Henderson County Code Enforcement Services

100 N King St. Hendersonville, North Carolina 28792
Phone (828) 697-4857 Fax (828) 697-4535

MEMORANDUM

DATE:	10/18/2011
TO:	Technical Review Committee
TRC MEETING DATE:	November 1, 2011
REGARDING:	Minor Site Plan Review
NAME OF APPLICANT:	Beth and Ronnie Oliver/Little Bearwallow Mountain LLC
DEPARTMENT:	Code Enforcement Services
STAFF CONTACT:	Toby Linville
ATTACHMENTS:	Site Plan / Technical Specifications

Please find attached plans for the following development proposal to be reviewed by the Henderson County Technical Review Committee on November 1, 2011.

Minor Site Plan Review
John Myers of Little Bearwallow Mountain LLC, and Beth and Ronnie Oliver, submitted the minor site plan for this project. They wish to utilize the property for a wind turbine.

SR 3.17. Wind Mill/Turbine, Accessory > 40 ft height
(1) Principal Structure/Use Requirement. Accessory wind mills/turbines shall only be permitted in conjunction with a principal residential dwelling unit or business.
(2) Height. Wind turbine height shall be no more than 40 feet above any obstruction (*structure*, tree, etc. (excluding *communication towers*)) within a 200 foot radius of the base of the wind turbine. In no case shall the height exceed 100 feet.
(3) Rotor Blades. Rotor blades shall maintain a minimum ground clearance of ten (10) feet.
(4) Setback. The base of the wind turbine shall be at least ten (10) feet from surrounding property lines and setback a distance equivalent to 110 percent of the height of the wind turbine at its highest point from the property line.
(5) Color. Wind turbines must be a color that is consistent with *existing development* or natural conditions.
(6) Compliance with FAA Regulations. Wind turbines must comply with applicable FAA regulations, including any necessary approvals for installation close to *airports*.
Evidence of compliance or non-applicability shall be submitted to the *Zoning Administrator*.
(7) Compliance with FCC Regulations. Wind turbines must comply with applicable FCC regulations. Evidence of compliance or non-applicability shall be submitted to the *Zoning Administrator*.
(8) Structure Requirements. Wind turbines shall require a building permit to insure that the foundation is designed and constructed with a concrete foundation per the manufacturing requirements. Sealed engineering drawings shall be required prior to the issuance of a building permit. These standards shall not preempt the State Building Code standards or requirements to insure structural stability.
(9) Survival Wind Speed. Wind turbines shall be designed to withstand wind speeds as required by the State Building Code.
(10) Other Considerations. In addition to the standard review for special use permits, the Zoning Board of Adjustment shall consider noise and appearance criteria as factors when reviewing special use permit applications for wind turbines.

The project site is shown on the zoning report below. The project meets the requirements of the Land Development Code and all the applicable major site plan requirements are met.
If you would like to submit your changes early please use the comment sheet provided and sending it back via email to tlinville@hendersoncountync.org.

HENDERSON COUNTY
REVIEW AGENCY RESPONSE FORM

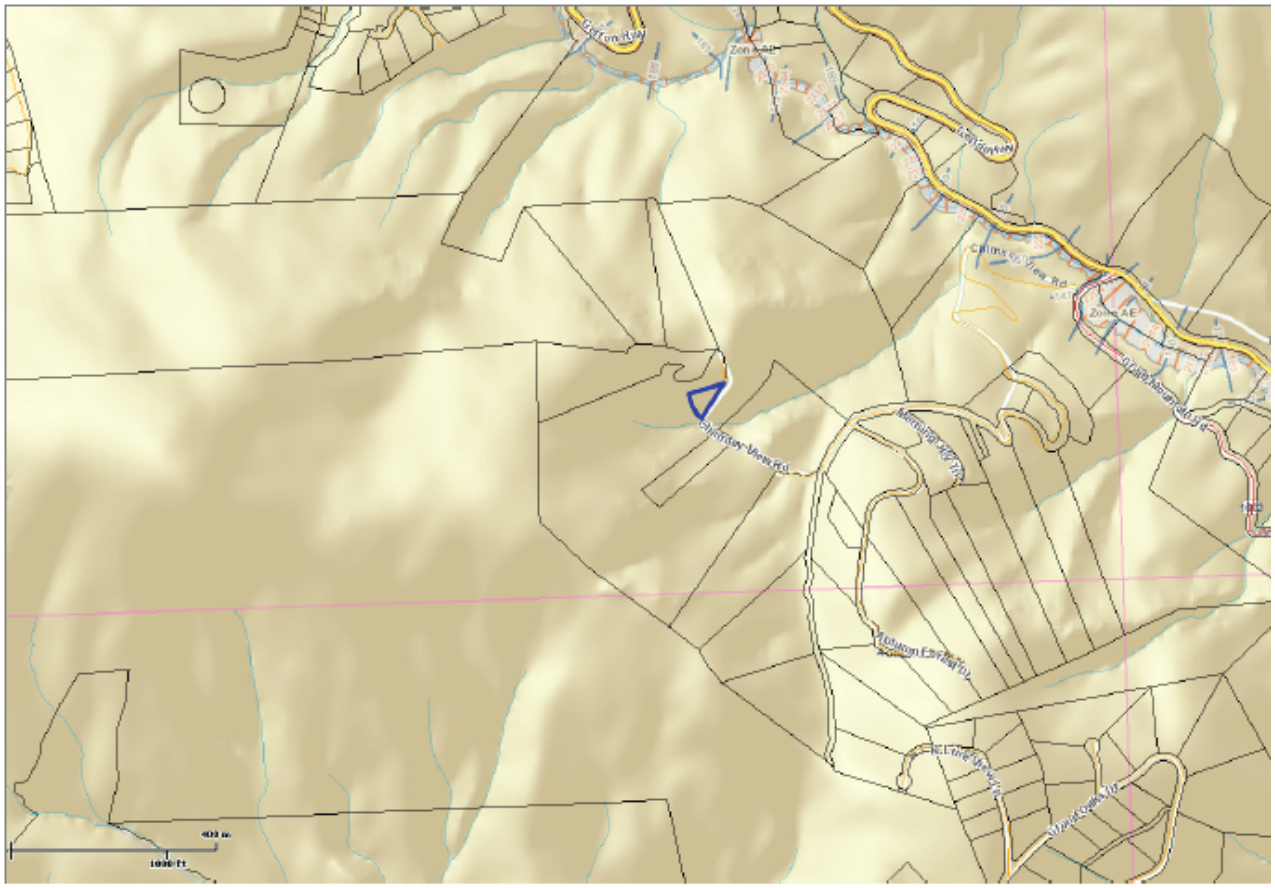
I have reviewed the minor site plan and offer the following comments:

(If necessary use back of form or additional sheets for comments)

Reviewed By _____ Agency _____ Date _____

Please Return to:

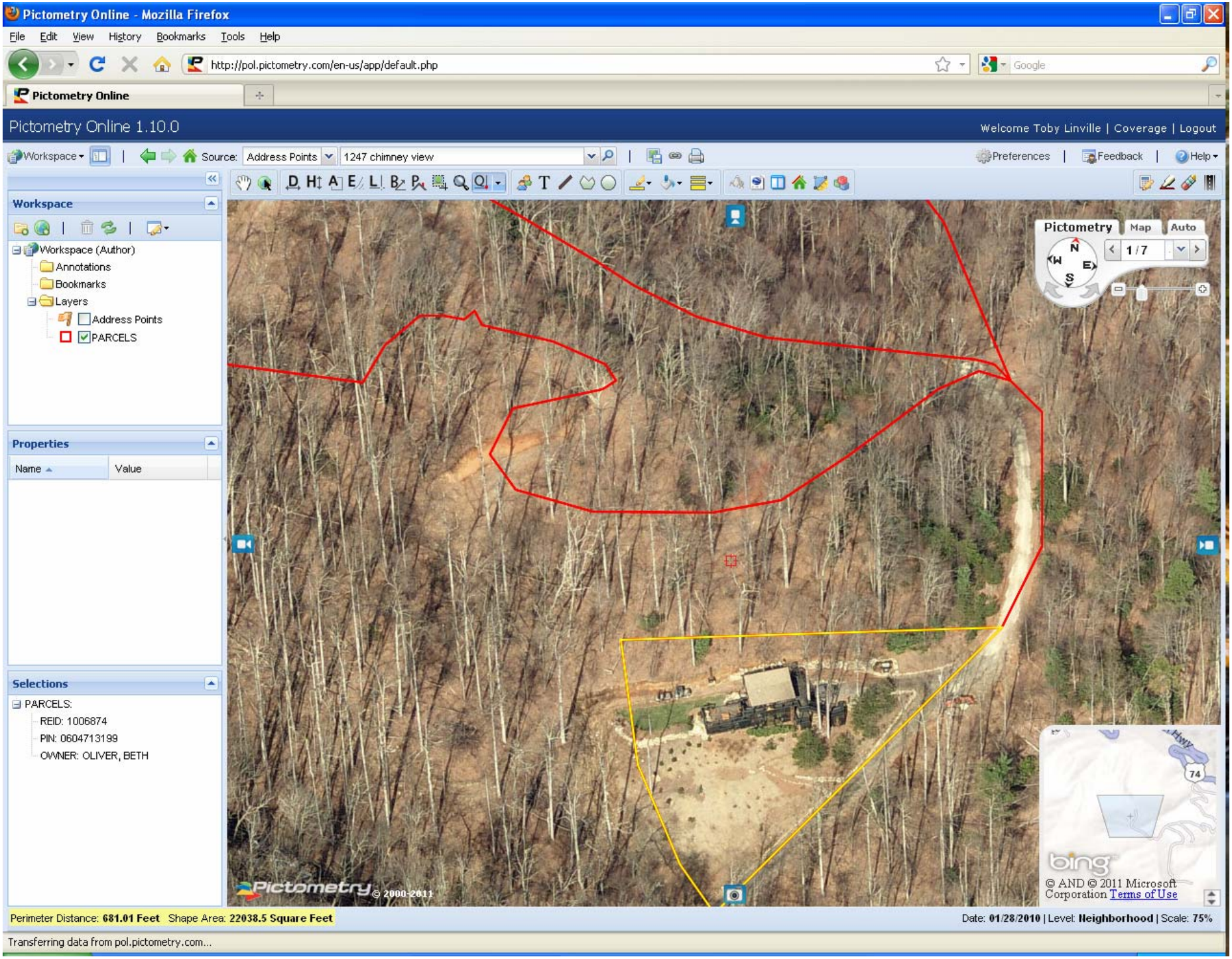
Toby Linville
tlinville@hendersoncountync.org
828-694-6627



Henderson County Government
Geographic Information Systems (GIS)
200 North Grove Street
Hendersonville, NC 28792
P - 828-698-5124
F- 828-698-5122

Parcel Information

PIN: 0604713199	Parcel Number: 1006874		
Listed To:	OLIVER, BETH	Jurisdiction:	
Physical Address:	1247 CHIMNEY VIEW RD	Fire District:	GERTON FIRE
Deed:	1308/022	Plat:	SLD 6484
Date Recorded:	02/22/2007	County Zoning:	R3
Mailing Address:	233 OLIVER LN	Elementary School District:	EDNEYVILLE
Mailing City, State, Zip Code:	ABBEVILLE, SC 29620	Middle School District:	APPLE VALLEY MIDDLE
Property Description:	Lot # 1 MINI STORAGE	High School District:	NORTH HIGH
Map Sheet:	0604.00	Soils:	Porters stony loam, 25 to 45 percent slopes
Neighborhood:	GERTON	Voting Precinct:	Bat Cave
Township:	Edneyville	Commissioner District:	4
Revenue Stamps:	320		
Assessed Acreage:	0.4700	Agricultural District:	None Found
Building Value:	$94,200.00		
Land Value:	$6,600.00		
Total Value:	$100,800.00		


Pictometry Online - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://pol.pictometry.com/en-us/app/default.php
Pictometry Online
Pictometry Online 1.10.0
Welcome Toby Linville | Coverage | Logout
Workspace
Source: Address Points
1247 chimney view
Preferences | Feedback | Help
Workspace
Workspace (Author)
Annotations
Bookmarks
Layers
Address Points
PARCELS
Properties
Name
Value
Selections
PARCELS:
REID: 1006874
PIN: 0604713199
OWNER: OLIVER, BETH
Pictometry
Map
Auto
1 / 7
N
W
E
S
Pictometry © 2000-2011
bing
© AND © 2011 Microsoft Corporation Terms of Use
Perimeter Distance: 681.01 Feet Shape Area: 22038.5 Square Feet
Date: 01/28/2010 | Level: Neighborhood | Scale: 75%
Transferring data from pol.pictometry.com...

Application No. _____

HENDERSON COUNTY
SPECIAL USE PERMIT APPLICATION FORM

GENERAL INFORMATION

Date of Application: 10-5-2011

Previously Submitted (Circle One): (Yes) No

Date of Pre-Application Conference: _____

Site Plan Attached (Circle One): (Yes) No

Traffic Impact Study Required (Circle One): Yes (No)

SPECIAL USE PERMIT INFORMATION

Type of use to be permitted: Wind Turbine (Bergey Excel 10K) 740' height SR #: 3.17

Existing Structures or Uses on property: Vacant land adjoining primary residence

Road System (Circle): Public (Private)

Water System (Circle): (Individual) Community Public (Municipal or County)

Sewer System (Circle): (Individual) Community Public (Municipal or County)

SITE PLAN REQUIREMENTS

If a minor or major site plan is not specifically required, the applicant shall submit a site plan with the following items:

- Dimensions of property.
- Location of existing and proposed structures (including accessory structures), and general use thereof.
- Setbacks of existing and proposed structures from property lines and edge of right-of-way for roads (from centerline of roads for uses located in the R-40, WR, or SW districts).
- Separation of existing and proposed structures from one another.
- Parking and off/on loading areas
- Location of signs (including sign dimensions, height, type of material, lighting).
- Location and dimensions of existing and proposed roads / driveways and their entrance/exits.
- Location of dumpsters.
- Location and general description of any fences, landscaping or other buffering (proposed or existing).

Site plan not to exceed 11 X 17 size. Anything submitted larger than 11 X 17, the applicant must provide 12 copies with the application form.

PARCEL INFORMATION

PIN: 0604516921 Deed Book/Page: 1208/593 Tract Size (Acres): 90.44

Zoning District: _____ Fire District: Gerton Watershed: _____ Floodplain: n/a

Location of property to be developed: Lot # SR1620 off Grant Mountain Rd on Chimney View Rd. Adjacent to principal residence on PIN: 0604713199, Deed: 1308/22

CONTACT INFORMATION

Property Owner:(s)

Name: Little Bearwallow Mountain and Beth & Ronnie Oliver Phone: 828-712-4926

Address: 3259 Gerton Highway City, State, and Zip: Gerton, NC 28735

Co-Applicant:

Name: John Myers (Little Bearwallow Mountain) Phone: 828-712-4926

Application No. _____

Address: 3259 Gerton Highway City, State, and Zip: Gerton, NC 28735

~~Agent:~~ Co-Applicant:

Name: Ronnie & Beth Oliver Phone: 864-223-8300

Address: Chimney View Rd. City, State, and Zip: Gerton, NC 28735

~~Agent Form (Circle One): Yes No~~

Plan Preparer:

Name: John Myers Phone: 828-712-4926

Address: (same as above) City, State, and Zip: _____

STANDARDS FOR REVIEW

The Land Development Code imposes the following GENERAL REQUIREMENTS on the use requested by the applicant. Under each requirement, the applicant should explain, where applicable, how the proposed use satisfies these requirements:

A. General Requirement #1: The use will not materially endanger the public health, safety or welfare:
1. Foundation is engineered for high winds
2. Tower and turbine are also designed to withstand high winds
3. Installed in 50 countries, 29 yr track record; no history of structural failure
4. Independently tested by 3rd party
5. Site is secured behind locked entrance

B. General Requirement #2. The use will not substantially injure the value of property or improvements in the area.
1. Tower and turbine can be dismantled and moved.
2. Homes with renewable energy increase in value.

C. General Requirement #3. The use will be in harmony with the surrounding area.
1. Bergey is a small-scale turbine with tower not exceeding 100' height.
2. Quiet operation, safe for birds and wildlife

The Land Development Code also imposes the following SPECIFIC REQUIREMENTS on the use requested by the applicant. The applicant should be prepared to demonstrate that satisfactory provisions have been made for the following, where applicable.

