

A decorative graphic on the left side of the slide, consisting of white lines and circles on a teal background, resembling a circuit board or data network.

PROPOSED ZONING TEXT AMENDMENT TO ALLOW DATA CENTERS IN ZONES IX AND I5

§2.2, §4.9.C.5, §4.10.C.6, §6.11.C

KEVIN PAGINI – TOWN PLANNER

ALISON KAPUSHINSKI, P.E. – TOWN ENGINEER

JANUARY 10, 2021
PLANNING & ZONING COMMISSION

SUMMARY OF CHANGES SINCE OCTOBER MEETING

- “ Added minimum setback of 500 feet from data center to residential properties
- “ Added minimum setback of 750 feet from electrical substation to residential properties
- “ Further setbacks can be required as part of the Special Permit application process
- “ Added a definition for background noise level as well changes to sound mitigation strategies for HVAC and emergency generators
- “ Consulted with Gregory Tocci, P.E. of Cavanaugh Tocci Associates, Inc. regarding noise mitigation strategies
- “ Added regulations for generators including allowable time for testing

NOISE CONSULTANT – KEY TAKEAWAYS

- “ More power usage translates to more noise
- “ Major contributors to noise are the HVAC systems and the Emergency Generators
 - “ Dry cooling is less noisy than wet cooling
 - “ Data centers in our climate would be using dry cooling systems
- “ Low speed fans, barriers, and other acoustical noise controls can be used to reduce noise of HVAC units
- “ Required that any testing of emergency generators is performed during loudest ambient noise levels (typically during the day)

PERMITTING PROCESS

- “ Allowing data centers as a Special Permit use does not mean any data center will automatically be approved. Special Permits are used to apply additional conditions to uses within a zone and take into account the location of the use.
- “ Special Permits also allow the Commission to determine that the use is not appropriate for a certain property.
- “ We have listened to and understand every concern that has been raised and have written a regulation that will allow for responsible development of data centers in the least invasive way possible and with the least amount of impact to the surrounding neighborhood
- “ Any application would likely also be subject to Inland Wetlands approval
 - “ Any application wishing to utilize the tax incentives available will also be subject to a Municipal Host Agreement approved by the Town Council

MONITORING

- “ Monitoring requirements can be addressed through the Conditions of Approval when an application is presented to the Commission.
- “ Monitoring can be required post-construction to ensure compliance with approved sound levels before a Certificate of Occupancy is issued and further compliance testing can also be required when any changes are made to the building as a Condition of Approval
- “ Any further monitoring beyond this would be complaint-based and dealt with as other zoning land uses are handled

EMISSIONS

- “ Based on our review of the EPA Clean Air Act requirements, regulations only allow for 50 hours a year for use of emergency generators for demand response purposes, which includes peak shaving.
- “ All generators must also comply with CT DEEP permitting and emissions requirements for emergency generators.
- “ Use and duration of non-emergency use of generators can also be made a Condition of Approval through the Special Permit process
- “ Applicants must provide documentation of when generators are going to run, how they will be used, and for what purpose they will be used for

ILLNESS

“ Research conducted through scholarly journal databases resulted in no direct links to data centers and human illnesses

TRAFFIC

- “ It’s anticipated that a data center would generate, at a maximum, 30-35 vehicle trips during the peak hour of the surrounding roadway network.
- “ Parking areas are also very minimal, sometimes only requiring 1 space per 3,500 sq. ft. (ex. A 100,000 sq. ft. data center might only requires 29 parking spaces)
- “ Any application that exceeds 100 peak hour vehicle trips would be subject to Special Permit requirements as they already exist in the Zoning Regulations, including the submission of a traffic study and funding for a peer review consultant hired by the Commission.

