Civil

A. Narrative / Scope:
   1. Concessions building with building services.
   2. Ticketing Plaza.
   3. Lighting and Sound Systems.
   4. Home and Grandstand Bleachers and Press Box.
   5. Visitor Bleachers.
   6. ADA Routes.
   7. Turf Replacement.

B. We have researched and discovered a 50' setback for non-residential structures along streets - we're proposing to keep the proposed concessions building outside of that. Any concerns or other setbacks we should be aware of?

C. There is a desire for a drive entrance apron to the south of the site for their television crews during games. This will be gated off and only utilized by district staff during events. Is there a City Standard Detail we should use for the apron, curb and gutter, or sidewalk?
   1. There is an existing one further east that is hardly used and we envision this one to replicate it.

D. How many ADA parking stalls would be required to serve the field? Currently, there are none in the adjacent parking lots. City code is one standard parking space per three seats.

E. The site is located in a wellhead protection zone. Underground retention system and bioretention will likely be utilized for stormwater management. Disturbance will be over one acre and there the NPDES permit and SWPPP requirements apply:
   1. Lower Minnesota River Watershed District:
      a. Runoff rates shall not exceed existing for 1- or 2-, 10-, and 100- year 24 hour events using NOAA Atlas 14.
      b. Runoff volume to achieve a net reduction from existing.
      c. Projects that create 1 acre or more of new impervious surface shall have no net increase from existing TP and TSS.
   2. It is our understanding that The City of Bloomington issues permits and acts as the primary permitting authority to the Watershed District, are there other city stormwater requirements that we need to comply to?

F. Does this project require Planning Commission or City Council? What should we expect for the review process? Do you expect a Conditional Use Permit be needed for any improvements?

G. Are there neighborhood concerns that we should be aware of or need to mitigate?

H. Are we required to use any City Standard Specifications - utility related?

Architectural

Scope includes a 500sf concessions facility. The concessions area shall include equipment for warming food and a hand washing sink. Wall construction shall comprise of masonry backup with brick to match the existing High School. Wall finishes to include paint; ceiling finishes to include painted gyp bd. The building will be designed to meet both current life safety and accessibility code requirements.
The bleachers will be a prefabricated assembly with 2,000 seats on the home side and 500 seats on the opposite visitor side. It is planned to move existing Kennedy bleachers to Jefferson to be used on the visitor side. A pre-fabricated press box is planned for the home side and integrated within the bleachers. Bleachers will be designed to meet both current life safety and accessibility code requirements.

Structural

The concessions building roof will be framed with conventional pitched wood trusses with flat bottom chords spaced at 24"oc max, spanning between exterior CMU bearing walls. The exterior CMU walls will also act as shear walls, and will be supported on conventional strip footings. The floor slab will be a non-structural slab on grade.

Mechanical

New water and sanitary sewer services will be provided for concessions and toilet plumbing fixtures. New water service will have shutoff, drain, and blowout provisions for winterization. Electric water heater will provide hot water to hand sinks. Code required exhaust and makeup air will be provided for toilets and concessions. Electric heaters will provide heat during shoulder seasons when plumbing systems are not winterized.

Electrical

A. General Work Scopes:
   1. The design will comply with the current versions of the following codes and standards:
      a. 26 05 00 Common Work Results for Electrical
      b. 26 05 03 Electrical Demolition
      c. 26 05 19 Electrical Power Conductors
      d. 26 05 26 Grounding and Bonding for Electrical Systems
      e. 26 05 29 Hangers and Supports for Electrical Systems
      f. 26 05 33 Raceway and Boxes for Electrical Systems
      g. 26 05 53 Identification for Electrical Systems
      h. 26 09 23 Lighting Control Devices
      i. 26 22 00 Low-Voltage Transformers
      j. 26 24 16 Panelboards
      k. 26 27 26 Wiring Devices
      l. 26 28 16 Enclosed Switches and Circuit Breakers
      m. 26 51 00 Lighting
      n. 26 56 68 Exterior Athletic Lighting

B. Electrical Narrative:
   1. Electrical work will be provided for both Jefferson and Kennedy stadiums.

C. Electrical Distribution:
   1. A 200A, 480V/3-phase fusible switch and associated feeders will be provided out to site to power both the field lights, press box, scoreboard, and field outlets.

