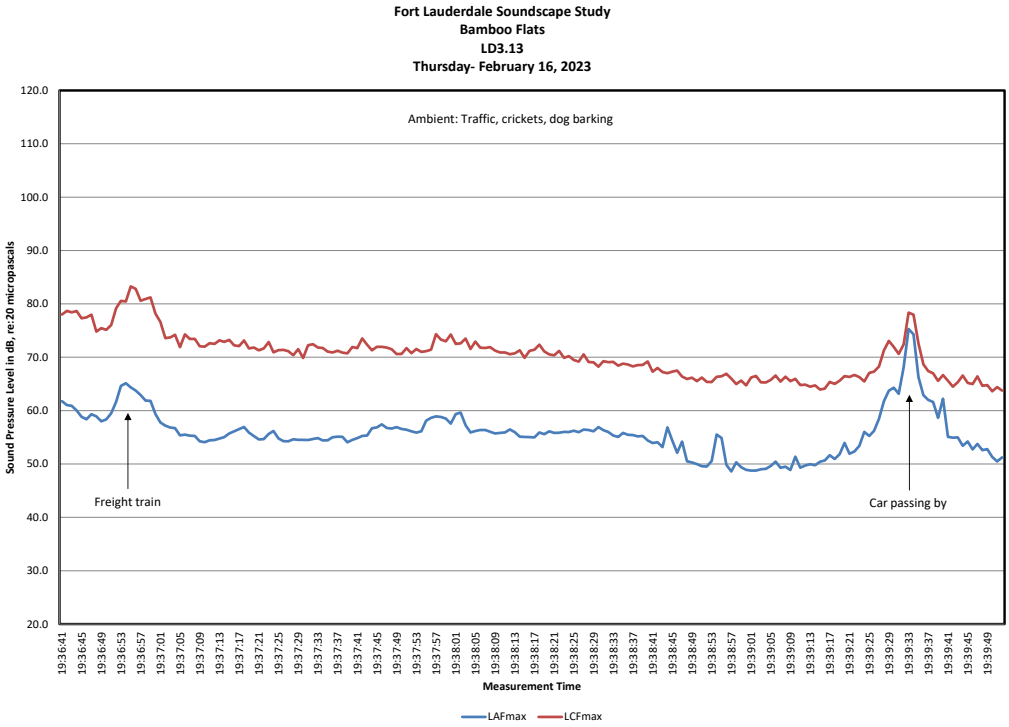


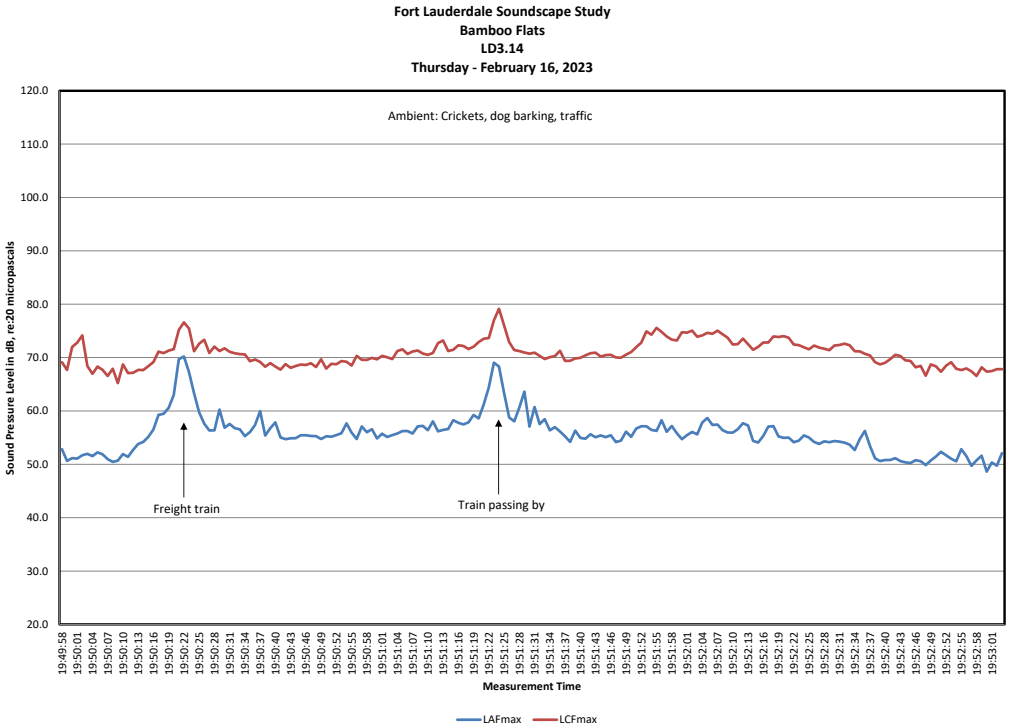
Fort Lauderdale Soundscape Study
Along NE 3rd Avenue from NE 5th Street to Holly Blue Restaurant
LD3.10
Thursday - February 16, 2023

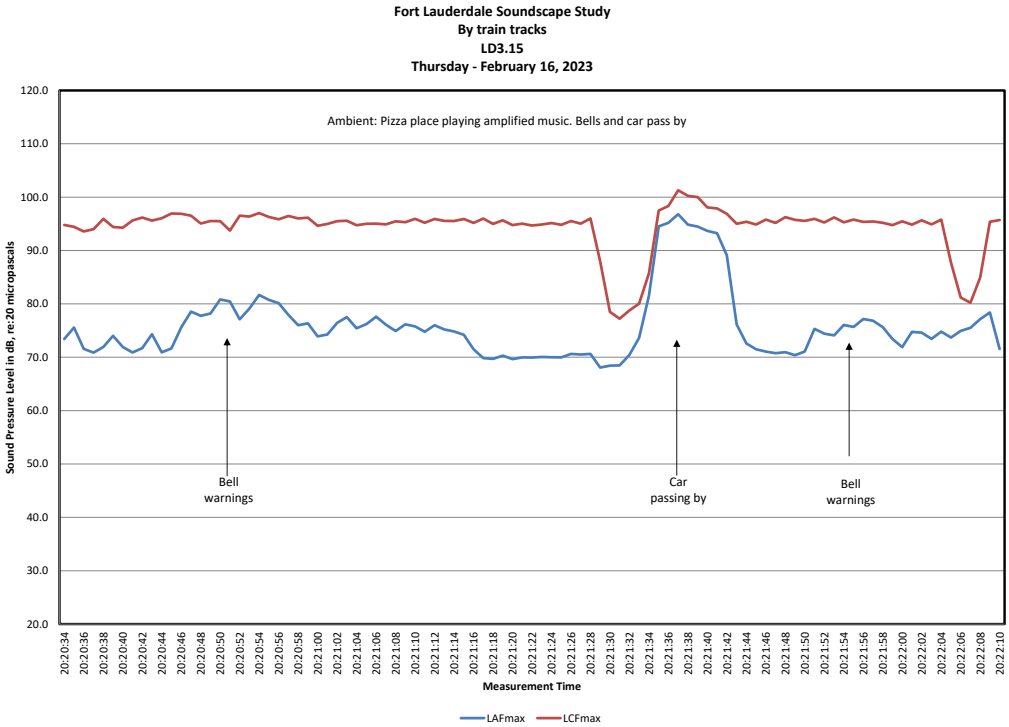


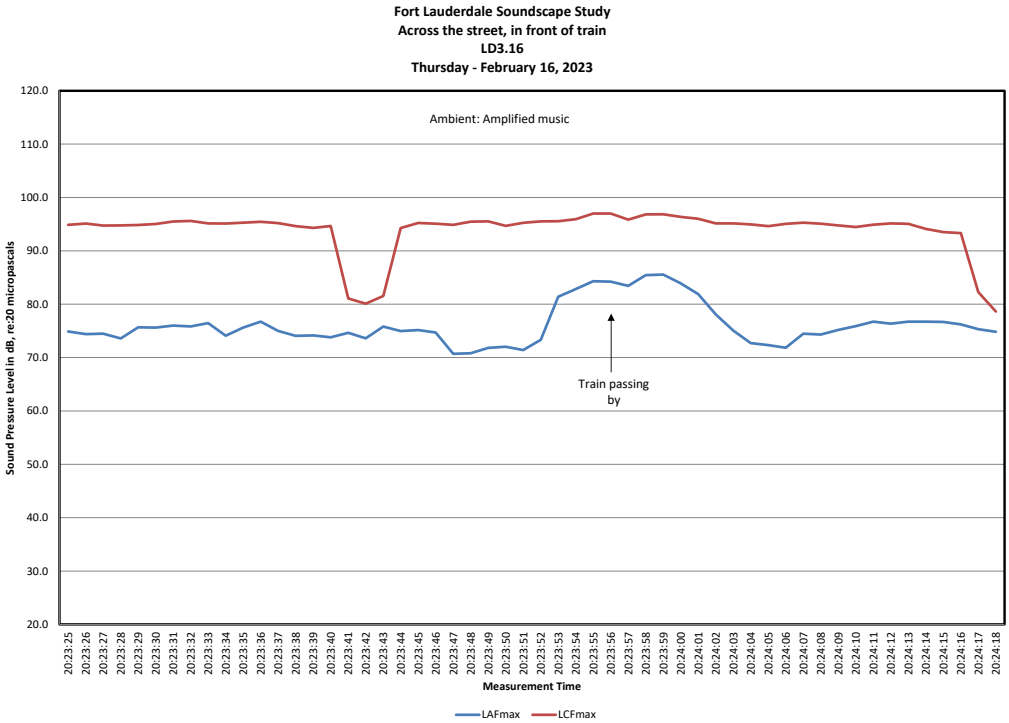

Fort Lauderdale Soundscape Study
By the dining area of the Angeles
LD3.11
Thursday - February 16, 2023
Ambient: Some car pass bys on NE 3rd Ave
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

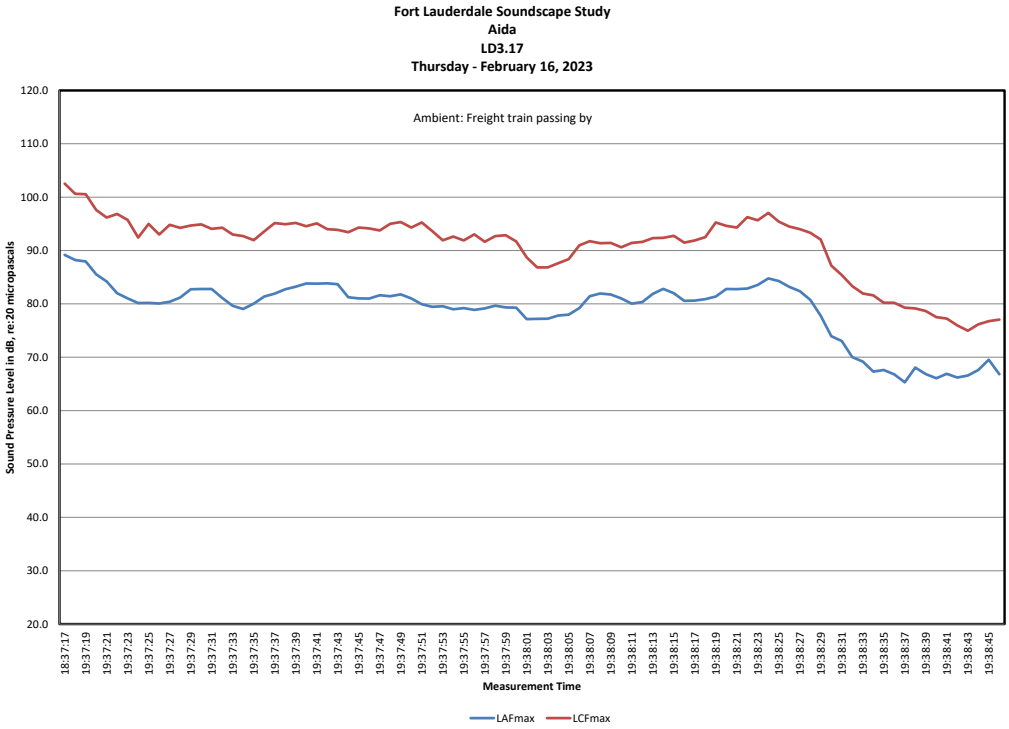

Fort Lauderdale Soundscape Study
The Hub
LD3.12
Thursday - February 16, 2023
Ambient: Bass music
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

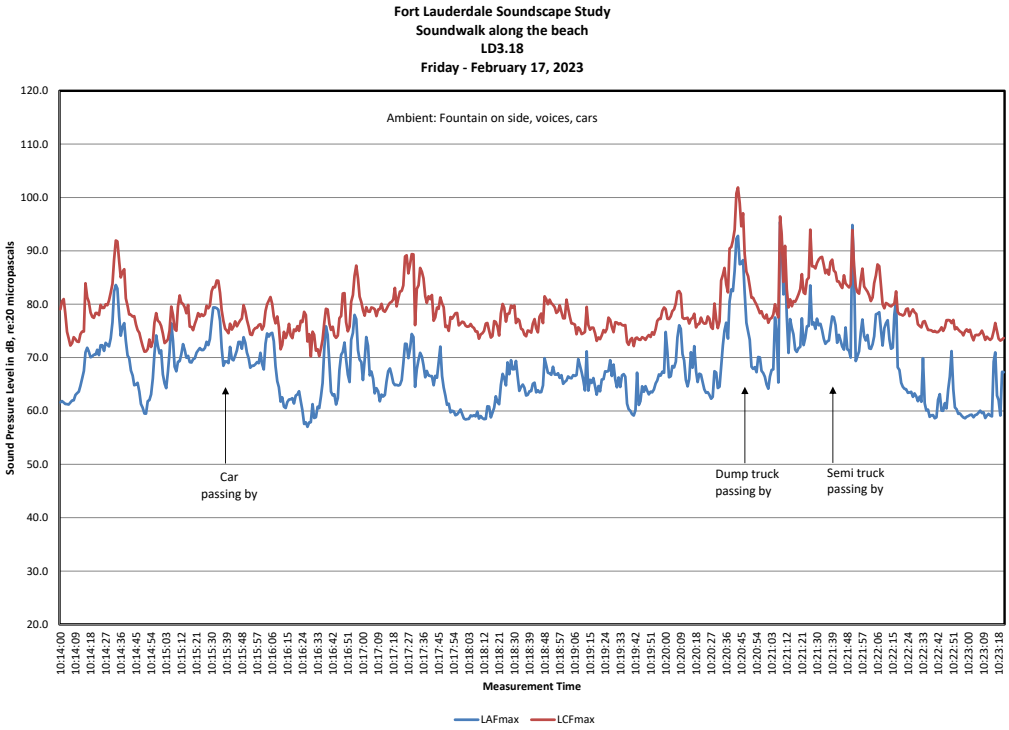

Fort Lauderdale Soundscape Study
Bamboo Flats
LD3.13
Thursday- February 16, 2023
Ambient: Traffic, crickets, dog barking
Sound Pressure Level in dB, re:20 micropascals
Freight train
Car passing by
Measurement Time
LAFmax
LCFmax


Fort Lauderdale Soundscape Study
Bamboo Flats
LD3.14
Thursday - February 16, 2023
Ambient: Crickets, dog barking, traffic
Sound Pressure Level in dB, re:20 micropascals
Freight train
Train passing by
Measurement Time
LAFmax
LCFmax

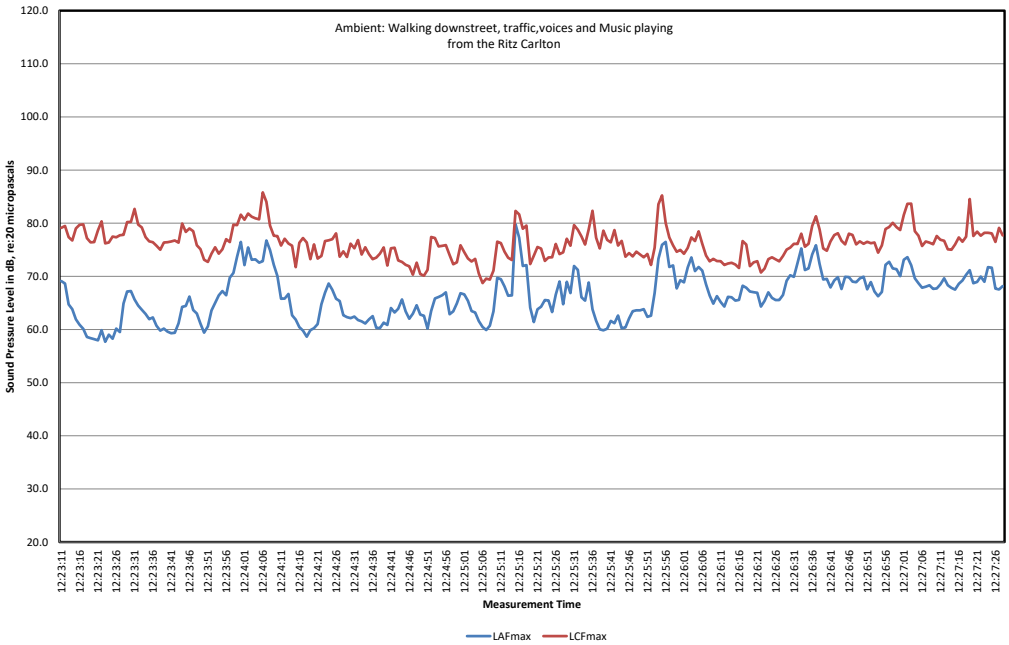

Fort Lauderdale Soundscape Study
By train tracks
LD3.15
Thursday - February 16, 2023
Ambient: Pizza place playing amplified music. Bells and car pass by
Sound Pressure Level in dB, re:20 micropascals
Bell warnings
Car passing by
Bell warnings
Measurement Time
LAFmax
LCFmax


Fort Lauderdale Soundscape Study
Across the street, in front of train
LD3.16
Thursday - February 16, 2023
Ambient: Amplified music
Sound Pressure Level in dB, re:20 micropascals
Train passing by
Measurement Time
LAFmax
LCFmax

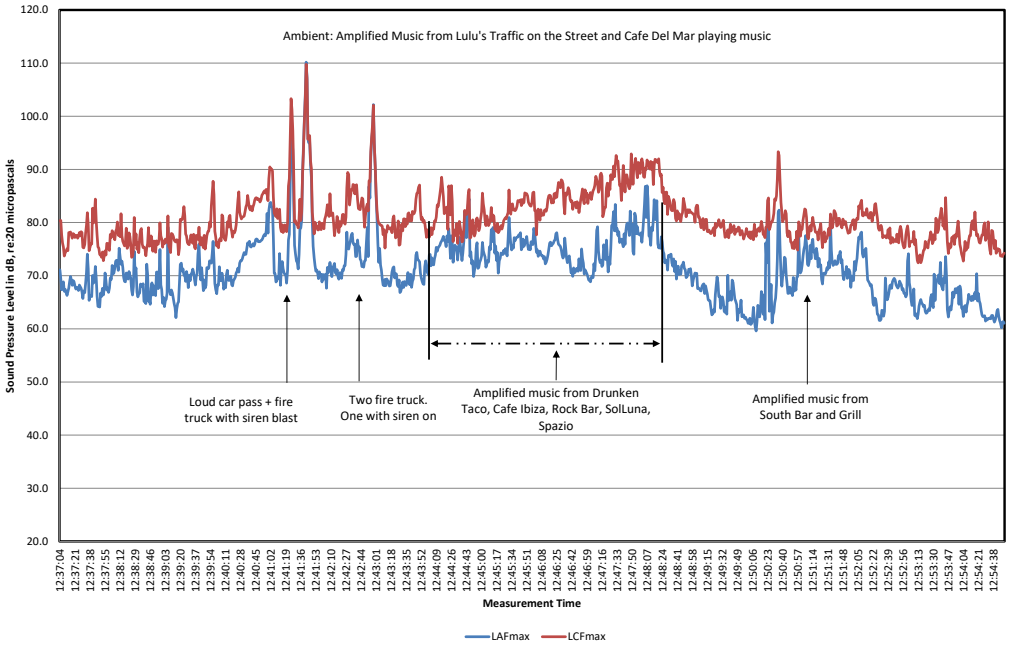

Fort Lauderdale Soundscape Study
Aida
LD3.17
Thursday - February 16, 2023
Ambient: Freight train passing by
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

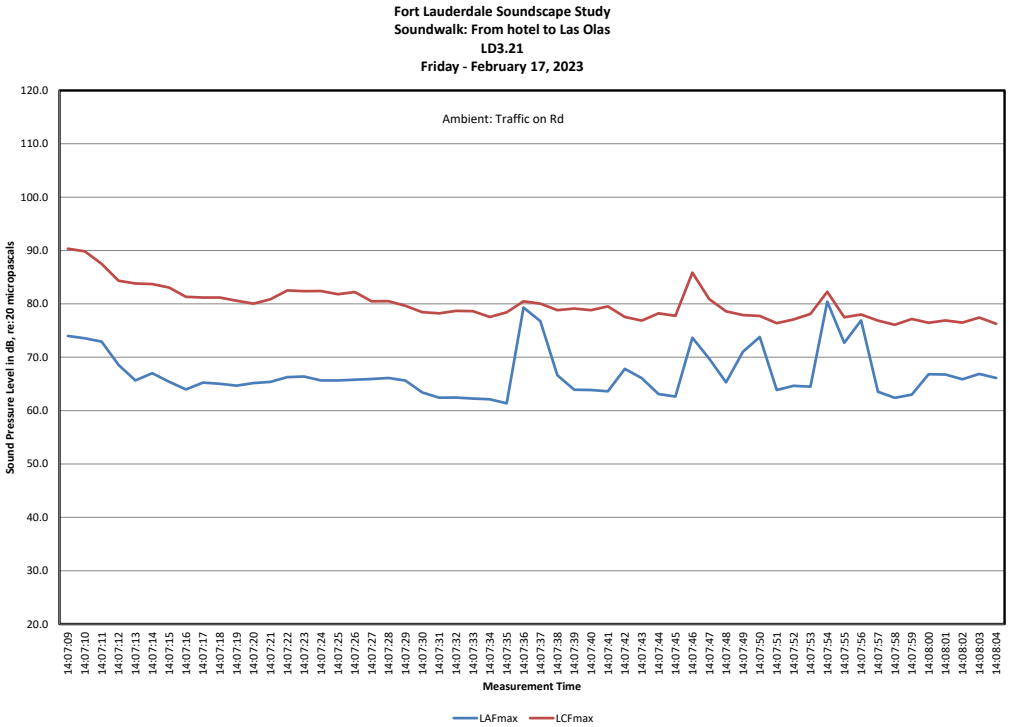

Fort Lauderdale Soundscape Study
Soundwalk along the beach
LD3.18
Friday - February 17, 2023
Ambient: Fountain on side, voices, cars
Car passing by
Dump truck passing by
Semi truck passing by
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

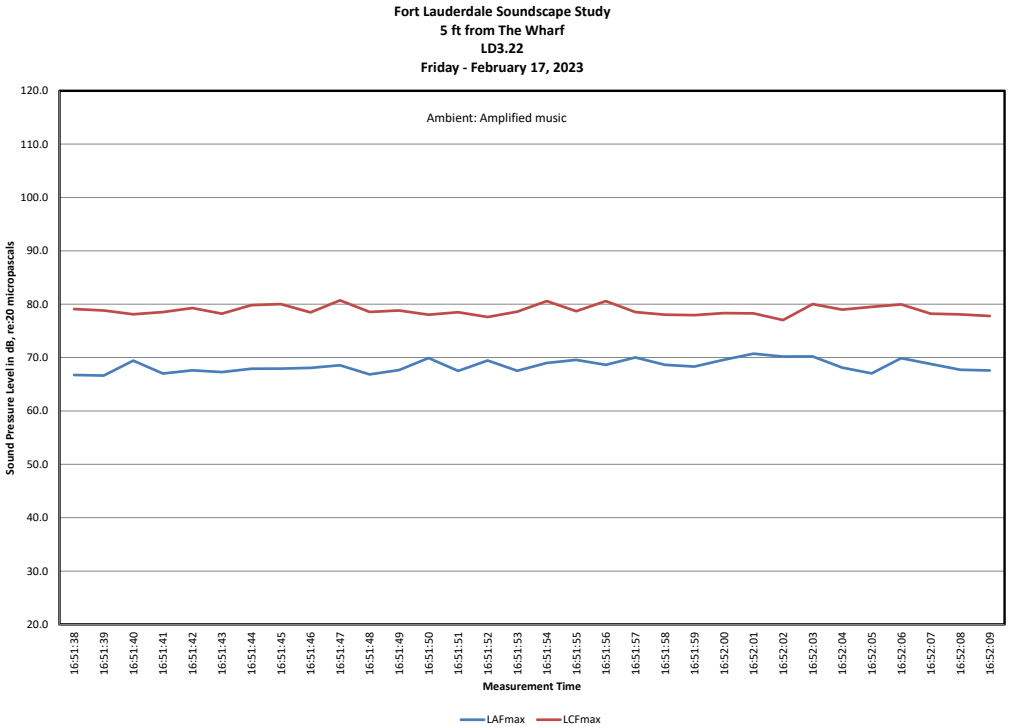
Fort Lauderdale Soundscape Study
Beach Soundwalk Start at Svantek 205 and end at CVS
LD3.19
Friday - February 17, 2023

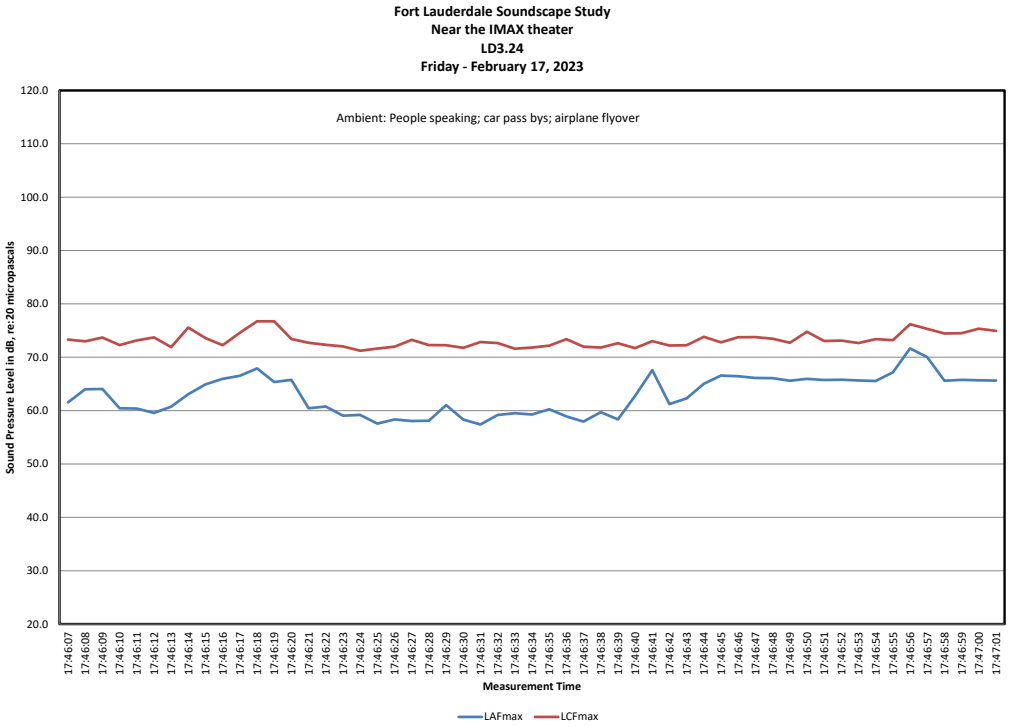


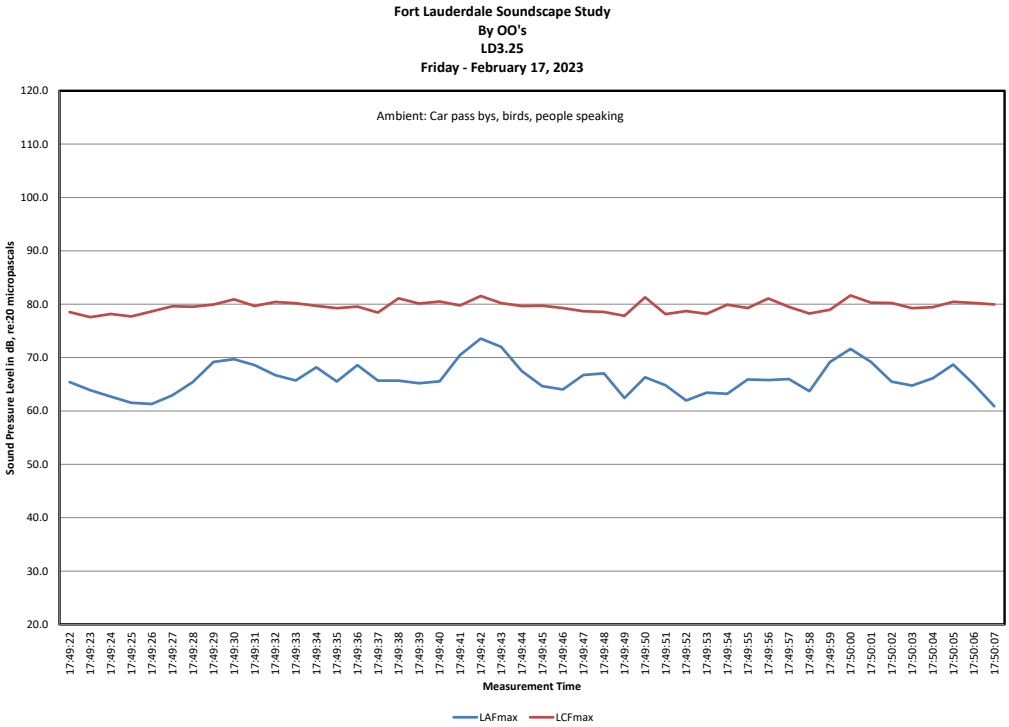
Fort Lauderdale Soundscape Study
Soundwalk: Beach Soundwalk Start at CVS to Cafe Del Mar
LD3.20
Friday - February 17, 2023

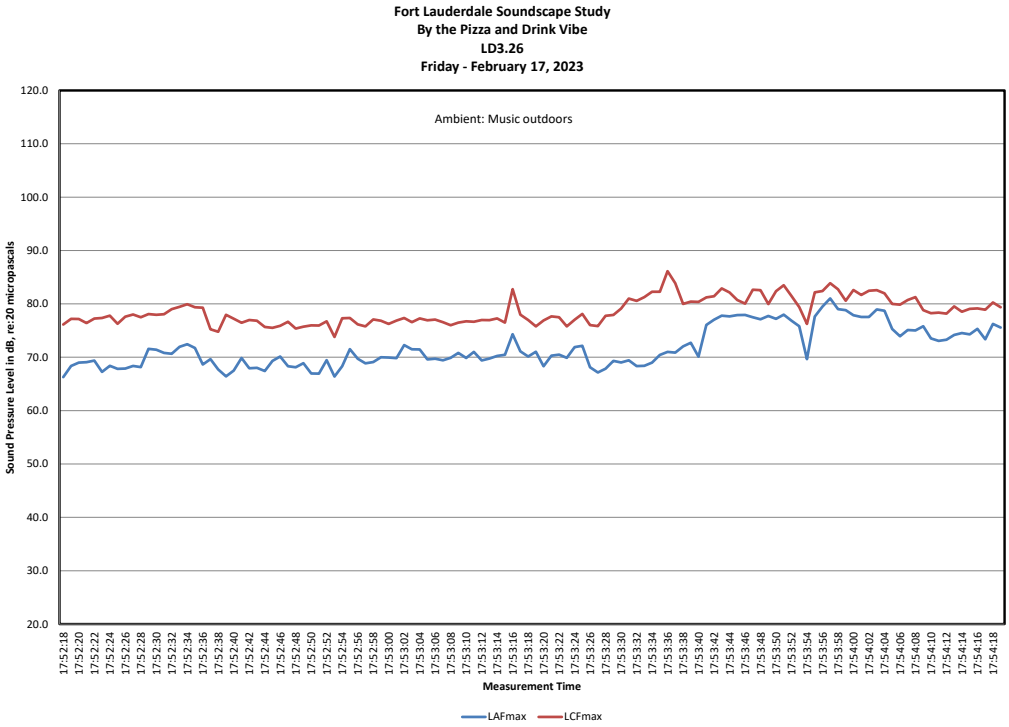


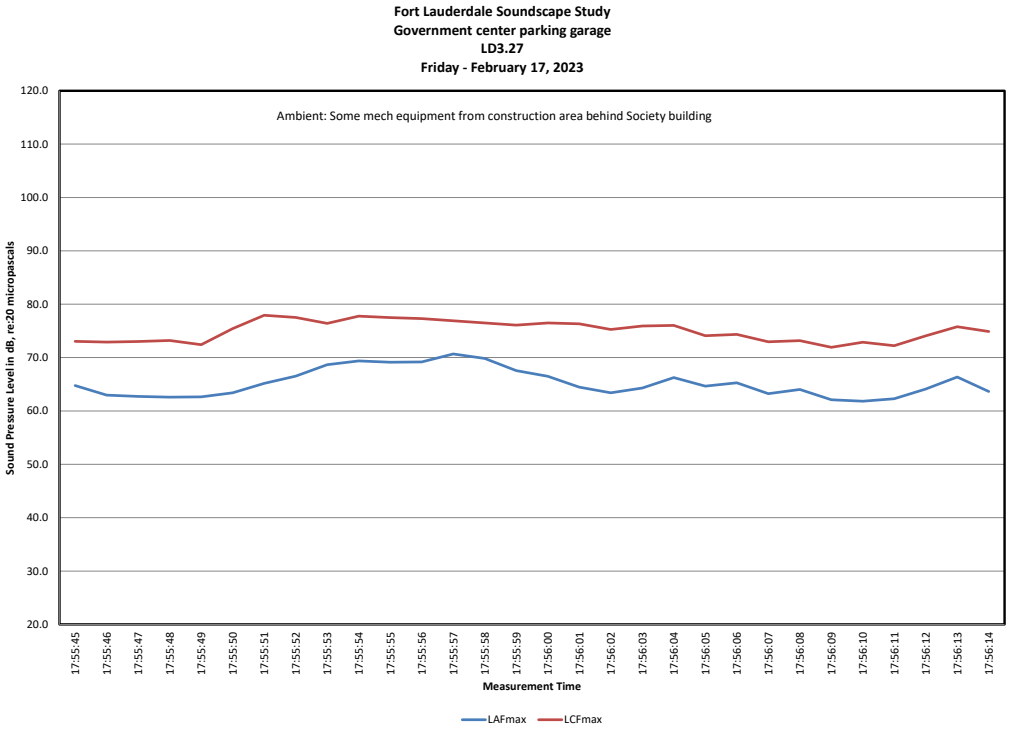

Fort Lauderdale Soundscape Study
Soundwalk: From hotel to Las Olas
LD3.21
Friday - February 17, 2023
Ambient: Traffic on Rd
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

