

Agenda
Town of Duck Planning Board – Regular Meeting
Duck Municipal Office Board Room
Wednesday, March 10, 2010
6:30 p.m.

1. Call to Order

2. Public Comments

3. Old Business

Continuation of Wind Turbine Ordinance Discussion from February 24, 2010

4. New Business

5. Approval of Minutes

- *Joint Planning Board/Town Council Discussion from Town Council Retreat - January 19, 2010*
- *Planning Board Meeting February 10, 2010*
- *Planning Board Mid-Month Meeting February 24, 2010*

6. Other Business

7. Staff Comments

8. Board Comments

9. Adjournment

BoA Board of Adjustment
CUP Conditional Use Permit
LUP Land Use Plan
PB Planning Board
RZ Rezoning

SE Special Exception
TC Town Council
V Variance
ZTA Zoning Text Amendment

Memorandum

To: Chairman Britt and Members of the Planning Board
From: Andy Garman, Director of Community Development
Date: 03/05/10
Re: Continuation of Wind Turbine Discussion from February 24, 2010 Planning Board Meeting

The draft wind energy ordinance has been revised based on discussions from the February 24, 2010 Planning Board Meeting. A summary of the changes is as follows:

- The definition for small wind energy facility has been modified and is now referred to as a “Supplementary Wind Energy Facility.” The definition no longer references a maximum rated power capacity. A definition for “Commercial Wind Energy Facility” has also been added which is now referred to in the ordinance.
- Several definitions have been added to accompany the proposed changes to the “noise” section of the ordinance.
- The height limits have been modified as suggested; the height limit is now administratively the district height limit plus five feet.
- The number of wind energy facilities permitted on each lot has not changed. This still needs to be discussed.
- Changes have been added to the setback language to ensure wind energy facilities do not encroach into the CAMA small structure setback or 30-foot estuarine shoreline buffer.
- The noise section now includes a recommended limitation of maximum sound levels and a procedure for measuring noise if a violation occurs. Staff will explain this in more detail at the meeting. Staff has included in your packet a document obtained from the North Carolina Solar Center prepared by the American Wind Energy Association which includes a recommended standard for measuring noise from a small wind energy system. This is referred to in the ordinance.
- Other wording changes have been made as suggested by the Planning Board.

Staff looks forward to a review of the ordinance at the upcoming meeting.

Attachments:

Draft Wind Ordinance
AWEA Small Wind Turbine Performance and Safety Standard, Standard AWEA 9.1 – 2009

DRAFT WIND ENERGY ORDINANCE

§ 156.002 DEFINITIONS.

Wind Energy Facility. An electric generating facility, whose main purpose is to supply electricity, consisting of one or more Wind Turbines and other accessory structures and buildings, including substations, meteorological towers, electrical infrastructure, transmission lines and other appurtenant structures & facilities.

Wind Energy Facility, Supplementary. A single system designed to supplement other electricity sources as an accessory use to existing buildings or facilities, wherein the power generated is used primarily for on-site consumption. A supplemental wind facility may consist of a single wind turbine mounted either on a freestanding tower or on the roof of a building with associated control or conversion electronics.

Wind Energy Facility, Commercial. An electric generating facility consisting of one or more wind turbines under common ownership or operating control that includes substations, MET towers, cables/wires and other building accessories to such facility, whose main purpose is to supply electricity to off-site customer(s).

Wind Power. The conversion of wind energy into another form of energy.

Wind Turbine. A wind energy conversion system that converts wind energy into electricity through the use of a wind turbine generator, and may include a nacelle, rotor, tower, guy wires and pad transformer.

Wind Turbine Height. The distance measured from grade at the center of the tower to the highest point of the turbine rotor or tip of the turbine blade when it reaches its highest elevation.

Shadow Flicker. The visible flicker effect when rotating turbine blades cast shadows on the ground and nearby structures causing the repeating pattern of light and shadow

A-Weighted Sound Level. The sound pressure level in decibels as measured on a sound level meter using the A-weighting network. The level so read is designated dB(A).

Decibel (dB). A unit for describing the amplitude of sound equal to 20 times the logarithm to the base ten of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micro newtons per square meter.

Ambient Noise. The sound present in a given environment, being usually a composite of sounds from many sources. For the purposes of this ordinance, this shall be the A-weighted sound level in decibels that is exceeded 90 percent of the time.

156.138 RENEWABLE ENERGY

Wind Energy Facilities

- (A) *Purpose.* (To be completed)
- (B) *Types of wind energy facilities permitted by zoning district.* Supplementary Wind Energy Facilities, as defined in Town Code Section 156.002, shall be permitted in all zoning districts within the Town. Commercial Wind Energy Facilities are considered to be incompatible with development in the Town of Duck and are hereby prohibited.
- (C) *Use guidelines and dimensional requirements.*
 - (1) *Height.* Wind turbine structures shall not exceed the five feet above the maximum height limitation established within each zoning district.
 - (2) *Setbacks.* Freestanding wind turbines shall be set back a distance of least 1.1 times the total height of the wind energy facility from:
 - (a) Public and private roads.
 - (b) Adjacent property lines.
 - (c) The first line of stable natural vegetation of the Atlantic Ocean beach. In no instance shall the wind energy facility be located within the small structure setback established by the North Carolina Coastal Area Management Authority (CAMA).
 - (d) The normal water line of the Currituck Sound. In no instance shall the wind energy facility be located within 30 feet of the normal water line of the Currituck Sound.

Roof-mounted wind turbines and other accessory components of wind energy facilities shall be required to adhere to the minimum yard requirements for principal structures established in each zoning district.

 - (3) There shall be a maximum of one wind energy facility permitted per lot.
 - (4) *Noise.*
 - (a) The maximum audible sound resulting from a wind energy facility shall be fifty-five decibels (dBA) or five decibels (dBA) above the existing ambient noise level, whichever is greater, measured at the closest adjacent property line. The maximum audible sound shall be the sound pressure level that is exceeded for more than 10 percent of the measurement duration. This standard shall not apply to short-term events such as utility outages and/or severe wind storms.
 - (b) When it is necessary to measure the noise generated from a wind turbine as a result of a valid complaint reported in accordance with the procedures set forth in Town Code Section 91.40, the owner of the wind turbine shall be required to perform an acoustic sound measurement of the wind turbine. This measurement shall be conducted in accordance with industry standards for performing acoustic testing of small wind energy facilities which may include, but shall not limited to, the procedures set forth in

the American Wind Energy Association Publication “AWEA Small Wind Turbine Performance and Safety Standard, Standard AWEA 9.1 – 2009.”

- (c) If the results of this measurement indicate that a violation will persist without action by the owner of the wind turbine, the property owner shall discontinue use of the wind turbine until measures can be taken to retrofit the structure or mitigate the noise at the affected property lines. If the wind turbine noise cannot be brought into compliance with the noise requirements established by this section, the owner of the wind turbine shall be required to decommission the wind energy facility.

(5) *Aesthetics.*

- (a) *Tower.* If a tower is part of a wind energy facility, it shall be a self-supporting tubular tower (monopole) tower.
- (b) *Exterior Finish.* Each wind energy facility shall maintain a non-reflective finish neutral in color to reduce reflection and glare and to otherwise reduce visual obtrusiveness.
- (c) *Signage and lighting.* Signs, advertisements, flags, streamers and other decorative items shall be prohibited from a wind energy facility. No lighting on the wind energy facility shall be permitted unless required by FAA regulations.
- (d) *Communications antenna.* No communications antenna or arrangement of wires unrelated to the wind energy facility shall be installed or connected to the wind energy facility.

(D) *Structural Requirements.*

- (1) All wind energy facilities shall be designed and certified by a North Carolina licensed professional engineer that the wind energy system meets the design requirements established by the current North Carolina State Building Code, including the ability to withstand the force exerted by a 130-mph, three-second wind gust.
- (2) If the lowest point of a rotor blade or other movable part is located closer than 12 feet to the ground, an adequate barrier shall be placed around the facility’s tower base to prevent injury.
- (3) The installation and design of all wind energy systems shall comply with any applicable industry standards, and all electrical and mechanical components shall conform to relevant local, state and national codes.
- (4) Wind energy systems shall meet all applicable FAA regulations.
- (5) All wind energy systems shall be equipped with a disconnection means compliant with Article 705 of the National Electric Code.

(E) *Decommissioning.*

- (1) A wind energy facility that is out of service and not functioning shall be repaired by the owner or removed. If the town determines that a wind energy facility has not been operational for a continuous 90-day period, the Department of Community Development

shall give written notice by certified mail to the owner of the facility. The owner shall be given 45 days from receipt of said notice to respond in writing and provide information that explains the reason(s) that the system has been out-of-service and the corrective action that will be taken to put the system back in service. The response shall also include a timetable for completion of repairs.

- (2) If the town determines that the corrective measures and/or the proposed time for repairs is unreasonable, the Department of Community Development shall give written notice by certified mail to the owner or occupant of the property on which the wind energy facility is located to remove the system within 90 days of receipt of said notice. The owner or occupant of the property on which the facility is located shall be solely responsible for safe removal of the facility, and all costs to remove the facility shall be borne solely by such owner or occupant.
- (3) Upon failure to comply with a notice of removal within the time specified, the town shall cause removal of the wind energy facility, and any expense incurred shall be paid by the owner of the property upon which the wind energy facility was erected or maintained.

(F) *Wind Energy Facility Permitting Requirements.*

- (1) No person shall erect any wind energy facility without first obtaining a permit from the Director of Community Development (Director) in accordance with the procedures set forth in this section.
- (2) All permit applications for wind energy facilities shall include the following:
 - (a) Site plan depicting the proposed location of all components of the wind energy facility as well as existing structures located on the subject property with dimensions showing compliance with minimum yard requirements;
 - (b) Construction drawings of the wind energy facility depicting the design of the turbine structure, tower, base and footings, sealed by a licensed North Carolina Professional Engineer certifying that the drawings conform to all structural requirements established by law;
 - (c) Wind energy facility specifications including the total rated capacity;
 - (d) Estimated noise levels resulting from the wind energy facility at adjacent property lines;
 - (e) Construction plan;
 - (f) Operation and maintenance plans and specifications;
 - (g) Shutdown procedures;
 - (h) Evidence of at least \$500,000.00 of general liability insurance coverage as part of a homeowners insurance policy, as "umbrella coverage", or otherwise;
 - (i) Any county, state and federal permits required by law or regulation; and
 - (j) Other relevant information as may be reasonably requested to ensure compliance with the requirements of this Ordinance.

(Waivers and Exceptions)

Typically the Town provides the opportunity to apply for a special exception to the administrative provisions of an ordinance. Generally, this would apply to a permitted rather than conditional use requirement. If the Planning Board decides to regulate wind turbines as a permitted use, the Planning Board may wish to consider allowing for special exceptions when unique circumstances exist that warrant a deviation from the administrative provisions of the ordinance.

AWEA Standard
AWEA 9.1 - 2009

AWEA Small Wind Turbine Performance and Safety Standard



American Wind Energy Association
1501 M Street NW, Suite 1000
Washington, DC 20005

AMERICAN WIND ENERGY ASSOCIATION STANDARDS

Standards promulgated by the American Wind Energy Association (AWEA) conform to the AWEA Standards Development Procedures adopted by the AWEA Board of Directors. The procedures are intended to ensure that AWEA standards reflect a consensus to persons substantially affected by the standard. The AWEA Standards Development Procedures are intended to be in compliance with the American National Standards Institute (ANSI) Essential Requirements. Standards developed under the AWEA Standards Development Procedures are intended to be eligible for adoption as American National Standards.

