VoiceLink

VoiceLink Communications, LLC PO Box 8447 275 New State Road Manchester, CT 06040 USA 860.649.5465 office 860.643.0410 fax 866.515.8686 toll-free www.voicelink.net web

September 16, 2002

S. Derek Phelps, Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

RE: EM-MARCUS-143-020214-Marcus Communications, LLC notice of intent to modify an existing telecommunications facility located at 1210 Highland Avenue, Torrington, Connecticut

Mr. Phelps:

On August 6, 2002, staff of Marcus Communications, LLC (Marcus) measured power density pursuant to the Connecticut Siting Council's (Council) March 7, 2002, approval of the above referenced matter. Marcus staff used a calibrated NARDA Model 8718 Electromagnetic Field Survey Meter with shaped probe Model A8742D to take the measurements.

Eight data points were chosen, two for each cardinal point of the compass. Measurements were taken at the base of the tower compound and 100 feet in each direction. The 100 foot measurements were taken with a measuring wheel. Each data point was averaged over 10 seconds starting with the probe at the ground and raised to two meters above ground level to provide a whole body measurement. The results are listed in percent of maximum permissible limits for general population/uncontrolled exposure:

	NORTH	EAST	SOUTH	WEST
BASE	0.30	3.24	1.26	2.19
100 FEET	0.68	0.43	0.39	1.63

These measurements confirm that the site is in full compliance with the FCC regulations regarding power density. The results also confirm that the conservative assumptions required by the Council when calculating power density, provide a more than adequate safety margin for the public.

The February 27, 2002, letter from the City of Torrington also requested that if Marcus were to store any hazardous materials, that a best management plan be submitted, including provisions for containment. Marcus will not be storing any such materials at the site.

This letter has been co-signed by Marcus' RF engineer in compliance with the request from the City. Please call me at (860) 643-0440 extension 223 if you have any questions.

Regards,

Stephen M. Howard
Director-Site Development

Chad W. Hart
RF Engineer

C: Martin J. Conner, City Planner

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square
New Britain, Connecticut 06051
Phone: (860) 827-2935
Fax: (860) 827-2950

March 12, 2002

Julie M. Donaldson, Esq.
Hurwitz & Sagarin LLC
147 North Broad Street
P.O. Box 112
Milford, CT 06460-0112

RE: **EM-MARCUS-143-020214** - Marcus Communications, LLC notice of intent to modify an existing telecommunications facility located at 1210 Highland Avenue, Torrington, Connecticut.

Dear Attorney Donaldson: Julie

At a public meeting held on March 7, 2002, the Connecticut Siting Council (Council) acknowledged your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the condition that field radio frequency testing be conducted as request by the City of Torrington (see attached letter).

The proposed modifications are to be implemented as specified here and in your notice dated February 14, 2002. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

Thank you for your attention and cooperation.

Very truly yours,

Mortimer A. Gelston
Chairman

MAG/laf

Enclosure: City of Torrington letter dated February 27, 2002

c: Honorable Owen J. Quinn, Jr., Mayor, City of Torrington
Martin Connor, City Planner, City of Torrington
Esther McNany, SBA, Inc.
Christopher B. Fisher, Esq., Cuddy & Feder & Worby LLP
Ronald C. Clark, Nextel Communications

City Of Torrington

PLANNING AND ZONING COMMISSION
140 Main Street
Torrington, CT 06790-5245

Tel.: (860) 489-2220
Fax: (860) 489-2550

Via fax and regular mail

February 27, 2002

S. Derek Phillips, Executive Director
Connecticut Siting Council
Ten Franklin Street
New Britain, CT 06051

Re: Notification of EM-MARCUS-143-020214, SBA Telecommunications Facility, 1210 Highland Avenue

Dear Mr. Phillips:

We are in receipt of your letter dated February 20, 2002, regarding Marcus Communications, LLC 's request to modify an existing telecommunications facility owned by SBA at 1210 Highland Avenue. Enclosed are Torrington's Zoning Regulations regarding Wireless Communications Facilities. We would like you to review our Regulations and make your findings consistent with our Regulations. In particular, please make sure that within 90 days of beginning operations, Marcus Communications, LLC, submits existing measurements of radio frequency radiation, (RFR) from the facility, signed and sealed by an RF Engineer, stating that the RFR measurements are accurate and below the maximum permissible exposure (MPE) limits established by the FCC Guidelines. We request that this report be submitted to the office of the Torrington City Planner. We also ask that this information be submitted on an annual basis thereafter. We also specifically request you require Marcus Communications, LLC to provide a plan for handling of any hazardous materials using best management practices. If any hazardous materials are to be used on site, there shall be provisions for full containment of such materials. An enclosed containment area shall be provided with a sealed floor, designed to contain at least 110% of the volume of hazardous materials stored or used on the site.

If you have any questions, please call me at (860) 489-2220.

Sincerely yours,

Martin J. Connor, AICP
City Planner

Cc: Planning & Zoning Commission
Mayor Owen J. Quinn, Jr.

HURWITZ & SAGARIN LLC

February 14, 2002

Mr. Mortimer A. Gelston
Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051

Re: Notice of Exempt Modification
SBA Telecommunications Facility
1210 Highland Avenue, Torrington, Connecticut

Dear Mr. Gelston:

On behalf of Marcus Communications, LLC ("Marcus"), I am pleased to submit this exempt modification letter of notification. Enclosed are an original plus twenty-five (25) copies of a petition requesting acknowledgement that the co-location of Marcus' equipment on the telecommunications facility located at 1210 Highland Avenue, Torrington, Connecticut, satisfies the requirements set forth in R.C.S.A. §16-50j-72(b)(2). A check in the amount of $500.00 to cover the filing fee for this request for acknowledgement is also enclosed.

The Mayor of Torrington has been sent notice of this filing by certified mail.

Sincerely,

Julie M. Don

JULIE M. DONALDSON
rr/enc.

cc: Owen J. Quinn, Mayor of Torrington
Stephen Howard, Marcus Communications, LLC
Esther McNany, SBA Communications

LAW OFFICES
147 North Broad Street, P.O. Box 112, Milford, Connecticut 06460-0112 Tel. 203-877-8000 • Fax 203-878-9800

HURWITZ & SAGARIN LLC

February 14, 2002

Mr. S. Derek Phelps
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: Notice of Exempt Modification
SBA Telecommunications Facility
1210 Highland Avenue
Torrington, Connecticut

Dear Mr. Phelps:

Marcus Communications, LLC ("Marcus") hereby requests acknowledgement that Marcus' proposed co-location on a telecommunications tower located at 1210 Highland Avenue, Torrington , Connecticut, ("Torrington Facility ") constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). Marcus submits this request for acknowledgment as agent for the tower owner, SBA Communications ("SBA"). A letter of authorization is attached hereto as Exhibit A. Under this request for acknowledgment, SBA intends to allow Marcus to install antennas and related equipment at this existing telecommunications facility in Torrington. Please accept this letter as notification, pursuant to R.C.S.A. § 16-50j-73, of modification to an existing telecommunications tower, which constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Owen Quinn, the Mayor of Torrington.

The existing facility consists of a 260-foot lattice tower and related equipment located at 1210 Highland Avenue, Torrington, Connecticut. This tower currently supports antenna arrays operated by several users, including the cellular division of AT&T (formerly Litchfield Acquisition Company), who was approved by the Council on July 16, 1991.

Marcus plans to attach two (2), two-foot microwave dish antennas to the existing tower at antenna centerline heights of 60 feet and 100 feet, respectively. Marcus' associated radio equipment consists of equipment racks in the existing equipment building at the base of the tower.

For the following reasons, the proposed modifications to the Torrington Facility fall squarely within and satisfy the requirements set forth in R.C.S.A. § 16-50j-72(b)(2):

LAW OFFICES
147 North Broad Street, P.O. Box 112, Milford, Connecticut 06460-0112 Tel. 203-877-8000 • Fax 203-878-9800

1. The proposed modifications will not increase the height of the tower. Marcus' antenna will be installed at centerline heights of approximately 60 and 100 feet above ground level (AGL). The site plan attached as Exhibit B confirms that the proposed Marcus installation will not increase the overall height of the tower.

2. The installation of Marcus equipment in the existing building will not require an extension of the site boundaries, as evidenced on the attached site plan. Marcus' proposed equipment location, access, and utility routing will be located entirely within the existing site.

3. Because no additional HVAC equipment is required, the proposed modifications will not increase the noise levels at the existing facility by six decibels or more.

4. The operation of the additional antennas will not increase the total radio frequency (RF) power density, measured at the site boundary, to a level at or above the applicable standard. The "worst-case" percentage for RF power density for a point at the tower base is calculated to be 0.0068% for the Marcus antennas. Based upon information in the aforementioned Nextel Communications filing, the calculated "worst-case" power density for the combined operations at the site is 5.0868% of the standard for general population/uncontrolled exposure.[1]

For the foregoing reasons, Marcus respectfully submits that the proposed addition of Marcus' antenna and equipment at the Torrington Facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Very truly yours,

Julie M. Donaldson

Julie M. Donaldson

cc: Owen J. Quinn, Mayor of Torrington
Stephen Howard, Marcus Communications, LLC
Esther McNany, SBA Communications

---

[1] Based upon the 5.08% figure of current or approved users power density calculations submitted by Nextel Communications of the Mid-Atlantic, Inc., d/b/a Nextel Communications, in TS-NEXTEL-143-000817.

LETTER OF AUTHORIZATION

Municipality: TORRINGTON (CT02303-A-20).

Site Address: 1210 HIGHLAND AVENUE

Re.: Building Permits and Land Use Approvals

SBA Properties, Inc., the Landlord/Owner of 1210 Highland Avenue in Torrington, Connecticut, (the "Property") does hereby appoint Marcus Communications, LLC ("Marcus") and its agents and representatives as Landlord/Owner's Agent for the purpose of completing, executing, and/or filing any application, form, map, approval, variance, special permit, Siting Council application, or other local, state, or federal land use approval or building permit ("Approvals") required to provide Marcus with lawful access to, and the ability to use the Property for the purpose of installing, erecting, or otherwise placing antenna, support structures and related equipment on the Property. Owner shall fully cooperate with Marcus and its agents and representatives in obtaining any required Approvals. Marcus shall be responsible for all costs, filing fees, or any expense incurred in connection with securing any Approvals.

Landlord/Owner: SBA Properties, Inc.

By: _____

Name: Jason Silberstein

Its: Vice President, Property Management

Date: 11/14/01

STATE OF FLORIDA :

:

COUNTY OF Palm Beach :

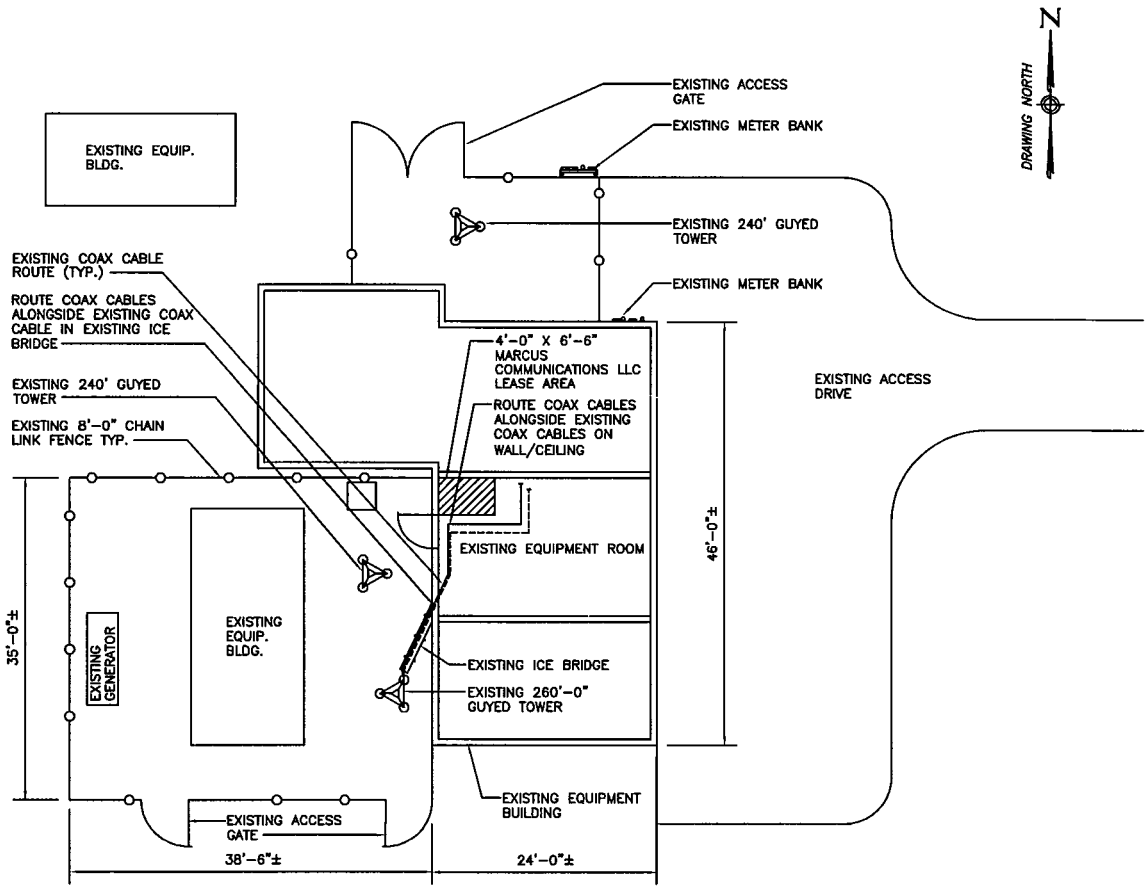
Signed and Sworn to before me this 14th day of November, 2001

Georgiana E. Slaughter

Notary Public

My Commission expires:

GEORGIANA E. SLAUGHTER
MY COMMISSION # CC 988867
EXPIRES: December 18, 2004
Bonded Thru Notary Public Underwriters