D. Lighting:
   1. Field lighting will be provided for the stadium.

E. Power Systems:
   1. A freestanding feed point with 480V panel, transformer, and 208/240V? panel enclosed will be provided on site for the stadium power requirements. The 480 V panel shall feed field lighting and associated Musco controls, and the lower voltage panel shall feed the press box and field outlets. The feed point will be NEMA 3R rated and mounted on a concrete pad with lockable doors. Field lighting will be controlled via this feed point.
   2. Existing power to the scoreboard will be rerouted to the feed point.

Technology

Independent School District #271

Jefferson High School Stadium Technology SD Narrative

August 16, 2023

A. Technology Narrative Based on Each of the Following Systems:
   1. General:
      a. The system below will be provided at both Jefferson and Kennedy stadiums.
   2. Stadium Audiovisual System:
      a. General: The stadium's audiovisual system will include loudspeakers hung from the lighting poles and press box to deliver a semi uniform coverage of 85dB +-10dB of audio to the home and away team bleachers and the sports field. The loudspeakers will receive wireless microphone audio from either the press box or the sidelines of the home team side of the sports field. The press box will also have a Bluetooth receiver accessible to play music over the loudspeaker system. The system will be controlled using a table-mounted touch panel to adjust volume levels and pairing capabilities. The headend components of the system will be mounted in a portable rack that can be removed when the stadium is not in use to help protect the longevity of the system.
   3. Stadium Structured Cabling System:
      a. General: Fiber optic cabling will connect the stadium press box to the school's main distribution frame using an owner-provided network switch. This switch will provide internet access to wireless access points near the bleachers. Additional cabling will be provided for the video surveillance system. The network switch will be co-located in the portable rack for the audiovisual to protect the system when not in use.
   4. Physical Security System:
      a. General: Leveraging the owner provided network switch one (1) video surveillance cameras will be placed in the interior of the press box capturing the entrance of the door and another camera will be placed on the exterior of the press box capturing the sports field. These cameras will be tied into an existing owner furnished video surveillance security camera system.
   5. Exclusions:
      a. All electrical races way, J-Box and power are provided by Division 26 Contractor.

PL202300158

Eric Melbye, Ed.D.
Superintendent of Schools
952.681.6402
Fax: 952.681.6406
emelbye@isd271.org

BLOOMINGTON
Public Schools

Educational Services Center
1350 West 106th Street
Bloomington, MN 55431-4126

www.bloomington.k12.mn.us

City of Bloomington
1800 West Old Shakopee Road
Bloomington, MN 55431

April 15, 2024

Dear City of Bloomington:

I understand there is some concern around late night noise with the proposed high school-based stadiums. Please be assured our high schools don't schedule outdoor events or competitions to go past 10 p.m.

Although the district does rent facilities to external groups that sometimes hold indoor events past 10 p.m. the outdoor stadiums are reserved for school or district use only.

The project will also include a sound limiting device for the sound system. Paul Aplikowski from Wold Architects and Engineers has provided you with that information.

Thank you for your consideration.

Sincerely,

Eric Melbye, Ed.D.
Superintendent of Schools

General:

Veneklasen's report contains specific recommendations for the stadium audio system design, which have been thoughtfully incorporated into the design below. Based on further discussion with Veneklasen, setting the sound pressure level at the center of the bleachers to 95 dBA has been recommended.

Audio System Design:

The placement of loudspeakers will be arranged to create a semi-even listening plane that will focus the audio from the system on the bleachers. The audio system specifications will clearly state that the target noise level at the center of the bleacher must not exceed 95 dBA. Furthermore, the specifications will require the contractor to take sound pressure level readings from multiple locations along the adjacent property line and provide a report attesting this fact to ensure that the audio is precisely focused on the bleachers and does not exceed 65 dBA at the property line.

The system will employ a digital signal processor (DSP) to route the audio. The system's inputs will include filters to auto-level all audio inputs, ensuring relative unity from all sources feeding into the system. These sources will be fed through the DSP to a compression module that will provide a peak limiter to the DSP's outputs, limiting the sound pressure level of the loudspeaker to approximately 95 dBA at the center of the bleachers based on a set line level signal within the compressor module.

The audio system will be operated using a touch panel located in the press box. This touch panel will play a crucial role in enforcing the limitations set within the DSP. Providing a clear interface for the operator to see how much of the volume control is being used will significantly reduce the risk of exceeding the 95 dBA noise ordinance, thereby ensuring adherence to the community's noise regulations.

