

# ACUSTICA

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SHAPING SOUND THROUGH ARCHITECTURE

**To:** Heather Hubble - TSW  
**From:** Shimby McCreery – Acustica  
**Date:** 18 October, 2022

**Re: Site Noise Study**  
Amphitheater Noise Study – Stockbridge, GA

Dear Heather,

The following document summarizes our findings from a recent environmental site noise study performed at the Stockbridge Amphitheater site on Saturday August 20, 2022. Please let me know if you have any questions or concerns regarding the contents of this report.

## **Project Overview**

The city of Stockbridge recently opened a municipal amphitheater located at 4545 N. Henry Boulevard in Stockbridge, GA. The city has received complaints from some residents near the site about the level of sound that is reaching their property during sound checks and performances. The city has requested that the problem be studied and that options for noise control and abatement be developed.

## **Resident Survey Summary**

Prior to conducting the site noise measurements, a survey was distributed to residents to determine the extent and character of the disturbance. Survey results revealed that the level of disturbance is highly subjective and that proximity to the site is not the only factor affecting residents' reported level of disturbance.

- Of the 13 respondents to the survey, all responded that they were aware of sound coming from the amphitheater.
- 7 of the 13 respondents reported being disturbed by that sound.
- Of the 7 respondents that reported disturbance, 4 live outside the immediate vicinity of the amphitheater (1000 ft. or greater from the amphitheater stage).
- 3 of the respondents who responded disturbance were located within the measurement range of the study on adjacent N. Lee and Bryant streets.
- 1 of the respondents to report no disturbance lived within the measurement range of the study while the other 5 respondents lived beyond the measured range.

## **Measurement Procedure and Equipment**

The measurement procedure, results and equipment were performed in accordance with the updated City of Stockbridge Noise Ordinance which is attached to the end of this document as Appendix B for reference. This report is intended to document measured levels and does not aim to interpret the existing noise ordinance with respect to whether or not the amphitheater is in compliance with said ordinance.

Measurements were performed with the following equipment:

| Equipment         | Model      | Serial #  | Most Recent Laboratory Calibration Date: |
|-------------------|------------|-----------|------------------------------------------|
| Sound Level Meter | Rion NL-52 | 008432243 | 2/14/2022                                |
| Preamplifier      | Rion NH-25 | 43257     | 2/14/2022                                |
| Microphone        | Rion UC-59 | 06881     | 2/11/2022                                |
| Calibrator        | Rion NC-74 | 35078716  | 5/9/2022                                 |
| Windscreen        | Rion WS-10 | N/A       | N/A                                      |

Calibration certificates for test equipment is included at the end of this report under Appendix C.

The sound level meter was set to record A-weighted levels on the fast setting due to fluctuations in levels coming from the amphitheater. Sound level measurements during the concert on the evening of Saturday 8/20/2022 were performed under the following weather conditions: 80 degrees F and no precipitation. Background sound level measurements with no activity in the amphitheater were performed the morning of Monday 8/22/2022 under the following weather conditions: 74 degrees F and no precipitation

### **Measurement Locations and Results**

A total of 15 measurement locations were documented during the testing performed on 8/20/2022. These are located on the measurement map attached as Appendix A. To the extent possible, measurements were taken at or within 5ft. of the residential property line.

The following table outlines the registered A-weighted sound levels at each measurement location. For logistical reasons, measurement locations were not documented in the numerical order listed on the map; consequently, measurement times are not necessarily sequential.

Table 1. dBA Levels Recorded Along Property Lines Surrounding Amphitheater

| Measurement Location | Concert Sound Level (dBA) | Time: | Background Sound Level (dBA) |
|----------------------|---------------------------|-------|------------------------------|
| 01                   | 65                        | 21:53 | 54                           |
| 02                   | 63                        | 21:46 | 53                           |
| 03                   | 66                        | 21:40 | 51                           |
| 04                   | 64                        | 21:34 | 53                           |
| 05                   | 68                        | 19:59 | 46                           |
| 06                   | 69                        | 20:06 | 48                           |
| 07                   | 69                        | 20:15 | 49                           |
| 08                   | 67                        | 20:28 | 46                           |
| 09                   | 65                        | 20:37 | 48                           |
| 10                   | 62                        | 21:25 | 47                           |
| 11                   | 61                        | 21:18 | 51                           |
| 12                   | 62                        | 21:12 | 49                           |
| 13                   | 64                        | 21:06 | 53                           |
| 14                   | 62                        | 21:00 | 52                           |
| 15                   | 67                        | 20:53 | 51                           |

## **Measurement Findings**

- While this document reports measured levels, it does not aim to interpret the results with respect to the City of Stockbridge Noise Ordinance and whether the amphitheater complies with the updated ordinance. This interpretation has been left to the City of Stockbridge.
- Some residents have registered complaints suggesting that the sound levels from the Amphitheater have resulted in hearing loss. While this report does not aim to establish whether this has in fact occurred, the measured levels can be compared to permissible noise exposures designated by the Occupational and Safety and Health Administration (OSHA) in their Standard 1919.95 – Occupational Noise Exposure. This standard establishes allowable duration of exposure to certain sound levels that are deemed permissible based on OSHA's mission of protecting the health and safety of workers. This standard does not speak to annoyance or disturbance. Table G-16 in the aforementioned standard states that hearing protection is required when levels reach 100 dBA for 2 or more hours per day. The allowable exposure is increased to 3 hours per day when levels reach 97 dBA. The lowest cited level in the table is 90 dBA for which permissible exposure extends to 8 hours per day. Based on the measured levels documented in Table 1 above, the levels produced at residential property lines do not approach the OSHA thresholds that would require hearing protection to avoid long-term hearing loss.

## **Recommendations**

Should the city choose to pursue sound abatement strategies in order to reduce the impact to surrounding residents, the best first step would be to purchase and install a sound containment curtain for the amphitheater stage. This element would be comprised of a flexible mass loaded vinyl core intended to block the sound. As these curtains are industrial in appearance the city would have the choice of deploying a more traditional theatrical drape in front of (and potentially behind) the sound isolating core curtain.

The curtain would extend down the sides of the stage and turn to run behind the central brick wall to provide a continuous sound containment barrier shielding areas behind the stage from sound produced by the PA. Access for performers and crew would be provided through an operable opening such as a tracking portion of the curtain and/or overlapping curtain segments with a gap between. The exact layout will need to be refined in conjunction with the architect and structural engineer as mounting positions and load limits will need to be verified.

The basis of design for the sound isolating core would be an SCC-16 Noise Curtain provided by Steelguard Safety Products. This product comes in 4' wide vertical strips that are joined with velcro at overlapping vertical joints. An alternate product with comparable isolation performance could be considered.

As the bulk of the acoustical performance will be provided by the sound isolating core, there are many options for the face curtain intended to conceal the core. Acoustically, the recommendation would be to employ an inherently flame-retardant velour type curtain material. A standard product for this type of application would be Black Commando 16oz. FR by Rose Brand Fabrics sewn to a minimum 50% fullness. Long term durability may be a concern and manufacturer guidelines should be consulted. Explicitly outdoor-rated options are available, but tend to be lower performing and

cost significantly more. A more extensive review of alternative face fabric options can be performed in consultation with the design team.

A preliminary sketch and cost estimate of the proposed solution was prepared by ADE Construction Consultants and is attached to the end of this report as Appendix D.

**End of Report**



APPENDIX A  
MEASUREMENT LOCATIONS FOR ENVIRONMENTAL SITE NOISE  
MONITORING PERFORMED ON 8/20/22



## APPENDIX B

### CITY OF STOCKBRIDGE NOISE ORDINANCE

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#### **11.26.010. Name, purpose, and intent.**

- 1) This chapter shall be informally known as the Stockbridge Noise Ordinance.
- 2) The provisions contained in this chapter are enacted for the purpose of preventing unreasonable noise or noise disturbance. Above certain levels, unreasonable noise or noise disturbance is detrimental to the health and welfare of the citizenry and the individual's right to peaceful and quiet enjoyment. Therefore, it is hereby declared to be the policy of the city to prohibit unreasonable noise or noise disturbance from all sources, subject to its police power in order to secure and promote the public health, comfort, convenience, safety, welfare, and prosperity of the citizens of Stockbridge.
- 3) This chapter shall apply to the control of sound originating from sources within the city limits.
- 4) Nothing in this chapter is intended to deter individuals from lawfully exercising the individual right to freedom of speech or any other freedom guaranteed under the Constitutions of the United States of America or of the State of Georgia.
- 5) No provisions of this chapter shall apply to the emission of sound for the purpose of alerting persons to the existence of an emergency, the emission of sound in the performance of emergency work, or noises resulting from any authorized emergency vehicles when responding to an emergency.

#### **11.26.020. Definitions.**

- 1) The following words, terms, and phrases, when used in this chapter, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:
  - a) "Ambient sound level" means the total sound pressure level in the area of interest excluding the noise source of interest.
  - b) "*A-weighted sound level*" means the sound pressure level in decibels as measured on a sound level meter using the A-weighting network. The level so read is designated as dB(A) or dBA.
  - c) "City" means the City of Stockbridge, Georgia.
  - d) "*Commercial area*" means, for the purposes of this chapter, any parcel of land in an area zoned for commercial use as set forth in the city zoning ordinance.
  - e) "*Decibel*" (dB) means a unit for measuring the volume of a sound, equal to 20 times the logarithm to the base ten of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
  - f) "*Emergency*" means any occurrence or set of circumstances involving actual or imminent physical trauma or property damage which demands immediate action.