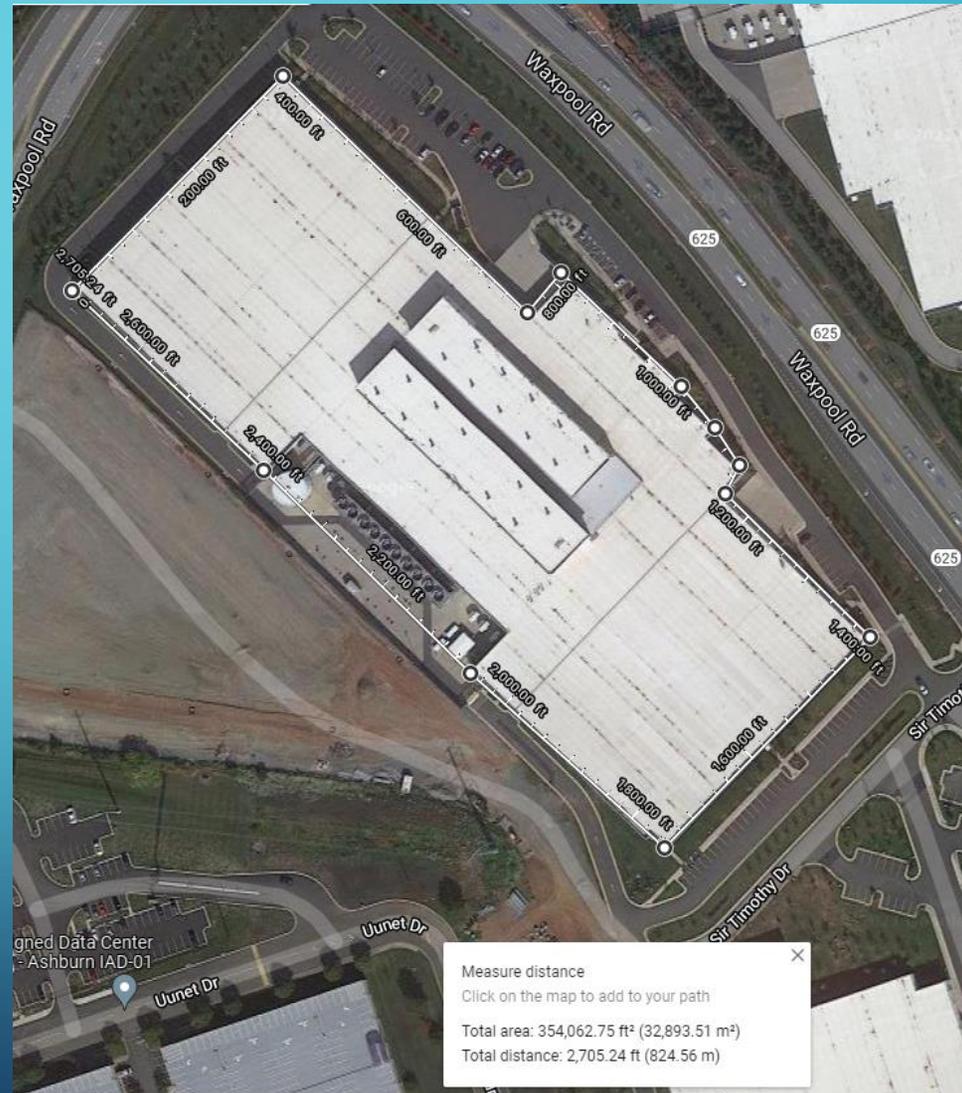
Example: Data Center
21745 Sir Timothy Dr, Ashburn, VA 20147

Approximately 350,000 sq. ft. building and has 115 parking spaces, most of which seem underutilized.

For comparison, the Wallingford train station parking lot (North Cherry Street side) has ± 70 spaces.

The proposed minimum required parking for data centers is 1 space per employee at peak shift.