The proposed use shall be located and developed in such a manner as to:

a. Comply with all applicable local, state and federal statutes, ordinance and regulations.
See attached "Requirements"

b. Be in accordance with the Comprehensive Plan, Long Range Transportation Plans and Comprehensive Transportation Plans of the county and/or Long Range Transportation Plans and comprehensive Transportation Plans of nay municipality of the County.
n/a

Application No. _____

c. Minimize the effects of noise, glare, dust, solar access and odor on those persons residing or working in the neighborhood of the proposed use.

See attached "Noise, Glare, Dust"

d. Minimize the environmental impacts on the neighborhood including the following groundwater, surface water, wetlands, endangered/threatened species, archeological sites, historic preservation sites and unique natural areas.

1. Pre-existing driveway and previously cleared area at turbine site.
2. Footings to be placed in cleared area surrounded by forest.
3. Quiet, safe for wildlife

Show that satisfactory provision/arrangement has been made (where applicable or required) concerning:

a. Ingress and egress to property and proposed structures thereon (with particular reference to automotive/pedestrian safety/convenience and traffic flow/control).

Existing gravel driveway to site

b. Off-street parking and loading areas.

All located within property

c. Utilities (with particular reference to locations, availability and compatibility).

Underground electric and transformer box are pre-existing and near tower site

d. Buffering and landscaping (with particular reference to type, location and dimensions).

Site is far from neighboring dwellings

e. Structures (with particular reference to location, size and use).

Principal residence is located nearby. No other structures at tower site.

I certify that the information shown above is true and accurate and is in conformance with the Land Development regulations of Henderson County.

John Myers

Print Applicant (Owner or Agent)

John Myers

Signature Applicant (Owner or Agent)

10-5-2011

Date

County Use Only

Fee: $_____ Paid: _____ Method: _____ Received by: _____

Authority to grant the requested permit is contained in the Land Development Code, Sections: _____

Community Planning Area: _____

SR 3.17. Wind Mill/Turbine, Accessory > 40 ft height

(1) Principal Structure/Use Requirement. Accessory wind mills/turbines shall only be permitted in conjunction with a principal residential dwelling unit or business.
(2) Height. Wind turbine height shall be no more than 40 feet above any obstruction (*structure*, tree, etc. (excluding *communication towers*)) within a 200 foot radius of the base of the wind turbine. In no case shall the height exceed 100 feet.
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(4) Setback. The base of the wind turbine shall be at least ten (10) feet from surrounding property lines and setback a distance equivalent to 110 percent of the height of the wind turbine at its highest point from the property line.
(5) Color. Wind turbines must be a color that is consistent with *existing development* or natural conditions.
(6) Compliance with FAA Regulations. Wind turbines must comply with applicable FAA regulations, including any necessary approvals for installation close to *airports*. Evidence of compliance or non-applicability shall be submitted to the *Zoning Administrator*.
(7) Compliance with FCC Regulations. Wind turbines must comply with applicable FCC regulations. Evidence of compliance or non-applicability shall be submitted to the *Zoning Administrator*.
(8) Structure Requirements. Wind turbines shall require a building permit to insure that the foundation is designed and constructed with a concrete foundation per the July 6, 2009 manufacturing requirements. Sealed engineering drawings shall be required prior to the issuance of a building permit. These standards shall not preempt the State Building Code standards or requirements to insure structural stability.
(9) Survival Wind Speed. Wind turbines shall be designed to withstand wind speeds as required by the State Building Code.
(10) Other Considerations. In addition to the standard review for special use permits, the Zoning Board of Adjustment shall consider noise and appearance criteria as factors when reviewing special use permit applications for wind turbines.

Requirements

Special Use Permit: Little Bearwallow Mountain
Ronnie and Beth Oliver
Gerton, NC

October 5, 2011
Bergey Excel 10K

Specific Requirements on Use

a. Comply with all applicable local, state, and federal statutes, ordinances and regulations.

- Tower height not exceeding 100' restriction
- Set Backs - Siting has set backs over 50' from property lines
- Color - Color of tower is gray and turbine is white
- FAA – well under FAA height restriction - Wind Turbine is in compliance
- FCC – N/A
- Building permit for foundation – Engineer drawing included
- Survival wind speed – 125 miles per hour sustained
- Noise – the nearest neighbor is over 1000' away from the tower site; at this distance any noise produced by the turbine will be imperceptible above the ambient, background noise (see wind fact sheet)

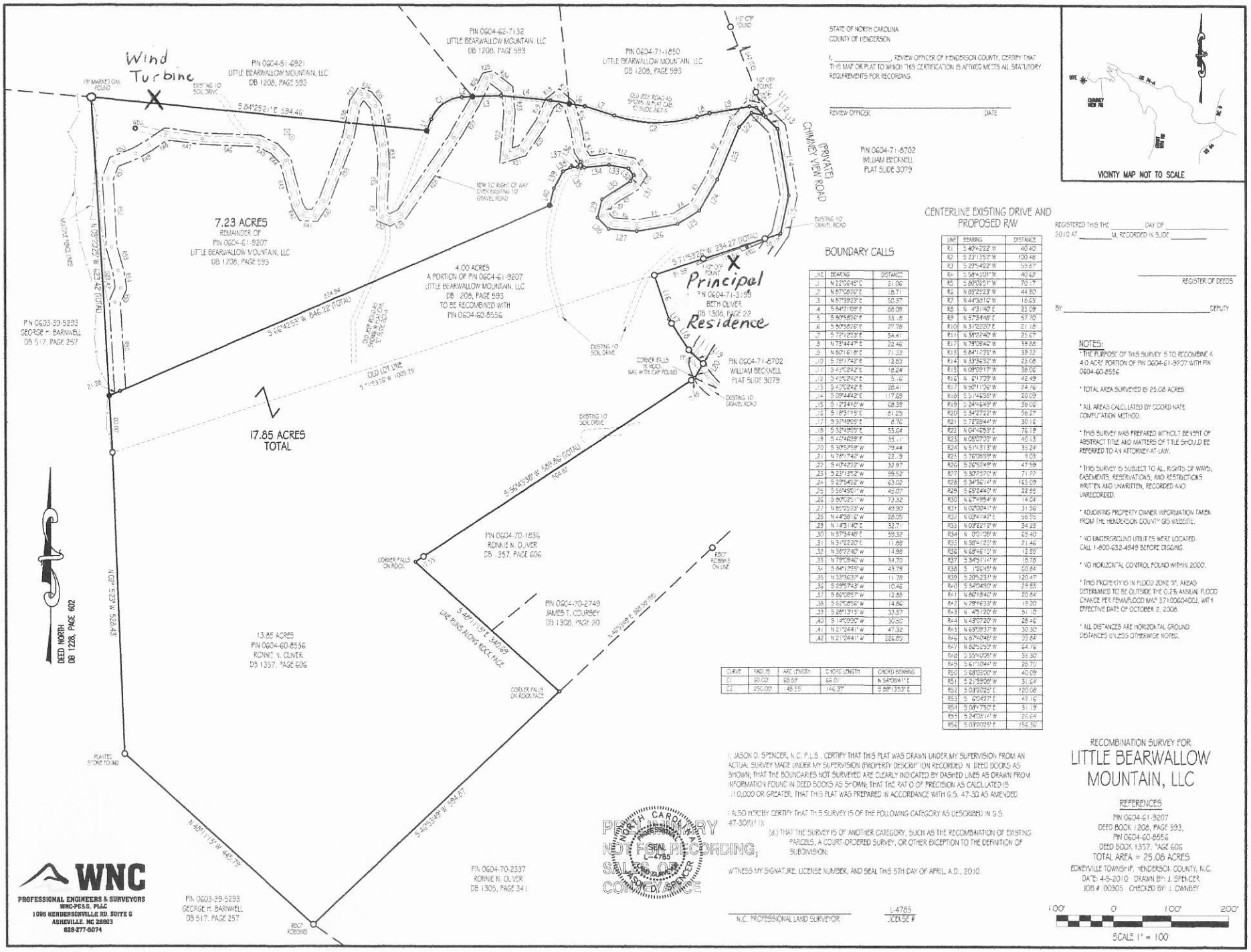
Noise Glare Dust

Special Use Permit: Mountain Roots, Gerton, NC
October 5, 2011
Bergey Excel 10K

c. Minimize the effect of noise, glare, dust, ……..

