

ENVIRONMENTAL STANDARDS

Revised DRAFT – 9-27-21

ARTICLE: To see if the Town will vote to amend the Zoning Bylaw, Section 7.3 Environmental Standards, by deleting it in its entirety and replacing it as follows:

7.3. ENVIRONMENTAL STANDARDS

- A. **Purpose.** The intent of this section is to provide standards for uses which, by their operation, may generate impacts that are potentially hazardous, harmful to the environment, disturbing, offensive or objectionable.
- B. **Enforcement:** The Zoning Bylaw, § 3.1, Enforcement, Violations, and Penalties authorizes the Building Commissioner, or designee, to interpret and enforce the Bylaw. At the discretion of the Building Commissioner, a technical consultant may be engaged by the Town of Medway to investigate and document violations pursuant to this section.
- C. **Definitions:** For purposes of this section of the Bylaw, the following terms shall be defined as follows:

Ambient Noise: The sound pressure level at a given location produced by everything else excluding the source of sound being monitored, analyzed, or evaluated. Also referred to as background noise. Ambient noise includes environmental noises from sources such as traffic, aircraft, waves, alarms, animals or noise from existing mechanical devices such as air conditioning, power supplies, or motors that are present prior to introduction of a new intrusive sound source that is being evaluated. The measurement metric to determine ambient noise levels will be the A-weighted L_{90} sound level.

Commercial Zones: Properties located in the Central Business, Village Commercial, Neighborhood Commercial, Oak Grove Village Center, or Oak Grove Business Park zoning districts as shown on the Medway Zoning Map

(Hz) Hertz: A unit for measuring the number of cycles that occur in a second. In this standard, Hz will be referring to sound waves.

(dB) Decibel: A logarithmic (dimensionless) measure used in describing the amplitude of sound.

(dBA) A-weighted decibel: An expression of the relative loudness of sound in the air as perceived by the human ear.

Detection Threshold: The lowest concentration or intensity of noise, odor, vibration, or other environmental hazard regulated by this bylaw that is noticeable to a reasonable person with normal sensory sensitivities.

Disturbing, offensive or objectionable odors: Those which are at or above the detection threshold of a person with normal olfactory sensitivity.

Industrial Zones: Properties located in the East Industrial, West Industrial, Business/Industrial, or Energy Resource zoning districts as shown on the Medway Zoning Map

L₉₀ Sound Level: The A-weighted sound level that is exceeded ninety percent (90%) of the time during a measurement period.

Noise Level: The frequency weighted sound pressure level as measured with a sound level meter or equivalent device using the A-weighting network. This level is designated dBA.

Octave Band: A frequency band where the highest frequency is twice the lowest frequency.

One-third Octave Band (TOB): A frequency band where the highest frequency is 1.26 times the lowest frequency.

Odor Plume: The cloud of odor created when odor molecules are released from their source and are expanded through air movement.

Prominent Discrete Tone: The presence of acoustic energy concentrated in a narrow frequency range, including, but not limited to, an audible tone, which produces a one-third octave sound pressure level greater than that of either adjacent one-third octave and which exceeds the arithmetic average of the two adjacent one-third octave band levels by an amount greater than shown in the following table opposite the center of frequency for the one-third octave band containing the concentration of acoustical energy.

| 1/3 Octave Band Center Frequency (Hz) | dB | 1/3 Octave Band Center Frequency (Hz) | dB |
|------------------------------------------|----|------------------------------------------|----|
| 100 | 16 | 1250 | 4 |
| 125 | 14 | 1600 | 4 |
| 160 | 12 | 2000 | 3 |
| 200 | 11 | 2500 | 3 |
| 250 | 9 | 3150 | 3 |
| 315 | 8 | 4000 | 3 |
| 400 | 7 | 5000 | 4 |
| 500 | 6 | 6300 | 4 |
| 630 | 6 | 8000 | 5 |
| 800 | 5 | 10000 | 6 |
| 1000 | 4 | | |

Residential Zones: Properties located in the Agricultural-I, Agricultural-II, Village Residential, or Oak Grove Neighborhood zoning districts as shown on the Medway Zoning Map

Sensitive Receptor: An occupied residence or facility whose occupants are more susceptible to the adverse effects of noise and odor including but not limited to hospitals, schools, daycare facilities, elderly housing, and convalescent facilities.