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- g) *"Emergency work"* means any work performed for the purpose of preventing or alleviating the physical trauma or property damage threatened or caused by an emergency.
- h) *"Gross vehicle weight rating (GVWR)"* means the value specified by the manufacturer as the recommended maximum loaded weight of a single motor vehicle. In cases where trailers and tractors are separable, the gross combination weight rating (GCWR), which is the value specified by the manufacturer as the recommended maximum loaded weight of the combination vehicle, shall be used.
- i) *"Industrial area"* means, for the purposes of this chapter, any parcel of land in an area zoned for industrial use as set forth in the city zoning ordinance.
- j) *"Land use categories"* means, for the purpose of this chapter the land use categories defined as "residential," "commercial" and "industrial" shall have their ordinary and customary meaning provided further that the residential classifications shall include the following classifications from the city zoning ordinance: RA, R-1, R-2, R-3, RD, RM, RMH, and PD (for all residential uses). The commercial classifications shall include the following classifications from the city zoning ordinance: C-1, C-2, C-3, M-1, M-2, and OI (for all commercial uses). The industrial classifications shall include the following classifications from the city zoning ordinance: M1 and M2 (for all industrial uses).
- k) *"Motor carrier vehicle engaged in interstate commerce"* means any vehicle for which regulations apply pursuant to section 18 of the Federal Noise Control Act of 1972 (P.L. 92-574), as amended, pertaining to motor carriers engaged in interstate commerce.
- l) *"Motorcycle"* means any motor vehicle designed to travel on not more than three wheels in contact with the ground and any four-wheeled vehicle weighing less than 500 pounds and equipped with an engine of less than six horsepower, excepting farm tractors
- m) *"Motor vehicle"* means any self-propelled device or device designed for self-propulsion, upon or by which any person or property is or may be drawn or transported upon a street or highway, except devices moved by human power or used exclusively upon stationary wheels or tracks.
- n) *"Noise"* means any sound of such level and duration as to be or tend to be injurious to human health or welfare, or which would unreasonably interfere with the enjoyment of life or property throughout the city or in any portions thereof, but excludes all aspects of the employer-employee relationship concerning health and safety hazard within the confines of a place of employment.
- o) *"Noise control administrator (NCA)"* means any individual designated by the director of the department of community development or the chief of police as the liaison with all city departments for issues related to noise control and who is charged with the administration of the noise ordinance, maintaining records showing that noise control officers are properly trained and that the sound level meters in use in the city meet the standards required by the noise ordinance.

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- p) *"Noise disturbance"* means any sound that due to such sound exceeding the limits set forth in this article, endangers the health, safety, or welfare of any person, and therefore is detrimental to the peaceful enjoyment of private property and the use and enjoyment of public spaces including public rights-of-way, any sound that:
- q) *"Person"* means any individual, corporation, company, association, society, firm partnership, joint stock company, the municipality any political subdivision, agency, or instrumentality of the municipality.
- r) *"Public right-of-way"* means any street, avenue, boulevard, road, highway, sidewalk, or alley that is leased, owned, or controlled by a governmental entity.
- s) *"Property boundary"* means an imaginary line along the ground surface, and its vertical extension, which separates the real property owned, leased, or otherwise legally controlled by one person from that owned, leased, or otherwise legally controlled by another person, including intra-building real property divisions.
- t) *"Residential area"* means, for the purposes of this chapter, any parcel of land any parcel of land in an area zoned for residential use as set forth in city zoning ordinance.
- u) *"Sound"* means an oscillation in pressure, particle displacement, particle velocity or other physical parameter, in a medium with internal forces that causes compression and rarefaction of that medium. The description of sound may include any characteristic of such sound, including duration, intensity, and frequency.
- v) *"Sound generation"* means any conduct, activity, or operation, whether human, mechanical, electronic, or other, and whether continuous, intermittent, or sporadic, and whether stationary or ambulatory in nature, which produces or results in an audible sound.
- w) *"Sound level"* means the weighted sound pressure level obtained by the use of a sound level meter and the A-frequency weighting network, as specified in American National Standards Institute specifications for sound level meters.
- x) *"Sound level meter"* means an instrument which includes a microphone, amplifier, RMS detector, integrator, or time averager, output meter and weighting networks used to measure sound pressure levels.

#### **11.26.030. Enforcement officers.**

- 1) The provisions of this chapter shall be enforced by the code enforcement officers and/or the police officers of the city.
- 2) The director of the department of community development, or his/her designee, or the chief of police, or his/her designee, shall have the power to:



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- a) Coordinate the noise control activities of all municipal departments and cooperate with all other public bodies and agencies to the extent practicable;
  - b) Review the actions of other municipal departments and advise such departments to the effect, if any, of such actions on noise control;
  - c) Review public and private projects, subject to mandatory review or approval by other departments or boards, for compliance with this chapter;
  - d) Grant permits for variances according to the provisions of section 11.26.120; and
  - e) Grant special temporary permits according to the provisions of section 11.26.130.
- 3) A code enforcement officer or police officer shall be qualified to enforce the provisions of this chapter if he/she has satisfactorily completed any of the following:
- a) An instructional program in community noise from a certified noise control engineer, as evidenced by certification from the Institute of Noise Control Engineering (INCE);
  - b) An instructional program in community noise from another qualified code enforcement officer or police officer; or
  - c) Education or experience or a combination thereof certified by the director of the department of community development or the chief of police as equivalent to the provisions of subsections (3)(a) or (b) of this section.
  - d) Noise measurements taken by a code enforcement officer or police officer shall be taken in accordance with the procedures specified in this chapter and as promulgated by the chief of police pursuant to section 11.26.070 herein.

**11-26.040. Duties and responsibilities of other departments.**

- 1) All departments and agencies of the city shall carry out their programs according to law and shall cooperate with the director of the department of community development or the chief of police in the implementation and enforcement of this chapter.
- 2) All departments charged with new projects or changes to existing projects that may result in the production of noise shall consult with the director of the department of community development or the chief of police, prior to the approval of such projects, to ensure that such activities comply with the provisions of this chapter.

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**11.26.050. Enforcement procedures.**

- 1) Upon occurrence of a violation of this chapter, code enforcement officers or police officers having jurisdiction in the area where the violation takes place may issue a citation or summons for the violation returnable to the municipal court of the city.
- 2) In lieu of issuing a citation or summons the director of the department of community development or the chief of police may issue an order requiring abatement of any sound source alleged to be in violation of this chapter within a reasonable time period and according to guidelines that the director or chief may prescribe.
- 3) No provision of this chapter shall be construed to impair any common law or statutory cause of action, or legal remedy therefrom, of any person for injury or damage arising from any violation of this chapter or from other law.

**11.26.060. Testing of sound level meters.**

- 1) In order to implement and enforce this chapter effectively, the director of the department of community development or the chief of police shall develop and promulgate standards and procedures for testing and validating sound level meters used in the enforcement of this chapter.

**11.26.070 Sound measurement procedures.**

- 1) Insofar as practicable, sound will be measured while the source under investigation is operating at normal, routine conditions. All noise measurements shall be made at or outside the property boundary of the impacted site, unless otherwise directed in this chapter. When instrumentation cannot be placed at or outside the property boundary, the measurement shall be made as close thereto as is reasonable. However, noise measurements shall not be made at a distance of less than twenty-five (25) feet from the edge of a noise source unless otherwise stated in this chapter.
- 2) In a structure used as a multifamily dwelling enforcement officers may take measurements to determine sound levels from common areas within or outside the structure or from other dwelling units within the structure, when requested to do so by the owner or tenant in possession and control thereof. Such measurement shall be taken at a point at least four feet from the wall, ceiling, or floor nearest the noise source, with doors to the receiving area closed and windows in the normal position for the season.
- 3) All tests shall be conducted in accordance with the following procedures:
  - a) The city shall, to the extent practicable, identify all sources contributing sound to the point of measurement.

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- b) Measurements shall be taken at or outside the property line of the affected person(s), including the city.
  - c) No outdoor measurements shall be taken:
    - (1) During periods when wind speeds (including gusts) exceed fifteen (15) mph;
    - (2) Without a windscreen, recommended by the sound level meter manufacturer, properly attached to the sound level meter;
    - (3) Under any condition that allows the sound level meter to become wet;
    - (4) When the ambient temperature is out of the range of the tolerance of the SLM;
    - (5) Provided however that it shall not be necessary to document the absence of the conditions set forth in this subsection for a reading to be valid.

