



CITY OF CAMBRIDGE, MASSACHUSETTS

# PLANNING BOARD

CITY HALL ANNEX, 344 BROADWAY, CAMBRIDGE, MA 02139

June 16, 2009

To the Honorable, the City Council,

**Subject: Recommendation on the City Council rezoning petition regarding Wind Turbine Installations.**

## Recommendation

The Planning Board recommends adoption of the proposed zoning, with recommendations for modification as outlined below. The Board supports the goal of encouraging technologies that allow for the production of clean, renewable energy in order to further the City's goal of reducing greenhouse gas emissions. Establishing a regulatory framework for wind turbine energy systems will help to facilitate the incorporation of these new technologies by clarifying the rules and permitting procedures for such systems.

The Board recommends the following modifications to the rezoning proposal:

1. The period after which a Wind Turbine Installation in disuse is considered abandoned should be shortened from two years to one year, unless the owner is able to demonstrate an intention to repair the installation and to explain why additional time is necessary to make the needed repairs.
2. In the case where the Planning Board may issue a Special Permit for a Wind Turbine Installation, the Planning Board should be allowed to grant a waiver from the requirements to accommodate laydown of the equipment within the site and to post a bond or surety to cover the cost of removal of the wind turbine, if the Board determines that such measures are not needed in a particular case.
3. For Wind Turbine Installations permitted as-of-right, the setback limitations should be defined using a formula by which the required minimum setback increases proportionally to the vertical dimension of the turbine. This would be comparable to a bulk control plane, except that turbines less than ten feet in height would have no required minimum setback, and turbines permitted as-of-right would be limited to forty feet or less in height.
4. To improve clarity, the Board suggests a reorganization of the proposed zoning text for the new Section 11.40, so that it first describes the requirements for all Wind Turbine Installations, then describes the criteria and procedures for Wind Turbine Installations allowed by special permit, and finally describes the specific conditions under which Wind Turbine Installations may be allowed as-of-right.

Respectfully submitted for the Planning Board,

  
William Tibbs, Chair

ATTACHED: Proposed rezoning text with recommended changes (substantive changes are highlighted)

*A. Amend the Table of Use Regulations, Section 4.30, by adding a new use category “j. Wind Turbine” in Section 4.32.*

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**4.30 TABLE OF USE REGULATIONS**

**4.32 Transportation, Communication & Utility Uses**

- a. Bus or railroad passenger station
- b. Automobile parking lot or parking garage for private passenger cars<sup>18</sup>
- c. Railroad freight terminal, railroad yard and shops
- d. Truck or bus terminal, yard or building for storage or servicing of trucks, trailers or buses, parking lot for trucks
- e. Radio and Television transmission station, including towers
- f. Radio and television studio
- g. Utilities
  - 1. Telephone exchange (including switching, relay and transmission facilities serving mobile communications systems) and any towers or antennas accessory thereto<sup>49</sup>
  - 2. Transformer station, substation, gas regulator station, or pumping station
  - 3. Power Plant for the non-nuclear production, generation, and distribution of electricity or steam.
- h. Helipad or Airport
- i. *Vehicle Sharing Parking Facility*

*PB*<sup>56</sup>

**j. Wind Turbine System**

**PB**<sup>57</sup> (in all districts)

*B. Amend the Footnotes to the Table of Use Regulations, Section 4.40, by adding a new Footnote 57 to read as follows:*

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**4.40 FOOTNOTES TO THE TABLE OF USE REGULATIONS**

**57 Subject to the provisions of Section 11.40.**

*C. Amend Section 5.22 to read as follows:*

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**5.23** *Height Exceptions.* The provisions of this Ordinance governing the height of buildings and structures in all districts shall generally not apply to (a) chimneys, water towers, air conditioning equipment, elevator bulkheads, skylights, ventilators and other necessary features appurtenant to buildings which are usually carried above roofs and are not used for human occupancy, (b) to domes, towers, or spires above buildings

if such features are not used for human occupancy, and occupy less than ten (10) percent of the lot area, **and** (c) to wireless or broadcasting towers and other like unenclosed structures which occupy less than ten (10) percent of the lot area **and (d) to Wind Turbines, subject to the requirements and limitations set forth in Section 11.40.**

However, building elements enumerated in (a) above shall be limited in height where they are placed on a building located in a non-residential district, which district abuts a Residence A-1, A-2, B, C, C-1, C-1A, C-2, C-2A, C-2B district. In these instances the following height limitations shall apply to those building elements:

1. The elements must be below one or more forty-five (45) degree bulk control planes. Each bulk control plane shall begin, in the vertical dimension, at the maximum height limit permitted in the non-residential zoning district. In the horizontal dimension, the plane shall begin at the residential/non-residential zoning district line: however, where that line lies within a street, the plane shall begin at the front lot line, located nearest the zoning district line, of the lots on which the building is sited. Thereafter the bulk control plane shall rise from its beginning over the non-residential zoning district. (*See illustrative figure 5.23*)
2. The limitations in Paragraph 1 above may be waived by special permit from the Planning Board upon a finding by the Board that the additional height is necessary. In making that determination the Planning Board shall consider the special and unique requirements of the use that the elements are serving, any special constraints imposed by the site upon which the building is located, the nature and character of development in the adjacent residential district, and the extent to which successful efforts are made to minimize the visual and acoustical impact of he elements on neighbors.

