



Town of Winchester

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Board of Selectmen Meeting
Monday, October 24, 2016

BUSINESS

Docket Item G-3:

Noise Bylaw – review of revisions

Supporting Documents:

G - 3:

Revised Noise Bylaw

Action Required:

G - 3:

VOTE to approve bylaw in current form or
make additional revisions.

ARTICLE 4: To see if the Town will vote to amend the Town of Winchester Code of By-Laws by adding a new chapter, as follows:

NOISE REGULATIONS

1. Purpose

The purpose of this Noise Bylaw is to allow the Town of Winchester, Massachusetts (the Town) to establish reasonable guidelines, restrictions and limitations to maintain acceptable noise conditions within the Town.

This bylaw defines noise criteria limits and restrictions for the purposes of (1) maintaining acceptable existing conditions, equipment operations, social interactions, and avoidance of disruption of the peace, and (2) managing and controlling potential future noise conditions in the Town stemming from development of properties, equipment operations, and infrastructure.

This bylaw is intended to maintain the quality-of-life within the Town from an acoustical perspective. This by-law addresses so-called "community noise" by establishing acceptable noise conditions from the receiver's perspective in order to support the continued use and enjoyment of the receiving property for its intended purpose.

This bylaw is not intended to define safe noise levels to protect people's hearing or avoid auditory damages from excessively loud noises either within the workplace or from private activities which are the subject of workplace and labor regulations. As such, this bylaw is not intended to maintain public health and safety with respect to noise. The remedies for maintaining acceptable noise conditions as the outlined in this bylaw are intended to be in addition to, and not excluding of, such other laws, regulation and rules of the Commonwealth, the Town of Winchester, and its agents departments.

Therefore, it shall be a violation of this bylaw for a person or persons to knowingly generate, or allow continued generation of, noise levels which either (1) exceed the criteria limits found in Section 3, except under conditions defined in Section 5, when measured at a receiving party's property line or at any location on the receiving property, OR (2) are deemed to be excessively loud to a "reasonable person", as defined to be a Member of the Board of Health of the Town, and/or their designee, officers of the Winchester Police Department, employees of the Winchester Building and Zoning Department as defined in Section 4.

2. Acoustical Terms and Definitions

Community noise is generated by natural and man-made sources such as transportation systems, industrial processes, construction operations, building air handling systems, power generation, agricultural processes, landscaping machinery, human activities, meteorological conditions, etc. In general, noise can be quantified by its magnitudinal (loudness), tonal (frequency) and temporal (time) characteristics. The following are definitions to terms typically used to describe community noise.

Sound – Sound is a physical parameter which is produced when a vibrating surface transfers energy in the form of air pressure waves which fluctuate above and below barometric pressure to such a degree and within a frequency range that it can be perceived by the human auditory system (i.e. sound can be heard).

Noise – Noise is defined as "unwanted sound" which can occur when a source is either too loud, uncontrollable, conveys unwanted information, masks-out other desirable sound, occurs at unacceptable times, or has annoying characteristics.

Decibels (dB) – The magnitude or loudness of noise is expressed in units of decibels (dB). Decibels relate the actual fluctuating air pressure levels against a standardized reference air pressure level of 20 micro-pascals. Human beings can hear noise over a tremendously large range of air pressure so the use of a decibel scale (from about 0 dB to 140 dB) is used for convenience. Zero decibels represents the “threshold of hearing”, while at the other extreme, pain and hearing damage can occur at noise levels of about 140 decibels.

Audible Frequency Range (and A-weighting) – Human beings can perceive noise only if the fluctuating air pressure waves are within the so-called “audible frequency range” of about 20 Hz to 20,000 Hz (Hertz, or cycles-per-second). However, people do not hear noise equally well at all frequencies. As such, a frequency weighting adjustment has been standardized in ANSI Standard S1.42 to account for humans responding less sensitively to lower and higher frequency ranges. This frequency weighted adjustment is referred to as “A-weighting”, with results expressed as A-weighted decibels, or dBA.