#### **11.26.080. Sound level testing.**

- 1) The decibel level of any noise regulated by this chapter may be measured by the use of a sound level meter which measures sound pressure levels. Such measurements shall be accepted as prima facie evidence of the level of noise at issue in any court or legal proceeding to enforce the provisions of this chapter.
- 2) The sound level meter must be certified, and the calibrator must be recalibrated at least once each year by the manufacturer or by a person that has been approved by the noise control administrator (NCA). A copy of written documentation of such recertification and recalibration, in a form approved by the NCA, shall be kept with the equipment to which it refers.
- 3) The accuracy of the sound level meter shall be tested by a calibrator recommended by the sound level meter manufacturer before and after each series of readings. Any sworn report of the results of any test of the calibrator for the accuracy of a sound level meter shall be admissible in court in any criminal or civil proceeding, as evidence of the facts therein stated.
- 4) An individual operating a sound level meter pursuant to the provisions of this chapter shall complete a sworn report to indicate:
  - a) That the sound level meter used to take the decibel level reading was operated in accordance with the manufacturer's specifications;
  - b) That the city has on file a certificate which states that the sound level meter has been tested within the past 12 months and has been found to be accurate;
  - c) The name of the accused;
  - d) The location of the noise;
  - e) The date and time that the reading was made; and

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f) The decibel level reading.

- 5) Such sworn report, when attested by the operator taking the decibel level reading, shall be admissible in court in any criminal or civil proceeding as evidence of the facts therein stated and of the decibel level reading. A copy of the sworn report shall be delivered to the accused upon request.

**11.26.090. Maximum sound levels in residential areas.**

- 1) It shall be unlawful, except as expressly permitted herein, to make, cause or allow the making of any noise or sound which violates the provisions of this chapter.
- 2) No person shall operate or cause to be operated any source of sound from any location in such a manner as to create a sound level which exceeds the limits set forth in the table below for the receiving land use category (zoning classification) as measured at any point along the real property boundary separating the real property from which the sound emanates from the receiving land use category.

| Receiving Property                                                                | Daytime<br>(7:00 a.m.—11:00 p.m.) | Nighttime<br>(11:01 p.m.—6:59 a.m.) |
|-----------------------------------------------------------------------------------|-----------------------------------|-------------------------------------|
| Zoning Classification<br>Residential (RA, R-1, R-2, R-3,<br>RD, RM, RMH, PD, PTD) | 75                                | 65                                  |
| Commercial (C-1, C-2, and C-3)                                                    | 80                                | 70                                  |
| Industrial (O-I, M-1, and M-2)                                                    | 85                                | 75                                  |

**11.26.100. Exemptions.**

- 1) The following activities or sources of noise shall be exempt from the daytime prohibition set forth in subsection 11.26.090.
- a) Religious or political gatherings and other activities protected by the First Amendment to the United States Constitution.
  - b) Activities for which the regulation of noise has been preempted by state or federal law.
  - c) The generation of noise in the performance of any work or action necessary to deliver essential services including, but not limited to, water or sewer projects, and other related public works projects; repairing gas, electric, telephone, and/or public transportation facilities; removing fallen trees on public rights-of-way; or abating emergency conditions threatening the public health, safety, or general welfare.
  - d) Noise from public and private transportation, refuse collection and sanitation services.



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- e) Carillons, chimes, or unamplified bells while being used in conjunction with religious services.
  - f) Noises resulting from any event sponsored by, associated with, or approved by a recognized institution of learning.
  - g) Noises that result from or arise out of or stem from the occurrence of athletic contests or organized sports league.
  - h) Noise generated from celebrations, outdoor festivals, and/or city sponsored or approved events which were approved by contract, permit or otherwise.
  - i) Aircraft-related noises associated with aircraft while in flight and while under the jurisdiction of the Federal Aviation Administration or the Department of Defense.
  - j) Railroad-related noises associated with trains while operating and while under the jurisdiction of applicable federal or state entities.
  - k) Noise from an exterior burglar alarm of any building, or from an automobile alarm, provided such alarm shall terminate its operation within five (5) minutes of its activation if the sound is not intermittent or ten (10) minutes if intermittent.
  - l) Activities related to the construction, repair, maintenance, remodeling, or demolition, grading or other improvement of real property, except as further regulated pursuant to section 11.26.140 subsection (n). This will not apply to the operations of existing mining operations within the city.
  - m) Gardening, lawn care, tree maintenance or removal and other landscaping activities, except that all professional landscaping companies are further regulated pursuant to section 11.26.140 subsection (i).
  - n) Any noise resulting from activities of a temporary duration, for which a permit for temporary variance has been granted pursuant to this chapter, and which conforms to the conditions and limits stated in the variance and reasonably related activities.
  - o) Events with amplified or un-amplified sound that are operating within the parameters set forth in an approved special temporary event permit as defined in section 11.26.130.

**11.26.110. Motor vehicle maximum sound levels; amplified sound from vehicles.**

- 1) No person shall operate or cause to be operated a public or private motor vehicle or motorcycle on a public right-of-way at any time in such a manner that the sound level emitted by the motor vehicle or motorcycle, when measured at a distance of fifty (50) feet or more, exceeds the level set forth in the following table:

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| Vehicle Class                                                                     | Speed limit<br>35 MPH or<br>less | Speed limit<br>Over 35 MPH |
|-----------------------------------------------------------------------------------|----------------------------------|----------------------------|
| All motor vehicles of GVWR or GCWR of 6,000 lbs. or more                          | 86                               | 90                         |
| Any motorcycle                                                                    | 82                               | 86                         |
| Any other motor vehicle or any combination of vehicles towed by any motor vehicle | 76                               | 82                         |

- 2) *Exemptions:* The following activities or sources of noise shall be exempt from the prohibitions set forth in subsection (1) of this section:
- a) Any motor carrier vehicle engaged in interstate commerce;
  - b) Motor vehicles driven in a duly authorized parade, or;
  - c) Motor vehicle alarms or other security devices.
- 3) *Adequate Mufflers or Sound-Dissipative Devices.*
- a) No person shall operate or cause to be operated any motor vehicle or motorcycle on a public or private road which is not equipped with a muffler in proper working order and in constant operation.
  - b) No person shall remove or render inoperative or cause to be removed or rendered inoperative any muffler or sound-dissipative device on a motor vehicle or motorcycle other than for purposes of maintenance, repair, or replacement.
  - c) The provisions of the subsections of this section apply to moving motor vehicles. Those motor vehicles operating in a stationary position or condition are governed by the provisions of Section 11.26.090 and subsection (2).
- 4) Notwithstanding any other provisions of this section or provisions of this chapter related to noise, it shall be unlawful for any person to play or operate or permit the playing, use or operation of any radio, tape player, compact disc player, loud speaker or other electronic device used for the amplification of sound, which is located within a motor vehicle being operated or parked on public or private property within the city, including any public or private street or alley, in such manner as to disturb the peace, quiet and comfort of passersby or other persons outside of the subject motor vehicle. The operation of any such machine or device between the hours of 11:00 p.m. and 7:00 a.m. in such a manner as to be audible to the human ear at a distance of (100) or more feet from the vehicle in which it is located shall be prima facie evidence of a violation of this section. Such acts for purposes of this subsection are hereby found to be the creation of unreasonably loud, disturbing, and unnecessary noise in the city.

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#### **11.26.120. Variances.**

- 1) Any person desiring temporary relief from any provisions of this chapter may apply for a variance to cause or create a noise at sound levels which would otherwise be in violation of this chapter. Variances to the provisions contained in this chapter may be requested, in writing, at least 48 hours prior to the proposed operation or event, for consideration by the director of the department of community development or the chief of police. Such a request shall state the following:
  - a) The reasons that a variance from the provisions of this chapter are needed;
  - b) The impact that the denial of this request will have on the applicant's project or event and the surrounding properties;
  - c) The steps which have been taken by the applicant to communicate those needs and impacts to owners of surrounding and nearby properties;
  - d) The steps that have or will be taken to limit the impact of the proposed activity upon surrounding and nearby properties, activities and uses;
  - e) The time at which the proposed activity that requires a variance will occur; and
  - f) The duration of the proposed activity that requires a variance to the provisions of this chapter.
- 2) No variance shall be approved unless the applicant presents adequate proof that:
  - a) Noise levels occurring during the period of the variance will not constitute a danger to public health; and
  - b) Compliance with this chapter would impose an unreasonable hardship on the applicant; or
  - c) Compliance with this chapter would prevent a benefit to the public equal to or greater than any detriment caused by noncompliance.
- 3) In making the determination of granting a variance, the director of the department of community development or the chief of police shall consider the following:
  - a) The character and potential or actual degree of injury to, or interference with, the health and welfare of the public or the reasonable use of adjoining properties;
  - b) The social and economic value of the activity for which the variance is sought;
  - c) The ability of the applicant to apply the best practical noise control measures;

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- d) The time and duration of the activity for which the variance is sought; and
  - e) The location of the activity in relationship to adjoining properties, uses and activities.
- 4) If the director of the department of community development or the chief of police find that the variance application adequately demonstrates the need for a variation from the provisions of this chapter and adequately provides for the amelioration of the impact upon surrounding and nearby properties, an administrative variance shall be granted shall be granted for a period of no longer than 14 days. Any person holding a permit of temporary variance and requesting an extension of time shall apply for a new permit of temporary variance according to the provisions of this section. An extension of 14 days may be granted without a second hearing in the event that there have been no complaints received by the NCA. If complaints have been received, a new application and hearing shall be required.
  - 5) A fee of twenty-five dollars (\$25.00) shall accompany the noise variance application.
  - 6) The permit of variance may be revoked by the director of the department of community development or the chief of police if the terms of the permit of variance are violated. A variance may be revoked if there is a:
    - a) Violation of one or more conditions of the variance;
    - b) Material misrepresentation of fact in the variance application; or
    - c) Material changes in any of the circumstances relied on in granting the variance.