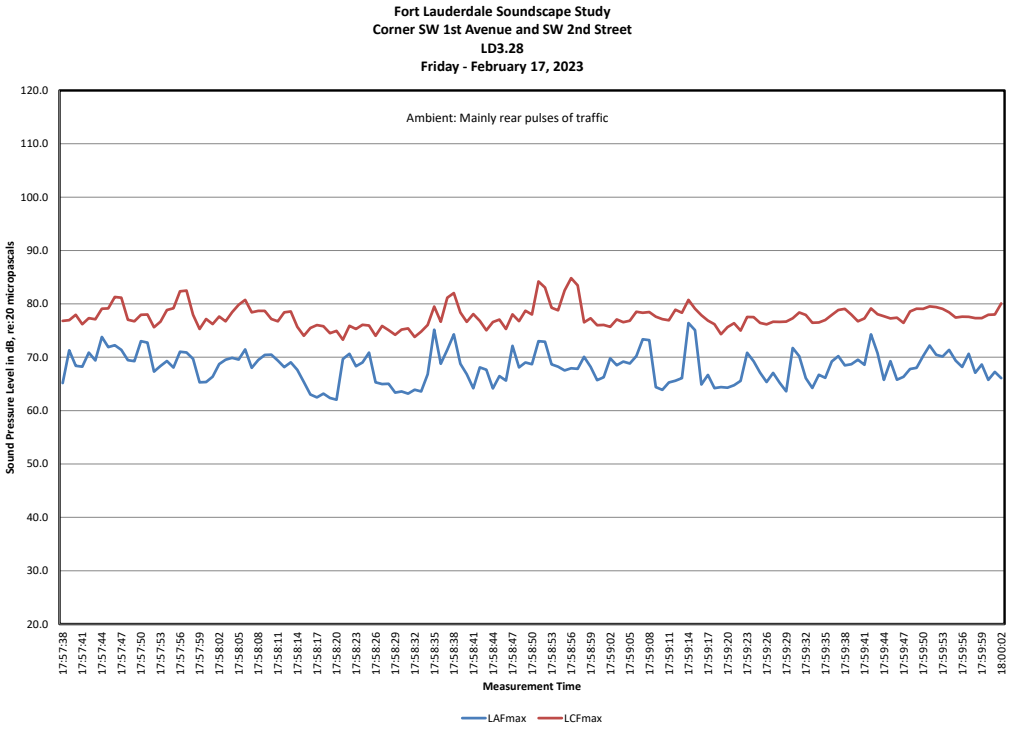

Fort Lauderdale Soundscape Study
5 ft from The Wharf
LD3.22
Friday - February 17, 2023
Ambient: Amplified music
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

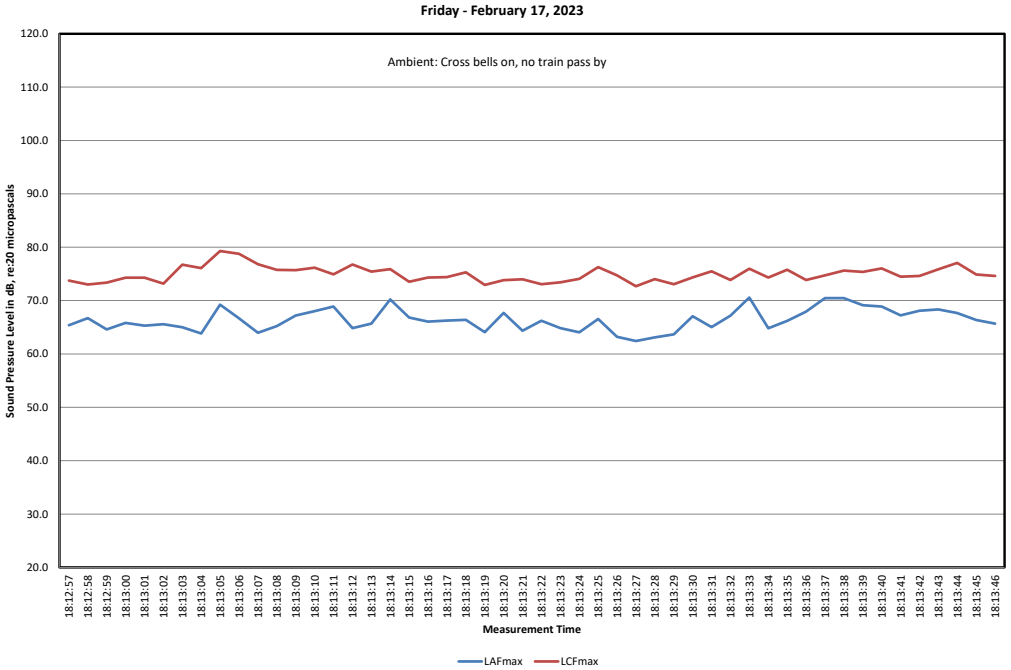

Fort Lauderdale Soundscape Study
Near the IMAX theater
LD3.24
Friday - February 17, 2023
Ambient: People speaking; car pass bys; airplane flyover
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

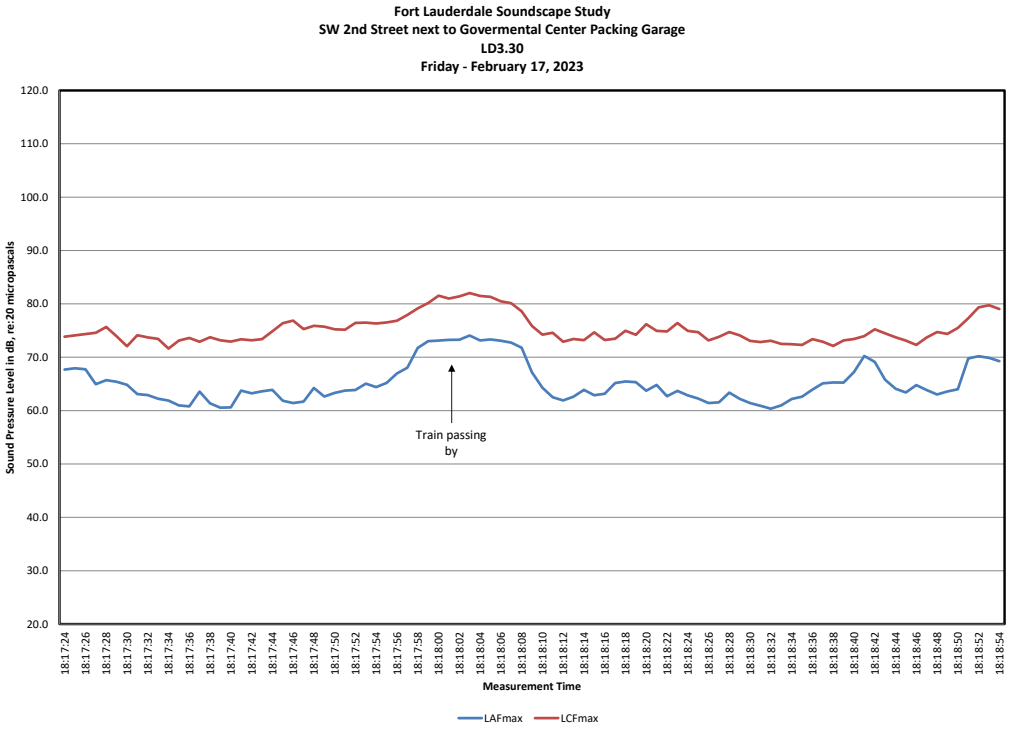

Fort Lauderdale Soundscape Study
By OO's
LD3.25
Friday - February 17, 2023
Ambient: Car pass bys, birds, people speaking
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

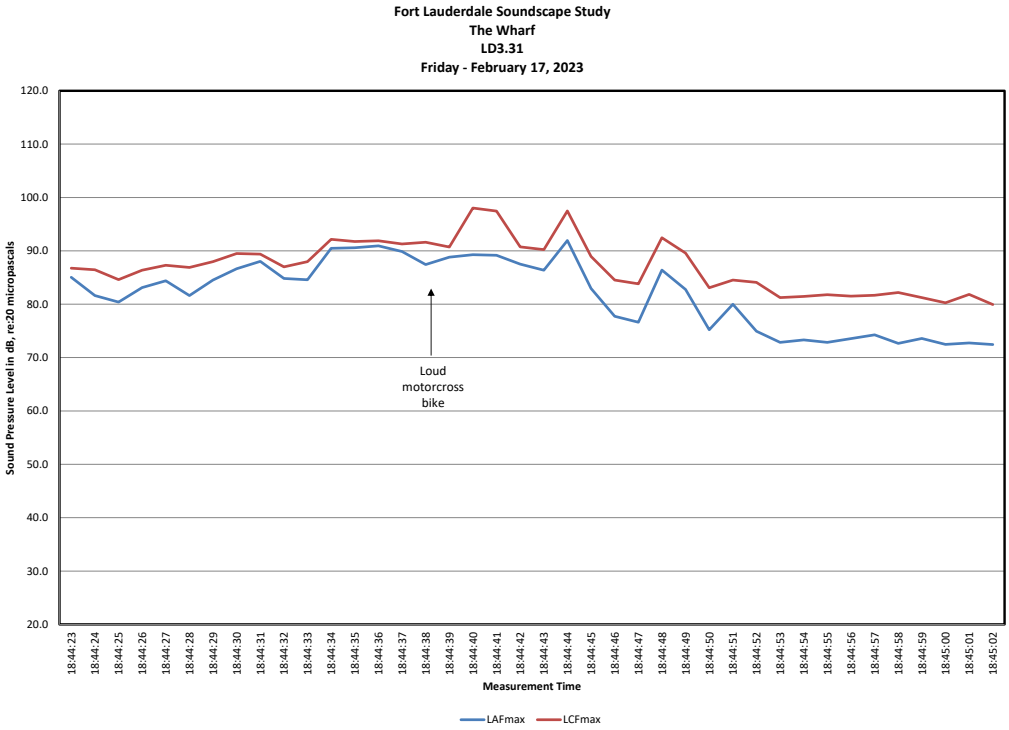

Fort Lauderdale Soundscape Study
By the Pizza and Drink Vibe
LD3.26
Friday - February 17, 2023
Ambient: Music outdoors
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

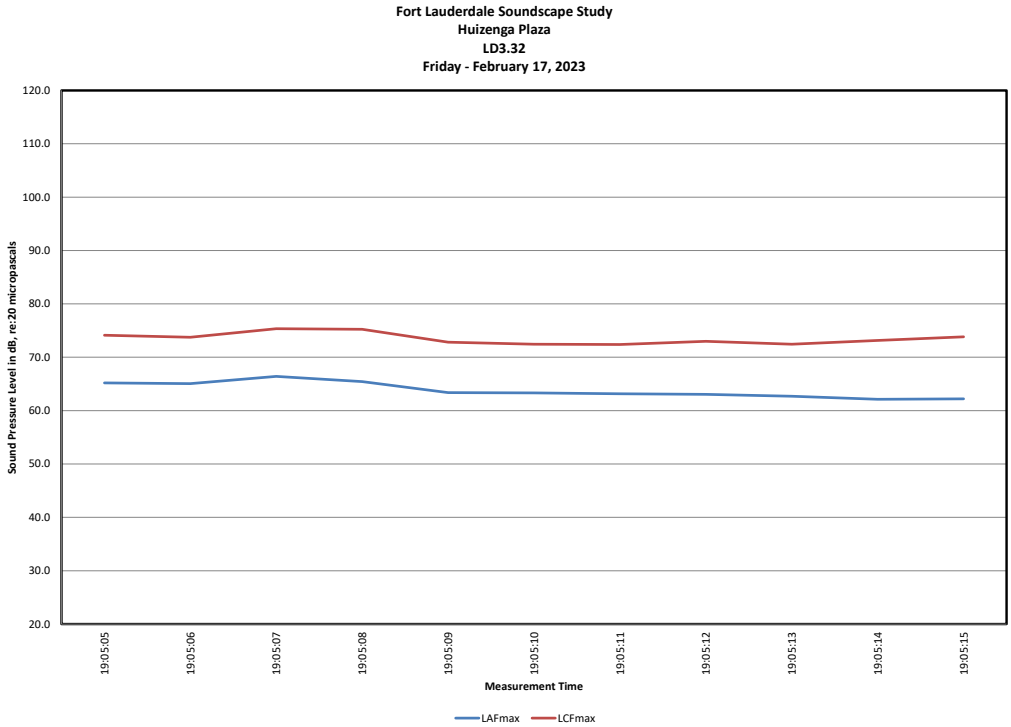

Fort Lauderdale Soundscape Study
Government center parking garage
LD3.27
Friday - February 17, 2023
Ambient: Some mech equipment from construction area behind Society building
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

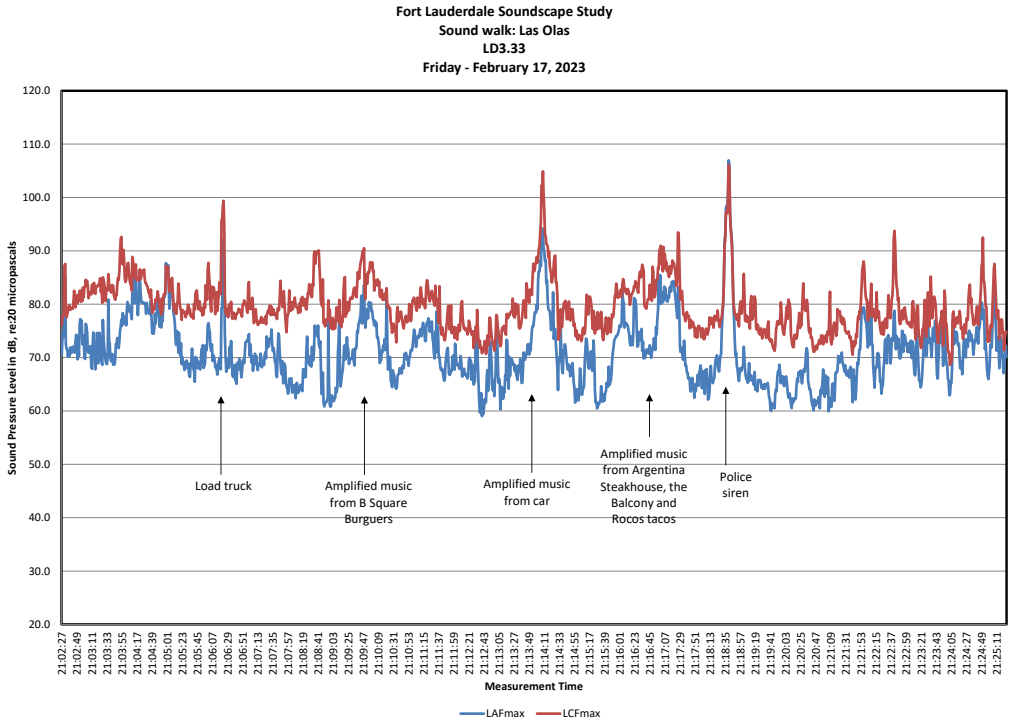

Fort Lauderdale Soundscape Study
Corner SW 1st Avenue and SW 2nd Street
LD3.28
Friday - February 17, 2023
Ambient: Mainly rear pulses of traffic
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

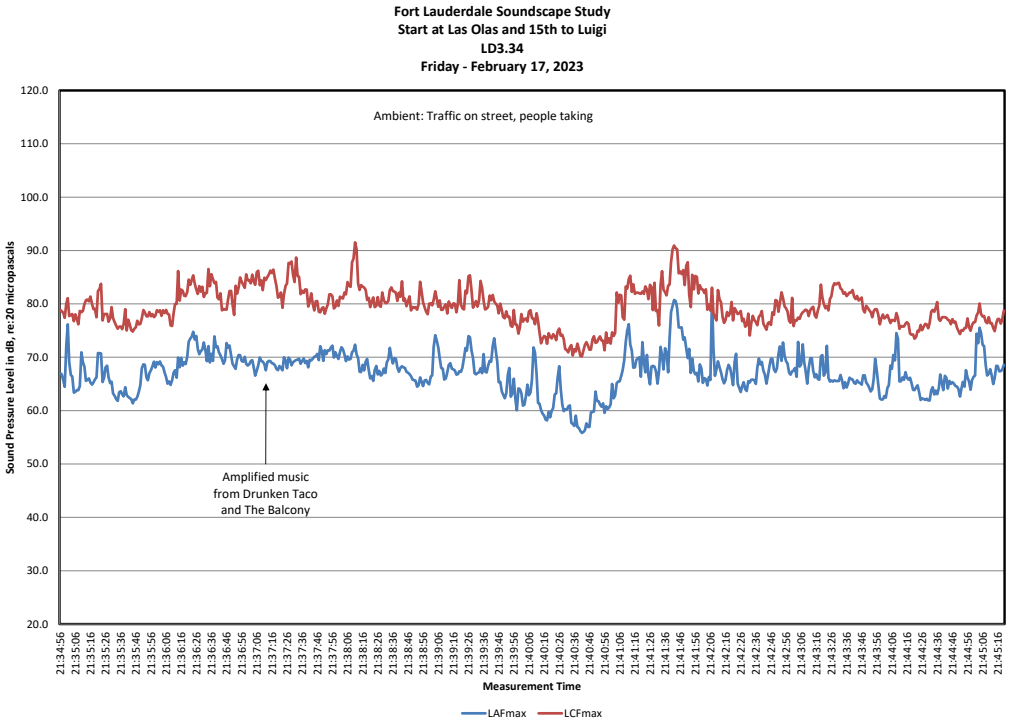

Fort Lauderdale Soundscape Study
SW 2nd Street next to Govermental Center Packing Garage
LD3.29
Friday - February 17, 2023
Ambient: Cross bells on, no train pass by
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

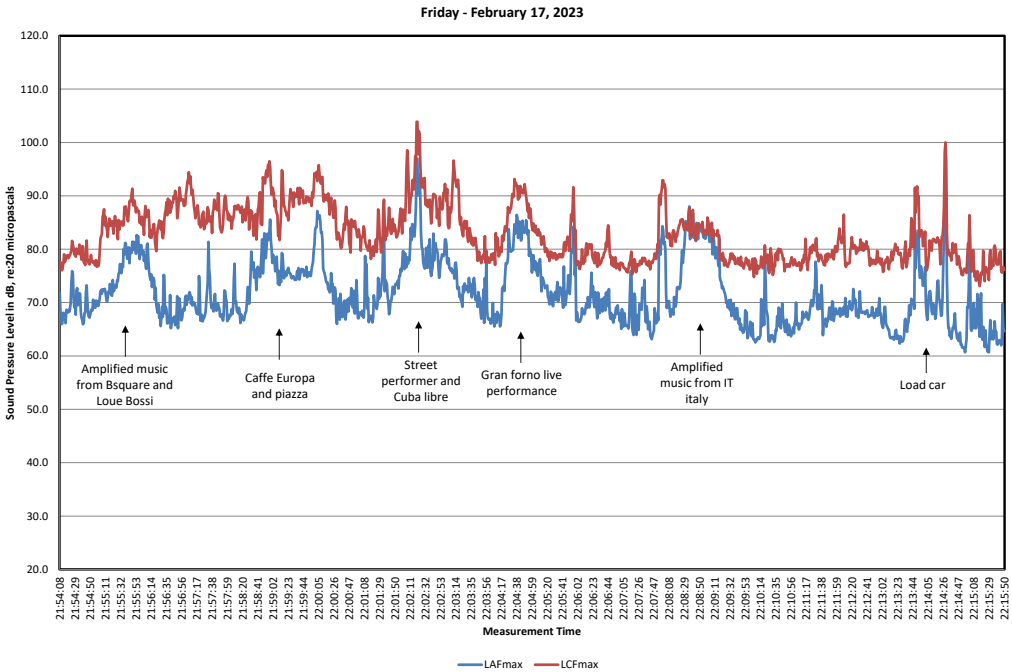

Fort Lauderdale Soundscape Study
SW 2nd Street next to Govermental Center Packing Garage
LD3.30
Friday - February 17, 2023
Sound Pressure Level in dB, re:20 micropascals
Train passing by
Measurement Time
LAFmax
LCFmax

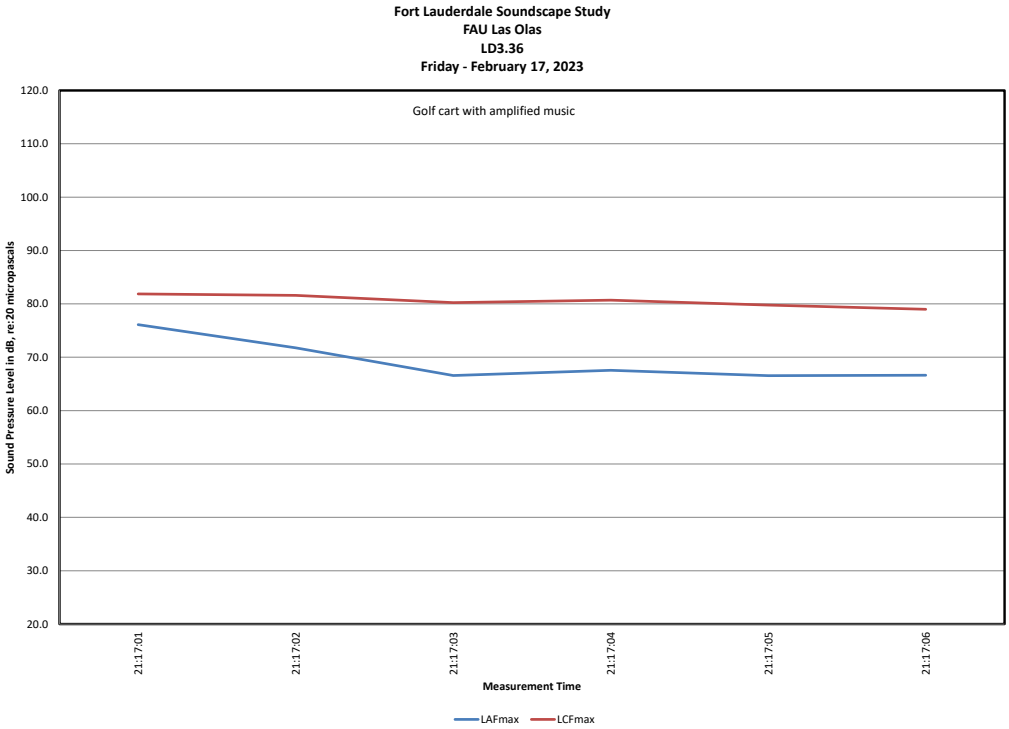

Fort Lauderdale Soundscape Study
The Wharf
LD3.31
Friday - February 17, 2023
Sound Pressure Level in dB, re:20 micropascals
Loud motorcross bike
Measurement Time
LAFmax
LCFmax

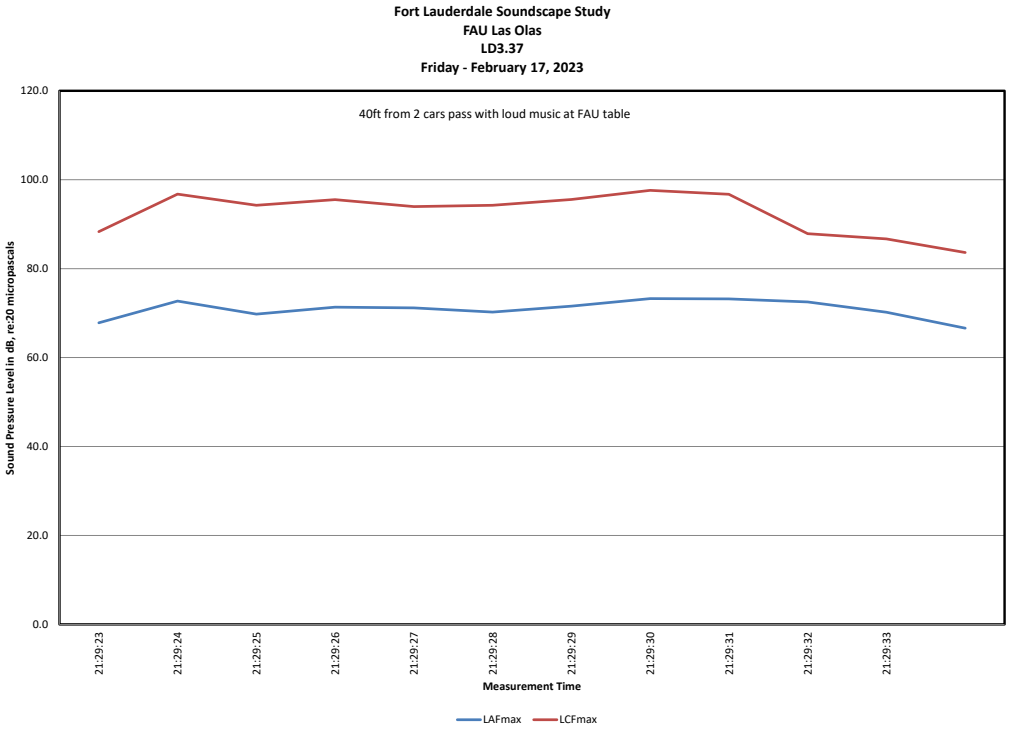

Fort Lauderdale Soundscape Study
Huizenga Plaza
LD3.32
Friday - February 17, 2023
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

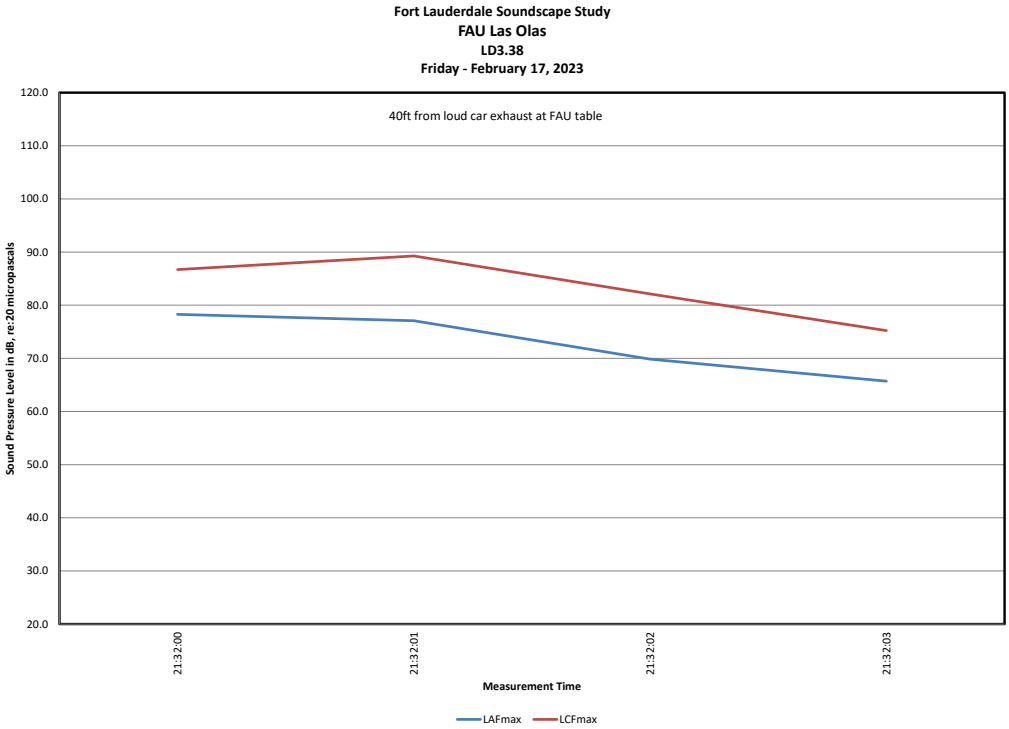

Fort Lauderdale Soundscape Study
Sound walk: Las Olas
LD3.33
Friday - February 17, 2023
Sound Pressure Level in dB, re:20 micropascals
Load truck
Amplified music from B Square Burguers
Amplified music from car
Amplified music from Argentina Steakhouse, the Balcony and Rocos tacos
Police siren
Measurement Time
LAFmax
LCFmax

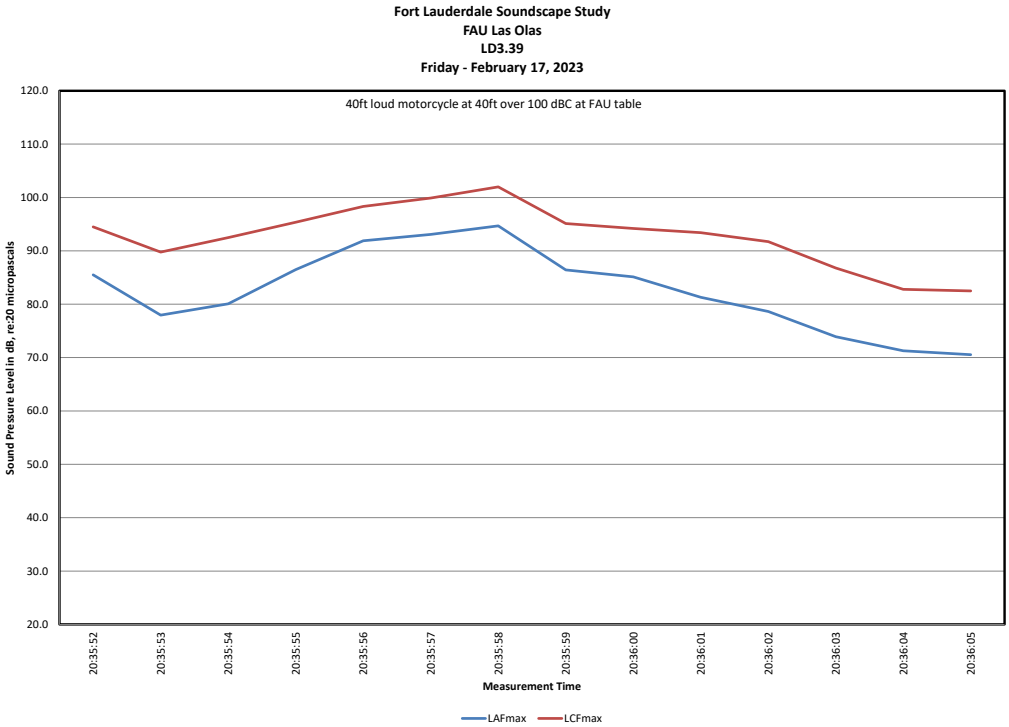

Fort Lauderdale Soundscape Study
Start at Las Olas and 15th to Luigi
LD3.34
Friday - February 17, 2023
Ambient: Traffic on street, people taking
Amplified music from Drunken Taco and The Balcony
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