*D. In Article 11.000 create a new Section 11.40 to read as follows:*

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## ARTICLE 11.000 SPECIAL REGULATIONS

11.10 TOWNHOUSE DEVELOPMENT

11.20 *Vehicle Sharing Parking Facility*

11.30 FAST ORDER FOOD ESTABLISHMENTS

**11.40 WIND TURBINE SYSTEMS**

11.50 DELETED See Article 20.000

11.60 DELETED See Article 20.000

11.70 DELETED See Article 20.000

11.80 EMPLOYMENT PLAN COMPLIANCE PROCEDURE

11.90 DELETED

11.100 DELETED See Article 20.000

11.200 AFFORDABLE HOUSING REQUIREMENTS

11.300 DELETED See Article 20.000

11.400 DELETED See Article 20.000

11.500 PLANNING OVERLAY REQUIREMENTS

**11.40** **WIND TURBINE SYSTEMS** [ *all new*]

**11.41** *Purpose.* It is the intent of this Section 11.40 to permit the limited use of wind turbines throughout the city (a) for the purpose of small scale generation of electricity for on-site consumption as an accessory use to other activities located on the same lot, (b) for the purpose of researching, testing, evaluating, or demonstration of the efficacy in an urban setting of such instruments as a means by which renewable sources of energy might be employed to generate electricity at a larger scale for both a domestic and commercial purposes, and (c) in appropriate locations in non residential districts for the generation of electricity for commercial sale as a principal use. These provisions are intended to ensure that such facilities are well designed, carefully sited, and operated in a manner that will not pose a nuisance or hazard to the general public or nearby neighbors.

**11.42** *Wind Turbine Systems Permitted by Special Permit.*

A Wind Turbine System ~~not meeting the requirements of Section 11.42 above (including commercial applications and freestanding equipment)~~ may generally be permitted anywhere in the city ~~only~~ after the granting of a special permit from the Planning Board, subject to the conditions and limitations described in this Subsection 11.42. In special cases, there is a limited provision for the permitting of Wind Turbine Systems as-of-right, without the granting of a special permit, as described in Subsection 11.43 below.

**11.42.1** *Dimensional Limitations.*

1. *Height.* There shall be no maximum height limit for a Wind Turbine, but the permitted height of a Wind Turbine shall be specifically approved by the Planning Board.
2. *Setbacks.* There shall be no required minimum yard setbacks for a Wind Turbine, but the permitted placement of a Wind Turbine with respect to public street lines and adjacent lot lines shall be specifically approved by the Planning Board. All equipment and structures accessory to the Wind Turbine shall be subject to the yard requirements of the applicable zoning district unless waived by the Planning Board.

**11.42.2** *Application Material.*

At a minimum the special permit application shall contain the following material:

1. Plans of the site showing the location of the Wind Turbine System and its relationship to other uses and buildings on the site, including elevations of Wind Turbines and other features on the site; plans, descriptions, illustrations and/or photographs describing the surrounding uses and physical context in

sufficient detail to allow an assessment of the proposal on those surrounding activities; illustration of the laydown options for maintenance of the equipment; any proposed screening and landscaping.

2. A detailed description of the Wind Turbine System including number, size, materials, noise rating, operational plan, maintenance schedule.
3. A narrative discussion of the extent to which the operation of the proposed Wind Turbine System will generate continuous shadows, intermittent shadows (a.k.a. flicker), and/or noise that may be detected from adjacent properties and from the public street.
4. Photo simulations or other representations, from at least two vantage points (one of which should be from a public street), illustrating the proposal in its physical context.
5. A detailed estimate of the cost of removal of the Wind Turbine System.

### 11.42.3

#### *Standards for Granting of the Special Permit.*

In addition to the limitations requirements described in Section 11.44 below and the criteria established in Section 10.43 of the Zoning Ordinance for the granting of a special permit, the Planning Board shall consider the following specific criteria.