#### **11.26.130. Special temporary permits**

- 1) Sound Amplification Devices.
  - a) General. Except as otherwise provided for in this chapter, no person shall use or operate, or cause to be used or operated, any sound amplification device in any location within the city where the sounds therefrom may be heard in any public place or public street without first having obtained a permit from the city. For purposes of this chapter, "sound amplification device" shall mean means the speaker or mechanism from which amplified sound emanates.
  - b) Separate Permits. A separate permit and fee shall not be required for each sound amplification device but shall be required for each day during which a sound amplification device is used; provided, however, where authorized by this chapter, a single permit may be issued which will extend for the two-hour period between 12:01 a.m. and two (2:00) a.m. of the subsequent day. This restriction shall not apply where the permit is requested to use or operate a sound amplification device in a park or in connection with an activity for which the city council has approved a street closure.
  - c) Frequency of Permit Issuance. No permit may be issued for the use or operation of a sound amplification device if a sound amplification permit had been obtained for the same tract of land or address within the

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previous thirty (30) days; provided, however, this restriction shall not apply to parks or in connection with a city sponsored event.

- d) Application Procedure. Each person desiring to use or operate a sound amplification device shall make an application in writing to the director of the department of community development or chief of police on form(s) provided by the city, requesting a permit for such use or operation. The form of such application shall be prescribed by the director of the department of community development or chief of police and shall include the name, address and telephone number of the applicant; the address or location upon which the applicant proposes to use or operate a sound amplification device; the hours during which the applicant proposes to use or operate such device; and a statement by which the applicant accepts and assumes responsibility for ensuring compliance with all terms and conditions of any permit issued to the applicant.
- e) Permit Based on Certain Conditions. The director of the department of community development or chief of police shall, upon receipt of such application and after payment of the required application fee, issue the applicant a sound amplification permit in accordance with the conditions established in this chapter:
- f) No permit shall be issued for the use or operation of a sound amplification device at any location within one hundred (100) feet of any property having a residential zoning designation; provided, this restriction shall not apply to public parks, or a street closure approved by the city;
- g) No permit shall be issued for the use or operation of a sound amplification device located for within three hundred (300) feet of a school, church or hospital; provided, however, this prohibition shall not apply if approval in writing is obtained by the applicant from the affected school, church or hospital, and included with the application;
- h) A permit for the use of a sound amplification device on a vehicle traveling the public streets or rights-of-way will be granted conditioned upon the use of such device between the hours of ten (10:00) a.m. and seven (7:00) p.m. only on Monday through Saturday, and between the hours of twelve (12:00) noon and six (6:00) p.m. on Sunday. Notwithstanding any other provision of this chapter, written permission of a church, school or hospital shall not be required as a condition for the issuance of a permit for the amplification of sound from a moving vehicle;
- i) If the sound amplification device is to be used or operated within a park, any permit shall be conditioned upon the use or operation of such device between the hours of ten (10:00) a.m. and eleven (11:00) p.m., except as provided hereinafter:
- j) If approval for use of the park beyond the established curfew has been obtained from the city, and the sound amplification device is to be used or operated on a permanently constructed bandstand, or within or about a building utilized for dances, performances, parties or similar activities, any permit shall be

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conditioned upon the use or operation of such device between the hours of ten (10:00) a.m. and two (2:00) a.m.;

- k) If approval for use of the park beyond the established curfew has been obtained from the city, and the amplified sound device is more than six hundred (600) feet from any property having a residential zoning designation, any permit shall be conditioned upon the use or operation of the sound amplification device between the hours of ten (10:00) a.m. and two (2:00) a.m.;
  - l) In addition to the preceding time restrictions, no amplification device shall be used or operated within a park to produce a sound in excess of eighty-five (85) dB between ten (10:00) a.m. and eleven (11:00) p.m.; and eighty (80) dB between eleven (11:00) p.m. and two (2:00) a.m., as measured one hundred (100) feet in front of the device or at the boundary of such park in front of the device, whichever distance is lesser.
  - m) If the tract of land or location upon which the applicant proposes to use or operate the sound amplification device is beyond one hundred (100) feet but within six hundred (600) feet of any property having a residential zoning designation, any permit will be conditioned upon such use or operation between the hours of ten (10:00) a.m. and eight (8:00) a.m. on Sunday through Thursday, and between the hours of ten (10:00) a.m. and eleven (11:00) p.m. on Friday and Saturday.
  - n) If the tract of land or location upon which the applicant proposes to use or operate the sound amplification device is beyond six hundred (600) feet of any property having a residential zoning designation, any permit will be conditioned upon such use or operation between the hours of ten (10:00) a.m. and two (2:00) a.m.
- 2) Copy for Permittee. A copy of any original permit shall be provided to the applicant.
- 3) *Exemptions.*
- a) The permit requirement contained in this section shall not apply to a person using a device for the amplification of sound at a permanent business location or at a stadium or ballpark, or at a church where such device is used for the amplification of clarions. Such persons shall be governed by the provisions of this section generally.
  - b) The permit requirement shall also not apply to officers and employees of the city, the county, the state, the United States of America, or any official governmental entity when such amplification of sound is being used by such officer or employee while engaged in his official duty.
- 4) Fee. Applicants for permits shall pay a fee of twenty-five dollars (\$25.00) to cover expenses resulting from the processing of the application for a temporary permit.
- 5) No temporary permit shall be approved unless the applicant presents adequate proof that:

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- a) Noise levels occurring during the period of the temporary permit will not constitute a danger to public health; and
  - b) Compliance with the chapter would impose an unreasonable hardship on the applicant without equal or greater benefits to the public.
- 6) In making the determination of granting a temporary permit, the city shall consider the following factors:
- a) The character and degree of injury to, or interference with, the health and welfare or the reasonable use of property that is caused or threatened to be caused;
  - b) The social and economic value of the activity for which the temporary variance is sought; and
  - c) The ability of the applicant to apply the best practical noise control measures.
- 7) The temporary permit may be revoked by the city if the terms of the temporary permit are violated.
- a) A temporary permit may be revoked by the city if there is:
    - i) Violation of one (1) or more conditions of the temporary permit;
    - ii) Material misrepresentation of fact in the temporary permit application; or
    - iii) Material changes in any of the circumstances relied on by the city in granting the temporary permit.

#### **11.26.140 Specific prohibitions.**

- 1) It shall be unlawful for any person to make, continue to make or cause to be made, within the city, any loud, unnecessary, or unusual sound or noise which either unreasonably annoys, disturbs, injures, or unreasonably endangers the comfort, repose, health, peace, or safety of others, and which is audible to the human ear at a distance of 100 or more feet from the point of origin of such sound or noise. Such acts for purposes of this section are hereby found to be the creation of unreasonably loud, disturbing, and unnecessary noise in the city.
- 2) The general prohibition in this section includes the use of consumer fireworks that create loud and unreasonable noise, except during the following dates and times: after the time of 10:00 a.m. and up to and including the time of 11:59 p.m. on January 1, the last Saturday and Sunday in May, July 3, July 4, the first Monday in September, and December 31 of each year; and beginning at the time of 12:00 midnight and up to and including the ending time of 1:00 a.m. on January 1 of each year.
- 3) The following specific acts, without limitation, are declared to be loud, disturbing, or unnecessary sounds or noises in violation of this chapter, except by variance or a special temporary permit issued by the city pursuant to Section 11.26.120 or Section 11.26.130. Provided, however, that sound amplification to a level of sixty-five



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(65) decibels at a hundred (100) feet from the source of the sound without a permit shall be allowed for a limited period of time not to exceed two (2) hours.

- a) *Horns, signaling devices.* The sounding of any horn or signaling device on any automobile, motorcycle, or other vehicle on public right of way or other place in the city, except as a danger warning. This includes the sounding of any horn or signaling device for any unnecessary and unreasonable period of time.
- b) *Radios, phonographs, stereos, tape players, compact disc players, other handheld music players, or similar devices.* The using, operating, or permitting to be played, used, or operated of any machine or device for the producing or reproducing of sound within the city in such manner as to unreasonably disturb the peace, quiet and comfort of the neighboring inhabitants, or at any time with louder volume than is reasonably necessary for convenient hearing for the person who is in the room, vehicle, or chamber in which such machine or device is operated and who is a voluntary listener thereto. The operation of any such set, instrument, phonograph, machine, or device between the hours of 11:00 p.m. and 7:00 a.m. in such a manner as to be plainly audible to a person with reasonably normal hearing at a distance of (100) feet from the room, building, structure, or vehicle in which it is located shall be prima facie evidence of a violation of this section.
- c) *Loudspeakers, amplifiers for advertising or attention.* The using, operating, or permitting to be played, used, or operated of any radio receiving set, musical instrument, phonograph, loudspeaker, sound amplifier, or other machine or device within the city for the producing or reproducing of sound which is cast upon the public right of ways for the purpose of commercial advertising or otherwise attracting the attention of the public for any purpose to any building or structure.
- d) *Yelling, shouting, etc.* Yelling, shouting, hooting, or whistling on the public right of way, between the hours of 11:00 p.m. and 7:00 a.m. or at any time or place so as to unreasonably annoy or disturb the quiet, comfort, or repose of persons in any residence, dwelling, hotel, office building, or government building.
- e) *Animals, birds.* The keeping of any animal or bird within the city which, by causing frequent or long continued sound or noise, shall unreasonably disturb the comfort or repose of any persons.
- f) *Exhausts.* The discharge within the city into the open air of the exhaust of any steam engine, stationary internal combustion engine, motor vehicle, or motorboat except through a muffler or other [device] which effectively prevents unreasonably loud or explosive noises therefrom.
- g) *Defect in vehicle or load.* The use of any automobile, motorcycle, or vehicle so out of repair, so loaded, or in such manner as to create unreasonably loud and unnecessary grating, grinding, rattling or other noise.
- h) *Loading, unloading, opening boxes.* The creation of any unreasonably loud and excessive noise within the city in connection with loading or unloading any vehicle or the opening and destruction of bales, boxes, crates, and containers, between the hours of 11:00 p.m. and 7:00 a.m.

