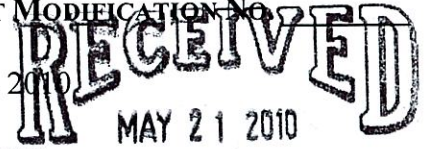


## CONNECTICUT SITING COUNCIL

In re:

Clear Wireless LLC Notice to Make an Exempt : EXEMPT MODIFICATION No.  
Modification to an Existing Facility at :  
100 Reef Road, Fairfield, Connecticut. : May 21, 2010

 RECEIVED  
MAY 21 2010NOTICE OF EXEMPT MODIFICATIONCONNECTICUT  
SITING COUNCIL

Pursuant to Conn. Agencies Regs. §§ 16-50j-73 and 16-50j-72(b), Clear Wireless LLC

("Clearwire") hereby gives notice to the Connecticut Siting Council ("Council") and the Town of Fairfield of Clearwire's intent to make an exempt modification to a monopole tower (the "Tower") at 100 Reef Road in Fairfield, Connecticut. Specifically, Clearwire plans to remove and replace 3 antennas, add 6 Remote Radio Heads and add 2 Dragonwave dishes required for backhaul. Under the Council's regulations (Conn. Agencies Regs. § 16-50j-72(b)), Clearwire's plans do not constitute a modification subject to the Council's review because Clearwire will not change the height of the tower, will not extend the boundaries of the compound, will not increase the noise levels at the site, and will not increase the total radio frequency electromagnetic radiation power density at the site to levels above applicable standards.

Clearwire is currently developing a 4G wireless broadband network to provide high-speed wireless data and VoIP service within the State of Connecticut. Clearwire's 4G service leverages the WiMAX technology to enable enhanced wireless data communications. In order to accomplish the upgrade at this site, Clearwire plans to remove and replace 3 antennas, add 6 Remote Radio Heads, add 2 dishes and install additional WiMAX-related electronic equipment at the base of the Tower.

The Tower is a 145-foot monopole tower located at 100 Reef Road in Fairfield, Connecticut (latitude 41° 08' 23", longitude -73° 15' 28"). The Tower is owned by the Town of

Fairfield. Multiple carriers are currently located on the Tower. Presently, Nextel has 12 CDMA antennas spread over three sectors with an antenna centerline at 145 feet. Nextel's base station equipment is located adjacent to the base of the Tower. A site plan with the Tower specifications is attached.

Clearwire plans to remove 3 existing antennas and replace 3 of the existing antennas with 3 WiMAX antennas (one per sector). Clearwire also plans to add 6 Remote Radio Heads and 2 Dragonwave dishes to the Tower. The new antennas, Remote Radio Heads and Dragonwave dishes will have the same centerline as the existing antennas – 145 feet. Six cables, 5/16" in diameter, will run to the new WiMAX antennas (two per panel). Additionally, 2 cables, 1/2" in diameter, will run to the new Dragonwave dishes (one per dish). To confirm that the Tower can support these changes, Clearwire commissioned FHD Engineering to perform a structural analysis of the Tower (attached). According to the structural analysis dated May 6, 2010, "... the foundation should have the necessary capacity to support the existing and proposed loading ... " (Page 1, Structural Analysis, emphasis in original).

Within the existing compound Clearwire will install its equipment cabinet in the existing 10-foot by 20-foot (approximately) equipment shelter. Clearwire also plans to install one GPS antenna on the exterior wall of the existing shelter. Hence, no increase in the size of the boundaries of the site is necessary. Excluding brief, minor, construction-related noise during the addition of the antennas, Dragonwave dishes and the installation of the equipment cabinets, the proposed changes to the Tower will not increase noise levels at the site.

The addition of the new WiMAX antennas, Remote Radio Heads and Dragonwave dishes will not adversely impact the health and safety of the surrounding community or the people

working on the Tower. The total radio frequency exposure measured around the Tower will be well below the National Council on Radiation Protection and Measurements' ("NCRP") standard adopted by the Federal Communications Commission ("FCC"). The worst-case power density analysis for the antennas, measured at the base of the Tower, indicates that the proposed antennas will emit .000121% of the NCRP's standard for maximum permissible exposure. A cumulative power density analysis indicates that together, all of the antennas on the Tower will emit 21.38% of the NCRP's standard for maximum permissible exposure. Therefore, the power density levels will be well below the FCC mandated radio frequency exposure limits in all locations around the Tower, even with extremely conservative assumptions. The power density analysis is attached.

