



November 3, 2017

Abby DeWolfe
Gensler
2020 K Street NW
Washington, DC 20006

**Re: Georgetown Day School
Exterior Noise Impact Summary
C&A #30841**

Dear Abby,

This memo discusses the expected acoustic impact of the proposed outdoor programming at the Georgetown Day School (GDS) Lower and Middle School.

1.0 Executive Summary

We have analyzed the expected noise levels from the proposed exterior operations at the Lower and Middle School (LMS). Based on measurements taken around GDS High School and at the current GDS LMS during the school's recess period, we conclude that the new Lower and Middle School will affect the environment in the following ways:

- At the exterior of nearby residences, the sound of children playing will be audible above existing ambient levels. This will be isolated to daytime hours and during certain school functions.
- The increased number of students at the new campus will be coupled with an increase to the total available outdoor space is thus not a concern acoustically.
- The unamplified human voice is exempt from noise regulations per Section 2708.4 in the District of Columbia Municipal Regulations. The District of Columbia does not regulate sound from play areas which do not use amplified audio.
- The proposed, 7 foot or 10 foot tall sound fence to the nearby residences will significantly reduce the impact of the playgrounds on the adjacent properties
- The sound of children playing through typical exterior, residential windows will be below typical interior residential ambient noise levels. Most of the time, we expect the sounds of children playing to be inaudible within residences.
- Cars entering and exiting the parking garage are expected to be no louder than existing traffic on Ellicott Streets or other nearby streets.
- Noise from cars within the parking garage will not impact the environment outside of the parking garage.
- No mechanical air shafts will be provided to the parking garage, so supply/exhaust fans are not a concern for exterior noise.

These conclusions are discussed in the following sections.

2.0 Field Measurements

2.1 Existing Conditions around Proposed LMS Site

On September 21, 2017, Cerami visited the existing site of the GDS High School and parking lot of the nearby Safeway to measure daytime ambient sound levels. The existing ambient levels for the locations

in the proposed site plan labeled in **Figure 1** are provided in **Table 1**. Measurements were taken during a typical weekday with clear weather using a Type 1 sound level meter per ANSI Standard S1.4.

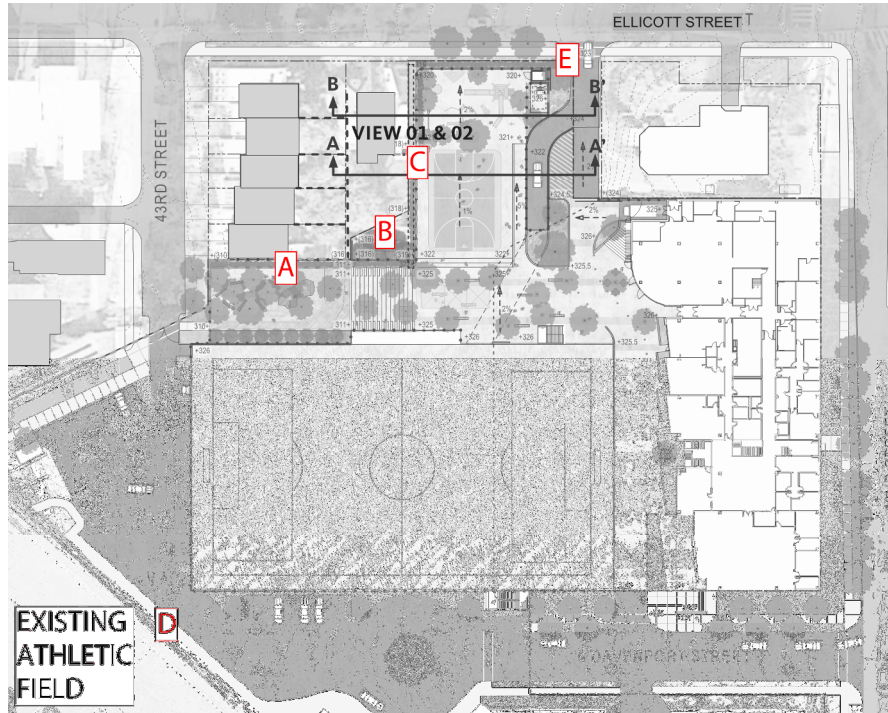


Figure 1: Analyzed Locations on Proposed GDS LMS Site Plan

Table 1: Existing Ambient Sound Levels

Location (Refer to Figure 1)	Existing Daytime Ambient Sound Level
A	52 dBA
B	52 dBA
C	54 dBA
D	51 dBA
E	54 dBA