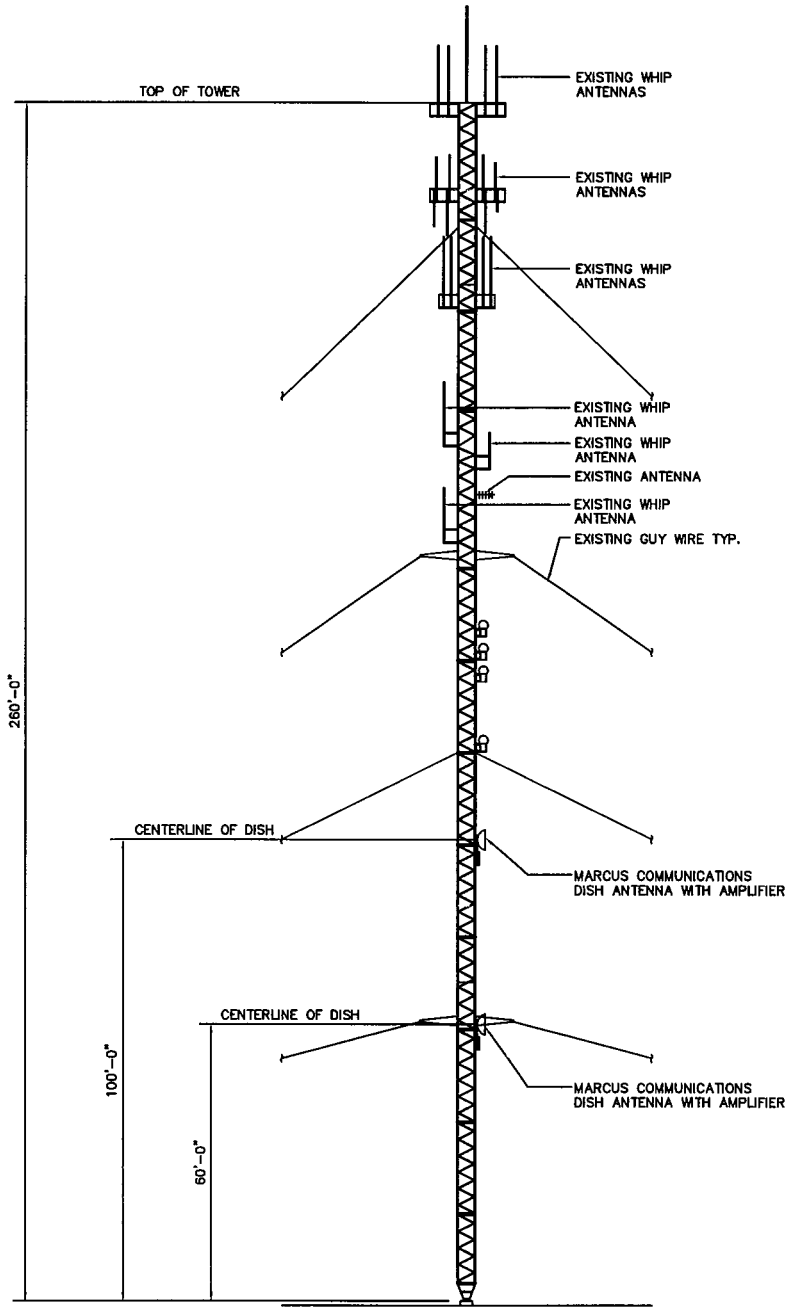


1 / SC-1 SITE PLAN

SCALE: 1" = 20'-0"

0 5 10 20 40

SITE ID NO: CT-907	MARCUS COMMUNICATIONS LLC	Dwg. No. SC-1
Designed by:	UNMANNED WIRELESS COMMUNICATION EQUIPMENT SITE	
Drawn by: RB	A 2-7-02 SITING COUNCIL REVIEW	
Checked by:	REV. DATE: DESCRIPTION	
URS CORPORATION-AES 500 ENTERPRISE DRIVE ROCKY HILL, CT. 06067 1-(860)-529-8882	SITE ADDRESS: TORRINGTON 1210 HIGHLAND AVENUE TORRINGTON, CONNECTICUT	Scale: AS SHOWN Date: 2-7-02
		Job No. F302003.07 File No. Dwg. 1 of 2



1 / SC-2 TOWER ELEVATION

SCALE: 1" = 40'-0"

0 10 20 40 80

SITE ID NO: CT-907

Designed by:

Drawn by: RB

Checked by:

URS

URS CORPORATION-AES
500 ENTERPRISE DRIVE
ROCKY HILL, CT. 06067
1-(860)-529-8882

MARCUS COMMUNICATIONS LLC

UNMANNED WIRELESS COMMUNICATION EQUIPMENT SITE

SITE ADDRESS: TORRINGTON
1210 HIGHLAND AVENUE
TORRINGTON, CONNECTICUT

REV.	DATE:	DESCRIPTION
A	2-7-02	SITING COUNCIL REVIEW

Scale: AS SHOWN | Date: 2-7-02

Job No. F302003.07 | File No.

Dwg. No. SC-2

Dwg. 2 of 2

ALL-POINTS TECHNOLOGY CORPORATION, P.C.

STRUCTURAL ANALYSIS REPORT
260' PiROD GUYED TOWER
TORRINGTON, CONNECTICUT

Prepared for
Marcus Communications

January 21, 2002

APT Project #CT122160

☐ 711 NORTH MOUNTAIN ROAD • NEWINGTON, CONNECTICUT 06111 • PHONE: 860-953-4444 • FAX: 860-953-1181
☒ 150 OLD WESTSIDE ROAD • NORTH CONWAY, NEW HAMPSHIRE 03860 • PHONE/FAX: 603-356-5214

STRUCTURAL ANALYSIS REPORT
of
260' GUYED TOWER
TORRINGTON, CONNECTICUT
prepared for
Marcus Communications

EXECUTIVE SUMMARY:

All-Points Technology Corporation, P.C. (APT) performed a structural analysis of the 260-foot guyed tower in Torrington, Connecticut. The analysis was performed with the addition of a 2-foot microwave dish antenna and a Radio-Frequency Converter (RFC) at 100-feet.

Our analysis indicates the tower is capable of supporting the proposed antenna changes. APT recommends a safety cable be installed on the tower to facilitate future antenna installations.

INTRODUCTION:

A structural analysis was performed by APT on this 260' guyed tower by APT for Marcus Communications. The tower is located at 1210 Highland Avenue in Torrington, Connecticut. The structure is a 260-foot #36 galvanized steel guyed tower manufactured by PiROD, Inc.

Robert E. Adair, P.E. previously inspected the tower on December 26, 2001 to record information regarding physical and dimensional properties of the structure and its appurtenances. Mr. Adair climbed the structure in its entirety to compile data necessary to perform the structural analysis.

The analysis also relied on information provided by Marcus Communications, which included proposed antenna specifications and details; and SBA, Inc., which included PiROD design drawings.

The analysis was performed with the following antenna inventory:

Antenna Inventory Used For Analysis

Antenna	Elev.	Leg	Mount	Coax.
Beacon & lightning rod	260'	NW	Top plate	1" conduit
20' whip	259'	N Face	10' candelabra	1-5/8"
12' whip	259'	E Face	10' candelabra	1-5/8"
(2) 16' whips[1]	259'	SW Face	10' candelabra	1/2", (2) 7/8"
Amplifier box	256'	E Face	Face	-
14' whip	222'	NW	4' sidearm	1-5/8"
10' whip	222'	NW	Leg	1-1/4"
(2) 12' whips[1], 14' whip, 16' whip	218'	N Face	10' candelabra	7/8", (3) 1-1/4"
(2) 12' whips[1], 10' whip, 7' whip	218'	E Face	10' candelabra	(2) 7/8", (3) 1-1/4"
(2) 12' whips[1], 7' whip	218'	SW Face	10' candelabra	(3) 1-1/4"
(12) ALP7130.16 panels[2]	200'	All	(3) 15' sector mnts	(12) 1-5/8"
12' whip	178'	NW	2' sidearm	7/8"
12' whip	177'	NE	4' sidearm	7/8"
7' whip & 2' yagi	176'	S	3' sidearm	1-1/4", 7/8"
2' dish	171'	NE	1' sidearm	1/2"
14' whip	167'	E Face	6' sidearm	7/8"
7' whip	163'	NW	2' sidearm	7/8"
10' whip	159'	S	1' sidearm	1-1/4"
10' whip	140'	NW	3' sidearm	7/8"
10' whip	130'	NW	2' sidearm	7/8"
3-bay Shively FM w/radome	121'	S	2' sidearm	1-5/8"
2' dish and RFC	**100'**	**Any**	**Leg**	**1/2"**
1-bay Shively FM w/radome	84'	S	2' sidearm	1-5/8"
2' dish and RFC	60'	Any	Leg	1/2"

[1] One whip upright, one inverted
[2] These antennas and mounts replacing existing whip antennas and mounts at 200'.
Proposed antennas in **bold text**.
Elevation information refers to centerline of mounting point.

CONDITION INSPECTION:

- **General Observations:** The tower, a galvanized steel structure, appeared to be in excellent condition. No signs of movement or overstress of the tower were observed.

- **Legs:** Leg members ranged in size from 1.5" solid rod to 1.75" solid rod and are comprised of 50 ksi steel, according to PiROD specifications. The leg members appeared to be in excellent condition.

- **Bracing:** Bracing members are solid rod ranging from 9/16" to 5/8" diameter. Connections were visually inspected to the maximum extent practicable. All connections that were observed appeared to be sound, with no weld defects noted.

- **Antenna Connections:** Antenna mounting hardware was in good condition, with corrosion resistant hardware and galvanized members prevalent.

- **Splice Connections:** Observed splice bolts and connections were in good condition. No loose or missing bolts or nuts were observed.

- **Guy Cables and Hardware:** Guy cables appeared to be in good condition, with no surface rust observed. End sleeves were observed to be in place on preformed dead ends (performs). Torque arms and attachment hardware were in good condition. Guy anchor turnbuckles had recommended safety cable loops in place.

STRUCTURAL ANALYSIS:

Methodology:

The structural analysis was done in accordance with EIA/TIA-222-F, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures; and the American Institute of Steel Construction (AISC), Manual of Steel Construction, Allowable Stress Design, Ninth Edition.

The analysis was conducted using a wind speed of 80 miles per hour and one-half inch of radial ice over the entire structure and all appurtenances. The EIA/TIA Standard requires a minimum wind speed of 80 miles per hour for Litchfield County, Connecticut. The tower was analyzed by calculating the resultant wind loading and associated maximum bending moments, shear forces, and axial loads. The moments and forces were used to

calculate stresses in leg and bracing members and combined axial and bending stresses in the tower mast, which were compared to allowable stresses according to AISC.

Two loading conditions were evaluated in accordance with EIA/TIA-222-F to determine the tower's capacity. The more demanding of the two cases is used to calculate the tower capacity:

- Case 1 = Wind Load (without ice) + Tower Dead Load
- Case 2 = 0.75 Wind Load (with ice) + Ice Load + Tower Dead Load

In addition, the TIA/EIA standard permits a one-third increase in allowable stresses for towers less than 700-feet tall. Allowable stresses of tower members were increased by one-third when computing the tower capacity values shown below.

Analysis Results:

Analysis of the tower was conducted in accordance with the criteria outlined herein with antenna changes as previously described. Our analysis determined the existing tower is capable of supporting the proposed antenna changes. The following table summarizes the results of the analysis based on combined axial and bending stresses of the tower mast and compressive stresses of individual leg members:

Elevation	Capacity
0-70'	**72%**
70'-100'	**71%**
100'-140'	**80%**
140'-198'	**73%**
198'-240'	**52%**
240'-260'	**26%**

Lattice Bracing:

Bracing is installed in an X-brace configuration, with each compression member paired with a corresponding tension member. Bracing was evaluated by calculating bracing members' allowable compression and tension forces and assessing each tower section's ability to resist shear forces.

Bracing members were determined to be appropriately sized based on comparison of calculated vs. allowable tower shear.

Guy Cables:

EIA/TIA-222-F paragraph 8.2.1 requires all guy cables to have a factor of safety of 2.0 or greater for structures less than 700-feet in height. Based on this requirement, all guys are appropriately sized.

Base Foundation and Guy Anchors:

Evaluation of the existing guy anchors and base foundation was performed using PiROD design drawings. The existing foundation and guy anchors are found to be adequate to support calculated reactions imposed by the proposed loads..

Base reactions imposed with the additional antennas were calculated as follows:

Location	Vertical	Horizontal
Base:	92.9 kips	-1.8 kips
Guy Anchor:	-33.1 kips	-43.6 kips

CONCLUSIONS AND RECOMMENDATIONS:

Our structural analysis indicates the 260-foot guyed tower located in Torrington, Connecticut is capable of supporting the proposed antennas.

APT recommends a safety cable be installed to facilitate future work on the structure.

LIMITATIONS:

This report is based on the following:

1. Tower is properly installed and maintained.
2. All members are in new condition.
3. All required members are in place.
4. All bolts are in place and are properly tightened.
5. Tower is in plumb condition.
6. All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.

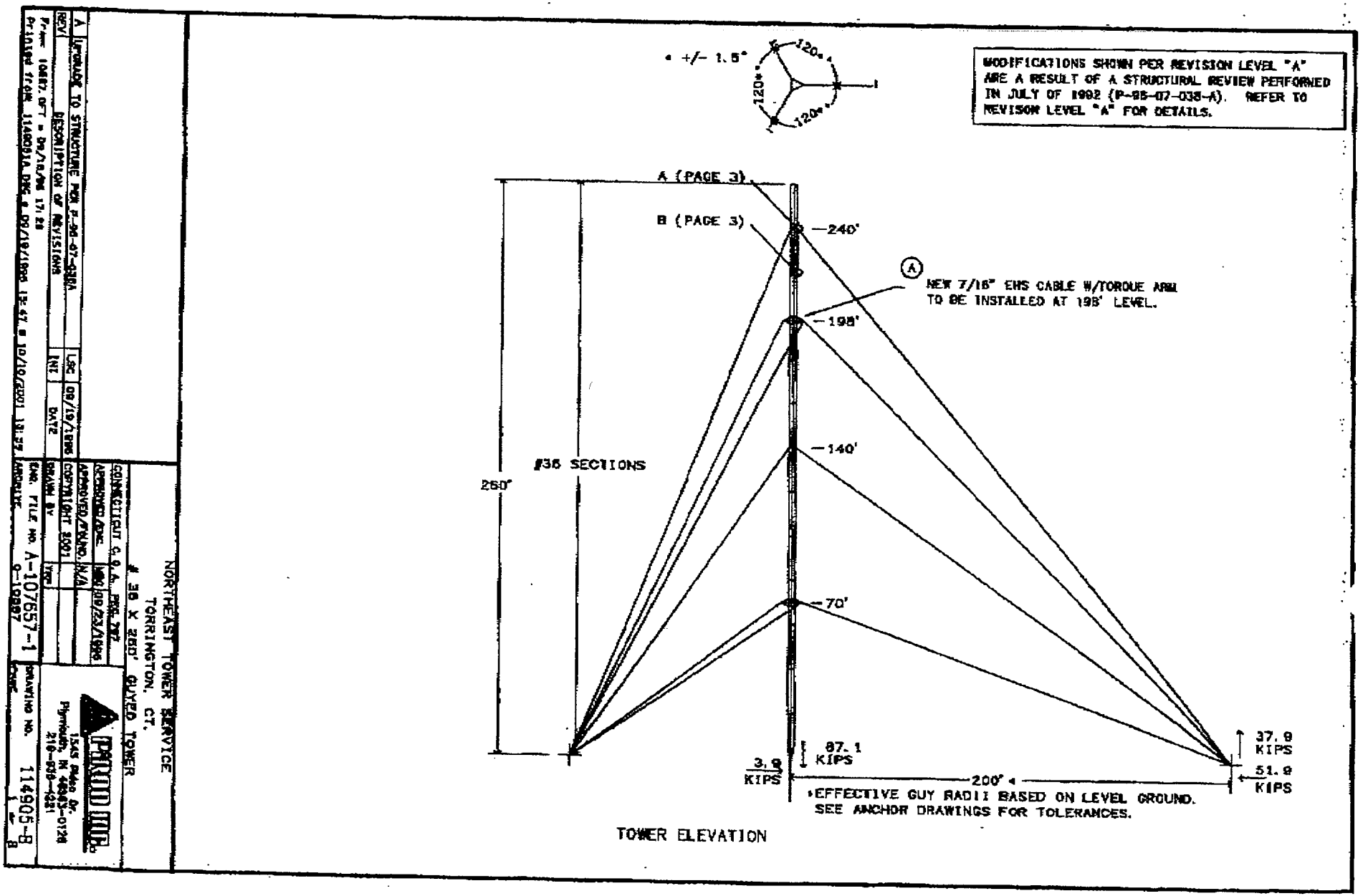
All-Points Technology Corp., P.C. (APT) is not responsible for modifications completed prior to or hereafter which APT is not or was not directly involved. Modifications include but are not limited to:

1. Replacing or reinforcing members in any manner.
2. Adding or relocating guy cables.
3. Installing antenna mounting frames or side arms.
4. Extending tower.