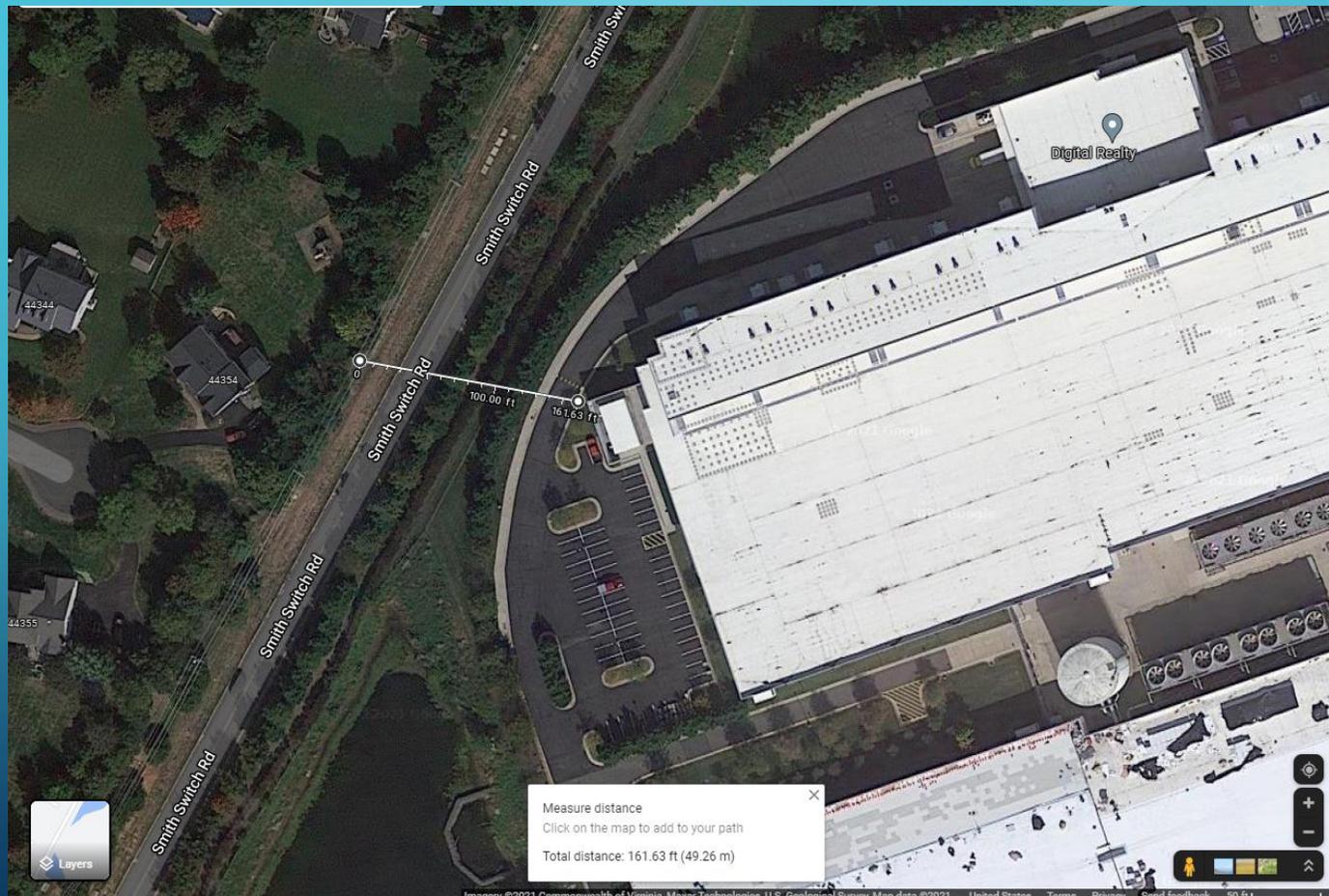
According to a 2014 report by CBRE Group, the number of employees at an average data center is approximately 30.



DATA CENTERS ADJACENT TO RESIDENTIAL AREAS

- “ Examples were found across the country where Data Centers were located sometimes as close as 80 feet to residential neighborhoods
- “ From our research, we recommend a 500-foot setback to residential properties, which will likely need to be paired with other noise mitigation strategies to achieve compliance
- “ Our current zoning regulations require a minimum 500 foot setback from residential properties to some industrial uses in the I-40 and I-20 Districts
- “ Most uses currently allowed in the IX and I5 zones do not require a setback of this size