In conclusion, Clearwire's proposed plan to remove and replace 3 antennas, add 6 Remote Radio Heads, add 2 Dragonwave dishes, and add WiMAX associated base station equipment does not constitute a modification subject to the Council's jurisdiction because Clearwire will not increase the height of the Tower, will not extend the boundaries of the site, will not increase the noise levels at the site, and the total radio frequency electromagnetic radiation power density will stay within all applicable standards. *See* Conn. Agencies Regs. § 16-50j-72.

Clear Wireless LLC

By: Thomas J. Regan  
Thomas J. Regan  
Brown Rudnick LLP  
185 Asylum Street, CityPlace I  
Hartford, CT 06103-3402  
Email - tregan@brownrudnick.com  
Phone - 860.509.6522  
Fax - 860.509.6501

**Certificate of Service**

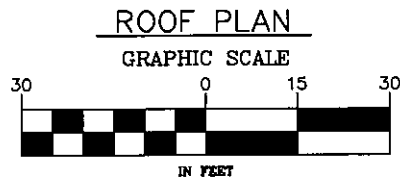
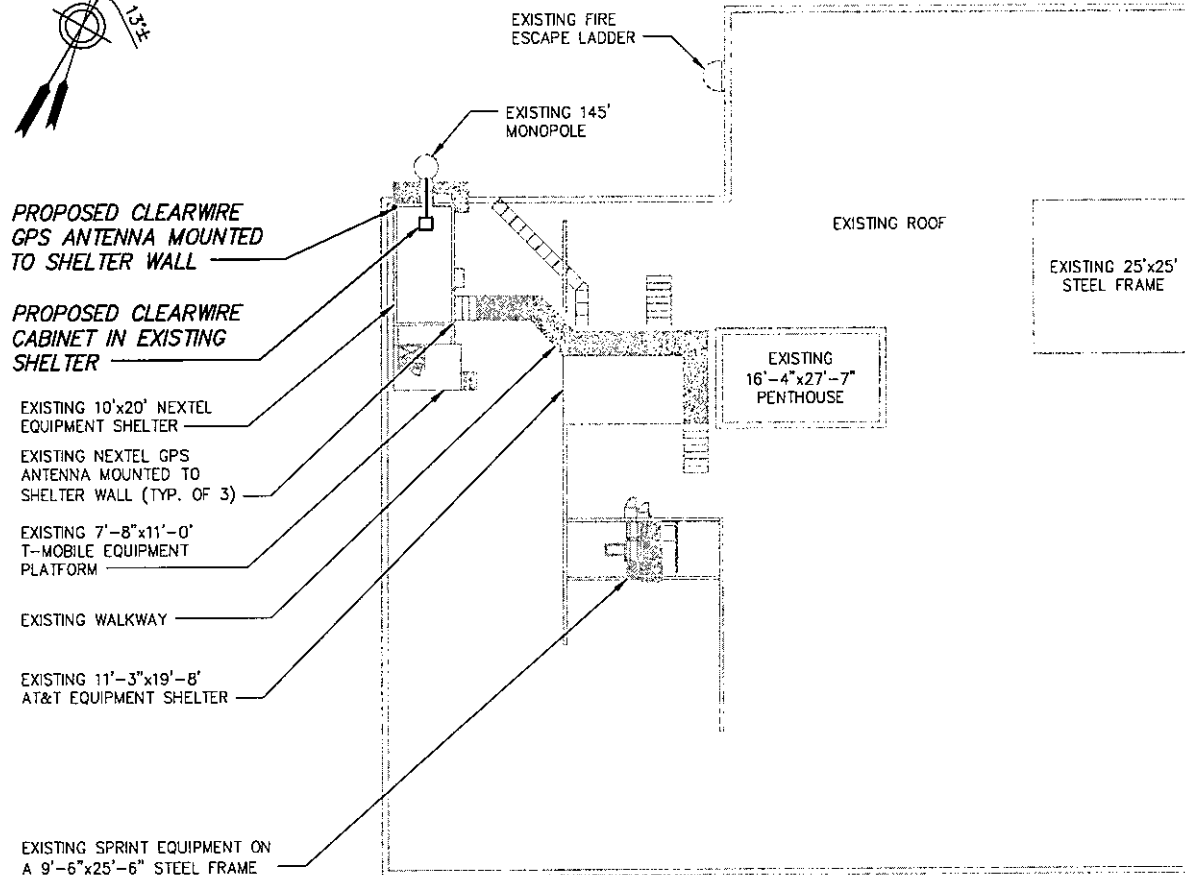
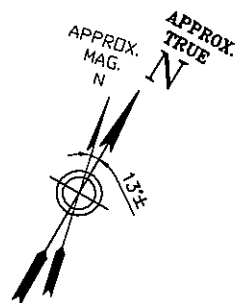
This is to certify that on this 21<sup>st</sup> day of May, 2010, the foregoing Notice of Exempt Modification was sent, via first class mail, to the following:

Town of Fairfield  
First Selectman Ken Flato  
John J. Sullivan Independence Hall  
Second Floor  
725 Old Post Road  
Fairfield, CT 06824

By: Thomas J. Regan  
Thomas J. Regan

# 40273445 v1 - 025064/0017

File: W:\TRANSCEND\20621\SITES\046-CT-BDR0088\LE\CT-BDR0088-LE.DWG Saved: 5/20/2010 4:18:58 PM Plotted: 5/20/2010 4:21:08 PM User: Wyld, Heather



## LEASE EXHIBIT

SCALE: 1" = 30'  
MAY 20, 2010

1 OF 2

REVISION NUMBER 2



111 Winners Circle, PO Box 5209 • Albany, NY 12205-0209  
Mch: (516) 468-4500 • www.chacompanies.com

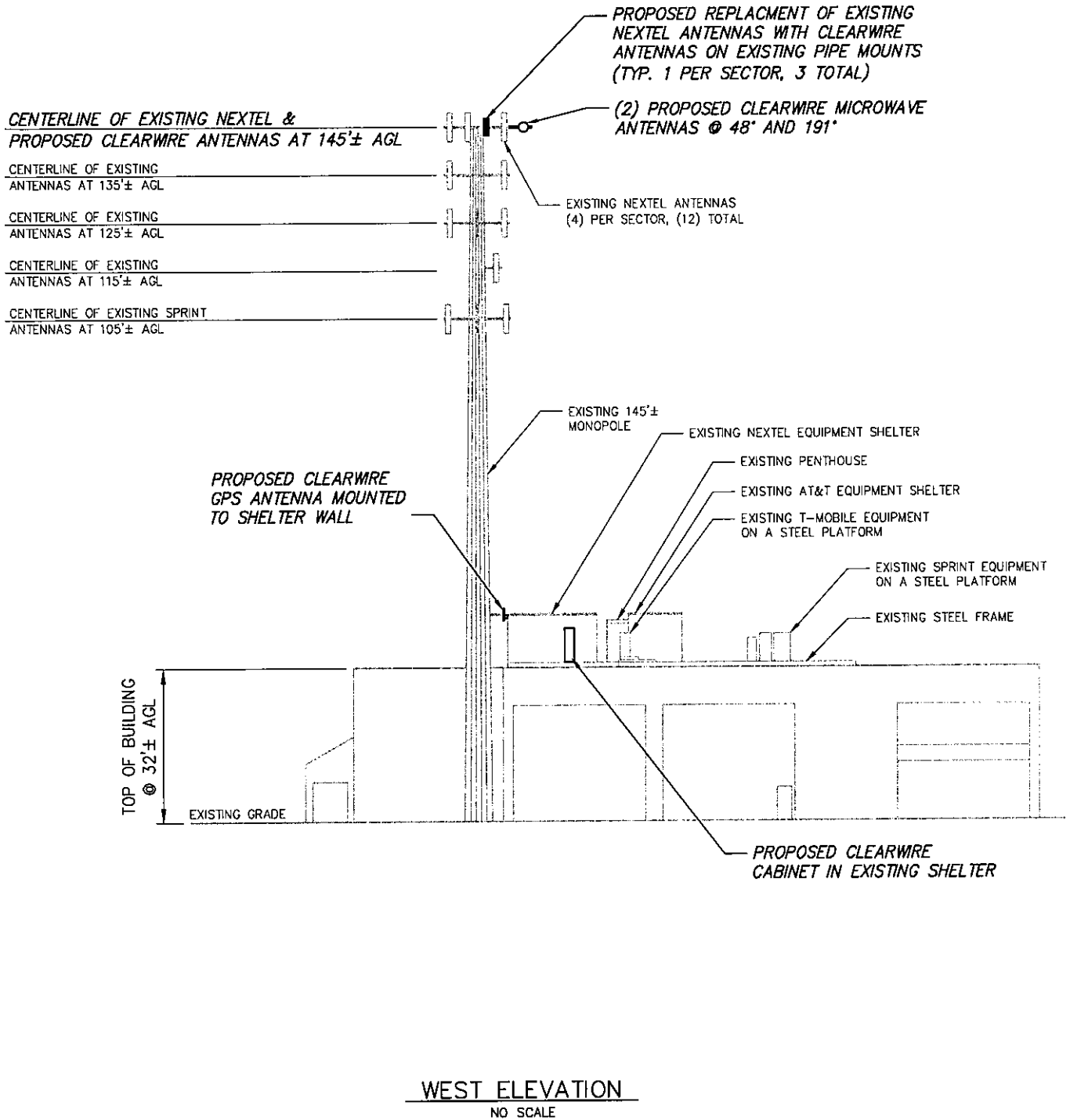
**clearw're**  
TECHNOLOGIES, INC.