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- i) *Construction or repair of buildings.* Construction of any type, including, but not limited to, the erection (including excavation), demolition, alteration, or repair of any building, as well as the operation of any pile driver, steam shovel, pneumatic hammer, derrick, steam or electric hoist, automatic nailers or staplers, or any similar equipment, shall be prohibited during the following times: Before 7:30 a.m. or after 7:30 p.m. on weekdays, and before 8:00 a.m. or after 5:00 p.m. on Saturdays, and at any time on Sundays and/or legal holidays (New Years' Day (as observed by the city), Memorial Day, Independence Day (as observed by the city), Labor Day, Thanksgiving Day and Christmas Day (as observed by the city)). Notwithstanding the foregoing, interior construction shall be permitted subject to the provisions of sections 38-87(a) and (b) or section 38-89 above, as applicable.
- j) *Schools, courts, churches, hospitals.* The creation of any excessive and unreasonable noise on any street adjacent to any school, institution of learning, church, or court while the same are in use, or adjacent to any hospital, which reasonably interferes with the working of such institution, or which disturbs or unduly annoys patients in the hospital; provided that conspicuous signs are displayed in such streets indicating that school, hospital, church, or court is nearby and the hours of operation. Noise caused by school events in conjunction with sports activities, public performances and related activities shall not be deemed excessive and unreasonable noise during the event.
- k) *Hawkers, peddlers, vendors.* The shouting and crying of peddlers, hawkers, or vendors within the city which unreasonably disturbs the peace and quiet of the neighborhood.
- l) *Noises to attract attention.* The use of any drum or other instrument or device within the city for the purpose of attracting attention to any performance, show or sale by creation of the noise.
- m) *Motorized equipment.* The operation within the city of any noise-creating mower, blower, vacuum, power fan or other equipment before 6:30 a.m. or after 9:00 p.m. on weekdays, and before 8:00 a.m. or after 9:00 p.m. on weekends.
- n) *Landscape contractors.* The use of any type of motorized mowers or mechanical blowers and other equipment which create noise exceeding 55 dB(A) when measured at or outside the property boundary shall be prohibited, during the following times: Before 6:30 a.m. or after 7:30 p.m. on weekdays, and before 8:00 a.m. or after 5:00 p.m. on weekends, and/or legal holidays (New Years' Day (as observed by the city), Memorial Day, Independence Day (as observed by the city), Labor Day, Thanksgiving Day and Christmas Day (as observed by the city)).
- o) *Sound trucks.* The use within the city of mechanical loudspeakers or amplifiers on trucks or other moving or standing vehicles for advertising or other commercial purposes or when used at such an unreasonably loud volume so as to unreasonably disturb persons in their residences, offices, schools, hospitals,

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churches, or courts; or for noncommercial purposes when used between the hours of 11:00 p.m. and 7:00 a.m.

p) *Car drifting on private property within 1,000 feet of a residentially zoned district.* For purposes of this section, car drifting shall mean a driving technique or motorsport where the driver intentionally oversteers, causing loss of traction in the rear wheels, while maintaining control from entry to exit of a corner. A car is drifting when the rear slip angle is greater than the front slip angle, to such an extent that the front wheels are pointing in the opposite direction to the turn (e.g., car is turning left; wheels are pointed right or vice versa).

q) *Alarms and Emergency Warning Systems.*

- i) Except in a case of an emergency, the intentional sounding of any alarm between the hours of nine (9:00) p.m. and eight (8:00) a.m.
- ii) The testing of any alarm for a period in excess of sixty (60) seconds at any time.
- iii) The testing of a complete emergency warning system, including the signaling device and the personnel response to the signaling device, more than once in each calendar month, and the sounding of said emergency warning system for a period in excess of fifteen (15) minutes.

#### **11.26.150. Penalties.**

- 1) Any person violating the terms of this chapter shall be punished in municipal court as provided for in Section 1.04.080.
- 2) Each day any violation of this chapter shall continue shall constitute a new and separate offense.
- 3) In addition to the penalties provided in this section, any condition caused or permitted to exist in violation of any provisions of this chapter shall be deemed a public nuisance and may be abated by the city or its designee as provided by law or ordinance, either summarily by a restraining order or by a court of competent jurisdiction.

#### **11.26.160. Inconsistent provisions.**

- 1) Insofar as the provisions of this chapter are inconsistent with any other title of the city code, or any other rule or regulation of the city, then the provisions of this noise control ordinance shall be controlling.

**Secs. 11.26.161—11.26-999. Reserved.**

# APPENDIX C

## SOUND LEVEL METER CALIBRATION CERTIFICATES

**Scantek, Inc.**

CALIBRATION LABORATORY

ISO 17025: 2017, ANSI/NCSL Z540:1994 Part 1

ACCREDITED by NVLAP (an ILAC MRA signatory)

**NVLAP**<sup>®</sup>  
CALIBRATION  
NVLAP Lab Code: 200625-0

### Calibration Certificate No.47546

Instrument: Sound Level Meter  
Model: NL52  
Manufacturer: Rion  
Serial number: 00843243  
Tested with: Microphone UC-59 s/n 06881  
Preamp: NH25 s/n 43257  
Type (class): 1  
Customer: Scantek, Inc.  
Tel/Fax: 410-290-7726 / 410-290-9167

Date Calibrated: 2/14/2022 Cal Due: 2/14/2023

| Status:           | Received | Sent |
|-------------------|----------|------|
| In tolerance:     | X        | X    |
| Out of tolerance: |          |      |

See comments:

Contains non-accredited tests: ☐ Yes ☒ No

Calibration service: ☐ Basic ☒ Standard

Address: 6430 Dobbin Road, Suite C,  
Columbia, MD 21045

Tested in accordance with the following procedures and standards:  
Calibration of Sound Level Meters, Scantek Inc., Rev. 6/26/2015  
SLM & Dosimeters – Acoustical Tests, Scantek Inc., Rev. 7/6/2011

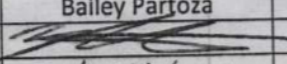
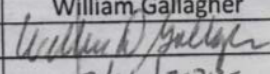
Instrumentation used for calibration: Nor-1504 Norsonic Test System:

| Instrument - Manufacturer   | Description           | S/N        | Cal. Date          | Traceability evidence    | Cal. Due      |
|-----------------------------|-----------------------|------------|--------------------|--------------------------|---------------|
|                             |                       |            |                    | Cal. Lab / Accreditation |               |
| 483B-Norsonic               | SME Cal Unit          | 31052      | Nov 8, 2021        | Scantek, Inc./ NVLAP     | Nov 8, 2022   |
| DS-360-SRS                  | Function Generator    | 88077      | Dec 3, 2020        | ACR Env./ A2LA           | Dec 3, 2022   |
| 34401A-Agilent Technologies | Digital Voltmeter     | MY47011118 | Feb 4, 2021        | ACR Env. / A2LA          | Mar 4, 2022   |
| PTU300-Vaisala              | Environmental Monitor | P5011262   | Sept 10, 2021      | ACR Env./ A2LA           | Sept 10, 2022 |
| PC Program 1019 Norsonic    | Calibration software  | v.6.1T     | Validated Nov 2014 | Scantek, Inc.            | -             |
| 1251-Norsonic               | Calibrator            | 30878      | Oct 27, 2021       | Scantek, Inc./ NVLAP     | Oct 27, 2022  |

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK).