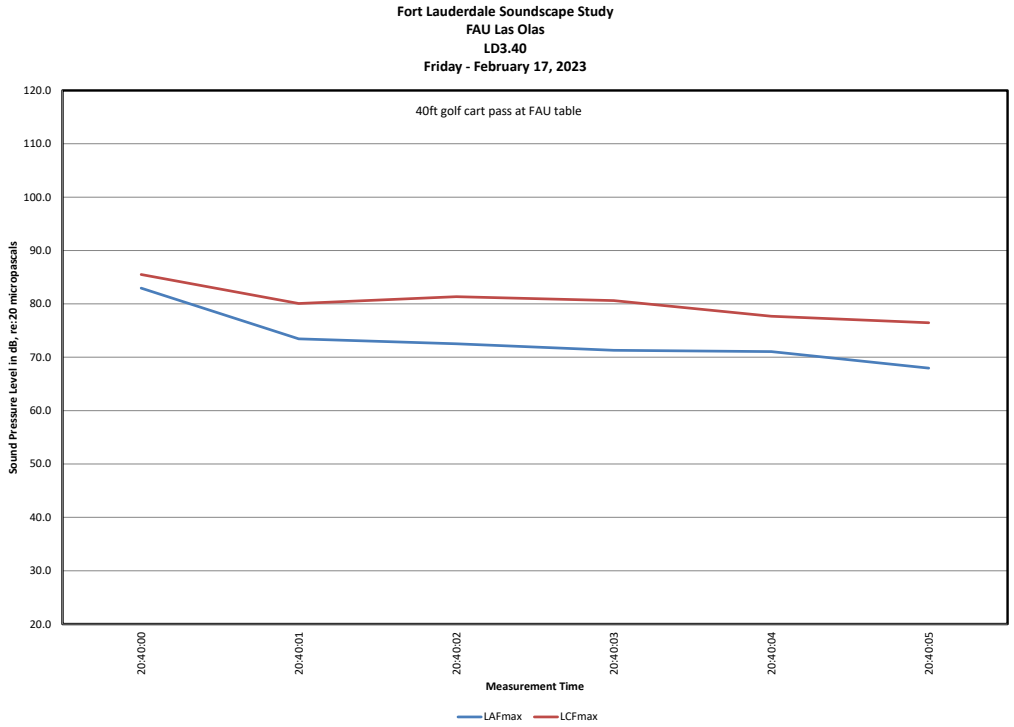

Fort Lauderdale Soundscape Study
Cross SE 11th Avenue at 36 to 200 East las Olas
LD3.35
Friday - February 17, 2023
Amplified music from Bsquare and Loue Bossi
Caffe Europa and piazza
Street performer and Cuba libre
Gran forno live performance
Amplified music from IT italy
Load car
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

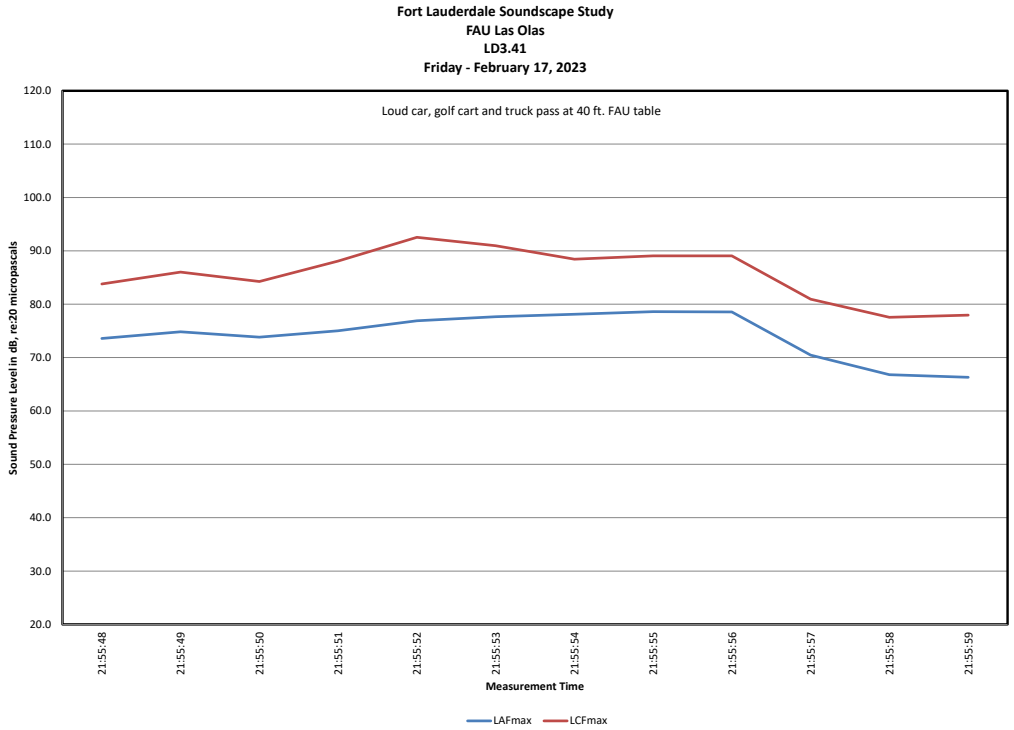

Fort Lauderdale Soundscape Study
FAU Las Olas
LD3.36
Friday - February 17, 2023
Golf cart with amplified music
Sound Pressure Level in dB, re:20 micropascals
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
21:17:01
21:17:02
21:17:03
21:17:04
21:17:05
21:17:06
Measurement Time
LAFmax
LCFmax

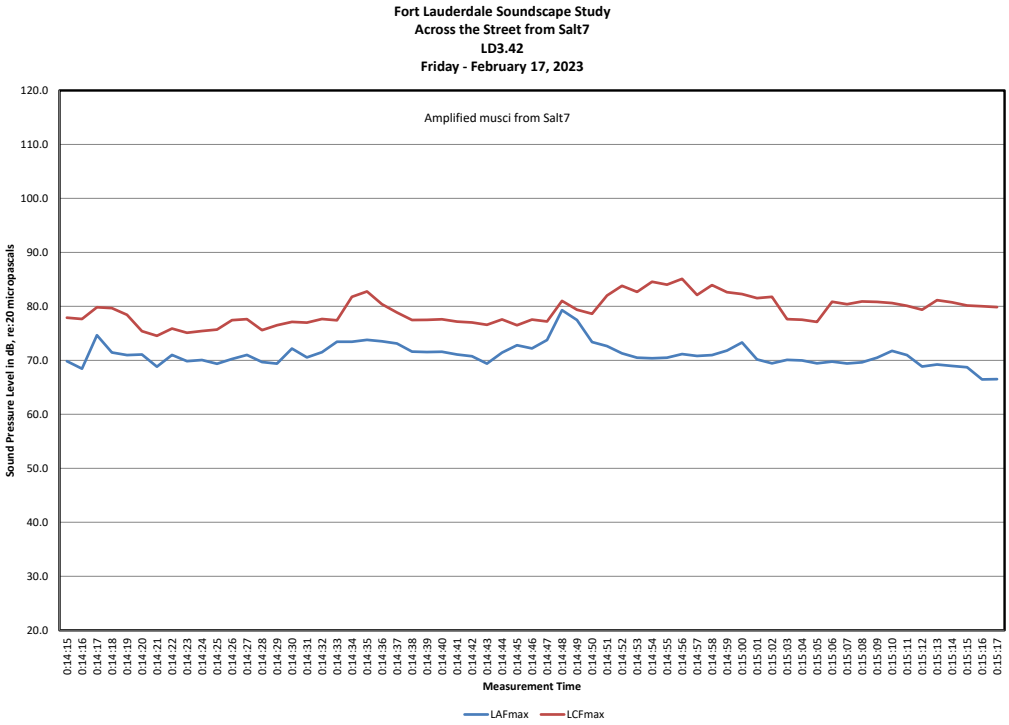

Fort Lauderdale Soundscape Study
FAU Las Olas
LD3.37
Friday - February 17, 2023
40ft from 2 cars pass with loud music at FAU table
Sound Pressure Level in dB, re:20 micropascals
120.0
100.0
80.0
60.0
40.0
20.0
0.0
21:29:23
21:29:24
21:29:25
21:29:26
21:29:27
21:29:28
21:29:29
21:29:30
21:29:31
21:29:32
21:29:33
Measurement Time
LAFmax
LCFmax

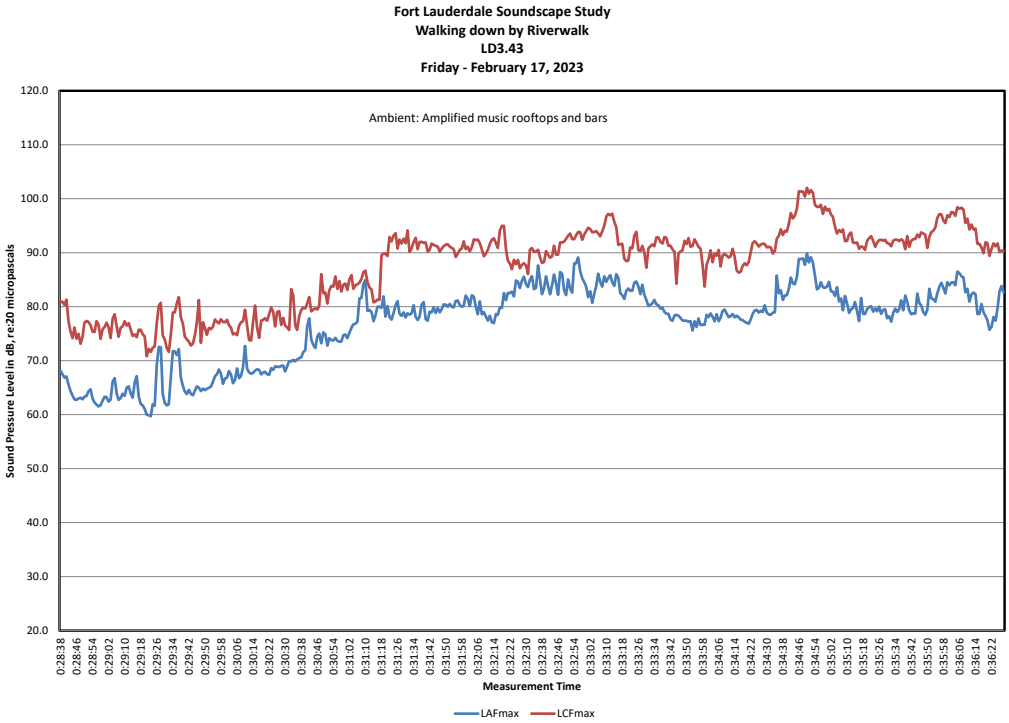

Fort Lauderdale Soundscape Study
FAU Las Olas
LD3.38
Friday - February 17, 2023
40ft from loud car exhaust at FAU table
Sound Pressure Level in dB, re:20 micropascals
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
21:32:00
21:32:01
21:32:02
21:32:03
Measurement Time
LAFmax
LCFmax

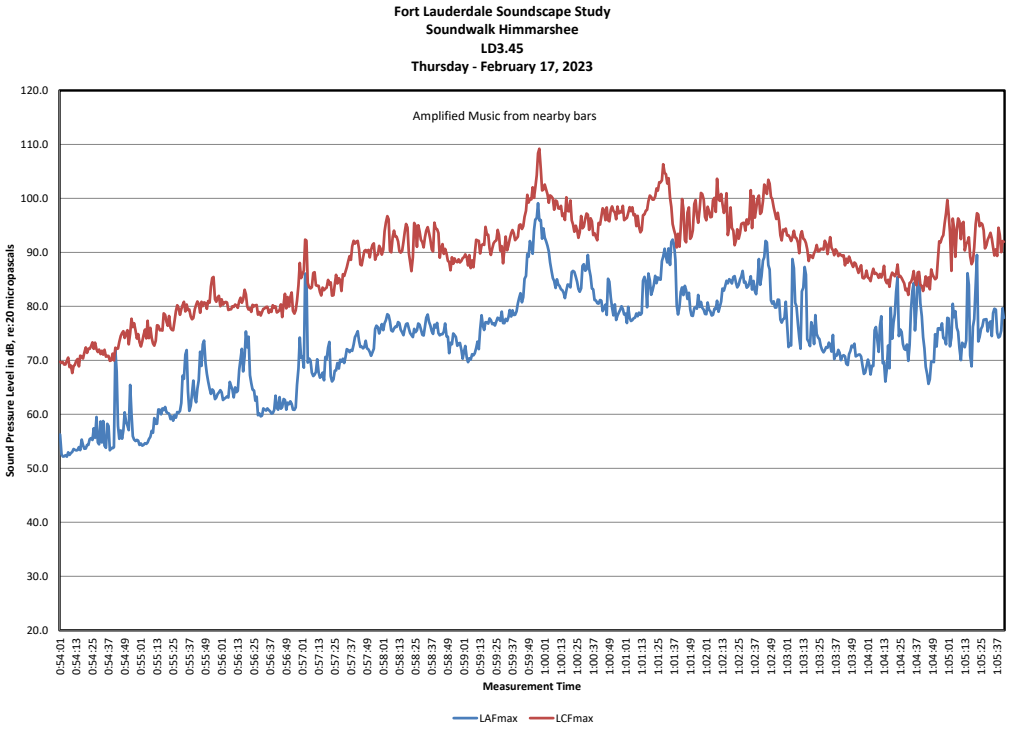

Fort Lauderdale Soundscape Study
FAU Las Olas
LD3.39
Friday - February 17, 2023
40ft loud motorcycle at 40ft over 100 dBC at FAU table
Sound Pressure Level in dB, re:20 micropascals
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
20:35:52
20:35:53
20:35:54
20:35:55
20:35:56
20:35:57
20:35:58
20:35:59
20:36:00
20:36:01
20:36:02
20:36:03
20:36:04
20:36:05
Measurement Time
LAFmax
LCFmax

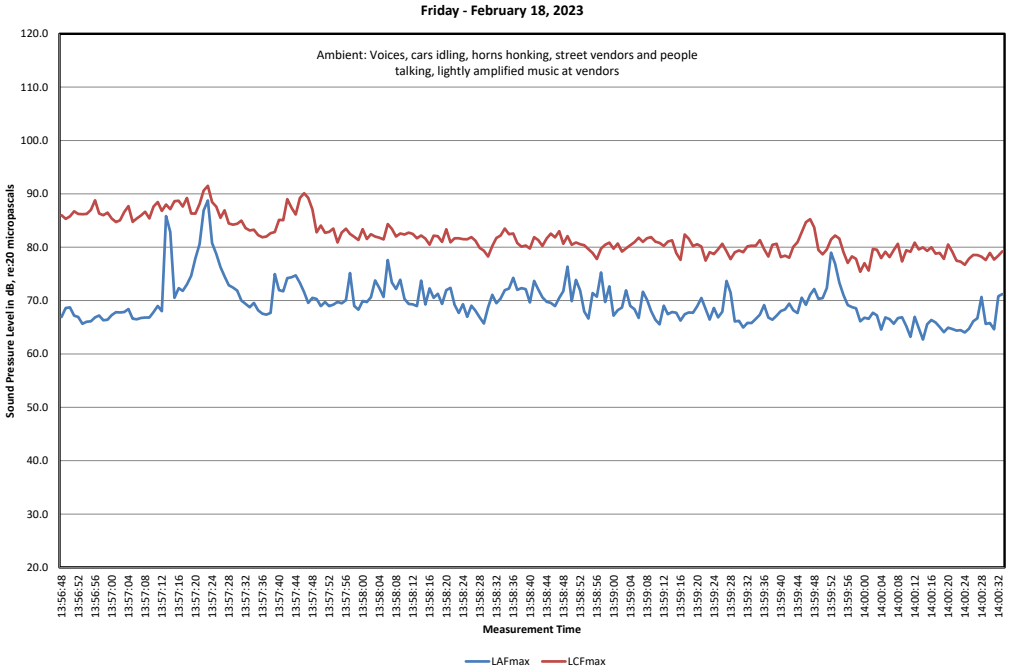

Fort Lauderdale Soundscape Study
FAU Las Olas
LD3.40
Friday - February 17, 2023
40ft golf cart pass at FAU table
Sound Pressure Level in dB, re:20 micropascals
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
20:40:00
20:40:01
20:40:02
20:40:03
20:40:04
20:40:05
Measurement Time
LAFmax
LCFmax


Fort Lauderdale Soundscape Study
FAU Las Olas
LD3.41
Friday - February 17, 2023
Loud car, golf cart and truck pass at 40 ft. FAU table
Sound Pressure Level in dB, re:20 micropascals
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
21:55:48
21:55:49
21:55:50
21:55:51
21:55:52
21:55:53
21:55:54
21:55:55
21:55:56
21:55:57
21:55:58
21:55:59
Measurement Time
LAFmax
LCFmax

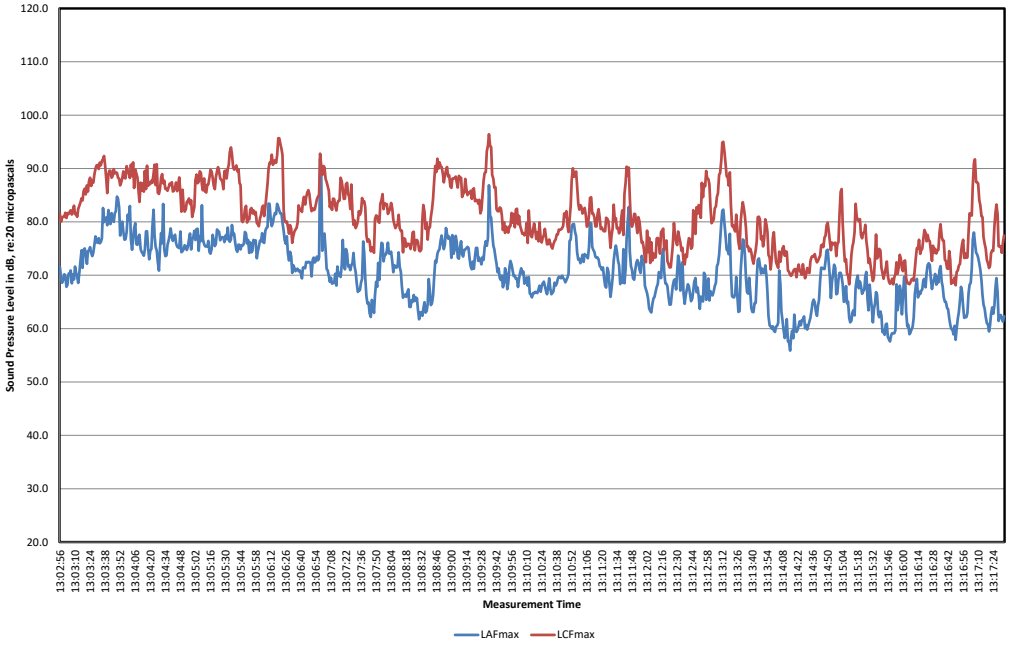

Fort Lauderdale Soundscape Study
Across the Street from Salt7
LD3.42
Friday - February 17, 2023
Amplified musci from Salt7
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax


Fort Lauderdale Soundscape Study
Walking down by Riverwalk
LD3.43
Friday - February 17, 2023
Ambient: Amplified music rooftops and bars
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

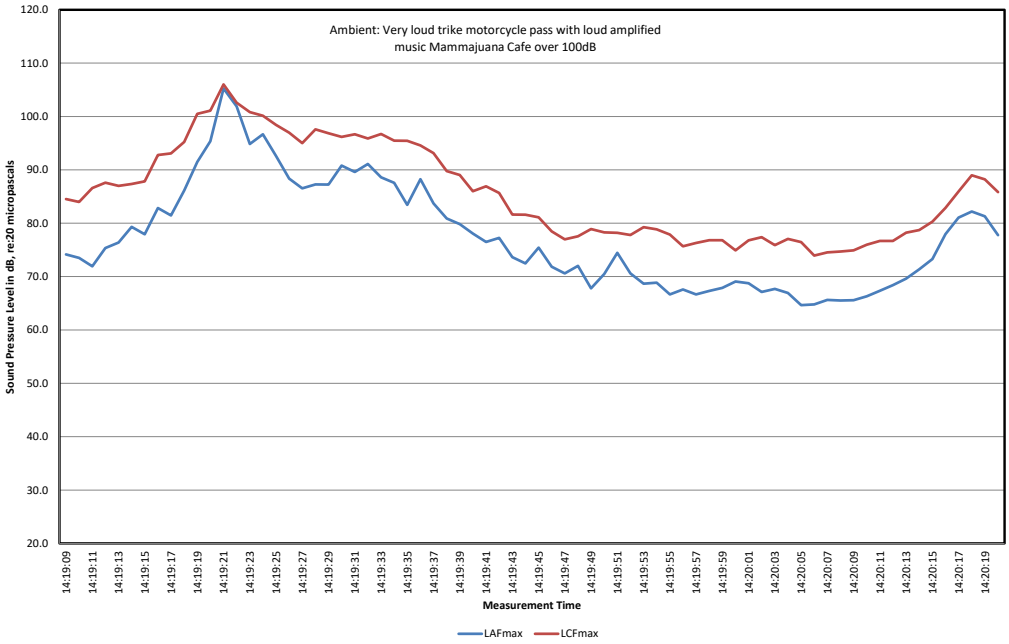

Fort Lauderdale Soundscape Study
Soundwalk Himmarshee
LD3.45
Thursday - February 17, 2023
Amplified Music from nearby bars
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

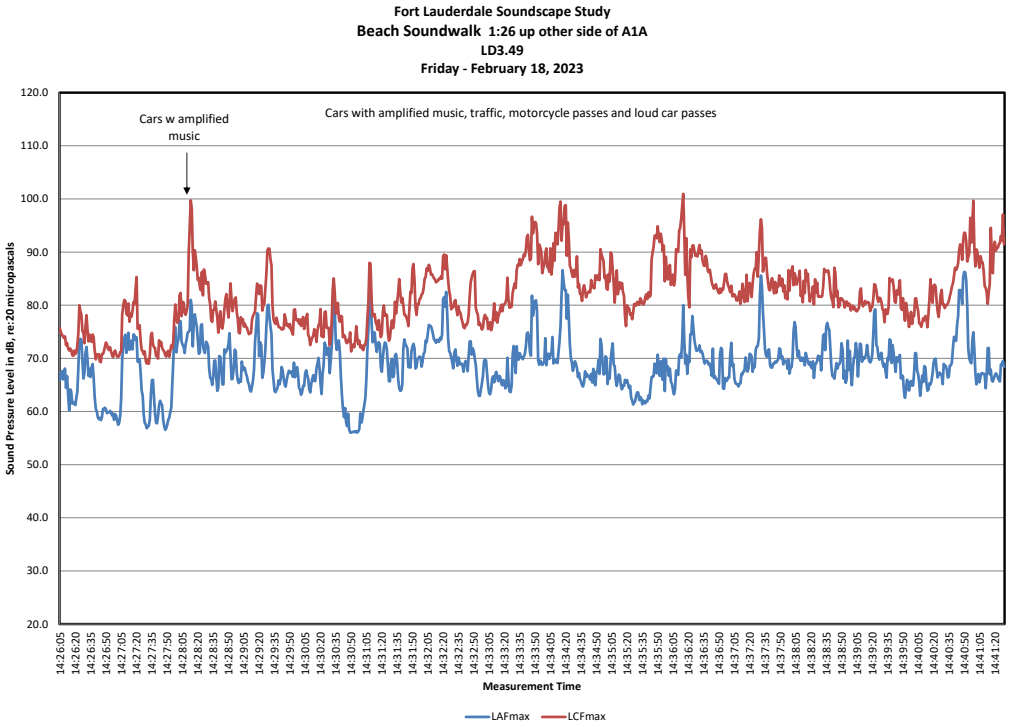

Fort Lauderdale Soundscape Study
Soundwalk to corner of Las Ola's to Farmer's Market area
LD3.46
Friday - February 18, 2023
Ambient: Voices, cars idling, horns honking, street vendors and people talking, lightly amplified music at vendors
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

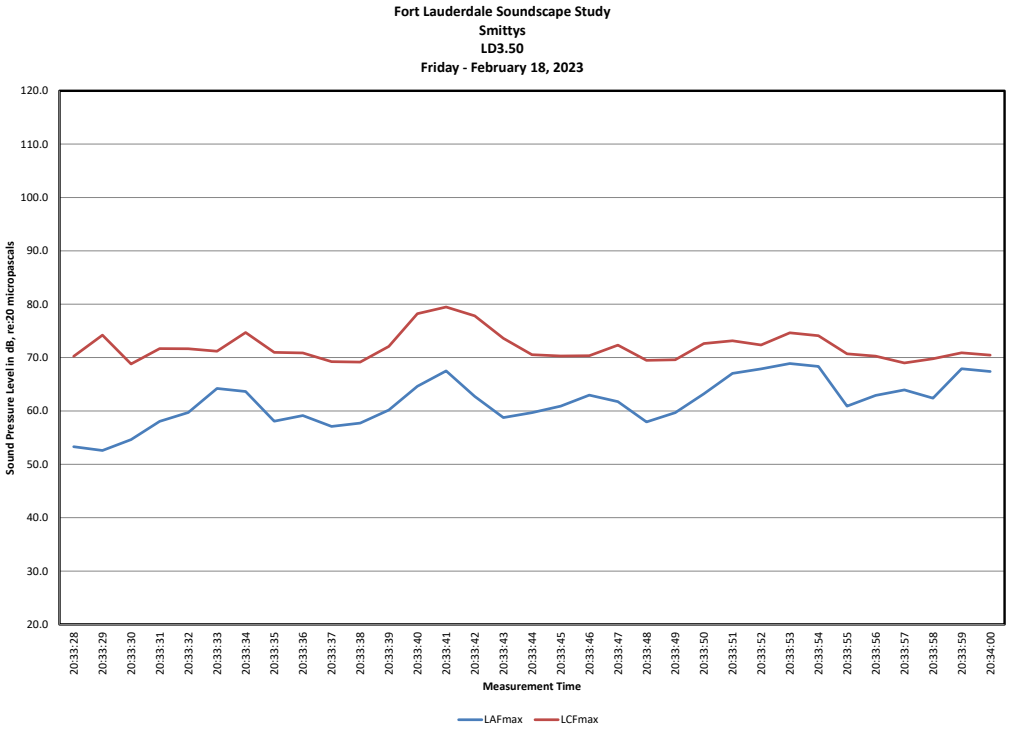
Fort Lauderdale Riverwalk
Soundwalk: Ft. Lauderdale Beach from Las Olas to Merriweather Resort
LD3.47
Friday - February 18, 2023

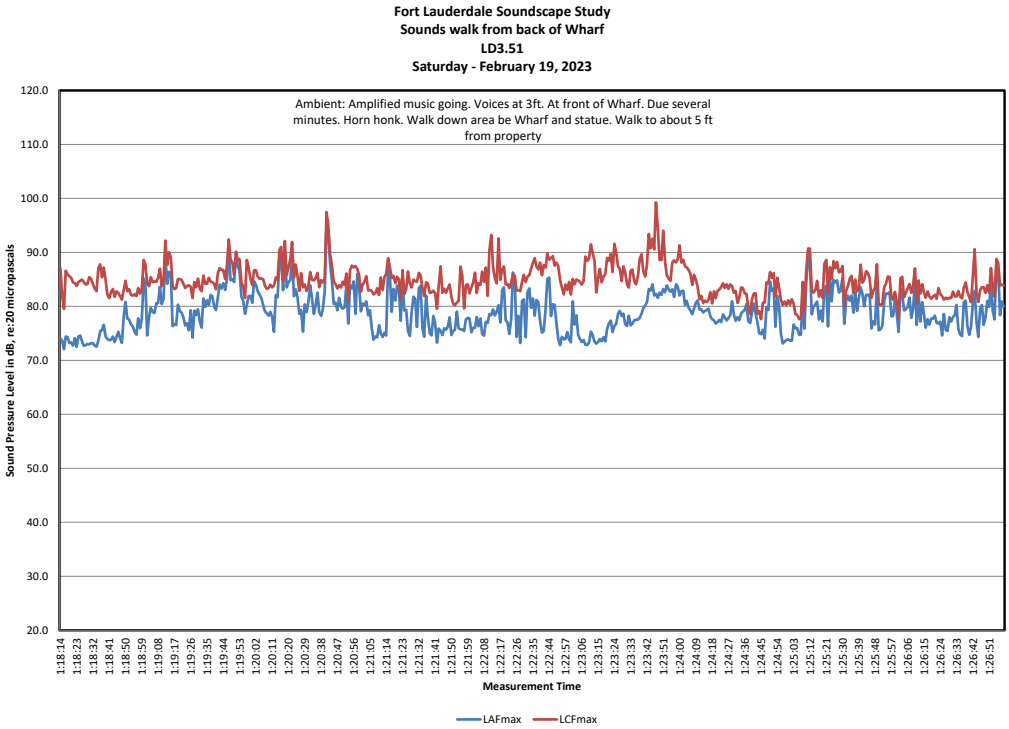


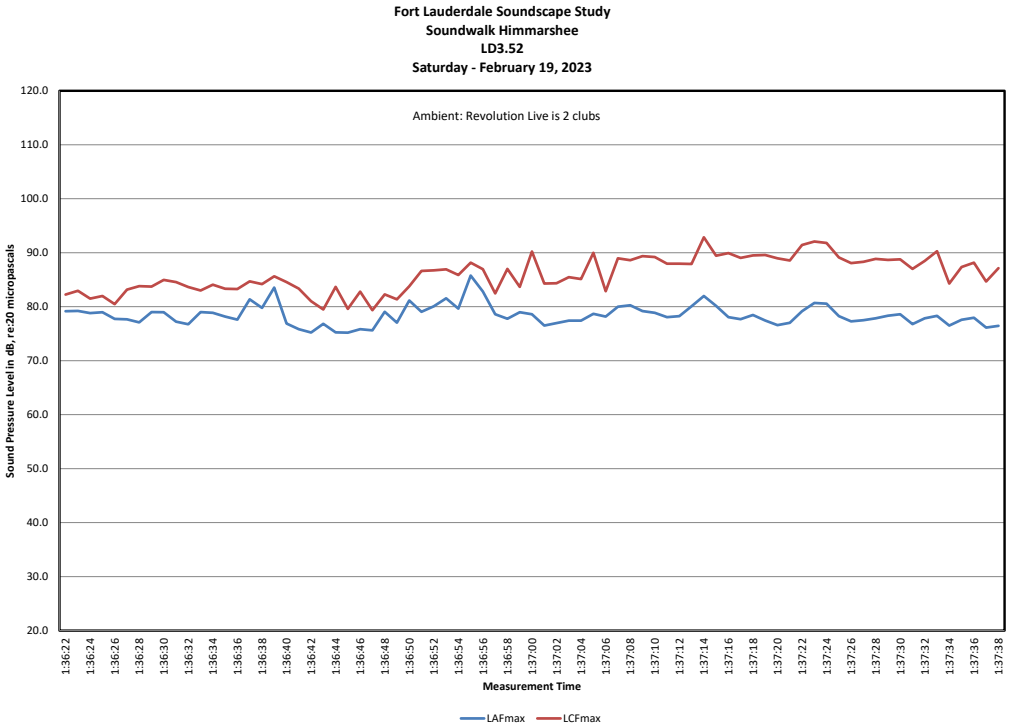
Fort Lauderdale Soundscape Study
In front of Merriweahter Resort
LD3.48
Friday - February 18, 2023

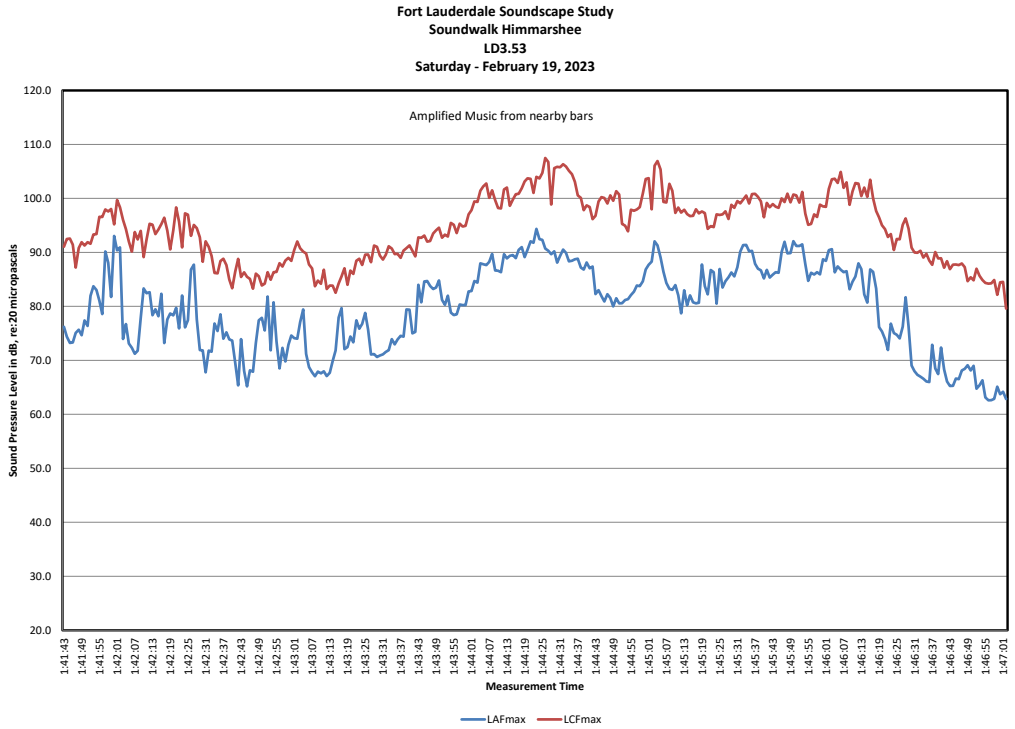


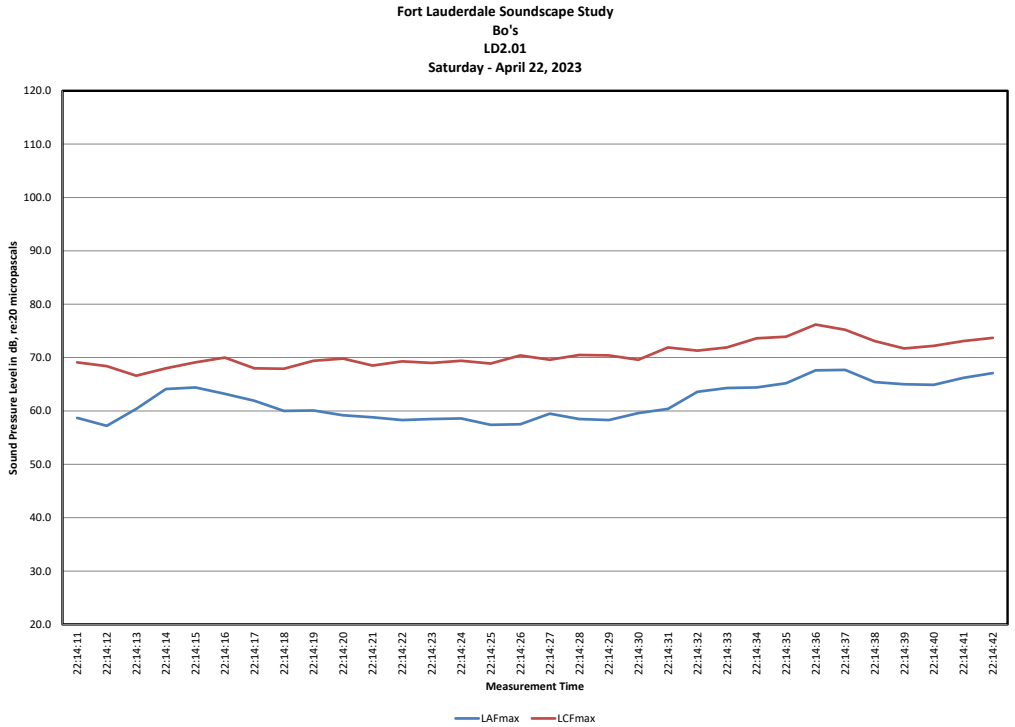

Fort Lauderdale Soundscape Study
Beach Soundwalk 1:26 up other side of A1A
LD3.49
Friday - February 18, 2023
Cars w amplified music
Cars with amplified music, traffic, motorcycle passes and loud car passes
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

