CITY OF PALM SPRINGS

DEPARTMENT OF PLANNING SERVICES

MEMORANDUM

Date: April 27, 2011

To: Planning Commission

From: Edward O. Robertson, Principal Planner

Subject: Replacement of Meteorological Tower

On April 11, 2011, the Planning Department received a letter from Windpower Partners 1993 LP, requesting approval for the replacement of an existing meteorological tower with a new tower in the same location. The overall height of the existing tower is 131 feet; the proposed replacement tower is 197 feet in height. Meteorological towers are designed for wind energy resource measurement.

According to Section 94.02.00.H.8.c.ii of the City's Zoning Code, meteorological towers with an overall height of less than 200 feet may be approved with a Conditional Use Permit.

It has been determined by staff that the meteorological tower is part of an earlier installation with an existing Conditional Use Permit which may be amended to allow a replacement. The proposed replacement is minor in nature; the Director of Planning Services is prepared to approve the proposal as submitted since the request qualifies as an insignificant change to the original approval.

Staff is forwarding the request to the Planning Commission for a confirmation or further considerations of the proposal.

Attachments:

- Letter of request from the applicant
- Existing & proposed meteorological tower location map
- Drawings of tower installation

NEXTera® ENERGY RESOURCES

March 22, 2011

Craig A. Ewing, AICP
Director of Planning Services
City of Palm Springs
3200 E. Tahquitz Canyon Way
Palm Springs, CA 92263-2743

Dear Mr. Ewing:

In order to continue to measure wind speed and direction, as well as other meteorological attributes, Windpower Partners 1993 L.P. (WPP93) proposes to replace an existing met tower associated with its wind facilities within the City of Palm Springs. Due to the age of the existing tower, WPP93 has determined that it is more economical to replace rather than repair the existing tower. The existing 131 foot (40 meter) tower would be replaced with a new standard 197 foot (60 meter) tower in the location shown in Attachment A. The proposed design utilizes the newest industry standards for met towers and is nearly identical to the new met towers in Palm Springs.

The stamped engineered drawing for the proposed met tower is shown in Attachment B. It designed and manufactured by NRG Systems, Inc. The proposed met tower is designed specifically for wind energy resource measurements. The lightweight tower is made of galvanized steel tubing. The tubes slide together without bolts or clamps, and are made from a combination of sections. The sections are assembled horizontally on the ground and then tilted up using a gin pole and winch. The towers rest on a steel base plate approximately 0.8 square meters (9 square feet) in size, and are supported with aircraft cable guy wires in four directions at each guy level (Figure 1). Guy wires extend in a radius of up to 167 feet (50 meters) from the center of the met tower and are anchored with standard screw-in anchors, hammer driven pins or anchor pins set in a concrete plug.

No heavy equipment such as cranes are required and no concrete foundations for the base of the met tower are required. Met towers will be erected next to existing roads or may be accessed via overland travel using rubber tired vehicles. No road grading or other cut and fill land type land disturbing activities are required for installation. No Federal Aviation Administration (FAA) permit is required for erection of the met towers as they are 197 feet tall and are thus below the FAA notice of construction or alteration threshold for structures equal to or greater 200 feet above ground surface.

Construction of the tower is expected to take up to 2 days. The tower will be laid out horizontally on the ground at the site. The tubes will be assembled on the ground, and solar panel and communications equipment will be installed. The tower will then be raised using a winch and a gin pole. The anchor points would be placed at the four corners of a square approximately 50 meters (167 feet) from the tower.

The tower specifications are as follows (NRG Systems, Inc. 2006):

