

A black and white photograph of three tall, lattice-structured radio towers standing on a grassy hill. In the foreground, a two-story building with a central entrance and several windows is visible. The sky is overcast. A dark horizontal band is overlaid across the middle of the image, serving as a background for the text.

N8XPK 2018 Tower Build

Silvercreek Amateur Radio Association November 2018 Meeting

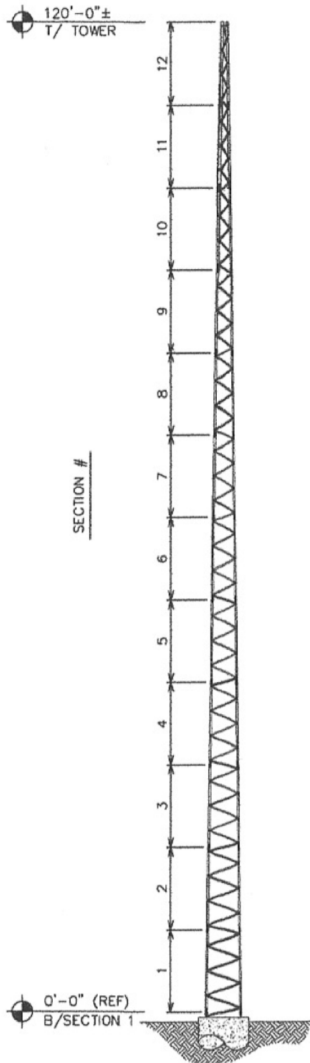
About N8XPK

- Ham since 1991
- Owner of Baker Tower Inc. for 25 years
- Installed dozens of towers
- Climbed hundreds of towers
- Owner of 2 commercial towers

What this presentation will cover

- **What goes into planning a tower install**
- **Guyed or self support?**
- **My new home tower install**
 - **Planning**
 - **Getting the tower and material**
 - **Preparing**
 - **Foundation**
 - **Installing the tower**
 - **Adding antennas**

Planning – Manufacturer Datasheets



TOWER ELEVATION

N.T.S.

ALLOWABLE DESIGN LOADING FOR ROUND APPURTENANCES														
(SEE FOOTNOTE 2 FOR LOADING CONFIGURATIONS WITH FLAT APPURTENANCES)														
TOWER HEIGHT (FT)	TOWER MODEL	TOWER SECTION	90-mph BWS		100-mph BWS		110-mph BWS		120-mph BWS		130-mph BWS		140-mph BWS	
			AREA, A _o (sq ft)	FOUNDATION TYPE	AREA, A _o (sq ft)	FOUNDATION TYPE	AREA, A _o (sq ft)	FOUNDATION TYPE	AREA, A _o (sq ft)	FOUNDATION TYPE	AREA, A _o (sq ft)	FOUNDATION TYPE	AREA, A _o (sq ft)	FOUNDATION TYPE
100	HHD-100	1-10	43.5	G	23.5	G	8.5	G	-	-	-	-	-	-
90	HHD-90	1-9	52.0	G	32.5	G	18.5	G	5.0	G	-	-	-	-
80	HHD-80	1-8	75.0	G	50.0	G	32.5	G	10.0	G	-	-	-	-

NOTES:

1. TOWER DESIGNS ARE IN ACCORDANCE WITH THE APPROVED NATIONAL STANDARD, ANSI/TIA-222-G, USING THE FOLLOWING DESIGN CRITERIA:

EXPOSURE CATEGORY B: URBAN AND SUBURBAN AREAS, WOODED AREAS, OR OTHER TERRAIN WITH NUMEROUS CLOSELY SPACED OBSTRUCTIONS HAVING THE SIZE OF SINGLE-FAMILY DWELLINGS OR LARGER.

STRUCTURE CLASS 1: STRUCTURES THAT DUE TO HEIGHT, USE OR LOCATION REPRESENT A LOW HAZARD TO HUMAN LIFE AND DAMAGE TO PROPERTY IN THE EVENT OF FAILURE AND/OR USED FOR SERVICES THAT ARE OPTIONAL AND/OR WHERE A DELAY IN RETURNING THE SERVICES WOULD BE ACCEPTABLE.

TOPOGRAPHIC CATEGORY 1: NO ABRUPT CHANGES IN GENERAL TOPOGRAPHY, E.G. FLAT OR ROLLING TERRAIN, NO WIND SPEED UP CONSIDERATION SHALL BE REQUIRED.