AWEA standards may be revised or withdrawn from time to time. Contact AWEA to determine the most recent version of this standard.

Published by:

American Wind Energy Association
1501 M Street, NW, Suite 1000
Washington, DC 20005
202.383.2500

Copyright © 2009 American Wind Energy Association

Attribution:

No part of this standard may be reproduced or utilized in any form without proper attribution to the American Wind Energy Association. Credit should be acknowledged as follows: "AWEA Small Wind Turbine Performance and Safety Standard (AWEA Standard 9.1 – 2009) © The American Wind Energy Association."

Disclaimer

AWEA Standards are developed through a consensus process of interested parties administered by the American Wind Energy Association. AWEA cannot be held liable for products claiming to be in conformance with this standard.

FOREWORD and BACKGROUND

The Foreword and Background sections are included with this document for information purposes only, and are not part of the AWEA Small Wind Turbine Performance and Safety Standard.

Foreword

The goal of this standard is to provide meaningful criteria upon which to assess the quality of the engineering that has gone into a small wind turbine meeting this standard, and to provide consumers with performance data that will help them make informed purchasing decisions. The standard is intended to be written to ensure the quality of the product can be assessed while imposing only reasonable costs and difficulty on the manufacturer to comply with the standard.

Background

AWEA is recognized by the American National Standards Institute (ANSI) as an Accredited Standards Developer and the AWEA standard will be submitted for adoption as an American National Standard. This standard has been developed in a regimented ANSI process for “voluntary consensus standards” which requires participation from a range of representatives for manufacturers, technical experts, public sector agencies, and consumers.

The draft that follows has been developed over the last five years in a process that involved over 60 participants, three meetings, 22 hours of conference calls, countless e-mails, a list serve, and five intermediate drafts. It represents hundreds of hours of detailed discussion, debate, compromise, revision, and formal response. The Canadian Wind Energy Association has been actively involved since the beginning and the British Wind Energy Association has now adopted and approved this standard almost word for word.

The proposed standard was developed by the AWEA Small Wind Turbine Standard Subcommittee, which was chaired by Mike Bergey of Bergey Windpower Co. Members of the subcommittee have included the following people. Please note that there has been some turnover in the subcommittee, some positions have changed, and not all members were active (though they did receive the drafts and correspondence).

Name	Affiliation	Stakeholder Category
Bill Colavecchio	Underwriters Laboratory	Certifying Agency
Lex Bartlett	Aeromag	Manufacturer
David Blittersdorf	Earth Turbines	Manufacturer / Consumer
David Calley	Southwest Windpower	Manufacturer
Jito Coleman	Northern Power	Manufacturer
David Laino	Endurance	Manufacturer
Robert Preus	Abundant Ren. Energy	Manufacturer
Steve Turek	Wind Turbine Industries	Manufacturer
Dr. Craig Hansen	Windward Engineering	Technical Expert
Robert Poore	Global Energy Concepts	Technical Expert
Ken Starcher	Alternate Energy Institute	Technical Expert
Trudy Forsyth	National Renewable Energy Laboratory	Researcher / Technical Expert
Jim Green	National Renewable Energy Laboratory	Researcher / Technical Expert
Hal Link	National Renewable Energy Laboratory	Researcher / Technical Expert
Brian Vick	USDA/Bushland	Technical Expert
Brent Summerville	SWCC	Technical Expert
Alex DePillis	Wisconsin Energy Office	State Energy Office / Consumer
Jennifer Harvey	NYSERDA	State Energy Office
Cassandra Kling	New Jersey BPU	State Energy Office
Dora Yen	California Energy Comm.	State Energy Office
Paul Gipe	California	Consumer
Mike Klemen	North Dakota	Consumer
Heather Rhoads Weaver	Washington	Consumer / AWEA
Mick Sagrillo	Wisconsin	Consumer
Brad Cochran	Colorado	Interested Party
Samit Sharma	Canada	CanWEA
Svend de Bruyn	Deltronics	Canadian Industry

Other participants in the development of this proposed standard have included (as they were affiliated at the time of their involvement):

Mark Bastasch
Ralph Belden, Synergy Power
Michael Blair
David Blecker, Seventh Generation
Bob Clarke, Ventera Energy
Dean Davis, Windward Engineering
John Dunlop, AWEA
Henry DuPont, Lorax

Mike Gray, Gray Engineering
Jeffrey Haase, State of Minnesota
Tod Hanley, Bergey Windpower
Robert Hornung, CanWEA
Arlinda Huskey, NREL
Dale Jones, Geocorp
Dan Juhl, DanMar
Steve Kalland, NCSU
Peter Konesky, State of Nevada
Andy Kruse, Southwest Windpower
Jean-Daniel Langlios
Amy Legere, Southwest Windpower
Malcomb Lodge, Entegritiy Wind
Charles Newcomb, Entegritiy Wind
Chuck Maas
Dennis Makeperce, E.R.D.
Tom Maves, State of Ohio
Michael Mayhew
Richard Michaud, US-DOE
Jacques Michel, E.R.D.
Paul Migliore, NREL
Lawrence Mott, Earth Turbines
Jennifer Oliver, Southwest Windpower
Philippe Quinet
Doug Selsam, Selsam Engineering
David Sharman, Ampair / BWEA
Robert Sherwin, Vermont Wind Power Int'l
Larry Sherwood, IREC
P.V. Slooten
Eric Stephens
Brian Smith, NREL
Jeroen van Dam, NREL / UL
David VanLuvanee
Jane Weismann, IREC
Kyle Wetzel, Consultant
Sean Whittaker, CanWEA

AWEA Small Wind Turbine Performance and Safety Standard

Table of Contents

<u>Section</u>	<u>Page</u>
1. General Information	1
2. Performance Testing	4
3. Acoustic Sound Testing	4
4. Strength and Safety	5
5. Duration Test	6
6. Reporting	6
7. Labeling	7
8. Changes to Certified Products	8
9. References and Appendices	8
Appendix A	Addendum

AWEA Small Wind Turbine Performance and Safety Standard

1 General Information

1.1 Purpose

This standard was created by the small wind turbine industry, scientists, state officials, and consumers to provide consumers with realistic and comparable performance ratings and an assurance the small wind turbine products certified to this standard have been engineered to meet carefully considered standards for safety and operation. The goal of the standard is to provide consumers with a measure of confidence in the quality of small wind turbine products meeting this standard and an improved basis for comparing the performance of competing products.

1.2 Overview

1.2.1 This performance and safety standard provides a method for evaluation of wind turbine systems in terms of safety, reliability, power performance, and acoustic characteristics. This standard for small wind turbines is derived largely from existing international wind turbine standards developed under the auspices of the International Electrotechnical Commission (IEC). Specific departures from the IEC standards are provided to account for technical differences between large and small wind turbines, to streamline their use, and to present their results in a more consumer-friendly manner.

1.2.2 No indirect or secondary standards references are intended. Only standards directly referenced in this standard are embodied.

1.3 Scope

1.3.1 This standard generally applies to small wind turbines for both on-grid and off-grid applications.

1.3.2 This standard applies to wind turbines having a rotor swept area of 200 m² or less. In a horizontal-axis wind turbine this equates to a rotor diameter of ~ 16 m (~ 52 ft)

1.3.3 A turbine system includes the wind turbine itself, the turbine controller, the inverter, if required, wiring and disconnects, and the installation and operation manual(s).

1.3.4 In cases where several variations of a turbine system are available, it is expected that a full evaluation would be performed on one of the most representative arrangements. Other variations, such as different power output forms, need only be evaluated or tested in the ways in which they are different from the base configuration. For example, a wind turbine available in both grid-intertie and battery charging versions would need

separate performance tests if both versions were to be certified, but would not need a separate safety evaluation in most cases.

- 1.3.5 Except as noted in Sections, 4.2, 4.5, 5.2.3, 5.2.4, 5.2.5 and 6.1.8, towers and foundations are not part of the scope of this standard because it is assumed that conformance of the tower structure to the International Building Code, Uniform Building Code or their local equivalent will be required for a building permit.

1.4 Compliance

- 1.4.1 Certification to this standard shall be done by an independent certifying agency such as the Small Wind Certification Council (SWCC) or a Nationally Recognized Testing Laboratory (NRTL). Self-certification is not allowed.
- 1.4.2 It is the intent of this standard to allow test data from manufacturers, subject to review by the certifying agency.
- 1.4.3 Compliance with this standard for the purposes of advertising or program qualification, or any other purpose, is the responsibility of the manufacturer.

1.5 Definitions

- 1.5.1 Definitions contained in IEC 61400-12-1, ed.1 (Performance); IEC 61400-11, ed.2 (Acoustic Noise); and IEC 61400-2, ed.2 (Design Requirements) are hereby incorporated by reference.
- 1.5.2 Additional Definitions
 - 1.5.2.1 AWEA Rated Power: The wind turbine's power output at 11 m/s (24.6 mph) per the power curve from IEC 61400-12-1, except as modified in Section II of this Standard.
 - 1.5.2.2 AWEA Rated Annual Energy: The calculated total energy that would be produced during a one-year period at an average wind speed of 5 m/s (11.2 mph), assuming a Rayleigh wind speed distribution, 100% availability, and the power curve derived from IEC 61400-12-1 (sea level normalized), except as modified in Section II of this Standard.
 - 1.5.2.3 AWEA Rated Sound Level: The sound level that will not be exceeded 95% of the time, assuming an average wind speed of 5 m/s (11.2 mph), a Rayleigh wind speed distribution, 100% availability, and an observer location 60 m (~ 200 ft.) from the rotor center¹, calculated from IEC 61400-11 test results, except

¹ Appendix A contains guidance on obtaining sound levels for different observer locations and background sound levels.

as modified in Section III of this Standard.

- 1.5.2.4 Cut-in Wind Speed: The first wind speed bin in the averaged power curve that is positive.
- 1.5.2.5 Cut-out Wind Speed: The wind speed above which, due to control function, the wind turbine will have no power output.
- 1.5.2.6 Maximum Power: The maximum one-minute average power output a wind turbine in normal steady-state operation will produce (peak instantaneous power output can be higher).
- 1.5.2.7 Maximum Voltage: The maximum instantaneous voltage the wind turbine will produce in operation including open circuit conditions.
- 1.5.2.8 Maximum Current(s): The maximum instantaneous current(s) the wind turbine will produce on each side of the system's control or power conversion electronics.
- 1.5.2.9 Overspeed Control: The action of a control system, or part of such system, which prevents excessive rotor speed.
- 1.5.2.10 Power Form: Physical characteristics which describe the form in which power produced by the turbine is made deliverable to the load.
- 1.5.2.11 Rotor Swept Area: Projected area perpendicular to the wind direction swept by the wind turbine rotor in normal operation (un-furled position). If the rotor is ducted, the area inscribed by the ducting shall be included.
- 1.5.2.12 Turbulence Intensity: The standard deviation of wind speed divided by the mean wind speed based on 1-minute averaged data that is sampled at 1 Hz.

1.6 Units

- 1.6.1 The primary units shall be SI (metric). The inclusion of secondary units in the English system is recommended [e.g., 10 m/s (22.4 mph)].

1.7 Test Turbine and Electronics

- 1.7.1 Tested wind turbines and their associated electronics shall conform to the specific requirements of the governing IEC wind generator standard referenced for each test, but incorporating any amendments contained in this standard.