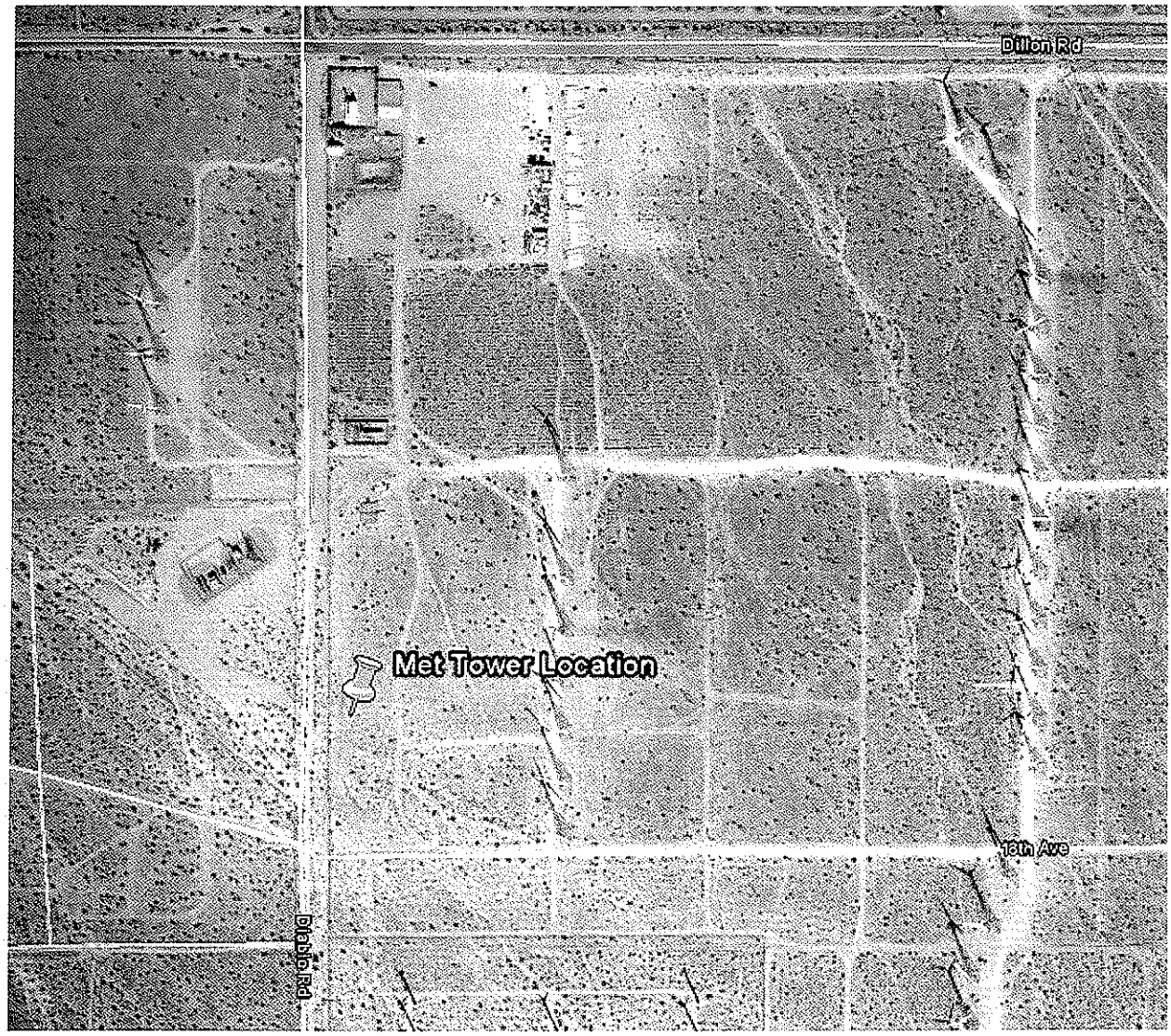
Height: 197 feet (60.0 meters)
Guy Radius 167 feet (50 meters)
Base Plate: 3 feet x 3 feet steel on 3 inch thick concrete pad
Anchors: Screw-in type or pin anchors 5-8 feet deep set in an 8 inch concrete plug.

WPP93 requests to obtain planning director approval and the necessary entitlements for the replacement of the above mentioned met tower. Please feel free to contact me at 561-304-5854 any time if you have any questions or concerns regarding this met tower or methods for installation of the tower.