1. The visual impact of the Wind Turbine System on the abutting properties and the neighborhood. In recognition of the fact that a Wind Turbine of any significant size will introduce a physical structure and form not typical of most residential and commercial neighborhoods in the city, the Planning Board shall consider the following when assessing whether a proposal has any unreasonable negative impacts on neighborhood character or adjacent uses:
  - a. the size, scale and bulk of the proposed Wind Turbine System in relationship to the scale of typical buildings and other elements in the neighborhood;
  - b. the visibility and impact of the proposed Wind Turbine System from important view corridors and viewsheds, with the understanding that reasonable efforts should be made to make the system visually unobtrusive, although in many cases a system may not be reasonably expected to be screened from public view;
  - c. the nature of adjacent uses, including the historical and architectural quality of surrounding buildings, the consistency of that architectural character over an extended area, and the extent to which the proposed

Wind Turbine System is visually integrated with that character and with the larger urban landscape; and

- d. in the case of building-mounted Wind Turbine Systems, the visual relationship between the system and the architecture of the building upon which it is installed.
2. The extent, frequency and duration of continuous and intermittent shadows and their relationship to interior spaces and places people will regularly occupy. Such impacts should be minimized and directed away from sensitive spaces in residential environments. It shall be the burden of the applicant to demonstrate that there shall be no significant adverse impact on adjacent properties.
3. The extent of detectable noise and vibration impact on neighboring uses.
4. Where a Wind Turbine System is proposed in an Open Space District or near an open space facility, particularly one with a significant natural aspect, the system's impact on any conservation, historic, or recreational value should be carefully analyzed.
5. Other factors with regard to the operational and visual impacts of the Wind Turbine System that may suggest that a time limitation should be imposed on the special permit.

**11.43** *Wind Turbine Systems Permitted As-of-right.*

A Wind Turbine System shall be permitted as-of-right, without the granting of a special permit, only if the conditions and limitations of this Subsection 11.43 and the requirements of Subsection 11.44 below are met. Any proposed Wind Turbine System not meeting all of the conditions and limitations of this Subsection 11.43 may be permitted only after the granting of a special permit by the Planning Board, as described in Subsection 11.42 above.

**11.43.1** *District Limitations.*

The Wind Turbine System and all associated monitoring and testing equipment must be located in a Residence C-3, C-3A, C-3B or Special District 6 zoning district.

**11.43.2** *Use Limitations.*

1. The Wind Turbine System must be accessory to an educational use, Section 4.56 c, Paragraphs 4-6, dormitory use accessory to such educational use, Section 4.56 c, Paragraph 8, or museum use, Section 4.56 i, Paragraph 2 where such museum has as its core mission the display, exploration and

dissemination of knowledge, scientific principles, and natural phenomena to the general public.

2. The Wind Turbine System shall be subject to the following conditions and limitations and shall only be installed for the purpose of advancing the educational and instructional purposes of the institution to which it is accessory and shall not be installed for the specific and principal purpose of generating electricity for sale. However, energy generated by the Wind Turbine System may be used in the operation of the physical plant of the institution to which it is accessory.

### 11.43.3

*Dimensional Limitations.*—The following dimensional limitations shall apply.

1. The Wind Turbine must be installed on a building and may not be a freestanding structure.
2. *Height:* The Wind Turbine Height may not extend more than forty (40) feet above the existing height of the portion of the building upon which it is mounted. Such limitation shall apply even if the height of the building is non-conforming and already exceeds the height of structures permitted in the zoning district. The height shall be measured to the highest point of the turbine, including the height of blades when in the vertical position.
3. *Setbacks.* The Wind Turbine shall be subject to the following minimum setbacks, which shall be required and they shall apply regardless of the location of the building upon which the turbine is installed.
  - a. No portion of the Wind Turbine may be located nearer than two hundred (200) feet to any structure containing a residential use (exclusive of transient residential uses, Section 4.31 i) that is neither owned nor under the control of the educational or museum institution erecting the turbine.
  - b. The minimum setback of the Wind Turbine from any public street line or from a lot line of a lot not in the ownership of the institution to which the Wind Turbine is accessory shall be a distance equal to the Wind Turbine Height. However, a Wind Turbine with a height of ten (10) feet or less shall have no required minimum setback.

All portions of the turbine shall comply with the following setbacks from any public street line or from a lot line of a lot not in the ownership of the educational or museum institution erecting the turbine.

(1) No setback shall be required for a turbine having a vertical dimension of ten (10) feet or less.

(2) Twenty five (25) feet for a turbine having a vertical dimension greater than ten feet but no more than twenty feet.

~~(3) Fifty (50) feet for a turbine having a vertical dimension greater than twenty feet.~~

~~No other yard setbacks shall apply.~~

**11.43.4** *Time Limitations*

A building permit authorizing the installation of a Wind Turbine System under the provisions of this Subsection 11.43 shall lapse after two years unless a request in writing is submitted to the Inspectional Services Department for an extension of the permit for an additional two years. Such extension shall not be unreasonably withheld and may be granted if the conditions and requirements of this Subsection 11.43 and Subsection 11.44 below continue to be met by the Wind Turbine System and no nuisance or hazard has been identified during the previous two years of operation. Such building permit may be extended for additional two year intervals without limit.