D. **Standards.** The following standards shall apply to all zoning districts.

1. **Smoke, Fly Ash, Dust, Fumes, Vapors, Gases, Other Forms of Air Pollution:** All activities involving smoke, fly ash, dust, fumes, vapors, gases, other forms of air pollution, as defined in [CMR 310, § 7](#), Air Pollution Control Regulations, as amended, which can cause damage to human health, to animals or vegetation, or other forms of property, or which cause any excessive soiling at any point are prohibited.
2. **Noise Disturbance:** The Building Commissioner may determine that a noise source is subject to investigation, and if it is determined to be in violation of this bylaw, may take appropriate enforcement action, including the issuance of orders requiring the development and implementation of corrective measures, and/or imposition of fines or non-criminal penalties.
 - a. **Standards.** No person or persons owning, leasing, or controlling the operation of any source or sources of noise shall permit the establishment of a condition of noise pollution. Disturbing, offensive or objectionable noises shall not be produced in any zoning district or impact any space where people live, work or assemble in a way that unreasonably interferes with the comfortable enjoyment of life or the use of property.
 - 1) **Continuous Noise.** For the purposes of this bylaw, continuous noise restrictions apply to permanent non-residential uses and home-based businesses where noise is a by-product of business operations (such as from exhaust equipment). Maximum permissible sound pressure levels measured at the property line of the noise source shall not exceed the values specified in the tables below. In addition, maximum permissible sound levels measured at Sensitive Receptors positioned anywhere on a property that is wholly or partially located within one-thousand feet of the property line of the source of continuously radiated noise shall not exceed the values in the tables below. Daytime is defined as between the hours of 7:00 a.m. and 7:00 p.m. ; Evening is defined as between the hours of 7:00 p.m. and 11:00 p.m.; and Nighttime is defined as between the hours of 11:00 p.m. and 7:00 a.m. (insert a footnote on source – WHO?)

Industrial Zoned Property to Industrial Zoned Property

| | Daytime 7:00 a.m. – 7:00 p.m. @ Property Line | Evening 7:00 pm – 11:00 pm @ Property Line | Nighttime 11:00 p.m. – 7:00 a.m. @ Property Line |
|------------------------|----------------------------------------------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------------|
| Overall Level (dBA) | 60 (or 55) | 60 (or 55) | 60 (or 55) |

Industrial or Commercial Zoned Property to Commercial Zoned Property

| | Daytime 7:00 a.m. – 7:00 p.m. @ Property Line | Evening 7:00 p.m. – 11:00 p.m. @ Property Line | Nighttime 11:00 p.m. – 7:00 a.m. @ Property Line |
|------------------------|----------------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|
| Overall Level (dBA) | 55 (or 50) | 55 (or 50) | 55 (or 50) |

Industrial or Commercial Zoned Property to Residential Zoned Property

- The introduction of any potential new noise sources cannot result in an increase in broadband sound pressure levels of more than 2 dB above the existing ambient conditions at the nearest residential property line or any Sensitive Receptor; and
- The introduction of any potential noise sources cannot result in overall noise levels that exceed the following:

| | Daytime 7:00 a.m. – 7:00 p.m. @ any Residential Property Line | Evening 7:00 pm – 11:00 pm @ any Residential Property Line | Nighttime 11:00 p.m. – 7:00 a.m. @ any Residential Property Line | Evening & Nighttime 7:00 p.m. – 7:00 a.m. @ Sensitive Receptors |
|-----------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Maximum Overall Noise Level (dBA) | 47 | 45 | 42 | 32 |

- 2) **Tonal Requirements** – The presence of prominent discrete tones, as defined in Section 7.3 (c) herein at any industrial, commercial or residential property line shall be considered a violation.
- 3) **Temporary Noise.** For the purposes of this bylaw, non-continuous noise restrictions apply to permanent non-residential installations and home-based businesses where noise is periodically produced. No person shall use or cause the use of any noise-

producing equipment or tool (such as for construction, repair, or demolition operations) between the hours of 9:00 p.m. and 7:00 a.m. This limitation shall apply to the periodic testing of onsite emergency generators. Periodic testing of onsite emergency generators should be scheduled to occur during the daytime hours of 7:00 a.m. to 7:00 p.m.