Sincerely,

Michael Andrew Starke
Project Director Wind Development

Attachment A
Met Tower Location Map



Attachment B
Stamped Drawing

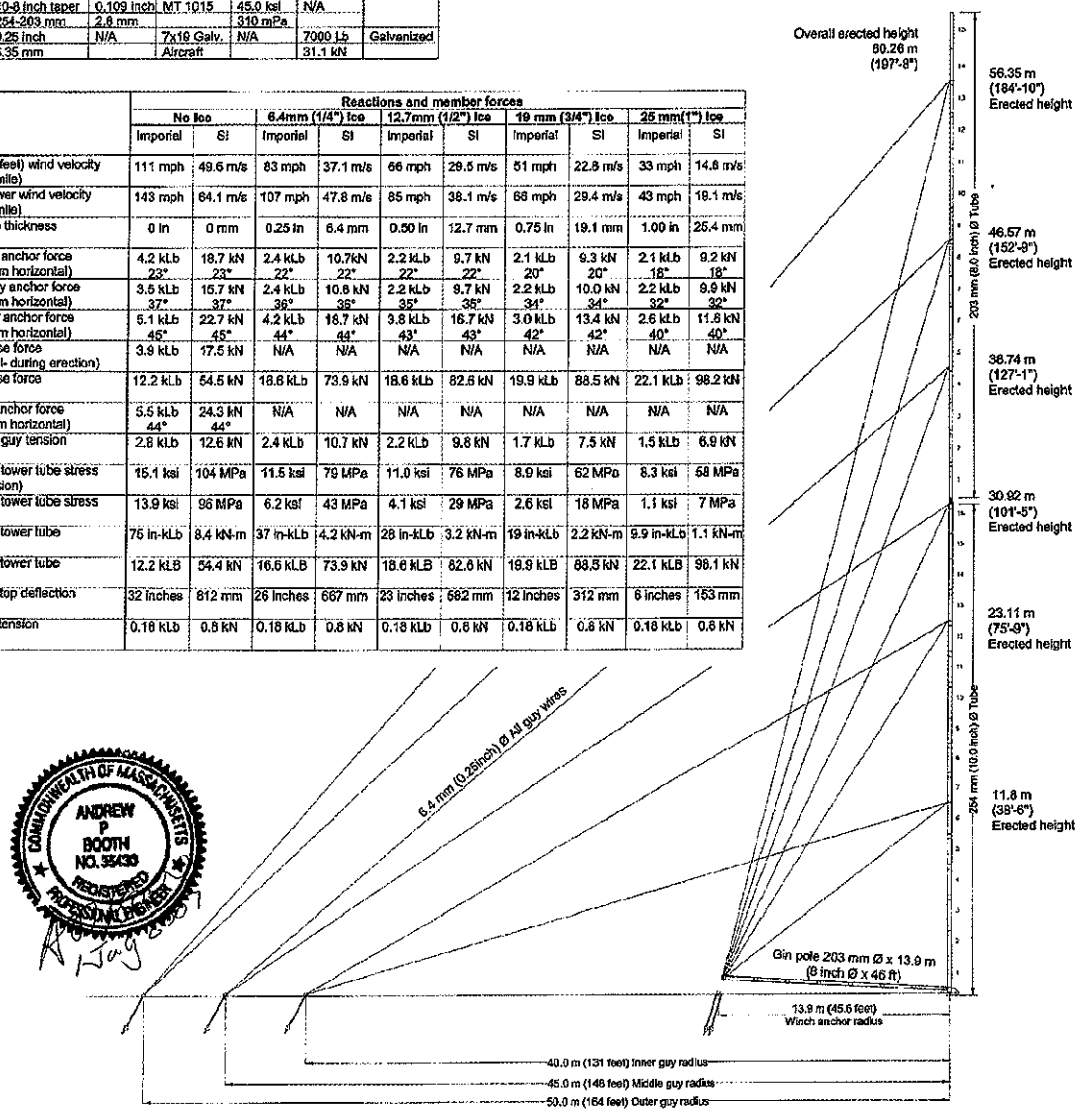
REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	Initial release	1 Jul 2007	A Booth

Materials

	Outer Diameter	Wall Thickness	Description	Yield Strength	Breaking Strength	Corrosion Protection
1	10 inch	0.099 inch	MT 1020	45.0 ksi	N/A	Hot Dipped Galvanized ASTM 653
	254 mm	2.51 mm		310 mPa		
2	8 inch	0.096 inch	MT 1020	45.0 ksi	N/A	
	203 mm	2.41 mm		310 mPa		
3	10-8 inch taper	0.109 inch	MT 1015	45.0 ksi	N/A	
	254-203 mm	2.6 mm		310 mPa		
4	0.25 inch	N/A	7x19 Galv. Aircraft	N/A	7000 Lb	Galvanized
	6.35 mm				31.1 kN	