Ambient levels at the locations above were controlled by traffic on the nearby streets, with Wisconsin Avenue being the primary source of noise. Additional measurements were made around the existing High School, including levels at the edge of the existing athletic field during a high school soccer practice. The soccer practice was measured at 52 dBA at the edge of the field, which was somewhat louder than the 51 dBA ambient levels near the existing High School. The measurement of the practice was taken about 75 to 100 feet from the nearest group of people (Location D in **Figure 1**).

Sound levels were also measured on Ellicott Street near the proposed entrance (Location E in **Figure 1**) of the parking garage. Levels were measured for passing cars from the sidewalk. Single cars on Ellicott Street generated levels around 62 dBA at the location indicated.



2.2 Existing GDS LMS Recess Sound Levels

Cerami conducted field sound level measurements at the existing GDS Lower Middle School during the recess periods from 12 PM to 12:45 PM on October 31, 2017. Measurements were taken at the perimeter of the existing athletic field and near the basketball court during both the Lower School recess period and the Middle School recess period. Weather was clear, and staff from the school said that the level of activity was representative of typical use. Groups of children were playing with balls and playing other games during recess. Different groups of children were distributed around the field. Each measurement was taken approximately 30 feet away from the nearest group of children (refer to **Appendix A** for measurement locations around the existing LMS).

The sound of recess had the following qualities:

- In general, levels measured were around 68 dBA with lulls to about 65 dBA. The average level measured was 68 dBA.
- Different groups of children would shout or yell occasionally, resulting in levels up to 75 dBA. These levels were not sustained for long durations of time.
- The overall sound level was controlled by sound in the middle to high frequencies (500 Hz to 4000 Hz), consistent with qualities of the human voice. Low frequency levels were controlled by ambient noise levels and occasional air traffic.
- The characteristics of the sound were similar for the Lower School and the Middle School students.

The overall sound level at the edge of the field ranged from 65 dBA to 75 dBA, with an average level of 68 dBA.

2.3 Increased Student Body at New Campus

The sound measurements from the existing LMS recess are representative of the levels that may be expected from the new campus, even with an increased number of students. The total area of the existing LMS Athletic Field and Basketball court (approximately 42 thousand square feet) is smaller than the total area of the proposed outdoor facilities (approximately 70 thousand square feet). The proposed outdoor facilities have a total area which is about 70% greater than the existing LMS facilities. Even with twice the number of students outside during recess, the density of students would increase by only about 20%, which would create no significant impact on the sound levels reported here.

Humans perceive sound on a logarithmic scale. As a result, doubling the number of a given sound source will, at most, increase the measured sound level by 3 dB. Subjectively, a 3 dB change represents a just noticeable difference in most listening environments. In the worst case, were the density of children at the new campus to double, this would result in an increase of only 3 dB. It is likely that any increase in sound levels due to the number of students will be between 0 dB to 1 dB, which is a subjectively indiscernible difference from the existing conditions.

3.0 Expected Impact of Proposed Outdoor Facilities

3.1 Sound Due to Outdoor Facilities, No Acoustic Mitigation

Based on the levels measured during recess at the GDS Lower Middle School, the typical use of the proposed play fields will result in the following range of sound levels at the nearby properties. The levels below assume that no sound barriers are used between the new play areas and field and existing houses. Sound levels have been corrected for the effects of distance.