5808 LAKE WASHINGTON  
BLVD. NE STE. 300  
KIRKLAND, WA 98033  
OFFICE: (425) 216-7600  
FAX: (425) 216-7900

TRANSCEND WIRELESS, LLC  
10 INDUSTRIAL AVENUE,  
2ND FLOOR  
MAHWAH, NJ 07430

CT-BDR0088  
100 REEF ROAD  
FAIRFIELD, CT 06824

CHA PROJ. NO. - 20621.1046.1101



## LEASE EXHIBIT

NO SCALE  
MAY 20, 2010

2  
OF 2

REVISION  
NUMBER 2



III Winners Circle, PO Box 5286 • Albany, NY 12205-0286  
Main: (618) 468-4600 • www.chacompanies.com

**clearw're**  
TECHNOLOGIES, INC.

5808 LAKE WASHINGTON  
BLVD. NE STE. 300  
KIRKLAND, WA 98033  
OFFICE: (425) 218-7800  
FAX: (425) 218-7800

TRANSCEND WIRELESS, LLC  
10 INDUSTRIAL AVENUE,  
2ND FLOOR  
MAHWAH, NJ 07430

CT-BDR0088  
100 REEF ROAD  
FAIRFIELD, CT 06824

CHA PROJ. NO. - 20621.1046.1101



FDH Engineering, Inc., 2730 Rowland Rd. Raleigh, NC 27615, Ph. 919.755.1012, Fax 919.755.1031

## Structural Analysis for URS Corporation

145 ft Monopole

Site Name: Fairfield  
Site ID: CT-BDR0088

FDH Project Number 10-04369E S1

Prepared By:

James Mathewson III, EI  
Project Engineer

Reviewed By:

Christopher M. Murphy, PE  
Vice President  
CT PE License No. 25842

**FDH Engineering, Inc.**  
2730 Rowland Rd.  
Raleigh, NC 27615  
(919) 755-1012  
info@fdh-inc.com



May 6, 2010

*Prepared pursuant to TIA/EIA-222-F June 1996 Structural Standards for Steel Antenna Towers and Antenna Supporting Structures*

TABLE OF CONTENTS

EXECUTIVE SUMMARY..... 3  
    Conclusions  
    Recommendations

APPURTENANCE LISTING..... 4

RESULTS..... 5

GENERAL COMMENTS..... 6

LIMITATIONS..... 6

POLE PROFILE..... 7

BASE LEVEL SKETCH..... 8



## EXECUTIVE SUMMARY

At the request of URS Corporation, FDH Engineering, Inc. performed a structural analysis of the monopole located in Fairfield, CT to determine whether the tower is structurally adequate to support both the existing and proposed loads, pursuant to the *Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, TIA/EIA-222-F*. Information pertaining to the existing/proposed antenna loading, current tower geometry, and member sizes was obtained from Valmont Industries, Inc. (Order No. 11635-94) Record Drawings dated May 19, 1994, All-Points Technology Corporation (Project No. CT255621) Structural Analysis Report dated April 30, 2008 and URS Corporation.

The *basic design wind speed* per *TIA/EIA-222-F* standards is 85 mph without ice and 74 mph with 1/2" radial ice.

## Conclusions

With the current and proposed antennas from Sprint at 143 ft, the tower meets the requirements of the *TIA/EIA-222-F* standards provided the **Recommendations** below are satisfied. Furthermore, provided the foundation was designed and constructed to support the original design reactions (See Valmont Order No. 11635-94), the foundation should have the necessary capacity to support the existing and proposed loading. For a more detailed description of the analysis of the tower, see the **Results** section of this report.

Our structural analysis has been performed assuming all information provided to FDH Engineering, Inc. is accurate (i.e. the steel data, tower layout, existing antenna loading, and proposed antenna loading) and that the tower has been properly erected and maintained per the original design drawings.