2 Performance Testing

- 2.1 Wind turbine performance shall be tested and documented in a test report per the latest edition of IEC 61400-12-1, Annex H, but incorporating the additional guidance provided in this section.
 - 2.1.1 In item b, battery banks are considered to be part of the wind turbine system for grid-connected wind turbines that incorporate a battery bank.
 - 2.1.2 In item e, the total wire run length, measured from the base of the tower, must be at least 8 rotor diameters and the wiring is to be sized per the manufacturer's installation instructions.
 - 2.1.3 In item n, the database shall include 10 minutes of data for all wind speeds at least 5 m/s beyond the lowest wind speed at which power is within 95% of Maximum Power (or when sustained output is attained).

3 Acoustic Sound Testing

- 3.1 Wind turbine sound levels shall be measured and reported in accordance with the latest edition of IEC 61400-11 ed.2, but incorporating the additional guidance provided in this section.
 - 3.1.1 The averaging period shall be 10-second instead of 1-minute.
 - 3.1.2 Measuring wind speed directly instead of deriving wind speed through power is the preferred method.
 - 3.1.3 The method of bins shall be used to determine the sound pressure levels at integer wind speeds.
 - 3.1.4 It shall be attempted to cover as wide a wind speed range as possible, as long as the wind screen remains effective.
 - 3.1.5 A description shall be provided of any obvious changes in sound at high wind speeds where overspeed protection becomes active (like furling or pitching).
 - 3.1.6 A tonality analysis is not required, but the presence of prominent tones shall be observed and reported.

4 Strength and Safety

- 4.1 Except as noted below, mechanical strength of the turbine system shall be assessed using either the simple equations in Section 7.4 of IEC 61400-2 ed.2 in combination with the safety factors in Section 7.8, or the aeroelastic modeling methods in the IEC standard. Evaluation of, as a minimum, the blade root, main shaft and the yaw axis (for horizontal axis wind turbines) shall be performed using the outcome of these analyses. A quick check of the rest of the structure for obvious flaws or hazards shall be done and if judged needed, additional analysis may be required.
- 4.2 Variable speed wind turbines are generally known to avoid harmful dynamic interactions with towers. Single/dual speed wind turbines are generally known to have potentially harmful dynamic interactions with their towers. Therefore, in the case of single/dual speed wind turbines, such as those using either one or two induction generators, the wind turbine and tower(s) must be shown to avoid potentially harmful dynamic interactions. A variable speed wind turbine with dynamic interactions, arising for example from control functions, must also show that potentially harmful interactions are likewise avoided.
- 4.3 Other safety aspects of the turbine system shall be evaluated including:
 - 4.3.1 procedures to be used to operate the turbine;
 - 4.3.2 provisions to prevent dangerous operation in high wind;
 - 4.3.3 methods available to slow or stop the turbine in an emergency or for maintenance;
 - 4.3.4 adequacy of maintenance and component replacement provisions; and
 - 4.3.5 susceptibility to harmful reduction of control function at the lowest claimed operating ambient temperature.
- 4.4 A Safety and Function Test shall be performed in accordance with Section 9.6 of IEC 61400-2 ed.2.
- 4.5 The manufacturer shall submit design requirements for towers including:
 - 4.5.1 mechanical and electrical connections;
 - 4.5.2 minimum blade/tower clearance;
 - 4.5.3 maximum tower top loads; and
 - 4.5.4 maximum allowable tower top deflection.

5 Duration Test

- 5.1 To establish a minimum threshold of reliability, a duration test shall be performed in accordance with the IEC 61400-2 ed.2 Section 9.4.
- 5.2 Changes and additional clarifications to this standard include:
 - 5.2.1 The test must include at least 25 hours in wind speeds of 15 m/s (33.6 mph) and above.
 - 5.2.2 Minor repairs are allowed, but must be reported.
 - 5.2.3 If any major component such as blades, main shaft, generator, tower, controller, or inverter is replaced during the test, the test must be restarted.
 - 5.2.4 The turbine and tower shall be observed for any tower dynamics problems during the duration test and the test report shall include a statement of the presence or absence of any observable problems.
 - 5.2.5 The tower used for the duration test must comply with the tower design requirements described in section 4.5.

6 Reporting and Certification

- 6.1 The test report shall include the following information:
 - 6.1.1 Summary Report, containing a power curve, an Annual Energy Production curve, and the measured sound pressure levels (Section 9.4 of IEC 61400-11 ed.2). The report is intended to be publicly available once approved by the certifying agency.
 - 6.1.2 Power Performance Test Report
 - 6.1.3 Acoustic Test Report
 - 6.1.4 The AWEA Rated Annual Energy
 - 6.1.5 The AWEA Rated Sound Level
 - 6.1.6 The AWEA Rated Power
 - 6.1.7 Wind Turbine Strength and Safety Report
 - 6.1.8 The tower design requirements shall be reported
 - 6.1.9 Duration Test Report
- 6.2 The manufacturers of certified wind turbines must abide by the labeling requirements of the certifying agency.

7 Labeling

- 7.1 The AWEA Rated Annual Energy (AWEA RAE) shall be stated in any label, product literature or advertising in which product specifications are provided.
 - 7.1.1 The AWEA RAE shall be rounded to no more than 3 significant figures.
- 7.2 The manufacturer shall state the AWEA Rated Power if a rated power is specified.
- 7.3 The manufacturer shall state the AWEA Estimated Sound Level if a sound level is specified.
- 7.4 Other performance data recommended to be stated in specifications about the turbine are:
 - 7.4.1 Cut-in Wind Speed
 - 7.4.2 Cut-out Wind Speed
 - 7.4.3 Maximum Power
 - 7.4.4 Maximum Voltage
 - 7.4.5 Maximum Current(s)
 - 7.4.6 Overspeed Control
 - 7.4.7 Power Form

8 Changes to Certified Products

- 8.1 It is anticipated that certified wind turbines will occasionally be changed to provide one form of improvement or another. In some cases such changes will require review by the certifying agency and possible changes to the certified product parameters. The following guidance is provided concerning when product changes will require certifying agency review:
- 8.1.1 Any changes to a certified wind turbine that will have the cumulative effect of reducing AWEA Rated Power or AWEA Rated Annual Energy by more than 10%, or that will raise the AWEA Rated Sound Level by more than 1 dBA will require retesting and recertification by the certifying agency. Only those characteristics of the wind turbine affected by the design change(s) would be reviewed again.
 - 8.1.2 Any changes to a certified wind turbine that could reduce the strength and safety factors by 10%, or increase operating voltages or currents by 10%, will require resubmission of the Wind Turbine Strength and Safety Report and recertification by the certifying agency.
 - 8.1.3 Any changes to a certified wind turbine that could materially affect the results of the Duration Test will require retesting, submission of a new Duration Test Report, and recertification by the certifying agency.
- 8.2 The manufacturer is required to notify the certifying agency of all changes to the product, including hardware and software, for the life of the turbine certification. The certifying agency will determine whether the need for retesting and additional review under the guidelines provided in Section 8.1.
- 8.3 The use of Engineering Change Orders or their equivalent is recommended.

9 References and Appendices

9.1 References

- 9.1.1 Evaluation Protocol for Small Wind Systems, Rev. 3. NREL internal document
- 9.1.2 IEC 61400-12-1 ed.1, Wind Turbines – Part 12-1: Power performance measurements of electricity producing wind turbines
- 9.1.3 IEC 61400-11 ed.2, Wind turbine generator systems - Part 11: Acoustic noise measurement techniques
- 9.1.4 IEC 61400-2, ed.2, Wind Turbines – Part 2: Design requirements of small wind turbines

Appendix A

Sound Levels for Different Observer Locations and Background Sound Levels

The AWEA Rated Sound Level is calculated at a distance of 60 meters from the rotor hub and excludes any contribution of background sound. As the distance from the turbine increases, the background sound becomes more dominant in determining the overall sound level (turbine plus background).

Background sound levels depend greatly on the location and presence of roads, trees, and other sound sources. Typical background sound levels range from 35 dBA (quiet) to 50 dBA (urban setting)

Equation 1 can be used to calculate the contribution of the turbine to the overall sound level using the AWEA Rated Sound Level. Equation 2 can be used to add the turbine sound level to the background sound level to obtain the overall sound level.

$$\text{turbine sound level} = L_{\text{AWEA}} + 10\log(4\pi 60^2) - 10\log(4\pi R^2) \quad (1)$$

Where:

L_{AWEA} is the AWEA Rated Sound Level [dBA].

R is the observer distance from the turbine rotor center [m]

$$\text{overall sound level} = 10\log\left(10^{\frac{\text{turbine level}}{10}} + 10^{\frac{\text{background level}}{10}}\right) \quad (2)$$

Table 1 Overall Sound Levels at Different Locations for an AWEA Rated Sound Level of 40 dBA

Distance from rotor center [m]	L_{AWEA} : 40 dBA				
	background noise level (dBA):				
	30	35	40	45	50
10	55.6	55.6	55.7	55.9	56.6
20	49.6	49.7	50.0	50.9	52.8
30	46.1	46.4	47.0	48.6	51.5
40	43.7	44.1	45.1	47.3	50.9
50	41.9	42.4	43.9	46.6	50.6
60	40.4	41.2	43.0	46.2	50.4
70	39.2	40.2	42.4	45.9	50.3
80	38.2	39.4	41.9	45.7	50.2
100	36.6	38.3	41.3	45.5	50.2
150	34.1	36.8	40.6	45.2	50.1
200	32.8	36.1	40.4	45.1	50.0

Table 2 Overall Sound Levels at Different Locations for an AWEA Rated Sound Level of 45 dBA

Distance from rotor center [m]	L _{AWEA} : 45 dBA				
	background noise level (dBA):				
	30	35	40	45	50
10	60.6	60.6	60.6	60.7	60.9
20	54.6	54.6	54.7	55.0	55.9
30	51.1	51.1	51.4	52.0	53.6
40	48.6	48.7	49.1	50.1	52.3
50	46.7	46.9	47.4	48.9	51.6
60	45.1	45.4	46.2	48.0	51.2
70	43.8	44.2	45.2	47.4	50.9
80	42.7	43.2	44.4	46.9	50.7
100	40.9	41.6	43.3	46.3	50.5
150	37.8	39.1	41.8	45.6	50.2
200	35.9	37.8	41.1	45.4	50.1

Table 3 Overall Sound Levels at Different Locations for an AWEA Rated Sound Level of 50 dBA

Distance from rotor center [m]	L _{AWEA} : 50 dBA				
	background noise level (dBA):				
	30	35	40	45	50
10	65.6	65.6	65.6	65.6	65.7
20	59.5	59.6	59.6	59.7	60.0
30	56.0	56.1	56.1	56.4	57.0
40	53.5	53.6	53.7	54.1	55.1
50	51.6	51.7	51.9	52.4	53.9
60	50.0	50.1	50.4	51.2	53.0
70	48.7	48.8	49.2	50.2	52.4
80	47.6	47.7	48.2	49.4	51.9
100	45.7	45.9	46.6	48.3	51.3
150	42.3	42.8	44.1	46.8	50.6
200	40.0	40.9	42.8	46.1	50.4

Table 4 Overall Sound Levels at Different Locations for an AWEA Rated Sound Level of 55 dBA

Distance from rotor center [m]	L _{AWEA} : 55 dBA				
	background noise level (dBA):				
	30	35	40	45	50
10	70.6	70.6	70.6	70.6	70.6
20	64.5	64.5	64.6	64.6	64.7
30	61.0	61.0	61.1	61.1	61.4
40	58.5	58.5	58.6	58.7	59.1
50	56.6	56.6	56.7	56.9	57.4
60	55.0	55.0	55.1	55.4	56.2
70	53.7	53.7	53.8	54.2	55.2
80	52.5	52.6	52.7	53.2	54.4
100	50.6	50.7	50.9	51.6	53.3
150	47.1	47.3	47.8	49.1	51.8
200	44.7	45.0	45.9	47.8	51.1