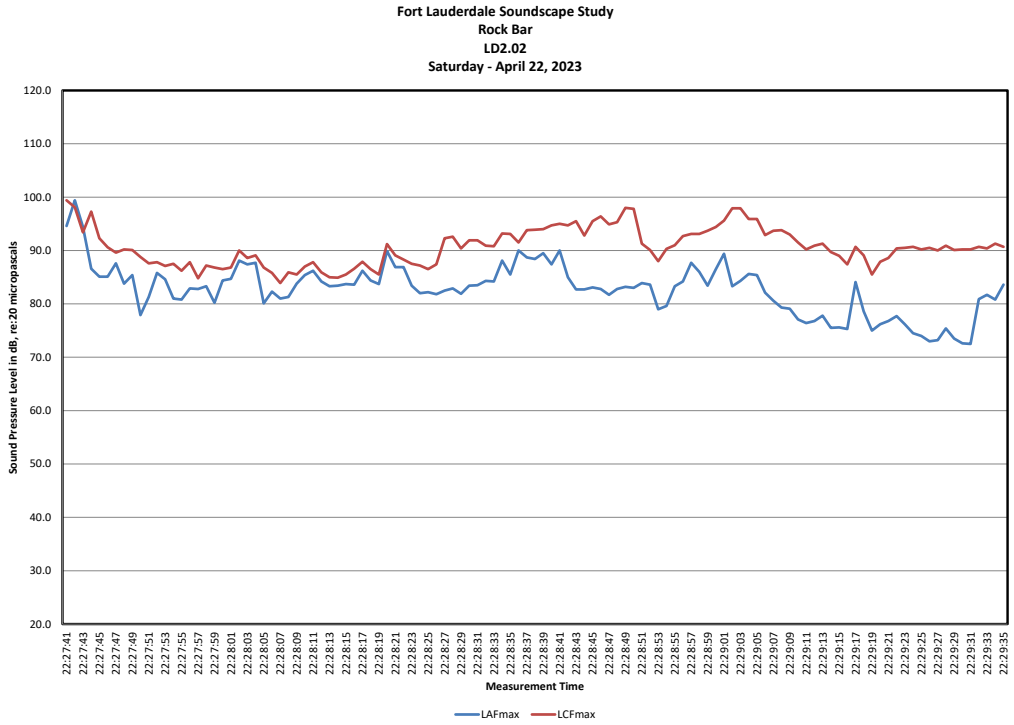

Fort Lauderdale Soundscape Study
Smittys
LD3.50
Friday - February 18, 2023
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

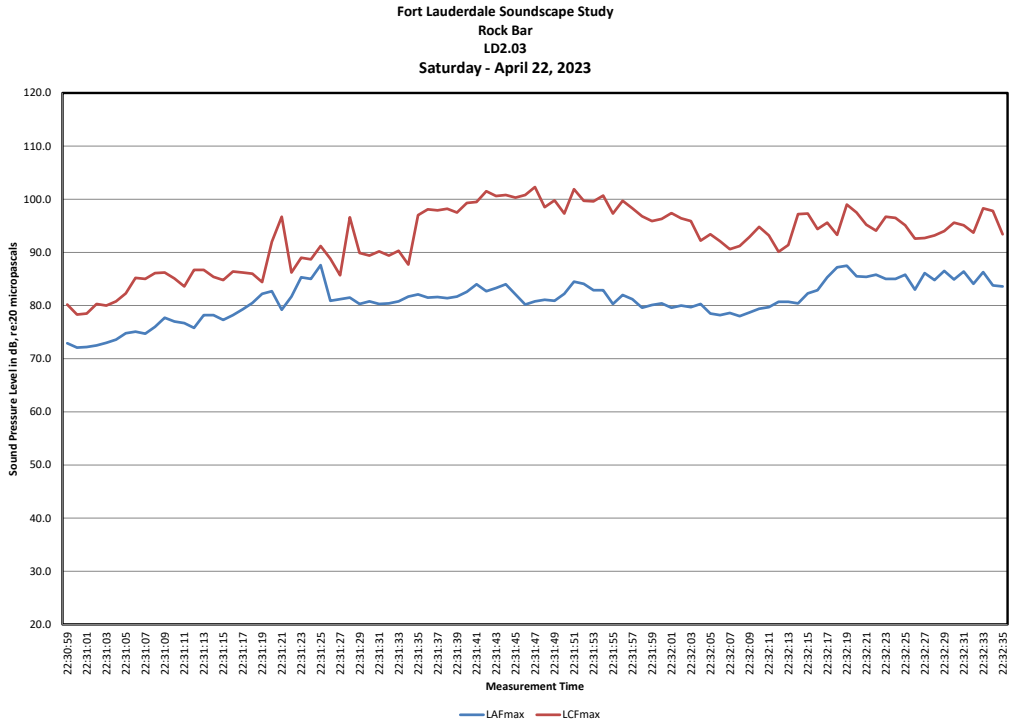

Fort Lauderdale Soundscape Study
Sounds walk from back of Wharf
LD3.51
Saturday - February 19, 2023
Ambient: Amplified music going. Voices at 3ft. At front of Wharf. Due several minutes. Horn honk. Walk down area be Wharf and statue. Walk to about 5 ft from property
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

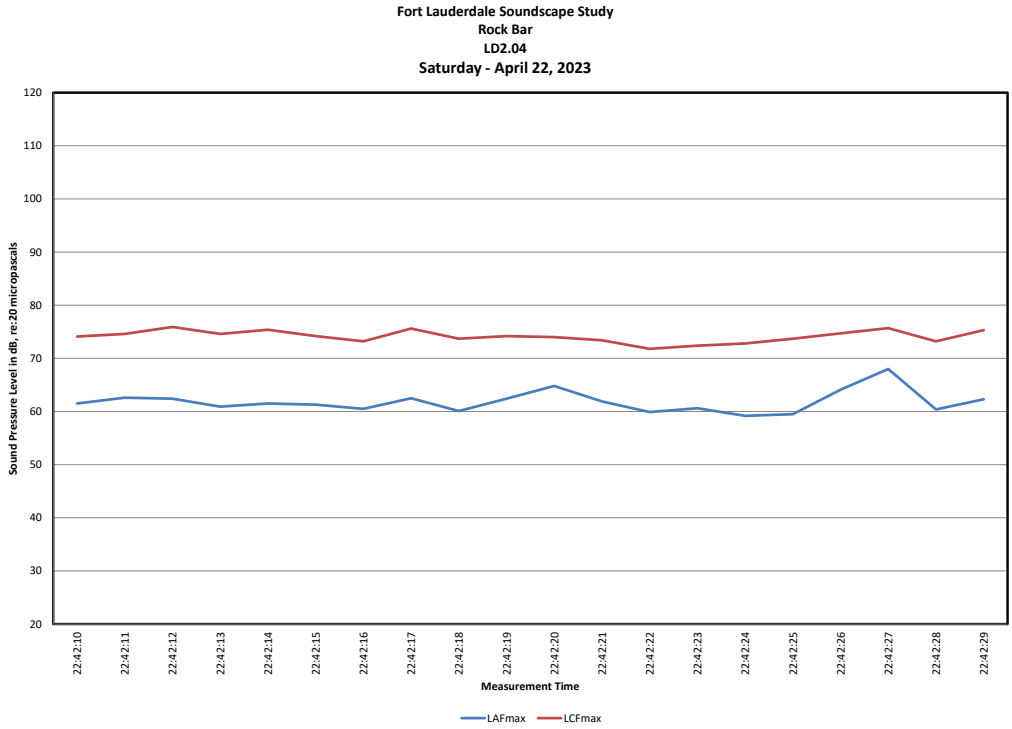

Fort Lauderdale Soundscape Study
Soundwalk Himmarshee
LD3.52
Saturday - February 19, 2023
Ambient: Revolution Live is 2 clubs
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

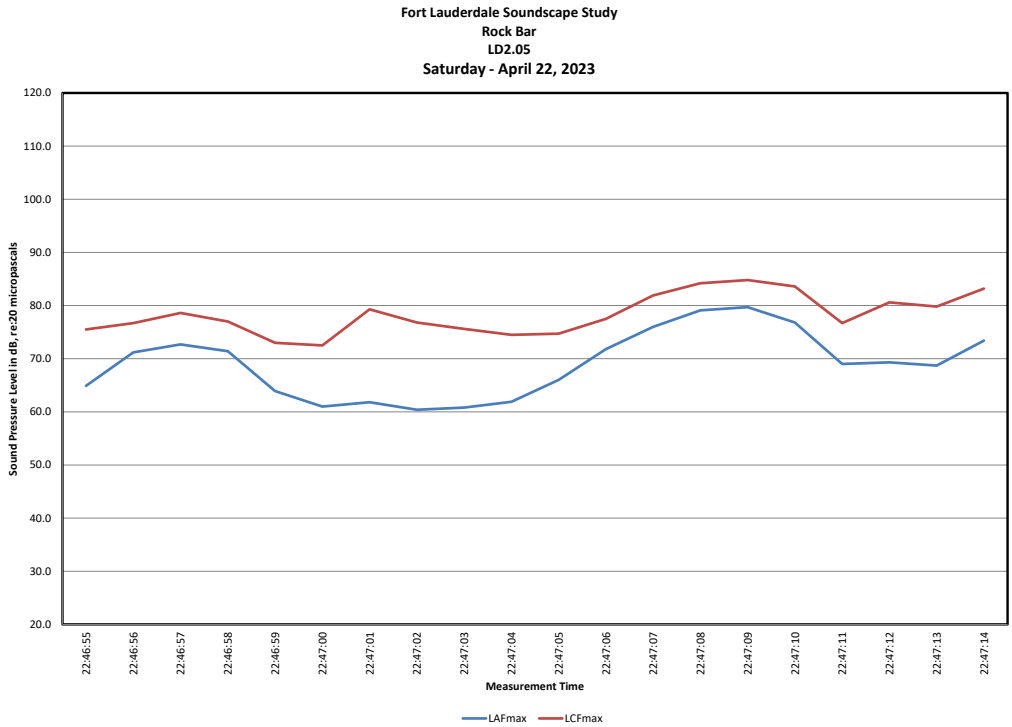

Fort Lauderdale Soundscape Study
Soundwalk Himmarshee
LD3.53
Saturday - February 19, 2023
Amplified Music from nearby bars
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

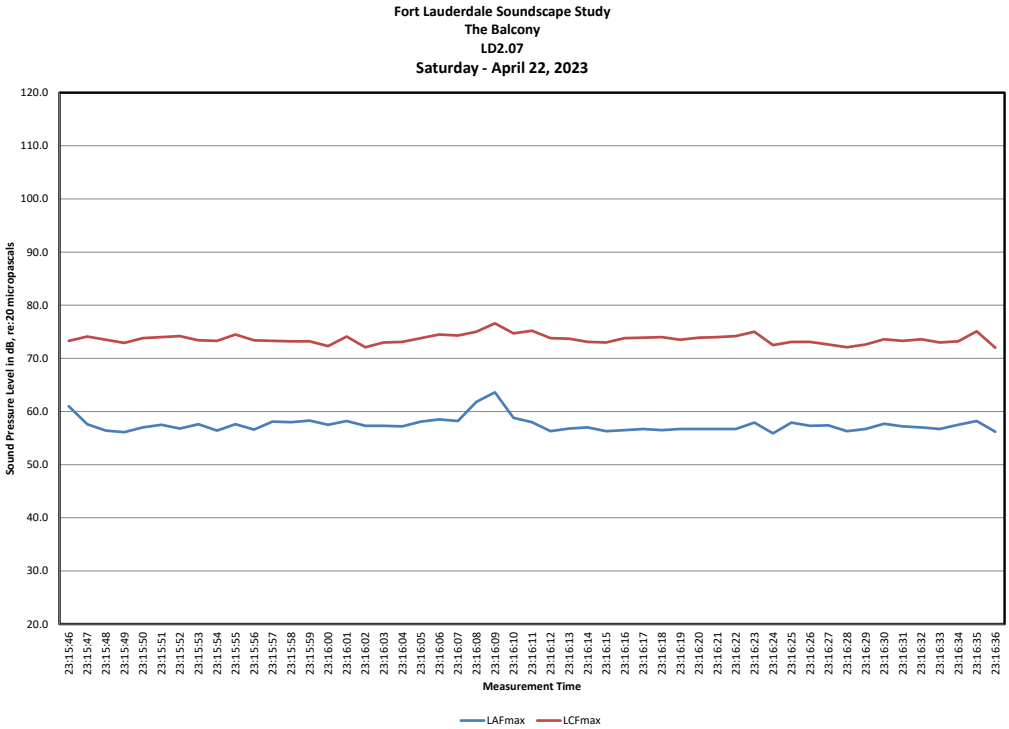

Fort Lauderdale Soundscape Study
Bo's
LD2.01
Saturday - April 22, 2023
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

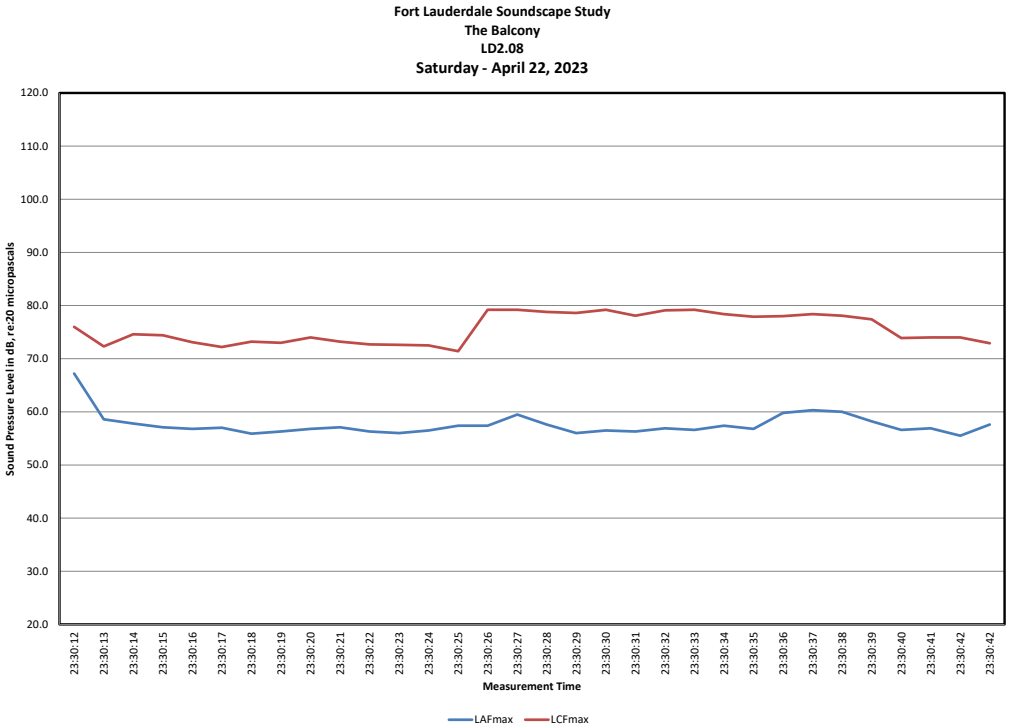

Fort Lauderdale Soundscape Study
Rock Bar
LD2.02
Saturday - April 22, 2023
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

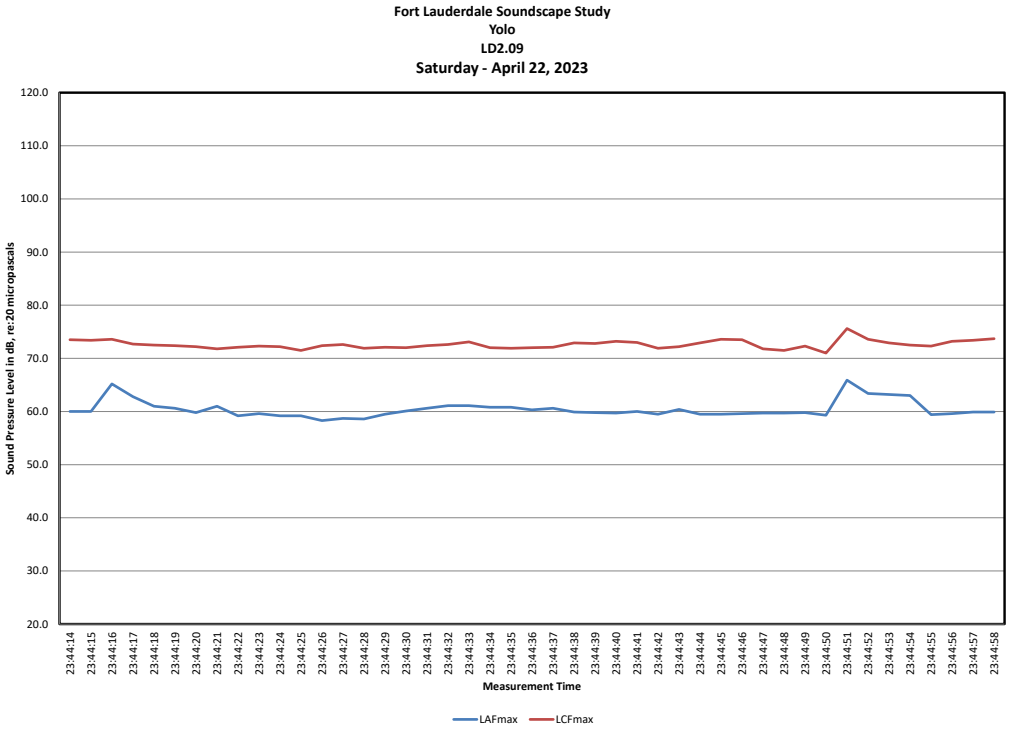

Fort Lauderdale Soundscape Study
Rock Bar
LD2.03
Saturday - April 22, 2023
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

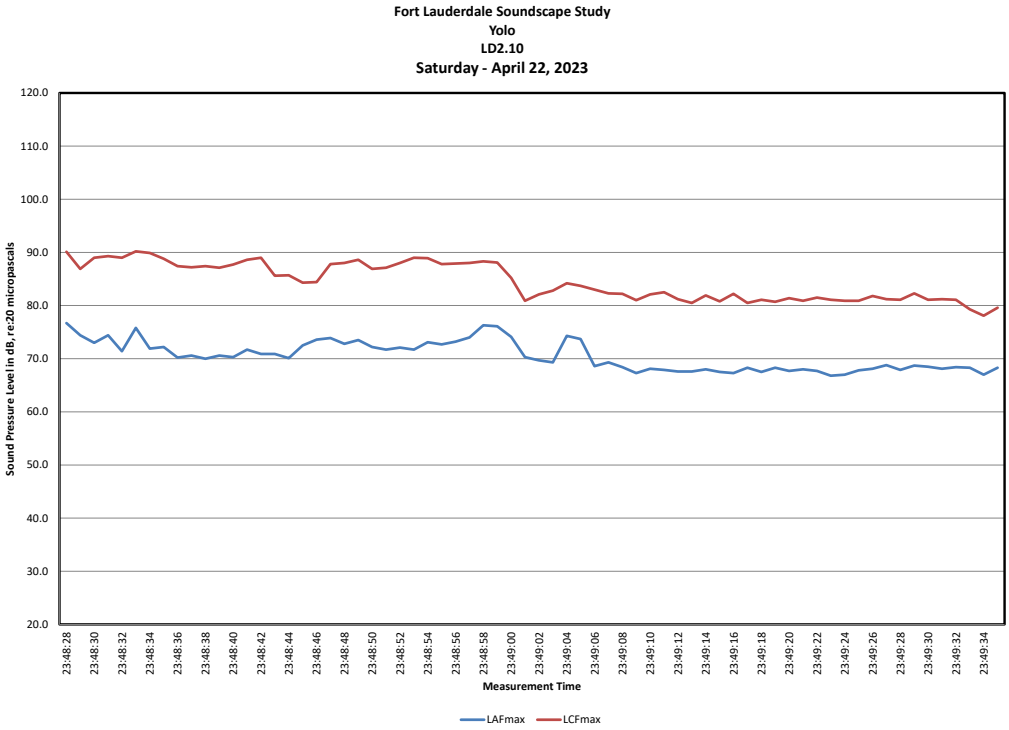

Fort Lauderdale Soundscape Study
Rock Bar
LD2.04
Saturday - April 22, 2023
Sound Pressure Level in dB, re:20 micropascals
120
110
100
90
80
70
60
50
40
30
20
22:42:10
22:42:11
22:42:12
22:42:13
22:42:14
22:42:15
22:42:16
22:42:17
22:42:18
22:42:19
22:42:20
22:42:21
22:42:22
22:42:23
22:42:24
22:42:25
22:42:26
22:42:27
22:42:28
22:42:29
Measurement Time
LAFmax
LCFmax

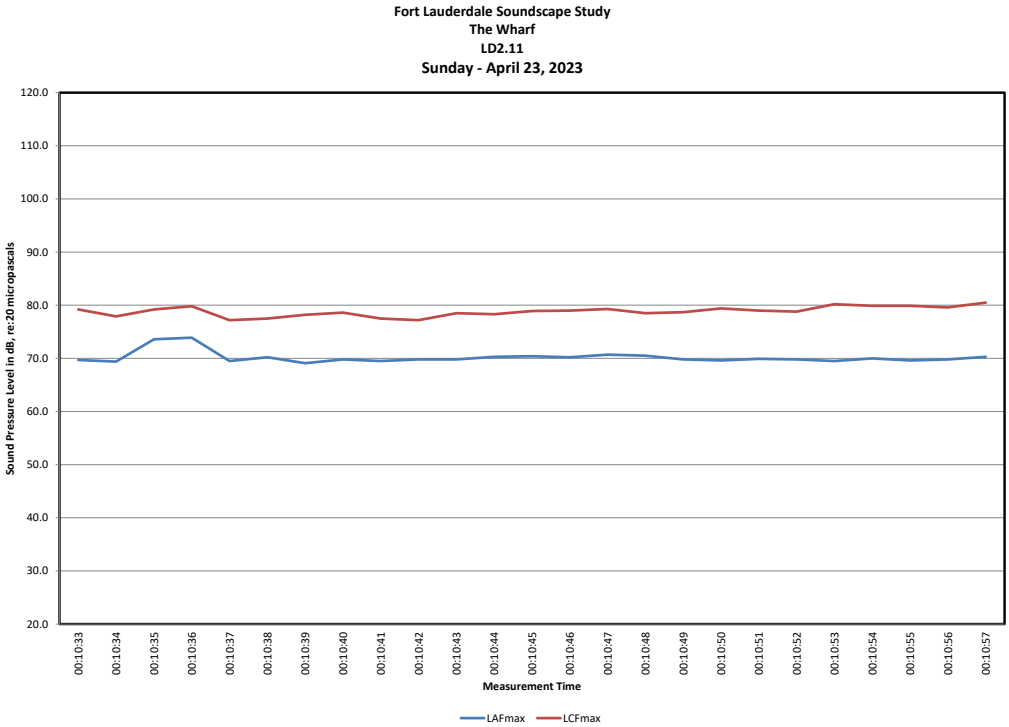

Fort Lauderdale Soundscape Study
Rock Bar
LD2.05
Saturday - April 22, 2023
Sound Pressure Level in dB, re:20 micropascals
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
22:46:55
22:46:56
22:46:57
22:46:58
22:46:59
22:47:00
22:47:01
22:47:02
22:47:03
22:47:04
22:47:05
22:47:06
22:47:07
22:47:08
22:47:09
22:47:10
22:47:11
22:47:12
22:47:13
22:47:14
Measurement Time
LAFmax
LCFmax

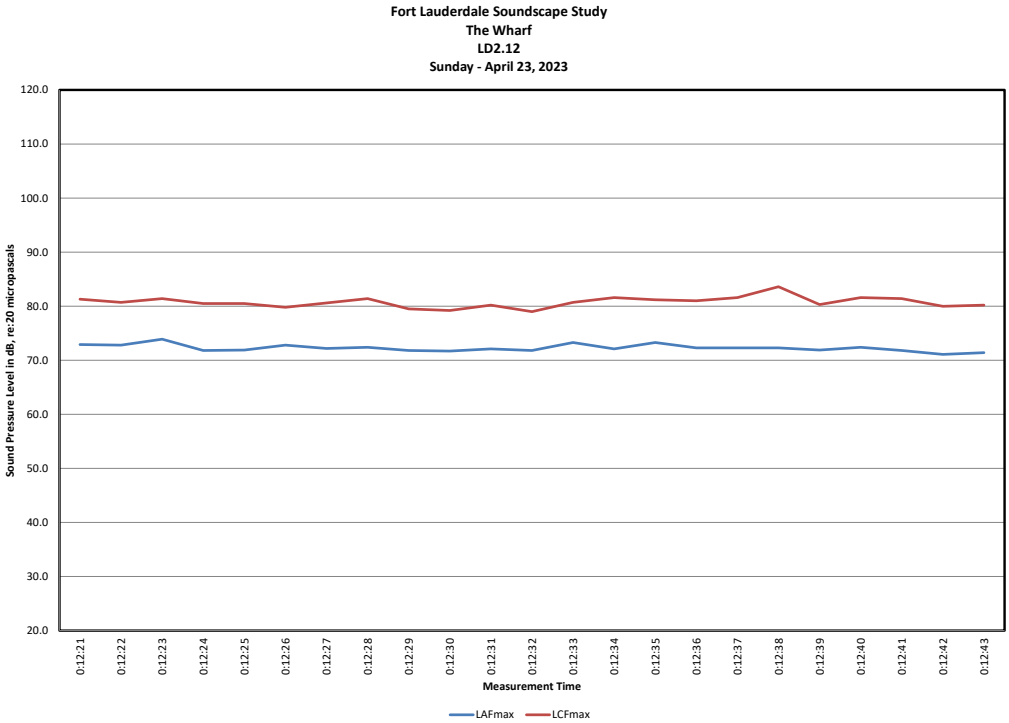

Fort Lauderdale Soundscape Study
The Balcony
LD2.07
Saturday - April 22, 2023
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

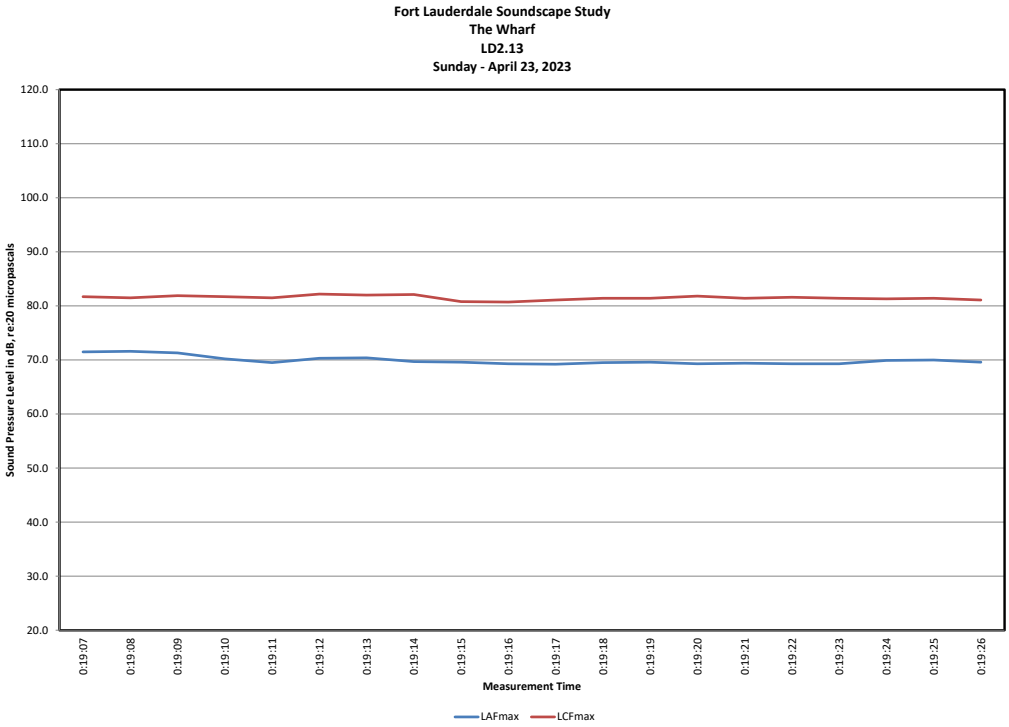

Fort Lauderdale Soundscape Study
The Balcony
LD2.08
Saturday - April 22, 2023
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

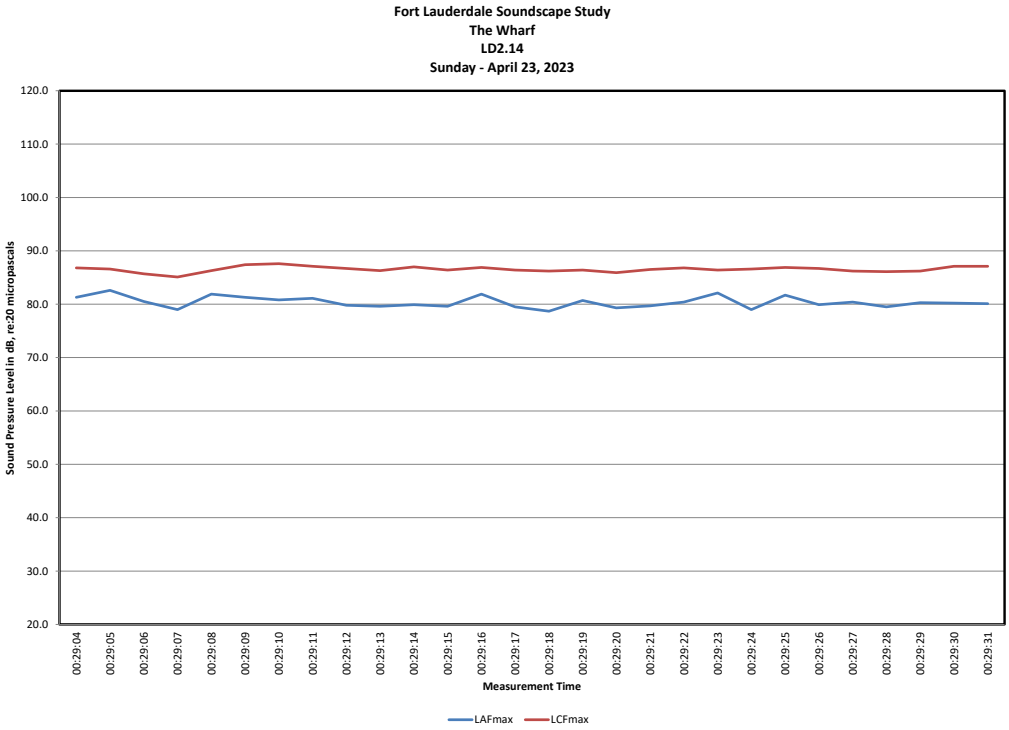

Fort Lauderdale Soundscape Study
Yolo
LD2.09
Saturday - April 22, 2023
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