## Recommendations

To ensure the requirements of the *TIA/EIA-222-F* standards are met with the existing and proposed loading in place, we have the following recommendations:

1. Proposed coax should be installed inside the monopole's shaft, but may be installed outside the monopole's shaft in a single row, if necessary.
2. The proposed radio heads should be installed directly behind the proposed antennas.

## APPURTENANCE LISTING

The proposed and existing antennas with their corresponding cables/coax lines are shown in Table 1. *If the actual layout determined in the field deviates from this layout, FDH Engineering, Inc. should be contacted to perform a revised analysis.*

**Table 1 – Appurtenance Loading**

### Existing Loading:

Antenna No.	Antenna Elevation (ft)	Description	Coax and Lines <sup>1</sup>	Carrier	Mount Elevation (ft)	Mount Type
1-15	152	(1) 18' x 2.5" Omni	(10) 7/8" (6) 1-5/8" (2) 1-1/4"	Sprint	143 <sup>2</sup>	(3) 12' T-Arms
	147	(2) 8' 4-bay Dipoles				
	143	(9) Decibel DB844H90E-XY (3) KMW AM-X-WM-17-65				
16-23	133 <sup>3</sup>	(3) EMS RR90-18-00DP (3) RFS APX16DWV-16DWV-S-E-ACU (2) 2' x 2' Panels	(6) 1-1/4" (6) 1-5/8" <sup>3</sup> (1) 7/8"	Omnipoint	133	(3) 12' T-Arms
24-31	129	(1) 8' x 1.5" Omni	(6) 1-1/4" (3) 1-5/8" (2) 1/2"	---	125	(3) 10' T-Arms
	126.5	(1) 3' x 2" Omni				
	125	(6) Allgon 7770.00 (6) LGP2140x TMA's				
32-37	116	(6) Kathrein 800-10504	(6) 1-5/8" (6) 1-5/8" <sup>3</sup>	Metro PCS	116	(3) 10' T-Arms
38-43	108	(6) Decibel DB980H90E-M	(6) 1-5/8"	---	108	(1) Low Profile Platform

<sup>1</sup> Coax is installed inside the monopole's shaft unless otherwise noted.

<sup>2</sup> The loading for Sprint mounted at 143 ft will be altered. See the proposed loading below.

<sup>3</sup> Coax located outside the monopole's shaft in a single row.

### Proposed Loading:

Antenna No.	Antenna Elevation (ft)	Description	Coax and Lines	Carrier	Mount Elevation (ft)	Mount Type
1-17	152	(1) 18' x 2.5" Omni	(10) 7/8" (6) 1-5/8" (2) 1-1/4" (6) 5/16" (2) 1/2"	Sprint	143 <sup>1</sup>	(3) 12' T-Arms w/ (2) 3' Standoffs (Valmont P/N B1739)
	147	(2) 8' 4-bay Dipoles				
	143	(9) Decibel DB844H90E-XY (3) Argus LLPX310R (6) Samsung Radio Heads (2) Dragonwave A-ANT-28G-2 Dishes				

<sup>1</sup> This represents the final configuration for Sprint mounted at 143 ft. According to information provided by URS, Sprint will remove (3) KMW AM-X-WM-17-65 antennas and install (3) Argus LLPX310R antennas, (2) 3' standoffs (Valmont P/N B1739), (6) Samsung radio heads, (2) Dragonwave A-ANT-28G-2 dishes, (6) 5/16" coax and (2) 1/2" coax at 143 ft.

## RESULTS

Based on information obtained from the original design drawings, the yield strength of steel for individual members was as follows:

**Table 2 - Material Strength**

Member Type	Yield Strength
Tower Shaft Sections	65 ksi
Base Plate	60 ksi
Anchor Bolts	75 ksi

**Table 3** displays the summary of the ratio (as a percentage) of force in the member to their capacities. Values greater than 100% indicate locations where the maximum force in the member exceeds its capacity. **Table 4** displays the maximum foundation reactions. **Table 5** displays the maximum antenna rotations at service wind speed.

If the assumptions outlined in this report differ from actual field conditions, FDH Engineering, Inc. should be contacted to perform a revised analysis. Furthermore, as no information pertaining to the allowable twist and sway requirements for the existing or proposed appurtenances was provided, deflection and rotation were not taken into consideration when performing this analysis.

See the **Pole Profile & Base Level Sketch** for detailed modeling information.