- Footings include one central support pier and 3 surrounding piers for attaching guyed cables (see foundation specs)
- 2 days of backhoe equipment to dig and pour footers
- 2 days to install including crane to lift tower and turbine and complete electrical hookup
- Gray color metal tower, white turbine blades
- Tower will not exceed 100'
- All finishes have been pre-applied in factory


to Fairview
Buncombe, NC
Gerton
to Bat Cave
74
Wind Turbine Site
Primary Residence
WEAVER DR
COTTAGE HILL DR
RAY FREEMAN RD
JESSE GWINN RD
BEARWALLOW MOUNTAIN RD
MONTANE LN
RABBIT RUN LN
LITTLE BEARWALLOW RD
MOUNTAIN RIDGE RD
CLINT MEPHELL RD
TEDDY BEAR LN
BOULDER LN
ROOSEVELT RD
SNOW RIDGE DR
SUMMERSET DR
GERTON HWY
HAPPY HOLLOW RD
KELLY HILL RD
THOMASVILLE LN
CHESTNUT HILL RD
PORTERFIELD LN
WOODYS DR
CHIMNEY VIEW RD



STATE OF NORTH CAROLINA
COUNTY OF HENDERSON

I, _____, REVIEW OFFICER OF HENDERSON COUNTY, CERTIFY THAT THIS MAP OR PLAT TO WHICH THIS CERTIFICATION IS AFFIXED MEETS ALL STATUTORY REQUIREMENTS FOR RECORDING.

_____ _____
REVIEW OFFICER DATE

REGISTERED THIS THE _____ DAY OF _____
2010 AT _____ M, RECORDED IN SLIDE _____

_____
REGISTER OF DEEDS

BY _____ DEPUTY

BOUNDARY CALLS

LINE	BEARING	DISTANCE
L1	N 22°08'45" E	21.06
L2	N 57°08'26" E	18.71
L3	N 67°39'23" E	50.37
L4	S 64°21'09" E	66.09
L5	S 80°58'52" E	33.16
L6	S 80°58'26" E	37.78
L7	S 72°12'23" E	54.41
L8	N 73°44'47" E	22.46
L9	N 60°16'18" E	71.33
L10	S 78°17'42" E	12.83
L11	S 47°02'42" E	16.24
L12	S 47°02'42" E	5.16
L13	S 47°02'42" E	28.41
L14	S 09°44'42" E	117.69
L15	S 12°24'18" W	68.39
L16	S 18°31'15" E	61.25
L17	S 32°49'05" E	8.76
L18	S 32°49'05" E	55.64
L19	S 42°46'39" E	35.11
L20	S 50°57'59" W	79.44
L21	N 78°17'42" W	22.19
L22	S 47°42'12" W	32.87
L23	S 23°18'52" W	99.52
L24	S 27°54'12" W	93.02
L25	S 58°45'01" W	45.07
L26	S 80°02'51" W	73.32
L27	N 65°25'23" W	49.90
L28	N 44°38'16" W	28.05
L29	N 14°31'40" E	32.71
L30	N 57°34'48" E	59.32
L31	N 31°22'20" E	11.68
L32	N 38°27'40" W	14.98
L33	N 79°09'46" W	34.70
L34	S 64°12'59" W	43.78
L35	N 33°36'37" W	11.78
L36	S 29°57'53" W	10.46
L37	S 80°08'57" W	12.88
L38	S 52°08'56" W	14.86
L39	S 24°13'15" W	33.57
L40	S 14°09'30" W	30.50
L41	N 21°24'41" W	47.32
L42	N 21°24'41" W	226.85

CURVE	RADIUS	ARC LENGTH	CHORD LENGTH	CHORD BEARING
C1	50.00'	69.68'	64.01'	N 54°08'41" E
C2	250.00'	148.59'	146.37'	S 88°13'53" E

CENTERLINE EXISTING DRIVE AND PROPOSED R/W

LINE	BEARING	DISTANCE
R1	S 40°42'22" W	40.40
R2	S 23°13'52" W	100.48'
R3	S 29°54'22" W	59.67'
R4	S 58°43'31" W	40.62'
R5	S 80°03'51" W	70.17'
R6	N 85°52'23" W	44.80'
R7	N 44°38'16" W	16.65'
R8	N 43°11'40" E	33.09'
R9	N 57°34'48" E	57.70'
R10	N 31°22'20" E	21.18'
R11	N 58°22'40" W	25.47'
R12	N 79°08'42" W	39.66'
R13	S 64°12'35" W	59.03'
R14	N 33°53'52" W	23.06'
R15	N 09°09'17" W	36.00'
R16	N 6°17'09" W	42.49'
R17	N 50°11'06" W	24.76'
R18	S 51°14'58" W	20.09'
R19	S 24°46'49" W	36.06'
R20	S 34°27'22" W	56.27'
R21	S 72°28'44" W	30.16'
R22	N 04°46'53" E	76.19'
R23	N 05°07'03" W	40.13'
R24	N 51°43'13" W	35.24'
R25	S 76°08'59" W	9.09'
R26	S 26°57'49" W	47.59'
R27	S 80°23'50" W	71.22'
R28	S 34°36'12" W	163.09'
R29	S 68°24'49" W	22.95'
R30	N 67°49'54" W	14.04'
R31	N 02°00'41" W	31.96'
R32	N 03°41'42" E	96.55'
R33	N 00°22'12" W	34.23'
R34	N 00°10'38" W	69.40'
R35	N 38°41'25" W	21.46'
R36	N 68°46'12" W	12.85'
R37	S 34°57'14" W	15.78'
R38	S 12°45'11" W	60.84'
R39	S 20°52'31" W	120.47'
R40	S 34°54'50" W	28.83'
R41	N 80°18'42" W	20.84'
R42	N 29°16'33" W	18.30'
R43	N 4°51'20" W	51.10'
R44	N 43°07'20" W	28.46'
R45	N 69°39'37" W	30.30'
R46	N 87°40'46" W	33.84'
R47	N 82°52'59" W	64.76'
R48	S 35°40'09" W	35.30'
R49	S 61°10'44" W	26.75'
R50	S 69°03'00" W	40.09'
R51	S 21°39'08" W	31.24'
R52	S 03°02'05" E	120.08'
R53	S 05°42'27" E	49.16'
R54	S 08°47'50" E	31.19'
R55	S 24°03'14" W	26.64'
R56	S 03°20'05" E	156.30'

NOTES:

* THE PURPOSE OF THIS SURVEY IS TO RECOMBINE A 4.0 ACRE PORTION OF PIN 0604-61-9207 WITH PIN 0604-60-8556
* TOTAL AREA SURVEYED IS 25.08 ACRES.
* ALL AREAS CALCULATED BY COORD NATE COMPUTATION METHOD.
* THIS SURVEY WAS PREPARED WITHOUT BENEFIT OF ABSTRACT TITLE AND MATTERS OF TITLE SHOULD BE REFERRED TO AN ATTORNEY-AT-LAW.
* THIS SURVEY IS SUBJECT TO ALL RIGHTS-OF-WAYS, EASEMENTS, RESERVATIONS, AND RESTRICTIONS WRITTEN AND UNWRITTEN, RECORDED AND UNRECORDED.
* ADJOINING PROPERTY OWNER INFORMATION TAKEN FROM THE HENDERSON COUNTY GIS WEBSITE.
* NO UNDERGROUND UTILITIES WERE LOCATED. CALL 1-800-632-4949 BEFORE DIGGING.
* NO HORIZONTAL CONTROL FOUND WITHIN 2000'.
* THIS PROPERTY IS IN FLOOD ZONE "X", AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL FLOOD CHANCE PER FEMA/FLOOD MAP 3710060400J, WITH EFFECTIVE DATE OF OCTOBER 2, 2008.
* ALL DISTANCES ARE HORIZONTAL GROUND DISTANCES UNLESS OTHERWISE NOTED.

I, JASON D. SPENCER, N.C. P.L.S., CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION (PROPERTY DESCRIPTION RECORDED IN DEED BOOKS AS SHOWN); THAT THE BOUNDARIES NOT SURVEYED ARE CLEARLY INDICATED BY DASHED LINES AS DRAWN FROM INFORMATION FOUND IN DEED BOOKS AS SHOWN; THAT THE RATIO OF PRECISION AS CALCULATED IS 1:10,000 OR GREATER, THAT THIS PLAT WAS PREPARED IN ACCORDANCE WITH G.S. 47-30 AS AMENDED.