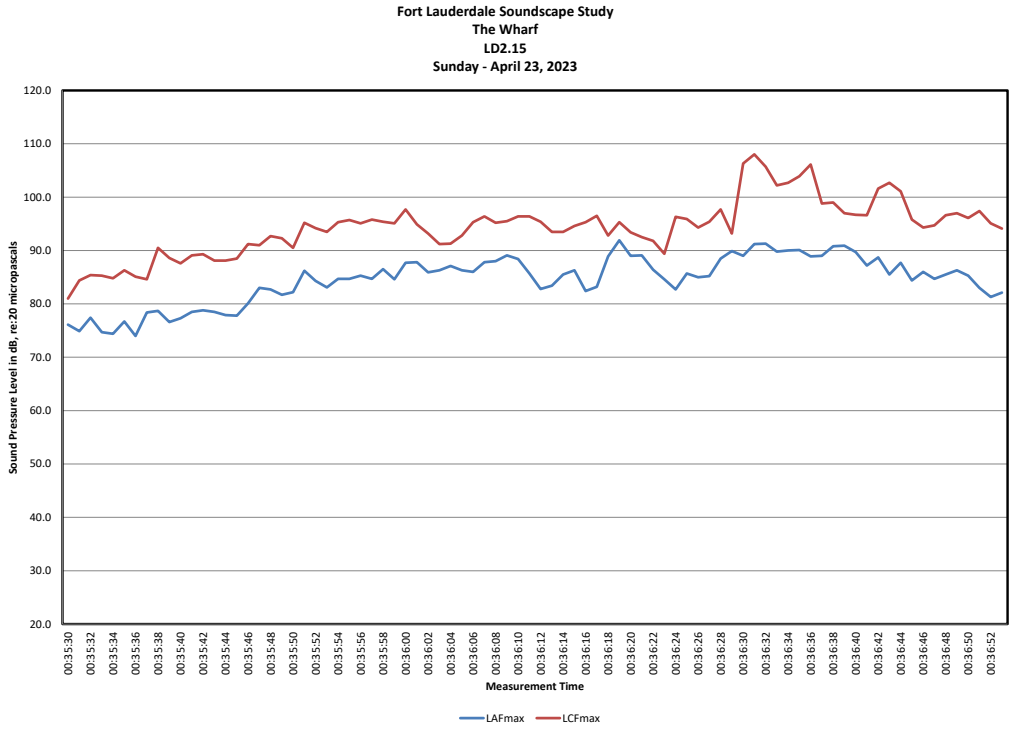

Fort Lauderdale Soundscape Study
Yolo
LD2.10
Saturday - April 22, 2023
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

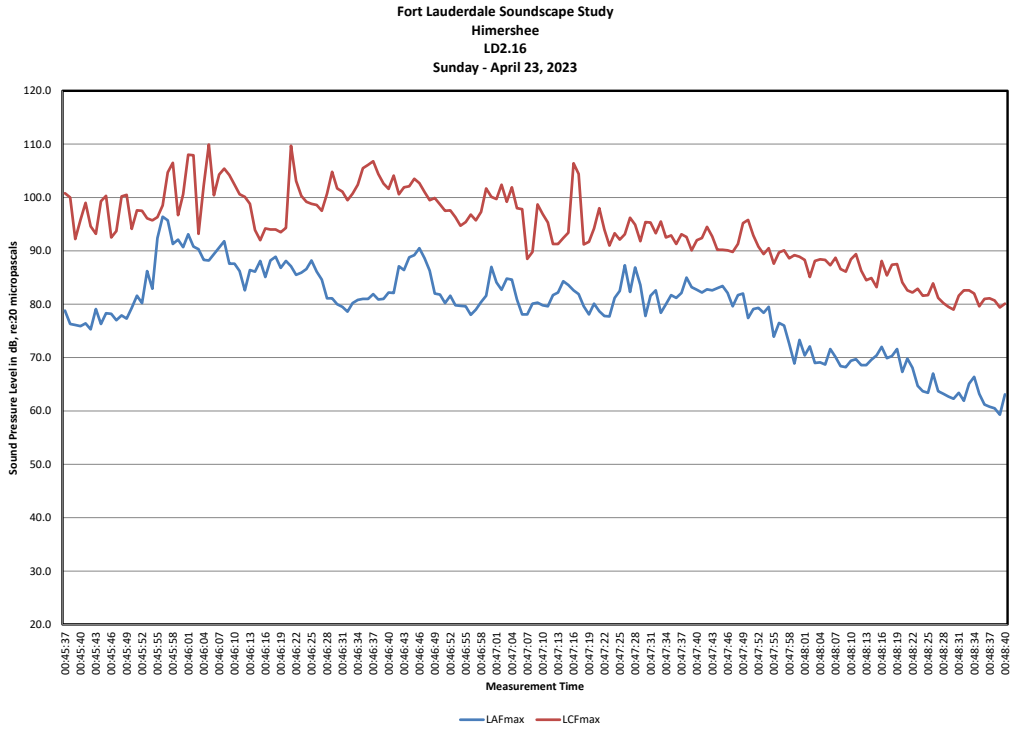

Fort Lauderdale Soundscape Study
The Wharf
LD2.11
Sunday - April 23, 2023
Sound Pressure Level in dB, re:20 micropascals
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
00:10:33
00:10:34
00:10:35
00:10:36
00:10:37
00:10:38
00:10:39
00:10:40
00:10:41
00:10:42
00:10:43
00:10:44
00:10:45
00:10:46
00:10:47
00:10:48
00:10:49
00:10:50
00:10:51
00:10:52
00:10:53
00:10:54
00:10:55
00:10:56
00:10:57
Measurement Time
LAFmax
LCFmax

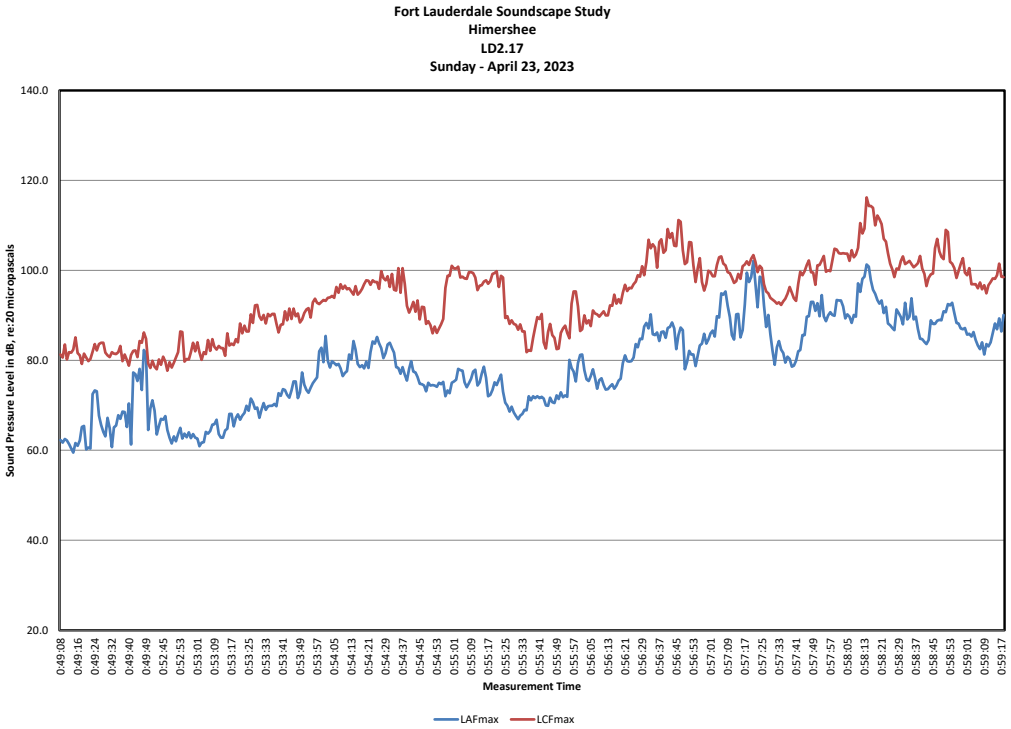

Fort Lauderdale Soundscape Study
The Wharf
LD2.12
Sunday - April 23, 2023
Sound Pressure Level in dB, re:20 micropascals
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
0:12:21
0:12:22
0:12:23
0:12:24
0:12:25
0:12:26
0:12:27
0:12:28
0:12:29
0:12:30
0:12:31
0:12:32
0:12:33
0:12:34
0:12:35
0:12:36
0:12:37
0:12:38
0:12:39
0:12:40
0:12:41
0:12:42
0:12:43
Measurement Time
LAFmax
LCFmax

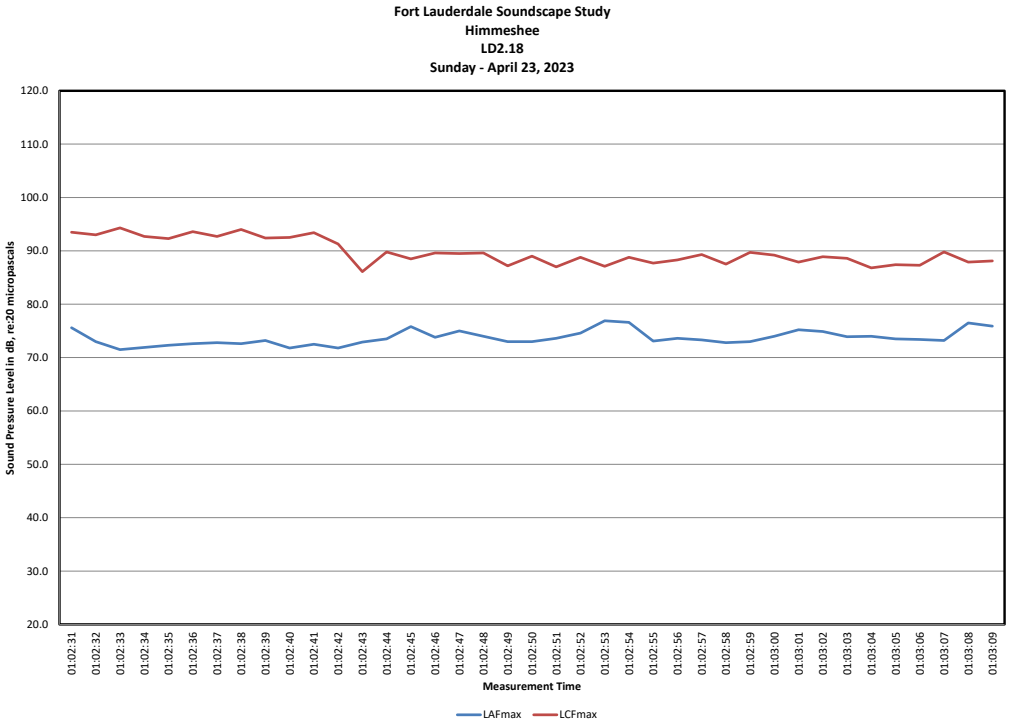

Fort Lauderdale Soundscape Study
The Wharf
LD2.13
Sunday - April 23, 2023
Sound Pressure Level in dB, re:20 micropascals
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
0:19:07
0:19:08
0:19:09
0:19:10
0:19:11
0:19:12
0:19:13
0:19:14
0:19:15
0:19:16
0:19:17
0:19:18
0:19:19
0:19:20
0:19:21
0:19:22
0:19:23
0:19:24
0:19:25
0:19:26
Measurement Time
LAFmax
LCFmax

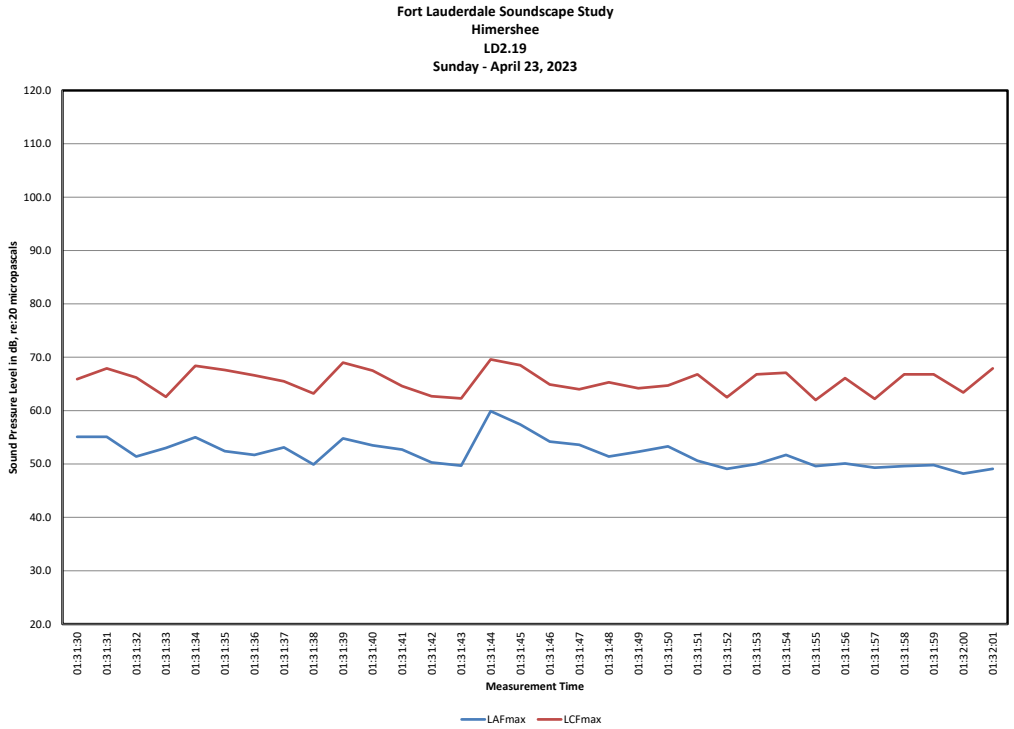

Fort Lauderdale Soundscape Study
The Wharf
LD2.14
Sunday - April 23, 2023
Sound Pressure Level in dB, re:20 micropascals
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
00:29:04
00:29:05
00:29:06
00:29:07
00:29:08
00:29:09
00:29:10
00:29:11
00:29:12
00:29:13
00:29:14
00:29:15
00:29:16
00:29:17
00:29:18
00:29:19
00:29:20
00:29:21
00:29:22
00:29:23
00:29:24
00:29:25
00:29:26
00:29:27
00:29:28
00:29:29
00:29:30
00:29:31
Measurement Time
LAFmax
LCFmax

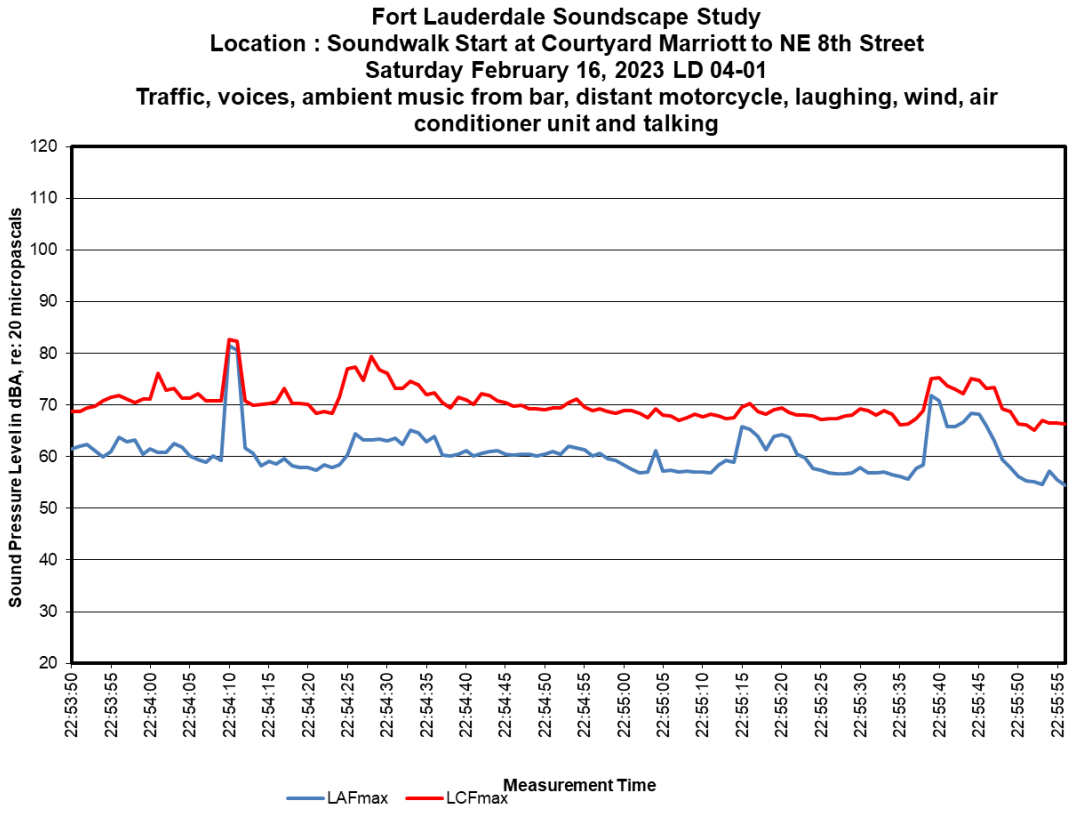

Fort Lauderdale Soundscape Study
The Wharf
LD2.15
Sunday - April 23, 2023
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax


Fort Lauderdale Soundscape Study
Himershee
LD2.16
Sunday - April 23, 2023
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

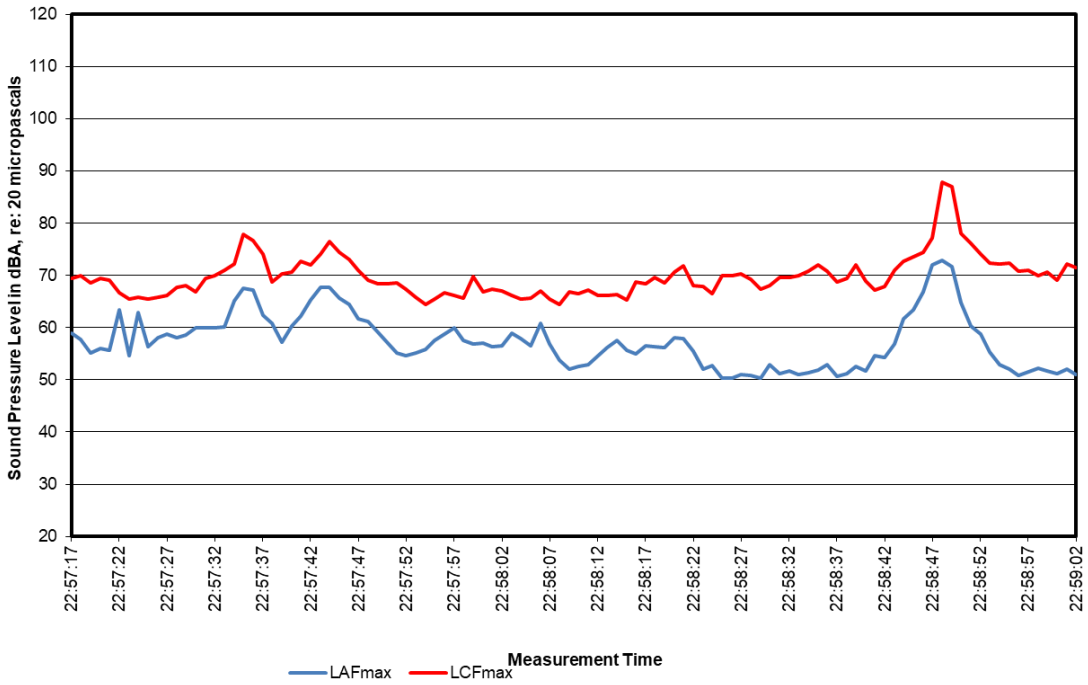

Fort Lauderdale Soundscape Study
Himershee
LD2.17
Sunday - April 23, 2023
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax


Fort Lauderdale Soundscape Study
Himmeshee
LD2.18
Sunday - April 23, 2023
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax

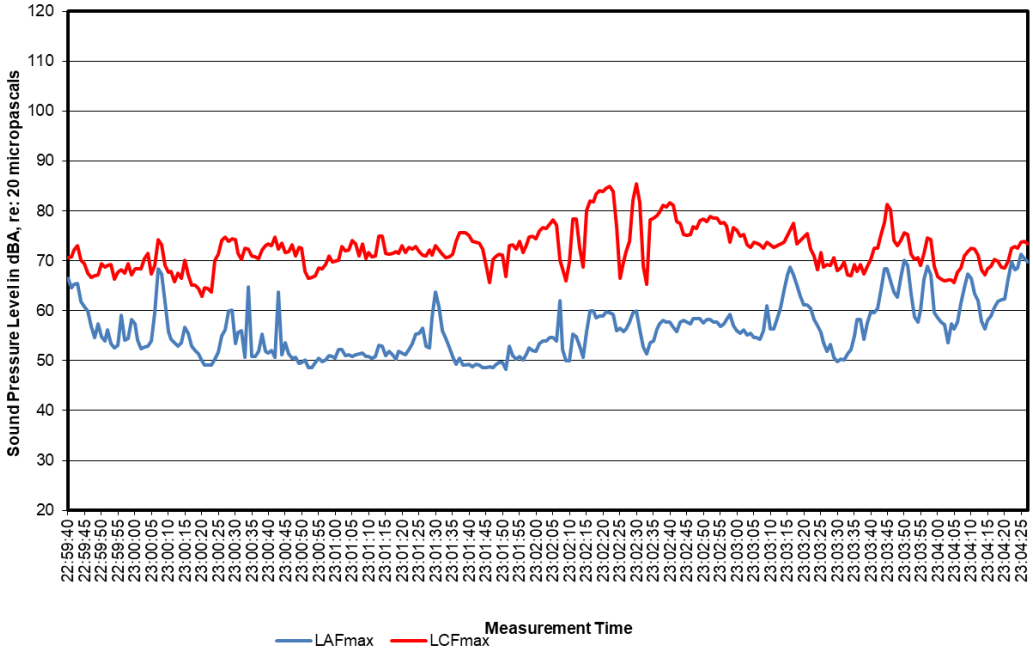

Fort Lauderdale Soundscape Study
Himershee
LD2.19
Sunday - April 23, 2023
Sound Pressure Level in dB, re:20 micropascals
Measurement Time
LAFmax
LCFmax


Fort Lauderdale Soundscape Study
Location : Soundwalk Start at Courtyard Marriott to NE 8th Street
Saturday February 16, 2023 LD 04-01
Traffic, voices, ambient music from bar, distant motorcycle, laughing, wind, air conditioner unit and talking
Sound Pressure Level in dBA, re: 20 micropascals
Measurement Time
LAFmax
LCFmax

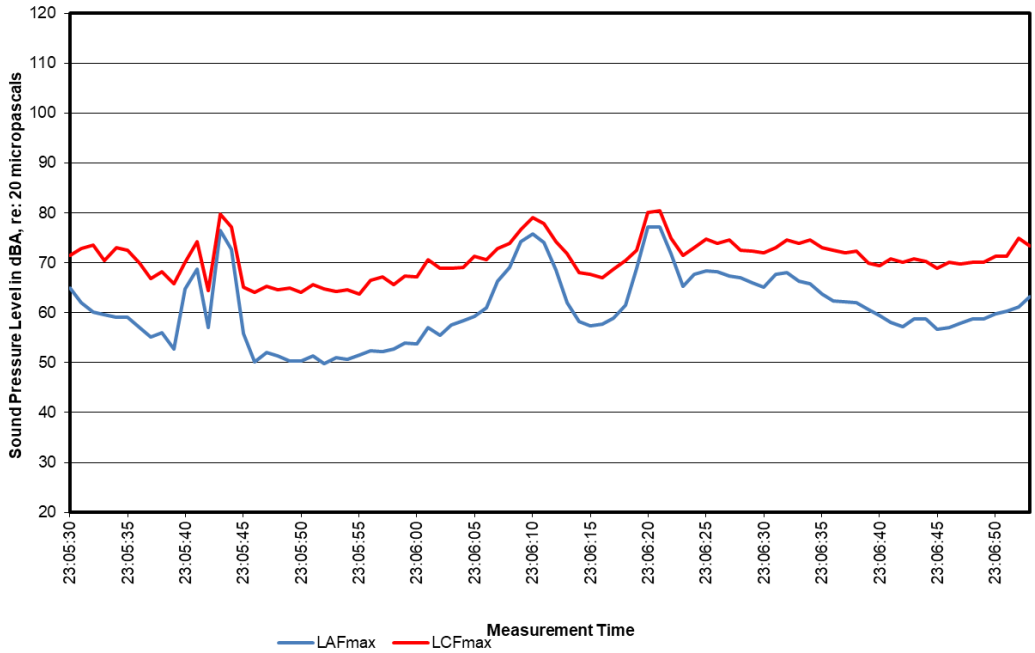
Fort Lauderdale Soundscape Study
Location : Soundwalk Start at NE 8th Street Flager Village
Saturday February 16, 2023 LD 04-02
Water going down drain, distant voices, cars on 8th, birds and music from party



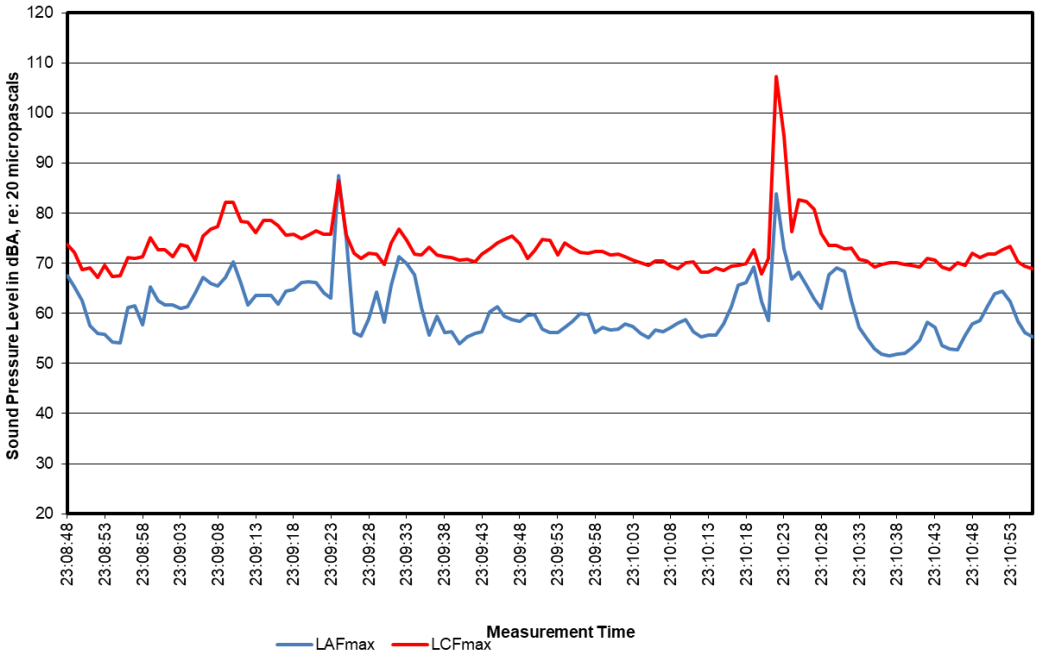
Fort Lauderdale Soundscape Study
Location : NE 8th Street Flager Village
February 16, 2023 LD 04-03
Car revving, yelling, music from party, motorcycle and cars passing, music at Rose Club



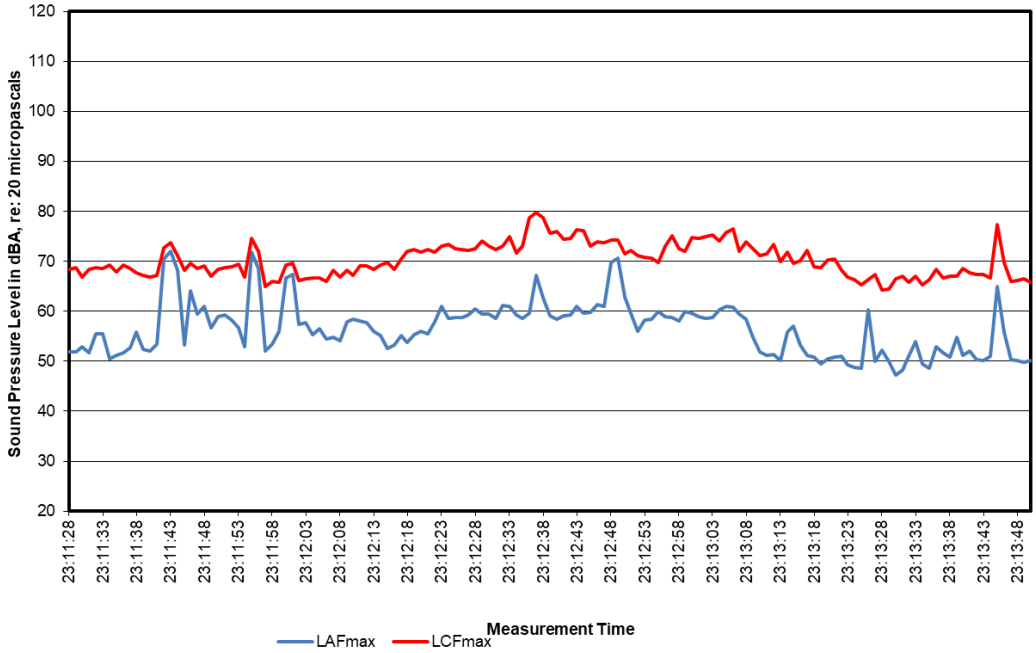
Fort Lauderdale Soundscape Study
Location : NE 8th Street Flager Village and 3rd
February 17, 2023 LD 04-04
Music from house, traffic and coughing



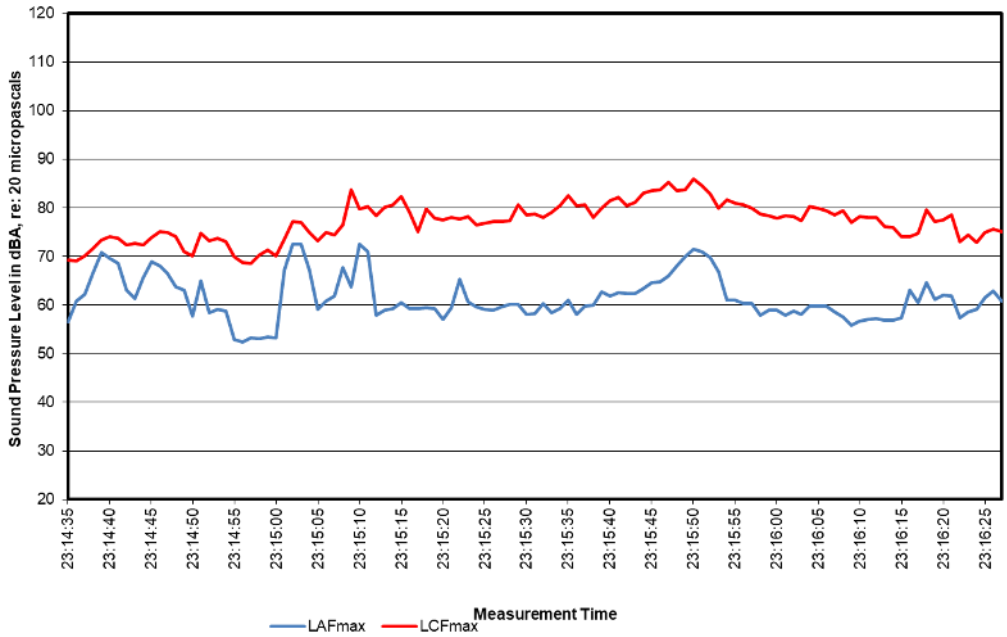
Fort Lauderdale Soundscape Study
Location : Flager Drive at NE 3rd going down Flagler Drive to NE 4th
February 17, 2023 LD 04-05
Music across train tracks, Traffic, Car Revving, airplane, voices, crickets and Music



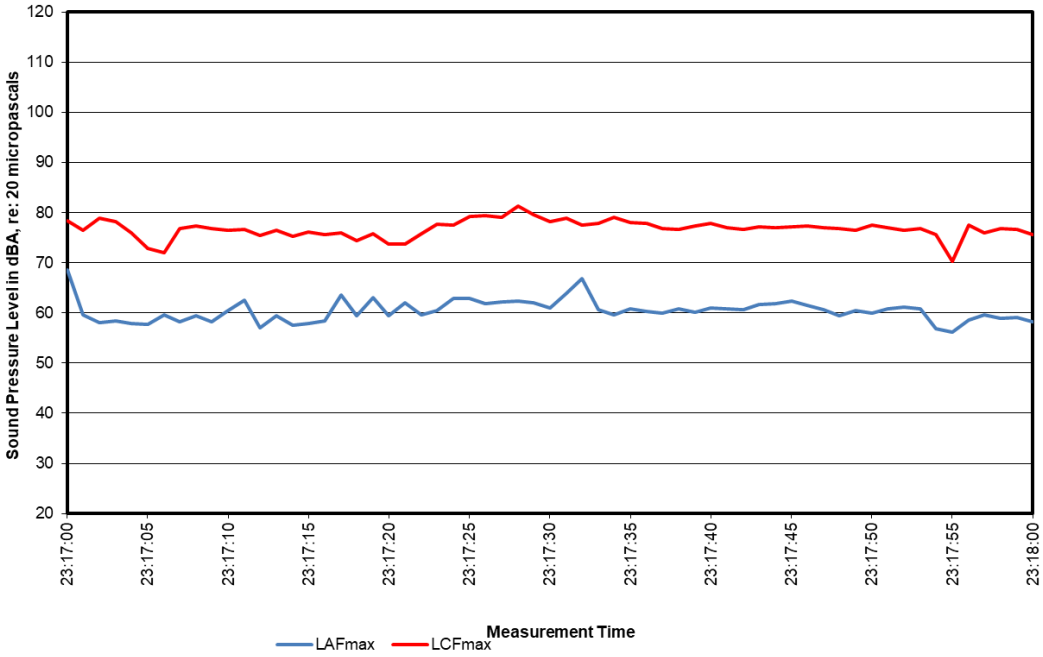
Fort Lauderdale Soundscape Study
Location : NE 4th and North Flagler
February 17, 2023 LD 04-06
Distant music, voices, Loud distant music, Glitch bar 75 ft behind and crickets