Environmental conditions:

| Temperature (°C) | Barometric pressure (kPa) | Relative Humidity (%) |
|------------------|---------------------------|-----------------------|
| 23.0             | 101.06                    | 41.0                  |

|                |                                                                                     |                       |                                                                                       |
|----------------|-------------------------------------------------------------------------------------|-----------------------|---------------------------------------------------------------------------------------|
| Calibrated by: | Bailey Partoza                                                                      | Authorized signatory: | William Gallagher                                                                     |
| Signature      |  | Signature             |  |
| Date           | 2/14/22                                                                             | Date                  | 2/16/2022                                                                             |

Calibration Certificates or Test Reports shall not be reproduced, except in full, without written approval of the laboratory.  
This Calibration Certificate or Test Reports shall not be used to claim product certification, approval or endorsement by NVLAP, NIST, or any agency of the federal government.  
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**Results summary:** Device complies with following clauses of mentioned specifications:

| CLAUSES <sup>1</sup> FROM IEC/ANSI STANDARDS<br>REFERENCED IN PROCEDURES: | RESULT <sup>2,3</sup> | EXPANDED<br>UNCERTAINTY<br>(coverage factor 2) [dB] |
|---------------------------------------------------------------------------|-----------------------|-----------------------------------------------------|
| INDICATION AT THE CALIBRATION CHECK FREQUENCY - IEC61672-3 ED.2 CLAUSE 10 | Passed                | 0.15                                                |
| SELF-GENERATED NOISE - IEC 61672-3 ED.2 CLAUSE 11                         | Passed                | 0.30                                                |
| FREQUENCY WEIGHTINGS: A NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13            | Passed                | 0.20                                                |
| FREQUENCY WEIGHTINGS: C NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13            | Passed                | 0.20                                                |
| FREQUENCY WEIGHTINGS: Z NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13            | Passed                | 0.20                                                |
| FREQUENCY AND TIME WEIGHTINGS AT 1 KHZ IEC 61672-3 ED.2.0 CLAUSE 14       | Passed                | 0.20                                                |
| LEVEL LINEARITY ON THE REFERENCE LEVEL RANGE - IEC 61672-3 ED.2 CLAUSE 16 | Passed                | 0.25                                                |
| TONEBURST RESPONSE - IEC 61672-3 ED.2.0 CLAUSE 18                         | Passed                | 0.30                                                |
| PEAK C SOUND LEVEL - IEC 61672-3 ED.2.0 CLAUSE 19                         | Passed                | 0.35                                                |
| OVERLOAD INDICATION - IEC 61672-3 ED.2.0 CLAUSE 20                        | Passed                | 0.25                                                |
| HIGH LEVEL STABILITY TEST - IEC 61672-3 ED.2.0 CLAUSE 21                  | Passed                | 0.1                                                 |
| LONG TERM STABILITY TEST - IEC 61672-3 ED.2.0 CLAUSE 15                   | Passed                | 0.1                                                 |
| COMBINED ELECTRICAL AND ACOUSTICAL TEST - IEC 61672-3 ED.2.0 CLAUSE 13    | Passed                | See test report                                     |

<sup>1</sup> The results of this calibration apply only to the instrument type with serial number identified in this report.

<sup>2</sup> Parameters are certified at actual environmental conditions.

<sup>3</sup> The tests marked with (\*) are not covered by the current NVLAP accreditation.

**Comments:** The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organization responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2, to demonstrate that the model of sound level meter fully conforms to the requirements in the IEC 61672-2, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1.

**Note:** The instrument was tested for the parameters listed in the table above, using the test methods described in the listed standards. All tests were performed around the reference conditions. The test results were compared with the manufacturer's or with the standard's specifications, whichever are larger. The measurement results are reported as Pass / Fail simple acceptance; measured values are in the tolerance interval.

**Tests made with the following attachments to the instrument:**

|                                     |                                                 |
|-------------------------------------|-------------------------------------------------|
| Microphone:                         | Rion UC-59 s/n 06881 for acoustical test        |
| Preamplifier:                       | Rion NH25 s/n 43257 for all tests               |
| Other:                              | line adaptor ADP005 (18pF) for electrical tests |
| Accompanying acoustical calibrator: | none                                            |
| Windscreen:                         | Rion WS-10                                      |

**Measured Data:** in Test Report # 47546 of 7 +1 pages.

**Place of Calibration:** Scantek, Inc.  
6430 Dobbin Road, Suite C  
Columbia, MD 21045 USA

Ph/Fax: 410-290-7726/ -9167  
[callab@scantekinc.com](mailto:callab@scantekinc.com)

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**Scantek, Inc.**

CALIBRATION LABORATORY

ISO 17025: 2017, ANSI/NCSL Z540:1994 Part 1  
ACCREDITED by NVLAP (an ILAC MRA signatory)**NVLAP**<sup>®</sup>  
CALIBRATION  
NVLAP Lab Code: 200625-0

## Calibration Certificate No.47547

Instrument: Microphone  
Model: UC-59  
Manufacturer: Rion  
Serial number: 06881  
Composed of:

Date Calibrated: 2/11/2022 Cal Due: 2/11/2023  
Status: 

| Received | Sent |
|----------|------|
| X        | X    |
|          |      |
|          |      |

  
In tolerance:   
Out of tolerance:   
See comments:   
Contains non-accredited tests: Yes X No

Customer: Scantek, Inc.  
Tel/Fax: 410-290-7726/410-290-9167

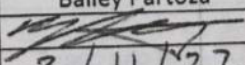
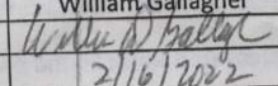
Address: 6430 Dobbin Road, Suite C,  
Columbia, MD 21045

Tested in accordance with the following procedures and standards:  
Calibration of Measurement Microphones, Scantek, Inc., Rev. 2/25/2015

Instrumentation used for calibration: N-1504 Norsonic Test System:

| Instrument - Manufacturer   | Description           | S/N        | Cal. Date          | Traceability evidence    | Cal. Due      |
|-----------------------------|-----------------------|------------|--------------------|--------------------------|---------------|
|                             |                       |            |                    | Cal. Lab / Accreditation |               |
| 483B-Norsonic               | SME Cal Unit          | 31052      | Nov 8, 2021        | Scantek, Inc./ NVLAP     | Nov 8, 2022   |
| DS-360-SRS                  | Function Generator    | 88077      | Dec 3, 2020        | ACR Env./ A2LA           | Dec 3, 2022   |
| 34401A-Agilent Technologies | Digital Voltmeter     | MY47011118 | Feb 4, 2021        | ACR Env. / A2LA          | Mar 4, 2022   |
| PTU300-Vaisala              | Environmental Monitor | P5011262   | Sept 10, 2021      | ACR Env./ A2LA           | Sept 10, 2022 |
| PC Program 1017 Norsonic    | Calibration software  | v.6.1T     | Validated Nov 2014 | Scantek, Inc.            | -             |
| 1253-Norsonic               | Calibrator            | 28326      | Oct 27, 2021       | Scantek, Inc./ NVLAP     | Oct 27, 2022  |
| 1203-Norsonic               | Preamplifier          | 14059      | March 3, 2021      | Scantek, Inc./ NVLAP     | March 3, 2022 |
| 4180-Brüel&Kjær             | Microphone            | 2246115    | Oct 6, 2021        | DPLA / DANAK             | Oct 6, 2023   |

Instrumentation and test results are traceable to SI - BIPM through standards maintained by NPL (UK) and NIST (USA)

|                |                                                                                     |                       |                                                                                       |
|----------------|-------------------------------------------------------------------------------------|-----------------------|---------------------------------------------------------------------------------------|
| Calibrated by: | Bailey Partoza                                                                      | Authorized signatory: | William Gallagher                                                                     |
| Signature      |  | Signature             |  |
| Date           | 2/11/22                                                                             | Date                  | 2/16/2022                                                                             |

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This Calibration Certificate or Test Reports shall not be used to claim product certification, approval or endorsement by NVLAP, NIST, or any agency of the federal government.  
Document stored as: Y:\Calibration Lab\Mic 2022\Rion59\_06881\_M1.doc



**Results summary:** Device was tested and complies with following clauses of mentioned specifications:

| CLAUSES / METHODS <sup>1</sup><br>FROM PROCEDURES        |                                 | MET <sup>2,3</sup> | NOT<br>MET | NOT<br>TESTED | MEASUREMENT<br>EXPANDED<br>UNCERTAINTY<br>(coverage factor 2)                                                                           |
|----------------------------------------------------------|---------------------------------|--------------------|------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Open circuit sensitivity (insert voltage method, 250 Hz) |                                 | X                  |            |               | See below                                                                                                                               |
| Frequency<br>response                                    | Actuator response               | X                  |            |               | 63 – 200Hz: 0.3 dB<br>200 – 8000 Hz: 0.2 dB<br>8 – 10 kHz: 0.5 dB<br>10 – 20 kHz: 0.7 dB<br>20 – 50 kHz: 0.9 dB<br>50 – 100 kHz: 1.2 dB |
|                                                          | FF/Diffuse field responses      | X                  |            |               | 63 – 200Hz: 0.3 dB<br>200 – 4000 Hz: 0.2 dB<br>4 – 10 kHz: 0.6 dB<br>10 – 20 kHz: 0.9 dB<br>20 – 50 kHz: 2.2 dB<br>50 – 100 kHz: 4.4 dB |
|                                                          | Scantek, Inc. acoustical method |                    |            | X             | 31.5 – 125 Hz: 0.16 dB<br>250, 1000 Hz: 0.12 dB<br>2 – 8 kHz: 0.8 dB<br>12.5 – 16 kHz: 2.4 dB                                           |

<sup>1</sup> The results of this calibration apply only to the instrument type with serial number identified in this report.

<sup>2</sup> Parameters are certified at actual environmental conditions.

<sup>3</sup> The tests marked with (\*) are not covered by the current NVLAP accreditation.