Time Constant (RMS Slow) – The speed with which the electronic root-mean-square (RMS) detector of a sound level meter responds to changes in instantaneous noise levels has been standardized in ANSI Standard S1.4. A “fast” time constant is defined as a rise-time of 0.125 seconds, while “slow” is defined as a rise-time of 1 second. For the purpose of this bylaw, all noise levels and limits are expressed in units of A-weighted decibels using an RMS “slow” time constant (dBAs).

Background (Bkgd) Noise – The background noise is the prevailing or pre-existing noise conditions that can be measured at a given location of interest *without* the contribution of the noise source of concern.

Nuisance Noise – Nuisance noise is defined as noise which can annoy or disturb individual listeners. When measured, nuisance noise levels may or may not exceed specified noise criteria limits so nuisance noise is often defined qualitatively by listing specific examples, as in **Section 3.A** of this bylaw.

Equivalent Sound Level (Leq) – The Leq represents the energy-averaged noise level over some time period of interest. The Leq is expressed in dBA, and the time period over which the Leq value applies should also be stated (i.e. Leq(1min) represents a one minute average; Leq(24h) represents a 24 hour average, etc.).

Maximum and Minimum Sound Levels (Lmax and Lmin) – The Lmax and Lmin represents the absolute loudest and quietest noise levels experienced for just an instant during some time period of interest. The Lmax and Lmin levels are expressed in dBA.

Noise Percentile Levels (Ln) – Ln levels are a statistical representation of changing noise levels indicating the noise level that was exceeded “n” percent of the time. For example, the L10, L50, and L90 represent the noise levels exceeded 10%, 50%, and 90% of the time, respectively. The L10 is often used to identify an intrusive noise level, while the L90 is considered to represent the steady background noise level.

Reasonable Person – Acting on behalf of the greater good of the public, a reasonable person is able to judge in an unbiased manner the appropriateness of a given situation. A reasonable person is appropriately informed, rational, capable, aware of the law, and fair-minded when applications of the law is sought, compatible with planning, working, or getting along with others. For the purpose of this bylaw, a reasonable person shall be defined as a Member of the Town, and/or their designee, as further described in **Section 4**.

Sound Level Meter (SLM) – A sound level meter is a calibrated electrical device used to measure the loudness of noise. For the purposes of this bylaw, a SLM must be capable of measuring and expressing noise levels in A-weighted decibels using an RMS “slow” time constant in accordance with Type 1 or Type 2 accuracy requirements of ANSI Standard S1.4. In addition, an “integrating” SLM must be used if any time-averaged noise metrics (such as Leq or Ln percentiles) are to be reported.

Stationary Noise Sources – Sources that emit noise on a continuous or repeatable basis and that are located in fixed positions. Example stationary noise sources would include, but are not limited to, building mechanical (HVAC) systems, power transformers, commercial processing machinery, etc.

Construction Noise Sources – Sources, activities, vehicles and/or equipment that emit noise as part of a construction or demolition project. Typically some form of engine power is required such as diesel or gasoline motors, hydraulic or pneumatic pressure, or electric power.

Designee – A person, who after due consideration, is selected by the Winchester Board of Health to respond in their place to investigate noise complaints. The designee becomes an authorized representative of the Board of Health only for matters involving this bylaw. A designee should work for the Town in some capacity such as, but not limited to, the Building Department, or a consultant hired by the Town to act in these regards.

3. Noise Criteria Limits

Noise criteria limits in this bylaw are based on the type of noise being produced, the sensitivity of the receiver and land-use being affected, the time of day during which the noise is generated, and the existing background noise level. Except where noted, the following noise criteria limits and restrictions are based on noise propagating to and affecting the receiver’s location.

3.A. Nuisance Noise

Noise which has the potential to annoy or disturb can be described as nuisance noise. Nuisance noise can vary significantly from person to person, and typically exhibit aspects such as pure tone squealing or whining, loud impulsive noises, repetitive thumping, low-frequency air-borne vibrations, etc.