APT hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon the information contained and set forth herein. If you are aware of any information which is contrary to that which is stated herein, or you are aware of any defects arising from the original design, material, fabrication and erection deficiencies, you should disregard this report and immediately contact APT. APT disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

Appendix A

Tower Drawings



SECTION DATA							LEG CONNECTION		
SPAN HEIGHT	SEC#	LEN	LEGS	BRACES	PART#	BOLT DIAM	BOLT LEN	BOLTS /SEC
240' - 260'	36	20'	1- 1/2 "	9/16"	104494	9/16"	3-1/2"	9
100' - 240'	36	20'	1- 1/2 "	9/16"	104494	9/16"	3-1/2"	9
20' - 100'	36	20'	1- 3/4 "	5/8 "	104495	5/8"	4 "	12
0' - 20'	35	20'	1- 3/4 "		104496	5/8"	4 "	12

CANDELABRA DATA			
HT.	DESCRIPTION	BRACKET PART#	BRACKET C-C
260'	CANDELABRA	100492	25.50"

TOP VIEW
MARKED LEG

THE MARKED LEG OF EACH SECTION IS STAMPED WITH THE LAST 3 DIGITS OF THE TOWER SERIAL # AND THE JOINT # AT EACH END OF THE SECTION. JOINTS ARE CONSECUTIVELY NUMBERED STARTING WITH 0 AT THE TOWER BASE. ASSEMBLE TOWER WITH MARKED LEGS TOGETHER IN PROPER SEQUENCE.

* INDICATES RELATIVE POSITION OF LINE HANGING BRACKETS P/N 110116 AT NOMINAL 3' VERTICAL SPACING.

REV	DESCRIPTION OF REVISIONS	BY	DATE
A	UPGRADE TO STRUCTURE PER A-96_07-018A	LJO	09/18/1996

From: 10667.DFT - 09/18/96 17:29
Printed from: 1149052A.DWG - 09/18/1996 15:48 & 10/16/2001 13:39

NORTHEAST TOWER SERVICE
TORRINGTON, CT.
36 X 250' GUYED TOWER

CONNECTICUT C.O.A. REG. 787		
APPROVED/ENG.	MBB	09/23/1996
APPROVED/FOUND.	N/A	
COPYRIGHT 2001		
DRAWN BY	TRP	
ENG. FILE NO. A-107657-1		
ARCHIVE Q-10597		

PIROD INC.
1845 Pidco Dr.
Plymouth, IN 46563-0128
219-936-4221

DRAWING NO. 114905-B
PAGE 2 OF 6

GUY HARDWARE DETAIL (QUANTITIES ARE PER WIRE)

HT.	GUY SIZE	TORQ SIZE	LUG PART #	SHACKL SIZE	STRAIN INSUL QTY	STRAIN INSUL LEN	STRAIN INSUL CAP.	THIMBLE SIZE	TURN-BUCKLE	PRELFORM	INITIAL TENSION ** @ 0°F @ 30°F @ 60°F @ 90°F @120°F
240'	9/16" EHS.		105062	3/4"				3/8	7/8"	BG-2116	4429# 4117# 3811# 3500# 3199# 2921#
198'	7/16" EHS.	12'	Ⓐ	3/4"				1/2	7/8"	BG-2148	2742# 2505# 2288# 2080# 1881# 1685#
140'	1/2 " EHS.		105062		1	20'	35000#	5/8	7/8"	BG-2115	3815# 3427# 3047# 2690# 2348# 2024#
70'	1/2 " EHS.	12'	105062	3/4"				5/8	7/8"	BG-2115	4197# 3677# 3167# 2690# 2243# 1833#

** INTERPOLATION IS PERMITTED FOR OTHER TEMPERATURES. TOLERANCE IS +/- 10% OF INITIAL TENSION SHOWN.

GUY LENGTH DATA		
HT.	GUY SIZE	THEO. LENGTH
240'	9/16" EHS.	312.4'
198'	7/16" EHS.	281.4'
140'	1/2 " EHS.	244.1'
70'	1/2 " EHS.	211.8'

NEW GUY LEVEL & CABLE W/TORQUE ARM

EXISTING GUY LUG P/N 105062 @260' LEVEL

A-325 BOLTS SEE LEG CONNECT TABLE FOR SIZE

VIEW B TYPICAL LEG CONNECTION

VIEW A TYPICAL GUY CONNECTION LUG

REV	DESCRIPTION OF REVISIONS	INI	DATE
A	UPGRADE TO STRUCTURE PER P-06-07-038A	LSC	09/19/1998

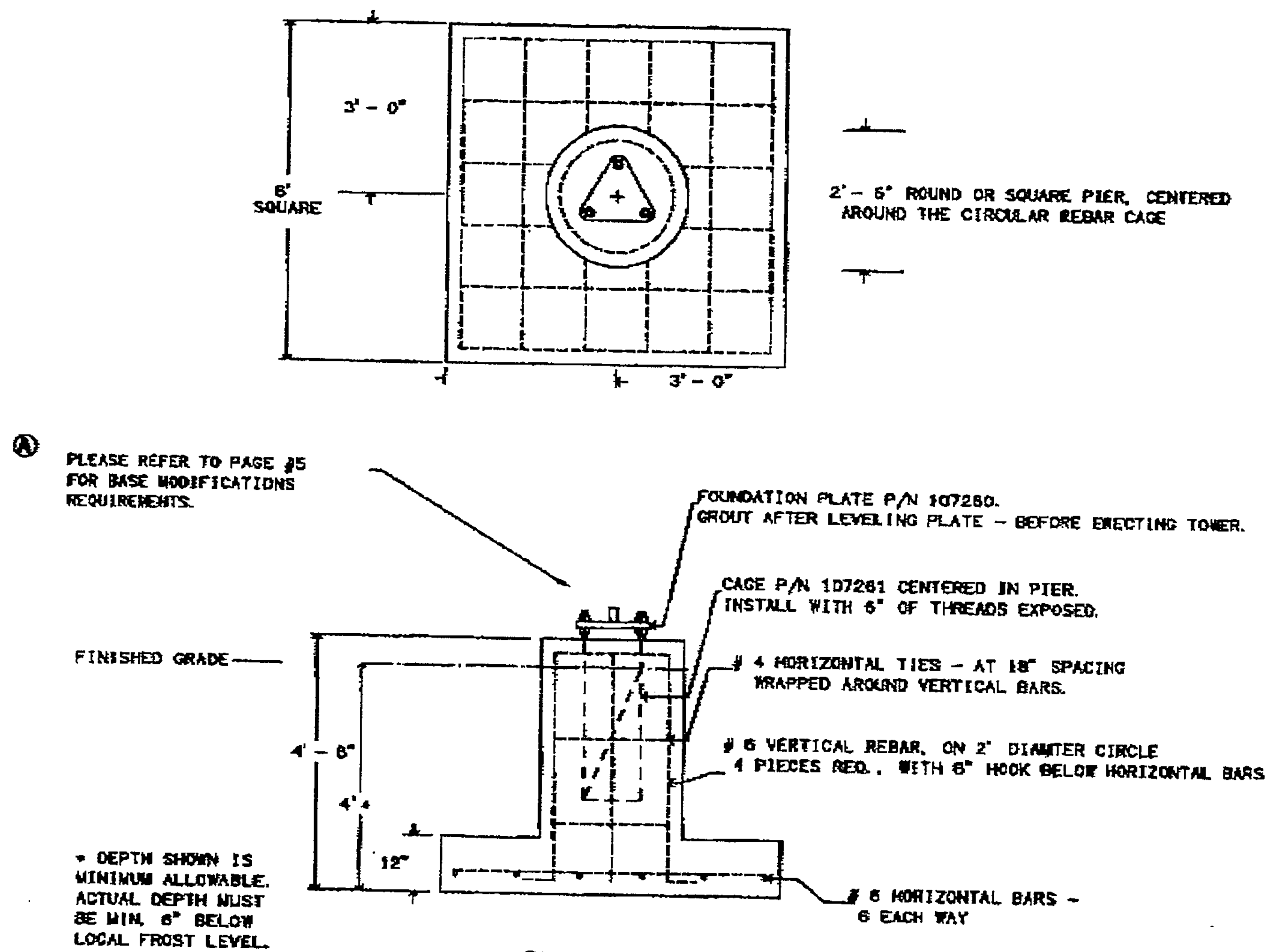
From 10697.DWT - 09/18/98 17:29
Printed from 114905A.DWG - 09/19/1998 10:12 & 10/10/2001 13:59

NORTHEAST TOWER SERVICE
TORRINGTON, CT.
36 X 260' GUYED TOWER

CONNECTICUT C. O. A.	PEC.797	
APPROVED/ENG.	MBD	09/23/1998
APPROVED/FOUND.	N/A	
COPYRIGHT 2001		
DRAWN BY	TRF	
ENG. FILE NO.	A-107657-1	
ARCHIVE	D-10697	

PIROD INC.
1545 Pilcox Dr.
Plymouth, IN 46563-0128
219-936-4227

DRAWING NO. 114905-B
PAGE 3 OF 8



TOWER FOUNDATION
2.0 CU. YDS. CONCRETE REQUIRED

NOTE: ALL REBAR IS EQUALLY SPACED AND REQUIRES MIN. 3" CONCRETE COVER.

REV	DESCRIPTION OF REVISIONS	INI	DATE
A	UPGRADE TO STRUCTURE PER F-96-07-038A	LSC	09/13/1996

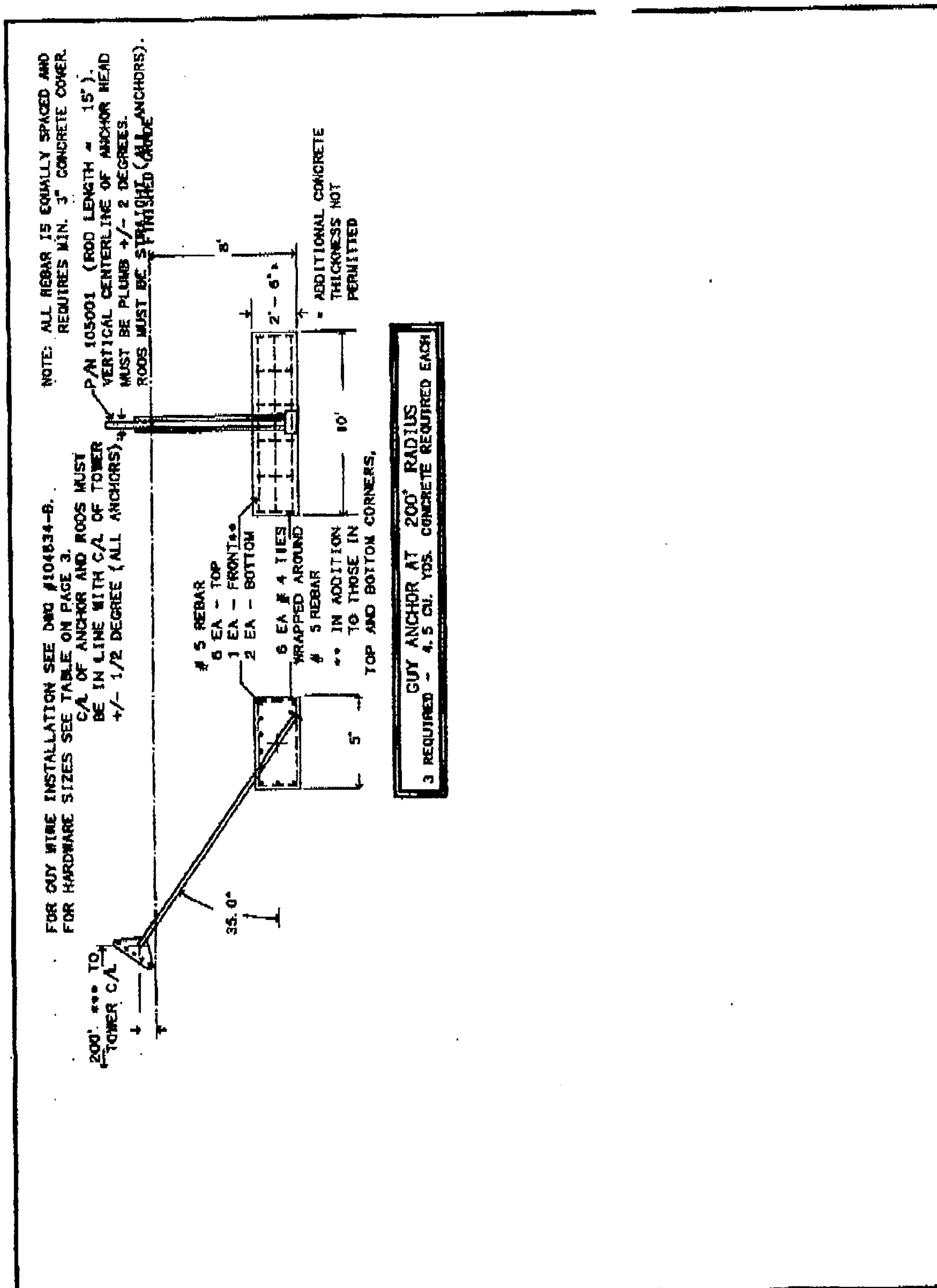
From 10897.DFT - 09/13/96 17:39
Printed from 114905BA.DWG = 09/20/1996 08:52 @ 10/10/2001 13:59

NORTHEAST TOWER SERVICE
TORRINGTON, CT.
36 X 260' GUYED TOWER

CONNECTICUT C.G.A.	PEC 707	
APPROVED/ENG.	WBD	09/23/1996
APPROVED/FOUND.	DDA	09/23/1996
COPYRIGHT 2001		
DRAWN BY	TRP	
ENG. FILE NO.	A-107657-1	
ARCHIVE	G-10897	