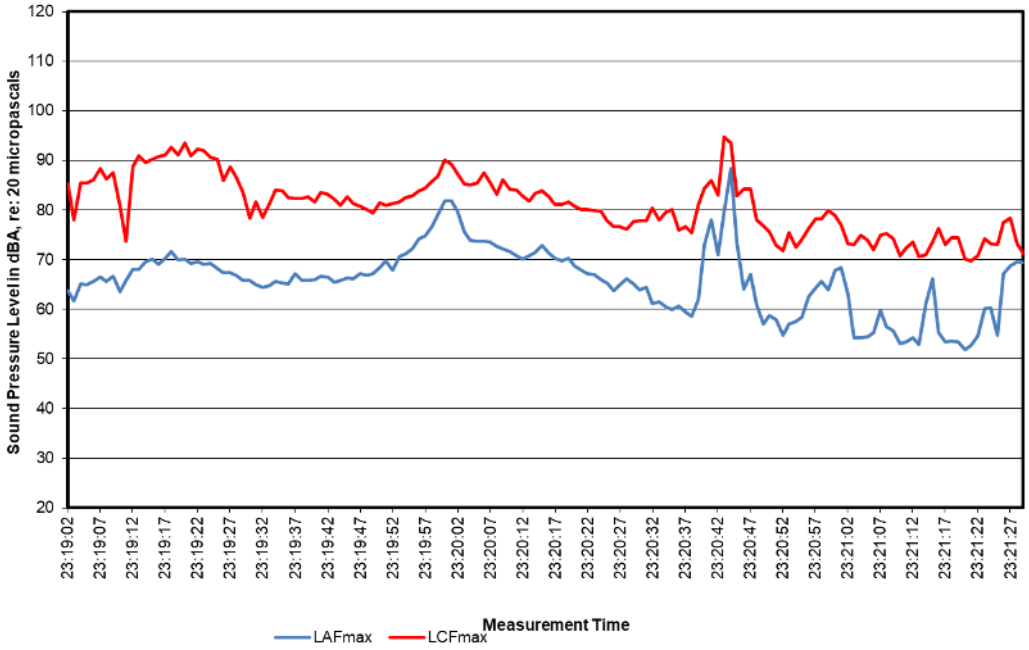
Fort Lauderdale Soundscape Study
Location : NE 4th and North Flagler
February 17, 2023 LD 04-07
Distant music, voices, Loud distant music, Glitch bar 75 ft behind and crickets



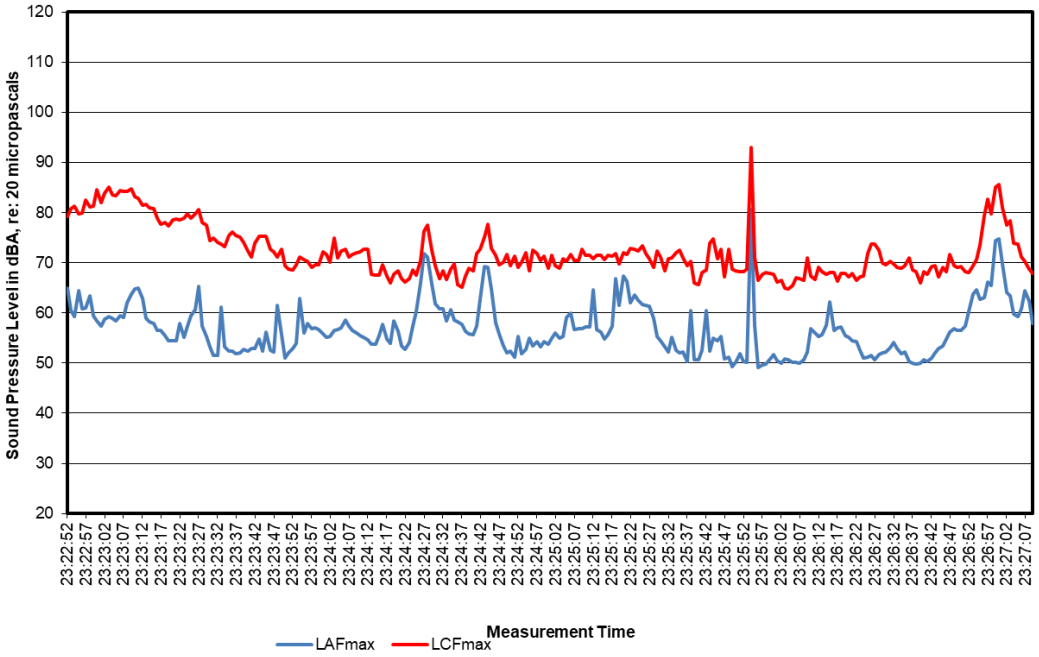
Fort Lauderdale Soundscape Study
Location : Juice Bar
February 17, 2023 LD 04-08
Voices, traffic, car revving, cough, Glitch Bar and wind



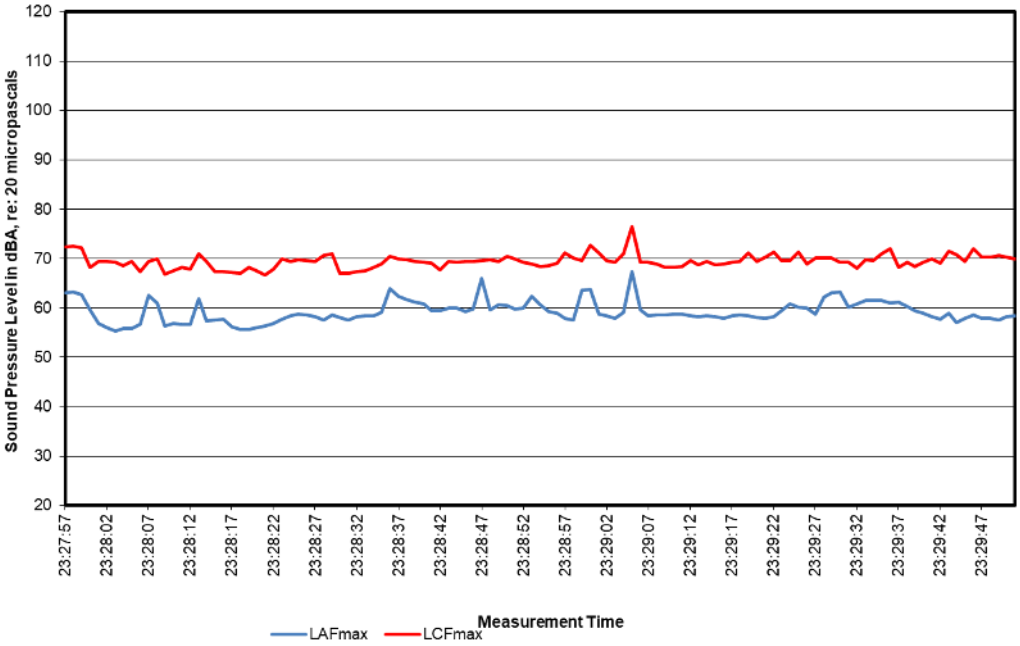
Fort Lauderdale Soundscape Study
Location : NE 5th Flager Village beyond glicth bar
February 17, 2023 LD 04-09
Voices, music from bar and traffic



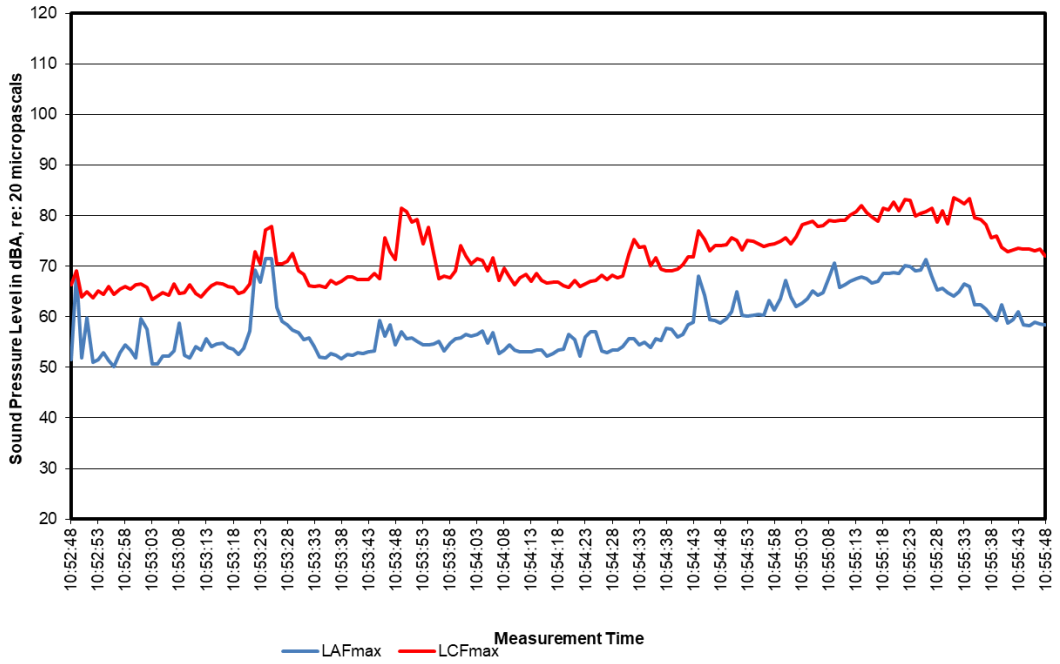
Fort Lauderdale Soundscape Study
Location : NE 8th going to courtyard
February 17, 2023 LD 04-10
Voices, Rose music get louder when door is opened, AC unit, Distant train and traffic



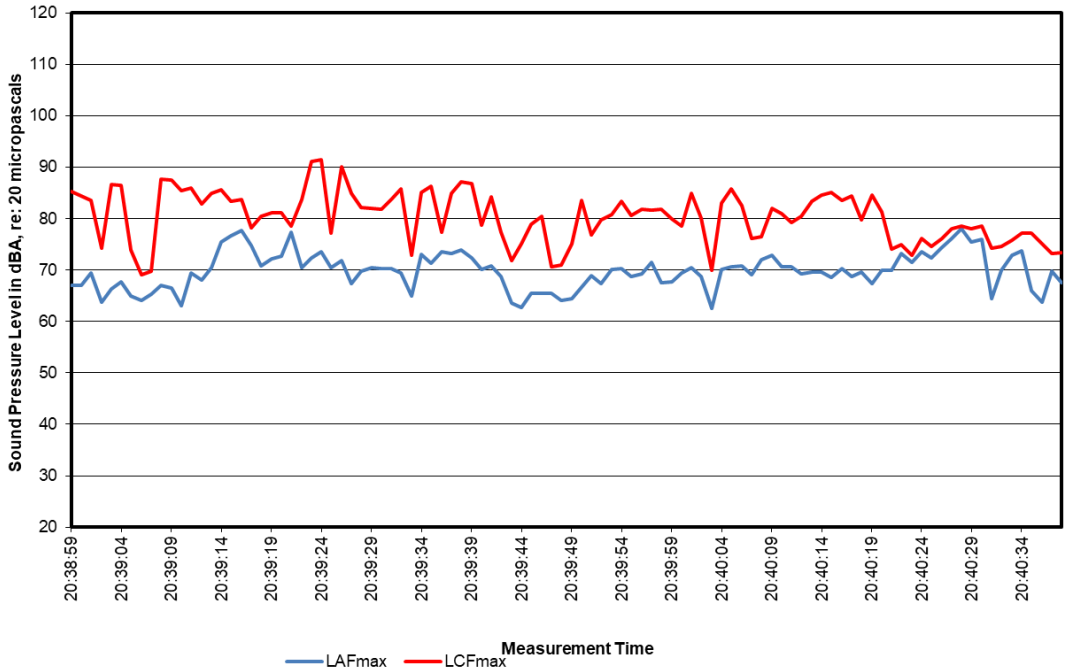
Fort Lauderdale Soundscape Study
Location : NE 5th terrace going to courtyard
February 17, 2023 LD 04-11
Motorcycle, bus stop noise, AC unit, sprinklers, voices, insects and music



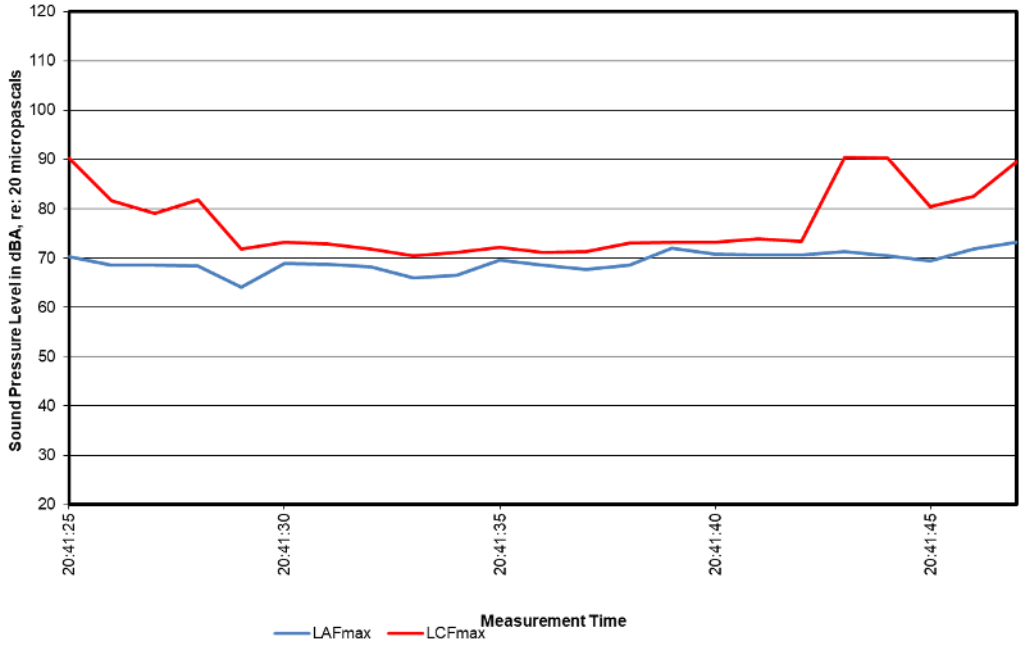
Fort Lauderdale Soundscape Study
Location : Bamboo Flats to Coner near Rose
February 17, 2023 LD 04-12
Ambient traffic on nearby roads and engine revving



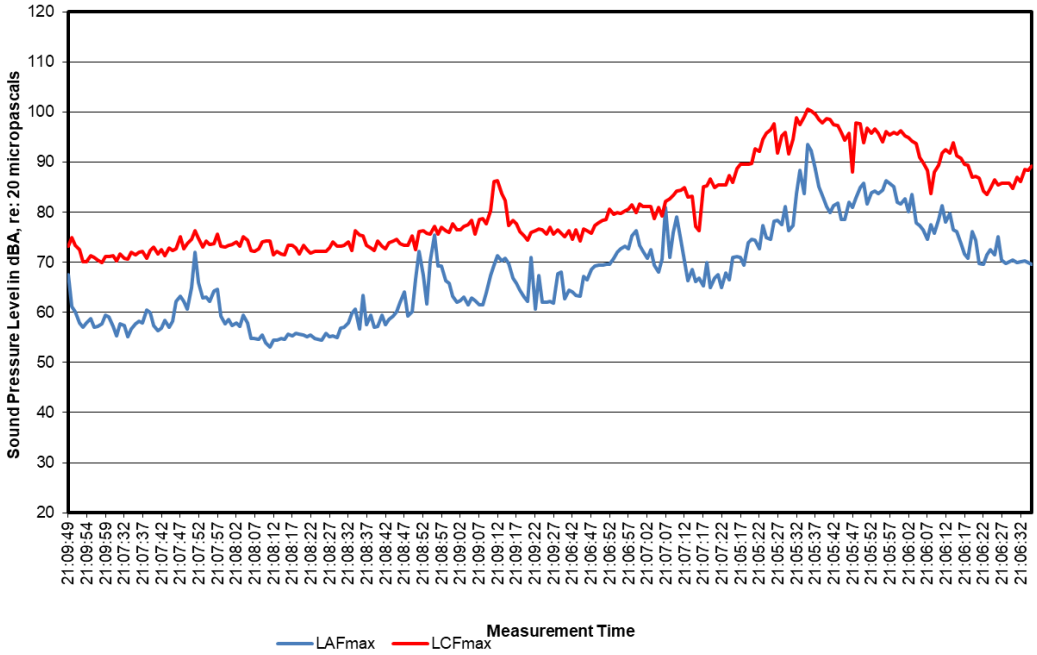
Fort Lauderdale Soundscape Study
Location : Courtyard by Marriott Downtown Rooftop Bar
February 17, 2023 LD 04-13
Music and Voices



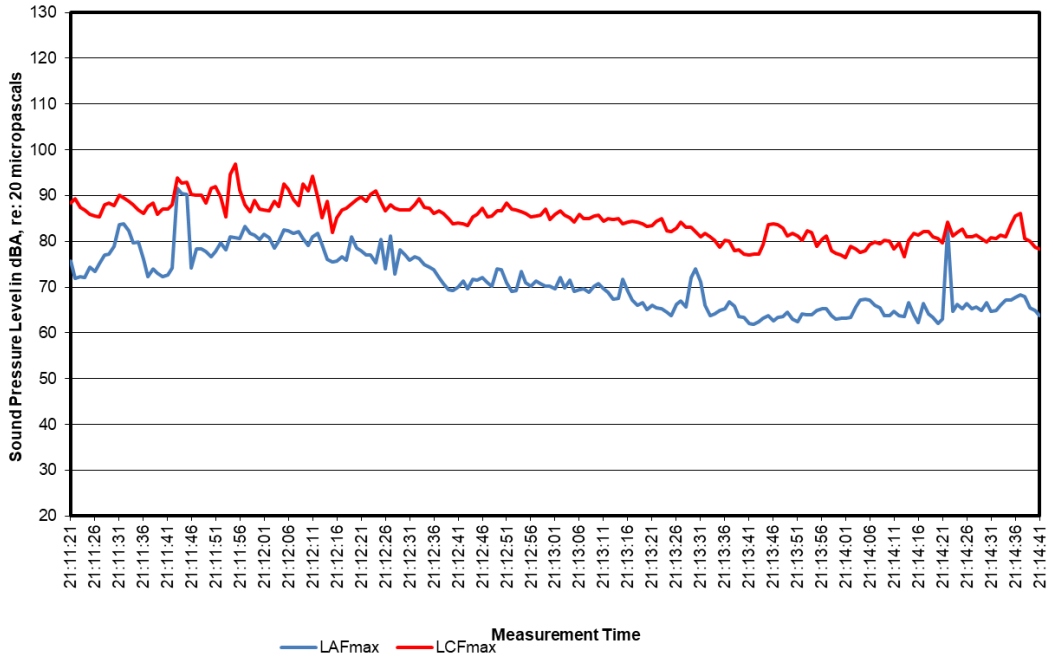
Fort Lauderdale Soundscape Study
Location : Courtyard by Marriott Downtown Rooftop Bar
February 17, 2023 LD 04-14
Music and Voices



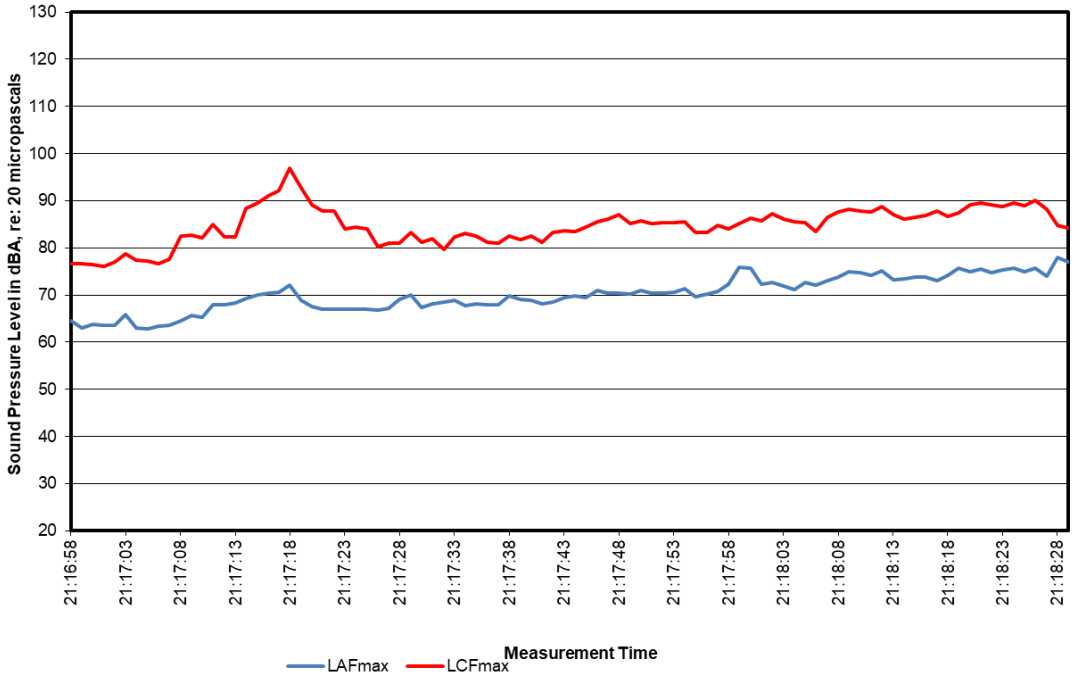
Fort Lauderdale Soundscape Study
Location : Esplande Park Starting at Commodore Brook Ave,
February 17, 2023 LD 04-15
Soundwalk, footsteps, nearby and distant traffic, distant music, Voices and music at Fat Catz

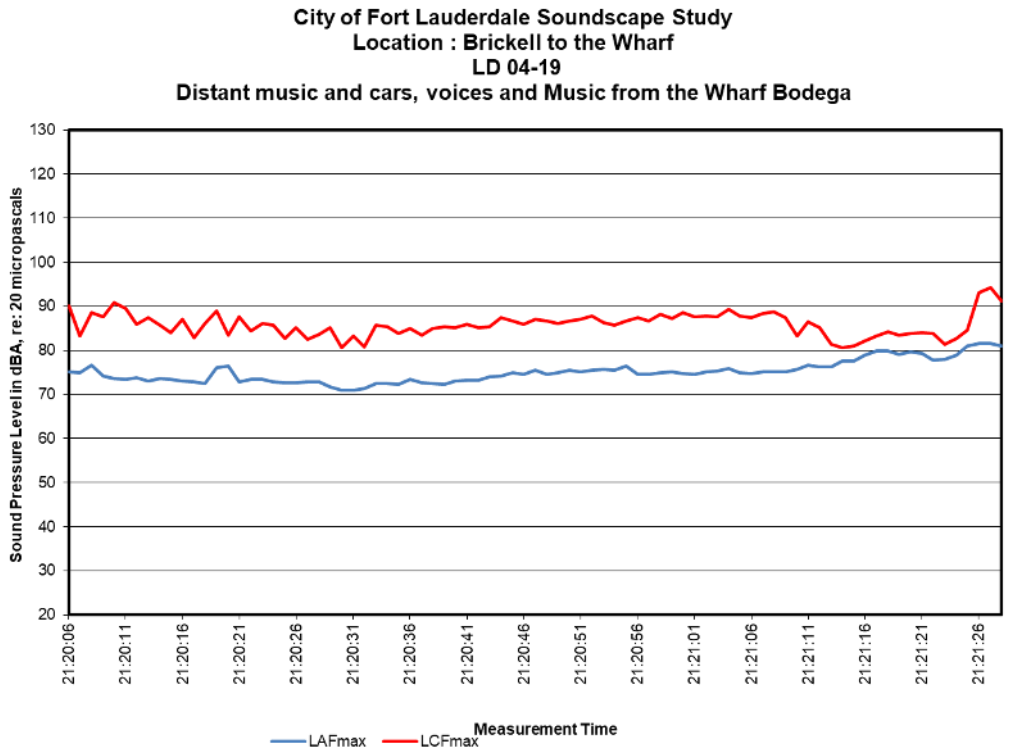


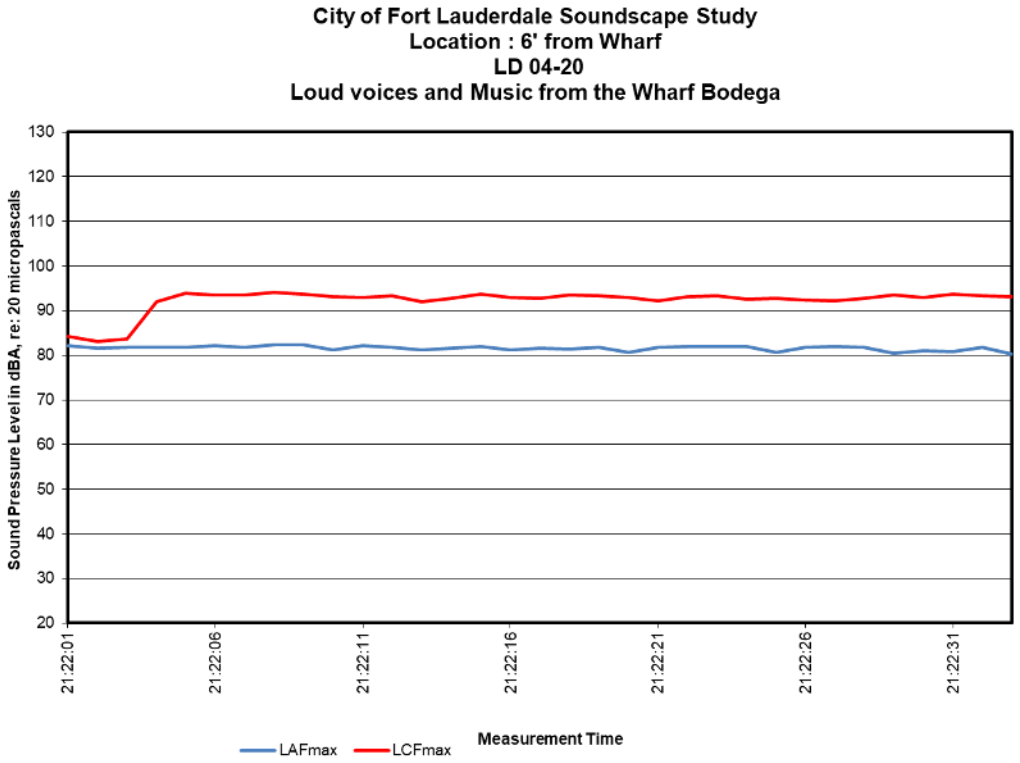
City of Fort Lauderdale Soundscape Study
Location : Crossing the street
LD 04-16
Music from Lucky's Tavern, voices, music from Wee Tacos, traffic and engine rev



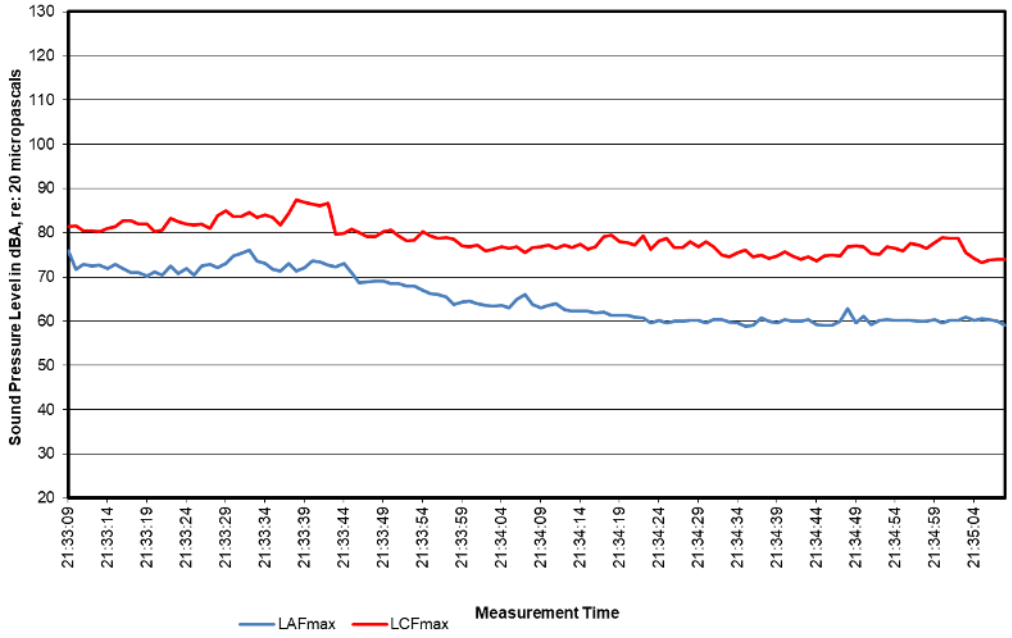
City of Fort Lauderdale Soundscape Study
Location : The Wharf
LD 04-17
Distant music, distant voices, voices and music from the Wharf Bodega



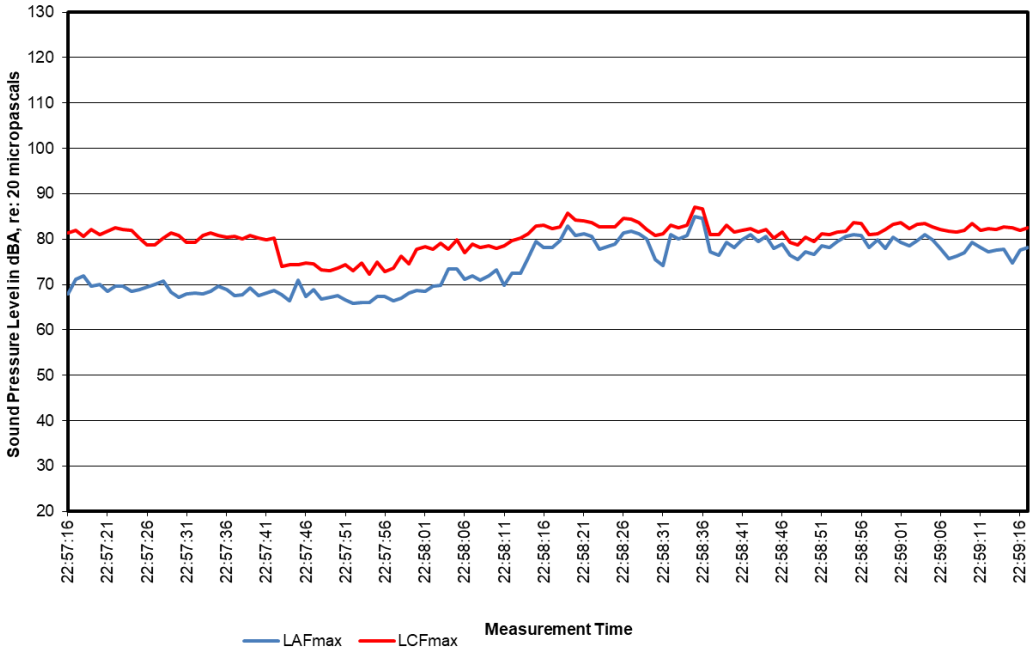

City of Fort Lauderdale Soundscape Study
Location : Brickell to the Wharf
LD 04-19
Distant music and cars, voices and Music from the Wharf Bodega
Sound Pressure Level in dBA, re: 20 micropascals
130
120
110
100
90
80
70
60
50
40
30
20
21:20:06
21:20:11
21:20:16
21:20:21
21:20:26
21:20:31
21:20:36
21:20:41
21:20:46
21:20:51
21:20:56
21:21:01
21:21:06
21:21:11
21:21:16
21:21:21
21:21:26
Measurement Time
LAFmax
LCFmax


City of Fort Lauderdale Soundscape Study
Location : 6' from Wharf
LD 04-20
Loud voices and Music from the Wharf Bodega
Sound Pressure Level in dBA, re: 20 micropascals
130
120
110
100
90
80
70
60
50
40
30
20
21:22:01
21:22:06
21:22:11
21:22:16
21:22:21
21:22:26
21:22:31
Measurement Time
LAFmax
LCFmax