For the purposes of this bylaw, nuisance noise shall be qualitatively defined by listing specific examples which are deemed to be annoying.

Therefore, it will be prohibited for persons or equipment to generate the following nuisance noises:

- The use of excessively loud radios, public address systems, shouting, or other noises associated with communications or advertisement, that have the potential to disturb nearby residents during the nighttime hours of 9:00 PM to 7:00 AM.
- The emptying and/or replacing of waste dumpsters that is not in accordance with Board of Health regulations.
- The use of powered landscaping tools, such as but not limited to lawn mowers and leaf blowers, during the nighttime hours of 9:00 PM to 7:00 AM.
- The use of truck Jake-brakes (other than emergency vehicles).

- The use of noise enhancing exhaust muffler systems (i.e. glass packs, sport mufflers) on motor vehicles and motorcycles at any time of day or night.
- The use of excessively loud automobile sound systems (i.e. radios, CD players, etc.), as judged by a reasonable person as defined in **Section 4**, at any time of day or night.
- The unreasonable extended use of vehicle horns under non-emergency conditions.
- The unnecessary (i.e. false) sounding of vehicle security alarm systems.

Note: that for all the purposes cited above in this Section 3.A., it is prohibited on Saturdays and Sundays to generate nuisances noise before 8:30am and after 6:00pm. For cited examples that are prohibited any time of day or night said prohibition will continue for all hours on Saturday and Sunday as well.

3.B. Stationary Noise Sources

Stationary sources of noise may include, but are not limited to, building HVAC systems, power generation facilities, industrial equipment, water or sewage pump stations, railroad and subway lay-over facilities, electric power transformers, commercial factories and plants, truck depots, and recreational events. The noise level emitted by stationary noise sources shall not exceed the limits contained in **Table 1** when measured at the property line of the receiving property.

**Table 1.
Noise Criteria Limits from Stationary Noise Sources**

Receiver Land-Use	Daytime Noise Limit (7 AM to 6 PM)	Evening Noise Limit (6 PM to 9 PM)	Nighttime Noise Limit (9 PM to 7 AM)
Residential: - including private residences, multi-family residences, apartment complexes, retirement homes, etc.	55 dBAs Leq(1min) or Background Leq(1min), whichever is greater	50 dBAs Leq(1min) or Background Leq(1min), whichever is greater	45 dBAs Leq(1min) or Background Leq(1min), whichever is greater
Residential within Commercial: - mixed land-use, primarily commercial areas but with some residential development, hotel/motels, hospitals, etc.	60 dBAs Leq(1min) or Background Leq(1min), whichever is greater	60 dBAs Leq(1min) or Background Leq(1min), whichever is greater	55 dBAs Leq(1min) or Background Leq(1min), whichever is greater
Commercial: - including retail stores, business offices, houses of worship, restaurants, libraries, theaters, public parks, etc.	65 dBAs Leq(1min) or Background Leq(1min), whichever is greater	65 dBAs Leq(1min) or Background Leq(1min), whichever is greater	60 dBAs Leq(1min) or Background Leq(1min), whichever is greater

Notes: Background Leq(1min) noise levels should be measured without the noise source in question operating.

Average noise levels measurements can be estimated if an integrating Leq noise meter is not available.

3.C. Construction Noise Sources

In general, construction and/or demolition activities shall only be permitted to occur within the town during the hours of 7:00 AM to 6:00 PM. However, it is understood that construction and demolition are inherently noisy activities which will likely be heard by adjacent residents and business operators during short periods of time. As such, the intent of this section is to balance the needs for the necessary construction work to be performed with the needs of the community for peace and quiet.

Therefore, cumulative noise generated by construction and/or demolition activities and operations shall not exceed the limits contained in **Table 2** when evaluated at the property line of the receiving property, nor shall the noise emission level of any individual piece of construction equipment exceed the noise emission limits contained in **Table 3** when measured at a distance of 50 feet from the loudest side of the piece of equipment.