Veneklasen Associates
Consultants in Acoustics | Noise | Vibration | AV | IT

March 14, 2024

Wold Architects and Engineers
332 Minnesota Street, Suite W2000
Saint Paul, Minnesota 55101

Attention: **Andrew Dahlquist | AIA, LEED AP**

Subject: **Bloomington High School Stadiums – Kennedy and Thomas Jefferson High Schools**
Bloomington, Minnesota
Stadium Noise Study
Veneklasen Project No. 8512-001

Dear Andrew:

Veneklasen Associates, Inc. (Veneklasen) has completed our review of the Bloomington High School Stadiums – Kennedy and Thomas Jefferson High Schools project located in Bloomington, Minnesota. This report predicts noise levels due to typical high school stadium noise sources (loudspeakers, crowd noise, and marching band) to nearby neighboring residences. This report represents the results of our findings.

1.0 INTRODUCTION

This study was conducted to determine the impact of the typical stadium noise sources from two high school stadiums in Bloomington, Minnesota. Veneklasen's scope of work included calculating the noise from typical stadium noise sources to nearby neighboring residences and comparing the predicted noise levels to the applicable code requirements.

The two high school stadiums analyzed in this study included Kennedy High School, located at 9701 Nicollet Ave, and Thomas Jefferson High School, located at 4001 W 102nd St, in Bloomington, MN.

Computer modeling and predictions were made using current known locations of the stadiums, and the updated layouts of the stadium/bleachers/loudspeaker locations shown in the CD drawings dated October 24, 2022.

2.0 NOISE CRITERIA

2.1 Acoustic Terminology

The following are a few acoustic terms and definitions that should be understood as these are referenced in the remainder of the report.

Decibel (dB) – The decibel is a measure, on a logarithmic scale, of the magnitude of a particular quantity (such as sound pressure level or sound power level) with respect to a standard reference value.

A-Weighted Sound Level – The ear does not respond equally to all frequencies but is less sensitive at low and high frequencies than it is a medium or speech range frequencies. Thus, to obtain a single number representing the sound level of a noise containing a wide range of frequencies in manner representative of the ear's response, it is necessary to reduce the effects of the low and high frequencies with respect to the medium frequencies. The resultant sound level is said to be A-weighted, and the units are dBA. The A-weighted sound level is also called the noise level.

L10 – The sound level is exceeded 10 percent of the time. This is a measure of the louder sound levels during the measurement period. Example: During a 1-hour measurement, an L10 of 85 dBA means the sound level was at or above 85 dBA for 6 minutes.

L50 – The sound level is exceeded 50 percent of the time. This is a measure of the louder sound levels during the measurement period. Example: During a 1-hour measurement, an L50 of 67 dBA means the sound level was at or above 67 dBA for 30 minutes.

2.2 Minnesota Pollution Control Agency (MPCA) – A Guide to Noise Control in Minnesota

Section 7030, Noise Pollution Control, states that "any municipality having authority to regulate land use shall take all reasonable measures within its jurisdiction to prevent the establishment of land use activities listed in noise area classification (NAC) 1, 2, of 3 in any location where the standards established in part 7030.0040 will be violated immediately upon establishment of the land use."

Section 7030.0040, 'Noise Standards', establishes the limiting levels of sound based on the preservation of public health and welfare and is grouped according to land activities by the noise are classification (NAC) system. Noise standards are established for daytime and nighttime hours and use the L10 and L50 metrics. Below are the noise standards in Figure 1:

Figure 1 - MPCA Noise Standards Summary

Noise Area Classification	Daytime		Nighttime	
	L_{10}	L_{50}	L_{10}	L_{50}
1	65	60	55	50
2	70	65	70	65
3	80	75	80	75

The guide also states the noise area classification is based on the land use activity at the location of the receiver and determines the noise standards applicable to that land use activity unless an exception is applied under Section 7030.0050, subpart 3. All nearby receptors to both stadiums are residential and therefore classified NAC1.

3.0 COMPUTER MODELING

Veneklasen utilized the ISO 9613 noise calculation method in the SoftNoise Predictor-LimA modeling program in order to predict stadium noise to nearby residences. The model accounts for known geographical conditions at both locations and accounts for any corresponding atmospheric mitigation effects.

Stadium noise sources were based on previously calculated noise sources, known data, calculation methods, and given crowd size estimates.

Modeling was performed under "typical" operating conditions. Based on our conversations with the Client, we understand that there will be only one "Home" bleacher for the Kennedy High School stadium in typical conditions (at the west end of the stadium).