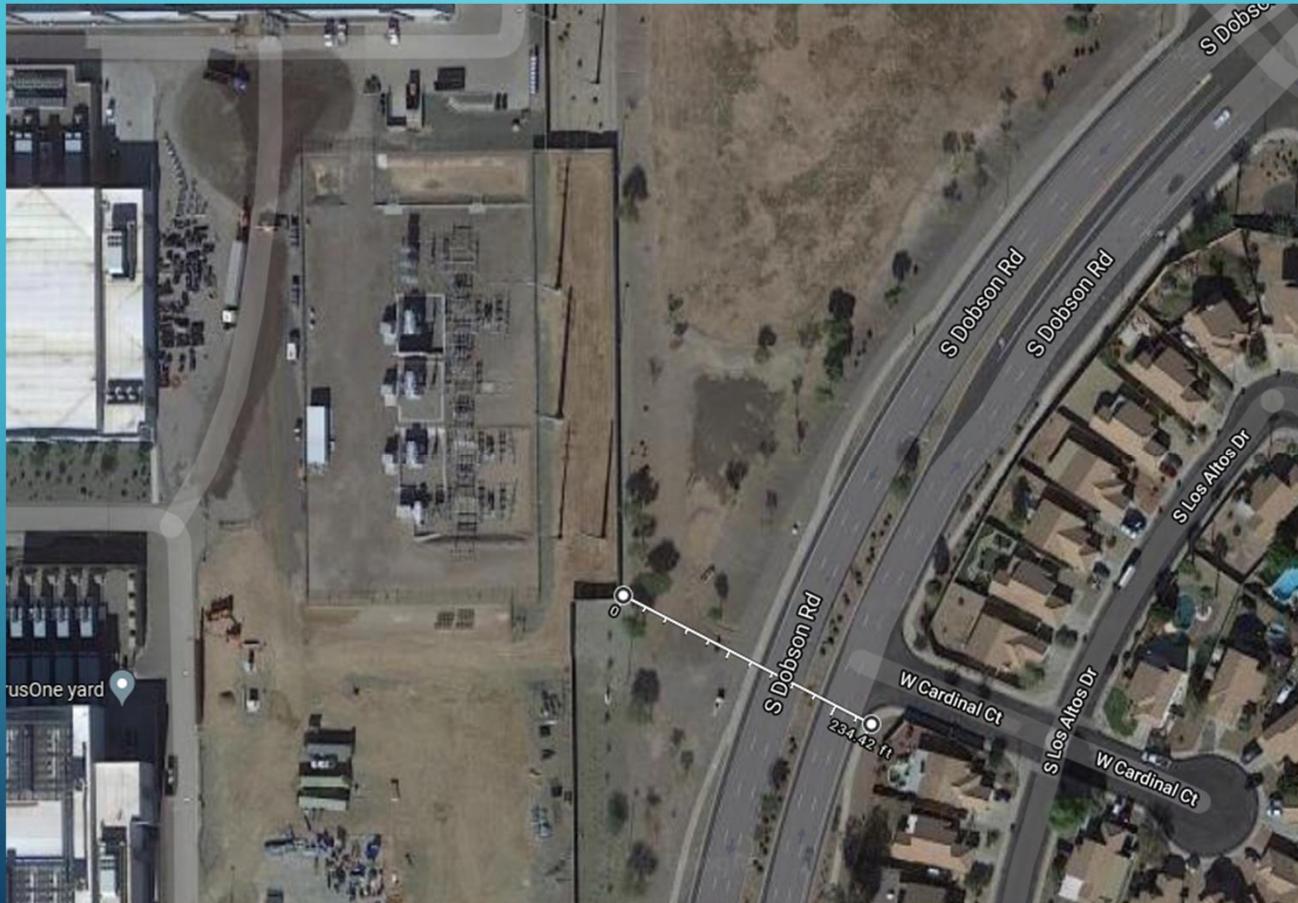
DATA CENTER - 44461 CHILUM PL, ASHBURN, VA 201 47 APPROXIMATELY 160 FEET FROM BUILDING TO RESIDENTIAL PROPERTY LINE



ELECTRICAL SUBSTATIONS ADJACENT TO RESIDENTIAL AREAS

- “ Examples were found across the country where electrical substations were located sometimes as close as 230 feet to residential neighborhoods
- “ From our research, we recommend a 750-foot setback to residential properties, which could be paired with other noise mitigation strategies to achieve compliance

DATA CENTER – 2605 SOUTH ELLIS STREET, CHANDLER, AZ 85286
APPROXIMATELY 230 FEET FROM SUBSTATION TO RESIDENTIAL PROPERTY LINE



NOISE COMPLAINTS AROUND THE COUNTRY

- “ Many communities, including Chicago IL, Chandler AZ, Loudon VA, have been brought up during Public Comment as examples where neighborhoods were not properly protected during the approval of data centers.
 - “ Many of these communities do not have adequate requirements for data centers, and list them as an allowed use (not a Special Permit as is proposed here).
- “ We are not aware of ANY other community proposing the level of regulation and requirements being presented today.
- “ Submission of a Sound and Vibration Impact Analysis also appears to be a unique requirement, as is the peer review.
- “ Our Noise Consultant has reviewed the proposed regulation and has stated that they are protectant of neighboring residential properties.