2. THE ALLOWABLE APPURTENANCE AREAS, A_o (SQ FT), ARE CALCULATED FOR ROUND OR CYLINDRICAL APPURTENANCES. WHEN LOADING INCLUDES FLAT APPURTENANCES OR FLAT COMPONENTS, THE ALLOWABLE A_o LISTED SHALL BE REDUCED BY A FACTOR OF 0.7.

3. LOADING VALUES ASSUME THREE (3) 1/2" TRANSMISSION LINES SYMMETRICALLY PLACED AROUND THE TOWER.

4. THE FULL ALLOWABLE LOADING SHALL NOT BE PLACED HIGHER THAN 5-FT ABOVE THE TOP OF TOWER.

5. FOUNDATIONS HAVE BEEN DESIGNED FOR THE PRESUMPTIVE SOIL PARAMETERS PROVIDED IN ANNEX F OF THE TIA-222-G STANDARD FOR A CLAY SOIL TYPE.

6. ALL TOWER INSTALLATIONS SHALL BE GROUNDED IN ACCORDANCE WITH LOCAL AND NATIONAL CODES.

<p>PREPARED FOR:</p> <p> AN Wireless Towers</p> <p>350 Kuhn Fording Road East Berlin, PA 17316 Office: (717) 259-0419 Mobile: (717) 465-0519 www.anwtowers.com</p>	<p>PREPARED BY:</p> <p> TOWER ENGINEERING PROFESSIONALS</p> <p>326 Tryon Road Raleigh, NC 27603 Office: (919) 661-6351 Fax: (919) 661-6350 www.tepgroup.net</p>	<p>SHEET TITLE:</p> <p>HHD TOWER MODELS ALLOWABLE DESIGN LOADING</p> <p>DESIGN INFORMATION:</p> <p>STANDARD: ANSI/TIA-222-G-1 EXPOSURE CATEGORY: B STRUCTURE CLASSIFICATION: 1 TOPOGRAPHIC CATEGORY: 1 SOIL TYPE: CLAY</p> <p>TEPJOE #: 090003.10 DRAWN BY: PEH REV: 1</p>
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Planning – Manufacturer Datasheets

ALLOWABLE DESIGN LOADING FOR ROUND APPURTENANCES

(SEE FOOTNOTE 2 FOR LOADING CONFIGURATIONS WITH FLAT APPURTENANCES)