Reactions and member forces

	No Ice		6.4mm (1/4") Ice		12.7mm (1/2") Ice		19 mm (3/4") Ice		25 mm(1") Ice	
	Imperial	SI	Imperial	SI	Imperial	SI	Imperial	SI	Imperial	SI
10 m (33 feet) wind velocity (Fastest mile)	111 mph	49.6 m/s	83 mph	37.1 m/s	66 mph	29.5 m/s	51 mph	22.8 m/s	33 mph	14.8 m/s
Top of tower wind velocity (Fastest mile)	143 mph	64.1 m/s	107 mph	47.8 m/s	85 mph	38.1 m/s	66 mph	29.4 m/s	43 mph	19.1 m/s
Radial ice thickness	0 in	0 mm	0.25 in	6.4 mm	0.50 in	12.7 mm	0.75 in	19.1 mm	1.00 in	25.4 mm
Inner guy anchor force (angle from horizontal)	4.2 kLb 23°	18.7 kN 23°	2.4 kLb 22°	10.7kN 22°	2.2 kLb 22°	9.7 kN 22°	2.1 kLb 20°	9.3 kN 20°	2.1 kLb 18°	9.2 kN 18°
Middle guy anchor force (angle from horizontal)	3.5 kLb 37°	15.7 kN 37°	2.4 kLb 36°	10.6 kN 36°	2.2 kLb 35°	9.7 kN 35°	2.2 kLb 34°	10.0 kN 34°	2.2 kLb 32°	9.9 kN 32°
Outer guy anchor force (angle from horizontal)	5.1 kLb 45°	22.7 kN 45°	4.2 kLb 44°	18.7 kN 44°	3.8 kLb 43°	16.7 kN 43°	3.0 kLb 42°	13.4 kN 42°	2.6 kLb 40°	11.6 kN 40°
Tower base force (horizontal- during erection)	3.9 kLb	17.5 kN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tower base force (vertical)	12.2 kLb	54.5 kN	16.6 kLb	73.9 kN	18.6 kLb	82.6 kN	19.9 kLb	88.5 kN	22.1 kLb	98.2 kN
Erection anchor force (angle from horizontal)	5.5 kLb 44°	24.3 kN 44°	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Maximum guy tension	2.8 kLb	12.6 kN	2.4 kLb	10.7 kN	2.2 kLb	9.8 kN	1.7 kLb	7.5 kN	1.5 kLb	6.9 kN
Maximum tower tube stress (compression)	15.1 ksi	104 MPa	11.5 ksi	79 MPa	11.0 ksi	76 MPa	8.9 ksi	62 MPa	8.3 ksi	58 MPa
Maximum tower tube stress (tension)	13.9 ksi	96 MPa	6.2 ksi	43 MPa	4.1 ksi	29 MPa	2.6 ksi	18 MPa	1.1 ksi	7 MPa
Maximum tower tube moment	75 in-kLb	8.4 kN-m	37 in-kLb	4.2 kN-m	28 in-kLb	3.2 kN-m	19 in-kLb	2.2 kN-m	9.9 in-kLb	1.1 kN-m
Maximum tower tube axial load	12.2 kLB	54.4 kN	16.6 kLB	73.9 kN	18.6 kLB	82.6 kN	19.9 kLB	88.5 kN	22.1 kLB	98.1 kN
Maximum top deflection	32 inches	812 mm	26 inches	667 mm	23 inches	582 mm	12 inches	312 mm	6 inches	153 mm
Initial guy tension	0.18 kLb	0.8 kN	0.18 kLb	0.8 kN	0.18 kLb	0.8 kN	0.18 kLb	0.8 kN	0.18 kLb	0.8 kN



COMMONWEALTH OF MASSACHUSETTS
ANDREW P BOOTH
NO. 35430
REGISTERED PROFESSIONAL ENGINEER

Notes
A) Wind forces and allowable member loads are calculated using ANSI TIA/EIA-222-F, (1996), "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures".
B) Wind speeds are fastest mile wind velocity per EIA-222-F. EIA-222-F wind loading coefficients: GF=1.69, CF=1.0, α =2/7.
C) Fastest mile (fm) wind speed can be converted to an approximate three second (3sec) wind speed using the equation:
V(3sec) =1.22 V(fm) for V(fm) <= 100 mph
D) Guy joint efficiency = 0.9 and the guy safety factor is greater than or equal to 2.0.
E) An ANSYS large deflection FEA model using beam (Pipe16) and tension (Link10) elements with distributed wind load was used to calculate member forces and reactions.
F) Tower allowable stress design per American Institute of Steel Construction (AISC) " Allowable Stress Design", 9th Ed. 1989. Chapter H, equations H1-1, H1-2
G) This tower design meets the structural requirements of EIA-222-F, sections 1,2,3,6,8 for the given loading condition. This analysis does not apply to EIA-222-F sections 7,11,12,13.
H) Foundation design must be considered separately and is not a part of this analysis. Foundation details must be approved for the specific application and site by a qualified professional.
I) A locally qualified professional must determine the applicability of this analysis for the expected site conditions. Due to the lack of involvement in the siting or construction phase of this product at a specific location, liability is strictly limited to issues arising from negligence or willful misconduct by NRG or the professional engineer completing this analysis. No warranty, expressed or implied, is made concerning the suitability of this product for a given application or location.
J) Given dimensions are nominal. Actual dimensions may vary.

Units notation

mm - Millimeters
m - Meters
m/s - Meters per second
kN - 1,000 Newtons
mPa - 1,000,000 Pascals
kLb - 1,000 US pounds
ksi - 1,000 US pounds per inch^2
mph - Miles per hour
Ø - Diameter

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES X ± .030 ± 1/16 .XX ± .015 .XXX ± .005 ± 1° DO NOT SCALE DRAWING

APPROVALS	DATE
DRAWN EMR	06/27/07
CHECKED APB	07/01/07
ENG APPR.	
MFG APPR.	

NRG SYSTEMS INC
110 RIGGS RD. HINESBURG, VT., 05461

TITLE: 60(50)mHD_60m with Large Footprint 254, 203 mm (10.0, 8.0 inch) diameter tube

SIZE B | DWG NO. N4344 | REV A

SCALE NTS | SHEET 1 of 1