- 4) **Construction Noise.** Work at construction sites and in the operation of construction equipment including start-up and movement of trucks, vehicles, and machines shall commence no earlier than 7:00 a.m. and shall cease no later than 6:00 p.m., Monday through Saturday. No construction shall take place on Sundays, federal holidays or state legal holidays without the advance written approval of the Building Commissioner.

Advisory Note – State regulations authorize municipal police departments, fire departments, and board of health officials to enforce noise standards that are based on certain sections of [310 Code of Massachusetts Regulations \(CMR\), § 7](#), Air Pollution Control Regulations. Such regulations are distinct and separate from the Town's zoning regulations for noise.

- b. **Investigation.** The Building Commissioner may determine that a noise source is subject to investigation, and, if it is determined to be in violation of this bylaw, may take appropriate enforcement action, including the issuance of orders requiring the development and implementation of corrective measures, and/or imposition of fines or non-criminal penalties. If the Building Commissioner determines that an investigation is warranted, he or she or a designee, may undertake a noise study to determine if a non-compliant noise condition exists. The Building Commissioner may enlist the assistance of other Town personnel for the investigation. At the discretion of the Building Commissioner, a qualified acoustical consultant whose qualifications include Institute of Noise Control Engineering (INCE) board certification or equivalent experience may be engaged by the Town to assist in the investigation including measurements and documentation of violations. Depending on the particular site and its noise generators, the noise study shall include, at a minimum, measurements of:

- Ambient noise (Daytime, Evening, and Nighttime) and
- Operational noise levels (Daytime, Evening, and Nighttime) at the facility property line and at Sensitive Receptors located anywhere on a property that is wholly or partially located within one thousand feet of the facility property line. These operational measurements shall include one-third octave band measurements to check for the prominent discrete tone condition as defined in Section 7.3(c).

- c. **Noise Control, Abatement and Mitigation Plan.**

- 1) If the Building Commissioner determines that there is a violation, he or she shall order the owner or operator to come into compliance. The owner and/or operator of the noise producing use shall provide a noise control, abatement and mitigation plan to the Building Commissioner for review and approval, or otherwise bring the property into compliance with this bylaw and the order of the Building Commissioner. The plan shall address how the site will become compliant. Compliance shall be achieved through industry best practices and suitable mitigation measures. The plan shall be prepared by a qualified acoustical consultant whose qualifications include Institute of Noise Control Engineering (INCE) board certification or equivalent experience.
- 2) Special permit and site plan applicants for facilities that could potentially introduce noise will be required to conduct a background noise survey over a minimum of a 7-day period to establish levels at each residential property line **and at any Sensitive Receptor property line (for abutters within 300 feet)** for conditions at the time of application. The sound monitoring is to be conducted by a qualified professional acoustic testing firm, in accordance with the procedures in with the most current versions of American National Standards ANSI S12.18¹ and ANSI/ASA S3/SC1.100-2014/ANSI/ASA S12.100-2014². Sound analyzers used for the background noise monitoring should be capable of collecting 10-minute and hourly L₉₀ sound levels. The arithmetic average of the hourly L₉₀ levels for Nighttime, Evening and Daytime hours will represent the background levels. The 10-minute L₉₀ sound levels will be used to determine if any unusual activity occurred during that hour. If so, that hourly measurement will be discarded and not included in the average calculation.
- 3) If a special permit or site plan approval is required for construction/operation of any facility which could introduce noise sources into the community, once background ambient noise levels are established, the applicant shall submit a noise control, abatement and mitigation plan during the permitting process to demonstrate that the noise levels as specified above will not be exceeded.
- 4) A noise control, abatement and mitigation plan shall use established acoustical prediction procedures and should predict noise levels at property lines as well as Sensitive Receptors. The noise control, abatement and mitigation plan shall include the concept of “buy quiet”, which means using the quietest equipment that will meet

¹ Acoustical Society of America, American National Standard ANSI S12.18-1994 (R2009), “Procedures for Outdoor Measurement of Sound Pressure Level,” reaffirmed by ANSI June 15, 2009. Reference is to Method #1: General method for routine measurements.