Table 2: Exterior Sound Levels at Nearby Properties During Recess

Location (refer to Figure 1)	Existing Daytime Ambient Sound Level	Sound Levels from Operations in the Proposed GDS LMS Outdoor Facilities
A (Source: Play Field)	52 dBA	Average: 61 dBA Range: 58 to 68 dBA
A (Source: Adjacent Playground)	52 dBA	Average: 68 dBA Range: 65 to 75 dBA
B (Source: Play Field)	52 dBA	Average: 61 dBA Range: 58 to 68 dBA
C (Source: Adjacent Playground)	54 dBA	Average: 68 dBA Range: 65 to 75 dBA

In all cases, we expect the sound of children to be audible at the property lines. The playgrounds which are adjacent to the properties will have the most impact on the exterior noise. Proposed mitigation for Locations A and C is discussed in **Section 3.2** and **3.3**. Though these levels are above ambient levels, we expect the average levels of children playing to be similar to isolated vehicles passing the houses, though with significantly less low frequency noise than a car, truck, or bus would generate.

Since the use of the play areas will be within limited hours, the addition of the playgrounds will not raise the exterior ambient noise levels of nearby residences. No amplified audio will be used in the sports field.

The addition of playgrounds and associated noise is allowable per the noise regulations of the District of Columbia. The District of Columbia Municipal Regulations (DCMR) lists maximum sound levels which must be met at property lines, but includes multiple exemptions from these levels. Section 2704.8 of the DCMR states that *"The unamplified voice shall be exempt at all times."* As such, the sound of children playing is not regulated by the District.

Through typical exterior glazing, the sound levels at all locations shown in **Table 2** are expected to result in sound levels within residences which are at or below typical residential interior noise levels. The average expected levels through exterior glazing are expected to be barely audible most of the time. Occasional events, such as children shouting or yelling, will be more audible within the residences. However, these will be isolated to only times when the facilities are in use.

3.2 Proposed Sound Fence between Property C and North Play Area

A wood, sound barrier fence has been proposed between the Playground and Basketball court and the east-most residential property (Property C), as shown in **Figure 4**. To be effective acoustically, the fence must be a minimum of 7 feet tall. The fence must also be solid, with no gaps between any part of the construction. Two sections are shown through the Play Area and Property C to show the change in elevation as one moves north toward Ellicott Street.

