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October 17, 2016

Via Electronic Filing

Ms. Barcy McNeal
Public Utilities Commission of Ohio
Administration/Docketing
180 East Broad Street, 11th Floor
Columbus, OH 43215-3793

Re: Hardin Wind Energy LLC, Case No. 09-479-EL-BGN

Dear Ms. McNeal:

The March 22, 2010 Opinion, Order, and Certificate (“Certificate”) approving Hardin Wind Energy LLC’s (“Hardin Wind Energy”) Certificate of Environmental Compatibility and Public Need established a set of conditions as part of the Certificate. On April 29, 2011 in Case No. 11-3446-EL-BGA, the Ohio Power Siting Board (“OPSB”) approved an amendment (“Amended Certificate”) to Hardin Wind Energy’s Certificate, which also established an additional set of conditions.

Within this set of conditions, **Certificate Condition No. 23** requires that:

At least 30 days before construction, Hardin shall submit to staff, for review and approval, the final turbine foundation design for each turbine location.

In compliance with Certificate Condition No. 23, attached is a copy of the turbine foundation design.

If you have any questions please call at the number listed above.

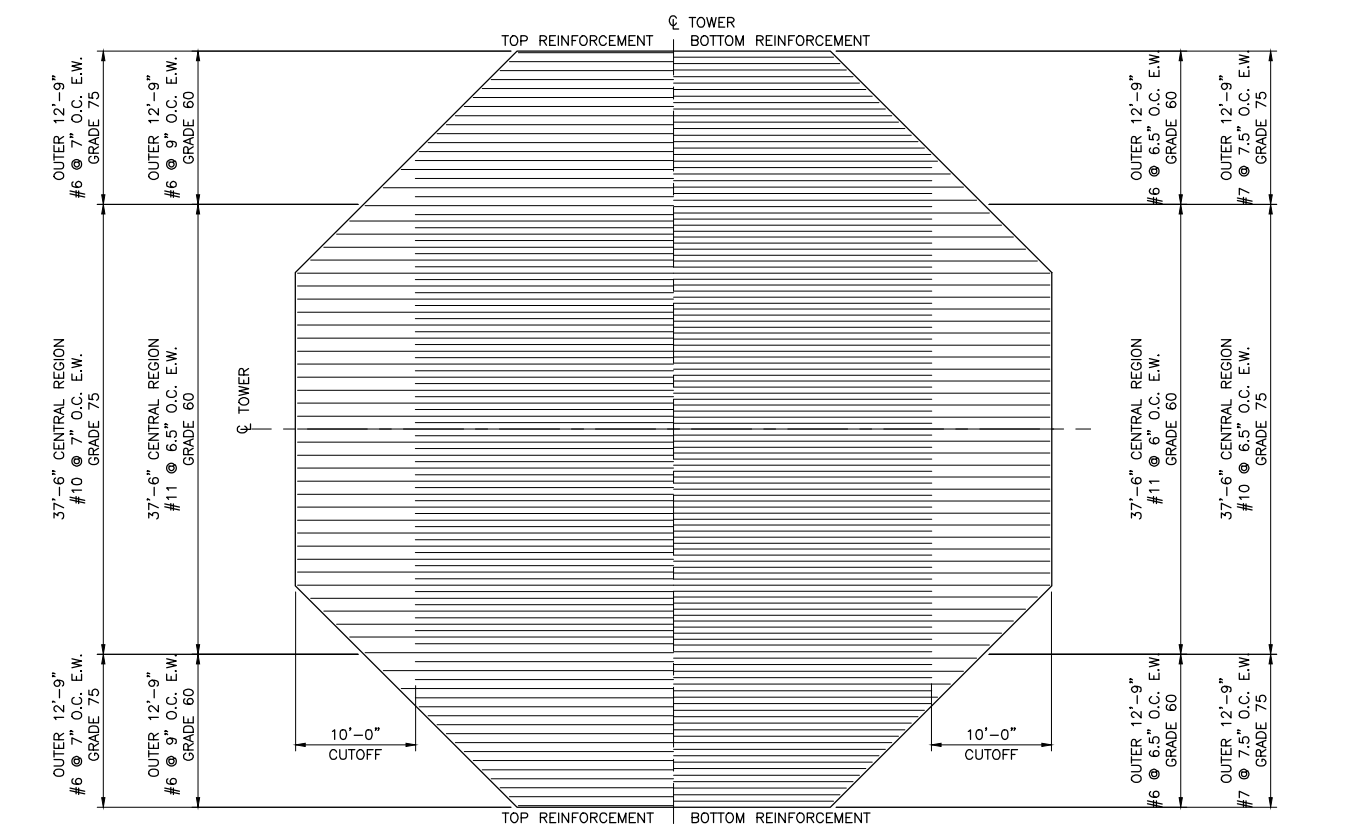
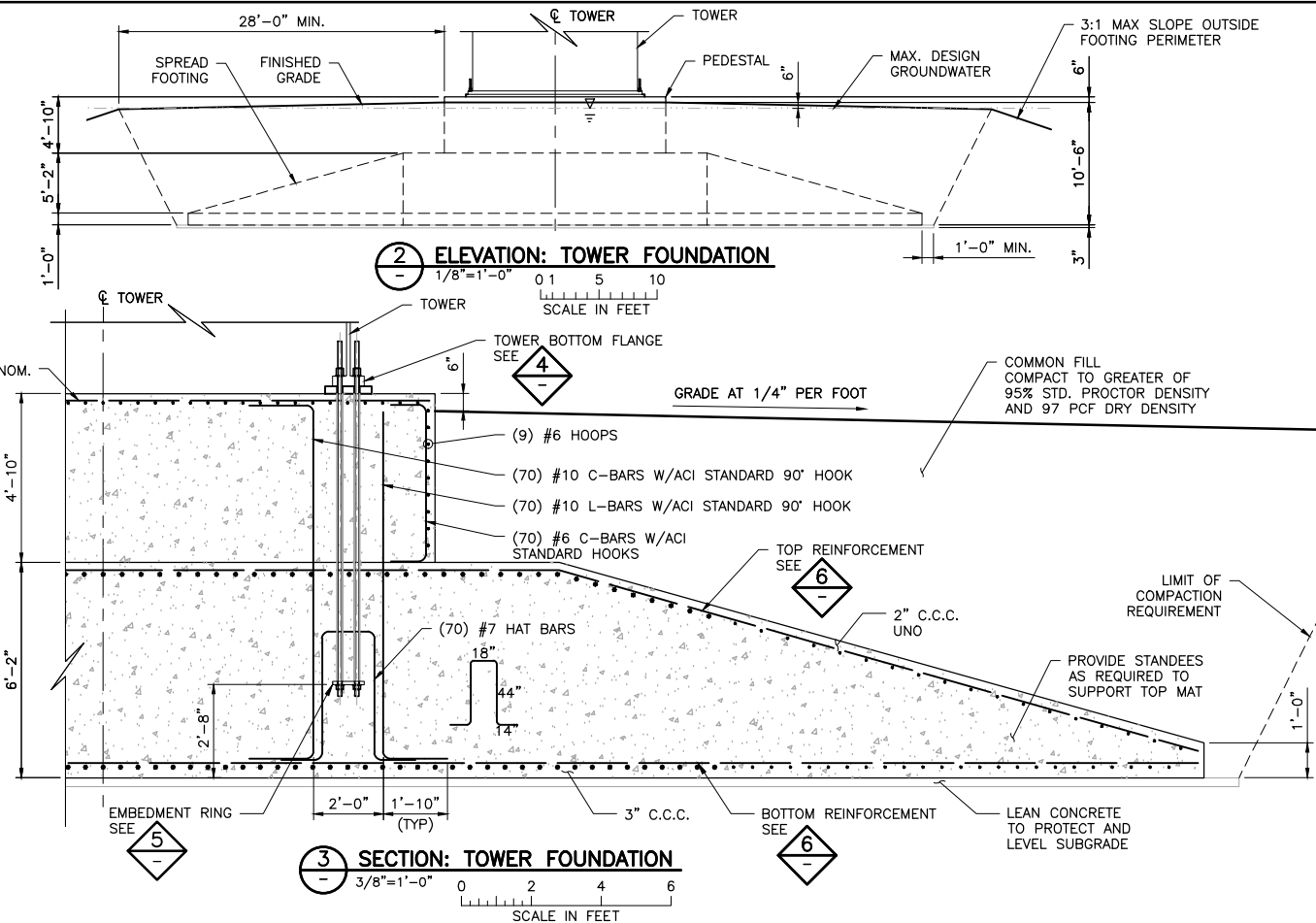
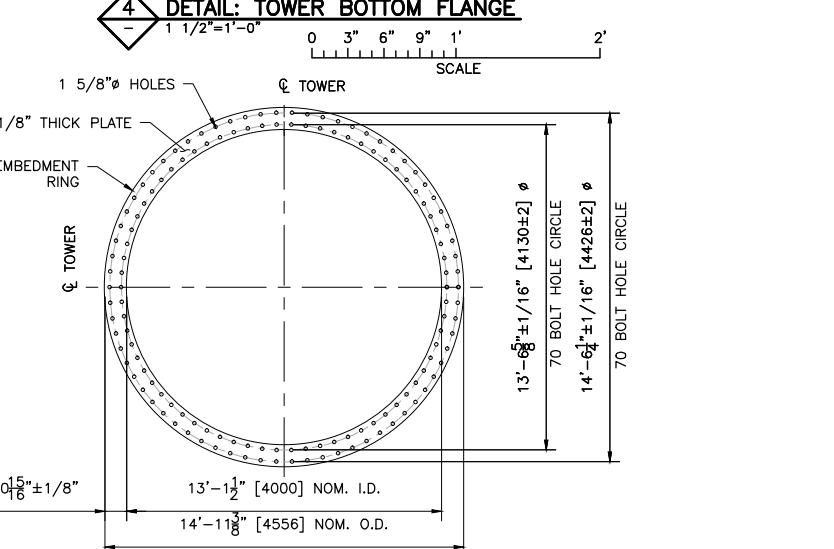
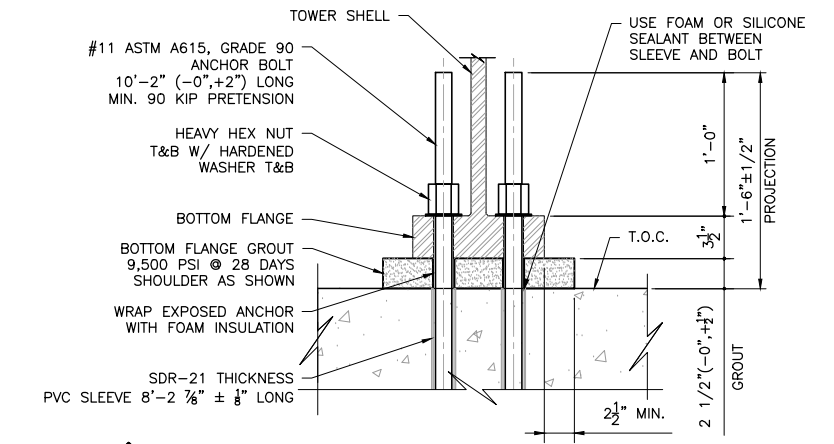
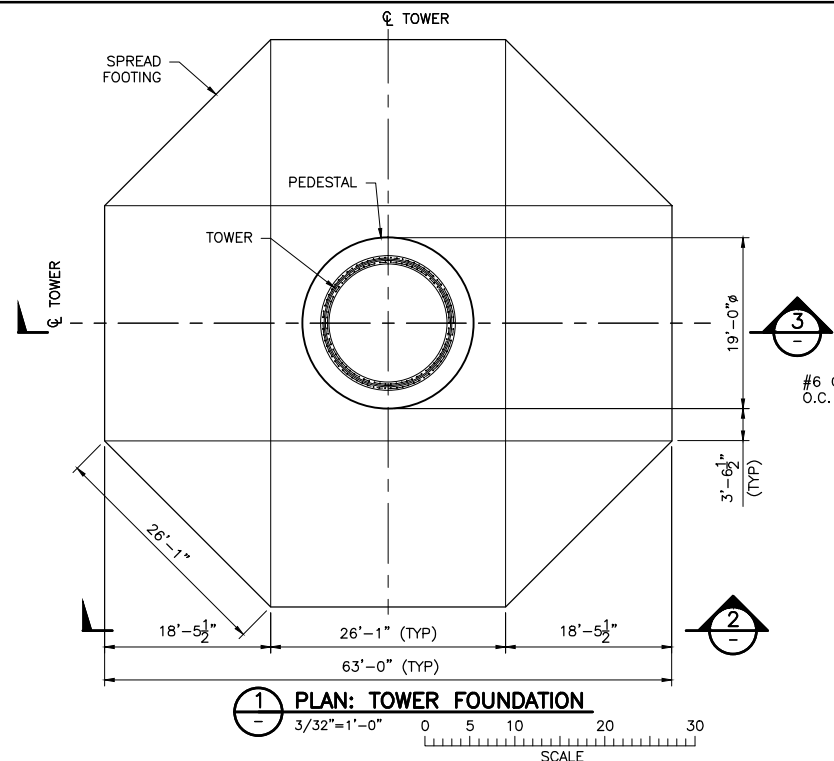
Sincerely,