PEER REVIEW VS. INDEPENDENT SOUND ANALYSIS

- “ Some comments have mentioned wanting an Acoustical Engineer, hired by the Commission, to perform an independent Sound and Vibration Impact Analysis
- “ We agree that a second set of eyes on the Analysis will be beneficial for both Town Staff and the Commission
- “ We don’t require an independent analysis for traffic studies, and are not concerned that fraudulent reports will be submitted by a credentialed Professional Engineer.
- “ The Analysis and peer review will both be certified by a Professional Acoustical Engineer

903-21

September 8, 2021

Revised January 4, 2022

Proposed Text Amendment to the Town of Wallingford Zoning Regulations to add Data Centers as an allowed use by Special Permit in the Industrial Expansion (IX) and Interchange (I-5) Districts:

Add definitions to Section 2.2 – Specific Terms

Data Center - A principal use involving a building/premises primarily occupied by computers, computer servers and/or telecommunications equipment along with any related use, including supporting equipment, where electronic information is processed, transferred and/or stored **and where generators are may be utilized for emergency power.**

Sound and Vibration Impact Analysis – a study performed by a professional engineer that identifies existing sources of sound and vibration, ~~predicts~~ **analyzes** future noise (non-tonal and tonal that may produce beating, temporal variation and amplitude modulating sounds) and vibration levels, determines jurisdictional limits for noise and vibration, **proposes** development of noise and vibration control concepts, recommends testing intervals for noise compliance and concludes with an overall assessment of the mitigation strategies **and concepts to be implemented in facility design.**

Existing Background Sound Level – the existing measured 90th percentile A-weighted sound level (LAF90 1-hr) during the quietest system operating hour prior to operation of the proposed facility.

Add proposed new section 4.9.C.5 to Industrial Expansion (IX) District with the following language:

5. Data Centers with accessory electrical substations:

a. Submission of a Sound and Vibration Impact Analysis containing detailed information concerning all activity, equipment and machinery associated with the use, sound and vibration levels resulting from such activity, equipment or machinery as well as all measures, including but not limited to those of a structural and/or nonstructural- related nature, necessary to mitigate noise and vibration and to ensure that the noise to be emitted from the proposed development does not ~~substantially~~ raise the **existing background sound level** established ~~baseline environmental noise level,~~ equal to (LAF90,1-hr), with insect sound removed, **in accordance with the latest version of ANSI/ASA S12.100,** by more than 5dBA, emit objectionable harmful sounds (including high and low frequency audible tonal sound, infrasound, beating, and amplitude modulated sound) or create vibration levels to a degree ~~that is perceptible to would adversely affect the neighboring properties.~~ **Nothing herein shall authorize a sound level in excess of the limits established by state law or town ordinance. The more restrictive sound level controls: set by law shall be the governing sound level required.**

(1) In all cases in which the Commission determines that a peer review of the applicant's noise and vibration impact analysis is warranted, the applicant shall be required to pay the Town for the cost of the Sound and Vibration Impact analysis study **peer review.** This payment shall be made to the Town prior to the third party firm peer reviewer beginning their work.

(2) The Sound and Vibration Impact Analysis shall include ~~establishing~~ **measuring the existing background sound levels during the anticipated operating hours** ~~an environmental baseline using ambient noise of the existing conditions,~~ **computing** potential noise impacts and **developing** noise mitigation controls including but not limited to acoustic louvres, acoustic mufflers, low-speed fans, enclosures, barriers, **silencers** and containers for HVAC equipment and emergency generators, if required. Seasonal scenarios and hours of the proposed use shall also be considered during the analysis.

b. **Visual** Screening of Mechanical Equipment. In order to minimize visibility from adjacent roads and adjacent properties, ground level and roof top mechanical equipment shall be screened. This screening may be provided by a principal building. Mechanical equipment not screened **from view** by a principal building shall be screened by a visually solid fence, screen wall or panel, parapet wall, or other visually solid screen that shall be constructed of materials compatible with those used in the exterior construction of the principal building. Notwithstanding the requirements of this section, mechanical equipment located in a manner found to have no adverse impact on adjacent roads and adjacent properties, as determined by the Commission, shall not be required to be screened.

(1) Notwithstanding the requirements of §6.24, there shall be no limit to the amount of roof area occupied by HVAC equipment

c. **All generators must comply with Connecticut Department of Energy and Environmental Protection emissions standards, and**

d. **Any application must be accompanied by documentation outlining all aspects of generator usage that details when the generators will be run, how they will be used and for what purpose(s) they are being proposed will be used for. Any All testing must be performed during the time of day with the loudest ambient noise levels.**

e. ~~In addition to the requirements of Section 5.1G, Where any side, front or rear yard abuts~~ **ting** a residential property or property located within a Residential Zoning District ~~non-industrial zoning district is not developed with commercial or industrial uses,~~ the minimum side, front and rear yard setback shall be dictated by the Sound and Vibration Impact Analysis and shall in no case be less than **500** feet.

f. ~~In addition to the requirements of Section 6.14 and Section 4.9.F.4, Where any side, front or rear yard abuts~~ **ting** a residential property or property located within a Residential Zoning District ~~non-industrial zoning district is not developed with commercial or industrial uses~~ the required yards shall include a 100-foot wide natural open space buffer, or landscaped buffer if natural vegetation does not exist, with an earthen berm at least 6 feet in height with a grade no steeper than 3:1.