For our predictions, the following considerations and sound pressure levels were used in our models:

- Loudspeakers: Placement was based on drawings and communication with Client/AV consultant. Sound pressure level of 95dBA was used for L10 level, 88dBA was used for L50 level (measured at the center of the bleachers).
- Crowd noise: Crowd size of 2500 was used, per Client estimates of crowd size. Bleacher size and orientation was modeled per CD drawings. Sound pressure level of 85dBA was used for L10 level, 78dBA was used for L50 level. Sound pressure levels were predicted using previous measurements and literature studies by Leo Beranek.

- Marching Band noise: Typical high school band size, and approximated noise from center of field. 85dBA was used for L10 level, and 78dBA was used for L50 level. Noise levels were derived from historical measurements Veneklasen has conducted of similar applications.

Note that these noise sources, particularly crowd noise and marching band noise, are all highly variable and dynamic. Any major fluctuations of sound level of these noise sources beyond what is typical and what was modelled could result in property line noise levels differing from predicted levels below.

4.0 NOISE PREDICTIONS

Veneklasen predicted noise levels due to typical stadium noise sources to the nearest residences to the school.

In completing these acoustic models, Veneklasen notes that noise from loudspeakers generally dominates the property line noise levels. This is the most controllable of the sound sources. One option to control noise levels from this source would be to incorporate an electronic volume limiter to control maximum wattage fed to loudspeakers. This system would need to be tuned to the anticipated sound levels discussed in the previous section.

Table 1 shows the predicted daytime noise levels at the nearest, loudest residence to the stadiums due to typical stadium noise sources. Modelled sound levels to nearest property lines comply with MPCA noise criteria for daytime (7am – 10pm) usage.

From correspondence with the Client, Veneklasen understands that the intention is to end sporting events, and other stadium usages, by 10pm such that nighttime noise criteria is not applicable (see Figure 1). However, understand that activities that do go past 10pm will not comply with MPCA standards.

Table 1 – Predicted Sound Levels

Location (nearest residence)	Address of nearest residence	Daytime, dBA	
		L10	L50
MPCA Noise Standard	-	65	60
Thomas Jefferson High School	10395 Johnson Ave S	64	57
Kennedy High School	9721 3rd Ave S	58	51

Figure 2 through Figure 5 show the predicted noise as a heat map, showing noise contours for nearby residences to the Stadiums. The closest residence is indicated with a decibel value on each figure.