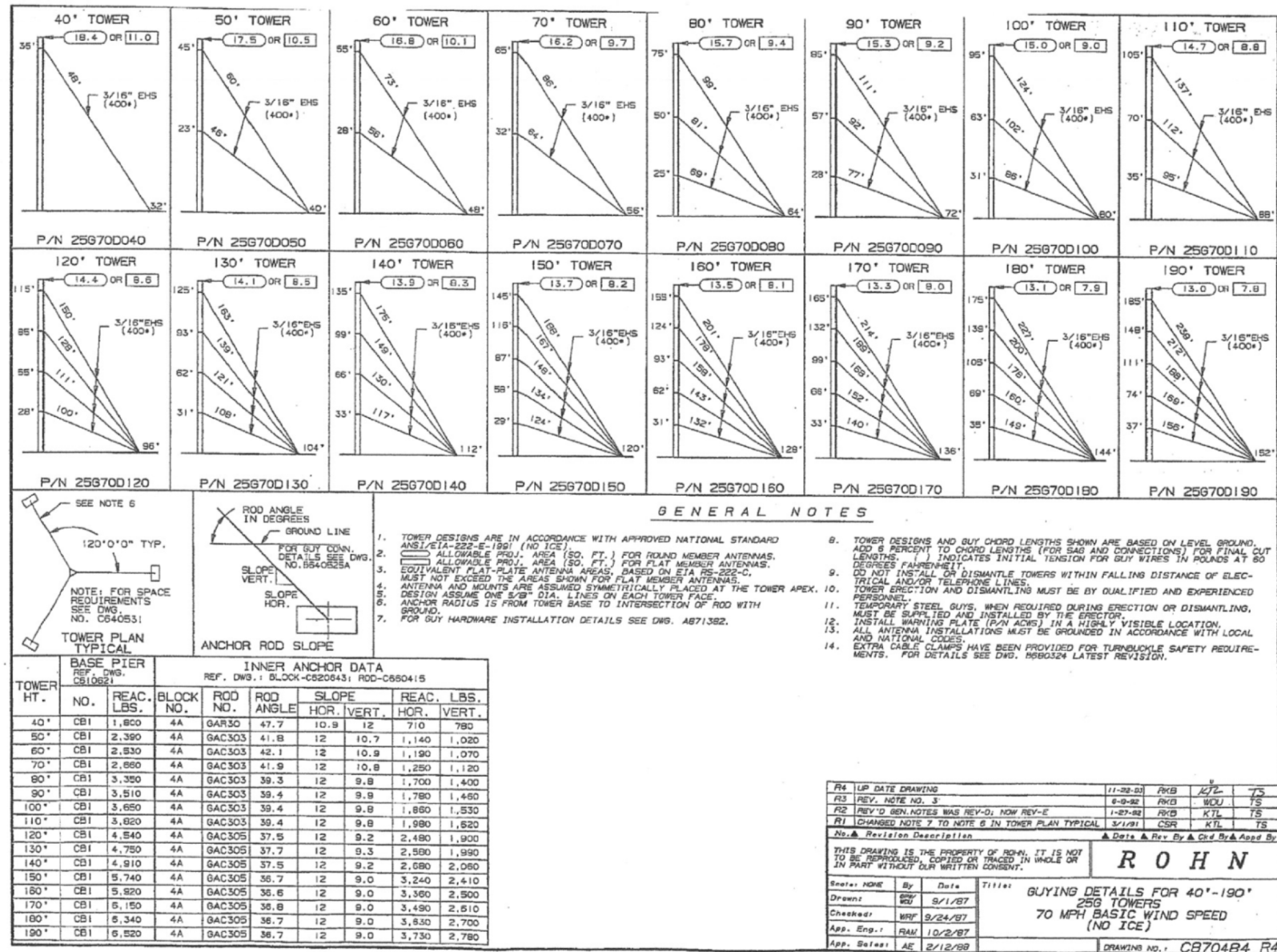
TOWER HEIGHT (FT)	TOWER MODEL	TOWER SECTION	90-mph BWS		100-mph BWS		110-mph BWS		120-mph BWS		130-mph BWS		140-mph BWS	
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ALLOWABLE DESIGN LOADING FOR ROUND APPURTENANCES

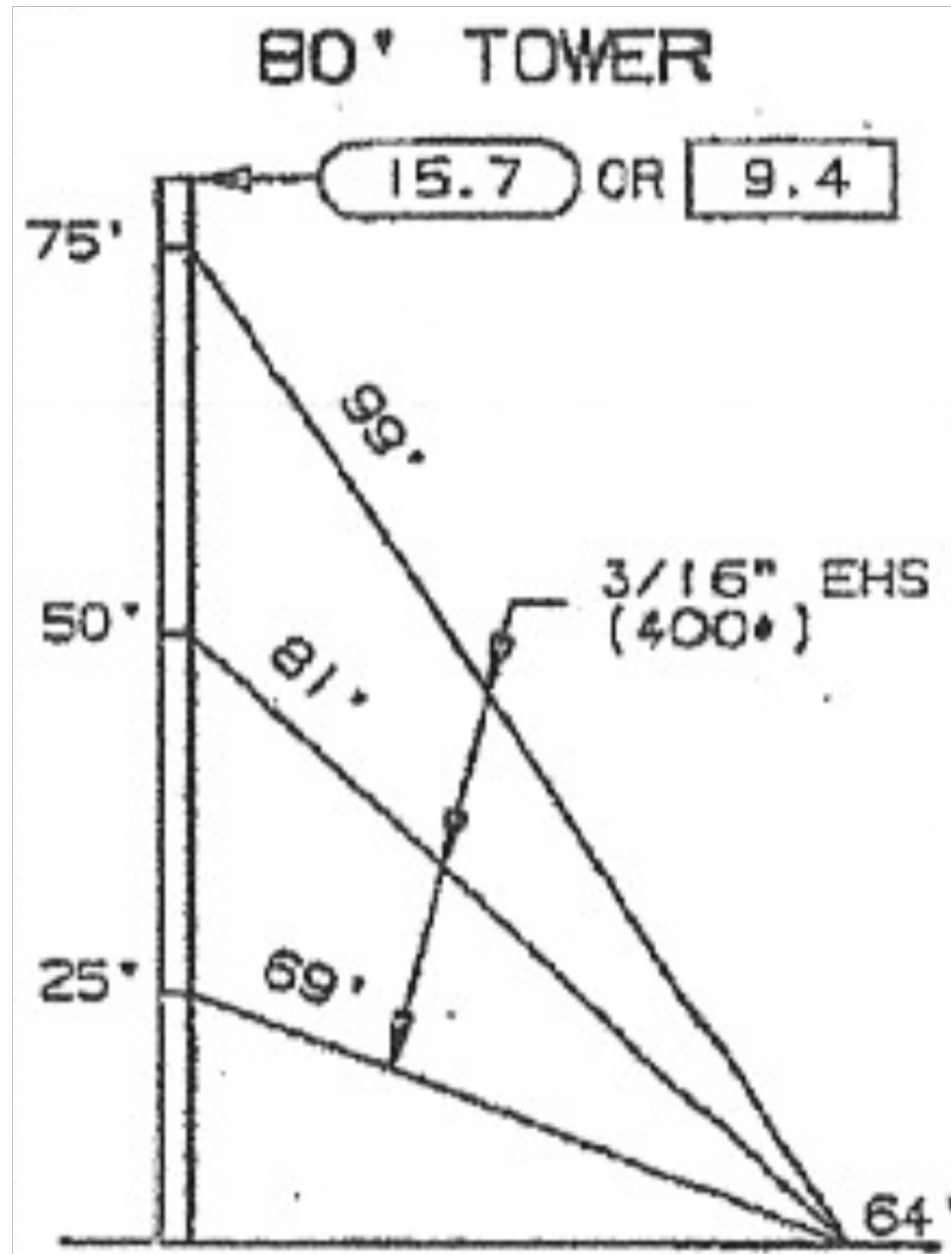
(SEE FOOTNOTE 2 FOR LOADING CONFIGURATIONS WITH FLAT APPURTENANCES)