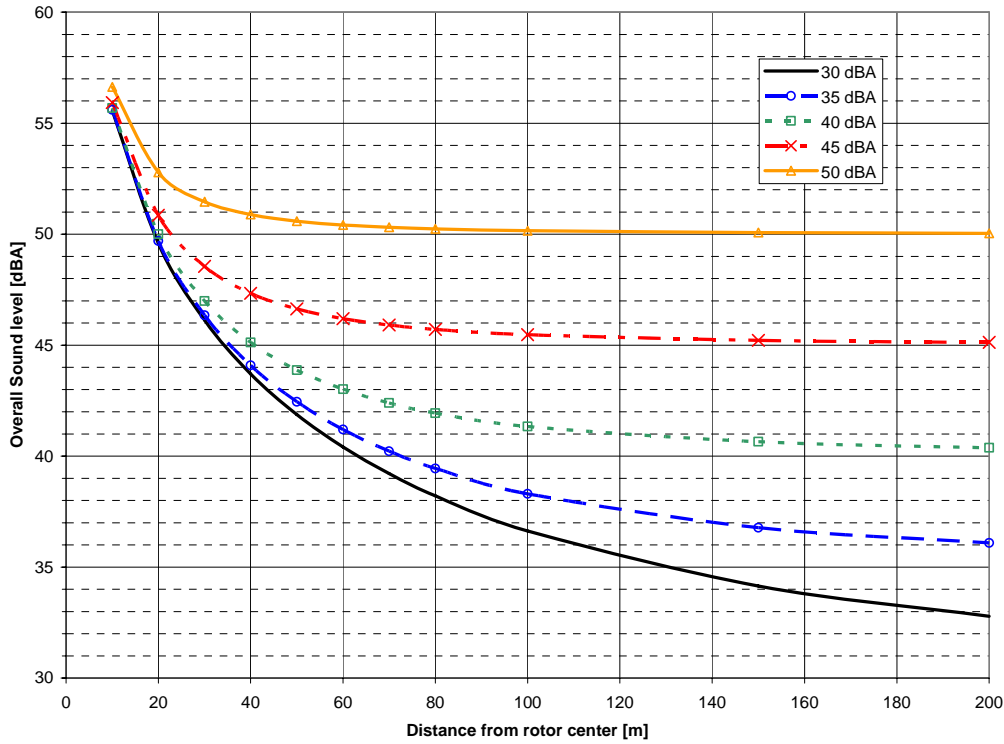


Figure 1 Sound levels as a function of distance and background noise levels for AWEA rated sound level of 40 dBA

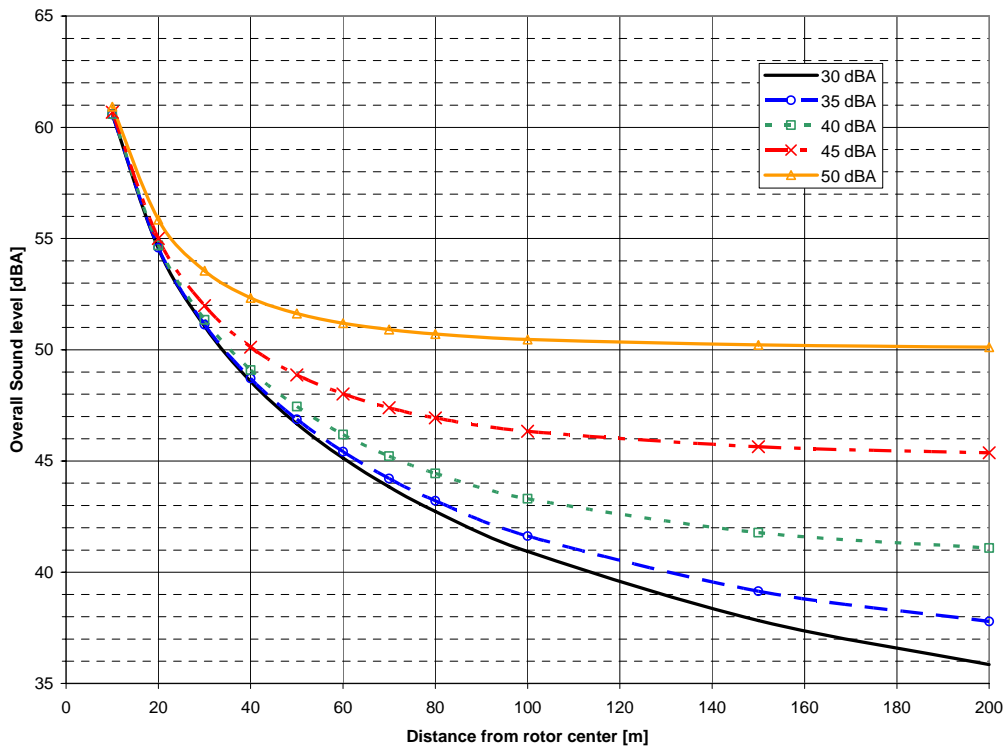


Figure 2 Sound levels as a function of distance and background noise levels for AWEA rated sound level of 45 dBA

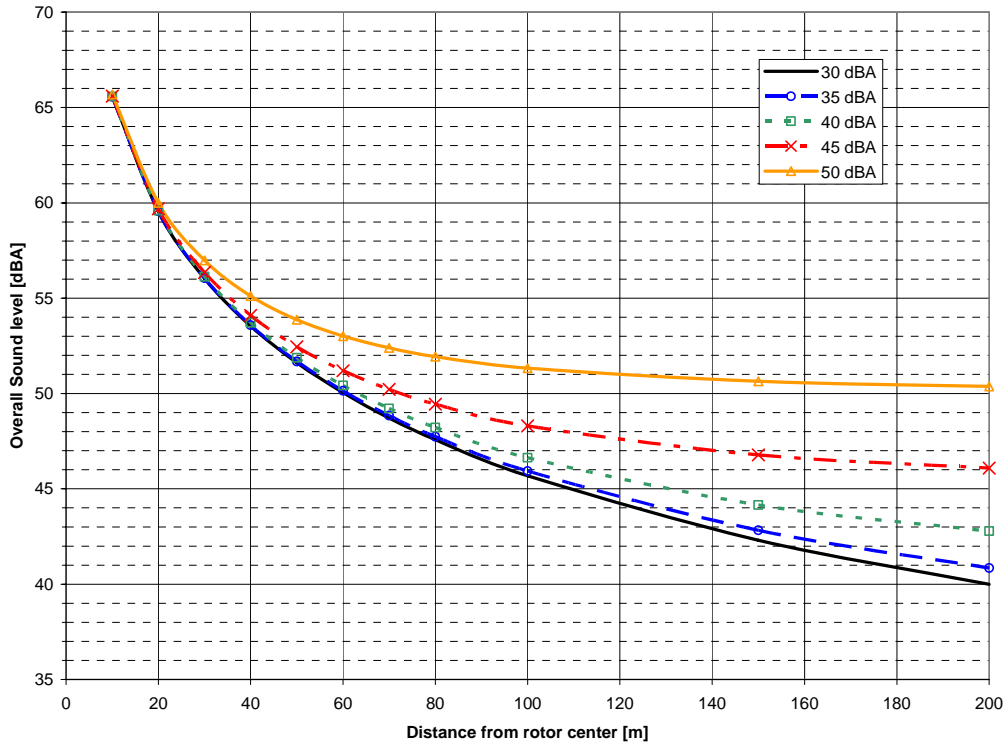


Figure 3 Sound levels as a function of distance and background noise levels for AWEA rated sound level of 50 dBA

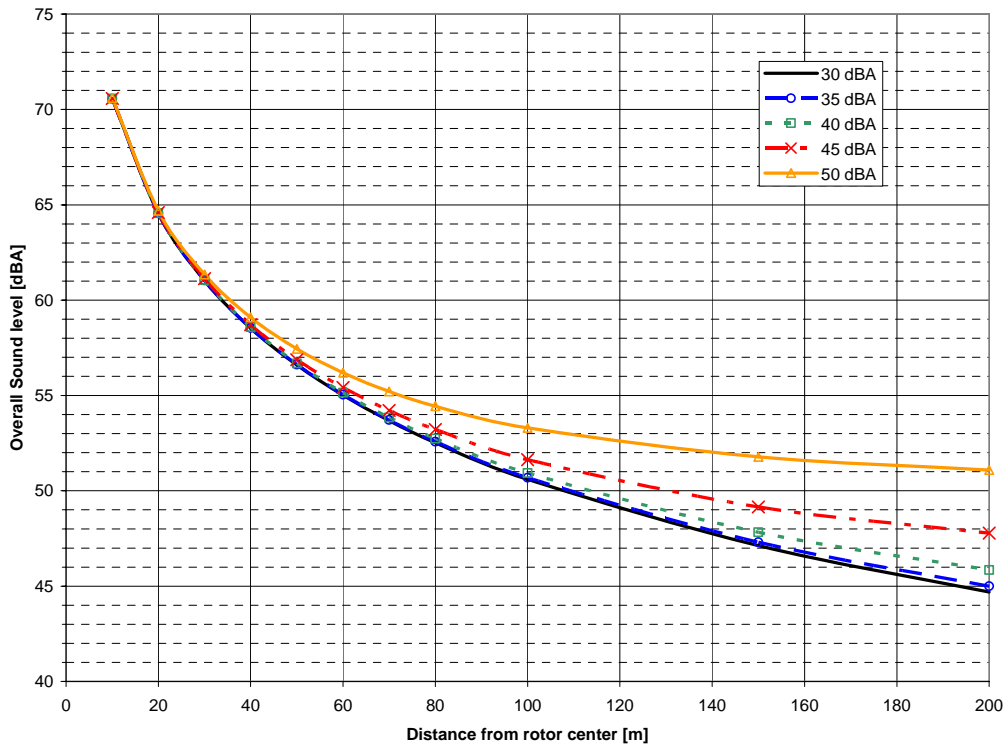


Figure 4 Sound levels as a function of distance and background noise levels for AWEA rated sound level of 55 dBA

**TOWN OF DUCK
TOWN COUNCIL
RETREAT
January 18 & 19, 2010**

RECONVENE

The Town Council for the Town of Duck reconvened at the Sanderling Inn at 8:00 a.m. on Tuesday, January 19, 2010.

COUNCIL MEMBERS PRESENT: Mayor Dave Wessel; Mayor Pro Tempore Don Kingston; Councilor Neil Morrison; Councilor Monica Thibodeau; and Councilor Chuck Burdick.

OTHERS PRESENT: Town Manager Christopher J. Layton, Director of Community Development Andy Garman; Town Attorney Robert Hobbs; Fire Chief Donna Black; Deputy Fire Chief Bill Walker; Police Chief Phillip Ferguson; First Sergeant Jeff Ackerman; Sergeant Jeff Deringer; Building Inspector Cory Tate; Permit Coordinator Sandy Cady; Jim Snyder of Outer Banks Sporting Events; Public Relations Coordinator Kathy McCullough-Testa; Planning Board Chairman Jon Britt; Planning Board Vice Chairman Joe Blakaitis; Planning Board Member John Fricker; Planning Board Member Ron Forlano; and Administrative Assistant Christie Moseman.

ABSENT: Town Clerk Lori Kopec.