Table 2.
Construction Noise Criteria Limits

Receiver Land-Use	Daytime Noise Limit (7 AM to 6 PM)	Evening Noise Limit (if specifically permitted) (6 PM to 9 PM)	Nighttime Noise Limit (9 PM to 7 AM)	Saturday and Sunday Noise Limit (8 AM to 4 PM)
Residential: - including private residences, multi-family residences, apartment complexes, retirement homes, etc.	65 dBAs L10 or Bkgd L10 + 5 dBAs, whichever is greater	60 dBAs L10 or Bkgd L10 + 5 dBAs, whichever is greater	N/A (*) Non-emergency construction and/or demolition activities are prohibited	45 dBAs L10 or Bkgd L10 + 5 dBAs, whichever is greater
Residential within Commercial: - mixed land-use, primarily commercial areas but with some residential development, hotel/motels, hospitals, etc.	75 dBAs L10 or Bkgd L10 + 5 dBAs, whichever is greater	70 dBAs L10 or Bkgd L10 + 5 dBAs, whichever is greater	N/A (*) Non-emergency construction and/or demolition activities are prohibited	50 dBAs L10 or Bkgd L10 + 5 dBAs, whichever is greater
Commercial: - including retail stores, business offices, houses of worship, restaurants, libraries, theaters, public parks, etc.	80 dBAs L10 or Bkgd L10 + 5 dBAs, whichever is greater	75 dBAs L10 or Bkgd L10 + 5 dBAs, whichever is greater	N/A (*) Non-emergency construction and/or demolition activities are prohibited	55 dBAs L10 or Bkgd L10 + 5 dBAs, whichever is greater

Notes: Criteria approach taken from FHWA Roadway Construction Noise Handbook (FHWA, 2006).

L10 noise levels shall be measured over a period of 20 minutes.

Background (Bkgd) L10 noise levels should be measured prior to construction commencing in the field or without the noise source in question operating.

L10 noise levels measurements can be estimated if an integrating noise meter is not available by determining the average or Leq noise level plus 3 dBA.

Table 2 noise limits do not apply to roadway construction activities.

(*) Except when determined necessary by the Board of Selectmen to protect public safety.

Activity on Sunday must be specifically permitted by the Chief of Police, otherwise Nighttime Noise Limits apply

**Table 3.
Construction Equipment Noise Emission Criteria Limits**

Generic Type of Construction Equipment	Noise Emission Limit at 50 feet
Blasting – as well as explosive tools such as concrete nail guns	95 dBAs Lmax
Pile Drivers – including impact and vibratory type drivers	95 dBAs Lmax
Impact Devices – such as hoe rams, jackhammers and pavement breakers	90 dBAs Lmax
Saws and Drills – including chain saws, concrete saws and vermeer saws, rock drills, and auger drill rigs	90 dBAs Lmax
Demolition Equipment – such as grapples and shears	85 dBAs Lmax
Earth Movers – including excavators, backhoes, bull dozers, gradalls, front end loaders, scrapers and vacuum excavators	85 dBAs Lmax
Trucks and Tractors – including dump trucks, concrete mixers, concrete pump trucks, flatbed trucks, and street sweepers	85 dBAs Lmax
Finishing Equipment – including graders, rollers, pavers and compactors	80 dBAs Lmax
Support Equipment – such as cranes, compressors, generators and pumps	80 dBAs Lmax
Tools – including pneumatic and gas-powered hand tools	80 dBAs Lmax
Any other equipment not listed above	85 dBAs Lmax

Notes: Criteria limits consistent with FHWA Roadway Construction Noise Handbook (FHWA, 2006).

Lmax noise emission levels shall be measured 50 feet from the loudest side of the equipment while the equipment is engaged in its intended activity.

In addition to the construction noise criteria limits shown in **Tables 2 and 3**, the following restriction(s) shall apply to any and all pieces of construction and/or maintenance equipment.