I ALSO HEREBY CERTIFY THAT THIS SURVEY IS OF THE FOLLOWING CATEGORY AS DESCRIBED IN G.S. 47-30(f)(11):

(d.) THAT THE SURVEY IS OF ANOTHER CATEGORY, SUCH AS THE RECOMBINATION OF EXISTING PARCELS, A COURT-ORDERED SURVEY, OR OTHER EXCEPTION TO THE DEFINITION OF SUBDIVISION;

WITNESS MY SIGNATURE, LICENSE NUMBER, AND SEAL THIS 5TH DAY OF APRIL, A.D., 2010.

PRELIMINARY
NOT FOR RECORDING,
SALES OR
CONVEYANCE

NORTH CAROLINA PROFESSIONAL SEAL L-4785 LAND SURVEYOR JASON D. SPENCER

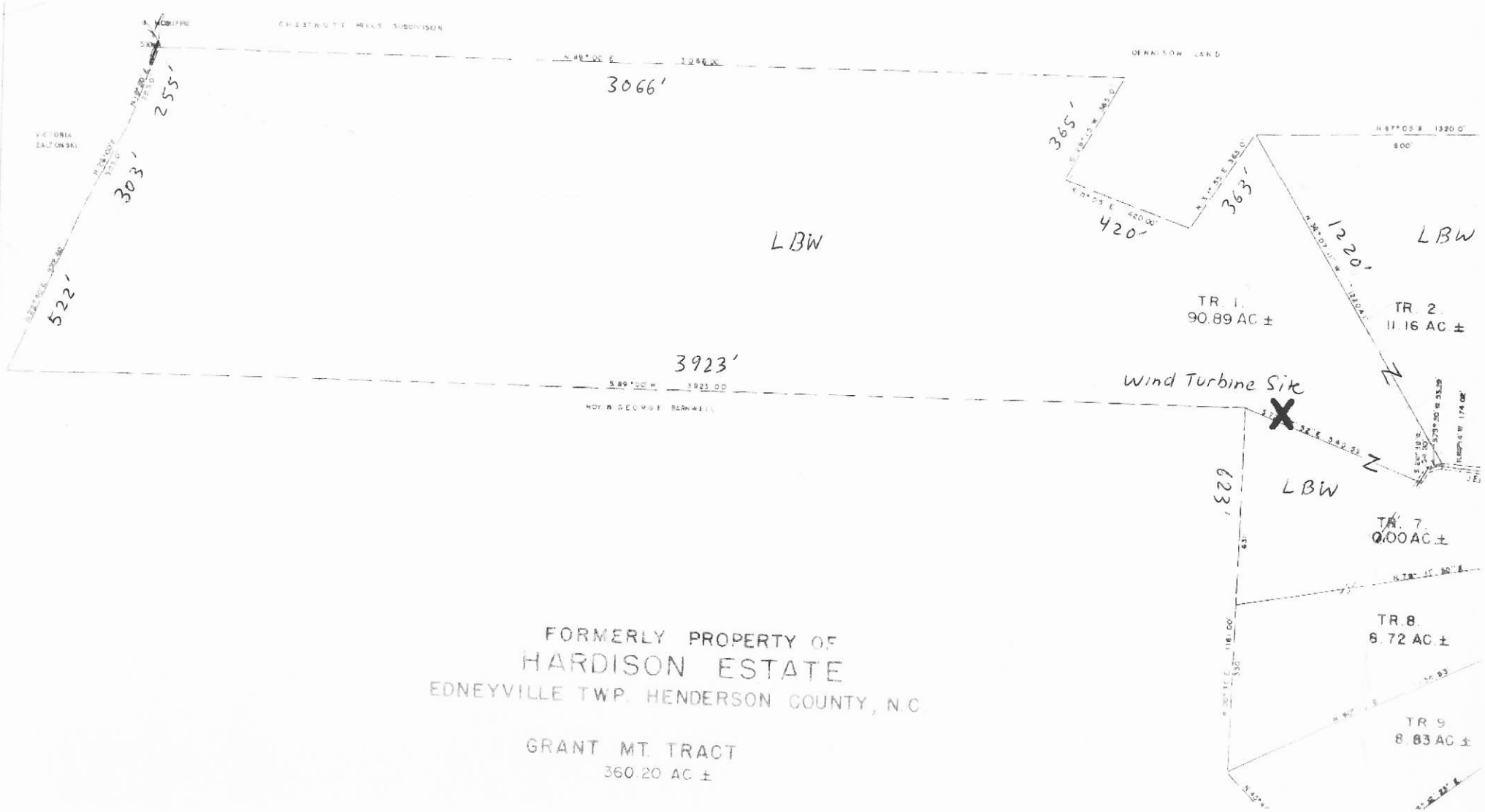
_____ L-4785
N.C. PROFESSIONAL LAND SURVEYOR LICENSE #

WNC
PROFESSIONAL ENGINEERS & SURVEYORS
WNC-PE&S, PLLC
1095 HENDERSONVILLE RD. SUITE C
ASHEVILLE, NC 28803
828-277-5074

RECOMBINATION SURVEY FOR
LITTLE BEARWALLOW MOUNTAIN, LLC

REFERENCES
PIN 0604-61-9207
DEED BOOK 1208, PAGE 593,
PIN 0604-60-8556
DEED BOOK 1357, PAGE 606
TOTAL AREA = 25.08 ACRES
EDNEYVILLE TOWNSHIP, HENDERSON COUNTY, N.C.
DATE: 4-5-2010 DRAWN BY: J. SPENCER
JOB # 00305 CHECKED BY: J. OWNBY

100' 0' 100' 200'
SCALE 1" = 100



FORMERLY PROPERTY OF
HARDISON ESTATE
EDNEYVILLE TWP. HENDERSON COUNTY, N.C.