*Note:* The free field/diffuse field characteristics were calculated based on the measured actuator response and adjustment coefficients as provided by the manufacturer. The measurement results are reported as Pass / Fail simple acceptance; measured values are in the tolerance interval.

**Comments:** The instrument was tested and met all specifications found in the referenced procedures.

**Environmental conditions:**

| Temperature (°C) | Barometric pressure (kPa) | Relative Humidity (%) |
|------------------|---------------------------|-----------------------|
| 22.1 ± 1.0       | 100.28 ± 0.020            | 49.3 ± 2.0            |

**Main measured parameters:**

| Tone frequency (Hz) | Measured <sup>4</sup> /Acceptable<br>Open circuit sensitivity (dB re 1V/Pa) | Sensitivity (mV/Pa) |
|---------------------|-----------------------------------------------------------------------------|---------------------|
| 250                 | -25.97 ± 0.12/ -27.0 ± 2.0                                                  | 50.30               |

<sup>4</sup> The reported expanded uncertainty is calculated with a coverage factor k=2.00

**Tests made with following attachments to instrument and auxiliary devices:**

|                                                      |
|------------------------------------------------------|
| Protection grid mounted for sensitivity measurements |
| Actuator type: G.R.A.S. RA0014                       |

**Measured Data:** Found on Microphone Test Report # 47547 of one page.

**Place of Calibration:** Scantek, Inc.  
6430 Dobbin Road, Suite C  
Columbia, MD 21045 USA

Ph/Fax: 410-290-7726/ -9167  
[callab@scantekinc.com](mailto:callab@scantekinc.com)

Calibration Certificates or Test Reports shall not be reproduced, except in full, without written approval of the laboratory.  
This Calibration Certificate or Test Reports shall not be used to claim product certification, approval or endorsement by NVLAP, NIST, or any agency of the federal government.

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**Scantek, Inc.**

CALIBRATION LABORATORY

ISO 17025: 2017, ANSI/NCSL Z540:1994 Part 1

ACCREDITED by NVLAP (an ILAC MRA signatory)

**NVLAP**<sup>®</sup>

CALIBRATION

NVLAP Lab Code: 200625-0

## Calibration Certificate No.48080

**Instrument:** Acoustical Calibrator  
**Model:** NC-74  
**Manufacturer:** Rion  
**Serial number:** 35078716  
**Class (IEC 60942):** 1  
**Barometer type:**  
**Barometer s/n:**

**Date Calibrated:** 5/9/2022 **Cal Due:** 5/9/2023**Status:**

| Received | Sent |
|----------|------|
| X        | X    |

**In tolerance:**

|   |   |
|---|---|
| X | X |
|---|---|

**Out of tolerance:**

|  |  |
|--|--|
|  |  |
|--|--|

**See comments:**

|  |  |
|--|--|
|  |  |
|--|--|

**Contains non-accredited tests:** Yes X No

**Customer:** Scantek, Inc.  
**Tel/Fax:** 410-290-7726 / 410-290-9167

**Address:** 6430 Dobbin Road, Suite C,  
Columbia, MD 21045

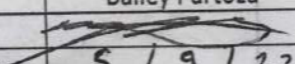
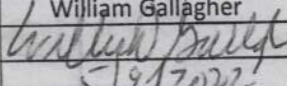
**Tested in accordance with the following procedures and standards:**

Calibration of Acoustical Calibrators, Scantek Inc., Rev. 10/1/2010

**Instrumentation used for calibration:** Nor-1504 Norsonic Test System:

| Instrument - Manufacturer   | Description           | S/N        | Cal. Date          | Traceability evidence    | Cal. Due      |
|-----------------------------|-----------------------|------------|--------------------|--------------------------|---------------|
|                             |                       |            |                    | Cal. Lab / Accreditation |               |
| 483B-Norsonic               | SME Cal Unit          | 31052      | Nov 8, 2021        | Scantek, Inc. / NVLAP    | Nov 8, 2022   |
| DS-360-SRS                  | Function Generator    | 88077      | Dec 3, 2020        | ACR Env. / A2LA          | Dec 3, 2022   |
| 34401A-Agilent Technologies | Digital Voltmeter     | MY47011118 | Mar 10, 2022       | ACR Env. / A2LA          | Mar 10, 2023  |
| PTU300-Vaisala              | Environmental Monitor | P5011262   | Sept 10, 2021      | ACR Env. / A2LA          | Sept 10, 2022 |
| 140-Norsonic                | Real Time Analyzer    | 1406423    | Nov 8, 2021        | Scantek / NVLAP          | Nov 8, 2022   |
| PC Program 1018 Norsonic    | Calibration software  | v.6.1T     | Validated Nov 2014 | Scantek, Inc.            | -             |
| 4134-Brüel&Kjær             | Microphone            | 173368     | Nov 8, 2021        | Scantek, Inc. / NVLAP    | Nov 8, 2022   |
| 1203-Norsonic               | Preamplifier          | 14059      | Mar 7, 2022        | Scantek, Inc. / NVLAP    | Mar 7, 2023   |

**Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK)**

|                       |                                                                                     |                              |                                                                                       |
|-----------------------|-------------------------------------------------------------------------------------|------------------------------|---------------------------------------------------------------------------------------|
| <b>Calibrated by:</b> | Bailey Partoza                                                                      | <b>Authorized signatory:</b> | William Gallagher                                                                     |
| Signature             |  | Signature                    |  |
| Date                  | 5 / 9 / 22                                                                          | Date                         | 5 / 9 / 2022                                                                          |

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Page 1 of 2



**Results summary:** Device was tested and complies with following clauses of mentioned specifications:

| CLAUSES <sup>1</sup> FROM STANDARDS REFERENCED IN PROCEDURES:                  | MET <sup>2</sup> | NOT MET | COMMENTS |
|--------------------------------------------------------------------------------|------------------|---------|----------|
| <b>Manufacturer specifications</b>                                             |                  |         |          |
| Manufacturer specifications: Sound pressure level                              | X                |         |          |
| Manufacturer specifications: Frequency                                         | X                |         |          |
| Manufacturer specifications: Total harmonic distortion                         | X                |         |          |
| <b>Current standards</b>                                                       |                  |         |          |
| ANSI S1.40:2006 B.3 / IEC 60942: 2003 B.2 - Preliminary inspection             | X                |         |          |
| ANSI S1.40:2006 B.4.4 / IEC 60942: 2003 B.3.4 - Sound pressure level           | X                |         |          |
| ANSI S1.40:2006 A.5.4 / IEC 60942: 2003 A.4.4 - Sound pressure level stability | -                | -       |          |
| ANSI S1.40:2006 B.4.5 / IEC 60942: 2003 B.3.5 - Frequency                      | X                |         |          |
| ANSI S1.40:2006 B.4.6 / IEC 60942: 2003 B.3.6 - Total harmonic distortion      | X                |         |          |

<sup>1</sup> The results of this calibration apply only to the instrument type with serial number identified in this report.

<sup>2</sup> The tests marked with (\*) are not covered by the current NVLAP accreditation.

**Main measured parameters <sup>3</sup>:**

| Measured <sup>4</sup> /Acceptable <sup>5</sup><br>Tone frequency (Hz): | Measured <sup>4</sup> /Acceptable <sup>5</sup><br>Total Harmonic Distortion (%): | Measured <sup>4</sup> /Acceptable Level <sup>5</sup><br>(dB): |
|------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------|
| 1001.92 ± 1.0/1000.0 ± 10.0                                            | 1.41 ± 0.10/ < 3                                                                 | 94.15 ± 0.12/94.0 ± 0.4                                       |

<sup>3</sup> The stated level is valid at measurement conditions.

<sup>4</sup> The above expanded uncertainties for frequency and distortion are calculated with a coverage factor k=2; for level k=2.00

<sup>5</sup> Acceptable parameters values are from the current standards

**Environmental conditions:**

| Temperature (°C) | Barometric pressure (kPa) | Relative Humidity (%) |
|------------------|---------------------------|-----------------------|
| 22.8 ± 1.0       | 101.05 ± 0.000            | 44.1 ± 2.0            |

**Tests made with following attachments to instrument:**

|                                       |
|---------------------------------------|
| Calibrator ½" Adaptor Type: NC-74-002 |
| Other:                                |

**Adjustments:** Unit was not adjusted.

**Comments:** The instrument was tested and met all specifications found in the referenced procedures.

*Note:* The instrument was tested for the parameters listed in the table above, using the test methods described in the listed standards. All tests were performed around the reference conditions. The test results were compared with the manufacturer's or with the standard's specifications, whichever are larger. The measurement results are reported as Pass / Fail simple acceptance; measured values are in the tolerance interval.