TOWER HEIGHT (FT)	TOWER MODEL	TOWER SECTION	90-mph BWS		100-mph BWS		110-mph BWS		120-mph BWS		130-mph BWS		140-mph BWS	
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120	HD-120	1-12	15.0	G	-	-	-	-	-	-	-	-	-	-
100	HD-100	3-12	20.0	G	5.0	F	-	-	-	-	-	-	-	-
90	HD-90	3-11	35.0	F	17.5	F	6.0	F	-	-	-	-	-	-
	LD-90	4-12	27.5	E	12.5	E	1.5	E	-	-	-	-	-	-
80	HD-80	3-10	52.5	F	32.5	F	20.0	F	8.5	F	-	-	-	-
	LD-80	5-12	28.5	E	16.0	E	6.0	E	-	-	-	-	-	-
70	HD-70	3-9	75.0	F	52.5	F	36.0	F	23.5	F	11.0	F	6.0	F
	LD-70	6-12	30.0	D	20.0	D	10.0	D	3.5	D	-	-	-	-
60	HD-60	3-8	107.5	F	78.5	F	58.5	F	42.5	F	30.0	F	20.0	F
	LD-60	7-12	30.0	C	20.0	D	10.0	D	3.5	D	-	-	-	-
50	HD-50	3-7	135.0	F	105.0	F	80.0	F	62.5	F	47.5	F	37.5	F
	LD-50	8-12	35.0	C	27.5	C	21.0	C	15.0	C	10.0	C	5.0	C
40	HD-40	3-6	187.5	F	147.5	F	117.5	F	95.0	F	75.0	F	62.5	F
	LD-40	9-12	37.5	C	28.5	C	22.5	C	17.5	C	13.5	C	10.0	C
30	HD-30	3-5	255.0	F	195.0	F	150.0	F	120.0	F	95.0	F	75.0	E
	LD-30	10-12	41.0	B	32.5	B	25.0	B	18.5	B	15.0	A	11.0	B
20	HD-20	3-4	265.0	D	206.0	E	165.0	E	132.5	E	107.5	E	87.5	D
	LD-20	11-12	41.0	A	32.5	A	25.0	A	18.5	A	15.0	A	11.0	A