PiROD INC.
1545 Pidco Dr.
Plymouth, IN 46563-0128
219-936-4221

DRAWING NO. 114905-B
PAGE 7 of 8



NORTHEAST TOWER SERVICE
TORRINGTON, CT.
38 X 260' GUY ANCHORS

CONNECTICUT C.O.A. PEC.797			
APPROVED/ENG.	MDG	09/23/1998	
APPROVED/MOUNG.	DDA	09/23/1998	
COPYRIGHT 2001			
DRAWN BY	TNP		
ENG. FILE NO. A-107657-1			
ARCHIVE 9-10587			

PIROD INC.
1545 Pidco Dr.
Plymouth, IN 46563-0128
219-936-4221

DRAWING NO. 114905-B
PAGE 8 OF 8

REV	DESCRIPTION OF REVISIONS	INI	DATE
A	UPGRADE TO STRUCTURE PER P-98-07-038A	LSO	09/18/1998

From: 10687.DFT - 09/18/98 17:29
Printed from 114905BA.DWG - 09/18/1998 16:09 @ 10/10/2001 13:37

Appendix B

Calculations

All-Points Technology Corp.
150 Old Westside Road
North Conway, NH 03860
(603) 356-5214

Client: **Marcus Communications**
Job: **Torrington, CT**
Calculated By: **R. Adair**

Job No.: **CT122160**
Date: **21-Jan-02**

General Information

Tower Manufacturer	PiROD	
Tower Type	#36 Guyed	
Total Height of Tower	260 ft.	
Leg Spread	3.00 ft.	
Wind Speed EIA-TIA: Litchfield County	80 mph.	
Radial Ice	0.5 in.	
75% Reduction for ice	yes (yes or no)	
1/3 increase for allowable loads	yes (yes or no)	**O.K.**
Number of faces	3 faces	

Antenna Force Calculations based on EIA/TIA-222-F, using the following formulas:

Force on discrete appurtenance: $F=Qz*Gh*Ca*A$

Force on microwave antennae: $F=Cr*A*Gh*Kz*V^2$, where $Cr=((Ca^2)+(Cs^2))^{(1/2)}$

$Gh=.65+.60/(h/33)^{(1/7)}$ = Gh= 1.10

V as specified EIA-222-F

Fy	50 ksi	
E (Modulus of Elasticity)	29000 ksi	
Fb	0.6	
K	1	

Section No.	Section Length	Leg Spread @ Base of section	Leg Size (Description)		Width of Leg to Wind	Leg Properties		
						Area	r_z	Unbraced Lengths
1	70	3.00	1 3/4" Solid	13.00	1.75	2.41	0.44	28.00
2	30	3.00	1 3/4" Solid	13.00	1.75	2.41	0.44	28.00
3	40	3.00	1 1/2" Solid	10.00	1.50	1.77	0.38	28.00
4	58	3.00	1 1/2" Solid	10.00	1.50	1.77	0.38	28.00
5	42	3.00	1 1/2" Solid	10.00	1.50	1.77	0.38	28.00
6	20	3.00	1 1/2" Solid	10.00	1.50	1.77	0.38	28.00
top		3.00						
	260							

Section No.	Unbraced Length	Tower Properties						
		Data info	Area	I	J	S_x	r_z	K
1	840	13.00	7.22	1563.2	3126.4	74.49	14.72	1.00
2	840	13.00	7.22	1563.2	3126.4	74.49	14.72	1.00
3	840	10.00	5.30	1148.2	2296.4	55.04	14.72	1.00
4	696	10.00	5.30	1148.2	2296.4	55.04	14.72	1.00
5	504	10.00	5.30	1148.2	2296.4	55.04	14.72	1.00
6	240	10.00	5.30	1148.2	2296.4	55.04	14.72	2.00
top								

All-Points Technology Corp.
150 Old Westside Road
North Conway, NH 03860
(603) 356-5214

Client: **Marcus Communications**
Job: **Torrington, CT**
Calculated By: **R. Adair**

Job No.: **CT122160**
Date: **21-Jan-02**

Tower Summary

Section ***1*** ***type*** #36

Ag = 220 sf z = 35 ft

	Quantity Per Face	Length (ft.)	Width (in.)	Area (sf)	Area w/ ice	Wt. Per ft.	Wt. (lbs.) Tower	Wt. (lbs.) Ice
Round Members								
Leg	2	70.0	1.75	20.4	32.1	8.18	1718.8	288.5
Diagonal	56	3.7	0.63	10.8	28.0	1.04	646.6	425.4
Step Horizontals	21	2.9	0.63	3.1	8.1	1.04	62.6	41.2
Horizontals	11	2.9	0.63	1.6	4.1	1.04	93.9	61.8
Flat Members								
	0	0.0	0.00	0.0	0.0	0.0	0.0	0.0
				0.0	0.0		0.0	0.0
				0.0	0.0		0.0	0.0

Section ***2*** ***type*** #36

Ag = 94 sf z = 85 ft

	Quantity Per Face	Length (ft.)	Width (in.)	Area (sf)	Area w/ ice	Wt. Per ft.	Wt. (lbs.) Tower	Wt. (lbs.) Ice
Round Members								
Leg	2	30.0	1.75	8.8	13.8	8.2	736.6	123.6
Diagonal	24	3.7	0.63	4.6	12.0	1.04	277.1	182.3
Step Horizontals	9	2.9	0.63	1.3	3.5	1.04	26.8	17.6
Horizontals	5	2.9	0.63	0.7	1.7	1.04	40.2	26.5
Flat Members								
Leg	0	0.0	0.00	0.0	0.0	0.0	0.0	0.0
				0.0	0.0		0.0	0.0
				0.0	0.0		0.0	0.0

Section ***3*** ***type*** #36

Ag = 125 sf z = 120 ft

	Quantity Per Face	Length (ft.)	Width (in.)	Area (sf)	Area w/ ice	Wt. Per ft.	Wt. (lbs.) Tower	Wt. (lbs.) Ice
Round Members								
Leg	2	40.0	1.50	10.0	16.7	6.0	721.6	146.5
Diagonal	32	3.7	0.56	5.6	15.4	0.85	300.6	230.6
Step Horizontals	12	2.9	0.56	1.6	4.5	0.85	29.2	22.4
Horizontals	6	2.9	0.56	0.8	2.2	0.85	43.8	33.6
Flat Members								
Leg	0	0.0	0.00	0.0	0.0	0.0	0.0	0.0
				0.0	0.0		0.0	0.0
				0.0	0.0		0.0	0.0

All-Points Technology Corp.
150 Old Westside Road
North Conway, NH 03860
(603) 356-5214

Client: **Marcus Communications**
Job: **Torrington, CT**
Calculated By: **R. Adair**

Job No.: **CT122160**
Date: **21-Jan-02**

Section ***4*** ***type*** #36

Ag = 181 sf z = 169 ft

	Quantity Per Face	Length (ft.)	Width (in.)	Area (sf)	Area w/ ice	Wt. Per ft.	Wt. (lbs.) Tower	Wt. (lbs.) Ice
Round Members								
Leg	2	58.0	1.50	14.5	24.2	6.0	1046.3	212.5
Diagonal	46	3.7	0.56	8.1	22.4	0.85	435.8	334.4
Step Horizontals	17	2.9	0.56	2.3	6.5	0.85	42.3	32.5
Horizontals	9	2.9	0.56	1.2	3.3	0.85	63.5	48.7
Flat Members								
Leg	0	0.0	0.00	0.0	0.0	0.0	0.0	0.0
				0.0	0.0		0.0	0.0
				0.0	0.0		0.0	0.0

Section ***5*** ***type*** #36

Ag = 131 sf z = 219 ft

	Quantity Per Face	Length (ft.)	Width (in.)	Area (sf)	Area w/ ice	Wt. Per ft.	Wt. (lbs.) Tower	Wt. (lbs.) Ice
Round Members								
Leg	2	42.0	1.50	10.5	17.5	6.0	757.7	153.9
Diagonal	34	3.7	0.56	5.8	16.2	0.85	315.6	242.1
Step Horizontals	13	2.9	0.56	1.7	4.7	0.85	30.6	23.5
Horizontals	6	2.9	0.56	0.8	2.4	0.85	45.9	35.2
Flat Members								
Leg	0	0.0	0.00	0.0	0.0	0.0	0.0	0.0
				0.0	0.0		0.0	0.0
				0.0	0.0		0.0	0.0

Section ***6*** ***type*** #36

Ag = 63 sf z = 250 ft

	Quantity Per Face	Length (ft.)	Width (in.)	Area (sf)	Area w/ ice	Wt. Per ft.	Wt. (lbs.) Tower	Wt. (lbs.) Ice
Round Members								
Leg	2	20.0	1.50	5.0	8.3	6.0	360.8	73.3
Diagonal	16	3.7	0.56	2.8	7.7	0.85	150.3	115.3
Step Horizontals	6	2.9	0.56	0.8	2.2	0.85	14.6	11.2
Horizontals	1	2.9	0.56	0.1	0.4	0.85	7.3	5.6
Flat Members								
Leg	0	0.0	0.00	0.0	0.0	0.0	0.0	0.0
Horizontals	2	2.9	3.00	1.4	1.9	5.1	88.0	47.0
				0.0	0.0		0.0	0.0

Section ***top*** ***type***

Ag = 0 sf z = 260 ft

	Quantity Per Face	Length (ft.)	Width (in.)	Area (sf)	Area w/ ice	Wt. Per ft.	Wt. (lbs.) Tower	Wt. (lbs.) Ice
Round Members								
Leg	2	0.0	0.00	0.0	0.0	0.0	0.0	0.0
				0.0	0.0		0.0	0.0
				0.0	0.0		0.0	0.0
				0.0	0.0		0.0	0.0
Flat Members								
Leg	2	0.0	0.00	0.0	0.0	0.0	0.0	0.0
				0.0	0.0		0.0	0.0
				0.0	0.0		0.0	0.0

All-Points Technology Corp.
150 Old Westside Road
North Conway, NH 03860
(603) 356-5214

Client: **Marcus Communications**
Job: **Torrington, CT** Job No.: **CT122160**
Calculated By: **R. Adair** Date: **21-Jan-02**

Antennas

Type	Elev. (z)	Coeff. (C)	Kz	Qz	Area (no ice)	Area (ice)	Force (no ice)	Weight (no ice)	Force (ice)	Weight (w/ ice)	Loc.		
Beacon	260	0.8	1.80	29.55	2.5	2.7	**65**	50	**70**	75	N 7		
(4) whips on (3) 10' candal	259	1.2	1.80	29.52	15.9	28.6	**618**	1100	**1110**	1600	6-19		
Amplifier box	256	1.4	1.80	29.42	3.3	3.6	**151**	50	**165**	75	6-16		
(2) whips, 4' s.a.	222	1.2	1.72	28.25	7.0	10.1	**261**	150	**375**	225	5-24		
(11) whips on (3) 10' candal	218	0.8	1.72	28.10	31.2	49.0	**768**	1450	**1208**	2000	5-20		
(4) whips on (2) 6'-8" candal.	200	1.2	1.67	27.42	12.5	21.6	**Remove**	600	**Remove**	850			
Whip on 2' s.a.	178	1.2	1.62	26.52	3.4	4.8	**119**	75	**166**	125	4-38		
Whip on 4' s.a.	177	1.2	1.62	26.48	5.4	7.5	**189**	125	**261**	200	4-37		
Whip & Yagi on 3' s.a.	176	1.2	1.61	26.43	2.8	4.4	**97**	75	**152**	125	4-36		
Whip on 6' s.a.	167	1.2	1.59	26.04	3.2	6.0	**109**	100	**206**	175	4-27		
Whip on 2' s.a.	163	1.2	1.58	25.86	1.3	2.3	**43**	50	**79**	75	4-23		
Whip on 1' s.a.	159	1.2	1.57	25.68	2.9	4.0	**97**	75	**134**	125	4-19		
Whip on 3' s.a.	140	1.2	1.51	24.76	4.1	5.9	**133**	100	**193**	175	N 4		
Whip on 2' s.a.	130	1.2	1.48	24.24	2.5	3.7	**80**	75	**117**	125	3-30		
3-bay FM w/radome	121	1.2	1.45	23.75	16.5	19.1	**516**	300	**595**	400	3-21		
1-bay FM w/radome	84	1.2	1.31	21.40	5.3	5.9	**148**	100	**165**	130	2-14		
			1.00	16.38			**0**		**0**				
(12) ALP7130.16	200	1.4	1.67	27.42	74.0	89.1	**3113**	1860	**3751**	2730			
Torque Arm	198	2.0	1.67	27.34	13.3	16.7	**800**	400	**999**	600	N 5		
Torque Arm	70	2.0	1.24	20.31	13.3	16.7	**594**	400	**743**	600	N 2		
RFC	60	1.0	1.19	19.44	1.3	1.5	**28**	20	**33**	30			
			1.00	16.38			**0**		**0**				
			1.00	16.38			**0**		**0**				
			1.00	16.38			**0**		**0**				
			1.00	16.38			**0**		**0**				
Dishes				Orient							Elem/Dis	Ca	Cs
2' dish	171	0.0040	1.60	0	4.1	4.4	**183**	50	**196**	80	4-31	0.0040	0.0000
2' dish	60	0.0040	1.19		4.1	4.4	**136**	30	**145**	50	1-60	0.00397	
		0.0000	1.00				**0**		**0**				
		0.0000	1.00				**0**		**0**				
		0.0000	1.00				**0**		**0**				
		0.0000	1.00				**0**		**0**				
		0.0000	1.00				**0**		**0**				
		0.0000	1.00				**0**		**0**				
		0.0000	1.00				**0**		**0**				
Proposed Antennas													
RFC	100	1.0	1.37	22.49	1.3	1.5	**32**	20	**38**	30			
2' dish	100	0.0040	1.37		4.1	4.4	**157**	30	**168**	50	3-0	0.00397	
		0.0000	1.00				**0**		**0**				

All-Points Technology Corp.
150 Old Westside Road
North Conway, NH 03860
(603) 356-5214

Client: **Marcus Communications**
Job: **Torrington, CT**
Calculated By: **R. Adair**

Job No.: **CT122160**
Date: **21-Jan-02**

Existing Wind Load Without Ice

Section	Areas					Factors			Qz	Gh	Wind Load	Uniform Load
	Gross	Flats	Rounds	Ae	Aa	Df	Dr	Ca				
1	220.2	0.0	35.9	20.9	177.33	1	1	1.2	16.66	1.10	**4930 lbs.**	**70 lbs/ft.**
2	94.4	0.0	15.4	9.0	76.00	1	1	1.2	21.47	1.10	**2723 lbs.**	**91 lbs/ft.**
3	125.0	0.0	18.0	10.4	101.33	1	1	1.2	23.69	1.10	**3918 lbs.**	**98 lbs/ft.**
4	181.3	0.0	26.1	15.1	145.52	1	1	1.2	26.13	1.10	**6216 lbs.**	**107 lbs/ft.**
5	131.3	0.0	18.9	11.0	45.09	1	1	1.2	28.14	1.10	**2615 lbs.**	**62 lbs/ft.**
6	62.5	1.4	8.7	6.5	10.52	1	1	1.2	29.22	1.10	**975 lbs.**	**49 lbs/ft.**