Sally W. Bloomfield

Attachment

cc: Andrew Conway (w/Attachment)
Derek Collins (w/Attachment)

CADD USER: Jennifer A. Entwistle FILE: M:\ADPTWORK\JMW_35331001.01_S-01.DWG PLOT SCALE: 1:2 PLOT DATE: 7/29/2016 4:03 PM
 BARR MA AutoCAD 2011 Support\enu\template\Barr_2011_Template.dwt Plot at 1 10/05/2010 14:03:50



**PRELIMINARY
NOT FOR CONSTRUCTION**

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
A	JMW	JAD2	MBJ	07/29/16	PRELIMINARY DESIGN

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF OHIO.
 PRINTED NAME: _____
 SIGNATURE: _____
 DATE: _____ LICENSE # _____

CLIENT	7/29
CONSTRUCTION	
RELEASED TO/FOR	A B C O 1 2 3
DATE RELEASED	

BARR ENGINEERING CO.
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 MINNEAPOLIS, MN 55435
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 Suite 200
 MINNEAPOLIS, MN 55435
 Ph: 1-800-632-2277
 Fax: (952) 832-2601
 www.barr.com

Scale	AS SHOWN
Date	7/29/1016
Drawn	JMW
Checked	JAD2
Designed	JAD2
Approved	MBJ

INVENERGY, LLC
CHICAGO, ILLINOIS

BUILDING AND DESIGN CODES:
 INTERNATIONAL BUILDING CODE 2012, INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS.
 BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE, ACI 318, 2011, AMERICAN CONCRETE INSTITUTE.

WIND TURBINE AND TOWER:
 MANUFACTURER: GE
 MODEL: 2.3-116
 POWER OUTPUT: 2.3 MW
 TURBINE HUB HEIGHT: 94m
 ROTOR DIAMETER: 116m

DESIGN SERVICE LOADS:
 ABNORMAL EXTREME LOAD DLC LOAD CASE 2.2 - IN LIEU OF IEC 1.10 LOAD FACTOR APPLY 1.14 LOAD FACTOR TO THAT LISTED BELOW TO MEET GE REQUIREMENTS WHEN USING ACI 318.
 OVERTURNING MOMENT, MXY = 66,516 KN-M = 49,060 FT-KIPS
 HORIZONTAL BASE SHEAR, HXY = 789 KN = 177 KIPS
 VERTICAL TOWER LOAD, WZ = 3,150 KN = 708 KIPS