Mayor Wessel called the meeting to order at 8:22 a.m. He welcomed all to the second session of the Retreat and thanked all the presenters at the Retreat from the previous day. He noted that Councilor Burdick was not present but would be arriving soon.

DISCUSSION WITH PLANNING BOARD ON RENEWABLE ENERGY

Director Garman gave a short presentation on renewable energy to Council, the Planning Board members and the audience. He added that the Planning Board was looking for direction from Council.

Mayor Pro Tempore Kingston asked if vertical wind turbines made noise and had flicker problems. He further asked what the rating would be for hurricane winds. Director Garman stated that the structure he looked at was rated for 105 mile per hour winds. Building Inspector Tate stated that the structure would have to be listed as rated to withstand 130 mile per hour wind gusts and that the foundation would need to be rated to suit the site conditions. Director Garman noted that they could be designed to be lowered by the property owner. Building Inspector Tate stated that the Building Code would not recognize lowered turbines as suitable alternative methods.

Mayor Pro Tempore Kingston asked what the feeling was regarding flicker and noise. Director Garman stated that there would be noise, but that the model ordinance had guidelines for decibel levels.

Councilor Thibodeau asked if the model ordinance talked about suitability of a site. Director Garman stated that he only saw ordinances that require the placement of an anemometer. He stated that he had not seen any ordinance that had performance standards.

Member Forlano stated that he had looked into purchasing a windmill and the company would not sell one to him until they completed an anemometer study for one (1) year to see if he would receive the performance that was promised. He stated that he did not think the Town needed to get involved on

whether a product performed as it was advertised. Councilor Thibodeau agreed with Member Forlano's comments and thought it would be more of an educational component. Member Forlano thought all wind turbines would give a certain degree of shadow flicker and noise.

Councilor Burdick wondered if the Town should look at zoning districts. He questioned whether wind turbines came near the vision of the Town. He didn't think any survey would have the majority of the public in favor of wind turbines. He thought the issue should be dropped for good.

Member Fricker stated that the Planning Board recommended having a dialogue with Council because the issue had not come up. He thought the Board had not moved forward with a draft ordinance because the members were not sure that Council wanted to move forward or promote wind turbines in residential areas. Councilor Burdick thought the Council should debate the issue. Member Fricker suggested the issue be broken down into sub-parts as to whether Council would support wind turbines in residential districts, commercial districts and municipal districts.

Councilor Burdick stated he was having trouble finding a redeeming quality for wind turbines in residential areas. Councilor Thibodeau stated that she could not see the Town having tall wind turbines in residential areas. She pointed out that flag poles were allowed in Duck that make some noise and cause a little shadow flicker. She thought there was a personal property right issue with not knowing where the technology may go. She stated that she could not envision a wholesale ban on the issue, but liked the idea of a Conditional Use Permit for them.

Mayor Wessel agreed with Councilor Thibodeau's comments. He stated that it was possible that the wind turbines could not be seen in certain circumstances. He stated that he could see residential units that were acceptable under a Conditional Use Permit application. He added that an outright ban would be the opposite of the Town trying to be "green."

Councilor Burdick noted that there was a height ordinance in place, but wondered if there should be an ordinance that would allow a Conditional Use Permit before a smaller turbine could be built. Mayor Wessel noted that the noise ordinance would also come into play with the issue.

Mayor Pro Tempore Kingston noted that no one knew what new technologies would come. He suggested going ahead with an ordinance, but being on the cautious side.

Vice Chair Blakaitis cautioned Council and the Board not to lose sight of the fact that the purpose the two bodies were meeting was for Council to give the Board direction. He stated that the Planning Board was well equipped to deal with the ordinance. He added that he would not want to see the direction given to the Board with a limiting factor. He thought Council should not direct the Planning Board at this stage by eliminating choices. He asked Council not to tie the Planning Board's hands.

Councilor Burdick thought the direction for the Planning Board was if there was interest in the tall wind turbines. He thought the answer was no for residential areas as he hadn't heard anyone support it. Member Blakaitis stated that the Planning Board had completed a lot of work but had not sat down and nitpicked the ordinance. Councilor Burdick asked if Council wanted the Planning Board to spend time on an ordinance in an area they were not in favor of allowing. Vice Chair Blakaitis noted that there were other aspects of renewable energy and not just wind turbines.

Member Fricker thought there was some confusion. He stated that he came to the meeting with the understanding that the Council would give the Planning Board direction on the topic. He added that Member Blakaitis was now asking Council not to tie the Planning Board's hands. He asked if Council wanted to give the Board direction to go ahead and draft an ordinance.

Councilor Morrison understood that the Planning Board did not want to draft an ordinance if the Council had already made up their minds which way they would vote on it. Member Fricker thought that the Planning Board was not told to draft an ordinance but to investigate the issue and come back with a recommendation.

Mayor Pro Tempore Kingston thought at the last Council meeting it was decided that a moratorium would need to be worked on to put a halt on any activity that may be going on.

Chairman Britt noted that vertical turbines have come up and was more prominent as the Board has been discussing them. He added that there were obvious conflicts with the Town's Land Use Plan. He thought that vertical turbines needed to be visited more since it was newer technology.

Council and the Planning Board went on to discuss the issue further. Councilor Thibodeau didn't think there should be an ordinance written that states that wind energy of any kind was prohibited. Mayor Wessel suggested the Council charge the Planning Board with drafting a proposed ordinance with the direction being that they would be given current height, noise, safety, and visual impact that would protect neighbors and the community from negative impacts.

It was *consensus* to direct the Planning Board to continue its research and draft an ordinance with regard to the potential regulation of wind turbines and bring it back to Council. Vice Chair Blakaitis thought the Board was supposed to consider all aspects of renewable energy. Chairman Britt thought it was the hot button topic.

Councilor Burdick thought the Planning Board should prepare a wind turbine renewable energy ordinance in light of the current restrictions that exist within the Town ordinances.

Councilor Thibodeau clarified that the ordinance would be separated by residential, commercial and municipal.

Councilor Morrison clarified that Councilor Burdick wanted the Planning Board to draft an ordinance, keeping in place the current height restrictions in each classification. Councilor Burdick stated he was correct. He added that if the Board had a different recommendation, he would be happy for them to bring them forward. Chairman Britt stated that he would appreciate not having restrictions with regard to commercial and municipal.

Approved: _____
Chairman Jon Britt

**TOWN OF DUCK
PLANNING BOARD
REGULAR MEETING
February 10, 2010**

The Planning Board for the Town of Duck convened at the Duck Municipal Offices at 6:30 p.m. on Wednesday, February 10, 2010.

Present were Chairman Jon Britt, Vice Chair Joe Blakaitis, Ron Forlano, John Fricker and Randy Gilbreath.

Absent: None.

Also present were Director of Community Development Andy Garman and Council Liaison Chuck Burdick.

Others Present: None.

Absent: Permit Coordinator Sandy Cady.

Chairman Britt called to order the Regular Meeting of the Planning Board for February 10, 2010 at 6:31 p.m.

PUBLIC COMMENTS

None.

OLD BUSINESS

Discussion of Wind Turbine Ordinance

Director Garman stated that the Town Council adopted a moratorium at their February 3, 2010 meeting for wind turbines for a period of ninety (90) days. He stated that it gave the Board several months to discuss the issue and come up with a draft ordinance for the Town Council's April 7, 2010 meeting. He noted that if the Board felt they needed more time, they could always request an extension to the moratorium. He stated that the Board could schedule a mid-month meeting for February if they wished. He went on to review the issue of wind turbines with the Board.

Vice Chair Blakaitis asked how the ordinance changed from a renewable energy ordinance to a wind turbine ordinance. He asked if it would be completed in pieces. Director Garman thought it would be a renewable energy ordinance but for now because of the moratorium, wind turbines would be discussed first. Chairman Britt noted that the wind turbine portion was the only part of the ordinance that had the moratorium on it.

Council Liaison Burdick noted that the Council wanted only the wind turbine ordinance by the end of the ninety (90) day moratorium. He added that wind turbines were just a piece of the

whole plan. Chairman Britt agreed and thought the Planning Board could complete the ordinance before the moratorium is up.

Chairman Britt stated that he was under the impression that Council did not want an expansion of the thirty-five (35) foot height limit in residential areas. He noted that Conditional Use Permits were technically allowed uses with conditions. Director Garman agreed and noted that certain findings had to be made.

Member Fricker asked if the way the Board approached the issue was dependent upon whether they want to go with a straight ordinance that people seek to obtain a permit from versus a Conditional Use Permit approach. He asked if it was a threshold issue or one the Board could address at the end of the discussion. He stated that he wasn't sure whether he agreed with a Conditional Use Permit. He stated that he would be opposed to going that route.

Member Forlano thought if the ordinance was written tight enough with enough limitations/restrictions, it would be unnecessary to require a conditional use permit. He stated that the only thing he could see with a Conditional Use Permit was that there was an element of time associated with it. Chairman Britt thought it was a good point. Member Forlano noted that the ordinance could be revised in the future if it is necessary to require a conditional use permit.

Member Fricker asked if the Board wanted to discuss the ordinance one element at a time. Chairman Britt stated that the Board could review each item one by one. Member Fricker suggested the Board discuss residential districts first. Chairman Britt thought it was good idea. Director Garman and the Board went on to discuss residential districts and height limitations.

Member Forlano asked where the thirty-five (35) foot height limit would come into play if a person wanted to put a wind turbine on the roof of their home. He asked if it would be taken from the bottom of the wind turbine or the bottom of the building. Member Fricker stated he did not know. He asked if the answer to the question would influence Member Forlano's position with regard to the threshold question as to whether the Board should establish a height limit that was uniform throughout the residential district. Member Gilbreath thought the turbine would be added to the total height of the building.

Member Fricker asked the Board if they were in agreement that they wanted to establish a height limit in residential areas for wind turbines and that it should be thirty-five (35) feet. Member Forlano stated that he agreed with Member Fricker. Chairman Britt stated that he was in agreement as well. Vice Chair Blakaitis stated that he was in agreement except for how the Board may clarify or allow wind turbines on rooftops. Member Fricker thought the answer to that seemed to focus on utility or effectiveness of the wind turbine.

Council Liaison Burdick thought his impression from the Council Retreat was that the thirty-five (35) foot height was the absolute highest anything could be built or erected. Chairman Britt thought there was some flexibility. He stated that the utility aspect had no bearing on the way he looked at the issue. Director Garman stated that there were several building features in the residential district that were exempt from the height limitation. He stated that a structure could go five (5) feet above the height limit in certain instance (i.e., solar panels, chimneys, cupolas and observation towers). He thought that wind turbines could be given the same exemption.

Chairman Britt thought the wind turbine could be put on the slope of the roof to stay within the height limitation.

Member Fricker clarified that the Board tentatively agreed that in residential districts, the height would be thirty-five (35) feet with the exception of a roof-mounted wind turbine, which could go an additional five (5) feet. He asked if it would apply to the fifty-two (52) foot residential areas as well. Chairman Britt stated this is correct. Member Fricker asked if any Board member had an argument that in the residential areas where fifty-two (52) foot houses were permitted, that the thirty-five (35) foot turbine would be included or did they have to look at turbines that would sit on top of a fifty-two (52) foot house. Chairman Britt stated that the 52 foot height limit would apply in those districts. Director Garman thought the ordinance read that the five (5) foot exemption also applied to free-standing structures. He added that the ordinance didn't state that the wind turbine had to be mounted on the roof of a building. Director Garman and the Board discussed setback ratios.