Planning – Manufacturer Datasheets



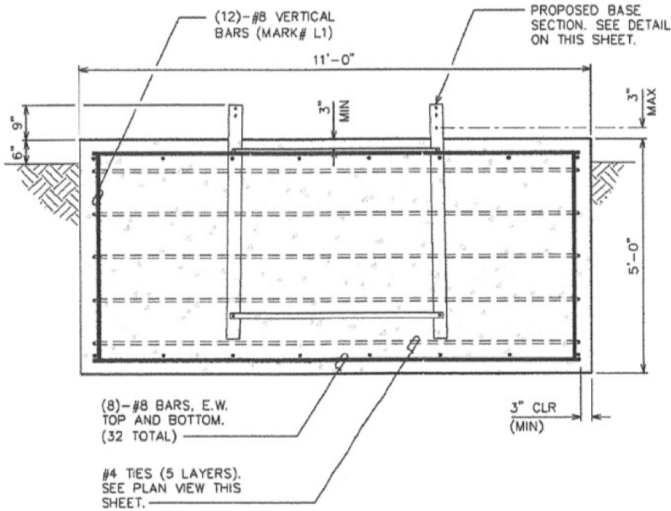
Planning – Manufacturer Datasheets



Planning – Manufacturer Datasheets

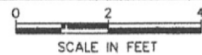
NOTE:

TOP AND BOTTOM BARS
NOT SHOWN FOR CLARITY.



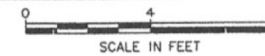
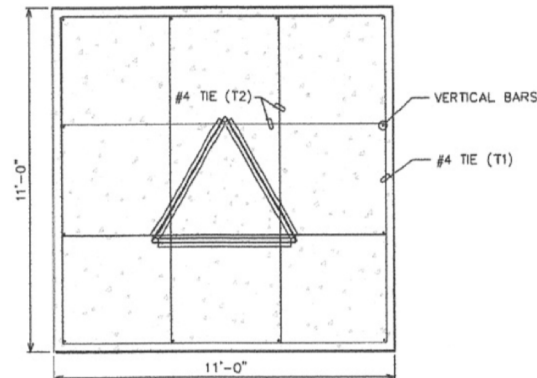
FOUNDATION ELEVATION

SCALE: $\frac{3}{8}" = 1'-0"$



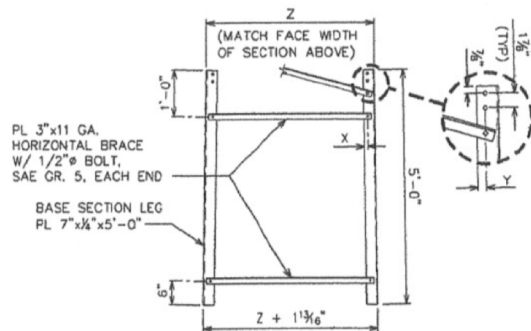
FOUNDATION PLAN VIEW

SCALE: $\frac{3}{8}" = 1'-0"$



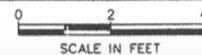
NOTE:

DIMENSIONS X, Y, AND Z TO MATCH THOSE OF SECTION ABOVE



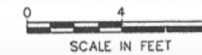
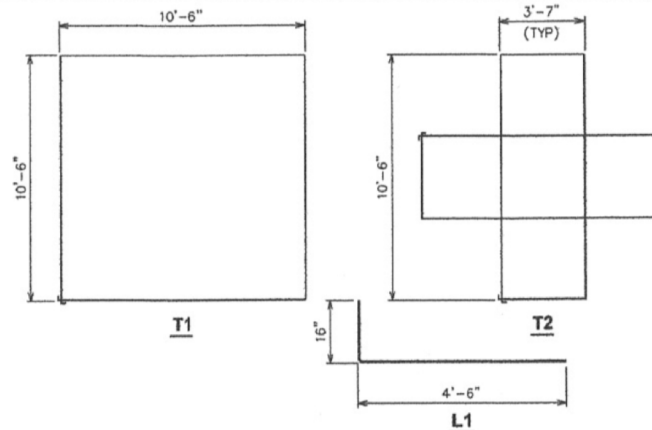
BASE SECTION ELEVATION

SCALE: $\frac{3}{8}" = 1'-0"$



BAR DETAILS

SCALE: $\frac{3}{8}" = 1'-0"$



REINFORCEMENT SCHEDULE

BAR	#	QUANTITY	LENGTH
TOP BARS	8	16	10'-6"
BOTTOM BARS	8	16	10'-6"
VERTICAL BARS	8	12	5'-10"
TIE (T1)	4	5	42'-8"
TIE (T2)	4	10	28'-10"