**Table 3 – Summary of Working Percentage of Structural Components**

Section No.	Elevation ft	Component Type	Size	% Capacity	Pass Fail
L1	145 - 90.83	Pole	TP33.48x23.61x0.281	62.0	Pass
L2	90.83 - 42.83	Pole	TP41.64x31.976x0.375	82.3	Pass
L3	42.83 - 0	Pole	TP48.69x39.7686x0.4375	89.5	Pass
		Anchor Bolts	(16) 2.25"Ø w/ BC = 56.91"	81.9	Pass
		Base Plate	62.91"Ø PL x 2.75" Thk.	56.8	Pass

\*Capacities include 1/3 allowable increase for wind.

**Table 4 – Maximum Base Reactions**

Base Reactions	Current Analysis* (TIA/EIA-222-F)	Original Design (TIA/EIA-222-F)
Axial	36 k	37 k
Shear	31 k	28 k
Moment	3,070 k-ft	3,277 k-ft

\*Based on projects of similar type the foundation has been determined to have adequate capacity to resist the additional shear load.

**Table 5 – Maximum Antenna Rotations at Service Wind Speed  
(Proposed Antennas Only)**

Centerline Elevation (ft)	Antenna	Tilt (deg)*	Twist (deg)*
143	(2) Dragonwave A-ANT-28G-2	1.7572	0.0156

\*Allowable tilt and twist values to be reviewed by Sprint.

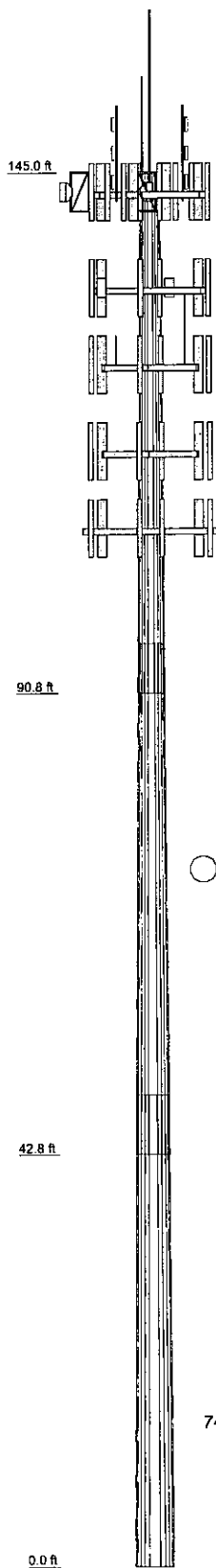
## GENERAL COMMENTS

This engineering analysis is based upon the theoretical capacity of the structure. It is not a condition assessment of the tower and its foundation. It is the responsibility of URS Corporation to verify that the tower modeled and analyzed is the correct structure (with accurate antenna loading information) modeled. If there are substantial modifications to be made or the assumptions made in this analysis are not accurate, FDH Engineering, Inc. should be notified immediately to perform a revised analysis.

## LIMITATIONS

All opinions and conclusions are considered accurate to a reasonable degree of engineering certainty based upon the evidence available at the time of this report. All opinions and conclusions are subject to revision based upon receipt of new or additional/updated information. All services are provided exercising a level of care and diligence equivalent to the standard and care of our profession. No other warranty or guarantee, expressed or implied, is offered. Our services are confidential in nature and we will not release this report to any other party without the client's consent. The use of this engineering work is limited to the express purpose for which it was commissioned and it may not be reused, copied, or distributed for any other purpose without the written consent of FDH Engineering, Inc.

Section	1	2	3	4
Length (ft)	54.17	53.17	49.00	23.0
Number of Sides	12	12	12	12
Thickness (in)	0.2810	0.3750	0.4375	0.4375
Socket Length (ft)	5.17	6.17	39.7685	48.5900
Top Dia (in)	23.6100	31.9760	41.6400	48.5900
Bot Dia (in)	33.4800	41.6400	48.5900	48.5900
Grade	A572-65	A572-65	A572-65	A572-65
Weight (K)	4.7	8.0	10.3	23.0