Existing Wind Load With Ice

Section	Areas					Factors			Qz	Gh	Wind Load	Uniform Load
	Gross	Flats	Rounds	Ae	Ai	Df	Dr	Ca				
1	220.2	0.0	72.2	45.1	213.33	1	1	1.2	16.66	1.10	**6512 lbs.**	**93 lbs/ft.**
2	94.4	0.0	30.9	19.3	91.43	1	1	1.2	21.47	1.10	**3596 lbs.**	**120 lbs/ft.**
3	125.0	0.0	38.8	24.0	121.90	1	1	1.2	23.69	1.10	**5218 lbs.**	**130 lbs/ft.**
4	181.3	0.0	56.3	34.9	173.09	1	1	1.2	26.13	1.10	**8218 lbs.**	**142 lbs/ft.**
5	131.3	0.0	40.8	25.2	54.85	1	1	1.2	28.14	1.10	**3798 lbs.**	**90 lbs/ft.**
6	62.5	1.9	18.7	13.6	13.22	1	1	1.2	29.22	1.10	**1476 lbs.**	**74 lbs/ft.**

Proposed Wind Load Without Ice

Section	Areas					Factors			Qz	Gh	Wind Load	Uniform Load
	Gross	Flats	Rounds	Ae	Aa	Df	Dr	Ca				
1	220.2	0.0	35.9	20.9	177.33	1	1	1.2	16.66	1.10	**4930 lbs.**	**70 lbs/ft.**
2	94.4	0.0	15.4	9.0	76.00	1	1	1.2	21.47	1.10	**2723 lbs.**	**91 lbs/ft.**
3	125.0	0.0	18.0	10.4	101.33	1	1	1.2	23.69	1.10	**3918 lbs.**	**98 lbs/ft.**
4	181.3	0.0	26.1	15.1	145.52	1	1	1.2	26.13	1.10	**6216 lbs.**	**107 lbs/ft.**
5	131.3	0.0	18.9	11.0	45.09	1	1	1.2	28.14	1.10	**2615 lbs.**	**62 lbs/ft.**
6	62.5	1.4	8.7	6.5	10.52	1	1	1.2	29.22	1.10	**975 lbs.**	**49 lbs/ft.**

Proposed Wind Load With Ice

Section	Areas					Factors			Qz	Gh	Wind Load	Uniform Load
	Gross	Flats	Rounds	Ae	Ai	Df	Dr	Ca				
1	220.2	0.0	72.2	45.1	213.33	1	1	1.2	16.66	1.10	**6512 lbs.**	**93 lbs/ft.**
2	94.4	0.0	30.9	19.3	91.43	1	1	1.2	21.47	1.10	**3596 lbs.**	**120 lbs/ft.**
3	125.0	0.0	38.8	24.0	121.90	1	1	1.2	23.69	1.10	**5218 lbs.**	**130 lbs/ft.**
4	181.3	0.0	56.3	34.9	173.09	1	1	1.2	26.13	1.10	**8218 lbs.**	**142 lbs/ft.**
5	131.3	0.0	40.8	25.2	54.85	1	1	1.2	28.14	1.10	**3798 lbs.**	**90 lbs/ft.**
6	62.5	1.9	18.7	13.6	13.22	1	1	1.2	29.22	1.10	**1476 lbs.**	**74 lbs/ft.**

All-Points Technology Corp.
150 Old Westside Road
North Conway, NH 03860
(603) 356-5214

Client: **Marcus Communications**
Job: **Torrington, CT** Job No.: **CT122160**
Calculated By: **R. Adair** Date: **21-Jan-02**

Dead Load Multipliers

Section	Length evaluated	Manufacturers Number	Manufacturers Weight for Section	Ecom 1.0 DL Multiplier	Spreadsheet Determined Ice Load	Linear Appurtenance Dead Load	Linear Appurtenance DL plus Ice	**Dead Load Multiplier**	**DL plus Ice Multiplier**
1	70	NA	2522	1718.8	816.8	2383	6311	**2.9**	**5.6**
2	30	NA	1081	736.6	350.1	1005	2664	**2.8**	**5.6**
3	40	NA	1095	721.6	433.1	1295	3441	**3.3**	**6.9**
4	58	NA	1588	1046.3	628.0	1677	4422	**3.1**	**6.3**
5	42	NA	1150	757.7	454.7	411	1104	**2.1**	**3.6**
6	20	NA	621	360.8	252.3	83	211	**2.0**	**3.0**
top	0	NA	0	0.0	#DIV/0!	#VALUE!	#VALUE!	**#VALUE!**	**#DIV/0!**
0	0	NA	0	0.0	#DIV/0!	#DIV/0!	#DIV/0!	**#DIV/0!**	**#DIV/0!**
#REF!	#REF!	NA	#REF!	#REF!	#REF!	#REF!	#REF!	**#REF!**	**#REF!**
#REF!	#REF!		#REF!	#REF!	#REF!	#REF!	#REF!	**#REF!**	**#REF!**
#REF!	#REF!		#REF!	#REF!	#REF!	#REF!	#REF!	**#REF!**	**#REF!**

All-Points Technology Corp.
150 Old Westside Road
North Conway, NH 03860
(603) 356-5214

Client: **Marcus Communications**
Job: **Torrington, CT** Job No.: **CT122160**
Calculated By: **R. Adair** Date: **21-Jan-02**

Guy Loads

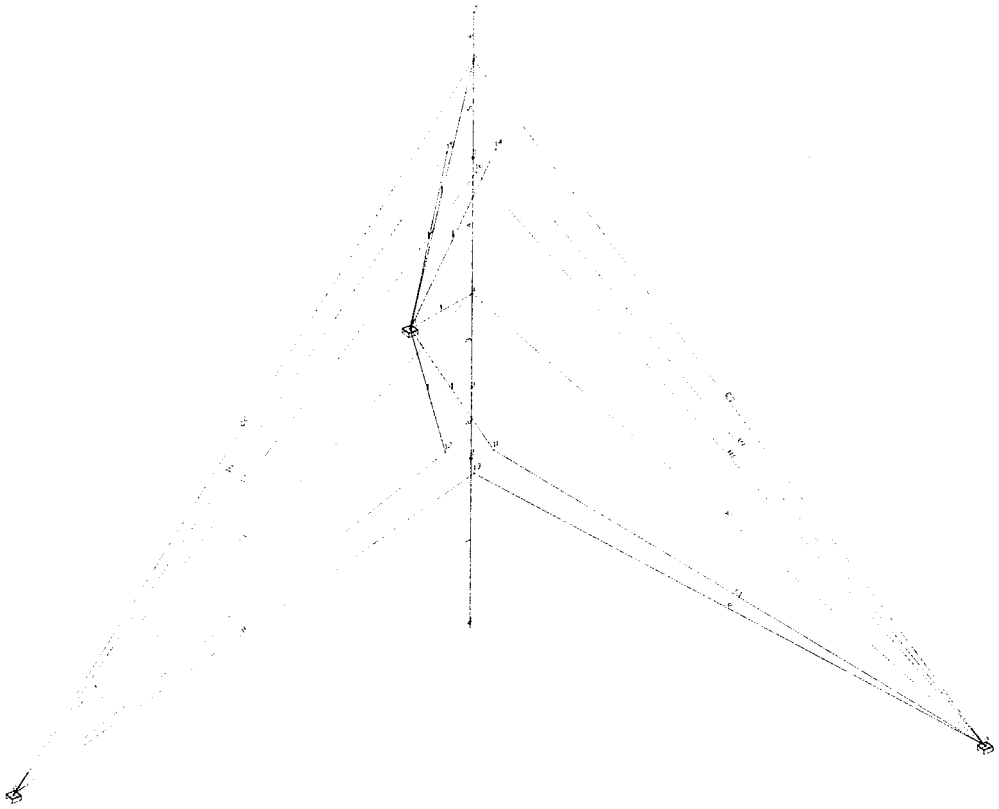
F_D= qz $G_H C_D d L_C$ = Total Drag Force (lb)
F_L= qz $G_H C_L d L_C$ = Total Lift Force (lb)

qz = Velocity pressure at mid-height of guy (lb/ft^2)
G_H = Gust response factor based on total height of structure
d = Diameter of guy strand (in)
L_C = Chord length of guy (ft)
L_A = Horizontal length from tower to guy anchor
θ = Clockwise angle from guy chord to wind direction vector ($\theta <= 180°$)(in Radians)
$C_D = 1.2 \sin^3 \theta$
$C_L = 1.2 \sin^2 \theta \cos \theta$

Node	Height	L_A	L_C	θ	qz	G_H	d	# Guys	Wind Pressure
2	70	200	211.9	0.34	16.7	1.10	1/2	1	0.018
4	140	200	244.1	0.61	20.3	1.10	1/2	1	0.022
5	198	200	281.4	0.78	22.4	1.10	7/16	2	0.025
6	240	200	312.4	0.88	23.7	1.10	9/16	1	0.026
			0.0	#DIV/0!	16.4	1.10			0.018
			0.0	#DIV/0!	16.4	1.10			0.018
			0.0	#DIV/0!	16.4	1.10			0.018
			0.0	#DIV/0!	16.4	1.10			0.018
			0.0	#DIV/0!	16.4	1.10			0.018

Frame Static Analysis Report

Project::	Marcus Communications - Torrington CT122160	Company:	All-Points Technology Corporation
Description:	260' PiROD #36 Guyed Tower	User:	Robert Adair, P.E.
Date:	01/21/2002 12:22 PM	Software:	Eagle Point Frame Analysis & Design



		NODAL COORDINATES			BOUNDARY CONDITIONS (F=FIX,S=SUP,M=MASTER/SLAVE)						
NODE NO	REBAND NO	X	Y	Z	NODE TEMP	ALPHA	BETA	GAMMA	DIR	DDDOOO XYZXYZ	STIFFNESS
Units:		Ft	Ft	Ft	F	Deg	Deg	Deg			K /In /Deg
1	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00		FFF.F.	
2	2	0.00	70.00	0.00	0.00	0.00	0.00	0.00			
3	3	0.00	100.00	0.00	0.00	0.00	0.00	0.00			
4	4	0.00	140.00	0.00	0.00	0.00	0.00	0.00			
5	5	0.00	198.00	0.00	0.00	0.00	0.00	0.00			
6	6	0.00	240.00	0.00	0.00	0.00	0.00	0.00			
7	7	0.00	260.00	0.00	0.00	0.00	0.00	0.00			
8	8	-200.00	0.00	0.00	0.00	0.00	0.00	0.00		FFFFFF	
9	9	100.00	0.00	173.20	0.00	0.00	0.00	0.00		FFFFFF	
10	10	100.00	0.00	-173.20	0.00	0.00	0.00	0.00		FFFFFF	
11	11	10.00	70.00	0.00	0.00	0.00	0.00	0.00		MMMMMM	
									DX	Slave to Node 2	
									DY	Slave to Node 2	
									DZ	Slave to Node 2	
									OX	Slave to Node 2	
									OY	Slave to Node 2	
									OZ	Slave to Node 2	

12	12	-5.00	70.00	-8.66	0.00	0.00	0.00	0.00	MMMMMM
									DX Slave to Node 2
									DY Slave to Node 2
									DZ Slave to Node 2
									OX Slave to Node 2
									OY Slave to Node 2
									OZ Slave to Node 2
13	13	-5.00	70.00	8.66	0.00	0.00	0.00	0.00	MMMMMM
									DX Slave to Node 2
									DY Slave to Node 2
									DZ Slave to Node 2
									OX Slave to Node 2
									OY Slave to Node 2
									OZ Slave to Node 2
14	14	10.00	198.00	0.00	0.00	0.00	0.00	0.00	MMMMMM
									DX Slave to Node 5
									DY Slave to Node 5
									DZ Slave to Node 5
									OX Slave to Node 5
									OY Slave to Node 5
									OZ Slave to Node 5
15	15	-5.00	198.00	-8.66	0.00	0.00	0.00	0.00	MMMMMM
									DX Slave to Node 5
									DY Slave to Node 5
									DZ Slave to Node 5
									OX Slave to Node 5
									OY Slave to Node 5
									OZ Slave to Node 5
16	16	-5.00	198.00	8.66	0.00	0.00	0.00	0.00	MMMMMM
									DX Slave to Node 5
									DY Slave to Node 5
									DZ Slave to Node 5
									OX Slave to Node 5
									OY Slave to Node 5
									OZ Slave to Node 5

2 NODE PRISMATIC BEAM ELEMENT

ELEM NO	NE NO	PE NO	ALPHA	BETA	GAMMA	LENGTH	MAT TYPE	PROP TYPE	RELEASE NE	RELEASE PE	REF TEMP	OFFSET DIR	OFFSET NE	OFFSET PE	STIFFNESS NE	STIFFNESS PE
Units:			Deg	Deg	Deg	Ft					F		Ft	Ft	K /In /Deg	K /In /Deg
1	1	2	90.00	-90.00	0.00	70.00	1	1								
2	2	3	90.00	-90.00	0.00	30.00	1	1								
3	3	4	90.00	-90.00	0.00	40.00	1	2								
4	4	5	90.00	-90.00	0.00	58.00	1	2								
5	5	6	90.00	-90.00	0.00	42.00	1	2								
6	6	7	90.00	-90.00	0.00	20.00	1	2								

2 NODE CABLE ELEMENT

ELEM NO	NE NO	PE NO	ALPHA	BETA	CHORD LENGTH	MAT TYPE	PROP TYPE	TEN	LU	REF TEMP	CONNECTION OFFSETS DX	DY	DZ	DX	DY	DZ
Units:			Deg	Deg	Ft			K	Ft	F	Ft	Ft	Ft	Ft	Ft	Ft
7	8	12	92.54	-19.73	207.36	2	3	2.69	0.00							
8	8	13	87.46	-19.73	207.36	2	3	2.69	0.00							
9	9	13	-147.46	-19.73	207.36	2	3	2.69	0.00							
10	9	11	-152.54	-19.73	207.36	2	3	2.69	0.00							
11	10	11	-27.46	-19.73	207.36	2	3	2.69	0.00							
12	10	12	-32.54	-19.73	207.36	2	3	2.69	0.00							
13	8	4	90.00	-34.99	244.13	2	3	2.69	0.00							
14	9	4	-150.00	-34.99	244.13	2	3	2.69	0.00							
15	10	4	-30.00	-34.99	244.13	2	3	2.69	0.00							
16	8	15	92.54	-45.41	278.04	2	4	2.08	0.00							
17	8	16	87.46	-45.41	278.04	2	4	2.08	0.00							
18	9	16	-147.46	-45.41	278.03	2	4	2.08	0.00							
19	9	14	-152.54	-45.41	278.03	2	4	2.08	0.00							
20	10	14	-27.46	-45.41	278.03	2	4	2.08	0.00							
21	10	15	-32.54	-45.41	278.03	2	4	2.08	0.00							
22	8	6	90.00	-50.19	312.41	2	5	3.50	0.00							
23	9	6	-150.00	-50.20	312.41	2	5	3.50	0.00							
24	10	6	-30.00	-50.20	312.41	2	5	3.50	0.00							