NOTES

- 3" COVER FOR ALL STEEL IN THE FOUNDATION IS REQUIRED.
- CONCRETE SHALL BE 4000 PSI AT 28 DAYS.
- ALL STEEL REINFORCEMENT SHALL BE ASTM A615, GR. 60.
- FOUNDATION DESIGN BASED ON THE PRESUMPTIVE SOIL PARAMETERS LISTED IN ANNEX F OF THE TR-222-G STANDARD.
- FOUNDATION PIER IS DESIGNED AS STRUCTURAL PLAIN CONCRETE.
- THEORETICAL WEIGHT OF BASE SECTION BEFORE GALVANIZING IS 100 LBS.
- TACK WELDS ARE PERMITTED ON PROPOSED REINFORCEMENT CAGE.
- INSTALL TOWER BASE SECTION AFTER SETTING BOTTOM STEEL REINFORCING AND PRIOR TO SETTING VERTICAL BARS, TIES, AND TOP STEEL.

TOWER MANUFACTURER:

TOWER DESIGNER:

AN Wireless Towers

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Office: (717) 259-0419
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Office: (919) 661-6351
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PROJECT INFORMATION:

FOUNDATION TYPE G

0 03-15-10 STANDARD DRAWINGS

REV DATE ISSUED FOR: PLANNING

JOB #: 090003.10 DRAWN BY: PE1 CHECKED BY: REG

SHEET TITLE:

SOLID BLOCK
FOUNDATION

FOUNDATION TYPE:

G

REVISION:

0

Planning – Manufacturer Datasheets

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Wind Loading revision

Allowable Design Loading & Foundation Plans - TIA Revision G

Updated March 15, 2010

AN Wireless Tower Company, LLC has modified our Allowable Design Loading tables and Foundation Plans to adhere to Approved National Standard ANSI/TIA-222-G. This Standard, sometimes referred to simply as 'Revision G' has replaced ANSI/TIA/EIA-222-F.

Revision G requires more site-specific parameters be given consideration prior to both specification and construction of tower and foundation, as compared to Revision F. Some of these parameters which now require attention include Exposure Category, Structure Classification and Topographic Category. The minimum design windspeed has gone from 70-mph fastest-mile under Revision F, to 90-mph 3-second gust under Revision G. With new wind force equations in Revision G, the change in wind speeds alone does not produce a significant change to the wind forces on towers. The introduction of the parameters listed above is proving to have a more substantial impact. In addition, the Soil Type now carries a more finite definition as compared to the 'Normal Soil' specification which was phased out with Revision F.

It is ultimately up to the purchaser to properly specify a tower for a given site. Care must be taken in order to fully understand the information contained in our Allowable Design Loading tables, which are displayed as PDF files accessed through the links below.

The 'Sheet Title' block found in the lower right hand corner of each Allowable Design Loading table includes Category, Classification and Soil Type description information for that table.

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Wind Loading Categories and Exposures

Wind Exposure Categories

Exposure Categories can have a significant effect on the design wind pressures for fenestration products such as vehicular access doors. For such doors, the design wind pressure values can vary by 30% or more, resulting in doors with a great difference in materials needed. This article will overview some easy-to-recognize conditions that would help distinguish between Exposure B and Exposure C, two common alternatives to choose from at a building site.

What are Exposures B and C?

It is important to know how ASCE 7, Minimum Design Loads for Buildings and Other Structures, describes each category. ASCE 7 is the standard by which wind pressures are determined, and is referenced in model codes adopted as base codes by most every U.S. state.

Exposure Categories are based on "surface roughness", defined as follows for buildings less than 30 feet high.

Exposure B: Urban and suburban areas, wooded areas, or other terrain with numerous closely spaced obstructions having the size of single-family dwellings or larger, prevailing for a distance greater than 1,500 feet in any direction from the installation.

Exposure C: Open terrain with scattered obstructions having heights generally less than 30 feet. (Commonly associated with flat open country and grasslands).

A Word about Exposure D

Exposure D involves a structure a close distance (typically within 600 feet) from an "open waterway" one mile or more across. This category is readily distinguishable, where the locally enforced code very likely has considered this in their requirements.