GRANT MT. TRACT
360.20 AC ±

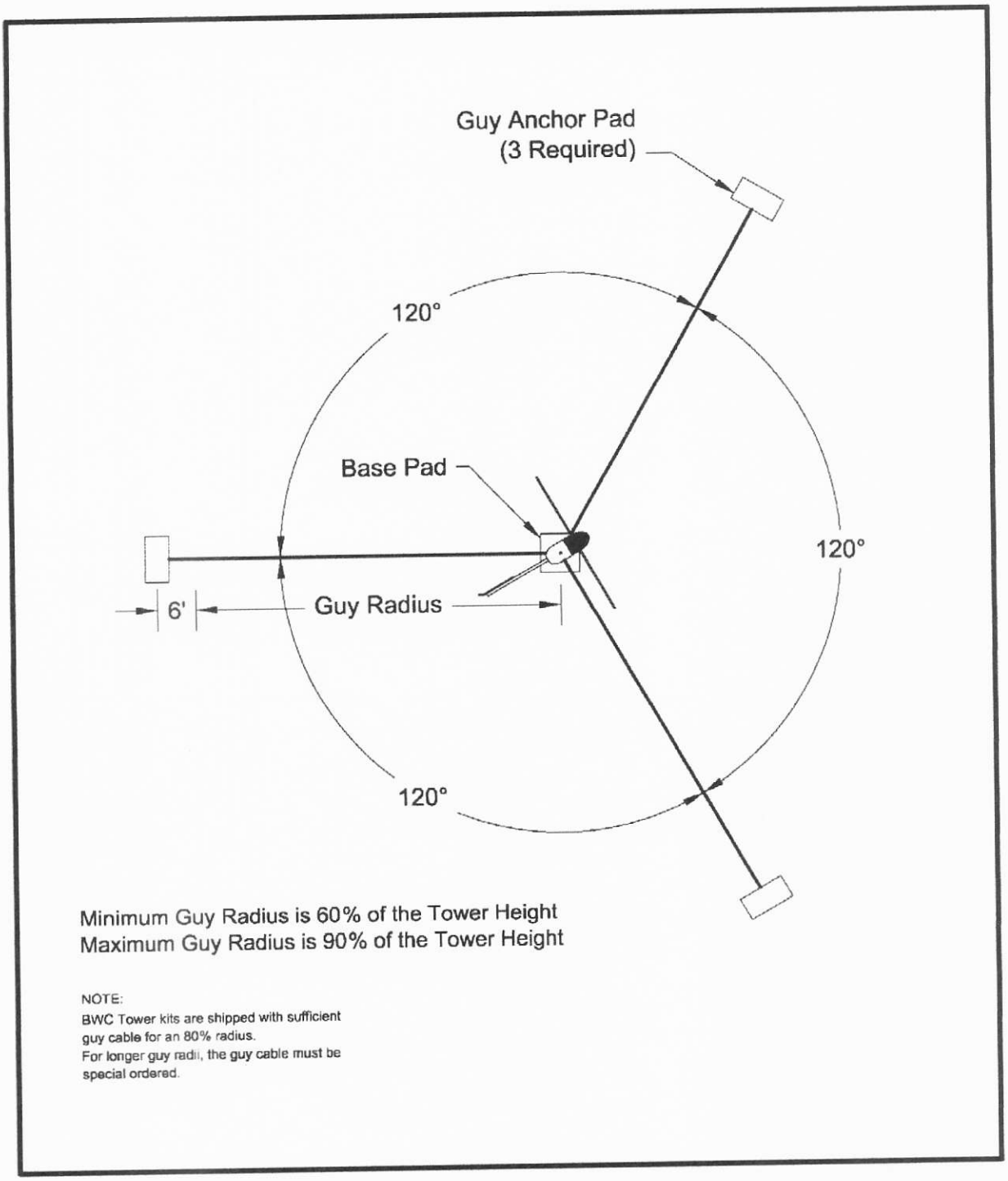


Figure 4. Nominal Foundation Layout for all BWC Guyed Lattice Towers

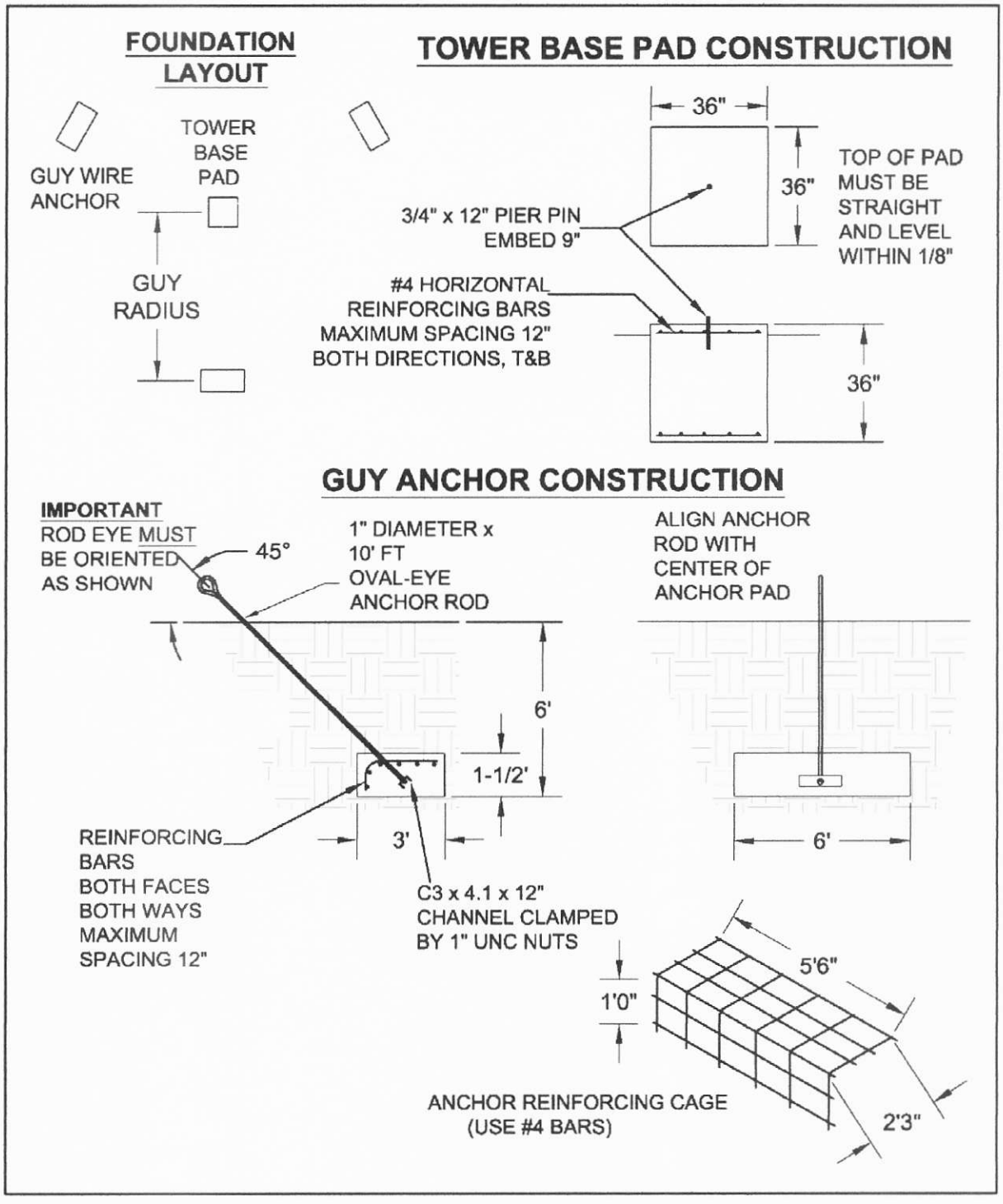


Figure 7. GL 60-120 Tower Foundations for BWC EXCEL Turbine
(Tower base pad must extend below frost depth.)