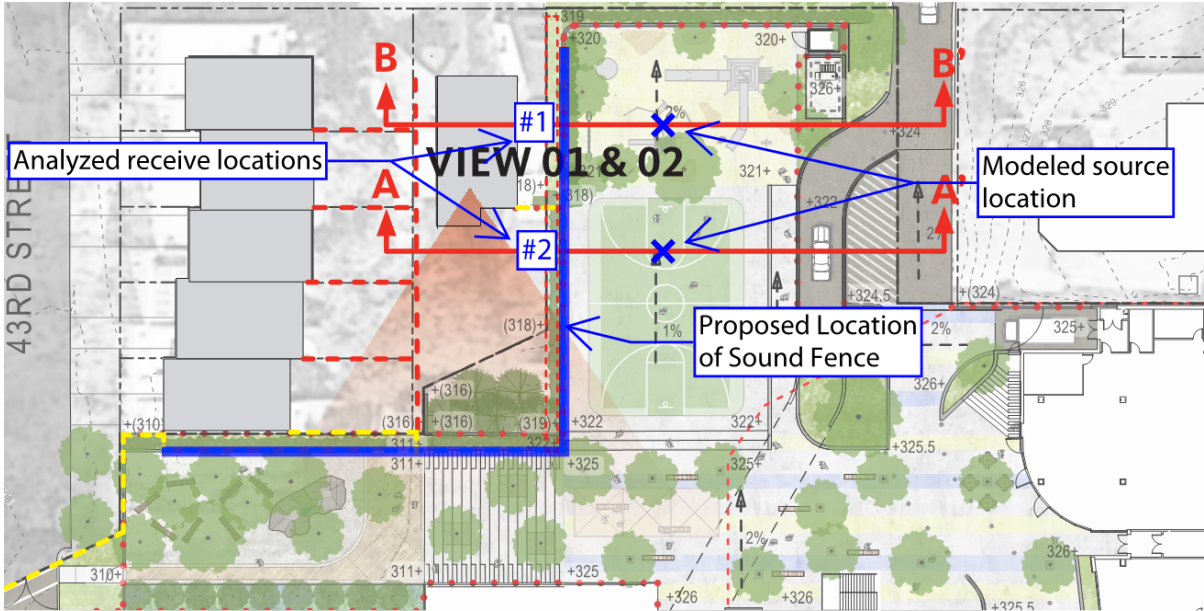


Figure 2: Locations of Sections Showing Sound Fence, Locations Analyzed for Sound Transmission

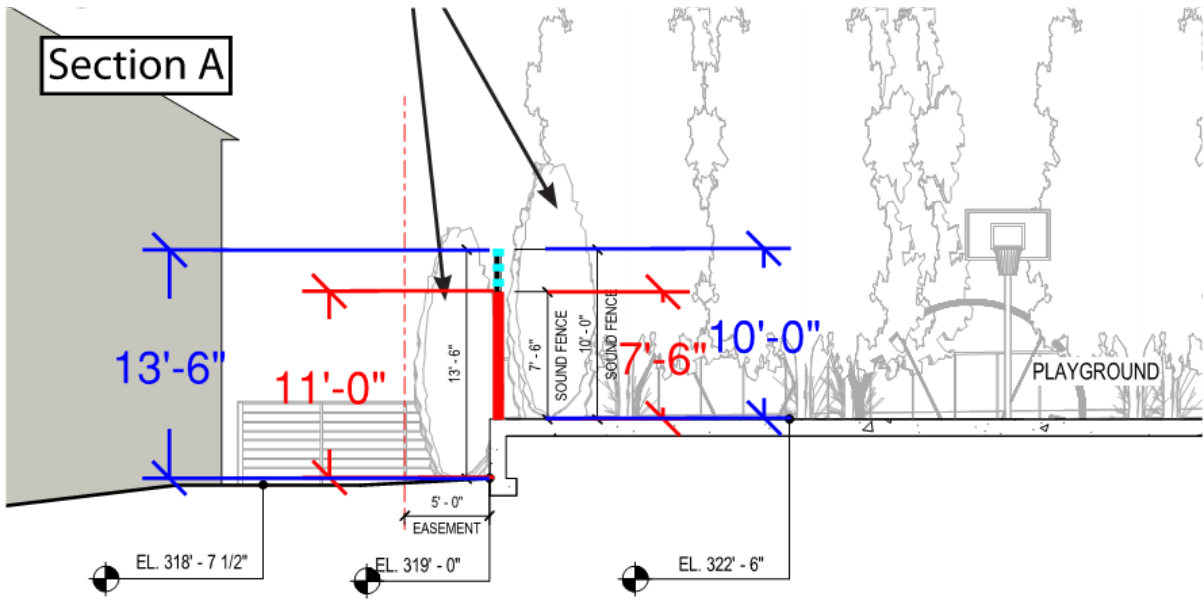


Figure 3: Section A through East-most Residential Property and Playground, Showing Sound Fence