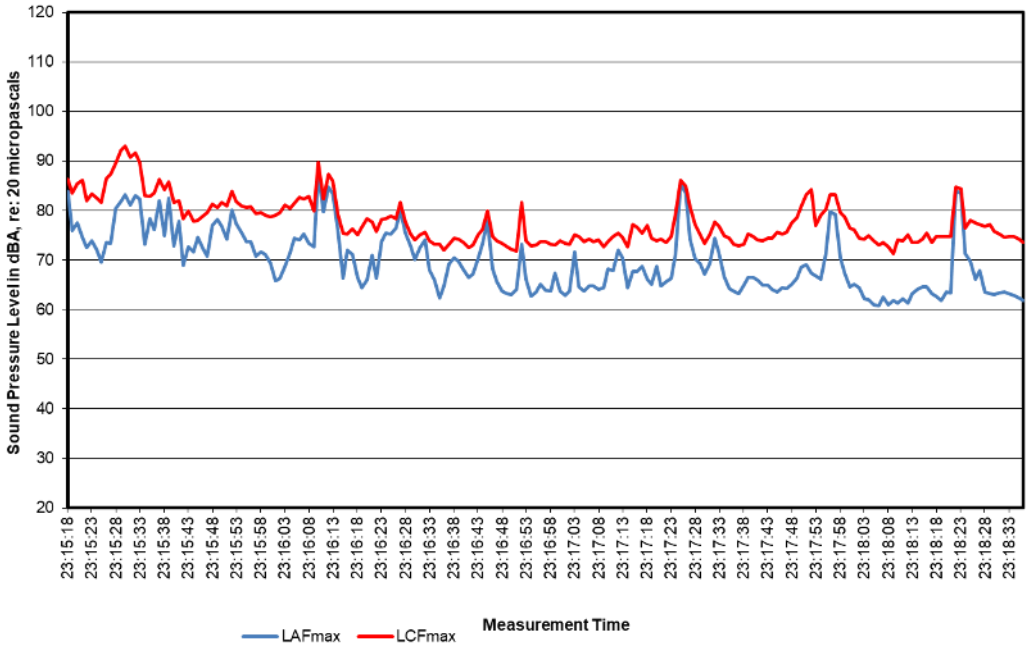
City of Fort Lauderdale Soundscape Study
Location : Riverwalk to Automation Stage
LD 04-21
Boats, distant music, quiet waves, distant bass and distant talking



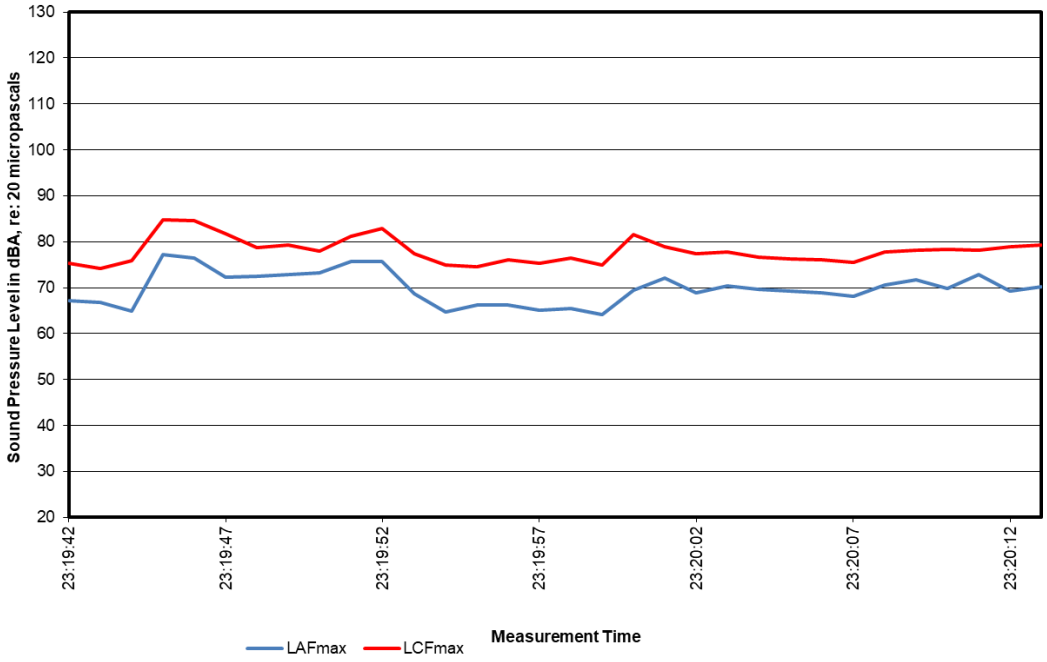
City of Fort Lauderdale Soundscape Study
Location : Soundwalk New River Drive to Salt Seven
LD 04-23
Music, voices and crickets



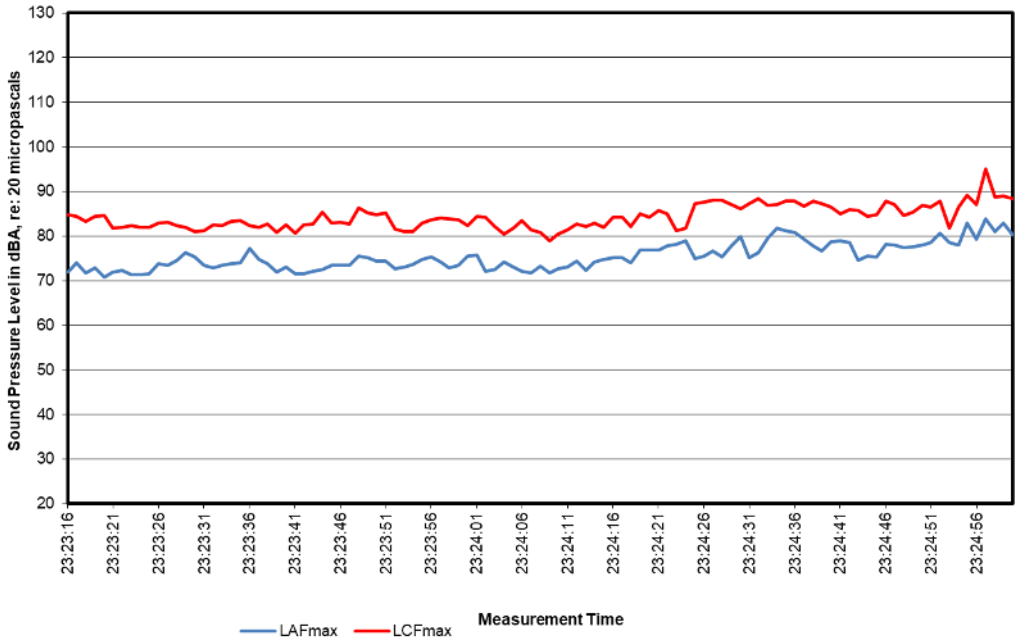
Fort Lauderdale Soundscape Study
Location : Soundwalk New River Drive to Salt Seven
February 17, 2023 LD 04-26
Car Rev, Voices at Fogo De Chao, distant music from Eddie V's, yelling and distant music



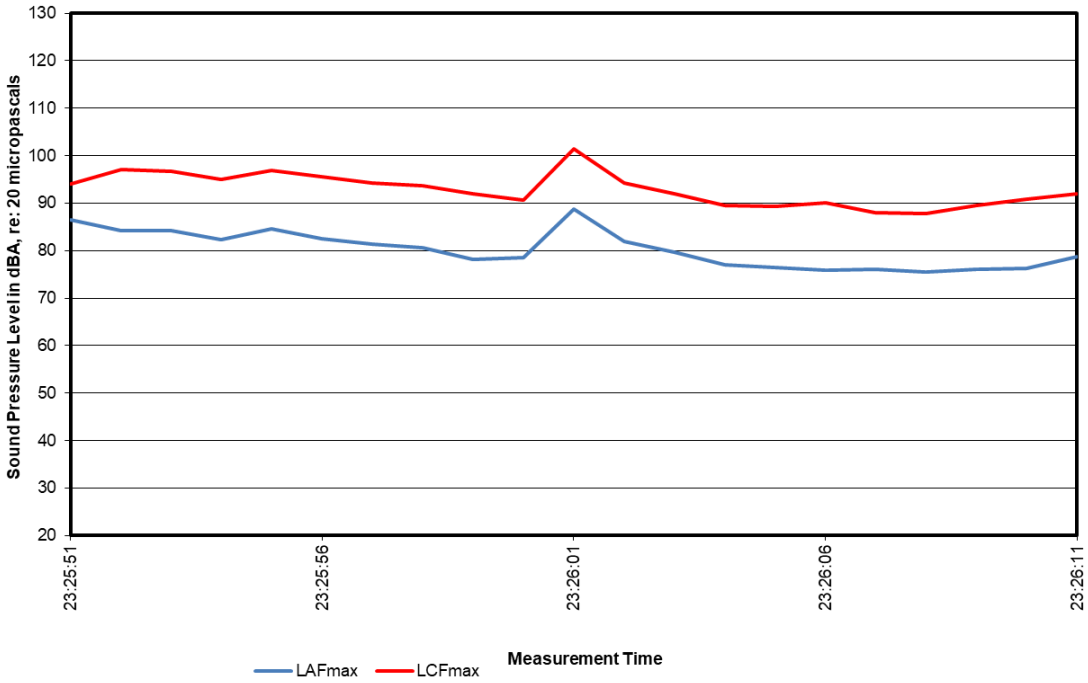
Fort Lauderdale Soundscape Study
Location : Outside Hyatt Centric
February 17, 2023 LD 04-27
Music, voices and traffic



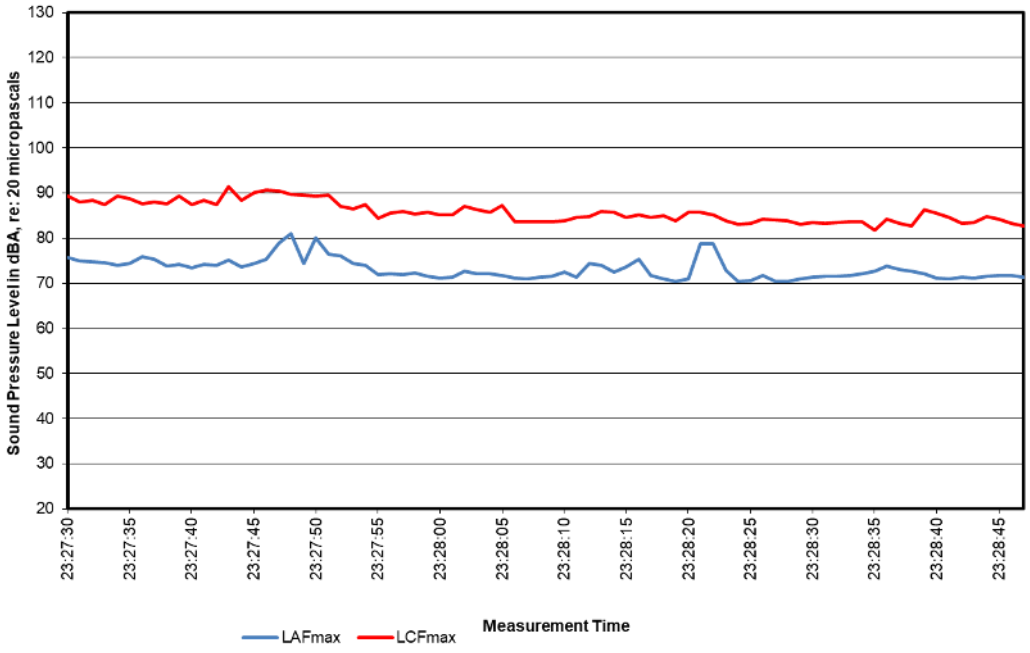
Fort Lauderdale Soundscape Study
Location : Andres Ave to The Wharf
February 17, 2023 LD 04-28
Music, voices and traffic



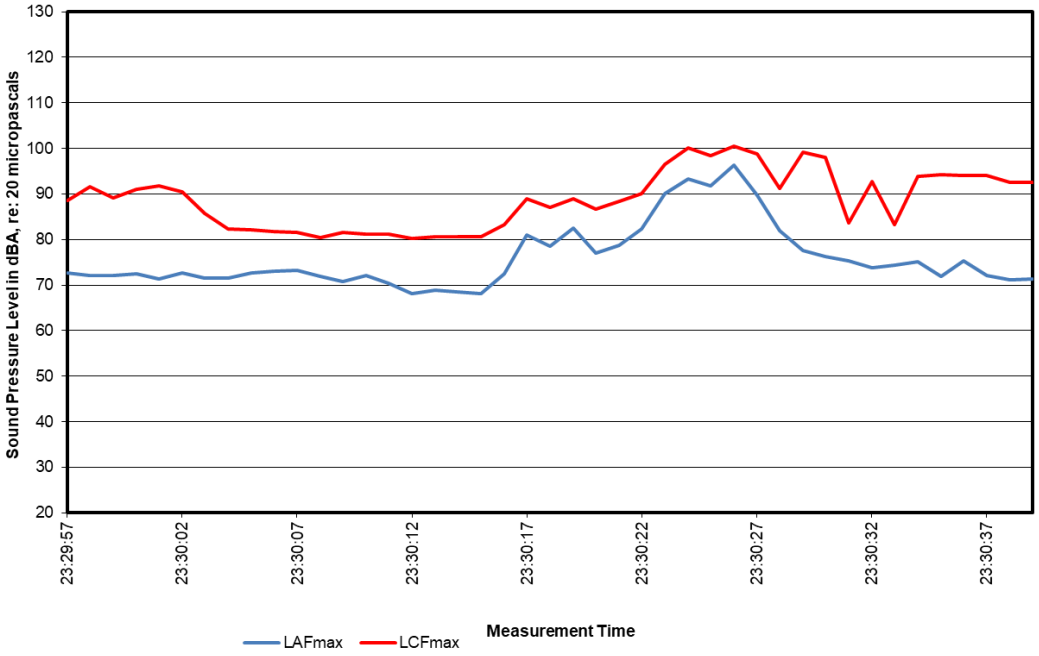
Fort Lauderdale Soundscape Study
Location : The Wharf
February 17, 2023 LD 04-29
Music, voices, Lamborgini and Bentley Revving



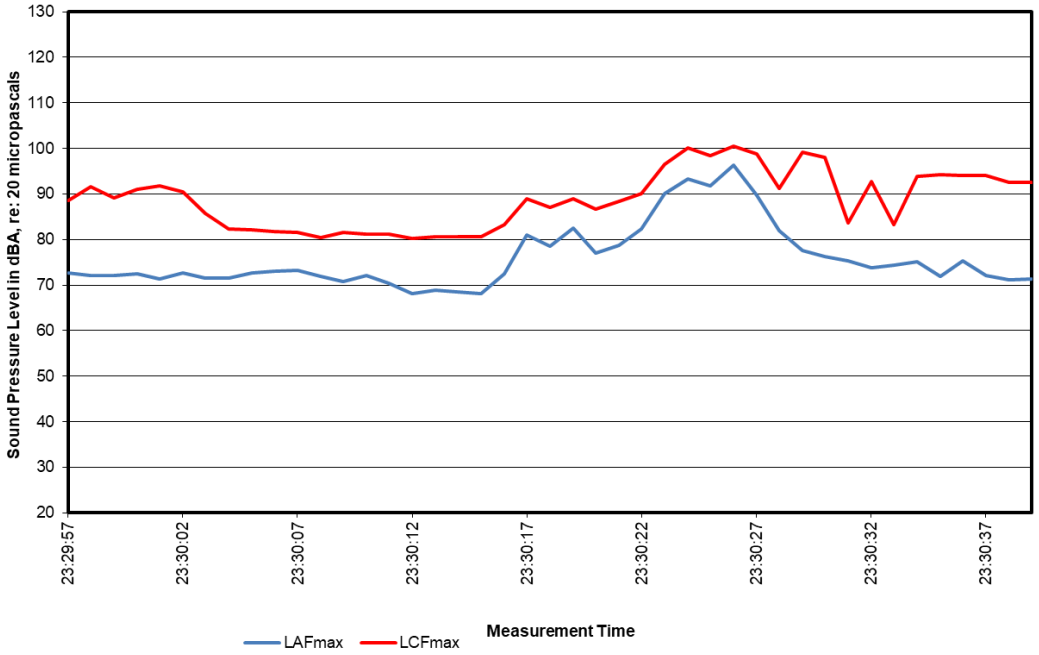
Fort Lauderdale Soundscape Study
Location : Corner of The Wharf and Bodega
February 17, 2023 LD 04-30
Music, voices, slow traffic and Car Revving



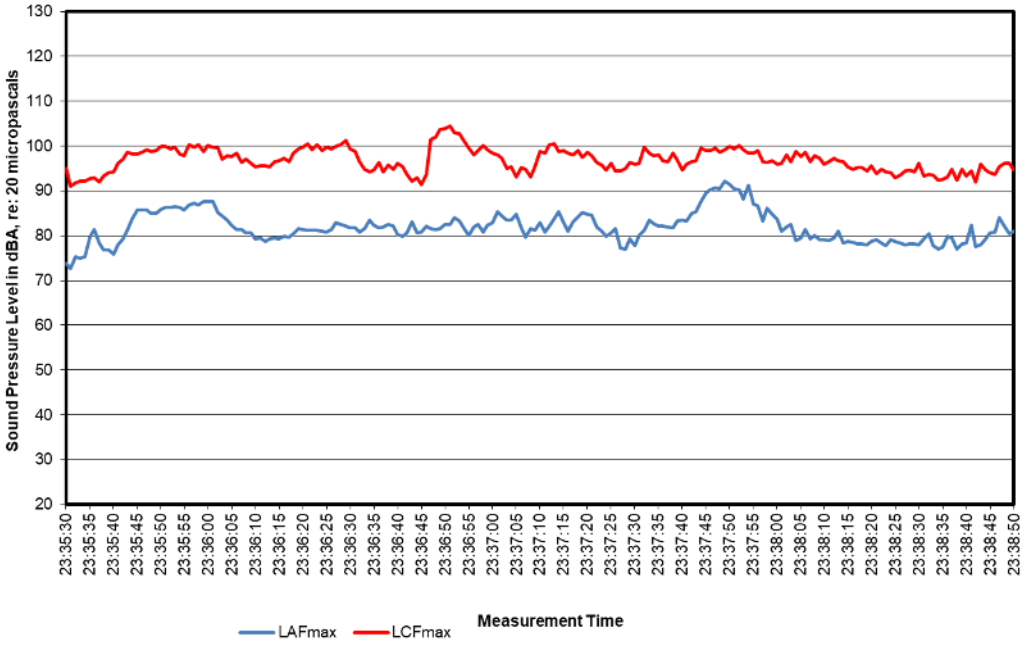
Fort Lauderdale Soundscape Study
Location : Bricklell and 2nd Ave
February 17, 2023 LD 04-31
Music, voices and Motorcycle Passing



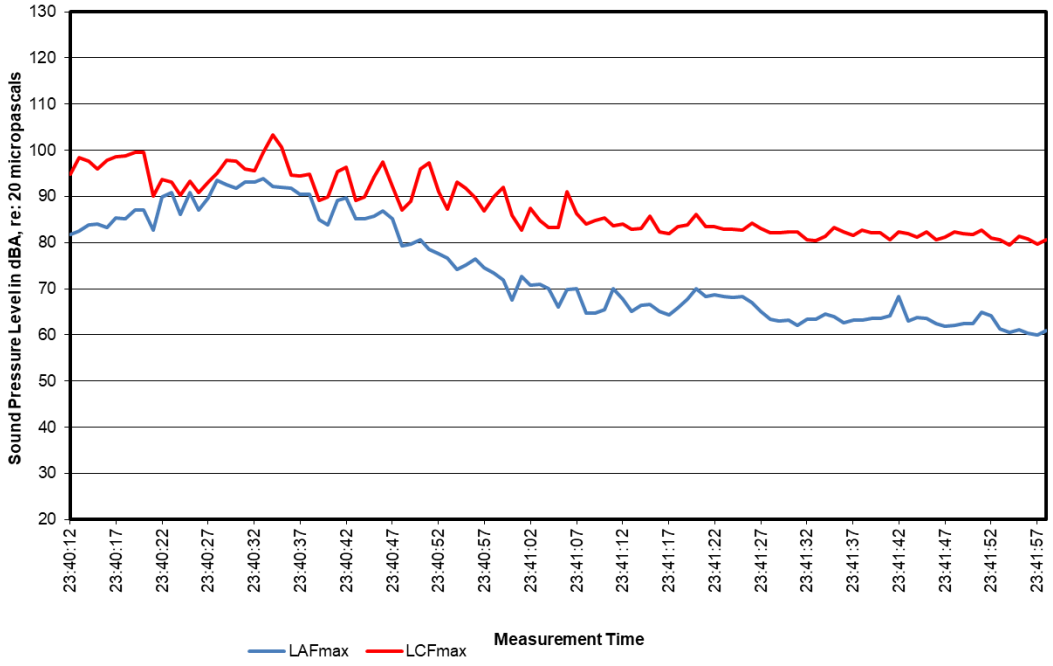
Fort Lauderdale Soundscape Study
Location : Brickell and 2nd Ave
February 17, 2023 LD 04-31
Music, voices and Motorcycle Passing



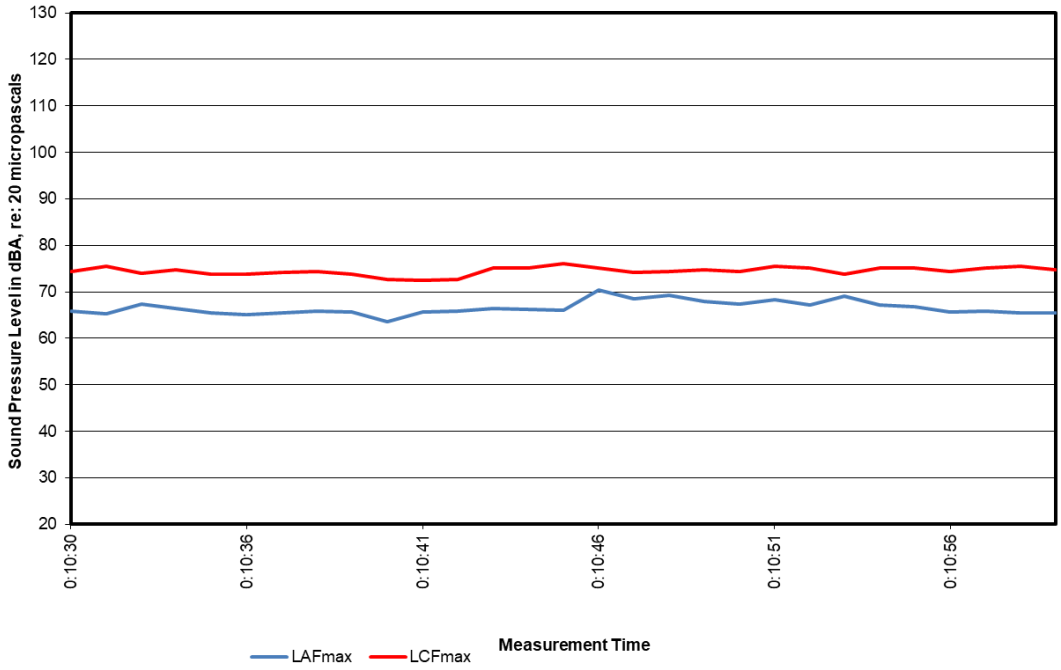
Fort Lauderdale Soundscape Study
Location : Moffat Ave walking down Himmarshee
February 17, 2023 LD 04-33
Music, bass, and voices



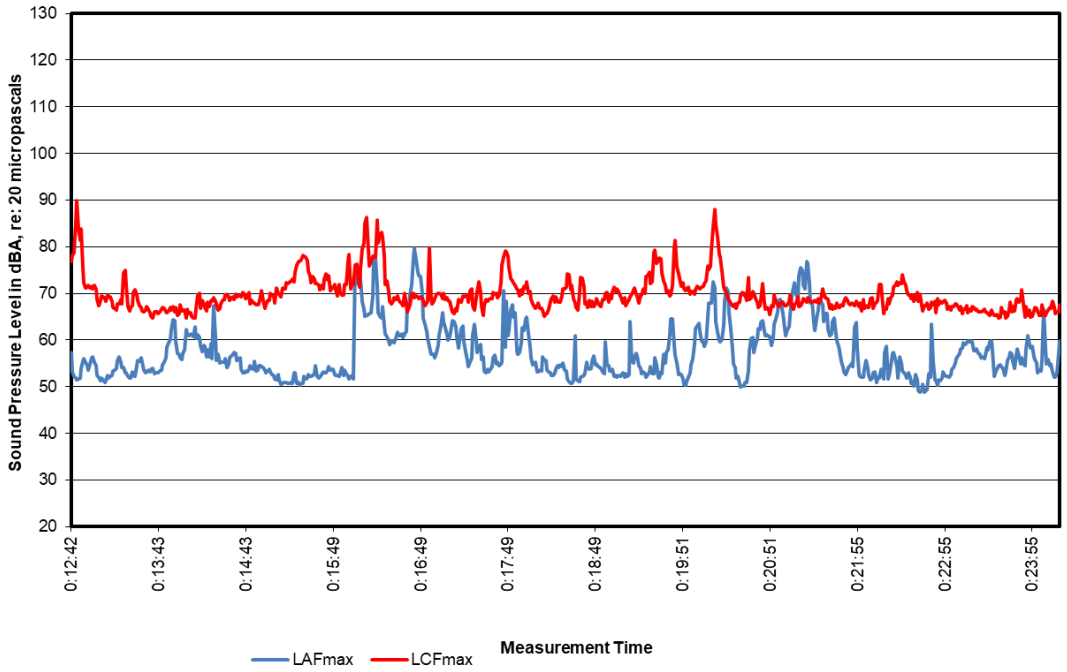
Fort Lauderdale Soundscape Study
Location : Capones to Southwest 4th
February 17, 2023 LD 04-34
Music, bass, and voices



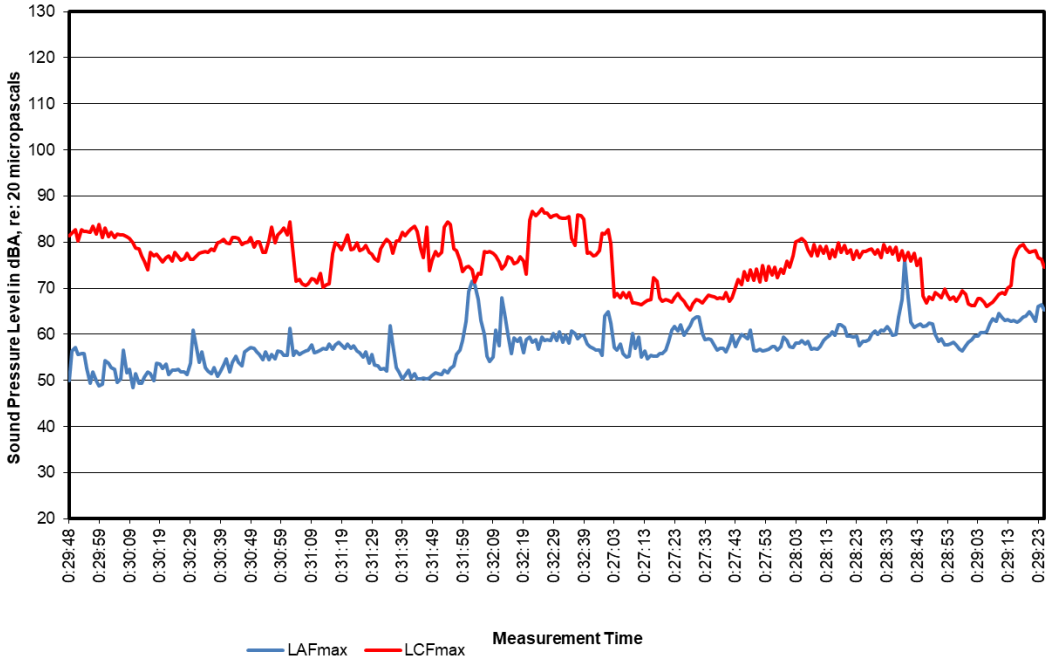
Fort Lauderdale Soundscape Study
Location : Port Cochere at Marriott
February 17, 2023 LD 04-35
Background music, traffic, and voices



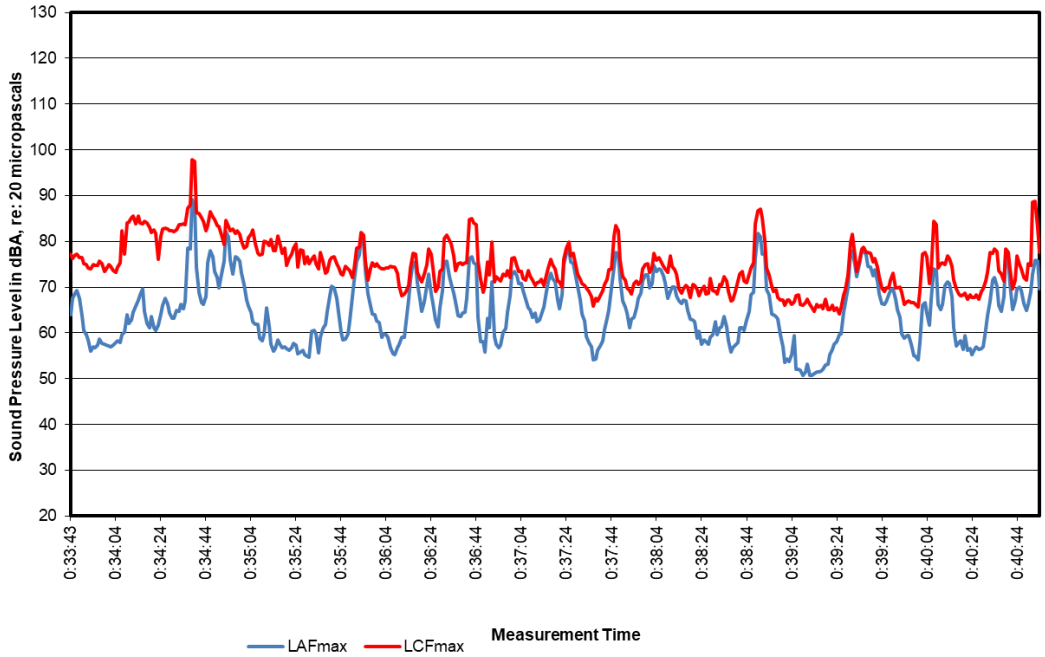
Fort Lauderdale Soundscape Study
Location : NE 7th street
February 17, 2023 LD 04-36
Siren, insects, distant plane, music, train horn, traffic, and voices



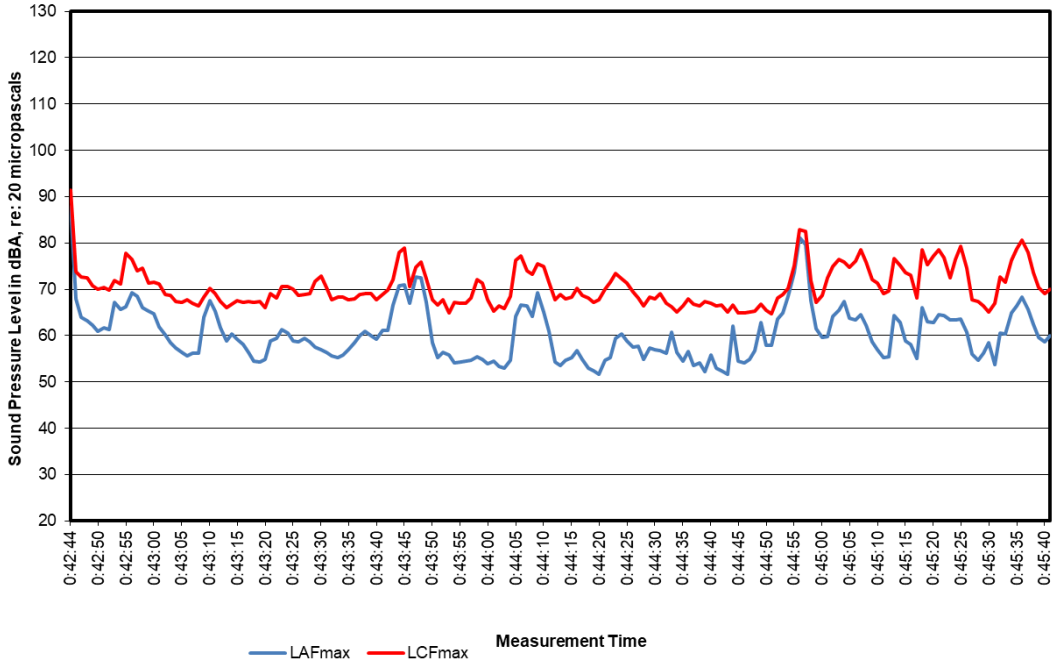
Fort Lauderdale Soundscape Study
Location : NE 1st and NE 7th Street
February 17, 2023 LD 04-37
Distant plane, music, traffic and voices