4.1 Thomas Jefferson High School

Figure 2 - Thomas Jefferson HS L10

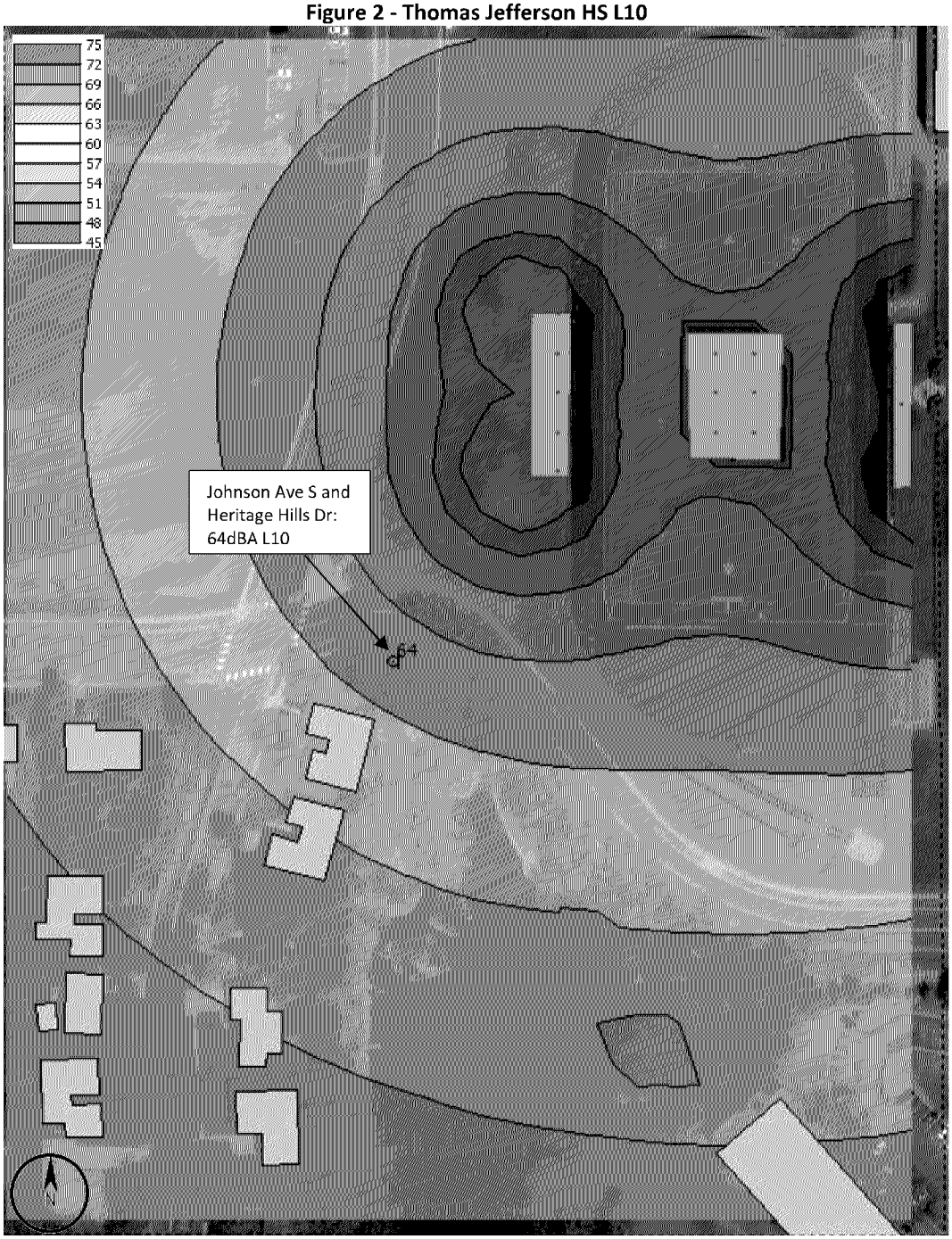
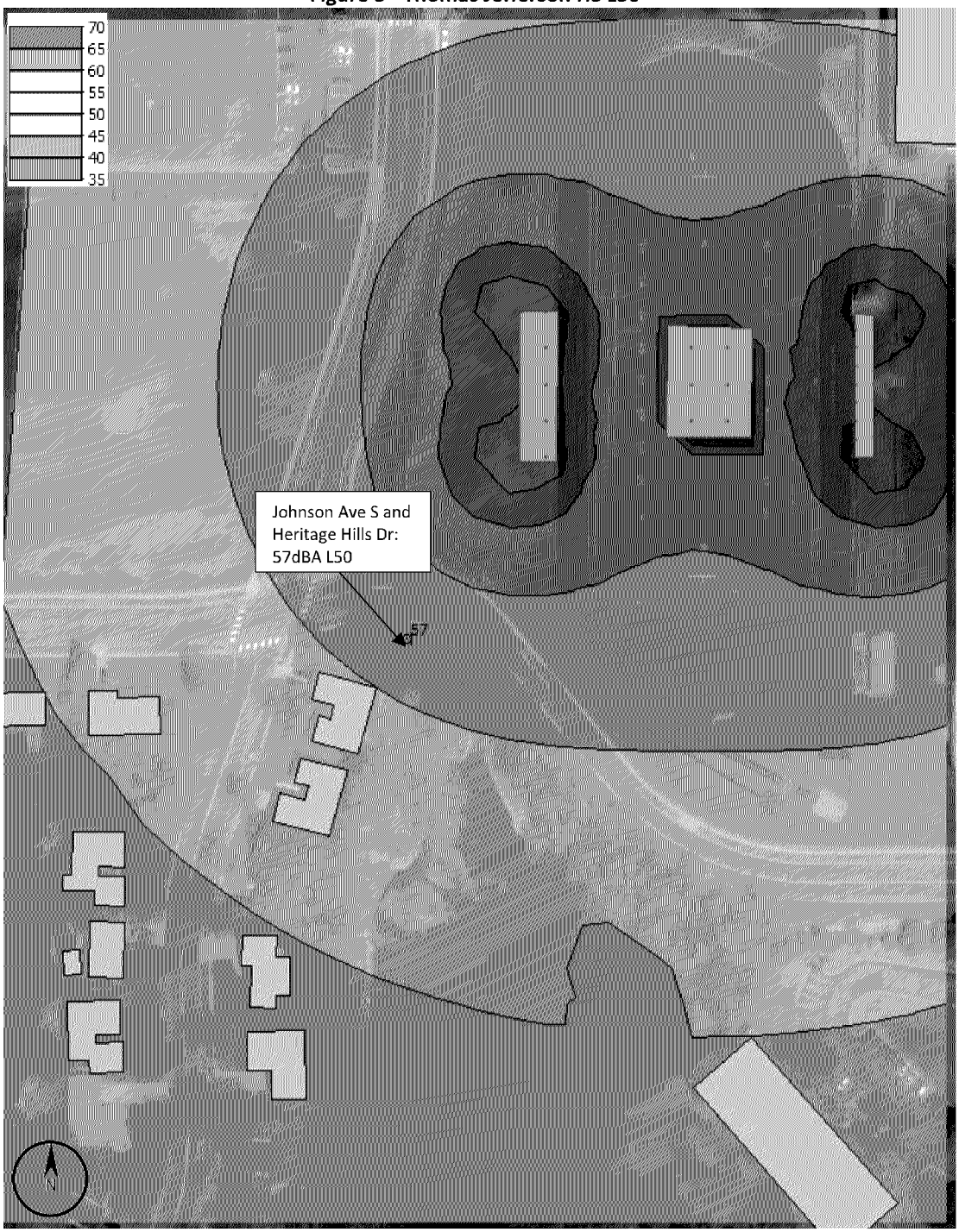