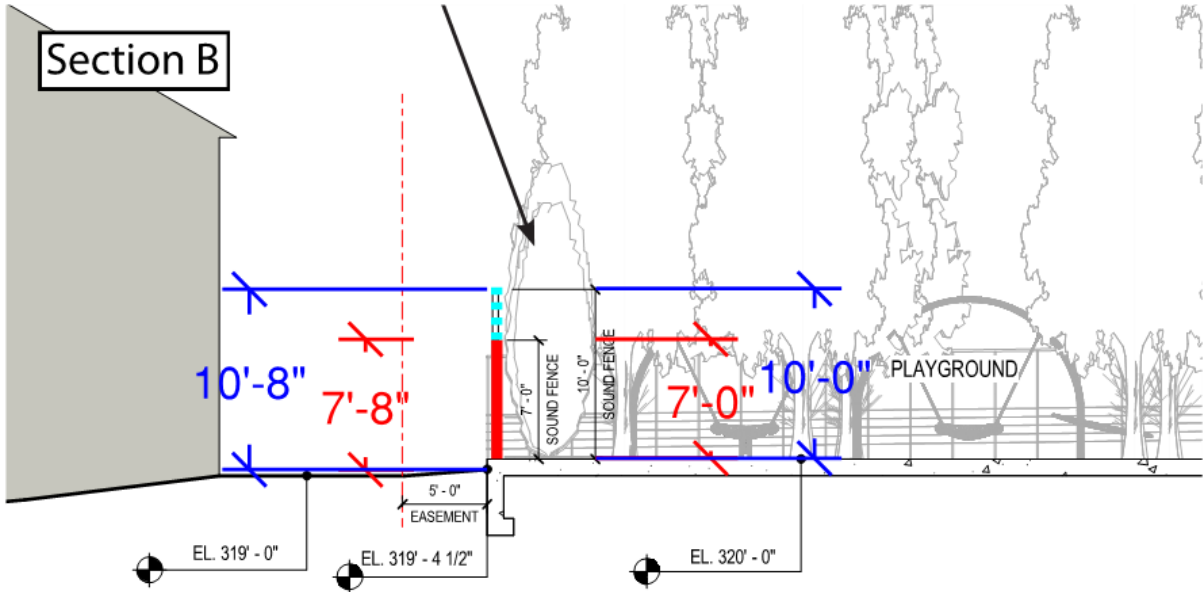


Figure 4: Section B through East-most Residential Property and Playground, Showing Sound Fence

Table 3 shows the difference between expected exterior noise levels with and without a solid, 7 foot tall fence compared to a solid, 10 foot tall fence. The sound of playing children will be audible for both fence construction, but will have minimal impact to people within the yard of Property C and represent a significant reduction to the sound levels expected from the playground.

Table 3: Exterior Sound Levels at Property C, Comparison With and Without Sound Fence

Condition At Location C	Existing Daytime Ambient Sound Level	Sound Levels from Playground to Residence, <u>No Fence</u>	Sound Levels from Playground to Residence, <u>With Sound Fence</u>
Section A: 7' fence	54 dBA	Average: 68 dBA Range: 65 to 75 dBA	Average: 60 dBA Range: 57 to 67 dBA
Section A: 10' fence			Average: 58 dBA Range: 55 to 65 dBA
Section B: 7'-6" fence			Average: 63 dBA Range: 60 to 70 dBA
Section B: 10' fence			Average: 59 dBA Range: 56 to 66 dBA

Through typical exterior glazing, all exterior levels at Location C, in **Table 3**, including the levels without a fence, will result in sound levels which are below interior residential background noise levels. With a sound fence, children will likely be inaudible inside the residence at Location C almost all of the time.

3.3 Proposed Sound Fence between Property A and Play Area

The sound fence has also been proposed near the residential property at Location A. There is no significant change in elevation between the two properties at this location. **Table 4** includes the calculated levels for a 7 foot and 10 foot solid, wood sound fence between the Play Area and Location A.