MATERIAL PROPERTIES

MATL NO	DESIGNATION	YOUNG'S MODULUS	POISSON'S RATIO	THERMAL COEFF	MASS DENSITY	WEIGHT DENSITY
Units:		K /In ^2		F	Slug/Ft^3	Lb/Ft ^3
1	Steel	2.9e+004	0.295	6.5e-006	15.2	490
2	Cable	9e+004	0.151	6.5e-006	11.9	382

2 NODE PRISMATIC BEAM ELEMENT PROPERTIES

PROP	DESIGNATION	A	IXX	IYY	J	IXY	SFY	SFX	CW
Units:		In^2	In^4	In^4	In^4	In^4			In^6
1	PIROD 36 - 1.75 LEGS	7.22	1.56e+003	1.56e+003	3.13e+003	0	1.000	1.000	0
2	PIROD 36 - 1.5 LEGS	5.3	1.15e+003	1.15e+003	2.3e+003	0	1.000	1.000	0

2 NODE CABLE ELEMENT PROPERTIES

PROP	DESIGNATION	A	Diameter
Units:		In^2	In
3	CB1/2 EHS	0.196	0.500
4	CB7/16 EHS	0.15	0.438
5	CB9/16 EHS	0.249	0.563

2 NODE PRISMATIC BEAM ELEMENT LOAD INFORMATION

REC NO	LOAD TYPE	LOAD SYS	DIST SPEC		DIST	PX	PY	PZ	MX	MY	MZ
Units:					Ft	K	K	K	Ft-K	Ft-K	Ft-K
DESCRIPTION : Wind on 1											
LOAD CASES : 1											
ELEMENT LIST : 1											
1	LINR	GLO	FRAC	B	0.000	0.070	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.070	0.000	0.000	0.000	0.000	0.000
DESCRIPTION : Wind w/ice on 1											
LOAD CASES : 2											
ELEMENT LIST : 1											
2	LINR	GLO	FRAC	B	0.000	0.093	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.093	0.000	0.000	0.000	0.000	0.000
DESCRIPTION : 2' dish & RFC @ 60'											
LOAD CASES : 1											
ELEMENT LIST : 1											
DISTANCES : 60											
3	CONC	GLO	DIST			0.164	-0.050	0.000	0.000	0.000	0.000
DESCRIPTION : 2' dish & RFC @ 60' w/ice											
LOAD CASES : 2											
ELEMENT LIST : 1											
DISTANCES : 60											
4	CONC	GLO	DIST			0.145	0.000	0.000	0.000	0.000	0.000
DESCRIPTION : 2' dish & RFC @ 60' d.l. w/ice											
LOAD CASES : 3											
ELEMENT LIST : 1											
DISTANCES : 60											
5	CONC	GLO	DIST			0.000	-0.050	0.000	0.000	0.000	0.000
DESCRIPTION : Wind on 2											
LOAD CASES : 1											
ELEMENT LIST : 2											
6	LINR	GLO	FRAC	B	0.000	0.091	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.091	0.000	0.000	0.000	0.000	0.000
DESCRIPTION : Wind w/ice on 2											
LOAD CASES : 2											
ELEMENT LIST : 2											
7	LINR	GLO	FRAC	B	0.000	0.120	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.120	0.000	0.000	0.000	0.000	0.000

DESCRIPTION : FM @ 84'
LOAD CASES : 1
ELEMENT LIST : 2
ISTANCES : 14

8	CONC	GLO	DIST		0.148	-0.100	0.000	0.000	0.000	0.000

DESCRIPTION : FM @ 84' w/ice
LOAD CASES : 2
ELEMENT LIST : 2
DISTANCES : 14

9	CONC	GLO	DIST		0.165	0.000	0.000	0.000	0.000	0.000

DESCRIPTION : FM @ 84' d.l. w/ice
LOAD CASES : 3
ELEMENT LIST : 2
DISTANCES : 14

10	CONC	GLO	DIST		0.000	-0.130	0.000	0.000	0.000	0.000

DESCRIPTION : Wind on 3
LOAD CASES : 1
ELEMENT LIST : 3

11	LINR	GLO	FRAC	B	0.000	0.098	0.000	0.000	0.000	0.000
				E	1.000	0.098	0.000	0.000	0.000	0.000

DESCRIPTION : Wind w/ice on 3
LOAD CASES : 2
ELEMENT LIST : 3

12	LINR	GLO	FRAC	B	0.000	0.130	0.000	0.000	0.000	0.000
				E	1.000	0.130	0.000	0.000	0.000	0.000

DESCRIPTION : Whip @ 130'
LOAD CASES : 1
ELEMENT LIST : 3
DISTANCES : 30

13	CONC	GLO	DIST		0.080	-0.075	0.000	0.000	0.000	0.000

DESCRIPTION : 3-bay FM @ 121'
LOAD CASES : 1
ELEMENT LIST : 3
DISTANCES : 21

14	CONC	GLO	DIST		0.516	-0.300	0.000	0.000	0.000	0.000

DESCRIPTION : 3-bay FM @ 121' w/ice
LOAD CASES : 2
ELEMENT LIST : 3
DISTANCES : 21

15	CONC	GLO	DIST		0.595	0.000	0.000	0.000	0.000	0.000

DESCRIPTION : Whip @ 130' d.l. w/ice
LOAD CASES : 3
ELEMENT LIST : 3
DISTANCES : 30

16	CONC	GLO	DIST		0.000	-0.125	0.000	0.000	0.000	0.000

DESCRIPTION : 3-bay FM @ 121' d.l. w/ice
'OAD CASES : 3
.EMENT LIST : 3
DISTANCES : 21

17	CONC	GLO	DIST		0.000	-0.400	0.000	0.000	0.000	0.000

DESCRIPTION : Wind on 4
LOAD CASES : 1
ELEMENT LIST : 4

18	LINR	GLO	FRAC	B	0.000	0.107	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.107	0.000	0.000	0.000	0.000	0.000

DESCRIPTION : Wind w/ice on 4
LOAD CASES : 2
ELEMENT LIST : 4

19	LINR	GLO	FRAC	B	0.000	0.142	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.142	0.000	0.000	0.000	0.000	0.000

DESCRIPTION : Whip @ 178'
LOAD CASES : 1
ELEMENT LIST : 4
DISTANCES : 38

20	CONC	GLO	DIST		0.119	-0.075	0.000	0.000	0.000	0.000

DESCRIPTION : Whip @ 177'
LOAD CASES : 1
ELEMENT LIST : 4
DISTANCES : 37

21	CONC	GLO	DIST		0.189	-0.125	0.000	0.000	0.000	0.000

DESCRIPTION : Whip & Yagi @ 176'
LOAD CASES : 1
ELEMENT LIST : 4
DISTANCES : 36

22	CONC	GLO	DIST		0.097	-0.075	0.000	0.000	0.000	0.000

ESCRIPTION : Whip @ 167'
LOAD CASES : 1
ELEMENT LIST : 4
DISTANCES : 27

23	CONC	GLO	DIST		0.109	-0.100	0.000	0.000	0.000	0.000

DESCRIPTION : Whip @ 163'
LOAD CASES : 1
ELEMENT LIST : 4
DISTANCES : 23

24	CONC	GLO	DIST		0.043	-0.050	0.000	0.000	0.000	0.000

DESCRIPTION : Whip @ 159'
LOAD CASES : 1
ELEMENT LIST : 4
DISTANCES : 19

25	CONC	GLO	DIST		0.097	-0.075	0.000	0.000	0.000	0.000

DESCRIPTION : 2' dish @ 171'
LOAD CASES : 1
ELEMENT LIST : 4
DISTANCES : 31

26	CONC	GLO	DIST		0.183	-0.050	0.000	0.000	0.000	0.000

DESCRIPTION : Whip @ 178' w/ice
LOAD CASES : 2
ELEMENT LIST : 4
DISTANCES : 38

27	CONC	GLO	DIST		0.166	0.000	0.000	0.000	0.000	0.000

DESCRIPTION : Whip @ 177' w/ice
LOAD CASES : 2
ELEMENT LIST : 4
ISTANCES : 37

28	CONC	GLO	DIST	0.261	0.000	0.000	0.000	0.000	0.000

DESCRIPTION : Whip & Yagi @ 176' w/ice
LOAD CASES : 2
ELEMENT LIST : 4
DISTANCES : 36

29	CONC	GLO	DIST	0.152	0.000	0.000	0.000	0.000	0.000

DESCRIPTION : Whip @ 167' w/ice
LOAD CASES : 2
ELEMENT LIST : 4
DISTANCES : 27

30	CONC	GLO	DIST	0.206	0.000	0.000	0.000	0.000	0.000

DESCRIPTION : Whip @ 163' w/ice
LOAD CASES : 2
ELEMENT LIST : 4
DISTANCES : 23

31	CONC	GLO	DIST	0.079	0.000	0.000	0.000	0.000	0.000

DESCRIPTION : Whip @ 159' w/ice
LOAD CASES : 2
ELEMENT LIST : 4
DISTANCES : 19

32	CONC	GLO	DIST	0.134	0.000	0.000	0.000	0.000	0.000

DESCRIPTION : 2' dish @ 171' w/ice
LOAD CASES : 2
ELEMENT LIST : 4
DISTANCES : 31

33	CONC	GLO	DIST	0.196	0.000	0.000	0.000	0.000	0.000

DESCRIPTION : (12) panels @ 200' w/ice
LOAD CASES : 2
ELEMENT LIST : 4
DISTANCES : 2

34	CONC	GLO	DIST	3.751	0.000	0.000	0.000	0.000	0.000

DESCRIPTION : Whip @ 178' d.l. w/ice
LOAD CASES : 3
ELEMENT LIST : 4
DISTANCES : 38

35	CONC	GLO	DIST	0.000	-0.125	0.000	0.000	0.000	0.000

DESCRIPTION : Whip @ 177' d.l. w/ice
LOAD CASES : 3
ELEMENT LIST : 4
DISTANCES : 37

36	CONC	GLO	DIST	0.000	-0.200	0.000	0.000	0.000	0.000

DESCRIPTION : Whip & Yagi @ 176' d.l. w/ice
'OAD CASES : 3
.EMENT LIST : 4
DISTANCES : 36

37	CONC	GLO	DIST	0.000	-0.125	0.000	0.000	0.000	0.000

DESCRIPTION : Whip @ 167' d.l. w/ice
LOAD CASES : 3
ELEMENT LIST : 4
DISTANCES : 27

38	CONC	GLO	DIST		0.000	-0.175	0.000	0.000	0.000	0.000

DESCRIPTION : Whip @ 163' d.l. w/ice
LOAD CASES : 3
ELEMENT LIST : 4
DISTANCES : 23

39	CONC	GLO	DIST		0.000	-0.075	0.000	0.000	0.000	0.000

DESCRIPTION : Whip @ 159' d.l. w/ice
LOAD CASES : 3
ELEMENT LIST : 4
DISTANCES : 19

40	CONC	GLO	DIST		0.000	-0.125	0.000	0.000	0.000	0.000

DESCRIPTION : 2' dish @ 171' d.l. w/ice
LOAD CASES : 3
ELEMENT LIST : 4
DISTANCES : 31

41	CONC	GLO	DIST		0.000	-0.080	0.000	0.000	0.000	0.000

DESCRIPTION : Wind on 5
LOAD CASES : 1
ELEMENT LIST : 5

42	LINR	GLO	FRAC	B	0.000	0.062	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.062	0.000	0.000	0.000	0.000	0.000

ESCRIPTION : Wind w/ice on 5
LOAD CASES : 2
ELEMENT LIST : 5

43	LINR	GLO	FRAC	B	0.000	0.090	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.090	0.000	0.000	0.000	0.000	0.000

DESCRIPTION : (2) whips @ 222'
LOAD CASES : 1
ELEMENT LIST : 5
DISTANCES : 24

44	CONC	GLO	DIST		0.261	-0.150	0.000	0.000	0.000	0.000

DESCRIPTION : (11) whips on (3) candalabras @
LOAD CASES : 1
ELEMENT LIST : 5
DISTANCES : 20

45	CONC	GLO	DIST		0.768	-1.450	0.000	0.000	0.000	0.000

DESCRIPTION : (12) panels @ 200'
LOAD CASES : 1
ELEMENT LIST : 5
DISTANCES : 2

46	CONC	GLO	DIST		3.113	-1.860	0.000	0.000	0.000	0.000

DESCRIPTION : (2) whips @ 222' w/ice
LOAD CASES : 2
ELEMENT LIST : 5
ISTANCES : 24

47	CONC	GLO	DIST		0.375	0.000	0.000	0.000	0.000	0.000

DESCRIPTION : (11) whips @ 218' w/ice
LOAD CASES : 2
ELEMENT LIST : 5
DISTANCES : 20

48	CONC	GLO	DIST		1.208	0.000	0.000	0.000	0.000	0.000

DESCRIPTION : (12) panels @ 200' w/ice
LOAD CASES : 2
ELEMENT LIST : 5
DISTANCES : 2

49	CONC	GLO	DIST		3.751	0.000	0.000	0.000	0.000	0.000

DESCRIPTION : (2) whips @ 222' d.l. w/ice
LOAD CASES : 3
ELEMENT LIST : 5
DISTANCES : 24

50	CONC	GLO	DIST		0.000	-0.225	0.000	0.000	0.000	0.000

DESCRIPTION : (11) whips @ 218' d.l. w/ice
LOAD CASES : 3
ELEMENT LIST : 5
DISTANCES : 20

51	CONC	GLO	DIST		0.000	-2.000	0.000	0.000	0.000	0.000

DESCRIPTION : (12) panels @ 200' d.l. w/ice
LOAD CASES : 3
ELEMENT LIST : 5
DISTANCES : 2

52	CONC	GLO	DIST		0.000	-2.730	0.000	0.000	0.000	0.000

DESCRIPTION : Wind on 6
LOAD CASES : 1
ELEMENT LIST : 6

53	LINR	GLO	FRAC	B	0.000	0.049	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.049	0.000	0.000	0.000	0.000	0.000

DESCRIPTION : Wind w/ice on 6
LOAD CASES : 2
ELEMENT LIST : 6

54	LINR	GLO	FRAC	B	0.000	0.074	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.074	0.000	0.000	0.000	0.000	0.000

DESCRIPTION : (4) whips on (3) candalabras @
LOAD CASES : 1
ELEMENT LIST : 6
DISTANCES : 19