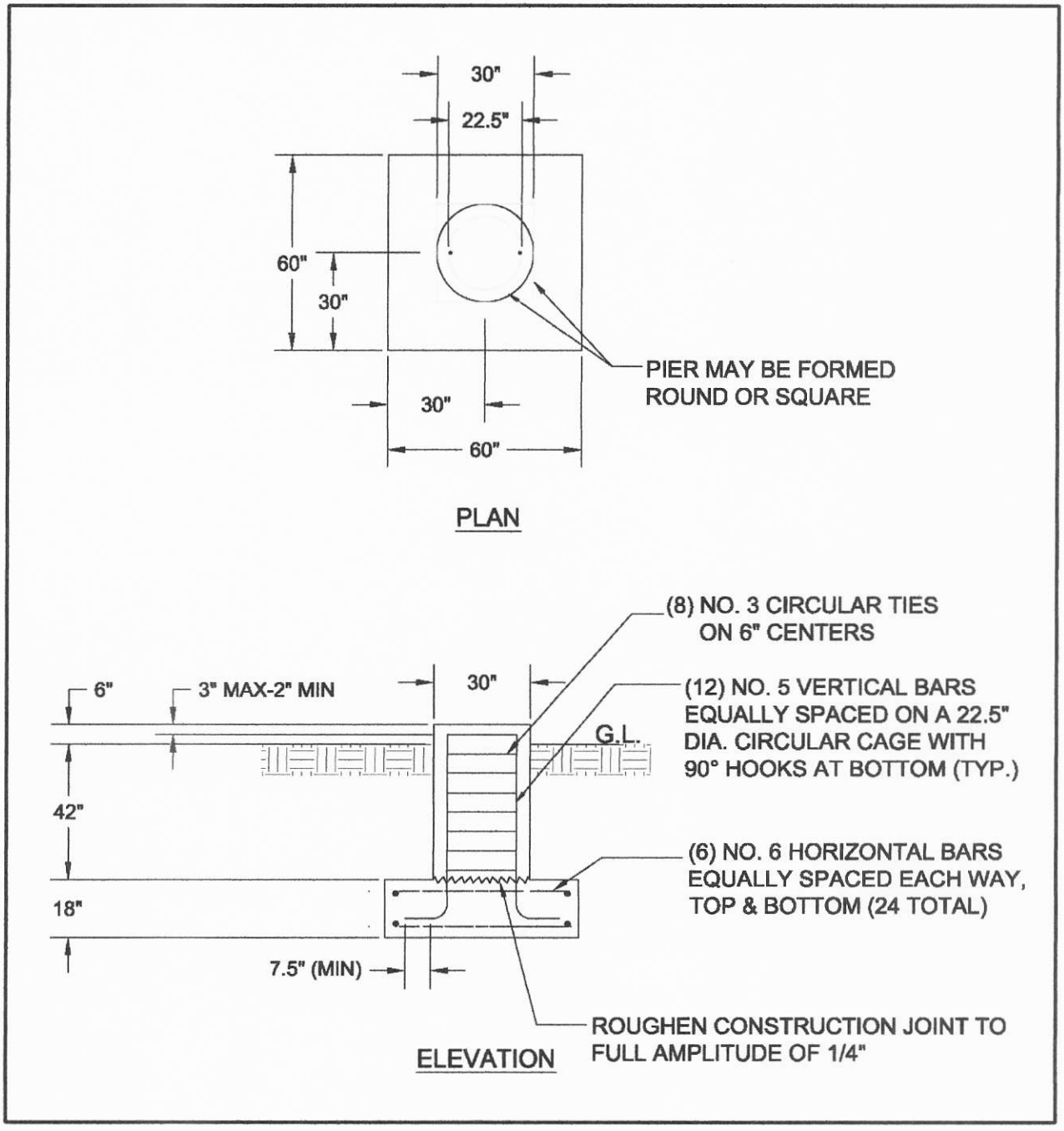


Figure 8. Pier-Pad Base Foundation for GL 60-120 Towers

Figure 12 shows guy heights and *minimum* guy radii for GL18 towers 60-120 ft in height.

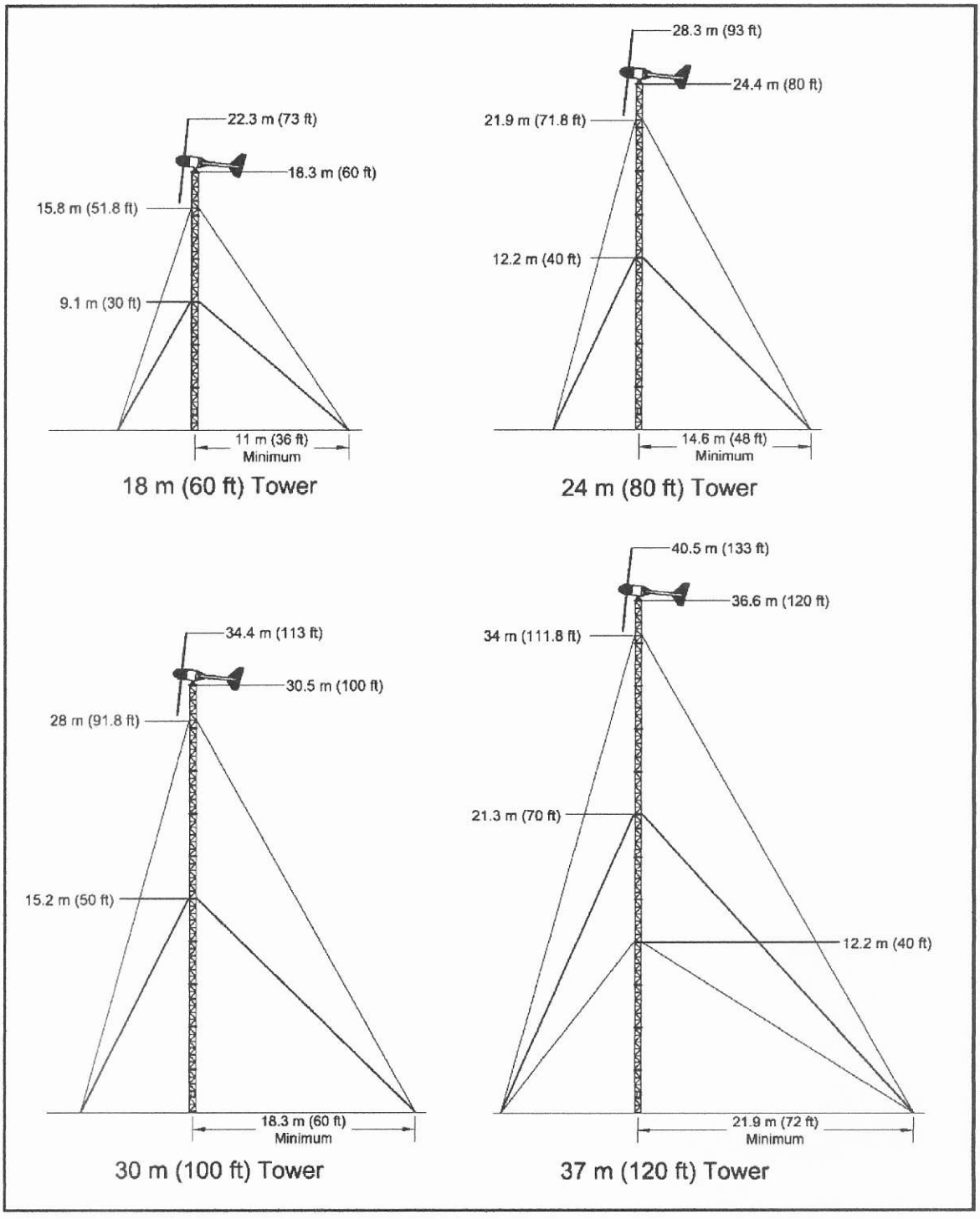
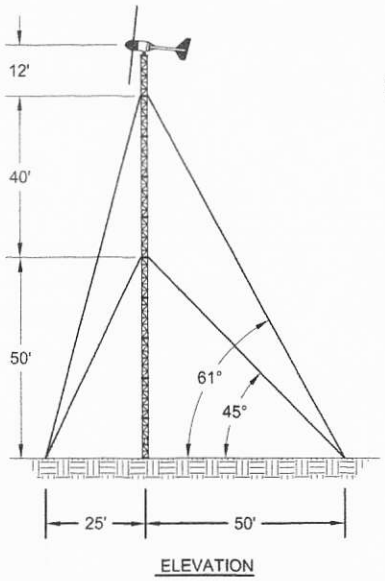
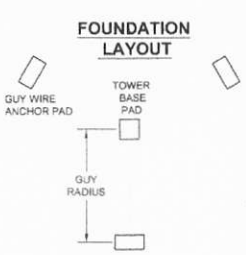


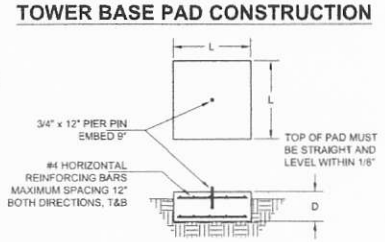
Figure 12. GL60-120 Tower configurations

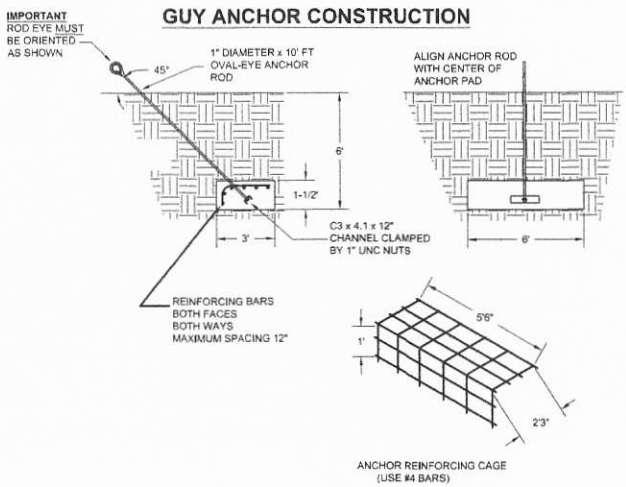
Electrical Wiring Specification

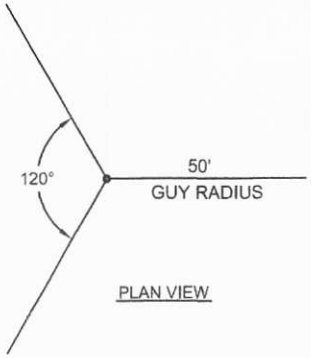


ELEVATION









PLAN VIEW

Tower Wiring:
3 x #6 AWG MC Armored Cable

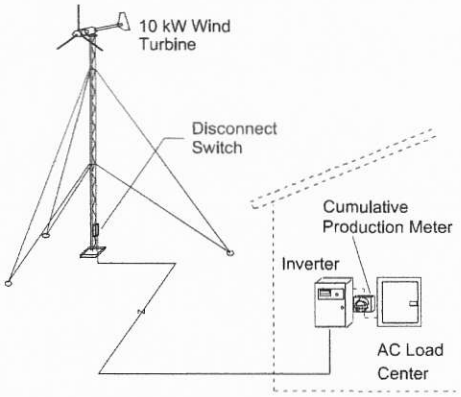
Safety Switch:
60A 600V 3-pole Fusible
NEMA Type 3R Rainproof
Serves as lockable disconnect
3 @ 35A Fuses Type FRS-R-35
Delta LA603 3-Phase Surge Arrestor

Grounding:
3 @ 8' copper-clad ground rods
1 rod per tower leg
#2 AWG bare 7-strand ground cable
#8 bare solid bond wire between tower base ground rod and inverter / utility ground

Wire Run:
Consult BWC tables for wire size based on length of wire run.
Underground conductors and bond wire must be housed in conduit.
Minimum conduit burial depth is 18".