Director Garman and the Board discussed the number of wind turbines that would be allowed on a property. Council Liaison Burdick thought the decision regarding aesthetics will need to be made. Member Forlano stated that the Board could not do that. He added that they could not rule against what a property owner liked. Councilor Burdick stated that the noise associated with wind turbines would be another limiting factor. He stated that he was concerned if a property owner had sufficient space to put up 2-3 freestanding wind turbines and what the safety impact and flicker would be on neighboring properties. Member Forlano stated that the setbacks would take care of the flicker and noise. Vice Chair Blakaitis agreed with Member Forlano's comments. Council Liaison Burdick thought Director Garman could obtain input on what noise issues would be associated with wind turbines to help the Board. Director Garman stated he would research the issue and bring something back to the Board. Council Liaison Burdick stated that he would like to see something that addressed any continuous noise such as noise from air conditioning units. He thought if this wasn't included, there would be a situation something could be permitted for one person and not for another. Vice Chair Blakaitis suggested having something in the ordinance to state that maintenance and upkeep of the unit is the responsibility of the homeowner so that it does not exceed the noise limits.

Director Garman and the Board discussed tower design and appearance. Member Fricker stated that he didn't have any problem with what has been proposed. Council Liaison Burdick stated that he didn't like that they would be white in color. Vice Chair Blakaitis asked Council Liaison Burdick what was wrong with the color white. Council Liaison Burdick stated that it would stand out. He thought that they should blend in and added that white would not blend in very well. Vice Chair Blakaitis asked Council Liaison Burdick what he would suggest for a color. Director Garman stated that the language that was used in the commercial ordinance could be used, which calls for neutral, subtle or earth tones. Council Liaison Burdick thought it would make sense.

Chairman Britt suggested that the Board discuss the appearance of wind turbines. Director Garman noted that some ordinances do not allow lattice-type towers. The Planning Board agreed to allow monopole type towers only.

Chairman Britt directed the Board to discuss lighting. He asked the Board if they wanted to go with having no lighting on the turbines. It was *consensus* of the Board to not have lighting on wind turbines. Council Liaison Burdick asked if signage should be included. Chairman Britt felt the language in the ordinance wasn't strong enough for signage. Director Garman noted that the language in the Pine Knoll Shores' ordinance would work better in this instance (regarding signage and lighting). It was *consensus* of the Board to use the language from the Pine Knoll Shores ordinance.

Chairman Britt directed the Board to discuss the decommissioning requirements. Member Fricker noted that that the ordinance referred to owners or occupants. He asked why it would be anyone other than the owner. Chairman Britt thought the language came from ordinances that address utility scale turbines where the owner of the turbine may not be the owner of the property. Member Fricker noted that if the Town gave the occupant notice, it was still requiring the owner to hold the entire responsibility. He thought it should be a "short leash" if the wind turbine was not being used or maintained. He didn't think there should be a lot of leniency. Member Fricker agreed. Council Liaison Burdick asked about owners who only lived in Duck part-time. Chairman Britt thought there could be language crafted with regard to seasonal owners. Member Fricker asked how long the wind turbine had to be out of service before the time starts ticking for the owner to decommission it. Vice Chair Blakaitis noted that the ordinance had language giving the owner ninety (90) days if it wasn't operational for a continuous ninety (90) day period. Chairman Britt thought the language should be strict and if there was a situation that required leniency, it could happen. It was *consensus* of the Board that they wanted the timeframe for decommissioning to be relatively short.

Chairman Britt asked the Board if they thought anything was missed in the ordinance. Member Fricker stated that the additional findings and conditions section and the waivers and exceptions spoke to Conditional Use Permits as a way of going at the issue. He added that the Board had decided to wait to make a decision at the end of the discussion. He wasn't sure if it was at the end of the meeting or at the end of the whole discussion. Chairman Britt thought once the rules were established, it could be set up as an administrative or Conditional Use Permit. Member Fricker stated that the Board was leaning towards a permitted use. Director Garman suggested that the Board consider a special exception if there ordinance permitted wind energy facilities by-right. Director Garman and the Board went on to decide what was desired and then discussed whether it should be a Conditional Use Permit, Special Exception or administrative.

Chairman Britt asked the Board if they wanted to discuss commercial uses at this meeting or at a later meeting. He thought there needed to be a discussion about commercial uses and another discussion regarding the Town Park property. Member Forlano asked if everything would be put in one (1) ordinance with three (3) sections. Chairman Britt thought so and thought it was one way to keep it clean and simple.

Director Garman and the Board discussed commercial uses. Director Garman stated that the biggest issue would be height. He suggested keeping the standards the same as residential or as a permitted use. He suggested discussing some sort of increased height as a conditional use. Chairman Britt stated that he liked the idea of an edict of an exception or CUP if the owner wanted to go above the thirty-five (35) foot height limit. Member Forlano reminded the Board that they had to come up with a Village Commercial ordinance because the lots in Duck were so

small and irregular in size. He added that there were only a couple properties like the Waterfront Shops or Scarborough Faire that had the area necessary for a taller wind turbine.

Member Fricker stated that he did not make a big distinction between aesthetic considerations in residential areas or the business areas. He thought one of the things that was most striking about Duck was that in the business district, all the power lines were underground or out in the sound. He stated that Aqua-S having three (3) wind turbines sitting on their front lawn was not appealing to him and made the place look tacky and industrial. Chairman Britt thought there would be opposition to the whole issue.

Chairman Britt thought the Board needed to think about things a little more. He stated that he did not object to Director Garman's thought in that if the turbine is above thirty-five (35) feet, it became a CUP, so the applicant would have to come before the Board and could obtain more input. He thought the Board would recommend what they thought was right and then the Town Council could decide if they want to change the height limit.

Chairman Britt asked if it was consensus of the Board to direct Director Garman to draft an ordinance that would allow a higher height but that the applicant would have to come before the Board. Director Garman pointed out that the Commercial Design Guidelines spoke to placement of mechanical and utility equipment. He stated that the guidelines would, in theory, apply to wind turbines. He added that there would be a separate ordinance for wind turbines, but the Board would still review a commercial project in light of the guidelines, including the wind turbines. He suggested amending a section of the ordinance to directly deal with it. Chairman Britt noted that it would be utility equipment. Director Garman indicated that the ordinance specified that utility equipment did not include overhead power lines, light poles or similar equipment. He asked the Board if they wanted to specifically amend that section to deal with wind turbines. Chairman Britt asked the Board if they wanted to put further restrictions on the owner. He suggested that the Board draft their own language for turbines. Vice Chair Blakaitis noted that turbines weren't utility lines. Member Forlano noted that the turbines fell under utility equipment. Vice Chair Blakaitis stated that he didn't think they fell under utility equipment.

Council Liaison Burdick asked the Board if they thought Duck wanted to be a "green" town. Chairman Britt stated he would not like to see wind turbines go before the Board of Adjustment for the decision on height, as that Board doesn't know a lot about the issue. Director Garman stated that the Planning Board had to make a decision on whether to make the issue a CUP or not. He added that the Board was leaning towards a permitted use. Chairman Britt thought both commercial and residential uses could be achieved as a permitted use. Vice Chair Blakaitis noted that there would be a double height standard. Chairman Britt suggested having the uses as permitted ones.

Member Forlano asked if there could be an ordinance with part of it having residential as a permitted use and the commercial use through a CUP. Chairman Britt stated that it was possible. Member Forlano stated that he had envisioned the ordinance to be written that way. Chairman Britt agreed.

Member Fricker stated that he liked the look of the Village Commercial district as well as the rest of the residential area. He stated he would like to try to preserve it to the extent that the

Board could. Council Liaison Burdick pointed out that the Board hadn't addressed the Municipal area. He thought the question was if the Board wanted to allow anything in the Town Park. Member Forlano stated it would be handled as a CUP. Chairman Britt agreed.

Chairman Britt directed Director Garman to bring a draft ordinance back. He stated that based on the discussion at the March 10, 2010 meeting, it will be decided whether a mid-month meeting would be needed in order to send it to Council. Vice Chair Blakaitis pointed out that the Board had ninety (90) days to send it to Council. Chairman Britt reminded the Board that he would not be attending the March meeting. Director Garman stated that he would work on the ordinance and forward it to the Board well in advance of the March meeting.

Chairman Britt thought the Board made a lot of progress. Council Liaison Burdick suggested having a February mid-month meeting. Chairman Britt noted that he hoped that Council would look at the ordinance at their April 7, 2010 meeting. Member Fricker agreed. Council Liaison Burdick thought it would be worthwhile for Director Garman to draft an ordinance now and bring it back at a mid-month meeting so they wouldn't go to the April Council meeting and ask Council to make up their minds about the ordinance. Chairman Britt stated that the Board wouldn't, as Council would see it at their April 7, 2010 meeting and then schedule the public hearing for the May 5, 2010 meeting. Vice Chair Blakaitis agreed and noted that Council would need to schedule a public hearing. Council Liaison Burdick reminded the Board that the moratorium ends on May 5, 2010. Chairman Britt stated that the Board was aware. Council Liaison Burdick noted that the Board may not be at a final point for Council to schedule the public hearing. Chairman Britt and Director Garman noted that Council could extend the moratorium by thirty (30) days. Director Garman stated that the draft ordinance would be able to be presented to Council at their April 7, 2010 meeting. He added that there could be a moratorium extension drafted at the same meeting so Council could make a decision.

Chairman Britt thought giving it to Council at their April 7, 2010 meeting would give them enough time to decide whether or not to extend the moratorium. Member Fricker asked if the Board was contemplating having two (2) additional meetings before the draft ordinance is presented to Council in April. Chairman Britt thought the Board would have one (1) meeting in mid-March if they needed based on the results of their regular March meeting. He thought the Board accomplished a lot and didn't think a second meeting was needed for February. Vice Chair Blakaitis clarified that Chairman Britt would be able to attend the mid-month meeting in March. Chairman Britt stated that he would. Member Fricker suggested that rather than have the mid-month meeting in March, it would be good to have a second meeting on February 24, 2010 and only one (1) meeting in March – the regularly scheduled one. Chairman Britt asked if Director Garman would be able to have information ready for a February 24, 2010 meeting. Director Garman stated he would. It was *consensus* of the Board to have a mid-month meeting on February 24, 2010 at 6:30 p.m.

NEW BUSINESS

None.

APPROVAL OF MINUTES

Planning Board Meeting January 6, 2010

Chairman Britt directed the Board to review the minutes from the January 6, 2010 meeting.

Council Liaison Burdick stated he had one change. Vice Chair Blakaitis pointed out that Council Liaison Burdick was not a member of the Planning Board. Council Liaison Burdick stated he wanted the minutes corrected because he was misquoted. He had two changes to Page 5.

Member Fricker moved to approve the minutes as amended. Vice Chair Blakaitis seconded.

Motion carried 5-0.

OTHER BUSINESS

None.

STAFF COMMENTS

Director Garman stated that in light of the recent rainfall the area has experienced, the Town has had a lot of problem areas and has learned of several properties considering raising their homes to resolve drainage issues. He stated that if a property owner was going to take an existing house built on a slab and elevate it and build it on a wood floor system, the wood floor system would be elevated to the base flood elevation with the bottom of the joist at base flood elevation, which adds a foot to the entire house. He added that the Town had received multiple cases where the property owner needed an extra foot of height since they would be building on a wood floor system versus a slab. He thought it could be something the Board could consider allowing without having to go through the variance process. Chairman Britt asked if it would be considered an administrative one (1) foot exception. Director Garman stated it would.