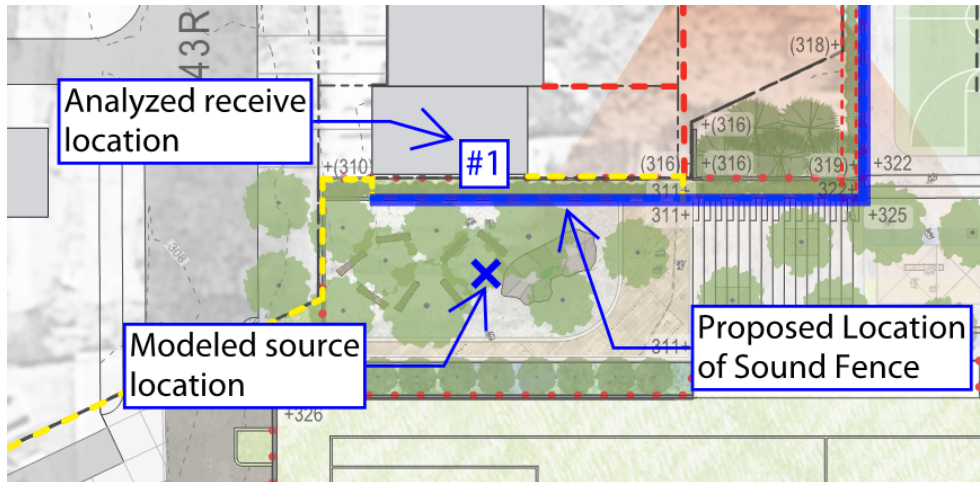


Figure 5: Location A Sound Fence Location

Table 4: Exterior Sound Levels at Property A, Comparison With and Without Sound Fence

Condition at Location A	Existing Daytime Ambient Sound Level	Sound Levels from Playground to Residence, <u>No Fence</u>	Sound Levels from Playground to Residence, <u>With Sound Fence</u>
7' fence	52 dBA	Average: 68 dBA Range: 65 to 75 dBA	Average: 63 dBA Range: 60 to 70 dBA
10' fence			Average: 59 dBA Range: 56 to 66 dBA

Both the 7 and the 10 foot sound fence would significantly reduce sound from children playing in the Play Area to the Property C outdoor space. Within the residence, the sound of children playing will be below interior residential background noise levels, and will likely be inaudible most of the time, with both fence options.

3.4 Hours of Operation

The sound levels shown in the tables above are only expected to occur during periods when the outdoor facilities are in use. These times are limited to the following school functions:

- Physical education classes and occasional outdoor class activities
- Recess periods for the Lower and Middle Schools, which are currently limited to the hours between 11 am and 1 pm, with the highest activity happening from 12 pm to 12:30 pm
- Sports practices or games, which typically end around or before 3:30 pm at the current Lower and Middle School. These occur only on full length school days.



Outside of school hours, the playgrounds are planned to be open for community use. These open use times will likely result in less sound than the recess periods used as a model in the analysis above. Additionally, the playgrounds and other spaces will not be used outside of daytime hours. When the outdoor facilities are not in use, the addition of the GDS LMS campus will have no impact on the surrounding noise environment.

4.0 Parking Garage Noise

4.1 Entrance and Exit Ramp

Cars which enter and exit the garage are expected to generate sound levels which are below 54 dBA at Location C. They will be no louder than traffic that already exists on Ellicott Street and will have little to no impact on nearby residences.

4.2 Noise from Within the Parking Garage

Noise generated by cars within the parking garage will not impact nearby property lines. The following has been considered in the design the parking garage to limit noise levels to the environment:

- Speeds within the parking garage will generate noise levels at the entrance of the parking garage which are no louder than cars on the ramp.
- No exhaust or supply fans will be provided for the parking garage. As such, outside air shafts, often a significant source of noise, will not be used and are not a concern.

5.0 Conclusion

We conclude that the proposed outdoor play areas for the GDS Lower and Middle School will control the impact on the nearby properties. The exterior sound levels that will result from the play areas are allowable by the District of Columbia's noise regulations, will be isolated to limited periods within daytime hours, and will have minimal impact to the interior of nearby residences. The addition of a sound fence will significantly reduce the impact of the Play areas on nearby residences, if the barrier is a minimum of 7 feet tall. Finally, the parking garage will not have a significant acoustic impact on the surrounding area.

This concludes our comments at this time. We welcome further involvement in the process where requested.

Very truly yours,

Cerami & Associates, Inc.

Jameson Dickman, LEED Green Associate
Associate

cc: Atilla Kara / Gensler
Robby Deem / Cerami

Appendix A: Measurement Locations at Current GDS LMS Athletic Field