Figure 3 - Thomas Jefferson HS L50



4.2 Kennedy High School

Figure 4 - Kennedy HS L10

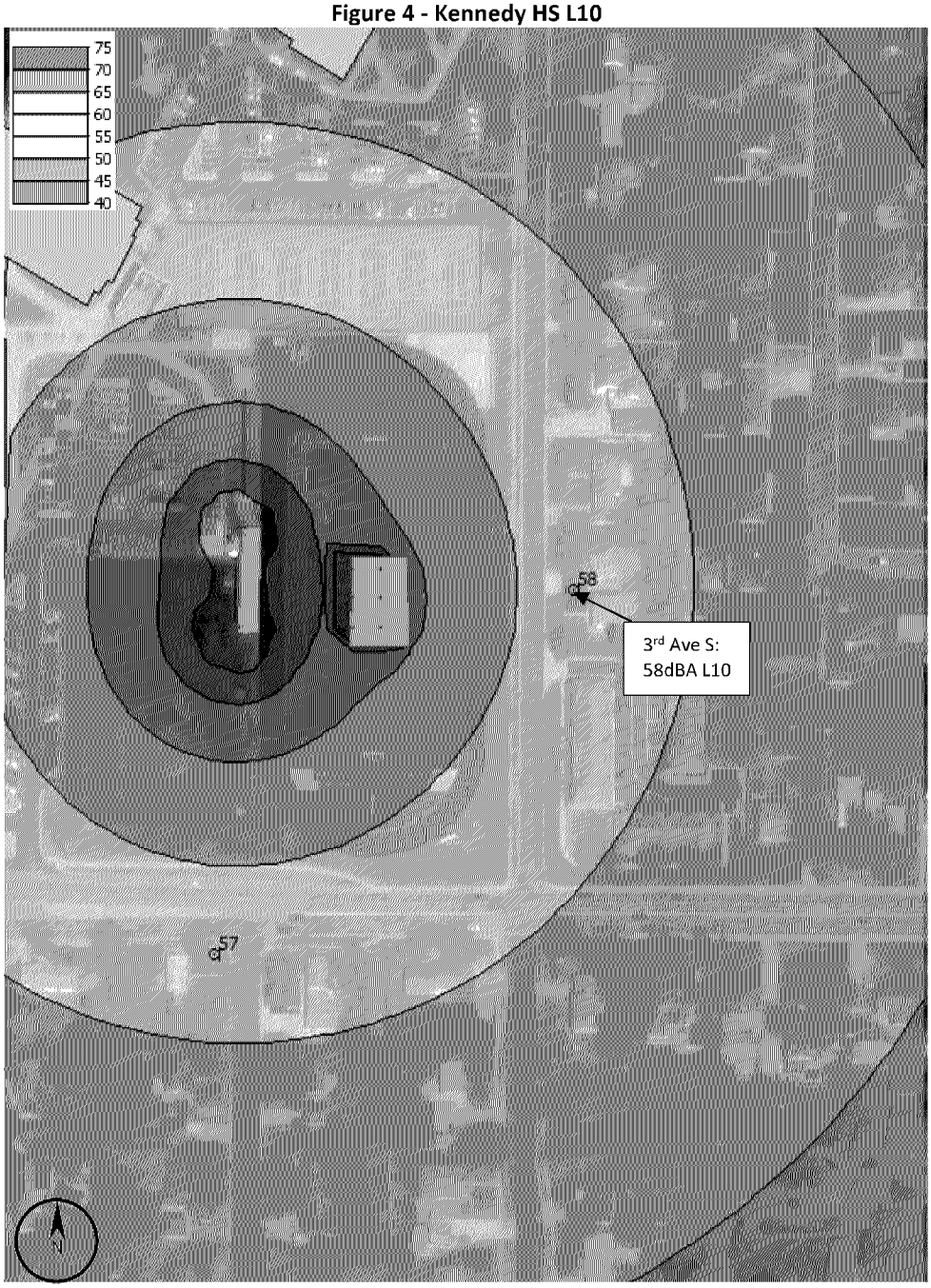
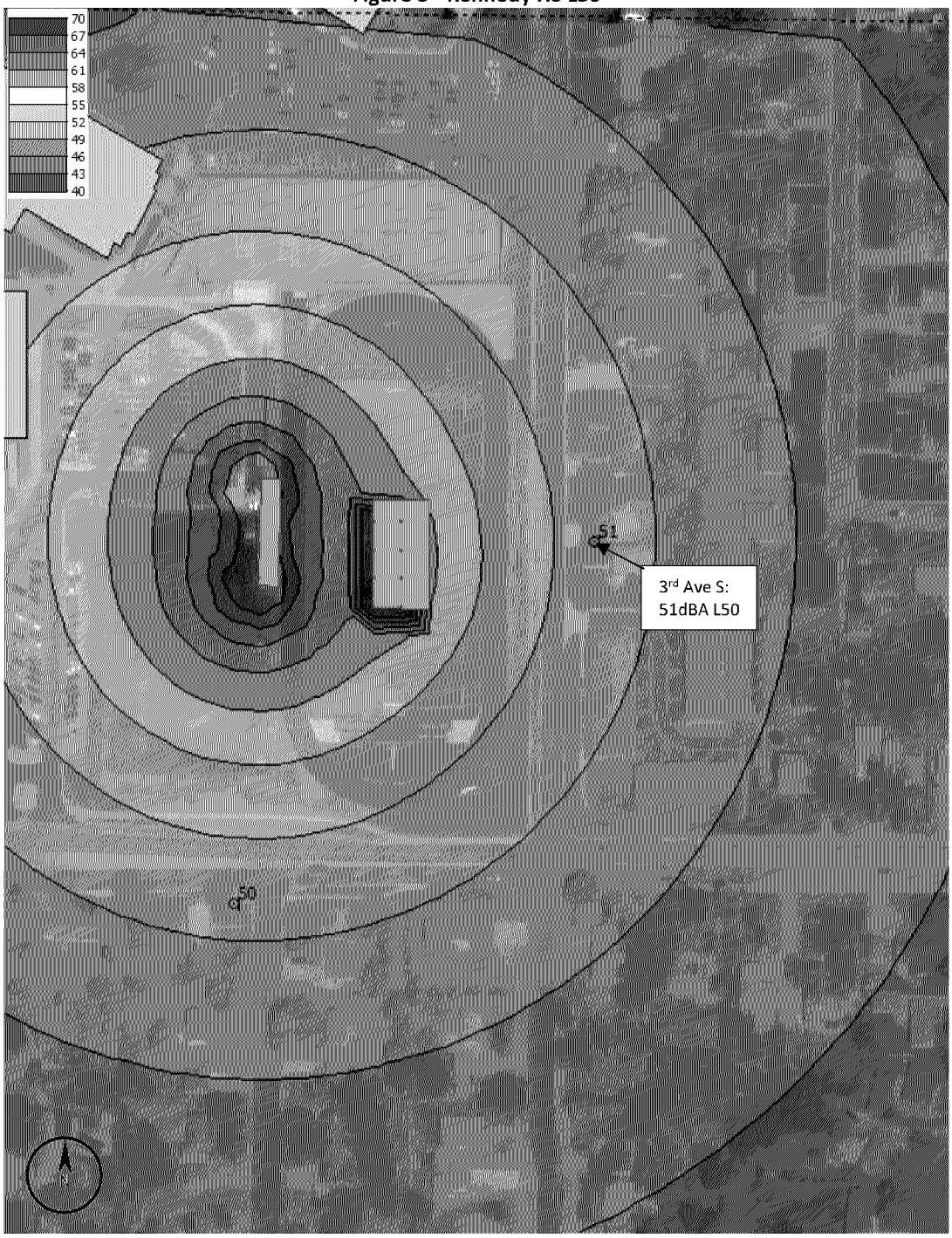