**Measured Data:** in Acoustical Calibrator Test Report # 48080 of one page.

**Place of Calibration:** Scantek, Inc.  
6430 Dobbin Road, Suite C  
Columbia, MD 21045 USA

Ph/Fax: 410-290-7726/ -9167  
[callab@scantekinc.com](mailto:callab@scantekinc.com)

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APPENDIX D  
SOUND CONTROL CURTAIN COST ESTIMATE

SCHEMATIC DESIGN ANALYSIS  
For The  
**SOUND CONTROL STUDY**  
**STOCKBRIDGE AMPHITHEATER**  
Stockbridge, Georgia

| CODE                                                         | DESCRIPTION                          | QTY   | UNIT       | COST           | TOTAL          |
|--------------------------------------------------------------|--------------------------------------|-------|------------|----------------|----------------|
| <b><u>PROJECT SUMMARY</u></b>                                |                                      |       |            |                |                |
|                                                              | SOUND CONTROL                        |       |            | 366,082        |                |
|                                                              |                                      |       |            | <b>366,082</b> |                |
|                                                              | GENERAL CONDITIONS                   | 10.0% |            | 36,608         |                |
|                                                              | BONDS, INSURANCES, AND FEES          | 3.0%  |            | 12,081         |                |
|                                                              | ESCALATION (18% per year, 12 months) | 18.0% |            | 74,659         |                |
|                                                              | FEE - GENERAL CONTRACTOR             | 7.0%  |            | 34,260         |                |
|                                                              | DESIGN CONTINGENCY                   | 10.0% |            | 52,369         |                |
|                                                              |                                      |       |            |                |                |
| <b>TOTAL CONST COST (HARD COST)</b>                          |                                      | -     | <b>GSF</b> | <b>\$</b>      | <b>576,059</b> |
|                                                              |                                      |       |            |                |                |
| <b>TOTAL SOFT COST (A&amp;E fees, permitting, insurance)</b> |                                      | 11.0% |            | <b>63,366</b>  |                |
| <b>TOTAL FFE (furniture, fixtures, &amp; equipment)</b>      |                                      | 7.0%  |            | <b>NIC</b>     |                |
| <b>TOTAL OWNER'S CONTINGENCY</b>                             |                                      | LS    |            | <b>NIC</b>     |                |
| <b>TOTAL PROJECT COST</b>                                    |                                      |       |            | <b>\$</b>      | <b>639,425</b> |

| CODE | DESCRIPTION | QTY | UNIT | COST | TOTAL |
|------|-------------|-----|------|------|-------|
|------|-------------|-----|------|------|-------|

## **PROJECT DETAIL**

### SOUND CONTROL STUDY

|     |                                            |       |      |          |         |
|-----|--------------------------------------------|-------|------|----------|---------|
| 2-1 | Temporary Protection Allowance             | 1     | LS   | 2,500.00 | 2,500   |
| 2-2 | Demo Soffit Panels                         | 700   | SF   | 7.50     | 5,250   |
| 2-3 | Reinstall and Rework Soffit Panels         | 700   | SF   | 12.50    | 8,750   |
| 2-4 | Miscellaneous Steel Allowance              | 2     | TONS | 6,750.00 | 13,500  |
| 2-5 | Touch Up Allowance                         | 1     | LS   | 2,500.00 | 2,500   |
| 2-6 | Sound Curtain                              | 4,196 | SF   | 19.50    | 81,822  |
| 2-7 | Aesthetic Curtain - Front Side - Allowance | 4,196 | SF   | 30.00    | 125,880 |
| 2-8 | Aesthetic Curtain - Back Side - Allowance  | 4,196 | SF   | 30.00    | 125,880 |

**Division 2 Subtotal** **366,082**

---

**DIVISIONS SUBTOTAL** **366,082**

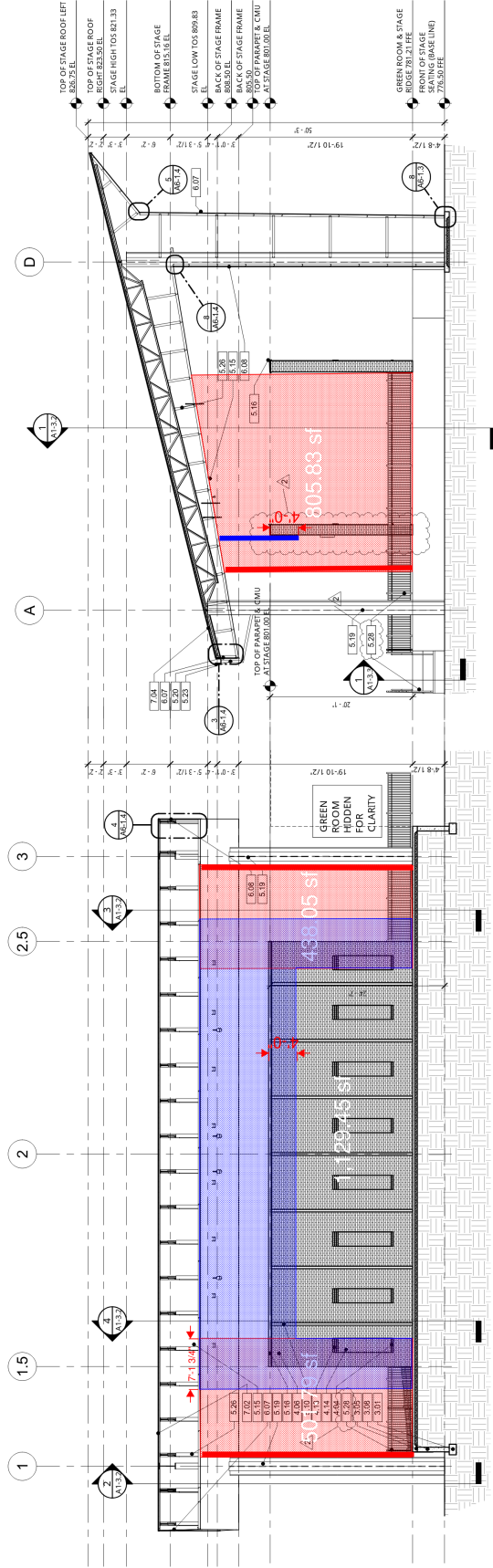
|                                      |       |        |
|--------------------------------------|-------|--------|
| GENERAL CONDITIONS                   | 10.0% | 36,608 |
| BONDS, INSURANCES, AND FEES          | 3.0%  | 12,081 |
| ESCALATION (18% per year, 12 months) | 18.0% | 74,659 |
| FEE - GENERAL CONTRACTOR             | 7.0%  | 34,260 |
| DESIGN CONTINGENCY                   | 10.0% | 52,369 |

---

**TOTAL HARD COST** **\$ 576,059**

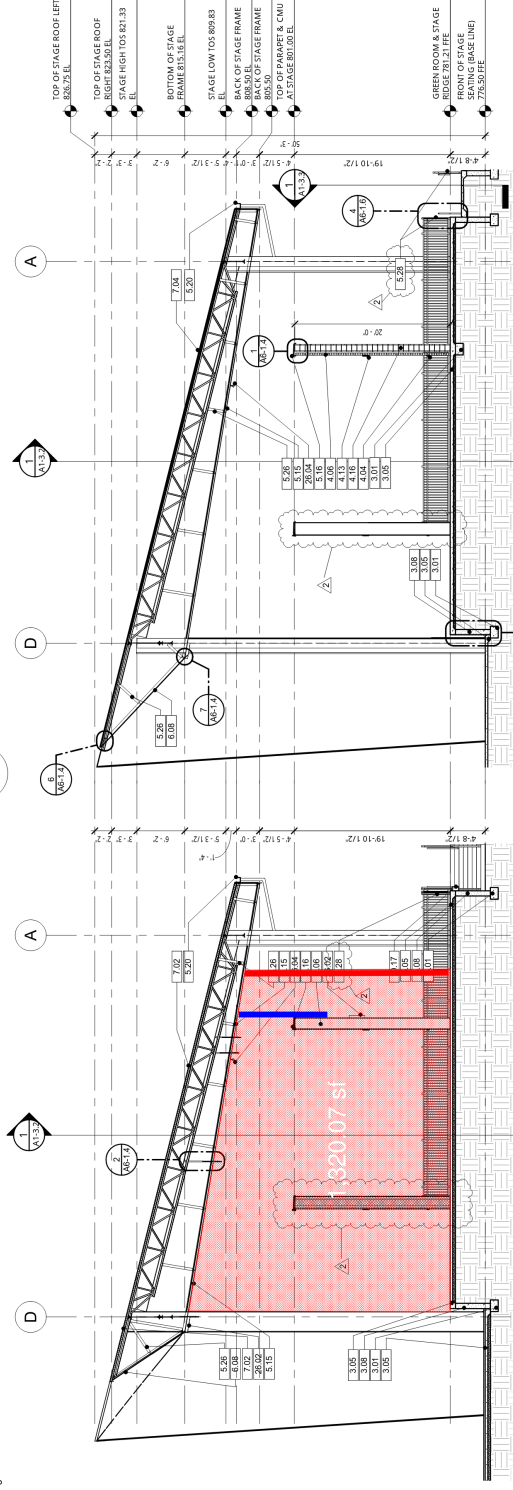






1 STAGE LONGITUDINAL SECTION  
A1:3.2 SCALE: 1/8" = 1'-0"

2 STAGE TRANSVERSE SECTION @ COLUMN  
A1:3.2 SCALE: 1/8" = 1'-0"



3 STAGE TRANSVERSE SECTION  
A1:3.2 SCALE: 1/8" = 1'-0"

4 STAGE TRANSVERSE SECTION @ WALL  
A1:3.2 SCALE: 1/8" = 1'-0"