² Acoustical Society of America, American National Standard ANSI/ASA S3/SC1.100-2014/ANSI/ASA S12.100-2014. Methods to Define and Measure the Residual Sound in Protected Natural and Quiet Residential Areas <https://webstore.ansi.org/standards/asa/ansiasas3sc11002014s12>

operational requirements. The practice of using the Best Available Control Technology (BACT) shall also be employed to assure that any equipment being installed is as quiet as possible. The potential existence of prominent discrete tones as defined above shall also be evaluated and addressed.

- d. **Corrective Measures.** Non-residential uses that produce non-compliant noise must install and maintain noise reducing equipment in accordance with the approved noise control plan to meet the requirements of this section. The Building Commissioner may require the provision of reports to document ongoing noise compliance.
 - e. **Continued Noise Compliance.** Should it be determined that a facility goes out of compliance and exceeds any allowable noise limit conditions (e.g. due to equipment wear), corrective action will be required to bring the facility back into compliance which could include, but not be limited to, equipment replacement or additional mitigation steps.
3. **Vibration:** No vibration which is discernible to the human sense of feeling for three minutes or more in any hour between 7:00 a.m. and 9:00 p.m. or for thirty seconds or more in any one hour from 9:00 p.m. to 7:00 a.m. shall be permitted. No vibration at any time shall produce an acceleration of more than 0.1g or shall result in any combination of amplitude and frequencies beyond the "safe" range on the most recent edition of Table 7, U.S. Bureau of Mines Bulletin NO. 442 (U.S. Department of the Interior).
4. **Odors:** The Building Commissioner may determine that an odor is disturbing, offensive or objectionable and is subject to investigation, and, if it is determined to be in violation of this bylaw, may take appropriate enforcement action, including the issuance of orders requiring the development and implementation of corrective measures, and/or the imposition of fines and non-criminal penalties.
- a. **Standards** – Disturbing, offensive or objectionable odors as defined in Paragraph C. shall not be produced in any zoning district or impact any space where people live, work or assemble in a way that unreasonably interferes with the comfortable enjoyment of life or the use of property. Failure to meet either the Reasonableness Standard or the Measurement Standard listed below shall constitute a violation of this section.
 - 1) **Sensorial Reasonableness Standard** –The Building Commissioner, or designee, may determine, using only her or his sense of smell, that an odor is one which is disturbing, offensive or objectionable to a reasonable person with normal olfactory sensitivity.
 - 2) **Measurement Standards** – No disturbing, offensive or objectionable odor greater than that caused by the lowest odor detection thresholds as listed in the most recent edition of the [American Industrial Hygiene Association \(AIHA\) Odor Thresholds for Chemicals with Established Occupational Health Standards, Reported Odor](#)

Thresholds (EG Table 6.3 in 2nd Edition) shall be permitted. Due to the potential of odorant mixtures causing more intense odors than individual odorant compounds in isolation, nothing in this Bylaw shall be interpreted as allowing for any disturbing, offensive or objectionable odors at or above the cited detection thresholds.

b. **Investigation.** The Building Commissioner or designee shall investigate odor complaints until determined to be without merit or resolved to the satisfaction of the Building Commissioner.

1) **Assessment Area** – The Building Commissioner or designee shall investigate odor complaints for odors emanating from:

- a) **Immediate Impact Zone** - Any resident, occupant, or owner of property located within 1,000 feet of the property line of the property with a source generating and emitting the disturbing, objectionable or offensive odor, as measured from property line to property line.
- b) **Secondary Impact Zone** - A collection of complaints from five or more residents, occupants, or owners of property located within 2,500 feet of the property line of the property with a source generating and emitting the disturbing, objectionable or offensive odor as measured from property line to property line.

2) The Building Commissioner or designee may investigate possible odor violations upon their own initiative or at the request of Town officials or staff and shall investigate public complaints about an odor of a suspicious or dangerous nature.