NOTE: ALL LOAD COMBINATIONS INCLUDE A 1,500 kN-m MISALIGNMENT LOAD

FOUNDATION DESIGN DATA:
 MIN. FACTOR OF SAFETY AGAINST OVERTURNING: >1.5
 MIN. FACTOR OF SAFETY AGAINST SLIDING: >1.5
 MIN. FACTOR OF SAFETY AGAINST BEARING CAPACITY FAILURE: >2.26 ON EXTREME

REFERENCE DOCUMENTS:
 1. GE POWER & WATER, "FOUNDATION LOAD SPECIFICATION FOR WIND TURBINE GENERATOR SYSTEMS, 2.3-116, 50hz/60hz, 94m HUB HEIGHT, GE56.9/LM56.9 BLADE, STANDARD WEATHER/COLD WEATHER EXTREME IEC CLASS S," 2015.
 2. BARR ENGINEERING COMPANY, "GEOTECHNICAL ENGINEERING REPORT, HARDIN WIND PROJECT, HARDIN COUNTY, OHIO," JANUARY 2012.

MIN. 28-DAY COMPRESSIVE STRENGTH CONCRETE:
5000 PSI

MIN. YIELD POINT STRENGTH OF REINFORCING BAR:
60 KSI UNO

MIN. STRENGTH OF ANCHOR BOLTS:
TENSILE STRENGTH 120 KSI YIELD STRENGTH 90 KSI

MIN. 28-DAY COMPRESSIVE STRENGTH OF NON-SHRINK GROUT:
9,500 PSI

MIN. YIELD POINT STRENGTH OF EMBEDMENT PLATE:
36 KSI

VOLUME OF FOUNDATION AS DIMENSIONED:
531 CUBIC YARDS

ESTIMATED WEIGHT OF STEEL REINFORCING:
 GRADE 60 OPTION: 50.9 TONS
 GRADE 75 OPTION: 35.8 TONS GRADE 75, 6.2 TONS GRADE 60

COARSE AGGREGATE GRADATION:
 ASTM C33 (SIZE NUMBER 6 OR 67) WITH A MINIMUM OF 2% RETAINED ON THE 3/4-INCH SIEVE.

ABBREVIATIONS:
 B.O. BOTTOM OF
 C.C.C. CLEAR CONCRETE COVER
 C.L. CENTER LINE
 EL. ELEVATION
 E.O. EACH WAY
 EX. EXISTING
 I.D. INSIDE DIAMETER
 MIN. MINIMUM
 NOM. NOMINAL
 Ø DIAMETER
 O.C. ON CENTER
 O.D. OUTSIDE DIAMETER
 R RADIUS
 T&B TOP AND BOTTOM
 T.O.C. TOP OF CONCRETE
 TYP. TYPICAL
 UNO UNLESS NOTED OTHERWISE
 MAX. MAXIMUM
 W/ WITH

CONFIDENTIAL
 THIS DRAWING IS THE PROPERTY OF BARR ENGINEERING COMPANY (BARR). NO OTHER USE IS PERMITTED WITHOUT THE WRITTEN PERMISSION OF BARR. ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED.

**HARDIN WIND PROJECT
HARDIN COUNTY, OHIO**

**SPREAD FOOTING FOUNDATION
PLAN, ELEVATION, SECTION & DETAILS**

BARR PROJECT No. **35331001.01**
 CLIENT PROJECT No. _____
 DWG. No. **S-01** REV. No. **A**

This foregoing document was electronically filed with the Public Utilities

Commission of Ohio Docketing Information System on

10/17/2016 9:59:15 AM

in

Case No(s). 09-0479-EL-BGN

Summary: Correspondence of Hardin Wind Energy LLC in Compliance with Certificate Condition No. 23 - Turbine Foundation Design electronically filed by Teresa Orahood on behalf of Sally W. Bloomfield