## DESIGNED APPURTENANCE LOADING

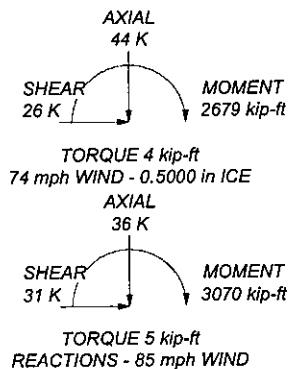
TYPE	ELEVATION	TYPE	ELEVATION
18' x 2.5" omni	152	APX16DWV-16DWV-S-E-ACU w/ mount pipe	133
Lightning Rod	150	2' x 2' panel w/ mount pipe	133
8' 4-bay dipole	147	2' x 2' panel w/ mount pipe	133
8' 4-bay dipole	147	12' T-Arms	133
(3) DB844H90E-XY w/ mount pipe	143	12' T-Arms	133
(3) DB844H90E-XY w/ mount pipe	143	8' x 1.5" omni	129
(3) DB844H90E-XY w/ mount pipe	143	3' x 2" omni	126.5
12' T-Arms	143	(2) 7770.00 w/ mount pipe	125
12' T-Arms	143	(2) 7770.00 w/ mount pipe	125
12' T-Arms	143	(2) LGP2140X TMA	125
LLPX310R w/ mount pipe	143	(2) LGP2140X TMA	125
LLPX310R w/ mount pipe	143	(2) LGP2140X TMA	125
LLPX310R w/ mount pipe	143	10' T-Arm	125
3' Standoff (Valmont P/N B1739)	143	(2) 7770.00 w/ mount pipe	125
3' Standoff (Valmont P/N B1739)	143	10' T-Arm	125
(2) Samsung Radio Head	143	10' T-Arm	125
(2) Samsung Radio Head	143	10' T-Arm	125
(2) Samsung Radio Head	143	10' T-Arm	116
A-ANT-28G-2	143	(2) 800-10504 w/ mount pipe	116
A-ANT-28G-2	143	(2) 800-10504 w/ mount pipe	116
12' T-Arms	133	(2) 800-10504 w/ mount pipe	116
RR90-18-00DP w/ mount pipe	133	10' T-Arm	116
APX16DWV-16DWV-S-E-ACU w/ mount pipe	133	10' T-Arm	116
RR90-18-00DP w/ mount pipe	133	(2) DB980H90E-M w/ mount pipe	108
APX16DWV-16DWV-S-E-ACU w/ mount pipe	133	(2) DB980H90E-M w/ mount pipe	108
RR90-18-00DP w/ mount pipe	133	13' Low Profile Platform	108
		(2) DB980H90E-M w/ mount pipe	108

## MATERIAL STRENGTH

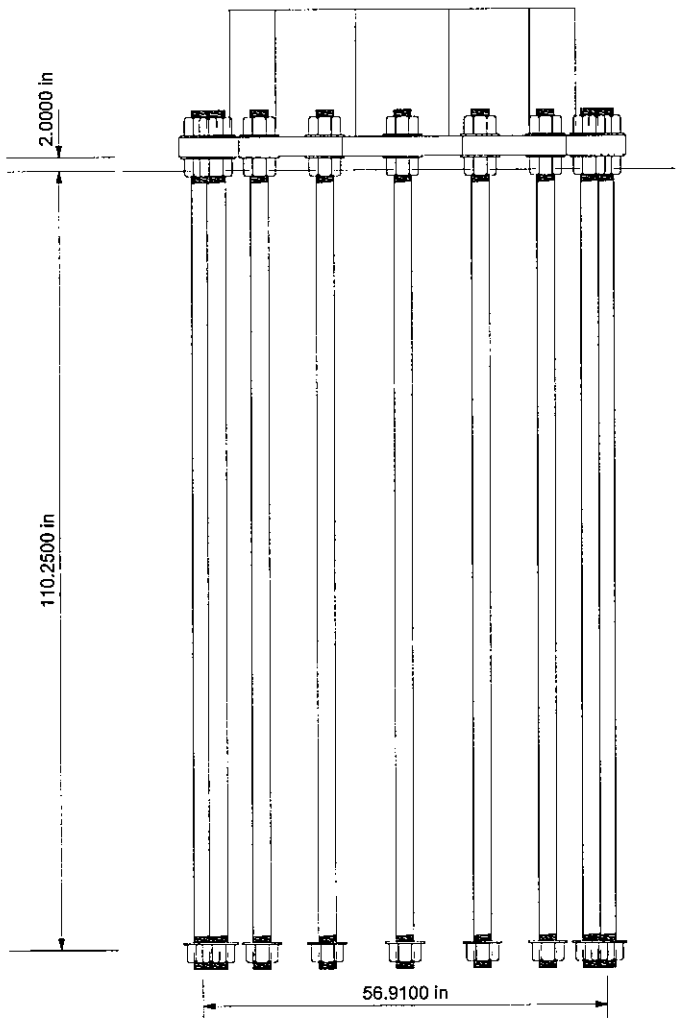
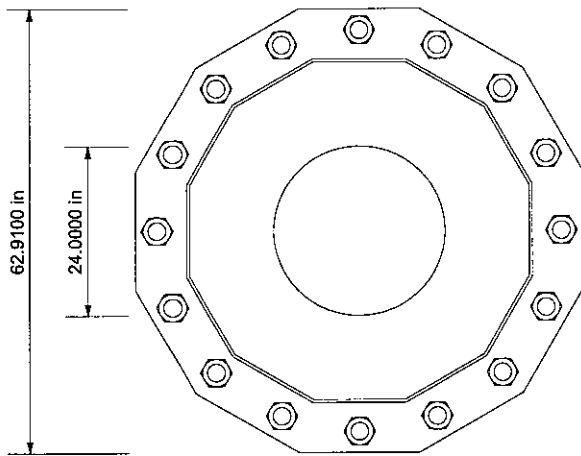
GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

## TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.



<b>FDH</b> Engineering, Inc. 2730 Rowland Road Raleigh, North Carolina Phone: (919) 755-1012 FAX: (919) 755-1031	Job: <b>Fairfield, CT-BDR0088</b>			
	Project: <b>10-04369E S1</b>			
	Client: <b>URS Corporation</b>	Drawn by: <b>James Mathewson II</b>	App'd:	
	Code: <b>TIA/EIA-222-F</b>	Date: <b>05/06/10</b>	Scale: <b>NTS</b>	
	Path:	Dwg No. <b>E-1</b>		



#### FOUNDATION NOTES

1. Plate thickness is 2.7500 in.
2. Plate grade is A633-60.
3. Anchor bolt grade is A615-75.
4.  $f_c$  is 4 ksi.

<b>FDH</b> <small>ENGINEERING, INC.</small>  Tower Analysis	<b>FDH Engineering, Inc.</b>		Job: <b>Fairfield, CT-BDR0088</b>	
	2730 Rowland Road		Project: <b>10-04369E S1</b>	
	Raleigh, North Carolina		Client: URS Corporation	Drawn by: James Mathewson II
	Phone: (919) 755-1012		Code: TIA/EIA-222-F	Date: 05/06/10
	FAX: (919) 755-1031		Path:	Scale: NTS
		App'd:		Dwg No. F-1



To: HPC  
From: Julius De La Cruz – Radio Frequency Engineer  
Cc: Micah Hawthorne  
Subject: Power Density Report for CT-BDR0088  
Date: May 17, 2010

---

**1. Introduction:**

This report is the result of Electromagnetic Field Intensities (EMF – Power Densities) study for the Clearwire broadband antenna installation on a Self Support Tower at 100 Reef Road, Fairfield, CT 06824. This study incorporates the most conservative consideration for determining the practical combined worst case power density levels that would be theoretically encountered from locations surrounding the transmitting location:

**2: Discussion:**

The following assumptions were used in the calculations:

- 1) The emissions from Clearwire transmitters are in the (2496 – 2690) Frequency Band
- 2) The emissions from the Clearwire Microwave dishes are in the 11 GHz Frequency Band
- 3) The model number for Clearwire Antenna is Argus LLPX310R
- 4) The model number for the Microwave dish Dragonwave A-ANT 28G-2
- 5) The Clearwire panel antenna centerline is 143 feet
- 6) The Clearwire microwave dish centerline is 143 feet
- 7) The Maximum Transmit power from any Clearwire panel antenna is 251 Watts Effective Isotropic Radiated Power (EIRP) assuming 2 channels per sector.
- 8) The Maximum Transmit power from any Clearwire microwave dish is 346 Watts Effective Isotropic Radiated Power (EIRP) assuming 1 channel per dish
- 9) All antennas are simultaneously transmitting and receiving 24 hours per day
- 10) The average ground level of the studied area does not change significantly with respect to the transmitting location

Equations given in “FCC OET Bulletin 65, Edition 97-01” were used with the above information to perform the calculations.

**3: Conclusion:**

Based on the above worst case assumptions, the power density calculation from the Clearwire antenna installation on a self-support tower at 100 Reef Road, Fairfield, CT 06824 is 0.0000012 mW/cm<sup>2</sup>. This value represents 0.000121% of the Maximum Permissible Exposure (MPE) standard of 1 milliwatt per square centimeter (mW/cm<sup>2</sup>) set forth in the FCC/ANSI/IEEE C95-1-1991. Furthermore, the proposed antenna location for Clearwire will not interfere with existing public safety communications, AM or FM radio broadcasts, TV, Police Communications, HAM Radio communications or any other signals in the area.

The combined Power Density from all other carriers is 21.38 %. The combined Power Density for this site is 21.380121% of the M.P.E. standard.