Inverter:
GridTek 10, UL listed

Load Panel:
2-Pole, 240V, 60A breakers, dedicated



Material Specifications

1. Tower Legs: ASTM A529 Grade 50
   Minimum yield stress 50,000 psi
2. Tower Flanges: ASTM A572 Grade 50
   Minimum yield stress 50,000 psi
3. Tower Braces: ASTM A529 Grade 50
   Minimum yield stress 50,000 psi
4. Tower Bolts: ASTM A325 construction grade
   Minimum tensile stress 120,000 psi
   Minimum yield stress 92,000 psi
5. Anchor Rods: A. B. Chance 1" Oval-eye
   Minimum tensile strength 36,000 lb

Foundation Notes:

1. Concrete: 2500 psi minimum ultimate strength
2. ASTM A-615 Grade 40 deformed reinforcing bars, 1/2" minimum diameter, two faces, both ways, 12" O.C. maximum spacing
3. Minimum concrete cover on all reinforcing bar is 2" top, 3" all other locations
4. Compact fill in 8" lifts to minimum 100 psf
5. Water table below all concrete at all times
6. Soil bearing strength as noted in analysis

Design Criteria

1. IBC-2003 and EIA-TIA-222F compliant
2. Design Basic Wind Speed: 90 mph
3. Rotor Thrust: 2000 lb max
4. Turbine Weight: 1050 lb
5. Maximum Torque: 250 ft-lb @ 300 rpm
6. Furled Moment: 875 ft-lb
7. Ice accumulation as noted

BERGEY WINDPOWER

DRAWN K. G. C. 08-29-2005	TITLE SUMMARY SHEET
CHECKED M.B. 08-30-2005	10 kW ON GL18-100 TOWER
APPROVED	DWG NO.
SCALE NONE	1400-XL-GL18-100

SMALL WIND
FACTSHEETS

How Much Noise Do Small Wind Systems Make?

Few moving parts

Most residential-sized wind generators are direct-drive devices with few moving parts. Unlike the utility-scale turbines used in wind farms, they do not have high-speed transmissions. Thus, most of the sound that comes from a residential sized wind turbine is aerodynamic noise caused by the blades passing through the air. The noise level of most modern residential turbines measures close to the ambient noise levels under average wind conditions. It is audible, if you are out of doors and listening for it, but no noisier than your average refrigerator.

Most residential turbines do not begin turning until a certain threshold, or "cut-in" wind-speed is reached - typically about 7 m.p.h. So, on a calm, windless day (or night), the turbine is still and silent.

Background noise masks aerodynamic sounds

Just how audible depends on the distance of the listener from the turbine - and also on the level of existing background noise, including traffic, farm machinery, barking dogs, children playing, lawn mowers, and even the environment itself. Residential-sized wind turbines are variable speed devices, turning faster and thus creating more sound as wind speed increases. At the same time, the wind itself creates sound, rustling through trees, shrubs, and fields, and even rattling buildings. These natural back-ground sounds also increase with wind speed, thereby effectively masking much of a small turbine's aerodynamic sound. The sound of a wind turbine may be distinguishable from ambient (background) noise even though it is not louder. However, the same can be said for all of the other components of ambient noise, including things like barking dogs, traffic, kids playing, tractors, and even trees.

Sound levels fall with distance

Sound levels fall off significantly with distance. In one sound test carried out on a Bergey Windpower 10 kW BWC Excel wind system at a distance of 300 feet and in 25 mph winds, the BWC Excel generated sound with a 54 dB(A) to 55 dB(A) rating, making the wind generator barely audible over the 52.5 dB(A) rating of the surrounding environment's background noise. At about 500 feet, the BWC Excel sound rating was 53 dB(A), making it just another part of the background sound.

In another instance, sounds from a 10-kW Jacobs wind system were measured by a representative of the Clinton (Iowa) Detective Bureau. "In wind speeds between 16 mph and 36 mph and at a position only 50 feet from the wind generator, the decibel meter registered the

continued...

sound of the wind generator between 55 dB(A) and 59 dB(A). The detective noted that, 'at this location, the sound output from the generator was observed to be partially masked by the sounds from the rustling of leaves in the trees.' When the decibel meter was pointed at the trees (which were 300 feet away), the meter registered the tree sounds at 60 dB(A) to 62 dB(A).'" The conclusion: "the wind generator sounds were 'inconsequential in total noise emission.'"

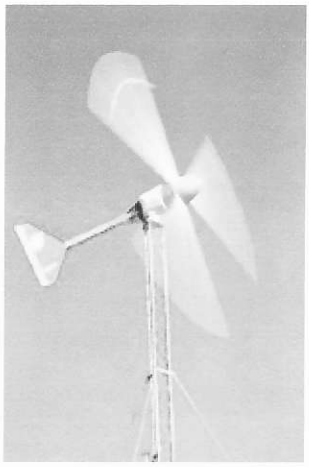
References

Mick Sagrillo, Windletter Feb/Mar 1997

Other Fact Sheets Available on Small Wind Energy:

What is Small Wind?
Do Small Wind Systems Kill Birds?
What About Visual Impact?
Small Wind Systems and Public Safety
How Do Small Wind Systems
Affect Property Values?

BWC EXCEL Wind Turbine



The **BWC EXCEL** is a modern 7 meter (23 ft) diameter, 10,000W wind turbine designed for high reliability, low maintenance, and automatic operation in adverse weather conditions. It is available in two configurations: battery charging and grid-connected (the pumping version is not currently available). The BWC Excel is a ruggedly built turbine that comes with the longest warranty (5 years) in the industry.

In October 2008 the Excel-S was upgraded to a more efficient Powersync II inverter. In July 2009 the Excel turbine was upgraded with a more powerful alternator and longer blades. Performance has been improved by an average of 25%. Also in July 2009 the warranty on the Excel wind turbine was increased to 10 years - the longest in the industry.

Battery charging BWC EXCEL's can be supplied with outputs of 24, 48, 120 or 240 VDC. They are well suited for large rural homes, remote villages and facilities, eco-tourism resorts, and larger telecommunications sites.

The BWC EXCEL was introduced in 1983 and it has been installed at over 1,600 sites around the world. We invite you to review our list of notable customers and our example projects.

Specifications

Start-up Wind Speed: 3.4 m/s (7.5 mph)
Cut-in Wind Speed: 2.5 m/s (5 mph) - grid intertie; 4 m/s (9 mph) - battery charging
Rated Wind Speed: 12 m/s (27 mph)
Rated Power: 10 kW for grid intertie, 7.5 kW for battery-charging
Cut-Out Wind Speed: None
Furling Wind Speed: 15.6 m/s (35 mph)
Max. Design Wind Speed: 60 m/s (134 mph)

Go to Detailed Technical Description of the Excel-R Turbine

Type: 3 Blade Upwind
Rotor Diameter: 7 m (23 ft.)
Blade Pitch Control: None, Fixed Pitch
Overspeed Protection: AUTOFURL
Gearbox: None, Direct Drive
Temperature Range: -40 to +60 Deg. C (-40 to +140 Deg. F)
Generator: Permanent Magnet Alternator
Output Form: 3 Phase AC, Variable Frequency (Regulated 48 - 240 VDC after VCS-10, or 240 VAC, 1Ø, 60 Hz or 220 VAC, 1Ø, 50 Hz with Powersnyc II inverter.