(1) The top of the berm must be horizontal (level), with the width equal to at least three (3'-0") feet. The landscaping must be comprised of grass or meadow mix; with no trees or shrubs that could potentially affect the long-term integrity of the berm. Evergreen or native trees must also be planted every 10 linear feet along the outside edge of the berm to provide extra screening for residential properties.

(2) All substations shall be properly screened with evergreen trees not to exceed 10 feet in height. All substations shall also be surrounded by fencing; all fencing shall be designed to

withstand ice/wind loading. All substations must be located a minimum of 750 feet from a residential property or residential zoning district.

Add proposed new section 4.10.C.6 to Interchange (I-5) District with the following language:

6. Data Centers with accessory electrical substations:

a. Submission of a Sound and Vibration Impact Analysis containing detailed information concerning all activity, equipment and machinery associated with the use, sound and vibration levels resulting from such activity, equipment or machinery as well as all measures, including but not limited to those of a structural and/or nonstructural- related nature, necessary to mitigate noise and vibration and to ensure that the noise to be emitted from the proposed development does not substantially raise the **existing background sound level** established ~~baseline environmental noise level~~, equal to (LAF_{90,1-hr}), with insect sound removed, **in accordance with the latest version of ANSI/ASA S12.100**, by more than 5dBA, emit objectionable harmful sounds (**including high and low frequency audible tonal sound, infrasound, beating, and amplitude modulated sound**) or create vibration levels to a degree ~~that is perceptible to~~ would adversely affect the neighboring properties. **Nothing herein shall authorize a sound level in excess of the limits established by state law or town ordinance. The more restrictive sound level controls set by law shall be the governing sound level required.**

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(2) The Sound and Vibration Impact Analysis shall include ~~establishing~~ **measuring the existing background sound levels during the anticipated operating hours** ~~an environmental baseline using ambient noise of the existing conditions~~, **computing** potential noise impacts and **developing** noise mitigation controls including but not limited to acoustic louvres, acoustic mufflers, low-speed fans, enclosures, barriers, **silencers** and containers for HVAC equipment and emergency generators, if required. Seasonal scenarios and hours of the proposed use shall also be considered during the analysis.

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Add parking requirement for Data Centers under 6.11.C as follows:

Data centers

1 parking space for each employee at peak shift

903-211

January 5, 2022

Ms. Janis M. Small, *Corporation Counsel*
Department of Law
Town of Wallingford
45 South Main Street
Wallingford, CT 06492

Direct: (203)294-2140
e-Mail: lawdept@wallingfordct.gov

Subject: Proposed Data Center
Wallingford, CT

Dear Ms. Small,

RECEIVED
JAN - 6 2022
WALLINGFORD
PLANNING & ZONING

On November 15, 2021, you sent a draft of a proposed zoning regulation for the Town of Wallingford, CT. On December 6, I sent a mark-up suggesting changes to the proposed regulation. Suggested changes were discussed in a GoToMeeting conference with you and other members of the Town. Finally, on December 10, you sent an inquiry from the Commission as follows:

Are the proposed limits (5 dBA above existing background sound level) protective of the neighboring residential properties?

By "neighboring", it is understood to be "residences neighboring an industrial or commercial use." The "5 dBA above background" limit is explained below and how a residential community might perceive it is discussed for two typical environments: 1) a location far from a major highway near a town road and 2) a location near both an Interstate highway and a town road. In both cases, it is concluded that the 5 dBA above background is reasonably protective in both cases. For both cases considered, I describe "reasonably protective" as new facility sound at a residence generally only being slightly audible for at most only a few hours per night, and otherwise inaudible for much of a typical 24-hour period.

As illustrated in the two figures below, we define **background sound level** as the average of the lowest hourly 90th percentile A-weighted sound levels measured each day with insect sound removed as per ANSI S12.100. This definition is comprised of the following elements:

- A-weighted sound level
- 90th percentile descriptor
- Removal of insect sound as per ANSI S12.100

These are defined as follows:

A-Weighting (dBA)—The filtering of sound that replicates the human hearing frequency response. The human ear is most sensitivity to sound at mid frequencies (500 to 4,000 Hz) and is progressively less sensitive to sound at frequencies above and below this range. A-weighted sound level is the most commonly used descriptor to quantify the relative loudness of various types of sounds with similar or differing frequency characteristics.