Ready for installation



Rotor and thrust bearing plates



First – remove the old base



The Original Tower in 1985



Digging the foundation



Foundation hole almost complete



The base section



Placing the base



Rebar and forms ready for concrete



Rebar and forms ready for concrete



Two trucks standing by



The Pour



The Pour



Finishing



Finishing



Base complete - curing



Top section



Tower delivery



Tower assembly



Crane ready to lift



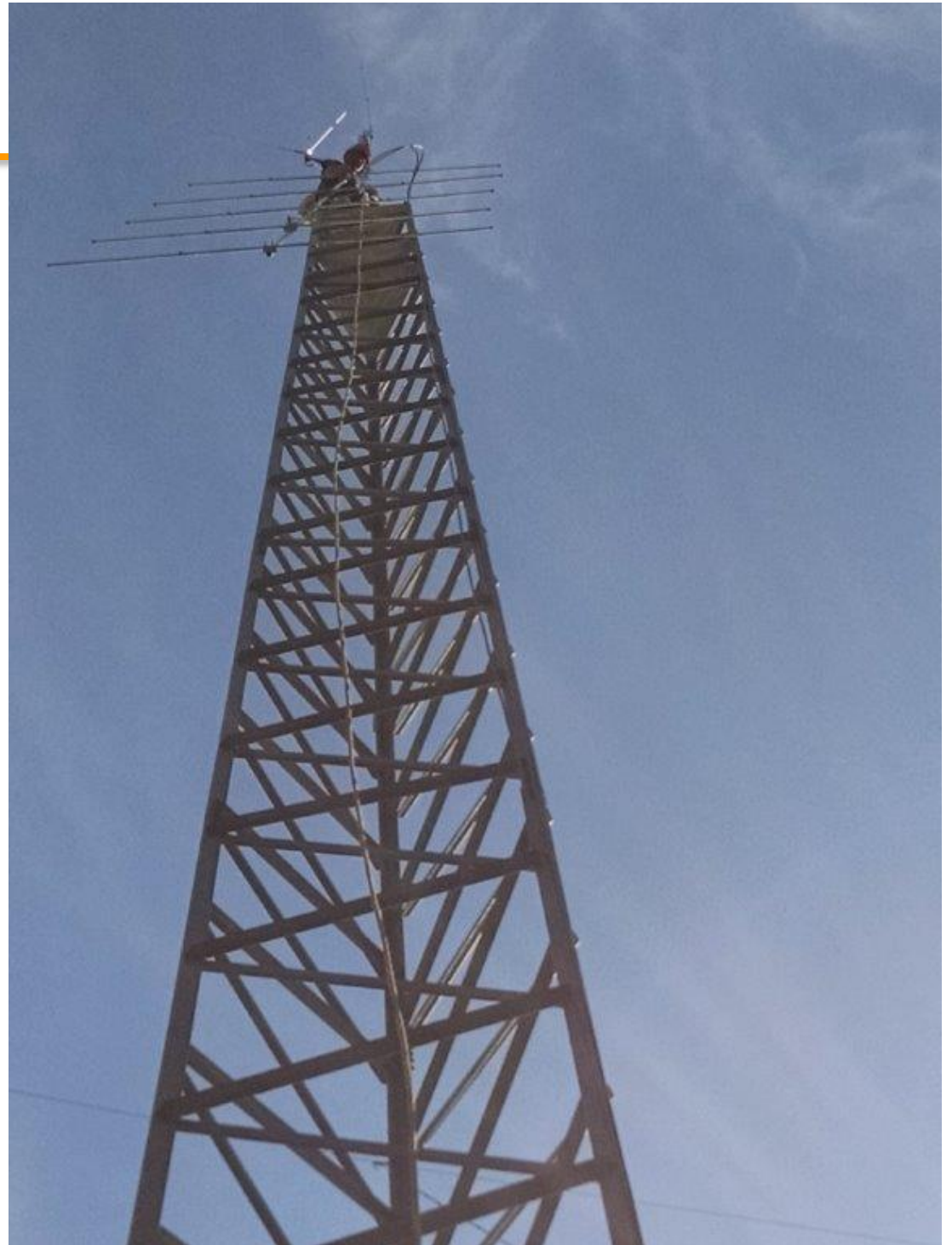
Crane lifting



Tower Erected



6m Beam



The finished product



Mosley Pro67 B assembly



Mosley Pro67 B assembly



Safety gear for climbing



The finished product



The Finished Product



Finish Product