Figure 5 - Kennedy HS L50



5.0 SUMMARY

Stadium noise from Kennedy High School and Thomas Jefferson High School is predicted to be below MPCA noise standards at nearby residences. It is important to note that this is based on current known conditions and typical operating noise levels. Fluctuations beyond those noise levels used in Section 3.0 could cause deviations from predicted property line noise levels.

If you have any questions or comments regarding this report, please do not hesitate to contact us.

Sincerely,
Veneklasen Associates, Inc.

Kevin Patterson
Senior Associate

Arjun Shankar
Associate

Veneklasen Associates
Consultants in Acoustics | Noise | Vibration | AV | IT

April 3, 2024

Wold Architects and Engineers
332 Minnesota Street, Suite W2000
Saint Paul, Minnesota 55101

Attention: **Andrew Dahlquist | AIA, LEED AP**

Subject: **Bloomington High School Stadiums – Kennedy and Thomas Jefferson High Schools**
Bloomington, Minnesota
Stadium Noise Study - Memo
Veneklasen Project No. 8512-001

Dear Andrew:

Veneklasen Associates, Inc. (Veneklasen) has put together a short narrative regarding our calculation methodology regarding the Bloomington High School Stadiums – Kennedy and Thomas Jefferson High Schools project located in Bloomington, Minnesota. Three different noise sources were modeled to predict overall noise levels at nearby properties to each stadium, and the associated methods/information for each are presented herein. This narrative is intended to aid in the understanding of the results presented in our previously sent report dated March 14, 2024.

CALCULATION METHODOLOGY

Marching Band

Marching Band noise was modeled using existing measurements from events at two high schools in California: Ernest Righetti High School (total enrollment of ~1900) in Santa Maria, California, and Elk Grove High School (total enrollment of ~1800) in Elk Grove, California. Measurements at both high schools were during nighttime football games in 2002, when the marching bands were performing in the center of the field, during halftime, of the games. Measurements were taken at various locations from the field and the bleachers, ranging from 300ft to 450ft away from the stadiums.

Using this data, we obtained the sound pressure levels measured at various distances away from the center of the field. We then calculated an average sound power level using the formula:

$$L_p = L_W - \left|10 \cdot \log\left(\frac{Q}{4\pi \cdot r^2}\right)\right|$$

Where L_p is the sound pressure level, L_W is the sound power level, Q is the directivity factor (2 in this case with a hemispherical sound source), and r is the distance from the sound source. Sound source is treated as a point source given the distance at which measurements were taken and the frequency range of the acoustic model. The sound power level was then input into the SoftNoise Predictor-ISO 9613 modeling program.

Crowd Noise

A widely cited noise study developed by Leo Beranek in 1954 was the basis for the predicted crowd noise for each stadium. Crowd noise was based on calculations using various degrees of speech noise spectrum described in Chapter 13 of *Acoustics* by Leo Beranek. Sound power levels were calculated using the noise spectrum for "shouted" voice levels for average males, and estimated crowd size. This sound power level was then input into the modeling program and located at the center of the bleachers.

Loudspeaker Noise

Loudspeaker noise was modeled based on the AV Consultant's designed maximum sound level of 95dBA sound pressure level at the center of the bleachers. Veneklasen calibrated the model to match 95dBA as the

L10 value at the center of each set of bleachers. A typical noise spectrum for loudspeaker noise was used to generate a sound pressure level of 95dBA at the center of the bleachers, which was between 7-8 decibels higher in the lower frequencies (<250Hz) compared to mid and high frequencies (500 to 8000Hz). The same equation shown above was then used to convert to sound power level in each octave band, and then input into the modeling software.

Notes

Note that these noise sources, particularly crowd noise and marching band noise, are all highly variable and dynamic. Any major fluctuations of sound level of these noise sources beyond what is typical and what was modelled could result in property line noise levels differing from predicted levels shown in our previously sent report.

If you have any questions or comments regarding this letter, please do not hesitate to contact us.

Sincerely,
Veneklasen Associates, Inc.

Kevin Patterson
Senior Associate

Arjun Shankar
Associate