Hourly 90th percentile sound level ($L_{A90,1-hr}$)—The residual sound level in an area and is the lowest level of sound typically occurring each hour. It is the A-weighted sound level exceeded 90% of each hour monitored.

Insect sound removal—A filtering procedure described in ANSI S12.100 to exclude high frequency sound energy above 1000 Hz where appropriate. We adapt the standard procedures by truncating at a frequency just below insect sound but often above the 1000 Hz octave band.

In addition to the hourly 90th percentile A-weighted sound level, the 1st percentile and energy average A-weighted sound levels are often reported. These are symbolized as the $L_{A01,1-hr}$ and the $L_{Aeq,1-hr}$ and respectively represent the highest and average sound levels measured each hour. Highest sound levels are largely produced by noisy vehicles passing close to the measurement location. The average sound levels include these sounds and sounds emanating from all sources in the area.

All three descriptors, $L_{A01,1-hr}$, $L_{Aeq,1-hr}$, and $L_{A90,1-hr}$, for two typical measurement sites are shown in Figures 1 and 2. Sound levels in both figures are lower during nighttime hours than during the day and are typical of environments where road traffic sound dominates the ambient.

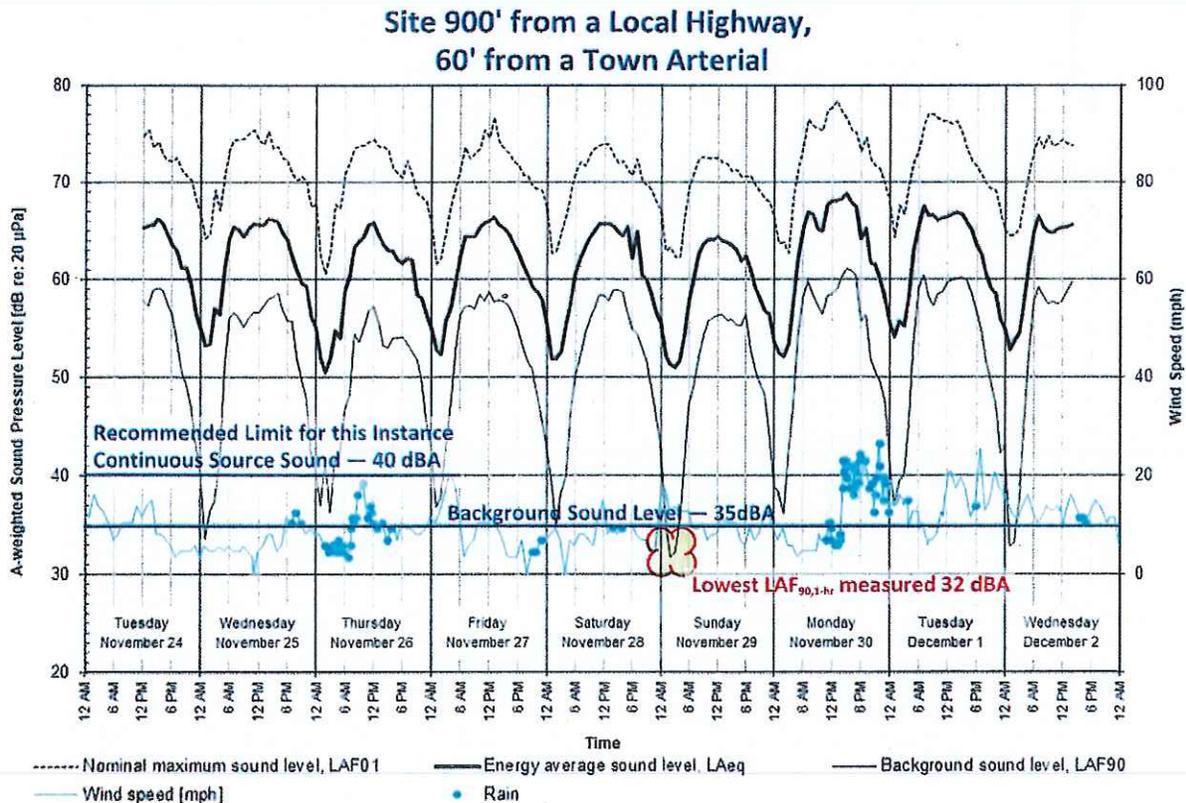


Figure 1. Example of hourly sound levels measured at a site far from a major interstate highway and recommended commercial/industrial sound level limit at residential property