55	CONC	GLO	DIST		0.618	-1.100	0.000	0.000	0.000	0.000

DESCRIPTION : Amp box @ 256'
LOAD CASES : 1
ELEMENT LIST : 6
DISTANCES : 16

56	CONC	GLO	DIST		0.151	-0.050	0.000	0.000	0.000	0.000

DESCRIPTION : (4) whips @ 259' w/ice
LOAD CASES : 2
ELEMENT LIST : 6
DISTANCES : 19

57	CONC	GLO	DIST		1.110	0.000	0.000	0.000	0.000	0.000

DESCRIPTION : Amp box @ 256' w/ice
LOAD CASES : 2
ELEMENT LIST : 6
DISTANCES : 16

58	CONC	GLO	DIST	0.165	0.000	0.000	0.000	0.000	0.000

DESCRIPTION : (4) whips @ 259' d.l. w/ice
LOAD CASES : 3
ELEMENT LIST : 6
DISTANCES : 19

59	CONC	GLO	DIST	0.000	-1.600	0.000	0.000	0.000	0.000

DESCRIPTION : Amp box @ 256' d.l. w/ice
LOAD CASES : 3
ELEMENT LIST : 6
DISTANCES : 16

60	CONC	GLO	DIST	0.000	-0.075	0.000	0.000	0.000	0.000

2 NODE CABLE ELEMENT LOAD INFORMATION

REC NO	WIND PRESSURE	WIND ALPHA	ICE RADIAL THICK	ICE DENSITY
Units:	K /Ft ^2	Deg	In	Lb/Ft ^3

DESCRIPTION : Wind on 70' guys
LOAD CASES : 4
ELEMENT LIST : 7

61	0.018	90.000	0.000	0.000

DESCRIPTION : Wind on 70' guys
LOAD CASES : 4
ELEMENT LIST : 8

62	0.018	90.000	0.000	0.000

DESCRIPTION : Wind on 70' guys
LOAD CASES : 4
ELEMENT LIST : 9

63	0.018	90.000	0.000	0.000

DESCRIPTION : Wind on 70' guys
LOAD CASES : 4
ELEMENT LIST : 10

64	0.018	90.000	0.000	0.000

DESCRIPTION : Wind on 70' guys
LOAD CASES : 4
ELEMENT LIST : 11

65	0.018	90.000	0.000	0.000

DESCRIPTION : Wind on 70' guys
LOAD CASES : 4
ELEMENT LIST : 12

66	0.018	90.000	0.000	0.000

DESCRIPTION : Wind on 140' guys
LOAD CASES : 4
ELEMENT LIST : 13

67	0.022	90.000	0.000	0.000

DESCRIPTION : Wind on 140' guys
LOAD CASES : 4
ELEMENT LIST : 14

68	0.022	90.000	0.000	0.000

DESCRIPTION : Wind on 140' guys
LOAD CASES : 4
ELEMENT LIST : 15

69	0.022	90.000	0.000	0.000

DESCRIPTION : Wind on 198' guys
LOAD CASES : 4
ELEMENT LIST : 16

70	0.025	90.000	0.000	0.000

DESCRIPTION : Wind on 198' guys
LOAD CASES : 4
ELEMENT LIST : 17

71	0.025	90.000	0.000	0.000

DESCRIPTION : Wind on 198' guys
LOAD CASES : 4
ELEMENT LIST : 18

72	0.025	90.000	0.000	0.000

DESCRIPTION : Wind on 198' guys
LOAD CASES : 4
ELEMENT LIST : 19

73	0.025	90.000	0.000	0.000

DESCRIPTION : Wind on 198' guys
LOAD CASES : 4
ELEMENT LIST : 20

74	0.025	90.000	0.000	0.000

DESCRIPTION : Wind on 198' guys
LOAD CASES : 4
ELEMENT LIST : 21

75	0.025	90.000	0.000	0.000

DESCRIPTION : Wind on 240' guys
LOAD CASES : 4
ELEMENT LIST : 22

76	0.026	90.000	0.000	0.000

DESCRIPTION : Wind on 240' guys
LOAD CASES : 4
ELEMENT LIST : 23

77	0.026	90.000	0.000	0.000

DESCRIPTION : Wind on 240' guys
LOAD CASES : 4
ELEMENT LIST : 24

78	0.026	90.000	0.000	0.000

GRAVITY LOAD MULTIPLIERS

?C /O	PX	PY	PZ
DESCRIPTION : Self Weight LOAD CASES : 3 ELEMENT LIST : 1			
1	0.000	-5.600	0.000
DESCRIPTION : Self Weight LOAD CASES : 1 ELEMENT LIST : 1			
2	0.000	-2.900	0.000
DESCRIPTION : Self Weight LOAD CASES : 3 ELEMENT LIST : 2			
3	0.000	-5.600	0.000
DESCRIPTION : Self Weight LOAD CASES : 1 ELEMENT LIST : 2			
4	0.000	-2.800	0.000
DESCRIPTION : Self Weight LOAD CASES : 3 ELEMENT LIST : 3			
5	0.000	-6.900	0.000
DESCRIPTION : Self Weight LOAD CASES : 1 ELEMENT LIST : 3			
6	0.000	-3.300	0.000
DESCRIPTION : Self Weight LOAD CASES : 3 ELEMENT LIST : 4			
7	0.000	-6.300	0.000
DESCRIPTION : Self Weight LOAD CASES : 1 ELEMENT LIST : 4			
8	0.000	-3.100	0.000
DESCRIPTION : Self Weight LOAD CASES : 3 ELEMENT LIST : 5			
9	0.000	-3.600	0.000
DESCRIPTION : Self Weight LOAD CASES : 3 ELEMENT LIST : 5			
10	0.000	-3.000	0.000
ESCRIPTION : Self Weight LOAD CASES : 1 ELEMENT LIST : 5			
11	0.000	-2.100	0.000

DESCRIPTION : Self Weight
LOAD CASES : 3
ELEMENT LIST : 6

12	0.000	-3.000	0.000

DESCRIPTION : Self Weight
LOAD CASES : 1
ELEMENT LIST : 6

13	0.000	-2.000	0.000

DESCRIPTION : Self Weight
LOAD CASES : 4
ELEMENT LIST : 7

14	0.000	-1.000	0.000

DESCRIPTION : Self Weight
LOAD CASES : 4
ELEMENT LIST : 8

15	0.000	-1.000	0.000

DESCRIPTION : Self Weight
LOAD CASES : 4
ELEMENT LIST : 9

16	0.000	-1.000	0.000

DESCRIPTION : Self Weight
LOAD CASES : 4
ELEMENT LIST : 10

17	0.000	-1.000	0.000

DESCRIPTION : Self Weight
LOAD CASES : 4
ELEMENT LIST : 11

18	0.000	-1.000	0.000

DESCRIPTION : Self Weight
LOAD CASES : 4
ELEMENT LIST : 12

19	0.000	-1.000	0.000

DESCRIPTION : Self Weight
LOAD CASES : 4
ELEMENT LIST : 13

20	0.000	-1.000	0.000

DESCRIPTION : Self Weight
LOAD CASES : 4
ELEMENT LIST : 14

21	0.000	-1.000	0.000

DESCRIPTION : Self Weight
LOAD CASES : 4
ELEMENT LIST : 15

22	0.000	-1.000	0.000

DESCRIPTION : Self Weight
LOAD CASES : 4
ELEMENT LIST : 16

23	0.000	-1.000	0.000

DESCRIPTION : Self Weight
LOAD CASES : 4
ELEMENT LIST : 17

24	0.000	-1.000	0.000

DESCRIPTION : Self Weight
LOAD CASES : 4
ELEMENT LIST : 18

25	0.000	-1.000	0.000

DESCRIPTION : Self Weight
LOAD CASES : 4
ELEMENT LIST : 19

26	0.000	-1.000	0.000

DESCRIPTION : Self Weight
LOAD CASES : 4
ELEMENT LIST : 20

27	0.000	-1.000	0.000

DESCRIPTION : Self Weight
LOAD CASES : 4
ELEMENT LIST : 21

28	0.000	-1.000	0.000

DESCRIPTION : Self Weight
LOAD CASES : 4
ELEMENT LIST : 22

29	0.000	-1.000	0.000

DESCRIPTION : Self Weight
LOAD CASES : 4
ELEMENT LIST : 23

30	0.000	-1.000	0.000

DESCRIPTION : Self Weight
LOAD CASES : 4
ELEMENT LIST : 24

31	0.000	-1.000	0.000

SEC NO	ALPHA	BETA	GAMMA	NODAL LOADS PX	PY	PZ	MX	MY	MZ
DESCRIPTION : Torque arm @ 70'									
LOAD CASES : 1									
NODE LIST : 2									
1	0.00	0.00	0.00	0.594	-0.400	0.000	0.000	0.000	0.000
DESCRIPTION : Torque arm @ 70' w/ice									
LOAD CASES : 2									
NODE LIST : 2									
2	0.00	0.00	0.00	0.743	0.000	0.000	0.000	0.000	0.000
DESCRIPTION : Torque arm @ 70' d.l. w/ice									
LOAD CASES : 3									
NODE LIST : 2									
3	0.00	0.00	0.00	0.000	-0.600	0.000	0.000	0.000	0.000
DESCRIPTION : 2' dish & RFC @ 100'									
LOAD CASES : 1									
NODE LIST : 3									
4	0.00	0.00	0.00	0.189	-0.050	0.000	0.000	0.000	0.000
DESCRIPTION : 2' dish & RFC @ 100' w-ice									
LOAD CASES : 2									
NODE LIST : 3									
5	0.00	0.00	0.00	0.206	0.000	0.000	0.000	0.000	0.000
DESCRIPTION : 2' dish & RFC @ 100' d.l. w/ice									
LOAD CASES : 3									
NODE LIST : 3									
6	0.00	0.00	0.00	0.000	-0.050	0.000	0.000	0.000	0.000
DESCRIPTION : Whip @ 140'									
LOAD CASES : 1									
NODE LIST : 4									
7	0.00	0.00	0.00	0.133	-0.100	0.000	0.000	0.000	0.000
DESCRIPTION : Whip @ 140' w/ice									
LOAD CASES : 2									
NODE LIST : 4									
8	0.00	0.00	0.00	0.193	0.000	0.000	0.000	0.000	0.000
DESCRIPTION : Whip @ 140' d.l. w/ice									
LOAD CASES : 3									
NODE LIST : 4									
9	0.00	0.00	0.00	0.000	-0.175	0.000	0.000	0.000	0.000
DESCRIPTION : Torque arm @ 198'									
LOAD CASES : 1									
NODE LIST : 5									
10	0.00	0.00	0.00	0.800	-0.400	0.000	0.000	0.000	0.000
DESCRIPTION : Torque arm @ 198' w/ice									
LOAD CASES : 2									
NODE LIST : 5									
11	0.00	0.00	0.00	0.999	0.000	0.000	0.000	0.000	0.000

DESCRIPTION : Torque arm @ 198'
LOAD CASES : 3
NODE LIST : 5

12	0.00	0.00	0.00	0.000	-0.600	0.000	0.000	0.000	0.000

DESCRIPTION : Beacon at top
LOAD CASES : 1
NODE LIST : 7

13	0.00	0.00	0.00	0.065	-0.050	0.000	0.000	0.000	0.000

DESCRIPTION : Beacon w/ice @ top
LOAD CASES : 2
NODE LIST : 7

14	0.00	0.00	0.00	0.070	0.000	0.000	0.000	0.000	0.000

DESCRIPTION : Beacon @ top d.l. w/ice
LOAD CASES : 3
NODE LIST : 7

15	0.00	0.00	0.00	0.000	-0.075	0.000	0.000	0.000	0.000

S T R U C T U R E L O A D C O M B I N A T I O N S

COMB LIST OF FACTORS * CASES

DESCRIPTION : Comb1
1 1.000*1,1.000*4

DESCRIPTION : Comb2
2 0.750*2,1.000*3,1.000*4

P-D E L T A A N A L Y S I S R E S U L T S

N O D A L D I S P L A C E M E N T S

(* Indicates Displacements Occur in Nodal Local System)

NODE NO	LOAD COMB	DX	DY	DZ	OX	OY	OZ
Units:		In	In	In	Deg	Deg	Deg
1	1	0.0000	0.0000	0.0000	0.0021	0.0000	-0.1423
	2	0.0000	0.0000	0.0000	0.0000	0.0000	-0.1282
2	1	0.7306	-0.2798	0.0184	-0.0003	-0.0016	-0.0565
	2	0.7341	-0.3538	0.0001	0.0000	0.0000	-0.0845
3	1	1.5861	-0.3810	0.0134	-0.0011	-0.0014	-0.1454
	2	1.8429	-0.4814	0.0001	-0.0000	0.0000	-0.1941
4	1	2.3749	-0.5557	0.0029	-0.0010	-0.0011	-0.1409
	2	2.9928	-0.6963	0.0000	-0.0000	0.0000	-0.1624
5	1	3.1686	-0.7494	-0.0043	-0.0005	-0.0007	0.1488
	2	3.4398	-0.9263	0.0000	-0.0000	-0.0000	0.1749
6	1	2.3156	-0.8087	-0.0095	-0.0006	-0.0007	0.0436
	2	2.6879	-0.9957	0.0000	-0.0000	-0.0000	0.0050
7	1	2.2918	-0.8111	-0.0121	-0.0006	-0.0007	-0.0083
	2	2.8567	-0.9992	0.0000	-0.0000	-0.0000	-0.0572
8	1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9	1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10	1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
11	1	0.7306	-0.3981	0.0217	-0.0003	-0.0016	-0.0565
	2	0.7341	-0.5307	0.0001	0.0000	0.0000	-0.0845
12	1	0.7335	-0.2213	0.0167	-0.0003	-0.0016	-0.0565
	2	0.7341	-0.2653	0.0001	0.0000	0.0000	-0.0845
13	1	0.7277	-0.2201	0.0167	-0.0003	-0.0016	-0.0565
	2	0.7341	-0.2653	0.0001	0.0000	0.0000	-0.0845
14	1	3.1686	-0.4378	-0.0029	-0.0005	-0.0007	0.1488
	2	3.4398	-0.5600	0.0000	-0.0000	-0.0000	0.1749
15	1	3.1698	-0.9061	-0.0050	-0.0005	-0.0007	0.1488
	2	3.4398	-1.1094	0.0000	-0.0000	-0.0000	0.1749
16	1	3.1674	-0.9043	-0.0050	-0.0005	-0.0007	0.1488
	2	3.4398	-1.1094	0.0000	-0.0000	-0.0000	0.1749