**11.44** *General Limitations and Requirements for Wind Turbine Systems*

**11.44.1** In all cases, a Wind Turbine System shall be subject to the following limitations and requirements:

1. The Wind Turbine System shall be free from any appurtenances with the exception of equipment necessary to monitor, regulate, secure, and maintain the system and the electricity it may produce. No sign may be attached to the system ~~equipment~~ with the exception of unobtrusive manufacturer identification and operational guidance informational signs. No cellular or mobile phone equipment may be attached to the system ~~equipment~~.
2. The Wind Turbine System ~~equipment~~ shall not be independently lighted except as may be required by any local, state or federal regulation.
3. The Wind Turbine System ~~Equipment~~ shall be painted in subdued tones of white, black, silver, grey, dark green, brown, blue or similarly subdued, non-reflective color unless otherwise required by local, state and/or federal regulations or allowed by the Planning Board.
4. In operation the Wind Turbine System ~~equipment~~ shall meet the requirements of the Cambridge Noise Ordinance, cumulatively for all equipment installed at a single location. All equipment shall be rated for noise generation so that it can be evaluated prior to installation.
5. The site shall be capable of accommodating the laydown of the Wind Turbine ~~equipment~~ without trespass onto city streets or adjacent lots held in a different ownership.

6. The Wind Turbine System shall be designed and located so as to prevent unauthorized access and otherwise be maintained in a safe operating condition.
7. *Abandonment.* Given the unique safety considerations associated with Wind Turbines, the owner shall be obligated to remove the Wind Turbine System if any one of the following occurs:
  - a. abandonment of the Wind Turbine System through disuse for a period of one year;
  - b. non-functioning of the Wind Turbine System for more than 100 days, where substantial steps have not been initiated to make necessary repairs; or
  - c. failure to request an extension of a building permit as required in Subsection 11.43.4 above, or a special permit authorized under Subsection 11.42 above, where that special permit may have been time-limited by the Planning Board.

Upon failure to remove the Wind Turbine System 150 days after any one of these threshold events occurs, the City of Cambridge shall have the authority to enter the property and remove the system at the expense of the owner/operator where it finds that the equipment constitutes a hazard to the general public. At or before issuance of a building permit for the system, the Permittee shall post a bond or other surety in a form and in an amount acceptable to the City that shall cover the cost of removal of the system by the City should that be necessary, such bond amount to be consistent with estimates for removal prepared at the Permittee's expense by a qualified engineer. The surety mechanism shall account for cost of living adjustments over the expected life of the system.

8. ~~Installation of A Wind Turbine System as a principal~~ principally used for the express purpose of the commercial selling of the energy generated shall be permitted only in non-residential zoning districts. In residential districts, such commercial use is shall not be permitted. However, it is understood that in those residential districts a portion of the energy generated by the system that is not immediately consumed on-site may at times be sold back or credited to the local-serving power utility, consistent with any applicable state or federal law or regulation. Furthermore, a cooperative system serving multiple adjacent properties shall be permitted in residential districts and may share the output of the system without being considered a commercial use.

**11.44.2** *Waiver of Requirements*

When granting a special permit for a Wind Turbine System, the Planning Board may grant a waiver from the general requirement to accommodate laydown of a Wind Turbine without trespass onto city streets or adjacent lots as described in Subsection 11.44.1, Paragraph 5 above. The Planning Board may also grant a waiver of the requirement to post a bond or other surety that shall cover the cost of removal of the Wind Turbine System by the City, as described in Subsection 11.44.1, Paragraph 7 above. The Planning Board may grant such a waiver if the Board finds the requirement to be unnecessary in a given case.

**11.45** *Definitions*

**11.45.1** *Wind Turbine.* A device that converts wind energy to rotational energy that then drives an electrical generator. A conventional turbine generally consists of a tower or pole, a nacelle body, and a rotor with multiple blades. Variations may include vertical axis turbines and structural elements housing and encapsulating the rotating elements of the turbine. It is anticipated that as testing and experimentation continues the physical form of turbines may become much more varied.

**11.45.2** *Wind Turbine System.* A combination of equipment designed to be permanently mounted on a building or freestanding, including Wind Turbines and associated and accessory equipment and structures, necessary to convert wind energy to electricity.

**11.45.3** *Wind Turbine Height.* The vertical dimension of a Wind Turbine as measured from ground level in the case of a freestanding turbine, or from the height of the portion of the building upon which it is mounted in the case of a building-mounted turbine, to the highest point of the Wind Turbine, including the height of blades when in the vertical position.