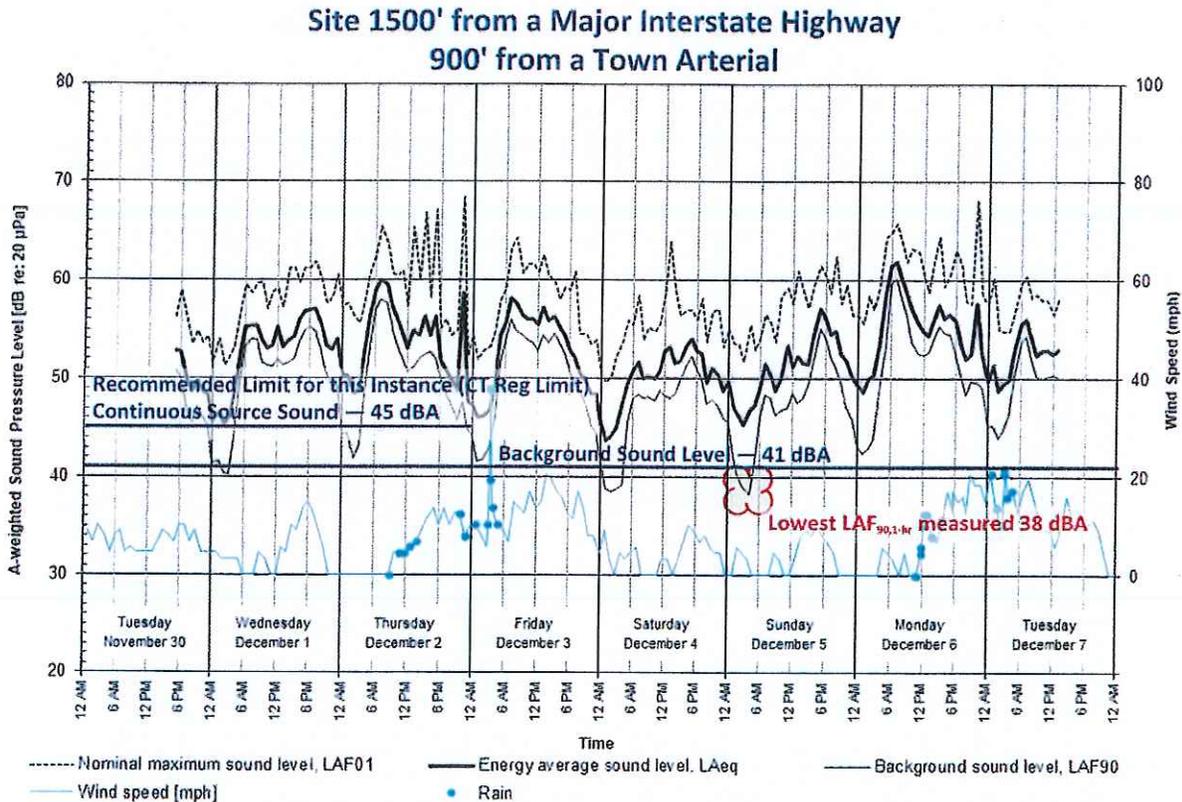


Figure 2. Example of hourly sound levels measured at a site close to a busy interstate highway and recommended commercial/industrial sound level limit at residential property

In addition to Figures 1 and 2 exhibiting typical sound level descriptors, proposed limits for commercial/industrial source sound transmitted to residential property at night are recommended. The proposed nighttime limit for commercial/industrial sound transmitted to residential property at night is the lesser of 5 dBA above the background (background as defined above) or the applicable State of Connecticut and Town of Wallingford limits.

In both cases of environmental sound, commercial/industrial source sound just meeting the proposed zoning limit may be audible at night for up to 5 hours, but most often less than the energy average sound level ($L_{Aeq,1-hr}$). It is our conclusion that the proposed limit would be "...reasonably protective of neighboring residential properties."

If we can provide any further information, please do not hesitate to contact us. Thank you.

Sincerely,
 CAVANAUGH TOCCI

Gregory C. Tocci, Sr. Principal Consultant
 21126 Wallingford Data Center Inq 2021.12.06b.Docx