2 NODE PRISMATIC BEAM ELEMENT -- ELEMENT REPORTS

SIGN CONVENTION : BEAM DESIGNERS

ELEM NO	LOAD COMB	NODE NO	AXIAL	TORSION	SHEAR X	MOMENT Y	MAX MOM/DEFL	DIST	SHEAR Y	MOMENT X	MAX MOM/DEFL	DIST
Units:			K	K -Ft	K	K -Ft	K -Ft / In	Ft	K	K -Ft	K -Ft / In	Ft
REPORT TYPE : Max Forces Full												
ELEMENT LIST : 1-6												
1	1	1	-72.1472	0.1696	-0.0067	0.0038			1.8128	-0.0018	23.4706	25.90
		2	-67.1143	0.1696	-0.0064	-0.4527	0.0055	40.48	-3.2556	-46.3996	-0.3342	29.08
	2	1	-92.9096	-0.0000	0.0000	-0.0000			1.7191	-0.0011	21.1844	24.65
		2	-83.2333	-0.0000	0.0000	0.0003			-3.2806	-51.9324	-0.2687	27.43
2	1	2	-59.3038	-0.0518	0.0152	-0.9234			3.8990	-60.2441		
		3	-57.1469	-0.0518	0.0152	-0.4674	0.0029	14.19	1.0159	13.3316	0.0689	10.08
	2	2	-75.3772	0.0000	0.0000	-0.0001			4.0082	-65.7581		
		3	-71.1285	0.0000	0.0000	0.0007			1.1713	11.8102	0.0840	10.59
3	1	3	-57.0976	-0.0520	0.0181	-0.4699			0.7850	13.3317	16.4754	8.01
		4	-54.3494	-0.0520	0.0179	0.2495	0.0014	13.00	-3.7356	-44.3627	-0.0714	12.72
	2	3	-71.0797	0.0000	-0.0000	0.0005			0.9680	11.8101	16.6155	9.93
		4	-65.5875	0.0000	-0.0000	-0.0003			-3.3914	-36.2078	-0.0903	14.37
4	1	4	-44.5499	-0.0522	-0.0007	0.2481			4.4423	-44.3627	42.1359	36.57
		5	-40.7653	-0.0522	-0.0008	0.2059	-0.0050	28.57	-2.6051	11.0988	-0.6439	32.56
	2	4	-54.4591	0.0000	-0.0000	0.0001			6.8912	-36.2085	42.8304	33.96
		5	-46.9706	0.0000	-0.0000	-0.0002			-2.9993	2.8086	-0.7037	31.09
5	1	5	-21.2663	0.0000	-0.0038	0.1569			4.8778	-29.5675	-0.4448	20.00
		6	-16.2042	0.0000	-0.0037	0.0004	-0.0009	17.73	-1.8596	-25.2550	0.0624	23.93
	2	5	-27.2593	-0.0000	0.0000	-0.0001			4.9146	-39.7232	-5.5699	20.00
		6	-17.2949	-0.0000	0.0000	0.0001			-1.9060	-29.9783	0.1265	19.85
6	1	6	-1.9215	-0.0000	-0.0000	0.0005			1.8138	-25.2550		
		7	-0.0500	-0.0000	-0.0000	0.0000			0.0650	-0.0000	0.0265	7.99
	2	6	-2.8306	-0.0000	0.0000	-0.0001			2.1207	-29.9784		
		7	-0.0750	-0.0000	0.0000	0.0001			0.0526	-0.0000	0.0319	8.02

2 NODE CABLE ELEMENT -- ELEMENT REPORTS

COORDINATE SYSTEM : GLOBAL

ELEM NO	LOAD COMB	NODE NO	FORCE X	FORCE Y	FORCE Z	TENSION
7	1	8	-5.9876	-2.0827	0.2646	6.3451
		12	5.9803	2.2107	-0.2671	6.3814
	2	8	-5.8789	-2.0437	0.2596	6.2294
		12	5.8716	2.1716	-0.2621	6.2658
8	1	8	-5.9079	-2.0542	-0.2607	6.2603
		13	5.9006	2.1821	0.2632	6.2967
	2	8	-5.8790	-2.0437	-0.2596	6.2295
		13	5.8716	2.1716	0.2621	6.2658
9	1	9	1.0261	-0.6840	1.7348	2.1284
		13	-1.1458	0.7643	-1.6701	2.1648
	2	9	0.9320	-0.6213	1.5873	1.9427
		13	-1.0517	0.7016	-1.5226	1.9791

10	1	9	0.9251	-0.7311	1.9431	2.2729
		11	-1.0616	0.8143	-1.8822	2.3092
	2	9	0.8428	-0.6670	1.7846	2.0832
		11	-0.9793	0.7502	-1.7236	2.1196
11	1	10	0.8406	-0.6654	-1.7803	2.0782
		11	-0.9771	0.7486	1.7193	2.1145
	2	10	0.8428	-0.6670	-1.7845	2.0832
		11	-0.9793	0.7502	1.7236	2.1196
12	1	10	0.9476	-0.6317	-1.6115	1.9733
		12	-1.0673	0.7120	1.5469	2.0097
	2	10	0.9320	-0.6212	-1.5872	1.9426
		12	-1.0517	0.7016	1.5225	1.9790
13	1	8	-10.2809	-7.0698	0.0001	12.4771
		4	10.2304	7.2689	-0.0001	12.5498
	2	8	-10.3459	-7.5105	0.0000	12.7846
		4	10.2954	7.7096	0.0000	12.8621
14	1	9	0.7396	-1.1449	1.4949	2.0230
		4	-0.9436	1.2143	-1.4238	2.0958
	2	9	0.6688	-1.0461	1.3727	1.8509
		4	-0.8729	1.1155	-1.3016	1.9237
15	1	10	0.7333	-1.1361	-1.4840	2.0077
		4	-0.9374	1.2055	1.4129	2.0804
	2	10	0.6688	-1.0461	-1.3727	1.8509
		4	-0.8729	1.1155	1.3016	1.9237
16	1	8	-6.1293	-6.0470	0.2670	8.6143
		15	6.0195	6.2658	-0.2718	8.6930
	2	8	-6.2519	-6.1700	0.2724	8.7880
		15	6.1421	6.3887	-0.2771	8.8667
17	1	8	-6.1236	-6.0412	-0.2667	8.6062
		16	6.0138	6.2600	0.2715	8.6849
	2	8	-6.2519	-6.1700	-0.2724	8.7880
		16	6.1421	6.3887	0.2771	8.8667
18	1	9	0.6472	-1.4325	1.2366	2.0000
		16	-0.8888	1.4675	-1.1737	2.0788
	2	9	0.6159	-1.3735	1.1876	1.9174
		16	-0.8575	1.4085	-1.1248	1.9961
19	1	9	0.6879	-1.7783	1.6040	2.4917
		14	-0.9456	1.8228	-1.5461	2.5704
	2	9	0.6598	-1.7167	1.5502	2.4053
		14	-0.9176	1.7612	-1.4923	2.4841
20	1	10	0.6877	-1.7779	-1.6036	2.4910
		14	-0.9454	1.8223	1.5457	2.5698
	2	10	0.6598	-1.7167	-1.5502	2.4053
		14	-0.9176	1.7612	1.4923	2.4841
21	1	10	0.6465	-1.4312	-1.2355	1.9982
		15	-0.8881	1.4662	1.1726	2.0769
	2	10	0.6159	-1.3735	-1.1876	1.9173
		15	-0.8575	1.4085	1.1248	1.9961

22	1	8	-6.7515	-7.7782	0.0000	10.2997
		6	6.5447	8.1571	-0.0000	10.4581
	2	8	-7.0370	-8.1185	0.0000	10.7438
		6	6.8303	8.4974	0.0000	10.9022
23	1	9	1.0605	-2.9640	2.2137	3.8484
		6	-1.4491	3.0640	-2.1369	4.0068
	2	9	1.0272	-2.8844	2.1563	3.7450
		6	-1.4159	2.9845	-2.0796	3.9034
24	1	10	1.0611	-2.9655	-2.2147	3.8504
		6	-1.4498	3.0656	2.1380	4.0088
	2	10	1.0272	-2.8844	-2.1563	3.7450
		6	-1.4159	2.9845	2.0796	3.9034

R E A C T I O N S

(* Indicates Reactions Occur in Nodal Local System)

NODE NO	LOAD COMB	PX	PY	PZ	MX	MY	MZ
Units:		K	K	K	K -Ft	K -Ft	K -Ft
1	1	-1.7501	72.1488	0.0020	0.0000	0.1696	0.0000
	2	-1.6379	92.9111	-0.0000	0.0000	-0.0000	0.0000
8	1	-41.1809	-31.0732	0.0042	0.0000	0.0000	0.0000
	2	-43.6446	-33.0562	0.0000	0.0000	0.0000	0.0000
9	1	5.0863	-8.7349	10.2271	0.0000	0.0000	0.0000
	2	4.7466	-8.3090	9.6386	0.0000	0.0000	0.0000
10	1	4.9168	-8.6077	-9.9296	0.0000	0.0000	0.0000
	2	4.7466	-8.3090	-9.6385	0.0000	0.0000	0.0000

All-Points Technology Corp., P.C.
150 Old Westside Road
North Conway, NH 03860
(603) 356-5214

Client: Marcus Communications
Job: Torrington, CT
Calculated By: R. Adair

Job No.: CT122160
Date: 21-Jan-02

Evaluation of Bracing Members

Center Welded/Bolted? Yes
Yield Strength (F_Y): 36 ksi C_C = 126.1

Section	Member	K Value	Length (ft.)	Area (in.^{2})	r_X (in.)	r_Z (in.)	kL/r_X	kL/r_Z	All. Tens. (k)	Fa (ksi)	All. Comp. (k)	Data Ref
1	5/8" Solid	0.65	3.69	0.307	0.156	0.156	138.0	92.0	6.63	7.84	2.40	4.00
2	5/8" Solid	0.65	3.69	0.307	0.156	0.156	138.0	92.0	6.63	7.84	2.40	4.00
3	9/16" Solid	0.65	3.69	0.249	0.141	0.141	153.4	102.2	5.37	6.35	1.58	3.00
4	9/16" Solid	0.65	3.69	0.249	0.141	0.141	153.4	102.2	5.37	6.35	1.58	3.00
5	9/16" Solid	0.65	3.69	0.249	0.141	0.141	153.4	102.2	5.37	6.35	1.58	3.00
6	9/16" Solid	0.65	3.69	0.249	0.141	0.141	153.4	102.2	5.37	6.35	1.58	3.00

Section	Brace Angle	X-brace?	All. Shear (k)	Act. Shear (k)	Str. Ratio
1	0.778	Yes	11.15	3.28	29%
2	0.778	Yes	11.15	4.01	36%
3	0.778	Yes	8.57	3.74	44%
4	0.778	Yes	8.57	6.89	80%
5	0.778	Yes	8.57	4.91	57%
6	0.778	Yes	8.57	2.12	25%

All-Points Technology Corp.
150 Old Westside Road
North Conway, NH 03860
(603) 356-5214

Client: **Marcus Communications**
Job: **Torrington, CT**
Calculated By: **R. Adair**

Job No.: **CT122160**
Date: **21-Jan-02**

Evaluation of Leg Members

Leg Capacity

Section	Size	Kl/r	Cc	Fa allow	133% Allow	Max (KSI)
1	1 3/4" Solid	64.00	106.94	22.02	29.36	21.18
2	1 3/4" Solid	64.00	106.94	22.02	29.36	20.98
3	1 1/2" Solid	74.67	106.94	20.05	26.73	21.30
4	1 1/2" Solid	74.67	106.94	20.05	26.73	19.60
5	1 1/2" Solid	74.67	106.94	20.05	26.73	13.80
6	1 1/2" Solid	74.67	106.94	20.05	26.73	7.06
top	0.00	#DIV/0!	106.94	#DIV/0!	#DIV/0!	#DIV/0!
0	0.00	#DIV/0!	106.94	#DIV/0!	#DIV/0!	#DIV/0!
#REF!	#REF!	#REF!	106.94	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	106.94	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	106.94	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	106.94	#REF!	#REF!	#REF!
0	0.00	#DIV/0!	106.94	#DIV/0!	#DIV/0!	#DIV/0!

Elev.	Max
0	**72%**
70	**71%**
100	**80%**
140	**73%**
198	**52%**
240	**26%**
260	**#DIV/0!**
260	**#DIV/0!**
260	**#REF!**
#REF!	**#REF!**
0	**#REF!**
0	**#REF!**
0	**#DIV/0!**

Evaluation of Tower Mast

Mast Capacity

Tower Capacity

Section	Fa allow	133% Allow	fa	133% Fb Allow.	fb	**Combined Stresses**	**Mast Capacity**
1	23.97	31.96	12.87	40.00	8.36	**0.63**	**63%**
2	23.97	31.96	10.45	40.00	10.60	**0.60**	**60%**
3	23.97	31.96	13.41	40.00	9.68	**0.68**	**68%**
4	25.45	33.93	10.28	40.00	9.68	**0.54**	**54%**
5	27.15	36.20	5.15	40.00	8.66	**0.35**	**35%**
6	27.34	36.45	0.53	40.00	6.54	**0.18**	**18%**
top	#DIV/0!	#DIV/0!	#DIV/0!	40.00	#DIV/0!	**#DIV/0!**	**#DIV/0!**
0	#DIV/0!	#DIV/0!	#DIV/0!	40.00	#DIV/0!	**#DIV/0!**	**#DIV/0!**
#REF!	#DIV/0!	#DIV/0!	#DIV/0!	40.00	#DIV/0!	**#DIV/0!**	**#DIV/0!**
#REF!	#DIV/0!	#DIV/0!	#DIV/0!	40.00	#DIV/0!	**#DIV/0!**	**#DIV/0!**
#REF!	#DIV/0!	#DIV/0!	#DIV/0!	40.00	#DIV/0!	**#DIV/0!**	**#DIV/0!**
#REF!	#DIV/0!	#DIV/0!	#DIV/0!	40.00	#DIV/0!	**#DIV/0!**	**#DIV/0!**
0	#DIV/0!	#DIV/0!	#DIV/0!	40.00	#DIV/0!	**#DIV/0!**	**#DIV/0!**

Tower Capacity
72%
71%
80%
73%
52%
26%
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!
#DIV/0!

Power Density Calculation

CT-907 Torrington
1210 Highland Avenue
Torrington, CT

Proposed Marcus Communications LLC: Dish antenna at 60' and 100' Centerline

Transmitter	Frequency	CT Standard (mW/cm^2)	Number of Channels	ERP/channel (mW)	Centerline of transmitter (cm)	Power density calculated at tower base
Proposed Microwave Dish 1	5.8GHz	1.00	1	100	1829	0.000068
Proposed Microwave Dish 2	5.8GHz	1.00	1	100	3048	0.000024
Percentage of CT and Federal Standard						0.0068%

$S = (P*G)/(4*pi*R^2)$

	Dish 1 Input Units		Dish 2 Input Units	
P	100.00	mW	100.00	mW
G	28.50	dBi	28.50	dBi
R	1829.00	cm	3048.00	cm
S =	0.000068	mW/cm^2	0.000024	mW/cm^2
Max Exposure Allowed =	1.00	mW/cm^2	1.00	mW/cm^2
Percentage of Total	0.0068%		0.0024%	