- The use of standard vehicle backup alarms, whose noise level exceeds 105 dBAs at a distance of 4 feet behind the vehicle, shall be prohibited. Alternatively, quieter-type manually-adjustable or automatically-adjustable backup alarms, or the use of observers used in lieu of audible backup alarms, are permitted for use in accordance with applicable OSHA Guidelines (29 CFR Part 1926, Subpart “O”, 1926.601.b.4 and 1926.602.a.9.).

4. Reasonable Person Determination

It shall be a violation of this bylaw to knowingly generate, or allow continued generation of, noise levels which a reasonable person would consider to be excessively loud. For the purposes of interpretation and enforcement, a *reasonable person* shall be defined in this bylaw as Member of the Board of Health and/or their designee; officers from the Winchester Police Department; employees of the Winchester Building and Zoning Department

To be applicable, the Member, and/or their designee, must hear for him/herself the noise source in question. The Member, and/or their designee, must take conditional, circumstantial and extenuating factors into account, including but not limited to, the following:

- The necessity of the noise source to continue to operate.
- The extent to which the noise propagates to, and is heard by, noise-sensitive receivers.
- The time of day or night that the noise is occurring.
- The duration of time that the noise is expected to continue.

5. Exceptions

The following cases shall be exceptions to the restrictions and criteria limits contained in this noise bylaw. The Town shall maintain the right to modify, add or remove any or all of these exemption cases.

- Grandfathering - All existing residential, commercial, industrial and/or agricultural stationary noise sources, which have been operating on a lawful basis prior to the effective date of this bylaw, shall be allowed. However, this exception does *not* apply to any *new or upgraded* sources of noise subsequently brought into operation at an existing location.
- Noise generated by transportation systems in motion, such as vehicular traffic traveling on public roadways, aircraft overflights, commuter and freight trains, public transit systems and buses, are generally not regulated by local ordinances, and as such, shall not be a part of this noise bylaw (however, specific motor vehicle noise-enhancing devices, as described in **Section 3.A**, will still be subject to this bylaw). Commercial deliveries involving idling trucks and/or idling freight trains will be subject to this bylaw after a period not to exceed 20 minutes.
- Noise emitted by utility or Town service crews and equipment performing emergency repairs to restore supply of and/or operation of critical public utilities such as natural gas, electrical power, steam, potable water, telecommunications, sewerage removal, etc.
- Any noise emitted by public safety or emergency response vehicles while performing their intended duties. Specific examples of exempt emergency equipment include sirens, horns, generators, pumps, public address systems, etc.
- Noise generated by sources intended for public entertainment, when said sources are part of a legal activity such as, but not limited to, parades, sporting events, public concerts, fireworks display, etc.

- All snow clearance activities at any time of day, evening or night.
- The performance of Town-sponsored street sweeping operations at night on public ways which are otherwise inaccessible during daytime hours.
- Due to the continuously progressing nature of roadway work, the cumulative property line construction noise limits shown in **Table 2** shall not apply for roadway construction (however, individual pieces of equipment used for roadway construction will still be subject to the 50 foot emission limits shown in **Table 3**).
- The use of hand tools, powered lawn equipment and small motorized vehicles for construction, maintenance or repair of properties between the hours of 7:00 AM to 9:00 PM.

6. Noise Compliance Measurements

Quantitative noise level measurements performed to demonstrate compliance or exceedance of the various noise criteria limits contained in this bylaw must be collected in accordance with accepted practices and procedures as recommended in ASTM Standards E1686-03, E1780-04, and E1014-84, using a sound level meter (SLM) capable of meeting ANSI Standard S1.4 for Type 1 or Type 2 accuracy. Noise data shall be collected using a calibrated SLM using a "slow" time constant with results expressed in A-weighted decibels (dBAs). The minimum information necessary to collect and report shall include the following:

- (1) The make and model of SLM and portable calibrator used for the noise readings.
- (2) The date which the SLM was last certified by the manufacturer, or other independent calibration laboratory, as meeting ANSI Standard S1.4 for Type 1 or Type 2 accuracy requirements (should be within previous two years).
- (3) The SLM calibration readings obtained prior to, and immediately following, performing the compliance noise measurements.
- (4) The type of windscreen used to cover the microphone.
- (5) The height at which the noise readings were collected (should be at least 5 feet above ground), and an estimate of the distance (in feet) from the noise source to the SLM.
- (6) The time of day, date, and duration of noise data collected by the SLM.
- (7) An indication of the background noise level collected in the absence of the noise source in question.
- (8) A brief description of the meteorological conditions during the noise readings including wind speed and direction, air temperature, precipitation, and ground cover conditions.
- (9) A clear and concise comparison of the measured noise level data (expressed in dBAs) verses the applicable noise criteria limits contained in **Section 3** of this bylaw.
- (10) The findings and conclusions to be drawn from the noise compliance measurements.

7. Enforcement, Penalties, Appeals

7.A. Enforcement

In the event a noise complaint is received from a resident or business owner, or at any time at the discretion of the Town, a representative from any appropriate department, and/or their designee, shall respond and investigate the circumstances surrounding the noise issue. Noise levels may be judged excessively loud by a "reasonable person" standard as defined in **Section 4** or may be measured at the receiving party's property line by a properly designated investigating agent. If measurements are deemed necessary, the investigating agent shall first have been trained in the proper use of, and equipped with, a calibrated sound level meter meeting the requirements described above in **Section 6**. The investigating agent shall collect all relevant information, perform noise compliance measurements (if available), and prepare a written report summarizing their findings in a manner consistent with the procedure described in **Section 6**.

If the investigating agent's findings indicate a violation of the noise criteria limits or restrictions contained in **Section 3**, except in those cases as described in **Section 5**, then the producer(s) of said noise shall be found in violation of this noise bylaw and will be cited to a civil penalty consistent with the guidelines in **Section 7.B** together with such relief as outlined in **Section 34** of Chapter 8 of the Town's bylaws.

7.B. Penalties

1. The first violation of this bylaw shall result in the issuance of a *written warning* indicating the reason(s) for the violation and stating, at the investigating agent's discretion, a time period within which the offender(s) must cease production of the noise, or mitigate (reduce) the noise down to acceptable levels which will then comply with the restrictions and noise criteria limits in this bylaw.
2. The second violation of this bylaw stemming from the same noise issue within any 12 month period shall be punished by a fine of one hundred dollars (\$100.00).
3. Further violations of this bylaw within any 12 month period shall be punished by a fine of one thousand dollars (\$1,000.00), together with a loss of permit or license applicable to any stationary or construction noise source as defined in 2 above.
4. Each such act in violation of this bylaw which either continues or occurs more than one hour after issuance of a written warning of violation of this bylaw shall be deemed a *separate* offense and shall be prosecuted as such, unless it occurs within the time period granted for correcting the original offense.
5. If the violation occurs on the premises of rental property which is not owned by the offender, then in the interest of assisting property owners in exercising responsible property management, the Town will notify the owner-of-record in writing that the violation has occurred, including the nature and circumstances of the violation.

7.C. Appeals

An offender who has been cited and/or fined under the terms and procedures of this noise bylaw can *appeal* the citation within 30 days after receiving it by presenting to the Board of Selectmen's appointed Hearing Officer any alternative information, situational evidence, noise measurement data, extenuating circumstances, or explanation to the contrary of the investigating agent's findings. The Hearing Officer

will serve in judgment of the appeal, and will have full discretion to reject, request additional details, reduce the severity of the penalties, continue, or enforce as issued the violation under appeal. The ruling of the Hearing Officer shall be final and not subject to further appeals within the Town's governance system.

8. Invalidity

If any provision of this bylaw shall be determined to be invalid or unenforceable by final judgment or order of a court of competent jurisdiction, the remaining provisions of this bylaw shall continue in effect to the fullest extent permitted bylaw.

(Board of Selectmen)