Director Garman stated there was another case in the Four Seasons subdivision where the owner had his house on a slab located at seven (7) feet above sea level and wanted to elevate his house to ten and one half (10½) feet. He added that the base flood elevation was at nine (9) feet. He stated that the owner wanted to be one and a half (1½) feet above base flood elevation because the owner thought he would need to be this high to get out of the flooded area. He noted that if the owner raised his house using pilings, which from a flood damage prevention perspective was preferential, he couldn't do it since the Town measures from base flood elevation, not from where the finished floor was. He added that the Town's fill ordinance allows the owner to fill three (3) feet, so he could fill the property to ten and one half (10½) feet and Town staff would measure from the center of the slab instead of from the base flood elevation. He stated that it favors someone that wants to use fill, as they wouldn't have to obtain a variance.

Chairman Britt stated that the only way to fix the problem would be to make it easier for the variance process.

Director Garman stated that he could bring the issue back at a future Board meeting so it could be reviewed in detail. Chairman Britt stated it could be brought back at a later meeting. He

added that he would like to see some flexibility in the ordinance to keep people from having to jump through unnecessary hoops.

BOARD COMMENTS

None.

ADJOURNMENT

Chairman Britt moved to adjourn the meeting.

Motion carried 5-0.

The time was 9:04 p.m.

Approved: _____
Jon Britt, Chairman

DRAFT

**TOWN OF DUCK
PLANNING BOARD
REGULAR MID- MONTH MEETING
February 24, 2010**

The Planning Board for the Town of Duck convened at the Duck Municipal Offices at 6:30 p.m. on Wednesday, February 24, 2010.

Present were Chairman Jon Britt, Vice Chair Joe Blakaitis, Ron Forlano, and John Fricker.

Absent: Randy Gilbreath.

Also present were Director of Community Development Andy Garman, Council Liaison Chuck Burdick and Permit Coordinator Sandy Cady.

Others Present: Paul Keller of 125 Wiroans Court.

Absent: None.

Chairman Britt called to order the Regular Meeting of the Planning Board for February 24, 2010 at 6:30 p.m.

PUBLIC COMMENTS

Paul Keller of 125 Wiroans Court was recognized to speak. Mr. Keller stated that he was happy with what the Planning Board was doing. He thought Duck was more of a coastal village than any of the other communities.

OLD BUSINESS

Continuation of Wind Turbine Ordinance Discussion from February 10, 2010

Director Garman stated that the staff report explained what he had accomplished since the February 10, 2010 meeting. He stated that the Board had a lengthy discussion and came up with a lot of good information, which he compiled into a draft ordinance. He stated that the draft ordinance allowed a wind turbine or wind energy facility to be located in most all of the zoning districts in Town, but would be limited to either small wind energy facilities or rooftop energy facilities. He added that the wind energy facilities could not be a principal use structure and would have to be an accessory use to another type of principal use structure.

Director Garman stated that the Board discussed various use guidelines and thought the draft ordinance was consistent with the Board's discussion. He stated that the height limits existing in each district would stay the same and would also apply to wind turbines. He explained that where thirty-five (35) foot height limits were in place, it would apply to wind turbines, however in residential districts an additional five (5) feet would apply to other structures such as cupolas and wind turbines. He stated that in the RS-2 District, which allowed a fifty-two (52) foot height

limit, it would allow a wind turbine making the height limit at fifty-seven (57) feet. He stated it would also apply to roof top turbines in residential districts.

Director Garman noted that commercial districts would have a different procedure for allowing some sort of variance to the existing height limitation and would go before the Board of Adjustment. He added that it would be a more cumbersome procedure but would allow more flexibility. He stated that the additional five (5) foot for residential districts would be an administrative process approved by staff. He stated that the variance for Commercial Districts would not be limited to any specific number. He noted that in the staff report that the Board may want to discuss parameters for standards when dealing with variance requests.

Council Liaison Burdick noted that four (4) feet was referenced in the draft ordinance. Chairman Britt noted that the Board had already discussed the issue. Director Garman stated that it was referring to parapet walls and not wind turbines. Council Liaison Burdick thought it was referring to everything in the list. Director Garman thought Council Liaison Burdick was reading the ordinance differently than it has been administered. He stated that the parapet walls were the only thing that was limited to four (4) feet above roof level. Council Liaison Burdick suggested adding a semi-colon before parapet. Director Garman stated he would adjust it.

Member Fricker stated he had the same difficulty with the language. Director Garman stated that the intent of the ordinance was to imply the four (4) foot limitation of parapet walls. He stated that he would adjust the ordinance.

Director Garman stated that the following basic premises applied to the ordinance: height, included details on aesthetics, type of tower that would have to be used, exterior finish, lighting, communications antennas, how it would have to be designed to meet wind zone requirements, procedures for decommissioning and what would have to be included in the permit application. He noted that the ordinance was designed to be a permitted use without having to go before the Planning Board or Town Council. He pointed out that the draft ordinance as written would limit these to one (1) wind energy facility per lot and thought it would be a good point for the Board to discuss. He added that the biggest discussion point for the Board would be the noise issue and a procedure would need to be put in place to deal with it.

Chairman Britt suggested that the Board start at the beginning of the draft ordinance and work their way through it. He noted that the Board should comment on any language or specific parts of the ordinance.

Council Liaison Burdick asked why there were meteorological towers in the definition portion of the draft ordinance. Director Garman stated it was a definition taken from the model wind ordinance and was a commonly used term.

Member Fricker asked if the first definition in the last line should read; "...or building integrated roof mounted systems..." He pointed out that the first definition of wind energy facilities specifically excluded roof mounted systems. Director Garman suggested striking the sentence from the ordinance. Member Fricker wasn't sure it should be stricken. He thought how the term was defined would affect how it would be interpreted. Director Garman clarified that he did not touch the definition. He added that he did not intend to exempt roof mounted systems from the

ordinance. Member Fricker noted that if it was excluded by the language that was drafted, it meant that a permit would not be needed to install a roof mounted turbine. He thought the definition should be included in the ordinance. Director Garman suggested deleting the last sentence of the first definition for wind energy facilities.

Council Liaison Burdick pointed that the 20kw limitation would limit what commercial properties could use. He wondered why the limitation was there and thought it did not fit the uses people may want to use. Director Garman thought it would be ambitious for someone to think that they would meet their entire energy demand with a wind turbine, especially with the height limitations the Board had discussed.

Member Fricker thought the reply to Council Liaison Burdick's comment was on Page 3 of the ordinance under wind energy facilities in subparagraph B. He noted that the last sentence read: "...wind energy facilities – total rated capacity greater than 20kw would be considered to be incompatible with development patterns in the Town of Duck and therefore prohibited..." He stated that the Board was not trying to afford every residential homeowner the ability to totally provide their home energy through wind turbines. He noted that the ordinance stated that wind turbines were designed to supplement other electrical sources. Director Garman stated that that was the key to the ordinance in that turbines were designed as a supplement. He stated that it was a tiered structure that was developed by the model ordinance. He added that anything greater than 20kw would result in other issues.

Chairman Britt asked if the Board even needed to have the numbers with all the other limitations that they were looking to place on owners. He wondered if the Board was putting rules in the ordinance that were not needed. He thought the Board was not trying to control how much could be kicked back into the system, but the effects on the neighboring properties. He thought maybe the language could be stricken from the ordinance. Vice Chair Blakaitis agreed with Chairman Britt's comments. He added that 20kw would be more than enough to handle a house. Director Garman suggested that he could put in a definition of a medium and large wind energy system and note that they would be incompatible.

Member Forlano stated that he looked at the last sentence as the ordinance would eliminate the possibility for a large wind facility in Duck, and particularly with regard to commercial entities. Director Garman stated he was correct and that it would be on a utility scale. Member Forlano clarified that something on a utility scale would fall in with the first definition. He further clarified that it would pertain to a large commercial facility. Director Garman stated it would only pertain to a general description of a facility. Member Forlano asked if the ordinance would be eliminating the possibility of a commercial facility in Duck. Director Garman stated it was the intent of the ordinance.

Vice Chair Blakaitis asked what would happen if a commercial business owner came in wanting to put in a wind facility halfway between the beach and the road where only the top of the turbine would be seen. He thought if it did happen; the Planning Board would need to revisit the ordinance while letting the turbine be installed.

Member Fricker asked if it was known what the impacts would be if the Town allowed wind turbines with a capacity greater than 20kw. Chairman Britt stated that there was language in

place that addressed height, noise and concerns of the community with regard to the effect on the neighbors. He added that he did not understand why a definition was needed as to what could be generated. Director Garman stated it could be taken out of the ordinance. Member Fricker suggested calling the wind turbines a supplemental wind energy facility. It was *consensus* to have the change made to the ordinance.

Vice Chair Blakaitis stated that he had a problem with a deck-mounted turbine in that the structural requirements would have to be much stronger. Chairman Britt stated that the issue was covered in the ordinance. Director Garman and the Board went on to discuss roof mounted systems. Director Garman stated he would rework language in the ordinance with regard to roof mounted systems.

Member Forlano noted that on Page 3-3, it referenced a maximum of one (1) wind energy facility for roof mounted systems. He asked if it addressed multiple roofs. Member Fricker stated that it was inconsistent with the definition as originally drafted of a roof top wind energy facility. Council Liaison Burdick asked if there was any reason to limit them to the roof tops. Member Fricker stated that there was if the turbine was free-standing. He added that a distinction could be made that there could be multiple roof top turbines. Member Forlano suggested adding the distinction. Vice Chair Blakaitis agreed. Chairman Britt noted that roof top mounted turbines were not of any concern regarding falling as it was considered part of the entire structure. He added that he interpreted the ordinance to read if an owner put in a roof mounted system, they would not be able to put in a free-standing one as well.

Member Forlano asked if the ordinance could limit an owner to one (1) free-standing wind facility. Chairman Britt stated it could be done. Member Fricker suggested limiting multiple roof mounted facilities. Vice Chair Blakaitis stated that he was fine with multiple roof mounted turbines as well as a free-standing one. Member Forlano noted that all of these issues may be objectionable, but the Board needed to be cognizant of property rights. Chairman Britt noted that the ordinances do not address aesthetic issues in any of the other residential rules.

Vice Chair Blakaitis asked if the ordinance could limit roof top wind generators to a certain number, but still allow a free-standing one. He wondered if it would be better aesthetically. Member Fricker noted that there may be industry standards that were self limiting. Chairman Britt stated that at the Board's last meeting, they decided that they did not want to stand in the way of wind energy, but did not want to make exceptions to height. He thought there could be more than one wind turbine if they fit on the property as it was in the spirit of where the Board was going with regard to the ordinance. Member Forlano and Chairman Britt thought #3 on Page 3 should be eliminated from the ordinance. Vice Chair Blakaitis clarified that the problem with multiple roof mounted and free-standing turbines was resolved. Chairman Britt stated that he was correct.

Council Liaison Burdick thought aesthetics was a concern of the Town Council. Member Forlano stated that the Board could not regulate aesthetics. Chairman Britt agreed with Member Forlano's comments. Member Forlano thought the Board should be concerned about safety. Chairman Britt stated that the Board wanted to allow turbines within the Town's existing regulations as it was the spirit of what the Board wanted at their last meeting. He stated that the

Board would send the ordinance forward as a recommendation and if Council wants to add aesthetic values in it, then so be it. Member Forlano agreed.