3) If the Building Commissioner determines that an investigation is warranted, he or she or a designee, may undertake an odor observation to determine if a disturbing, objectionable or offensive odor exists. At the discretion of the Building Commissioner, a technical odor consultant may be engaged by the Town to assist in the investigation including odor observation and documentation of violations. The odor consultant shall be trained in the practices of ASTM (American Society for Testing Materials) - E679 and meet the selection criteria of EN13725 (international olfactometry standard). As a component of such investigation, measurements may be done in the field by using:

- a) Undiluted odor field observations (i.e. sniffing) or odor sampling to be performed at a frequency, duration, and locations appropriate for the odor source under investigation and the locations of odor complaints that have been received by the Town including those beyond the source property lines. The purpose is to detect and assess the presence of recognizable odors linkable to a specific source in ambient air. This may be accomplished by:

- i. Grid method of analysis - Odor hours for a geographic area of evaluation to establish an odor hour frequency measurement.
- ii. Plume method of analysis – Measurement of extent of the area where an odor plume originating from a specific odor source can be perceived and recognized under specific meteorological and operating conditions.

The following other forms of measurement may be used only as supplemental methods to evaluate persistent problems or higher intensity odors as a way to determine the severity of the situation.

- b) Field Olfactometry - A method to quantify odors in ambient air by means of a portable odor detecting and measuring device known as a field olfactometer. A field olfactometer measures odor strength and persistence using a Dilution-to-Threshold (D/T) ratio. The Dilution-to-Threshold ratio is a measure of odor concentration by determining the number of carbon filtered air dilutions needed to make the odorous ambient air non-detectable. The formula for calculating D/T with a field olfactometer is:

$$D/T = \frac{\text{Volume of Carbon Filtered Air}}{\text{Volume of Odorous Air}}$$

- c) Chemical Analysis – Instrumental methods of characterizing odor involving the identification and quantification of chemical compounds in an odor sample by means of gas chromatography coupled with mass spectrometry, analysis of hydrocarbon molecules, and analysis of single gases such as ammonia and hydrogen sulfide.
 - d) Instrumental Odor Monitoring – Instruments designed to mimic human olfaction in the detection and characterization of simple or complex odors. Also referred to as electronic (E) - noses.
 - e) Any other method or best practice determined to be appropriate by the Building Commissioner.
- c. **Odor Control Plan** – If, based on the investigation, the Building Commissioner determines that there is a violation, the owner and/or operator of the odor-producing use shall be required to provide an odor control, abatement and mitigation plan to the Building Commissioner for review and approval, or otherwise bring the property into compliance with this bylaw and the order of the Building Commissioner. The plan shall address how the site will become compliant and specify suitable corrective measures. Compliance shall be achieved through industry best practices and suitable mitigation measures. The plan shall be prepared by a certified environmental engineer, certified environmental professional, or certified industrial hygienist with experience in odor

management, abatement and mitigation technologies. The Building Commissioner may also require the plan to include the provision of reports of ongoing odor monitoring and compliance.

- d. **Corrective Measures** - Non-residential uses that produce non-compliant odors shall be required to install and maintain odor-eliminating equipment in accordance with the approved odor control plan to meet the requirements of this section.

E. Exemptions

- 1) **Farming.** Impacts resulting from agricultural, farm-related, or forestry-related activities as defined by [G.L., c 128, Agriculture, § 1A](#), as amended, and Medway General Bylaws, ARTICLE XXXI, §2 Right to Farm, are exempt from these restrictions when such activities follow generally accepted practices ([G.L., c 111, §125A](#)).
- 2) **Residential Uses.** Impacts resulting from residential activities such as but not limited to barbecues, wood stove exhaust, driveway paving, gardening, and house painting are exempt from these restrictions.
- 3) **Repair and infrequent maintenance activities.** Repair and infrequent maintenance activities such as but not limited to those for septic and sewer systems are exempt from these restrictions.
- 4) **Construction.** Impacts resulting from construction, demolition, or repair work that occurs between 7:00 a.m. and 6:00 p.m. on public improvements authorized by a governmental body or agency; utility work and repairs, and other similar work on private property pursuant to an order by a governmental body or agency for health or safety purposes are exempt from these restrictions.

Or to act in any manner relating thereto.

PLANNING AND ECONOMIC DEVELOPMENT BOARD