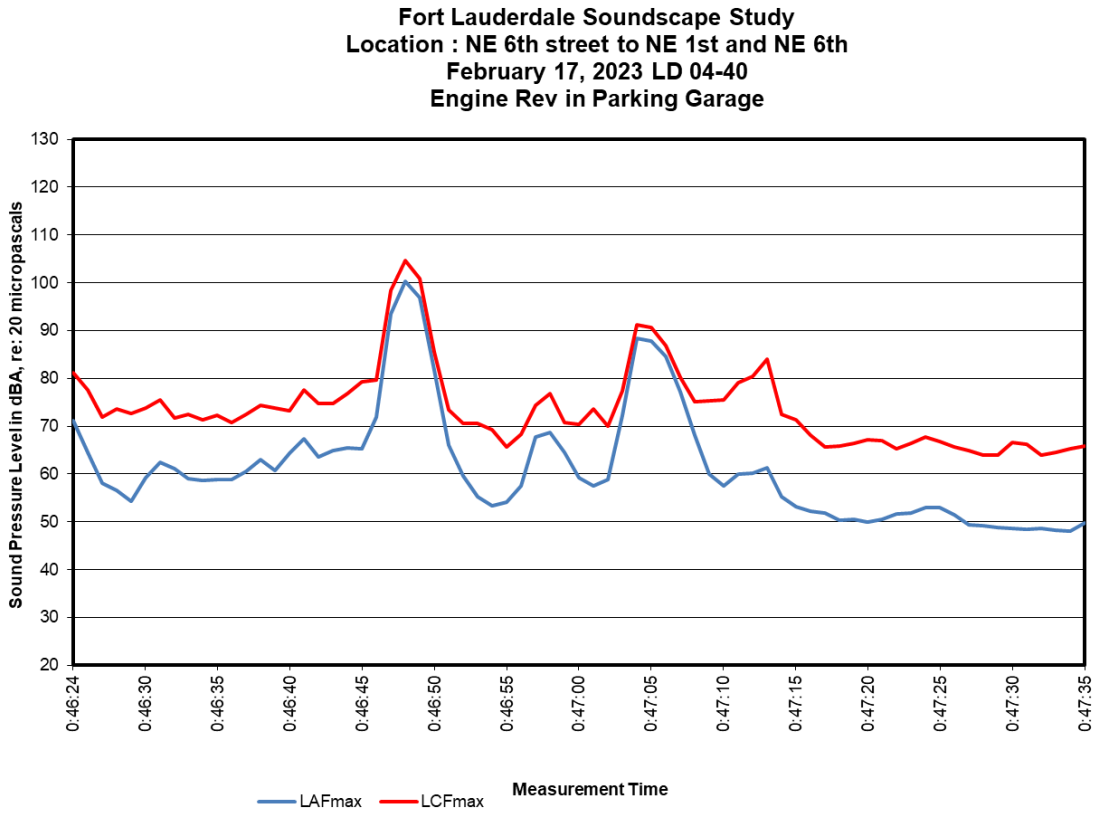


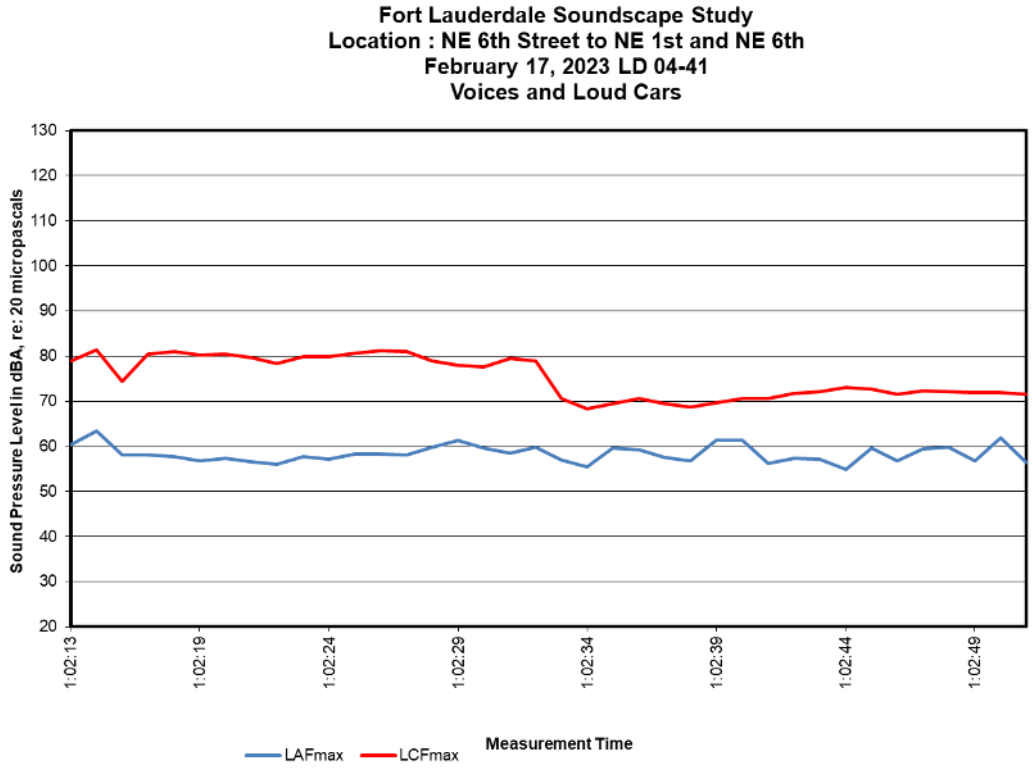
Fort Lauderdale Soundscape Study
Location : NE 7th by Ora to NE 30th Ave
February 17, 2023 LD 04-38
Music, loud traffic and voices



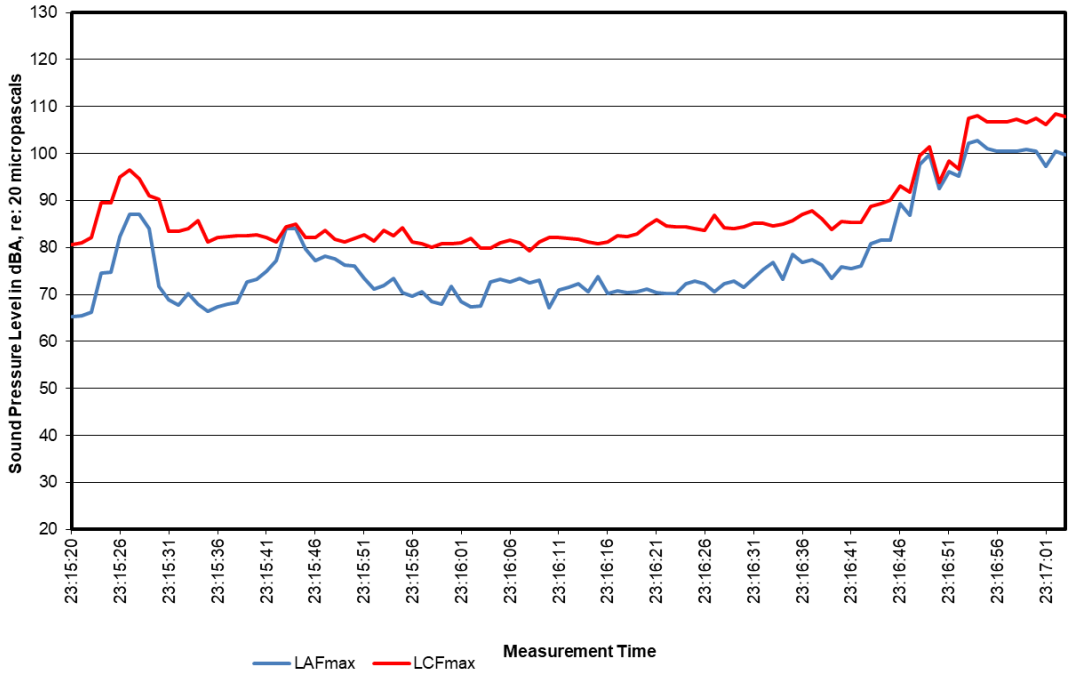
Fort Lauderdale Soundscape Study
Location : NE 6th street to NE 1st and NE 6th
February 17, 2023 LD 04-39
Music, insects, traffic and voices



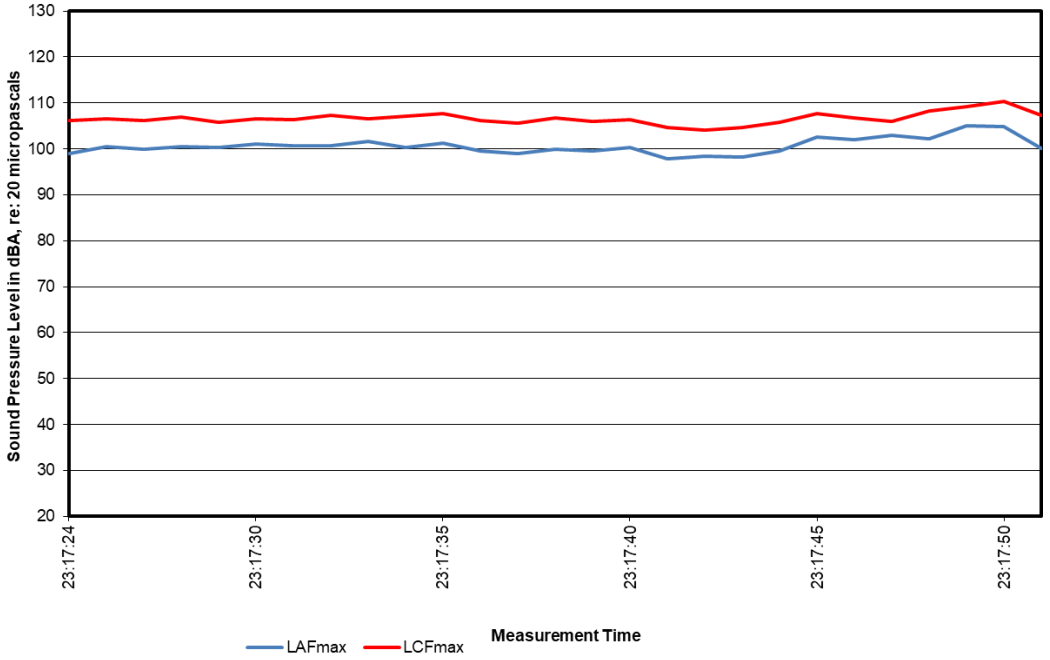

Fort Lauderdale Soundscape Study
Location : NE 6th street to NE 1st and NE 6th
February 17, 2023 LD 04-40
Engine Rev in Parking Garage
Sound Pressure Level in dBA, re: 20 micropascals
130
120
110
100
90
80
70
60
50
40
30
20
0:46:24
0:46:30
0:46:35
0:46:40
0:46:45
0:46:50
0:46:55
0:47:00
0:47:05
0:47:10
0:47:15
0:47:20
0:47:25
0:47:30
0:47:35
Measurement Time
LAFmax
LCFmax


Fort Lauderdale Soundscape Study
Location : NE 6th Street to NE 1st and NE 6th
February 17, 2023 LD 04-41
Voices and Loud Cars
Sound Pressure Level in dBA, re: 20 micropascals
130
120
110
100
90
80
70
60
50
40
30
20
1:02:13
1:02:19
1:02:24
1:02:29
1:02:34
1:02:39
1:02:44
1:02:49
Measurement Time
LAFmax
LCFmax

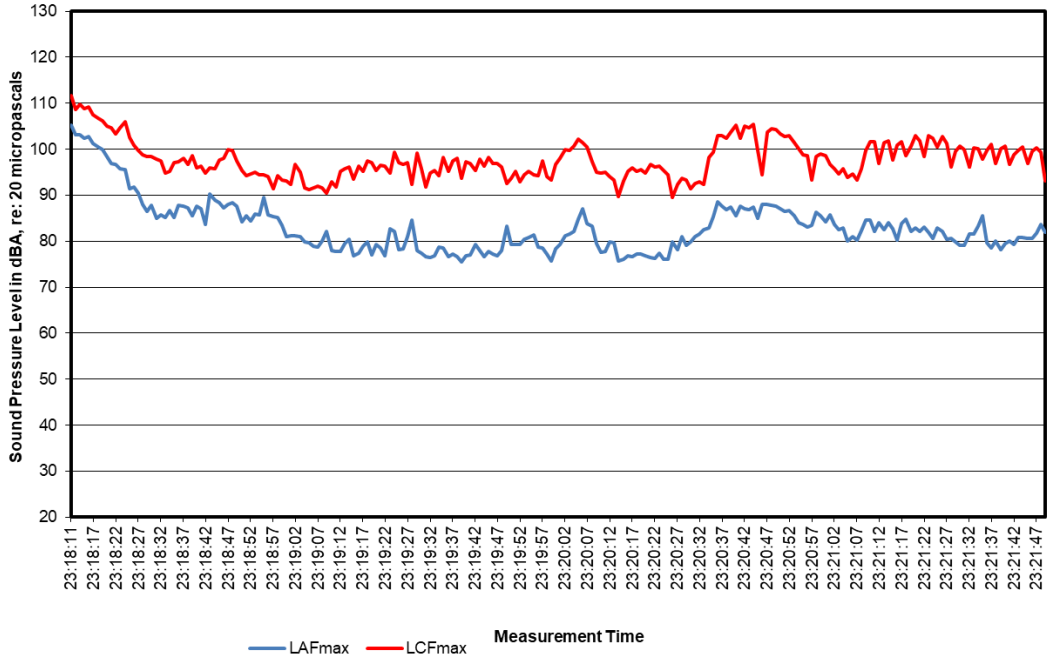
Fort Lauderdale Soundscape Study
Location : Fatcats
February 17, 2023 LD 04-52
Music, Voices and Loud Cars



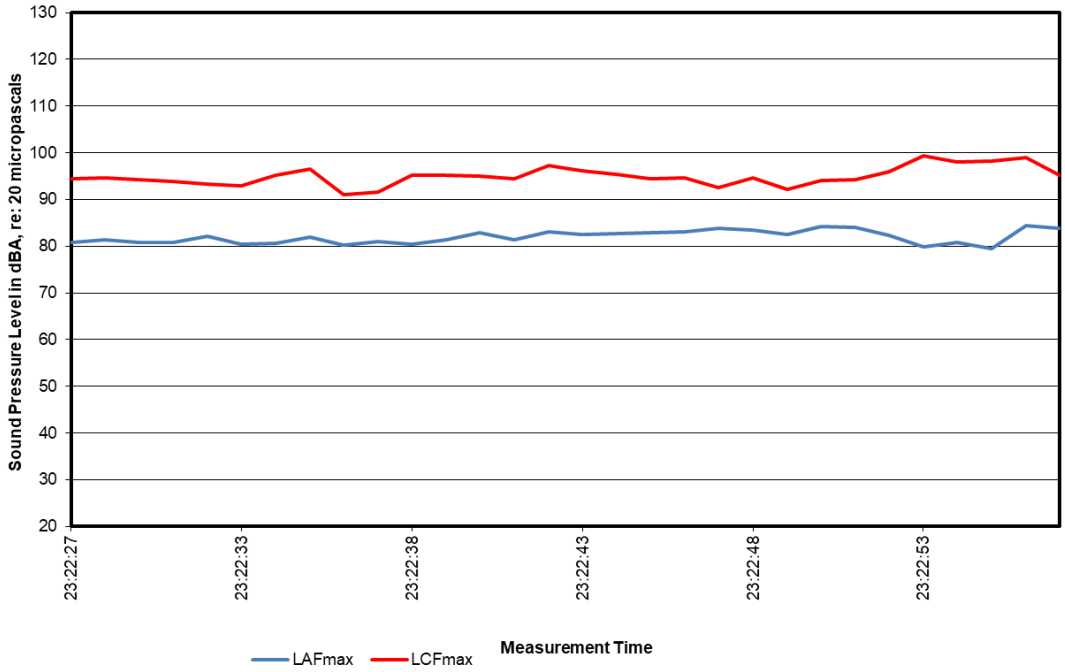
Fort Lauderdale Soundscape Study
Location : Fatcats
February 17, 2023 LD 04-53
Music, Voices and Traffic



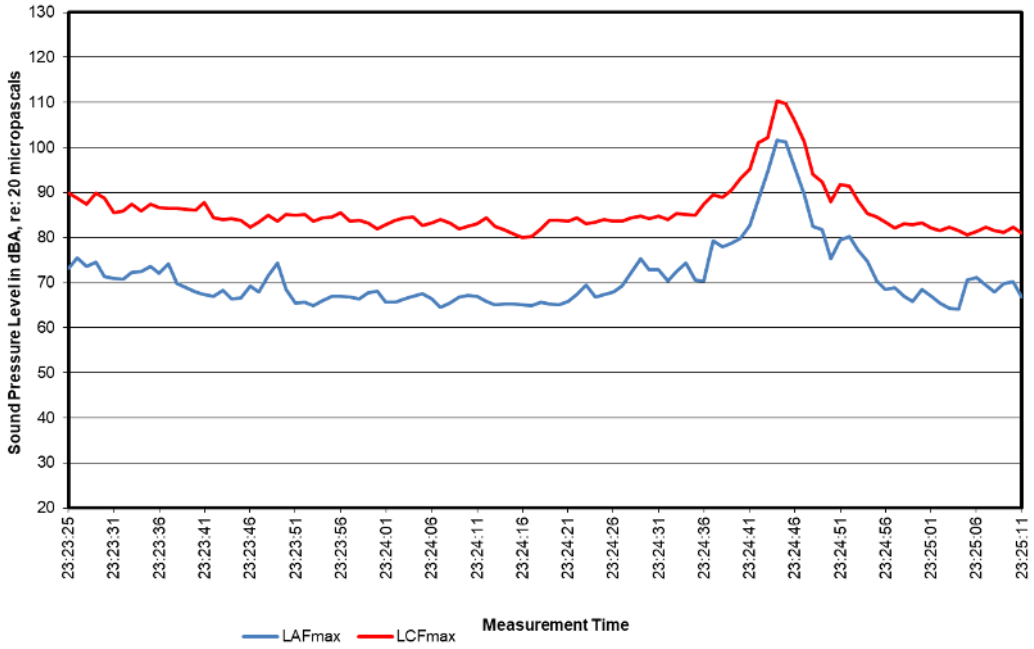
Fort Lauderdale Soundscape Study
Location : Fatcats to Rileys Irish Pub
February 17, 2023 LD 04-54
Music, Voices and Traffic



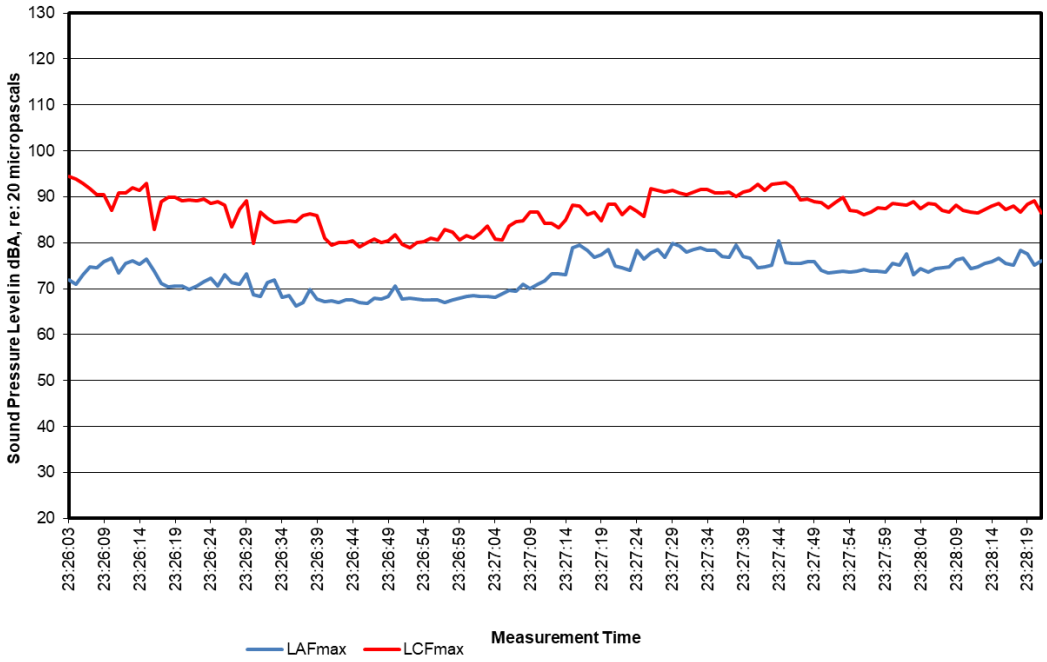
Fort Lauderdale Soundscape Study
Location : SW 2nd Ave by the Road
February 17, 2023 LD 04-55
Music, Voices and Traffic

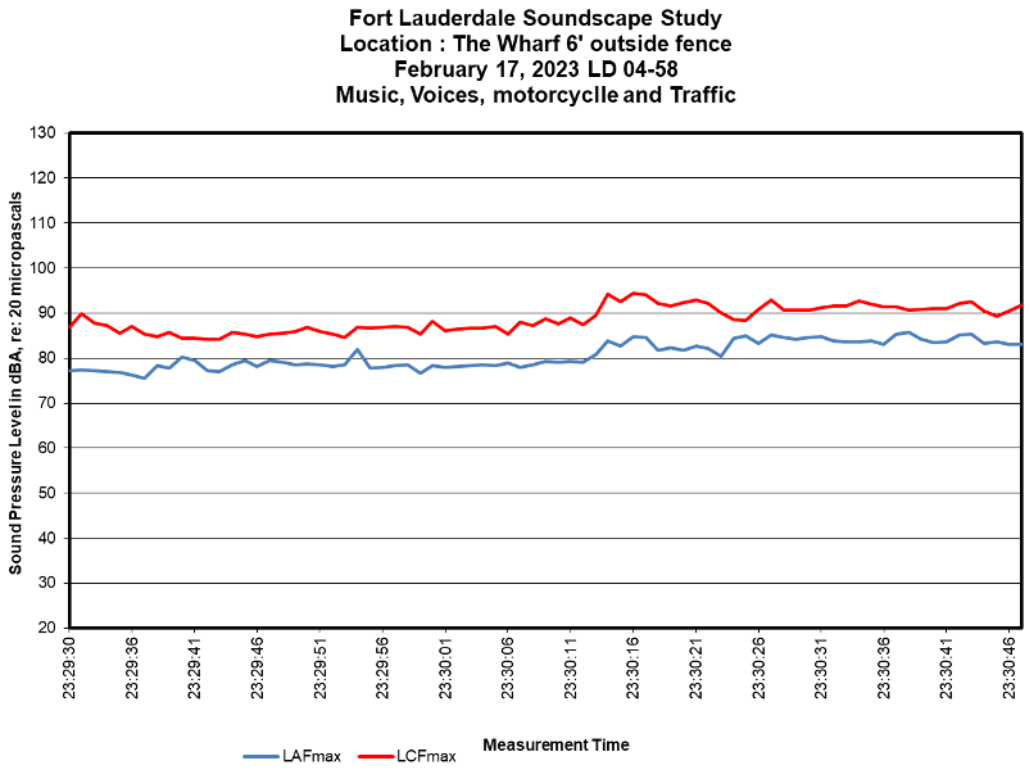


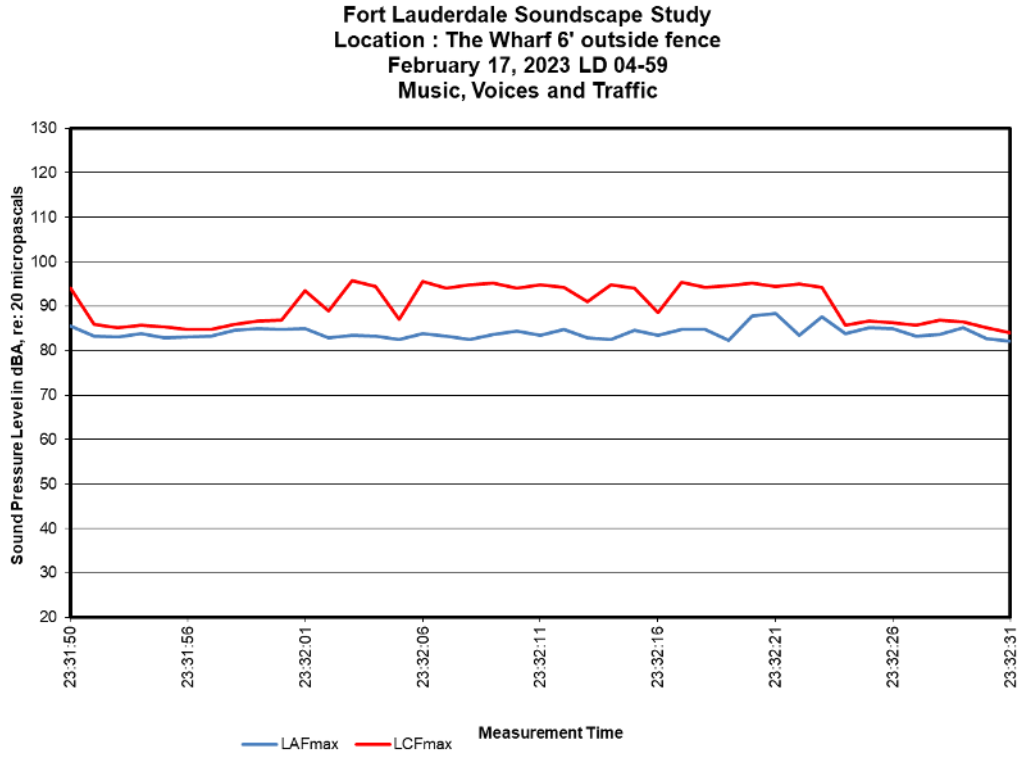
Fort Lauderdale Soundscape Study
Location : Moffat to Brickell
February 17, 2023 LD 04-56
Music, Insects, Voices, Loud Rev, Train and Traffic



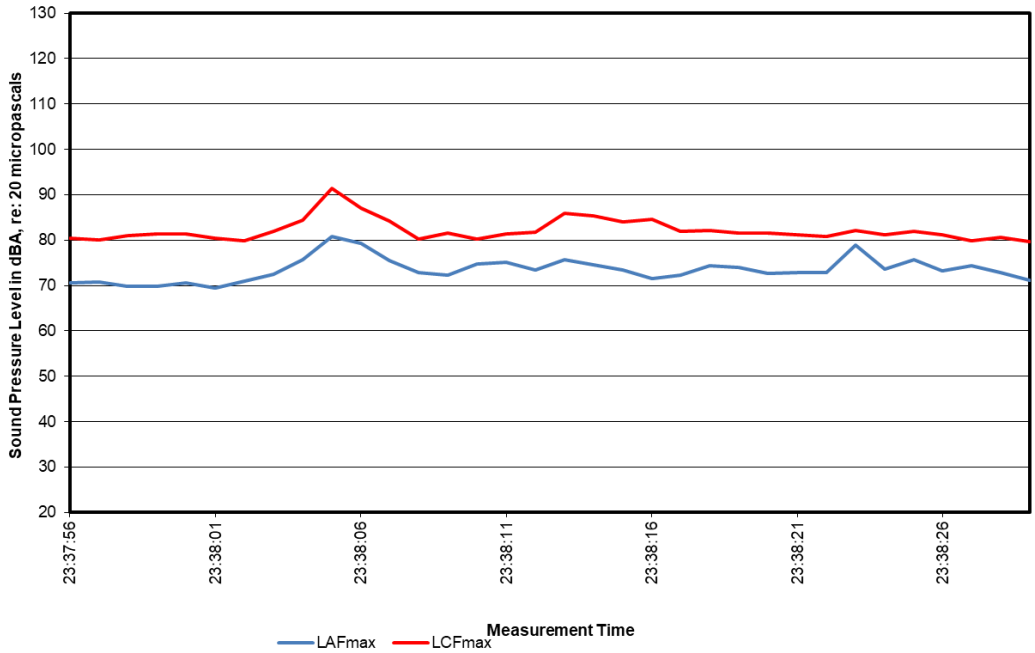
Fort Lauderdale Soundscape Study
Location : Brickell to the Wharf
February 17, 2023 LD 04-57
Music, Insects, Voices, car horn and Traffic



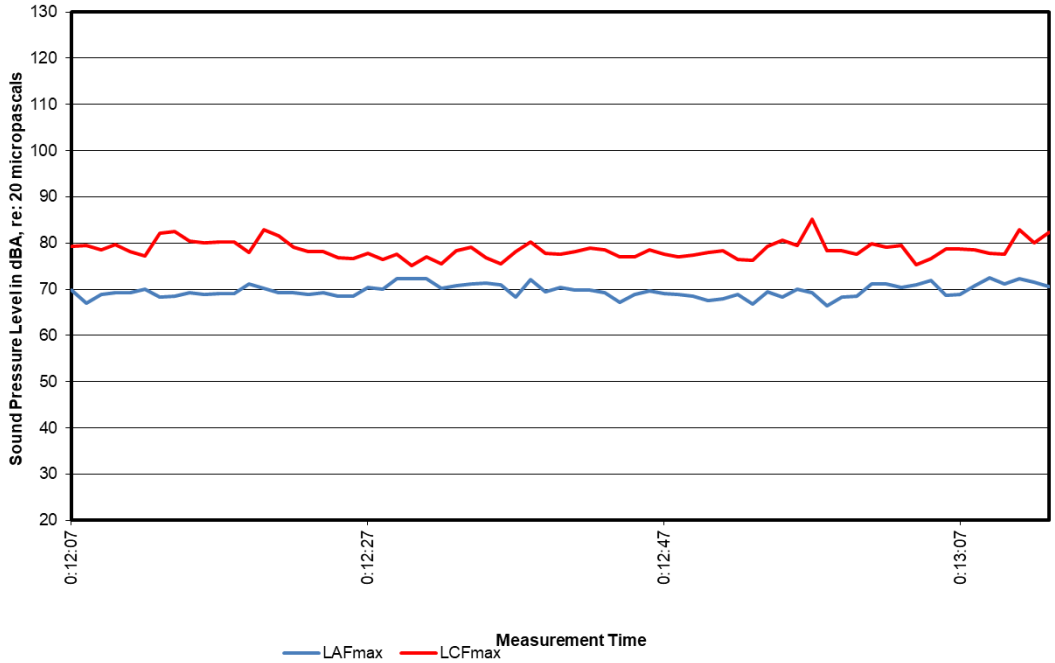

Fort Lauderdale Soundscape Study
Location : The Wharf 6' outside fence
February 17, 2023 LD 04-58
Music, Voices, motorcyclle and Traffic
Sound Pressure Level in dBA, re: 20 micropascals
130
120
110
100
90
80
70
60
50
40
30
20
23:29:30
23:29:36
23:29:41
23:29:46
23:29:51
23:29:56
23:30:01
23:30:06
23:30:11
23:30:16
23:30:21
23:30:26
23:30:31
23:30:36
23:30:41
23:30:46
Measurement Time
LAFmax
LCFmax

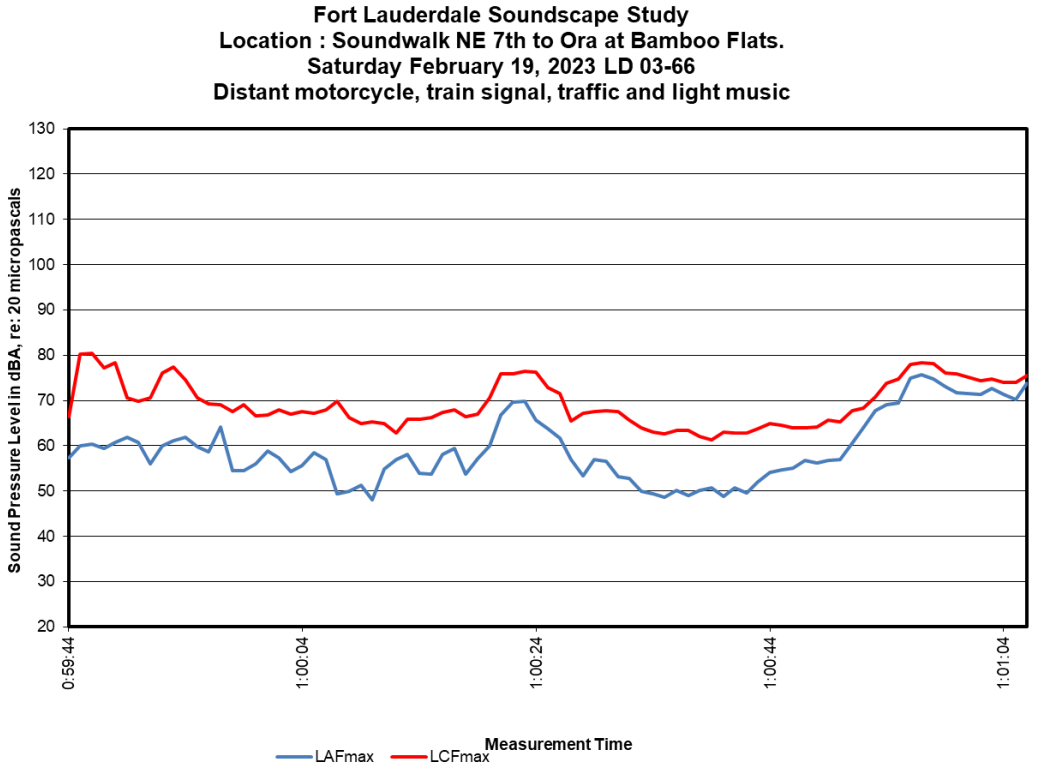

Fort Lauderdale Soundscape Study
Location : The Wharf 6' outside fence
February 17, 2023 LD 04-59
Music, Voices and Traffic
Sound Pressure Level in dBA, re: 20 micropascals
130
120
110
100
90
80
70
60
50
40
30
20
23:31:50
23:31:56
23:32:01
23:32:06
23:32:11
23:32:16
23:32:21
23:32:26
23:32:31
Measurement Time
LAFmax
LCFmax

Fort Lauderdale Soundscape Study
Location : Las Olas and St. Andrews
Saturday February 19, 2023 LD 03-60
Traffic, music from bar and talking



Fort Lauderdale Soundscape Study
Location : Salt 7
Saturday February 19, 2023 LD 03-64
Distant traffic, music voices and distant motorcycle




Fort Lauderdale Soundscape Study
Location : Soundwalk NE 7th to Ora at Bamboo Flats.
Saturday February 19, 2023 LD 03-66
Distant motorcycle, train signal, traffic and light music
Sound Pressure Level in dBA, re: 20 micropascals
130
120
110
100
90
80
70
60
50
40
30
20
0:59:44
1:00:04
1:00:24
1:00:44
1:01:04
Measurement Time
LAFmax
LCFmax