Council Liaison Burdick stated that his question was not from an aesthetic value, but thought there were there some safety standards that would be written into the ordinance that would preclude the problem. He thought the only item in the ordinance was the one regarding noise. Chairman Britt stated that the issues were in the ordinance. He suggested that #3 be stricken from the ordinance. Vice Chair Blakaitis stated he was undecided with regard to striking #3. Member Fricker stated that he was opposed to striking it and did not accept the premise that it was not for the Board to legislate aesthetics. He thought the entire Town of Duck reflected that the Board was very conscious of aesthetics. He stated that he knew of no reason why the thirty-five (35) foot height limit was required on buildings. He stated that it was an aesthetic value the Town had legislated when the Town was incorporated. He thought it remained an issue and was opposed to striking #3 from the ordinance. Member Forlano thought the issue should be debated. Chairman Britt suggested that #3 stay in the ordinance and that the Board would further discuss it at their March 10, 2010 meeting.

Chairman Britt directed the Board to discuss noise in the ordinance. Vice Chair Blakaitis noted that there were two (2) noise options in the ordinance. He clarified that the second option was taken from an ordinance from California. Director Garman stated that second option was taken from the Pine Knoll Shores' ordinance and the first option was pulled from an ordinance from Charlotte, North Carolina. Council Liaison Burdick thought the distinction with regard to day and night noise was something that stood out to him. Director Garman pointed out that dwellings were designed to attenuate a certain type of noise. Member Fricker noted that there wasn't a real standard on noise or how to measure noise. Chairman Britt agreed and noted that it was very difficult on the Outer Banks because it's very windy. He stated that he liked the idea of a specific test that would not tax Town staff. Member Fricker stated that it appeared that there wasn't an industry standard. He stated that the variable of noise was not something the Board had to regulate, such as output or the number of units on a property, because everything that would be regulated was going to be controlled. He added that the noise was not an issue the Board would be able to regulate because it was soft and there wasn't a standard. Chairman Britt agreed and stated it was a prominent gray area in the ordinance.

Member Forlano liked the suggestion on the ordinance where it stated that the applicant would be required to have tests performed according to industry approved methods. He added that the homeowner would have to have an anemometer on the wind turbine for one (1) year. He asked if there was an ability to test what the turbine would put out with regard to noise. He further asked if it could not be a requirement before an owner can obtain a permit. Director Garman thought that was what he was suggesting. He stated that the manufacturer should have some sort of model that could be run. He stated that the property owner should be reasonably assured that they would meet the standard. Member Forlano asked if the ordinance could state that anything over 10 decibels over ambient sound would be allowed and the property owner would have to show the noise that the turbine would put out. Director Garman stated that the owner would have to show staff their model and should be reasonably assured that the facility will meet the standard. He added that more specific parameters would have to be defined and would need more research.

Council Liaison Burdick noted that he had experience in industrial settings where the Environmental Protection Agency regulated noise. He stated that there were pre-set limits for noise and noise protection was dependant on the limits. He stated that he didn't see any reason why the Board could not come up with a standard test that would need to be performed with a set limit above ambient with regard to day or night noise. Director Garman noted that industrial settings had machinery that had to be controlled and the test gave a certain reading so one would know whether anything needed to be completed to get the noise level lowered. He added that with wind, the test could be taken when the wind was blowing 15mph southwest and give one reading, but if the test was taken again with more than 25mph winds out of the northeast it would give a different reading. He cautioned the Board that wind would be tricky.

Vice Chair Blakaitis stated that noise was a real sticky subject as there could be a house in a quiet area and unnecessarily restricting the decibel level would not be right. Member Forlano agreed and stated that was what the ordinance would protect. Chairman Britt stated that the Board wanted to be serious regarding the effects on neighboring properties. He suggested that Director Garman look into it some more. Director Garman stated that he would.

Chairman Britt directed the Board to discuss aesthetics. He asked if there were any comments or changes to the ordinance. It was *consensus* of the Board that the aesthetics portion of the ordinance was fine.

Chairman Britt directed the Board to discuss structural requirements. Member Fricker thought Paragraph 1 in Section D needed to be reworked. He stated that the introductory phrase; "...wind turbine structures..." was not used anywhere else within Section D. He added that every place else in the ordinance referred to "wind energy system". He proposed the following language: "All wind energy systems shall be designed..." He further proposed the following language: "All wind energy systems shall be designed to meet, and be certified by a North Carolina licensed structural engineer..." Director Garman stated that the proposed language could not be put in the ordinance. Member Fricker changed the language to read: "...by a professional engineer that the system does meet the design requirements..." Vice Chair Blakaitis stated that if a certified engineer was stamping the drawings, he would be saying what Member Fricker was proposing. Member Fricker disagreed. Vice Chair Blakaitis noted that that was what the language was implying. Member Fricker suggested making it "express". Vice Chair Blakaitis stated that the engineer was licensed. Member Fricker thought that because Vice Chair Blakaitis assumed what Member Fricker meant was really not what he meant. Vice Chair Blakaitis stated that when a professional engineer puts his stamp on plans, he was saying that it meets the requirements.

Vice Chair Blakaitis clarified that Member Fricker wanted not only a stamp, but also a statement on the plans. Member Fricker stated that he wanted the code to say that the Town understands the steps. Vice Chair Blakaitis stated it could be done.

Chairman Britt stated that he had a comment regarding the sentence that stated: "...including the ability to withstand the force exerted by 130mph three (3) second wind gusts..." He asked why the language was in the ordinance. Director Garman stated that it was right from the mouth of Building Inspector Cory Tate and the North Carolina Building Code.

Member Fricker asked why “a licensed structural engineer” could not be language that could be used in the ordinance. Director Garman stated that he had talked to engineers. He stated that they get tested to be a professional engineer and then work in a certain expertise for a certain number of years. He stated that it was understood in the profession that engineers were not supposed to stamp or certify things that they were not qualified to stamp. He stated that whenever a person has a problem with something another person did where plans were stamped from an engineer who was not qualified to do so, it becomes an issue with their board and a complaint could be filed. He stated that it was how the trade governed itself. He stated that there was no such thing as a structural engineer, only an emphasis in structural engineering.

Member Forlano asked for an explanation of industry standards. He thought there weren't any standards set up yet for wind turbines. Director Garman stated that they were being worked on.

Chairman Britt directed the Board to discuss decommissioning. Member Fricker stated that Subparagraph 1, five lines down in the ordinance read: “...given 45 days from receipt of said notice...” He stated that Subparagraph 2, towards the end read: “...shall give written notice by registered mail...” He suggested that the language be changed from “registered mail” to “certified mail”.

Chairman Britt asked if there were any issues with Subparagraph 3. Member Fricker suggested adding the following language to 2B in Subparagraph 3: “...certifying that drawings conform to all structural requirements established by law or industry standards...” Chairman Britt stated that the engineer's seal meant that. Vice Chair Blakaitis agreed but adding the extra language would make more sense to him. It was *consensus* of the Board to add the additional language to the ordinance.

Chairman Britt stated that the Board had discussed taking out the language regarding capacity from the ordinance. He asked if C was needed. Council Liaison Burdick thought the manufacturer's specifications would be needed. Vice Chair Blakaitis noted that Section H had the same language that was in Section B. It was *consensus* of the Board to strike Section H from the ordinance.

Council Liaison Burdick noted that the ordinance referenced \$500,000 for homeowner's insurance. He noted that the standard was \$300,000. Vice Chair Blakaitis stated that most homeowners had an umbrella policy. Council Liaison Burdick disagreed. Chairman Britt asked where the \$500,000 liability insurance came from. Director Garman stated he had taken it from the Pine Knolls Shores' ordinance. Chairman Britt stated that he would like the Town Attorney's opinion if the \$500,000 insurance should be left in the ordinance. Director Garman stated he would research the issue further.

Chairman Britt directed the Board to discuss variances. Member Forlano asked why there were four (4) feet on commercial and five (5) feet on residential. Director Garman stated that was clarified at the beginning of the meeting, and the four (4) feet referred to parapet walls. Member Fricker asked if something needed to be added at the end of Section A in Paragraph 6 that could state: “...provided, however, that the Board of Adjustment makes findings of fact that the variance will be in harmony with...” He asked if it needed to be in the ordinance. Chairman Britt stated that his interpretation on variances was that it was a difficult thing to prove if the

rules were read the way they were supposed to be read and that there could be no other option. He stated that he didn't see how any wind turbine could fall under a variance. Council Liaison Burdick asked if there was a reason to differentiate that from the five (5) foot additional restriction. Director Garman stated that it would only apply if there wasn't a limit in place for commercial areas. Chairman Britt stated that variances were very difficult by the definition to grant. He added that there could not be any other option. He stated that he didn't see how the owner could obtain one. Member Fricker asked if Chairman Britt's comments were true, it should be written into the language of the ordinance. He stated that he understood that if a person was seeking a variance from the Board of Adjustment, the Board of Adjustment had to make findings of fact, but noted that the issue with Sunset Grill had nothing in the underlying ordinance to tell the Board what the findings of fact were that they were supposed to make. He asked if the Planning Board should help the Board of Adjustment by stating in this section that they needed to make findings of fact to include findings with the general purpose, intent of the chapter, not injurious to neighboring properties, otherwise detrimental to the public, and due to having no other options. He wondered if it should be in the ordinance.

Chairman Britt wondered if there was another avenue the Board could pursue. He thought the point was to try to give the commercial district some flexibility. Director Garman noted that the variance section of the code read that there were a series of findings that the Board of Adjustment would have to make in order to grant the variance. He stated that he had a problem with it as the Board would be getting into a larger issue with the section. He thought the spirit was to allow flexibility for height limits for cupolas or an ornamental tower or dome. Chairman Britt thought the Board should not be doing it with a variance. Director Garman agreed.

Chairman Britt asked if the Board was saying that there needed to be an avenue for commercial landowners to go above thirty-five (35) feet. He asked if the Board wanted to go in that direction. Vice Chair Blakaitis stated that he wanted to go in that direction. Member Forlano agreed and stated that he wanted to allow flexibility in commercial areas to go higher. He noted that there would be other self limiting factors. Director Garman stated that if the goal was to allow the same height allowance that was applied to residential areas, which was five (5) feet, it could be taken out of the variance section completely and include it in the wind turbine section of the ordinance under height and state that the turbines shall not exceed five (5) feet above the maximum height limit for the district.

Member Fricker asked if the Board would want to allow turbine heights to extend any farther above the roof of a commercial building or the roof of a residential building. Member Forlano stated he would not. He didn't see why it should be allowed. He thought it would be easy to legislate if the turbine were five (5) feet above and no higher. Chairman Britt stated he was pro alternative energy, but thought height was going to be an issue. Director Garman stated he would change Section C1 to allow for five (5) feet above the limit for the district height limit.

Chairman Britt stated that the Board would need to discuss at their next meeting the number of wind turbines per lot. He added that Director Garman would be doing some work on the noise issue and come back with something that the Board would be happy with.

Member Forlano asked Paul Keller what his feeling was regarding an owner putting in a wind turbine next to his property or seeing wind turbines in the Commercial District. Paul Keller

stated that he wrote down consider wind turbine restrictions in subdivisions covenants. He stated that he would not want one in the direct line of vision between his home and the ocean. He thought the lower height for wind turbines was a good option.

NEW BUSINESS

None.

APPROVAL OF MINUTES

None.

OTHER BUSINESS

None.

STAFF COMMENTS

None.

BOARD COMMENTS

Chairman Britt noted that he will not be in attendance at the March 10, 2010, but that Vice Chair Blakaitis would chair the meeting.

ADJOURNMENT

Chairman Britt moved to adjourn the meeting.

Motion carried 5-0.

The time was 8:21 p.m.

Approved: _____
Jon Britt, Chairman